Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

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May 23, 2023
File: 2019-4231

Robert Boswick, P. Eng.
Senior Environmental Engineer
Environmental Approvals Branch
Manitoba Conservation and Climate
1007 Century Street
Winnipeg MB R3H 0W4
Canada

Re: LICENCE 1666 S3
ST. CLAUDE LAGOON - NOTICE OF ALTERATION Rev2.

Dear Mr. Boswick:

In accordance with the Environment Act (Section 14), this submission is a request for minor alterations to said facility operating under Licence Number 1666 S3 for the RM of Grey.

1 PROJECT DESCRIPTION

1.1 LAGOON AERATION REPLACEMENT

The existing aeration system is past its useful life and numerous leaks and repairs reduces its efficiency. It is currently proposed to replace the system in 2023/24. Prior to replacement, the accumulated biosolids in all three cells will be removed for land disposal (EAP under separate submission). Once the biosolids are removed, the new aeration piping and diffusers will be replaced in the cells.

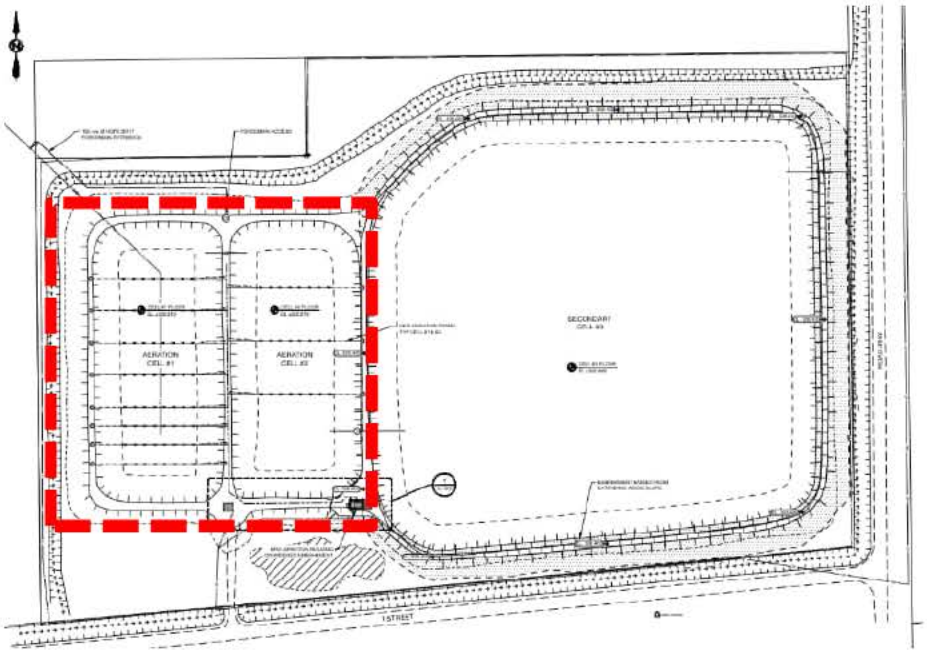
The new aeration system is to be designed for the projected 2042 organic load of 355 kg BOD/day with an average day flow of 396 m^3/day. It is proposed to design the new aeration system to match the exiting treatment rate of 355 kg BOD/day and to maintain at least 2.0 mg/L of dissolved oxygen in the water column.

The following Table summarizes the current and future loadings to the facility.

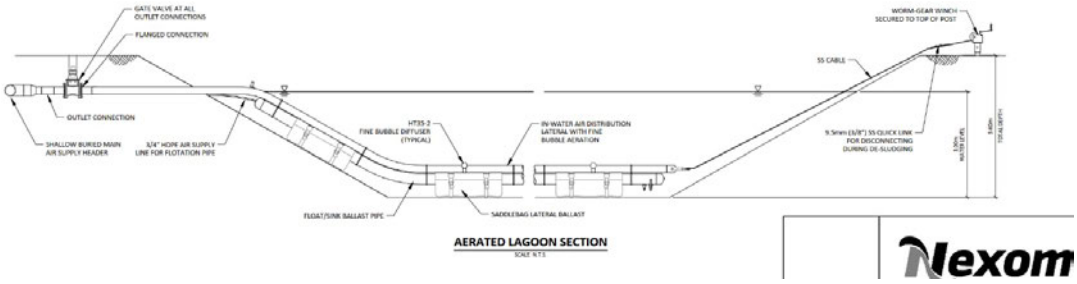
	2023 UPDATED	2042 UPDATED
Contributing Population	600 Residents	700 Residents
ORGANIC LOADING		
Typical BOD Load per Resident	0.077 kg/BOD/person/day	0.077 kg/BOD/person/day
Total Daily BOD Load from Residents	46 kg BOD/day	54 kg BOD/day
Total Daily BOD Load from Abattoir	3 kg BOD/day	3 kg BOD/day

	2023 UPDATED	2042 UPDATED
Total Daily BOD Load From Dairy	270 kg BOD/day (BOD - 2,000 mg/L)	270 kg BOD/day (BOD - 2,000 mg/L)
TOTAL ORGANIC LOADING TO LAGOON:	319 kg BOD/day	327 kg BOD/day
APPROXIMATE DESIGN CAPACITY : (winter, if functional)	355 kg BOD/day	355 kg BOD/day
Hydraulic Loading		
Per capita wastewater contribution (includes normal infiltration amount)	373 Litres /capita /day	373 Litres /capita /day
Average daily flow from Residents	224 m^3/day	261 m^3/day
Dairy Industry wastewater contribution	135 m^3/day	135 m^3/day
Climate Adaptation (wetter springs - extreme infiltration)	-	30,000 m^3
TOTAL HYDRAULIC LOAD TO LAGOON:	**81,493 m^3** (over 227 days)	119,892 m^3 (over 227 days)
AVAILABLE STORAGE (to FSL):	81,000 m^3	119,000 m^3 (raised berms)
HYDRAULIC LAGOON CAPACITY USED:	100%	100.7%

The following Figure shows the propose new aeration layout in the cells.



The new aeration system will be a partially buried header in the common berm. This design improves access to berms for grass cutting and maintenance. The laterals and diffusers will also be submerged to the cell floor, unlike suspended laterals that would move with water levels.



The new aeration system will also include a new blower building on the existing berms with new aeration blowers. The old blower building would be demolished with the old aeration system once the new system is operational.

The old aeration system (from the 1980's) is prone to failure and short circuiting when leaks occur. As a result, the system can be challenged to adequately treat the incoming wastewater.

For robustness, the design target of the new aeration is to maintain the existing loading rate of 355 kg BOD/day, even as the estimated loading is projected to be lower. This provides some added capacity to handle any peaking events from the dairy industry that shares the facility with the community.

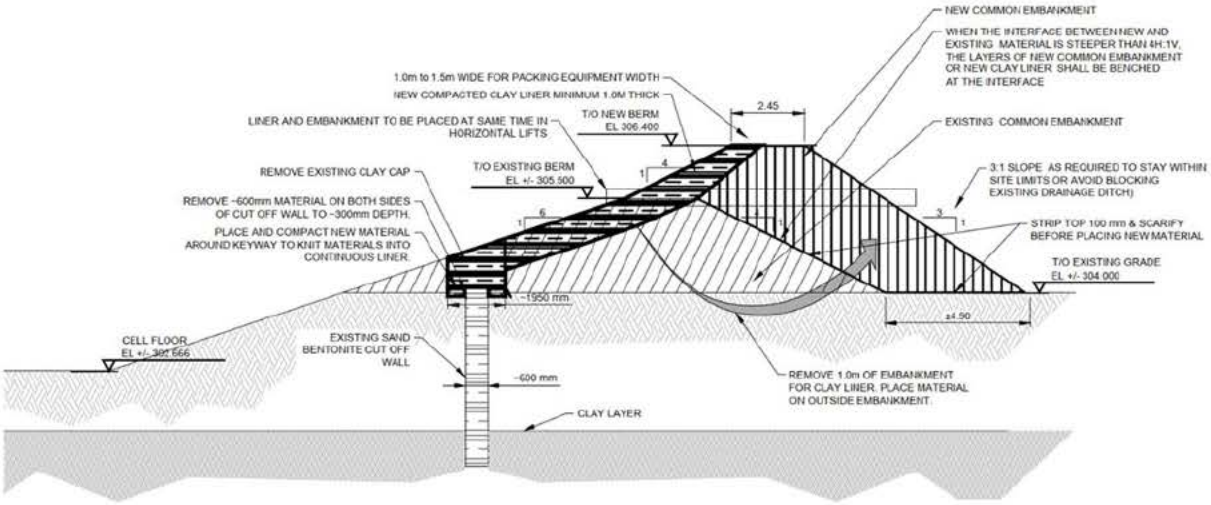
1.2 RAISING BERMS

The scope of the proposed project upgrades will also include raising the three berms of the storage cell to match the elevation of the two aeration cells. The original design of the facility incorporated lower berms around the storage cell that provided ~1.80 m of liquid storage depth. To increase storage capacity of the facility, we are proposing to raise the berms ~0.9 m to match the elevation of the berms around the aeration cells. This would then allow a Full Service Level (FSL) of ~ 2.70m of liquid depth plus 1.0 m of freeboard to the top of berms.

The objective of raising the berms around the storage cell is to be able to accommodate the wet year's spring melt waters and try to avoid any emergency discharges in spring. Historically, the cell is usually sufficient storage, but in 2017 the cells were near overtopping.

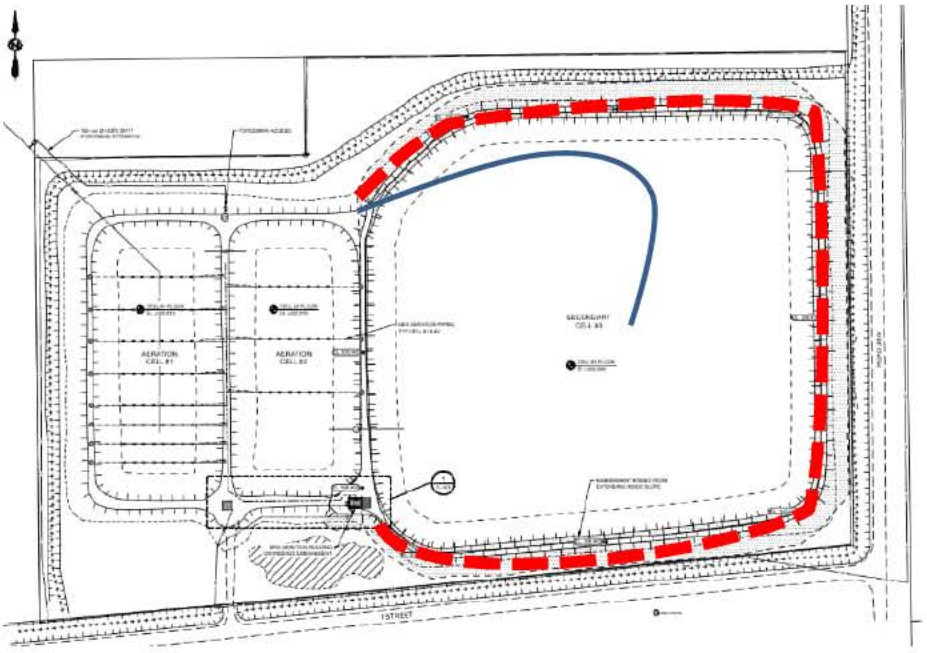
The original facility was constructed with a bentonite slurry keyway around the outside berms as the containment mechanism. With raising the berms, we propose to line the interior slopes of the added height with 0.9 m of suitable clay with hydraulic conductivity that is less than $1x10^{-7}$ cm/s. The new liner will also be keyed into the existing keyway to form a continuous liner.

The following figure shows the construction of the raised berms and new liner integrity.



The attached geotechnical report from Trek dated January 20th, 2023, details the construction and methodology of raising the lagoon berms.

The following plan shows the extent of the berms to be raised.



1.3 OPERATIONAL PARAMETERS OF THE UPGRADES LAGOON

This NOA is proposing to alter the following clauses in EAL 1666 S3 "General Requirements"

Original Requirements:

2. *The Licencee shall operate and maintain the aerated wastewater treatment lagoon in such a manner that:*
   - *(a) a minimum of 3 milligrams of dissolved oxygen per litre is detectable at all times in the top 2.5 metres of the liquid in the aerated cells.*
   - *(b) the organic loading on the wastewater treatment lagoon, in terms of the 5-day biochemical oxygen demand, is not in excess of 355 kilograms per day.*
   - *(c) the depth of the liquid in the aeration cells does not exceed 2.75 m.*
   - *(d) the depth of the liquid in the storage cell does not exceed 1.8 m.*

Proposed Alterations:

2. **The Licencee shall operate and maintain the aerated wastewater treatment lagoon in such a manner that:**
   - **(a) a minimum of 2.0 milligrams of dissolved oxygen per litre is detectable at all times in the top 2.5 metres of the liquid in the aerated cells.**
   - **(b) the organic loading on the wastewater treatment lagoon, in terms of the 5-day biochemical oxygen demand, is not in excess of 355 kilograms per day.**
   - **(c) the depth of the liquid in the aeration cells does not exceed 2.75 m.**
   - **(d) the depth of the liquid in the storage cell does not exceed 2.70 m.**

Salinity Requirements from EAL 1666 S3 Clause 15. And 16. :

The original 1996 Licence was written when the Village of St. Claude was on its own water system and many residents were utilizing their own water softeners due to the source water hardness. As a result of the softeners which exchanges water hardness for sodium chloride ions, the wastewater stream had elevated sodium and chloride levels. As a means to address the "salinity reduction program' the community converted their drinking water source to the Pembina Valley Water Cooperative Stephenfield Regional Water Treatment Plant. This new softened water source eliminated the use of water softeners and lowered the sodium and chloride levels in the wastewater. The typical sodium levels in the PVWC supply are 25-30 mg/L (lower than the 200 mg/L objective in Clause 15), and the typical chloride levels in the supply is 20-25 mg/L.

It is therefore requested that these clauses 15 and 16 as they relate to sodium levels be removed from future Licence requirements.

2 INDUSTRY FLOWS AND LOADING

The RM of Grey continues to work with the local dairy industry on their wastewater flows and is in the process of developing an Industrial Services Agreement with them. It is estimated that the process will take up to a year to finalize this agreement. Therefore, it is unknown at this time what changes will be made, if any, to the industry's loading to the lagoon. At this time, it is not anticipated that the loadings will get higher, but they could be reduced if the industry implements on-site treatment strategies.

For the purpose of design of the RM's lagoon upgrades, it is assumed that the industry loads will remain status quo and continue as they are now. This amounts to allocating a relatively high strength wastewater BOD load as noted in the table in Section 1.1.

The RM is planning for Phase 2 upgrades of their facility in the next year or two for phosphorus removal. But the design and sizing of the phosphorus treatment system cannot be finalized until the RM has a finalized ISA and a firm effluent expectation for phosphorus from the industry. It is unknown if the industry will implement on-site treatment to improve their effluent quality or contribute to a larger RM facility.

3 ENVIRONMENTAL EFFECTS OF THE WORKS

As this NoA is being submitted in conjunction with the "Rural Municipality Of Grey - St. Claude Environment Act Proposal for Land Application of Lagoon Biosolids" prepared by Dillon Consulting September 2021. For conciseness, this NoA will not duplicate the general site descriptions provided in that EAP document, please refer to "Section 3.0 Description of Existing Environment in Study Area" from that EAP for the general site descriptions.

This NoA will focus on the environmental effects as they directly relate to the replacement of the aeration system and the raising of the berms.

The majority of any negative environmental effects will be during the construction phase of the project. The long-term effects, however, will be more positive by providing better treatment efficiency with the new aeration and the higher berms provides more emergency storage capacity that reduces the occurrences of emergency discharges in spring.

3.1 ENVIRONMENTAL EFFECTS DURING CONSTRUCTION

3.1.1 Air Quality Impacts

Construction activities with the placing of new earth along the berms will create dust and emissions from construction machinery. Dust suppression along the gravel roads used by equipment will use water sprays or mists alleviate potential dust from being raised. Air quality effects from any dust generation during construction would be localized and temporary and is considered to have a low or negligible environmental effect. Emissions from construction equipment will be temporary and minimized by having machinery operating within normal limits and outfitted with mufflers (where

application) to reduce air emissions. Contributions from construction activities and operations to greenhouse gas emissions are not expected to be significantly above background levels and are unlikely to contribute significantly to overall greenhouse gas inventories from the area.

3.1.2 Soils Impacts

A risk exists, during the construction of the facility, for a spill to occur from construction machinery and vehicle equipment. To reduce this risk storage of fuel, other petroleum products and lubricants will not be permitted within the area of any nearby water supply. Therefore, the risk of occurrence is small based and additionally standard construction best practices for managing clean-up and removal of any impacted soils will be used to prevent any impacts.

3.1.3 Surface Water and Fish Habitat

Potential environmental impacts to surface water and fish habitat are expected to be negligible and short-term during construction. The majority of the work will take place at least 1500m from the nearest water body (Lac a Parker). Standard construction best management practices for sedimentation and erosion control will be implemented during construction to reduce potential effects to downstream aquatic life along the ditches and drains.

3.1.4 Climate Change Adaptation

As previously mentioned, contributions from construction activities and operations to greenhouse gas emissions are not expected to be significantly above background levels and are unlikely to contribute significantly to overall greenhouse gas inventories from the area.

3.2 ENVIRONMENTAL MITIGATION DURING CONSTRUCTION

3.2.1 Air Quality

Well maintained vehicles and equipment and reduction of unnecessarily transportation and idling of vehicles will assist in mitigating air quality impacts.

The control of dust with water sprays or an approved dust suppressant will limit the impact of dust to the air quality. Prompt re-establishment of vegetation disturbed during construction and also limiting certain work to periods of low winds will also help mitigate air quality impacts.

3.2.2 Soils

Preparation of an emergency response plan to mitigate potential impacts to soil by contaminants from petroleum products as well as use and availability of on-site spill clean-up equipment and materials, using properly maintained equipment and fuelling procedures.

Minimal ground disturbance of areas not previously disturbed is anticipated during the construction phase. The reestablishment of vegetation and backfill of any short trenches or excavations will occur as soon as possible after any disturbance to reduce the loss of soil due to wind or water erosion.

3.2.3 Surface Water

Surface water issues may be mitigated during construction by redirecting surface run-off, pumping accumulated water to adjacent ditches and installing proper erosion control practices such as silt fences and erosion control blankets.

Properly maintained, operated and fueled equipment will assist with the mitigation of potential fuel or petroleum spills. Manitoba Sustainable Development will be notified through the emergency response line and appropriate measures will be taken according to Manitoba Sustainable Development requirements.

Washing, refueling and servicing machinery and storage of fuel and other materials for the machinery will occur in such a way to prevent any deleterious substances from entering the water. Vehicles will stay on established roads and not unnecessarily disturb riparian zones. Any disturbed vegetation will be re-established as soon as possible.

3.2.4 Groundwater

The same mitigation efforts as described for surface water can be applied to as mitigation measures to reduce potential impact to any groundwater.

3.2.5 Vegetation and Wildlife

The establishment of vegetation will occur as soon as practically possible for disturbed areas. Minimizing laydown areas and construction activities will act as a measure to reduce disturbance to soils, and vegetation. Proper noise control and dust control as previously discussed will be implemented to mitigate potential impacts.

3.2.6 Fisheries

Fisheries impacts will be mitigated by controlling run-off and any construction related discharge to the watercourse to reduce potential harmful effects. The work area will be set back from riparian zones and a vegetated buffer will remain intact to minimize any sediment from entering drainage channels. Proper erosion and sedimentation control measures for working near water will be implemented. These measures will limit any short-term temporary impact to fisheries during construction activities.

3.2.7 Noise and Vibration

Unnecessary operation of equipment, properly muffled vehicles and equipment on site and properly maintained equipment will be assist in mitigating noise and vibration issues.

3.3 ENVIRONMENTAL EFFECTS FROM OPERATING THE UPGRADED FACILITY

3.3.1 Air Quality Odour Considerations

It is anticipated that during the operation of the upgraded facility there would not be any release of pollutants to the air. It is not anticipated that the operation of the upgraded facility will create any more odours than the current facility, the improved aeration may reduce odours with the more effective aeration equipment.

3.3.2 Soils Impacts

The raised berms will maintain containment around the storage cell with a clay liner to current standards. Potential adverse impacts to soil quality are assessed to be negligible.

3.3.3 Groundwater Impacts

The proposed activities associated with the upgrades are not expected to impact groundwater resources. The storage cell will be lined with compacted clay liner. The potential environmental effects to groundwater resources are therefore expected to be negligible during operations.

3.3.4 Wildlife Habitat

The potential effects to wildlife and habitat loss were assessed to be negligible as all activities are occurring in areas previously disturbed.

3.3.5 Surface Water and Fish Habitat

The proposed new facility is expected to result in improved wastewater effluent over the current 40-year-old equipment. The expected reduction in BOD, Fecal and ammonia loading in the effluent should have a positive effect on the receiving surface water quality.

The potential for increased hydraulic retention in the storage pond should also result in effluent temperatures that are close to the receiving body ambient temperature. This should minimize any temperature shock, or effects in any receiving streams.

4 SCHEDULE OF CONSTRUCTION

The RM has $2.0M in funding with the Manitoba Water Services Board (MWSB) for the entire phase of this project (which includes biosolids removal). The Project will be managed by the MWSB.

The proposed schedule of construction and biosolids removal will likely revolve around the land application timeline. Time is of the essence given the failure rate of the existing aeration system.

At this time, we are anticipating the preferred land application time is in late fall 2023 when the crop is taken off but tendering of the project will also not occur until the EAP and NoA are approved.

Based on these timelines, the following is our best estimation of the construction schedule:

1. Construct new blower building in summer/fall of 2023.
2. Set up pumps and piping for biosolids removal in summer of 2023
3. Raise berms around storage cell August/September 2023 (completion in spring 2024 if time runs out).
4. Install new blowers and new aeration header in fall/winter 2023/24.
5. Remove biosolids for land application from storage cell and aerated cells in fall of 2023 (assume 3-4 weeks for application process)
6. Test storage cell to see if BOD is high in prior to fall discharge. Consider pumped re-circulation loop back to aerated cells if BOD is too high for any discharge.
    a. Stirring up the cells may increase BOD and Fecal levels. Chlorination may be required if levels are still too high.
7. Remove aeration from Cell #1 and replace after biosolids are removed – late 2023.
8. Remove aeration from Cell #2 and replace after biosolids are removed – late 2023.
9. Test storage cell to see if BOD is high after aeration replacement works. Consider pumped re-circ loop back to aerated cells if BOD is too high for any discharge.
10. Once all aeration equipment is commissioned in later 2023, the system would be cut over to new equipment and the old equipment would be decommissioned and removed in early 2024.

Yours truly,

[redacted]

[redacted]

Ken Anderson, P.Eng.
Manager, Water

KEA

TREK GEOTECHNICAL Quality Engineering | Valued Relationships

January 20, 2023 Our File No. 0115-079-00

Mr. Ken Anderson, P. Eng.
Manager, Water
Associated Engineering (Sask.) Ltd.
203 - Number Five Donald Street,
Winnipeg, MB
R3L 2T4

RE: St. Claude Wasterwater Lagoon Aeration Upgrades
Permeability Assessment of a Potential Borrow Source

As requested by Associated Engineering Ltd. (Associated), TREK Geotechnical Inc. (TREK) has completed a permeability assessment of material from a potential borrow source. The location of the borrow source was not provided, but was from the same source used for the Elm Creek Landfill project. This material is to be used to construct a new clay liner that satisfies the provincial requirements for low permeability barrier to have a hydraulic conductivity less than $1x10^{-9}$ m/s ($1x10^{-7}$ cm/s). A bulk sample was delivered to TREK on December 7, 2022. TREK's scope of work includes laboratory testing, interpretation of results and recommendations for the new compacted clay liner.

Laboratory Testing

Laboratory testing was performed to classify the soil and determine the permeability characteristics of the material. The specific tests undertaken include Atterberg Limits, grain size analysis (hydrometer method) and a hydraulic conductivity test using a flexible wall permeameter. Table 01 summarizes the laboratory tests performed; a full summary of detailed test results are attached.

Table 1: Soil Permeability Properties

Source	Location	Soil Description	Hydraulic Conductivity (m/s)	Atterberg limits			Grain-Size Distribution (%)		
				PL	LL	PI	Sand	Silt	Clay
Borrow for Elm Creek Landfill	unknown	High Plastic Clay	$2.33x10^{-10}$	24	75	51	1.8	26.8	71.4

The material is a high plastic clay well suited for use as a low permeability barrier. In general, a liquid limit (LL) greater than 50 along with a clay content greater then 30% suggests the hydraulic conductivity of the material will likely be less 1 x 10^{-9} m/s (1 x 10^{-7} cm/s). This is supported by the hydraulic conductivity test conducted on a reconstituted sample, as shown above in Table 1. Typically, a clay liner is compacted to 95% of the Standard Proctor Maximum Dry Density (SPMDD) at or near the optimum moisture content. In this regard, the clay borrow sample was compacted (reconstituted) to approximately 95% of the SPMDD at optimum moisture and then a sample suitable for the flexible wall test apparatus was extracted from the Proctor mold. The hydraulic conductivity of the reconstituted sample meets the provincial permeability requirement.

Clay Liner Recommendations

TREK has reviewed the attached construction drawing related to the new clay liner and has no comments in terms of the liner layout and geometry. The following recommendations apply to design and construction of the clay dike:

1. The fill for the new compacted clay liner should be highly plastic with a liquid limit greater than 50% and a clay content greater then 30%.
2. The clay fill for the liner and the new common fill material should be well mixed and homogeneous. The fills are to be unfrozen, free from organic matter, debris and deleterious materials.
3. Topsoil and compressible, or otherwise unsuitable materials, should be stripped and removed from the sub-grade prior to dike construction.
4. Excavation should be completed in a manner that minimizes disturbance to the existing clay cap.
5. Top of the existing common embankment after excavation should be scarified prior to placement of the new clay liner or the new common fill when slopes are 6H:1V. For excavated slopes sitting at 4H:1V or steeper, placement of new material (clay liner or common fill) on top of the existing common embankment should be benched at the interface of the two materials.
6. The existing clay cap and the existing common embankment material should be protected from mechanical disturbance, freezing, drying, or inundation with water at all times. If any of these conditions occur these materials should be scarified, moisture conditioned as appropriate, and re-compacted to a minimum of 95% of the SPMDD or the disturbed zone may have to be excavated and replaced clay fill.
7. The clay fill and new common fill embankment should be placed in a direction parallel to the dike axis in level, uniform lifts, no thicker than 150 mm and compacted to a minimum of 95% of the SPMDD and be within 2% of the optimum moisture content. If the new common fill material is non-cohesive (e.g. sands, gravels), the compaction target is a minimum of 98% of the SPMDD.

The sample provided is suitable for the new compacted clay liner as it meets the provincial requirements and recommendations listed above. The liquidity index of the material indicates it is workable and can be compacted by traditional compaction equipment intended for clay soils provided the in-situ moisture content does not notable change.

It is our understanding that the intent is to leave as much as possible of the existing clay cap in place. In this regard, TREK will assess the condition of the existing clay cap during construction to determine if part or all the existing clay cap is suitable and can be left in place. Additional testing may be undertaken at that time to confirm the suitability of the existing clay cap.

Closure

The information provided in this report is in accordance with current engineering/testing principles and practices (Standard of Practice). The findings of this report were based on information and materials provided. Natural soil deposits inherently can be variable. If materials proposed to be utilized are different than those presented here, we should be notified to adjust our findings if necessary.

All information provided in this letter is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work or standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms

and conditions, contact our office and you will be promptly provided with a copy.

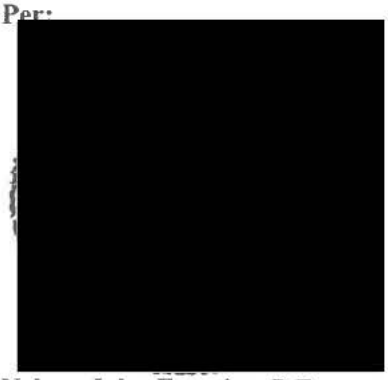
This letter has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of Associated Engineering Ltd. (the Client) and their agents for the work product presented in the letter. Any findings or recommendations provided in this letter are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

If you have any questions, please contact the undersigned.

Kind Regards,

TREK Geotechnical

Per:



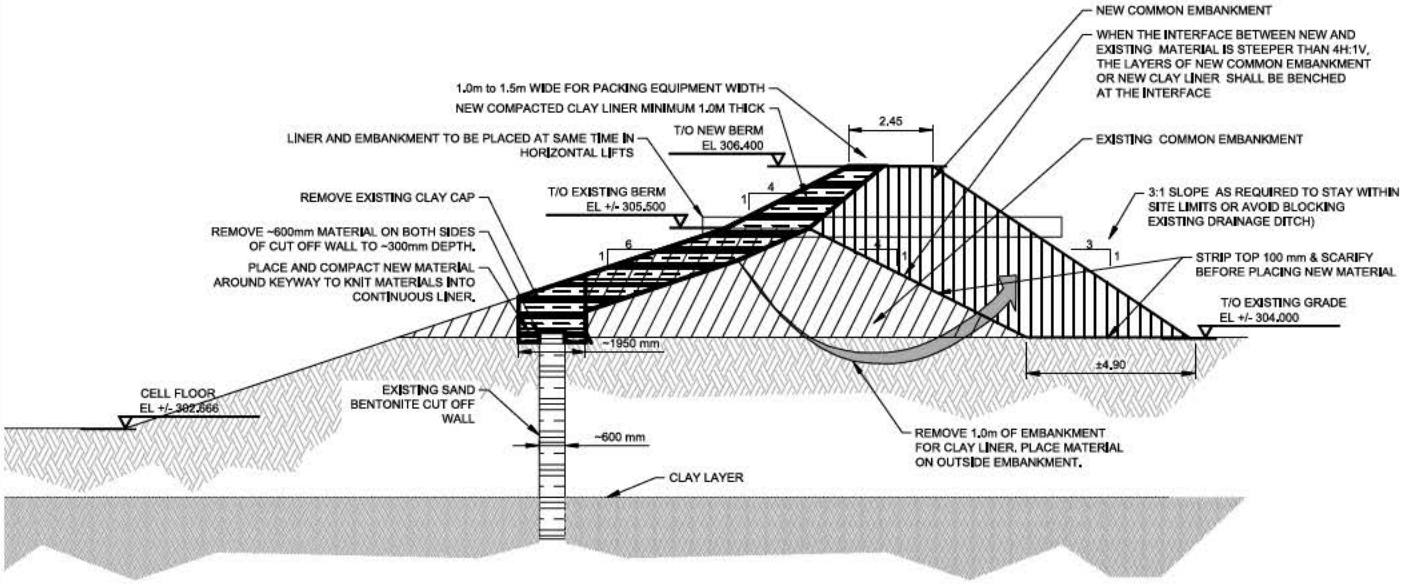
Nelson John Ferreira, P.Eng.
Senior Geotechnical Engineer

Reviewed By:

Brent Hay, M.Sc., P.Eng.
Senior Geotechnical Engineer

ENGINEERS
GEOSCIENTISTS
MANITOBA
Certificate of Authorization
TREK GEOTECHNICAL INC.
No. 4877

IF NOT 25 mm ADJUST SCALES
25 mm
SCALE(S) SHOWN ARE INTENDED FOR LETTER (8.5X11) SIZE DRAWINGS UNLESS NOTED OTHERWISE



1 / C-104 DETAIL NTS
CELL #3 BERM UPGRADE

PLOT DATE: 2023-01-18 2:55:54 PM
SAVE DATE: 2023-01-18 2:53:54 PM SAVED BY: ANDERSONK
DWG PATH: p:\2019\4231\00_mweb_st_claude\working_dwgs\100_civil\c114231-00-c-501.dwg

Associated Engineering

BEST MANAGED COMPANIES
Platinum member

AE PROJECT No.	2019-4231
SCALE	NTS
APPROVED	
DATE	2023-01-11
REV	0
DESCRIPTION	ISSUED FOR NOA

FIGURE 1

MANITOBA WATER SERVICES BOARD
RM OF GREY

CIVIL
ST. CLAUDE LAGOON UPGRADES
BERM AND LINER UPGRADES

Quality Engineering | Valued Relationships

January 11, 2023 Our File No. 1000-078-10

Ken Anderson, P.Eng.,
Associated Engineering (Sask.) Ltd.
203 – Number Five Donald Street
Winnipeg, Manitoba.
R3L 2T4

RE Laboratory Testing Results for St. Claude Lagoon – Hydraulic Conductivity

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Please see the attached Hydraulic Conductivity report. A sample of clay material was brought to TREK on December 7, 2022. This report contains Atterberg Limits, grain size analysis (Hydrometer method), Standard proctor and the hydraulic conductivity test results for sample L22-676 using a flexible wall permeameter following ASTM D5080-16. The sample was remolded to 95.3% of SPMDD.

The test report for the sample is attached showing the calculated hydraulic conductivity values corrected to 20°C are as follows:

Sample L22-676 2.35E-10 m/s (2.35 x 10^{-8} cm/s)

The services undertaken by TREK on this assignment constitutes testing services only and engineering evaluation or interpretation has not been undertaken, but is available upon request

If you have any questions or require additional information or clarifications, please contact Angela at 204.792.8458.

Kind Regards,

TREK Geotechnical

Review Control:

Prepared By: AFK	*Reviewed By:* AFK	*Checked By:* NJF

TREK GEOTECHNICAL
www.trekgeotechnical.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433 Fax: 204.975.9435

Atterberg Limits
ASTM D4318-10e1

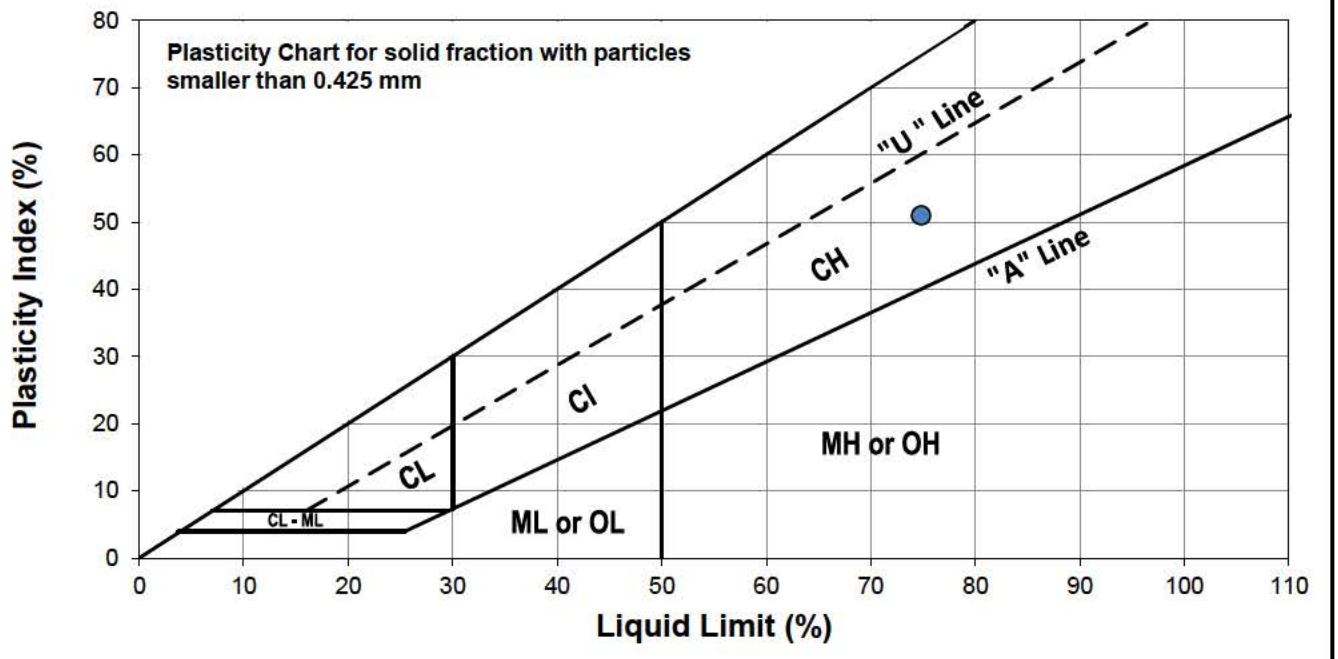
CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

Project No.	1000-078-10
Client	Associated Engineering
Project	St. Claude Lagoon
Source	Elm Creek Landfill
Sample #	L22-676
Depth (m)	N/A
Sample Date	07-Dec-22
Test Date	06-Jan-22
Technician	AD

Liquid Limit	75
Plastic Limit	24
Plasticity Index	51

Liquid Limit

Trial #	1	2	3		
Number of Blows (N)	17	21	33		
Mass Tare (g)	13.844	14.046	13.874		
Mass Wet Soil + Tare (g)	23.937	24.065	23.022		
Mass Dry Soil + Tare (g)	19.528	19.755	19.157		
Mass Water (g)	4.409	4.310	3.865		
Mass Dry Soil (g)	5.684	5.709	5.283		
Moisture Content (%)	77.569	75.495	73.159		



Plastic Limit

Trial #	1	2	3	4	5
Mass Tare (g)	14.209	13.883			
Mass Wet Soil + Tare (g)	21.167	20.095			
Mass Dry Soil + Tare (g)	19.817	18.908			
Mass Water (g)	1.350	1.187			
Mass Dry Soil (g)	5.608	5.025			
Moisture Content (%)	24.073	23.622			

Note: Additional information recorded/measured for this test is available upon request.

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Winnipeg, MB R3H 0L3
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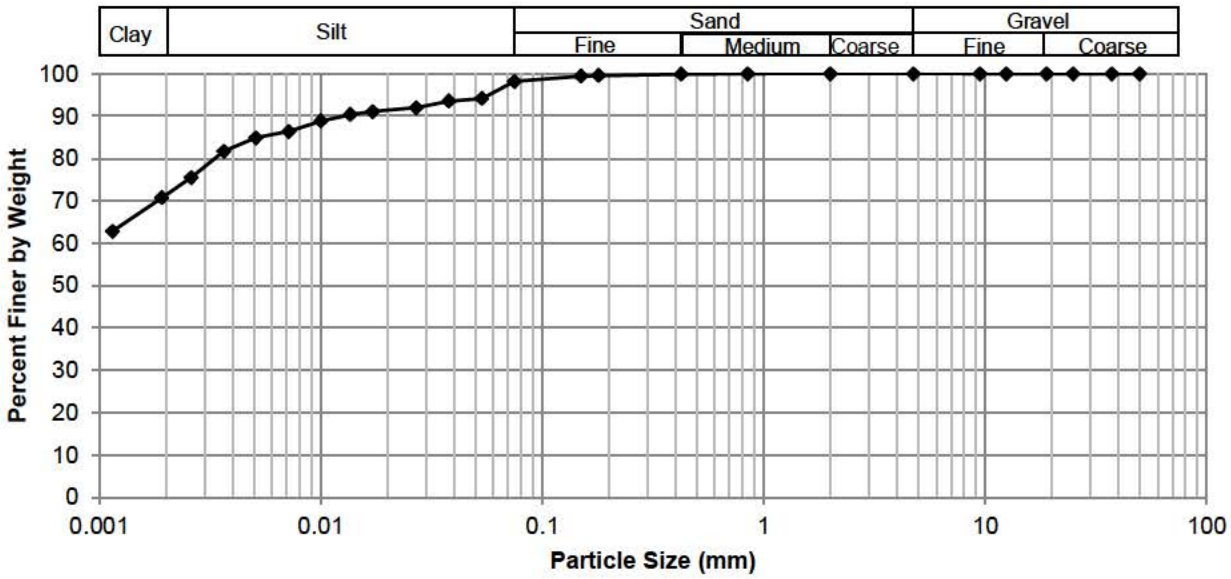
Grain Size Analysis (Hydrometer Method)
AASHTO T 88

CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

Project No.	1000-078-10
Client	Associated Engineering
Project	St. Claude Lagoon
Source	Elm Creek Landfill
Sample #	L22-676
Depth (m)	N/A
Sample Date	7-Dec-22
Test Date	9-Jan-23
Technician	JC

Gravel	0.0%
Sand	1.8%
Silt	26.8%
Clay	71.4%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	**Percent Passing**	**Particle Size (mm)**	**Percent Passing**	**Particle Size (mm)**	**Percent Passing**
50.0	100.00	4.75	100.00	0.0750	98.20
37.5	100.00	2.00	99.98	0.0535	94.20
25.0	100.00	0.850	99.98	0.0380	93.57
19.0	100.00	0.425	99.96	0.0270	92.01
12.5	100.00	0.180	99.62	0.0172	91.07
9.50	100.00	0.150	99.48	0.0136	90.45
4.75	100.00	0.075	98.20	0.0100	88.88
				0.0072	86.38
				0.0051	84.87
				0.0037	81.74
				0.0026	75.53
				0.0019	70.80
				0.0011	62.80

TREK GEOTECHNICAL
www.trekgeotechnical.ca
1712 St. James Street
Winnipeg, MB R3H 0L3
Tel: 204.975.9433 Fax: 204.975.9435

Standard Proctor Compaction Test

ASTM D698-12 (2021)

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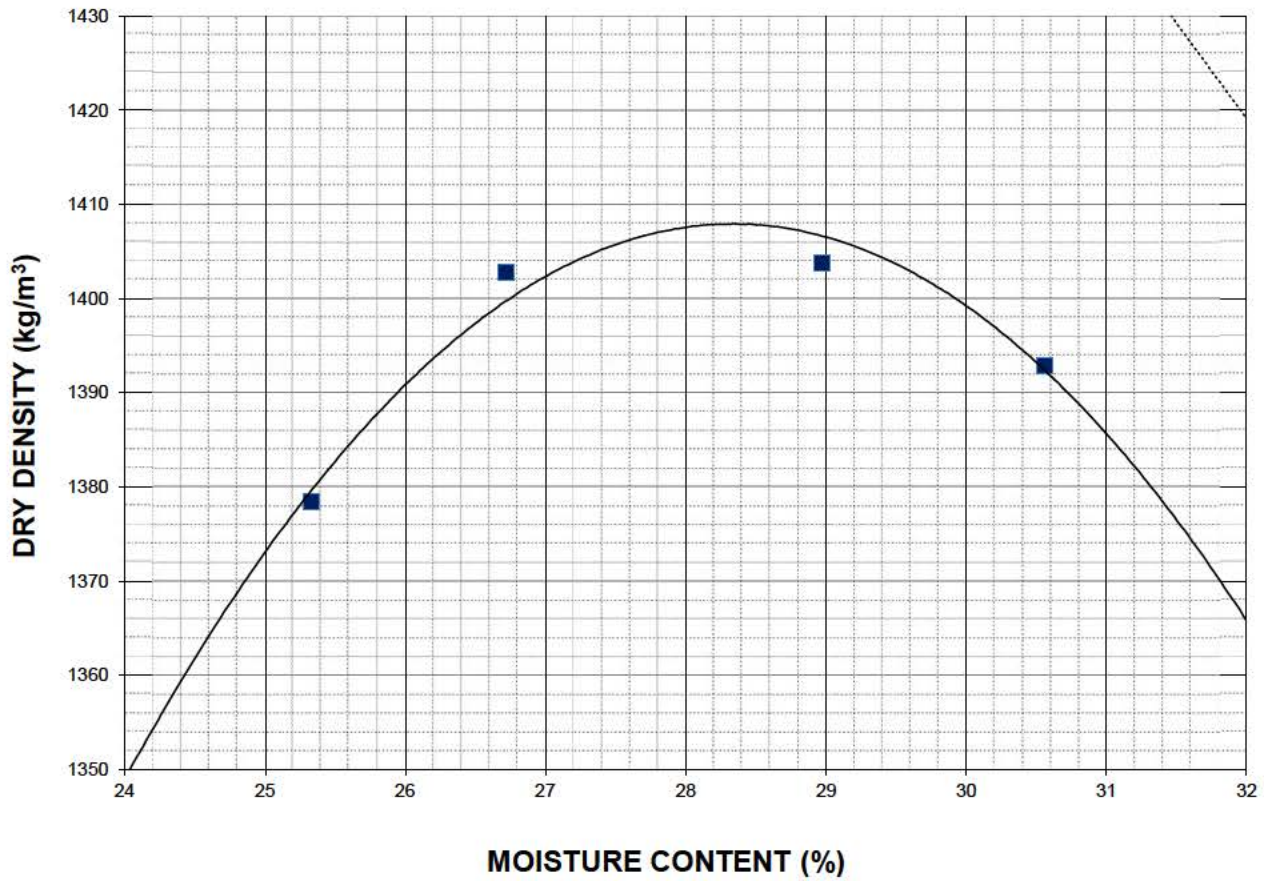
Project No.	1000-078-10
Client	Associated Engineering
Project	St. Claude Lagoon
Sample #	L22-676-01
Source	Elm Creek Landfill
Material	Clay
Sample Date	N/A
Test Date	10-Dec-22
Technician	DS

Maximum Dry Density (kg/m3)	1408
Optimum Moisture (%)	28.3

Trial Number	1	2	3	4	
Wet Density (kg/m^3)	1728	1778	1811	1819	
Dry Density (kg/m^3)	1378	1403	1404	1393	
Moisture Content (%)	25.3	26.7	29.0	30.6	



Note: Additional information recorded/measured for this test is available upon request.

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Hydraulic Conductivity Determination (Flexible Wall)

ASTM D5084-16

Project No.	1000-078-10	**Source**	Elm Creek Landfill
Client	Associated Engineering Ltd.	**Trek Sample #**	L22-676
Project	St. Claude Lagoon	**Depth (m)**	N/A
		Sample Date	N/A
		Test Date	December 14, 2022 to January 4, 2023
		Technician	Angela Fidler-Kliewer

Specimen Details

Visual Classification Clay, silty, trace gravel (<5mm diam.), grey, moist,stiff, high plasticity

Comments The specific gravity of the soil was assumed to be 2.65. Sample was remolded to 95.3% of SPMDD.

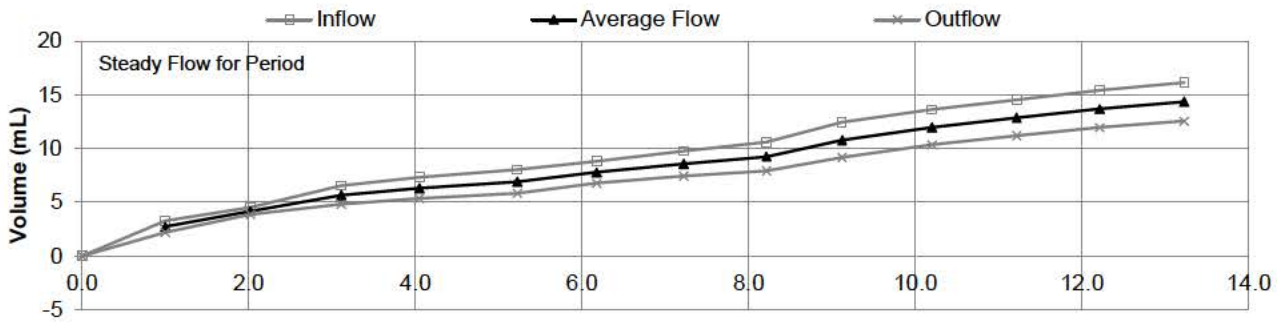
Index Testing

Liquid Limit	75
Plastic Limit	24
Plasticity Index	51
Clay Content (%)	71

Test Details

Permeant	Distilled, de-aired water
Method	Constant Rate
Cell Pressure	126.6 kPa
Influent Pressure	91.8 kPa
Effluent Pressure	84.6 kPa
Gradient	7.38

Permeation Graph



Steady Flow Permeation Data

Time Increment (Days)	Elapsed Time (Days)	Flow (Q)		Inflow / Outflow Ratio	Average Flow (mL)	Temperature Correction	Corrected Hydraulic Conductivity, k_{20} (m/s)
		Influent (mL)	Effluent (mL)				
1.08	10.21	13.62	10.32	1.03	1.18	1.01	2.97E-10
1.01	11.22	14.52	11.18	1.05	0.88	1.00	2.38E-10
1.00	12.21	15.42	11.92	1.22	0.82	1.00	2.31E-10
1.02	13.23	16.10	12.53	1.11	0.65	0.99	1.73E-10

Average Temperature Corrected Hydraulic Conductivity, k_{20} (m/s) **2.35E-10** **(2.35×10^{-8} cm/s)**

Consolidation Data

	Average Height (m)	Average Diameter (m)	Moisture Content (%)	Dry Density (kN/m^3)	Degree of Saturation (%)	Cell Pressure	Back Pressure
Initial	0.0987	0.0736	29.7	13.2	80.8	120.0	85.2
Final	0.1007	0.0747	40.3	12.4	98.1	120.0	84.4

DRAWING INDEX

SHEET	DRAWING NAME	REVISION	DRAWING TITLE	DRAWING DESCRIPTION
GENERAL				
1	4231-00-g-001	0	COVER PAGE	
CIVIL				
2	4231-00-c-101	0	LAGOON SITE PLAN	EXISTING
3	4231-00-c-102	0	LAGOON SITE PLAN	PROPOSED
4	4231-00-c-103	0	LAGOON CELL #1 AND #2 PLAN	AERATION REPLACEMENT
5	4231-00-c-104	0	LAGOON CELL #3 PLAN	BERM UPGRADE
6	4231-00-c-105	0	BLOWER BUILDING SITE PLAN	
7	4231-00-c-501	0	DETAILS	
BUILDING				
8	4231-00-a-101	0	MAIN FLOOR PLAN	
9	4231-00-a-102	0	ROOF PLAN	
10	4231-00-a-201	0	ELEVATIONS	EAST AND NORTH
11	4231-00-a-202	0	ELEVATIONS	WEST AND SOUTH
12	4231-00-a-501	0	DETAILS	
13	4231-00-a-801	0	CODE OVERVIEW	AND SCHEDULES
STRUCTURAL				
14	4231-00-s-101	0	MAIN FLOOR PLAN	
15	4231-00-s-501	0	DETAILS	
PROCESS				
16	4231-00-d-101	0	MAIN FLOOR PLAN	BLOWER PIPING
17	4231-00-d-301	0	SECTION	
MECHANICAL				
18	4231-00-m-001	0		
19	4231-00-m-101	0	MAIN FLOOR PLAN	HVAC AND DRAINAGE
20	4231-00-m-501	0	DETAILS	
21	4231-00-m-601	0	SCHEDULES	
ELECTRICAL				
22	4231-00-e-001	0		
23	4231-00-e-002	0	SINGLE LINE DRAWING	
24	4231-00-e-101	0	SITE PLAN	AERATION BUILDING
25	4231-00-e-102	0	MAIN FLOOR PLAN	LIGHTING, POWER AND INSTRUMENTS
26	4231-00-e-301	0		
27	4231-00-E-601	0	DETAILS	SINGLE LINE DIAGRAM

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RURAL MUNICIPALITY OF GREY

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES

M.W.S.B. #: 1493

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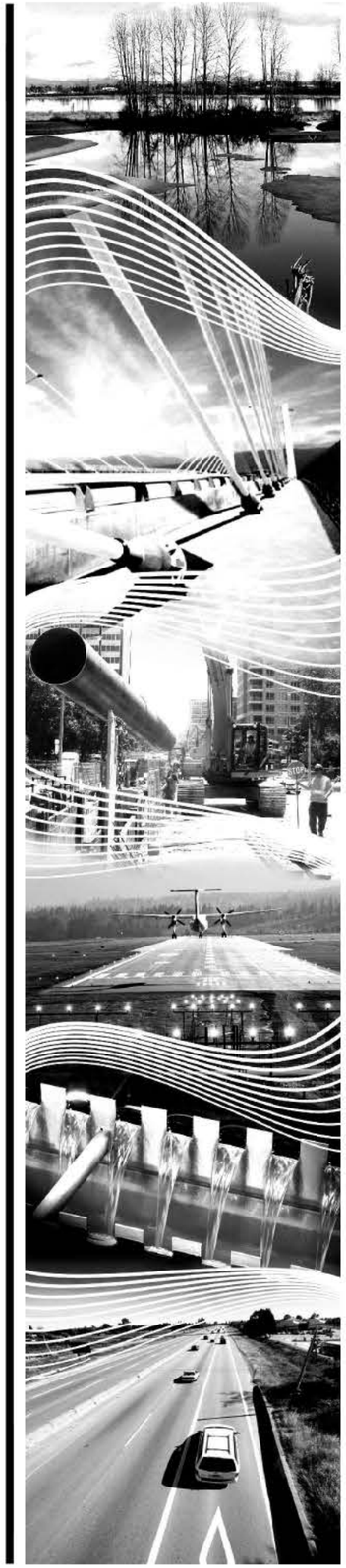

Associated Engineering
203 - Number Five Donald Street, Winnipeg, Manitoba, R3L 2T4
Ph 204 942 6391 Fax 204 942 6399
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20194231-00

REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	K. ANDERSON	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

DRAWING	REVISION	SHEET
4231-00-G-001	0	1

IF NOT 50 mm ADJUST SCALES
50 mm

SCALE(S) SHOWN ARE INTENDED FOR ANSI D (22X34) SIZE DRAWINGS, TABLOID (11X17) SIZE DRAWINGS ARE 1/2 OF SCALE(S) SHOWN UNLESS NOTED OTHERWISE

NOTES:

1. ALL MATERIALS AND INSTALLATION PRACTICES SHALL CONFORM TO M.W.S.B. STANDARD CONSTRUCTION SPECIFICATIONS.
2. DECIMALIZED NUMBERS INDICATE METERS AND WHOLE NUMBERS INDICATE MILLIMETERS.
3. LOCATION OF UNDERGROUND SERVICES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE, BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT.
4. CONTRACTOR MUST CONFIRM WITH THE INDIVIDUAL UTILITIES FOR EXISTENCE AND EXACT LOCATIONS OF ALL THE SERVICES PRIOR TO CONSTRUCTION.
5. CONTRACTOR MUST EXPOSE EXISTING INFRASTRUCTURE AT THE PROPOSED TIE-IN LOCATIONS TO ALLOW SITE ENGINEER TO VERIFY SIZE, MATERIAL AND INVERTS PRIOR TO CONSTRUCTION OF TIE-INS.
6. ALL SITE LAYDOWN AREAS SHALL BE AS NOTED IN THE SPECIFICATIONS AND APPROVED BY THE OWNER AND ENGINEER.
7. ALL AREAS SUBJECT TO CONSTRUCTION OPERATIONS SHALL BE RESTORED TO THE CONDITION IN WHICH THEY EXISTED PRIOR TO CONSTRUCTION. THIS INCLUDES, BUT IS NOT LIMITED TO, PAVEMENT REPAIRS, RE-GRAVELLING, TRENCH SETTLEMENT CORRECTION AND RE-SEEDING OF GRASSED AREAS. RESTORATION SHALL CONFORM TO M.W.S.B. AND MUNICIPAL STANDARDS.
8. CONTRACTOR SHALL MAINTAIN THE FOLLOWING INSTALLATION DISTANCES:
   - 8.1. SEPARATION BETWEEN POTABLE WATER AND RAW WATER OR WASTE WATER:
     - 8.1.1. HORIZONTAL = 3.0 m
     - 8.1.2. VERTICAL = 0.45 M, POTABLE WATER ABOVE.
   - 8.2. MINIMUM BURY DEPTH:
     - 8.2.1. WITHIN CITY, TOWN AND VILLAGE LIMITS = 2.75 m
     - 8.2.2. RURAL AREAS = 2.4 m
     - 8.2.3. CROSSINGS (ROAD, DRAIN, ETC.) = 3.0 m
     - 8.2.4. INSTALLATIONS WITH LESS THAN MINIMUM COVER SHALL BE INSULATED AS PER M.W.S.B. SPECIFICATIONS.
9. WHERE THE PROPOSED ALIGNMENT CROSSES PTH'S, PR'S, DEVELOPED ROAD ALLOWANCES, PRIVATE LANES, WATER RUNS AND WETLANDS, A TRENCHLESS METHOD OF INSTALLATION SHALL BE USED.

LEGEND

LINETYPES

ROAD	EXISTING	PROPOSED
CONTROL LINE		100+000
GRAVEL ROAD		
EDGE OF PAVEMENT		
MISCELLANEOUS		
FENCE	X	X
SILT FENCE	O	O
ABANDONED PIPE		
RAILWAY		
BOTTOM OF BANK		
TOP OF BANK		
HEDGE		
BUILDING		
WATER		
WATER MAIN	W	W
RAW WATER		
POTABLE WATER		
SANITARY SEWER		
SANITARY SEWER		
SANITARY FORCEMAIN		
COMMUNICATIONS / TELEPHONE		
FIBRE OPTIC CABLE		
TELEPHONE/LINE		
UNDERGROUND TELEPHONE		
ELECTRICAL / POWER		
POWER / COMM / CONDUIT		
OVERHEAD POWER		
UNDERGROUND POWER		
GAS/OIL		
GAS		
PROPERTY		
PARCEL / LOT LINE		
EASEMENT		
ROAD ROW		
CONCRETE		
RIP-RAP / DRAIN ROCK		
EARTH / NATIVE MATERIAL		
COMPACTED CLAY LAYER		
COMPACTED EARTH		

SYMBOLS

SURVEY	EXISTING	PROPOSED
IRON PIN	IP	
IRON PIN (FOUND)	IPF	
MISCELLANEOUS		
TEST PIT	TP	TP
BORE HOLE	BH	BH
RAILWAY SIGNAL LIGHT		
BOLLARD		
SIGN		
BUSH		
TREE (DECIDUOUS)		
TREE (CONIFEROUS)		
SPOT ELEVATION	EL100.000	EL100.000
SLOPE	% 1 2	% 1 2
WATERMAIN		
CLEANOUT\FLUSHOUT	CO	CO
FIRE HYDRANT	FH	FH
MANHOLE	W	W
METER CHAMBER	W	W
END CAP / PLUG		
GATE VALVE		
THRUST BLOCK		
ENCASEMENT		
WATER LEVEL		
COUPLING		
REDUCER		
SANITARY SEWER		
MANHOLE	S	S
LIFT / PUMP STATION	LS	LS
STORM DRAINAGE		
CULVERT INLET		
CULVERT OUTLET		
DITCH FLOW		
ELECTRICAL/POWER		
LIGHT / LAMP STANDARD		
HYDRO / UTILITY POLE		
GUY WIRE		
COMMUNICATIONS / TELEPHONE		
TELEPHONE PEDESTAL	T	T

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NOTES AND LEGEND

DRAWING	REVISION	SHEET
4231-00-C-001	0	----

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50 mm

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PROPERTY LIMIT
PERIMETER FENCE
150 mm Ø FORCEMAIN STUB
150 mm Ø FORCEMAIN
INTERCELL PIPING C/W GATE VALVE
EXISTING AERATION PIPING & SUPPORT TO BE REMOVED, TYP BOTH CELLS
EXISTING CELL #3 EMBANKMENTS TO BE RAISED TO EL. 306.400, TYP
CELL #1 FLOOR EL ±302.819
CELL #2 FLOOR EL ±302.819
SECONDARY CELL #3
STORAGE VOLUME: 123,000 m³
CONSTRUCTION YEAR: 19XX
LINER: PERIMETER CLAY KEYWAY
CELL #3 FLOOR EL ±302.666
AERATION CELL #1
STORAGE VOLUME: 17,300 m³
CONSTRUCTION YEAR: 19XX
LINER: PERIMETER CLAY KEYWAY
AERATION CELL #2
STORAGE VOLUME: 17,300 m³
CONSTRUCTION YEAR: 19XX
LINER: PERIMETER CLAY KEYWAY
BIOSOLIDS TO BE REMOVED & APPLIED TO FARM LAND AS DIRECTED
INTERCELL MANHOLE C/W 300 mm Ø DISCHARGE PIPING & GATE VALVE
ABANDONED SHACK TO BE REMOVED
BLOWER BUILDING
OVERHEAD POWER
ROAD 38W
1 STREET
SBM 334086

EL 305.574
EL 305.480
EL 305.580
EL 306.296
EL 306.240
EL 306.528
EL 306.437
EL 306.050
EL 306.177
EL 306.189
EL 306.177
EL 306.262
EL 306.184
EL 306.223
EL 306.258
EL 306.201
EL 305.870
EL 305.593
EL 305.546
EL 305.701
EL 305.437

1 - PLAN 1:750
LAGOON SITE
EXISTING

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M.W.S.B.#: 1493
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SCALE: AS SHOWN

CIVIL
LAGOON SITE PLAN
EXISTING

DRAWING	REVISION	SHEET
4231-00-C-101	0	2

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1 - PLAN 1:750
LAGOON SITE
PROPOSED

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SCALE: AS SHOWN

CIVIL
LAGOON SITE PLAN
PROPOSED

DRAWING	REVISION	SHEET
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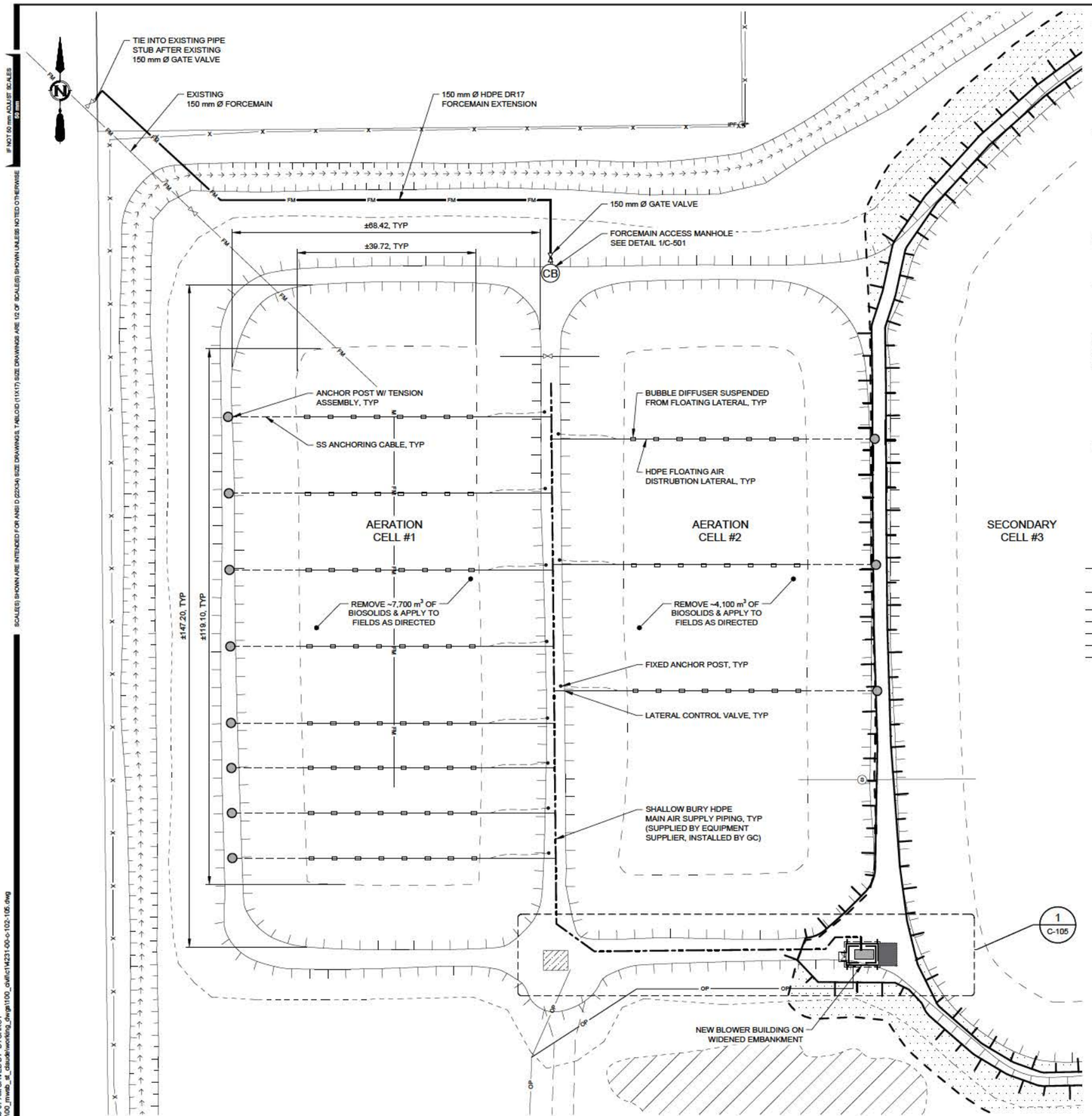
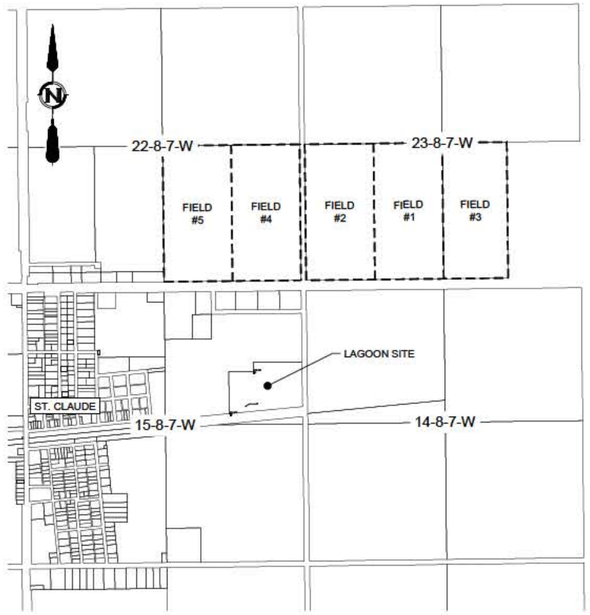


1 - PLAN 1:500
CELL #1 AND #2 AERATION REPLACEMENT



1 - PLAN 1:17500
BIOSOLIDS LAND APPLICATION

BIOSOLIDS LAND APPLICATION

BIOSOLIDS LOCATION	FIELD NO.	CROP	LAND AREA
CELL #1	4, 5	WHEAT	120 ACRES
CELL #1	1, 2, 3	CANOLA	106 ACRES
CELL #2	4, 5	WHEAT	21 ACRES
CELL #2	1, 2, 3	CANOLA	18 ACRES

NOTE:
SEE SPECIFICATIONS FOR INFORMATION REGARDING AERATION SYSTEM PACKAGE SCOPE OF SUPPLY AND CONTRACTOR SCOPE OF WORK.

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AERATION UPGRADES
M.W.S.B.#: 1493
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SCALE: AS SHOWN

CIVIL
LAGOON CELL #1 AND #2 PLAN
AERATION REPLACEMENT

DRAWING	REVISION	SHEET
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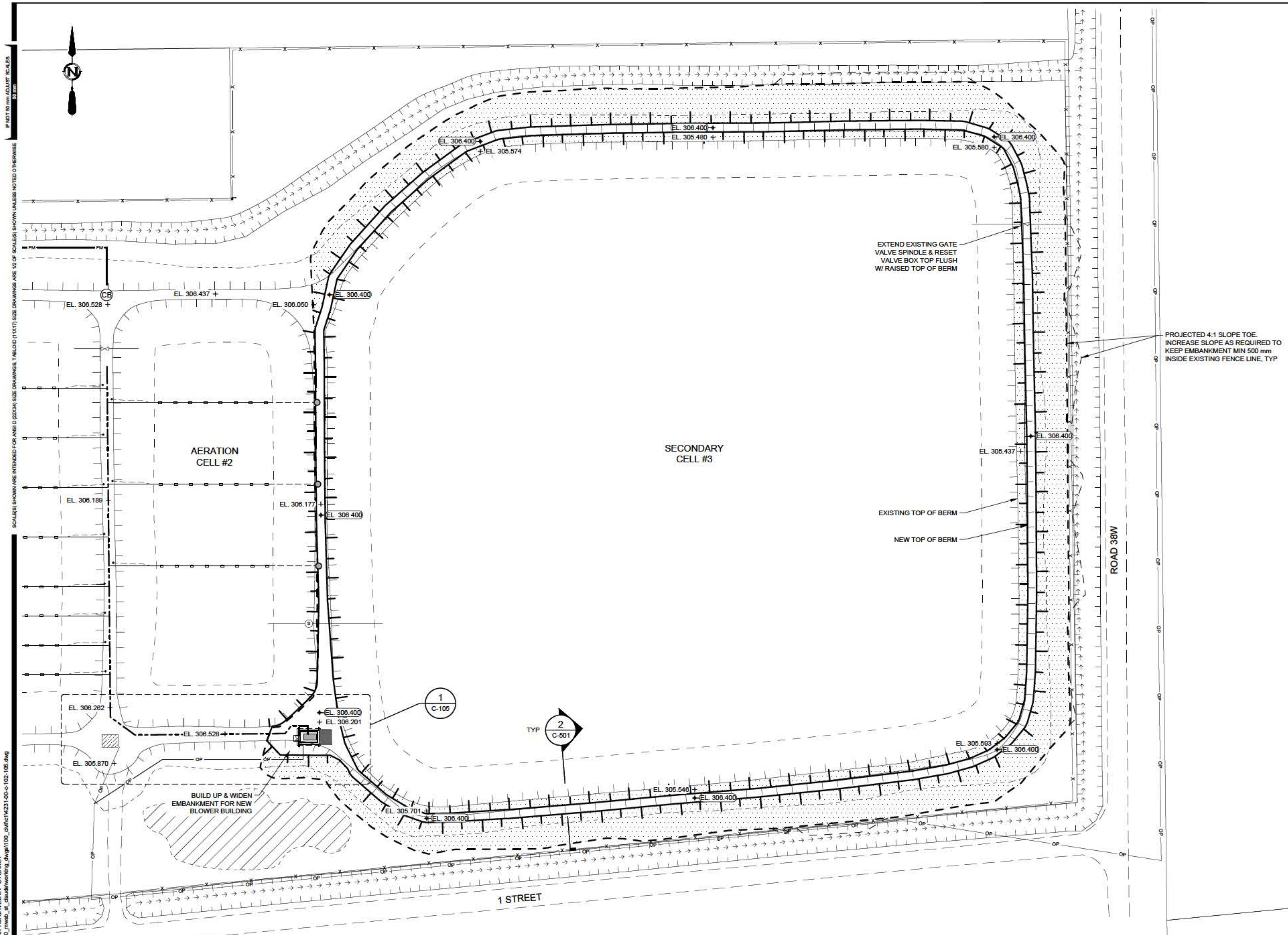

1 PLAN 1:650
LAGOON CELL #3
BERM UPGRADE

IF NOT 50 mm ADJUST SCALES 50 mm

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AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

CIVIL
LAGOON CELL #3 PLAN
BERM UPGRADE

DRAWING	REVISION	SHEET
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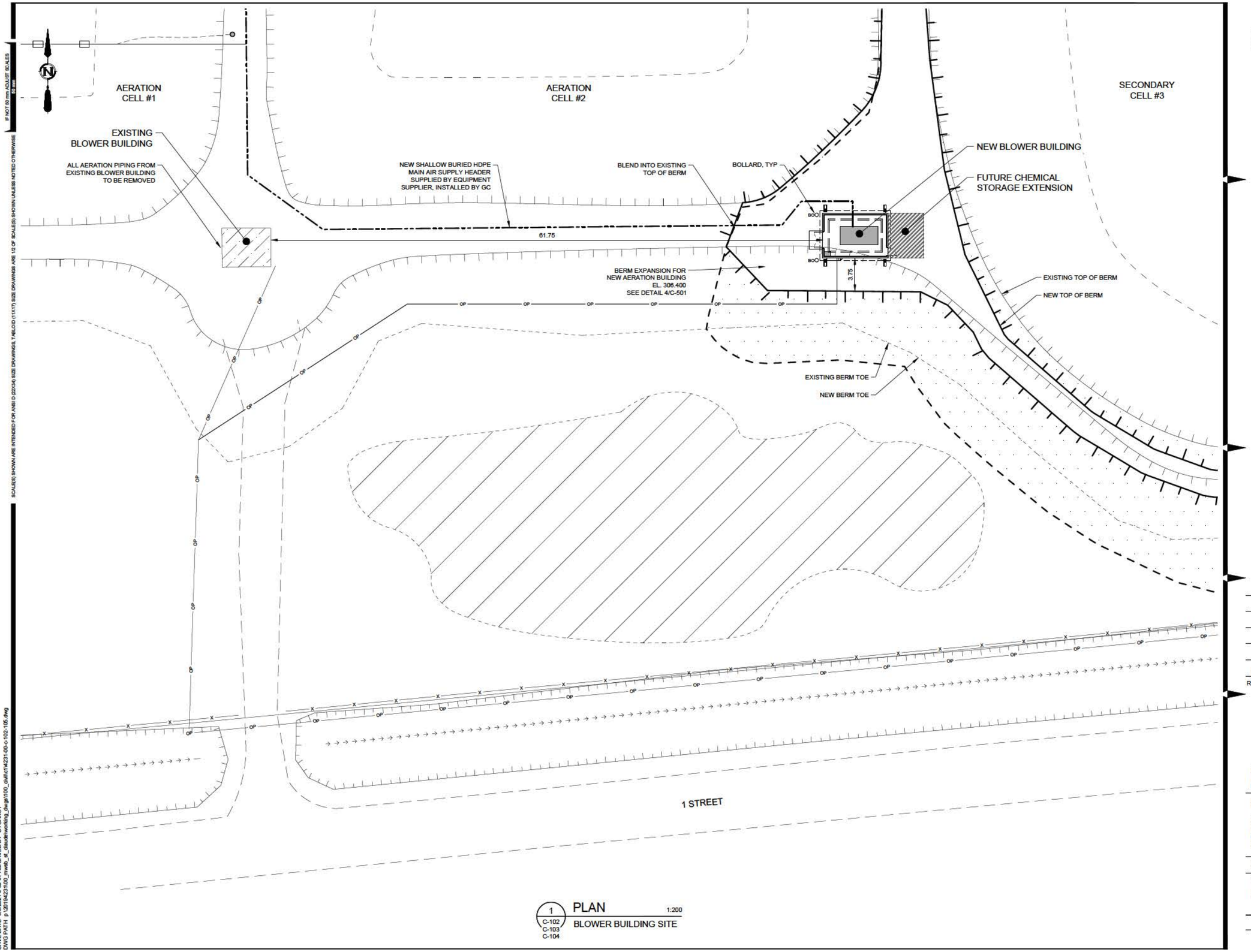

1 C-102 C-103 C-104 PLAN 1:200
BLOWER BUILDING SITE

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MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

CIVIL
BLOWER BUILDING SITE PLAN

DRAWING	REVISION	SHEET
4231-00-C-105	0	6

PLOT DATE 5/6/2021 11:03:06 AM
SAVE DATE 5/6/2021 9:09:07 AM SAVED BY DYCHKOT
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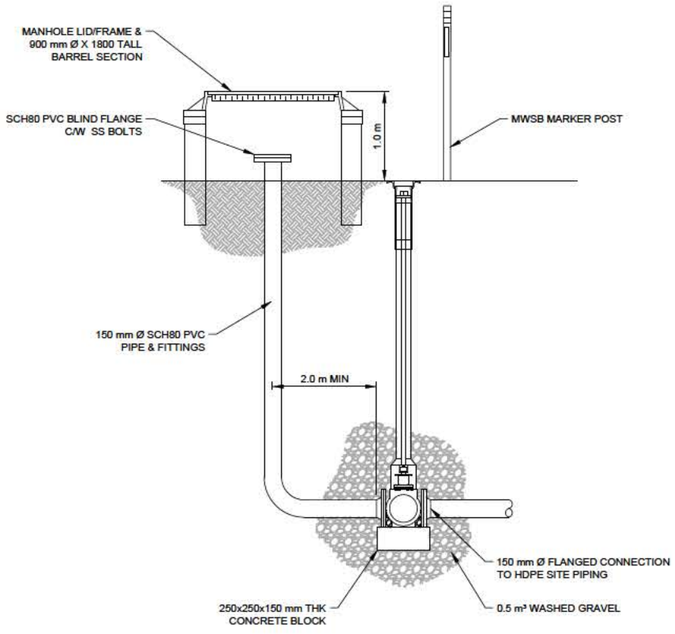
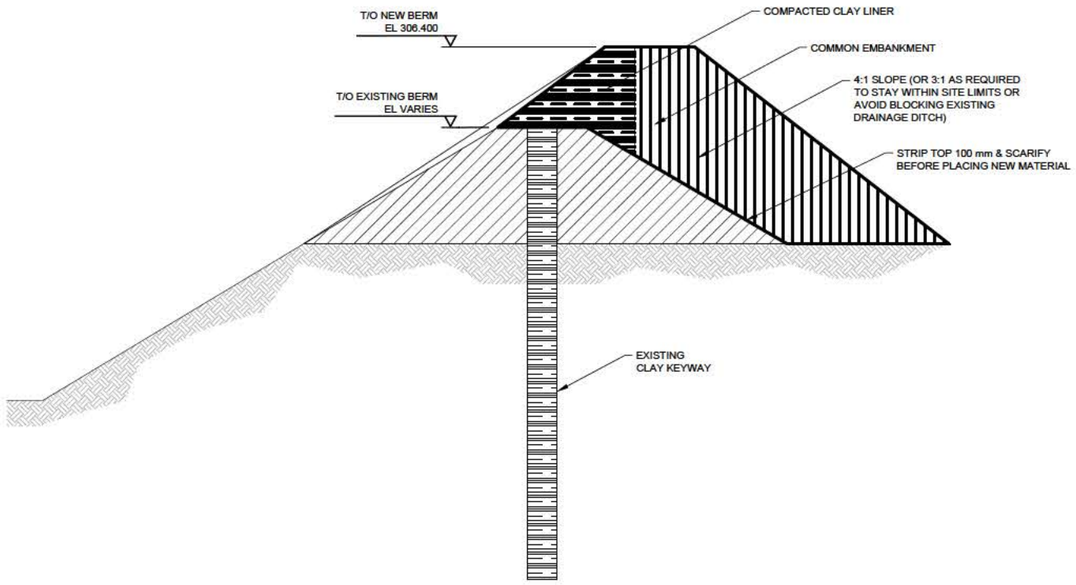
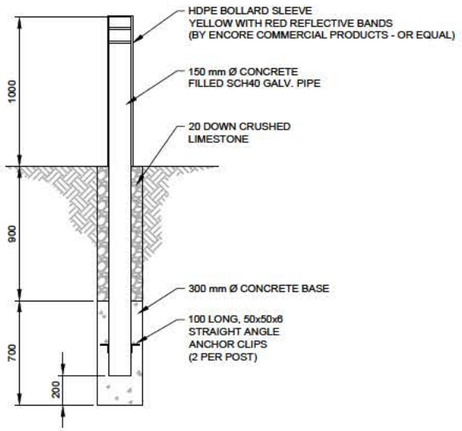


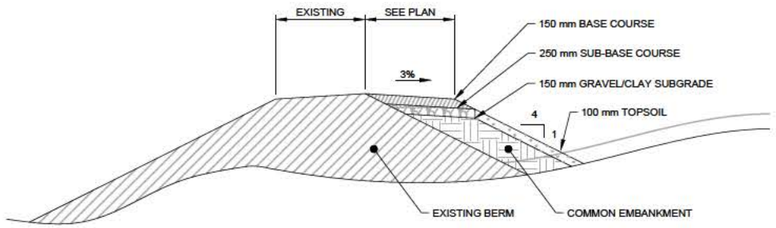
1 C-103 **DETAIL** 1:20
FORCEMAIN ACCESS MANHOLE



2 C-104 **DETAIL** 1:20
CELL #3 BERM UPGRADE



3 **TYPICAL DETAIL** 1:20
CONCRETE BOLLARD



4 C-105 **DETAIL** NTS
AERATION BUILDING
BERM EXPANSION

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CANADA'S BEST MANAGED COMPANIES
Platinum member

The Manitoba Water Services Board

REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	K. ANDERSON	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

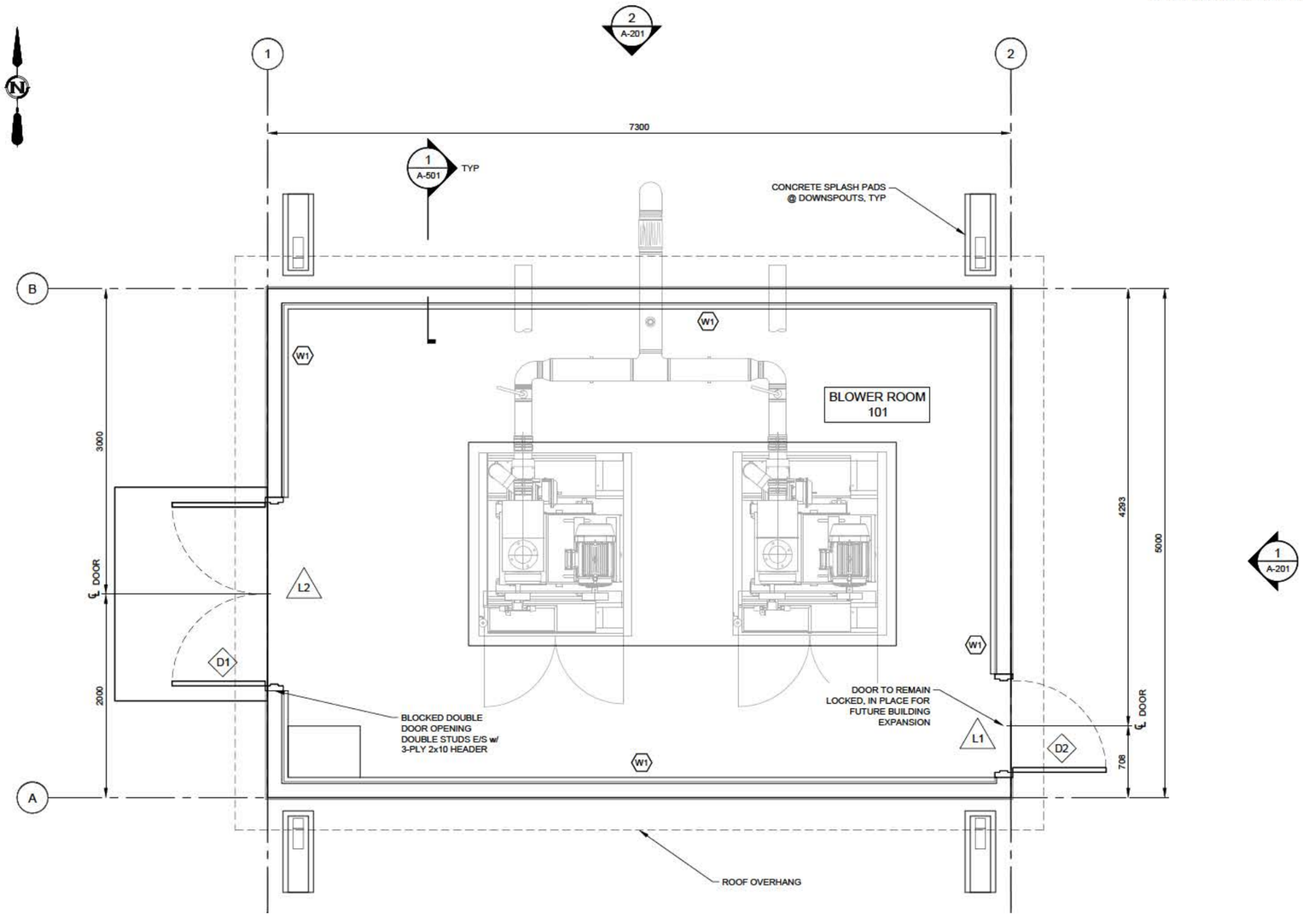
SCALE: AS SHOWN

CIVIL
DETAILS

DRAWING	REVISION	SHEET
4231-00-C-501	0	7

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTES OTHERWISE.
2. ALL EXTERIOR OPENINGS NOT SHOWN TO HAVE L1 LINTEL.
3. SEE 4342-03-A-601 SCHEDULES FOR WALL TYPES.



1 - PLAN 1:25
MAIN FLOOR

LINTEL SCHEDULE

OPENING Δ	COLUMN	WOOD LINTEL
L1	3-PLY STUD	3-PLY 38X184
L2	4-PLY STUD	3-PLY 45X235 20E LVL

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0	2021MAY10	G. SARAZIN	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

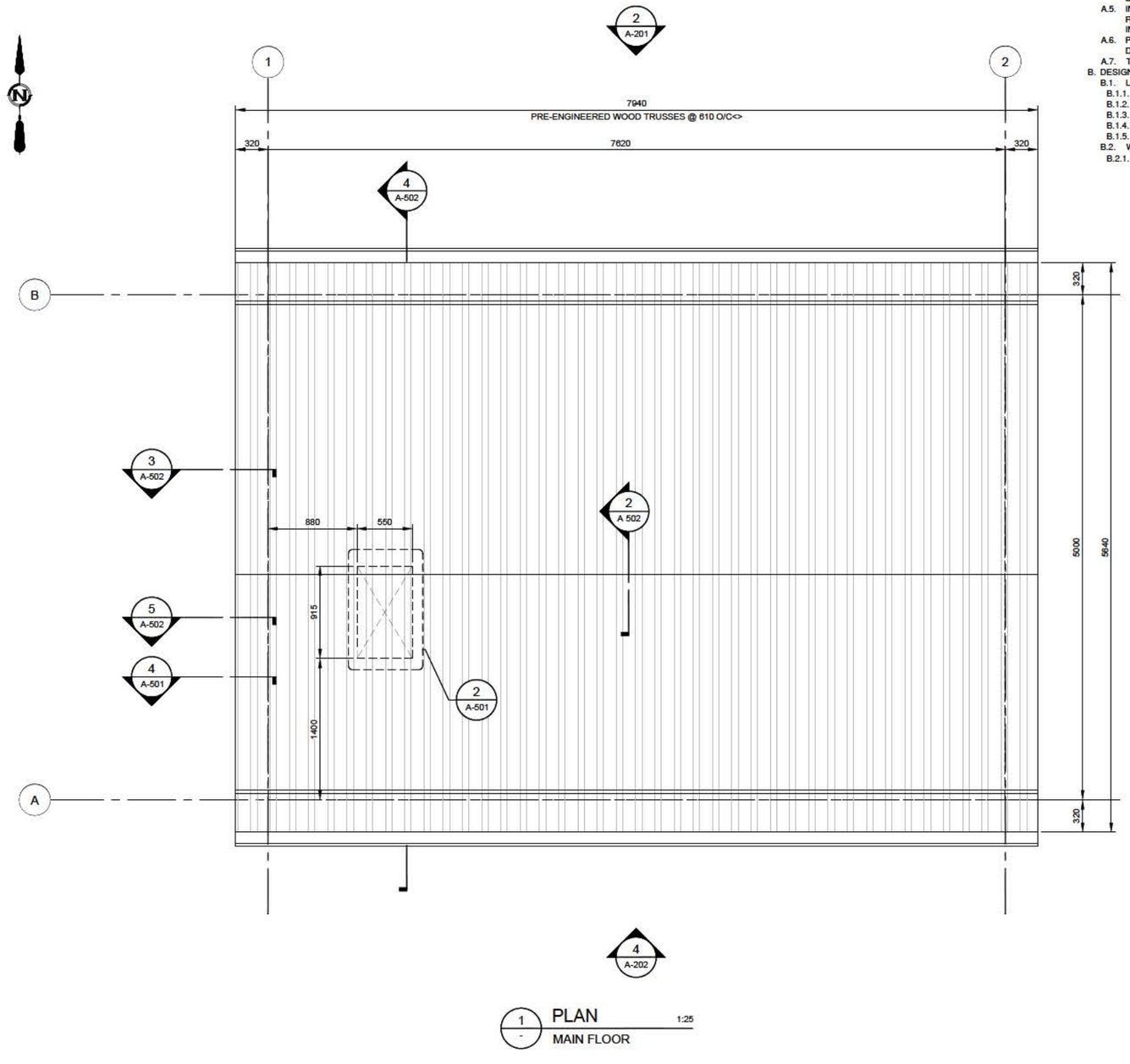
BUILDING
MAIN FLOOR PLAN

DRAWING	REVISION	SHEET
4231-00-A-101	0	8

NOTES:

A. COORDINATION
- A.1. CHECK ALL DIMENSIONS, ELEVATIONS, AND DETAILS PRIOR TO CONSTRUCTION OR FABRICATION.
- A.2. REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- A.3. REFER TO CIVIL AND PROCESS MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE CONFIRMATION OF SIZE AND LOCATION OF ALL OPENINGS, PIPING AND INSERTS.
- A.4. ANCHOR ALL TRUSSES, GIRDERS AND JACKS w/ GALVANIZED TIE DOWNS AS SPECIFIED BY TRUSS MANUFACTURER.
- A.5. INSTALL TYPICAL 38x89 DIAGONAL BRACING WHERE REQUIRED TO REDUCE L/D OF COMPRESSION WEB MEMBRANES; SUPPLIED AND INSTALLED BY GENERAL CONTRACTOR.
- A.6. PROVIDE BRIDGING AND BRACING AS REQUIRED BY TRUSS SHOP DRAWINGS.
- A.7. THIS FACILITY IS A POST DISASTER STRUCTURE.

B. DESIGN LOADS
- B.1. LIVE LOADS:
  - B.1.1. GROUND SNOW: X.X kPa
  - B.1.2. RAIN LOAD: X.X kPa
  - B.1.3. ROOF LIVE LOAD: X.X kPa
  - B.1.4. ROOF COLLATERAL LOAD: X.X kPa
  - B.1.5. DEAD LOAD: X.X kPa
- B.2. WIND:
  - B.2.1. X $^{5}/_{XX}$ – X.XX kPa



1 / - PLAN 1:25
MAIN FLOOR

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MANITOBA WATER SERVICES BOARD

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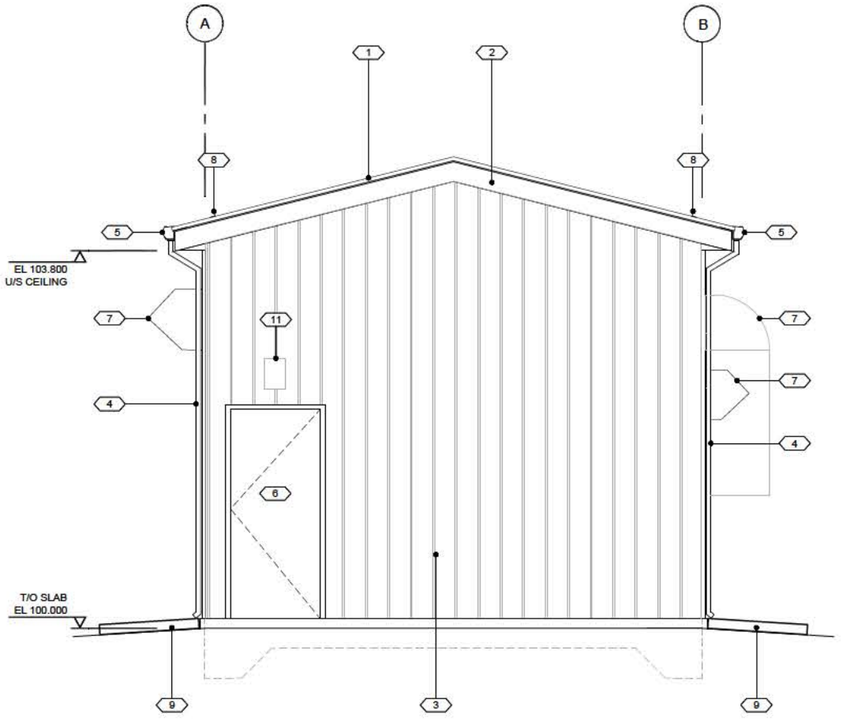
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

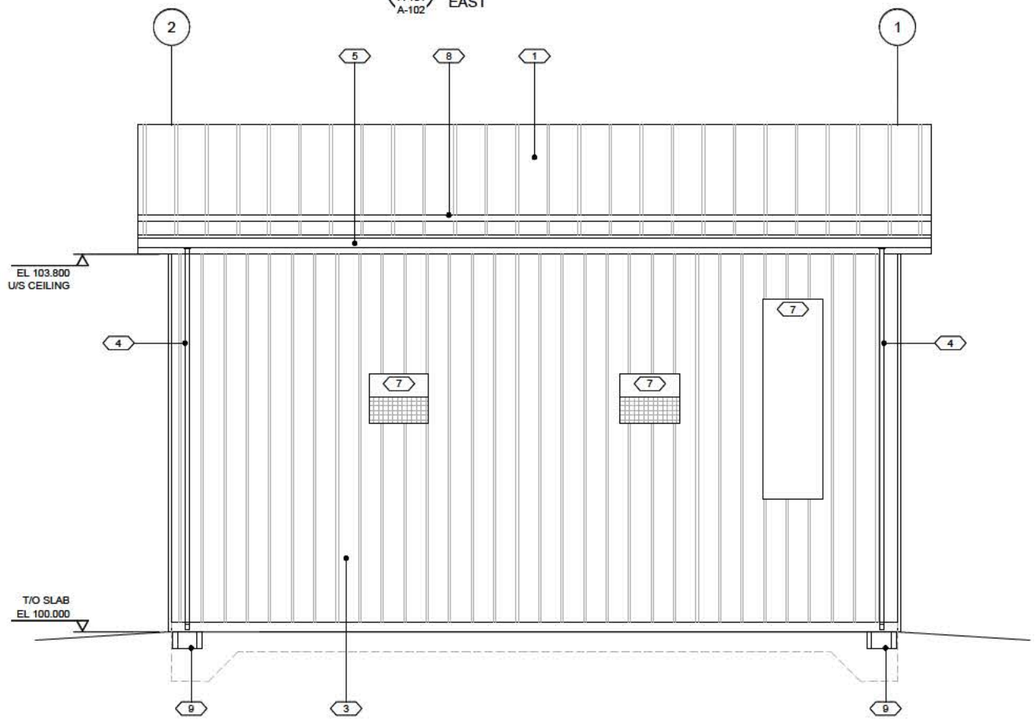
SCALE: AS SHOWN

BUILDING
ROOF PLAN

DRAWING	REVISION	SHEET
4231-00-A-102	0	9



1 A-101 A-102 ELEVATION 1:30
EAST



2 A-101 A-102 ELEVATION 1:30
NORTH

MATERIALS LEGEND

1	PRE-FINISHED METAL ROOF
2	PRE-FINISHED METAL FACIA
3	PRE-FINISHED METAL SIDING
4	100 mm PRE-FINISHED METAL DOWNSPOUT
5	100 mm PRE-FINISHED METAL ROOF GUTTER
6	INSULATED METAL DOOR AND FRAME
7	VENTILATION EQUIPMENT (MECHANICAL)
8	CONTINUOUS SNOW GUARD
9	PRE-CAST CONCRETE SPLASH PAD
10	SIGNAGE
11	LIGHTING (ELECTRICAL)
12	PIPING (PROCESS)

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CANADA'S BEST MANAGED COMPANIES
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The Manitoba Water Services Board

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0	2021MAY10	G. SARAZIN	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

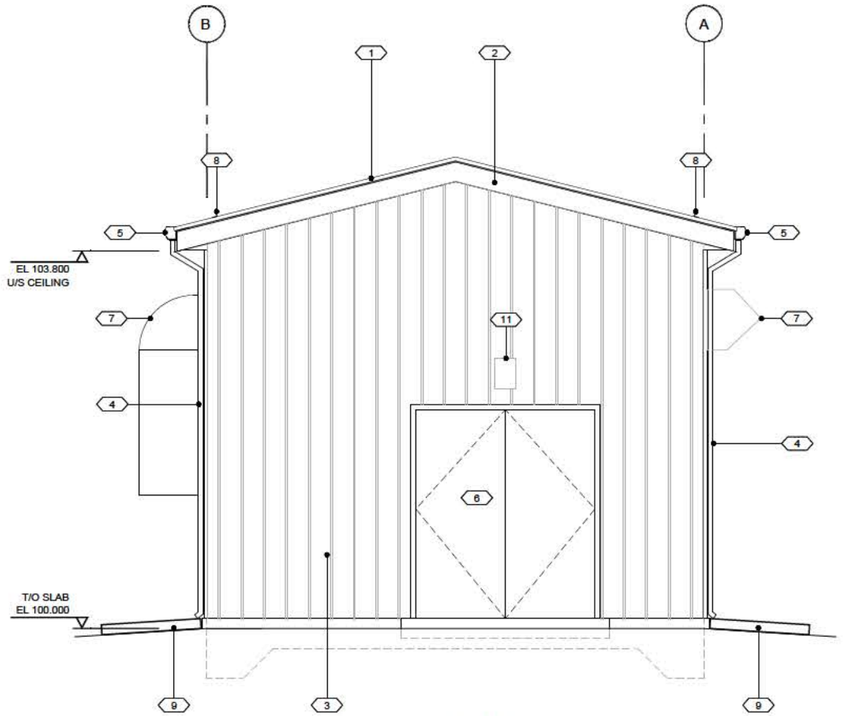
RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

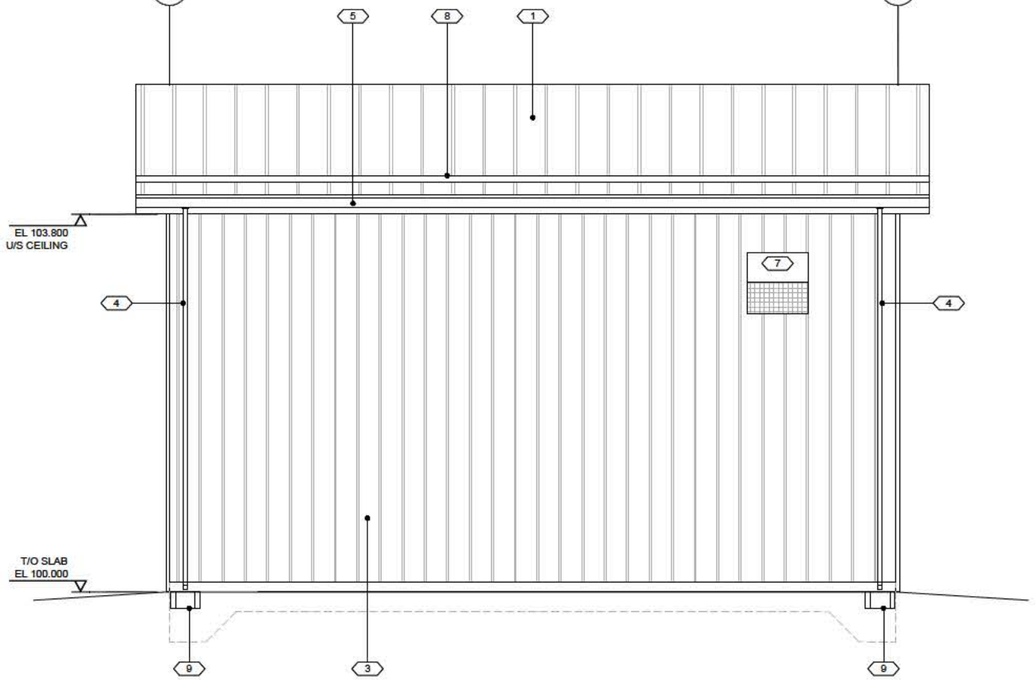
SCALE: AS SHOWN

BUILDING
ELEVATIONS
EAST AND NORTH

DRAWING	REVISION	SHEET
4231-00-A-201	0	10



3 A-101 A-102 **ELEVATION** 1:30
WEST



4 A-101 A-102 **ELEVATION** 1:30
SOUTH

MATERIALS LEGEND

1. PRE-FINISHED METAL ROOF
2. PRE-FINISHED METAL FACIA
3. PRE-FINISHED METAL SIDING
4. 100 mm PRE-FINISHED METAL DOWNSPOUT
5. 100 mm PRE-FINISHED METAL ROOF GUTTER
6. INSULATED METAL DOOR AND FRAME
7. VENTILATION EQUIPMENT (MECHANICAL)
8. CONTINUOUS SNOW GUARD
9. PRE-CAST CONCRETE SPLASH PAD
10. SIGNAGE
11. LIGHTING (ELECTRICAL)
12. PIPING (PROCESS)

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0	2021MAY10	G. SARAZIN	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

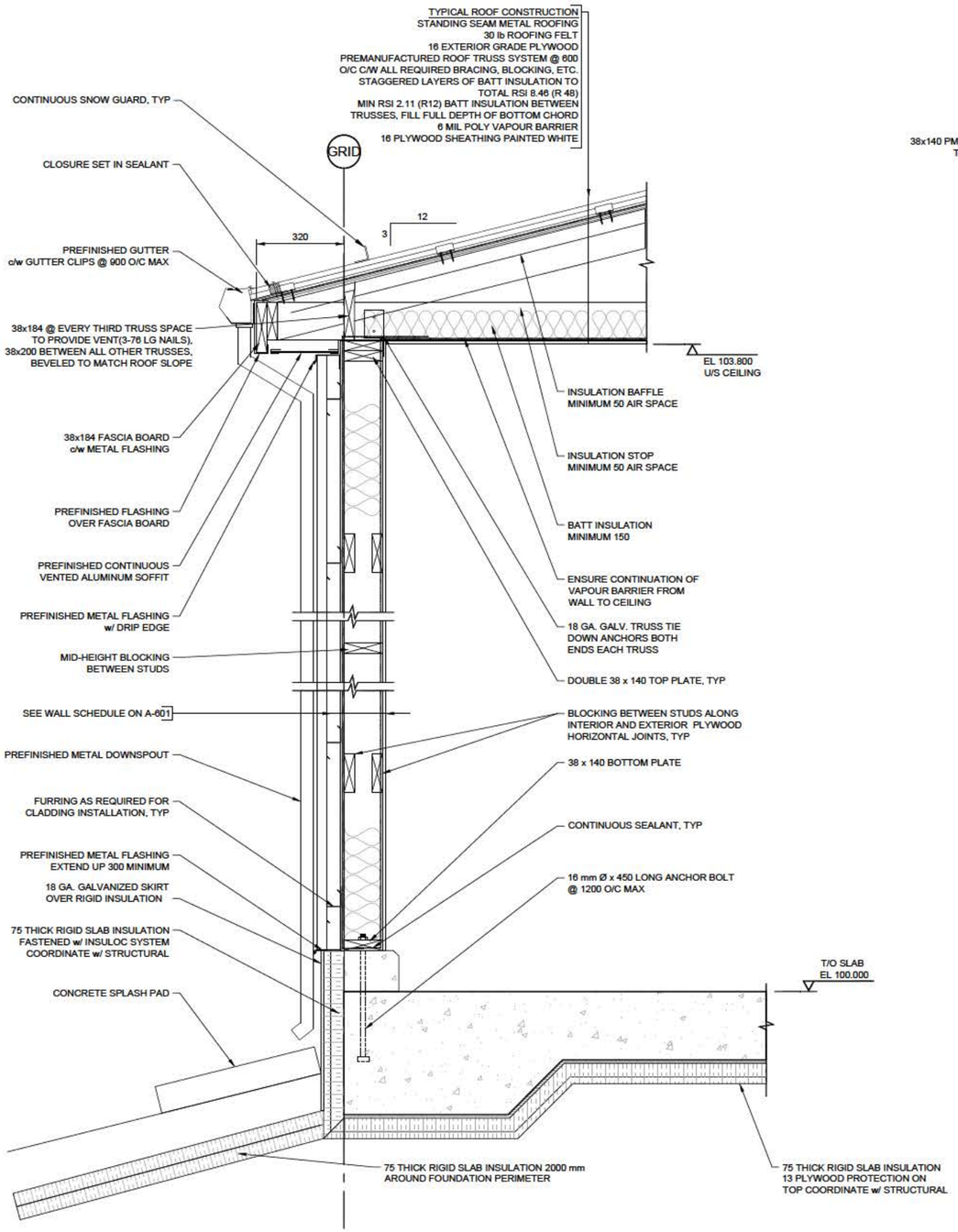
RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

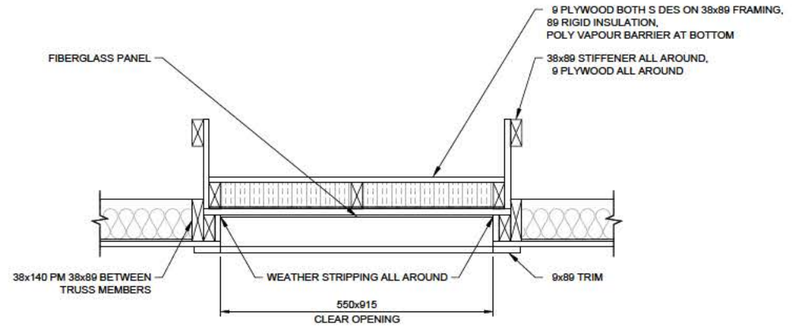
SCALE: AS SHOWN

BUILDING
ELEVATIONS
WEST AND SOUTH

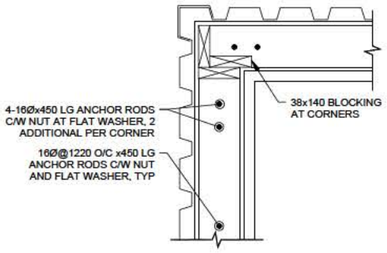
DRAWING	REVISION	SHEET
4231-00-A-202	0	11



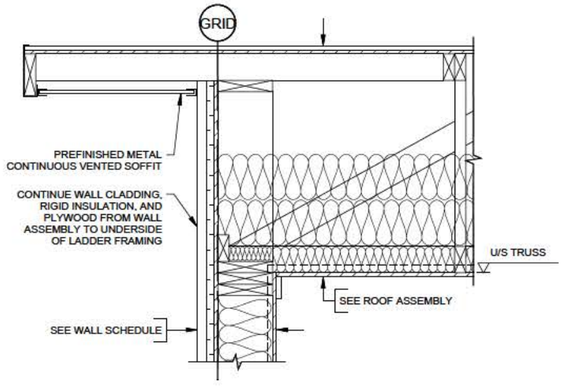
1 / A-101 **SECTION** 1:10
EXTERIOR WALL SECTION



2 / A-102 **DETAIL** 1:10
ATTIC ACCESS



3 / **TYPICAL DETAIL** 1:10
ANCHOR RODS



4 / A-102 **DETAIL** 1:10
GABLE END

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RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

BUILDING DETAILS

DRAWING	REVISION	SHEET
4231-00-A-501	0	12

IF NOT 50 mm ADJUST SCALES
50 mm
SCALE(S) SHOWN ARE INTENDED FOR ANSI D (22X34) SIZE DRAWINGS, TABLOID (11X17) SIZE DRAWINGS ARE 1/2 OF SCALE(S) SHOWN UNLESS NOTED OTHERWISE

CODE REVIEW

PROJECT DESCRIPTION :

THE PROJECT CONSISTS OF A NEW ONE-STOREY
BLOWER BUILDING & SITE WORK

MUNICIPAL ADDRESS :

TBD
ST CLAUDE, MANITOBA CANADA

LEGAL DESCRIPTION :

TBD

LAND USE DESIGNATION:

INDUSTRIAL

MAXIMUM HEIGHT PERMITTED:

PERMITTED: N/A
ACTUAL: N/A

SITE AREA: +1,000 SQ m

REFERENCE CODE:
MANITOBA BUILDING CODE 2010
ENERGY CODE MANITOBA BUILDING CODE 2010 SECTION 9.36
MANITOBA FIRE CODE 2016

BUILDING CLASSIFICATION

MAJOR OCCUPANCY CLASSIFICATION	GROUP F, DIVISION 3 - LOW HAZARD
SPRINKLER SYSTEM	NOT REQUIRED
BUILDING FOOTPRINT	60 SQ m (645 SQ FT)
NUMBER OF STOREYS	ONE
BUILDING AREAS	60 SQ m (645 SQ FT)
CONSTRUCTION TYPE	PERMITTED: COMBUSTIBLE OR NON-COMBUSTIBLE ACTUAL: COMBUSTIBLE
FLOOR ASSEMBLY	NOT REQUIRED FOR UNOCCUPIED SERVICE BUILDING
LOAD BEARING WALLS ASSEMBLY	NOT REQUIRED FOR UNOCCUPIED SERVICE BUILDING
ROOF ASSEMBLY	NOT REQUIRED FOR UNOCCUPIED SERVICE BUILDING
FIRE ALARM SYSTEM	NOT REQUIRED
OCCUPANT LOAD	N/A
TRAVEL DISTANCE	8.0 m (26.2 FT)

BARRIER FREE REQUIREMENTS

DUE TO THE NATURE OF THE PROJECT, A RELAXATION WILL BE ASSUMED TO ALLOW THE BUILDING TO BE WAVED FROM THE BARRIER-FREE ACCESS

ENERGY CODE REVIEW

PRESCRIPTIVE PATH/TRADE OFF	NBCC 2010 9.36
HEATING DEGREE DAY (HDD) AND ZONE	5400 7A
WALL AREA	142 m^2
DOOR/LOUVER AREA	8.9 m^2
FENESTRATION AREA	0 m^2

MATERIALS SCHEDULE

COLOURED HARDENER HPT1 (GENERAL)		FIBERGLASS REINFORCED PLASTIC FRP1 (REFER TO SPEC)	
MANUFACTURER:	SIKA	MANUFACTURER:	SEE SPEC
TYPE:	DIAMAG 7	CLASS:	SEE SPEC
COLOUR NAME:	NATURAL CONCRETE GRAY	COLOUR:	BRIGHT WHITE
		FINISH:	PEBBLE, SEE SPEC FOR INSTALLATION INSTRUCTIONS
TYPE:	FLORSEAL WB 18		
COLOUR NAME:	WATER CLEAR		

PT1 (TRIM & DOOR PAINT)	
MANUFACTURER:	DULUX
COLOUR NAME:	OWNER SELECTED
COLOUR NUMBER:	OWNER SELECTED
FINISH TYPE:	SEMI-GLOSS

ROOM FINISH SCHEDULE

TAG	ROOM	FLOOR		WALL		CEILING		
		MATERIAL	FINISH	MATERIAL	FINISH	HEIGHT	MATERIAL	FINISH
101	BLOWER ROOM	CONCRETE	HPT1	WOOD SHEATHING	FRP1	3800	WOOD SHEATHING	FRP1

WALL TYPE

EXTERIOR WALL
24 GA PREFINISHED METAL SIDING
TYVEK AIR BARRIER
19 mm EXTERIOR GRADE PLYWOOD
38x140 STUDS @ 400 mm O/C
140 (R20) BATT INSULATION
6 MIL POLY VAPOUR BARRIER
19 mm PLYWOOD w/ LAMINATED
FIBRE REINFORCED PLASTIC PANEL

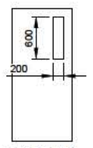
* FIBRE REINFORCED PLASTIC PANEL SYSTEMS TO BE WATER TIGHT

W1

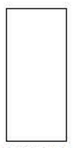
DOOR SCHEDULE

LOCATION			DOORS				FRAMES	
TAG	FROM	TO	SIZE	TYPE	SWING	FINISH	TYPE	FINISH
D1	BLOWER ROOM	EXTERIOR	2-915x2150	1	LH/RH	PT1	A	PT1
D2	BLOWER ROOM	EXTERIOR	915x2150	2	RHR	PT1	A	PT1

DOOR TYPES

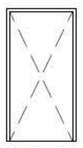


DOOR TYPE 1
NARROW LITE



DOOR TYPE 2
NO LITE

FRAME TYPES



FRAME TYPE A
THERMALLY BROKEN

NOTES:

1. ALL HARDWARE TO BE MEDIUM DUTY, COMMERCIAL GRADE. SEE SPECIFICATIONS.
2. ALL HARDWARE TO BE KEYED TO MASTER KEYING SYSTEM.
3. ALL CLOSERS TO HAVE 90 HOLD OPEN DEVICE.
4. ALL EXTERIOR DOORS TO HAVE STOP CHAINS.
5. SEE SPECIFICATIONS.

ABBREVIATIONS:

INSUL	= INSULATED
PS	= PRESSED STEEL
PREF	= PREFINISHED
MANUF	= MANUFACTURER
FRR	= FIRE RESISTANCE RATING
PT	= PAINT

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Platinum member

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0	2021MAY10	G. SARAZIN	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

BUILDING
CODE OVERVIEW
AND SCHEDULES

DRAWING	REVISION	SHEET
4231-00-A-601	0	13

PLOT DATE 5/6/2021 11:04:06 AM
SAVE DATE 5/6/2021 9:12:26 AM SAVED BY DYCHKOT
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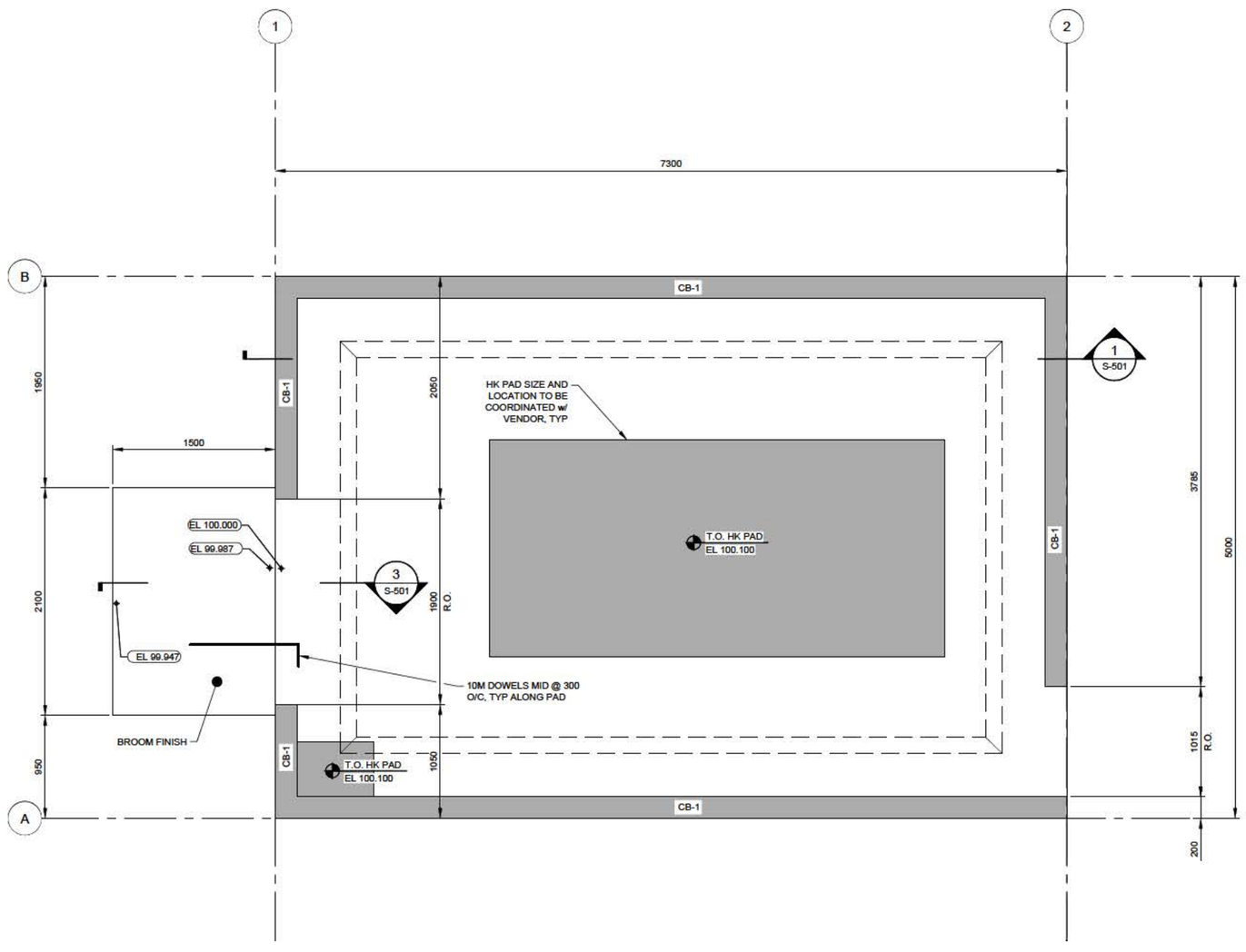

1 - PLAN 1:25
MAIN FLOOR

CURB SCHEDULE

TYPE	SIZE	REINFORCING			
		BAR SIZE	SPACING	QTY	NOTES
CB-1	150 HIGH X 200 WIDE	15M		2	TOP CONTINUOUS
		10M	150 O/C		HAIRPIN DOWELS EMBEDDED 200 INTO SLAB

NOTES:

A. COORDINATION
- A.1. CHECK ALL DIMENSIONS, ELEVATIONS, AND DETAILS PRIOR TO CONSTRUCTION OR FABRICATION.
- A.2. REPORT DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- A.3. REFER TO CIVIL AND PROCESS MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE CONFIRMATION OF SIZE AND LOCATION OF ALL OPENINGS, PIPING AND INSERTS.

B. DESIGN LOADS
- B.1. LIVE LOADS:
  - B.1.1. GROUND SNOW: XXXkPa
  - B.1.2. RAIN LOAD: XXXkPa
  - B.1.3. ROOF LIVE LOAD: XXXkPa
  - B.1.4. ROOF COLLATERAL LOAD: XXXkPa
  - B.1.5. MAIN FLOOR: 4.8kPa
  - B.1.6. WIND LOAD q50 (1 IN 50 YEARS): XXXXkPa
  - B.1.7. SEISMIC FORCE:
    - Sa(0.2) – XXXX
    - Sa(0.5) – XXXX
    - Sa(1.0) – XXXX
    - Sa(2.0) – XXXX
    - PGA – XXXX
- B.2. DEAD LOAD: MATERIAL SELF-WEIGHT (1.0kPa)
- B.3. THIS BUILDING IS DESIGNED AS A POST-DISASTER STRUCTURE

C. BUILDING CODES AND STANDARDS
- C.1. NATIONAL BUILDING CODE OF CANADA, 2010
- C.2. ACI 350 "ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES"
- C.3. CSA A23.3 " DESIGN OF CONCRETE STRUCTURES
- C.4. CSA A23.1 "CONCRETE MATERIALS AND METHODS OF CONSTRUCTION"
- C.5. CSA S16 " LIMIT STATES DESIGN OF STEEL STRUCTURES"
- C.6. CSA G40.21 " STRUCTURAL QUALITY STEELS
- C.7. CSA W59 " WELDED STEEL CONSTRUCTION"

D. STRUCTURAL CONCRETE
- D.1. ALL CONCRETE AND REINFORCED CONCRETE IN ACCORDANCE WITH CSA A23.1/A23.2.
- D.2. ALL CONCRETE WITH THE EXCEPTION OF THE INTERIOR EQUIPMENT PADS AND CURBS, TO HAVE THE FOLLOWING PROPERTIES:
  - D.2.1. CLASS OF EXPOSURE: S-2.
  - D.2.2. CONCRETE 56 DAYS STRENGTH: 32 MPa.
  - D.2.3. MAXIMUM AGGREGATE: 20 mm.
  - D.2.4. AIR ENTRAINMENT: AIR CONTENT CATEGORY 1 (5-8%).
- D.3. INTERIOR EQUIPMENT PADS AND CURBS TO HAVE THE FOLLOWING PROPERTIES:
  - D.3.1. CLASS OF EXPOSURE: N.
  - D.3.2. CONCRETE 56 DAYS STRENGTH: 32 MPa.
  - D.3.3. MAXIMUM AGGREGATE: 20 mm.
  - D.3.4. NO AIR ENTRAINMENT.
- D.4. 50 COVER UNLESS NOTED OTHERWISE.
- D.5. ALL EXPOSED CONCRETE EDGES SHALL BE 20 mm CHAMFER.

E. REINFORCING STEEL.
- E.1. ALL CONCRETE REINFORCEMENT IN ACCORDANCE WITH CSA G30.18.
- E.2. REINFORCING BARS GRADE 400R.
- E.3. REINFORCING TIES GRADE 400W.
- E.4. USE CLASS 'B' TENSION SPLICES WITH A MINIMUM LENGTH FOR:
  - 10m – 500 mm
  - 15M – 750 mm

ORDER OF PLACEMENT:

N-S BOTTOM LOWER LEVEL
E-W BOTTOM UPPER LEVEL
E-W TOP LOWER LEVEL
N-S TOP UPPER LEVEL

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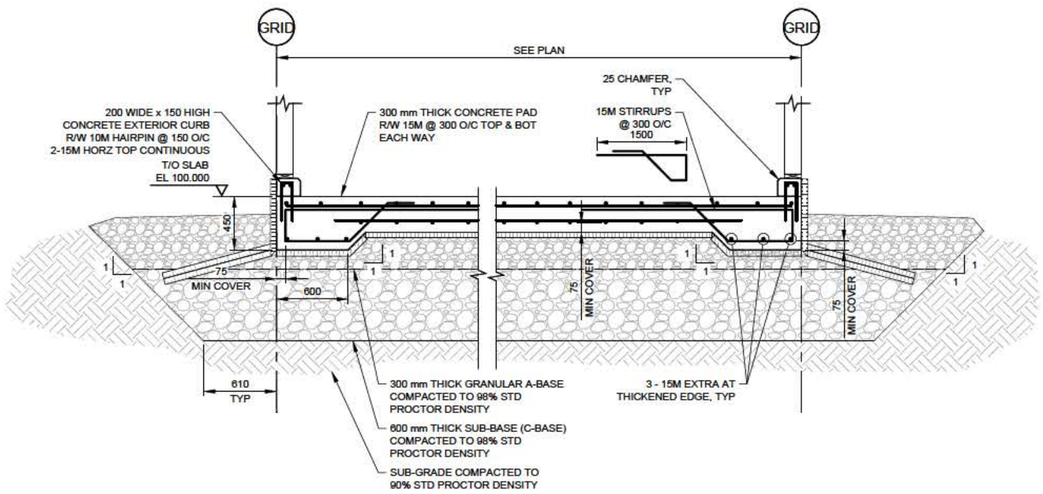
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

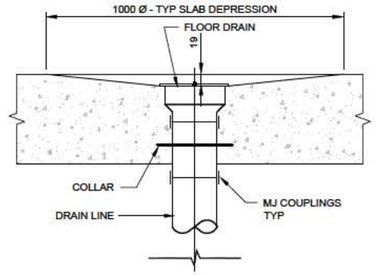
SCALE: AS SHOWN

STRUCTURAL
MAIN FLOOR PLAN

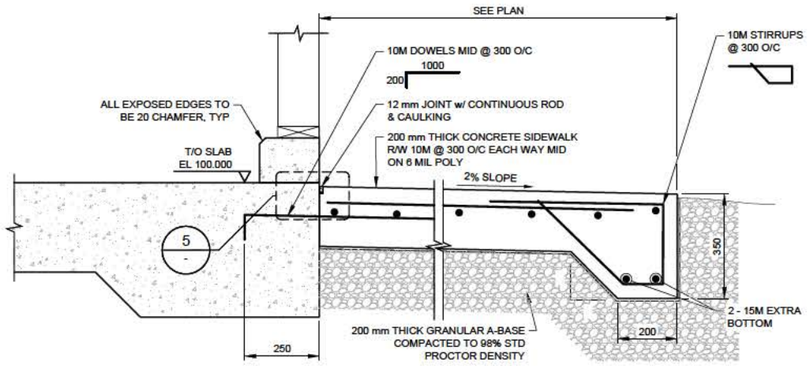
DRAWING	REVISION	SHEET
4231-00-S-101	0	14



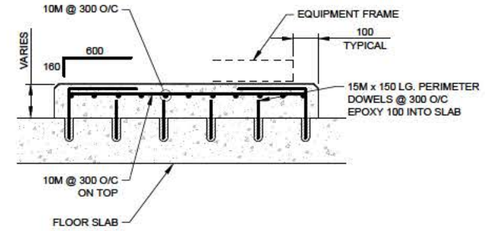
1 S-101 **DETAIL** 1:25
CONCRETE FLOOR SLAB



2 **TYPICAL DETAIL** NTS
FLOOR DRAIN

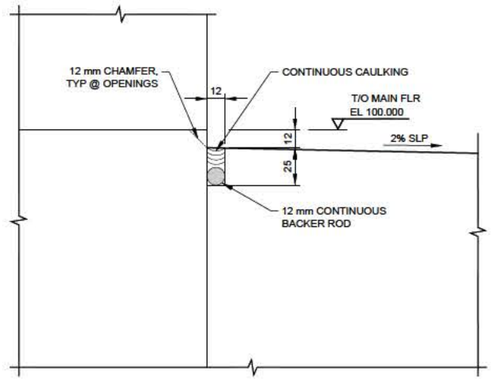


3 S-101 **DETAIL** 1:10
CONCRETE PAD



NOTE:
CONTRACTOR TO COORDINATE LAYOUT, DIMENSIONS AND ANCHORAGE OF HOUSEKEEPING PADS FOR EACH PIECE OF EQUIPMENT.

4 **TYPICAL DETAIL** NTS
HOUSEKEEPING PAD



5 - **DETAIL** NTS
CONCRETE LANDING

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REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	G. SARAZIN	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

Grey

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

STRUCTURAL DETAILS

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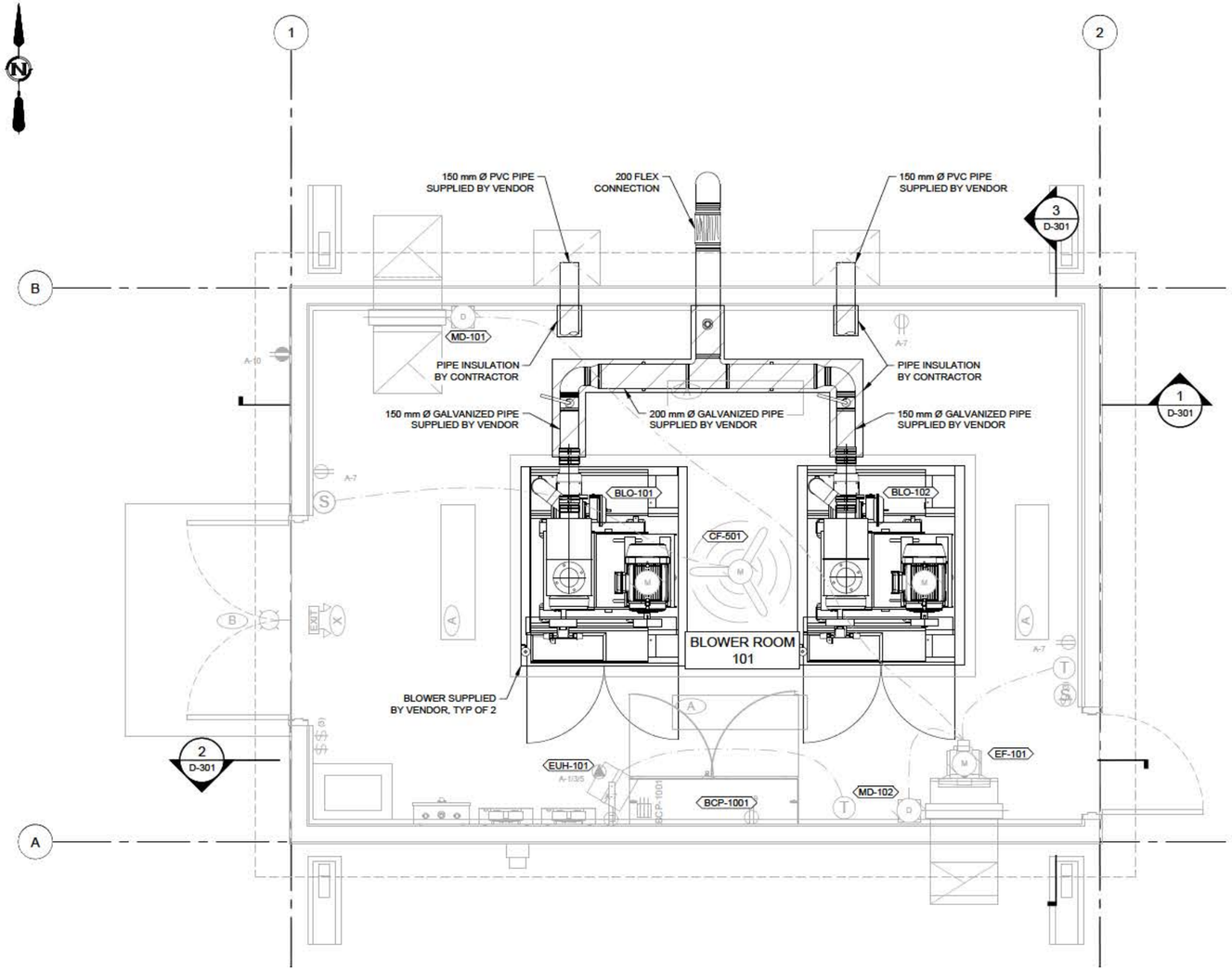

1 PLAN 1:25
MAIN FLOOR

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REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	K. ANDERSON	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

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MANITOBA WATER SERVICES BOARD

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AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

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PROCESS
MAIN FLOOR PLAN
BLOWER PIPING

DRAWING	REVISION	SHEET
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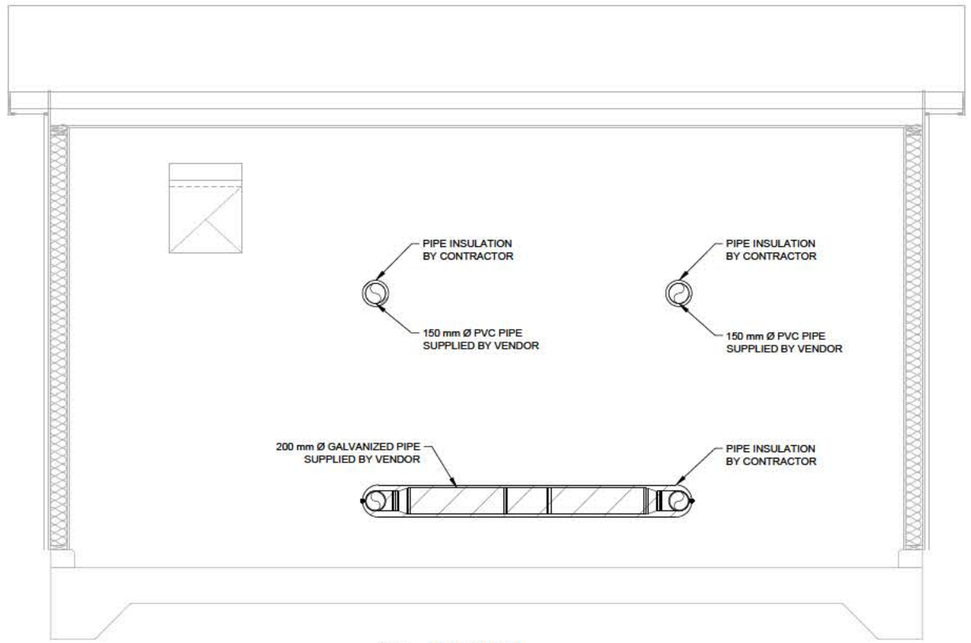
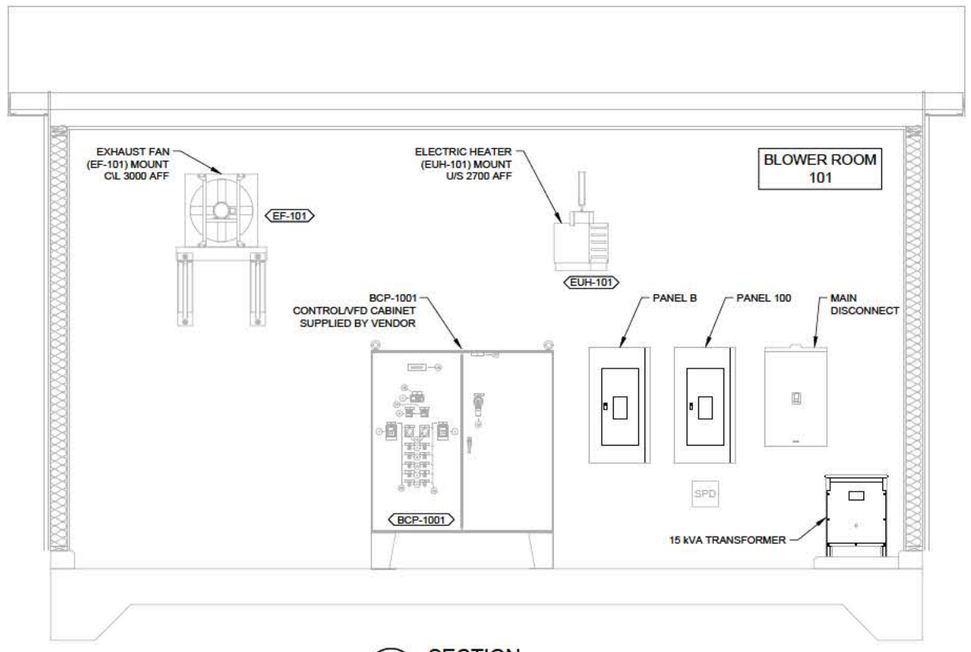
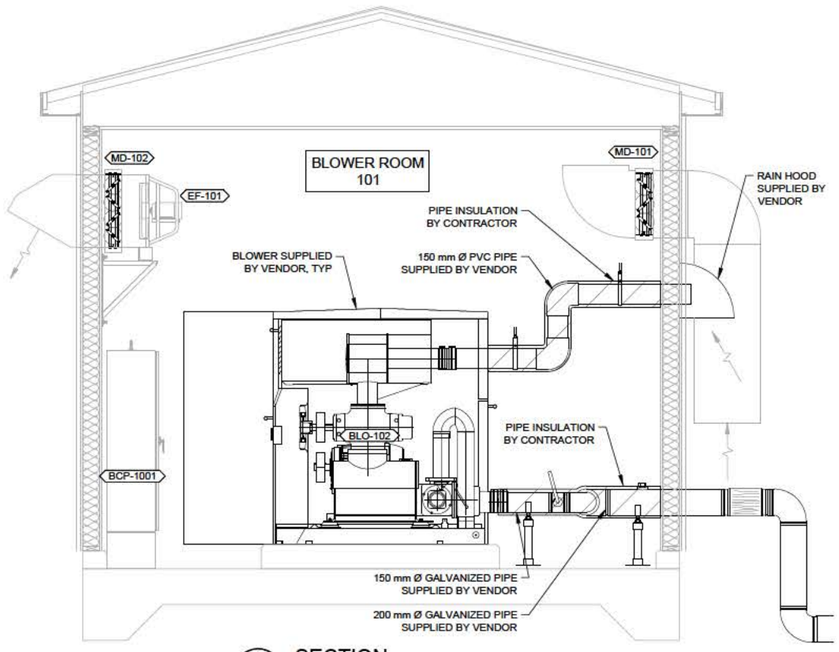


1 D-101 SECTION 1:25



2 D-101 SECTION 1:25



3 D-101 SECTION 1:25

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0	2021MAY10	K. ANDERSON	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

PROCESS
SECTION

DRAWING	REVISION	SHEET
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IF NOT 50 mm ADJUST SCALES
50 mm

SCALE(S) SHOWN ARE INTENDED FOR ANSI D (22X34) SIZE DRAWINGS, TABLOID (11X17) SIZE DRAWINGS ARE 1/2 OF SCALE(S) SHOWN UNLESS NOTED OTHERWISE

HEATING, VENTILATION AND AIR CONDITIONING SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
	AIR MOVEMENT ARROW
	SUPPLY AIR DUCT DOWN
	SUPPLY AIR DUCT UP
	OUTSIDE AIR DUCT DOWN
	OUTSIDE AIR DUCT UP
	RETURN AIR DUCT DOWN
	RETURN AIR DUCT UP
	EXHAUST AIR DUCT DOWN
	EXHAUST AIR DUCT UP
CD	SUPPLY AIR DIFFUSER (ROUND)
CD	SUPPLY AIR DIFFUSER (SQUARE)
CG	EXHAUST GRILLE - CEILING
CG	RETURN GRILLE - CEILING
CG	SUPPLY GRILLE - CEILING
WG	EXHAUST / RETURN GRILLE - SCHEMATIC
WG	SUPPLY GRILLE - SCHEMATIC
	SIDEWALL EXHAUST / RETURN / SUPPLY GRILLE
	ROUND DUCT DOWN
	ROUND DUCT UP
	FLEXIBLE DUCT CONNECTION
	THERMALLY INSULATED DUCT
	DUCT W/ ACOUSTIC INSULATION
MATL 1 MATL 2	CHANGE IN DUCT MATERIAL C/W FLANGED CONNECTION
	TURNING VANES
	DUCT TAKE-OFF (RECTANGULAR MAIN AND RECTANGULAR BRANCH)
	DUCT TAKE-OFF (RECTANGULAR MAIN AND ROUND BRANCH)
	DUCT TAKE-OFF (ROUND MAIN AND ROUND BRANCH)
	CONICAL WYE (ROUND MAIN AND ROUND BRANCH)
	FLEXIBLE DUCT
	DUCT OR PIPE, CAP-OFF OR BLIND FLANGE
AD	ACCESS DOOR, SIDE OR BOTTOM OF DUCT
	RECTANGULAR DUCT TRANSITION - CONCENTRIC
	RECTANGULAR DUCT TRANSITION - ECCENTRIC
	ROUND DUCT TRANSITION
D	DUCT SLOPE DROP
R	DUCT SLOPE RISE
	AIR FILTER
	PARALLEL BLADE DAMPER

HEATING, VENTILATION AND AIR CONDITIONING SYMBOL SCHEDULE (CONT'D)

SYMBOL	DESCRIPTION
	OPPOSED BLADE DAMPER
VD	BALANCING / VOLUME DAMPER
BDD	BACK DRAFT DAMPER
FD	FIRE DAMPER (VERTICAL)
FD	FIRE DAMPER (HORIZONTAL)
TG 300x300	TRANSFER AIR GRILLE
	TRANSFER AIR OPENING
	CEILING FAN
	CENTRIFUGAL FAN
	AXIAL FAN
	PROPELLER FAN
	THERMOMETER C/W COCK
H	HUMIDISTAT
M	MOTOR (ELECTRIC)
M	MOTOR (PNEUMATIC)
P	PRESSURE SENSOR
P	PRESSURE STAT
T	THERMOSTAT
T	THERMOSTAT C/W GUARD AND INSULATED BACKPLATE
T	SELF-CONTAINED THERMOSTAT C/W REMOTE BULB
T	TEMPERATURE SENSOR
$	SWITCH
CO	CARBON MONOXIDE DETECTOR
PS	PRESSURE SWITCH
	HEATING COIL
HVAC	HVAC CONTROL PANEL
	RADIANT CELING PANEL
	BASEBOARD HEATER - ELECTRIC
C H	HEAT EXCHANGER - AIR TO AIR
	HEAT EXCHANGER
UH	UNIT HEATER
AC	ROOM AIR CONDITIONING EQUIPMENT

FIRE SUPPRESSION SYMBOL SCHEDULE

	PORTABLE FIRE EXTINGUISHER DRY CHEMICAL, MULTI-PURPOSE (TYPE ABC)
	FIRE DEPARTMENT SIAMESE CONNECTION FREE STANDING
	FIRE DEPARTMENT SIAMESE CONNECTION TWO-WAY
	FIRE DEPARTMENT CONNECTION ONE WAY
	WALL HYDRANT - TWO HOSE OUTLET

PIPING SYMBOL SCHEDULE

CO	CLEANOUT
CO	CLEANOUT UP TO FINISHED FLOOR/GRADE
CO	P-TRAP C/W TRAP PRIMER
	RUNNING TRAP C/W CLEANOUT AND TRAP PRIMER

HEATING, VENTILATION AND AIR CONDITIONING SYMBOL SCHEDULE (CONT'D)

SYMBOL	DESCRIPTION
	LOUVER TAG
	STATIC PRESSURE TAG
TYPE SIZE (mm) CAPACITY (L/s)	AIR OUTLET OR INLET TAG
	EQUIPMENT TAG
TYPE SIZE (mm) CAPACITY (kW)	RADIATION TAG

PIPING SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
	DIRECTION OF FLOW
	PIPE TEE
	ELBOW UP
	TOP PIPE TAKE-OFF
	ELBOW DOWN
	BOTTOM PIPE TAKE-OFF
	PIPE OFFSET
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	FLOW METER
	FLEXIBLE PIPE CONNECTION
	EXPANSION JOINT
	PIPE SLEEVE
	PIPE GUIDE
	FLOW INDICATOR
	FILTER AND STRAINER
	VENT THRU ROOF C/W CAP
AV	AUTOMATIC AIR VENT
	HEAT TRACED PIPING
	STRAP-ON AQUA STAT
	PUMP - SCHEMATIC
	UNION (FLANGED)
	STRAINER C/W SCREWED END
	STRAINER (PLAN)
	GATE VALVE
	GLOBE VALVE
	BALL VALVE
	CHECK VALVE
	3-WAY CONTROL VALVE
	PRESSURE OR SAFETY RELIEF VALVE
	PRESSURE REDUCING VALVE
FS	FLOW SWITCH
	PRESSURE GAUGE C/W COCK
G	GAS METER
G	NATURAL GAS REGULATOR VALVE
W	WATER METER
DCVA	BACK-FLOW PREVENTER - DCVA
RP	BACK-FLOW PREVENTER - RP
TD	THERMOSTATIC MIXING VALVE
	WATER HAMMER ARRESTOR
VB	VACUUM BREAKER
	SHOWER HEAD
	HOSE REEL
	HOSE BIBB
	FLOOR DRAIN - OPEN FUNNEL
	FLOOR / HUB / FUNNEL / ROOF DRAIN - ROUND
	FLOOR DRAIN - SQUARE

SOFT METRIC CONVERSION CHART

NOMINAL DUCT SIZES	
IMPERIAL (IN)	METRIC (mm)
3	80
4	100
5	125
6	150
7	175
8	200
9	225
10	250
12	300
14	350
16	400
18	450
20	500
22	550
24	600
26	650
28	700
30	750
32	800
34	850
36	900
38	950
40	1000
42	1050
48	1200
60	1500
72	1800

NOMINAL PIPE SIZES	
IMPERIAL (IN)	METRIC (mm)
1/8	6
1/4	8
3/8	10
1/2	15
3/4	20
1	25
1-1/4	32
1-1/2	40
2	50
2-1/2	65
3	80
3-1/2	90
4	100
5	125
6	150
8	200
10	250
12	300
14	350

NOTE:
1. ALL WHOLE-NUMBER INCH DESIGNATIONS CONVERT TO MULTIPLES OF 25mm FOR DUCTWORK.
2. PIPE SIZE FROM 2" THROUGH TO 60", CONVERSION BASED ON CSA STANDARD Z245.1. PIPE SIZE 2" AND SMALLER, CONVERSION BASED ON EUROPEAN ISO STANDARD. OTHER PIPE SIZES ARE U.S. CONVERSIONS TO THE METRIC SYSTEM.

DUCT AND PIPE COMMODITY ABBREVIATIONS

ABBREVIATION	COMMODITY
C/A	COMBUSTION AIR DUCT
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RECIRCULATION
DTW	DOMESTIC TEMPERED WATER
E/A	EXHAUST AIR DUCT
F	FIRE WATER
HGR	HEATING GLYCOL RETURN
HGS	HEATING GLYCOL SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
NG	NATURAL GAS
O/A	OUTDOOR AIR
R/A	RETURN AIR
S/A	SUPPLY AIR
SAN	SANITARY DRAIN
STM	STORM DRAIN
T/A	TRANSFER AIR DUCT
V	VENT

PLUMBING AND DRAINAGE PIPE COMMODITY TAGS AND LINETYPES

DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RECIRCULATION
DTW	DOMESTIC TEMPERED WATER
SAN	SANITARY DRAIN
•SAN	SANITARY DRAIN BELOW FLOOR
STM	STORM DRAIN
•STM	STORM DRAIN BELOW FLOOR
V	VENT
G	NATURAL GAS

GENERAL NOTES

1. THE ROUTING AND LAYOUT OF ALL SERVICES, DUCTWORK, PIPING, ETC. IS SCHEMATIC. THIS CONTRACTOR IS RESPONSIBLE FOR FIELD MEASURING ALL MATERIAL PRIOR TO INSTALLATION AND TO OFFSET AS REQUIRED TO AVOID CONFLICTS WITH STRUCTURAL OR OTHER TRADES WORK IN ALL AREAS.
2. CONTRACTOR SHALL FIELD CHECK AND CONFIRM EXACT LOCATIONS, ELEVATIONS, INVERTS, AND INSTALLATIONS OF ALL SERVICES FOR THIS PROJECT PRIOR TO COMMENCING SITE WORK. INFORM THE ENGINEER OF ANY DISCREPANCIES.

ABBREVIATIONS

ABBR.	COMMODITY
ADJ	ADJUSTABLE
AF	AIR FILTER
AFF	ABOVE FINISHED FLOOR
BDD	BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTER
BV	BALL VALVE
C/W	COMPLETE WITH
CF	CEILING FAN
CHKV	CHECK VALVE
CO	CLEANOUT
COTG	CLEAN OUT TO GRADE
DIA	DIAMETER
DISCH	DISCHARGE
DM	DAMPER MOTOR
DMPR	DAMPER
DPV	DIAPHRAGM VALVE
DRLV	DOOR LOUVRE
DWH	DOMESTIC WATER HEATER
EBB	ELECTRIC BABEBOARD HEATER
EL	ELEVATION
ELEC	ELECTRIC
EPRF	EXPLOSION PROOF
EQUIP	EQUIPMENT
ESH	EMERGENCY SHOWER
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EXH FN	EXHAUST FAN
EXH GR	EXHAUST AIR GRILLE
EXST	EXISTING
EXT	EXTERIOR
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDMPR	FIRE DAMPER
FE	FIRE EXTINGUISHER
FL SW	FLOW SWITCH
FLR	FLOOR
FTG	FOOTING
FUD	FUNNEL DRAIN
FURN	FURNACE
GA	GAUGE
GALV	GALVANIZED
GLV	GLOBE VALVE
GTV	GATE VALVE
HB	HOSE BIBB
HD	HUB DRAIN
HDPE	HIGH DENSITY POLYETHYLENE
HEX	HEAT EXCHANGER
HORIZ	HORIZONTAL
HR	HOSE REEL
HT	HEAT TRACE
HTR	HEATER
IN WC	INCHES OF WATER COLUMN
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
L/s	LITERS PER SECOND
LAV	LAVATORY
LVR	LOUVER
MAX	MAXIMUM
MD	MANUAL DAMPER
MIN	MINIMUM
MISC	MISCELLANEOUS
MOD	MOTOR OPERATED DAMPER
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER
P	PUMP
PLV	PLUG VALVE
PRV	PRESSURE REDUCING VALVE
PSL	PIPE SLEEVE
RDC	REDUCER
SAG	SUPPLY AIR GRILLE
SK	SINK
SOV	SHUT OFF VALVE
SQ	SQUARE
SRV	SAFETY RELIEF VALVE
SSH	COMBINATIONEMERGENCY SHOWER / EYEWASH
STD	STANDARD
TG	TRANSFER AIR GRILLE
TK	TANK (UNSPECIFIED SERVICE)
TMV	THERMOSTATIC MIXING VALVE
TP	TRAP PRIMER
TSTAT	THERMOSTAT
TYP	TYPICAL
U/S	UNDER SIDE
UGND	UNDERGROUND
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
VAL	VALVE
VAR	VARIABLE
VB	VACUUM BREAKER
VD	VOLUME DAMPER
VERT	VERTICAL
VOL	VOLUME
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WCO	WALL CLEANOUT
WHA	WATER HAMMER ARRESTOR
WM	WATER METER
WW	WASTE WATER

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A	2021FEB08	K. ANDERSON	T. DYCHKO	ISSUED FOR 90% REVIEW

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

MECHANICAL

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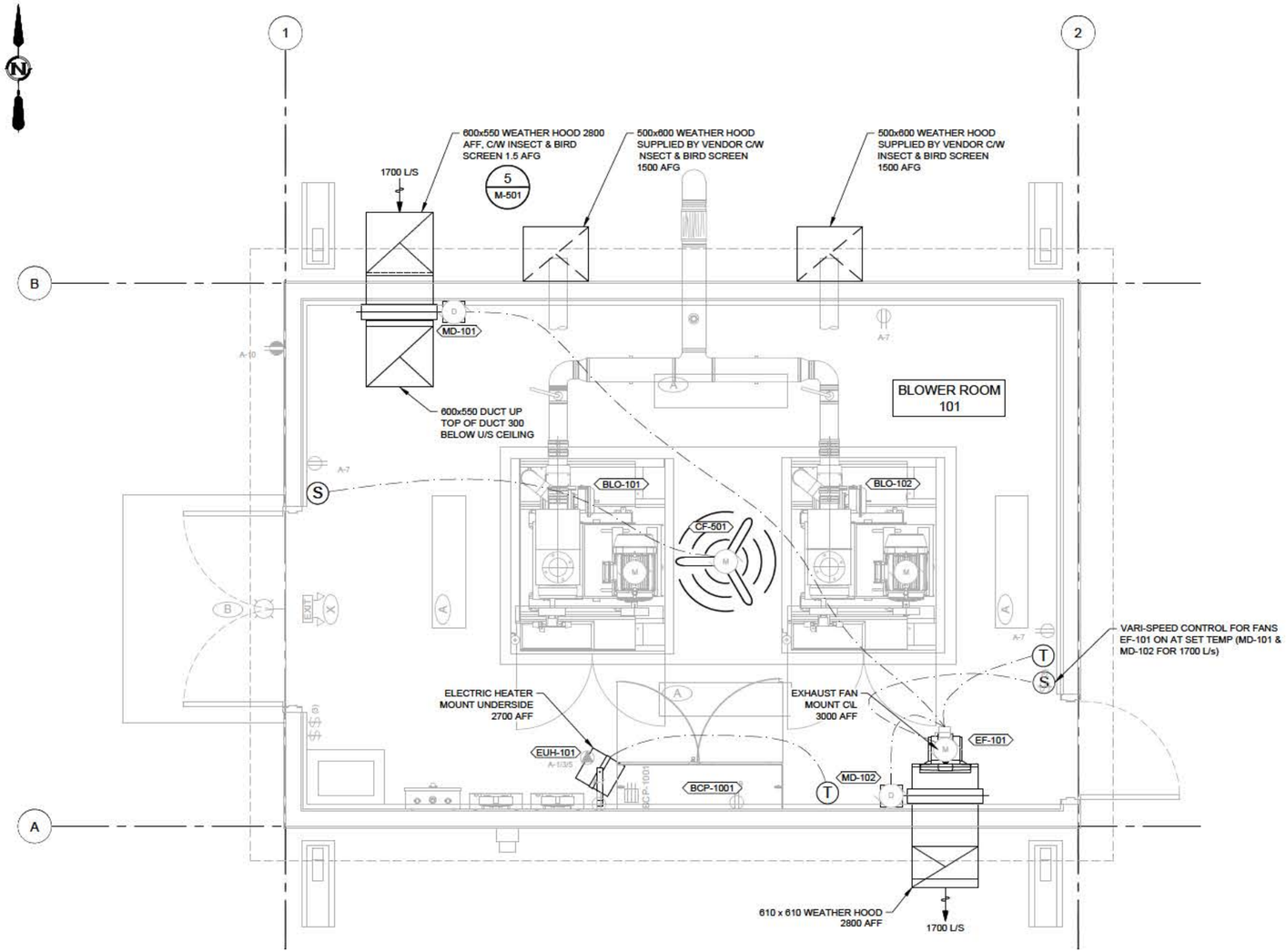

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MAIN FLOOR

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0	2021MAY10	K. ANDERSON	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

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MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

MECHANICAL
MAIN FLOOR PLAN
HVAC AND DRAINAGE

DRAWING	REVISION	SHEET
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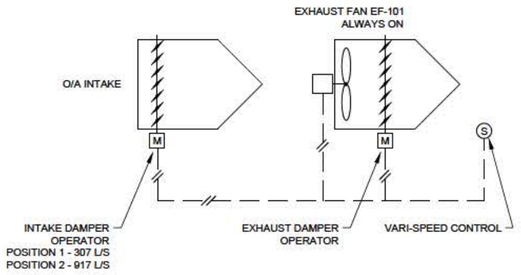
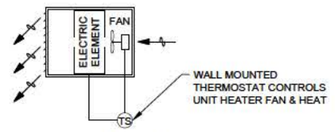
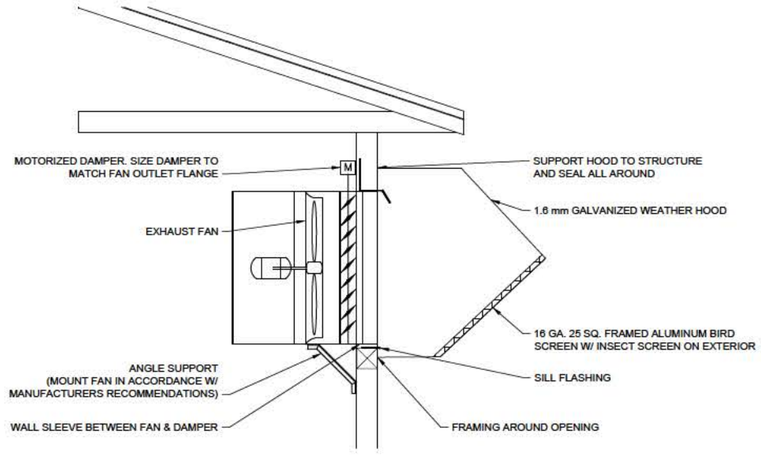


1 - SCHEMATIC NTS
DAMPER CONTROL

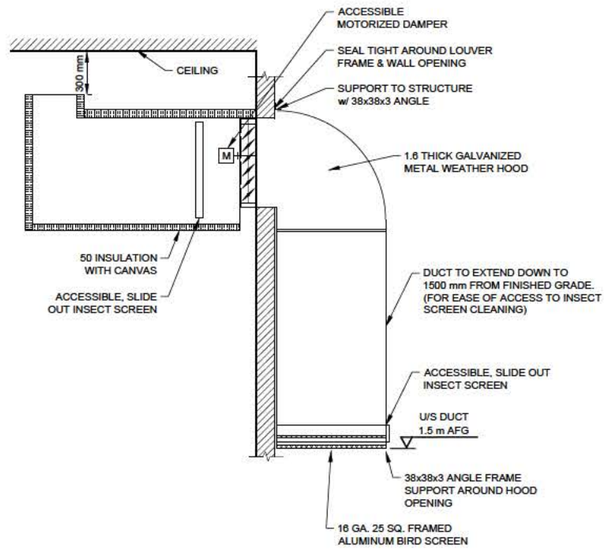


ELECTRIC UNIT HEATER

2 - SCHEMATIC NTS
UNIT HEATER CONTROL



3 - TYPICAL DETAIL NTS
EXHAUST AND FAN



4 - TYPICAL DETAIL NTS
INTAKE AND DUCT

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RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

MECHANICAL
DETAILS

DRAWING	REVISION	SHEET
4231-00-M-501	0	20

IF NOT 50 mm ADJUST SCALES
50 mm

SCALE(S) SHOWN ARE INTENDED FOR ANSI D (22X34) SIZE DRAWINGS, TABLOID (11X17) SIZE DRAWINGS ARE 1/2 OF SCALE(S) SHOWN UNLESS NOTED OTHERWISE

FAN SCHEDULE

TAG	MANUFACTURER	MODEL	SERVICE	LOCATION	SERVICE	AIR FLOW (L/s)	ESP (Pa)	FAN RPM	ARRANGEMENT	DRIVE TYPE	BHP (W)	MOTOR POWER (W)	V/Ph/Hz	NOTES
EF-101	GREENHECK	SE1-18-429-VG	EXHAUST	BLOWER BLDG	EXHAUST	1700	65	1750	DIRECT DRIVE	VSD	435	560	120/1/60	1, 4, 5, 11, 13
CF-501	CANARM	CP36 F&R	CIRCULATION	BLOWER BLDG	CIRCULATION	–	-	365	SUSPENDED	DIRECT	-	97	120/1/60	1

1. C/W VARIABLE SPEED CONTROLLER MOUNTED ON WALL
2. C/W VARIABLE SPEED CONTROLLER MOUNTED ON HOUSING
3. C/W BACKDRAFT DAMPER
4. C/W NEOPRENE VIBRATION ISOLATION
5. C/W ACOUSTIC LINED CABINET
6. SPARK RESISTANT (CLASS 1, DIV. 2)
7. C/W REVERSIBLE MOTOR AND CONTROL
8. C/W FAN CAGE
9. CONNECT TO WALL TOGGLE SWITCH
10. INTERLOCK WITH LIGHTS
11. C/W BIRDSCREEN
12. C/W ALUMINUM WALL/ROOF CAP
13. C/W DISCONNECT SWITCH
14. C/W AIR PROVING CURRENT SENSOR WITH REMOTE ALARM INTERLOCKS FOR AIR PROVING
15. PROVIDES COOLING. CONNECT TO THERMOSTAT
16. PROVIDES COOLING AND DEHUMIDIFICATION. CONNECT TO THERMOSTAT AND HUMIDISTAT.

DAMPER SCHEDULE

TAG	MANUFACTURER	MODEL	SERVICE	LOCATION	CONTROL TYPE	BLADE ORIENTATION	FLOW AREA (mm^2)	AIR FLOW RATE (L/s)	DIMENSIONS (mm x mm)	V/Ph/Hz	NOTES
MD-101	TAMCO	9000-MR	INTAKE	BLOWER BLDG	OPEN/CLOSE	OPPOSED	-	1700	600X550	120/1/60	1, 2
MD-102	TAMCO	9000-MR	EXHAUST	BLOWER BLDG	OPEN/CLOSE	OPPOSED	-	1700	600X600	120/1/60	1, 2

1. C/W BELIMO LF120 US SPRING RETURN ACTUATOR.
2. C/W TAMCO 6000 INSECT SCREEN IN DUCT. SLIDE OUT SIDE.

ELECTRIC UNIT HEATER SCHEDULE

TAG	MANUFACTURER	MODEL	LOCATION	INPUT/OUTPUT CAPACITY (kW)	AIR FLOW (L/s)	TEMPERATURE RISE (°C)	MOTOR RPM	MOTOR POWER (W)	V/Ph/Hz	NOTES
EUH-101	OUELLET	OAS05038AM	PUMP AREA	5.0	330	13	1550	5.0	208/3/60	1, 2, 4

1. CONTROLLED BY WALL MOUNTED THERMOSTAT
2. C/W ADJUSTABLE LOUVER DIFFUSER
3. SURFACE WALL MOUNT
4. CEILING MOUNT

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0	2021MAY10	K. ANDERSON	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

MECHANICAL
SCHEDULES

DRAWING	REVISION	SHEET
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IF NOT 50 mm ADJUST SCALES 50 mm

SCALE(S) SHOWN ARE INTENDED FOR ANSI D (22X34) SIZE DRAWINGS, TABLOID (11X17) SIZE DRAWINGS ARE 1/2 OF SCALE(S) SHOWN UNLESS NOTED OTHERWISE

LAYOUT SYMBOLS

CABLE, CONDUIT & WIRE

- CONDUIT RUN ON SURFACE (WALL OR CEILING)
- CONDUIT RUN IN SLAB (OR BELOW GRADE)
- CONDUIT CAPPED
- CONDUIT GOING UP
- CONDUIT GOING DOWN
- FLEXIBLE CONDUIT
- CONDUIT HOME RUN c/w NUMBER OF WIRES
- CONDUIT SEAL WP-WEATHERPROOF, EP-EXPLOSION PROOF
- CONDUIT UNION
- CONDUIT EXPANSION JOINT
- CONDUIT BEND
- BARE GROUND WIRE
- OVERHEAD POWER SERVICE ENTRANCE
- OVERHEAD TELEPHONE SERVICE ENTRANCE
- JUNCTION BOX - CEILING SPACE
- JUNCTION BOX - FLUSH MOUNTED
- JUNCTION BOX - WALL MOUNTED
- JUNCTION BOX - MOTOR / EQUIPMENT
- MULTI-CABLE TRANSIT (MCT)
- SPARE WIRE LOOP
- CABLE OR CONDUIT DESIGNATION (PC-101): PC-POWER, TC-TELEPHONE, CC-CONTROL, IC-INSTRUMENTATION, HC-HEATING
- A10-b: PANEL "A", CIRCUIT "10", SWITCH "b"

POWER

- XFMR: POWER TRANSFORMER
- PNL "A": MAIN DISTRIBUTION PANEL "A"
- PNL "A": LIGHTING OR BRANCH PANEL "A"
- SPLTR: SPLITTER
- MUA2D 5005: MOTOR AND/OR EQUIPMENT TAG c/w NAME, PLANT AREA & NUMBER
- MOTOR
- D: MOTORIZED DAMPER
- MOV: MOTOR OPERATED VALVE
- SOV: SOLENOID OPERATED VALVE
- ELECTRIC HEATER
- CHEMICAL PUMP RECEPTACLE
- DUPLEX RECEPTACLE
- SPLIT DUPLEX RECEPTACLE
- ISOLATED GROUND RECEPTACLE
- GROUND FAULT (GFCI) RECEPTACLE
- ABOVE COUNTER DUPLEX RECEPTACLE
- ABOVE COUNTER SPLIT DUPLEX RECEPTACLE
- ABOVE COUNTER GROUND FAULT (GFCI) RECEPTACLE
- FLOOR MOUNTED SINGLE RECEPTACLE
- FLOOR MOUNTED DUPLEX RECEPTACLE
- SPECIAL SINGLE PHASE RECEPTACLE
- SPECIAL THREE PHASE RECEPTACLE
- OVERHEAD REEL DUPLEX RECEPTACLE
- SINGLE PHASE POWER CONNECTION
- THREE PHASE POWER CONNECTION
- W: WELDING RECEPTACLE

LIGHTING

- A: FIXTURE TYPE "A"
- SURFACE MOUNTED OR SUSPENDED FLUORESCENT FIXTURE
- RECESSED FLUORESCENT FIXTURE
- SURFACE MOUNTED OR SUSPENDED 610 x 610 FLUORESCENT FIXTURE
- RECESSED 610 x 610 FLUORESCENT FIXTURE
- FLUORESCENT STRIP FIXTURE
- WALL MOUNTED FLUORESCENT FIXTURE
- SURFACE MOUNTED OR SUSPENDED UNSWITCHED FLUORESCENT FIXTURE
- RECESSED UNSWITCHED FLUORESCENT FIXTURE
- AREA LIGHTING FIXTURE
- SURFACE MOUNTED OR SUSPENDED LUMINAIRE
- LUMINAIRE ON EMERGENCY POWER
- RECESSED LUMINAIRE
- RECESSED LUMINAIRE ON EMERGENCY POWER
- WALL MOUNTED LUMINAIRE
- POLE MOUNTED LUMINAIRE
- CEILING MOUNTED EXIT SIGN c/w DIRECTION ARROW
- WALL MOUNTED EXIT SIGN c/w DIRECTION ARROW
- TENON MOUNTED LUMINAIRE
- EMERGENCY LIGHTING UNIT c/w BATTERY PACK, CHARGER AND TWO HEADS
- WALL MOUNTED SINGLE EMERGENCY LIGHTING HEAD c/w JUNCTION BOX
- WALL MOUNTED DOUBLE EMERGENCY LIGHTING HEAD c/w JUNCTION BOX
- B: 1 LAMP BALLAST (REMOTE MOUNTED)
- 2 LAMP BALLAST (REMOTE MOUNTED)

FIRE ALARM

- FIRE ALARM PANEL AND/OR ANNUNCIATOR
- F or PS: BREAK GLASS STATION
- F: FIRE ALARM BELL
- F cd: FIRE ALARM HORN AND STROBE c/w CANDELA LEVEL
- FIRE ALARM PHONE
- F: FIRE ALARM SPEAKER
- SMOKE DETECTOR
- SMOKE DETECTOR - DUCT MOUNTED
- COMBINATION HEAT DETECTOR
- HEAT DETECTOR - FIXED TEMPERATURE
- HEAT DETECTOR - RATE-OF-RISE
- F cd: FIRE ALARM STROBE LIGHT c/w CANDELA LEVEL
- EOL: END-OF-LINE RESISTOR
- FS: FLOW SWITCH
- PS: PRESSURE SWITCH
- Z: TAMPER SWITCH
- G: GAS DETECTOR
- IN: INFRARED DETECTOR
- U: ULTRAVIOLET DETECTOR
- D: MAGNETIC DOOR RELEASE
- L: ELECTRIC DOOR LOCK
- F: PRE-SIGNAL BUZZER
- CR: CONTROL RELAY MODULE
- I ARM: ISOLATOR BASE MODULE
- ADDRESSABLE ALARM RELAY MODULE

ABBREVIATIONS

BD	- BUS DUCT
CB	- CIRCUIT BREAKER
DB	- DUCT BANK
DS	- DISCONNECT SWITCH
MCC	- MOTOR CONTROL CENTRE
PDP	- POWER DISTRIBUTION PANEL
PNL	- BRANCH PANEL BOARD
SWB	- SWITCHBOARD
T	- TRANSFORMER
UPS	- UNINTERRUPTIBLE POWER SUPPLY

NOTES:

1. THIS DRAWING IS GENERAL IN NATURE. NOT ALL SYMBOLS, ABBREVIATIONS ARE USED IN THESE CONTRACT DRAWINGS.

COMMUNICATIONS

- TTB: TELEPHONE TERMINAL BOARD
- TELEPHONE OUTLET - WALL MOUNTED
- TELEPHONE OUTLET - FLOOR MOUNTED
- INTERCOM HANDSET OUTLET - WALL MOUNTED
- ITS LAN DATA OUTLET
- COMBINATION DATA/TELEPHONE OUTLET
- WIFI: WIFI CONNECTION POINT
- S: SPEAKER - CEILING MOUNTED
- S: SPEAKER - WALL MOUNTED

GROUNDING

- GROUND BUS
- GROUND COMPRESSION CONNECTION
- EQUIPMENT GROUND CONNECTION
- THERMIT WELD GROUND CONNECTION
- GROUND ROD
- GROUND WELL & ROD
- GROUND GRID w/ WELLS & RODS

SECURITY

- CARD READER
- SINGLE DOOR ALARM CONTACT
- MOTION DETECTOR
- C P: SECURITY CAMERA - CEILING MOUNTED

CONTROL

- SINGLE POLE SWITCH (SWITCH "a") PANEL "A" CIRCUIT "x"
- 2 SWITCHES IN 2 GANG BOX
- 3 SWITCHES IN 3 GANG BOX
- 4 SWITCHES IN 4 GANG BOX
- TWO POLE SWITCH
- THREE WAY SWITCH
- FOUR WAY SWITCH
- SWITCH c/w PILOT LIGHT
- MANUAL MOTOR SWITCH
- MANUAL MOTOR SWITCH c/w PILOT LIGHT
- KEY OPERATED SWITCH
- EXPLOSION PROOF SWITCH
- WEATHERPROOF SWITCH
- LOW VOLTAGE SWITCH (CIRCUIT "a")
- K, P: LOW VOLTAGE SWITCH (K-KEY OPERATED, P-PILOT LIGHT)
- DIMMER SWITCH
- SPECIAL LOW VOLTAGE SWITCH UNIT (SEE SPECIFICATIONS)
- RC: LOW VOLTAGE SWITCHING RELAY CABINET
- M: MOTION SENSOR SWITCH
- P: PHOTOELECTRIC CELL
- DISCONNECT SWITCH - FUSED
- DISCONNECT SWITCH - UNFUSED
- MANUAL MOTOR STARTER
- MAGNETIC MOTOR STARTER
- COMBINATION MAGNETIC STARTER
- T: LOW VOLTAGE THERMOSTAT
- T: LINE VOLTAGE THERMOSTAT
- H: HUMIDSTAT
- OI: ON-OFF CONTROL STATION
- HOA: HAND-OFF-AUTO SELECTOR SWITCH
- LO: LOCKOUT STOP CONTROL STATION
- LOR: LOCAL-OFF-REMOTE CONTROL STATION
- SELECTOR SWITCH (HOA, LOR, LO or OA)
- START-STOP PUSHBUTTON AND SELECTOR SWITCH (HOA, LOR, LO or OA)
- LOS: LOCKOUT STOP PUSHBUTTON
- START-STOP PUSHBUTTON
- START-STOP PUSHBUTTON c/w PILOT LIGHT & LOCKOUT STOP
- START-JOG-STOP PUSHBUTTON
- ESD: EMERGENCY SHUTDOWN PUSHBUTTON
- THERMISTOR CONTROL TRIPPING UNIT
- TS: TIME SWITCH
- LVT XX: LOW VOLTAGE TRANSFORMER (XX=TRANSFORMER NUMBER)

SINGLE LINE DIAGRAM / SCHEMATIC SYMBOLS

- EQUIPMENT BUS
- BUS EXTENSION / CONNECTION
- 52: 4160 V, 1200 A, 150 MVA: POWER CIRCUIT BREAKER
- 52: 4160 V, 1200 A, 150 MVA: DRAWOUT POWER CIRCUIT BREAKER
- AS: AMMETER SWITCH
- VS: VOLTMETER
- TD: TRANSDUCER
- XXX:X: CURRENT TRANSFORMER c/w RATIO & QUANTITY
- XXX:X QTY: ZERO SEQUENCING CURRENT TRANSFORMER c/w RATIO & QUANTITY
- QTY: BUSHING TYPE CURRENT TRANSFORMER c/w RATIO & QUANTITY
- V-V QTY: POTENTIAL TRANSFORMER c/w VOLTAGE RATING & QUANTITY
- K: KEY OPERATED INTERLOCK
- M: MOTOR OPERATED SWITCH
- DMS: DIGITAL METERING SYSTEM
- M: UTILITY POWER METER
- LIGHTNING ARRESTER w/ GROUNDED GAP
- LIGHTNING ARRESTER w/ GROUNDED GAP AND SURGE CAPACITOR
- V-V: DRAWOUT FUSED CURRENT TRANSFORMER
- A: DELTA-DELTA TRANSFORMER
- DELTA-WYE GROUND TRANSFORMER
- DELTA-WYE RESISTOR GROUND TRANSFORMER
- OPEN DELTA
- CLOSED DELTA
- THREE PHASE WYE
- THREE PHASE WYE TO GROUND
- THREE PHASE ZIGZAG TO GROUND
- THREE PHASE WYE w/ RESISTOR TO GROUND
- MALE & FEMALE DISCONNECT DEVICE
- 100AT 225AF, 3P: CIRCUIT BREAKER
- 100AT 225AF, 3P: DRAWOUT CIRCUIT BREAKER
- NON-FUSED DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- FUSED HRC DISCONNECT SWITCH
- LOAD BREAK DISCONNECT SWITCH
- FUSED LOAD BREAK DISCONNECT SWITCH
- HORN GAP SWITCH
- INTERRUPTER SWITCH
- FUSED INTERRUPTER SWITCH
- GROUND SWITCH
- MAGNETIC ELEMENT
- kVAR: CAPACITOR FOR PF CORRECTION c/w kVAR RATING
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- PLC: PROGRAMMABLE LOGIC CONTROLLER
- REACTOR
- HARMONIC FILTER
- or: TRANSFER SWITCH
- FLEX CONNECTOR
- J: JUNCTION BOX MOUNTED NEAR MOTOR

- RTD: RESISTANCE TEMPERATURE DETECTOR
- FVNR MAGNETIC STARTER c/w SIZE
- FVR (REVERSING) STARTER c/w SIZE
- TWO SPEED STARTER c/w SIZE
- THERMAL OVERLOAD RELAY
- X:X X: ELECTRONIC OVERLOAD c/w RATIO & QUANTITY
- HZ: VARIABLE SPEED DRIVE
- S/S: SOFT START REDUCED VOLTAGE
- GENERATOR
- HP: SQUIRREL CAGE MOTOR
- HP: MOTORIZED VALVE
- PANEL 'A': LIGHTING OR POWER PANEL
- VALVE TRAVEL LIMIT SWITCH-NORMALLY OPEN
- VALVE TRAVEL LIMIT SWITCH-NORMALLY CLOSED
- SPECIAL SINGLE PHASE RECEPTACLE
- SPECIAL THREE PHASE RECEPTACLE
- W: WELDING RECEPTACLE
- X kW: MOTOR SPACE HEATER
- TVSS: TRANSIENT VOLTAGE SURGE SUPPRESSION
- CTS: CURRENT TRANSFORMER SHORTING BLOCK
- 29-1: PT-CT TEST BLOCK
- TB: TEST BLOCK
- GROUND TO EARTH
- BATTERY
- 50 QTY: PROTECTIVE RELAY c/w QUANTITY (1 LINE)
- 50/51 QTY: PROTECTIVE RELAY c/w QUANTITY (2 LINE)
- RELAY SHUNT
- H1 XXX H2, X1 XXX X2: CONTROL POWER TRANSFORMER
- X HP: SINGLE or THREE PHASE MOTOR
- MOV: MOTOR OPERATED VALVE
- R101: RELAY COIL (1 LINE)
- R 101: RELAY COIL (2 LINE)
- R 4RT 101: RELAY COIL (3 LINE)
- TD 0-30 SECS: TIMING RELAY COIL w/ TDE -TIME DELAY ENERGIZED, TDD -TIME DELAY DE-ENERGIZED & TIME RANGE
- LC: LIGHTING CONTACTOR COIL
- M: MOTOR STARTER COIL
- CR: CONTROL RELAY
- RA: AUXILIARY RELAY
- PFR: POWER FAILURE RELAY
- OTR: OVERLOAD TRIP RELAY

- CC: CLOSING COIL
- HC: HOLDING COIL
- A: INDICATING PILOT LIGHT c/w LENS COLOR R=RED, G=GREEN, A=AMBER, Y=YELLOW, W=WHITE
- ETM: ELAPSED TIME METER
- O/L: MOTOR OVERLOAD CONTACT
- TEST SUPPLY PLUG
- X A: FUSE c/w FUSE No. or AMP RATING
- DUMMY FUSE
- X kW HTR: ELECTRIC HEATER c/w KILOWATT RATING
- X kW: MOTOR SPACE HEATER c/w KILOWATT RATING
- X OHMS: RESISTOR c/w RESISTANCE RATING
- SERIES COIL OR SOLENOID VALVE
- TC: TEMPERATURE CONTROLLER
- SURGE SUPPRESSOR
- SUPPRESSOR M: MOTOR SURGE SUPPRESSOR
- X A: FUSE ASSEMBLY w/ INDICATING LIGHT c/w FUSE NUMBER AND CURRENT RATING
- G: INDICATING LIGHT PUSH TO TEST c/w COLOR TYPE
- SEMICONDUCTOR DIODE
- 113: WIRE WITH WIRE NUMBERS
- MECHANICAL CONNECTION
- WIRES CROSSOVER
- WIRES CONNECTED
- FIELD CONNECTION
- NORMALLY CLOSED MUSHROOM HEAD PUSHBUTTON - MOMENTARY
- NORMALLY OPEN PUSHBUTTON - MOMENTARY
- NORMALLY CLOSED PUSHBUTTON - MOMENTARY
- THREE POLE CIRCUIT BREAKER (CONTROL SCHEMATIC ONLY)
- THREE POLE DISCONNECT SWITCH (CONTROL SCHEMATIC ONLY)
- SINGLE POLE SINGLE THROW DISCONNECT SWITCH
- SINGLE POLE DOUBLE THROW DISCONNECT SWITCH
- ON OFF: TWO (2) POSITION SELECTOR SWITCH (ON-OFF SWITCH SHOWN IN ON POSITION)
- H A O: THREE (3) POSITION SELECTOR SWITCH (HAND-OFF-AUTO SHOWN IN HAND POSITION)
- C 1 2 3: DUAL TRANSFER SWITCH
- FLOW SWITCH NORMALLY OPEN OR CLOSED
- LEVEL SWITCH NORMALLY OPEN OR CLOSED
- LIMIT SWITCH NORMALLY OPEN OR CLOSED
- PRESSURE SWITCH NORMALLY OPEN OR CLOSED
- TEMPERATURE SWITCH NORMALLY OPEN OR CLOSED
- TERMINALS - TYPE AND LOCATION ASSIGNMENT DESIGNATED BY PROJECT DESIGN

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The Manitoba Water Services Board

REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	S. FRIEL	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

Grey

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

ELECTRICAL

DRAWING	REVISION	SHEET
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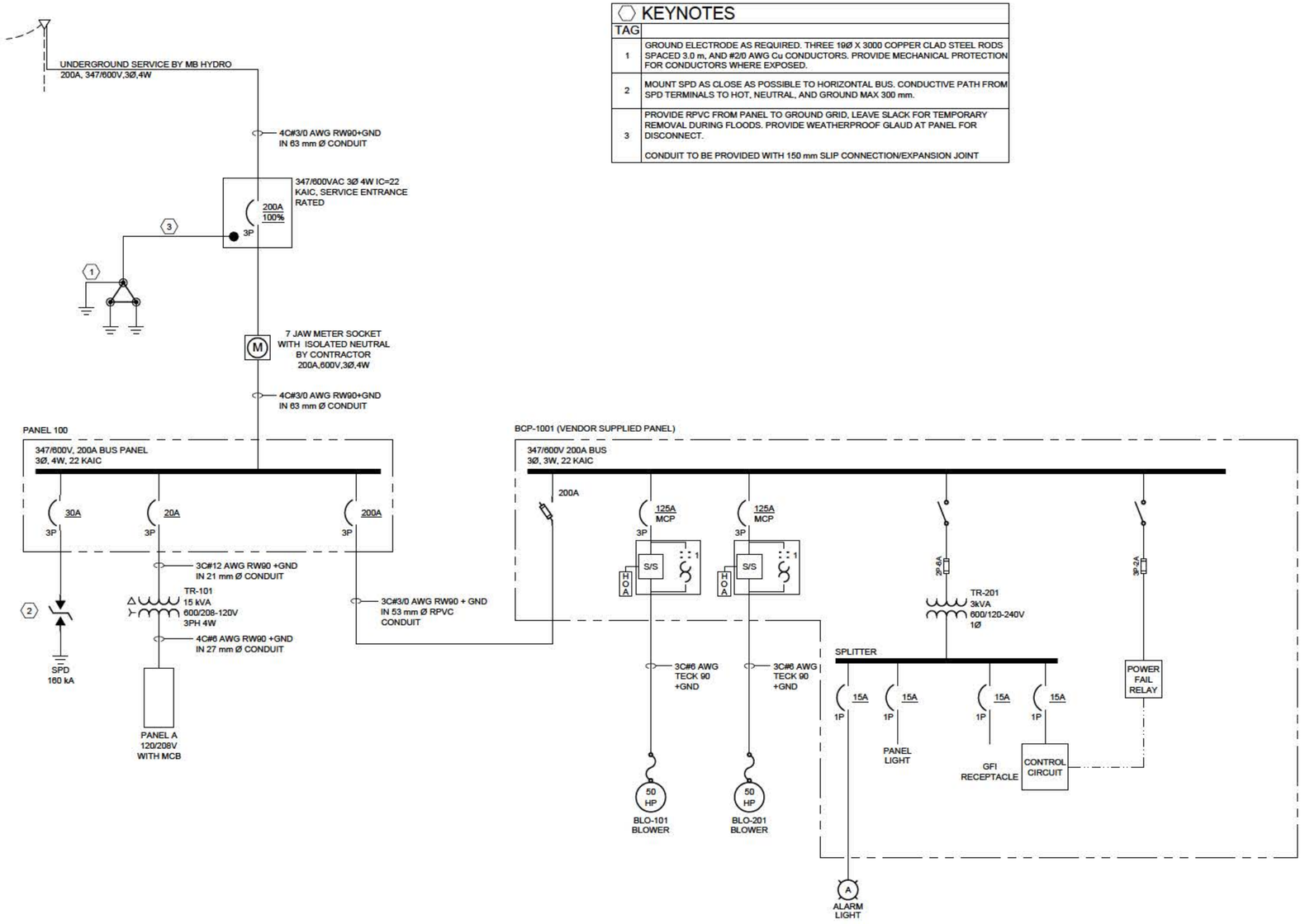
IF NOT 50 mm ADJUST SCALES
50 mm

SCALE(S) SHOWN ARE INTENDED FOR ANSI D (22X34) SIZE DRAWINGS, TABLOID (11X17) SIZE DRAWINGS ARE 1/2 OF SCALE(S) SHOWN UNLESS NOTED OTHERWISE



KEYNOTES

TAG	
1	GROUND ELECTRODE AS REQUIRED. THREE 19Ø X 3000 COPPER CLAD STEEL RODS SPACED 3.0 m, AND #2/0 AWG Cu CONDUCTORS. PROVIDE MECHANICAL PROTECTION FOR CONDUCTORS WHERE EXPOSED.
2	MOUNT SPD AS CLOSE AS POSSIBLE TO HORIZONTAL BUS. CONDUCTIVE PATH FROM SPD TERMINALS TO HOT, NEUTRAL, AND GROUND MAX 300 mm.
3	PROVIDE RPVC FROM PANEL TO GROUND GRID, LEAVE SLACK FOR TEMPORARY REMOVAL DURING FLOODS. PROVIDE WEATHERPROOF GLAUD AT PANEL FOR DISCONNECT. CONDUIT TO BE PROVIDED WITH 150 mm SLIP CONNECTION/EXPANSION JOINT

1 - SCHEMATIC NTS
SINGLE LINE

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RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

ELECTRICAL
SINGLE LINE DRAWING

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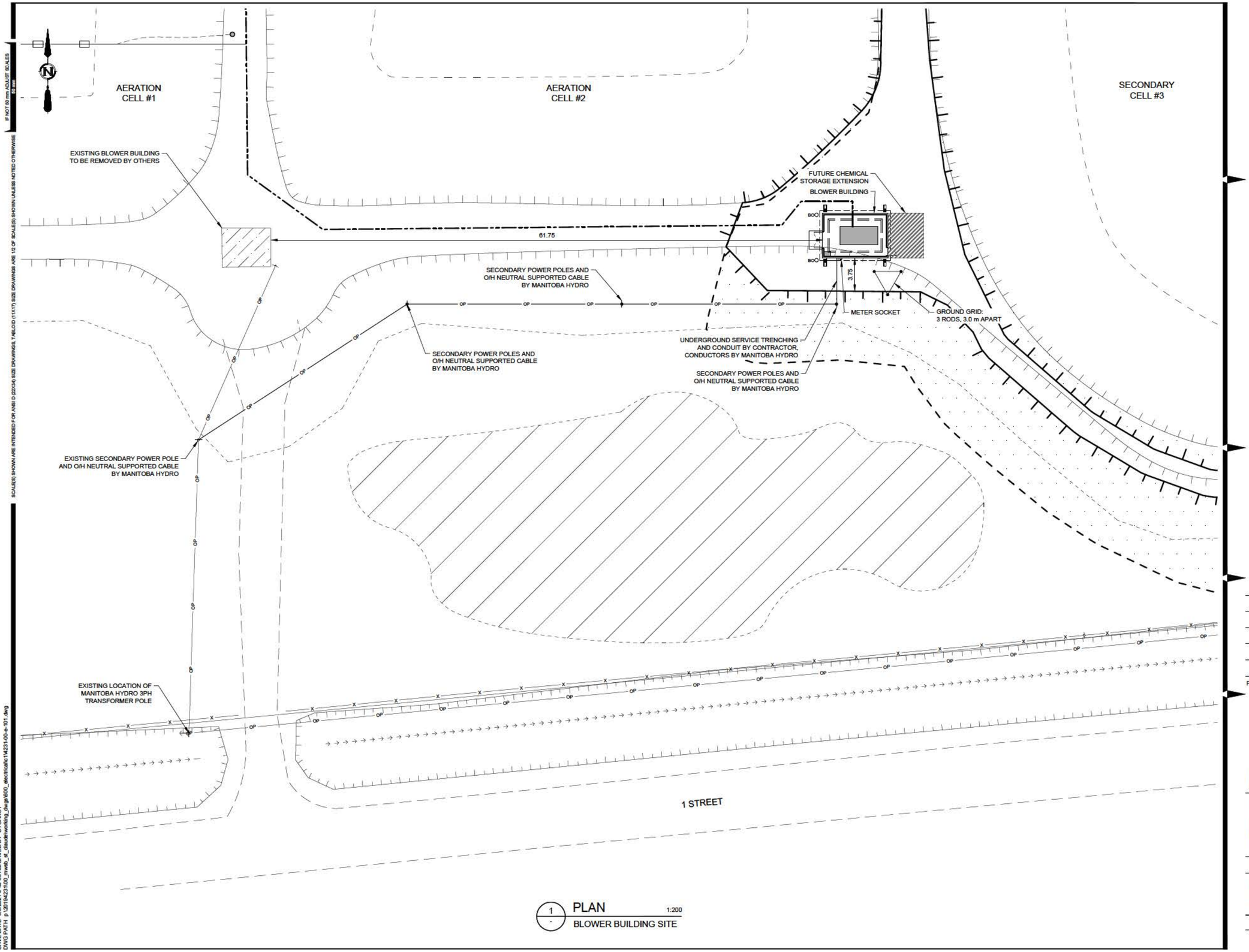

1 / - PLAN 1:200
BLOWER BUILDING SITE

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MANITOBA WATER SERVICES BOARD

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AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

ELECTRICAL
SITE PLAN
AERATION BUILDING

DRAWING	REVISION	SHEET
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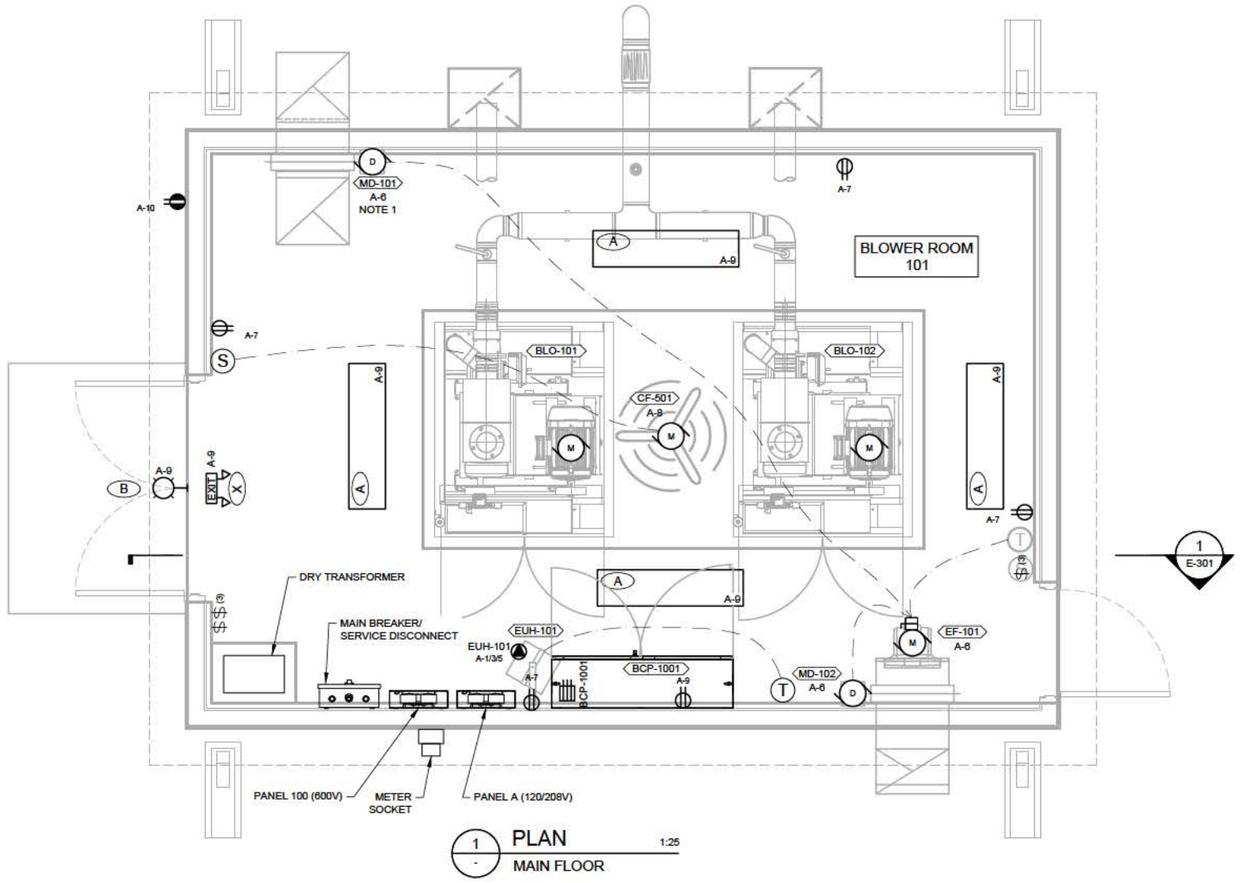
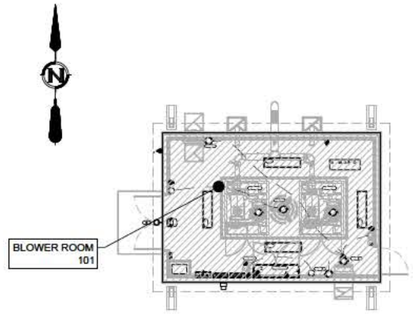
NOTE:
MD-101 AND MD-102 TO OPEN WHENEVER EF-101 RUNS.



1 - PLAN 1:25
MAIN FLOOR



LEGEND

ORDINARY LOCATION:
BLOWER ROOM 101

2 - PLAN :100
MAIN FLOOR
AREA CLASSIFICATIONS

1 E-301

LIGHTING FIXTURE SCHEDULE

FIXTURE TAG No.	EQUIPMENT INFORMATION										REMARKS
	DESCRIPTION	MANUFACTURER & CATALOGUE No.	MOUNTING TYPE	MOUNTING HEIGHT	VOLTS	FIXTURE SIZE	WATTS	LAMPS No.	LAMPS TYPE	LAMPS K-VALUE	
A	VAPOUR TIGHT LED FIXTURE	METALUX: VTLED-LD4-15-DR-UNV-L840-CD2-WL-U	SURFACE	CEIL NG	120 V	400X1320	138 W		LED	4000	CE L NG MOUNT
B	DOOR LIGHT	LUMARK: XTOR6BRL-Y-CB-PC1-120V	SURFACE	2300 AFF	120V	250X149	58 W	1	LED	2999	PHOTOCELL
X	EMERGENCY LIGHT / EXIT LIGHT COMBO	LUMACELL: LNC-1-BLANK-W-12N60-LD9-AT	WALL	2300 AFF	120 V	-	5 W	2	5W MR16 LED	-	-

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MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

ELECTRICAL
MAIN FLOOR PLAN
LIGHTING, POWER AND INSTRUMENTS

DRAWING	REVISION	SHEET
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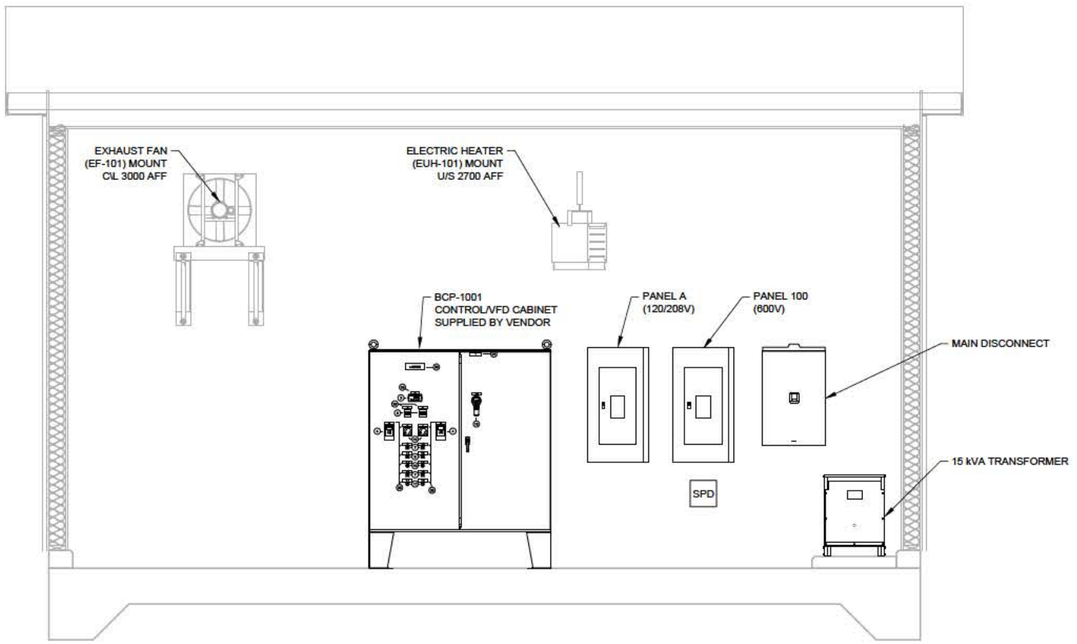

1 / E-102 SECTION 1:25

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REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	S. FRIEL	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON
AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

ELECTRICAL

DRAWING	REVISION	SHEET
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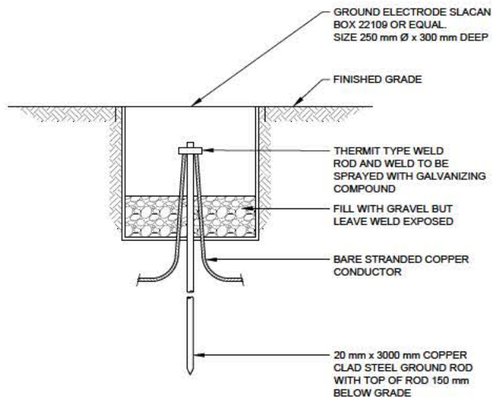
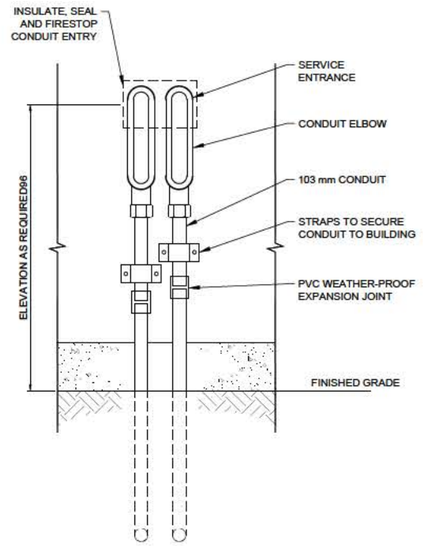
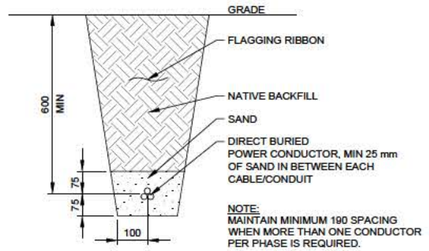


3 TYPICAL DETAIL NTS
GROUND ROD WELL



2 TYPICAL DETAIL NTS
SERVICE CONNECTIONS



3 TYPICAL DETAIL NTS
TRENCHING

PANEL A SCHEDULE

LOCATION: BLOWER ROOM | VOLTAGE: 120/208V | PHASE: 3 | WIRE: 4
MOUNTING: SURFACE | BUS RATING: 100A
INCOMING LUGS: YES | MAIN BREAKER: NO
MANUFACTURER: | FEEDER:

CCT No.	DESCRIPTION	WATTAGE			BKR AMPS	BUS A	BUS B	BUS C	BKR AMPS	WATTAGE			DESCRIPTION	CCT No.
1	ELECTRICAL HEATER (5kW)	1667			25A 3P	A			20A				SPARE	2
3			1667				B		20A				SPARE	4
5				1667				C	30A			1600	EXHAUST FAN, MD-101 AND MD-102	6
7	RECEPTACLES	500			20A	A			15A	100			CEILING FAN	8
9	LIGHTS		650		15A		B		15A		1200		EXTERIOR RECEPTACLES	10
11	SPARE				20A			C	20A				SPARE	12
13	SPARE				20A	A			20A				SPARE	14
15	SPARE				20A		B		20A				SPARE	16
17	SPARE				20A			C	20A				SPARE	18
19	SPACE					A							SPACE	20
21	SPACE						B						SPACE	22
23	SPACE							C					SPACE	24
25	SPACE					A							SPACE	26
27	SPACE						B						SPACE	28
29	SPACE							C					SPACE	30
	SUBTOTALS:	2167	2317	1667						100	1200	1600		

NOTES:
1. * DENOTES GROUND FAULT BREAKER WITH 30mA TRIP.
2. ** DENOTES GFI BREAKER WITH 5mA TRIP.

PHASE A TOTAL -	2267	W
PHASE B TOTAL -	3517	W
PHASE C TOTAL -	3267	W
PANEL LOAD TOTAL -	9051	W

4 SCHEDULE NTS
PANEL A

Associated Engineering
CANADA'S BEST MANAGED COMPANIES Platinum member

The Manitoba Water Services Board

REV	DATE	DESIGN	DRAWN	DESCRIPTION
0	2021MAY10	S. FRIEL	T. DYCHKO	ISSUED FOR TENDER & CONSTRUCTION

RURAL MUNICIPALITY OF GREY
MANITOBA WATER SERVICES BOARD

ST. CLAUDE WASTEWATER LAGOON AERATION UPGRADES
M.W.S.B.#: 1493
20194231-00

SCALE: AS SHOWN

ELECTRICAL
DETAILS
SINGLE LINE DIAGRAM

DRAWING	REVISION	SHEET
4231-00-E-601	0	27