Creating Sustainable Prosperity

T.I SERVICES

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February 10, 2026

Niagara Vineyards & Orchids Corp
C/O Arnie Lepp
R.R #5 1196 Irvine Road
Niagara-on-the-Lake, ON L0S 1J0

Re: Private Onsite Wastewater Servicing Report – Agricultural Service & Supply Facility 727 East & West Line NOTL – Revised February 10, 2026

To Whom It May Concern,

T.I Services is pleased to present the private onsite wastewater servicing report for the proposed agricultural warehouse facility located within the municipal jurisdiction of the Town of Niagara-On-The-Lake with a current civic address of 727 East & West Line, Niagara-on-the-Lake, Ontario L0S 1J0.

The purpose of this revised report is to provide details on the proposed preliminary onsite wastewater treatment system (commonly referred to as a septic system), including maximum daily sewage flow calculations, proposed septic system components and capacities, as well as septic design and layout meeting all *Ontario Building Code* requirements to support the planning approvals process. It also includes details on existing features related to the existing residential property. Please note this report has been revised to reflect updated information from onsite inspection, update septic system design and site plan and discussions with Niagara Region Sewage Regulating Office regarding the existing septic system and replacement leaching, as well as contingency leaching bed areas for the proposed in-ground absorption trenches.

If there are any questions regarding the information contained in this report, please do not hesitate to contact the undersigned.

Warm Regards,

T. Imhoff

Trevor Imhoff, B.E.S
Owner, T.I Services
23 Ludlow Crescent Brantford, ON N3P 1V2
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1.0 Introduction

The proposal includes a severance of the civic address located at 727 East & West Line Niagara-on-the-Lake, Ontario and the development consists of an Agricultural Service and Supply Facility with a total square meter of 7,129m^2 and includes ten (10) loading bays. The main purpose of the buildings will be orchard and vineyard equipment supply and sales, as well as cold fruit storage and distribution. The floor plans include proposed offices and reception area to support the main purpose of the buildings and will include four (4) water closets, four (4) wash basins, and two (2) showers. The buildings will be serviced by municipal potable water supply and a proposed private onsite wastewater treatment system. The proposed development is to be built in the municipal jurisdiction of the Town of Niagara-On-The-Lake, hereby referred to as the "The Site" with the closest intersection to the east being East & West Line and Concession 4 Road with agricultural fields to the south and rural residential to the east and west of The Site. See *Appendix A –Site Location*

The Site includes an existing rural residential single dwelling unit (SDU) and detached garage. The proposed severance will include two parts; Part 1 having a proposed area of 1.00 acre (0.4 Ha) for the existing SDU, and Part 2 having a proposed area of 4.36 acres (1.76Ha) for the proposed Agricultural Service and Supply Facility.

The proposed onsite wastewater treatment system will include a tertiary Class 4 Level IV system including a sewage lift station and two separate shallow buried trench leaching beds to service the Agricultural Service and Supply Facility.

2.0 Existing Site Features and Soil Characteristics

The Site was inspected by T.I Services on June 27, 2025 at approximately 10:00AM. Visual inspections of the existing agricultural field and visual inspection of the existing well and septic system servicing the existing residential building was completed. A utility probe was used to determine approximate location of existing leaching bed.

The existing Site features include a residential Single Dwelling Unit (SDU) containing 3 bedrooms, 2 bathrooms with a finished floor area of 1,400ft^2. Based on this the estimated maximum daily sewage flows according to *Table 8.2.1.3.A* of the *Ontario Building Code* is 1,600L/day. The septic system servicing the SDU appears to be a traditional Class 4 Level I septic system with a septic tank and in-ground absorption trenches. At the time of the Site inspection the septic tank was not visible, however it was marked in orange spray paint. At the time of the inspection there were no signs of malfunction with the septic tank and the ground around the septic tank was dry. The existing leaching bed was visually inspected and at the time of inspection was functioning with no evidence of soggy/soft ground or break-out.

At the request of Niagara Region both septic tank lids were exposed and a 12.0m length trench was dug along the proposed property line running east-west, south of the existing SDU. The trench was dug running east-west orientation and approximately 27.5m south of the existing SDU. T.I Services completed another onsite inspection November 4, 2025. Both septic tank lids were opened and inspected. The septic tank appeared to be in overall good condition with effluent levels at normal operating conditions. The primary chamber had effluent levels at or slightly below inlet pipe, it was noted there was no inlet baffle. The secondary chamber

had effluent levels at or slightly below outlet pipe and it was noted there was an outlet baffle, but no effluent filter.

The trench was inspected and it was noted there were four (4) clay distribution pipes and trenches running north-south. A utility probe followed the trenches, and it indicated the existing in-ground leaching bed does not meet current Ontario Building Code setbacks to the proposed property line. This was discussed with Niagara Region and it was agreed a replacement leaching bed would be required to service the SDU. See additional site photos in *Appendix E* and updated Septic Design and Site Layout in *Appendix C.*

The existing well is located north of the SDU in the front yard and contains a steel case with a Well Tag #A092690 (Ministry of Environment, Conservation and Parks, 2025). Please see *Appendix E – Site Photos*.

Soil conditions to determine soil permeability (T-Time) were completed by Soil-Mat Engineering through their Geotechnical study (see separate report). Boreholes were completed within the area of the proposed leaching beds (BH6 and BH7) and existing soil conditions were described as “Silty Clay/Clayey Silt”. Grain size analysis was also completed by Soil-Mat Engineering and was determined for both BH6 and BH7 with T-Time of >50min/cm.

Preliminary groundwater conditions were also assessed by Soil-Mat Engineering and it is noted that although the boreholes were backfilled prior to static groundwater levels to stabilize, based on their investigations, combined with drilling experience in the area, groundwater is estimated at depths of 2 to 3 metres below the existing ground surface.

3.0 Site Specific Design

3.1 Daily Sewage Flow Calculations

Sanitary Sewage Flows

The proposed daily sanitary sewage flow calculations for the proposed Agricultural Facility are broken down by the expected type of use of the building and follows *Table 8.2.1.3.B Other Occupancies* under *Part 8 Sewage Systems* of the *Ontario Building Code Act, 1992* (*OBC)*. Confirmation from the owners indicate there will be no irrigation or other process water entering the septic system. The sanitary sewage flow calculations are based on “Warehouse” calculations and broken down as follows:

- Total number of Water Closets; and
- Total number of Loading Bays.

Table 1.0 Maximum Daily Sanitary Sewage Flow Calculations

Description	Units	# Units	L/d per Unit	L/d
Warehouse Water Closets	# of Water Closets	4.0	950.0	3,800.0
Warehouse Loading Bays	# Loading Bays	10.0	150.0	1500.0
			TOTAL	**5,300.00**

Therefore the total maximum sanitary sewage flows are estimated at 5,300 L/day.

There is also currently a 1,000L/day contingency used to design the current septic system. This contingency is added only due to the uncertainty of how Niagara Region may require calculating the maximum daily sewage flows and to show the capability of The Site being able to be adequately serviced.

Therefore the total maximum daily sanitary sewage flows that will be used to design the onsite wastewater treatment system will be 6,300 L/d.

For further breakdown on wastewater calculations and minimum septic system component requirements please see *Appendix B – Maximum Daily Sewage Calculations*. Please note a subsequent meeting occurred on December 17, 2025 with Niagara Region's Private Sewage Inspector, Associate Director of Development Engineering and a Regional Planner to discuss previous comments submitted regarding daily sewage flows. Sewage calculations were discussed and there was no additional requirements indicated at that time.

3.2 Septic Tank Capacity Calculations

The septic tank was designed according to *clause 8.2.2.3. Septic Tanks* of the *Ontario Building Code (OBC)* at three (3) times the calculated daily sanitary sewage flows. The septic tank capacity formula serving the Agricultural Facility is calculated as:

Q x 3 = Minimum (L) Septic Tank Capacity

6,300 L/Day x 3 = 18,900 L

Whereas Q equals the total daily design sanitary sewage flow in liters from the agricultural facility.

Therefore, a double chamber septic tank meeting CSA B66 Construction Standard with a minimum capacity of 18,900 L is proposed. An effluent filter will be equipped on the outlet pipe of the septic tank prior to the tertiary tank.

The effluent from the septic tank will flow by gravity to the tertiary tank, whereby additional treatment will occur prior to flowing to the pump tank. Ther tertiary tank manufacturer, and therefore sizing is not included in this current design and report to allow for flexibility to decide on final technology and will be confirmed during final building and septic permit applications.

A minimum one (1/2) day capacity is recommended to size the pump tank and therefore the minimum capacity would be 3,150 L.

To see the proposed locations of the septic system please see *Appendix C – Onsite Wastewater Treatment Design and Layout*.

3.3 Shallow Buried Trench Calculations

The treated effluent is proposed to be dispersed into the subsurface environment utilizing two separate Shallow Buried Trenches (SBT) as the leaching beds. The loading rate of the SBT is calculated based on the soil permeability (T-Time of >50min/cm) and is in accordance with *Table 8.7.3.1A. Length of Leaching Chamber in Shallow Buried Trench* with the following formula:

L = Q / 30

210 m = (6,300 L/d) / 30

Whereas L equals the total length of chamber required in meters; and

Whereas Q equals the total daily design sanitary sewage flow in litres.

Therefore, the total minimum length of SBT is calculated at 210 m.

3.4 Proposed Treatment Summary

The proposed onsite wastewater treatment system includes primary and tertiary treatment of sanitary, residential strength sewage, with final treatment occurring within the in-ground Shallow Buried Trenches.

The components of the onsite wastewater treatment system will include:

- One (1) 9,100 L sewage lift station/pump tank equipped with a grinder pump connected to an audible and visual alarm system.
- A 2" high density polyethylene (HDPE) (or equivalent) manifold piping sending sewage from the lift station to the primary septic tank.
- One (1) Primary 18,900 L CSA double chamber septic tank equipped with an effluent filter.
- One (1) Tertiary septic tank sized to handle up to 6,300L/day sewage flows (technology/manufacturer to be determined during final septic permit application).
- Two (2) Shallow Buried Trench (SBT) Leaching beds each containing four (4) trenches each 27.0m in length with 1.5" pressurized PVC piping and chamber spaced 2.0 m on centre. Each trench depth will be between 600mm and 900mm and width will be between 500mm and 1000mm.

4.0 Qualifications of Lead Consultants

Trevor Imhoff, B.E.S is the owner of T.I Services. He received his Honours Bachelor Degree from the University of Waterloo with a Minor in Biology and Diploma in Ecological Restoration and Remediation. He has 12 years experience solving complex environmental problems. Trevor is currently qualified under the Ministry of Housing as a licensed *Independent Designer* for *Part 8 Sewage Systems* and *Part 9 Housing and Small Buildings*. He has over 10 years experience in the onsite wastewater treatment industry conducting hundreds of onsite wastewater inspections and designs for both residential and commercial properties. Over the course of his career he has worked for two engineering firms, spent 2.5 years as a Municipal Septic Inspector and member of the Ontario Building Officials Associations (OBOA). He has been an *Independent Designer* since 2014.

Recent similar successful projects T.I Services have completed include but are not limited to:

- Be In Christ Church Tertiary Septic System Design, Town of Pelham (2024);
- Waterview Farms Septic and Constructed Wetland Greenhouse and Warehouse Operation (2021), Town of Lincoln (Ministry of Environment, Conservation and Parks approval);
- Lepp Distillery Onsite Wastewater Design and Installation (2020), Town of Niagara-On-the-Lake;
- Orchid Greens Greenhouse Expansion (2020), Town of Niagara-On-The-Lake;
- Virgil Greenhouses Help House (2019), Town of Niagara-On-The-Lake;

- Pioneer Farms Advanced Tertiary Wastewater Design (2019), City of St. Catharines.

5.0 Conclusion

T.I Services is confident that the proposed onsite wastewater treatment system was designed conservatively in order to handle the calculated maximum sanitary sewage flows from the proposed agricultural facility. Maximum daily sewage flows were calculated based on past experience working with Niagara Region Sewage Regulating Office with additional contingency sewage flows provided. It is expected the actual maximum daily sewage flows would be less than what is calculated currently.

6.0 REFERENCES

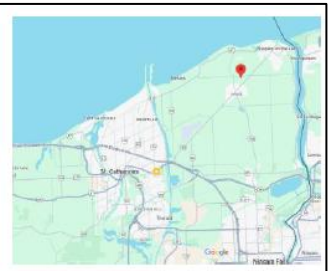
Niagara Region (2025). Navigator. Retrieved from: https://navigator.niagararegion.ca/portal/apps/webappviewer/index.html?id=4500745f3cd141ddb707913a444e7886

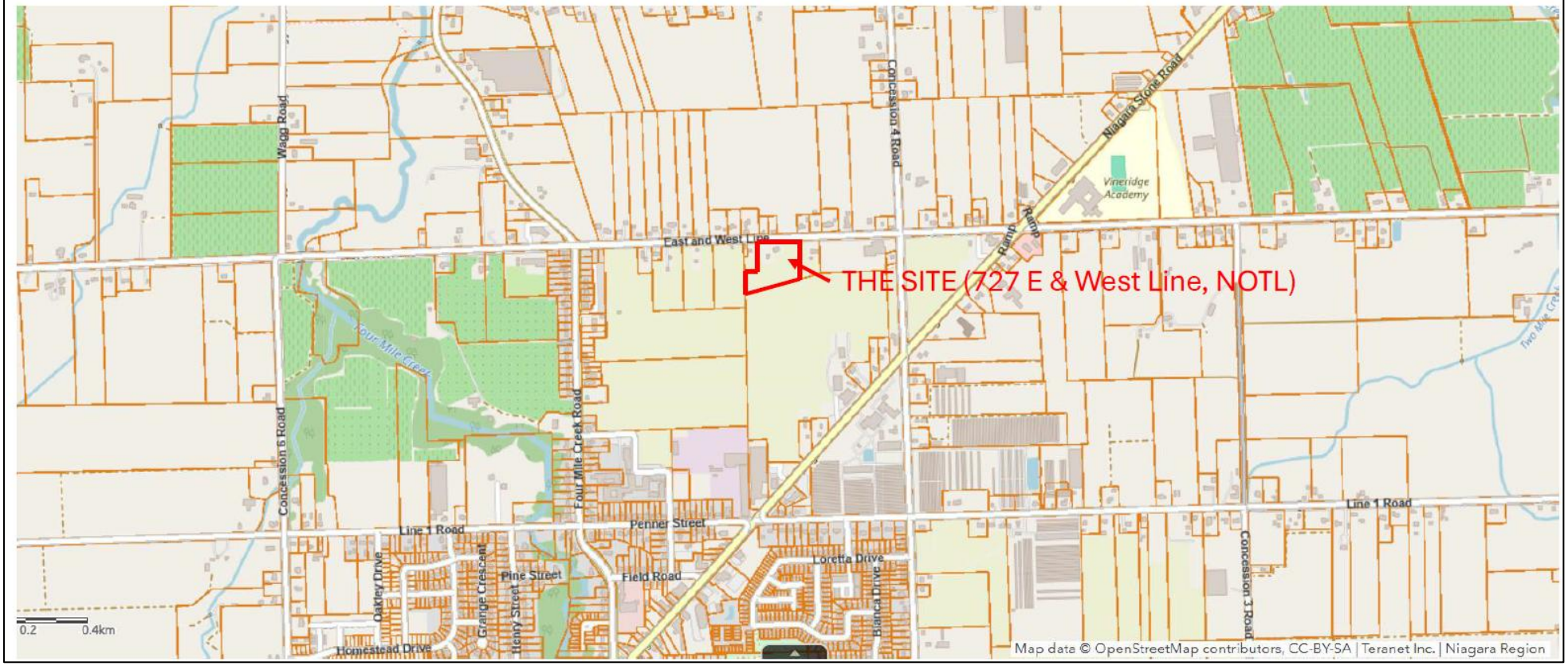
Province of Ontario Ministry of Agriculture, Food and Rural Affairs (2021). AgMaps Geographic Information Portal. Retrieved from: http://www.omafra.gov.on.ca/english/landuse/gis/portal.htm

Province of Ontario Ministry of Environment, Conservation and Parks(2025). Map: Well records. Retrieved from: https://www.ontario.ca/page/map-well-records

APPENDIX A – SITE LOCATION

727 E & West Line,
Niagara-on-the-Lake, Ontario
L0S 1J0





Source: Niagara Region (2025)

T.I SERVICES 23 Ludlow Crescent Brantford, ON N3P 1V2 Phone:(519) 802-7873 Email: tiservicesinfo@gmail.com BCIN # 42698	**Owner:** Niagara Orchids and Vineyards Corp.	**Site Location:** 727 East and West Line, NOTL

EXISTING Sewage Flow

Description	Units	# Units	L/d per Units	L/d
Existing Residential Building #1 (to be severed)	# bedrooms, # fixture units (FU), sq footage; or	3 bedroom, 2 bath, 1400ft2 single family dwelling	N/A	1600
			Total:	**1600**

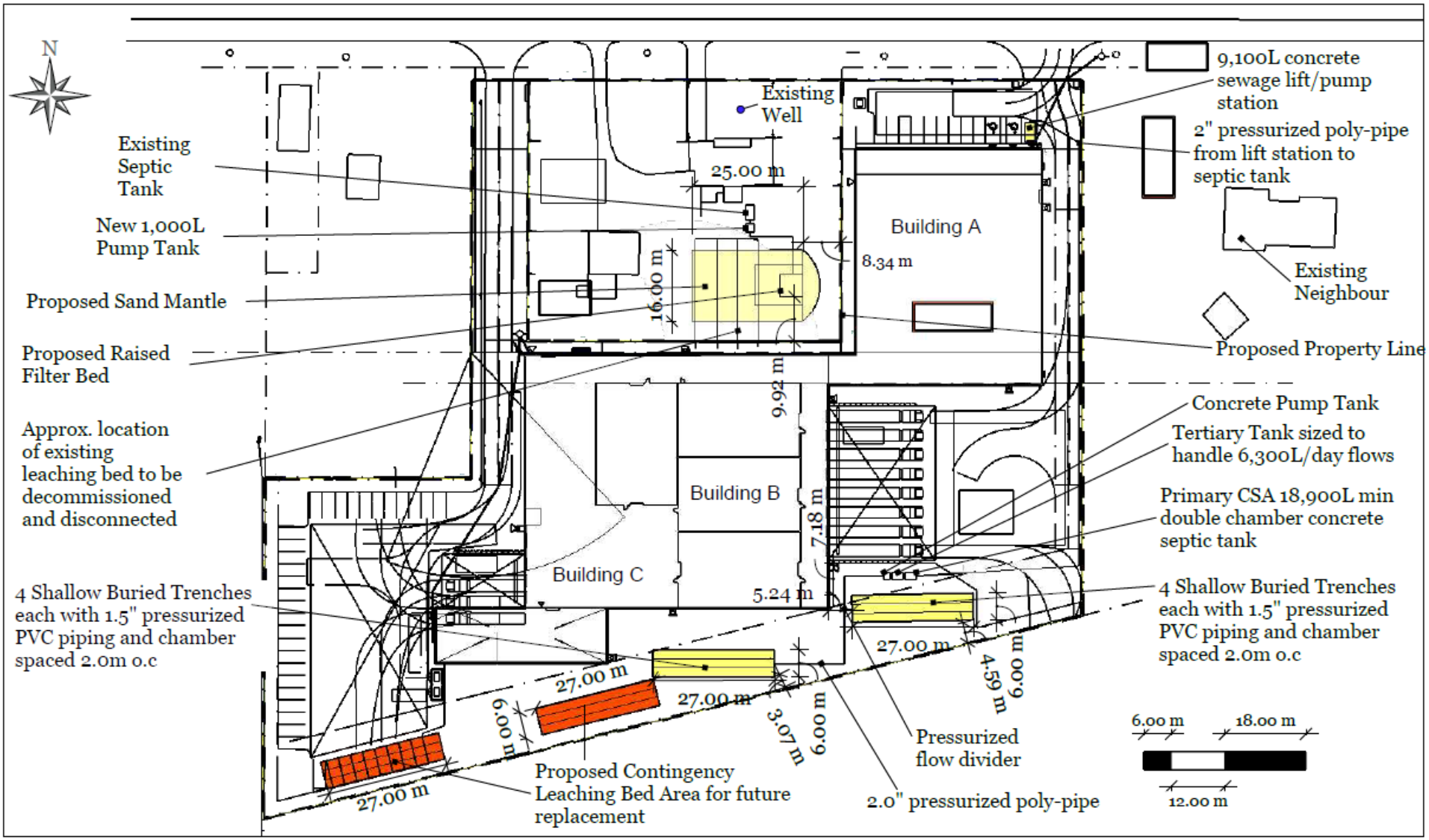
PROPOSED Sewage Flows

Warehouse Building	# of employees per 8 hour shift; or	16	75	1200
	# of toilets; and	4	950	3800
	# of urinals; and	0	450	0
	# of loading bays	10	150	1500
Total Proposed Sewage Flows based on combination of total number of toilets, urinals and loading bays.			Total:	5300
			Contingency Sewage Flows:	1000
			Total Calculated Max Daily Sewage Flows:	**6300**

Agricultural Facility Septic System Requirements (6,300L/day flow)

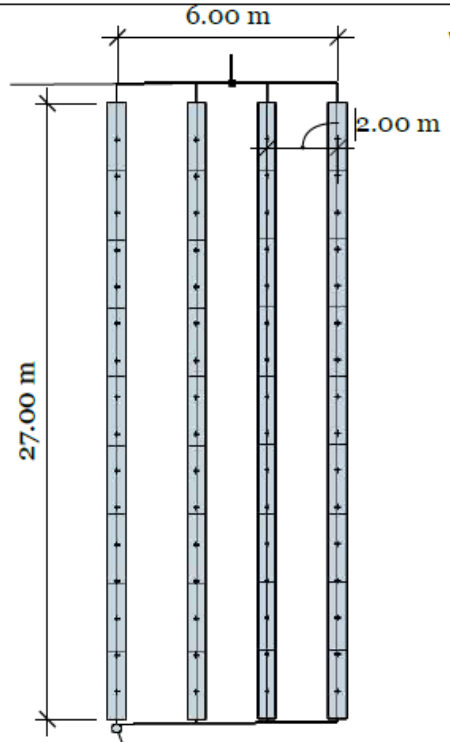
Septic Components	Calculations	Minimum Requirement	Units	Proposed/Required	Units
Primary Septic Tank	Q X 3	18900	Litres	18,900	Litres
Tertiary Septic Tank	N/A	N/A	N/A	6,300	Litres/day flows
Final Pump Tank	Q / 2	3150	Litres	3150	Litres
Tertiary Shallow Buried Trenches	Q / 30	210	Meters	216	Meters

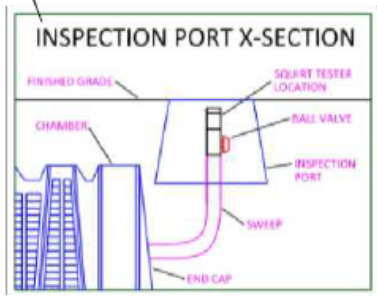
*Soil-Mat T-Time Analysis estimates clay soil with T-Time >=50 min/cm



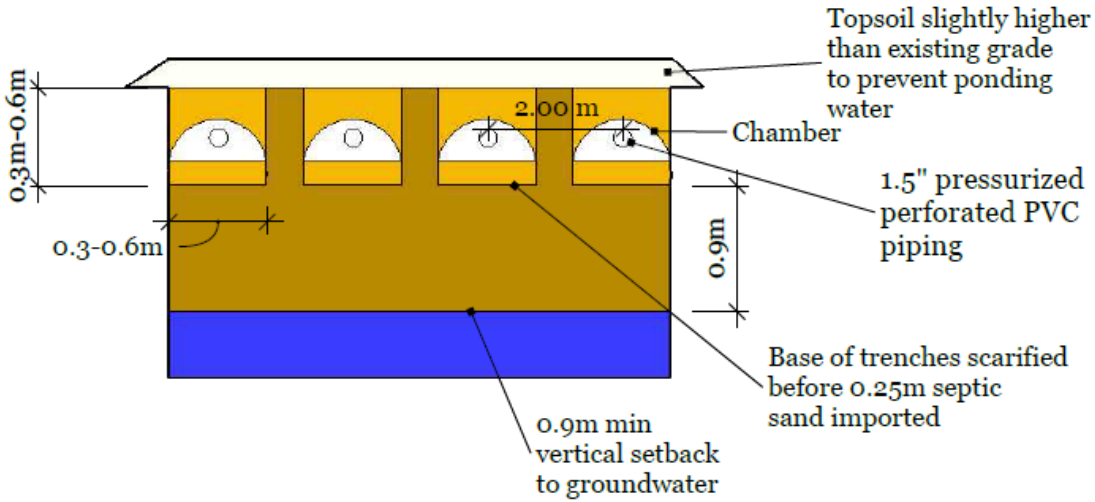
T.I Services 23 Ludlow Crescent Brantford, ON N3P 1V2 Ph: (519) 802-7873 | tiservicesinfo@gmail.com	**Title:** Tertiary Septic System Design - Agricultural Facility 727 E & West Line NOTL		A 01
	Client: Niagara Orchid and Vineyard Inc.	**Designer:** T. Imhoff **BCIN #: 42698**	MM/DD/YY / REMARKS 1 06/13/25 2 07/10/25 3 02/10/26

1.5" T connected to 1.5" PVC header dosing SBT evenly

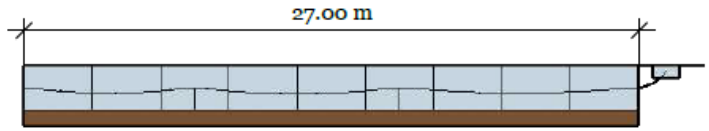


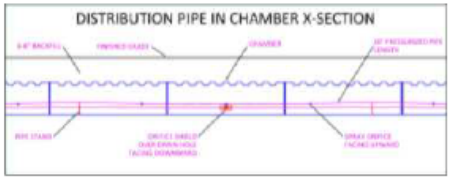


Vertical Cross Section Shallow Buried Trenches (SBT)



Horizontal Cross Section Shallow Buried Trenches (SBT)





T.I Services 23 Ludlow Crescent Brantford, ON N3P 1V2 Ph: (519) 802-7873 | tiservicesinfo@gmail.com	**Title:** Shallow Buried Trenches Cross Sections - Agricultural Facility 727 E & West Line NOTL			01
	Client: Niagara Orchid and Vineyard Inc.	**Designer:** **BCIN #: 42698**	MM/DD/YY / REMARKS 1 06 / 13 / 25 2 07 / 10 / 25 3 __/__/__	A

APPENDIX E – SITE PHOTOS

The Site	Septic Tank	Septic Tank Probed	Leaching Bed Area - North
			
Leaching Bed Area – South	Agricultural Field	Well Location	Well Tag
			

APPENDIX E – ADDITIONAL SITE PHOTOS

Trench Location – South Facing 	Trench Location – North Facing 	Existing Clay Distribution Pipes 
Septic Tank – Primary Chamber 	Septic Tank – Secondary Chamber 	Septic Tank – Location