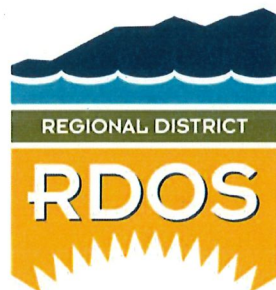




Vintage Views Wastewater System Assessment Report

Presented To:



Dated: February 2024

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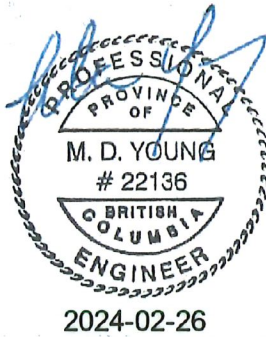
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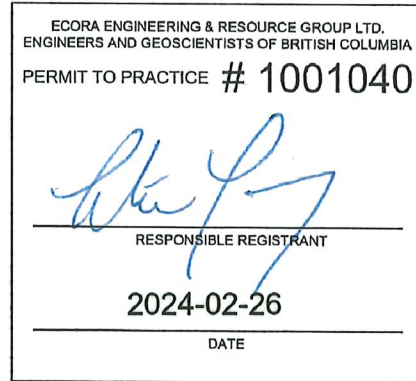
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Executive Summary

1. Ecora was retained by the Regional District of Okanagan-Similkameen to complete an engineering and financial assessment of the Vintage Views Sanitary System. The findings were as follows: The existing sanitary gravity pipe network, the lift station, and the force main are generally in good condition and have sufficient capacity to convey the current sanitary flows. However, there are numerous problems with the existing Wastewater Treatment Plant (WWTP) and infiltration field, along with a history of non-compliance and penalties. The most recent penalty on 7 June 2023 was for an amount of \$197,500. It is not known whether the private owner has paid this fine.
2. The WWTP and the infiltration system require a permanent Level 2 operator. Currently, the operator is part-time and is certified to Level 1.
3. The existing infiltration system is located on private farmland, which also falls within the Agricultural Land Reserve. The farming activities appear to be incompatible with the infiltration field. For example: the farmer previously damaged the infiltration field and groundwater monitoring wells by plowing over the property. The operator is required to check groundwater levels and to take samples from the monitoring wells but does not have direct access to the infiltration field from the WWTP. The operator currently must drive around to the farm entrance to gain access to the infiltration field. Ideally, the operator should be able to walk to the infiltration field to perform tasks. Of concern is that the existing easement agreement for the infiltration field states that "If the septic disposal system is no longer required because a municipal or regional septic disposal system is installed, the Grantee will execute a discharge of the easement granted herein upon request."
4. The most significant problem encountered with the Vintage Views WWTP is that it does not produce treated effluent that complies with the current permit and the Municipal Wastewater Regulation (MWR). Several process additions and modifications are required to improve the functionality of the system and the quality of the treated effluent. It is highly likely that poor effluent quality containing suspended solids previously blocked portions of the existing infiltration field. There is currently no flow meter at the inlet, which is a monitoring requirement in terms of the MWR. The addition of mechanical screening and grit removal is recommended to remove solids from the incoming flow. Fats, oils, and grease (FOG) removal will also be beneficial to protect possible future membranes and the existing infiltration field from blocking. Additional filtration through membranes or media filters is recommended to improve the quality of the treated effluent. The existing permit and the MWR specify the maximum number of fecal coliforms in the treated effluent, however, there is no disinfection process employed at the site. No WWTP can consistently achieve low fecal coliform measurements without disinfection. The addition of ultra-violet (UV) disinfection is recommended.
5. Site safety requires significant improvements. This includes a new fence with gates to enhance security and prevent unauthorized access. The construction of a roof at the entrance to the Control Room is recommended to prevent the area from filling up with snow and ice during the winter months. New buildings will be required at the site. The new buildings must be heated to prevent equipment from freezing.
6. The existing single-phase power supply from the neighboring farm is a service with a separate electricity meter. However, this does not meet industry standards and it is recommended to connect to the three-phase source within the road reserve. There is also no registered SRW for the power cable across the vineyard over private land. A new 3-phase Fortis BC power supply should be provided from Chadwell Place/Street.
7. A new PLC is required to comply with RDOS standards. More automation is suggested to reduce the daily responsibilities of the operator. There currently is no SCADA system and this should be added as an RDOS requirement. The SCADA system will require new communication channels such as radio communications (to say RDOS systems in Kaleden) and/or connectivity to the internet.



The financial implications of the recommended upgrades are significant. If a mortgage had to be taken out for the Vintage Views Wastewater System at a compound interest rate of 6% per year and an amortization period of twenty years, then households and vacant lots can expect to see an increase to \$5,800 per year and \$2,900 per year respectively to cover capital expenses and increases in operational costs. It was estimated that the rates would increase further by 2.2% per year to cover inflation.



Limitations of Report

This report and its contents are intended for the sole use of the Regional District of Okanagan-Similkameen (RDOS), their agents and the applicable regulatory authorities. Ecora Engineering & Resource Group Ltd. (Ecora) does not accept any responsibility for the accuracy of any data, analyses, or recommendations contained or referenced in the report when the report is used or relied upon by any Party other than the RDOS, their agents, the applicable regulatory authorities or for any Project other than that described in this report. Any such unauthorized use of this report is at the sole risk of the user.

Where Ecora submits both electronic file and hard copy versions of reports, drawings, and other project-related documents, only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Ecora shall be deemed to be the original for the Project. Both electronic file and hard copy versions of Ecora's deliverables shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Ecora.

Use of this report results in acceptance of the following assumptions and limitations:

- The work provided by Ecora represents Ecora's best assessment and judgement of the existing Vintage Views assets. This is based on our visual assessment and review of available background and factual information, relying on Ecora's experience on similar infrastructure projects;
- This report may identify noted system deficiencies concerning new regulations, however, it does not provide design details for the correction of those deficiencies.
- The information generated in this report is based on our best knowledge and information provided. Ecora does not assume any responsibility for the use of any information in this report for purposes other than its original intent;

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- Appendix B Layout Drawing of Sanitary System
- Appendix C List of Record Drawings
- Appendix D Penalties Imposed by the Ministry of Environment and Climate Change Strategy
- Appendix E Operation and Maintenance Plans
- Appendix F Cost Estimates

Acronyms and Abbreviations

ALR	Agricultural Land Reserve
BOD ₅	Biochemical Oxygen Demand, 5-day at 20°C measured in mg/L
CBC	Canadian Broadcasting Corporation
cfu	colony forming unit
COD	Chemical Oxygen Demand measured in mg/L
DO	Dissolved Oxygen
EAO	Environmental Assessment Office
EOCP	Environmental Operators Certification Program
EMA	Environmental Management Act
FOG	Fats, Oils, and Grease
HA	Health Authority
hp	Horsepower
HVAC	Heating Ventilation and Air Conditioning
IHA	Interior Health Authority
I/O	Input and Output
MoE	Ministry of Environment and Climate Change Strategy
MPN	Maximum Probable Number
MWR	Municipal Wastewater Regulation
PLC	Programmable Logic Controller
RAS	Return Activated Sludge
RDOS	Regional District of Okanagan-Similkameen
SCADA	Supervisory Control and Data Acquisition
SRW	Statutory Right of Way
SS	Settleable solids measured in mg/L
TDH	Total Dynamic Head
TSS	Total Suspended Solids measured in mg/L
UV	Ultra-violet
VFD	Variable Frequency Drive
WAS	Waste Activated Sludge
WWTP	Wastewater Treatment Plant

1. Background

The owner of the Vintage Views Development Sewer and Lakeshore Waterworks systems approached the Regional District of Okanagan-Similkameen (RDOS) expressing a desire to discuss the transfer of ownership of both systems to the RDOS. The RDOS follows a Utility Acquisition Policy when receiving such requests. The assessments of the water and sewer systems are the first step in the acquisition process.

The area developed in multiple stages over time commencing in 1976. Lakeshore Highlands, Heritage Hills, and Vintage Views are the residential neighborhoods located on the hillside east of East Side Road, between Okanagan Falls and Penticton. Together, these developments are approximately 112 ha in area.

The Vintage Views Sanitary system currently services 112 lots in these three neighborhoods.

The following image shows the location of the development area in relation to Skaha Lake, Penticton, and Okanagan Falls.



Figure 1: Location of Lakeshore Highlands, Heritage Hills and Vintage Views

The Vintage Views sewer system and wastewater treatment plant was constructed in 2003 and currently services 97 households and 15 vacant lots (a total of 112 connections). However, there is uncertainty about the exact number of properties connected to the system. The treatment facility is permitted to discharge up to 65 m³/day from the Class II treatment facility into the infiltration field situated on an adjacent agricultural lot.

The non-compliance history of the Vintage Views WWTP started before 2014 and is still ongoing. (See the Penalty Assessment Form in Appendix A. This document provides a comprehensive history and background of the Vintage Views WWTP and provides pertinent information on historic failures.) A Pollution Abatement Order was issued by the Ministry of Environment on August 22, 2019, to the Vintage Views Developments. The most recent fine of \$197,500 was issued by the Ministry of Environment and Climate Change Strategy (MoE) on June 7th, 2023, to the corporate owner of the sanitary system.

2. Introduction

Ecora Engineering & Resource Group Ltd. (Ecora) was retained by the Regional District Okanagan-Similkameen on April 11, 2023, to undertake assessments of the Vintage Views Sanitary and Lakeshore Water Systems. The findings of the assessments of the Vintage Views Wastewater System are discussed in this report.

3. Objectives

The objective of this report is to provide an overview of engineering, administrative, land ownership, and financial findings to enable the RDOS to make an informed decision regarding the possible acquisition of the existing wastewater system.

4. Assessment Criteria

Assessing a wastewater system is a critical aspect of ensuring its proper function and compliance with environmental regulations. The assessment criteria for engineering assessments of a wastewater system typically cover a range of technical, environmental, and operational aspects. These criteria can vary based on specific project requirements and regulatory standards, but included are some common assessment criteria:

- **Regulatory Compliance:** Ensure the system adheres to the operating permit, which includes effluent quality standards and discharge volumes.
- **Evaluate the design of the system,** including the layout, size, and capacity to handle current and future wastewater loads.
- **Infrastructure Integrity:** Assess the condition of infrastructure components such as pipes, pumps, treatment facilities, and storage tanks to ensure they are structurally sound.
- **Environmental Impacts:** Assess the impacts on groundwater and surface water. There are additional impacts that may be considered, such as greenhouse gas emissions, environmental footprints, electricity consumption, etc.
- **Resilience and Redundancy:** Ensure the system has backup measures in the case of equipment or power failures and is resilient against potential disasters like floods.
- **Monitoring and Control:** Examine the system's monitoring and control mechanisms, including real-time data collection and process automation, to maintain system performance.
- **Public Health and Safety:** Confirm that the system's design and operation protect public health by preventing sewer overflows, waterborne diseases, and contamination of water bodies.
- **Long-Term Sustainability:** Assess the long-term sustainability of the wastewater system, considering population growth, climate change, and other future challenges.
- **Documentation and Reporting:** Ensure that all relevant data, reports, and records are up to date and readily accessible for regulatory compliance and system management.

5. Regulatory Overview

Wastewater treatment plants in British Columbia, Canada, are subject to a comprehensive regulatory framework aimed at safeguarding public health, environmental quality, and water resources. These regulations are designed to ensure that wastewater is treated effectively and responsibly thereby minimizing the impact on local ecosystems and communities. Included is an overview of the key regulations and agencies that govern wastewater treatment plants in British Columbia:

Acts and Regulatory Requirements:

- **British Columbia Environmental Management Act (EMA):** The Environmental Management Act is the primary legislation governing environmental protection in British Columbia. Under this act, wastewater treatment facilities are subject to various requirements and responsibilities. The act empowers the Ministry of Environment and Climate Change Strategy to oversee and regulate environmental management activities.
- **Municipal Wastewater Regulation:** The Municipal Wastewater Regulation, under the Environmental Management Act, establishes the requirements for the treatment and discharge of wastewater from municipal sources. It sets standards for effluent quality, treatment processes, monitoring, and reporting.
- **British Columbia Ministry of Environment and Climate Change Strategy (MoE):** The provincial ministry is responsible for overseeing the implementation of the municipal wastewater regulations. The ministry issues permits and fines, conducts inspections, and sets guidelines for environmental assessments.
- **Health Act:** The Provincial Health Act provides a legal framework for public health protection. It includes provisions related to the management of wastewater and sets requirements for the safe handling and disposal of sewage. Compliance with these provisions is crucial for ensuring the health and well-being of the public.
- **Federal Fisheries Act:** Under the federal Fisheries Act, the Department of Fisheries and Oceans (DFO) plays a significant role in protecting fish habitat. Wastewater treatment plants must adhere to regulations that prevent harmful alterations to fish-bearing waters, including those associated with effluent discharges.
- **Environmental Assessment Office (EAO):** In some cases, the construction or expansion of wastewater treatment facilities may require an environmental assessment. The EAO oversees this process, which evaluates potential environmental impacts and mitigation measures.
- **British Columbia Water Sustainability Act:** The Water Sustainability Act regulates the use of water resources in British Columbia. It includes provisions for licensing the withdrawal of water for treatment processes and the discharge of treated effluent. Compliance with this act is essential for responsible water resource management.
- **Indigenous Consultation:** Consultation with Indigenous communities and nations is an integral part of the regulatory process. British Columbia has a duty to consult and accommodate Indigenous groups regarding activities that may impact their traditional territories and rights, including wastewater treatment projects.
- **Wastewater Systems Effluent Regulations:** Should the volume increase in the future to > 100 m³/day, additional reporting will be required.

6. Engineering Assessment of Existing System

6.1 System Overview

6.1.1 Collection System

A layout drawing of the existing sanitary system is presented in Appendix B. A schematic layout of the sanitary collection system is presented as Figure 2 below. A brief description of the system is provided below:

- Residential wastewater is collected through a 200 mm diameter pipe network from 26 households in the Heritage Hills Apple Court area to the inlet of the Vintage Views Wastewater Treatment Plant (WWTP). These 26 connections are located along the following roads: Heritage Blvd., One Quail Pl., Big Horn Tr., Apple Dr, and Apple Ct. No record drawings could be found for these house connections and sanitary mains. However, there are record drawings of the last 100 m of gravity mains to the wastewater treatment plant.
- All wastewater from the three phases of the Vintage Views development flows via gravity through a pipe network consisting mainly of 200 mm diameter pipes to a sanitary lift station located downhill and to the west of the development. Wastewater is then pumped from the lift station through a 100 mm diameter force main with a length of approximately 487 m to the Vintage Views WWTP. All of the vacant lots are in the Vintage Views area. There are therefore two (2) inlets to the WWTP that combine in a manhole on the WWTP site.

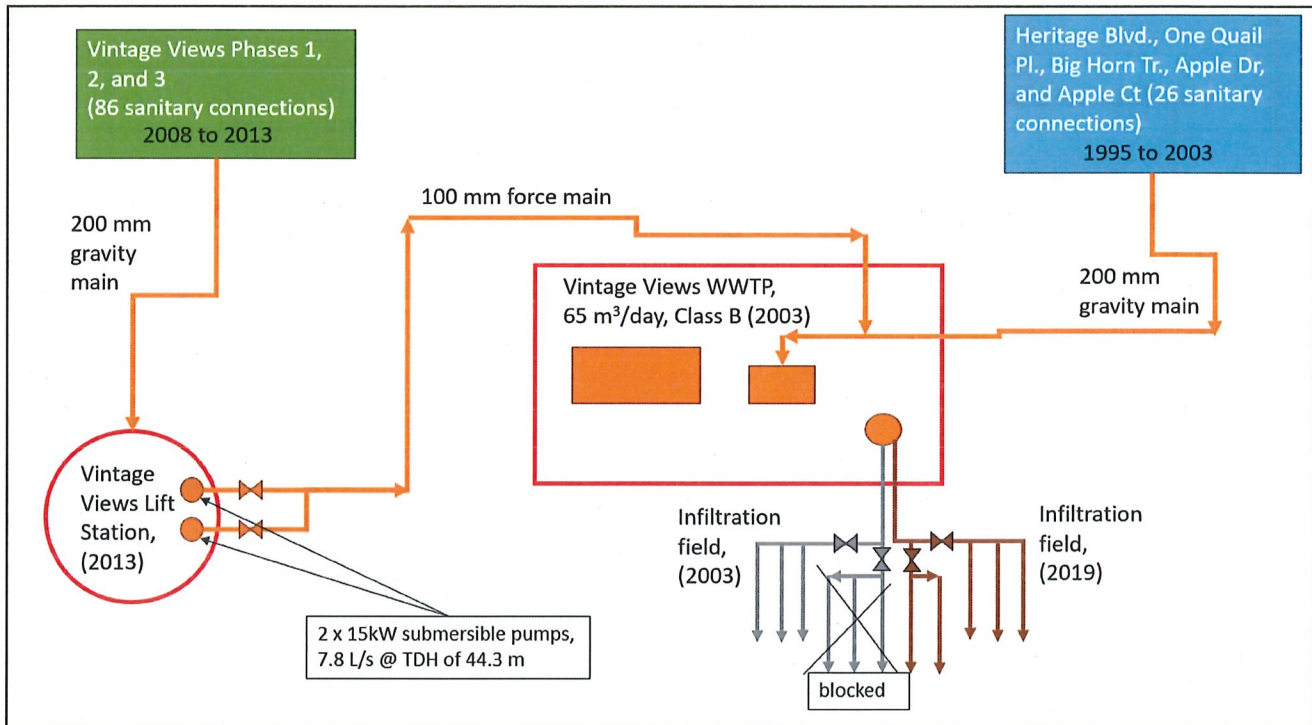


Figure 2: Schematic layout of the Vintage Views Sanitary System

6.1.2 Wastewater Treatment Plant

- The WWTP was originally constructed by a different private developer (not Vintage Views Developments), called Mountain Landco Ltd. in the year 2003. Vintage Views Developments Ltd. subsequently purchased the WWTP from Mountain Landco Ltd in 2009. The original intention during construction in 2003 was that the WWTP would have an initial capacity of 65 m³/day and that it could be upgraded to a capacity of 195 m³/day in the future. (However, the WWTP currently fails to treat flows lower than 65 m³/day to the permitted standards.) The biological reactor consists of 3 compartments of which only the first is currently in use. The two (2) unused compartments are currently filled with rainwater, but they can be repurposed in the future. (For example, equipment such as media filters may be installed in them. A few modifications and additions will be required for lighting, heating, access, and ventilation.) A schematic of the wastewater treatment plant is presented as Figure 3 below:
- The infiltration field that was constructed in 2003 has an area of 0.33 ha. We understand that half of this infiltration field is completely blocked, damaged, or otherwise unusable. A new infiltration field that was constructed in 2019 has a surface area of 0.27 ha.

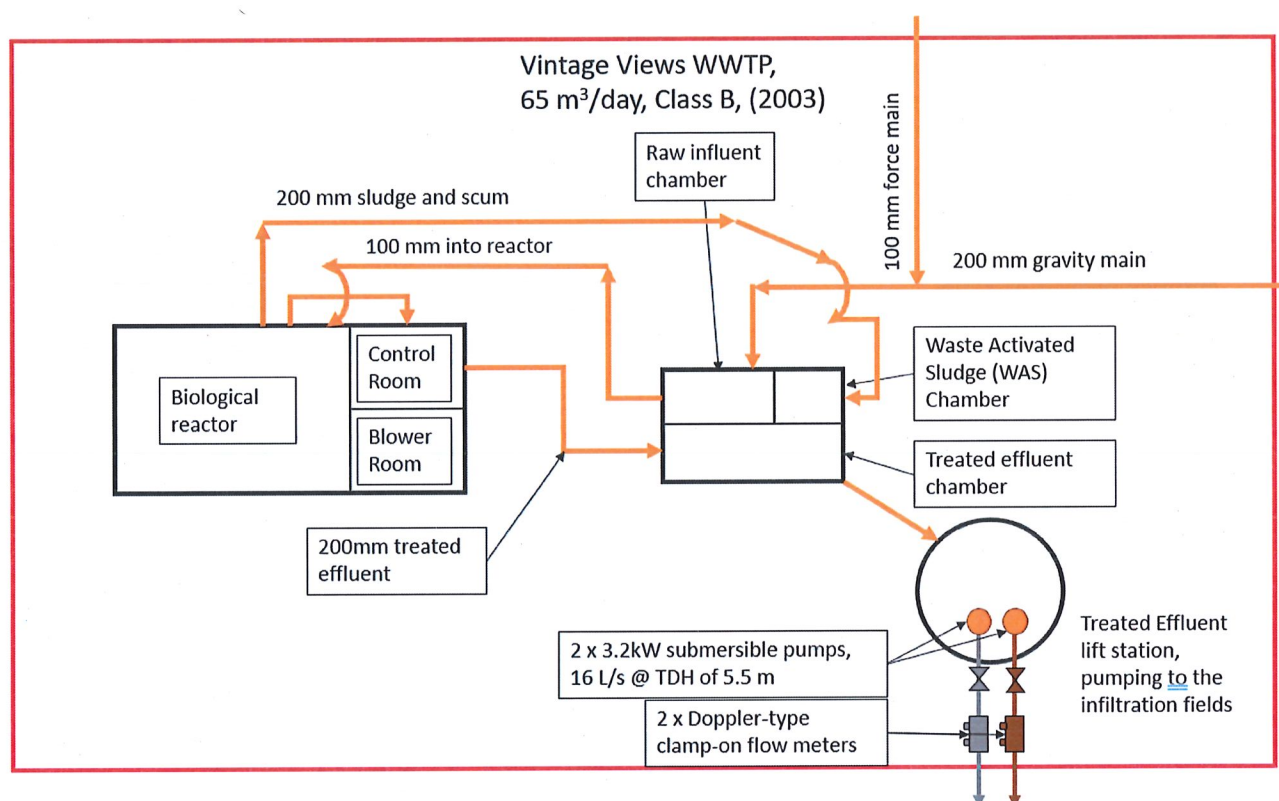


Figure 3: Schematic layout of the Vintage Views WWTP

- The WWTP drawings are available should the RDOS need to scrutinize them. The WWTP consists of the following components:
 - An inlet chamber with a live storage volume of 15 m³. There is a relatively coarse manual screen (25 mm openings) that separates rags and other larger items from the inflow. There are two submersible pumps installed inside the chamber. These are Meyers WHR5-03 pumps with 0.3

kW motors. The pumps automatically alternate. Their duty point is 3 L/s at 5.5 m total dynamic head (TDH). These submersible pumps transfer the wastewater into the first compartment of the biological reactor. A layout drawing of the inlet chamber, the sludge chamber, and the outlet chamber is presented as Figure 4 below:

- Each of the three compartments in the biological reactor has dimensions of 3.65 m by 6.59 m and a water depth of 3.5 m, giving a volume of 84 m³. The total reactor size is 252 m³. Only the first compartment of the biological reactor is currently in use. A bubble aeration system in this compartment aerates the wastewater. There is also a settling tank/clarifier installed below the water level inside this compartment. This clarifier could not be inspected (because it is not visible below the water level). The overflow from this clarifier flows to the mechanical microfilter screen in the control room. Sludge is removed from the clarifier by an airlift pump. An airlift pump in wastewater treatment is a mechanism that utilizes compressed air to lift or transport liquids, such as sewage or wastewater, from a lower to a higher elevation. This pump operates by injecting air into a pipe submerged in the liquid, causing a mixture of air and liquid to become less dense, thereby creating buoyancy and facilitating the upward movement of the fluid. A layout and section of the first compartment of the biological reactor is presented in Figure 5 below:

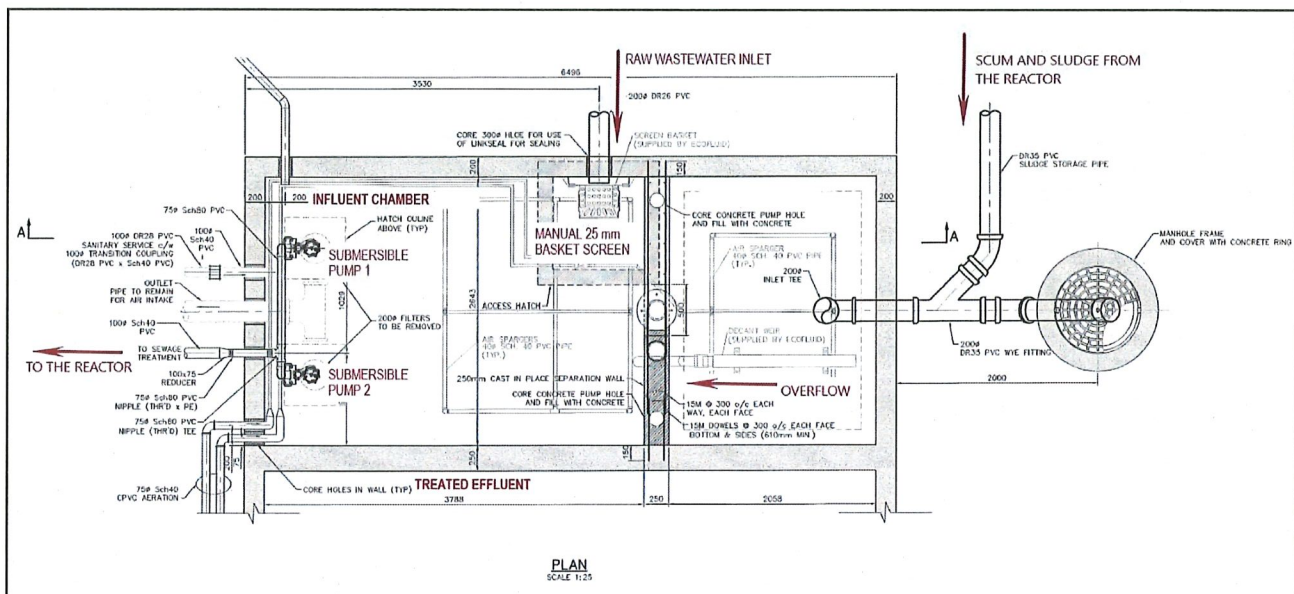


Figure 4: Inlet chamber, sludge chamber, and treated effluent chamber.

- The sludge raised by the airlift pump either recycles back into the reactor as recycled activated sludge (RAS) or is wasted as waste activated sludge (WAS) to the sludge storage chamber on site. There are manual valves on the top of the reactor to select between recycling or wasting sludge. There is no sludge treatment at the WWTP. A truck removes sludge from the sludge storage sump to the Penticton WWTP once per month in winter and every two weeks in summer. (Sludge production is higher during the warm months.) The sludge storage chamber on site overflows back into the inlet chamber if it is overfilled. When the sludge stands for a longer period (say 24 hours) in the sludge storage tank, the solids settle out, and a clear liquid/supernatant forms at the top. The operator can decant the supernatant back into the inlet chamber to make room available for additional de-sludging from the reactor.

- The microfilter is in the control room, the same room where the starters and PLC are located. The microfilter is a standalone unit “complete with a sludge and a backwash pump”. It is an Ineko 5BMF5 microfilter, equipped with a 1.5 kW backwash pump and the microfilter has a 0.3 kW electrical motor. There is only one microfilter with no backup units. A layout of the microfilter is presented in Figure 6 below. Effluent from the microfilter flows to a treated effluent chamber directly south and adjacent to the inflow chamber.
- From the treated effluent chamber, the treated effluent flows into a lift station wet well. There are two submersible pumps installed in the treated effluent lift station. There are two strap-on Doppler-type flow meters installed on the headers of the two pumps. The pumps are Flygt model C 3085 3.2 kW channel impeller pumps. The pumps can be removed with the lifting Davit crane installed on top of the wet well. These pumps each have a duty point of approximately 16 L/s at a TDH of 5.5 m.

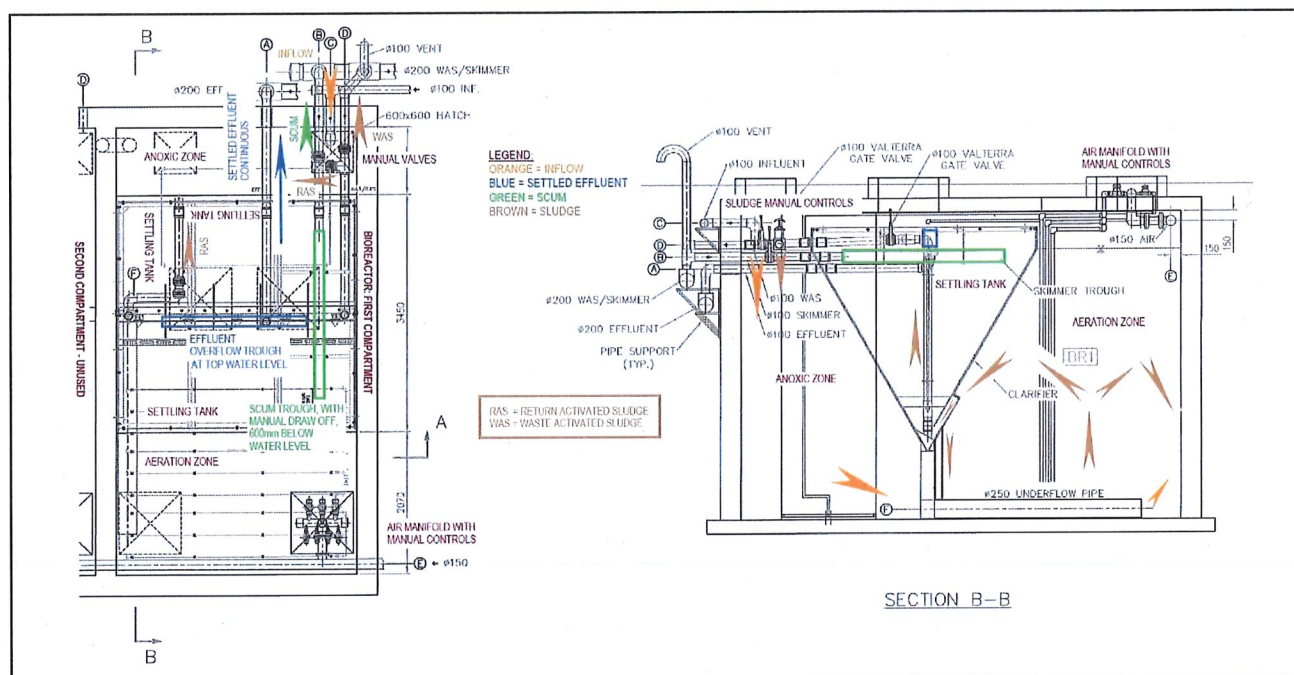


Figure 5: Bioreactor layout and section of the first compartment showing flow paths.

- From the treated effluent lift station, the water is pumped into the infiltration field on the adjacent farm. The original infiltration field consisted of two piping systems with laterals. One of these is blocked and de-commissioned. A new infiltration field with two new piping systems was installed in 2019.
- Directly south of the control room is an air blower room. There are two air blowers and a transformer installed in the air blower room. The electronic displays of the treated effluent flow meters are also inside this room on the wall. The (two) roots-type positive displacement air blowers do not have acoustic enclosures. The units are Dresser Roots Model 33 URAI, 5 kW blowers. The blowers operate at a speed of 1,800 rpm and have an (air) flow capacity of approximately 33 L/s.
- Electrical:
 - All the existing equipment at the WWTP is single phase, 120/240 Volt.

- The current power supply is from the neighboring farm. There is a power meter installed on a wooden pole near the farm buildings. This is a single-phase power supply. A transformer increases the voltage and decreases the current at the power meter. (This was probably done to enable the installation of a smaller power cable to the WWTP.) There is a buried power cable from the supply pole to the WWTP through the vineyard. The single-phase power supply enters the WWTP inside the blower room. There is a single-phase step-down transformer in the blower room to reduce the voltage from 600 Volt to 120/240 Volt.
- Communications engineering:
 - There is no SCADA system.
 - The Vintage Views sanitary lift station located approximately 300m west-northwest of the WWTP sends status and sewage level signals to the WWTP via a radio connection. The WWTP does not send any signals back to the sanitary lift station.

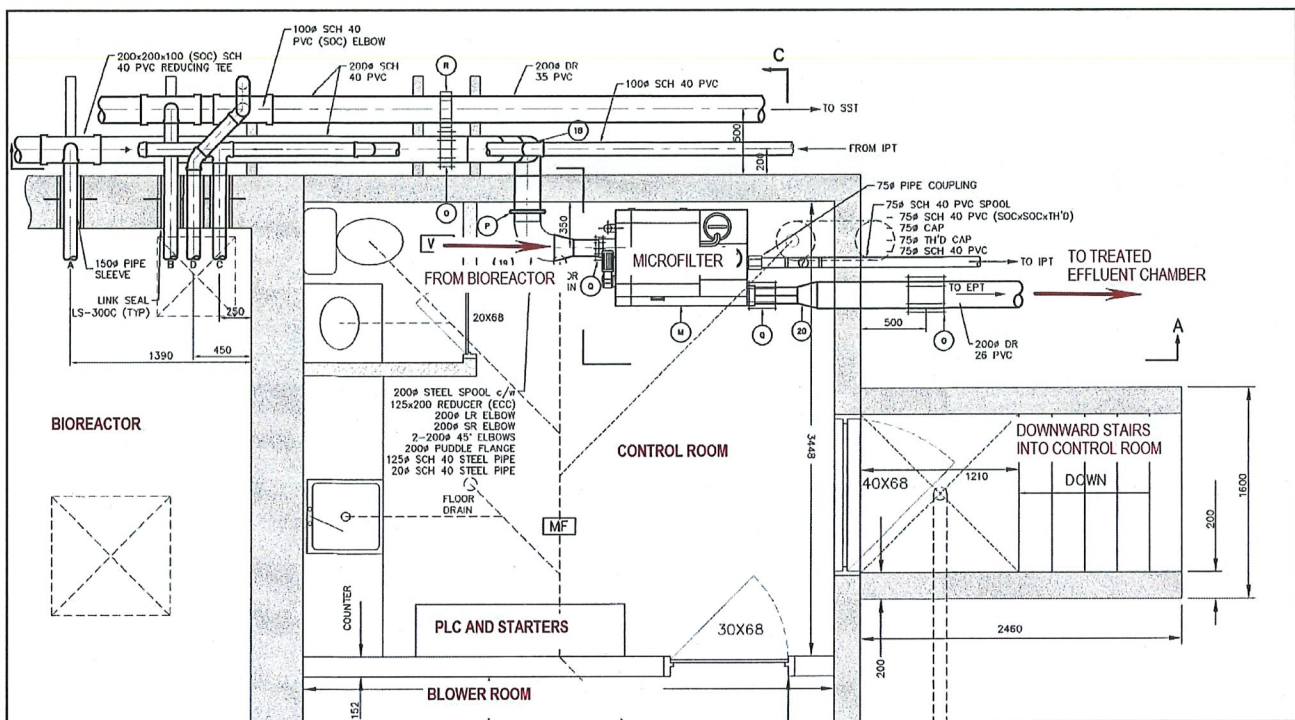


Figure 6: Microfilter in the Control Room

- The flow and volume readings from the effluent pump station are not connected to the existing PLC.
- The PLC is an older model with limited input and output capabilities. It is installed in the same enclosure as the electrical blower starters.
- There are dissolved oxygen analyzers installed in the wastewater in the biological reactor. The dissolved oxygen readings are recorded by the PLC.
- The stop and start of the air blowers are controlled by a timer that is set beforehand by the operator.

6.2 Permit

The Vintage Views WWTP holds an active permit (#17170) to discharge 65 m³/day of Class B effluent to an infiltration field. Pollution Prevention Order 110871 is also active for this site. This order prohibits new sewer connections until the system is re-registered under the Municipal Wastewater Regulation (MWR). Vintage Views Developments did initiate the re-registration process but did not submit a final application and has been removed from the application queue.

6.3 Wastewater Quality

6.3.1 Untreated/Influent

No recent raw wastewater tests have been done by the private owner. The untreated wastewater is of typical domestic quality because there are no industries or commercial developments within the residential suburb. No records were received of grab or composite sampling programs. The typical strength of domestic wastewater is presented in Table 1 below (Metcalf & Eddy, Inc., 2003):

Table 1: Typical strength of domestic wastewater

Contaminant	Low Strength	Medium Strength	High Strength
Total Suspended Solids (TSS) mg/L	120	210	400
Settleable solids mg/L	5	10	20
Biochemical Oxygen Demand, 5-day at 20°C, (BOD ₅) mg/L	110	190	350
Chemical Oxygen Demand (COD) mg/L	250	430	800
Total Nitrogen, as N mg/L	20	40	70
Total Phosphorous, as P mg/L	4	7	12
Fats, Oils and Grease (FOG) mg/L	50	90	100
Total Coliforms No./100mL	10 ⁶	10 ⁸	10 ¹⁰
Fecal Coliforms No./100mL	10 ³	10 ⁵	10 ⁸
<i>Cryptosporidium</i> Oocysts No./100mL	0.1	50	100
<i>Giardia</i> cysts No./100mL	0.1	500	1000

6.3.2 Treated Effluent Quality

The treated effluent must comply with Class B Effluent Requirements as per the Municipal Wastewater Regulation (MWR) (British Columbia, 2012). The requirements are summarized in Table 2 below:

Table 2: Class B effluent requirements

Requirement	Class B
BOD ₅ (mg/L)	<10
TSS (mg/L)	<10
Fecal coliforms (Most probable number [MPN]/100mL)	<400, if the maximum daily flow is ≥37 m ³ /d
Turbidity (NTU)	n/a
Nitrogen (mg/L)	n/a
Phosphorous (mg/L)	n/a

6.3.3 Monitoring Requirements

The monitoring requirements for a Class B, 65 m³/day wastewater treatment plant in terms of the Municipal Wastewater Regulation (MWR) are as follows:

Table 3: Monitoring requirements in terms of the MWR

Requirement	Class B, 65 m ³ /day
Flow frequency	Twice per week
BOD and TSS frequency and type	Twice per month, grab samples
Fecal coliforms frequency and type	Weekly grab samples
Turbidity frequency and type	None
Nitrogen total and nitrate (as N) frequency and type	None

6.3.3.1 Biochemical Oxygen Demand

No recent treated effluent test results have been received from the private owner. The average BOD for all samples between September 1, 2020, and April 30, 2022, was 18.7 mg/L which exceeds the Registration and MWR limit of 10 mg/L. Results exceeded Class B effluent quality limits for BOD (10 mg/L) in 12 of the 34 samples (35%). The maximum exceedance was 290 mg/L (2800% over the limit.)

Table 4: Non-compliant BOD₅ results

START DATE	BOD Results (mg/L)
2020-10-31	20.9
2021-03-31	290
2021-04-21	22.9
2021-04-30	30
2021-05-31	12
2021-09-30	24.7
2021-11-23	24.2
2021-11-30	17
2021-12-19	12.4
2021-12-27	10.8
2022-01-23	12.1
2022-04-22	12.9
Maximum:	290

6.3.3.2 Total Suspended Solids

No recent treated effluent test results have been received from the private owner. Between September 1, 2020, and April 30, 2022, the average TSS was 4.4 mg/L which is within the Registration and MWR limit. Results exceeded Class B effluent quality limits for TSS (10 mg/L) in four of the 34 samples (12%). The maximum value was 40.7 mg/L (307% above the discharge limit).

Table 5: Non-compliant TSS results

START DATE	TSS Results (mg/L)	% Over limit
2021-03-31	40.7	307%
2021-04-21	11	10%
2021-09-30	12	20%
2022-04-22	12.2	22%
Maximum:	40.7	307%

Reportedly, previous infiltration pipes blocked up, which is a clear indication of solids carry-over and non-compliance regarding TSS. These solids would collect in the infiltration pipes, settle out, and eventually block up.

6.3.3.3 Fecal Coliforms

No recent treated effluent test results have been received from the private owner. Between August 19, 2020, and May 6, 2022, all 16 fecal coliform samples exceeded MWR limits (400 MPN/100mL), by an average of 4,920% and a maximum of 24,700%.

START DATE	Coliform Results cfu/100mL	% Over limit
2021-01-21	3650	813%
2021-08-10	>2420	505%
2021-09-30	>24200	5950%
2021-11-23	>2420	505%
2021-11-30	15500	3775%
2021-12-19	>24200	5950%
2021-12-27	>2420	505%
2022-01-16	11400	2750%
2022-01-23	6300	1475%
2022-02-13	7410	1753%
2022-03-15	12700	3075%
2022-03-21	67000	16650%
2022-03-28	23000	5650%
2022-04-06	13400	3250%
2022-04-22	6060	1415%
2022-05-03	99300	24725%
Maximum:	99300	24725%

Even high-quality treated wastewater effluent will always contain some fecal coliforms and disinfection (by chlorination or ultra-violet radiation) is required to eliminate these organisms. However, the Vintage Views WWTP has never employed any form of disinfection.

6.4 Wastewater Quantity

No flow meter readings have been received from the private owner. The WWTP does not have an incoming flow meter. A side stream of sludge from the treatment process is stored in a chamber and periodically removed by truck to Penticton WWTP. The effluent flow rate can be measured using the existing Doppler-type clamp-on flow meters connected to the discharge pipes from the effluent pump station that measure the flow rates to the infiltration field. However, these are not connected to the programable logic controller (PLC). They are stand-alone flow meters, and it is not clear if flow rates are being regularly monitored and recorded.

6.4.1 Wastewater Volume

The average reported volume is 22 m³/day. The current operator, reports that the daily volume is never more than 32 m³/day. The theoretical sanitary demand in accordance with RDOS bylaws is presented in Table 6 below. The volumes reported by the operator are lower than the theoretical numbers, however, this is to be expected as sewage system design flows normally incorporate a safety margin and may therefore be greater than actual flows.

Table 6: Calculated sanitary volumes and flow rates in accordance with RDOS bylaws.

Description	Number	Units
Vintage Views Houses Connected	112	Connections (97 Active)
Number of people per house	2.3	People/HH
Total number of people	257.6	People
Average Dry Weather Flow	450	L/capita/day
Average Dry Weather Flow	115.92	m³/day
Population in Thousands	0.2576	
Peak Factor (M)	4.11	
Peak flow Rate	5.51	Lps

(Regional District of Okanagan-Similkameen, 2013)

6.4.2 Total Number of Connections

The data received from Vintage Views Developments indicates that there are 97 households and 15 vacant lots connected to the wastewater system. The addresses of connected homes are indicated in Table 7 below:

Table 7: Lots connected to the wastewater system

No.	Property Address	Household or Vacant Lot
1	240 Parsons Road	Household
2	250 Parsons Road	Household
3	115 Apple Court	Household
4	124 Apple Court	Household
5	130 Apple Court	Household
6	136 Apple Court	Household
7	148 Apple Court	Household
8	Empty Lot A Plan 75802	Vacant Lot
9	Empty Lot B Plan 75802	Vacant Lot
10	121 Apple Road	Household
11	135 Apple Road T208	Household
12	141 Apple Road	Household
13	147 Apple Road	Household
14	153 Apple Road	Household
15	159 Apple Road	Household
16	162 Apple Road	Household
17	164 Apple Road	Household
18	165 Apple Road	Household
19	110 Cabernet Drive	Household
20	120 Cabernet Drive	Household
21	126 Cabernet Drive	Household
22	#1 - 125 Cabernet Drive	Household
23	#2 - 125 Cabernet Drive	Household
24	#3 - 125 Cabernet Drive	Household
25	#4 - 125 Cabernet Drive	Household
26	#5 - 125 Cabernet Drive	Household
27	#6 - 125 Cabernet Drive	Household
28	#7 - 125 Cabernet Drive	Household

No.	Property Address	Household or Vacant Lot
29	#8 - 125 Cabernet Drive	Household
30	#9 - 125 Cabernet Drive	Household
31	#10 - 125 Cabernet Drive	Household
32	#11 - 125 Cabernet Drive	Household
33	#12 - 125 Cabernet Drive	Household
34	#13 - 125 Cabernet Drive	Household
35	#14 - 125 Cabernet Drive	Household
36	#15 - 125 Cabernet Drive	Household
37	#16 - 125 Cabernet Drive	Household
38	#17 - 125 Cabernet Drive	Vacant Lot
39	#19 - 125 Cabernet Drive	Vacant Lot
40	#20 - 125 Cabernet Drive	Vacant Lot
41	#21 - 125 Cabernet Drive	Household
42	#22 - 125 Cabernet Drive	Household
43	#23 - 125 Cabernet Drive	Household
44	#24 - 125 Cabernet Drive	Household
45	#25 - 125 Cabernet Drive	Household
46	#26 - 125 Cabernet Drive	Household
47	#27 - 125 Cabernet Drive	Household
48	#28 - 125 Cabernet Drive	Household
49	#29 - 125 Cabernet Drive	Household
50	#30 - 125 Cabernet Drive	Household
51	#31 - 125 Cabernet Drive	Household
52	#32 - 125 Cabernet Drive	Household
53	#33 - 125 Cabernet Drive	Household
54	#34 - 125 Cabernet Drive	Household
55	#35 - 125 Cabernet Drive	Household
56	#36 - 125 Cabernet Drive	Household
57	#37 - 125 Cabernet Drive	Household

No.	Property Address	Household or Vacant Lot
58	#38 - 125 Cabernet Drive	Household
59	#39 - 125 Cabernet Drive	Household
60	#40 - 125 Cabernet Drive	Vacant Lot
61	#41 - 125 Cabernet Drive	Household
62	#42 - 125 Cabernet Drive	Household
63	#1- Chadwell Place	Vacant Lot
64	#2- Chadwell Place	Vacant Lot
65	#3- Chadwell Place	Vacant Lot
66	#5- Chadwell Place (161)	Household
67	#7 - Chadwell Place	Household
68	#8 - Chadwell Place	Vacant Lot
69	#9 - Chadwell Place	Vacant Lot
70	#10 - Chadwell Place	Vacant Lot
71	#11 - Chadwell Place	Vacant Lot
72	#12- Chadwell Place	Household
73	#15 - Chadwell Place 124	Household
74	#16- Chadwell Place	Household
75	#17- Chadwell Place 147	Household
76	#18- Chadwell Place 136	Household
77	#19- Chadwell Place 140	Household
78	#20- Chadwell Place - 146	Household
79	#21- Chadwell Place - 150	Household
80	#23- Chadwell Place - 162	Household
81	101 Chardonay Court	Household
82	107 Chardonay Court	Household
83	108 Chardonay Court	Household
84	111 Chardonay Court	Household
85	117 Chardonay Court	Household
86	118 Chardonay Court	Household

No.	Property Address	Household or Vacant Lot
87	103 Vintage Blvd	Household
88	107 Vintage Blvd	Household
89	110 Vintage Blvd	Household
90	118 Vintage Blvd	Household
91	122 Vintage Blvd	Household
92	130 Vintage Views	Household
93	142 Vintage Blvd	Household
94	150 Vintage Blvd	Household
95	158 Vintage Blvd	Household
96	166 Vintage Blvd	Household
97	174 Vintage Blvd	Household
98	175 Vintage Blvd	Household
99	296 Heritage Blvd	Household
100	300 Heritage Blvd	Household
101	312 Heritage Blvd	Household
102	316 Heritage Blvd	Household
103	324 Heritage Blvd	Household
104	328 Heritage Blvd	Household
105	330 Heritage Blvd	Household
106	331 Heritage Blvd	Household
107	332 Heritage Blvd	Household
108	168 Sunnybrook Drive	Household
109	170 Sunnybrook Drive	Household
110	170 - A Sunnybrook Drive	Vacant Lot
111	170 - B Sunnybrook Drive	Vacant Lot
112	312 One Quail Place	Household

6.5 Wastewater Collection Network

Twenty-six (26) of the total of hundred and twelve (112) house connections are not shown on the record drawings. (See the layout drawing attached as Appendix B.). A summary of the known sanitary pipes is presented in Table 8 below:

Table 8: Installation dates, diameters, and lengths of known sanitary pipelines.

Year	Diameter (mm)	Gravity/Pressure Pipe	Length (m)	Percentage (%)
2006	150	Gravity	100	4%
2006	200	Gravity	460	19%
2007	200	Gravity	545	23%
2013	100	Pressure/ Force Main	487	20%
2013	200	Gravity	825	34%
		Total	2417	100%

6.6 Wastewater System Capacity

Gravity Pipe Network:

The Vintage Views portion of the gravity pipe network mostly consists of 200 mm diameter pipes. There are no concerns regarding the capacity of this system. The gravity pipe network in Heritage Hills could not be modeled and evaluated, because no record drawings are available.

Wastewater Treatment Plant

The original intention during construction in 2003 was that the WWTP would have an initial capacity of 65 m³/day and that it could be upgraded to a capacity of 195 m³/day in the future. (However, the WWTP currently fails to treat flows lower than 65 m³/day to the permitted standards.)

6.7 WWTP

6.7.1 Access

- Unauthorized access/fencing: Children and animals should be prevented from entering the site due to safety reasons. There is a low wooden fence around the site, but no access gate. There is a risk that a child or animal might fall into a manhole or wet chamber. A children's park is situated adjacent to the WWTP site. A photograph of the current fence is presented in Figure 9 below.
- There is no access to the infiltration field. The vineyard is fenced off. The operator needs to open and close valves in the infiltration field. The operator is required to measure groundwater levels and to take samples from monitoring wells. Currently, the operator must drive around to the farm entrance to gain access to the infiltration field.

6.7.2 Process

- There is no inflow measurement. It is a Municipal Wastewater Regulation requirement to monitor the incoming flow rate twice per week. It is the industry norm to measure and record variations in instantaneous flow rates and daily volumes.

- Mechanical screening of influent wastewater: There is currently a 25 mm static screen inside the inlet chamber. Reportedly, rags are sometimes captured by this screen. It is an industry norm to remove large solids from the incoming wastewater. The purpose is to prevent blockages, protect equipment (for example pumps), reduce odors, and enhance the efficiency of downstream processes, such as sedimentation. Screenings are normally treated further by washing, compacting, and then sent to landfill.
- Grit removal: The existing WWTP does not have any form of grit removal. This process is required to prevent chambers, reactors, and settling tanks from blocking up and to protect downstream equipment. The operator reported that solids clog up and collect in the existing inlet chamber and the existing bioreactor.
- Fats, Oils, and Grease (FOG) removal: The existing WWTP does not have any form of FOG removal. FOG may cause the formation of excessive foam on the surfaces of treatment units at the WWTP, it may lead to blocking of the infiltration field, or blocking of membranes in the process.
- Bypass: There is an open bypass between the inlet chamber and the treated effluent chamber. If the inflow is higher than the pumping capacity of the two existing pumps in the inlet chamber, or if the pumps become clogged or fail, then the water level will rise, and the raw wastewater bypasses the bioreactor. The bypass pipe is highlighted in red in Figure 7 below. The current operator only works at the WWTP on a part-time basis and is not notified if bypassing is occurring. Raw wastewater will pollute the groundwater around the existing infiltration field should bypassing occur.

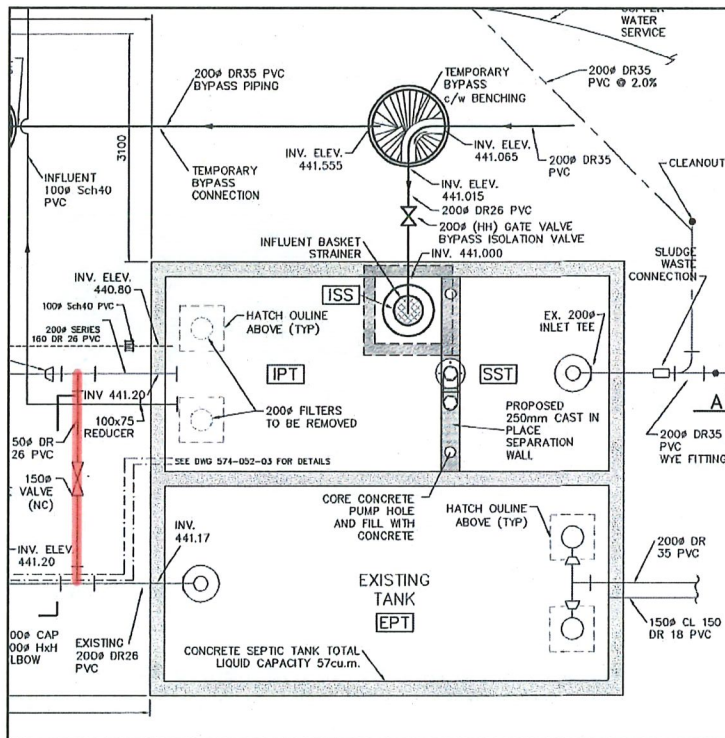


Figure 7: Existing bypass from the inlet chamber to the treated effluent chamber

- Existing clarifier: The average and peak surface loading rates of the existing clarifier inside the bioreactor are 9.2 m/day and 37 m/day respectively (considering that the process is driven by 3.0 L/s pumps in the inlet chamber), which is acceptable for secondary clarifiers following air-activated bioreactors.

Recommended average and peak surface loading rates are 16 m/day and 40 m/day respectively. (Metcalf & Eddy, Inc., 2003)] The surface area of the clarifier is acceptable in terms of industry norms.

- Disinfection: The existing WWTP does not employ any form of disinfection, such as ultra-violet radiation or chlorination. However, disinfection is required to comply with the MWR. The MWR specifies less than 400 fecal coliforms/100mL. Disinfection will be necessary to consistently achieve this relatively low number.

6.7.3 Civil & Mechanical

- Concrete structure: The existing bioreactor, control room, and blower room consist of cast-in-place concrete. No visible leaks or cracks were detected. A photograph of the reactor roof slab is presented in Figure 10.
- The downward stairs into the control room and landing are not covered by a roof and fill up with snow during winter. The location of the existing stairs is highlighted in green in Figure 8 below. This is a nuisance to the operator and a safety concern.

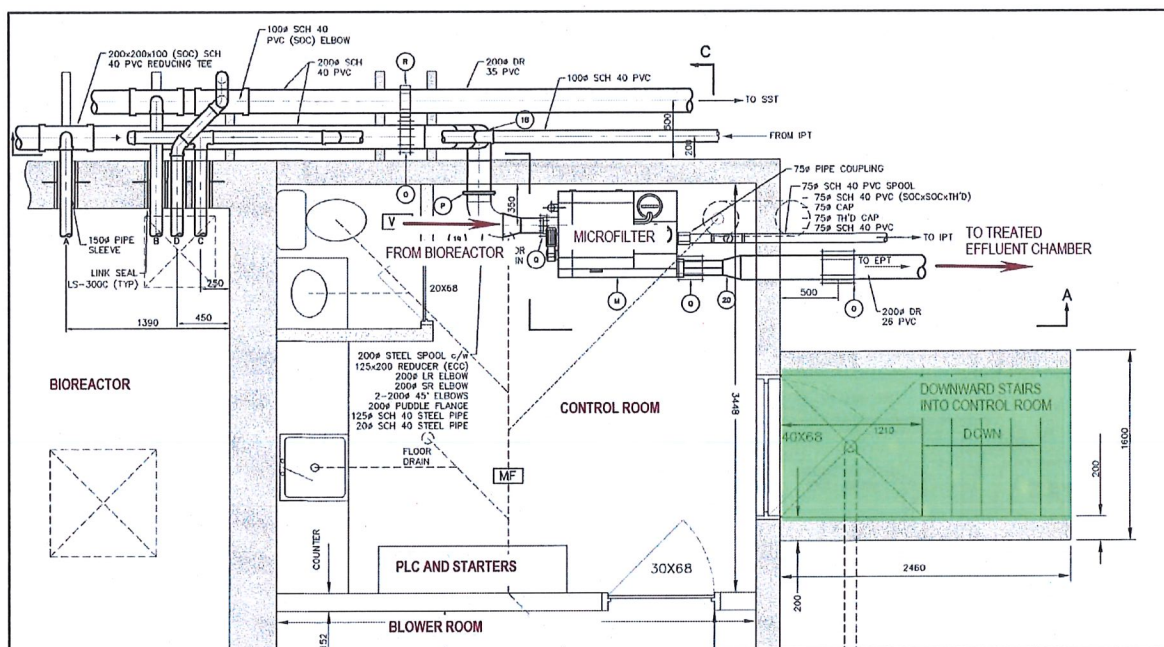


Figure 8: Location of stairs

6.7.3.1 Microfilter:

- There is only one microfilter. It is an industry standard in wastewater treatment to duplicate equipment for redundancy should a unit become inoperable. Photographs of the existing microfilter are presented in Figure 11 and Figure 12.
- The microfilter is situated inside the control room together with electrical and electronic equipment. The microfilter is connected to the enclosed bioreactor with pipework. Should methane gases ever build up within the reactor due to a malfunction with the aeration equipment, then these gases could enter the control room where electrical starters are currently located on the southern wall. Methane is an explosive gas and positioning the microfilter together with electrical switchgear in the same room is an electrical code violation. While methane itself is non-toxic and creates no hazard when inhaled in limited quantities

it can, however, in large quantities reduce the oxygen percentage in air, causing suffocation. This is a health and safety concern.

6.7.4 Electrical, Control & Instrumentation

6.7.4.1 Electrical Supply

Power is currently supplied from a single-phase source from the neighboring farm on a separately metered service. There is a separate service with an electric meter. The power supply should be updated to a 3-phase supply from Fortis BC in Chadwell Place. There is a buried electrical cable underneath the vineyard, but the exact location is unknown.

6.7.4.2 Control Panel

- There is insufficient wall space for additional electrical enclosures in the Control Room.
- The existing control panel has a PLC with limited input and output (I/O) and expansion capability. The motor starters are in the same panel as the PLC.

6.7.4.3 Dissolved Oxygen in the Reactor

Currently, dissolved oxygen (DO) is measured in the reactor, which sends a signal to the PLC. However, the blowers are not controlled by the PLC. Currently, the aeration process is not automated.

6.7.4.4 Gases

Methane may be formed in the bioreactor by organisms should the aeration system malfunction. Methane is a toxic, corrosive, and possibly explosive gas. Screening rooms are required to have detection for hydrogen sulfide (H₂S) and Lower Explosive Limit (LEL) gases. Currently, there is a duct with instrumentation cabling from the bioreactor into the electrical starter enclosure, which allows gases to travel directly from the bioreactor into the electrical panel. This is an electrical code violation.

6.7.5 Lift Station

The existing lift station is running on a daily basis and the operator is reporting that no major problems have been experienced at this lift station. Photographs of the lift station are presented in Figure 13 and Figure 14.

6.7.6 Vaults, Manholes, and Piping

All vaults at the existing WWTP were opened. Scum and suspended solids were seen in the treated effluent chamber. This is an indication of either bypassing from the inlet chamber or carry-over from the clarifier inside the bioreactor. This is a major concern because it indicates that either the inlet chamber is too small, leading to bypassing from the inlet chamber to the effluent chamber; or the clarifier inside the bioreactor is not functioning properly. Scum and suspended solids in the treated effluent chamber will cause non-compliance with the standards and will eventually lead to the blocking of the infiltration field. If the microfilter malfunctions, it also overflows into the treated effluent chamber.

6.8 System Monitoring and Communication

6.8.1 Remote Monitoring/SCADA

The WWTP and Vintage Views lift station do not have SCADA.

6.8.2 Communications Networks

There is a radio signal from the existing Vintage Views Lift Station that reports to the WWTP.

6.8.3 Security

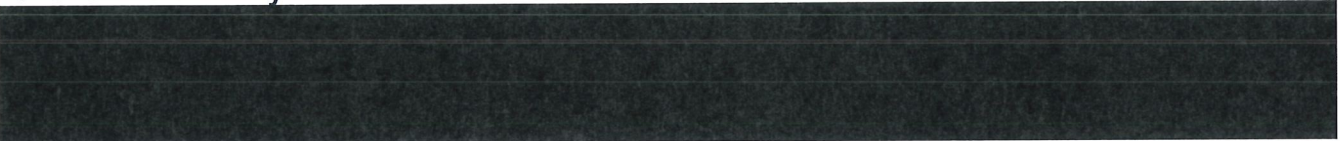


Figure 9: Vintage Views WWTP: Existing fencing in the foreground

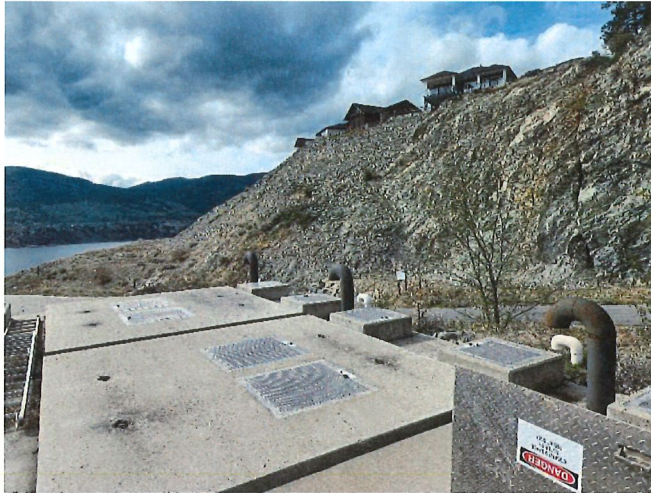


Figure 10: Vintage Views WWTP: Existing concrete roof slab of the reactor



Figure 11: Vintage Views WWTP: Mechanical effluent screen inside the control room

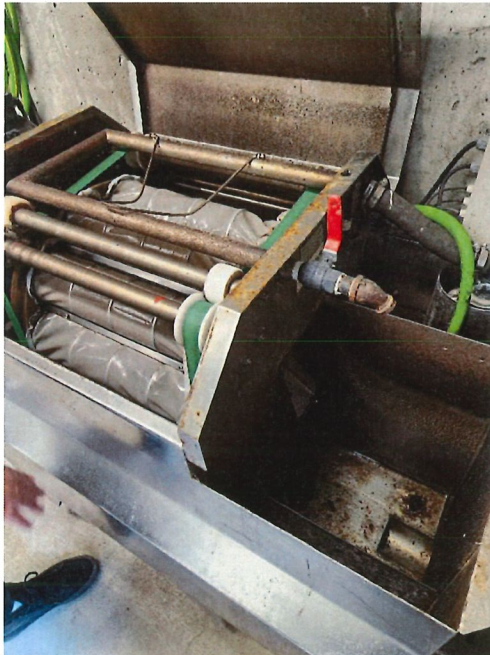


Figure 12: Vintage Views WWTP: Mechanical effluent screen with open cover

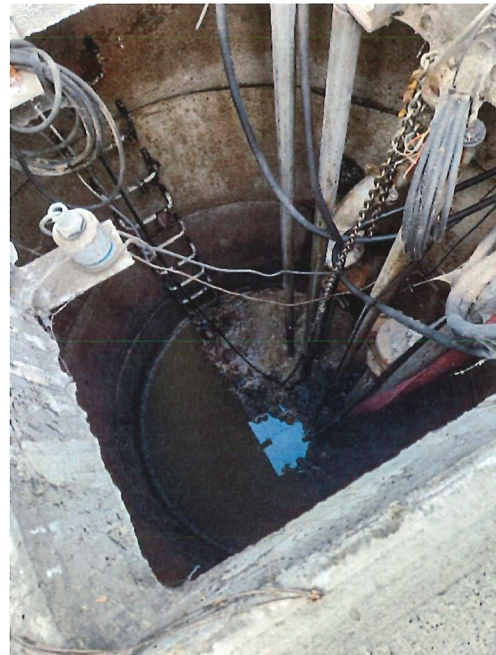


Figure 13: Wet well of the existing lift station



Figure 14: Existing lift station

7. Financial, Liability and Asset Report

7.1 Financial Report

7.1.1 Annual Reports

Annual reports have been requested from the private owner.

7.2 Asset Report

7.2.1 Asset Management

7.2.1.1 Listing

The list of existing sanitary infrastructure is as follows:

- Gravity sanitary pipes installed between 2006 and 2014:
 - 100 m of 150 mm diameter and
 - 1,830 m of 200 mm diameter,

- Thirty-two (32) sanitary manholes,
- One Hundred and twelve (112) sanitary service connections (97 active),
- A wastewater lift station and approximately 487 m of 100 mm diameter force main,
- A 65 m³/day wastewater treatment plant, and
- Two infiltration fields as follows:
 - 0.16 ha remains of the infiltration field installed in 2003 and
 - 0.27 ha of infiltration field was installed in 2019.
- The WWTP Lot belongs to Vintage Views Developments. LOT 4, PLAN EPP61041 has a size of 1160 m².

7.2.2 Estimated Current Value

7.2.2.1 Methodology

The following method was followed in estimating the current value of the infrastructure: The average expected useful life of municipal wastewater assets was obtained from the Statistics Canada website and is presented in Table 9 below:

Table 9: Average lifespan of municipally owned wastewater infrastructure in Canada between 2016 and 2020

Component	Average Useful Life (Statistics Canada, 2022)
Wastewater Treatment Plants (WWTPs)	28 years
Wastewater Lift Station	31 years
Sewer Pipes (smaller than 450 mm diameter)	76 years
Sanitary force mains	63 years

Construction cost estimates were prepared for what it would cost to design and construct the existing infrastructure in 2023. The depreciation of the value of the infrastructure was based on the age/years that transpired since construction compared to the average useful lifespan of the components. I.e., if a sewer pipe was installed 16 years ago and the total lifespan of sewer pipes is assumed to be 76 years, then the depreciation was assumed to be 21% (or 16 years divided by 76 years). If the pipeline costs \$100k to install, then the depreciation in the value of that pipeline is \$21k (or 21% x \$100k).

7.2.2.2 Results

The estimated value of the existing infrastructure and the remaining life is presented in Table 10 below.

Table 10: Estimate of Current Value and remaining life of the existing wastewater infrastructure.

Year Constructed	Description	Estimated Construction Cost in 2023 (Including 20% Contingency and Engineering Fee)	Depreciation	Estimated Current Value (2023)	Remaining Life - Estimated (Years)	Remaining Life - Estimated (%)
2003	Vintage Views WWTP	\$1,333,800.00	\$952,714.29	\$381,085.71	7	25%
2008	Vintage Views Phase 1 sanitary pipe network	\$260,010.00	\$51,317.76	\$208,692.24	61	80%
2010	Vintage Views Phase 2 sanitary pipe network	\$419,771.70	\$71,803.05	\$347,968.65	63	83%
2016	Vintage Views Phase 2 sanitary pipe network & Lift Station	\$854,528.40	\$171,962.01	\$682,566.39	49	80%
		\$2,868,110.10	\$1,247,797.11	\$1,620,312.99		

7.2.3 Operations and Maintenance

7.2.3.1 EOCP Classification

The WWTP is classified as a Class II facility. This EOCP classification expired on 21 September 2023. The collection system has never been classified by the EOCP. The current part-time operator has a Wastewater Operator I certification.

7.3 Statutory Right of Ways and Easements

SRWs were found for the WWTP, the lift station, and the pipelines. All the SRWs and Land Ownership documents are available for the RDOS to scrutinize. The SRWs are also listed in Table 11 below.

The existing infiltration field currently has the following challenges:

- It is located on private land without a registered SRW.
- It is located on the Agricultural Land Reserve (ALR).
- There is a major conflict between the agricultural and wastewater activities at the infiltration field.
- There is a registered easement between the connected homeowners and the farm owner regarding the infiltration field. The agreement between the two private entities is available should the RDOS need to examine it. The agreement between the private entities states that the easement will cease to exist when a municipality takes over the operations.

7.4 Land Parcel Ownership

Land parcel ownership for the wastewater lift station, the WWTP, and the effluent infiltration system are presented in Table 11 below. Note that the land parcel ownership is not currently split correctly between the Lakeshore Water System and the Vintage Views Sanitary System:

Table 11: Land parcel ownership for the lift station, the WWTP, and the infiltration system

INFRASTRUCTURE	RELEVANT SRW PLAN	AFFECTED PID	AFFECTED PARCEL	AFFECTED PARCEL OWNERS	NOTES
WASTEWATER LIFT STATION	SRW PLAN EPP71273 (DOCUMENT CA1836060)	029-841-488	LOT 15, PLAN EPP61041	Unnamed Private Owners	LIFT STATION APPEARS TO RESIDE ON LOT 15 BASED ON IMAGERY, SRW ALSO COVERS PORTIONS OF LOTS 2,3,4,12,16,21 AND 22, PLAN EPP61041 AND STRATA LOTS 22 AND 23, PLAN KAS3813
WASTEWATER LIFT STATION	SRW PLAN EPP71273 (DOCUMENT CA1836060)	029-841-496	LOT 16, PLAN EPP61041	Unnamed Private Owners	LIFT STATION APPEARS TO RESIDE ON LOT 15 BASED ON IMAGERY, SRW ALSO COVERS PORTIONS OF LOTS 2,3,4,12,15,21 AND 22, PLAN EPP61041 AND STRATA LOTS 22 AND 23, PLAN KAS3813
WASTEWATER TREATMENT PLANT	SRW PLAN EPP71273 (DOCUMENT CA1836060)	029-841-399	LOT 4, PLAN EPP61041	VINTAGE VIEWS DEVELOPMENTS LTD., INC.NO. BC0757526	SRW ALSO COVERS PORTIONS OF LOTS 2,3,12,15,16,21 AND 22, PLAN EPP61041 AND STRATA LOTS 22 AND 23, PLAN KAS3813
WW EFFLUENT INFILTRATION FIELD	EASEMENT PLAN KAP69078 (DOCUMENT KR48162)	004-567-099	LOT B, PLAN 28346	Unnamed Private Owners	NOT A SRW IN FAVOUR OF LAKESHORE WATERWORKS, BUT RATHER AN EASEMENT. SEE CONDITION 4 REGARDING MUNICIPAL/REGIONAL DISPOSAL SYSTEM AND EASEMENT DISCHARGE DOMINANT TENEMENTS: LOTS 1-7(INCLUSIVE) AND LOTS11-17(INCLUSIVE), PLAN KAP86678, STRATA LOTS 1-42(INCLUSIVE), BARELAND STRATA PLAN KAS3813, LOTS A AND B, PLAN KAP91496, LOTS 1-10(INCLUSIVE), LOT 12 AND LOTS 15-23(INCLUSIVE), PLAN EPP61041, LOTS 1-3(INCLUSIVE), PLAN EPP119408, LOTS 1-8(INCLUSIVE AND REMAINDER LOT 10, PLAN KAP70882, LOT D, PLAN KAP71474, LOTS 1 AND 2, PLAN KAP73302, LOTS A AND B, PLAN KAP75602, STRATA LOTS 1-5, BARELAND STRATA PLAN KAS2658, *NOTE: LOTS 13 AND 14, PLAN EPP61041 WERE CREATED FROM LOT 22, PLAN 27228 AND THEREFORE NOT INCLUDED AS AN EASEMENT DOMINANT TENEMENT LOT 11, PLAN KAP70882 WAS CREATED FROM LOT 28, PLAN KAP48437 AND THEREFORE NOT INCLUDED AS AN EASEMENT DOMINANT TENEMENT LOT D, PLAN KAP75602 WAS CREATED FROM REMAINDER LOT 15, PLAN KAP48437 AND THEREFORE NOT INCLUDED AS AN EASEMENT DOMINANT TENEMENT-ALSO SEE SECTION H OF KR48162(NOT ADDED AS GRANTEE) **NOTE: RIGHTS REGARDING EASEMENT CHARGE TO BE CONFIRMED BY LAWYER. ECORA LANDS SURVEYS IS NOT LIABLE FOR ANY INFORMATION PROVIDED REGARDING INTEREST RIGHTS

7.5 Drawings, GIS, and Specifications

Record drawings are available for most of the civil, and mechanical installations. The complete list of available record drawings is presented in Appendix C.

7.6 Legal

7.6.1 Liens and Lawsuits

Nothing to report.

7.6.2 Fines and Debts

The WWTP has a long history of non-compliance. Details of the most recent penalties are presented in Table 12 below. Actual copies of the penalties are attached as Appendix D:

Table 12: Details of penalties

Date Issued	Contraven- tions From Date	Contraven- tions To Date	Contraventions in terms of the MWR	Total Amount	Paid/Unpaid
20-Apr-22	09-Apr-19	11-Aug-20	50(1) Malfunction leading to non-compliant discharge 75(1) Discharge quality standards not met 86 Monitoring requirements of quality and quantity not met	\$ 19,300.00	Paid
07-Jun-23	12-Aug-20	06-May-22	47(a) Operator does not have the necessary experience, education, and qualifications 50(1) Malfunction leading to non-compliant discharge 53(b) Lack of monitoring of the receiving environment 55(5) Not submitting effluent flow, quality and receiving monitoring data 75(1) Discharge quality standards not met 85(1) There are insufficient groundwater monitoring wells. 86 Monitoring requirements of quality and quantity not met.	\$ 197,500.00	Unknown

8. Staffing and Support Resources

8.1 Staffing Report

A Level 1 Operator (registered with the Environmental Operators Certification Program [EOCP]) is employed by Vintage Views Ltd. on a part-time basis. As stated in Paragraph 7.2.3.1, a Level 2 operator is required for the WWTP. The current operator started his duties in September 2020.

8.1.1 Contractors

The following contractors are used by Vintage Views Ltd.

Work Description	Company and contact
PLC Programming	<i>Centrix:</i>
Electrical	<i>Wine Capital Electric:</i>
Pumps	<i>Penticton Pump Service:</i>

8.2 Training and Certifications

The operator has passed the following certifications:

- The one Operator has a Level 1 certification.

9. Documentation, Information, and Administration

9.1 Business Incorporation Information

The business incorporation information for Vintage Views Developments Ltd is available, should the RDOS need to scrutinize it.

9.2 Bylaws and Controls

9.2.1 Fees and Tariffs

Connected households pay \$250 per quarter (\$1,000 per year). Vacant lots pay \$500 per year. There are currently 15 connected vacant lots and 97 connected households. This gives a total theoretical annual income of \$104,500.

9.3 System Modeling

The gravity system in Vintage Views Phases 1, 2, and 3 has more than adequate capacity to convey the peak flows.

9.4 Operation and Maintenance Plans

The Operation and Maintenance Plans for the WWTP and the infiltration field are attached in Appendix E.

10. Infrastructure Upgrades and System Improvement

10.1 Required Remedial Work

The Vintage Views WWTP and infiltration field have a long history of non-compliance and require major upgrades to the infrastructure.

10.1.1 Project 1: Hydrogeological Study of the children's park

This project will entail doing hydrogeological investigations, studies, and tests in the RDOS children's park to convert it to a future infiltration field. A proposal for this work was obtained from Western Water Associates. The children's park is situated on RDOS land. The hydrogeological study is considered urgent. The existing infiltration field on private agricultural land is not considered feasible for the future unless appropriate SROs with the land owner can be negotiated.

10.1.2 Project 2: Preliminary designs and options analysis for upgrades to the WWTP

Preliminary designs must be prepared for different upgrading options of the WWTP. Feasible options must be compared in terms of the complexity of operation and total lifecycle costs, which will include operating costs. The operating costs will include electricity costs, operator salaries, and chemical costs. This project is considered urgent.

10.1.3 Project 3: New Infiltration field

This project will entail the construction of a new infiltration field for the treated effluent. It is unknown whether a new infiltration field in the children's park will have sufficient capacity for the WWTP.

10.1.4 Project 4: Upgrading the WWTP

The following upgrades are required to the WWTP:

- Process improvements:
 - An inlet flow meter chamber must be constructed so that the inflow into the plant can be measured. This is required in terms of the MWR.
 - The volume of the existing inlet chamber might have to be increased. Current calculations indicate that the volume should be increased from 15 m³ to 20 m³. However, there are uncertainties because the variable inflow rate has not been measured at the plant.
 - A mechanical screen must be installed to remove large solids (say >3 mm) from the wastewater. This will probably involve the installation of a rotary drum screen in a new channel or chamber. A typical rotary drum screen for the removal of solids is presented in Figure 15 below. This equipment will be installed inside a heated building. Screenings are collected in a container that is removed to an offsite disposal facility. This WWTP is too small to require a screenings washer and compactor. Mechanical screening will help prevent the clogging of downstream equipment.
 - The addition of grit removal is recommended. Grit includes solid particles in the wastewater with sizes of 0.1 mm to 3 mm and typically consists of eggshells, bone chips, seeds, coffee grounds, sand, and gravel. This should be removed to prevent settling tanks from clogging up. A typical grit trap is presented in Figure 16 below.

- The removal of FOG is suggested to prevent the clogging of membranes and the infiltration field.
- The addition of separate secondary clarifiers/settling tanks is recommended to ensure that solids are removed from the bioreactor effluent. However, if MBR is selected, then clarifiers will not be required.



Figure 15: Typical rotary drum screen installation

- The conversion of the system into a membrane bioreactor is recommended to improve the quality of the treated effluent. An MBR system must be designed and installed with sufficient attention to detail to prevent the frequent replacement of membranes. There is sufficient space in the unused reactor compartments to allow for future expansion of the WWTP (increased capacity).

- Ultra-violet (UV) radiation should be added to deactivate fecal coliforms in the filtered effluent.



Figure 16: A typical grit removal system

- Civil & building improvements:
 - Fencing should be provided around the site. This is both a safety and a security issue. It is to prevent theft, and vandalism, and prevent children and animals from entering the site. A security system is also recommended for the building.
 - A roof should be constructed over the stairs at the entrance to the Control Room to prevent snow from collecting in this area. This is required to improve safety at the site.
 - A new room is required for electrical equipment. There is insufficient wall space in the existing Control Room for additional motor starters and PLC enclosures.
 - An additional room is required for the rotary drum screen and the grit removal system.
- Electrical, Control & Instrumentation:
 - Electrical Supply:
 - A new 3-phase power supply to the whole WWTP is required from Fortis BC. The current supply from the neighboring private property is not preferred if there is a source available within the road reserve.
 - Control panel:
 - A new PLC is required because the existing PLC does not comply with RDOS standards and also does not have sufficient input and output capabilities for all the equipment and instruments at the site. The new PLC will also require programming.

- A new enclosure is required for the new PLC because the existing PLC is in the same enclosure as some motor starters. It is the industry standard to put the PLC in a different enclosure than the starters.
- Remote monitoring/SCADA
 - SCADA is required for the existing Vintage Views Lift Station and the WWTP. This is an RDOS standard. There is currently no SCADA at these sites.
 - Additional communication channels must be provided for the sites. This may consist of data and radio communications. This is required for the SCADA system to report to a remote RDOS computer.
- Gases:
 - There currently is an open conduit from the reactor into the PLC and starter enclosure. Gases such as hydrogen sulfide and methane may form in the reactor. Methane is potentially explosive. Hydrogen sulfide is very corrosive and poisonous. This is an electrical code violation. The following remedial work is required:
 - Add junction boxes for the equipment connections from hazardous areas external to the control room (on the exterior of the building or in a small kiosk). Add explosion-proof seals on the conduits leaving the new junction boxes.
 - Clean or replace control panel equipment that has already been damaged by corrosive gases.
- Additional automation:
 - Automation of the aeration system for the bioreactor is recommended. The operator should be able to set a target value for the dissolved oxygen in a zone and then the PLC must control the aeration to achieve the target. This is an industry norm and would decrease the workload of the operator and increase the efficiency of the treatment process.

10.2 Estimated Cost of Capital Projects

The estimated costs of the proposed capital projects are presented in Table 13 below:

Table 13: Estimated costs of capital projects

Project Number	Description	Estimated Construction Cost in 2023 (Including 40% Contingency and Engineering Fee)	Implementation Period (Years)	Assumed Inflation per year	Estimated Construction Cost in the year of implementation (Including 40% Contingency and Engineering Fee)
1	Hydrogeological studies for a new infiltration field	\$ 72,207.00	1	2.2%	\$ 74,000.00
2	Preliminary Designs and Options Analysis for Upgrading the WWTP	\$ 100,000.00	1	2.2%	\$ 103,000.00
3	Construction of a New Infiltration Field	\$ 465,000.00	2	2.2%	\$ 486,000.00
4	Upgrading the WWTP	\$ 4,968,160.00	5.0	2.2%	\$ 5,540,000.00
	Totals	\$ 5,605,367.00			\$ 6,203,000.00

A breakdown of Project 4: Upgrading the WWTP is provided in Table 14 below:

Table 14: Cost estimates for the required upgrades to the Vintage Views WWTP

Description	Unit	Quantity	Unit Price	Cost	Estimate Cost 2023 (Incl. Contingency and Engineering)
MBR Membranes and controls	LS	1	\$106,000.00	\$106,000.00	\$169,600.00
New Huber screening, grit, and FOG removal, and inlet channel	LS	1	\$800,000.00	\$800,000.00	\$1,280,000.00
New heated building for inlet works (6m x 6m)	LS	1	\$320,000.00	\$320,000.00	\$512,000.00
Additional Electrical Room (5m x 5m)	LS	1	\$300,000.00	\$300,000.00	\$480,000.00
New Roof for entrance (to prevent snow from getting in, 3m x 2m)	LS	1	\$16,800.00	\$16,800.00	\$26,880.00
Clearing, Grubbing and Dust Control	LS	1	\$7,500.00	\$7,500.00	\$12,000.00
Earthworks (Cut and Fill)	LS	1	\$70,000.00	\$70,000.00	\$112,000.00
Pumping System Components, Replacement of Pumps in the existing Inlet Chamber, Controls, Electrical - Supply and Install	LS	1	\$300,000.00	\$300,000.00	\$480,000.00
Site Improvements (Including Fencing)	LS	1	\$40,000.00	\$40,000.00	\$64,000.00
<u>New Effluent Pipe to S/W:</u>					
1050mm Sanitary Manhole - Supply and Install c/w Drain rock Bedding, Base, Risers, Concrete Lid and Castings	ea	1	\$4,000.00	\$4,000.00	\$6,400.00

Description	Unit	Quantity	Unit Price	Cost	Estimate Cost 2023 (Incl. Contingency and Engineering)
100mm SDR28 PVC Sanitary Service c/w bedding and 2x4 marker	lm	90	\$120.00	\$10,800.00	\$17,280.00
General Requirements - Mobilization, Traffic Control, Survey, etc.	LS	1	\$10,000.00	\$10,000.00	\$16,000.00
Tie-ins and dealing with incoming wastewater	LS	1	\$50,000.00	\$50,000.00	\$80,000.00
<u>Electrical:</u>					
New Three-Phase 600 Volt Fortis BC Feed service from Chadwell Place Street	LS	1	\$150,000.00	\$150,000.00	\$240,000.00
New 600 Volt breakers	LS	1	\$100,000.00	\$100,000.00	\$160,000.00
New 150kVA generator for the WWTP	LS	1	\$370,000.00	\$370,000.00	\$592,000.00
Additional rooms electrical work (lighting, small power, etc.)	LS	1	\$75,000.00	\$75,000.00	\$120,000.00
Starters and wiring for new process equipment	LS	1	\$150,000.00	\$150,000.00	\$240,000.00
Update electrical cabling to bring to code at the WWTP	LS	1	\$75,000.00	\$75,000.00	\$120,000.00
<u>Control & Instrumentation Engineering:</u>					
New PLC & Programming to RDOS standards	LS	1	\$100,000.00	\$100,000.00	\$160,000.00
Add SCADA telemetry to the site	LS	1	\$50,000.00	\$50,000.00	\$80,000.00
Total incl. 40% contingency and engineering, excluding escalation					\$4,968,160.00

11. Financial Implications

If a mortgage had to be taken out for the Vintage Views Wastewater System at a compound interest rate of 6% and an amortization period of twenty years, then households and vacant lots can expect to see an increase to \$5,800 per year and \$2,900 per year respectively to cover capital expenses and increases in operational costs. It was estimated that the rates would increase further by 2.2% per year to cover inflation.

11.1 Cashflow

Estimated costs for the wastewater system over the next five (5) years are presented in Table 15 below:

Table 15: Estimated cashflow for the Vintage Views Wastewater System in the next 5 years

Number	Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total Estimated Negative Cashflow
1	Capital Projects	\$ 177,000.00	\$ 486,000.00	\$ -	\$2,770,000.00	\$2,770,000.00	\$ 6,203,000.00
2	Operation and maintenance	\$ 104,500.00	\$ 153,375.00	\$ 202,250.00	\$ 251,125.00	\$ 300,000.00	\$ 1,011,250.00
Sub-Totals		\$ 281,500.00	\$ 639,375.00	\$ 202,250.00	\$ 3,021,125.00	\$ 3,070,000.00	\$7,214,250.00

11.2 Schedule

The most urgent projects would be to do hydrogeological studies for a new infiltration field and to do preliminary designs for the upgrades required at the WWTP.

11.3 Operational Expenditure

Financial reports were requested but not received from the private owner. The connected households and vacant lots currently pay \$1,000 and \$500 respectively per year for wastewater. This gives a theoretical annual income of approximately \$104,500 for the utility. The current annual operational expenditure is, therefore, estimated to be in the order of \$100k.

11.4 Rate Structure

The connected households and vacant lots currently pay \$1,000 and \$500 respectively per year for wastewater.

12. Risks

Health and Safety:

There are several health and safety risks at the WWTP, which include the following: Children and animals entering the site and getting hurt. A risk of slipping and falling on the entrance steps in winter. There is a very slight risk of methane gas in the existing Control Room entering from the bioreactor, should the aeration system not work for several days.

Environmental risks:

The existing system might be polluting the groundwater and negatively affecting the wells on the neighboring farms.

Operational risks:

Some operational risks are listed here: Equipment failure, human error, process upsets (increases and decreases in flow and changes in wastewater composition), weather events, stormwater infiltration into the wastewater system, and security threats (theft, sabotage, etc.)

Legal risks:

Should the RDOS decide to acquire the Vintage Views wastewater system, then it is strongly advisable to obtain contractual immunity against past fines and future fines for a certain period. It would be possible for RDOS' legal advisors to include limitations of liability clauses in a sales contract. It is suggested that the RDOS' immunity concerning fines and penalties extend for 5 to 10 years into the future to allow time for applications for funding to be submitted and the WWTP to be repaired and upgraded to comply with MWR requirements, RDOS standards, and industry norms.

13. Conclusion

The existing sanitary gravity pipe network, the lift station, and the force main are generally in good condition and have sufficient capacity to convey the current sanitary flows. However, there are numerous problems with the existing WWTP and infiltration field, as follows:

1. There is a long history of non-compliance and penalties. The most recent penalty on 7 June 2023 was for an amount of \$197,500. It is not known whether the private owner has paid this fine.
2. The current part-time operator is certified as a Level 1 operator, but the WWTP and the infiltration system require a permanent Level 2 operator.
3. The existing infiltration system is on private farmland, which also falls on the Agricultural Land Reserve. The farming activities are clashing with the infiltration field activities. For example: the farmer previously damaged the infiltration field and groundwater monitoring wells by plowing over it. The operator is required to check groundwater levels and to take samples from the monitoring wells but does not have direct access to the infiltration field from the WWTP. The operator has to drive around to the farm entrance to gain access to the infiltration field. Preferably the operator must be able to walk to the infiltration field to perform tasks. The existing easement agreement for the infiltration field states that "If the septic disposal system is no longer required because a municipal or regional septic disposal system is installed, the Grantee will execute a discharge of the easement granted herein upon request."
4. The most significant problem encountered with the Vintage Views WWTP is that it does not produce treated effluent that complies with the current permit and the Municipal Wastewater Regulation (MWR). Several process additions and modifications are required to improve the functionality of the system and the quality of the treated effluent. It is highly likely that poor effluent quality containing suspended solids previously blocked portions of the existing infiltration field. There is currently no flow meter at the inlet, which is a monitoring requirement in terms of the MWR. The addition of mechanical screening and grit removal is recommended to remove solids from the incoming flow. Fats, oils, and grease (FOG) removal will also be beneficial to protect possible future membranes and the existing infiltration field from blocking. Additional filtration through membranes or media filters is recommended to improve the quality of the treated effluent. The existing permit and the MWR specify the maximum number of fecal coliforms in the treated effluent, however, there is no disinfection process employed at the site. No WWTP can consistently achieve low fecal coliform measurements without disinfection. The addition of ultra-violet (UV) disinfection is recommended.
5. Site safety requires significant improvements. This includes a new fence with gates to enhance security and prevent unauthorized access. The construction of a roof at the entrance to the Control Room is recommended to prevent the area from filling up with snow and ice during the winter months.

6. New buildings will be required at the site. The new buildings must be heated to prevent equipment from freezing.
7. The existing single-phase power supply from the neighboring farm is a service with a separate electricity meter. However, this does not meet industry standards and it is recommended to connect to the three-phase source within the road reserve. There is also no registered SRW for the power cable across the vineyard over private land. A new 3-phase Fortis BC power supply should be provided from Chadwell Place/Street.
8. A new PLC is required to comply with RDOS standards. More automation is suggested to reduce the daily responsibilities of the operator. There currently is no SCADA system and this should be added as an RDOS requirement. The SCADA system will require new communication channels such as radio communications (to say RDOS systems in Kaleden) and/or connectivity to the internet.

The financial implications of the recommended upgrades are significant. If a mortgage had to be taken out for the Vintage Views Wastewater System at a compound interest rate of 6% per year and an amortization period of twenty years, then households and vacant lots can expect to see an increase to \$5,800 per year and \$2,900 per year respectively to cover capital expenses and increases in operational costs. It was estimated that the rates would increase further by 2.2% per year to cover inflation. It was estimated that operational costs would increase to \$300k per year by 2028.

14. References

Metcalf & Eddy, Inc. (2003). *Wastewater Engineering: Treatment and Reuse* (Fourth Edition ed.). New York, USA: McGraw-Hill.

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Statistics Canada. (2022, July 26). Average expected useful life of new municipally owned wastewater assets, by urban and rural, and population size, Infrastructure Canada. *Average expected useful life of new municipally owned wastewater assets, by urban and rural, and population size, Infrastructure Canada*. Canada: Statistics Canada. Retrieved from <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410022901&cubeTimeFrame.startYear=2016&cubeTimeFrame.endYear=2020&referencePeriods=20160101%2C20200101>

Appendix A

Penalty Assessment Form (17 April 2023)



PENALTY ASSESSMENT FORM

FILE: 2022-31

PART ONE: THE CONTRAVENTION

Name of Party:

Vintage Views Developments Ltd. and Johnny Joseph Aantjes

Contravention or Failure:

- A. Contravention of the Municipal Wastewater Regulation 87/2012 (MWR) Section 47(a):**
47 A discharger must not discharge unless the wastewater facility is operated and maintained by persons who
(a) have the education, experience and qualifications specified in the operating plan
- B. Contravention of the MWR Section 50(1):**
50(1) If a malfunction or other condition results, or may result, in a discharge that fails to meet a requirement of this regulation, a discharger must notify a director immediately
- C. Contravention of the MWR Section 53(b):**
53 A person must not discharge, or provide or use reclaimed water, unless the discharger monitors,
(b) the receiving environment, to determine compliance with this regulation
- D. Contravention of the MWR Section 55(5):**
55(5) A discharger must submit municipal effluent flow, municipal effluent quality and receiving environment monitoring data, and associated quality control data
(a) by electronic transmission directly to the central computer system of the ministry of the minister, or
(b) in a form acceptable to the director
- E. Contravention of the MWR Section 75(1):**
75(1) A discharger of class A, B or C municipal effluent must meet the applicable municipal effluent quality requirements set out in this section and listed in Table 3:

Table 3 — Municipal Effluent Quality Requirements

Requirement	Class A	Class B	Class C
BOD ₅ (mg/L)	10	10	45
TSS (mg/L)	10	10	45
fecal coliform (MPN / 100 mL)	median: 2.2 any sample: 14	400, if maximum daily flow is $\geq 37 \text{ m}^3/\text{d}$	n/a
turbidity (NTU)	average: 2 any sample: 5	n/a	n/a
nitrogen (mg/L)	Nitrate-N: 10 total N: 20	n/a	n/a

F. Contravention of the MWR Section 85(1):

85(1) Subject to subsection (2), a discharger must install monitoring wells in sufficient number and orientation, as determined by a qualified professional, to measure background and receiving environment water quality.

G. Contravention of the MWR Section 86:

A discharger must monitor municipal effluent quality and quantity in accordance with section 87 [*additional monitoring requirements*] and Table 6, 7 or 8, as applicable, of this section.

Table 7 — Monitoring Requirements
If Maximum Daily Flow $\geq 50 \text{ m}^3/\text{d}$ and $< 500 \text{ m}^3/\text{d}$

	Class A	Class B	Class C
flow frequency	twice / week	twice / week	twice / week
BOD ₅ , TSS frequency and type	twice / month grab samples	twice / month grab samples	monthly grab samples
fecal coliform frequency and type	weekly grab samples	weekly grab samples	none
turbidity frequency and type	weekly grab samples	none	none
nitrogen total, and NO ₃ (as N frequency and type)	twice / month grab samples	none	none

Date of Contravention or Failure:

A. MWR Section 47(a): continuously from September 1, 2020 to May 6, 2022

B. MWR Section 50(1): on thirty-three (33) occasions:

- October 31, 2020
- January 21, 2021
- March 31, 2021*
- April 21, 2021*
- April 30, 2021
- May 31, 2021
- August 10, 2021
- September 30, 2021**
- November 23, 2021*
- November 30, 2021*
- December 19, 2021*
- December 27, 2021*
- January 16, 2022
- January 23, 2022*
- February 13, 2022
- March 15, 2022
- March 21, 2022
- March 28, 2022
- April 6, 2022
- April 22, 2022**
- May 2, 2022
- May 3, 2022

(*) Indicates two contraventions on this day

(**) Indicates three contraventions on this day

C. MWR Section 53(b): continuously from August 19, 2020 to May 6, 2022

D. MWR Section 55(5): on twelve (12) occasions:

- 2020 Q3 & Q4*
- 2020 Annual*
- 2021 Q1 & Q2*
- 2021 Q3 & Q4*
- 2021 Annual*
- 2022 Q1 & Q2*

(*) Indicates two contraventions on this day

E. MWR Section 75(1): on the following thirty-two (32) occasions:

- October 31, 2020
- January 21, 2021
- March 31, 2021*
- April 21, 2021*
- April 30, 2021
- May 31, 2021
- August 10, 2021
- September 30, 2021**
- November 23, 2021*
- November 30, 2021*
- December 19, 2021*
- December 27, 2021*
- January 16, 2022
- January 23, 2022*
- February 13, 2022
- March 15, 2022
- March 21, 2022
- March 28, 2022
- April 6, 2022
- April 22, 2022**
- May 3, 2022

(*) Indicates two contraventions on this day

(**) Indicates three contraventions on this day

F. MWR Section 85(1): continuously from August 19, 2020 to May 6, 2022

G. MWR Section: 86: on the following 265 occasions:

- Week of August 19, 2020
- Week of August 26, 2020
- Week of September 02, 2020
- Week of September 09, 2020
- Week of September 16, 2020
- Week of September 23, 2020
- Week of September 30, 2020
- Week of October 07, 2020
- Week of October 14, 2020
- Week of October 21, 2020
- Week of October 28, 2020
- Week of November 04, 2020
- Week of November 11, 2020
- Week of November 18, 2020
- Week of November 25, 2020
- Week of December 02, 2020
- Week of December 09, 2020
- Week of December 16, 2020
- Week of December 23, 2020
- Week of December 30, 2020
- Week of January 06, 2021
- Week of January 13, 2021
- Week of January 27, 2021
- Week of February 03, 2021
- Week of February 10, 2021
- Week of February 17, 2021
- Week of February 24, 2021
- Week of March 03, 2021
- Week of March 10, 2021
- Week of March 17, 2021
- Week of March 24, 2021
- Week of March 31, 2021
- Week of April 07, 2021
- Week of April 14, 2021
- Week of April 21, 2021
- Week of April 28, 2021
- Month of May 2021*
- Week of May 05, 2021
- Week of May 12, 2021
- Week of May 19, 2021
- Week of May 26, 2021
- Month of June 2021*
- Week of June 02, 2021
- Week of June 09, 2021
- Week of June 16, 2021
- Week of June 23, 2021
- Week of June 30, 2021
- Week of July 07, 2021
- Week of July 14, 2021
- Week of July 21, 2021
- Week of July 28, 2021
- Month of August 2021*
- Week of August 11, 2021
- Week of August 18, 2021
- Week of August 25, 2021
- Month of September, 2021*
- Week of September 01, 2021
- Week of September 08, 2021
- Week of September 15, 2021
- Week of September 22, 2021
- Month of October 2021***
- Week of October 06, 2021
- Week of October 13, 2021
- Week of October 20, 2021
- Week of October 27, 2021
- Week of November 03, 2021
- Week of November 10, 2021
- Week of December 01, 2021
- Week of December 08, 2021
- Week of December 29, 2021
- Week of January 05, 2022
- Week of January 26, 2022
- Month of February 2022*
- Week of February 02, 2022
- Week of February 16, 2022
- Week of February 23, 2022
- Week of March 02, 2022
- Week of March 30, 2022
- Week of April 13, 2022
- Bi-weekly flow monitoring Aug 19, 2020- May 6, 2022 (x178)

(*) Indicates two contraventions on this day (***) Indicates four contraventions on this day

Background

1. Vintage Views is a company registered in British Columbia (BC) that owns and operates a municipal wastewater collection and treatment system for a residential housing development at Heritage Hills, near Okanagan Falls, BC (Facility). Johnny Aantjes is the sole director/officer of Vintage Views.
[2023-04-06 BC Company Summary]
2. The Vintage Views development was planned with full build-out of approximately 120 residences. The current number of homes connected to the wastewater system is unclear. Fifty-five current connections are listed in Vintage Views' December 6, 2021, amendment application but in a May 2022 pre-application meeting, the Owner stated that there are 90 connections.
[2021-12-08 Registration Amendment Application]
[2022-05-03 Pre-Application Meeting Minutes]
3. The residences at the Vintage Views development are generally large, luxury homes where bed and breakfast or secondary suites are permitted.
[2022-09-01 Okanagan Valley Zoning Bylaw No. 2800, 2022]
4. There is a history of non-compliance at this Facility extending back to pre-2014. There have been three known releases of effluent from this treatment system including one that flowed off-site and down an adjacent road. After several warnings and a previous administrative penalty, the Facility remains out of compliance with the Municipal Wastewater Regulation (MWR). Vintage Views is currently subject to two pollution prevention orders.
[2022-09-22 PPO 111349]
5. This administrative penalty relates to MWR operating, monitoring and reporting contraventions, exceedances of effluent criteria, and failure to notify the Ministry of exceedances that occurred between August 19, 2020, and May 6, 2022.

Authorization for Environmental Discharge – Registration 17170

6. The provincial regulatory authorization governing the discharge of wastewater from Vintage Views is Registration 17170 (Registration) issued pursuant to the *Environmental Management Act*, S.B.C. 2003, c. 53 (EMA).
[2002-06-24 Original Registration]
7. The Registration was issued and is administered by the BC Ministry of Environment and Climate Change Strategy (Ministry).
8. The Registration authorizes a maximum discharge of 65 m³/day of secondary treated Class B effluent to the ground via a discharge field located on adjacent agricultural lands.

Summary of Relevant Facts

9. The original Registration under the Municipal Sewage Regulation (MSR) was issued to Mountain Landco Ltd. and came into effect May 29, 2002.
[2002-06-24 Original Registration]
10. The Facility is an upflow sludge blanket denitrification system discharging municipal wastewater effluent to ground.
[2003-01-21 Heritage Hills WWTP Operating Plan]
11. The 2002 Registration was amended on June 29, 2009. The previous owner, Mountain Landco Ltd., requested a reduction in the maximum discharge from 195 m³/day to 65 m³/day and transfer of ownership to Vintage Views. The volume reduction reflects that treatment plant capacity was designed to be expanded in three phases, but only phase one was installed and is operational.
[2006-10-25 Request to Amend Registration]
[2009-06-29 Registration Amendment Letter]
12. The 2009 Registration amendment letter required:
 - Flows be monitored two times per week;
 - Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) be sampled two times per month;
 - Groundwater levels in all monitoring wells be measured quarterly;
 - Sampling and analysis of three monitoring wells annually for multiple parameters; and
 - Groundwater monitoring program be reviewed annually by a qualified professional hydrologist.[2009-06-29 Registration Amendment Letter]
13. Effective April 20, 2012, the Registration was transferred from the MSR to the MWR in accordance with MWR Section 121(1).
14. From 2013 to 2022 the Ministry conducted nine Facility inspections and issued two advisories, four warnings and four administrative penalty referrals for contraventions including failure to monitor, failure to submit reports, effluent exceedances, failure to report non-compliance, failing to follow-operating plan, lack of a capital replacement fund. The contraventions from these inspections are summarized in the following table:

2022	2020	2019	2018 (Oct)	2018 (Feb)	2015	2014 (Apr)	2014 (Feb)	2013 (Apr)	2013 (Mar)	MWR Section (or EMA or Registration)	Contravention Description
IR187275	IR156484	IR127579	IR098538	IR061089	IR020211	IR017346	IR016325	IR009501	IR009501		
X	X									EMA 6(3)	Unauthorized Discharge
					X		X			3	Must not exceed effluent quality
									X	19/20	Conduct Env Impact Study and Receiving water monitoring program
X										23(c)	Operating plan requirements
X	X									29(b)(i)	Capital replacement fund required
X										47(a), (b)	Operator qualification and certificate.
X	X	X	X	X						48	Must follow operating plan
	X									49(1)	Must not by-pass
X		X	X							50(1)	Must notify of non-compliance
X	X	X			X	X	X	X		53	Monitor discharge and receiving env.
		X								54(b)(i)	Must install flow meter
X	X	X	X	X						55(5)(a)	Must submit effluent flow, quality, receiving env. monitoring and QA/QC
X										56	Sample schedule spacing requirement
		X	X							63(d)	Records must be available for inspect. d) effluent flow, effluent quality,
		X								63(e)	e) receiving environment monitoring
X										66(1)(a), (b)	Report by date specified w. info reqd.
X	X	X	X	X		X				75(1)	Must meet effluent quality specified
	X	X								75(4)(a)	Filtration is required for drain field
X										81(2)(a), (b)	Require two drain fields and standby
X										82(2)(b)	No incompatible use of field area
X	X	X								85(1)	Install monitoring wells per QP
		X	X	X						85(2)(b)	Minimum 4 wells, incl. 1 background
X	X	X	X	X						86	Effluent monitoring frequency
	X	X		X						87(3)(b)	Data to be submitted quarterly
X	X			X	X	X		X	X	Registration 17170	G/W sampling, Hydro rept, data 2x/yr

[2013-03-18 Warning]
[2013-04-22 IR9501 Warning]

[2014-02-05 IR16325 Warning]
[2014-04-22 IR17346 Advisory]
[2015-03-31 IR20211 Warning]
[2018-02-21 IR61089 Warning]
[2018-10-02 IR98538 AMP]
[2019-08-21 IR 127579 AMP]
[2020-09-30 IR156484 AMP]
[2022-06-16 IR187275 AMP]

15. Pollution abatement order (PAO) 109945 was issued May 30, 2019, in response to reports of surfacing effluent in an orchard. It required, among others, a schedule for the sampling required under the MWR; an assessment of human health risk from surfacing effluent; design and implementation of a groundwater monitoring system in accordance with the MWR and the 2009 Registration amendment letter.

[2019-08-26 PAO 109945 Amended]

16. On June 25, 2019, the Owner submitted an annual hydrogeological review. The report indicated that groundwater quality was analyzed from only one well and only in 2014, 2015 and 2016. The report noted that this well had been damaged and was no longer functional. While this is an annual requirement, the 2019 report is the only such review that has been submitted to the Ministry.

[2019-06-25 Heritage Hills Annual Hydro Review]

17. PAO 110100 was issued October 23, 2019, as a result of Vintage Views not complying with PAO 109945. This Order required a qualified professional to take action to mitigate and contain surfacing effluent; repair the system; to sample and analyze effluent, groundwater monitoring wells and a nearby domestic well; implement a schedule for sampling required under the MWR and 2009 Registration amendment; and design and implement a groundwater monitoring system.

[2019-10-23 PAO 110100]

18. A replacement drain field, constructed in 2019, was designed with laterals in the middle of the space between rows of apple trees. This field was installed on top of the original drain field area, but never commissioned.

[2021-08-23 Pollution Abatement Order 110100 Repair Plan and Final Report]

19. In November 2019, Interior Health Authority staff observed overland flow of effluent from on-site infiltration pits onto a public road. The Owner had dug the pits as a disposal option while the drain field was out of operation. The drain pits and the overflow were not reported to the Ministry.

[2019-11-15 PAO 110145]

20. In response, PAO 110145 was issued on November 15, 2019. It required closure of the infiltration pits; repair of the drain field; hauling of effluent to an authorized disposal facility; and prohibited new connections to the septic system pending amendment of the Registration or a new authorization.

[2019-11-15 PAO 110145]

21. A water sample, collected on December 17, 2019, from a domestic well located within 150 meters of the disposal field, exceeded the B.C. Source Drinking Water Quality Guidelines and Health Canada's Guideline for Canadian Drinking Water Quality for nitrate and total coliforms. The results from the well were 13.2 mg/L for nitrates and > 4 for total coliforms. The guidelines for nitrate and total coliforms are 10 mg/L and 0 CFU/100 mL, respectively.

[2020-04-03 Erdman Well Letter]

[2022-07-26 Erdman Well Location]

22. On February 25, 2020, PAO 110145 was cancelled as all conditions had been met. The cancellation noted that "*no new connections to the system should occur until you have determined that current flows and effluent quality will meet the requirements of the MWR.*"

[2020-02-25 PAO 110145 Cancellation]

23. In an e-mail, dated July 29, 2020, Associated Engineering (Michael Owen), a Qualified Professional (QP) working for the Owner, stated that, "*the property where the field is to be located has just sold and the future plans are to remove the orchard and replace with a vineyard.*"

[2020-07-29 Extension Request]

24. In 2020, a new drain field was constructed in the back-up field area and commissioned in January 2021. The drain field was installed in the spaces between orchard rows.

[2021-08-23 Pollution Abatement Order 110100 Repair Plan and Final Report]

25. On August 12, 2021, Pollution Prevention Order (PPO) 110871 was issued to Vintage Views due to the ongoing non-compliance with previous PAOs which had required repair of system, sampling and reporting. PPO 110871 prohibits the connection of new units to the Facility. The Regional District of Okanagan Similkameen is not issuing building permits for lots within the Vintage Views development until this order is cancelled.

[2021-08-12 PPO 110871]

26. In October 2021, the Ministry informed the Owner that PPO 110871 will be cancelled once the Facility has been re-registered under the MWR. The Facility has not been re-registered under the MWR, and this order remains in effect.

[2021-10-28 Beckett to AE regarding MWR Re-reg]

27. Between August 2021 and September 2022, multiple property owners have contacted the Ministry, MLA and Minister's office regarding their inability to build on lots they own in the Vintage Views development. They claim this is due to PPO 110871. The exact number of owners affected is unknown to the Ministry, as some reached out as individuals while others were representatives of a larger group. An estimated 20 undeveloped lots are in this situation.

28. Vintage Views was found in compliance with PAO 110100 in October 2021 and the order was cancelled.

[2021-10-12 IR168918 Notice]

29. On December 8, 2021, Associated Engineering, the Owner's agent, submitted a registration amendment request and supporting information. The Ministry responded that the scope of changes to the system was beyond a simple amendment and a new registration was required.
[2021-12-08 Registration Amendment Application]

30. On April 20, 2022, the Ministry issued three Administrative Penalty determinations (AMP 2019-20) to Vintage Views for non-compliance with MWR Sections 50(1), 75(1) and 86 between April 9, 2019, and August 11, 2020. Penalties assessed totalled \$19,300. They were paid in full.
[2022-04-20 AMP2019-20 Final Determination]

31. On May 3, 2022, a pre-application meeting was held between the Ministry and the Owner to review Registration requirements. A Regional District of Okanagan Similkameen director also attended. As a result of this meeting an Application Instruction Document (AID) was sent to Vintage Views requiring them to provide a map and listing of properties connected to the system as well as maximum flow calculations by July 15, 2022. The final registration package is due in July 2023. The Owner had not responded to the AID as of November 30, 2022.
[2022-07-07 Applicant Instruction Document]

32. In a May 2, 2022 e-mail from the Owner's QP, Tony Friesen, P.Geo., Interior Geoscience, stated, *"I have just got a call from Kendall Wilson (the operator) this evening, and he is currently on site right, and he has let me know that during his routine walk through noticed that the new land owners/farmers have plowed over most of the valve boxes and have caused some other damage as well."*
[2022-05-02 Damage to field from vineyard]

33. During a May 6, 2022, inspection, Ministry staff observed workers installing a vineyard over the drain field. The Operator, Kendell Wilson, (Operator) informed Ministry staff that they were not notified or consulted during installation of the vineyard. Some trellis rows were installed directly on top of and across the laterals. Several valve boxes, inspection ports and at least two discharge pipes were damaged. Effluent was discharged to the ground surface in areas around the damaged pipes. This effluent discharge was not reported to the Ministry. The damaged valve boxes resulted in surfacing of an unknown amount of treated effluent.
[2022-06-16 IR187275 AMP]

34. On May 6, 2022, the Ministry conducted an on-site inspection (IR 187275) which resulted in the current referral for an Administrative Penalty. During the inspection, Ministry staff learned that the sub-surface drainage field had been damaged while installing a vineyard to replace the apple orchard and effluent had been discharged to the surface. The Ministry was not notified of this release. Vintage Views was found to be out of compliance with Section 6(3) of EMA for non-compliance with the MWR. The inspection also observed the following non-compliances with the MWR:

- Section 23(c) – Not having a commissioning or contingency plan
- Section 29(b)(i) – Not maintaining a capital replacement fund

- Section 47(a) – Operator not trained and qualified as per operating plan
- Section 47(b) – Operator not certified with EOCP
- Section 48 – Not adhering to the operations plan
- Section 50(1) – Failure to notify of condition resulting in discharge not meeting requirements of the regulation
- Section 53(b) – Not conducting receiving environment monitoring
- Section 55(5)(a) – Not conducting required effluent quality monitoring
- Section 56(1)(b) – Less than 10 days between monthly samples
- Section 66(1)(a) – Failure to submit bi-annual reports
- Section 66(1)(b) – Reports not in required format or not including relevant information
- Section 75(1), Table 3 – fecal coliform, BOD and TSS exceedances
- Section 81(2)(a) – Not having second drain field
- Section 81(2)(b) – Not having undeveloped area for third field
- Section 82(2)(b) – Ensuring subsurface fields not subject to damage or interference
- Section 85(1) – Insufficient number of background and receiving monitoring wells
- Section 86, Table 7 – Failure to monitor effluent in accordance with MWR (TSS, BOD and fecal coliform)

[2022-06-16 IR187275 AMP]

35. The Owner has stated in communications with the Ministry and to the media that the system is operating well below the Registration limit of 65 m³/day. MWR Section 74(2)(a) allows system design using actual maximum daily flow if measured flows exceed 37 m³/day. Actual flow rates, as reported by the Operator in a 2019 report and flow meter readings observed by Ministry staff during the May 6, 2022 inspection, are approximately 22 m³/day. This is less than 37 m³/day, therefore, Section 74(2)(a) of the MWR does not apply and the Facility needs to be operated based on calculated maximum daily flow.

[2019-06-25 Heritage Hills Annual Hydro Review]

36. On September 22, 2022, the Ministry issued PPO 111349 requiring the provision of a map of all units connected to the system, maximum flow calculations, and conceptual plans to bring the system into compliance with the MWR. These items were required by October 28, 2022. The Owner had not responded to this order as of November 30, 2022. The Order also requires the Owner to submit a complete Facility registration package by June 12, 2023.

[2022-09-22 PPO 111349]

Contravention of MWR Section 47(a) – Operator Training

37. The 2003 treatment plant operating plan states that *“it is anticipated that [the Facility] will be operated by one O&M Supervisor having a minimum of Class II certificate.”* The 2021 Vintage Views Drainfield Operations Manual states that this portion of the system is *“Level 3”* and *“requires a Level 3 operator”*. The Environmental Operators Certification Program (EOCP) has classified the Facility as *“Level II”*.

[2003-01-21 Heritage Hills WWTP Operating Plan]

[2021-08 Vintage Views Drainfield OM Manual]

38. Prior to September 2020, the Facility was operated by a person having Level II or higher certification.

[2022-07-11 EOCB Organization Profile – Vintage Views]

39. The Vintage Views August 2020 monthly report noted that the Operator would take over the plant effective September 1, 2020. This was the last monthly report received.

[2020-09-09 2020 August Monthly Report Vintage Views WWTP]

40. The June 1, 2022, Ministry inspection report (IR) 187275 states that,
“Section 2 (Operator Certification) of the 2003 Operating Plan requires an EOCB Level II operator to run the Facility.[...] These non-compliances were confirmed during previous inspections (IR156484, dated September 30, 2020; IR127579, dated August 21, 2019; IR098538, dated October 2, 2018; and IR061089, dated February 21, 2018).”

“On May 6, 2022, Ministry staff conducted a search of the EOCB online database, which confirmed that the Facility does not have a Level II certified operator. During the on-site inspection, the Operator informed Ministry staff that he held an EOCB Level 1 certificate. However, the EOCB online database confirmed that the Operator's certification lapsed on November 17, 2021.”

[2022-06-16 IR187275 AMP]

41. Querying the EOCB database in November 2022 determined that the Operator now has a valid Level I certification expiring December 31, 2022. The Operator does not meet the certification requirements specified in the operating plan.

[2021-12-07 Operator Certificate Kendell Wilson]

[2022-07-11 EOCB Organization Profile – Vintage Views]

42. The Owner was first notified of this issue in June 2022.

[2022-06-16 IR187275 AMP]

43. The Facility's compliance with effluent standards and reporting has decreased since October 2020. From August 2013 to September 2020 less than 15% of samples failed to meet discharge criteria. Since October 2020 more than 22% of samples have failed to meet criteria. Monthly reports, including effluent quality and flow data, have not been submitted since September 2020. Annual reports on receiving environment monitoring and groundwater levels have not been submitted. Non-compliance reports have not been submitted since September 2020. The only reporting from Vintage Views to the Ministry since September 2020 has been data uploads by the CARO Analytical Services (CARO) laboratory.

Contravention of MWR Section 50(1) – Notification of Non-compliance

44. In April 2022, Vintage Views received an Administrative Penalty of \$5,850 for contravening MWR Section 50(1) on May 28, 2019, and November 13, 2019.

[2022-04-20 AMP2019-20 Final Determination]

45. Between August 19, 2020, and May 6, 2022, thirty-two lab results exceeded MWR requirements. CARO laboratory uploaded the raw data to the Ministry EMS database. The Ministry did not receive non-compliance reports for any of these exceedances. See below - Section 25 Contravention of MWR Section 75(1) - for details on the exceedances.
[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]
46. During the May 2022 inspection, Ministry staff observed that effluent had surfaced from breaks in the drain field caused by the surface leaseholder removing the orchard and installing a vineyard over top of the drain field. The Operator told Ministry staff that they were unaware of when the breaks had occurred, or what volume of effluent discharged. Surfacing of effluent within a drain field is contrary to Section 73 of the MWR. The Ministry was not notified when effluent surfaced and/or was discharged from the Facility. This is the third known incident where Vintage Views has failed to notify of a surface release of effluent. The previous two discharges were captured in Administrative Penalty 2019-20.
[2022-04-20 AMP2019-20 Final Determination]
[2022-06-16 IR187275 AMP]
47. Vintage Views was previously informed of failing to notify Ministry of malfunctions or non-compliance with discharge criteria in 2018, 2019 and 2022.
[2018-10-02 IR98538 AMP]
[2019-08-21 IR127579 AMP]
[2022-06-16 IR187275 AMP]

**Contravention of MWR Section 53(b) – Receiving Environment Monitoring and
Contravention of MWR Section 85 – Monitoring Wells Required**

48. Findings for Sections 53 and 85 of the MWR are combined due to significant overlap in the nature of the contraventions and background information.
49. Vintage Views is required to monitor the receiving environment and install monitoring wells to do so. The 2009 Registration amendment letter requires:
- Groundwater levels in all monitoring wells be measured quarterly
 - Sampling and analysis of three monitoring wells annually for multiple parameters
 - The groundwater monitoring program be reviewed annually by a qualified professional hydrologist.
- [2009-06-29 Registration Amendment Letter]
50. Groundwater monitoring well levels were measured only twice in 2020 and three times in 2021. No report has been received for 2022.
[2021-08-23 Pollution Abatement Order 110100 Repair Plan and Final Report]
51. Groundwater quality was last analyzed in 2016. Annual sampling and reporting did not occur in 2017, 2018, 2019, 2020, or 2021. The 2022 reporting is not yet due.
[2021-08-23 Pollution Abatement Order 110100 Repair Plan and Final Report]
52. Section 85 of the MWR requires a minimum of four monitoring wells.

53. There are eleven monitoring wells located on-site. Seven of these have always been dry and the remaining four only occasionally have water. Only two wells have had measurable water since August 2017.
[2019-06-25 Heritage Hills Annual Hydro Review]
54. A 2019 groundwater monitoring program annual review indicated that groundwater quality at only one well had been analyzed and only in 2014, 2015 and 2016. This well was at the upper end of the drain field and according to the 2019 Hydro Review has since been declared ‘not in service’ and “*all other wells have been reported as dry or there has been too little water to sample since monitoring began*”.
[2019-06-25 Heritage Hills Annual Hydro Review]
55. According to the same report, “*Water quality results at this location cannot be compared to background levels nor any other downgradient wells due to the lack of groundwater occurrence at this site.*”
[2019-06-25 Heritage Hills Annual Hydro Review]
56. The most recent data regarding on-site receiving environment groundwater quality from Vintage Views was collected in 2016.
[2019-06-25 Heritage Hills Annual Hydro Review]
57. Vintage Views was previously informed of the requirement to monitor groundwater in letters and inspection reports in 2013(x2), 2014(x2), 2015, 2019, 2020, 2022.
[2013-03-18 Warning]
[2013-04-22 IR9501 Warning]
[2014-02-05 IR16325 Advisory]
[2014-04-24 IR17346 Advisory]
[2015-03-31 IR20211 Warning]
[2019-08-21 IR127579 AMP]
[2020-09-30 IR156484 AMP]
[2022-06-16 IR187275 AMP]
58. On June 25, 2019, the Owner submitted an annual hydrological review prepared by Western Water Associates Ltd. These reports are an annual requirement, but this is the only hydrological review received since 2009.
[2019-06-25 Heritage Hills Annual Hydro Review]
59. PAO 109945, issued May 30, 2019, and PAO 110100, originally issued October 23, 2019, included actions to sample groundwater from monitoring wells and the nearby domestic well, as well as “*design and implementation of a Groundwater monitoring system in accordance with the Municipal Wastewater Regulation and the same or equivalent to the 2009 Registration Amendment Letter.*”
[2019-08-26 PAO 109945 Amended]
[2021-08-12 PAO 110100 Amended]

60. In 2019, in response to PAO 110100, the Owner hired Associated Engineering to complete order requirements. While none of the on-site wells were tested, they did test water quality at a nearby domestic well. December 2019 results at that well exceeded drinking water quality guidelines for total coliforms and nitrates. The exceedances were not present in 2021 samples.

[2019-06-25 Heritage Hills Annual Hydro Review]
[2020-04-03 Erdman Well Letter]

61. In August 2021, in response to PAO 110100, Associated Engineering submitted a final report. The report included recommendations for quarterly groundwater sampling and repair of damaged monitoring wells, followed by annual review of the results by a hydrogeologist. These recommendations have not been implemented. Monitoring well levels and groundwater quality have not been reported. The report indicates groundwater levels were only measured twice in 2020. Quarterly groundwater quality results were not submitted. There is no record of the well being repaired. No additional wells have been installed. No hydrogeologist review has been submitted. The report states that, *“With limited data and no background water quality information, the cause of the above-mentioned exceedances cannot be determined. Based on our hydrogeological review WTN 117515 is cross / downgradient of the effluent field, and as a result could be affected by it but also other land use practices.”*

[2021-08-23 Pollution Abatement Order 110100: Repair Plan and Final Report]

62. Vintage Views was informed of the need for additional groundwater monitoring wells through inspection reports issued in 2019, 2020 and 2022. Additional wells have not been installed.

[2019-08-21 IR127579 AMP]
[2020-09-30 IR156484 AMP]
[2022-06-16 IR187275 AMP]

Contravention of MWR Section 55(5) – Reporting

63. The following table summarizes reporting requirements for Vintage Views as indicated in the 2009 Registration amendment.

Report Type	Report Frequency	Missing Reporting Periods	Number Missed
Flow Reporting	2x/year	2020 Q3/4, 2021 Q1/Q2, Q3/4, 2022 Q1/2	4
Effluent Reporting	2x/year	2020 Q3/4, 2021 Q1/Q2, Q3/4, 2022 Q1/2	4
G/W Well Analysis	annual	2020, 2021	2
Hydrologist Review	annual	2020, 2021	2
Total			12

[2009-06-29 Registration Amendment Letter]

64. Flow data has not been submitted since August 2020. During the May 2022 inspection *“Ministry staff observed two installed and operational Greyline DFM 6.1 Doppler Flow*

Meters". During the May 2022 inspection hard-copy flow records covering the month of April 2022 were observed at the Facility.

[2022-06-16 IR187275 AMP]

65. Vintage Views has not submitted bi-annual effluent reports since August 2020. However, effluent samples were collected by the Operator and the lab analyses were uploaded to EMS by CARO. Data uploaded by the lab does not include sampling methodology, sample locations, or quality control information.

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

66. Receiving environment data has not been provided since analysis of a June 21, 2016, sample from background monitoring well BH02-1, reported in the 2019 hydrologist report.

[2019-06-25 Heritage Hills Annual Hydro Review]

67. No hydrologist report was received for 2020 or 2021.

68. Vintage Views did not submit any monitoring reports between September 2020 and May 2022, other than the automated upload of sample results by CARO.

69. Vintage Views was previously informed of the reporting requirements through inspection reports issued in 2018(x2), 2019, 2020 and 2022.

[2018-02-21 IR61089 Warning]

[2018-10-02 IR098538 AMP]

[2019-08-21 IR127579 AMP]

[2020-09-30 IR156484 AMP]

[2022-06-16 IR187275 AMP]

Contravention of MWR Section 75(1) – Effluent Quality Standards

70. In April 2022, Vintage Views received an Administrative Penalty of \$2,600 for contravening MWR Section 75(1) on eight occasions between April 9, 2019, and August 11, 2020.

[2022-04-20 AMP2019-20 Final Determination]

71. Between September 1, 2020, and April 30, 2022, CARO uploaded 34 each of the required 40 bi-monthly BOD and TSS samples and 16 of the required 89 weekly fecal coliform samples. Of the 84 samples submitted, 32 (38%) exceeded MWR limits. Specific exceedance details are in the following paragraphs.

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

72. The average BOD for all samples between September 1, 2020, and April 30, 2022, was 18.7 mg/L which exceeds the Registration and MWR limit of 10 mg/L. Results exceeded Class B effluent quality limits for BOD (10 mg/L MWR Section 75, Table 3) in 12 of the 34 samples (35%). The maximum exceedance was 290 mg/L (2800% over the limit.)

START DATE	BOD Results (mg/L)	% Over limit
Limit	10	
2020-10-31	20.9	109%
2021-03-31	290	2800%
2021-04-21	22.9	129%
2021-04-30	30	200%
2021-05-31	12	20%
2021-09-30	24.7	147%
2021-11-23	24.2	142%
2021-11-30	17	70%
2021-12-19	12.4	24%
2021-12-27	10.8	8%
2022-01-23	12.1	21%
2022-04-22	12.9	29%
Count:	12	
Maximum:	290	2800%

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

73. Between September 1, 2020, and April 30, 2022, the average TSS was 4.4 mg/L which is within the Registration and MWR limit. Results exceeded Class B effluent quality limits for TSS (10mg/L MWR Section 75, Table 3) in four of the 34 samples (12%). The maximum value was 40.7 mg/L (307% above the discharge limit).

START DATE	TSS Results (mg/L)	% Over limit
Limit	10	
2021-03-31	40.7	307%
2021-04-21	11	10%
2021-09-30	12	20%
2022-04-22	12.2	22%
Count:	4	
Maximum:	40.7	307%

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

74. Between August 19, 2020, and May 6, 2022, all 16 fecal coliforms samples exceeded MWR limits (400 MPN/100mL), by an average of 4,920% and a maximum of 24,700%.

START DATE	Coliform Results cfu/100mL	% Over limit
Limit	10	
2021-01-21	3650	813%
2021-08-10	>2420	505%
2021-09-30	>24200	5950%
2021-11-23	>2420	505%
2021-11-30	15500	3775%
2021-12-19	>24200	5950%
2021-12-27	>2420	505%
2022-01-16	11400	2750%
2022-01-23	6300	1475%
2022-02-13	7410	1753%
2022-03-15	12700	3075%
2022-03-21	67000	16650%
2022-03-28	23000	5650%
2022-04-06	13400	3250%
2022-04-22	6060	1415%
2022-05-03	99300	24725%
Count:	16	
Maximum:	99300	24725%

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

75. Vintage Views was previously informed of the requirement to meet effluent discharge criteria in 2014, 2018(x2), 2019, 2020, 2022.

[2014-04-24 IR17346 Advisory]
 2018-02-21 IR61089 Warning]
 [2018-10-02 IR98538 AMP]
 [2019-08-21 IR127579 AMP]
 [2020-09-30 IR156484 AMP]
 [2022-06-16 IR187275 AMP]

Contravention of MWR Section 86 – Effluent Monitoring Frequency

76. Monitoring frequency for the Registration varies depending on the parameter. This table summarizes the required frequency and the number of missed monitoring events for the period between August 19, 2020, and May 6, 2022.

Sample/Report Type	Sample Frequency	Requirement Source	Number reqd./year	Number Required August 19, 2020 - May 6, 2022	Number Uploaded	Number of Missing Events
Flow	2x/week	MWR Sec.86, 2009 Letter	104	178	0	178*
BOD	2x/mo.	MWR Sec.86, 2009 Letter	24	40	33**	7
TSS	2x/mo.	MWR Sec.86, 2009 Letter	24	40	33**	7
Fecal	weekly	MWR Sec 86	52	89	16	73
					Total	265

* The Facility has a digital flow meter, but Vintage Views did not submit any data

** Two samples were not included in this total.

- The two May 2021 samples were less than the seven days apart required by MWR Section 56(1) and, therefore, only one is included.
- There were three March 2022 sample events. Only the required two are included.

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

77. Between August 19, 2020, and May 6, 2022, the Ministry received no flow records for the Facility. Upon inspection in May 2022 two digital flow meters were present and functional. The Facility log showed that in April 2022 flows were recorded every 4.7 days on average. This is less frequent than the required 2x/week.

78. BOD and TSS samples are required bi-monthly pursuant to MWR Table 7 and the 2009 Registration amendment letter.

79. Effluent quality data was uploaded directly to the Ministry's electronic database (EMS) by CARO. EMS records accessed on July 12, 2022, show that Vintage Views collected 50% (84 of 171) of the fecal, TSS and BOD samples required between August 20, 2020, and May 6, 2022.

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

80. Per MWR Section 86 Table 7, fecal coliforms are required to be sampled weekly for facilities with maximum daily flows exceeding 50 m³/ day.

81. Vintage Views was previously informed of the requirement to monitor effluent for fecal coliforms in 2018 (x2), 2019, 2020 and 2022 inspection reports.

[2018-02-21 IR61089 Warning]

[2018-10-02 IR98538 AMP]

[2019-08-21 IR127579 AMP]

[2020-09-30 IR156484 AMP]

[2022-06-16 IR187275 AMP]

82. Sampling intervals varied from five days to 54 days, with an average time between samples of 18 days. A detailed list of sample events is presented in the table on the next page.

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

83. The largest gap in samples occurred between August 10, 2021, and November 23, 2021 (15 weeks) with only one set of effluent samples collected on October 1, 2021.

[2022-07-12 Vintage Views Data EMS E248514 from 2020-08-16 to 2022-05-06]

84. In April 2022 Vintage Views was issued an administrative penalty of \$10,850 for contravening this section.

[2022-04-20 AMP2019-20 Final Determination]

Sample Event Table Legend (next page)

✓	✗	NR
Sampled	Not Sampled	No Sample Required

Week Starting	Samples Collected			Week Starting	Samples Collected		
	BOD	TSS	Fecal		BOD	TSS	Fecal
August 19, 2020	✓	✓	✗	June 30, 2021	NR	NR	✗
August 26, 2020	NR	NR	✗	July 07, 2021	✓	✓	✗
September 02, 2020	NR	NR	✗	July 14, 2021	NR	NR	✗
September 09, 2020	NR	NR	✗	July 21, 2021	NR	NR	✗
September 16, 2020	NR	NR	✗	July 28, 2021	✓	✓	✗
September 23, 2020	✓	✓	✗	August 04, 2021	✓	✓	✓
September 30, 2020	✓	✓	✗	August 11, 2021	NR	NR	✗
October 07, 2020	NR	NR	✗	August 18, 2021	✗	✗	✗
October 14, 2020	NR	NR	✗	August 25, 2021	NR	NR	✗
October 21, 2020	✓	✓	✗	September 01, 2021	NR	NR	✗
October 28, 2020	✓	✓	✗	September 08, 2021	✗	✗	✗
November 04, 2020	NR	NR	✗	September 15, 2021	NR	NR	✗
November 11, 2020	NR	NR	✗	September 22, 2021	NR	NR	✗
November 18, 2020	✓	✓	✗	September 29, 2021	✓	✓	✓
November 25, 2020	✓	✓	✗	October 06, 2021	NR	NR	✗
December 02, 2020	NR	NR	✗	October 13, 2021	✗	✗	✗
December 09, 2020	NR	NR	✗	October 20, 2021	NR	NR	✗
December 16, 2020	NR	NR	✗	October 27, 2021	✗	✗	✗
December 23, 2020	✓	✓	✗	November 03, 2021	NR	NR	✗
December 30, 2020	✓	✓	✗	November 10, 2021	NR	NR	✗
January 06, 2021	NR	NR	✗	November 17, 2021	✓	✓	✓
January 13, 2021	NR	NR	✗	November 24, 2021	✓	✓	✓
January 20, 2021	✓	✓	✓	December 01, 2021	NR	NR	✗
January 27, 2021	✓	✓	✗	December 08, 2021	NR	NR	✗
February 03, 2021	NR	NR	✗	December 15, 2021	✓	✓	✓

Week Starting	Samples Collected		
	BOD	TSS	Fecal
February 10, 2021	√	√	X
February 17, 2021	NR	NR	X
February 24, 2021	√	√	X
March 03, 2021	NR	NR	X
March 10, 2021	√	√	X
March 17, 2021	NR	NR	X
March 24, 2021	NR	NR	X
March 31, 2021	√	√	X
April 07, 2021	NR	NR	X
April 14, 2021	NR	NR	X
April 21, 2021	√	√	X
April 28, 2021	√	√	X
May 05, 2021	NR	NR	X
May 12, 2021	X	X	X
May 19, 2021	NR	NR	X
May 26, 2021	√	√	X
June 02, 2021	NR	NR	X
June 09, 2021	X	X	X
June 16, 2021	NR	NR	X
June 23, 2021	√	√	X

Week Starting	Samples Collected		
	BOD	TSS	Fecal
December 22, 2021	√	√	√
December 29, 2021	NR	NR	X
January 05, 2022	NR	NR	X
January 12, 2022	√	√	√
January 19, 2022	√	√	√
January 26, 2022	NR	NR	X
February 02, 2022	NR	NR	X
February 09, 2022	√	√	√
February 16, 2022	NR	NR	X
February 23, 2022	X	X	X
March 02, 2022	NR	NR	X
March 09, 2022	√	√	√
March 16, 2022	√	√	√
March 23, 2022	NR	NR	√
March 30, 2022	NR	NR	X
April 06, 2022	√	√	√
April 13, 2022	NR	NR	X
April 20, 2022	√	√	√
April 27, 2022	√	√	√

* + no flow records Aug 2020-May 2022

Findings

Contravention of MWR Section 47(a) – Operator Training

85. The Ministry finds that the Facility requires a minimum of a Level II certified operator.
86. The Ministry finds that from September 1, 2020, until May 6, 2022 (612 days), the Facility Operator did not meet the certification requirements to operate the Facility found in the operating plan.

Contravention of MWR Section 50(1) – Notification of Non-compliance

87. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views failed to notify the Ministry of non-compliances on thirty-three (33) occasions.
88. The Ministry finds that from August 19, 2020, until May 6, 2022, effluent samples exceeded discharge criteria on thirty-two (32) occasions. These non-compliances were not reported to the Ministry.

89. The Ministry finds that on May 6, 2022, Ministry staff observed evidence of recent effluent surfacing due to damage during construction of a vineyard over the drain field. This non-compliance was not reported to the Ministry.
90. The Ministry finds that in 2018, 2019 and 2022 inspection reports Vintage Views was previously informed of and was aware of the requirement to notify the Ministry of non-compliance or potential non-compliance.
91. The Ministry finds that in April 2022 Vintage Views was issued an Administrative Penalty of \$5,850 for contraventions of this section on May 28, 2019 and November 13, 2019.

**Contravention of MWR Section 53(b) – Receiving Environment Monitoring, and
Contravention of MWR Section 85(1) – Monitoring Wells Required**

92. The Ministry finds that Vintage Views has not monitored water levels quarterly. Two quarters were missed in 2020 and one in 2021. 2022 data has not yet been reported.
93. The Ministry finds that Vintage Views has not sampled and analyzed groundwater monitoring wells annually. No samples have been taken since 2016.
94. The Ministry finds that Vintage Views has not had the groundwater monitoring program reviewed annually by a QP since 2019.
95. The Ministry finds that Vintage Views was previously informed in 2013, 2014, 2015, 2019, 2020 and 2022, and was aware, of the requirement to monitor the receiving environment.
96. The Ministry finds that existing monitoring wells are non-functional and that the qualified professional recommendations for repair or replacement and implementation of a groundwater monitoring program have not been implemented.
97. The Ministry finds that Vintage Views was previously informed in 2019, 2020 and 2022, and was aware, of the MWR requirement for four functional monitoring wells, but functional wells have been not installed.

Contravention of MWR Section 55(5) – Reporting

98. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views did not submit any of the required bi-annual reports of twice-weekly effluent flow.
99. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views did not submit 2020 or 2021 annual reports of quarterly groundwater level measurements.
100. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views did not submit 2020 or 2021 annual groundwater monitoring well analyses.

101. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views did not submit 2020 or 2021 annual hydrologist reviews.
102. The Ministry finds that Vintage Views was previously informed, and was aware, of these reporting requirements in 2018, 2019, 2020 and 2022.

Contravention of MWR Section 75(1) – Effluent Quality Standards

103. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views effluent samples exceeded discharge criteria on 32 occasions. This included 12 BOD, four TSS and 16 fecal coliform samples. BOD exceeded limits by up to 2,800%. TSS exceeded limits by up to 307%. Fecal coliforms exceeded limits by more than 24,700%.
104. The Ministry finds that Vintage Views was previously informed, and was aware, of the effluent discharge limits and the requirement to meet them in 2014, 2018, 2019, 2020 and 2022.
105. In April 2022 Vintage Views was issued an Administrative Penalty of \$2,600 for eight contraventions of this section between April 9, 2019, and August 11, 2020.

Contravention of MWR Section 86 – Effluent Monitoring Frequency

106. The Ministry finds that from August 19, 2020, until May 6, 2022, Facility records indicate that effluent flows were being collected less than twice a week and none of the required 178 flow records were submitted to the Ministry.
107. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views failed to monitor BOD and TSS during seven of the required 40, bi-monthly periods (17.5%), including a 15-week interval with only one sample. Vintage Views was previously informed, and aware of the required frequency for BOD/TSS monitoring in 2020.
108. The Ministry finds that from August 19, 2020, until May 6, 2022, Vintage Views failed to monitor fecal coliforms during 73 of 89 weekly periods (82% failure). Vintage Views was previously informed, and was aware, of the fecal coliform monitoring requirement in 2018, 2019, and 2020.
109. In April 2022, Vintage Views was issued an Administrative Penalty of \$10,850 for contravention of this section between April 9, 2019, and August 11, 2020.

PART TWO: PENALTY CALCULATION

MWR Part 4 Section 47(a): Under Qualified Operator

Based on the information provided above, an administrative penalty is being considered for contravention of the MWR Section 47(a) for failing to operate and maintain the Facility by persons having the qualifications specified in the operating plan from September 1, 2020, until May 6, 2022.

The Administrative Penalties (EMA) Regulation Section 29(2) prescribes that a penalty for contravention of MWR Section 47 must not exceed \$40,000.

Factors to be considered in penalty calculation:

A. Base Penalty:

The base penalty reflects the seriousness of the contravention or failure, based on the following two factors:

a) Nature of Contravention or Failure

Moderate. This contravention undermines treatment plant operation and effectiveness. Having an Operator without the training and experience required to operate the plant has resulted in several deficiencies. Non-compliance reports, monthly and annual reporting ceased when the new Operator took over. Failure to report compromises the Ministry's ability to monitor and evaluate wastewater treatment operations.

b) Actual or Potential for Adverse Effect

Medium. The Operator's lack of training and experience has negatively impacted plant operations and effluent quality. There have been an increased number of effluent quality exceedances since the new Operator took over. The percentage of samples meeting criteria has decreased since October 1, 2020 (22%) compared to before October 1, 2020 (15%). Decreased effluent quality will have an increased impact on groundwater quality. This impact is not quantified as the Operator is not monitoring the receiving environment. Failing to report exceedances and surfacing of effluent limited the Ministry's ability to place additional protective measures or to inform potentially affected parties. Missing annual reports impede the Ministry's ability to evaluate wastewater system effectiveness.

BASE PENALTY:

Box A

\$10,000

B. Application of Penalty Adjustment Factors:

The following factors reflect the unique circumstances of this file, including what happened before, during and after the contravention or failure.

c) Previous contraventions, penalties imposed, or orders issued **\$0**

May 2022 was the first time this contravention was noted in an inspection report.

d) Whether contravention or failure was repeated or continuous **+ \$500**

The failure to have a trained and experienced operator has been continuous for 612 days since September 2020.

Five percent of the base penalty (\$500) is added to account for the continuous nature of contravention.

e) Whether contravention or failure was deliberate **\$0**

The Ministry does not have any evidence that the contravention was deliberate.

f) Economic benefit derived by the party from the contravention or failure **+ \$1,000**

Assessment – True or Estimated Values

Item Description	True or Estimated ¹ Value	Value (\$)	Avoided or Delayed	Lifespan ²	Time Length ³	Interest Rate ⁴	Total (\$)
Operator salary	Estimated	\$999.63	Avoided	3 hr/week	87 weeks	5.8%/yr	\$999.63
TOTAL		\$999.63					
¹ : See Spreadsheet for a list of estimated values ² : The lifespan of a fixed asset or frequency of a service/deliverable. E.g. QP review conducted annually = 1 year. Fixed asset lifespan to be entered if known. ³ : The length of the contravention (time period of the avoided or delayed cost) ⁴ : Canada's central bank average rate was 5.8% from 1990 until 2022							

Economic Benefit Rationale

Based upon a survey of thirty-eight wastewater positions in BC, an average Level I operator is paid \$31.72/hour while a Level II operator is paid \$35.55/hour, a difference of \$3.83/hour. The Operator stated they are on-site once or twice per week to monitor and maintain the Facility. In addition, the Operator would have travel, time for sample collection and laboratory submissions, and to prepare reports. Three hours per week is a conservative estimate of Operator time spent. From September 1, 2020, to May 6, 2022, is 87 weeks, resulting in an estimated savings of \$999.63 through hiring a Level I operator instead of a Level II.

An additional penalty of \$1,000 is added to offset the economic benefit received by not hiring a qualified operator.

g) Exercise of due diligence to prevent the contravention or failure \$0

The Ministry does not have any evidence that reasonable care was taken to hire an appropriately trained and qualified operator.

h) Efforts to correct the contravention or failure \$0

The Ministry does not have any evidence that efforts have been taken to correct the contravention.

i) Efforts to prevent reoccurrence of the contravention or failure \$0

The Ministry does not have any evidence that efforts have been taken to prevent reoccurrence of the failures to notify.

j) Any additional factors that are relevant \$0

N/A

add factors (c) to (j)

**TOTAL PENALTY
ADJUSTMENTS:**

Box B

+\$1,500

add Box A and Box B

**PENALTY AFTER
CONSIDERING
ALL FACTORS:**

Box C

\$11,500

IS A DAILY MULTIPLIER BEING APPLIED TO THIS PENALTY? NO

IF YES, HOW MANY DAYS? N/A

TOTAL PRELIMINARY PENALTY ASSESSMENT

\$11,500

PART THREE: PENALTY CALCULATION

MWR Part 4 Section 50(1): Fail to Notify of Non-compliance:

Based on the information provided above, an administrative penalty is being considered for contravention of the MWR Section 50(1) on 32 occasions between October 31, 2020 and May 3, 2022 for failure to immediately notify the Director when effluent exceed discharge criteria, and, on May 2, 2022, for failing to immediately notify the Director of effluent surfacing from the drain field.

The Administrative Penalties (EMA) Regulation Section 29 prescribes that a penalty for contravention of MWR Section 50 must not exceed \$75,000.

Factors to be considered in penalty calculation:

A. Base Penalty:

The base penalty reflects the seriousness of the contravention or failure, based on the following two factors:

a) Nature of Contravention or Failure

Major. This contravention undermines the basic integrity of the overarching regulatory regime and significantly interferes with the Ministry's capacity to protect the environment as the Ministry was not given the opportunity to order protective measures or inform potentially affected parties.

b) Actual or Potential for Adverse Effect

High. Failure to report non-compliance with effluent discharge limits meant that corrective measures were not investigated, and this had the potential to cause adverse impacts to drinking water, groundwater, or environmental receptors. Failure to report surfacing of effluent, which must be assumed to contain pathogens, in an area frequented by people and accessible to wildlife, and in a location that may impact a domestic drinking water well, prevented the Ministry from taking action to prevent potential acute adverse effects.

BASE PENALTY:

Box A

\$30,000

B. Application of Penalty Adjustment Factors:

The following factors reflect the unique circumstances of this file, including what happened before, during and after the contravention or failure.

c) Previous contraventions, penalties imposed, or orders issued + \$6,000

PAO 110100, issued in October 2019, noted that five BOD exceedances had not been reported.

An Administrative Penalty of \$5,850 was issued to Vintage Views on April 20, 2022, for contraventions of this section on May 28, 2019, and November 13, 2019.

Twenty percent of the base penalty (\$6,000) has been added to account for the history of non-compliance at the Facility.

d) Whether contravention or failure was repeated or continuous + \$15,000

Repeated: Failure to notify the Director as per MWR Section 50 occurred on 33 occasions.

Fifty percent of the base penalty (\$15,000) is added to account for the repeated nature of the contraventions.

e) Whether contravention or failure was deliberate + \$6,000

Vintage Views was previously reminded, and was aware, of the requirement to notify the Ministry of non-compliances, based on inspection reports issued in 2018, 2019 and 2020.

Twenty percent of the base penalty (\$6,000) has been added to account for the deliberate nature of the contraventions despite being previously advised of them.

f) Economic benefit derived by the party from the contravention or failure + \$0

The Ministry has no evidence that economic benefit was derived from failing to notify.

g) Exercise of due diligence to prevent the contravention or failure \$0

The Ministry has no evidence that reasonable care was taken to prevent the failures to notify.

h) Efforts to correct the contravention or failure \$0

The Ministry does have any evidence of efforts taken to correct the failures to notify.

i) Efforts to prevent reoccurrence of the contravention or failure \$0

The Ministry does have any evidence of efforts taken to prevent reoccurrence.

j) Any additional factors that are relevant \$0

N/A

add factors (c) to (j)

**TOTAL PENALTY
ADJUSTMENTS:**

Box B

+ \$27,000

add Box A and Box B

**PENALTY AFTER
CONSIDERING
ALL FACTORS:**

Box C

\$57,000

IS A DAILY MULTIPLIER BEING APPLIED TO THIS PENALTY? NO

IF YES, HOW MANY DAYS? N/A

TOTAL PRELIMINARY PENALTY ASSESSMENT

\$57,000

PART FOUR: PENALTY CALCULATION

MWR Part 4 Section 53(b): Failure to Monitor Receiving Environment

MWR Part 4 Section 85(1): Failure to Install Monitoring Wells

The Owner has not monitored groundwater levels quarterly. Annual groundwater quality samples have not been submitted since 2016. The required annual hydrologist's review has not been submitted since 2019. The required four functional monitoring wells have not been installed. An administrative penalty is being considered for these contraventions. Due to the similar nature and overlap in nature, the penalty calculation for these two sections is being combined.

The Administrative Penalties (EMA) Regulation Section 29 prescribes that penalties for contravention of MWR Section 53 and 85(1) must not exceed \$40,000 each.

Factors to be considered in penalty calculation:

A. Base Penalty:

The base penalty reflects the seriousness of the contravention or failure, based on the following two factors:

a) Nature of Contravention or Failure

Moderate. Subsurface discharge of effluent is, by design, invisible from the surface. When an underground drain field fails or is impaired, impacts such as degradation of natural water bodies and drinking water sources can occur.

Section 85 requires a minimum of four monitoring wells. Most on-site monitoring wells are dry. Only one well has been sampled. It is upgradient of the field and represents background conditions. It was found to be damaged in 2017 and has not been repaired. There has been no analysis of on-site monitoring wells since 2016.

Without functional monitoring wells no receiving environment monitoring can occur. Without monitoring of the receiving environment, failures of the field such as inadequate treatment will not be detected. The impact on human health or the environment from discharge exceedances could not be determined due to the lack of required receiving environment monitoring.

b) Actual or Potential for Adverse Effect

Medium. This contravention resulted in potential impact to the environment and human health as there were effluent discharge exceedances and no way to determine their impact on the receiving environment. In 2020 a domestic well at a residence downslope from the drain field had drinking water quality exceedances of total coliforms and nitrates. Without monitoring wells, it is uncertain if the drain field is the source.

Failure to monitor receiving environment has the potential to allow adverse impacts to drinking water, groundwater, or environmental receptors to persist, as Operator and the Ministry will be unaware of the need for protective measures or to inform potentially affected parties.

BASE PENALTY:

Box A

\$10,000

B. Application of Penalty Adjustment Factors:

The following factors reflect the unique circumstances of this file, including what happened before, during and after the contravention or failure.

c) Previous contraventions, penalties imposed, or orders issued + \$2,000

Two orders were issued that included the requirement to prepare and implement a groundwater monitoring program:

1. PAO 109945 was issued May 30, 2019,
2. PAO 110100 was issued October 23, 2019

Vintage Views' final report for PAO 110100 included recommendations for quarterly groundwater monitoring, annual sampling, and replacement of a damaged monitoring well. The report recommendations have not been implemented.

Twenty percent of the base penalty (\$2,000) has been added to account for the history of non-compliance at the Facility.

d) Whether contravention or failure was repeated or continuous + \$2,000

Repeated: The 2009 Registration Amendment Letter and MWR Section 53 requires regular monitoring of receiving environments as a condition of discharge. The QP report prepared in 2021 recommends that groundwater be sampled quarterly. This monitoring has not occurred, and discharge continues. Groundwater levels were missed for Q3 and Q4 of 2020. They were not reported for Q4 of 2021 or Q1, Q2 or Q3 of 2022. Groundwater quality was not monitored in 2020 or 2021.

Continuous: MWR Section 85 requires sufficient wells to monitor background and receiving environment. The wells are dry, therefore insufficient. The 2021 QP report in response to PPO 110100 recommended that the damage monitoring well be repaired. It has not. These deficiencies occurred over the entire period from August 19, 2020, to May 6, 2022 (625 days).

Twenty percent of the base penalty (\$2,000) has been added to account for the repeated and continuous nature of the contraventions.

e) Whether contravention or failure was deliberate + \$5,000

Vintage Views was found out of compliance with Section 53 and Section 85 in multiple inspection reports:

Date	Inspection Report	Out of Compliance with	
		Section 53	Section 85
2013-04-22	IR009501	X	
2014-02-05	IR016325	X	
2014-04-07	IR017346	X	
2015-03-31	IR020211	X	
2018-02-21	IR61089		X
2018-10-02	IR98538		X
2019-08-21	IR127579	X	X
2020-09-30	IR156484	X	X
2022-06-16	IR187275	X	X

Two PAOs were issued in 2019 and a QP prepared a response in 2021. These documents required or recommended well installation, well repair, well monitoring and annual review by a hydrogeologist. None of these actions have occurred.

These records indicate that the Owner was aware of the required groundwater wells and monitoring. There is no indication of actions to meet these requirements.

Fifty percent of the base penalty (\$5,000) has been added to account for the deliberate nature of these contraventions despite being previously advised of them.

f) Economic benefit derived by the party from the contravention or failure + \$36,207

Assessment – True or Estimated Values

Item Description	True or Estimated Value	Value (\$)	Avoided or Delayed	Frequency	Time Length ¹	Interest Rate ²	Total (\$)
Well installation x4	Estimated	\$24,000.00	Delayed	One time	3 years	5.8%	\$24,000.00
Well Sampling (Salary)	Estimated	\$71.10/year	Avoided	1x/year	3 years	5.8	\$213.30
Shipping (Salary)	Estimated	\$71.10/year	Avoided	1x/year	3 years	5.8	\$213.30
Laboratory Analysis Cost	Estimated	\$417.00/year	Avoided	1x/year	3 years	5.8	\$1,251.00
Supplies	Estimated	\$10.00/year	Avoided	1x/year	3 years	5.8	\$30.00
Reporting	Estimated	\$3500/year	Avoided	1x/year	3 years	5.8	\$10,500.00
TOTAL							\$36,207.60

1: The length of the contravention (time period of the avoided or delayed cost) 3 years is based on no groundwater monitoring well sampling or reporting for 2017,2018,2019,2020,2021, but reduced by the three-year statute of limitations on administrative penalties.

2: Canada's central bank average rate was 5.8% from 1990 until 2022

Economic Benefit Rationale

List	Rationale for Assessed Amount ⁶
Well Installation	Minimum 4 wells required. \$6,000 ea. Estimate from Ministry Economic Benefit spreadsheet (July 2022).
Well Sampling (Salary)	Based on sampling requiring 2 hours by Level 2 Operator (\$35.55/hr). - bottle order, measuring water level and field parameters, purging wells, collecting samples, labelling, packaging for transport at all 4 wells.
Shipping (Salary)	Based on 2 hours to transport samples to Caro Lab Kelowna by Level 2 Operator (\$35.55/hr)
Laboratory Analysis Cost	Based on standard lab pricing for the required analyses. Provided August 2022 by CARO Analytical Services, Kelowna, which is the lab used by Vintage Views. Ministry laboratory, ALS Environmental, price of \$30 for coliforms was used as CARO price of \$108 was high and included both fecal and total coliform.
Sampling Supplies	Gloves, bags, ice, etc
Annual Review/Reporting	Estimate of \$3500-4500/year for hydrologist report was provided to the Ministry by Vintage Views in March 2016.

An additional penalty of \$36,207 is added to offset the economic benefit of avoided costs.

g) Exercise of due diligence to prevent the contravention or failure **\$0**

The Ministry does not have any evidence that reasonable care was taken to prevent this contravention.

h) Efforts to correct the contravention or failure **\$0**

The Ministry does not have any evidence that effort was made to correct this contravention.

i) Efforts to prevent reoccurrence of the contravention or failure **\$0**

The Ministry does not have any evidence that effort was made to ensure this contravention would not reoccur.

j) Any additional factors that are relevant **\$0**

N/A

add factors (c) to (j)

**TOTAL PENALTY
ADJUSTMENTS:**

Box B

+ \$45,207

add Box A and Box B

**PENALTY AFTER
CONSIDERING
ALL FACTORS:**

Box C

\$55,207

The APR prescribes \$40,000 as the maximum daily penalty for this contravention. Accordingly, the calculated penalty has been adjusted from \$55,207 to \$40,000.

IS A DAILY MULTIPLIER BEING APPLIED TO THIS PENALTY? NO

IF YES, HOW MANY DAYS? N/A

TOTAL PRELIMINARY PENALTY ASSESSMENT

\$40,000

PART FIVE: PENALTY CALCULATION

MWR Part 5 Section 55(5): Submission of Monitoring Data:

Based on the information provided above, one administrative penalty is being considered for contravention of MWR Section 55(5) for failing to submit effluent flow, effluent quality and receiving environment data, and associated quality control data, between August 19, 2020, and May 6, 2022. Twelve reporting dates were missed.

The Administrative Penalties (EMA) Regulation Section 29 prescribes that the penalty for contravention of MWR 55 must not exceed \$10,000.

Factors to be considered in penalty calculation:

A. Base Penalty:

The base penalty reflects the seriousness of the contravention or failure, based on the following two factors:

a) Nature of Contravention or Failure

Minor. Failing to submit data is an administrative issue. Without these records the Ministry is unable to evaluate whether there are problems with the wastewater system, or risks to the environment of human health.

b) Actual or Potential for Adverse Effect

Medium. Failing to report results creates the potential for environmental or human health effects being present, but not actioned. As partial effluent data was submitted, the Ministry was able to determine that effluent is not being disinfected and extremely high levels of fecal coliforms are being released. This may result in contamination of nearby drinking water. Without reporting on flows or receiving environment results, appropriate corrective measures are more challenging to determine.

BASE PENALTY:

Box A

\$1,500

B. Application of Penalty Adjustment Factors:

The following factors reflect the unique circumstances of this file, including what happened before, during and after the contravention or failure.

c) Previous contraventions, penalties imposed, or orders issued \$0

No orders or administrative penalties have been issued for violation of this specific section.

d) Whether contravention or failure was repeated or continuous \$0

Repeated – The 2009 Registration amendment letter required that effluent monitoring data be submitted bi-annually. Flow data is required twice per year. It was not submitted in the second half of 2020, the first or second half of 2021 or the first half of 2022. Therefore, four reporting periods have been missed.

While raw data was uploaded by the laboratory, it did not indicate whether it was sample location influent, effluent, monitoring well, or other. Quality control information and sampling methodology was also not reported. Without this narrative the raw data could not be interpreted, and the report is incomplete. This information was not submitted in the second half of 2020, the first or second half of 2021 or the first half of 2022. Therefore, four reporting periods have been missed.

Receiving water data and hydrologist review is required annually. It was not received in 2020 or 2021. Two reporting periods have been missed for each.

The daily multiplier factor is used below to account for the repeated nature of the contravention.

e) Whether contravention or failure was deliberate + \$750

Vintage Views was previously informed, and was aware, of the reporting requirements of Section 55(5) through inspection reports in 2018(x2), 2019, 2020 and 2022. These records indicate that the Owner was aware of the reporting required. There is no indication of actions to meet these requirements.

Fifty percent of the base penalty (\$750) has been added to account for the deliberate nature of the contraventions despite being previously advised of them.

f) Economic benefit derived by the party from the contravention or failure \$0

The Ministry does not have any evidence that not submitting required data resulted in economic benefit.

g) Exercise of due diligence to prevent the contravention or failure \$0

The Ministry does not have any evidence that reasonable care was taken to prevent the contravention.

h) Efforts to correct the contravention or failure \$0

The Ministry does not have any evidence that efforts were made to correct the failures to submit the required data.

i) Efforts to prevent reoccurrence of the contravention or failure \$0

The Ministry does not have any evidence that effort was made to ensure this contravention would not reoccur.

j) Any additional factors that are relevant \$0

N/A

add factors (c) to (j)

**TOTAL PENALTY
ADJUSTMENTS:**

Box B

+ \$750

add Box A and Box B

**PENALTY AFTER
CONSIDERING
ALL FACTORS:**

Box C

\$2,250

IS A DAILY MULTIPLIER BEING APPLIED TO THIS PENALTY? Yes

IF YES, HOW MANY DAYS? 4

TOTAL PRELIMINARY PENALTY ASSESSMENT

\$9,000

PART SIX: PENALTY CALCULATION

MWR Part 5 Section 75(1): Exceeding Effluent Limits

Based on the information provided above, one administrative penalty is being considered for contravention of MWR Section 75(1) by exceeding Table 3 Class B effluent quality limits 32 times between August 19, 2020, and May 6, 2022.

The Administrative Penalties (EMA) Regulation Section 29 prescribes that the penalty for contravention of MWR 75 must not exceed \$40,000.

Factors to be considered in penalty calculation:

A. Base Penalty:

The base penalty reflects the seriousness of the contravention or failure, based on the following two factors:

a) Nature of Contravention or Failure

Major. Meeting the quality limits is a fundamental requirement of wastewater treatment. Limits are set to prevent environmental or human health concerns. The system is designed to perform to a certain level and if this is not achieved then downstream components such as the drain field may be impacted, and downgradient domestic wells are at increased risk of contamination. The exceedances were significant. BOD was 2,800% over, TSS was 307% and fecal coliform was over by 24,700%. All fecal coliform samples analysed during the inspection period exceeded the limits. There is no indication that corrective measures were taken to correct the high fecal coliforms.

The impact on human health or the environment from these exceedances could not be determined due to the lack of required receiving environment monitoring.

b) Actual or Potential for Adverse Effect

Medium. All fecal coliform samples analysed during the inspection period exceeded the MWR limits. All samples analysed were at least six times higher than the MWR limit. Extremely high fecal coliforms indicate increased potential for pathogens to contaminate surface and drinking water. A nearby drinking well had elevated coliforms, but no firm linkage to the drain field was established. As effluent was surfacing from the damaged field in May 2022 it represented potential exposure to workers and wildlife.

BASE PENALTY:

Box A

\$20,000

B. Application of Penalty Adjustment Factors:

The following factors reflect the unique circumstances of this file, including what happened before, during and after the contravention or failure.

c) Previous contraventions, penalties imposed, or orders issued + \$2,000

An Administrative Penalty of \$2,600 was issued to Vintage Views on April 20, 2022, for eight contraventions of this section between April 9, 2019, and August 11, 2020.

Ten percent of the base penalty (\$2,000) has been added to account for the compliance history of previous contraventions at the Facility.

d) Whether contravention or failure was repeated or continuous + \$20,000

Repeated – Vintage Views exceeded MWR effluent quality limits 32 times between August 19, 2020, and May 6, 2022.

One hundred percent of the base penalty (\$20,000) has been added to account for the repeated nature of the contraventions.

e) Whether contravention or failure was deliberate + \$4,000

Vintage Views was previously informed, and was aware, of similar exceedances and the need to address them via inspection reports issued in 2018 (x2), 2019, 2020 and 2022.

Twenty percent of the base penalty (\$4,000) has been added to account for the deliberate nature of the contraventions despite being previously advised of them.

f) Economic benefit derived by the party from the contravention or failure \$0

The Ministry does not have any evidence that the failures to meet MWR effluent limits resulted in economic benefit.

g) Exercise of due diligence to prevent the contravention or failure \$0

The Ministry does not have any evidence that reasonable care was taken to prevent the failures.

h) Efforts to correct the contravention or failure \$0

The Ministry does not have any evidence that efforts were made to correct the contravention.

i) Efforts to prevent reoccurrence of the contravention or failure \$0

The Ministry does not have any evidence that efforts were made to prevent reoccurrence. Since August 2020 the number of exceedances has increased.

j) Any additional factors that are relevant

\$0

N/A

add factors (c) to (j)

**TOTAL PENALTY
ADJUSTMENTS:**

Box B

+ \$26,000

add Box A and Box B

**PENALTY AFTER
CONSIDERING
ALL FACTORS:**

Box C

\$46,000

The APR prescribes \$40,000 as the maximum daily penalty for this contravention. Accordingly, the calculated penalty has been adjusted from \$46,000 to \$40,000.

IS A DAILY MULTIPLIER BEING APPLIED TO THIS PENALTY? NO

IF YES, HOW MANY DAYS? N/A

TOTAL PRELIMINARY PENALTY ASSESSMENT

\$40,000

PART SEVEN: PENALTY CALCULATION

MWR Part 5 Section 86: Failing to Sample:

Based on the information provided above, one administrative penalty is being considered for contravention of MWR Section 86 failing to sample effluent for TSS, BOD, fecal coliforms on 87 occasions between August 19, 2020, and May 6, 2022, and for failing to monitor effluent flows on 178 occasions in the same period.

The Administrative Penalties (EMA) Regulation Section 29 prescribes that a penalty for contravention of MWR 86 must not exceed \$40,000.

Factors to be considered in penalty calculation:

A. Base Penalty:

The base penalty reflects the seriousness of the contravention or failure, based on the following two factors:

a) Nature of Contravention or Failure

Major. Failure to monitor TSS, BOD and fecal coliform concentrations deprives the Operator and the Ministry of a key piece of information about the effectiveness of the treatment works, and information about the potential effects to the environment. Flow records determine if the Facility is approaching design capacity and relate to the magnitude of potential impact on the receiving environment if the treatment system were to fail further.

Only 18% of the required fecal coliform samples were collected during the period being considered for penalty. This missing data directly inhibits the Ministry's ability to assess risks to human health and the environment. For instance, if this data had been available it would have been used by the Ministry to determine the public health risks in the May 2022 effluent surfacing event.

b) Actual or Potential for Adverse Effect

Medium. While failing to collect samples does not result in direct adverse effects, it does make it challenging for the Operator to determine if the system is functioning correctly and interferes with the Ministry's capacity to protect the environment as the Ministry is reliant on these records to determine whether the regulatory requirements are being met. Without feedback on system performance significant environmental or human health effects may occur.

BASE PENALTY:

Box A

\$20,000

B. Application of Penalty Adjustment Factors:

The following factors reflect the unique circumstances of this file, including what happened before, during and after the contravention or failure.

c) Previous contraventions, penalties imposed, or orders issued + \$2,000

Three PAOs under Section 83 of EMA and two PPOs under Section 81 of EMA have been issued since 2019 in order to protect human health and the environment. Two of these are relevant to this contravention.

- PAO 109945 was issued May 30, 2019, to mitigate surfacing effluent in an orchard. It required, among other actions, that Vintage Views retain a QP to, “*Design and implementation of a regular inspection and maintenance schedule of the works, including [...] a schedule for sampling required under the Municipal Wastewater Regulation & the 2009 Registration Amendment Letter*”
- PAO 110100 was issued October 23, 2019, include the same requirement.

A previous Administrative Penalty of \$10,850 was issued to Vintage Views on April 20, 2022, for contraventions of this section between April 9, 2019, and August 11, 2020.

Twenty percent of the base penalty (\$2,000) has been added to account for the history of orders issued, and previous administrative penalty at this Facility.

d) Whether contravention or failure was repeated or continuous + \$2,000

Repeated - Fecal coliform samples were missed for 73 of the 89 weeks between August 19, 2020, and May 6, 2022.

Repeated - Effluent samples for TSS and BOD were each missed on 7 occasions in the same period. In one instance only one TSS/BOD sample was collected over a 15-week span.

Repeated – Effluent flow records were not provided for any of the 178 bi-weekly periods.

Twenty percent of the base penalty is added (\$2,000) to account for the repeated nature of the contraventions.

e) Whether contravention or failure was deliberate + \$10,000

Vintage Views was previously informed, and was aware, of these monitoring requirements via inspection reports issued in 2018 (x2), 2019, 2020 and 2022.

One hundred percent of the base penalty (\$10,000) has been added to account for the deliberate nature of the contraventions despite being previously advised of this requirement on multiple occasions.

f) Economic benefit derived by the party from the contravention or failure + \$11,174

By failing to conduct the required effluent sampling and analysis, the Owner gained an economic benefit by avoiding costs for labour, costs of shipping, and costs of analysis at a laboratory over the eighty-nine weeks between August 19, 2020 and May 6, 2022.

Item Description	True or Estimated Value	Value (\$)	Avoided or Delayed	Frequency	Time Length ¹	Interest Rate ²	Total (\$)
Sampling (Salary)	Estimated	\$35.55/event	Avoided	73 events	89 weeks	5.8	\$2,595.15
Shipping (Salary)	Estimated	\$71.10/event	Avoided	73 trips	89 weeks	5.8	\$5,190.30
Laboratory Analysis - Coliform	Estimated	\$31.75/sample	Avoided	73 samples	89 weeks	5.8	\$2,317.75
- TSS	Estimated	\$13.75/sample	Avoided	7 samples	89 weeks	5.8	\$96.25
- BOD	Estimated	\$35.00/sample	Avoided	6 samples	89 weeks	5.8	\$245.00
Supplies	Estimated	\$10.00/event	Avoided	73 events	89 weeks	5.8	\$730.00
TOTAL							\$ 11,174.45

1: The length of the contravention (time period of the avoided or delayed cost) is the total period over which samples were missed.
2: Canada's central bank average rate was 5.8% from 1990 until 2022

List	Rationale for Assessed Amount ⁶
Well Sampling (Salary)	Based on taking sampling requiring 1.0 hours by Level 2 Operator (\$35.55/hr). Sampling time included: placing bottle order, buying ice, measuring field parameters, purging sample ports, collecting samples, labelling, preparing chain of custody, packaging for transport. Assumes that TSS BOD samples are taken on days when fecal coliforms are sampled and add negligible additional time.
Shipping (Salary)	Based on 2 hours to drive samples to Caro in Kelowna by Level 2 Operator (\$35.55/hr)
Laboratory Analysis Cost	Based on standard lab pricing for the required analyses. Provided August 2022 by CARO Analytical Services, Kelowna, which is the lab used by Vintage Views. ALS price of \$30 for coliforms was used as CARO price of \$108 was too high.
Sampling Supplies	Gloves, bags, ice, etc
Annual Review/Reporting	Estimate of \$3500-4500/year for hydrologist report was provided to the Ministry by the Facility Operator in March 2016.

Based on the above information, the Ministry estimates that the Owner has avoided costs of not less than \$11,174.45. Therefore \$11,174 is added to this penalty calculation to account for the economic benefit of avoided costs.

g) Exercise of due diligence to prevent the contravention or failure \$0

The Ministry does not have any evidence that the Owner took reasonable care to avoid the failure to monitor effluent.

h) Efforts to correct the contravention or failure \$0

The Ministry does not have any evidence that the Owner made efforts to correct these failures.

i) Efforts to prevent reoccurrence of the contravention or failure - \$1,000

According to the Ministry's EMS database, prior to 2021, fecal coliforms were never sampled at this site. Since August 2021 fecal coliforms have been sampled approximately every 16 days. While this is not the required every 7 days, it does represent improvement.

As a result of this effort, the base penalty is reduced by ten percent (\$1,000).

j) Any additional factors that are relevant \$0

N/A

add factors (c) to (j)

**TOTAL PENALTY
ADJUSTMENTS:**

Box B

+ \$24,174

add Box A and Box B

**PENALTY AFTER
CONSIDERING
ALL FACTORS:**

Box C

\$44,174

The APR prescribes \$40,000 as the maximum daily penalty for this contravention. Accordingly, the calculated penalty has been adjusted from \$44,174 to \$40,000.

IS A DAILY MULTIPLIER BEING APPLIED TO THIS PENALTY? NO

IF YES, HOW MANY DAYS? N/A

TOTAL PRELIMINARY PENALTY ASSESSMENT

\$40,000

Appendix B

Layout Drawing of Sanitary System



SHADED AREA DEVOTES PROPERTIES SERVED BY VINTAGE VIEWS WASTEWATER TREATMENT PLANT

SANITARY MAIN SERVICING 26 HOMES ON HERITAGE BLVD S, ONE QUAIL PL, BIG HORN TR, APPLE RD, APPLE CT BY MEANS OF SRW PLAN 70584

EX. VINTAGE VIEWS WASTE-WATER TREATMENT PLANT 65 cu.m PER DAY

BOUNDARY OF VINTAGE VIEWS PHASES 1 - 3

EX. LIFT STATION

LEGEND:

SANITARY MAIN	—
SANITARY SERVICE (1000 P.C. TYP.)	—
SANITARY MANHOLE	○
PHASE BOUNDARY	- - -
PROJECT EXTENTS	—

SKAHA LAKE

NO.	DATE (Y/M/DD)	DRN	REVISION	OTD


ecora
 #201-204 MAIN STREET, PEIRCEVIEW, BC, V2A 5R2
 PHONE: 250-462-2327
 www.ecora.ca

PERMIT TO PRACTICE

SEAL

DESIGN: -
DRAWN: MAP
CHECKED: DR
DATE: DEC 2023
SCALE: 1:2500

RDOS
 VINTAGE VIEWS WATER & SANITARY ASSESSMENT
 RDOS
 SANITARY LOCATION PLAN

 Drawing No. 230122-SLP	Rev.No B
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Appendix C

List of Record Drawings

Date	Title	Number	Company	Format
1976-07-27	Lakeshore Highlands As Built Plan of 6" Pumping Main & 10" Intake	N/A	Alan R. Colby Consulting	PDF
1976-07-27	Lakeshore Highlands As Built Plan of 25,000 Gallon Reservoir	N/A	Alan R. Colby Consulting	PDF
1979-01-29	Lakeshore Highlands Plan Showing Stages of Development	N/A	Alan R. Colby Consulting	PDF
1981-10-01	Lakeshore Highlands - Phase 1 Water Pumping Station	1196-4	Hayes, Laird Engineering LTD.	PDF
1982-06-23	Lakeshore Highlands - Watermain Phase 1	1196-3	Hayes, Laird Engineering LTD.	PDF
1982-06-23	Lakeshore Highlands - Pump Station Electrical	1196-6	Hayes, Laird Engineering LTD.	PDF
1989-05-12	Lakeshore Highlands Phase II - Booster Pump Station	106	J&B Engineering LTD.	PDF
1989-07-04	Lakeshore Highlands Phase II - Plan of Waterline Along Road A & B	104	J&B Engineering LTD.	PDF
1990-06-01	Lakeshore Highlands - 150 Watermain for Lot A & B on Sunnybrook Drive	GL-100	Reid Crowther & Partners LTD.	PDF
1990-10-05	Appel Estates - Watermain for Lots 1-5 Cul-de-sac on Eastside Road	W-100	Reid Crowther & Partners LTD.	PDF
1992-06-01	Parson's Road - Re-alignment & Waterline	107	J&B Engineering LTD.	PDF
1992-06-14	Lakeshore Highlands Phase II - Proposed Watermain	2774-1	Hunter Laird Engineering LTD.	PDF
1992-09-10	Lakeshore Waterworks - Booster Station Electrical Control Schematics & Panel Details	395-011-E2	Interior Control & Instrumentation	PDF
1992-09-10	Lakeshore Waterworks - Booster Station Electrical Plan, Elevations, Single Line Diagram	395-011	Interior Control & Instrumentation	PDF
1992-09-10	Lakeshore Waterworks - Booster Station Station Plan and Piping Layout	395-011-03	Interior Control & Instrumentation	PDF
1992-09-10	Lakeshore Waterworks - Booster Station Sections and Details	395-011-04	Interior Control & Instrumentation	PDF
1993-05-11	Heritage Hills Subdivision Phase 3 - Proposed Watermains Areas 1 & 2	2774-2	Hunter Laird Engineering LTD.	PDF
1994-06-01	Heritage Hills Subdivision - Watermains Site Plan	Appel-1	Damax Consultants LTD.	PDF
1995-10-17	Heritage Hills Area 2 Waterworks - Big Horn Trail Asbuilt Drawings	2774-4	Damax Consultants LTD.	PDF
1997-09-01	North Christie Subdivision - Booster Pump Chamber Details	574-011-D1	True Engineering Consulting Group	PNG
1998-06-01	North Christie Subdivision - Waterworks		Damax Consultants LTD.	PDF
2001-05-01	Heritage Hills Area 2 - Booster Station Mechanical Plan and Sections	574-031-01	True Engineering Consulting Group	JPG
2002-03-04	Heritage Hills - Watermain As Constructed Drawing		Damax Consultants LTD.	PDF
2002-06-05	Lakeshore Highlands Phase II - Watermain Asbuilt Lots A-D	2774-1	Damax Consultants LTD.	PDF
2003-06-16	Heritage Hills - Site Plan for Proposed Subdivision - 4 Fee Simple & 6 Strata Lots	02-053-01	Chesapeake Services LTD.	PDF
2006-09-14	Vintage Views - Sanitary & Water Access Plan/Profile STA. 0+260 to 0+410	12-SW	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Roads & Utilities - Road 2 Plan/Profile STA. 0+000 to 0+360	18-RS	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Sanitary & Water - Road 2 Plan/Profile STA. 0+000 to 0+360	19-SW	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Roads & Utilities - Road 2 Plan/Profile STA. 0+300 to 0+420	20-RS	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Sanitary & Water - Road 2 Plan/Profile STA. 0+300 to 0+420	21-SW	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Roads & Utilities - Road 3 Plan/Profile STA. 0+000 to 0+100	22-RS	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Sanitary & Water - Road 3 Plan/Profile STA. 0+000 to 0+100	23-SW	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Road & Utilities - Road 4 Plan/Profile STA. 0+000 to 0+100	24-RS	Quantum Consulting Group LTD.	PDF
2006-09-14	Vintage Views - Sanitary & Water - Road 4 Plan/Profile STA. 0+000 to 0+200	26-SW	Quantum Consulting Group LTD.	PDF
2007-03-21	Vintage Views - Sanitary & Water - Access Plan/Profile STA. 0+000 to 0+260	06-090-01	Chesapeake Services LTD.	PDF
2007-04-02	Vintage Views - Sanitary & Water - Access Plan/Profile STA. 0+260 to 0+410	06-090-02	Chesapeake Services LTD.	PDF

Date	Title	Number	Company	Format
2010-02-09	Vintage Views - Sanitary & Water - Road 2 Plan/Profile STA. 0+000 to 0+120	07-154-05	Chesapeake Services LTD.	PDF
2010-02-09	Vintage Views - Sanitary & Water - Road 4 Plan/Profile STA. 0+000 to 0+260	07-154-05	Chesapeake Services LTD.	PDF
2010-03-23	Heritage Hills Water Composite	07-014-Comp	Chesapeake Services LTD.	PDF
2010-06-21	Custom VSD Control Panel With Submonitor, LA, LR, CCT, 6x CR's, Summer/Winter SS, & 3x Pilot Lights	3LS-115-28047	Selectric Inc.	PDF
2010-07-15	Vintage Views - 3 Lot Subdivision of Lot 10 KAP50897	08-149-01	Chesapeake Services LTD.	PDF
2010-11-18	Heritage Hills Pump Station Upgrades - Cover Page	07-014-01	Chesapeake Services LTD.	PDF
2011-11-11	Heritage Hills Pump Station Upgrades - Plans & Profiles	07-014-02	Chesapeake Services LTD.	PDF
2011-11-11	Heritage Hills Pump Station Upgrades - Details	07-014-03	Chesapeake Services LTD.	PDF
2010-11-18	Heritage Hills Pump Station Upgrades - Overhead Powerline Plan & Profile, Detail	07-014-04	Chesapeake Services LTD.	PDF
2010-11-18	Heritage Hills Pump Station Upgrades - New Pump Can Details	07-014-05	Chesapeake Services LTD.	PDF
N/A	13-141 - Lift Station Detail	N/A	N/A	PDF
2016-04-01	Chadwell Place Record Drawings - Cover	PE-13-141-A-01	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Composite Utility Plan	PE-13-141-A-02	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Chadwell Place Plan & Profile STA 0+000 to 0+280	PE-13-141-A-03	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Chadwell Place Plan & Profile STA 0+280 to 0+580	PE-13-141-A-04	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Chadwell Place Plan & Profile Cul-De-Sac	PE-13-141-A-05	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - SRW - Vintage Blvd to Prop Lift Stn - Plan & Profile	PE-13-141-A-06	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Lot 2 Egress Road - Plan & Profile	PE-13-141-A-07	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Electrical & Gas Plan (Fortis)	PE-13-141-A-08	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Shaw Plan	PE-13-141-A-09	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Sections (0+080 to 0+240)	PE-13-141-A-10	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Sections (0+260 to 0+420)	PE-13-141-A-11	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Sections (0+420 to 0+660)	PE-13-141-A-12	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Standard Details	PE-13-141-A-13	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Redi-Rock Retaining Wall Details	PE-13-141-A-14	Ecora Engineering & Resource Group	PDF
2016-04-01	Chadwell Place Record Drawings - Sanitary Lift Station Details	PE-13-141-A-15	Ecora Engineering & Resource Group	PDF
2016-04-04	Subdivision Plan EPP61041	14-171F	Steven J. Buzikievich Land Surveying	PDF
2014-11-02	300 Heritage Blvd - Sanitary Sewer Plan & Profile	PE-14-252-P-01	Ecora Engineering & Resource Group	PDF
2004-03-01	Heritage Hills Area Two - Septic Field Site Plan & Details	574-051-01	True Engineering Consulting Group	PDF
2004-03-01	Heritage Hills Area Two - Septic Tank & Effluent Pump Site Plan & Details	574-051-02	True Engineering Consulting Group	PDF
2001-06-01	Heritage Hills Area Two - Sewage Treatment & Disposal System - Structural Details	574-051-03	True Engineering Consulting Group	PDF
2004-03-01	Heritage Hills Area Two - Sewage Treatment Plant - Site Plan & Holding Tank Details	574-052-01	True Engineering Consulting Group	JPG
2004-03-01	Heritage Hills Area Two - Sewage Treatment Plant - Piping Details	574-052-02	True Engineering Consulting Group	PDF
2004-03-01	Heritage Hills Area Two - Sewage Treatment Plant - Influent Pump Tank Plan, Section & Details	574-052-03	True Engineering Consulting Group	PDF

Date	Title	Number	Company	Format
2003-06-20	Heritage Hills Area Two - Sewage Treatment Plant - Structural Details	574-052-04	True Engineering Consulting Group	PDF
2004-01-12	Heritage Hills Area Two - Sewage Treatment Plant - Structural Details	574-052-05	True Engineering Consulting Group	PDF
2003-08-25	Heritage Hills Area Two - Sewage Treatment Plant - Exterior Wall Details	574-052-06	True Engineering Consulting Group	PDF
2003-07-17	Heritage Hills Area Two - Sewage Treatment Plant - Ventilation & Misc. Details	574-052-07	True Engineering Consulting Group	PDF
2003-07-17	Heritage Hills Area Two - Sewage Treatment Plant - Electrical Plans & Details	574-052-06	True Engineering Consulting Group	PDF
2008-04-08	45 Lot Base Land Strata Development - Cover	N/A	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Site Plan	07-154-01	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Proposed Lot Layout	07-154-02	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Composite Utility Plan	07-154-03	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Road 2 - Road & Storm - Plan & Profile	07-154-04	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Road 2 - Water & Sanitary - Plan & Profile	07-154-05	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Road 2 - Water & Sanitary - Plan & Profile	07-154-06	Chesapeake Services LTD.	PDF
2008-04-08	45 Lot Base Land Strata Development - Details	07-154-07	Chesapeake Services LTD.	PDF
2004-05-04	3 Fee Simple & 6 Strata Lots - Site Plan	02-053-01	Chesapeake Services LTD.	PDF
2004-04-21	3 Fee Simple & 6 Strata Lots - Strata Road Profile	02-053-02	Chesapeake Services LTD.	PDF
2004-04-21	3 Fee Simple & 6 Strata Lots - Elec, TV, Tel, Gas Plan	02-053-03	Chesapeake Services LTD.	PDF
2004-04-04	3 Fee Simple & 6 Strata Lots - Site Plan - Water System Asbuilts	02-053-04	Chesapeake Services LTD.	PDF
2004-04-04	3 Fee Simple & 6 Strata Lots - Lot Plan & Topog for Subdivision	02-053-05	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views - Key Plan	06-090-00	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Road & Storm - Access Plan/Profile STA 0+000 to 0+260	06-090-01	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Sanitary & Water - Access Plan/Profile STA 0+000 to 0+260	06-090-02	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Road & Utilities - Access Plan/Profile STA 0+260 to 0+410	06-090-03	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Road & Utilities - Easement From Parsons Road	06-090-04	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Sanitary & Water - Access Plan/Profile STA 0+260 to 0+410	06-090-05	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Road & Utilities - Road 1 Plan/Profile STA 0+000 to 0+300	06-090-06	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Sanitary & Water - Road 1 Plan/Profile STA 0+000 to 0+300	06-090-07	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Roads & Storm - Road 2 Plan/Profile STA 0+000 to 0+360	06-090-08	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Sanitary & Water - Road 2 Plan/Profile STA 0+000 to 0+360	06-090-09	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Road & Storm - Road 3 Plan/Profile STA 0+000 to 0+100	06-090-10	Chesapeake Services LTD.	PDF
2008-07-07	Vintage Views Phase 1 - Sanitary & Water - Road 3 Plan/Profile STA 0+000 to 0+100	06-090-11	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Road 2 - Water & Sanitary - Plan/Profile	07-154-05	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Site Plan	07-154-01	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Lot Layout	07-154-02	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Composite Utility Plan	07-154-03	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Road 2 - Road & Storm - Plan/Profile	07-154-04	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Road 4 - Road, Water & Sanitary - Plan/Profile	07-154-06	Chesapeake Services LTD.	PDF

Date	Title	Number	Company	Format
2010-02-26	Vintage Views Phase 2 - CatV & Tel Plan	07-154-07	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Elec Plan	07-154-08	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Details	07-154-09	Chesapeake Services LTD.	PDF
2010-02-26	Vintage Views Phase 2 - Storm Water Management Plan	07-154-10	Chesapeake Services LTD.	PDF
2010-03-23	Heritage Hills Water Composite	07-014-Comp	Chesapeake Services LTD.	PDF
2015-10-01	Water System Composite Plan	Figure 1	Chesapeake Services LTD.	PDF
N/A	Lakeshore 7 Vintage Views 24x36 Map	N/A	N/A	PDF
N/A	Lakeshore 7 Vintage Views 24x36 Map with Imagery	N/A	N/A	PDF
N/A	Lakeshore 7 Vintage Views 24x36 Map with Imagery	N/A	N/A	TIF
2002-08-30	Heritage Hills - Site Plan	Figure 2	Golder Associates	PDF
2002-05-02	Heritage Hills - Site Plan	Figure 2	Golder Associates	PDF
2002-08-30	Heritage Hills - Percolation Test	Figure 3	Golder Associates	PDF

Appendix D

Penalties Imposed by the Ministry of Environment and Climate Change Strategy



MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE STRATEGY
COMPLIANCE AND ENVIRONMENTAL ENFORCEMENT BRANCH

DETERMINATION OF ADMINISTRATIVE PENALTY

April 20, 2022

File: 2019-20
17170

Email: speedway17@shaw.ca

Vintage Views Developments Ltd.
1B – 2525 Dobbin Road
West Kelowna, BC V4Y 2G1

Attention: Vintage Views Developments Ltd.

RE: Determination of Administrative Penalty

Further to the Notice Prior to Determination of Administrative Penalty issued to you on March 2, 2022, I have now made a Determination in this matter.

After reviewing the information available to me, I have concluded Vintage Views Developments Ltd. has contravened Sections 50(1), 75(1) and 86 of the Municipal Wastewater Regulation (MWR) (B.C. Reg 87/2012) in respect of which an administrative penalty is being imposed pursuant to Section 115 of the *Environmental Management Act* (EMA) and the Administrative Penalties (EMA) Regulation. The amount of the penalty, reasons for my decision, payment, and appeal information are provided in the attached decision document.

If you have any questions with regards to this Determination, please contact me at Bryan.Vroom@gov.bc.ca.

Sincerely,

Bryan Vroom
for Director, *Environmental Management Act*

Ministry of Environment and
Climate Change Strategy

Compliance and Enforcement
Division
Compliance and Environmental
Enforcement Branch

Mailing Address:
2080-A Labieux Road
Nanaimo BC V9T 6J9

Telephone: 250-751-3100
Facsimile: 250-751-3103
Website: www.gov.bc.ca/env

Attachments:

2022-04-20 2019-20 Penalty Assessment Form

cc: Matthew Beckett, Senior Environmental Protection Officer
Matthew.Beckett@gov.bc.ca

Brady Nelles, Executive Director, Compliance and Environmental Enforcement
Brady.Nelles@gov.bc.ca



DETERMINATION OF ADMINISTRATIVE PENALTY

File: 2019-20

THE CONTRAVENTION

Name of Party:

Vintage Views Developments Ltd.

Contravention or Failure:

**TOTAL AMOUNT OF
ADMINISTRATIVE PENALTY:**

2019-20a: \$5,850
2019-20b: \$2,600
2019-20c: \$10,850

TOTAL: \$19,300

- A. Contravention of the Municipal Wastewater Regulation 87/2012 Section 50(1):**
50(1) If a malfunction or other condition results, or may result, in a discharge that fails to meet a requirement of this regulation, a discharger must notify a director immediately.

- B. Contravention of the Municipal Wastewater Regulation 87/2012 Section 75(1):**
75(1) A discharger of class A, B or C municipal effluent must meet the applicable municipal effluent quality requirements set out in this section and listed in Table 3. (TSS and BOD 10 mg/L or less)

- C. Contravention of the Municipal Wastewater Regulation 87/2012 Section 86:**
86 A discharger must monitor municipal effluent quality and quantity in accordance with section 87 [additional monitoring requirements] and Table 6, 7 or 8, as applicable, of this section.

Date of Contravention or Failure:

A. Section 50: May 28 and November 13, 2019

B. Section 75:

- April 9, 2019
- April 24, 2019
- July 9, 2019
- July 31, 2019
- October 22, 2019
- March 17, 2020
- July 28, 2020
- August 11, 2020

C. Section 86: April 9, 2019 to August 11, 2020

Directors Summary:

1. On March 2, 2022, Vintage Views Developments Ltd. (Vintage Views) was provided with a Notice Prior to Determination of Administrative Penalty (Notice), and offered an Opportunity to Be Heard (OTBH). Johnny Aantjes, Director of Vintage Views, provided delivery confirmation via email on March 4, 2022. I have relied on the information in the Penalty Assessment Form that was attached in the Notice when making this decision.
2. On April 4, 2020, Vintage Views was notified by email that the deadline to request an OTBH had passed, and was given additional time to request an OTBH, with a new deadline of April 6, 2022.
3. Vintage Views did not request an OTBH in this matter.

Reasons for Decision:

I have considered all the information submitted to me. I note that there is no record of an OTBH submission provided by Vintage Views. My evaluation has included a consideration of the matters listed in Section 7(1) of the Administrative Penalties (EMA) Regulation, as applicable. Based on this assessment, I offer the following comments:

4. I find that Vintage Views has contravened Section 50(1) of the MWR and I have imposed a penalty of \$5,850. Details of how I determined this penalty amount are provide in Part Two of the enclosed Penalty Assessment Form.
5. I find that Vintage Views has contravened Section 75 of the MWR and I have imposed a penalty of \$2,600. Details of how I determined this penalty amount are provided in Part Three of the enclosed Penalty Assessment Form.
6. I find that Vintage Views has contravened Section 86 of the MWR and I have imposed a penalty of \$10,850. Details of how I determined this penalty amount are provided in Part Four of the enclosed Penalty Assessment Form.

DUE DATE AND PAYMENT:

Payment of this administrative penalty is due within thirty (30) calendar days after the date of service of this Determination of Administrative Penalty. You will be sent an invoice, to be paid via cheque or money order made **payable to the Minister of Finance**. Payment can be mailed to Business Services at:

Attn: Fees Analyst
Ministry of Environment and Climate Change Strategy
PO Box 9377 Stn Prov Govt
Victoria BC V8W 9M6

Please do not mail cash. A \$30 service fee will be charged for dishonoured payments.

If payment has not been received in the thirty (30) calendar day period, interest will be charged on overdue payments at a rate of 3% + the prime lending rate of the principal banker to the Province per month and the amount payable is recoverable as a debt due to the government. In the event of non-payment you will be ineligible to apply for new or amended authorizations until payment is received in full. Further, I am authorized by Section 18 of EMA to cancel or suspend your current authorization in the event of non-payment and if I decide to do so, you will be notified accordingly.

RIGHT TO APPEAL:

If you disagree with this Determination, Division 2 of Part 8 of EMA provides information for how to appeal my decision to the Environmental Appeal Board (EAB). In accordance with EMA and with the EAB Procedures Regulation, the EAB must receive notice of the appeal no later than 30 calendar days after the date you receive this Determination of Administrative Penalty. The notice must include:

- a. Your name and address and the name of the person, if any, making the request on your behalf;
- b. The address for serving a document to you or the person acting on your behalf;
- c. The grounds for appeal;
- d. A statement of the nature of the order requested; and
- e. The notice of appeal shall be signed by you, or your counsel or agent if any, and be accompanied by a fee of \$25, payable to the Minister for Finance by cheque, money order or bank draft.

The Notice of Appeal form is available online at <http://www.eab.gov.bc.ca/forms.htm>. It should be completed and filed by registered mail or by leaving a copy at the EAB office during normal business hours. The street address is 4th Floor, 747 Fort Street, Victoria, BC, and the office is open from 8:30 am – 4:30 pm Monday through Friday, excluding public holidays.

Notice may also be sent by email or fax, provided the original Notice of Appeal and the appeal fee follows by mail. The mailing address of the EAB is:

Environmental Appeal Board
PO Box 9425 Stn Prov Govt
Victoria BC V8W 9M6

For further information, please consult the EAB website at <http://www.eab.gov.bc.ca>. If the administrative penalty is appealed to the EAB and the penalty is upheld, payment is due within 30 calendar days after receiving a copy of the order or decision of the appeal board, or, if the EAB has sent the matter back to the decision maker, within 30 calendar days after a new Determination of Administrative Penalty is served.

Dated this 20th day of April, 2022.



MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE STRATEGY
COMPLIANCE AND ENVIRONMENTAL ENFORCEMENT BRANCH

DETERMINATION OF ADMINISTRATIVE PENALTY

June 7, 2023

File: 2022-31
17170

Email: speedway17@shaw.ca

Vintage Views Developments Ltd. and Johnny Joseph Aantjes
1B – 2525 Dobbin Road
West Kelowna, BC V4Y 2G1

Attention: Vintage Views Developments Ltd.

RE: Determination of Administrative Penalty

Further to the Notice Prior to Determination of Administrative Penalty issued to you on April 17, 2023, I have now made a Determination in this matter.

After reviewing the information available to me, I have concluded Vintage Views Developments Ltd. and Johnny Joseph Aantjes has contravened Municipal Wastewater Regulation Sections 47(a), 50(1), 53(b) / 85, 55(5), 75(1), and 86 in respect of which an administrative penalty is being imposed pursuant to Section 115 of the *Environmental Management Act* (EMA) and the Administrative Penalties (EMA) Regulation. The amount of the penalty, reasons for my decision, payment, and appeal information are provided in the attached decision document.

Ministry of Environment and
Climate Change Strategy

Environmental Protection Division
Compliance & Environmental
Enforcement Branch

Mailing Address:
2080-A Labieux Road
Nanaimo BC V9T 6J9

Telephone: 250-751-3100
Facsimile: 250-751-3103
Website: www.gov.bc.ca/env

If you have any questions with regards to this Determination, please contact me at 250-739-8215 or Bryan.Vroom@gov.bc.ca.

Sincerely,



Bryan Vroom
for Director, *Environmental Management Act*

cc: Jurgén Deagle, Environmental Protection Officer
Jurgén.Deagle@gov.bc.ca

Chris White, Environmental Protection Officer
Chris.White@gov.bc.ca

Brady Nelles, Executive Director, Compliance & Environmental Enforcement
Brady.Nelles@gov.bc.ca

COSNOKAN@gov.bc.ca



DETERMINATION OF ADMINISTRATIVE PENALTY

File: 2022-31

Name of Party:

Vintage Views Developments Ltd. and
Johnny Joseph Aantjes

**AMOUNT OF ADMINISTRATIVE
PENALTY:**

\$197,500

Contraventions:

- A. Contravention of the Municipal Wastewater Regulation 87/2012 (MWR) Section 47(a):**
47 A discharger must not discharge unless the wastewater facility is operated and maintained by persons who
 - (a) have the education, experience and qualifications specified in the operating plan

- B. Contravention of the MWR Section 50(1):**
50(1) If a malfunction or other condition results, or may result, in a discharge that fails to meet a requirement of this regulation, a discharger must notify a director immediately

- C. Contravention of the MWR Section 53(b):**
53 A person must not discharge, or provide or use reclaimed water, unless the discharger monitors,
 - (b) the receiving environment, to determine compliance with this regulation

- D. Contravention of the MWR Section 55(5):**
55(5) A discharger must submit municipal effluent flow, municipal effluent quality and receiving environment monitoring data, and associated quality control data
 - (a) by electronic transmission directly to the central computer system of the ministry of the minister, or
 - (b) in a form acceptable to the director

- E. Contravention of the MWR Section 75(1):**
75(1) A discharger of class A, B or C municipal effluent must meet the applicable municipal effluent quality requirements set out in this section and listed in Table 3:

Table 3 — Municipal Effluent Quality Requirements

Requirement	Class A	Class B	Class C
BOD ₅ (mg/L)	10	10	45
TSS (mg/L)	10	10	45
fecal coliform (MPN / 100 mL)	median: 2.2 any sample: 14	400, if maximum daily flow is $\geq 37 \text{ m}^3/\text{d}$	n/a
turbidity (NTU)	average: 2 any sample: 5	n/a	n/a
nitrogen (mg/L)	Nitrate-N: 10 total N: 20	n/a	n/a

F. Contravention of the MWR Section 85(1):

85(1) Subject to subsection (2), a discharger must install monitoring wells in sufficient number and orientation, as determined by a qualified professional, to measure background and receiving environment water quality.

G. Contravention of the MWR Section 86:

A discharger must monitor municipal effluent quality and quantity in accordance with section 87 [*additional monitoring requirements*] and Table 6, 7 or 8, as applicable, of this section.

Table 7 — Monitoring Requirements
If Maximum Daily Flow $\geq 50 \text{ m}^3/\text{d}$ and $< 500 \text{ m}^3/\text{d}$

	Class A	Class B	Class C
flow frequency	twice / week	twice / week	twice / week
BOD ₅ , TSS frequency and type	twice / month grab samples	twice / month grab samples	monthly grab samples
fecal coliform frequency and type	weekly grab samples	weekly grab samples	none
turbidity frequency and type	weekly grab samples	none	none
nitrogen total, and NO ₃ (as N frequency and type)	twice / month grab samples	none	none

Date of Contravention or Failure:

A. MWR Section 47(a): continuously from September 1, 2020 to May 6, 2022

B. MWR Section 50(1): on thirty-three (33) occasions:

- October 31, 2020
- January 21, 2021
- March 31, 2021*
- April 21, 2021*
- April 30, 2021
- May 31, 2021
- August 10, 2021
- September 30, 2021**
- November 23, 2021*
- November 30, 2021*
- December 19, 2021*
- December 27, 2021*
- January 16, 2022
- January 23, 2022*
- February 13, 2022
- March 15, 2022
- March 21, 2022
- March 28, 2022
- April 6, 2022
- April 22, 2022**
- May 2, 2022
- May 3, 2022

(*) Indicates two contraventions on this day
(**) Indicates three contraventions on this day

C. MWR Section 53(b): continuously from August 19, 2020 to May 6, 2022

D. MWR Section 55(5): on twelve (12) occasions:

- 2020 Q3 & Q4*
- 2020 Annual*
- 2021 Q1 & Q2*
- 2021 Q3 & Q4*
- 2021 Annual*
- 2022 Q1 & Q2*

(*) Indicates two contraventions on this day

E. MWR Section 75(1): on the following thirty-two (32) occasions:

- October 31, 2020
- January 21, 2021
- March 31, 2021*
- April 21, 2021*
- April 30, 2021
- May 31, 2021
- August 10, 2021
- September 30, 2021**
- November 23, 2021*
- November 30, 2021*
- December 19, 2021*
- December 27, 2021*
- January 16, 2022
- January 23, 2022*
- February 13, 2022
- March 15, 2022
- March 21, 2022
- March 28, 2022
- April 6, 2022
- April 22, 2022**
- May 3, 2022

(*) Indicates two contraventions on this day

(**) Indicates three contraventions on this day

F. MWR Section 85(1): continuously from August 19, 2020 to May 6, 2022

G. MWR Section: 86: on the following 265 occasions:

- Week of August 19, 2020
- Week of August 26, 2020
- Week of September 02, 2020
- Week of September 09, 2020
- Week of September 16, 2020
- Week of September 23, 2020
- Week of September 30, 2020
- Week of October 07, 2020
- Week of October 14, 2020
- Week of October 21, 2020
- Week of October 28, 2020
- Week of November 04, 2020
- Week of November 11, 2020
- Week of November 18, 2020
- Week of November 25, 2020
- Week of December 02, 2020
- Week of December 09, 2020
- Week of December 16, 2020
- Week of December 23, 2020
- Week of December 30, 2020
- Week of January 06, 2021
- Week of January 13, 2021
- Week of January 27, 2021
- Week of February 03, 2021
- Week of February 10, 2021
- Week of February 17, 2021
- Week of February 24, 2021
- Week of March 03, 2021
- Week of March 10, 2021
- Week of March 17, 2021
- Week of March 24, 2021
- Week of March 31, 2021
- Week of April 07, 2021
- Week of April 14, 2021
- Week of April 21, 2021
- Week of April 28, 2021
- Month of May 2021*
- Week of May 05, 2021
- Week of May 12, 2021
- Week of May 19, 2021
- Week of May 26, 2021
- Month of June 2021*
- Week of June 02, 2021
- Week of June 09, 2021
- Week of June 16, 2021
- Week of June 23, 2021
- Week of June 30, 2021
- Week of July 07, 2021
- Week of July 14, 2021
- Week of July 21, 2021
- Week of July 28, 2021
- Month of August 2021*
- Week of August 11, 2021
- Week of August 18, 2021
- Week of August 25, 2021
- Month of September, 2021*
- Week of September 01, 2021
- Week of September 08, 2021
- Week of September 15, 2021
- Week of September 22, 2021
- Month of October 2021***
- Week of October 06, 2021
- Week of October 13, 2021
- Week of October 20, 2021
- Week of October 27, 2021
- Week of November 03, 2021
- Week of November 10, 2021
- Week of December 01, 2021
- Week of December 08, 2021
- Week of December 29, 2021
- Week of January 05, 2022
- Week of January 26, 2022
- Month of February 2022*
- Week of February 02, 2022
- Week of February 16, 2022
- Week of February 23, 2022
- Week of March 02, 2022
- Week of March 30, 2022
- Week of April 13, 2022
- Bi-weekly flow monitoring Aug 19, 2020- May 6, 2022 (x178)

(*) Indicates two contraventions on this day (***) Indicates four contraventions on this day

Directors Summary:

1. Vintage Views is a company registered in British Columbia (BC) that owns and operates a municipal wastewater collection and treatment system for a residential housing development at Heritage Hills, near Okanagan Falls, BC (Facility). Johnny Aantjes is the sole director/officer of Vintage Views.
2. The Vintage Views development was planned with full build-out of approximately 120 residences. The current number of homes connected to the wastewater system is unclear. Fifty-five current connections are listed in Vintage Views' December 6, 2021, amendment application but in a May 2022 pre-application meeting, the Owner stated that there are 90 connections.
3. There is a history of non-compliance at this Facility extending back to pre-2014. There have been three known releases of effluent from this treatment system including one that flowed off-site and down an adjacent road. After several warnings and a previous administrative penalty, the Facility remains out of compliance with the Municipal Wastewater Regulation (MWR). Vintage Views is currently subject to two pollution prevention orders.

4. The provincial regulatory authorization governing the discharge of wastewater from Vintage Views is Registration 17170 (Registration) issued pursuant to the *Environmental Management Act*, S.B.C. 2003, c. 53 (EMA).
5. The Registration was issued and is administered by the BC Ministry of Environment and Climate Change Strategy (Ministry).
6. The Registration authorizes a maximum discharge of 65 m³/day of secondary treated Class B effluent to the ground via a discharge field located on adjacent agricultural lands.
7. On April 17, 2023, the Ministry issued a Notice Prior to Determination of Administrative Penalty (Notice) and accompanying Penalty Assessment Form (PAF) to Vintage Views Developments Ltd. and Johnny Joseph Aantjes via email. When no response was received, the Notice and PAF were hand delivered by a Conservation Officer on May 2, 2023. In the Notice, Vintage Views Developments Ltd. and Johnny Joseph Aantjes was offered an Opportunity to be Heard (OTBH) and given thirty (30) days to request an OTBH.
8. On May 19, 2023, the Ministry emailed Vintage Views Developments Ltd. and Johnny Joseph Aantjes a courtesy reminder of the upcoming due date (June 1, 2023) to request an OTBH.
9. The Ministry did not receive an OTBH submission from Vintage Views Developments Ltd. and Johnny Joseph Aantjes by the due date.

Reasons for Decision:

10. The Ministry of Environment and Climate Change Strategy, Administrative Penalties Handbook – *Environmental Management Act* and *Integrated Pest Management Act* (AMP Handbook) provides high level guidance to Ministry staff considering the assignment of administrative penalties. Statutory decision makers consider, and decisions are informed by this document.
11. I have considered all of the information submitted to me. I note that there is no record of an Opportunity to be Heard submission provided by Vintage Views Developments Ltd. and Johnny Joseph Aantjes. My evaluation has included a consideration of the matters listed in Section 7(1) of the Administrative Penalties (EMA) Regulation.
12. As the contraventions were not disputed, and no information was provided by Vintage Views Developments Ltd. and Johnny Joseph Aantjes after Notice, the base penalty and factors remain the same as described in the Notice and PAF.

DUE DATE AND PAYMENT

Payment of this administrative penalty is due within thirty (30) calendar days after the date of service of this Determination of Administrative Penalty (Determination). You will be sent an invoice, to be paid via cheque or money order made **payable to the Minister of Finance**. Payment can be mailed to Business Services at:

Attn: Fees Analyst
Ministry of Environment and Climate Change Strategy
PO Box 9377 Stn Prov Govt
Victoria, BC V8W 9M6

Please do not mail cash. A \$30 service fee will be charged for dishonoured payments.

If payment has not been received in the thirty (30) calendar day period, interest will be charged on overdue payments at a rate of 3% + the prime lending rate of the principal banker to the Province per month and the amount payable is recoverable as a debt due to the government. In the event of non-payment you will be ineligible for a permit or approval, or to amend a permit or approval, until the penalty is paid in full. Further, I am authorized by Section 18 of EMA to cancel or suspend your current authorization in the event of non-payment and if I decide to do so, you will be notified accordingly.

RIGHT TO APPEAL

If you disagree with this Determination, Division 2 of Part 8 of EMA provides information for how to appeal my decision to the Environmental Appeal Board (EAB). In accordance with EMA and with the EAB Procedures Regulation, the EAB must receive Notice of the Appeal no later than 30 calendar days after the date you receive this Determination of Administrative Penalty. The notice must include:

- a. Your name and address and the name of the person, if any, making the request on your behalf;
- b. The address for serving a document to you or the person acting on your behalf;
- c. The grounds for appeal;
- d. A statement of the nature of the order requested; and
- e. The notice of appeal shall be signed by you, or your counsel or agent if any, and be accompanied by a fee of \$25, payable to the Minister for Finance by cheque, money order or bank draft.

The Notice of Appeal form is available online at <https://www.bceab.ca/resources/forms-and-templates>. It should be completed and filed by registered mail or by leaving a copy at the EAB office during normal business hours. The street address is 4th Floor, 747 Fort Street, Victoria, BC, and the office is open from 8:30 am – 4:30 pm Monday through Friday, excluding public holidays.

Notice may also be sent by email or fax, provided the original Notice of Appeal and the appeal fee follows by mail. The mailing address of the EAB is:

Environmental Appeal Board
PO Box 9425 Stn Prov Govt
Victoria, BC V8W 9M6

For further information, please consult the EAB website at <https://www.bceab.ca>. If the administrative penalty is appealed to the EAB and the penalty is upheld, payment is due within 30 calendar days after receiving a copy of the order or decision of the appeal board, or, if the EAB has sent the matter back to the decision maker, within 30 calendar days after a new Determination of Administrative Penalty is served.

PUBLICATION:

Seven days after the date of service, this Determination will be published on the Natural Resource Compliance and Enforcement Database (NRCED) Website: <https://nrcead.gov.bc.ca/>

Dated this 7 day of June, 2023.

Appendix E

Operation and Maintenance Plans

**HERITAGE HILLS
WASTEWATER TREATMENT
PLANT
PENTICTON, B.C.**

**Phase I
Operating Manual**

Prepared By:
Ecofluid Services Ltd.
101-366 E. Kent Ave. S.
Vancouver, BC, V5X 4N6
T: 604 662-4544
F: 604 662-4564

November 2003

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1 INTRODUCTION

1.1 GENERAL

This manual has been written to provide operating procedures for the Ecofluid USBF wastewater treatment plant at Heritage Hills and to provide the operator with a reference guide. It is always to be interpreted and followed with reference to rules and regulations provided by Workers Compensation Board of B.C. and British Columbia Water & Wastewater Association.

The plant is a single sludge denitrification, extended aeration process that incorporates *upflow sludge blanket filtration* (USBF). It is composed of the components below:

1.	1	SB	Screen Basket
2.	1	IPT	Influent Pump Tank
3.	2	P1	Influent Pump
4.	1	BR	Bioreactor (c/w 1 clarifier)
5.	1	SST	Sludge Storage Tank
6.	1	MF	Microfilter
7.	1	MFBP	Microfilter Backwash Pump
8.	1	MFSP	Microfilter Sludge Pump
9.	2	AB	Air Blowers
10.	1	EPT	Effluent Pump Tank
11.	1	PS	Effluent Pump Station
12.	2	EP	Effluent Pump
13.	1	PLCM	PLC Monitoring System

1.2 DESIGN PARAMETERS

The plant is designed to process domestic wastewater having influent and effluent parameters equal to or better than those listed in Table 1 below:

Table 1: Influent and Effluent Design Parameters

Parameter		Unit	Influent	Effluent
Flow	Average Day	[m ³ /d]	65	
	Peak Hour	[M ³ /H]	10	
BOD ₅	Average Day	[KG/D]	18	
	Average Day	[MG/L]	270	< 10
TSS	Average Day	[KG/D]	18	
	Average Day	[mg/l]	270	< 10
N-NH ₄	Average Day	[KG/D]	2	
	Average Day	[mg/l]	30	< 1
Temperature	Minimum	[deg C]	8	
pH			6.5-8.5	

2 BIOLOGICAL TREATMENT PROCESS

2.1 INTRODUCTION

Influent wastewater is treated by an aerobic process by microorganisms such as zoogloea, protozoans and rotifers. These microorganisms consume the carbonaceous pollutants and produce flocculent particles that can be separated from the water in the clarifier. Microorganisms require a continuous source of oxygen to perform their function. They utilize carbon, nitrogen and phosphorus in the ratio of 100:5:1. If these nutrients are not present in the exact ratio, the final effluent may contain residues, or the operation may suffer from nutrient deficiencies.¹ The Bioreactor volume provides the necessary retention time to allow for the maximum utilization of nutrients.

In the aeration compartment, nitrogen in the form of ammonia is oxidized to nitrate in a process referred to as *nitrification* and in the anoxic compartment it is converted to nitrogen gas by biological *denitrification*. Phosphorus is removed by a biological process referred to as "*luxury uptake*" – by exposing the mixed liquor to alternating oxide and anoxic conditions. Under these conditions, the cells store more energy in the form of phosphorus than needed for their survival. If strictly oxide conditions are maintained during clarification, phosphorus will be retained by the cells and will be removed with the excess sludge. Unlike most other methods of clarification, the oxide conditions are maintained by the USBF clarification process.

The activated sludge treatment process relies on simultaneously maintaining a number of **operating parameters** within specified ranges by controlling the **process input variables** and by maintaining the **influent composition**.

2.2 OPERATING PARAMETERS

SRT (Sludge Residence Time) or Sludge Age: Sludge age is one of the most important parameters because it determines the nature of the bacteria in the system and ensures that the process of nitrification occurs effectively.² A relatively constant sludge age of 25-30 days is maintained in the USBF plant and is regulated by wasting a set amount of sludge (WAS) periodically from the clarifier.

MLSS (Mixed Liquor Suspended Solids): MLSS concentration is allowed to vary within the provided range. If a consistent increasing or decreasing trend becomes evident a small decrease or increase in the WAS rate will be required to compensate.

F/M (Food to Microorganism) Ratio or Plant Loading: The F/M ratio indicates the degree of the plant loading. As the growth rate of microorganisms is proportional to the amount of food available, by maintaining a constant sludge age and allowing the MLSS concentration to vary, the F/M ratio will tend to stabilize.

¹ Nitrogen and phosphorus are usually present in larger quantities than required.

² Sludge age of at least 15 days is sufficient to ensure complete reliable nitrification.

DO_{ac} (Dissolved Oxygen in Aeration Compartment): The mixed liquor dissolved oxygen concentration in the aeration compartment (DO_{ac}) should be between 2.5 to 4.5 mg/l. This will help to ensure complete nitrification and carbonaceous oxidation, and it will help to prevent the growth of filamentous bacteria. The blowers are designed to deliver more air than required and their air delivery capacity may need to be controlled (by variable frequency drive or by a timer). Aeration periods should not be less than 30 minutes, as DO concentration takes some time to be reached. For best results, DO measurements should be taken when the influent rate is at *average* loading.

DO_{an} (Dissolved Oxygen in Anoxic Compartment): In the anoxic compartment the dissolved concentration should fall to less than 0.5 mg/l and preferably as close to zero as possible.

SSV (Sludge Settled Volume): Although MLSS should be determined and F/M ratio calculated on a regular basis, day-to-day changes of the plant operation can be determined quickly by conducting a settled sludge volume test. A rough MLSS can be calculated by multiplying the value for SSV by factor of ten (10).

SVI (Sludge Volume Index): The sludge volume index provides a further measure of the settling characteristics of the sludge. Values of less than 120 are generally regarded as good.

pH: Biological activity is very pH dependent. Nitrification in particular is strongly inhibited outside the pH range of 6.5 – 8.5. During the production of nitrite, hydrogen ions are produced and result in a lowering of the pH of the sludge, i.e. alkalinity is consumed. During denitrification, however, hydrogen ions are consumed and result in a partial recovery of the alkalinity lost during the nitrification process.

Sludge Colour: As sludge flocs start to develop, the mixed liquor should start losing its grey colour and appear light brown. As they continue to build up, the flocs should get larger, develop a somewhat earthy odour and should change to a brown colour.

Table 2 – Plant Optimum Operating Parameters

PARAMETER		UNITS	OPTIMUM RANGE
Sludge Age	SRT	[days]	25 – 30
Mixed Liquor Suspended Solid	MLSS	[mg/l]	4000 – 6000
Food to Microorganism Ratio	F/M		0.05 - 0.13
Mixed Liquor Dissolved Oxygen (Aeration Compartment)	DO _{ac}	[mg/l]	2.5 – 4.5
Mixed Liquor Dissolved Oxygen (Anoxic Compartment)	DO _{an}	[mg/l]	< 0.5
Settled Sludge Volume @ 30 min. – OPTIMUM	SSV	[ml/l]	400 – 600
Settled Sludge Volume @ 30 min. – MINIMUM	SSV	[ml/l]	300
Settled Sludge Volume @ 30 min. – MAXIMUM	SSV	[ml/l]	800
Sludge Volume Index @ 30 min.	SVI	[ml/g]	80 – 120
Mixed liquor pH	pH		6.5 – 8.5
Sludge Colour			Brown

2.3 PROCESS INPUT VARIABLES

Oxygen Input: Considering the importance of dissolved oxygen concentration for the processes of carbonaceous removal (*nitrification* and *denitrification*), careful management of oxygen input is self-evident. Enough air must be supplied to ensure complete nitrification while not supplying too much thereby inhibiting denitrification. Monitoring the final effluent for ammonia, nitrate and nitrite nitrogen concentrations provides a sensitive measure of the required oxygen input. High ammonia (>5 mg/l) and low nitrite-nitrate nitrogen concentrations indicate that the nitrification process is not operative due to insufficient oxygen to completely oxidize ammonia. Low ammonia (<5 mg/l) and high nitrite-nitrate nitrogen concentrations indicate that denitrification is not operative due to over-aeration.³

RAS (Return Activated Sludge Recycle Ratio): The *recycle ratio* is a volumetric ratio of the plant's activated sludge recycled from the clarifier to the influent flow rate. USBF plants use high RAS rates (2.5 – 3.5) which facilitate the high rate of denitrification and also serve to accommodate high peak flows.

WAS (Waste Activated Sludge): The plant's wasting regime should be aimed at maintaining a sludge age of between 25 to 30 days. The quantity of wasted sludge will vary according to plant loading and sludge concentration.

2.4 INFLUENT COMPOSITION

To ensure trouble free operation it is important that materials harmful to the treatment biology are kept to a minimum. The materials to avoid are as follows:

- oil and fat (in concentrations higher than 30 mg/l)
- paints and paint thinners
- acids and alkalis
- petroleum products
- high strength cleaners and detergents
- large quantities of chlorine (e.g. pool chlorine)

³ This may also be due to low temperature or other causes.

3 PROCESS DESCRIPTION

3.1 HEADWORKS

Wastewater enters the plant into an influent screen basket located within influent pump tank. The screened sewage enters influent pump tank provided with level switches, temperature probe and two pumps. Controlled by the level switches, the influent is pumped from the pump tank to the anoxic compartment of the bioreactor. The screen basket is regularly inspected and manually raked and cleaned when required.

3.2 BIOREACTORS

The bioreactor anoxic compartment is equipped with coarse bubble air sparger designed to provide conditions for the sewage mixing with the activated sludge, recycled by means of an airlift RAS pump from the bottom of the clarifier compartment. From the anoxic compartment the mixed liquor flows to an aeration compartment equipped with fine bubble aeration elements. Aerated, it eventually enters the USBF prism shaped clarifier.

The mixture of microbial cells and water enters the clarifier at the bottom and, as it rises, upward velocity decreases until the flocs of cells become stationary and thus form a filtering media. A high degree of filtration efficiency is achieved as colloid and very fine particles are filtered out. As the flocs become large and heavy, they descend to the bottom of the clarifier and subsequently are transferred back into the anoxic zone. Upflow sludge blanket filtration has a substantially higher specific rate of separation than sedimentation. In addition, the technology accommodates high peak flows and flow swings in a self-regulating manner - the higher the flow, the higher sludge flocs rise and the larger the filtration area becomes.

3.3 CLARIFIERS

3.3.1 CLARIFIER BLOW-OFF

While the operation of the clarifier is fully self-regulating, it is important that the clarifier be inspected regularly and any developing problems corrected. No or low flow through the clarifier or loss of RAS flow may cause sludge settling within the clarifier. Prolonged settling may cause anoxic conditions, which in turn may result in nitrogen gas formation due to denitrification. Rising nitrogen gas may carry lumps of sludge to the surface of the clarifier. Should the condition occur it can be rectified by reversing the flow of air by closing "RAS valves" for a short period of time (15-30 seconds).

3.3.2 CLARIFIER SKIMMING

It is also possible that the surface of the clarifier will occasionally contain internally and externally carried-over materials, such as light plastic, corn kernels, leaves and fats and oils.⁴ These should be periodically skimmed off the surface of the clarifiers. To that end the clarifier is provided with a skimmer and periodically as required, the surface of the clarifier is skimmed by opening "Skimmer valves". The skimmings are to be transferred to sludge storage tank.

⁴ The system will "absorb" as much as 30 mg/l of influent fats and oils.

3.4 MICROFILTRATION

Microfilters efficiently remove residual suspended solids carried over from the biology. Experience has shown that microfilters are capable of removing up to 90% of the suspended solids. This not only improves the plant effluent parameters but more importantly, it significantly enhances the plant operating reliability. Further, the reduction of the suspended solids content simultaneously results in the decrease of other undesirable constituents such as BOD₅ and COD. Values of TSS contributing to BOD₅ and COD depend on activated sludge mineralization and stabilization but typically average 0.5 mg BOD₅/mg TSS and 1.2 mg COD/mg TSS. Statistical results indicate that 40 to 80% of the effluent BOD₅ is directly attributable to the total suspended solids content.

The flow from the bioreactors through the microfilter into effluent pump tank is by gravity. No mechanical forces are imposed on the sludge floc causing its break up and high filtration efficiency is achieved. One stand-alone microfilter within the process room is provided. Filtered effluent flows by gravity to the existing effluent holding tank and effluent disposal pump station.

3.5 SLUDGE HANDLING

Excess sludge generated in the bioreactors is transferred by means of airlift pumps from the bottom of the clarifiers to a sludge storage tank. Since the age of activated sludge in the bioreactors is in excess of 25 days, less excess sludge is generated, it is stabilized and its dewatering characteristics significantly improve. Typically, the sludge in the storage tank is thickened by gravity to 1.5-2.5%. Thickened stabilized sludge is periodically pumped out of the storage tank and hauled away for disposal. Sludge storage decant is returned to the influent pump tank.

3.6 AIR SUPPLY

Air to biology, airlift pumps and coarse bubble spargers is supplied by a set of air blowers (one operating and one standby). The blowers are provided with a common pressure indicator and a low pressure switch to annunciate air delivery failure. The blowers are supplied with emergency power should the grid power fail.

3.7 CONTROL SYSTEM

The plant is provided with a PLC monitoring system, which monitors equipment running status and receives data from transmitting instruments. Supplied by Ecofluid where not noted otherwise the entire process and operation control and alarm system consists of the supply of the following:

Influent Pump Tank	Level Switches	Lo	- pumps stop
		Hi	- lead pump starts
		Hi/Hi	- lag pump starts
	Float Level Switch	Hi/Hi/Hi	- alarm
Influent Pumps	Temperature Probe		
	Motor Overload		- alarm
	Hour Meter		
Air Blowers	Pressure Switch	Lo	- alarm
	Pressure relief valve		
	Pressure indicator		
Microfilter	Motor Overloads		- alarm

	Level sensor	Hi	- starts backwash
		HiHi	- alarm
LC, MCC, Modem, 30 min.	UPS		

By Others

Effluent Pump Station	Level Switches	Lo	- pumps stop
		Hi	- lead pump starts
		Hi/Hi	- lag pump starts
Effluent Pumps	Float Level Switch	Hi/Hi/Hi	- alarm
	Motor Overload		- alarm

3.9 FUTURE EXPANSION

The above influent flow represents 1/3 of the future anticipated flow and it is processed by one USBF bioreactor module. Two identical additional modules will be installed in two subsequent phases in the future as and when requested. Some of the equipment of this Phase 1 is sized for the plant ultimate capacity.

4 BIOREACTOR START-UP



ALWAYS CONSULT EQUIPMENT MANUAL PRIOR TO INDIVIDUAL EQUIPMENT START AND OPERATION.



ALWAYS CHECK FOR METHANE GAS WHEN OPENING TANKS AND CONFINED SPACES OR WHEN ENTERING ROOMS WHERE CONDITIONS FOR METHANE GAS FORMATION EXIST. ALWAYS VENT BEFORE ENTERING.



ALWAYS REFER TO EQUIPMENT MANUAL AND FOLLOW EQUIPMENT VENDOR'S INSTRUCTIONS AND SAFETY PROCEDURES.

Bioreactor will initially be started-up using seed-activated sludge from an extended aeration biological treatment plant (ideally another USBF plant), the sludge index (SVI) of which is no higher than 150 to 180 ml/g. Seed activated sludge must be fresh. If not aerated it should be used within 24 hours of collection. Improper seed sludge may significantly increase the start-up time. The seed sludge will typically be taken from the clarifier and thickened prior to transportation. Upon arrival on site the seed sludge is diluted and added to the water filled aeration compartment of the bioreactor. The more seed sludge the better; settled sludge volume (SSV) after seeding should be at least 300 ml/l.


4.1 INITIAL START-UP


1. Fill bioreactors with water. (Avoid using chlorinated water for initial fill-up)
2. Start air blower.
3. Start RAS pumps.
4. Gradually pump seed sludge into the aeration compartments of the bioreactors (ensure sludge does not overflow).
5. Seeded bioreactor is ready to receive influent wastewater. Loading with wastewater should start with a minimum of delay.


Notes:

- The “start-up” is simply an act of balancing the process input variables against the plant loading to obtain the desired operating parameters. No two plant loadings are ever exactly alike and the “pre-setting” of variables is not possible. The plant must simply be observed during the “run-up” period and input variables adjusted from time to time as needed.
- Expect light white foam to form on top of aeration compartment. Depending on the plant loading the foam will subside after a period of approximately 2 to 4 weeks.

5 PLANT OPERATION


 ALWAYS CONSULT EQUIPMENT MANUAL PRIOR TO INDIVIDUAL EQUIPMENT START AND OPERATION.

 ALWAYS CHECK FOR METHANE GAS WHEN OPENING TANKS AND CONFINED SPACES OR WHEN ENTERING ROOMS WHERE CONDITIONS FOR METHANE GAS FORMATION EXIST. ALWAYS VENT BEFORE ENTERING.

 ALWAYS REFER TO EQUIPMENT MANUAL AND FOLLOW EQUIPMENT VENDOR'S INSTRUCTIONS AND SAFETY PROCEDURES.

The plant should be regularly inspected with the frequency dictated by variables that include the plant's biological maturity and by the nature of the incoming sewage.

5.1 ROUTINE EQUIPMENT INSPECTION

 ALWAYS REFER TO AND FOLLOW VENDOR'S EQUIPMENT MANUAL AND INSPECTION INSTRUCTIONS.

Screen Basket

- Open hatch, winch up and check screen basket
- Remove screenings if required
- Lower screen basket into position (ensure that the influent is not by-passing the screen basket)
- Hose down the screenings pad

Pump Tanks and Pumps

- Open hatch and check the level.
- Verify that level switches are functioning.
- Occasionally start the pumps and check the flows. If flows are not at rated capacity check for debris clogging the impellers or the pipes.
- Ensure the pumps are correctly connected to their mounting couplings.
- Periodically remove the pumps and check for wear and tear.
- Check pump hour meters.

Bioreactors

- Open hatches and check and ensure the aeration pattern is uniform.
- Ensure effluent weirs are clean.
- Skim any floating substances from the surface of the clarifier.
- If required "blow-off" the bottom of the clarifier.
- Check the RAS airlift pipes for proper flow.
- Hose down any sludge buildup on the bioreactor and clarifier walls.

Sludge Storage Tank

- Open hatch and check the supernatant overflow trough; ensure it is clean.
- Using “sludge judge”, occasionally check level of thickened sludge. A disposal truck should be called if the tank is approximately 80% full.

Air Blowers

- Check air filters - clean if required.
- Check blowers and motors for excessive vibration, signs of leaking oil or signs of wear.
- Check and adjust belt tension if necessary.
- Check oil levels and fill to correct level if necessary.
- Check hour meters.

Microscreen Filters

- Open aluminum cover and observe the screen and its components in operation through at least one cycle.
- Observe and confirm levels are ‘normal’.
- Visually inspect screen cloth for signs of wear and tear.

Controls

- All component devices should be periodically checked for their proper function. Refer to vendor’s operating and maintenance instructions

5.2 PLANT MONITORING

To ensure good plant performance it is essential that a regular sampling and sample analysis program be established. Caution must be taken to ensure that the samples are representative. The 15th edition of “Standard Methods” should be consulted for proper sampling methodology and analytical procedures, however the following guidelines for taking both composite and grab samples should be observed:

- Samples should be taken at locations of completely mixed stream flow whenever possible.
- Particles greater than 6 mm (1/4”) should be excluded.
- To retard biological activity, samples should be refrigerated if not analyzed immediately.
- Composite of refrigerated samples should not be used for settling tests because the settling characteristics change with time.
- Samples should be analyzed as soon after collection as possible for best results.
- Larger volumes of samples than required for analysis should be collected.

A schedule of tests to be performed is to be determined by others. A minimum recommended frequency is summarized below:

Recommended Schedule of Testing

	INFLUENT	AERATION	ANOXIC	EFFLUENT
BOD ₅	M	-	-	M
TSS	M	-	-	M
MLSS	-	M	-	-
DO	-	1-2 per W *	1-2 per W *	-
N-NH ₄		-	-	M
N-NO ₃	-	-	-	M
N _{total}	-	-	-	M
P _{total}		-	-	-
SSV	-	1-2 per W	-	-
pH	M	-	-	M
Temperature	M	M	-	-

D - denotes daily

W - denotes weekly schedule

M - denotes monthly schedule

(*) - maintenance of correct DO in the aeration and anoxic compartments is one of the most important conditions of the USBF process proper function

All data should be recorded on log sheets and stored in a safe place.

5.3 TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	ACTION REQUIRED
Foaming of liquor in aeration compartment	Low MLSS concentration	<ul style="list-style-type: none"> Add activated sludge if possible. Self-correcting in time.
	High dissolved oxygen content	<ul style="list-style-type: none"> Break the foam down with water. Reduce air supply to air diffusers.
Sludge floating on the surface of the clarifier and/or escaping with effluent	High dissolved oxygen content	<ul style="list-style-type: none"> Break the foam down with water. Reduce air supply to air diffusers.
	High MLSS concentration	<ul style="list-style-type: none"> Increase sludge wasting rate.
	High influent flow	<ul style="list-style-type: none"> Find cause (high infiltration, etc).
	High sludge volume index (SVI)	<ul style="list-style-type: none"> Seed with sludge with lower index if possible. Self-correcting in time.
	Inflow of toxic materials	<ul style="list-style-type: none"> Report to owner.
	Malfunction of activated sludge recycle (high or no recycle)	<ul style="list-style-type: none"> Check RASP pump function or line for plugging. Reduce flow if too high.
Low mixed liquor dissolved oxygen content in aeration compartment	Air blower malfunction	<ul style="list-style-type: none"> Start standby blower.
	Prolonged electrical power supply interruption	<ul style="list-style-type: none"> Report to owner.
	High MLSS concentration	<ul style="list-style-type: none"> Increase sludge wasting rate.
	High influent flow	<ul style="list-style-type: none"> Find cause (high infiltration, etc).
High mixed liquor dissolved oxygen content in aeration	High air supply	<ul style="list-style-type: none"> Reduce air supply to air diffusers.
High ammonia (> 5 mg/l), low nitrite-nitrate nitrogen (< 1 mg/l) effluent concentration	Insufficient oxygen is available to oxidize ammonia	<ul style="list-style-type: none"> Increase air supply.
Low ammonia (< 2 mg/l), high nitrite-nitrate nitrogen (15-20 mg/l) effluent concentration	Over-aeration	<ul style="list-style-type: none"> Reduce air supply. Check activated sludge recycle rate.
High ammonia (> 5 mg/l), high nitrite-nitrate nitrogen (> 20 mg/l) effluent concentration	Low MLSS concentration	<ul style="list-style-type: none"> Add activated sludge (with as low SVI as possible) Self-correcting in time.
Sludge does not settle during SSV test	High SVI	<ul style="list-style-type: none"> Seed with sludge with lower index if possible. Self-correcting in time.
	Inflow of toxic materials	<ul style="list-style-type: none"> Report to owner.
	Low dissolved oxygen in aeration	<ul style="list-style-type: none"> See above.

6 SAFETY AND PERSONAL HYGIENE



The following are general guidelines on safety and hygiene. Refer to and always follow Workers Compensation Board of B.C. and British Columbia Water & Wastewater Association rules, regulations and guidelines.

6.1 SAFETY

Safe work practices include good habits, quality safety equipment and proper training. Safety equipment should include but is not limited to the following:

- Rubber or rubber-lined gloves
- Safety glasses for protection against splashing
- Safety harness and rope to be used whenever working around the tanks
- Rubber boots and rubber protective clothing
- Gas detectors

When working on equipment, ensure that the power is disconnected before accessing equipment components. Switches should be locked out to prevent accidental start.

When working within confined spaces and tanks, always test for toxic gases and vent the space prior to entry. A team approach is essential. A standby operator should be present to raise the alarm and to assist in the recovery of personnel in the event of an accident. Under no circumstances should the standby operator enter the confined space if problems develop.

6.2 PERSONAL HYGIENE

Raw sewage and streams from various stages of the treatment plant contain human pathogenic organisms. Without limiting the forthcoming, it is essential that anyone coming into contact with sewage from any stage of the process take the following precautions to prevent exposure to any human pathogenic organism present:

- Wash hands with disinfectant soap before eating, drinking, smoking etc.
- Wear long-sleeved shirts and trousers to prevent sewage contact with skin
- Avoid immersing hands by using gloves and collectors
- Wear eye glasses/safety goggles
- Never store or consume food or drink in close proximity to sewage or sewage samples (never store samples in the same refrigerator as foodstuffs or drinks)
- Remove clothing splashed or wet with sewage and exchange for clean as soon as possible; wash with disinfectant soap
- Ensure that cuts and abrasions are immediately treated with antiseptic and suitably covered

APPENDIX A - Samples of Parameter Calculations

SLUDGE AGE

The sludge age or mean cell residence time is a measure of how long the sludge has been held in the bioreactor. It is calculated based on the following formula:

$$R_s = V \times X_m / (Q_w \times X_w + Q_e \times X_e)$$

Where:

R_s	=	sludge age [days]
V	=	aeration compartment volume [m^3]; $V_{\text{module}} = 39 m^3$
X_m	=	MLSS concentration [mg/l]
X_e	=	effluent suspended solids [mg/l]
Q_w	=	waste sludge flow rate [m^3/day];
Q_e	=	effluent flow [m^3/day],
X_w	=	waste sludge suspended solids [mg/l]

Example:

The bioreactor's aeration compartment volume is $39 m^3$. Measured effluent flow is $50 m^3/d$, MLSS concentration is $5,000 \text{ mg/l}$, effluent suspended solids concentration is 10 mg/l and waste sludge suspended solids concentration is $5,000 \text{ mg/l}$. How much sludge has to be wasted daily to achieve 30 days sludge age:

$$Q_w = (V \times X_m / R_s - Q_e \times X_e) / X_w = (39 \times 5000 / 30 - 50 / 1000 \times 10) / 5000 = 1.3 m^3/\text{day}$$

FOOD TO MICROORGANISM (F/M) RATIO

The Food to Microorganism ratio is a measure of the organic loading of the plant. It is calculated as follows:

$$F/M = Q_r \times S_r / V / X_m / P$$

Where:

F	=	food entering the plant [kg/day]
M	=	mass of bacteria in system [kg]
Q_r	=	influent flow rate [m^3/day]
S_r	=	influent BOD_5 concentration [mg/l]
V	=	aeration compartment volume [m^3]
X_m	=	MLSS concentration [mg/l]
P	=	volatile solids fraction

Example:

Assuming the plant influent flow of 50 m³/d and MLSS concentration of 5000 mg/l, influent BOD₅ concentration of 200 mg/l and the volatile solids fraction of 65%, F/M ratio can then be calculated as follows:

$$F/M = 50 \times 200 / 39 / 5000 / 0.65 = 0.08$$

SSV (30 MINUTE SETTLED SLUDGE VOLUME)

The mixed liquor sample should be taken during the aeration cycle after the blowers have been in operation for at least 15 minutes. Return sludge sample should be taken after the RAS airlift pump has been in operation for at least 5 minutes. Settling ability of the mixed liquor and return sludge is determined by allowing 1000 ml of well mixed samples of each to settle in 1000 ml graduated cylinders. SSV is equal to the volume occupied by the sludge after 30 minutes.

SVI (SLUDGE VOLUME INDEX)

The sludge volume index provides a further measure of the settling characteristics of the sludge. It is defined as the volume in milliliters occupied by 1 gram of sludge, dry weight, after settling for 30 minutes in a 1000 ml graduated cylinder. After MLSS concentration has been determined by a laboratory, the SVI can be calculated as follows:

$$SVI = SSV \text{ (expressed as ml/l)} \times 1000 / MLSS \text{ (expressed as mg/l)}$$

Example:

Measured SSV is 600 ml/l and MLSS concentration is 5000 mg/l

$$SVI = 600 \times 1000 / 5000 = 120 \text{ (ml/g)}$$

Values of SVI of less than 120 are generally considered good.

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VINTAGE VIEWS DRAIN FIELD

Operations and Maintenance Manual



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1.0 Introduction

The purpose of this Operation and Maintenance (O&M) Manual is to provide the operator with instructions on how to safely and consistently operate and service the drainfield system. If followed carefully, this manual provides the operator with all the necessary information to avoid public health hazards and prevent negative environmental impacts.

A copy of this manual should be located in:

- 1) The wastewater treatment facility - for immediate reference,
- 2) The owner's office - for management reference and inspections.

Every operator should recognize that in taking on this role of operation and maintenance, they are taking responsibility for the health and well-being of the community they serve; as such, they should take the time to carefully read and understand the information provided in this document.

In British Columbia, discharges of effluent to land more than 22.7 m³/day and discharges to surface water are authorized under the Environmental Management Act and regulated by the Municipal Wastewater Regulation.

1.1 Operation vs. Maintenance

Operation and maintenance are two different things. **Operations** are activities which are required to make the system function (for example: switching the pump on or off and regular checking). However, **Maintenance** is a regularly scheduled (weekly, monthly, or yearly) activity that conserves the system and prevents breakdowns (for example: refilling the generator's oil). Both operation and maintenance activities are necessary.

Monitoring, actively looking at how things are going, by collecting data, calculating statistics and making comparisons, is an important task for all operators. Monitoring is required in order to decide whether some activities must be done, such as resetting the system or performing maintenance.

Unfortunately, if there is a problem, it is often because of incorrect operation or maintenance. Some common faults are summarised in the Failure Charts in *Section 3.2* and are designed to help the operator identify the possible source of a problem.

1.2 Scope

This operation and maintenance manual is limited in scope to the drain field, force main, force main valving, and air valves. The wastewater treatment system, pumps, and controls are outside of the scope of this manual - refer to EcoFluid's 2003 Operating Manual for this.

The contents of the various sections are:

Section 2	<ul style="list-style-type: none"> • A general description of the existing system • A general description of the new field (including design data and system capacity) • A layout sketch • A list of other useful documents and drawings
------------------	--

<p>Section 3</p>	<ul style="list-style-type: none"> • Detailed operations, maintenance, and troubleshooting instructions for every part & component within the field (including valves & pipe lines) <ul style="list-style-type: none"> ○ How to perform weekly, monthly, quarterly, and yearly O&M procedures ○ Failure charts (in order to identify possible problem sources)
<p>Section 4</p>	<ul style="list-style-type: none"> • Detailed instructions for discharge monitoring • Detailed instructions for receiving environmental monitoring • Detailed procedures for performing sampling & analysis • Reporting requirements for effluent flow • Reporting requirements for quality control • Reporting requirements for environmental monitoring data

1.3 Operator Requirements

Compliance with the MWR requires that the system be operated and maintained by persons who are certified by the EOCP, with the education, experience, and qualifications necessary for the system.

This system has been classified as a Level 3 system and requires the system to be operated and maintained by an operator at this level.

Operator Training, Qualifications, and Certification

Operator courses are available through course providers throughout the province. For a full list of recognized providers, visit the EOCP Customer Relationship Management System (CRM).

1.4 Confined Spaces

Prior to undertaking any O&M procedures, operators must familiarize themselves with applicable safety practices for this system. Any confined spaces must only be accessed using appropriate confined space entry methods by trained personnel. No one should enter confined spaces unless they have received confined space training and have all necessary and required safety apparatus and personnel on-site.

IMPORTANT:
Cleaning and Maintenance of HIGH hazard level confined spaces can be done without entry.

2.0 System Description

This section provides a description of the drain field system. There is also a treatment plant and pumping station, which is beyond the scope of this manual. An existing manual, EcoFluid's 2003 Operating Manual should be referenced for these other components.

If a problem is found with any of the parts or systems, refer to *Section 3.0: Operations, Maintenance, and Troubleshooting*.

2.1 System Overview

Two 100 mm forcemains carry treated effluent to the drain field, with each forcemain serving half of the infiltration chamber laterals. The pumps connected to the forcemains alternate, dosing the upper, then lower half of the laterals.

An air valve and flow meter are installed on each forcemain near the lift station. The air valves allow air from the forcemain to discharge when the pipe is filling, and more importantly, allow air to enter when the pipe is draining.

The drain field is designed to evenly apply treated effluent (10 mg/L BOD, 10 mg/L TSS) over the infiltration chamber area, with a maximum daily flow of 65 m³/d.

The field is designed based on a dose volume of 4710 L per cycle, with a pumping rate of 12 to 15 L/s. The dose duration should not exceed 15 minutes.

2.2 Drainfield Laterals

Each lateral is made up of a 50 mm SCH 40 PVC pipe housed inside an infiltrator chamber. The pipes have 3/16" orifices spaced at 1.2 m. Orifices alternate at 12 and 6 o'clock, except for the last orifice in each run, which is at 6 o'clock. This allows for improved distribution and to allow for the laterals to drain after each dose. Each orifice has an orifice shield to prevent soil scouring.

In order to slow and even percolation and improve effluent treatment each lateral has been lined with a minimum 150 mm of clean coarse sand.

Each lateral is equipped with a ball valve and cleanout to allow for line flushing. Valves can also be used for adjustment of flow to provide even squirt heights. Squirt heights are designed to be 8 ft, and when tested, ranged from 6 – 9 ft during commissioning.

The infiltration chambers are rated for a maximum load of 16,000 lbs/axle with 1 ft of cover which cannot be exceeded. Traffic over the infiltration chambers should be minimized to reduce compaction of the soil. Compacted soils prevent oxygen from getting through the soil, reducing the effectiveness of the additional effluent treatment that occurs in the drainfield. Compacted soils are also less insulative, and increase the chances of the drainfield freezing in the winter.

Table 2: Specifications of the Effluent Drainfield:

Description	Values	Remarks
Number of zones	2	
Numbers of doses per day at full design flow	14	7 Doses Per Zone Per Day
Dose Volume (l)	4710	

Description	Values	Remarks
Diameter of laterals (mm)	50	
Length of each lateral (m)	55.2	
Number of laterals per zone	3	
Total length of laterals per zone (m)	165.6	
Total length of laterals per field (m)	331.2	
Trench bottom width (m)	0.9	

3.0 Operations, Maintenance, and Troubleshooting

As discussed in *Section 1.1*, operations and maintenance (O&M) are defined differently. Most problems can be avoided when operators carefully follow the correct O&M procedures. Common faults and problems have been summarized in the failure charts, which may also assist in identifying the possible source of an error.

To assist operators, instructions are laid out in a table format that includes:

- General maintenance instructions
- Points of attention: this includes any particular cautions or information useful to the operator,
- Frequency: how often the activity should be performed (for example: every 4 months).

IMPORTANT:

ALL O&M activities, repairs, reports, and failures must be recorded in the logbook. Templates forms are provided in Appendix A.

Note: Step by step instructions for how to perform the maintenance activities have not been included as it is assumed the trained operator will be familiar with how activities such as 'checking the sewer main' should be carried out.

All O&M activities, problems, and failures must immediately be recorded in the logbook during or after completion to ensure the system's records are accurate and up-to-date. Accurate records are essential for quickly finding and fixing problems that may arise. The following forms can be found in *Appendix A* and can be photocopied and used in the logbook.

- **Form 1:** Operational Instructions for Operators
- **Form 2:** Registration Form for Maintenance
- **Form 3:** Record of Failures
- **Form 4:** Repaired, Replaced, or Lubricated Items

3.1 Start-Up, Operations, and Maintenance Procedures

3.1.2 Distribution piping

The distribution piping requires minimal maintenance and virtually no operational involvement. As a result, only maintenance instructions are given in the following sections.

Table 4: Maintenance Chart for the Sewage Forcemain

MAINTENANCE INSTRUCTIONS	POINTS OF ATTENTION	FREQUENCY
Check the forcemain valves for leaks and smooth operation.		Every 6 months
Service air valves	See manufacturers manual	Yearly

How to service the air valves: Refer to the manufacturer's Installation, Operation, & Maintenance Manual located in the appendix of this document.

How to check the forcemain valves: The valves should be checked with frequencies as outlined in *Table 4*. The valves can be checked by opening the lid of the riser and checking for any leaks from any of the fittings or the head of the valve assembly.

3.1.3 Pumps and Controls

Detailed O&M of the pumps and controls are outside the scope of this document; however flow should be recorded and checks should be made daily to ensure the pumps are dosing the proper volume to the field as intended, as well as to provide the records needed.

Table 5: Maintenance Chart for the Dosing Chamber and Controls

MAINTENANCE INSTRUCTIONS	POINTS OF ATTENTION	FREQUENCY
1. Check pump data	System should not exceed 7 doses per day. Pump Run Time should not exceed 15 minutes Pump rate should be 12 to 15 L/s Volume per dose should be 4710 L	Daily

3.1.5 Sewage Disposal Fields

The sewage disposal fields require virtually no operational involvement. However, it is important to observe and report any problems.

Traffic over the field should be minimized. Traffic compaction will reduce oxygen transfer into the soil and lower the insulative value of the soil, increasing risk of freezing. Less oxygen in the soil will reduce the additional treatment provided in the soil matrix.

Table 6: Maintenance Chart for the Sewage Disposal Fields

MAINTENANCE INSTRUCTIONS	POINTS OF ATTENTION	FREQUENCY
1. Check the liquid levels in the surrounding monitoring wells.	High water marks, biomat build up.	Every 6 months
2. Check Squirt Height	Squirt height should be relatively even across the field, and 6 to 9 ft high.	Annually
3. Flush Laterals		As Needed

4. Exercise valves

Annually

How to Check the Monitoring Well: The monitoring wells should be checked with frequencies as outlined in *Table 6*. To check the monitoring wells you will need a flashlight and measuring tape. The monitoring well is equipped with a threaded cap for easy removal for inspection. Unscrew the cap and using a flash light look inside the monitoring well to see if any water is present. If water is present use a measuring tape to record the depth from the top of the cap. This value is to be recorded in the supplied maintenance logs. Special attention should be paid to any high water marks or biomat buildup.

How to Check Squirt Height: The squirt height should be checked with frequencies as outlined in *Table 6*. Squirt height can be checked by replacing the threaded cleanout cap on one of the laterals with a cap that has been drilled with a 3/16" orifice on the centre of the cap. By running the pump on manual, measure the height that the effluent squirts out of the orifice about the ground level. Squirt height is designed to be 6 to 9 ft above finished grade, and relatively even across the field.

How to Flush Laterals: The laterals should be flushed with frequencies as outlined in *Table 6*. To flush the laterals, close the ball valve at the start of the lateral and unscrew the threaded cap at the end of the lateral. Using a water jet, flush from the start of the lateral to the end to pull any debris out of the lateral. DO NOT flush from the end of the lateral to the start. Doing so could force any debris further into the lateral compounding any possible issues.

3.2 Troubleshooting

3.2.3 Distribution Piping

Table 9: Troubleshooting Chart for the forcemain

PROBLEM	POSSIBLE SOLUTION
Distribution Piping is Plugged.	Flush forcemain
Leakage at air valve	See Troubleshooting table in manufacturer's manual.

3.2.4 Sewage Disposal Fields

Table 10: Troubleshooting Chart for the Sewage Disposal Fields

PROBLEM	POSSIBLE SOLUTION
Laterals not draining.	<ol style="list-style-type: none"> 1) Flush the laterals 2) Check monitoring wells for high ground water
Higher squirt height	<ol style="list-style-type: none"> 1) Check pump discharge rates 2) Flush the laterals 3) Throttle lateral ball valve to achieve even distribution.

Lower squirt height

- 1) Check pump discharge
 - 2) Flush forcemain
 - 3) Check for plugged automatic distribution valve
 - 4) Flush the laterals
-

3.3 Emergency Response Plan

3.3.4 Distribution Piping

Contact the Owner immediately if the distribution piping is leaking or plugged.

3.3.6 Sewage Disposal Fields

If a disposal field fails, contact the Owner immediately.

4.0 System Monitoring

Section 28 of the Waste Management Act and the Municipal Wastewater Regulation (MWR) requires that effluent flow and quality data and receiving environment monitoring data **be retained on file for inspection by the Ministry of Environment at any time**. It also requires that the data be submitted to the Ministry of Environment for their records. Data must be submitted to the Ministry of Environment **twice per year**.

Record keeping and reporting is necessary to have information on what has happened. The use of accurate records and reports is very important for regulatory agencies and to future system designers that may need to work on the system. The records must be detailed enough to allow evaluation of performance and to track the development of problems. The records and reports also give a good check on completed tasks and those left to complete.

IMPORTANT:
Keeping a detailed logbook and recording & reporting effluent data is mandatory!

4.1 Effluent Quality and Receiving Environment Monitoring Program

4.1.1 Discharge Monitoring

The facility is designed to discharge Class B effluent to the ground, permitted for 65 m³/d. MWR requires the following monitoring, at the frequencies shown. A continuous monitoring system must also be installed and operating. The preferred effluent sampling location is the inlet to the pump chamber.

Effluent Class	Maximum daily flow range (m ³ /d)	Frequency of data submission to Director	Flow	BOD ₅ , TSS	Fecal Coliforms	Turbidity	Nitrogen Total, NO ₃ as N
B	>50 m ³ /d	2x / Y	2x / W	2x / M	Weekly	None	None

Explanation of terms: 2x/Y = Two times per year; 2x/W = Two times per week

4.1.2 Receiving Environment Monitoring

See Groundwater Monitoring Program prepared by Associated Environmental which outlines the requirements for this.

4.1.3 Sampling and Analysis Procedures

Sampling and analysis must be performed to MWR requirements. From MWR Section 57:

(2) A discharger must ensure that sampling and flow measurements are carried out in accordance with standard practice and, for this purpose, may have regard to

- (a) the standards and procedures as set out in the sampling and laboratory manuals posted to the ministry website, or
 - (b) if the standards and procedures described in paragraph (a) do not apply, the standards and procedures as described in *British Columbia Field Sampling Manual: 2003 – For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples*, as published by the ministry and as amended from time to time.
- (3) A discharger must ensure that analysis is carried out in accordance with standard practice and, for this purpose, may have regard to
- (a) the standards and procedures as described in *British Columbia Environmental Laboratory Manual: 2009*, as published by the ministry and as amended from time to time, or
 - (b) suitable alternative procedures as authorized by the Resources Information Standards Committee of the ministry of the minister responsible for the [Forest Act](#).
- (4) A discharger must submit laboratory analyses required by this regulation in accordance with the Environmental Data Quality Assurance Regulation, B.C. Reg. 301/90.
- (a) sampling and flow measurements should be carried out in accordance with the procedures described in “British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples” as published by the Ministry of Environment, Lands and Parks, or by a suitable alternative procedure as authorized by the manager, and
 - (b) analysis should be carried out in accordance with the procedures described in *British Columbia Environmental Laboratory Manual for the Analysis of Waters, Wastewaters, Sediments and Biological Materials*, as published by the Ministry of Environment, Lands and Parks, or by suitable alternative procedures as authorized by the manager.

4.2 Spares

See *Appendix D: Tools & Spare Parts Forms*. See also *Appendix E*

4.3 Maintenance, Monitoring, and Inspection Data Log Templates

See *Appendix B: Logbook Forms* for templates that can be photocopied.

Appendix A

Logbook Forms

Form 1: Operational Instructions

Frequency	System Component	Description of Task	Point of Attention	Form No. to be filled in	Article Number in O&M Manual
Daily	Pump Chamber	Record Daily Flow	Verify operation and volumes		3.1.3
Every 6 Months	Distribution Piping	Check Valves for Leaks and Operation		2	3.1.2
	Monitoring wells	Check liquid levels in surrounding monitoring wells		2	3.1.5
Yearly	Whole system	Exercise valves		2	3.1.5
	Disposal Fields	Check squirt height		2	3.1.5
	Forcemain	Service air valves		2	3.1.2
As Needed	Disposal Field	Flush Laterals		2	3.1.5

Form 2: Registration Form for Maintenance

Frequency	System Component	Description of Task	Date	Date	Date	Date	Article Number in O&M Manual
Daily	Pump Chamber	Record Daily Flow					3.1.3
Every 6 Months	Distribution Piping	Check Valves for Leaks and Operation					3.1.2
	Monitoring wells	Check liquid levels in surrounding monitoring wells					3.1.5
Yearly	Whole system	Exercise valves					3.1.5
	Disposal Fields	Check squirt height					3.1.5
	Forcemain	Service air valves					3.1.2
As Needed	Disposal Field	Flush Laterals					3.1.5

Appendix B

Record Drawings

ASSOCIATED ENGINEERING

VINTAGE VIEWS DRAINFIELD



DRAWING INDEX

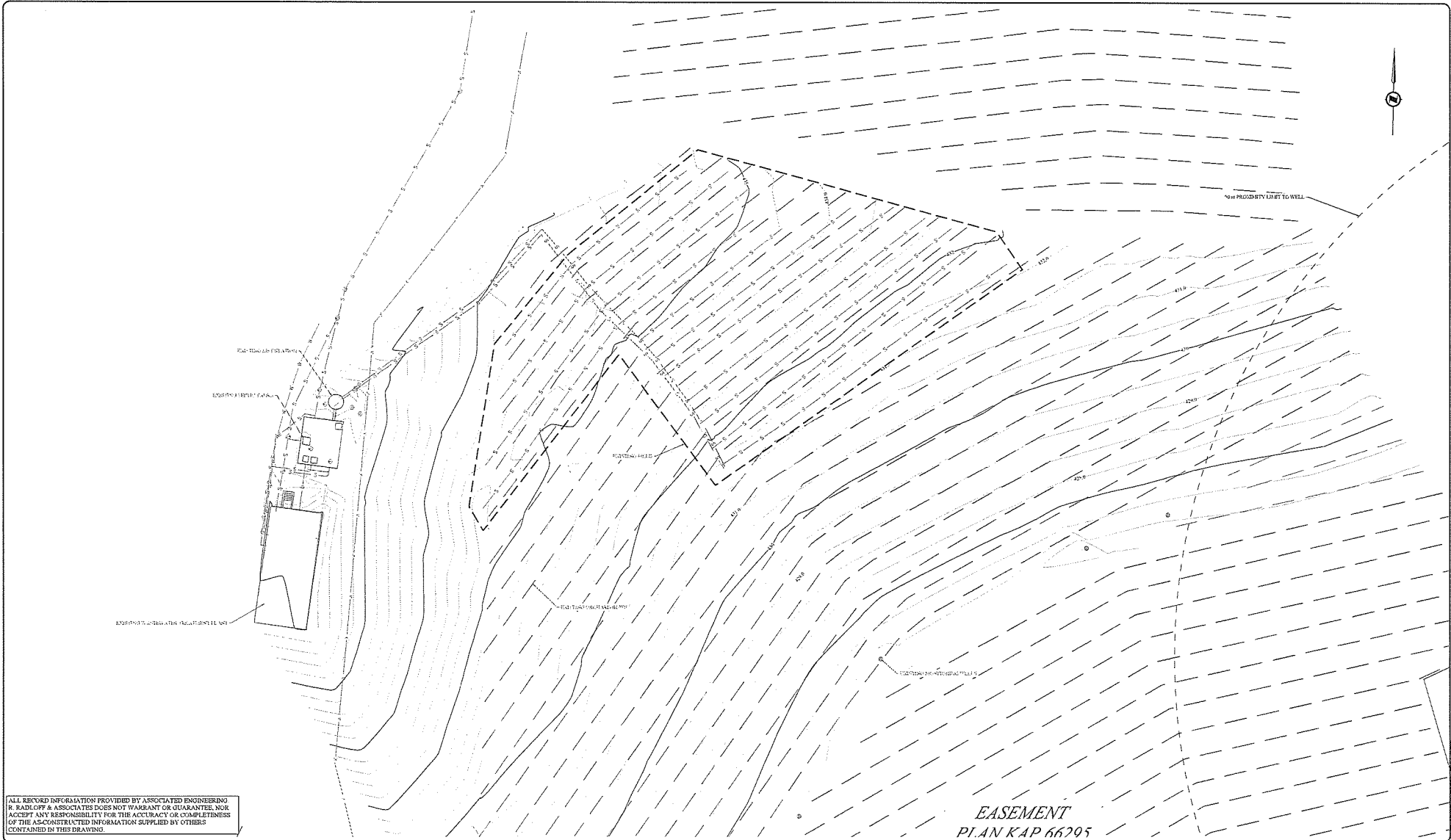
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C01	EXISTING SITE PLAN
C02	PROPOSED SITE PLAN
C03	FORCEMAIN PLAN & PROFILE
C04	INFILTRATION CHAMBER PLAN & PROFILES
C05	DETAILS

LEGEND	
WATERLINE	
SANITARY SEWER	
SAN FORCEMAIN	
STORM SEWER	
DITCHING	
CULVERT	
LEGAL BOUNDARY	
FENCE LINE	
ROAD SHOULDER	
POWERLINE	
TELEPHONE LINE	
GASLINE	
ORCHARD ROW	
UTILITY POLE	
VALVE	
CURB STOB	
BLOW-OFF HYDRANT	
FIRE HYDRANT	
WATER WELL	
MANHOLE SANITARY/STORM	
CLEAN OUT	
OLD IRON PIN	
SURVEY HUB	
SURVEY BENCHMARK	
TEST PIT	

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ISSUED FOR RECORD

PROJECT #: 800-008-03
 DATE: AUG 2021



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 Everett, WA 98201, P.O. Box 164
 Ph: (206) 862-8861, Fax: (206) 862-8828

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APPROVED BY	DATE
R.P.	200717

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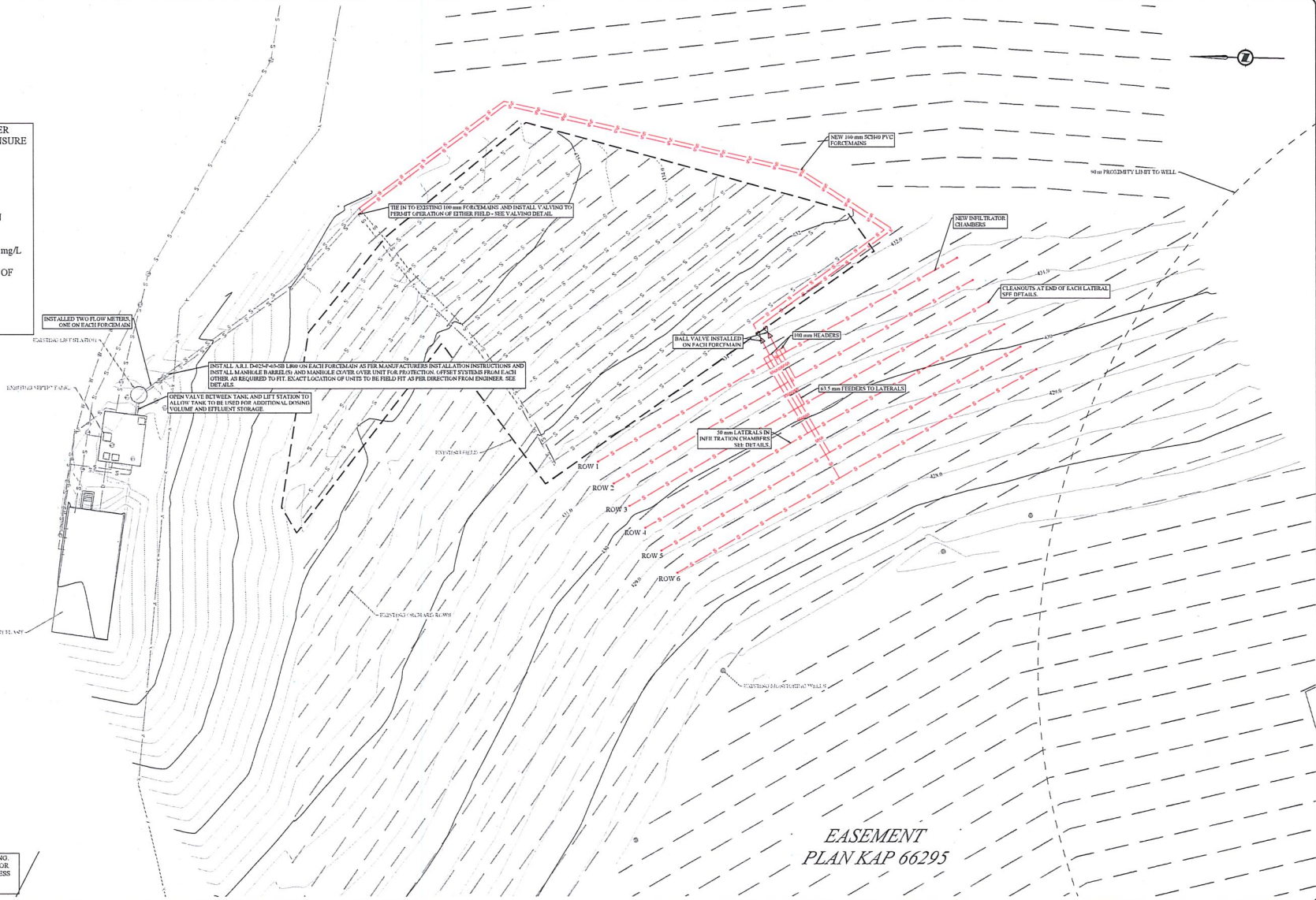
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 HORIZ. VERT.
 SHEET C01 OF C05
 ENG PROJECT NUMBER 800-008-03

PROJECT
**VINTAGE VIEWS ONSITE
 WASTEWATER**
 SHEET TITLE
EXISTING SITE PLAN

DESIGN BASED ON DOSE VOLUME OF 4710 L PER CYCLE AND PUMPING RATE OF 12 TO 15 L/s. ENSURE DOSE DURATION DOES NOT EXCEED 15 MIN.

ADJUST LIFT STATION CONTROL SYSTEM AS REQUIRED TO SATISFY DOSE VOLUME AND PUMPING RATE ABOVE.

- FIELD LENGTH BASED ON INFILTRATION TESTS PROVIDED BY ASSOCIATED ENGINEERING LTD.
- FIELD DESIGN ASSUMES 10 mg/L BOD, 10 mg/L TSS EFFLUENT
- FIELD DESIGN ASSUMES INSTALLATION OF EFFLUENT FILTER BY OTHERS ON THE WASTEWATER TREATMENT PLANT DISCHARGE. EFFLUENT FILTER TO BE SERVICED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.



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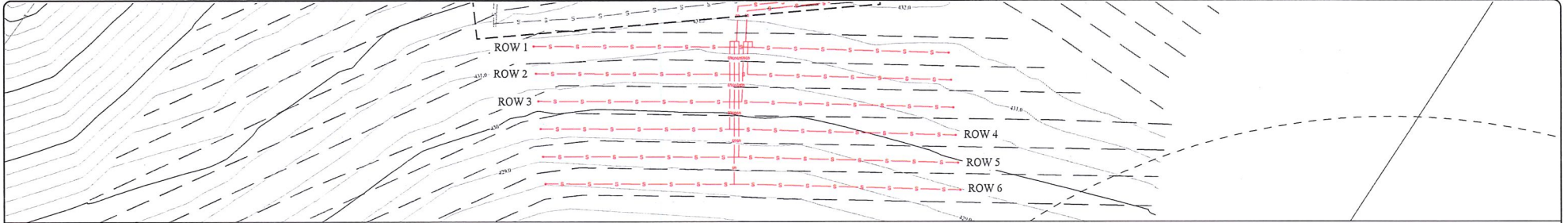
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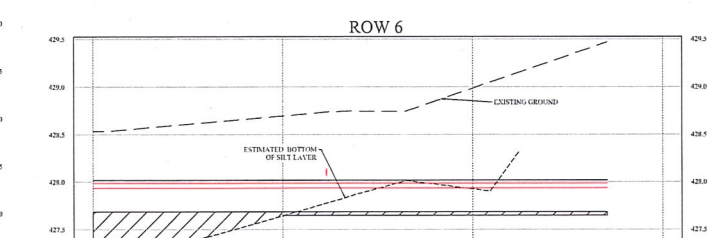
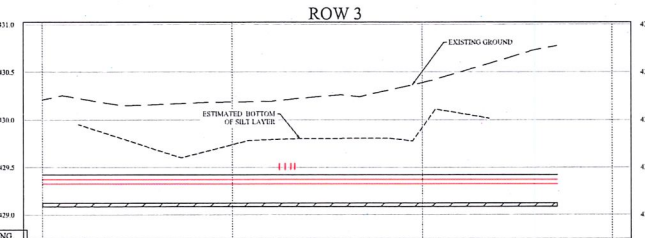
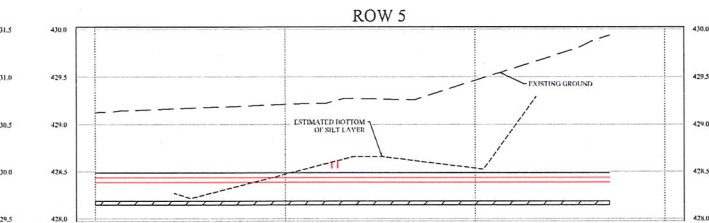
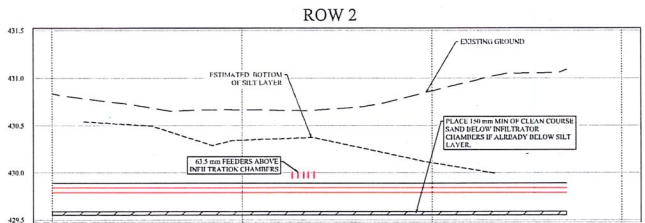
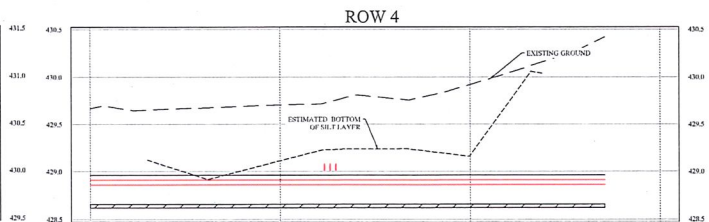
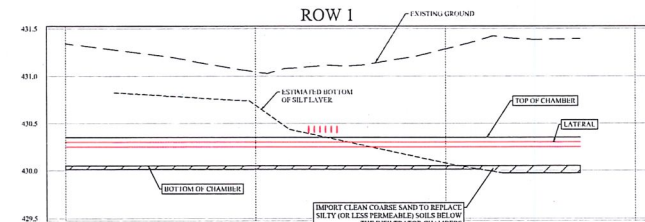
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SCALE
HORIZ 1:250 SCALE VERT.
SHEET C02 OF C05
ENG PROJECT NUMBER 800-008-03

PROJECT
VINTAGE VIEWS ONSITE WASTEWATER
SHEET TITLE
PROPOSED SITE PLAN



TOP FIELD INFILTRATOR CHAMBER PROFILES (FROM TOP TO BOTTOM) BOTTOM FIELD



CLEAN COARSE SAND TO BE APPLIED MIN 150 mm THICK EVERYWHERE UNDER INFILTRATORS. DEPTH OF CLEAN COARSE SAND TO PROVIDE CONTACT WITH NATURAL SAND LAYER WHERE REQUIRED.

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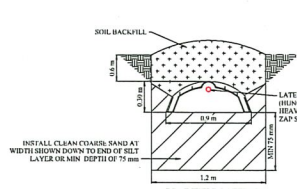
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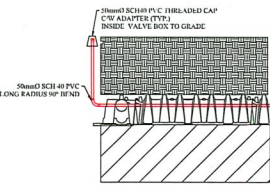
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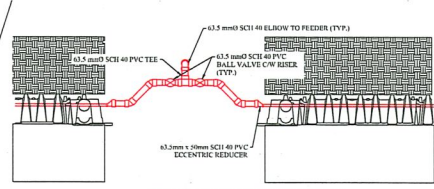
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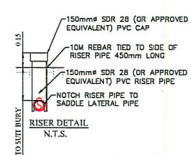
DRAINFIELD LATERAL LAYOUT DETAIL
 NOTE:
 LATERAL ORIFICES TO BE 3/16" ORIFICES TO ALTERNATE AT 4 O'CLOCK AND 12 O'CLOCK EXCEPT FOR THE LAST ORIFICE IN EACH RUN WHICH TO BE AT 4 O'CLOCK. ORIFICE SHIELDS INSTALLED ON ALL ORIFICES ORIFICES TO BE SPACED AT 1.2m.



DETAIL 1: SIDE VIEW AT LATERAL END
N.T.S.

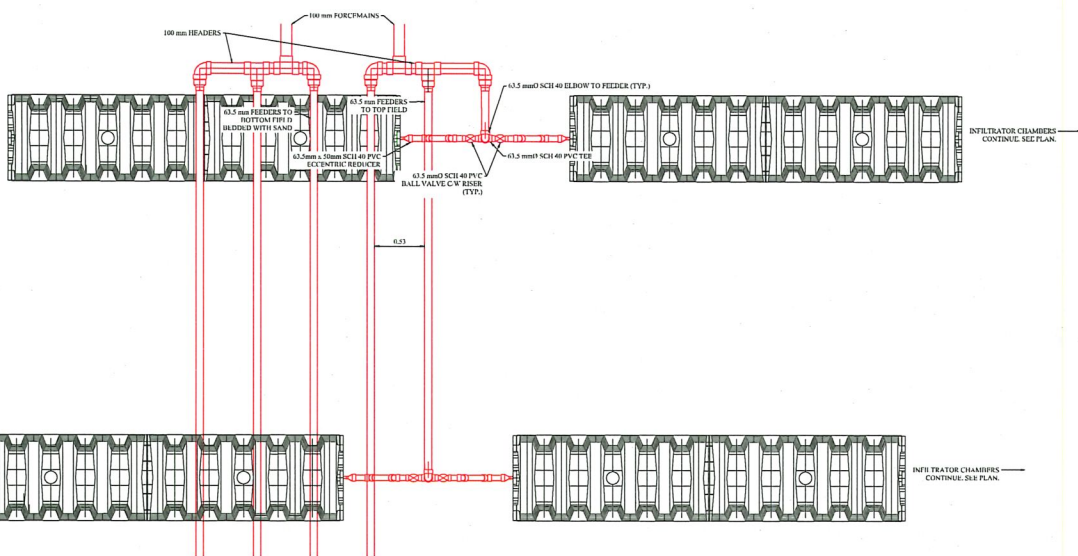


DETAIL 2: SIDE VIEW AT CENTRE WITH FEEDER
N.T.S.



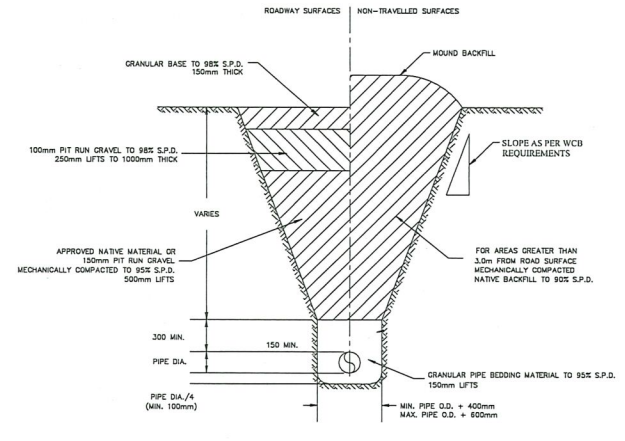
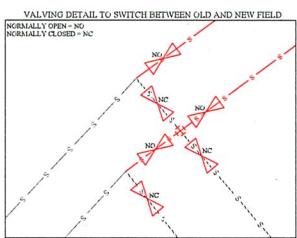
RISER DETAIL
N.T.S.

DETAIL 3: TOP DOWN VIEW OF HEADERS AND TYP. LATERAL
N.T.S.



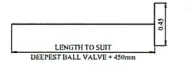
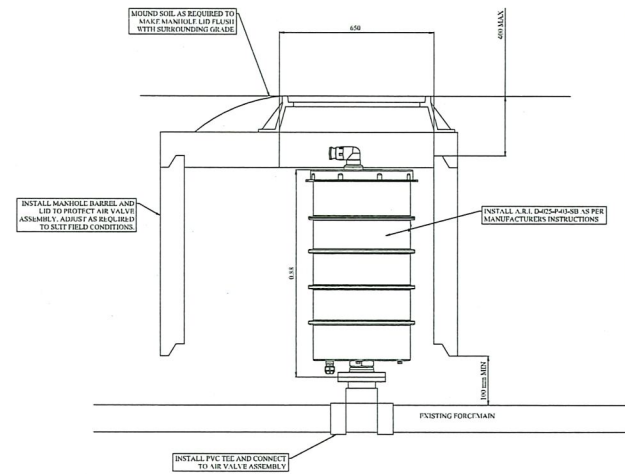
CLEAN COARSE SAND SPECIFICATION

SIEVE SIZE	PERCENT PASSING
9.5 mm (3/8")	100
4.75 mm (No. 4 sieve)	95 to 100
2.36 mm (No. 8)	80 to 100
1.18 mm (No. 16)	50 to 85
600 µm (No. 30)	25 to 60
300 µm (No. 50)	10 to 30
150 µm (No. 100)	< 7
75 µm (No. 200)	< 3



TYPICAL FORCEMAIN TRENCH
N.T.S.

- NOTES:
1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
 2. REFER TO SPECIFICATIONS FOR COMPLETE BACKFILL & RESTORATION DETAILS



- NOTES:
1. VALVE KEY TO BE CONSTRUCTED OF STEEL TYPING OF SUITABLE DIMENSION.
 2. BASK OF VALVE KEY TO BE CUT WITH OPERATING NOT ON BALL VALVE.
 3. CONTRACTOR TO PROVIDE 2 BALL VALVE KEYS

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Radloff R. Radloff & Associates Inc.
 Engineering, Planning & Consulting
 1820 3rd Avenue
 Prince George, B.C. V2L 1G4
 Ph: (250) 562-2851, Fax: (250) 562-8828

NO.	(YYMMDD)	BY	REVISIONS	ENG.

DESIGN BY	DATE	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
EAG	200710	EAG	200710	RPR	200710	RPR	200717

CLIENT
ASSOCIATED ENGINEERING

SCALE	SCALE
HORIZ.	VERT.
C05	C05

ENG PROJECT NUMBER: 800-008-03

PROJECT: VINTAGE VIEWS ONSITE WASTEWATER
 SHEET TITLE: DETAILS

Appendix C

Permits



June 29, 2009

Tracking Number: 7782
Authorization Number: 17170

Vintage Views Developments Ltd.
102-330 Ellis ST
Penticton, BC V2A 4L7

Dear Vintage Views Developments Ltd.,

Re: Registration under the Municipal Sewage Regulation

In response to your letter dated November 8, 2006, and pursuant to the Municipal Sewage Regulation your registration RE 17170 is hereby amended to reflect the transfer from MOUNTAIN LANDCO. LTD. to VINTAGE VIEWS DEVELOPMENTS LTD. In response to your letter dated October 25, 2006, the discharge rate has been reduced from 195 m³ per day to 65 m³ per day. Receipt of your completed registration update under the Municipal Sewage Regulation is acknowledged. Pursuant to Part 2, Section 3 of the Municipal Sewage Regulation, the effective date of registration of this discharge is November 8, 2006. On and following the effective date of registration you are exempt from section 6(2) and 6(3) of the *Environmental Management Act* and may discharge waste to the environment from this facility provided all conditions and requirements of the regulation are met.

Please indicate the ministry authorization number shown above on all future correspondence with the Ministry regarding this facility.

Your attention is respectfully directed to the terms and conditions specified in the regulation. Contravention of any of the conditions is a violation of the *Environmental Management Act* and may result in prosecution. If the regulation does not cover all waste streams at the site, additional authorizations may be required under the *Environmental Management Act*.

An annual registration fee will be determined according to the Permit Fees Regulation and you will be receiving an annual invoice from the ministry for payment of this fee. Payment of all fees due is necessary to comply with the Municipal Sewage Regulation.

Pursuant to the Municipal Sewage Regulation, Sec 8(2), you are required to sample your monitoring wells in accordance with your submitted environmental impact assessment, "Infiltration Testing at Proposed Effluent Disposal Field Heritage Hills Okanagan Falls BC" prepared by Golder Associates dated October 1, 2002 as follows:

1. Groundwater levels be measured in all monitoring wells on a quarterly basis.
2. Groundwater samples be collected from BH02-1 (deep), BH02-2 and BH02-3 (deep) on an annual basis.
3. The samples be submitted for analysis of the following parameters: total phosphorus, ortho phosphorus, total dissolved phosphorus, total nitrogen, nitrate nitrogen, ammonia nitrogen, pH, conductivity, sodium chloride and total and fecal coliform.
4. The results of the monitoring program be reviewed annually by a qualified professional hydrologist.

The facility discharges Class B effluent to the ground. Pursuant to the Municipal Sewage Regulation Schedule 6 Table 2, your class B effluent for flows greater than 50 cubic meters per day: flows should be monitored two times per week, grab samples of your effluent be sample two times per month for Biological Oxygen Demand (10mg/L) and Total Suspended Solids (10mg/L) and submit your effluent data twice per year by electronic transmission directly to the ministry's central computer system. The site reference number for this discharge is E248514.

This decision to specify more stringent standards or requirements under the Municipal Sewage Regulation may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Registration under the Municipal Sewage Regulation should not be construed as a representation that the works are adequately designed or will satisfy the regulation. It is the responsibility of the discharger to ensure that the works are adequately designed, constructed and operated and that the discharge quality complies with the regulation. Registration under the regulation is without prejudice to any additional works that may be required or any additional requirements that may be specified by the Director. The Director may also issue Orders under the *Environmental Management Act*.

Also, pursuant to the Municipal Sewage Regulation, Section 16 (1) the "Heritage Hills WWTP Penticton, BC USBF Wastewater Treatment Plant Operating Plan" prepared by Ecofluid Systems Inc, dated January 16, 2003 has been submitted.

An Irrevocable Clean Letter of Credit for a sum not exceeding the aggregate of Ninety Eight Thousand Dollars (Cdn. \$98,000.00) has been established.

Registration under the regulation is without prejudice to any additional requirements that may be specified by the Director. The Director may also issue Orders under the *Environmental Management Act*.

Registration under the regulation does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the operator. It is also the responsibility of the operator to ensure that all activities conducted under this regulation are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force. The operator must also obtain any necessary approvals from other agencies.

Administration of this regulation will be carried out by staff from the ministry regional office. Plans, data and reports pertinent to the regulation are to be submitted to the Regional Manager, Environmental Protection, at the regional office indicated above.

Yours truly,



Sajid A Barlas, Ph.D. , P.Ag.
Director's Delegate
Environmental Management Act

CC: Environment Canada

June 29, 2009

3

Tracking Number:
Authorization Number:

7782
17170

Mountain Landco Ltd.
2515 Campbell Road
Kelowna BC V1Z 1S9

ENCL: none

Appendix D

Tools & Spare Parts List

Tools & Measuring Equipment

The following tools should be available for operations and maintenance of the treatment system components:	
Tools:	Wrenches Valve Key Hammer Digital Multimeter Pipe Wrench Screwdrivers Hydrant Wrench Fire Hose and Nozzle Flash Light
Measuring Equipment:	Tape Measure Sludge Judge Pin Finder
Safety Equipment:	Hard Hat Safety Vest Steel Toe Boots Confined Space Entry Gear Gas Tester Training

Spare Parts and Stock Materials

A minimum stock of these regularly required, essential spare parts and materials should be kept in store to prevent long breakdowns due to uncertain delivery times:	
Spare Parts (general):	Gaskets for Pump Discharge (Northlands) Variety of Electrical Breakers Diesel Engine Oil for Generators Antifreeze for Generators
Spare Parts for pumps:	O-Rings (Northlands) Coolant (Northlands)

Appendix E

Product Info

COMBINATION AIR VALVE MODEL D-025

The following is a step by step narrated description of the A.R.I. D-025 industrial combination air valve installation, operation and maintenance processes.

The D-025 air valve is designed for systems that operate within the pressure and temperature framework of the model's specifications table. Please consult A.R.I. for products designed for other hazardous liquids systems.



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8. Limited Warranty	Page 24

Disclaimer

This document is an Installation, Operation and Maintenance (IOM) manual for A.R.I. Flow Control Accessories Ltd. (A.R.I.) products. The information enclosed herein contains restricted, privileged, proprietary and confidential information, intended only for usage by authorized A.R.I. technicians. If you are not a qualified technician, you must not take any action in reliance upon this document, unless otherwise permitted in writing by A.R.I.

A.R.I. has made every effort to ensure that this document is accurate; A.R.I. disclaims liability for any inaccuracies or omissions that may have occurred.

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A.R.I. accepts/assumes no liability whatsoever, whether caused by: accessing and/or relying upon this Disclaimer and/or in any document enclosed hereto including without limitation any links, procedures or materials.

A.R.I. shall **NOT** assume any liability for any costs, direct or indirect, including loss of income, loss of profits and/or goodwill, legal actions and/or damages of any kind whatsoever including any, damages accidents, equipment damage or bodily injury resulting from and/or related to any of the following:

- product has not been duly installed and thereafter maintained in strict compliance with its designated Maintenance Instructions and/or any other installation and operation manuals provided by A.R.I. for the product and/or applicable ordinances and/or codes;
- Repairs made in and to the products by personnel not authorized by A.R.I.
- Maintenance or repairs using parts or components other than those specified by A.R.I. and in their original condition.
- Operating the products in ways other than the operating procedures described in the manuals provided by A.R.I., or resulting from not following the cautionary remarks and warnings in the product manual.
- Improper storage, workplace conditions and environmental conditions which do not conform to those stated in the Product manual.
- Fires, earthquakes, floods, lightning, natural disasters, or acts of God.

A.R.I. does not warrant and hereby disclaims any express or implied warranties that the product will work properly in environments and applications other than its original design purpose, and makes no warranty and representation, either implied or expressed, with respect to the quality, performance, merchantability, or fitness for any other particular purpose.

Except as provided herein and to the full extent permitted by law, A.R.I. shall not be responsible and/or liable for direct, special, incidental or consequential damages or loss resulting from any breach of the above or under any other legal theory.

This document does not replace any certified drawing, procedure or information provided by A.R.I. in reference to a specific customer, site or project.

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1. SAFETY INSTRUCTIONS

General

1. A.R.I. products always operate as components in a larger system. It is essential for the system designers, installers, operators and maintenance personnel to comply with all the relevant safety standards.
2. Installation, operation or maintenance of the product should be done only by qualified workers, technicians and/or contractors using only good engineering practices, complying with and observing all conventional safety instructions in order to minimize risk and/or danger and/or hazard to workers, the public or to property in the vicinity in accordance with all relevant local standards.
3. Extra safety considerations should be taken with hot and hazardous liquids or in hazardous environments' applications to avoid bodily/physical harm and damage to public or private property.
4. All individuals installing operating and/or handling the products including all workers should at all times adhere to the occupational safety and health (OSH) instructions and wear safety helmets, goggles, gloves, and any other personal safety equipment required by the local standards and regulations.
5. Use only appropriate standard tools and equipment operated by qualified operators when installing, operating and maintaining the product.
6. Prior to installation, operation, maintenance or any other type of action carried out on the product, read carefully the safety, installation and operation instructions of the product.
7. **Please note:**
 - Pressurized fluid and/or gas may be discharged from the product without prior warning. Make sure that the product's outlet port is not directed toward electrical elements (pumps) or people.
 - The pressurized fluid and/or gas that can be discharged from the product may create high noise levels. Take this into consideration when installing the product in areas sensitive to noise.
8. Always open and close valves slowly and gradually.
9. Please note that the maximum working pressure indicated at the product's specifications table doesn't include pressure changes caused by water hammer and pressure surge effects. Use the product only according to its designated pressure rate specifications.
10. Use the product only for its intended use as designed by A.R.I. Any misuse of the product may lead to undesired damages and may affect your warranty coverage. Please consult with A.R.I. prior to any non regular use of this product and make no change or modification to the product without a prior written consent to be provided by A.R.I. at A.R.I.'s sole discretion.
11. Please note that A.R.I. shall **NOT** assume any liability with respect to any damage losses and/or expenses caused to any person and/or property whatsoever unless the product has been duly installed and thereafter maintained in strict compliance with its designated maintenance Instructions and/or any other installation and operation manuals provided by A.R.I. for the product and/or applicable ordinances and/or codes.

Handling

1. Shipping and handling the product must be done in a safe and stable manner and in accordance with the relevant standards and regulations.
2. Storage should be in the original delivery crates or cases. Storage should be off the ground in a clean, dry indoor area.
3. For lifting and positioning the product, use only approved lifting equipment operated by authorized employees and contractors.
4. Prior to the installation visually verify that the product was not damaged during shipment to the installation site.

Installation

1. Install the product according to the detailed Installation Instructions provided with it by A.R.I. and according to the description given in this manual.
2. The user should install a manual Isolation Valve under the product's inlet port.
3. In all installation sites, the user should enable good visibility and verify that the work and auxiliary equipment used are done in accordance with the relevant local authorized standards. Extra safety considerations should be taken on hazardous environment sites.
4. Check and re-tighten the bolts connecting the product to the pipeline during commissioning and before operating the product for the first time.

Commissioning and Operation

1. Read carefully the operation instructions prior to any attempt to operate the product.
2. Observe the safety stickers on the product and never perform any operation contradicting the instructions given.
3. In order to achieve maximum performance and smooth operation of the product, it is crucial to perform the startup and first operation procedures exactly as described in this manual.
4. In cases where formal commissioning procedure is required, it should be done by an authorized A.R.I. technician prior to the first operation of the product.

Maintenance

Before any maintenance or non-regular operation, please read the following:

1. Servicing the product should be done only by qualified technicians for this type of work.
2. Make sure that you know the exact type of the system fluid. Act accordingly and comply with all the relevant standards and regulations set for handling this type of fluid.
3. Before disconnecting the product from the system and before releasing the residual pressure do **NOT**:
 - loosen or unscrew the product bolts;
 - remove any protection cover;
 - open any service port.
4. Before any maintenance or non-regular operation, shut off the Isolation valve and release the residual pressure:
 - A. For air valves with a pressure release outlet, slowly open the pressure release plug or the ball valve and make sure that all pressure is released. Please note that some air release valves, especially the wastewater models, may contain a significant volume of compressed gas with accumulated energy!
 - B. For air valves without a pressure release outlet, slowly unscrew the flange bolts until all the pressure is released from the valve.
5. Make sure the air valve is empty of all liquid prior to commencing maintenance.
6. Remove the product from the line only after ensuring that internal pressure has been released.
7. Place warning signs around the work area as required by the local standards and procedures.
8. Inspect the product's safety stickers and replace any damaged or faded sticker.
9. Manual cleaning of the product and/or its components using high water pressure or steam should be performed in accordance with its specific cleaning instructions, the local standards and regulations and without endangering the operator or the vicinity
10. Manual cleaning of product and/or its components using acid or other chemical agents should be performed in accordance with the specific cleaning instructions, the relevant safety instructions for using that chemical as given by its supplier, the local standards and regulations and without endangering the operator or his vicinity.
11. For products used in potable water systems, if it is required to disinfect the product, do so according to the local water authority standards and regulations before putting the product into service.

Before returning to regular operation

1. Re-assemble any protection covers or protection mechanisms removed during service or maintenance operations.
2. Make sure that all the tools, ladders, lifting devices, etc. used during the maintenance procedures are taken away from the product area and stored.
3. Remove grease and fat material residues in order to avoid slipping.
4. In order to return the product to regular operation, follow the First Start-up Operation instructions as detailed in your user manual.

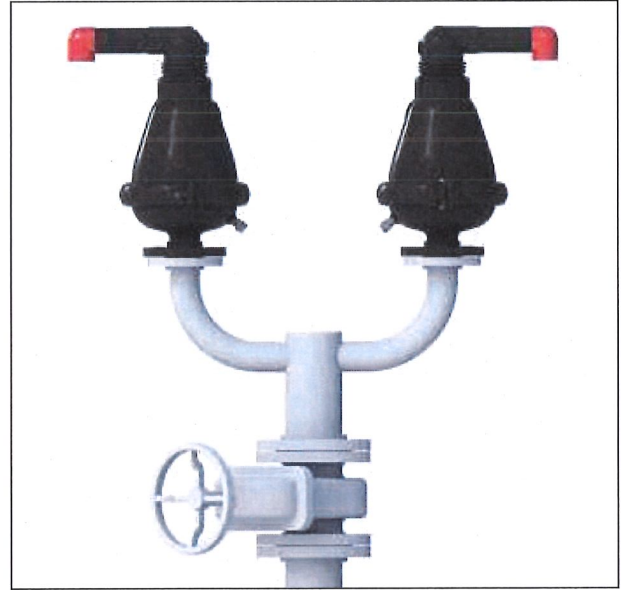
2. INSTALLATION

Important: Before performing any work on the air valve make sure that all workers on site are familiar with the safety instructions and the relevant local and general safety instructions and work regulations.

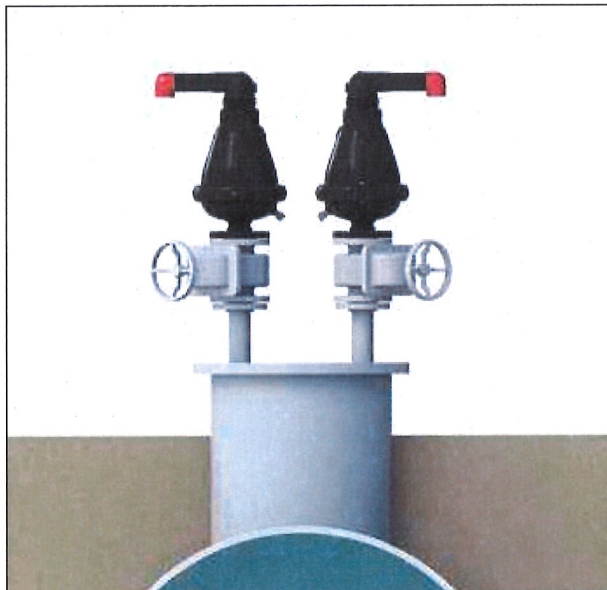
2.1. Installation Recommendations



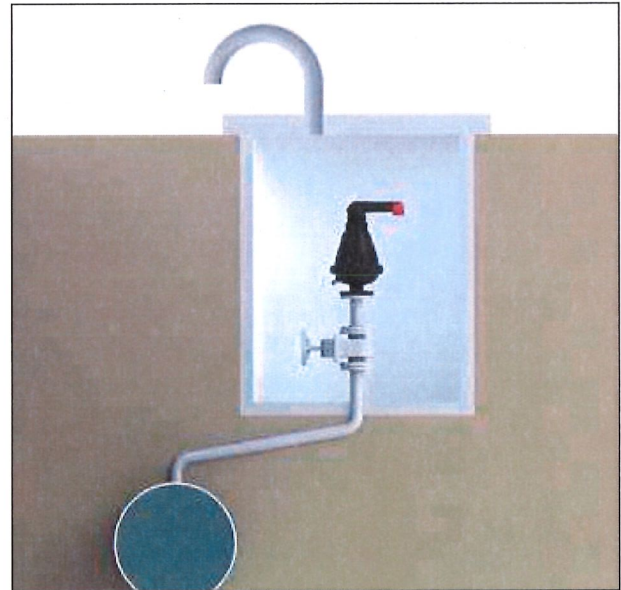
Single Air Valve on an Isolating Valve at 45° to Air Valve outlet



Two Air Valves on a shared Isolating Valve. Air Valves outlets face outward and the Isolating Valve at 45° to Air Valve outlets



Two Air Valves on an Air Trap with separate Isolating Valves. Air Valve outlets face outward and the Isolating Valves at 45° to Air Valve outlets



Underground Installations

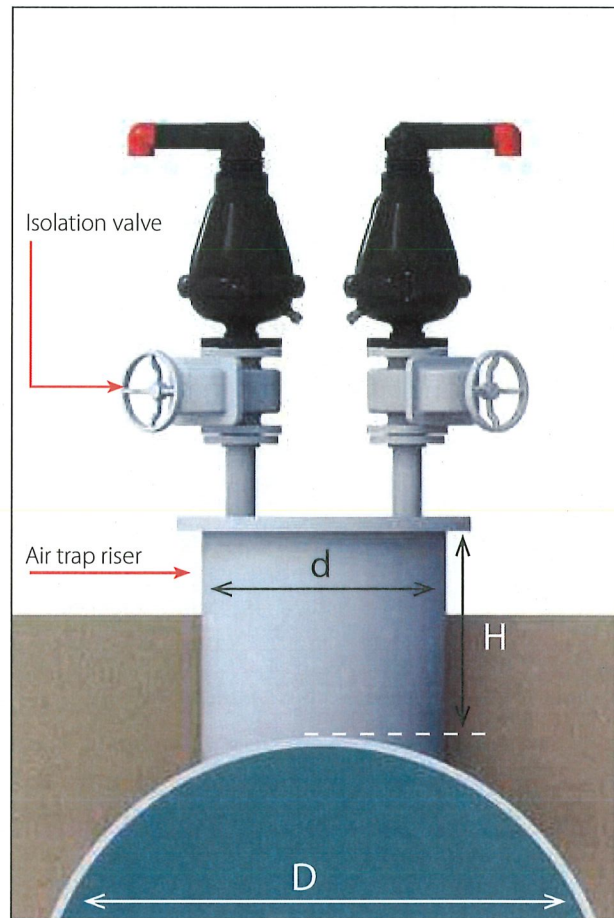
- ☒ Underground installations require a venting pipe from the manhole
- ☒ Use an angular installation to bypass an obstacle directly above the pipeline.

2.2. Conventions and Measurements

This paragraph presents and explains the terms and measurements used for the Installation process.

D = Diameter of pipeline
 d = diameter of riser
 H = Height of riser on the pipeline
 (measured from crown of pipeline)

- For pipelines up to 12" (300mm) in diameter (D), the Air Trap diameter (d) should be the same as the pipeline diameter.
- For larger pipelines of up to 60" (1500mm) in diameter (D), the Air trap diameter (d) should be 60% of the pipeline diameter.
- For larger than 60" (1500mm) pipelines (D), the Air trap diameter (d) should be 35% of the pipeline diameter.
- The Air trap length (H) should allow easy access to the air valve from below and should be at least 6" (150mm).



2.3. Installation Instructions

1. Flush the system before installing the air valve to avoid any debris or sharp objects getting into the air valve.
2. Carefully remove the air valve from the shipping package. Unload all air valves carefully to a sturdy level surface taking care not to drop them.
3. Air valves fitted with hoist rings should only be lifted and conveyed using these hoist rings.
4. Install an isolating valve below the air valve, connected by a Riser to the crown of the pipe.
5. Mount the air valve carefully on the rubber gaskets of the isolating valve.
6. Place washers on each of the bolts & nuts that connect the air valve flange to the isolating valve flange.
7. Tighten all the bolts and nuts using the crossover method.
 - a. The closure tightness of the bolts and nuts shall be according to the standard torque for their specific size.
 - b. Use ring wrench keys for the closing and opening of all bolts of the air valve (including the flange bolts).

3. OPERATION

When the system is charged and the pipeline begins to fill, the water flowing in the pipeline enters into the combination air valve, raising the air/ vacuum and air release floats to their sealing position.

During filling, air is discharged mainly through the air/ vacuum orifice as well as small amounts of air released through the air release orifice. As the pipeline becomes fully pressurized, the air/ vacuum orifice will seal and entrapped air will then be automatically released only from the air release orifice.

During pipe draining or water column separation, the floats will drop down due to the vacuum created, and air will enter into the pipeline through the air/ vacuum orifice.

4. TROUBLESHOOTING

Symptom	Possible Causes	Remedy
Valve leaking from Clamp area	O-ring is not in place, debris in sealing area, or Clamps are not properly tightened	Open the bolt, separate and remove the two Clamps. Check the placement and integrity of the O-ring. Check for debris, clean and close the Clamps
Valve leaking from the Discharge Outlet	A. Low pressure B. Debris caught in sealing mechanism or Rolling Seal is damaged	A. Requires a minimum pressure of 0.05 bar (0.7 psi) to seal properly B. Perform 5. Periodic Maintenance Including 5.3.2 Integrity Test and Replacing (cleaning) of the Rolling Seal Assembly
Threaded pipe connection is leaking	The nylon thread was compromised in installation	Replace the Base (17) section and O-ring (14) Suggest a double threaded nipple fitting for future use.
Leakage from the Tap	A. Tap not completely closed B. Debris caught inside the Tap	A. Tightly close the Tap B. Fully open, then fully close the Tap

5. PERIODIC MAINTENANCE

Please note that the periodic maintenance of the air valve is an integral part of the proper pipeline maintenance regime; it should be maintained at least once a year in accordance with the quality and composition of the fluid in the system.

Important: Before performing any work on the air valve, make sure that all workers on site are familiar with the safety instructions as appear in chapter 1 of this document and with all the relevant local and general safety instructions, standards and work regulations.

5.1. Preparation

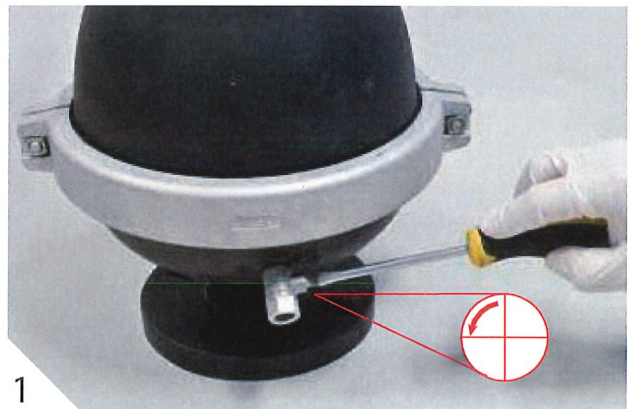
5.1.1. Required tools and materials:

- Flat tip screwdriver
- 6 mm Allen screwdriver
- Plastic head hammer
- 4.5mm roll pin punch
- Small bowl with kitchen type liquid soap



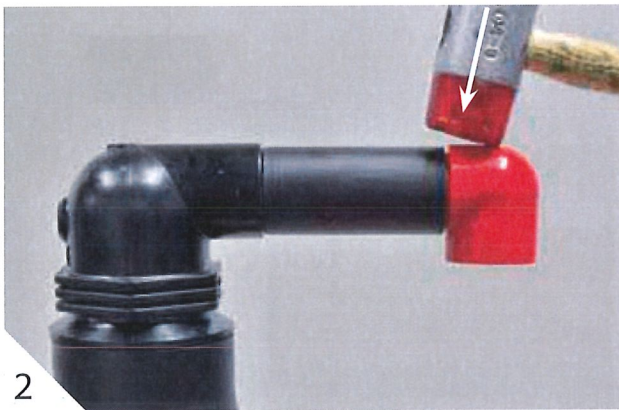
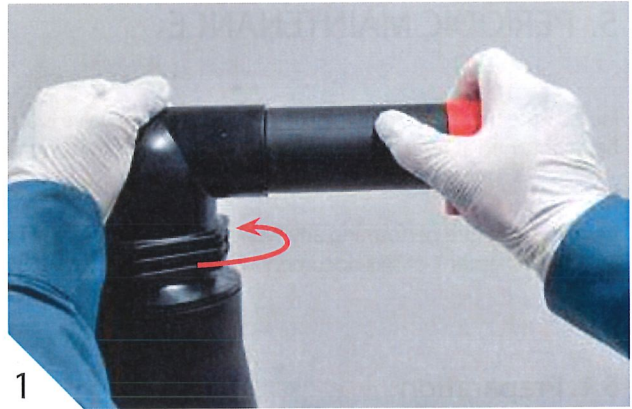
5.1.2. Releasing Pressure

- Shut the isolating valve located on the riser under the air valve
- Open the Ball Valve to release pressure and drain the air valve [1]
- Important: Discard liquid in compliance with local regulations

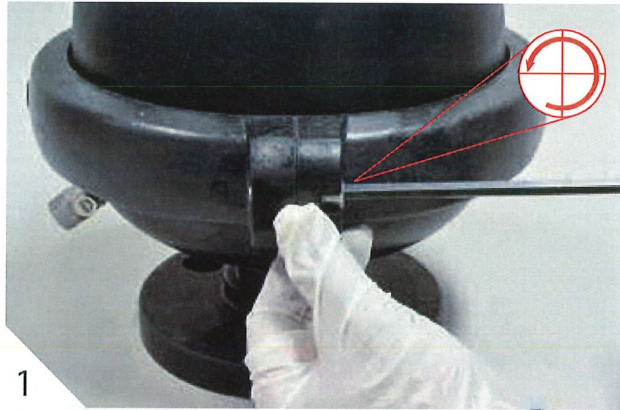


5.1.3 Remove the Air Valve Assembly

- Turn the upper Body one full turn counterclockwise to loosen it from the Body [1]
- With the plastic hammer, tap down on the upper part of the outlet elbow [2]
- Remove the Discharge Elbow and Extension from the Body [3]



- Insert the Allen screwdriver into the Allen screw head and turn counterclockwise to open [1]
- Remove Screw and Nut [2]
- Pull out to remove the Clamp from the valve Body [3]



• Tap on the top of the Body to separate it from the Base [1]



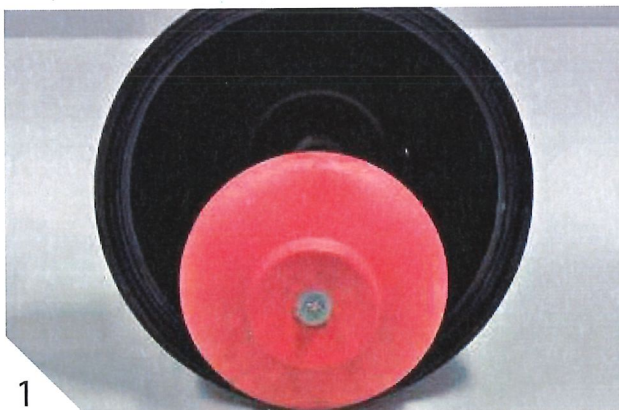
• Place the entire assembly on a clean, flat surface [2]



5.3. Maintenance

5.3.1. Disassembly and Cleaning

• Thoroughly wash and clean the inside of the Body, the Float [1] and the Base [2] under clean running water to remove all grime.

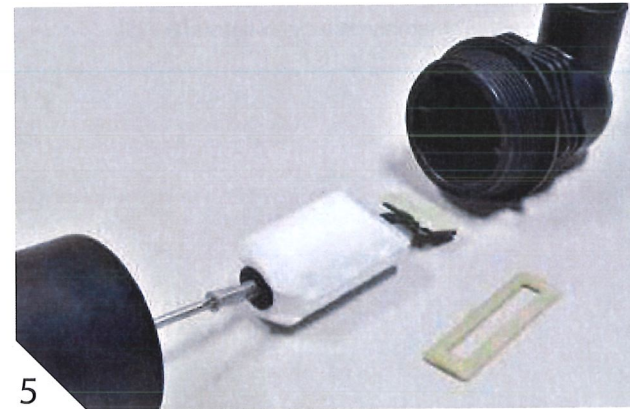
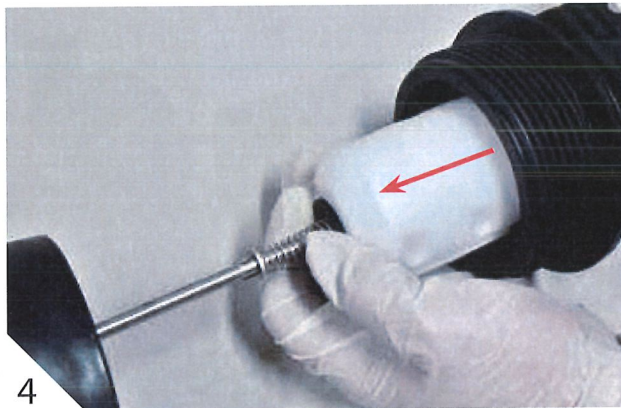
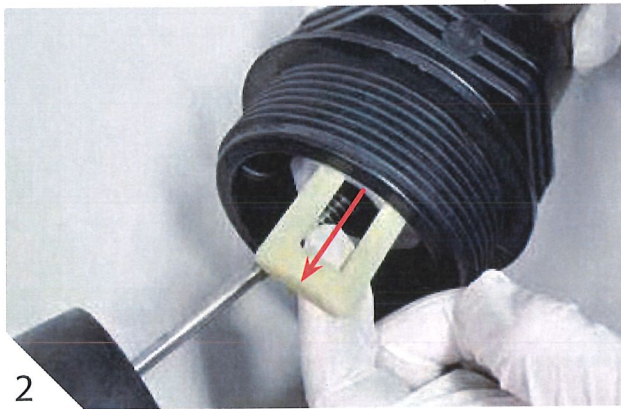




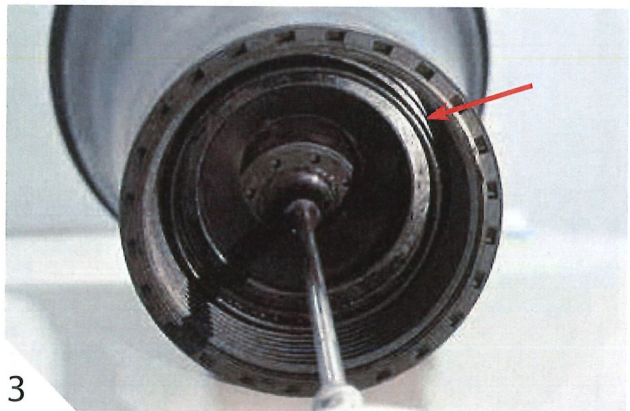
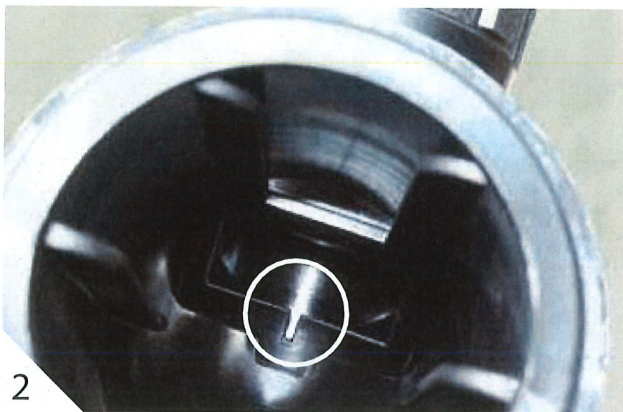
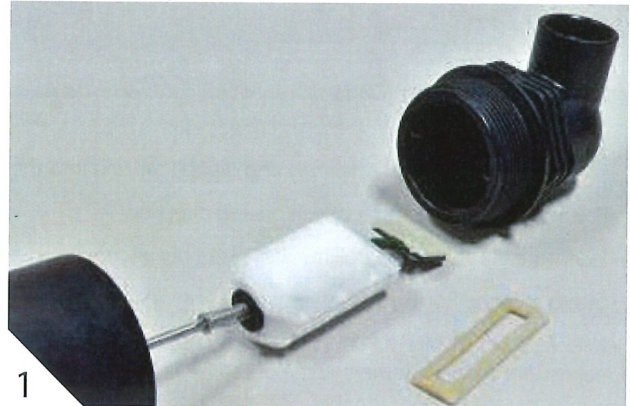
- Turn the upper Body counterclockwise to release, lift and separate it from the main Body [1], [2]
- Place the entire assembly on a clean, flat surface [3]



- Grasp the Clamping Stem and pull out to remove it from the upper Body [1], [2], [3]
- Pull out to remove the Float & Seal assembly from the upper Body [4], [5]

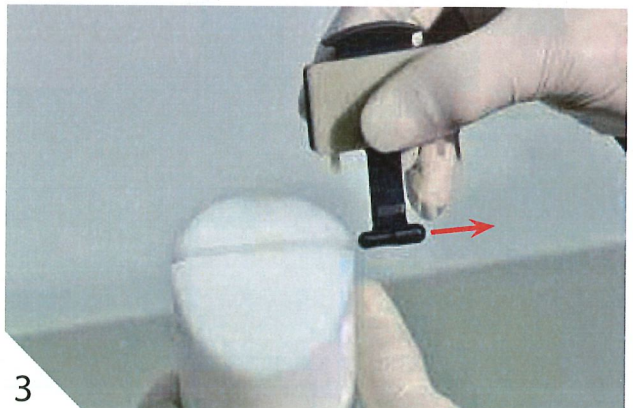
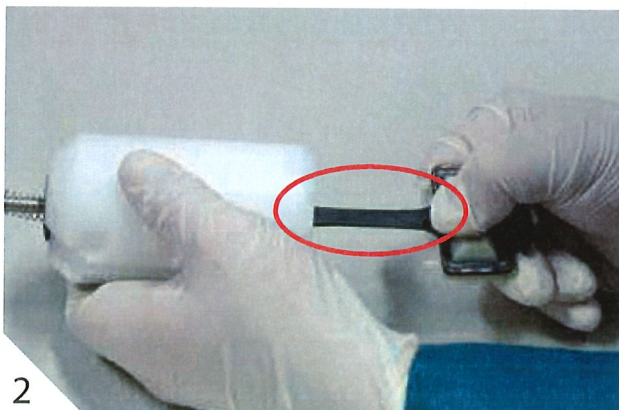
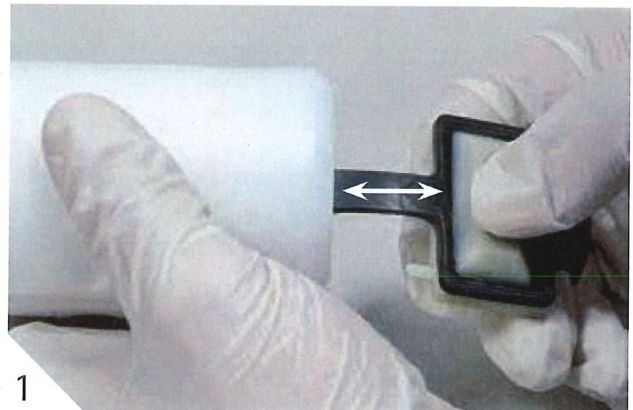


- Thoroughly wash and clean all removed components including the Float & Seal assembly, the Upper Body and the Clamping Stem under clean running water to remove all grime [1]
- Important: During cleaning, pay special attention to the sealing area of the upper Body [2], the area around the O-ring in the top of the main Body [3].

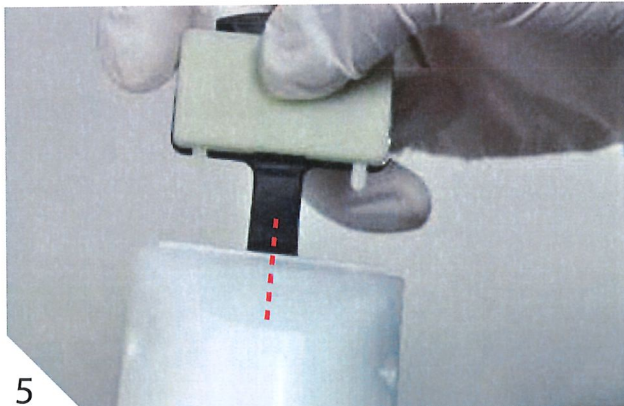
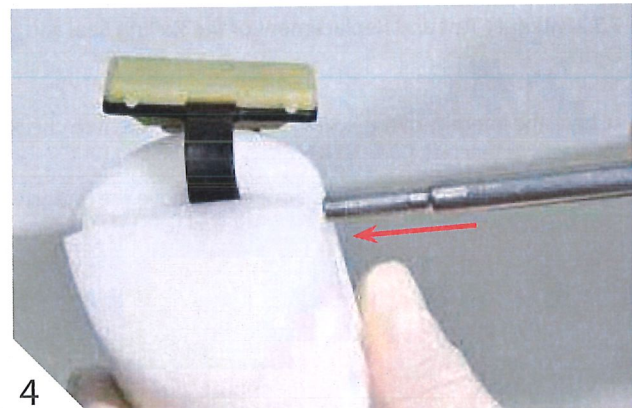
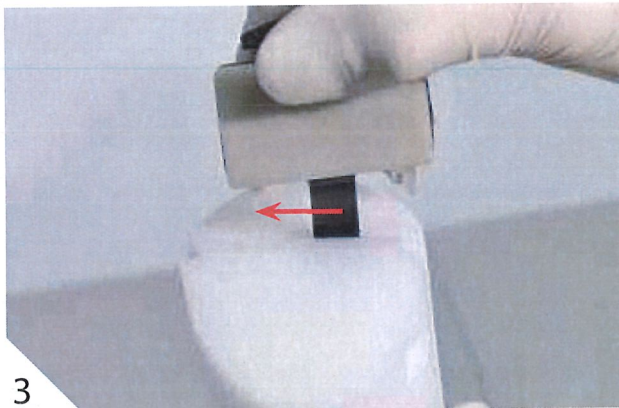
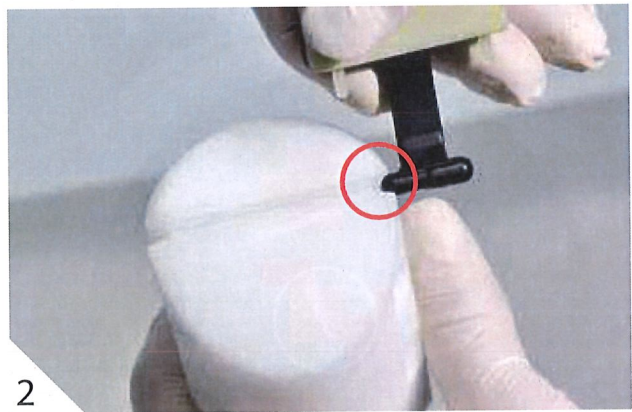


5.3.2 Integrity Test and Replacement of the Rolling Seal and O-ring

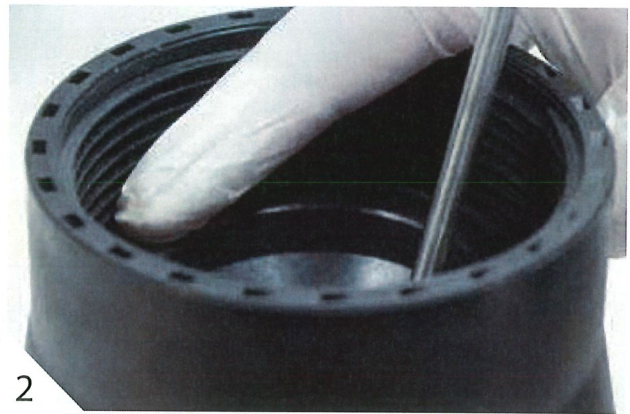
- Check the integrity of the Rolling Seal by stretching it to check for cracks or tears [1], [2]
- If replacement is necessary, slide out and remove the Rolling Seal Assembly [3]



- Take a new Rolling Seal Assembly and dip the tail end into the liquid soap solution [1]
- Pay attention to the correct position and direction [2].
- Insert the tail end of the Rolling Seal Assembly into the groove on the Float [2].
- Gently pull the Rolling Seal Assembly until it is partially inserted into the Float groove [3].
- Use the 4.5mm Roll Pin Punch to push the Rolling Seal Assembly to the middle of the Float [4] and align the middle of the Rolling Seal Assembly tail with the midline of the Float [5].

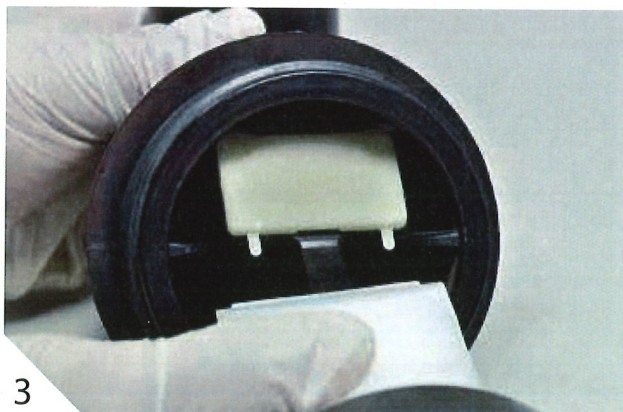
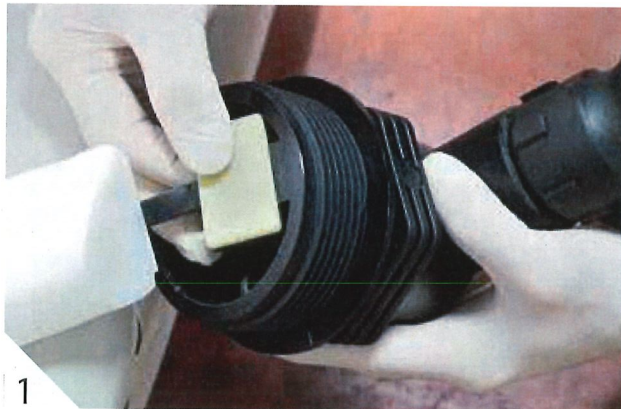


- Check the integrity of the main body O-ring [1]. Remove and replace, if necessary [2].

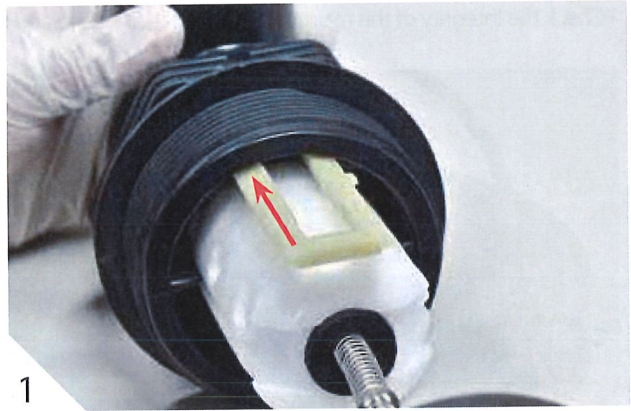


5.3.3 Assembly

- Position the Cover & Float assembly at the edge of the table so the float can hang over the end of the table [1].
- Insert the triangular end of the Rolling Seal assembly into the groove on the front side of the upper Body [2]. Continue to insert until the triangular end is halfway into the groove [3]. Slide the two grooves found on the sides of the Float onto the two rails found in the inside of the upper Body [4].



- Take the Clamping Stem and insert it with smooth side up into the same groove, just behind the triangular end of the Rolling Seal [1]
- Simultaneously push down on the Float and the Clamping Stem [2] till the end so they sit flush with the valve black Body [3].



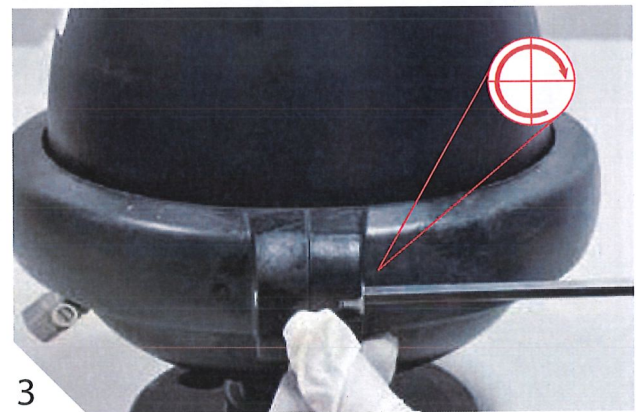
- Verify that the Rolling Seal is clamped in place by holding the end of the Clamping Stem in place while lifting up the assembly. The assembly should remain locked inside the upper Body [1]
- Manually insert the upper Body assembly into the main body [2].
- Manually screw the upper Body assembly into the main Body by turning clockwise until tight [3].



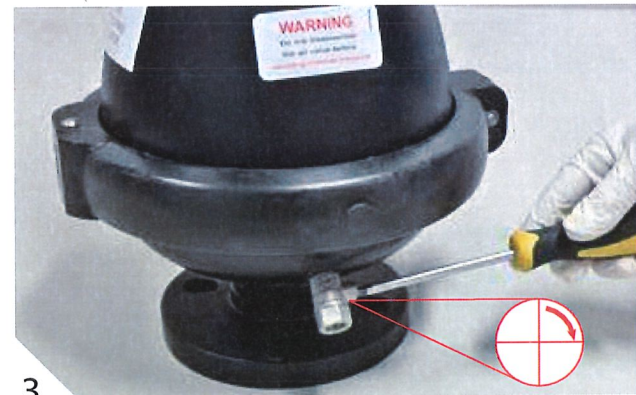
- Place the assembled main Body onto the Base and press down to insure the Body is aligned over the O-ring on the Base [1].
- With the aid of the plastic hammer, tap down on the top of the Body [2] until it sits flush with the Base and no gap between the parts is visible [3].



- Place the Clamp on the ridge between the Body and the Base [1].
- Insert the Screw and Nut into the Clamp [2], and tighten with the aid of the 6mm Allen screwdriver until tightly closed [3].



- Insert the Elbow and Extension into the upper Body outlet [1] and tap into place with the aid of the plastic hammer [2].
- Close the Ball Valve [3]
- Open the isolating valve located on the riser under the air valve.



6. ASSEMBLY BOM TABLE AND DRAWING

No.	Part name	QTY.
1	Discharge Elbow	1
2	Extension	1
3	Body	1
4	Clamping Stem	1
5	Rolling Seal Assembly	1
6	Float Connector	1
7	O-ring	1
8	Body	1
9	Domed Nut	1
10	Stopper	1
11	Spring	1
12	Float + Stem + Washer	1
13	O-ring	1
14	Clamp, Bolt & Nut	2
15	Base	1
16	Tap 1/4 "	1



7. Ordering Replacement Parts

Manual No. D025.IOM.ENG01

Size _____

PN _____

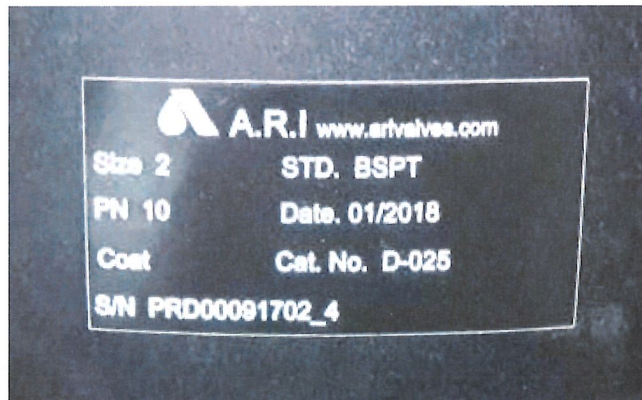
S/N _____

Cat. No. _____

BOM No.	Part	Quantity
[1]	Discharge Elbow	
[2]	Extension	
[4]	Clamping Stem	
[5]	Rolling Seal Assembly	
[7]	Bolt, Nut & Washer	
[8]	Domed Nut	
[9]	Stopper	
[10]	Spring	
[11]	O-ring (Cover)	
[13]	Float Assembly	
[1-6], [8-13]	Complete Float, Seal & Cover Assy. Kit	
[14]	O-ring (Body)	

- BOM TABLE & DRAWING see page 21

- We highly recommend that you send a photo of the product identification tag with all replacement parts requests in order to insure parts compatibility. See example below:



A.R.I. Standard International Warranty

A.R.I. manufactured products are guaranteed to be free from defect in material and/or workmanship and to perform as advertised when properly installed, used and maintained in accordance with current instructions, written or verbal.

Should any item prove defective within the time period set forth for that item(s), but in any case not later than within 12 (Twelve) months of that product having left A.R.I.'s premises, and subject to receipt by A.R.I. or its authorized representative, of written notice thereof from the purchaser within 30 days of discovery of such defect or failure - A.R.I. will repair or replace or refund the purchase price, at its sole discretion, any items proven defective in workmanship or material.

A.R.I. will not be responsible, nor does this warranty extend to any consequential or incidental damages or expenses of any kind or nature regardless of the nature thereof, including without limitation, injury to persons or property, loss of use of the products, loss of goodwill, loss of profits or any other contingent liabilities of any kind or character alleged to be the cause of loss or damage to the purchaser.

This warranty does not cover damage or failure caused by misuse, abuse or negligence, nor shall it apply to products upon which repairs or alterations have been made by other than an authorized A.R.I. representative.

This warranty does not extend to components, parts or raw materials used by A.R.I. but manufactured by others, which shall be only to extent warranted by the manufacturer's warranty.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, EXCEPT THIS WARRANTY WHICH IS GIVEN IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Guy Sagie
Chief Executive Officer



Appendix F

Cost Estimates

Summary of Sanitary Pipes by Year

Year	Diameter (mm)	Gravity/Pressure Pipe	Length (m)	Percentage (%)
2006	150	Gravity	100	4%
2006	200	Gravity	460	19%
2007	200	Gravity	545	23%
2013	100	Pressure/Force Main	487	20%
2013	200	Gravity	825	34%
		Total	2,417.00	100%

System Replacement
 Existing 65m³/day WWTP

Description	Unit	Quantity	Unit Price	Replacement Cost (2023)	Cont. Mat. (Engineering and Contingency 15%)	Indexed Year	Total Lifespan (Years)	Remaining Life	Remaining Value
Chemical, Grinding and Dart Control	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Earthwork (Cut and Fill)	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Structural (Tiepoint)	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Structural (Tiepoint)	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Concrete Reinforcement	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Cast-in-Place Concrete	m3	197	\$4,000.00	\$789,000.00	\$1,043,900.00	2003	28	0	\$ 363,542.86
Topsoil, Fertilizer, Grading, and Seeding	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Plants and equipment	LS	1	\$300,000.00	\$300,000.00	\$270,000.00	2003	28	0	\$ 71,428.56
Site Services	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Site Services	LS	1	Incl	Incl	Incl	2003	28	0	Incl
Site Improvements	LS	1	Incl	Incl	Incl	2003	28	0	Incl
General Requirements - Mobilization, Traffic Control, Survey, etc.	LS	1	Incl	Incl	Incl	2003	28	0	Incl
				Construction Total	\$980,000.00				\$ 301,083.71
				Contingency (20%)	\$197,200.00				
				Engineering (15%)	\$148,200.00				
				Grand Total	\$1,325,400.00				25%
					\$1,323,800.00				

Built in 2003

System Replacement
Indiana Veins Sanitary System: Phase 1

Description	Unit	Quantity	Unit Price	Replacement Cost (Cost)	Cost (incl. Contingency and Engineering)	Installed Year	Total Lifespan (Years)	Remaining Lifespan (Years)	Remaining Value
1050mm Sanitary Manhole - Supply and install cover, jammed, bedding, Base, Riser, Concrete Lid and Chasing	ea	6	\$4,000.00	\$24,000.00	\$32,400.00	2008	76	61	\$26,005.26
Sanitary Pipe PVC SDR 35, 150 mm diameter	m	160	\$160.00	\$25,600.00	\$21,600.00	2008	76	61	\$17,396.64
Sanitary Pipe PVC SDR 35, 200 mm diameter	m	480	\$180.00	\$86,400.00	\$111,780.00	2008	76	61	\$9,718.16
Sanitary Service Connections, 100 mm diameter per Standard Drawings	ea	20	\$1,900.00	\$38,000.00	\$35,000.00	2008	76	61	\$28,172.27
100mm SDR35 PVC Sanitary Service 600 bedding and 2-4 meter	m	240	\$150.00	\$36,000.00	\$38,850.00	2008	76	61	\$31,206.32
General Requirements - Mobilization, Traffic Control, Survey, etc.	LS	1	\$15,000.00	\$15,000.00	\$20,250.00	2008	76	61	\$16,253.29
Subtotal				\$192,600.00	\$192,600.00				
Contingency (20%)				\$38,520.00	\$38,520.00				
Engineering (5%)				\$9,630.00	\$9,630.00				
Grand Total				\$260,750.00	\$260,750.00				
					260,010.00				
								Remaining Life=	80%
									\$208,692.24

System Replacement
 Manago View Sanitary System Phase 2

Description	Unit	Quantity	Unit Price	Replacement Cost (2025)	Contingency and Engineering (%)	Installed Year	Total Lifespan (Years)	Remaining Lifespan (Years)	Remaining Value
100mm Sanitary Manhole - Supply and install over damaged bedding, Base, Rebar, Concrete Lid and Catchings	ea	9	\$4,000.00	\$ 36,000.00	\$ 48,600.00	2010	76	63	\$ 40,286.84
Sanitary Pipe PVC SDR 35, 200 mm diameter	lm	545	\$190.00	\$ 98,100.00	\$ 132,435.00	2010	76	63	\$ 109,731.64
Sanitary Tee in to Ex. manhole	ea	1	\$2,442.00	\$ 2,442.00	\$ 3,295.70	2010	76	63	\$ 2,732.79
Sanitary Service Connections - 100mm diameter per Standard Drawings	ea	60	\$1,300.00	\$ 78,000.00	\$ 105,300.00	2010	76	63	\$ 87,268.16
S7	lm	720	\$120.00	\$ 86,400.00	\$ 116,640.00	2010	76	63	\$ 96,693.42
100mm SDR33 PVC Sanitary Service over bedding and 2x4 manhole	lm	1	\$120.00	\$ 120.00	\$ 159.00	2010	76	63	\$ 140.46
General Requirements - Mobilisation, Traffic Control, Survey, etc.	LS	1	\$120,000.00	\$ 120,000.00	\$ 159,000.00	2010	76	63	\$ 141,553.63
Grand Total				\$ 419,771.70	\$ 567,225.70				\$ 477,525.25

Contingency (20%) \$ 62,188.40
 Engineering (15%) \$ 46,641.30
Grand Total \$ 419,771.70

Remaining Value

83%

System Replacement
 Village West Sanitary System: Phase 3

Description	Unit	Quantity	Unit Price	Replacement Cost (2013)	Contingency and Engineering (2013)	Installed Year	Total Lifespan (Years)	Remaining Lifespan (Years)	Remaining Value
1050mm Sanitary Manhole - Supply and install 6w diameter bedding, Base, Rise, Concrete Lid and Chasing	ea	17	\$4,000.00	\$ 68,000.00	\$ 91,800.00	2013	76	66	\$ 79,721.05
8" Sewer Pipe PVC SDR 35, 200 mm diameter	m	825	\$180.00	\$ 148,500.00	\$ 200,475.00	2013	76	66	\$ 174,606.71
Lift Station, Concrete	LS	1	\$217,000.00	\$ 217,000.00	\$ 292,950.00	2013	31	21	\$ 198,450.00
Sanitary Manhole 1500 (6ft x 6ft x 15ft)	ea	7	\$4,841.00	\$ 33,887.00	\$ 43,828.00	2013	76	66	\$ 43,828.00
Sanitary Manhole 1500 (6ft x 6ft x 15ft)	ea	2	\$2,420.50	\$ 4,841.00	\$ 6,282.40	2013	76	66	\$ 6,282.40
Sanitary Service Connections - 100 mm diameter per Standard Drawings	ea	30	\$1,200.00	\$ 36,000.00	\$ 47,400.00	2013	76	66	\$ 45,722.37
S7 - 800mm PVC Sanitary Service with bedding and 2.4 meter	LS	360	\$15,000.00	\$ 5,400,000.00	\$ 7,020,000.00	2013	76	66	\$ 6,812,553.33
General Bedding/Service - 100mm/150mm Traffic Control Safety, etc.	LS	1	\$15,000.00	\$ 15,000.00	\$ 20,250.00	2013	76	66	\$ 20,250.00
Construction Total				\$ 6,324,844.00	\$ 8,542,830.40				
Contingency (15%)				\$ 948,726.60					
Engineering (15%)				\$ 948,726.60					
Grand Total				\$ 8,222,297.20	\$ 8,542,830.40				80%

Current Value of Wastewater Assets

Year Constructed	Description	Estimated Construction Cost in 2023 (Including 20% Contingency and Engineering Fee)	Depreciation	Estimated Current Value (2023)	Remaining Life - Estimated (Years)	Remaining Life - Estimated (%)
2003	Vintage Views WWTP	\$ 1,333,800.00	\$ 952,714.29	\$ 381,085.71	7	25%
2008	Vintage Views Phase 1 sanitary pipe network	\$ 260,010.00	\$ 51,317.76	\$ 208,692.24	61	80%
2010	Vintage Views Phase 2 sanitary pipe network	\$ 419,771.70	\$ 71,803.05	\$ 347,968.65	63	83%
2016	Vintage Views Phase 2 sanitary pipe network & Lift Station	\$ 854,528.40	\$ 171,962.01	\$ 682,566.39	49	80%
		\$ 2,868,110.10	\$ 1,247,797.11	\$ 1,620,312.99		

Project 3: New Infiltration Field

Description	Unit	Quantity	Unit Price	Cost	Cost (Incl. Contingency and Engineering)
New Infiltration Field	LS	1	\$300,000.00	\$300,000.00	\$465,000.00
			Construction Total	\$300,000.00	
			Contingency (40%)	\$120,000.00	
			Engineering (15%)	\$45,000.00	
			Sub-Total	\$465,000.00	\$465,000.00



Project 4: Upgrading the WWTP

Description	Unit	Quantity	Unit Price	Cost	Estimate Cost 2023 (Incl. Contingency and Engineering)
MBR Membranes and controls	LS	1	\$106,000.00	\$106,000.00	\$169,600.00
New Huber screening, grit, and FOG removal and inlet channel	LS	1	\$800,000.00	\$800,000.00	\$1,280,000.00
New heated building for inlet works (6m x 6m)	LS	1	\$320,000.00	\$320,000.00	\$512,000.00
Additional Electrical Room (5m x 5m)	LS	1	\$300,000.00	\$300,000.00	\$480,000.00
New Roof for entrance (to prevent snow from getting in, 3m x 2m)	LS	1	\$16,800.00	\$16,800.00	\$26,880.00
Clearing, Grubbing and Dust Control	LS	1	\$7,500.00	\$7,500.00	\$12,000.00
Earthworks (Cut and Fill)	LS	1	\$70,000.00	\$70,000.00	\$112,000.00
Pumping System Components, Replacement of Pumps in the existing Inlet Chamber, Controls, Electrical - Supply and Install	LS	1	\$300,000.00	\$300,000.00	\$480,000.00
Site Improvements (Including Fencing)	LS	1	\$40,000.00	\$40,000.00	\$64,000.00
New Effluent Pipe to S/W:					
1050mm Sanitary Manhole - Supply and Install c/w Drainrock Bedding, Base, Risers, Concrete Lid and Castings	ea	1	\$4,000.00	\$4,000.00	\$6,400.00
100mm SDR28 PVC Sanitary Service c/w bedding and 2x4 marker	lm	90	\$120.00	\$10,800.00	\$17,280.00
Tie-Ins and dealing with incoming wastewater	LS	1	\$50,000.00	\$50,000.00	\$80,000.00
General Requirements - Mobilization, Traffic Control, Survey, etc.	LS	1	\$10,000.00	\$10,000.00	\$16,000.00
Electrical:					
New Three-Phase 600 Volt Fortis BC Feed service from Chadwell Place Street	LS	1	\$150,000.00	\$150,000.00	\$240,000.00
New 600 Volt breakers	LS	1	\$100,000.00	\$100,000.00	\$160,000.00
New 150kVA generator for the WWTP	LS	1	\$370,000.00	\$370,000.00	\$592,000.00
Additional rooms electrical work (lighting, small power, etc)	LS	1	\$75,000.00	\$75,000.00	\$120,000.00
Starters and wiring for new process equipment	LS	1	\$150,000.00	\$150,000.00	\$240,000.00
Update electrical cabling to bring to code at the WWTP	LS	1	\$75,000.00	\$75,000.00	\$120,000.00
Control & Instrumentation Engineering:					
New PLC & Programming to RDOS standards	LS	1	\$100,000.00	\$100,000.00	\$160,000.00
Add SCADA telemetry to the site	LS	1	\$50,000.00	\$50,000.00	\$80,000.00
Construction Total				\$3,105,100.00	\$4,968,160.00
Contingency (40%)				\$1,242,040.00	
Engineering (40%)				\$621,020.00	
Sub-Total				\$4,968,160.00	\$4,968,160.00



Infrastructure Upgrades and System Improvement

Project Number	Description	Estimated Construction Cost in 2023 (Including 40% Contingency and Engineering Fee)	Implementation Period (Years)	Assumed Inflation per year	Estimated Construction Cost in year of implementation (Including 40% Contingency and Engineering Fee)
1	Hydrogeological studies for a new infiltration field	\$ 72,207.00	1	2.2%	\$ 74,000.00
2	Preliminary Designs and Options Analysis for Upgrading the WWTP	\$ 100,000.00	1.0	2.2%	\$ 103,000.00
3	Construction of a New Infiltration Field	\$ 465,000.00	2	2.2%	\$ 486,000.00
4	Upgrading the WWTP	\$ 4,968,160.00	5.0	2.2%	\$ 5,540,000.00
		\$ 5,605,367.00			\$ 6,203,000.00