



January 27, 2016

Project No: 151-13571-00

Ms. Tracey Braun, M.Sc.

Director, Environmental Approvals

MANITOBA CONSERVATION AND WATER STEWARDSHIP

160-123 Main Street

Winnipeg, MB R3C 1A5

Dear Ms. Braun:

**RE: ENVIRONMENT ACT PROPOSAL – MAXWELL COLONY FARMS
WASTEWATER TREATMENT LAGOON**

Maxwell Colony has an existing two-cell wastewater treatment lagoon operating without an Environment Act Licence and has been requested by Conservation and Water Stewardship to submit an Environment Act Proposal for its continued operation. The existing facility is within the Colony yard and its location and size essentially exclude it from qualifying under the Act. Therefore, the Colony proposes to construct a new lagoon in an alternate location and decommission the existing facility.

The enclosed Environment Act Proposal report (4 copies, 1 CD) provides the details and information of the proposed development. It is accompanied by the signed application form, an application for Wastewater Treatment Facility Classification and a cheque in the amount of \$7,500.00. We request the opportunity to review the draft Licence when it is issued. Please contact the undersigned if further information is required.

Kind regards,

WSP Canada Inc.

A handwritten signature in blue ink, appearing to read "J. Bunn", is written over the printed name.


Jason Bunn, P.Eng.

Environmental Engineer

enclosure

Environment Act Proposal Form



Name of the development: Maxwell Colony Farms Wastewater Treatment Lagoon	
Type of development per Classes of Development Regulation (Manitoba Regulation 164/88): Class 2 - Wastewater Treatment Lagoon	
Legal name of the applicant: Maxwell Hutterian Mutual Corporation	
Mailing address of the applicant: 10450 Assiniboine Road	
Contact Person: Peter Wipf	
City: Cartier	Province: MB Postal Code: R4K 1B8
Phone Number: 204 864-2975	Fax: 204 864-2976 email:
Location of the development: RL 108, Parish of St. Francois Xavier, RM of Cartier	
Contact Person: Peter Wipf	
Street Address: 10450 Assiniboine Road	
Legal Description: RL 108, Parish of St. Francois Xavier	
City/Town: Cartier	Province: MB Postal Code: R4K 1B8
Phone Number: 204 864-2975	Fax: 204 864-2976 email:
Name of proponent contact person for purposes of the environmental assessment: Jason Bunn, P. Eng	
Phone: 204 477-6650	Mailing address: WSP Canada Inc.
Fax: 204 474-2864	1600 Buffalo Place, Wpg MB R3T 6B8
Email address: jason.bunn@wspgroup.com	
Webpage address: www.wspgroup.com	
Date: January 20, 2016	Signature of proponent, or corporate principal of corporate proponent: 
	Printed name:

A complete **Environment Act Proposal (EAP)** consists of the following components:

- **Cover letter**
- **Environment Act Proposal Form**
- **Reports/plans supporting the EAP** (see "Information Bulletin - Environment Act Proposal Report Guidelines" for required information and number of copies)
- **Application fee** (Cheque, payable to Minister of Finance, for the appropriate fee)

Per Environment Act Fees Regulation (Manitoba Regulation 168/96):	
Class 1 Developments	\$1,000
Class 2 Developments	\$7,500
Class 3 Developments:	
Transportation and Transmission Lines ..	\$10,000
Water Developments	\$60,000
Energy and Mining.....	\$120,000

Submit the complete EAP to:

Director
Environmental Approvals Branch
Manitoba Conservation and Water Stewardship
Suite 160, 123 Main Street
Winnipeg, Manitoba R3C 1A5

For more information:

Phone: (204) 945-8321

Fax: (204) 945-5229

<http://www.gov.mb.ca/conservation/eal>

**ENVIRONMENT ACT PROPOSAL
MAXWELL COLONY FARMS
WASTEWATER TREATMENT LAGOON**

**Prepared for:
Maxwell Colony**

Project No: 151-13571-00

January 2016



**WSP Canada Inc.
1600 Buffalo Place
Winnipeg, MB R3T 6B8
www.wspgroup.com**

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0.0 EXECUTIVE SUMMARY

Maxwell Colony has been asked by Conservation and Water Stewardship of Manitoba to apply for an Environment Act Licence for their wastewater treatment lagoon. The existing lagoon is within the Colony yard and is not in compliance with The Environment Act. The location and size essentially excludes it from qualifying for approval under the Act.

The Colony has engaged the services of WSP Canada Inc. to prepare an Environment Act Proposal (EAP) for the design and construction of a new wastewater treatment lagoon at a location that is appropriately separated from the Colony's residential area and that is developed to serve the future growth of the Colony population. The proposed location is south of the Colony farm site and adjacent to the existing earthen manure storage pond. The two cell lagoon is proposed to be built into the insitu high plasticity clay. Discharge is proposed to be into the existing Barrickman natural drain, which eventually empties into the Assiniboine River, a linear flow distance of approximately six (6) kilometres from the lagoon.

Major design appurtenances include installation of a forcemain, perimeter fence, valves, piping and lagoon signage.

It is anticipated that construction will begin in the year of the issuance of the Environment Act Licence, or the year following, depending on the time of year it is issued. Until the new wastewater treatment lagoon is built, tested and approved for use, the existing lagoon within the Colony will continue to be used and operated as it currently is with periodic testing for fecal and total coliform and BOD₅ and pumped discharge into the isolated oxbow channel to the west of the Maxwell Colony.

1.0 DEVELOPMENT INFORMATION

Maxwell Colony Farms Wastewater Treatment Lagoon

Name of development

Maxwell Hutterian Mutual Corporation

Legal name of the proponent of the development

River Lot 108, Parish of St. Francois Xavier, RM of Cartier

Location of development

Contact Person for Proponent:

Mr. Peter Wipf, Manager

Maxwell Colony
10450 Assiniboine Road
Cartier, Manitoba
R4K 1C3

Contact Person for Environmental Assessment:

Mr. Jason Bunn, P. Eng.

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba R3T 6B8

Proposal Contents:

Section of Environmental Act Proposal Form		Section Number in Report
DESCRIPTION OF DEVELOPMENT:		
(i)	Legal description and map of development	2.3
(ii)	Mineral rights	2.3
(iii)	Existing land use	2.3.3
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SCHEDULE:		7.0
FUNDING:		8.0

1.1 CANADIAN ENVIRONMENTAL ASSESSMENT INFORMATION

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6.	Public Involvement	5.9, 5.10
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9.	Personal Communication	Appendix E
10.	Attachments	Appendix A, B, C, D, E

2.0 INTRODUCTION AND BACKGROUND

2.1 MAXWELL COLONY

Maxwell Colony was established in 1918 by members of the Maxwell Colony from South Dakota. It was part of a larger group of Hutterite people that migrated from the Dakotas in that year and established an initial total of six colonies in this region. The Colony farmsite is located on the south bank of the Assiniboine River, in River Lots 102 to 105, Parish of St. Francois Xavier in the R.M. of Cartier.

The main business of the Colony is agriculture, primarily field crops and livestock production. In recent years they have added trucking and manufacturing of countertops to their economy. And in 2016, they are expected to open their new soybean crushing plant. The latter provides additional employment for the members of the Colony as well as a value-added dimension to the cropland production of soybeans.

The residential housing area of the Colony is located adjacent to the south bank of the Assiniboine River in the northeast quadrant of the yard. The houses are serviced by a sewage collection system that discharges to a lift station at the southwest corner of the residential area. A duplex pump system in the lift station pumps the wastewater to an existing two-cell treatment lagoon located within the yard site between the livestock barns and the residences.

2.2 EXISTING WASTEWATER TREATMENT LAGOON

The Colony wastewater treatment system is believed to have been developed as an initiative of Manitoba Agriculture with their Agri-Water assistance program. This program provided technical as well as financial assistance to farm producers, including Hutterite Colonies, in the development of water systems and wastewater treatment. The development of this system preceded the need to obtain an Environment Act Licence for a treatment lagoon. The Colony has, nevertheless, in recent years undertaken the testing of the contents of the lagoon for BOD₅ and for total and fecal coliform prior to discharge. Discharge from the secondary cell has then been to the oxbow channel west of the Colony site. This oxbow is an abandoned channel of the Assiniboine River that is completely isolated from the river and has no drainage

outlet. In years of extreme flooding of the river, the water has overflowed the divide between the river channel and the oxbow.

In May 2015, Manitoba Conservation and Water Stewardship (CWS) issued a letter (Appendix A) to Maxwell Colony indicating the requirement for the Colony to apply for an Environment Act Licence (EAL) for their wastewater lagoon. In consultation with their engineer, it was apparent that, while the existing facility was still in good repair and functional, it would not meet the current requirements for design size nor spatial separation from residential housing (the nearest home is about 75 metres from the edge of the lagoon). Also, the process of obtaining an EAL warranted the development of a facility at an alternate location that would serve the Colony well into the future. The Colony subsequently engaged WSP Canada Inc. to assist with the engineering of the proposed new facility and the application for Environment Act licencing. Further correspondence saw the deadline for submission extended to February 3, 2016. See Appendix A for CWS related correspondence.

2.3 PROJECT OWNERSHIP AND LOCATION

2.3.1 Land Ownership and Mineral Rights

The lagoon development area land and the project are owned by the Maxwell Colony Farms. The Status of Title for the proposed development area is included in Appendix B.

The rights to the mines & minerals and sand & gravel in River Lot 108, Parish of St. Francois Xavier go with the ownership of the land and are held by the Colony as has been confirmed by communication with Crown Lands & Property Branch (Appendix E) and a review of the Status of Title (Appendix B). Representatives of the Colony have confirmed same.

2.3.2 Proposed Wastewater Treatment Lagoon Location

The proposed wastewater treatment lagoon is to be located to the southwest of the Maxwell Colony farm site, across Provincial Road 424 (R.M. of Cartier) in River Lot 108, Parish of St. Francois Xavier, as shown in Figure 2.1. UTM co-ordinates for the site are 596200 m E, 5533150 m N.

2.3.3 Description Of Existing Land Use

The land intended for lagoon development is currently agricultural land. Land directly to the west of the proposed site supports an existing earthen manure storage (EMS) pond owned by the Colony.

This development area is designated as “RG”, Rural General Policy Area” and zoned “AG”, Agriculture General. Map 1 regarding the Development Plan By-Law No. 1-2008 for the White Horse Plains Planning District is included in Appendix E as is Map 1 regarding Zoning By-Law No. 1620-11 for the R.M. of Cartier.

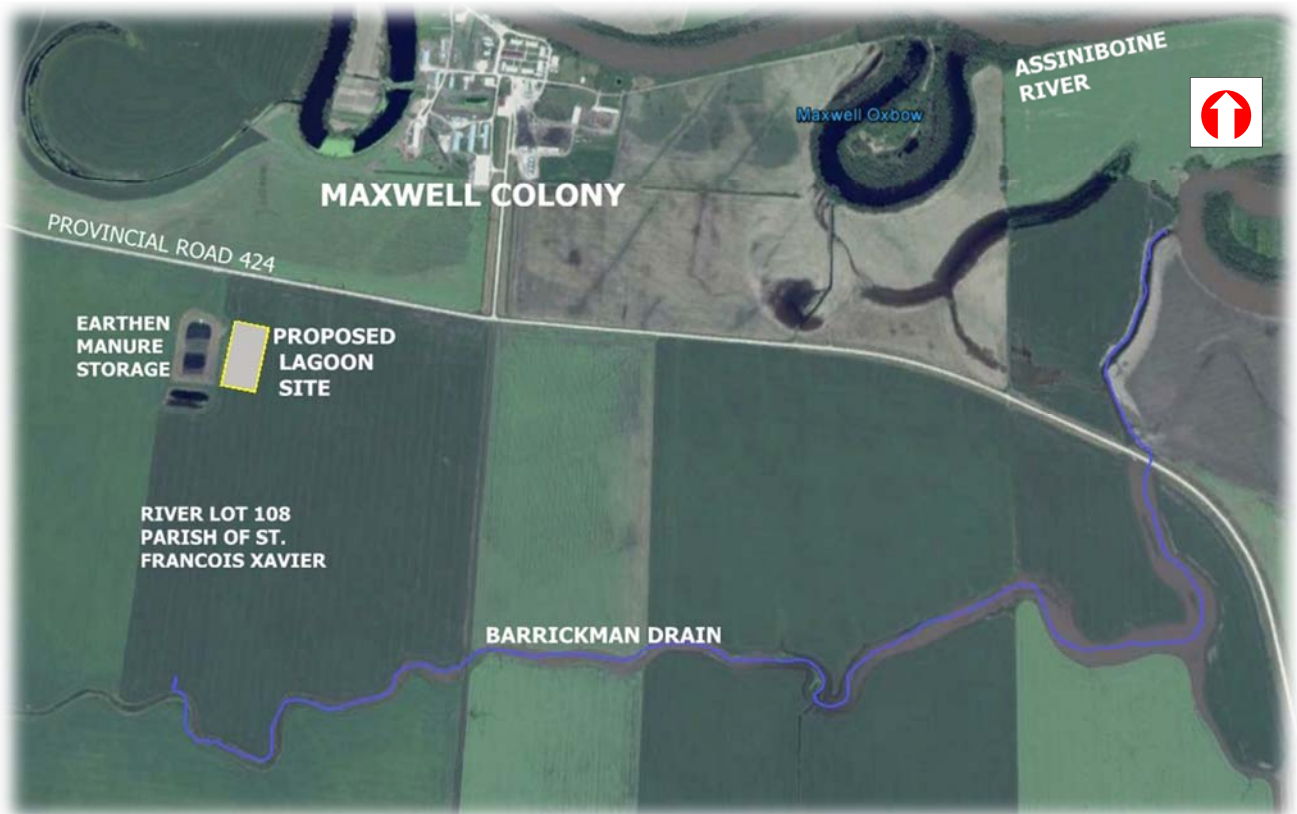


Figure 2.1: Maxwell Colony and Proposed Wastewater Lagoon Location Plan

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

It is proposed to develop a two-cell, earthen wastewater treatment lagoon at the site shown in Figure 2.1. The lagoon is to serve the wastewater treatment needs of Maxwell Colony into the future and will replace the existing lagoon located within the farmyard of the Colony. The new lagoon is proposed to have sufficient capacity to store the treated wastewater so that at design capacity, discharge may be limited to a single event in any year. It is proposed that discharge will be to the Barrickman Drain within River Lot 108, with eventual outlet to the Assiniboine River.

3.1 PREVIOUS STUDIES

Geotechnical Report for the Earthen Manure Storage Pond in River Lot 108

In 1998, Maxwell Colony built an earthen manure storage pond in River Lot 108, immediately adjacent to the location of the proposed wastewater treatment lagoon. The earthen manure pond was approved under Permit #LM-0028 by Manitoba Conservation. In support of the application for the permit, Cochrane Engineering Ltd. (currently WSP Canada) undertook a detailed geotechnical investigation.

The investigation included a site visit on December 2, 1997, excavating two testholes to a depth of 6.1 metres, sample collection and laboratory analysis. The report concluded that based on soil conditions, the pond cells should be built of the insitu, high plasticity, CH clay material. This is further described in Section 4.4 of this report.

3.2 POPULATION SERVICED AND DESIGN LOADING

Historically, with agricultural land being more readily available and Colonies being more focussed on cereal grains and livestock production for their economic development, the individual Colonies would acquire more land as they grew in population, and would typically divide when their number would reach about 120 people. That has changed in recent years as Colonies have expanded their operations to include manufacturing, both as value added industries to agricultural production and in the manufacture of a variety of consumer products. This has enabled the Colonies to sustain a greater population without the need to acquire more land or expand their livestock operations. In consultation with the Maxwell Colony we have based the design wastewater loading to the proposed lagoon on a population number of 220 people.

3.2.1 Sources Of Wastewater

The proposed lagoon will service the wastewater treatment needs of the Maxwell Colony. The current Colony population is approximately 110 people.

The Maxwell Colony has a meat processing facility that is typical of many colonies and is used for food processing for the use of their own residents. The Colony has offered a small amount of farm gate products for sale from this facility in the past. It would now be required to register the facility with Manitoba Agriculture, Food and Rural Development (MAFRD) and, subject to inspection, meet the requirements of Manitoba Regulation MR 339/88R *Food and Food Handling Establishments*. The Colony has not so registered their facility and has no plans to do so in the foreseeable future. No waste products from the process, other than wash water, are directed to the Colony sewer system. The estimates of water flow provided herein include the water that is used in the facility. As is indicated elsewhere in this EAP, the organic capacity in the proposed wastewater treatment lagoon is conservatively designed and will readily accommodate any organic loading that will be contributed by this plant.

3.2.2 Organic Loading

Organic loading refers to the quantity of organic material present in the incoming wastewater and is measured as the five day Biochemical Oxygen Demand (BOD₅). The organic loading becomes the total mass of BOD₅ in kg/d in the wastewater discharged to a lagoon.

On the basis of accepted practice, the daily BOD₅ production for domestic wastewater is 0.077 kg per person. The estimated organic loading to the proposed Maxwell Colony lagoon based on a design population of 220 people is (220 people x 0.077 kg-BOD₅/d) **16.94 kg-BOD₅/d**.

3.3 HYDRAULIC LOADING

Hydraulic loading refers to the volume of wastewater directed to the lagoon. In many typical cases, lagoons are designed for a 227-day storage period beginning November 1st and ending June 15th of the following year. Hydraulic loading over the 227-day storage period is used to calculate the volume of storage required in the lagoon facility. Discharge then typically takes place in June and again in October. In this case, the Colony is proposing to undertake a once

per year discharge. It will require a larger storage volume in the lagoon but reduces the work of arranging the discharge, provides more flexibility as to the timing and potentially prolongs the need for an expansion by providing the possibility of more than a single discharge within the anticipated discharge window of time from June 15th to October 31st in any year.

The water consumption as measured at the Colony's water supply plant indicates that a flow of up to 300 litres per capita per day (Lpcd) is produced, though not all of the water is used for domestic purposes. So it does not all end up as wastewater to be treated. Our estimates of wastewater flow that is typical for Hutterite Colonies ranges from 250 litres to 275 Lpcd.

A long-term domestic water consumption of 275 Lpcd has been estimated for the Maxwell Colony. This consumption is based on average consumption quantities obtained from other established colonies and is also supported by records at Maxwell Colony after deducting a portion of the metered water that is used on the Colony for non-domestic purposes. Conservatively, water consumption is assumed to equal wastewater generation and therefore 275 Lpcd is chosen as the design wastewater generation for the Colony. Infiltration into the existing sewer system is considered to be negligible since much of the wastewater flow is into holding tank pumping stations with pressure lines to the central lift station.

With the eventual design population of 220 people, the required active storage capacity for the proposed new lagoon is 22,082,500 Litres (275 Lpcd x 220 people x 365 days) or **22,083 m³** for a period of 365 days.

4.0 PROPOSED DEVELOPMENT

The proposed development consists of the construction of a new two-cell lagoon to serve the domestic wastewater treatment requirements of the Maxwell Colony. The new facility will provide treatment for the organic and hydraulic loading as indicated in Section 3.0.

4.1 NEW PRIMARY CELL

The new primary cell will be constructed as illustrated in the design drawings (Appendix D). It is proposed that the primary cell will be built into the insitu, high-plasticity clay as indicated in the Geotechnical Investigation and Soils Report (Section 4.4). The cell will be constructed with 4:1 interior and exterior side slopes. It will be operated at a maximum operating depth of 1.5 metres with 1.0 metre of freeboard. The maximum elevation of the operating depth of 1.5 metres will be about 0.3 metres above the maximum operating elevation of the secondary cell so as to allow for inflow during the time the secondary cell is isolated from the primary cell in preparation for discharge and during the discharge period.

The primary cell is sized, as a minimum, to meet the CWS guideline that requires at least one hectare (ha) of liquid surface area per 56 kg-BOD₅ of daily organic loading. In the current design, the size of the primary cell of the Maxwell Colony lagoon is determined on the basis of a maximum BOD₅ loading of 36 kg-BOD₅/ha per day. The conservative loading is chosen, in part to mitigate potential odours during spring break-up but also to optimize construction of a relatively small primary cell and to allow for potential population growth that could exceed the projected population of 220 people.

For a design population of 220 people contributing a total of 16.94 kg-BOD₅/day, the required minimum primary cell liquid surface at 56 kg-BOD₅/ha/d is 0.30 ha. At the selected loading rate of 36 kg-BOD₅/ha/d, and the contributing population, the primary cell surface area at a full-level liquid depth will be 0.47 ha.

Manitoba Conservation and Water Stewardship guidelines stipulate that only one-half of the total volume of the primary cell may contribute to the total storage volume of the lagoon. At an operating depth of 1.5 metres, the primary cell has a total volume of 5,672 m³ and an available storage volume of 2,836 m³.

Table 4.1 provides the details for the proposed design specifications for the new primary cell.

TABLE 4:1: NEW PRIMARY CELL SPECIFICATIONS

Parameter	New Primary Cell
Cell bottom	116 m (wide) x 25 m (long)
Liquid surface (at full design depth)	128 m x 37 m
Top of dyke (inside to inside)	136 m x 45 m
Operating depth	1.5 m
Freeboard height	1.0 m
Interior side slope	4:1
Exterior side slope	4:1
Total volume (at operating depth)	5,672 m ³
Storage volume	2,836 m ³
Surface area (at operating depth)	0.47 ha
Liner system	Insitu Clay Soil

4.2 NEW SECONDARY CELL

The new secondary cell will be constructed as illustrated in the design drawings (Appendix D). It is proposed that the secondary cell will also be built into the insitu, high-plasticity clay as indicated in the Geotechnical Investigation and Soils Report, Section 4.4. The cell will be constructed with 4:1 interior and exterior side slopes. Since the new lagoon is proposed to be built adjacent to the existing EMS pond, the top of the dyke of both the primary and secondary cells will abut against the existing east dyke of EMS so there will be no exterior slope of the dykes in this section. The secondary cell will be operated at a maximum operating depth of 1.5 metres with 1.0 metres of freeboard. The maximum elevation of the operating depth of 1.5 metres will be about 0.3 metres below the maximum operating elevation of the primary cell since there needs to be operating capacity in the latter while the secondary cell is being readied for discharge and during the discharge period itself.

The new secondary cell is designed to provide the balance of the wastewater storage. The volume of the cell below the invert of the discharge pipe is not included in the storage

calculation and is shown in Table 4.2 as “Dead storage volume”. The new cell contributes a storage volume of 19,554 m³ resulting in a total lagoon storage of 22,390 m³.

Table 4.2 provides details for the proposed design specifications for the new secondary cell.

TABLE 4.2: NEW SECONDARY CELL SPECIFICATIONS

Parameter	New Secondary Cell
Cell bottom	116 m (wide) x 125 m (long)
Liquid surface (at full design depth)	128 m x 137 m
Top of dyke (inside to inside)	136 m x 145 m
Operating depth	1.5 m
Freeboard height	1.0 m
Interior side slope	4:1
Exterior side slope	4:1
Total volume (at operating depth)	23,990 m ³
Dead storage depth	0.3 m
Dead storage volume (at 0.3 m depth)	4,436 m ³
Storage volume (at operating depth)	19,554 m ³
Liner system	Insitu Clay Soil

4.3 LOCAL TOPOGRAPHY

The topography at the site is very flat. The relief within a 1000 m radius in the field around the proposed lagoon site is not expected to vary by as much as one metre. The surrounding area is part of the Central Lowlands Area formed by glacial Lake Agassiz.

4.4 GEOTECHNICAL INVESTIGATION AND SOILS REPORT

As indicated in Section 3.1 of this report, in December of 1997, Cochrane Engineering (currently WSP) undertook a geotechnical investigation at this site in support of the design of an EMS which was constructed in 1998. The investigation included the excavating of two testholes to a depth of 6.1 metres, sample collection and laboratory analysis. It was found that the soil at the site consisted of firm, moist, high-plasticity grey to brown CH clay, all the

way from the surface organic soil to the bottom of both test pits. There was no water in the pits on completion of the tests.

Three samples were submitted to the laboratory for determination of the Atterberg limits. They confirmed the high-plasticity CH clay with a liquid limit between 55% and 71% and a plasticity index of between 22% and 26%. Based on laboratory analysis of similar clay soils, the hydraulic conductivity value was estimated to be 1×10^{-8} cm/s or lower. Test Hole logs TH 101 and TH 102, prepared at the time of the geotechnical investigation are included in Appendix C of this report along with a laboratory report showing the Atterberg limits of the soil. The logs incorrectly indicate that the site is in RL 105, Parish of St. Francois Xavier since that is the location of the Maxwell Colony farmsite. Current mapping shows that the actual EMS site as well as the proposed wastewater lagoon site are in RL 108, which is also the correct location of the testholes. The results of the soil tests show that the soil is consistent from one test hole to another. Since this is the ancient lakebed of Glacial Lake Agassiz, there is every reason to believe that they will also be consistent with the conditions at the adjacent site. The proposed wastewater lagoon will be built into the same high-plasticity CH clay which has not been disturbed in any way except for surface tillage for planting of successive crops over the years.

In 2012, Maxwell Colony undertook some maintenance of the EMS, cleaning out the accumulated sludge and repairing the inlet structure. This involved a cut of the dyke. The subsequent backfill of the cut was made with excavated soil from a borrow pit on the south side of the EMS. The soil was tested for maximum dry density and optimum moisture, which were $1,349 \text{ kg/m}^3$ and 29.8% respectively, which are typical of CH clay. Compaction tests of the soil in place showed that they met the specification for Standard Proctor Density. These test results are also included in Appendix C.

4.5 GROUNDWATER

Groundwater in the area, based on the drilling records for Maxwell Colony is found within the historic channel area of the Assiniboine River. Typically, the lacustrine clay deposit is six to seven metres in thickness, overlying another 10 metres of clay till. Additionally, the proposed lagoon site is outside the influence of the river channels and, as previously indicated, is in the

central lowlands of the Glacial Lake Agassiz basin. The known depth of the CH clay at the site is more than six metres. The proposed development of the wastewater lagoon is therefore no threat to groundwater.

4.6 CONSTRUCTION DETAILS

The proposed new lagoon will be constructed as detailed in the attached drawings and in accordance with the Manitoba Conservation and Water Stewardship Information Bulletin – *Design Objectives For Wastewater Treatment Lagoons (September 2014)*.

According to the surface profiles in the geotechnical investigation of the site, the topsoil in the proposed development area was observed to be about 300 mm. Typically, the lower portion of the apparent topsoil has a high proportion of inorganic clay. Re-usable organic topsoil from the proposed lagoon area will be stripped to a depth of 150 mm, stockpiled and re-applied at the end of the construction on the non-wetted areas of the dykes. The topsoil is to be stockpiled at a location and in such a way as not to be unduly susceptible to wind and water erosion during the construction period.

For lagoon construction, CWS requires that the proposed dykes and bottom of the proposed cells be provided with a layer consisting of at least one metre in thickness of soil having a permeability of less than 1×10^{-7} cm/s or equivalent. For this project, it is proposed that the excavated material from the construction of the lagoon cells will be used as embankment material for the construction of the dykes surrounding the cells. The insitu clay material, which is comparable to that used for the construction and maintenance of the adjacent earthen manure storage pond, has been tested to show that it is suitable to achieve the required permeability limit. In the unlikely event that any unsuitable material such as silty or sandy soil is encountered in the excavation, it will be excluded from use from the centre core to the inside face of the embankments. The inside surface of the excavated cells shall be scarified to a minimum depth of 150 mm and re-compacted. Construction of the embankment shall be in lifts not exceeding 150 mm and compacted with a pad foot roller to a minimum of 95% Standard Proctor density at minus one percent to plus three percent of optimum moisture content.

The interior and exterior side slopes of the constructed cells will be 4:1. The proposed cells will have a 1.5 metre operating depth with a minimum 1.0 metre freeboard. The top of the dykes will be 3.0 m wide to permit vehicle access to all points of the lagoon.

Rip rap is proposed for the inlet and outlet areas of the inter-cell and discharge piping. All inter-cell and discharge piping and valves will be located as shown on the design drawings.

A lockable access gate is to be installed as part of the construction activities. The gate is to be located across the lagoon access road and will connect with the perimeter fence. Signage identifying the nature of the facility will be placed alongside the access road at the entrance to the lagoon.

4.7 FORCEMAIN

The development of the proposed new lagoon will require the construction of a new forcemain to deliver the wastewater from the existing lift station in the residential area to the new lagoon. At this time, the size and routing of the forcemain is not finalized. At such time as an Environment Act Licence is issued for the proposed lagoon and its location is confirmed, the design of the forcemain will be completed and submitted to Manitoba Conservation and Water Stewardship for approval in accordance with Sections 6 and 7 of the *Water Works, Sewerage and Sewage Disposal Regulation MR 331/88R*.

4.8 DECOMMISSIONING OF THE EXISTING LAGOON

During the process of applying for the Environment Act Licence for the proposed new wastewater treatment lagoon and the construction and commissioning of the new facility, it is proposed that the existing wastewater lagoon that has served the Colony to the present, will continue to be operated as it has in the recent past and as described in Section 2.2 of this report. Once the new project is commissioned and connected to the existing sewage collection system, the liquid in the old lagoon will be tested and discharged as per the existing practice. The residual sludge will be retained in the cells for the duration of at least one winter to allow for freeze-thaw drying followed by blading into windrows for further drying. It is proposed that it will then be removed and incorporated into the soil on the Colony's agricultural land. As a

minimum, this will provide for one full year of stabilization of these solids from any contact with fresh sewage.

Following the removal of the dewatered solids from the former lagoon site, the area will be backfilled with the material from the dykes, levelled and eventually repurposed for use by the Colony.

5.0 ENVIRONMENTAL IMPACTS

5.1 ODOUR CONSIDERATIONS

The only time of the year that some minor odours may be present at the proposed lagoon is during the spring while the ice thaws. During the winter, ice cover largely prevents free oxygen from entering the water. This condition leads to the production of hydrogen sulphide gas (H₂S) by bacteria that do not require free oxygen. These accumulated gases dissipate quickly into the atmosphere when the ice breaks up and the pond returns to a non-odorous condition.

The closest residence to the proposed lagoon belongs to the Colony and is located approximately 1,100 metres away, which meets the CWS minimum setback distance of 300 metres.

5.2 LAND IMPACT

The land intended for lagoon development is currently cultivated agricultural land. Natural native land and habitat is not being disturbed by the lagoon developments.

5.3 SURFACE WATER

The structure of the proposed lagoon will not have any appreciable impact on surface water since the land all around it is flat, cultivated agricultural land. The treated effluent from the lagoon will be discharged into the existing Barrickman Drain, which crosses River Lot 108 from West to East about one kilometre south of the lagoon and eventually empties into the Assiniboine River. The distance of the route from the discharge point of the proposed lagoon to the Assiniboine River is approximately 6.2 kilometres, the first one kilometre of which, as indicated above, is the outlet from the lagoon across the agricultural field to the Barrickman Drain. The Colony proposes to use a portable piping system, commonly used for liquid manure application to their fields, to transport the effluent from the lagoon to the Drain. The Drain follows a natural drainage path at this point. It appears to be much larger than warranted for the watershed area that it drains, possibly as a result of historic, progressive erosion from the relatively lower elevation of the outlet into the Assiniboine River. The base of the drain is about 15 metres in width at the location of the proposed discharge from the lagoon and typically widens out from there downstream. And it is covered with a relatively thick growth of emergent vegetation of cattails and other plants.

The *Manitoba Water Quality Standards, Objectives and Guidelines*, updated in July 2011, now include a province-wide standard phosphorus limit of 1mg/L in the effluent. In considering the size of the nutrient load and the receiving water body, the Province has indicated that “Small wastewater treatment facilities (serving less than 2000 people or equivalent) have the option of implementing a demonstrated nutrient reduction strategy instead of the 1 mg/L phosphorus limit.” In keeping with this provision, it is proposed that the Maxwell Colony, with a projected maximum population of 220 people, will implement a discharge procedure that will firstly be periodic and not continuous, in keeping with the standard practice for facultative lagoons. Secondly, the discharge will consist of a trickle flow over a period of three or four weeks within the June 15th to October 31st window in any year. This will maximize the infiltration into the soil and the uptake by vegetation of the nutrients in the relatively wide, 5.2 kilometres of Barrickman Drain channel. Thirdly, the trickle flow will be discharged through a submerged bed of graded limestone for a degree of phosphorus absorption prior to entry into the Barrickman Drain. It is further expected that the conservative sizing of the lagoon relative to the published minimum standards of Manitoba Conservation and Water Stewardship, will result in a somewhat reduced level of nutrients in the treated effluent from the lagoon.

A discharge of the full 19,554 m³ hydraulic storage capacity of the lagoon at the design loading, spread over a 4 week period would provide a hydraulic load on the base width of the 5.2 kilometres of the Barrickman Drain of an estimated one to two centimetre of depth per day of discharge. A discharge during the summer or early fall when there is typically minimal or no runoff from the farmland, would result in little or no effluent reaching the Assiniboine River as most or all of the flow would be absorbed into the soil and vegetation or lost to evaporation.

The Water Licensing Branch of Manitoba Water Stewardship was consulted to provide a list of water users along the drainage route up to the Assiniboine River. The Branch responded that there are no licenced water users on the Barrickman Drain, which extends all the way to the Assiniboine River. A copy of the response is included in Appendix E.

The Maxwell Colony indicates that the proposed lagoon site and the adjacent, existing site of the earthen manure storage pond were not affected by the 2011 flood, which was estimated to be a 1 in 300-year event.

5.4 FUEL STORAGE ON SITE

The proposed facility does not require the onsite storage of gasoline or diesel fuel. During construction and upgrading, the contractor will be required to ensure that all equipment is properly maintained to prevent leaks and spills of fuel and motor fluids. Refuelling of equipment will not be within 100 metres of a water body, stream or wetland.

5.5 SPECIES IMPACT

A file search with the Biodiversity Conservation Wildlife and Ecosystem Protection Branch of Manitoba Conservation resulted in no occurrences found near the development site. Correspondence is included in Appendix E.

5.6 FISHERIES

The Barrickman Drain from where it arises in the agricultural fields, all the way down to its eventual discharge into the Assiniboine River (Figure 2.1), is classified as a type C habitat (complex habitat with no indicators present) according to Fisheries and Oceans Canada (DFO). The Assiniboine River into which it flows is type A (complex habitat, with indicators present). Details are included in Appendix E.

In order to protect any potential fish in the Assiniboine during the critical springtime spawning season, when effluent un-ionized ammonia tends to be high, the lagoon has been designed for a storage period that will permit the discharge to be made after June 15th in any year. This will allow for significant conversion of any potential toxic un-ionized ammonia into relatively benign nitrates and will minimize the potential of a discharge being made during the spawning period.

As noted from Fisheries and Oceans Canada (DFO), the deposit of deleterious substances into water frequented by fish is prohibited under the *Fisheries Act*. In addition, according to subsection 35(1) of the *Fisheries Act*, “no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.”

5.7 FORESTRY

There is no forestry activity in the development area. The construction of the lagoon will not affect any forested area nor any natural vegetative state. It is all cultivated agricultural land.

5.8 HERITAGE RESOURCES

In a letter dated January 15, 2016 from the Historic Resources Branch (Appendix E), it was stated that the Historic Resources Branch has found no areas of potential concern regarding heritage resources for this project.

5.9 SOCIO-ECONOMIC IMPACTS

The development of the lagoon will enable the Maxwell Colony to discontinue the use of the existing domestic lagoon which is located within the Colony farmyard and to repurpose the site for a use that promotes the economic activity of the Colony. This offers greater safety to the residents, removes an environmental hazard from the proximity of the residences and eliminates the potential for the discharge of inadequately treated wastewater as the population and water usage expands. The work of building the new lagoon will result in a short-term boost to the construction industry in the area.

5.10 PUBLIC INVOLVEMENT

Comments from members of the public in the development area will be solicited as part of the Manitoba Conservation and Water Stewardship review of the EAP prior to issuing the Environment Act Licence.

6.0 MANAGEMENT PRACTICE

The new wastewater treatment facility is specifically designed to provide wastewater treatment and storage capacity for the proposed population. The proposed lagoon is designed to treat wastewater up to an average loading of 16.94 kg-BOD₅/d and provide storage up to 22,630 m³ over a period of 365 days. The facility will normally be discharged sometime after June 15th and prior to October 31st in any year. It may be possible to discharge in alternate years in the beginning until population numbers and wastewater volume increases so as to require annual discharges. Treated effluent will be discharged by pumping from the isolated secondary cell at a rate that optimizes the opportunity for nutrients in the effluent to be assimilated in the discharge route prior to reaching the Assiniboine River while not challenging the normal operation of the wastewater treatment lagoon.

6.1 DISCHARGE PROCEDURE

- 1) Manipulate the valves to isolate the secondary storage cell two weeks before collecting the BOD₅, bacteriological, and any other samples required in the new Environment Act Licence.
- 2) Sample the isolated secondary cell. Allow at least one week to analyse the sample(s), plus shipment time.
- 3) If the tests indicate that the wastewater quality meets licence requirements the effluent can be discharged. If wastewater effluent quality does not meet licence requirements, re-test until they meet the required quality. Further discharge requirements may be instituted in the new Environment Act Licence that should be satisfied prior to discharge.
- 4) While discharging, the valve between the primary cell and the secondary cell remains closed to prevent additional liquid from transferring into the discharging secondary cell.
- 5) Once the secondary cell is discharged, reopen the valve between the primary cell and the secondary cell. This will allow the water levels in the cells to equalize. In many cases a sufficient amount of treated effluent is discharged from the secondary cell using this procedure to permit operation until the next scheduled discharge period. However, it may be necessary to discharge additional treated effluent to have enough storage for the wastewater flows in the following operational year.
- 6) If further discharging is necessary, repeat the isolation, testing and discharge process.

6.2 RECORD KEEPING AND INSPECTION ROUTINE

A record book, organized in five sections, should be maintained:

- 1) Daily Records – Pumping records for the lift station should be collected and retained for future estimation of flows to the wastewater treatment facility, i.e. elapsed time meter readings on the lift station pumps or flow meter.
- 2) Weekly Records - The weekly summer inspection would consist of recording the following: The water level, presence of odours and their source, and presence of floating objects (removal). The summer maintenance should also include grass cutting on the dykes, if necessary, elimination of emergent vegetation, extermination of burrowing animals, repair of the dykes and rip rap if damaged by wind erosion and wave action, repair of the fence and gate.
- 3) Periodic Winter Inspection is confined to inspecting for frozen piping, checking if the water level in the cells is as it should be.
- 4) Discharge Records - The records should contain all treated effluent quality analyses, dates of discharge, discharge procedure followed, water levels and other pertinent data.
- 5) Service Records - The lift station pumps should be serviced according to the manufacturer's instructions.

7.0 SCHEDULE

It is anticipated that the Environment Act Licence process will be finalized sometime during 2016. Construction could begin in 2016 or depending on the time of the issuance of the Environment Act Licence, could be undertaken in 2017.

8.0 FUNDING

The construction project is to be funded primarily by Maxwell Colony. The Colony proposes to pursue any and all applicable funding sources for this project.

Submitted by:
WSP Canada Inc.



Prepared by: A.J. Poetker, P. Eng.
Senior Project Consultant



Reviewed by: Jason Bunn, P. Eng.
Environmental Engineer

APPENDIX A

Manitoba Conservation and Water Stewardship Letters



Cal.wipf@gmail.com

Conservation and Water Stewardship

Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg, Manitoba R3H 0W4
T 204-945-7100 F 204-948-3833
www.manitoba.ca

REGISTERED MAIL

May 4, 2015

Mr. Peter Wipf, Manager
Maxwell Colony Ltd
10450 Assiniboine Road
Cartier MB R4K 1C3

Dear Mr. Wipf:

Re: Maxwell Colony Ltd – Requirement to apply for an Environment Act Licence

On January 26, 2012 Conservation and Water Stewardship requested that an Environment Act Licence proposal be submitted by April 30, 2012 to operate the wastewater treatment lagoon at Maxwell Colony. Departmental records indicate that an Environment Act Licence proposal has not been received.

A site inspection conducted on April 13, 2015 revealed that Maxwell Colony Ltd. continues to operate the wastewater treatment lagoon without a valid Environment Act licence. This existing development is not subject to "grandfathering" and continued use of the lagoon without receipt of an Environment Act Licence is in contravention of environmental legislation.

Wastewater treatment lagoons are listed as a Class 2 development under the *Classes of Development Regulation (M.R. 164/88)* and therefore require licencing under *The Environment Act*. The Environment Act proposal form, guide and "*Environment Act Proposal Supplementary Guidelines for Wastewater Treatment Facilities*" can be found at: <http://www.gov.mb.ca/conservation/eal/publs/index.html>.

In order to comply with the regulatory requirements, an engineer must assess your current wastewater disposal system and you are required to submit an Environment Act Licence proposal application by **August 15, 2015** to the following address:

Environmental Approval Branch
Manitoba Conservation and Water Stewardship
160-123 Main Street (Box 80)
Winnipeg MB R3C 1A5
Attention: Tracey Braun, Director

Please be advised that your facility is in non-compliance with *The Environment Act* and failure to file a proposal may result in prosecution under the *Act*.

Should you have any questions or concerns, please feel free to contact the undersigned at 204-945-8214 or by email at nada.suresh@gov.mb.ca.

Sincerely,

Nada Suresh, Environment Officer
Environmental Compliance and Enforcement
c: Tracey Braun, Environmental Approvals

Don Labossiere/Donna Smiley/Yvonne Hawryliuk, Environmental Compliance and Enforcement



Conservation and Water Stewardship
Environmental Stewardship Division
Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg MB R3H 0W4
T 204-945-7100 F 204-948-2338
www.gov.mb.ca/conservation/ece

September 30, 2015

Mr. Peter Wipf, Manager
Maxwell Colony Ltd.
10450 Assiniboine Road
Cartier MB R4K 1C3

Dear Mr. Wipf:

Re: Maxwell Colony Ltd – Requirement to apply for Environment Act Licence

Manitoba Conservation and Water Stewardship is in receipt of the letter dated September 14, 2015 requesting an extension to submit an Environment Act Proposal for a new wastewater treatment facility by January 31, 2016.

Your request for extension is granted. Please submit your Environment Act Proposal to the Environmental Approvals Branch by **February 3, 2016**. Please note that no further extension will be considered.

Also be advised that your present facility is in non-compliance with *The Environment Act* and failure to file a proposal may result in prosecution under the *Act*.

In the event you require further information or assistance please contact the undersigned in Winnipeg at 204-945-8214.

Sincerely,

Nada Suresh, Environment Officer
Environmental Compliance & Enforcement

c: Tracey Braun, Environmental Approvals Branch
Alf Poetker, P.Eng
Yvonne Hawryliuk/Geoffrey Stephens, Environmental Compliance and Enforcement

APPENDIX B
Status of Title

STATUS OF TITLE

Title Number **1760274/1**
Title Status **Accepted**
Client File **Maxwell Colony 151-13571-00**

The Property Registry

A Service Provider for the Province of Manitoba



1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

MAXWELL HUTTERIAN MUTUAL CORPORATION

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON
IN THE FOLLOWING DESCRIBED LAND:

RLS 101 TO 112 PARISH OF ST FRANCOIS XAVIER
EXC OUT OF ALL LOTS, MAIN HIGHWAY PLANS 552 WLTO AND 4137 WLTO AND
PUBLIC ROAD PLAN 38973 WLTO AND
EXC OUT SAID RL 103, ROAD PLAN 2906 WLTO

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act*.

2. ACTIVE INSTRUMENTS

Instrument Type: **Caveat**
Registration Number: **87-1429/1**
Instrument Status: **Accepted**

Registration Date: 1987-01-07
From/By: MANITOBA HYDRO ELECTRIC BOARD
To:

Amount:
Notes: AFF: PART RLS 101 AND 104
Description: No description

Instrument Type: **Mortgage**
Registration Number: **2013987/1**
Instrument Status: **Accepted**

Registration Date: 1996-05-01
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$1,300,000.00
Notes: No notes
Description: No description

Instrument Type: **Mortgage**
Registration Number: **2212865/1**
Instrument Status: **Accepted**

Registration Date: 1997-12-01
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$2,200,000.00
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **2332018/1**
Instrument Status: **Accepted**

Registration Date: 1998-12-08
From/By: MTS COMMUNICATIONS INC.
To:

Amount:
Notes: AFF.; PART
Description: EASEMENT

Instrument Type: **Caveat**
Registration Number: **2543530/1**
Instrument Status: **Accepted**

Registration Date: 2000-11-01
From/By: CARTIER REGIONAL WATER CO-OP INC.
To:

Amount:
Notes: AFF: WTN LTS R/W PL 38937
Description: EASEMENT

Instrument Type: **Mortgage**
Registration Number: **2786335/1**
Instrument Status: **Accepted**

Registration Date: 2002-11-04
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$4,000,000.00
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **3296420/1**
Instrument Status: **Accepted**

Registration Date: 2006-05-30
From/By: MTS ALLSTREAM INC.
To:

Amount:
Notes: PART OF ALL LOTS
Description: EASEMENT AGREEMENT

Instrument Type: **Mortgage**
Registration Number: **4248706/1**
Instrument Status: **Accepted**

Registration Date: 2012-07-26
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$8,000,000.00
Notes: No notes
Description: No description

Instrument Type: **Personal Property Security Notice**
Registration Number: **4248707/1**
Instrument Status: **Accepted**

Registration Date: 2012-07-26
From/By: BANK OF MONTREAL
To: JOHN R. BRAUN AS AGENT

Amount:
Notes: No notes
Description: EXPIRES ON 2022/07/11

Instrument Type: **Easement**
Registration Number: **4581237/1**
Instrument Status: **Accepted**

Registration Date: 2015-02-26
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: CENTRA GAS MANITOBA INC.

Amount:
Notes: AFF: WTN LTS R/W PL 57267
Description: STATUTORY EASEMENT

3. ADDRESSES FOR SERVICE

MAXWELL HUTTERIAN MUTUAL CORP.
RR 1 BOX 210
CARTIER MB
R4M 1B8

4. TITLE NOTES

No title notes

5. LAND TITLES DISTRICT

Winnipeg

6. DUPLICATE TITLE INFORMATION

Duplicate not produced

7. FROM TITLE NUMBERS

B87404/1 Partial

8. REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS

No real property application or grant information

9. ORIGINATING INSTRUMENTS

Instrument Type: **Request To Issue Title**
Registration Number: **2549192/1**

Registration Date: 2000-11-20
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To:
Amount:

10. LAND INDEX

RL 101 FX
EXC PLANS 552, 4137 AND 38973

RL 102 FX
EXC PLANS 552, 4137 AND 38973

RL 103 FX
EXC PLANS 552, 4137, 38973 AND 2906

RL 104 FX
EXC PLANS 552, 4137 AND 38973

RL 105 FX
EXC PLANS 552, 4137 AND 38973

RL 106 FX
EXC PLANS 552, 4137 AND 38973

RL 107 FX
EXC PLANS 552, 4137 AND 38973

RL 108 FX
EXC PLANS 552, 4137 AND 38973

RL 109 FX
EXC PLANS 552, 4137 AND 38973

RL 110 FX
EXC PLANS 552, 4137 AND 38973

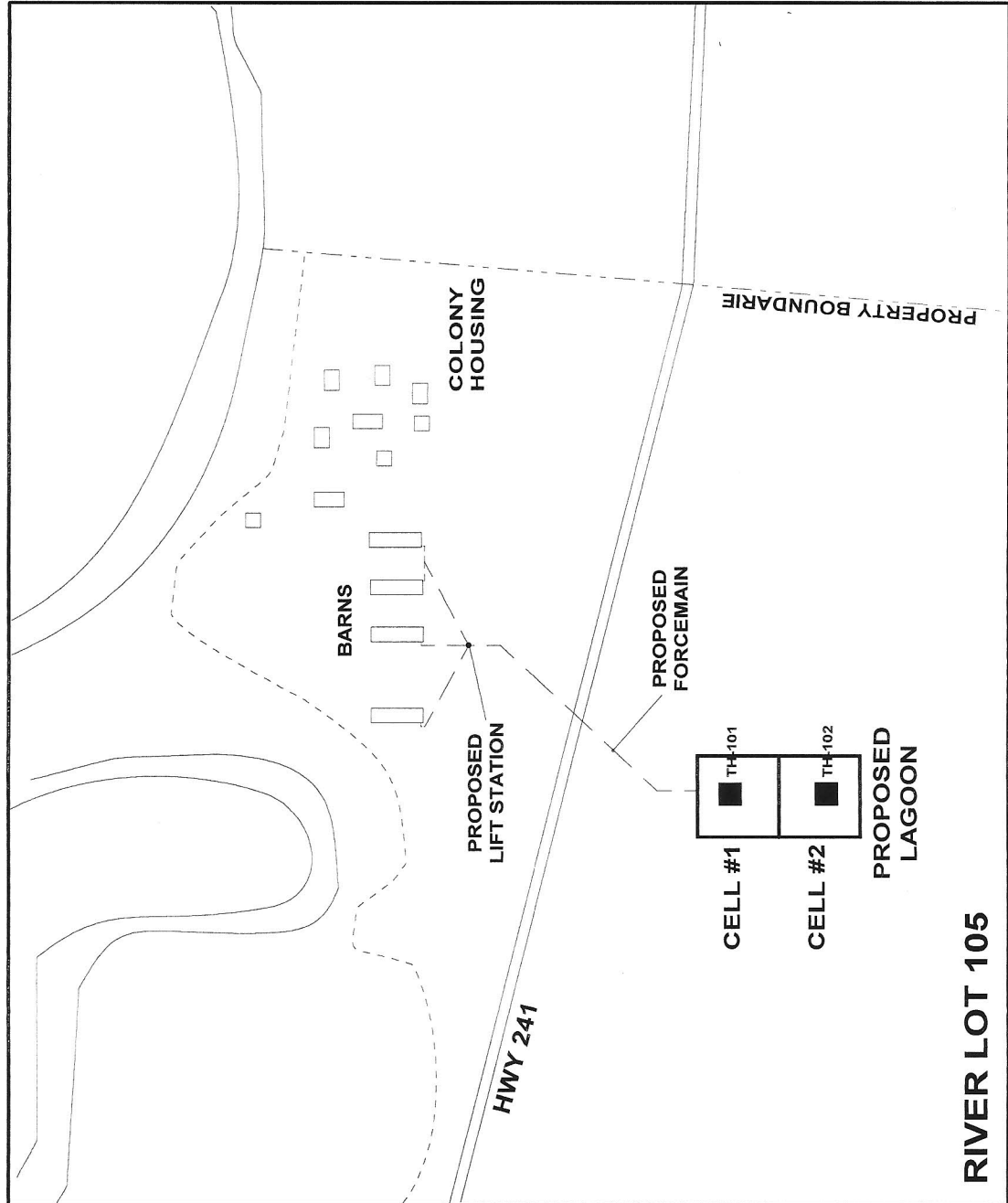
RL 111 FX
EXC PLANS 552, 4137 AND 38973

RL 112 FX
EXC PLANS 552, 4137 AND 38973

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE
SYSTEM OF TITLE NUMBER 1760274/1

APPENDIX C

Geotechnical Logs and Test Results



COCHRANE GROUP

Cochrane Engineering Ltd.
Engineers, Scientists & Project Managers

DESIGNED BY: GMR
CHECKED BY:
DATE: FEBRUARY 1998

DRAWN BY: GMR
APPROVED BY:
DWG NO: FIGURE 1

CLIENT: MAXWELL COLONY

PROJECT: PROPOSED LIVESTOCK WASTE HOLDING POND

DESCRIPTION: SITE & TEST LOCATIONS

TEST HOLE LOG

SOIL INVESTIGATION

Borehole: TH-101
Project number: 44601
Client: MAXWELL COLONY
Co-ords (x,y):
G.W. Table [m]:
Total depth [m]: 6.10
Type of boring: Backhoe

Project name: HOG LAGOON DESIGN
Site location: R.L. 105 ST. FRANCOIS
Vertical scale: 1:60
Elevation [m]: 100.00
Date: December 2, 1997
Logged by: AJP

Depth [m]	Samples	DESCRIPTION	Symbol	USCS	LAB TESTS	Notes	
0.00					0 w,LL,PL [%] 100		
100.00		Topsoil, black, organic, moist	[Cross-hatch pattern]	SO			
0.40		Clay, Grey to dark brown, moist, firm, high plasticity	[Vertical lines pattern]	CH		Estimated hydraulic conductivity $k = 1 \cdot 10^{-8}$ cm/s	
99.60							
1.00							
99.00							
2.00							
98.00	101-1						
3.00							
97.00							
4.00							
96.00							
5.00					[Water content plot]		
95.00	101-2						
6.10		TEST HOLE DRY ON COMPLETION					
93.00							

Thin-wall tube

- Thin-wall tube
- Cased length
- Split spoon
- Rock core
- Auger
- Wash
- OTHER

Atterberg limits

w_p w w_l

TEST HOLE LOG

SOIL INVESTIGATION

Borehole: TH-102
Project number: 44601
Client: MAXWELL COLONY
Co-ords (x,y):
G.W. Table [m]:
Total depth [m]: 6.10
Type of boring: Backhoe

Project name: HOG LAGOON DESIGN
Site location: R.L. 105 ST. FRANCOIS
Vertical scale: 1:60
Elevation [m]: 100.00
Date: December 2, 1997
Logged by: AJP

Depth [m]	Samples	DESCRIPTION	Symbol	USCS	LAB TESTS	Notes	
0.00					0 w,LL,PL [%] 100		
100.00 0.30		Topsoil, black, organic, moist	[Cross-hatched pattern]	SO		Estimated hydraulic conductivity $k = 1 \cdot 10^{-8}$ cm/s	
99.70		Clay, Grey to dark brown, moist, firm, high plasticity	[Vertical lines pattern]	CH			
1.00					[Dotted pattern]		
99.00	102-1				[Horizontal line with dot]		
2.00							
98.00							
3.00							
97.00							
4.00							
96.00							
5.00	102-2				[Horizontal line with dot]		
95.00							
6.10		TEST HOLE DRY ON COMPLETION					
93.90							

Thin-wall tube

- Thin-wall tube
- Cased length
- Split spoon
- Rock core
- Auger
- Wash
- OTHER

Atterberg limits

Cochrane Engineering Inc.
600-5 Donald Street
Winnipeg, Manitoba
R3L 2T4

December 15, 1997

Project : Maxwell Colony I log Lagoon
Your Project No.: 44601
Our Project No.: G822
Date Tested: Dec., 1- 15, 1997

Attention: Peter Bohonos, P. Eng.

SOIL TEST REPORT

ASTM Test Methods:

Liquid Limit, Plastic Limit and Plasticity Index of Soils (D4318-96)

Laboratory Determination of Water Content of Soil, Rock and Soil-Aggregate Mixture (D2216-92)

Field I.D.	Sample No.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index	% Retained on 0.425 mm sieve
101-1 16'	06546	37.3	60	22	38	1.3
102-1 5'	06547	38.7	71	26	45	1.4
102-2 16'	06548	43.0	55	24	31	1.4

Airdried: No Yes

Procedure: Multipoint Other

Prepared by:

Rod Girouard,
Geotechnical Technician

Reviewed by:

Peter Giesbrecht, P.Eng., Manager
Geotechnical Engineering Services



Unit 6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

**MOISTURE-DENSITY
 RELATIONSHIP**

30 Thatcher Drive
 Winnipeg, Manitoba
 R3T 2L2

File No.: 12-035-03
 Ref. No.: 12-35-3-2

Attention: Alf Poetker, P.Eng
 Project: MAXWELL COLONY LAGOON

Compaction Standard Method ASTM D698 ASTM D1557

Dry Density kg/m ³	1319	1345	1335	1285	
Moisture Content (%)	27.5	29.1	31.0	33.4	

Maximum Dry Density = 1349 kg/m³ Corrected =
 Optimum Moisture = 29.8 % Corrected =

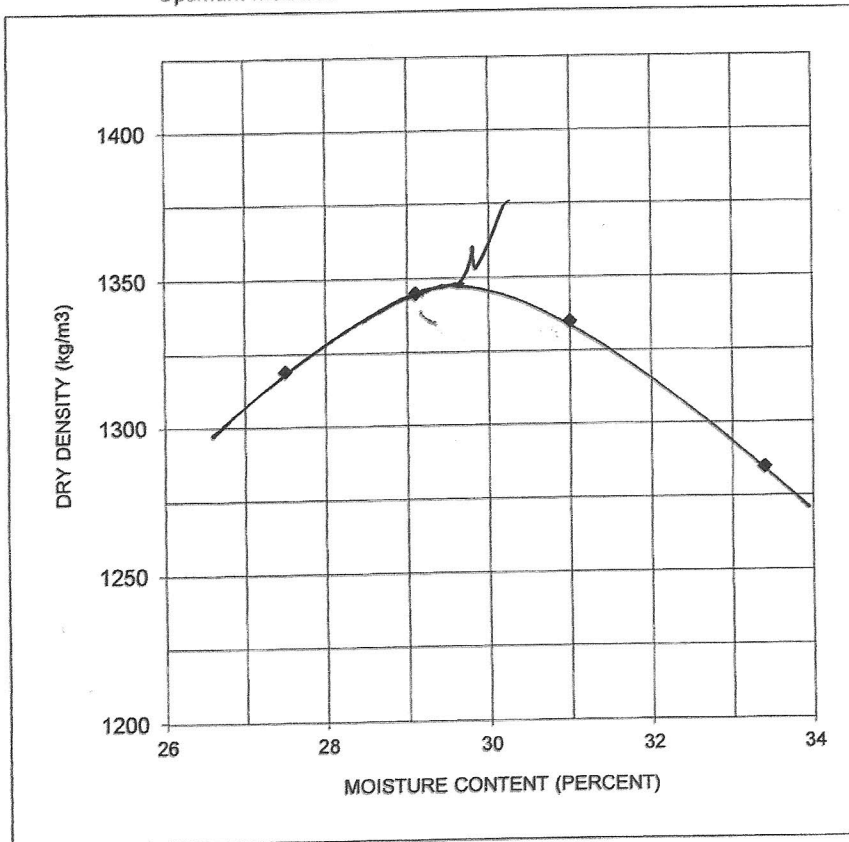
Source: Sampled obtained from
 test location 1 of Field
 Density report Ref No. 12-
 35-3-1

- kg/m³
 - %

Date Sampled: Nov 1/12
 Sampled By: ENG-TECH
 Date Received: Nov 2/12
 Date Tested: Nov 7/12

Material Oversize

4.75 mm = 0.1 %
 19 mm = - %



Soil Description:
 CH, clay, high plastic, dark brown with some
 black, silt sizes, trace sand, trace organics

Comments:

Cc.: Email: apoetker@shaw.ca

ENG-TECH Consulting Limited

[Signature]

Danny Holfeld, Principal
 Ph: (204) 233-1694 Fx: (204) 235-1579



Unit 6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng-tech@mts.net
 www.eng-tech.ca

FIELD DENSITY

30 Thatcher Drive
 Winnipeg, Manitoba
 R3T 2L2

File No.: 12-035-03

Ref. No.: 12-35-3-1

Attention: Alf Poetker, P.Eng

Project: MAXWELL COLONY LAGOON

Contractor:	Maxwell Colony/Eagle Eye Excavation	Page:	1 of 1
Test Location:	Maxwell Colony – passed St. Francois Xavier on PR 424	Specification:	95%
Type of Construction:	Clay	Date Tested:	Nov 1/12


Test No.	Location	Test Depth (mm)	Moisture Content (%)		Dry Density (kg/m ³)		Percent Maximum Density
			Field	Optimum	Field	Maximum	
1	5m North, 22m East of the South West corner of secondary cell on primary cell.	150	37.3	29.8	1288	1349	95.4
2	17m North of the South West corner of secondary cell and 2m West on secondary cell.	150	31.6	29.8	1380	1349	102.2
3	25m North on primary cell and 30m East of the South West corner of secondary cell.	150	34.2	29.8	1364	1349	101.1

Field Method:	ASTM D2167 Balloon	⊗	ASTM D6938 Nuclear	ASTM D1556 Sand Cone
Laboratory Method:	⊗	ASTM D698	ASTM 1557	One Point Proctor At Existing Field Moisture Utilizing ASTM D698

Comments: Preliminary results reported to and accepted by Alf (Genivar). Sample obtained from test location 1 for Moisture Density Relationship. Refer to Moisture Density Relationship report Ref. No. 12-35-3-2 for additional information. Final results were corrected based on oven dry moisture contents and reported to Alf (Genivar) via telephone on Nov 7/12 at 3:00pm.

Cc: Email: apoetker@shaw.ca

ENG-TECH Consulting Limited

Per 

 Danny Holfeld, Principal
 Ph: (204) 233-1694 Fx: (204) 235-1579

APPENDIX D

Plans and Details

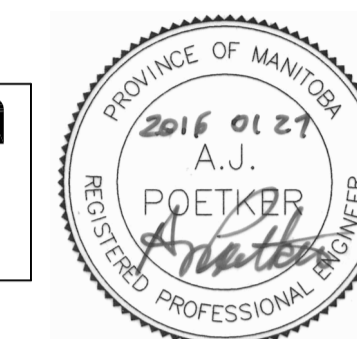


1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
PHONE: 204-477-6650 FAX: 204-474-2864
WWW.WSPGROUP.COM

CONSULTANT:

SEAL:

APEGM
Certificate of Authorization
WSP Canada Inc.
No. 5750 Date: January 27, 2016



CLIENT:

MAXWELL COLONY FARMS

CLIENT REF. #:

PROJECT:

PROPOSED WASTEWATER
LAGOON

KEY PLAN:

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1	2016/01/27	EAP SUBMISSION
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PROJECT NO:	DATE:
151-13571-00	2016/01/27

ORIGINAL SCALE:	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
1:5000	

DESIGNED BY:

AJP

DRAWN BY:

DTGB

CHECKED BY:

AJP/JSB

DISCIPLINE:

ENVIRONMENTAL INFRASTRUCTURE

TITLE:

EXISTING SITE PLAN

SHEET NUMBER:

C01

SHEET #:

1 OF 3

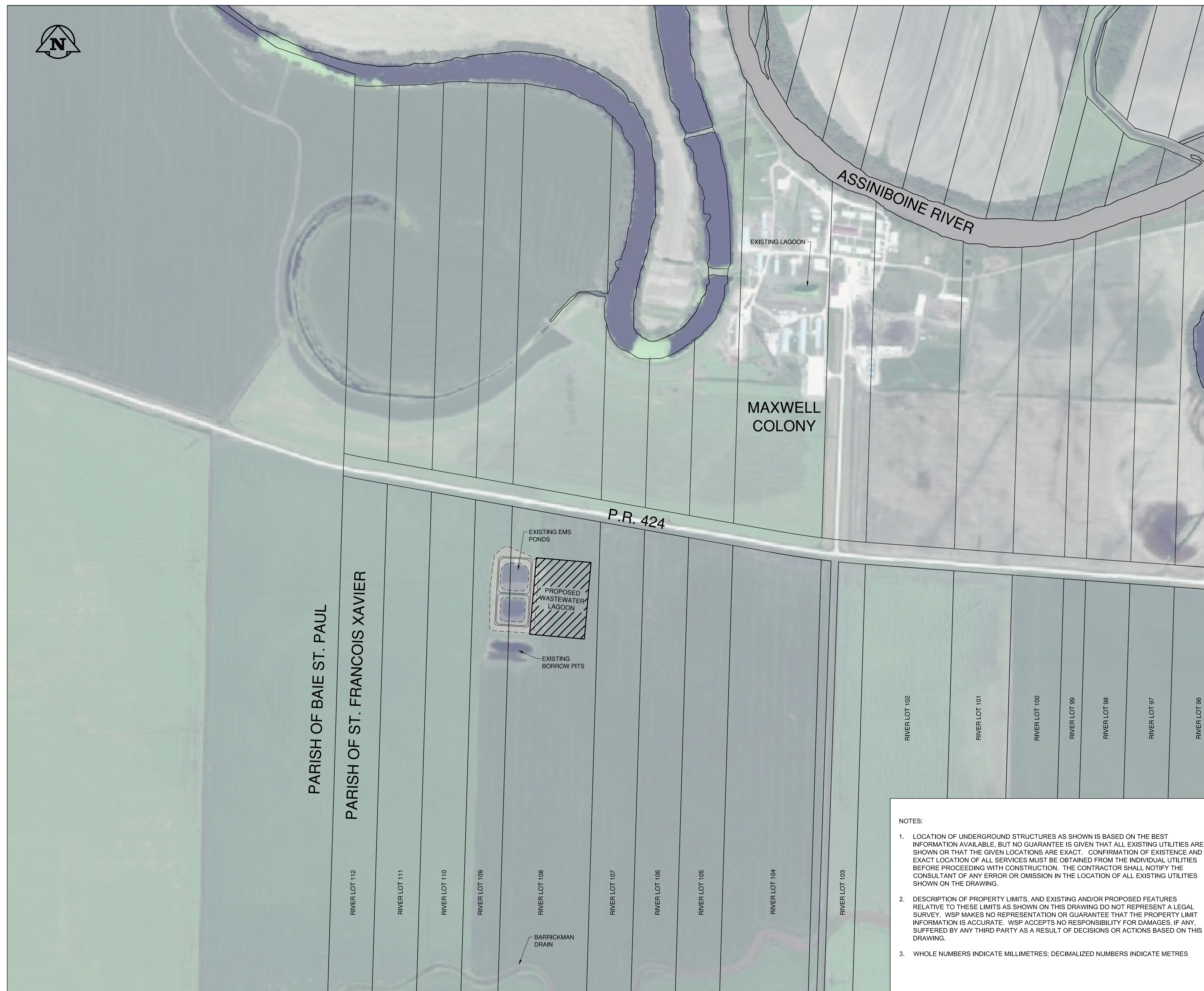
ISSUE:

EAP SUBMISSION

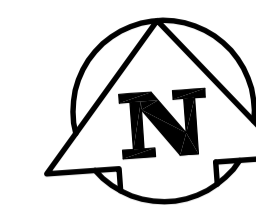
DATE OF: 2016/01/27

REV #

0

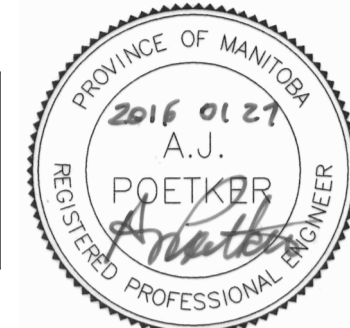


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 3. WHOLE NUMBERS INDICATE MILLIMETRES; DECIMALIZED NUMBERS INDICATE METRES



CONSULTANT:

SEAL:



CLIENT:

MAXWELL COLONY FARMS

CLIENT REF. #:

PROJECT:

PROPOSED WASTEWATER
LAGOON

KEY PLAN:

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ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
1		2016/01/27	EAP SUBMISSION

PROJECT NO: 151-13571-00 DATE: 2016/01/27

ORIGINAL SCALE: 1:500 IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

DESIGNED BY: AJP

DRAWN BY: DTGB

CHECKED BY: AJP/JSB

DISCIPLINE: ENVIRONMENTAL INFRASTRUCTURE

TITLE: PROPOSED SITE PLAN

SHEET NUMBER: C02

ISSUE: 2 OF 3

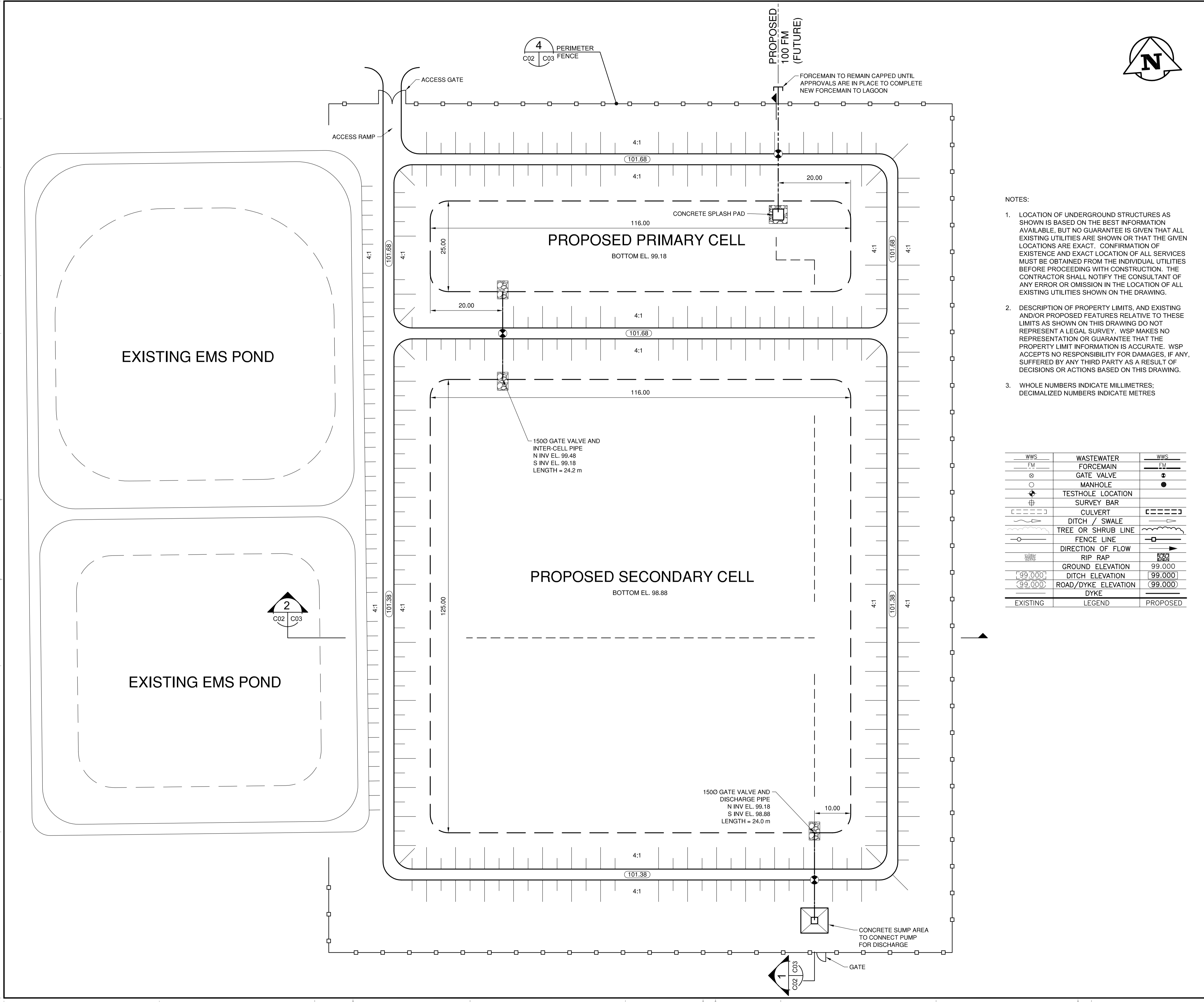
EAP SUBMISSION REV # 0

DATE OF: 2016/01/27

NOTES:

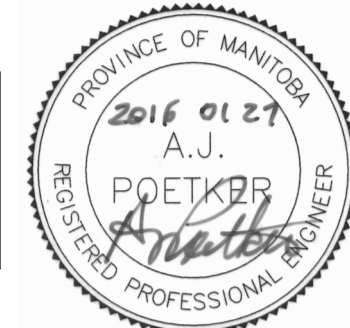
- LOCATION OF UNDERGROUND STRUCTURES AS SHOWN IS BASED ON THE BEST INFORMATION AVAILABLE, BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE CONSULTANT OF ANY ERROR OR OMISSION IN THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THE DRAWING.
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WWS	WASTEWATER	WWS
FM	FORCEMAIN	FM
⊗	GATE VALVE	⊗
○	MANHOLE	●
⊕	TESTHOLE LOCATION	
#	SURVEY BAR	
[---]	CULVERT	[---]
---	DITCH / SWALE	---
~	TREE OR SHRUB LINE	~
—○—	FENCE LINE	—○—
→	DIRECTION OF FLOW	→
■	RIP RAP	■
99.000	GROUND ELEVATION	99.000
[99.000]	DITCH ELEVATION	[99.000]
[99.000]	ROAD/DYKE ELEVATION	[99.000]
	DYKE	
EXISTING	LEGEND	PROPOSED



CONSULTANT:

SEAL:



CLIENT:

MAXWELL COLONY FARMS

CLIENT REF. #:

PROJECT:

PROPOSED WASTEWATER LAGOON

KEY PLAN:

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IS	RE	DATE	DESCRIPTION
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PROJECT NO: 151-13571-00 DATE: 2016/01/27

ORIGINAL SCALE: N.T.S. IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

DESIGNED BY: AP

DRAWN BY: DTGB

CHECKED BY: AP/JSB

DISCIPLINE: ENVIRONMENTAL INFRASTRUCTURE

TITLE: SECTION VIEWS AND DETAILS

SHEET NUMBER: C03

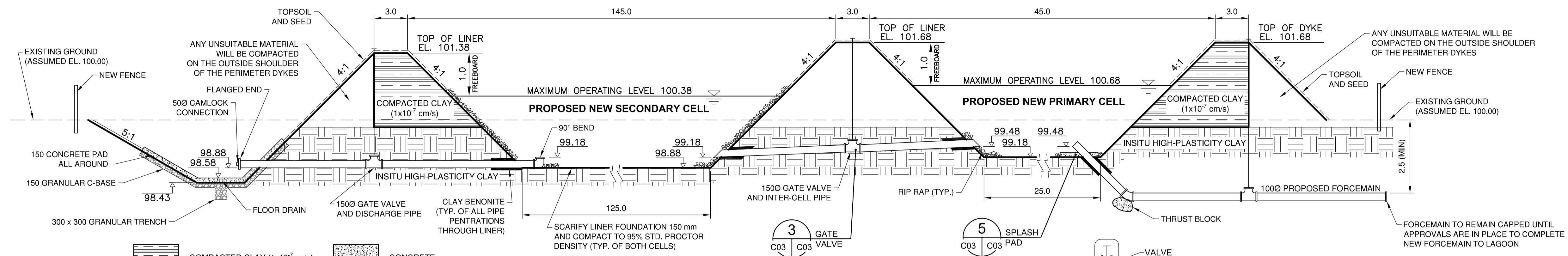
SHEET #: 3 OF 3

ISSUE: EAP SUBMISSION

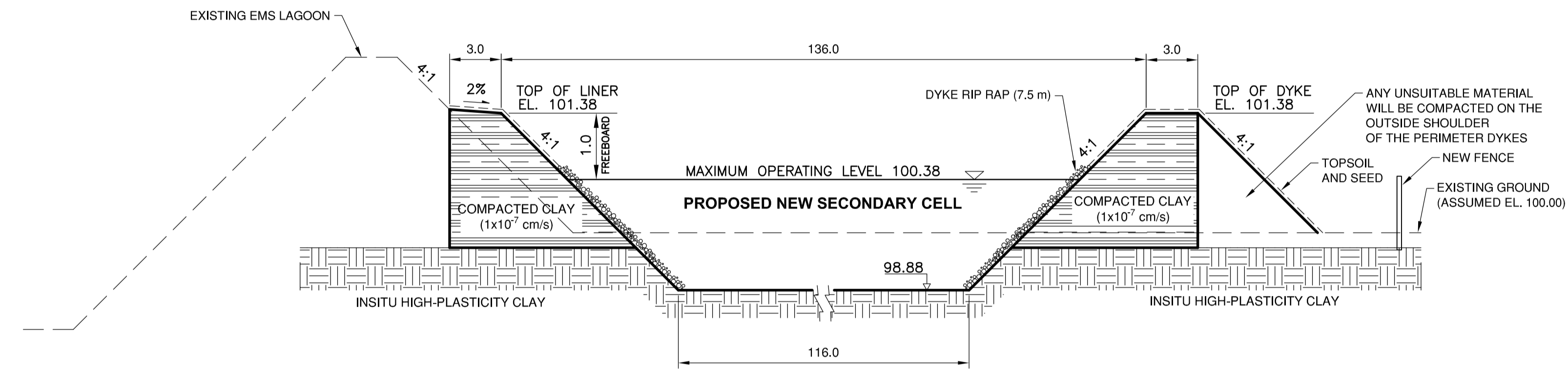
DATE OF: 2016/01/27

REV #

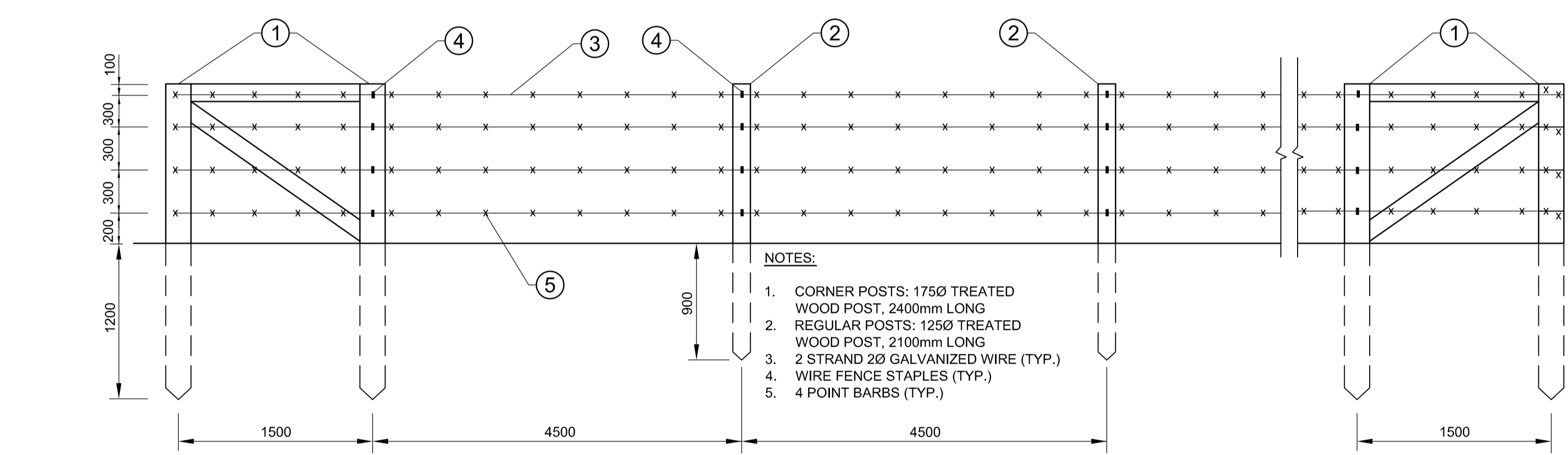
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1 S/N SECONDARY AND PRIMARY CELL SECTION
C02 C03 N.T.S.

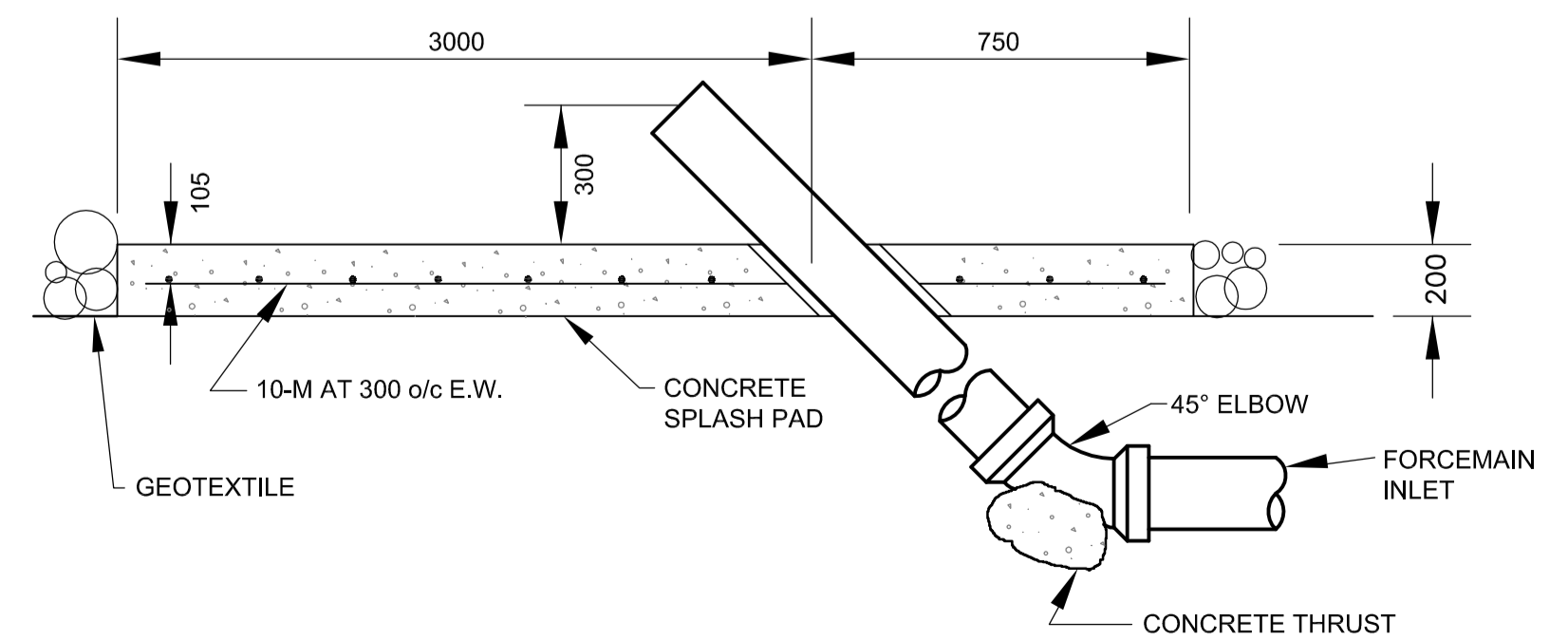


2 W/E NEW SECONDARY CELL SECTION
C02 C03 N.T.S.

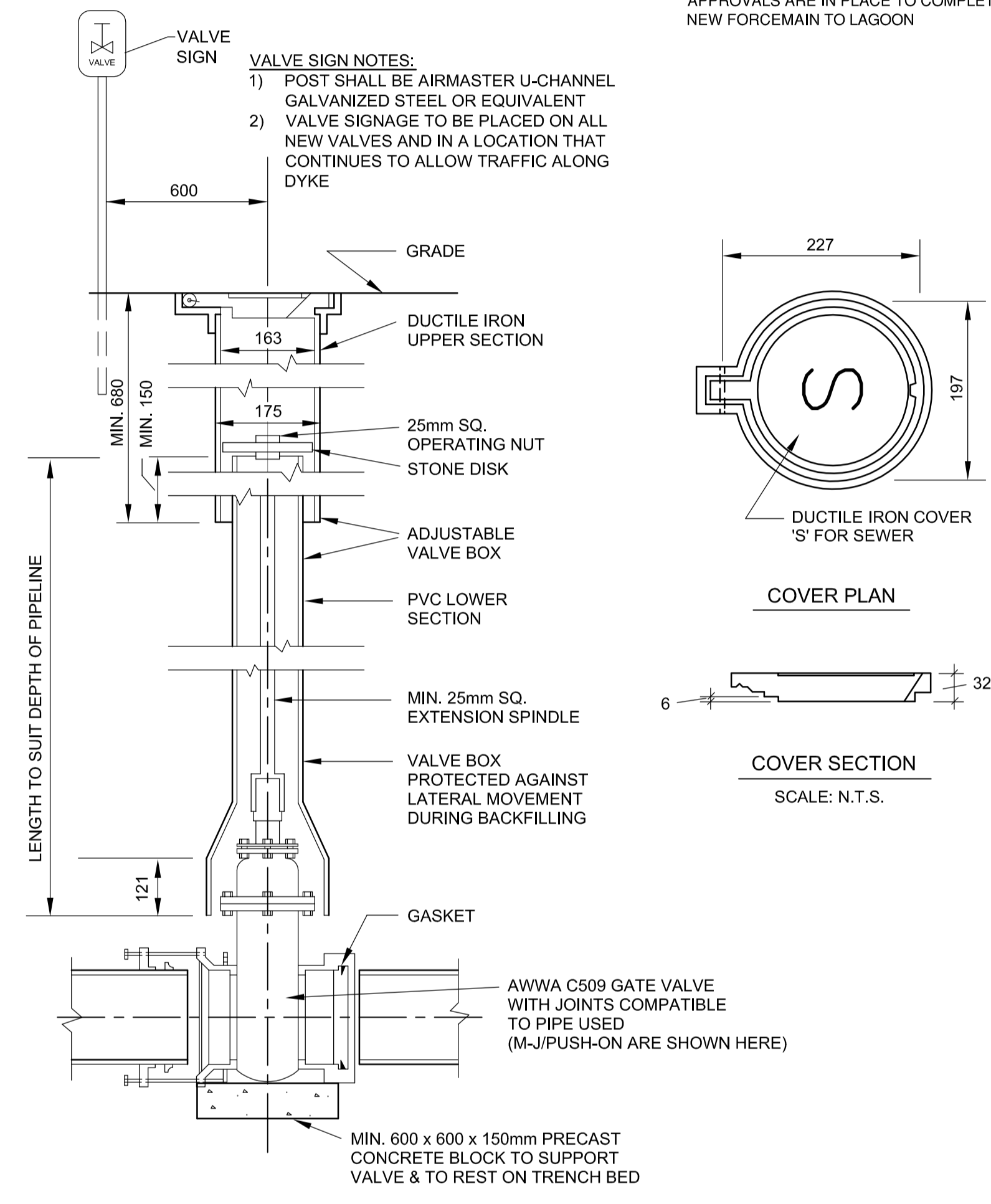


4 PERIMETER FENCE DETAIL
C02 C03 N.T.S.

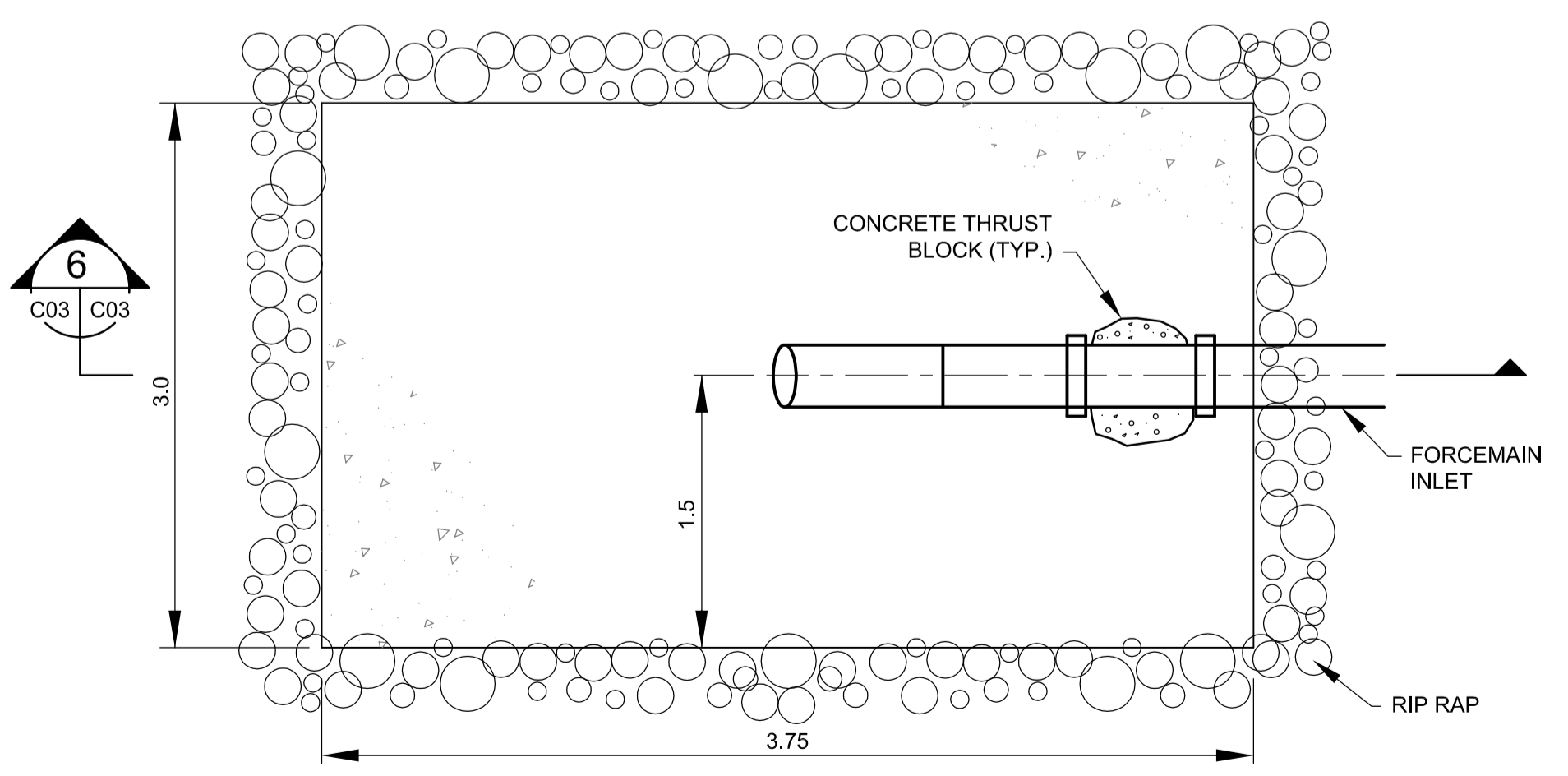
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6 FORCEMAIN SPLASH PAD SECTION
C03 C03 N.T.S.



3 GATE VALVE INSTALLATION
C03 C03 N.T.S.



5 FORCEMAIN SPLASH PAD
C03 C03 N.T.S.

6
C03 C03

APPENDIX E

General Correspondence for Reference

Bunn, Jason

From: Little, Karen (CLPA) <Karen.Little@gov.mb.ca>
Sent: December-11-15 9:34 AM
To: Bunn, Jason
Cc: 'Alf Poetker'; CA - WinnipegFiling
Subject: RE: Mineral Rights - Maxwell Colony [WSP# 151-13571-00]

Good morning Jason – according to The Crown Land Registry, this date, the Dominion of Canada granted:

- the Westerly 6 chains in width of RL 108 Parish of St. Francoise Xavier in 1878 to Michel Allard along with the mines & minerals and sand & gravel. The Crown kept no under-rights.
- the Easterly 6 chains in width of RL 108 Parish of St. Francois Xavier in 1885 to John S Morrison along with the mines & minerals and sand & gravel. The Crown kept no under-rights.

To determine current ownership of the under-rights you will need to do title searches at the Winnipeg Land Titles Office. Under-rights may have reverted back to the Crown by way of tax sale, which we are not aware of. <Karen>

Best wishes for the holidays,

Karen Little

Supervisor of Crown Lands Registry

Crown Lands and Property Agency
308 - 25 Tupper Street North
Portage la Prairie MB R1N 3K1
P 204-239-3805 F 204-239-3560
Toll Free 1-866-210-9589
karen.little@gov.mb.ca



An Agency of the Manitoba Government

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From: Bunn, Jason [mailto:Jason.Bunn@wspgroup.com]
Sent: December-10-15 9:33 AM
To: Little, Karen (CLPA)
Cc: Alf Poetker; CA - WinnipegFiling
Subject: Mineral Rights - Maxwell Colony [WSP# 151-13571-00]

Hi Karen,

We are preparing an EAP for Maxwell Colony for the construction of a new domestic lagoon in RL 108, Parish of St. Francois Xavier, R.M. of Cartier; proposed location south of PR 424 (also referred to as Road 241) and adjacent to the

existing earthen manure storage; current land use is as agricultural cropland. Could you please provide me with information as to the mineral rights (Mines and Minerals and Sand and Gravel) for this River Lot? We would greatly appreciate receiving this information by December 23/15.

Kind regards,



Jason Bunn, P.Eng.
Environmental Engineer

WSP Canada Inc.

1600 Buffalo Place, Winnipeg, Manitoba R3T 6B8

T 204 477 6650 ext#307 | F 204 474 2864 | E jason.bunn@wspgroup.com

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**MAP 1
Overall
Land Use Plan**

TWP 12

TWP 11

TWP 10

RGE 3 WPM

RGE 2 WPM

RGE 1 WPM

RM of Woodlands

RM of Rosser
RM of St Francois Xavier

RM of Cartier

RM of Portage la Prairie

RM of Headingley

RM of Grey

RGE 3 WPM


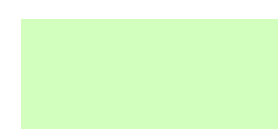





RGE 2 WPM

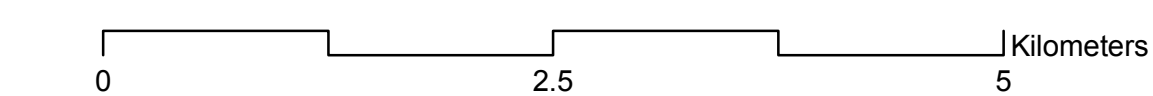
RGE 1 WPM

RM of Macdonald

**Project
site**

LEGEND

-  RG - Rural General Policy Area
-  RL - Rural Limited Policy Area
-  RR - Rural Residential Policy Area
-  SC - Settlement Centre Policy Area
-  B - Business Policy Area
-  Municipal Boundary
-  Direction of Future Development



RM OF CARTIER

**ZONING BY-LAW No. 1620-11
MAP 1**

DESIGNED BY:	DRAWN BY:
CHECKED BY:	DATE:

Landmark
Planning & Design Inc.

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Project site

LEGEND :

- RS** RESIDENTIAL SINGLE FAMILY
- RV** RESIDENTIAL VILLAGE
- RC** RESIDENTIAL COMPREHENSIVE
- RMH** RESIDENTIAL MOBILE HOME
- RM** RESIDENTIAL MULTIPLE FAMILY
- RR1** RURAL RESIDENTIAL
- RR2** RURAL RESIDENTIAL
- RR5** RURAL RESIDENTIAL

- CC** COMMERCIAL CENTRAL
- CH** COMMERCIAL HIGHWAY
- CR** COMMERCIAL RESORT

- MB** INDUSTRIAL BUSINESS
- MG** INDUSTRIAL GENERAL

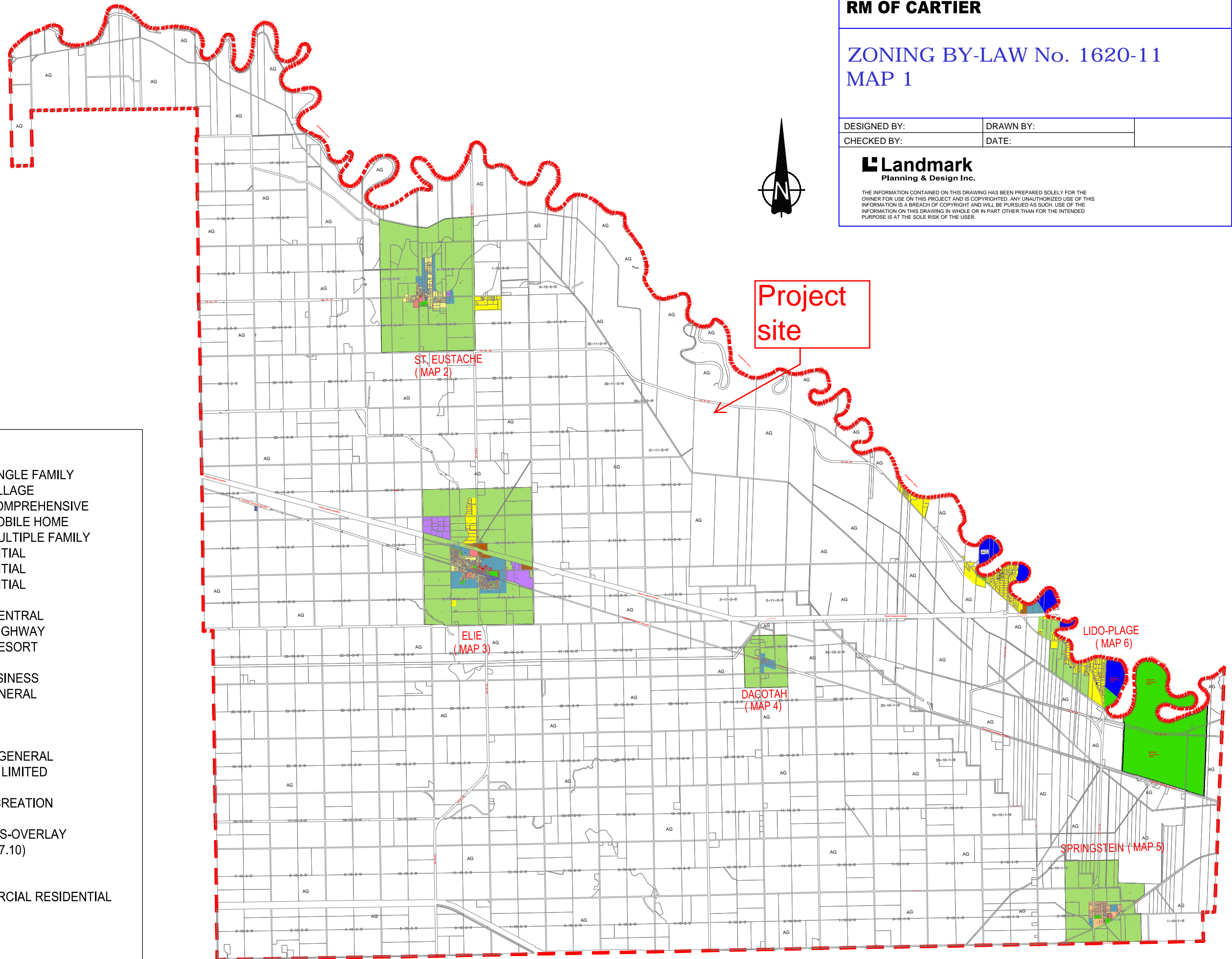
- I** INSTITUTIONAL

- AG** AGRICULTURAL GENERAL
- AL** AGRICULTURAL LIMITED

- PR** PARKS AND RECREATION
- SL** SENSITIVE LANDS-OVERLAY
(Refer to clause 17.10)

- HZ** HOLDING ZONE
- LCR** LIMITED COMMERCIAL RESIDENTIAL

- RM BOUNDARY**



Bunn, Jason

From: Matthews, Rob (CWS) <Rob.Matthews@gov.mb.ca>
Sent: December-10-15 11:26 AM
To: Bunn, Jason
Cc: Alf Poetker; CA - WinnipegFiling
Subject: RE: Licensed water users - Maxwell Colony [WSP# 151-13571-00]

Jason,

There are no licensed water users on this section of the Barrickman Drain.

Another thing to keep in mind is that the only licensed water use in such situations would be for non-municipal purposes.

Most likely if someone was taking water from such a drain, either under licence or unlicensed (domestic use exemption), it would be for livestock watering.

There are examples of people taking loads of water out of a drain during the spring runoff period and then storing it in a reservoir for irrigation purposes later in the year.

But that having been said, irrigation is not that common on the Lake Agassiz clay soils.

Rob

From: Bunn, Jason [mailto:Jason.Bunn@wspgroup.com]
Sent: December-10-15 9:29 AM
To: Matthews, Rob (CWS)
Cc: Alf Poetker; CA - WinnipegFiling
Subject: Licensed water users - Maxwell Colony [WSP# 151-13571-00]

Hi Rob,

We are preparing an EAP for Maxwell Colony for the construction of a new domestic lagoon in RL 108, Parish of St. Francois Xavier, R.M. of Cartier; proposed location south of PR 424 (also referred to as Road 241) and adjacent to the existing earthen manure storage; current land use is as agricultural cropland. The discharge is proposed to the south of the lagoon and into the Barrickman Drain in RL 108. Please provide the licensed water users for this Drain (if any) from RL 108 down to its convergence with the Assiniboine River (See attached map). We would appreciate receiving your response by December 23/15.

Kind regards,



Jason Bunn, P.Eng.
Environmental Engineer

WSP Canada Inc.
1600 Buffalo Place, Winnipeg, Manitoba R3T 6B8
T 204 477 6650 ext#307 | F 204 474 2864 | E jason.bunn@wspgroup.com
www.wspgroup.com

Maxwell Oxbow

MAXWELL COLONY

ASSINIBOINE RIVER

PR 424

PROPOSED LAGOON SITE

BARRICKMAN DRAIN

© 2015 Google
Image © 2015 DigitalGlobe

Google earth

867 m

2006

Imagery Date: 6/29/2013 49°56'24.47" N 97°38'20.70" W elev 239 m eye alt 4.10 km



Bunn, Jason

From: Friesen, Chris (CWS) <Chris.Friesen@gov.mb.ca>
Sent: January-05-16 10:43 AM
To: Bunn, Jason
Cc: 'Alf Poetker'; CA - WinnipegFiling
Subject: RE: Species search - Maxwell Colony [WSP# 151-13571-00]

Jason

Thank you for your information request. I completed a search of the Manitoba Conservation Data Centre's rare species database and found no occurrences at this time for your area of interest.

The information provided in this letter is based on existing data known to the Manitoba Conservation Data Centre at the time of the request. These data are dependent on the research and observations of CDC staff and others who have shared their data, and reflect our current state of knowledge. **An absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present;** in many areas, comprehensive surveys have never been completed. Therefore, this information should be regarded neither as a final statement on the occurrence of any species of concern, nor as a substitute for on-site surveys for species as part of environmental assessments.

Because the Manitoba CDC's Biotics database is continually updated and because information requests are evaluated by type of action, any given response is only appropriate for its respective request. Please contact the Manitoba CDC for an update on this natural heritage information if more than six months pass before it is utilized.

Third party requests for products wholly or partially derived from Biotics must be approved by the Manitoba CDC before information is released. Once approved, the primary user will identify the Manitoba CDC as data contributors on any map or publication using Biotics data, as follows as: Data developed by the Manitoba Conservation Data Centre; Wildlife Branch, Manitoba Conservation and Water Stewardship.

This letter is for information purposes only - it does not constitute consent or approval of the proposed project or activity, nor does it negate the need for any permits or approvals required by the Province of Manitoba.

We would be interested in receiving a copy of the results of any field surveys that you may undertake, to update our database with the most current knowledge of the area.

If you have any questions or require further information please contact me directly at (204) 945-7747.

Chris Friesen
Coordinator
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
<http://www.gov.mb.ca/conservation/cdc/>

From: Bunn, Jason [mailto:Jason.Bunn@wspgroup.com]
Sent: December-10-15 7:46 AM
To: Friesen, Chris (CWS)
Cc: Alf Poetker; CA - WinnipegFiling
Subject: Species search - Maxwell Colony [WSP# 151-13571-00]

Good morning Chris,

We are preparing an EAP for Maxwell Colony for the construction of a new domestic lagoon in RL 108, Parish of St. Francois Xavier, R.M. of Cartier; proposed location south of PR 424 (also referred to as Road 241) and adjacent to the

existing earthen manure storage; current land use is as agricultural cropland. Please provide a listing of rare species for the identified area. It would be great if we received your information by December 23/15.

Kind regards,



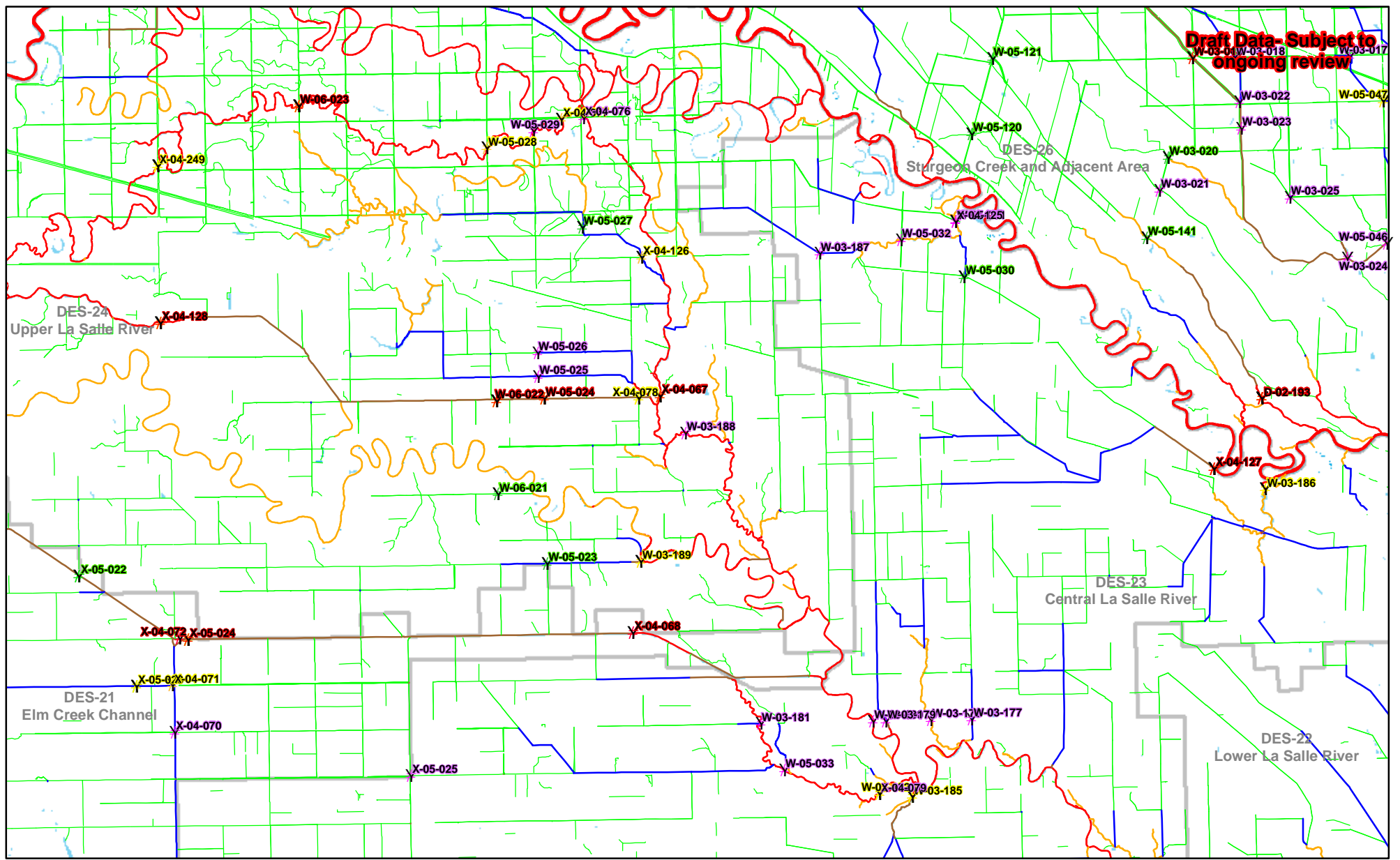
Jason Bunn, P.Eng.
Environmental Engineer

WSP Canada Inc.
1600 Buffalo Place, Winnipeg, Manitoba R3T 6B8
T 204 477 6650 ext#307 | F 204 474 2864 | E jason.bunn@wspgroup.com
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
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Draft Data - Subject to ongoing review







062J01	062I04	062I03
062G16	062H13	062H14
062G09	062H12	062H11

Habitat Classification

- A 
- B 
- C 
- D 
- E 

Fishing Results

- Indicator Species 
- Non-Indicator Species 
- No Catch 
- No Fishing Effort 

Appendix 9
Sampling sites, fish captures and habitat classification
of streams and constructed drains throughout
agricultural areas of Manitoba (2002 – 2006)

062H13

Produced April 2012

DATE: January 15, 2016

TO: Jason Bunn
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8
jason.bunn@wspgroup.com

FROM: Christina Nesbitt
Impact Assessment
Archaeologist
Historic Resources Branch
Main Floor 213 Notre Dame
Avenue
Winnipeg MB
R3B 1N3
Christina.Nesbitt@gov.mb.ca
PHONE NO: (204) 945-8145

SUBJECT: Domestic lagoon
Maxwell Colony
RL 108, Parish of St. Francois Xavier
HRB Review and Comments

HRB FILE: AAS-15-10103

Further to your memo requesting a heritage screening for the above lagoon for Maxwell Colony (Planned Area), the Historic Resources Branch (HRB) has examined the applicable areas proposed for development in conjunction with the Branch's records for areas of potential concern, and can advise you that HRB has no concerns with the project at this time.

However, please be advised that if any heritage resources are encountered in association with the Planned Area during development, the Developer is required to notify HRB and HRB may require that a heritage resource management strategy be implemented to mitigate the effects of development on the heritage resources.

If you have any questions or comments, please feel free to contact the undersigned at the above noted address, phone number, or e-mail.

Christina Nesbitt

Manitoba



Conservation and Water Stewardship
Environmental Stewardship Division
Environmental Approvals Branch
123 Main Street, Suite 180, Winnipeg, Manitoba R3C 1A5
T 204 945-8321 F 204 945-5229
www.gov.mb.ca/conservation/eal

March 09, 2016

Jason Bunn, P.Eng.
Environmental Engineer
WSP Canada Inc.
1600 Buffalo Place,
Winnipeg, MB R3T 6B8

Dear Mr. Bunn:

Re: Maxwell Colony Farms Wastewater Treatment Lagoon – Environment Act Proposal

A preliminary internal review of the Environment Act Proposal (EAP) for the Maxwell Colony Farms Wastewater Treatment Lagoon sent on January 27, 2016 has been completed. Upon completion of this review, it has been determined that the EAP report does not contain the following required components or information:

1. In section 3.2.1, it is indicated that there is a meat processing facility at the Maxwell colony which is used for food processing for the use of colony residents and only wash water is contributing to the Colony Sewer system from that facility. Please indicate how much organic and hydraulic loading from that facility would be contributing towards lagoon treatment and storage.
2. Although it is indicated in section 4.7 that the design of the forcemain would be submitted at a later date upon confirmation of the location, please provide general characteristics of the forcemain such as size, route, highway crossing location, etc.
3. In the section 4.8, it is indicated that the sludge from the existing lagoon would be incorporated into soil on the colony's agricultural land after drying for one year as part of the decommissioning process. The characteristics of the sludge from the existing lagoon and the soils of the land chosen for applying the sludge must be assessed to determine the characteristics before land application. Application of biosolids or sludge to agricultural land requires authorization through acquisition of an Environment Act Licence. Either the plan for land application of the sludge can be included with this Environment Act

Proposal (EAP) or you can submit a new EAP at a later date incurring another \$7,500 application fee.

4. The EAP did not include information relative to the 100 year flood elevation at the site as compared to dike top elevation. Please provide such information.
5. In section 5.3, it is indicated that a portable piping system would be used to transport the effluent from the lagoon to the Barrickman Drain (1 km long). It was not clear from the EAP that the pipe would be dedicated only to discharge treated wastewater and the sizing of the pipe would be compatible with the effluent discharge pipe to avoid spilling.
6. In section 5.3, it is indicated that a submerged bed of graded limestone for the purpose of phosphorus adsorption. Please indicate whether that bed would be considered to be a part of the Development or not. If so, please provide more details such as dimensions of that area.

In discussion with Environmental Compliance and Enforcement Branch, we would like to receive above additional information in a timely fashion. Please address and respond to these requests by March 31, 2016 so that the EAP review process may continue. If you have any questions or would like to discuss further, please contact me at 204-945-5234.

Yours sincerely,



Barsha Sagan, P. Eng.
Environmental Engineer

c: Peter Wipf, Maxwell Hutterian Mutual Corporation,
Nada Suresh/ Yvonne Hawryliuk, Environmental Compliance and Environment

July 19, 2016

Project No. 151-13571-00

Barsha Sagan, P. Eng.
Environmental Engineer
Manitoba Sustainable Development
Environmental Approvals
160 - 123 Main Street (Box 80)
Winnipeg MB R3C 1A5

Dear Ms. Sagan,

Re: Maxwell Colony Farms Wastewater Treatment Lagoon – Environment Act Proposal

Pursuant to your preliminary review of the Maxwell Colony Farms Wastewater Treatment Lagoon Environment Act Proposal (EAP) and the request for additional information, the following information is submitted in response to the request dated March 9, 2016:

1. The Maxwell Colony's meat processing plant is used for slaughtering, cutting and packaging poultry and hogs for food at the Colony. Poultry slaughtering is reported to be done three (3) times per year, in a single day preparing sufficient meat for the ensuing four months. Water use is for cooling the slaughtered birds and for wash-down of the facility on completion of each event. Blood and offal from the processing is captured via thorough cleanup and removed from the facility so as to minimize wash-down requirements. It does not end up in the wastewater. Cooling water to chill the carcasses is run for an estimated two hours for each event at a rate of 30 litres per minute for a total flow of 3,600 litres per event. Over three events per year that would amount to 10.8 m³ of wastewater flow. The washdown, after the meat is packaged and removed for storage in the freezer, takes another two hours or less with a hose that produces 19 litres per minute for an estimated maximum of 2,280 litres per event, a total of 6.84 m³.

The slaughter of hogs occurs once every five (5) months so there will be either two or three events in alternate years. The water use is for washing and takes an estimated two hours at 19 litres per minute, 2,280 litres per event. In a year when three events occur, the total flow will be 6.84 m³. All of these events in a year will combine to produce an estimated wastewater flow of 24.5 m³ which is 0.1 % of the total yearly flow estimated for the Colony in the EAP report.

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The strength of the cooling water is relatively low, beyond the initial wash, picking up only minor organic matter. There would be more organic matter in the washdown water, especially the initial flow. The capture and alternate disposal of the organic material reduces this to a small fraction of the total produced in the event. We do not have a measure of the strength of any actual flow but estimate the strength would not exceed 500 mg/L of BOD₅ and given the extent of the chilling and washdown, is probably diluted to less than that. At 500 mg/L, the total load for the year would be 12.25 kg of BOD₅, which is 0.2% of the total yearly organic loading to the lagoon. Both the hydraulic and the organic load contributed by the meat processing facility were considered to be included in the original projections of the totals in the report and are not to be considered here as additional to those reported earlier.

2. The application for approval of the forcemain to the lagoon will be submitted to the Environmental Assessment and Licencing Branch under the Water Works, Sewerage and Sewage Disposal Regulation, MR 33/88R of the Public Health Act at such time as the Licence for the proposed wastewater treatment lagoon is issued. Assuming that a Licence will be issued for the proposed lagoon at the location indicated in the Environment Act Proposal (EAP), the proposed pipeline will be about 900 metres in length, preliminary design at 100 mm diameter (subject to review depending on the assessment and possible modification of the current lift station). The expected alignment will be approximately as shown on the attached photomap of the area. The anticipated coordinates of the Highway crossing are shown on the photomap.

3. The decommissioning of the existing lagoon is proposed to be undertaken after the proposed lagoon is licenced, constructed and commissioned. There is expected to be an accumulation of sludge in the existing lagoon, the extent of which has not been determined. As indicated in the EAP, once this lagoon is no longer being used, it will be drained in the same way as it has been during the current operation with the testing of the contents for BOD₅, fecal and total coliform and discharged. It will then be left for a minimum of one year to allow the accumulation of sludge to stabilize and dry. It is then proposed to remove it and apply it to agricultural land in a way similar to the application of manure from the Colony's livestock operations. As indicated in your letter of March 9, 2016, this requires authorization in an Environment Act Licence. It is desired that this be included in the current EAP for the Licence to cover the construction and commissioning of the proposed new lagoon. It is understood that the characteristics of the sludge from the existing lagoon must be assessed as well as that of the soils of the land on which the sludge is to be applied prior to undertaking this operation. The land on which the sludge is expected to be applied is that lying just to the south of the Colony as shown on the attached photomap. Since the characteristics of both the sludge and that of the soil of this field will be subject to change in the intervening period, which could be several years, it is proposed that the requirement to provide this information be included as a deliverable in the Licence (similar to those of the construction reports and soil testing that are typically required at commissioning, and the testing of the lagoon effluent at discharge). That way the information that is provided prior to land application will reflect the conditions that actually exist at that time.

4. The flood information for the 100 year flood has been requested. The information that was provided is for the 200 year flood elevation of 241.9 metres and the flood protection level of 242.5 metres for the Maxwell Colony at the Assiniboine River. The proposed lagoon design drawings show elevations relative to the ground level at the site. A recent survey shows that the proposed top of dike elevation is 242.5 metres at the north, east and south sides of the primary cell. The east and south sides of the secondary cells are 0.3 metres lower and will be raised to match the elevation of the primary cell. The west side of the lagoon will be joined to the existing east dike of the manure storage pond which is about 2 metres higher and well above the proposed flood protection level.
5. The portable pipe that the Colony uses is a multipurpose pipe that may be used for various purposes in the Colony operations, which could include irrigation, drainage and may on occasion be used for pumping liquid manure (the Colony now has buried pipes in the field for this purpose which are covered by a permit from Manitoba Sustainable Development (formerly Conservation). When the pipe is used for whatever purpose, on completion, it is swabbed and blown out so that it is clean and ready for whatever its next use will be. The discharge pipe from the secondary cell is 150 mm in diameter, more than enough capacity to supply the discharge flow. The portable discharge pipe will be secured to the outlet via the secure Camlock connector. The valve will obviously not be opened until the connection is secure.
6. The EAP indicates in Section 5.3 that the proposal offers a “nutrient reduction strategy” as permitted for “Small wastewater treatment facilities” in lieu of meeting the standard phosphorus limit of 1 mg/L required of wastewater treatment facilities serving population centres of 2000 people or more. The strategies that are offered here include trickling the effluent through a bed of crushed limestone as it has been demonstrated to absorb some phosphorus. At this time we have no data from any scientific study to determine the degree of effectiveness or to provide an articulated design to achieve a specific reduction. The project may provide an opportunity to see how effective this mitigation measure is. Typically, the most significant phosphorus mitigation measure has been the slow release of the treated effluent, allowing absorption and plant uptake of both the liquid and of the dissolved and insoluble solids. The Barrickman Drain, with its wide bottom and emergent vegetation cannot be quantified in terms of a specific degree of phosphorus reduction in any given year. But together with the uptake of both nutrients and water volume, it is known from observations that we have made of actual discharges from other lagoons that this provides a significant reduction of these constituents, sometimes complete elimination of the discharge from entering the designated receiving stream.

It is understood that some of the information requested is not yet available. I trust that the foregoing is sufficient to proceed with the EAP review process. As indicated in the responses, some of the details requested in the March 9, 2016 letter will be available only after the project is in operation and will be provided at that time as a condition of the Environment Act Licence

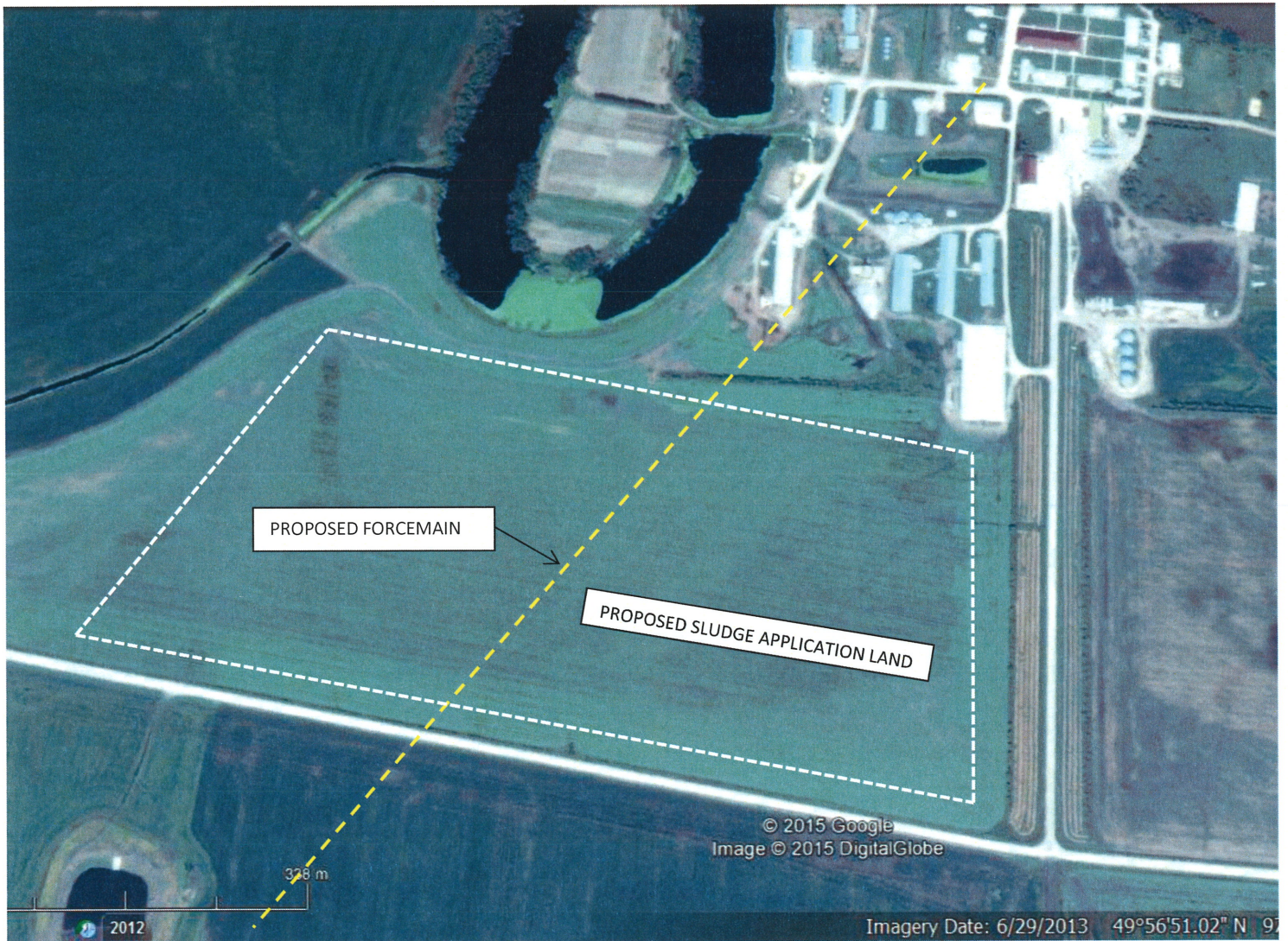
Yours truly,

WSP Canada Inc.

A handwritten signature in blue ink, appearing to read "Alf Poetker", with a long horizontal flourish extending to the right.

Alf Poetker, P. Eng.
Special Projects

enclosure



MAXWELL COLONY WASTEWATER TREATMENT LAGOON

Proposed Forcemain Location from Lift Station to Proposed Lagoon (preliminary)

(Highway Crossing at Approximately 49° 56' 40" N, 97° 39' 23" W)

Proposed Decommissioning Sludge Application Land – Approximately 25 Hectares

**ENVIRONMENT ACT PROPOSAL
MAXWELL COLONY FARMS
WASTEWATER TREATMENT LAGOON**

**Prepared for:
Maxwell Colony**

Project No: 151-13571-00

January 2016



**WSP Canada Inc.
1600 Buffalo Place
Winnipeg, MB R3T 6B8
www.wspgroup.com**

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APPENDICES

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Appendix B:	Status of Title
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Appendix D:	Plans and Details
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0.0 EXECUTIVE SUMMARY

Maxwell Colony has been asked by Conservation and Water Stewardship of Manitoba to apply for an Environment Act Licence for their wastewater treatment lagoon. The existing lagoon is within the Colony yard and is not in compliance with The Environment Act. The location and size essentially excludes it from qualifying for approval under the Act.

The Colony has engaged the services of WSP Canada Inc. to prepare an Environment Act Proposal (EAP) for the design and construction of a new wastewater treatment lagoon at a location that is appropriately separated from the Colony's residential area and that is developed to serve the future growth of the Colony population. The proposed location is south of the Colony farm site and adjacent to the existing earthen manure storage pond. The two cell lagoon is proposed to be built into the insitu high plasticity clay. Discharge is proposed to be into the existing Barrickman natural drain, which eventually empties into the Assiniboine River, a linear flow distance of approximately six (6) kilometres from the lagoon.

Major design appurtenances include installation of a forcemain, perimeter fence, valves, piping and lagoon signage.

It is anticipated that construction will begin in the year of the issuance of the Environment Act Licence, or the year following, depending on the time of year it is issued. Until the new wastewater treatment lagoon is built, tested and approved for use, the existing lagoon within the Colony will continue to be used and operated as it currently is with periodic testing for fecal and total coliform and BOD₅ and pumped discharge into the isolated oxbow channel to the west of the Maxwell Colony.

1.0 DEVELOPMENT INFORMATION

Maxwell Colony Farms Wastewater Treatment Lagoon

Name of development

Maxwell Hutterian Mutual Corporation

Legal name of the proponent of the development

River Lot 108, Parish of St. Francois Xavier, RM of Cartier

Location of development

Contact Person for Proponent:

Mr. Peter Wipf, Manager

Maxwell Colony
10450 Assiniboine Road
Cartier, Manitoba
R4K 1C3

Contact Person for Environmental Assessment:

Mr. Jason Bunn, P. Eng.

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba R3T 6B8

Proposal Contents:

Section of Environmental Act Proposal Form		Section Number in Report
DESCRIPTION OF DEVELOPMENT:		
(i)	Legal description and map of development	2.3
(ii)	Mineral rights	2.3
(iii)	Existing land use	2.3.3
(iv)	Previous studies	3.1
(v)	Proposed development	4.0
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FUNDING:		8.0

1.1 CANADIAN ENVIRONMENTAL ASSESSMENT INFORMATION

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6.	Public Involvement	5.9, 5.10
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8.	Contacts	1.0
9.	Personal Communication	Appendix E
10.	Attachments	Appendix A, B, C, D, E

2.0 INTRODUCTION AND BACKGROUND

2.1 MAXWELL COLONY

Maxwell Colony was established in 1918 by members of the Maxwell Colony from South Dakota. It was part of a larger group of Hutterite people that migrated from the Dakotas in that year and established an initial total of six colonies in this region. The Colony farmsite is located on the south bank of the Assiniboine River, in River Lots 102 to 105, Parish of St. Francois Xavier in the R.M. of Cartier.

The main business of the Colony is agriculture, primarily field crops and livestock production. In recent years they have added trucking and manufacturing of countertops to their economy. And in 2016, they are expected to open their new soybean crushing plant. The latter provides additional employment for the members of the Colony as well as a value-added dimension to the cropland production of soybeans.

The residential housing area of the Colony is located adjacent to the south bank of the Assiniboine River in the northeast quadrant of the yard. The houses are serviced by a sewage collection system that discharges to a lift station at the southwest corner of the residential area. A duplex pump system in the lift station pumps the wastewater to an existing two-cell treatment lagoon located within the yard site between the livestock barns and the residences.

2.2 EXISTING WASTEWATER TREATMENT LAGOON

The Colony wastewater treatment system is believed to have been developed as an initiative of Manitoba Agriculture with their Agri-Water assistance program. This program provided technical as well as financial assistance to farm producers, including Hutterite Colonies, in the development of water systems and wastewater treatment. The development of this system preceded the need to obtain an Environment Act Licence for a treatment lagoon. The Colony has, nevertheless, in recent years undertaken the testing of the contents of the lagoon for BOD₅ and for total and fecal coliform prior to discharge. Discharge from the secondary cell has then been to the oxbow channel west of the Colony site. This oxbow is an abandoned channel of the Assiniboine River that is completely isolated from the river and has no drainage

outlet. In years of extreme flooding of the river, the water has overflowed the divide between the river channel and the oxbow.

In May 2015, Manitoba Conservation and Water Stewardship (CWS) issued a letter (Appendix A) to Maxwell Colony indicating the requirement for the Colony to apply for an Environment Act Licence (EAL) for their wastewater lagoon. In consultation with their engineer, it was apparent that, while the existing facility was still in good repair and functional, it would not meet the current requirements for design size nor spatial separation from residential housing (the nearest home is about 75 metres from the edge of the lagoon). Also, the process of obtaining an EAL warranted the development of a facility at an alternate location that would serve the Colony well into the future. The Colony subsequently engaged WSP Canada Inc. to assist with the engineering of the proposed new facility and the application for Environment Act licencing. Further correspondence saw the deadline for submission extended to February 3, 2016. See Appendix A for CWS related correspondence.

2.3 PROJECT OWNERSHIP AND LOCATION

2.3.1 Land Ownership and Mineral Rights

The lagoon development area land and the project are owned by the Maxwell Colony Farms. The Status of Title for the proposed development area is included in Appendix B.

The rights to the mines & minerals and sand & gravel in River Lot 108, Parish of St. Francois Xavier go with the ownership of the land and are held by the Colony as has been confirmed by communication with Crown Lands & Property Branch (Appendix E) and a review of the Status of Title (Appendix B). Representatives of the Colony have confirmed same.

2.3.2 Proposed Wastewater Treatment Lagoon Location

The proposed wastewater treatment lagoon is to be located to the southwest of the Maxwell Colony farm site, across Provincial Road 424 (R.M. of Cartier) in River Lot 108, Parish of St. Francois Xavier, as shown in Figure 2.1. UTM co-ordinates for the site are 596200 m E, 5533150 m N.

2.3.3 Description Of Existing Land Use

The land intended for lagoon development is currently agricultural land. Land directly to the west of the proposed site supports an existing earthen manure storage (EMS) pond owned by the Colony.

This development area is designated as “RG”, Rural General Policy Area” and zoned “AG”, Agriculture General. Map 1 regarding the Development Plan By-Law No. 1-2008 for the White Horse Plains Planning District is included in Appendix E as is Map 1 regarding Zoning By-Law No. 1620-11 for the R.M. of Cartier.

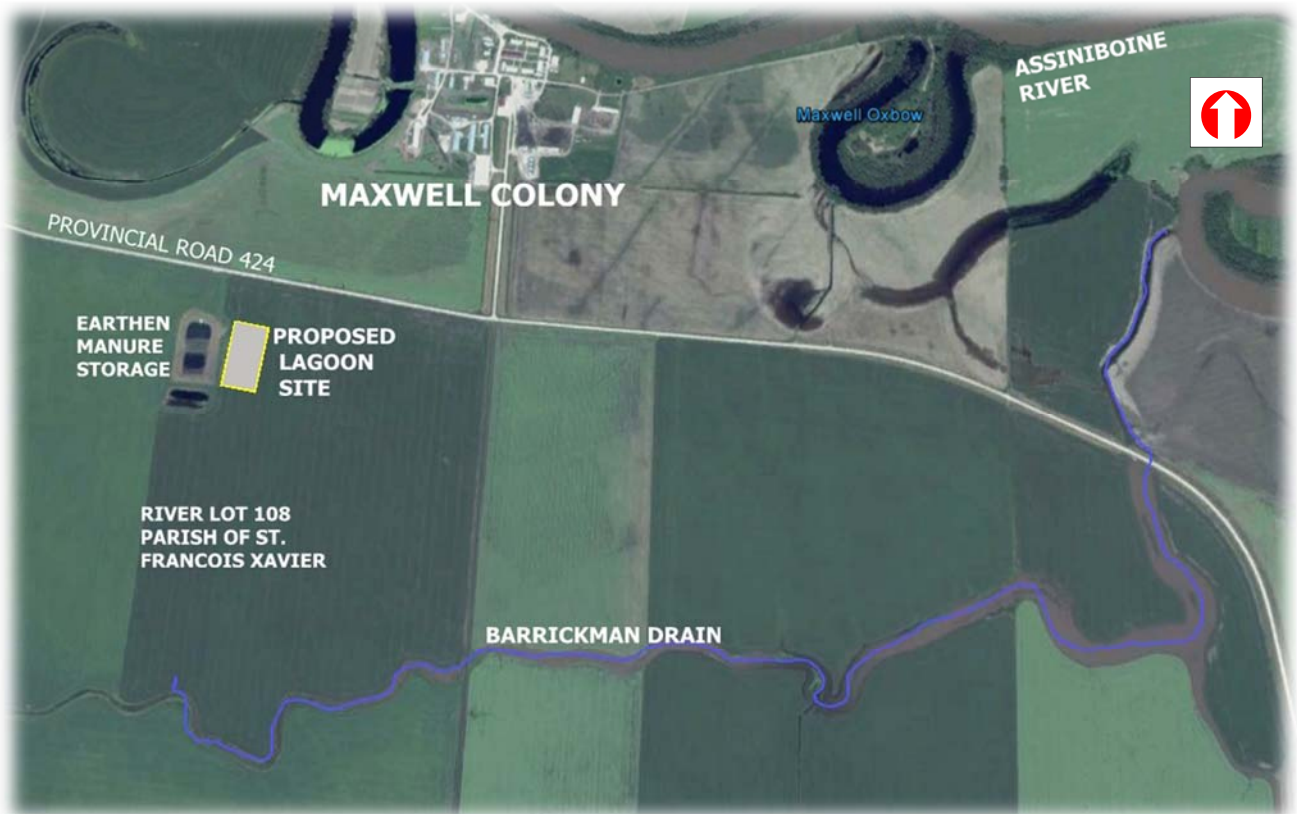


Figure 2.1: Maxwell Colony and Proposed Wastewater Lagoon Location Plan

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

It is proposed to develop a two-cell, earthen wastewater treatment lagoon at the site shown in Figure 2.1. The lagoon is to serve the wastewater treatment needs of Maxwell Colony into the future and will replace the existing lagoon located within the farmyard of the Colony. The new lagoon is proposed to have sufficient capacity to store the treated wastewater so that at design capacity, discharge may be limited to a single event in any year. It is proposed that discharge will be to the Barrickman Drain within River Lot 108, with eventual outlet to the Assiniboine River.

3.1 PREVIOUS STUDIES

Geotechnical Report for the Earthen Manure Storage Pond in River Lot 108

In 1998, Maxwell Colony built an earthen manure storage pond in River Lot 108, immediately adjacent to the location of the proposed wastewater treatment lagoon. The earthen manure pond was approved under Permit #LM-0028 by Manitoba Conservation. In support of the application for the permit, Cochrane Engineering Ltd. (currently WSP Canada) undertook a detailed geotechnical investigation.

The investigation included a site visit on December 2, 1997, excavating two testholes to a depth of 6.1 metres, sample collection and laboratory analysis. The report concluded that based on soil conditions, the pond cells should be built of the insitu, high plasticity, CH clay material. This is further described in Section 4.4 of this report.

3.2 POPULATION SERVICED AND DESIGN LOADING

Historically, with agricultural land being more readily available and Colonies being more focussed on cereal grains and livestock production for their economic development, the individual Colonies would acquire more land as they grew in population, and would typically divide when their number would reach about 120 people. That has changed in recent years as Colonies have expanded their operations to include manufacturing, both as value added industries to agricultural production and in the manufacture of a variety of consumer products. This has enabled the Colonies to sustain a greater population without the need to acquire more land or expand their livestock operations. In consultation with the Maxwell Colony we have based the design wastewater loading to the proposed lagoon on a population number of 220 people.

3.2.1 Sources Of Wastewater

The proposed lagoon will service the wastewater treatment needs of the Maxwell Colony. The current Colony population is approximately 110 people.

The Maxwell Colony has a meat processing facility that is typical of many colonies and is used for food processing for the use of their own residents. The Colony has offered a small amount of farm gate products for sale from this facility in the past. It would now be required to register the facility with Manitoba Agriculture, Food and Rural Development (MAFRD) and, subject to inspection, meet the requirements of Manitoba Regulation MR 339/88R *Food and Food Handling Establishments*. The Colony has not so registered their facility and has no plans to do so in the foreseeable future. No waste products from the process, other than wash water, are directed to the Colony sewer system. The estimates of water flow provided herein include the water that is used in the facility. As is indicated elsewhere in this EAP, the organic capacity in the proposed wastewater treatment lagoon is conservatively designed and will readily accommodate any organic loading that will be contributed by this plant.

3.2.2 Organic Loading

Organic loading refers to the quantity of organic material present in the incoming wastewater and is measured as the five day Biochemical Oxygen Demand (BOD₅). The organic loading becomes the total mass of BOD₅ in kg/d in the wastewater discharged to a lagoon.

On the basis of accepted practice, the daily BOD₅ production for domestic wastewater is 0.077 kg per person. The estimated organic loading to the proposed Maxwell Colony lagoon based on a design population of 220 people is (220 people x 0.077 kg-BOD₅/d) **16.94 kg-BOD₅/d**.

3.3 HYDRAULIC LOADING

Hydraulic loading refers to the volume of wastewater directed to the lagoon. In many typical cases, lagoons are designed for a 227-day storage period beginning November 1st and ending June 15th of the following year. Hydraulic loading over the 227-day storage period is used to calculate the volume of storage required in the lagoon facility. Discharge then typically takes place in June and again in October. In this case, the Colony is proposing to undertake a once

per year discharge. It will require a larger storage volume in the lagoon but reduces the work of arranging the discharge, provides more flexibility as to the timing and potentially prolongs the need for an expansion by providing the possibility of more than a single discharge within the anticipated discharge window of time from June 15th to October 31st in any year.

The water consumption as measured at the Colony's water supply plant indicates that a flow of up to 300 litres per capita per day (Lpcd) is produced, though not all of the water is used for domestic purposes. So it does not all end up as wastewater to be treated. Our estimates of wastewater flow that is typical for Hutterite Colonies ranges from 250 litres to 275 Lpcd.

A long-term domestic water consumption of 275 Lpcd has been estimated for the Maxwell Colony. This consumption is based on average consumption quantities obtained from other established colonies and is also supported by records at Maxwell Colony after deducting a portion of the metered water that is used on the Colony for non-domestic purposes. Conservatively, water consumption is assumed to equal wastewater generation and therefore 275 Lpcd is chosen as the design wastewater generation for the Colony. Infiltration into the existing sewer system is considered to be negligible since much of the wastewater flow is into holding tank pumping stations with pressure lines to the central lift station.

With the eventual design population of 220 people, the required active storage capacity for the proposed new lagoon is 22,082,500 Litres (275 Lpcd x 220 people x 365 days) or **22,083 m³** for a period of 365 days.

4.0 PROPOSED DEVELOPMENT

The proposed development consists of the construction of a new two-cell lagoon to serve the domestic wastewater treatment requirements of the Maxwell Colony. The new facility will provide treatment for the organic and hydraulic loading as indicated in Section 3.0.

4.1 NEW PRIMARY CELL

The new primary cell will be constructed as illustrated in the design drawings (Appendix D). It is proposed that the primary cell will be built into the insitu, high-plasticity clay as indicated in the Geotechnical Investigation and Soils Report (Section 4.4). The cell will be constructed with 4:1 interior and exterior side slopes. It will be operated at a maximum operating depth of 1.5 metres with 1.0 metre of freeboard. The maximum elevation of the operating depth of 1.5 metres will be about 0.3 metres above the maximum operating elevation of the secondary cell so as to allow for inflow during the time the secondary cell is isolated from the primary cell in preparation for discharge and during the discharge period.

The primary cell is sized, as a minimum, to meet the CWS guideline that requires at least one hectare (ha) of liquid surface area per 56 kg-BOD₅ of daily organic loading. In the current design, the size of the primary cell of the Maxwell Colony lagoon is determined on the basis of a maximum BOD₅ loading of 36 kg-BOD₅/ha per day. The conservative loading is chosen, in part to mitigate potential odours during spring break-up but also to optimize construction of a relatively small primary cell and to allow for potential population growth that could exceed the projected population of 220 people.

For a design population of 220 people contributing a total of 16.94 kg-BOD₅/day, the required minimum primary cell liquid surface at 56 kg-BOD₅/ha/d is 0.30 ha. At the selected loading rate of 36 kg-BOD₅/ha/d, and the contributing population, the primary cell surface area at a full-level liquid depth will be 0.47 ha.

Manitoba Conservation and Water Stewardship guidelines stipulate that only one-half of the total volume of the primary cell may contribute to the total storage volume of the lagoon. At an operating depth of 1.5 metres, the primary cell has a total volume of 5,672 m³ and an available storage volume of 2,836 m³.

Table 4.1 provides the details for the proposed design specifications for the new primary cell.

TABLE 4:1: NEW PRIMARY CELL SPECIFICATIONS

Parameter	New Primary Cell
Cell bottom	116 m (wide) x 25 m (long)
Liquid surface (at full design depth)	128 m x 37 m
Top of dyke (inside to inside)	136 m x 45 m
Operating depth	1.5 m
Freeboard height	1.0 m
Interior side slope	4:1
Exterior side slope	4:1
Total volume (at operating depth)	5,672 m ³
Storage volume	2,836 m ³
Surface area (at operating depth)	0.47 ha
Liner system	Insitu Clay Soil

4.2 NEW SECONDARY CELL

The new secondary cell will be constructed as illustrated in the design drawings (Appendix D). It is proposed that the secondary cell will also be built into the insitu, high-plasticity clay as indicated in the Geotechnical Investigation and Soils Report, Section 4.4. The cell will be constructed with 4:1 interior and exterior side slopes. Since the new lagoon is proposed to be built adjacent to the existing EMS pond, the top of the dyke of both the primary and secondary cells will abut against the existing east dyke of EMS so there will be no exterior slope of the dykes in this section. The secondary cell will be operated at a maximum operating depth of 1.5 metres with 1.0 metres of freeboard. The maximum elevation of the operating depth of 1.5 metres will be about 0.3 metres below the maximum operating elevation of the primary cell since there needs to be operating capacity in the latter while the secondary cell is being readied for discharge and during the discharge period itself.

The new secondary cell is designed to provide the balance of the wastewater storage. The volume of the cell below the invert of the discharge pipe is not included in the storage

calculation and is shown in Table 4.2 as “Dead storage volume”. The new cell contributes a storage volume of 19,554 m³ resulting in a total lagoon storage of 22,390 m³.

Table 4.2 provides details for the proposed design specifications for the new secondary cell.

TABLE 4.2: NEW SECONDARY CELL SPECIFICATIONS

Parameter	New Secondary Cell
Cell bottom	116 m (wide) x 125 m (long)
Liquid surface (at full design depth)	128 m x 137 m
Top of dyke (inside to inside)	136 m x 145 m
Operating depth	1.5 m
Freeboard height	1.0 m
Interior side slope	4:1
Exterior side slope	4:1
Total volume (at operating depth)	23,990 m ³
Dead storage depth	0.3 m
Dead storage volume (at 0.3 m depth)	4,436 m ³
Storage volume (at operating depth)	19,554 m ³
Liner system	Insitu Clay Soil

4.3 LOCAL TOPOGRAPHY

The topography at the site is very flat. The relief within a 1000 m radius in the field around the proposed lagoon site is not expected to vary by as much as one metre. The surrounding area is part of the Central Lowlands Area formed by glacial Lake Agassiz.

4.4 GEOTECHNICAL INVESTIGATION AND SOILS REPORT

As indicated in Section 3.1 of this report, in December of 1997, Cochrane Engineering (currently WSP) undertook a geotechnical investigation at this site in support of the design of an EMS which was constructed in 1998. The investigation included the excavating of two testholes to a depth of 6.1 metres, sample collection and laboratory analysis. It was found that the soil at the site consisted of firm, moist, high-plasticity grey to brown CH clay, all the

way from the surface organic soil to the bottom of both test pits. There was no water in the pits on completion of the tests.

Three samples were submitted to the laboratory for determination of the Atterberg limits. They confirmed the high-plasticity CH clay with a liquid limit between 55% and 71% and a plasticity index of between 22% and 26%. Based on laboratory analysis of similar clay soils, the hydraulic conductivity value was estimated to be 1×10^{-8} cm/s or lower. Test Hole logs TH 101 and TH 102, prepared at the time of the geotechnical investigation are included in Appendix C of this report along with a laboratory report showing the Atterberg limits of the soil. The logs incorrectly indicate that the site is in RL 105, Parish of St. Francois Xavier since that is the location of the Maxwell Colony farmsite. Current mapping shows that the actual EMS site as well as the proposed wastewater lagoon site are in RL 108, which is also the correct location of the testholes. The results of the soil tests show that the soil is consistent from one test hole to another. Since this is the ancient lakebed of Glacial Lake Agassiz, there is every reason to believe that they will also be consistent with the conditions at the adjacent site. The proposed wastewater lagoon will be built into the same high-plasticity CH clay which has not been disturbed in any way except for surface tillage for planting of successive crops over the years.

In 2012, Maxwell Colony undertook some maintenance of the EMS, cleaning out the accumulated sludge and repairing the inlet structure. This involved a cut of the dyke. The subsequent backfill of the cut was made with excavated soil from a borrow pit on the south side of the EMS. The soil was tested for maximum dry density and optimum moisture, which were $1,349 \text{ kg/m}^3$ and 29.8% respectively, which are typical of CH clay. Compaction tests of the soil in place showed that they met the specification for Standard Proctor Density. These test results are also included in Appendix C.

4.5 GROUNDWATER

Groundwater in the area, based on the drilling records for Maxwell Colony is found within the historic channel area of the Assiniboine River. Typically, the lacustrine clay deposit is six to seven metres in thickness, overlying another 10 metres of clay till. Additionally, the proposed lagoon site is outside the influence of the river channels and, as previously indicated, is in the

central lowlands of the Glacial Lake Agassiz basin. The known depth of the CH clay at the site is more than six metres. The proposed development of the wastewater lagoon is therefore no threat to groundwater.

4.6 CONSTRUCTION DETAILS

The proposed new lagoon will be constructed as detailed in the attached drawings and in accordance with the Manitoba Conservation and Water Stewardship Information Bulletin – *Design Objectives For Wastewater Treatment Lagoons (September 2014)*.

According to the surface profiles in the geotechnical investigation of the site, the topsoil in the proposed development area was observed to be about 300 mm. Typically, the lower portion of the apparent topsoil has a high proportion of inorganic clay. Re-usable organic topsoil from the proposed lagoon area will be stripped to a depth of 150 mm, stockpiled and re-applied at the end of the construction on the non-wetted areas of the dykes. The topsoil is to be stockpiled at a location and in such a way as not to be unduly susceptible to wind and water erosion during the construction period.

For lagoon construction, CWS requires that the proposed dykes and bottom of the proposed cells be provided with a layer consisting of at least one metre in thickness of soil having a permeability of less than 1×10^{-7} cm/s or equivalent. For this project, it is proposed that the excavated material from the construction of the lagoon cells will be used as embankment material for the construction of the dykes surrounding the cells. The insitu clay material, which is comparable to that used for the construction and maintenance of the adjacent earthen manure storage pond, has been tested to show that it is suitable to achieve the required permeability limit. In the unlikely event that any unsuitable material such as silty or sandy soil is encountered in the excavation, it will be excluded from use from the centre core to the inside face of the embankments. The inside surface of the excavated cells shall be scarified to a minimum depth of 150 mm and re-compacted. Construction of the embankment shall be in lifts not exceeding 150 mm and compacted with a pad foot roller to a minimum of 95% Standard Proctor density at minus one percent to plus three percent of optimum moisture content.

The interior and exterior side slopes of the constructed cells will be 4:1. The proposed cells will have a 1.5 metre operating depth with a minimum 1.0 metre freeboard. The top of the dykes will be 3.0 m wide to permit vehicle access to all points of the lagoon.

Rip rap is proposed for the inlet and outlet areas of the inter-cell and discharge piping. All inter-cell and discharge piping and valves will be located as shown on the design drawings.

A lockable access gate is to be installed as part of the construction activities. The gate is to be located across the lagoon access road and will connect with the perimeter fence. Signage identifying the nature of the facility will be placed alongside the access road at the entrance to the lagoon.

4.7 FORCEMAIN

The development of the proposed new lagoon will require the construction of a new forcemain to deliver the wastewater from the existing lift station in the residential area to the new lagoon. At this time, the size and routing of the forcemain is not finalized. At such time as an Environment Act Licence is issued for the proposed lagoon and its location is confirmed, the design of the forcemain will be completed and submitted to Manitoba Conservation and Water Stewardship for approval in accordance with Sections 6 and 7 of the *Water Works, Sewerage and Sewage Disposal Regulation MR 331/88R*.

4.8 DECOMMISSIONING OF THE EXISTING LAGOON

During the process of applying for the Environment Act Licence for the proposed new wastewater treatment lagoon and the construction and commissioning of the new facility, it is proposed that the existing wastewater lagoon that has served the Colony to the present, will continue to be operated as it has in the recent past and as described in Section 2.2 of this report. Once the new project is commissioned and connected to the existing sewage collection system, the liquid in the old lagoon will be tested and discharged as per the existing practice. The residual sludge will be retained in the cells for the duration of at least one winter to allow for freeze-thaw drying followed by blading into windrows for further drying. It is proposed that it will then be removed and incorporated into the soil on the Colony's agricultural land. As a

minimum, this will provide for one full year of stabilization of these solids from any contact with fresh sewage.

Following the removal of the dewatered solids from the former lagoon site, the area will be backfilled with the material from the dykes, levelled and eventually repurposed for use by the Colony.

5.0 ENVIRONMENTAL IMPACTS

5.1 ODOUR CONSIDERATIONS

The only time of the year that some minor odours may be present at the proposed lagoon is during the spring while the ice thaws. During the winter, ice cover largely prevents free oxygen from entering the water. This condition leads to the production of hydrogen sulphide gas (H₂S) by bacteria that do not require free oxygen. These accumulated gases dissipate quickly into the atmosphere when the ice breaks up and the pond returns to a non-odorous condition.

The closest residence to the proposed lagoon belongs to the Colony and is located approximately 1,100 metres away, which meets the CWS minimum setback distance of 300 metres.

5.2 LAND IMPACT

The land intended for lagoon development is currently cultivated agricultural land. Natural native land and habitat is not being disturbed by the lagoon developments.

5.3 SURFACE WATER

The structure of the proposed lagoon will not have any appreciable impact on surface water since the land all around it is flat, cultivated agricultural land. The treated effluent from the lagoon will be discharged into the existing Barrickman Drain, which crosses River Lot 108 from West to East about one kilometre south of the lagoon and eventually empties into the Assiniboine River. The distance of the route from the discharge point of the proposed lagoon to the Assiniboine River is approximately 6.2 kilometres, the first one kilometre of which, as indicated above, is the outlet from the lagoon across the agricultural field to the Barrickman Drain. The Colony proposes to use a portable piping system, commonly used for liquid manure application to their fields, to transport the effluent from the lagoon to the Drain. The Drain follows a natural drainage path at this point. It appears to be much larger than warranted for the watershed area that it drains, possibly as a result of historic, progressive erosion from the relatively lower elevation of the outlet into the Assiniboine River. The base of the drain is about 15 metres in width at the location of the proposed discharge from the lagoon and typically widens out from there downstream. And it is covered with a relatively thick growth of emergent vegetation of cattails and other plants.

The *Manitoba Water Quality Standards, Objectives and Guidelines*, updated in July 2011, now include a province-wide standard phosphorus limit of 1mg/L in the effluent. In considering the size of the nutrient load and the receiving water body, the Province has indicated that “Small wastewater treatment facilities (serving less than 2000 people or equivalent) have the option of implementing a demonstrated nutrient reduction strategy instead of the 1 mg/L phosphorus limit.” In keeping with this provision, it is proposed that the Maxwell Colony, with a projected maximum population of 220 people, will implement a discharge procedure that will firstly be periodic and not continuous, in keeping with the standard practice for facultative lagoons. Secondly, the discharge will consist of a trickle flow over a period of three or four weeks within the June 15th to October 31st window in any year. This will maximize the infiltration into the soil and the uptake by vegetation of the nutrients in the relatively wide, 5.2 kilometres of Barrickman Drain channel. Thirdly, the trickle flow will be discharged through a submerged bed of graded limestone for a degree of phosphorus absorption prior to entry into the Barrickman Drain. It is further expected that the conservative sizing of the lagoon relative to the published minimum standards of Manitoba Conservation and Water Stewardship, will result in a somewhat reduced level of nutrients in the treated effluent from the lagoon.

A discharge of the full 19,554 m³ hydraulic storage capacity of the lagoon at the design loading, spread over a 4 week period would provide a hydraulic load on the base width of the 5.2 kilometres of the Barrickman Drain of an estimated one to two centimetre of depth per day of discharge. A discharge during the summer or early fall when there is typically minimal or no runoff from the farmland, would result in little or no effluent reaching the Assiniboine River as most or all of the flow would be absorbed into the soil and vegetation or lost to evaporation.

The Water Licensing Branch of Manitoba Water Stewardship was consulted to provide a list of water users along the drainage route up to the Assiniboine River. The Branch responded that there are no licenced water users on the Barrickman Drain, which extends all the way to the Assiniboine River. A copy of the response is included in Appendix E.

The Maxwell Colony indicates that the proposed lagoon site and the adjacent, existing site of the earthen manure storage pond were not affected by the 2011 flood, which was estimated to be a 1 in 300-year event.

5.4 FUEL STORAGE ON SITE

The proposed facility does not require the onsite storage of gasoline or diesel fuel. During construction and upgrading, the contractor will be required to ensure that all equipment is properly maintained to prevent leaks and spills of fuel and motor fluids. Refuelling of equipment will not be within 100 metres of a water body, stream or wetland.

5.5 SPECIES IMPACT

A file search with the Biodiversity Conservation Wildlife and Ecosystem Protection Branch of Manitoba Conservation resulted in no occurrences found near the development site. Correspondence is included in Appendix E.

5.6 FISHERIES

The Barrickman Drain from where it arises in the agricultural fields, all the way down to its eventual discharge into the Assiniboine River (Figure 2.1), is classified as a type C habitat (complex habitat with no indicators present) according to Fisheries and Oceans Canada (DFO). The Assiniboine River into which it flows is type A (complex habitat, with indicators present). Details are included in Appendix E.

In order to protect any potential fish in the Assiniboine during the critical springtime spawning season, when effluent un-ionized ammonia tends to be high, the lagoon has been designed for a storage period that will permit the discharge to be made after June 15th in any year. This will allow for significant conversion of any potential toxic un-ionized ammonia into relatively benign nitrates and will minimize the potential of a discharge being made during the spawning period.

As noted from Fisheries and Oceans Canada (DFO), the deposit of deleterious substances into water frequented by fish is prohibited under the *Fisheries Act*. In addition, according to subsection 35(1) of the *Fisheries Act*, “no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.”

5.7 FORESTRY

There is no forestry activity in the development area. The construction of the lagoon will not affect any forested area nor any natural vegetative state. It is all cultivated agricultural land.

5.8 HERITAGE RESOURCES

In a letter dated January 15, 2016 from the Historic Resources Branch (Appendix E), it was stated that the Historic Resources Branch has found no areas of potential concern regarding heritage resources for this project.

5.9 SOCIO-ECONOMIC IMPACTS

The development of the lagoon will enable the Maxwell Colony to discontinue the use of the existing domestic lagoon which is located within the Colony farmyard and to repurpose the site for a use that promotes the economic activity of the Colony. This offers greater safety to the residents, removes an environmental hazard from the proximity of the residences and eliminates the potential for the discharge of inadequately treated wastewater as the population and water usage expands. The work of building the new lagoon will result in a short-term boost to the construction industry in the area.

5.10 PUBLIC INVOLVEMENT

Comments from members of the public in the development area will be solicited as part of the Manitoba Conservation and Water Stewardship review of the EAP prior to issuing the Environment Act Licence.

6.0 MANAGEMENT PRACTICE

The new wastewater treatment facility is specifically designed to provide wastewater treatment and storage capacity for the proposed population. The proposed lagoon is designed to treat wastewater up to an average loading of 16.94 kg-BOD₅/d and provide storage up to 22,630 m³ over a period of 365 days. The facility will normally be discharged sometime after June 15th and prior to October 31st in any year. It may be possible to discharge in alternate years in the beginning until population numbers and wastewater volume increases so as to require annual discharges. Treated effluent will be discharged by pumping from the isolated secondary cell at a rate that optimizes the opportunity for nutrients in the effluent to be assimilated in the discharge route prior to reaching the Assiniboine River while not challenging the normal operation of the wastewater treatment lagoon.

6.1 DISCHARGE PROCEDURE

- 1) Manipulate the valves to isolate the secondary storage cell two weeks before collecting the BOD₅, bacteriological, and any other samples required in the new Environment Act Licence.
- 2) Sample the isolated secondary cell. Allow at least one week to analyse the sample(s), plus shipment time.
- 3) If the tests indicate that the wastewater quality meets licence requirements the effluent can be discharged. If wastewater effluent quality does not meet licence requirements, re-test until they meet the required quality. Further discharge requirements may be instituted in the new Environment Act Licence that should be satisfied prior to discharge.
- 4) While discharging, the valve between the primary cell and the secondary cell remains closed to prevent additional liquid from transferring into the discharging secondary cell.
- 5) Once the secondary cell is discharged, reopen the valve between the primary cell and the secondary cell. This will allow the water levels in the cells to equalize. In many cases a sufficient amount of treated effluent is discharged from the secondary cell using this procedure to permit operation until the next scheduled discharge period. However, it may be necessary to discharge additional treated effluent to have enough storage for the wastewater flows in the following operational year.
- 6) If further discharging is necessary, repeat the isolation, testing and discharge process.

6.2 RECORD KEEPING AND INSPECTION ROUTINE

A record book, organized in five sections, should be maintained:

- 1) Daily Records – Pumping records for the lift station should be collected and retained for future estimation of flows to the wastewater treatment facility, i.e. elapsed time meter readings on the lift station pumps or flow meter.
- 2) Weekly Records - The weekly summer inspection would consist of recording the following: The water level, presence of odours and their source, and presence of floating objects (removal). The summer maintenance should also include grass cutting on the dykes, if necessary, elimination of emergent vegetation, extermination of burrowing animals, repair of the dykes and rip rap if damaged by wind erosion and wave action, repair of the fence and gate.
- 3) Periodic Winter Inspection is confined to inspecting for frozen piping, checking if the water level in the cells is as it should be.
- 4) Discharge Records - The records should contain all treated effluent quality analyses, dates of discharge, discharge procedure followed, water levels and other pertinent data.
- 5) Service Records - The lift station pumps should be serviced according to the manufacturer's instructions.

7.0 SCHEDULE

It is anticipated that the Environment Act Licence process will be finalized sometime during 2016. Construction could begin in 2016 or depending on the time of the issuance of the Environment Act Licence, could be undertaken in 2017.

8.0 FUNDING

The construction project is to be funded primarily by Maxwell Colony. The Colony proposes to pursue any and all applicable funding sources for this project.

Submitted by:
WSP Canada Inc.



Prepared by: A.J. Poetker, P. Eng.
Senior Project Consultant



Reviewed by: Jason Bunn, P. Eng.
Environmental Engineer

APPENDIX A

Manitoba Conservation and Water Stewardship Letters



Cal.wipf@gmail.com

Conservation and Water Stewardship

Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg, Manitoba R3H 0W4
T 204-945-7100 F 204-948-3833
www.manitoba.ca

REGISTERED MAIL

May 4, 2015

Mr. Peter Wipf, Manager
Maxwell Colony Ltd
10450 Assiniboine Road
Cartier MB R4K 1C3

Dear Mr. Wipf:

Re: Maxwell Colony Ltd – Requirement to apply for an Environment Act Licence

On January 26, 2012 Conservation and Water Stewardship requested that an Environment Act Licence proposal be submitted by April 30, 2012 to operate the wastewater treatment lagoon at Maxwell Colony. Departmental records indicate that an Environment Act Licence proposal has not been received.

A site inspection conducted on April 13, 2015 revealed that Maxwell Colony Ltd. continues to operate the wastewater treatment lagoon without a valid Environment Act licence. This existing development is not subject to "grandfathering" and continued use of the lagoon without receipt of an Environment Act Licence is in contravention of environmental legislation.

Wastewater treatment lagoons are listed as a Class 2 development under the *Classes of Development Regulation (M.R. 164/88)* and therefore require licencing under *The Environment Act*. The Environment Act proposal form, guide and "*Environment Act Proposal Supplementary Guidelines for Wastewater Treatment Facilities*" can be found at: <http://www.gov.mb.ca/conservation/eal/publs/index.html>.

In order to comply with the regulatory requirements, an engineer must assess your current wastewater disposal system and you are required to submit an Environment Act Licence proposal application by **August 15, 2015** to the following address:

Environmental Approval Branch
Manitoba Conservation and Water Stewardship
160-123 Main Street (Box 80)
Winnipeg MB R3C 1A5
Attention: Tracey Braun, Director

Please be advised that your facility is in non-compliance with *The Environment Act* and failure to file a proposal may result in prosecution under the *Act*.

Should you have any questions or concerns, please feel free to contact the undersigned at 204-945-8214 or by email at nada.suresh@gov.mb.ca.

Sincerely,

Nada Suresh, Environment Officer
Environmental Compliance and Enforcement
c: Tracey Braun, Environmental Approvals

Don Labossiere/Donna Smiley/Yvonne Hawryliuk, Environmental Compliance and Enforcement



Conservation and Water Stewardship
Environmental Stewardship Division
Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg MB R3H 0W4
T 204-945-7100 F 204-948-2338
www.gov.mb.ca/conservation/ece

September 30, 2015

Mr. Peter Wipf, Manager
Maxwell Colony Ltd.
10450 Assiniboine Road
Cartier MB R4K 1C3

Dear Mr. Wipf:

Re: Maxwell Colony Ltd – Requirement to apply for Environment Act Licence

Manitoba Conservation and Water Stewardship is in receipt of the letter dated September 14, 2015 requesting an extension to submit an Environment Act Proposal for a new wastewater treatment facility by January 31, 2016.

Your request for extension is granted. Please submit your Environment Act Proposal to the Environmental Approvals Branch by **February 3, 2016**. Please note that no further extension will be considered.

Also be advised that your present facility is in non-compliance with *The Environment Act* and failure to file a proposal may result in prosecution under the *Act*.

In the event you require further information or assistance please contact the undersigned in Winnipeg at 204-945-8214.

Sincerely,

Nada Suresh, Environment Officer
Environmental Compliance & Enforcement

c: Tracey Braun, Environmental Approvals Branch
Alf Poetker, P.Eng
Yvonne Hawryliuk/Geoffrey Stephens, Environmental Compliance and Enforcement

APPENDIX B
Status of Title

STATUS OF TITLE

Title Number **1760274/1**
Title Status **Accepted**
Client File **Maxwell Colony 151-13571-00**

The Property Registry

A Service Provider for the Province of Manitoba



1. REGISTERED OWNERS, TENANCY AND LAND DESCRIPTION

MAXWELL HUTTERIAN MUTUAL CORPORATION

IS REGISTERED OWNER SUBJECT TO SUCH ENTRIES RECORDED HEREON
IN THE FOLLOWING DESCRIBED LAND:

RLS 101 TO 112 PARISH OF ST FRANCOIS XAVIER
EXC OUT OF ALL LOTS, MAIN HIGHWAY PLANS 552 WLTO AND 4137 WLTO AND
PUBLIC ROAD PLAN 38973 WLTO AND
EXC OUT SAID RL 103, ROAD PLAN 2906 WLTO

The land in this title is, unless the contrary is expressly declared, deemed to be subject to the reservations and restrictions set out in section 58 of *The Real Property Act*.

2. ACTIVE INSTRUMENTS

Instrument Type: **Caveat**
Registration Number: **87-1429/1**
Instrument Status: **Accepted**

Registration Date: 1987-01-07
From/By: MANITOBA HYDRO ELECTRIC BOARD
To:

Amount:
Notes: AFF: PART RLS 101 AND 104
Description: No description

Instrument Type: **Mortgage**
Registration Number: **2013987/1**
Instrument Status: **Accepted**

Registration Date: 1996-05-01
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$1,300,000.00
Notes: No notes
Description: No description

Instrument Type: **Mortgage**
Registration Number: **2212865/1**
Instrument Status: **Accepted**

Registration Date: 1997-12-01
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$2,200,000.00
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **2332018/1**
Instrument Status: **Accepted**

Registration Date: 1998-12-08
From/By: MTS COMMUNICATIONS INC.
To:

Amount:
Notes: AFF.; PART
Description: EASEMENT

Instrument Type: **Caveat**
Registration Number: **2543530/1**
Instrument Status: **Accepted**

Registration Date: 2000-11-01
From/By: CARTIER REGIONAL WATER CO-OP INC.
To:

Amount:
Notes: AFF: WTN LTS R/W PL 38937
Description: EASEMENT

Instrument Type: **Mortgage**
Registration Number: **2786335/1**
Instrument Status: **Accepted**

Registration Date: 2002-11-04
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$4,000,000.00
Notes: No notes
Description: No description

Instrument Type: **Caveat**
Registration Number: **3296420/1**
Instrument Status: **Accepted**

Registration Date: 2006-05-30
From/By: MTS ALLSTREAM INC.
To:

Amount:
Notes: PART OF ALL LOTS
Description: EASEMENT AGREEMENT

Instrument Type: **Mortgage**
Registration Number: **4248706/1**
Instrument Status: **Accepted**

Registration Date: 2012-07-26
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: BANK OF MONTREAL

Amount: \$8,000,000.00
Notes: No notes
Description: No description

Instrument Type: **Personal Property Security Notice**
Registration Number: **4248707/1**
Instrument Status: **Accepted**

Registration Date: 2012-07-26
From/By: BANK OF MONTREAL
To: JOHN R. BRAUN AS AGENT

Amount:
Notes: No notes
Description: EXPIRES ON 2022/07/11

Instrument Type: **Easement**
Registration Number: **4581237/1**
Instrument Status: **Accepted**

Registration Date: 2015-02-26
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To: CENTRA GAS MANITOBA INC.

Amount:
Notes: AFF: WTN LTS R/W PL 57267
Description: STATUTORY EASEMENT

3. ADDRESSES FOR SERVICE

MAXWELL HUTTERIAN MUTUAL CORP.
RR 1 BOX 210
CARTIER MB
R4M 1B8

4. TITLE NOTES

No title notes

5. LAND TITLES DISTRICT

Winnipeg

6. DUPLICATE TITLE INFORMATION

Duplicate not produced

7. FROM TITLE NUMBERS

B87404/1 Partial

8. REAL PROPERTY APPLICATION / CROWN GRANT NUMBERS

No real property application or grant information

9. ORIGINATING INSTRUMENTS

Instrument Type: **Request To Issue Title**
Registration Number: **2549192/1**

Registration Date: 2000-11-20
From/By: MAXWELL HUTTERIAN MUTUAL CORPORATION
To:
Amount:

10. LAND INDEX

RL 101 FX
EXC PLANS 552, 4137 AND 38973

RL 102 FX
EXC PLANS 552, 4137 AND 38973

RL 103 FX
EXC PLANS 552, 4137, 38973 AND 2906

RL 104 FX
EXC PLANS 552, 4137 AND 38973

RL 105 FX
EXC PLANS 552, 4137 AND 38973

RL 106 FX
EXC PLANS 552, 4137 AND 38973

RL 107 FX
EXC PLANS 552, 4137 AND 38973

RL 108 FX
EXC PLANS 552, 4137 AND 38973

RL 109 FX
EXC PLANS 552, 4137 AND 38973

RL 110 FX
EXC PLANS 552, 4137 AND 38973

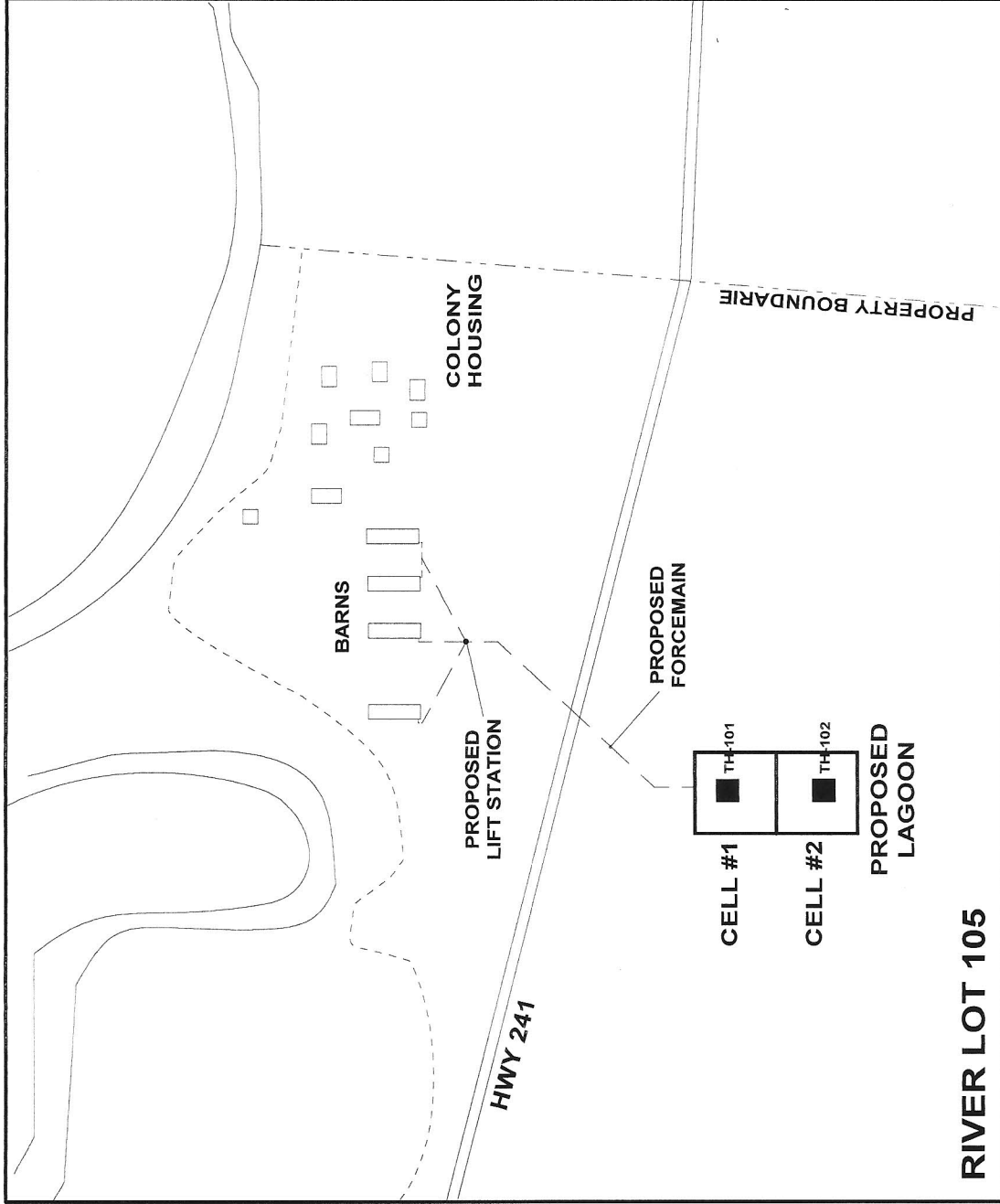
RL 111 FX
EXC PLANS 552, 4137 AND 38973

RL 112 FX
EXC PLANS 552, 4137 AND 38973

CERTIFIED TRUE EXTRACT PRODUCED FROM THE LAND TITLES DATA STORAGE
SYSTEM OF TITLE NUMBER 1760274/1

APPENDIX C

Geotechnical Logs and Test Results



RIVER LOT 105

COCHRANE GROUP		Cochrane Engineering Ltd.	
Engineers, Scientists & Project Managers		Engineers, Scientists & Project Managers	
DESIGNED BY: GMR	DRAWN BY: GMR	PROJECT: PROPOSED LIVESTOCK WASTE HOLDING POND	
CHECKED BY:	APPROVED BY:	DESCRIPTION: SITE & TEST LOCATIONS	
DATE: FEBRUARY 1998	DWG. NO.:	FIGURE 1	

CLIENT: MAXWELL COLONY
PROJECT: PROPOSED LIVESTOCK WASTE HOLDING POND
DESCRIPTION: SITE & TEST LOCATIONS

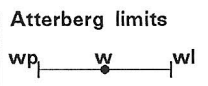
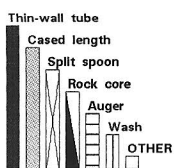
TEST HOLE LOG

SOIL INVESTIGATION

Borehole: TH-101
Project number: 44601
Client: MAXWELL COLONY
Co-ords (x,y):
G.W. Table [m]:
Total depth [m]: 6.10
Type of boring: Backhoe

Project name: HOG LAGOON DESIGN
Site location: R.L. 105 ST. FRANCOIS
Vertical scale: 1:60
Elevation [m]: 100.00
Date: December 2, 1997
Logged by: AJP

Depth [m]	Samples	DESCRIPTION	Symbol	USCS	LAB TESTS	Notes	
0.00					0 w,LL,PL [%] 100		
100.00		Topsoil, black, organic, moist	[Cross-hatch pattern]	SO			
0.40		Clay, Grey to dark brown, moist, firm, high plasticity	[Vertical lines pattern]	CH		Estimated hydraulic conductivity $k = 1 \cdot 10^{-8}$ cm/s	
99.60							
1.00							
99.00							
2.00							
98.00	101-1						
3.00							
97.00							
4.00							
96.00							
5.00					[Water table symbol]		
95.00	101-2						
6.10		TEST HOLE DRY ON COMPLETION					
93.00							



TEST HOLE LOG

SOIL INVESTIGATION

Borehole: TH-102
Project number: 44601
Client: MAXWELL COLONY
Co-ords (x,y):
G.W. Table [m]:
Total depth [m]: 6.10
Type of boring: Backhoe

Project name: HOG LAGOON DESIGN
Site location: R.L. 105 ST. FRANCOIS
Vertical scale: 1:60
Elevation [m]: 100.00
Date: December 2, 1997
Logged by: AJP

Depth [m]	Samples	DESCRIPTION	Symbol	USCS	LAB TESTS	Notes	
0.00					0 w,LL,PL [%] 100		
100.00 0.30		Topsoil, black, organic, moist	[Cross-hatched pattern]	SO		Estimated hydraulic conductivity $k = 1 \cdot 10^{-8}$ cm/s	
99.70		Clay, Grey to dark brown, moist, firm, high plasticity	[Vertical lines pattern]	CH			
1.00							
99.00							
2.00	102-1				[Graph: dot at ~10%]		
98.00							
3.00							
97.00							
4.00							
96.00							
5.00	102-2				[Graph: dot at ~10%]		
95.00							
6.10		TEST HOLE DRY ON COMPLETION					
93.90							

Thin-wall tube

- Thin-wall tube
- Cased length
- Split spoon
- Rock core
- Auger
- Wash
- OTHER

Atterberg limits

w_p — w — w_l

Cochrane Engineering Inc.
600-5 Donald Street
Winnipeg, Manitoba
R3L 2T4

December 15, 1997

Project : Maxwell Colony I log Lagoon
Your Project No.: 44601
Our Project No.: G822
Date Tested: Dec., 1- 15, 1997

Attention: Peter Bohonos, P. Eng.

SOIL TEST REPORT

ASTM Test Methods:

Liquid Limit, Plastic Limit and Plasticity Index of Soils (D4318-96)

Laboratory Determination of Water Content of Soil, Rock and Soil-Aggregate Mixture (D2216-92)

Field I.D.	Sample No.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index	% Retained on 0.425 mm sieve
101-1 16'	06546	37.3	60	22	38	1.3
102-1 5'	06547	38.7	71	26	45	1.4
102-2 16'	06548	43.0	55	24	31	1.4

Airdried: No Yes

Procedure: Multipoint Other

Prepared by:

Rod Girouard,
Geotechnical Technician

Reviewed by:

Peter Giesbrecht, P.Eng., Manager
Geotechnical Engineering Services



Unit 6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng_tech@mts.net
 www.eng-tech.ca

**MOISTURE-DENSITY
 RELATIONSHIP**

30 Thatcher Drive
 Winnipeg, Manitoba
 R3T 2L2

File No.: 12-035-03
 Ref. No.: 12-35-3-2

Attention: Alf Poetker, P.Eng
 Project: MAXWELL COLONY LAGOON

Compaction Standard Method ASTM D698 ASTM D1557

Dry Density kg/m ³	1319	1345	1335	1285	
Moisture Content (%)	27.5	29.1	31.0	33.4	

Maximum Dry Density = 1349 kg/m³ Corrected =
 Optimum Moisture = 29.8 % Corrected =

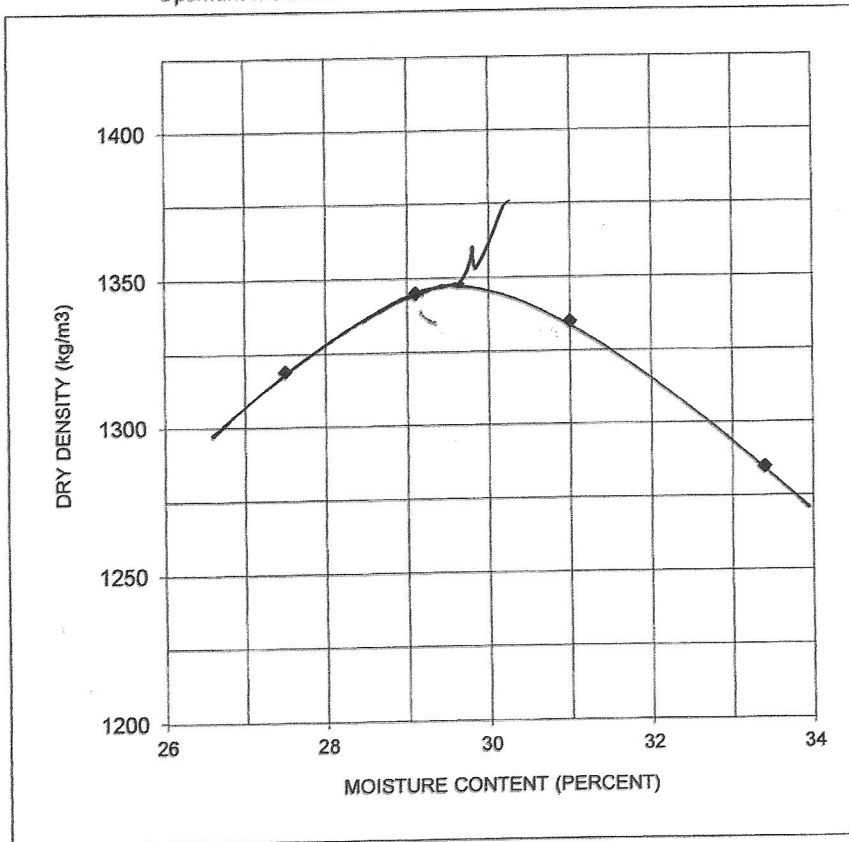
Source: Sampled obtained from
 test location 1 of Field
 Density report Ref No. 12-
 35-3-1

- kg/m³
 - %

Date Sampled: Nov 1/12
 Sampled By: ENG-TECH
 Date Received: Nov 2/12
 Date Tested: Nov 7/12

Material Oversize

4.75 mm = 0.1 %
 19 mm = - %



Soil Description:
 CH, clay, high plastic, dark brown with some
 black, silt sizes, trace sand, trace organics

Comments:

Cc.: Email: apoetker@shaw.ca

ENG-TECH Consulting Limited

Danny Holfeld, Principal
 Ph: (204) 233-1694 Fx: (204) 235-1579



Unit 6 - 854 Marion Street
 Winnipeg, Manitoba
 R2J 0K4
 eng-tech@mts.net
 www.eng-tech.ca

FIELD DENSITY

30 Thatcher Drive
 Winnipeg, Manitoba
 R3T 2L2

File No.: 12-035-03

Ref. No.: 12-35-3-1

Attention: Alf Poetker, P.Eng

Project: MAXWELL COLONY LAGOON

Contractor:	Maxwell Colony/Eagle Eye Excavation	Page:	1 of 1
Test Location:	Maxwell Colony – passed St. Francois Xavier on PR 424	Specification:	95%
Type of Construction:	Clay	Date Tested:	Nov 1/12


Test No.	Location	Test Depth (mm)	Moisture Content (%)		Dry Density (kg/m ³)		Percent Maximum Density
			Field	Optimum	Field	Maximum	
1	5m North, 22m East of the South West corner of secondary cell on primary cell.	150	37.3	29.8	1288	1349	95.4
2	17m North of the South West corner of secondary cell and 2m West on secondary cell.	150	31.6	29.8	1380	1349	102.2
3	25m North on primary cell and 30m East of the South West corner of secondary cell.	150	34.2	29.8	1364	1349	101.1

Field Method:	ASTM D2167 Balloon	⊗	ASTM D6938 Nuclear	ASTM D1556 Sand Cone
Laboratory Method:	⊗	ASTM D698	ASTM 1557	One Point Proctor At Existing Field Moisture Utilizing ASTM D698

Comments: Preliminary results reported to and accepted by Alf (Genivar). Sample obtained from test location 1 for Moisture Density Relationship. Refer to Moisture Density Relationship report Ref. No. 12-35-3-2 for additional information. Final results were corrected based on oven dry moisture contents and reported to Alf (Genivar) via telephone on Nov 7/12 at 3:00pm.

Cc: Email: apoetker@shaw.ca

ENG-TECH Consulting Limited

Per 
 Danny Holfeld, Principal
 Ph: (204) 233-1694 Fx: (204) 235-1579

APPENDIX D

Plans and Details

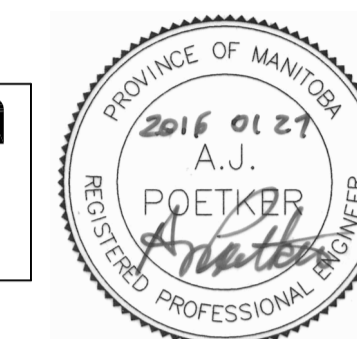


1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
PHONE: 204-477-6650 FAX: 204-474-2864
WWW.WSPGROUP.COM

CONSULTANT:

SEAL:

APEGM
Certificate of Authorization
WSP Canada Inc.
No. 5750 Date: January 27, 2016



CLIENT:

MAXWELL COLONY FARMS

CLIENT REF. #:

PROJECT:

PROPOSED WASTEWATER
LAGOON

KEY PLAN:

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ISSUED FOR - REVISION:

1	2016/01/27	EAP SUBMISSION
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IS	RE	DATE	DESCRIPTION
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PROJECT NO:	151-13571-00	DATE:	2016/01/27
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ORIGINAL SCALE:	1:5000	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
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DESIGNED BY:	AJP
DRAWN BY:	DTGB
CHECKED BY:	AJP/JSB

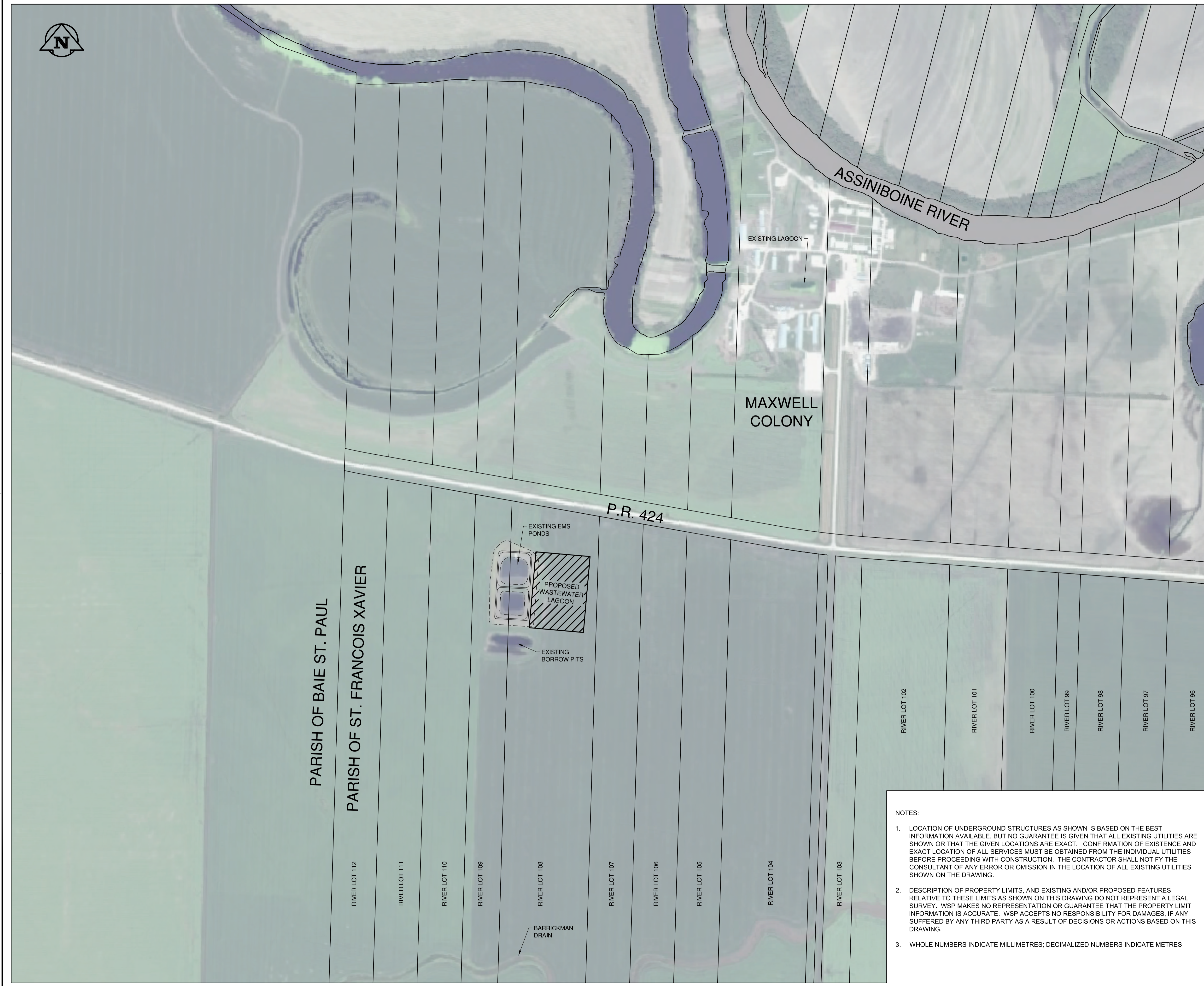
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TITLE: EXISTING SITE PLAN

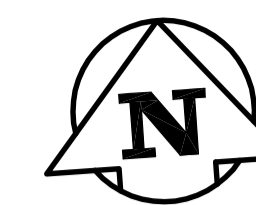
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SHEET #: 1 OF 3

ISSUE:	EAP SUBMISSION	REV #	0
DATE OF:	2016/01/27		

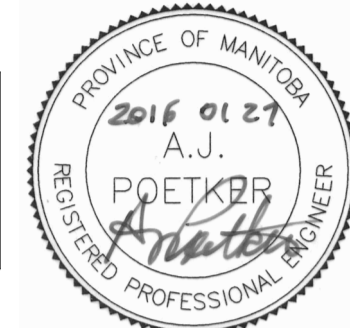
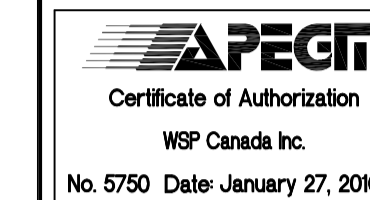


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 3. WHOLE NUMBERS INDICATE MILLIMETRES; DECIMALIZED NUMBERS INDICATE METRES



CONSULTANT:

SEAL:



CLIENT:

MAXWELL COLONY FARMS

CLIENT REF. #:

PROJECT:

PROPOSED WASTEWATER
LAGOON

KEY PLAN:

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1	2016/01/27	EAP SUBMISSION
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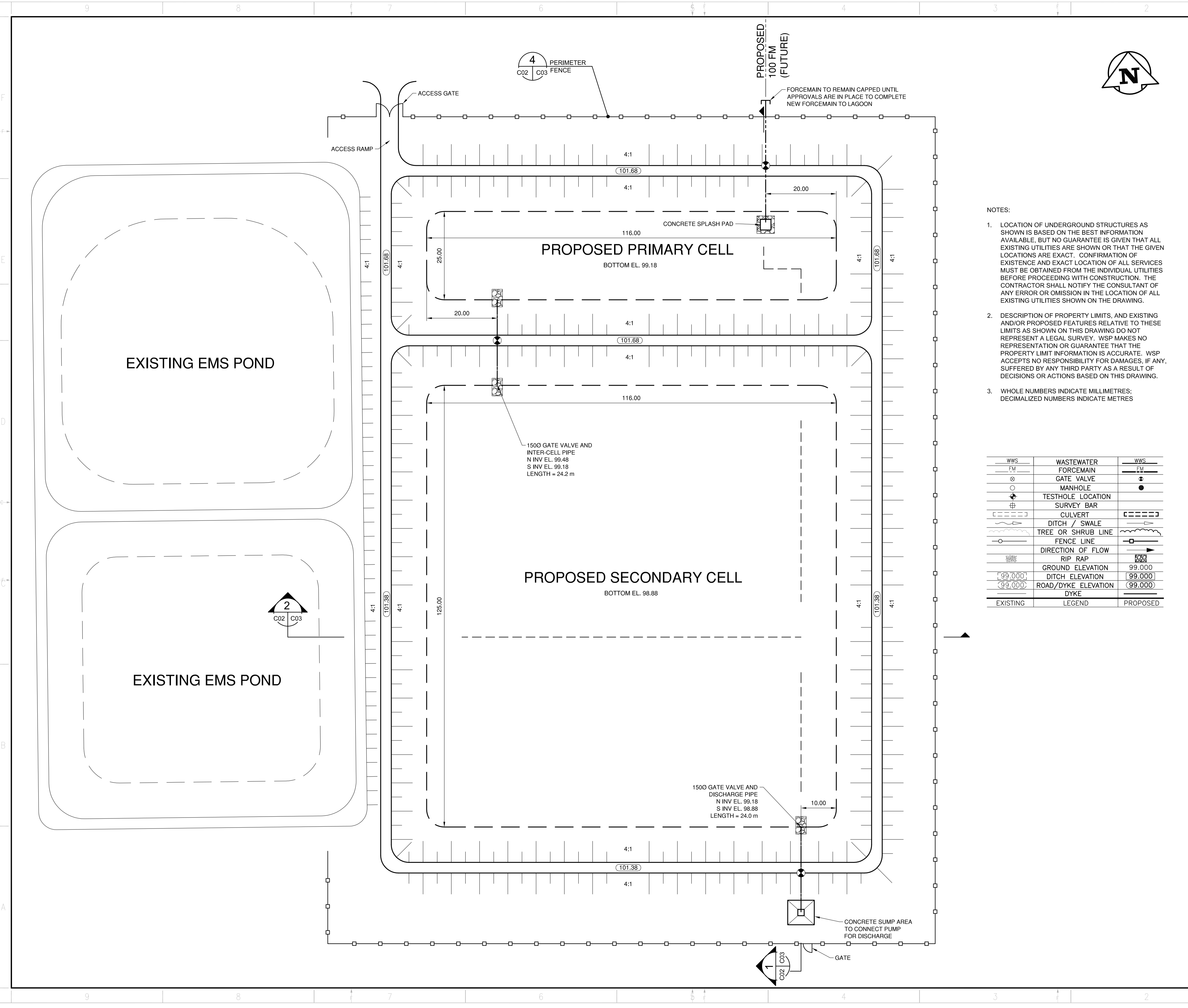
PROJECT NO:	151-13571-00	DATE:	2016/01/27
ORIGINAL SCALE:	1:500	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.	
DESIGNED BY:	AJP		
DRAWN BY:	DTGB		
CHECKED BY:	AJP/JSB		

DISCIPLINE: ENVIRONMENTAL INFRASTRUCTURE

TITLE: PROPOSED SITE PLAN

SHEET NUMBER: C02

ISSUE: EAP SUBMISSION
DATE OF: 2016/01/27



NOTES:

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WWS	WASTEWATER	WWS
FM	FORCEMAIN	FM
⊗	GATE VALVE	⊗
○	MANHOLE	●
⊕	TESTHOLE LOCATION	
#	SURVEY BAR	
[---]	CULVERT	[---]
---	DITCH / SWALE	---
~	TREE OR SHRUB LINE	~
—○—	FENCE LINE	—○—
→	DIRECTION OF FLOW	→
■	RIP RAP	■
99.000	GROUND ELEVATION	99.000
[99.000]	DITCH ELEVATION	[99.000]
[99.000]	ROAD/DYKE ELEVATION	[99.000]
	DYKE	
EXISTING	LEGEND	PROPOSED

CONSULTANT:

SEAL:

APEGM
Certificate of Authorization
WSP Canada Inc.
No. 5750 Date: January 27, 2016

PROVINCE OF MANITOBA
2016 01 27
A.J.
POETKOR
REGISTERED PROFESSIONAL ENGINEER

CLIENT:

MAXWELL COLONY FARMS

CLIENT REF. #:

PROJECT:

PROPOSED WASTEWATER LAGOON

KEY PLAN:

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PROJECT NO: 151-13571-00 DATE: 2016/01/27

ORIGINAL SCALE: N.T.S. IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

DESIGNED BY: AP

DRAWN BY: DTGB

CHECKED BY: AP/JSB

DISCIPLINE: ENVIRONMENTAL INFRASTRUCTURE

TITLE: SECTION VIEWS AND DETAILS

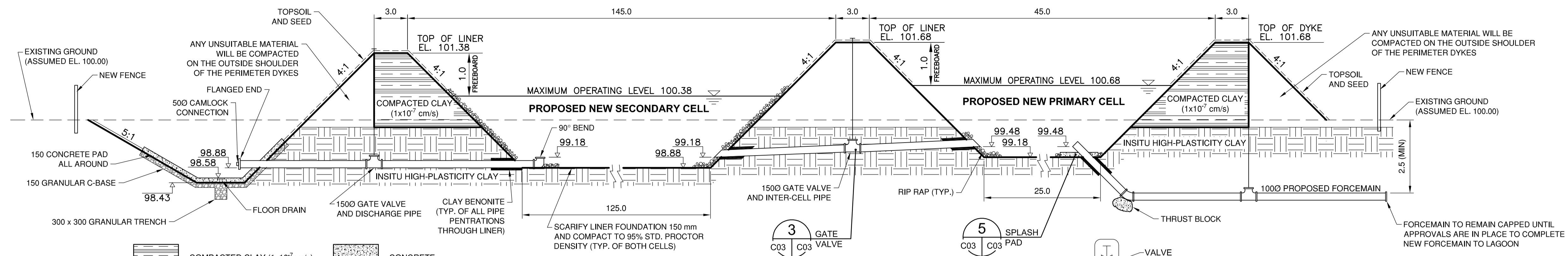
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SHEET #: 3 OF 3

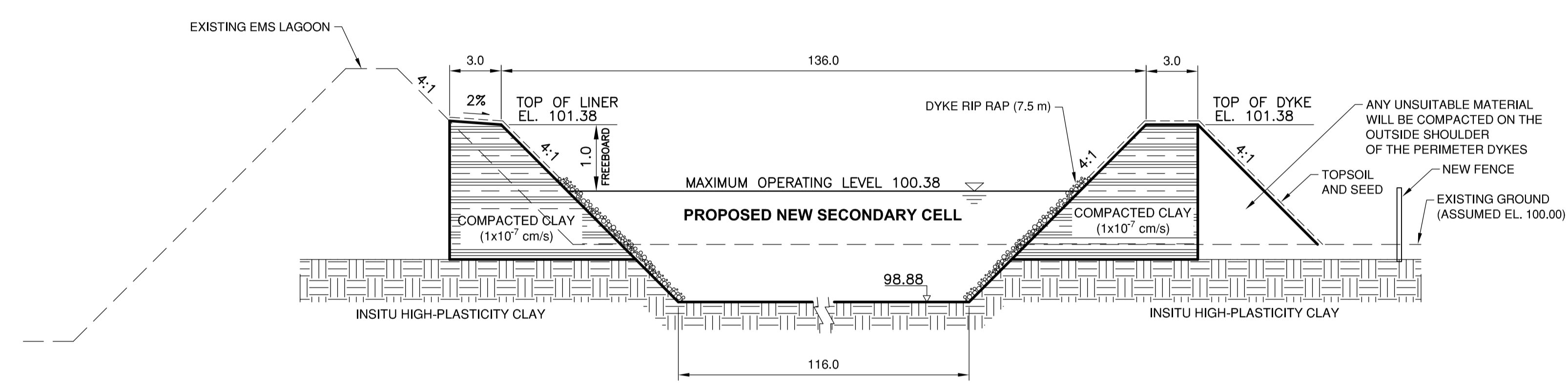
ISSUE: EAP SUBMISSION

DATE OF: 2016/01/27

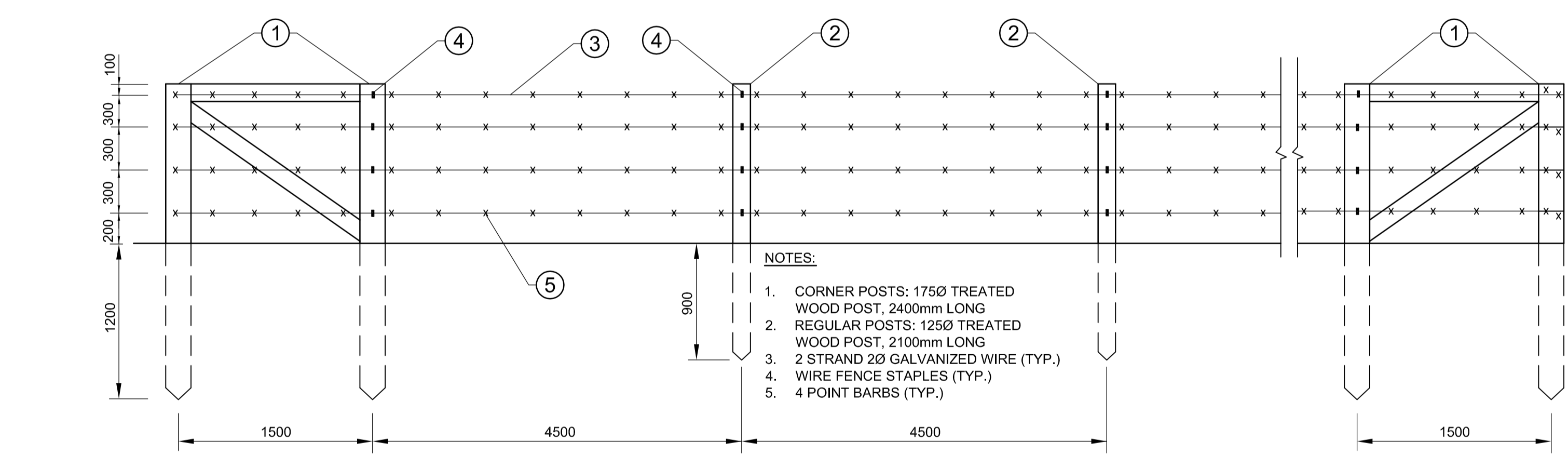
REV # 0



1 S/N SECONDARY AND PRIMARY CELL SECTION
C02 C03 N.T.S.

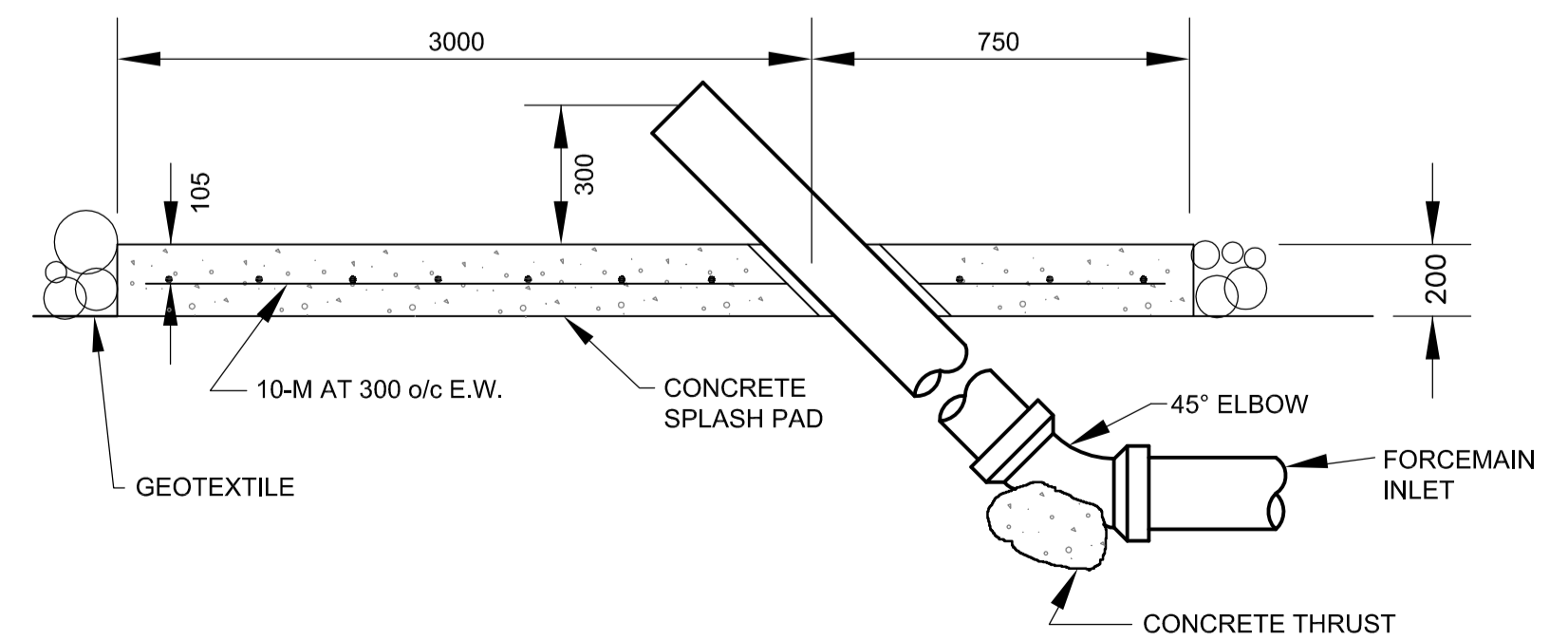


2 W/E NEW SECONDARY CELL SECTION
C02 C03 N.T.S.

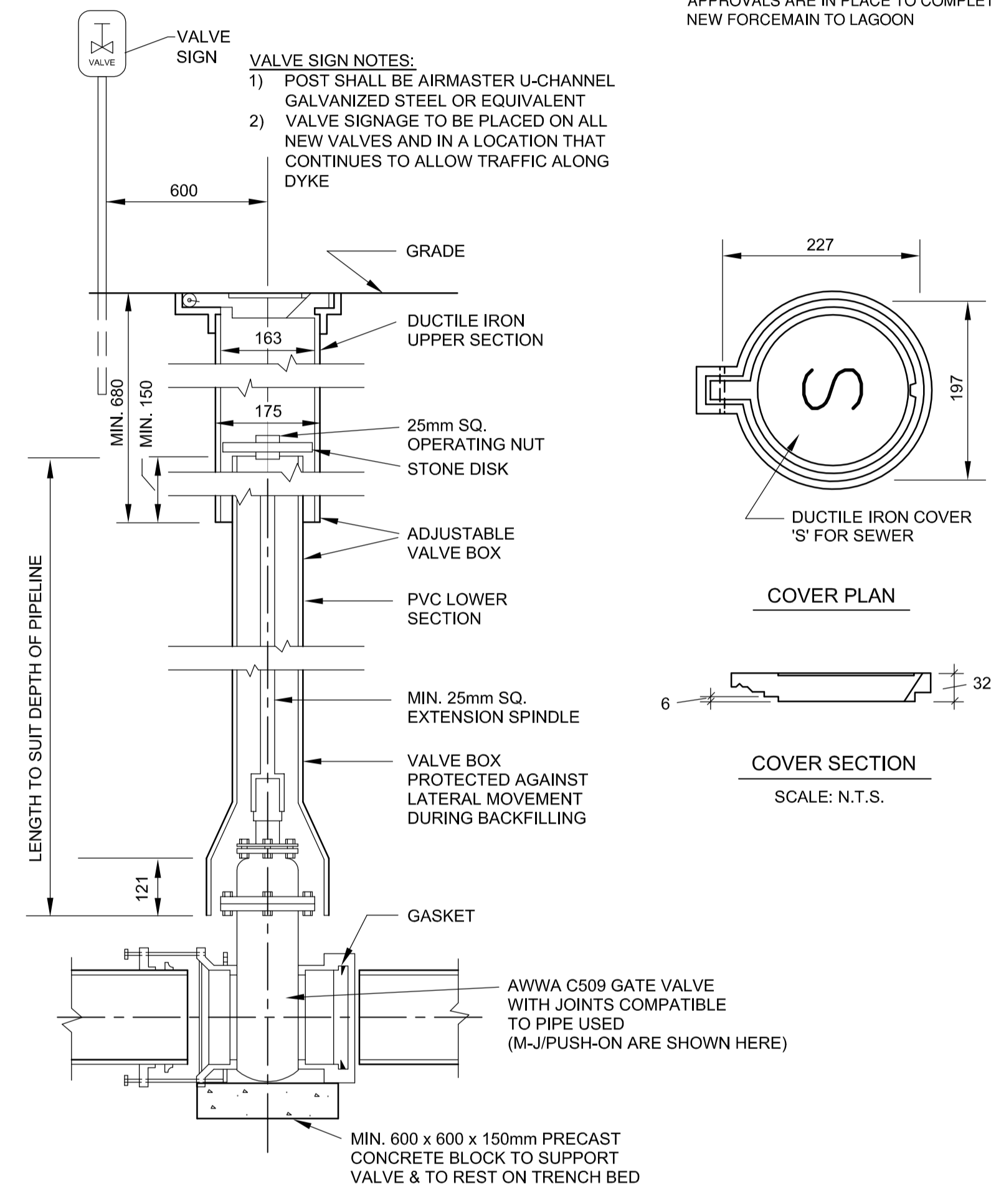


4 PERIMETER FENCE DETAIL
C02 C03 N.T.S.

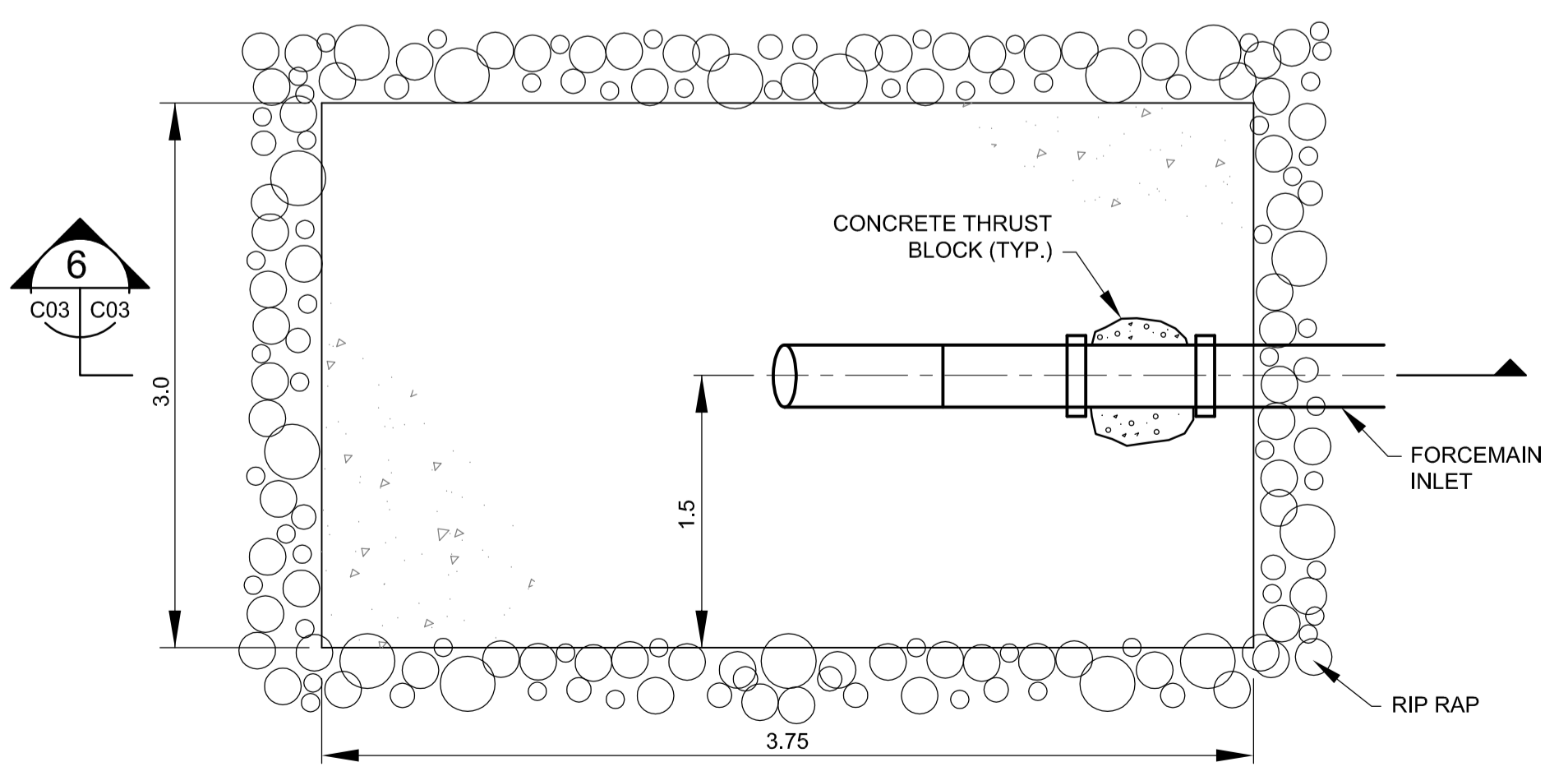
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6 FORCEMAIN SPLASH PAD SECTION
C03 C03 N.T.S.



3 GATE VALVE INSTALLATION
C03 C03 N.T.S.



5 FORCEMAIN SPLASH PAD
C03 C03 N.T.S.

APPENDIX E

General Correspondence for Reference

Bunn, Jason

From: Little, Karen (CLPA) <Karen.Little@gov.mb.ca>
Sent: December-11-15 9:34 AM
To: Bunn, Jason
Cc: 'Alf Poetker'; CA - WinnipegFiling
Subject: RE: Mineral Rights - Maxwell Colony [WSP# 151-13571-00]

Good morning Jason – according to The Crown Land Registry, this date, the Dominion of Canada granted:

- the Westerly 6 chains in width of RL 108 Parish of St. Francoise Xavier in 1878 to Michel Allard along with the mines & minerals and sand & gravel. The Crown kept no under-rights.
- the Easterly 6 chains in width of RL 108 Parish of St. Francois Xavier in 1885 to John S Morrison along with the mines & minerals and sand & gravel. The Crown kept no under-rights.

To determine current ownership of the under-rights you will need to do title searches at the Winnipeg Land Titles Office. Under-rights may have reverted back to the Crown by way of tax sale, which we are not aware of. <Karen>

Best wishes for the holidays,

Karen Little

Supervisor of Crown Lands Registry

Crown Lands and Property Agency
308 - 25 Tupper Street North
Portage la Prairie MB R1N 3K1
P 204-239-3805 F 204-239-3560
Toll Free 1-866-210-9589
karen.little@gov.mb.ca



An Agency of the Manitoba Government

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From: Bunn, Jason [mailto:Jason.Bunn@wspgroup.com]
Sent: December-10-15 9:33 AM
To: Little, Karen (CLPA)
Cc: Alf Poetker; CA - WinnipegFiling
Subject: Mineral Rights - Maxwell Colony [WSP# 151-13571-00]

Hi Karen,

We are preparing an EAP for Maxwell Colony for the construction of a new domestic lagoon in RL 108, Parish of St. Francois Xavier, R.M. of Cartier; proposed location south of PR 424 (also referred to as Road 241) and adjacent to the

existing earthen manure storage; current land use is as agricultural cropland. Could you please provide me with information as to the mineral rights (Mines and Minerals and Sand and Gravel) for this River Lot? We would greatly appreciate receiving this information by December 23/15.

Kind regards,



Jason Bunn, P.Eng.
Environmental Engineer

WSP Canada Inc.

1600 Buffalo Place, Winnipeg, Manitoba R3T 6B8

T 204 477 6650 ext#307 | F 204 474 2864 | E jason.bunn@wspgroup.com

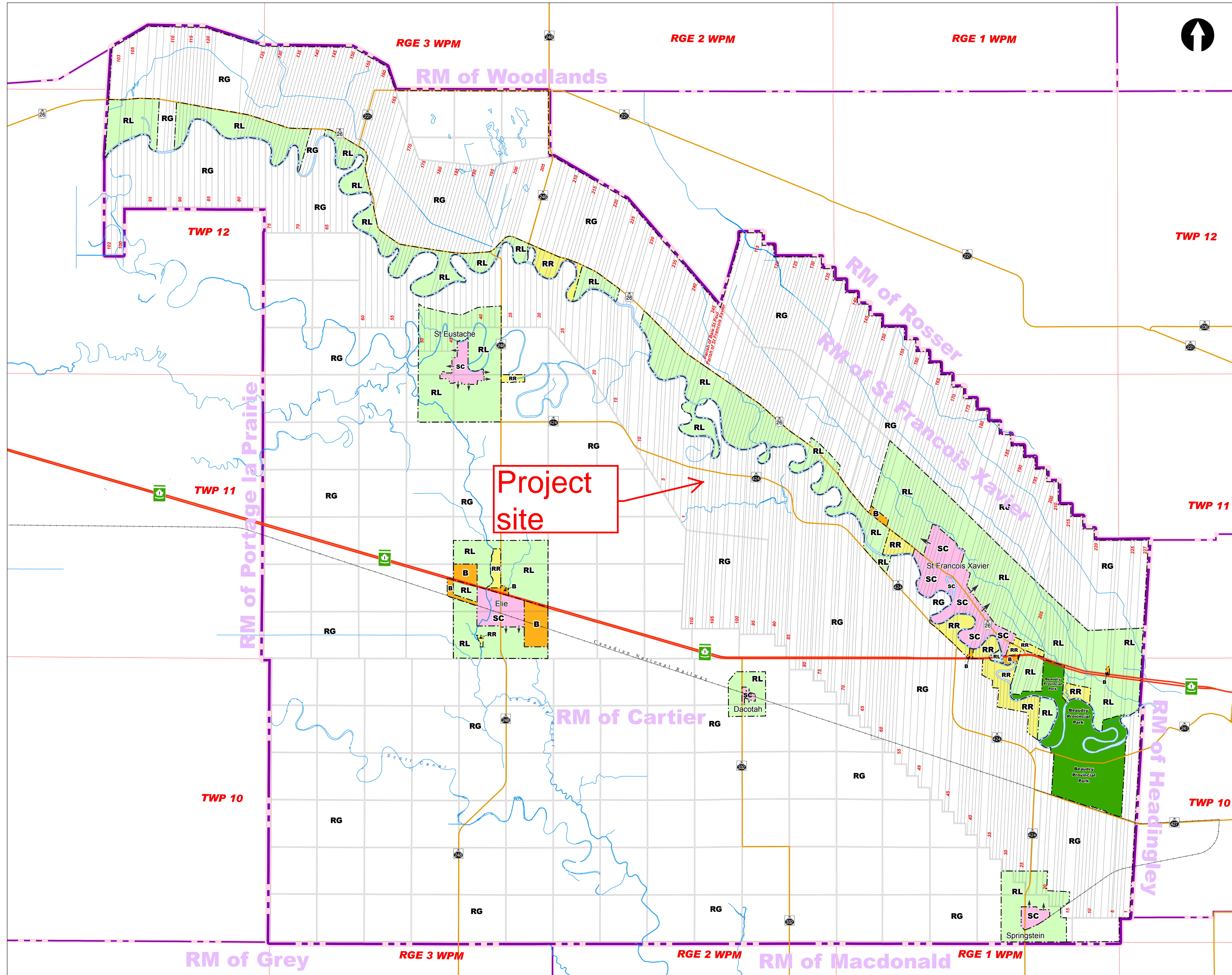
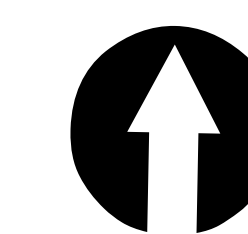
www.wspgroup.com

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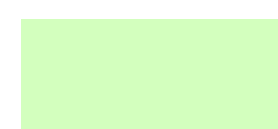





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**MAP 1
Overall
Land Use Plan**



LEGEND

-  RG - Rural General Policy Area
-  RL - Rural Limited Policy Area
-  RR - Rural Residential Policy Area
-  SC - Settlement Centre Policy Area
-  B - Business Policy Area
-  Municipal Boundary
-  Direction of Future Development



RM OF CARTIER

**ZONING BY-LAW No. 1620-11
MAP 1**

DESIGNED BY:	DRAWN BY:
CHECKED BY:	DATE:

Landmark
Planning & Design Inc.

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Project site

LEGEND :

- RS** RESIDENTIAL SINGLE FAMILY
- RV** RESIDENTIAL VILLAGE
- RC** RESIDENTIAL COMPREHENSIVE
- RMH** RESIDENTIAL MOBILE HOME
- RM** RESIDENTIAL MULTIPLE FAMILY
- RR1** RURAL RESIDENTIAL
- RR2** RURAL RESIDENTIAL
- RR5** RURAL RESIDENTIAL

- CC** COMMERCIAL CENTRAL
- CH** COMMERCIAL HIGHWAY
- CR** COMMERCIAL RESORT

- MB** INDUSTRIAL BUSINESS
- MG** INDUSTRIAL GENERAL

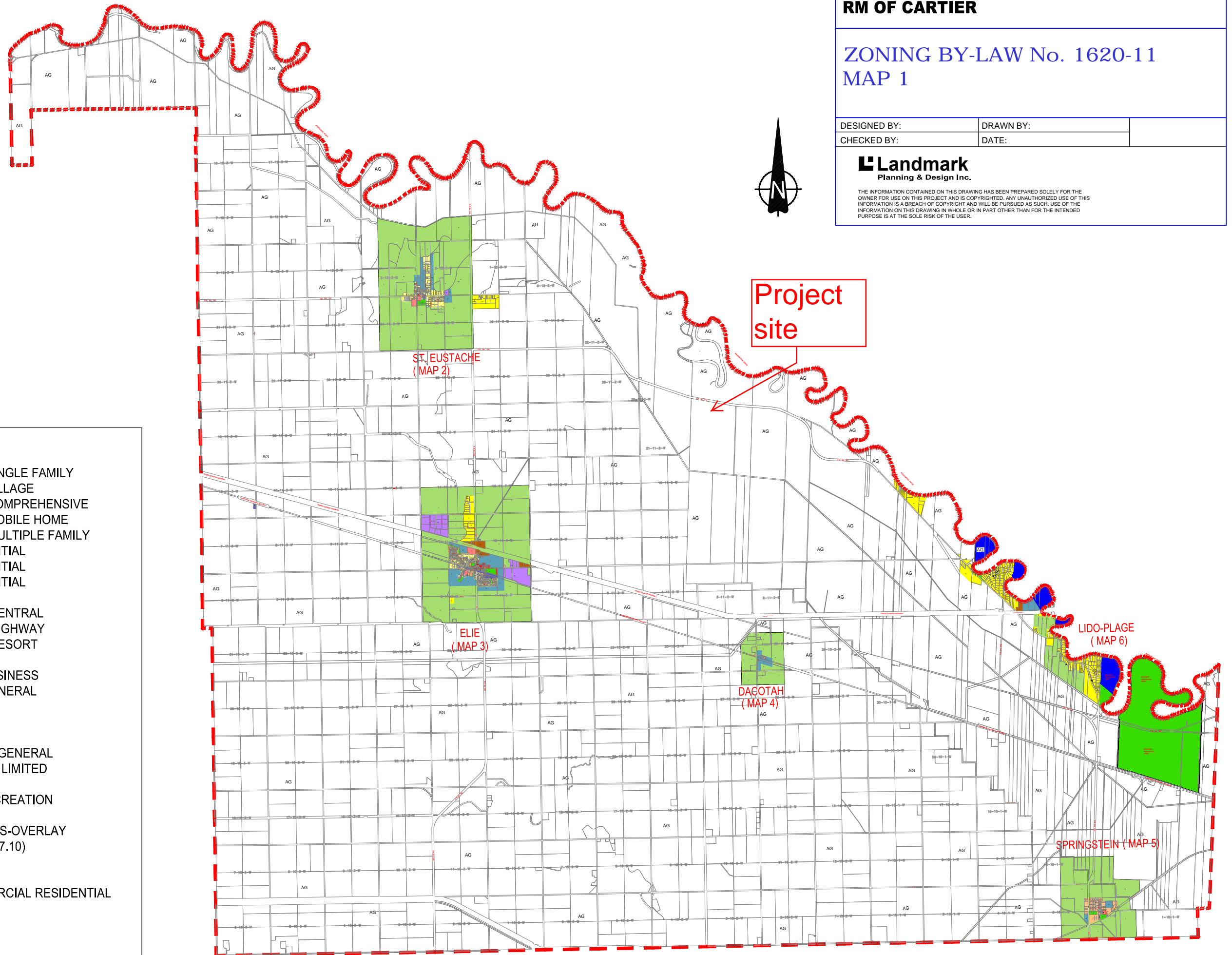
- I** INSTITUTIONAL

- AG** AGRICULTURAL GENERAL
- AL** AGRICULTURAL LIMITED

- PR** PARKS AND RECREATION
- SL** SENSITIVE LANDS-OVERLAY
(Refer to clause 17.10)

- HZ** HOLDING ZONE
- LCR** LIMITED COMMERCIAL RESIDENTIAL

- RM BOUNDARY**



Bunn, Jason

From: Matthews, Rob (CWS) <Rob.Matthews@gov.mb.ca>
Sent: December-10-15 11:26 AM
To: Bunn, Jason
Cc: Alf Poetker; CA - WinnipegFiling
Subject: RE: Licensed water users - Maxwell Colony [WSP# 151-13571-00]

Jason,

There are no licensed water users on this section of the Barrickman Drain.

Another thing to keep in mind is that the only licensed water use in such situations would be for non-municipal purposes.

Most likely if someone was taking water from such a drain, either under licence or unlicensed (domestic use exemption), it would be for livestock watering.

There are examples of people taking loads of water out of a drain during the spring runoff period and then storing it in a reservoir for irrigation purposes later in the year.

But that having been said, irrigation is not that common on the Lake Agassiz clay soils.

Rob

From: Bunn, Jason [mailto:Jason.Bunn@wspgroup.com]
Sent: December-10-15 9:29 AM
To: Matthews, Rob (CWS)
Cc: Alf Poetker; CA - WinnipegFiling
Subject: Licensed water users - Maxwell Colony [WSP# 151-13571-00]

Hi Rob,

We are preparing an EAP for Maxwell Colony for the construction of a new domestic lagoon in RL 108, Parish of St. Francois Xavier, R.M. of Cartier; proposed location south of PR 424 (also referred to as Road 241) and adjacent to the existing earthen manure storage; current land use is as agricultural cropland. The discharge is proposed to the south of the lagoon and into the Barrickman Drain in RL 108. Please provide the licensed water users for this Drain (if any) from RL 108 down to its convergence with the Assiniboine River (See attached map). We would appreciate receiving your response by December 23/15.

Kind regards,



Jason Bunn, P.Eng.
Environmental Engineer

WSP Canada Inc.
1600 Buffalo Place, Winnipeg, Manitoba R3T 6B8
T 204 477 6650 ext#307 | F 204 474 2864 | E jason.bunn@wspgroup.com
www.wspgroup.com

Maxwell Oxbow

MAXWELL COLONY

ASSINIBOINE RIVER

PR 424

PROPOSED LAGOON SITE

BARRICKMAN DRAIN

© 2015 Google
Image © 2015 DigitalGlobe

Google earth

867 m

2006

Imagery Date: 6/29/2013 49°56'24.47" N 97°38'20.70" W elev 239 m eye alt 4.10 km



Bunn, Jason

From: Friesen, Chris (CWS) <Chris.Friesen@gov.mb.ca>
Sent: January-05-16 10:43 AM
To: Bunn, Jason
Cc: 'Alf Poetker'; CA - WinnipegFiling
Subject: RE: Species search - Maxwell Colony [WSP# 151-13571-00]

Jason

Thank you for your information request. I completed a search of the Manitoba Conservation Data Centre's rare species database and found no occurrences at this time for your area of interest.

The information provided in this letter is based on existing data known to the Manitoba Conservation Data Centre at the time of the request. These data are dependent on the research and observations of CDC staff and others who have shared their data, and reflect our current state of knowledge. **An absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present;** in many areas, comprehensive surveys have never been completed. Therefore, this information should be regarded neither as a final statement on the occurrence of any species of concern, nor as a substitute for on-site surveys for species as part of environmental assessments.

Because the Manitoba CDC's Biotics database is continually updated and because information requests are evaluated by type of action, any given response is only appropriate for its respective request. Please contact the Manitoba CDC for an update on this natural heritage information if more than six months pass before it is utilized.

Third party requests for products wholly or partially derived from Biotics must be approved by the Manitoba CDC before information is released. Once approved, the primary user will identify the Manitoba CDC as data contributors on any map or publication using Biotics data, as follows as: Data developed by the Manitoba Conservation Data Centre; Wildlife Branch, Manitoba Conservation and Water Stewardship.

This letter is for information purposes only - it does not constitute consent or approval of the proposed project or activity, nor does it negate the need for any permits or approvals required by the Province of Manitoba.

We would be interested in receiving a copy of the results of any field surveys that you may undertake, to update our database with the most current knowledge of the area.

If you have any questions or require further information please contact me directly at (204) 945-7747.

Chris Friesen
Coordinator
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
<http://www.gov.mb.ca/conservation/cdc/>

From: Bunn, Jason [mailto:Jason.Bunn@wspgroup.com]
Sent: December-10-15 7:46 AM
To: Friesen, Chris (CWS)
Cc: Alf Poetker; CA - WinnipegFiling
Subject: Species search - Maxwell Colony [WSP# 151-13571-00]

Good morning Chris,

We are preparing an EAP for Maxwell Colony for the construction of a new domestic lagoon in RL 108, Parish of St. Francois Xavier, R.M. of Cartier; proposed location south of PR 424 (also referred to as Road 241) and adjacent to the

existing earthen manure storage; current land use is as agricultural cropland. Please provide a listing of rare species for the identified area. It would be great if we received your information by December 23/15.

Kind regards,



Jason Bunn, P.Eng.
Environmental Engineer

WSP Canada Inc.

1600 Buffalo Place, Winnipeg, Manitoba R3T 6B8

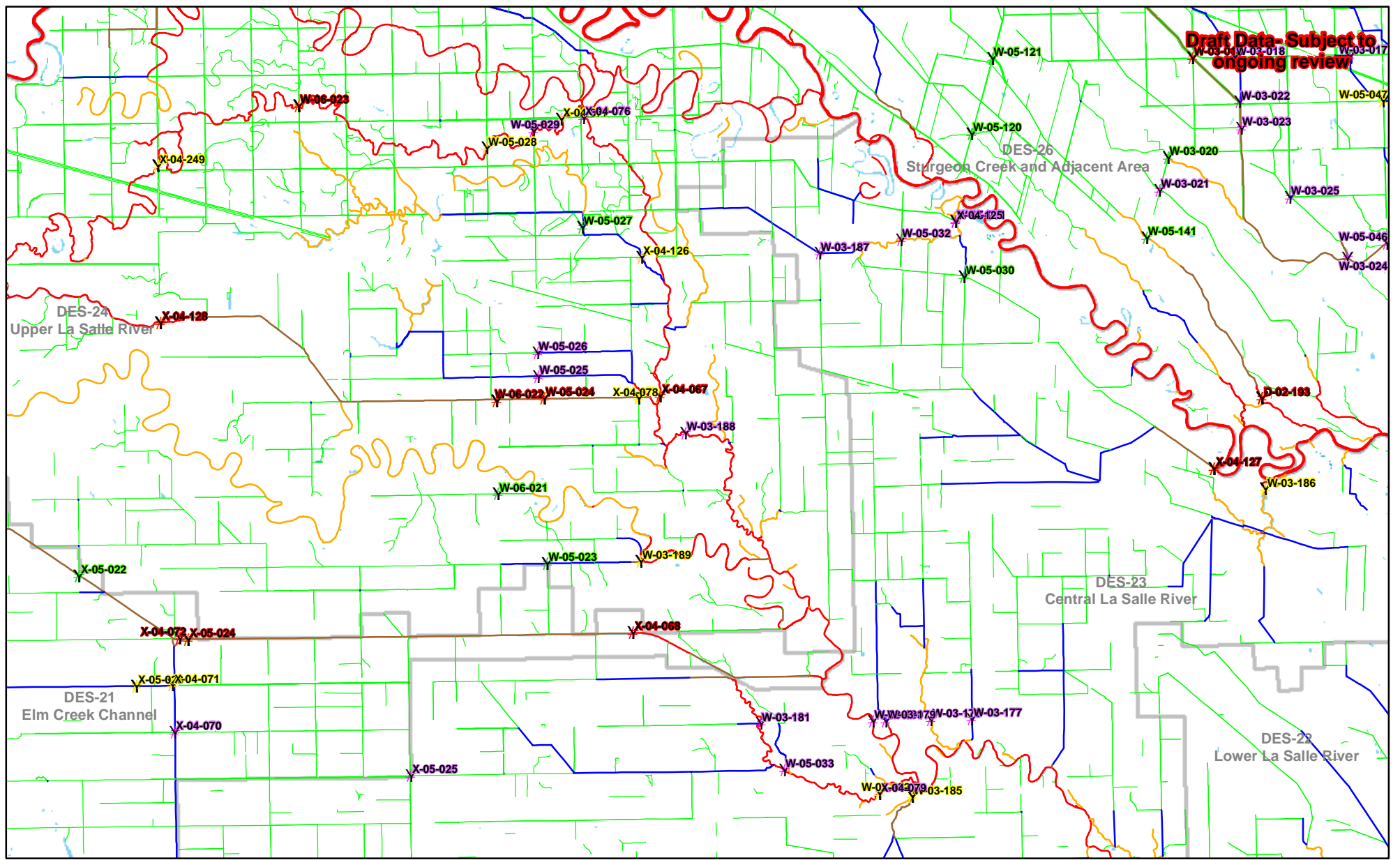
T 204 477 6650 ext#307 | F 204 474 2864 | E jason.bunn@wspgroup.com

www.wspgroup.com

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Draft Data - Subject to ongoing review



062J01	062I04	062I03
062G16	062H13	062H14
062G09	062H12	062H11

Habitat Classification

- A
- B
- C
- D
- E

Fishing Results

- Indicator Species
- Non-Indicator Species
- No Catch
- No Fishing Effort

Appendix 9
Sampling sites, fish captures and habitat classification
of streams and constructed drains throughout
agricultural areas of Manitoba (2002 – 2006)

062H13

Produced April 2012

DATE: January 15, 2016

TO: Jason Bunn
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8
jason.bunn@wspgroup.com

FROM: Christina Nesbitt
Impact Assessment
Archaeologist
Historic Resources Branch
Main Floor 213 Notre Dame
Avenue
Winnipeg MB
R3B 1N3
Christina.Nesbitt@gov.mb.ca
PHONE NO: (204) 945-8145

SUBJECT: Domestic lagoon
Maxwell Colony
RL 108, Parish of St. Francois Xavier
HRB Review and Comments

HRB FILE: AAS-15-10103

Further to your memo requesting a heritage screening for the above lagoon for Maxwell Colony (Planned Area), the Historic Resources Branch (HRB) has examined the applicable areas proposed for development in conjunction with the Branch's records for areas of potential concern, and can advise you that HRB has no concerns with the project at this time.

However, please be advised that if any heritage resources are encountered in association with the Planned Area during development, the Developer is required to notify HRB and HRB may require that a heritage resource management strategy be implemented to mitigate the effects of development on the heritage resources.

If you have any questions or comments, please feel free to contact the undersigned at the above noted address, phone number, or e-mail.

Christina Nesbitt