The Effort Trust Company

1015 - 1045 Dairy Drive

Design Brief

June 2025

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Design Brief
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1 Introduction

1.1 Scope

Arcadis has been retained by TSL Dairy Inc. c/o The Effort Trust Company to prepare the necessary engineering plans, specifications and documents to support the proposed Site Plan Application for the subject lands in accordance with the policies set out by the Planning and Development Branch of the City of Ottawa. This Brief will present a detailed grading and servicing scheme to support the development of the property and will include sections on-site grading, water supply, wastewater management, minor and major stormwater management, and erosion and sediment control.

1.2 Subject Site

The Self Storage Facility is located northeast of the Dairy Drive and Old Montreal Road intersection. The proposed Self Storage Facility development is approximately 2.48 hectares in size and is bounded by Diary Drive to the west, Old Montreal Road to the south, a private property zoned light industrial to the east, and a commercial dairy production facility to the north.

Please refer to **Figure 1**, below, for more information regarding the site location.

Figure 1 Subject Site Location

Due to the site's natural topography, with the existing grade sloping from south to north, the proposed concept aims to seamlessly integrate the two large buildings and two smaller buildings into the natural slope by utilizing a multi-storey approach for the larger southerly building. The south building's facades will be maintained at an accessible grade to permit entry into the upper and lower levels of the building at the building's north and south limits.

The primary vehicular and pedestrian access to the site is located off Old Montreal Road, and provides unimpeded access to the site office. A second, gated, vehicular access is provided off Dairy Drive.

The Self Storage Facility project will consist of the construction of 2 metal storage buildings and 2 industrial condominium buildings. One of the self-storage buildings will include a small rental and administration office. The site will also contain vehicular access routes, dedicated parking space and landscaping areas. A site plan of the proposed development is included in **Appendix A**.

1.3 Previous Studies

Design of this project has been undertaken in accordance with the following reports:

- Stormwater Design Plan – Cardinal Creek Business Park – Township of Cumberland prepared by Paul Wisner & Associates Inc., July 1992
- Greater Cardinal Creek Subwatershed Management Plan – City of Ottawa prepared by Aecom, August 2014

An engineering pre-consultation with the City of Ottawa was held in February 2023 regarding the proposed development. Notes from this meeting is included in **Appendix A**.

1.4 Geotechnical Considerations

Paterson Group Inc. was retained to prepare a geotechnical investigation for the site. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes
- To provide geotechnical recommendations pertaining to the design of the proposed development including construction considerations

The geotechnical investigation report PG6498-1 Revision No. 3 Dated January 11, 2024, confirmed that the site consists of topsoil underlain by a layer of fill, over a deep deposit of silty clay. Based on the undrained shear strength testing results, a varying permissible grade raise plan was created which has 5 different sections with individual permissible grade raise elevations which are referenced to a geodetic datum. The permissible elevations are between 64.5 on the south end of the site, to 60.5 at the north end of the site. The maximum and minimum deltas for grade raise are between 0.0m and 2.75m based on borehole elevations.

The report contains recommendations which include but are not limited to the following:

- Fill used for grading beneath the proposed development to meet OPSS Granular ‘A’ or Granular ‘B’ Type II placed in lifts no greater than 300 mm compacted to 98% SPMDD
- Pavement Structures as identified below

Table 1-1 Pavement Structure – Car Only Parking Areas

Local Road – Parking Areas	Thickness
12.5 Asphaltic Concrete	50 mm
OPSS Granular A Base	150 mm
OPSS Granular B Type II Subbase	300 mm

Table 1-2 Pavement Structure – Access Lanes, Fire Routes and Heavy Truck Parking Areas

Local Road	Thickness
12.5 Asphaltic Concrete	40 mm
19.0 Asphaltic Concrete	50 mm
OPSS Granular A Base	150 mm
OPSS Granular B Type II Subbase	450 mm

The report contains recommendations which include but are not limited to the following:

- Pipe bedding and cover: The pipe bedding for water and pipes placed on a relatively dry, undisturbed subgrade surface should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located upon silty clay the thickness of the bedding material should be increased to a minimum of 300 mm of OPSS Granular A. The bedding layer should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe should consist of OPSS Granular A or Granular B Type II. The bedding and cover materials should be placed in maximum 300 mm thick lifts compacted to a minimum of 95% of the material's SPMDD.
- The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level

2 Water Supply

2.1 Existing Conditions

As previously noted, the 2.48 ha Self Storage Facility site is surrounded by Diary Drive to the west, Old Montreal Road to the south, a private gravel driveway to the east, and a commercial diary supplier to the north. The subject site is flanked on both streets by existing watermains. An existing PVC 406 mm diameter watermain is located within the Dairy Drive right of way and the Old Montreal Road right of way. Both watermains fall within the City of Ottawa's pressure district Pressure Zone 1E which will provide the water supply to the site.

2.2 Design Criteria

2.2.1 Water Demands

Water demands have been calculated for the full development. This site consists of two self storage buildings that house a single office with an area of 121 m2 and two utility closets, and two industrial condominium buildings. Siamese connections will be provided for all buildings. Consumption rates are taken from Tables 4.1 and 4.2 at the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Commercial Shopping Center 2500 l/1000m^2/day
- Other Commercial 28,000 l/gross ha/day
- ICI Average Day Demand 28,000 l/gross ha/day
- ICI peak Daily Demand 42,000 l/gross ha/day
- ICI Peak Hour Demand 75,600 l/gross ha/day

A watermain demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 0.83 l/s
- Maximum Day 1.25 l/s
- Peak Hour 2.24 l/s

2.2.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 480 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in Clause 4.2.2 of the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.

Maximum Pressure	In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls will be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.
Water Age	A total travel time of 5 days or less during basic day demand is reasonable. A residence time of 8 days should not be exceeded.

2.2.3 Fire Flow Rates

The Self Storage Facility site plan contains of 2 storage buildings and two industrial condominium buildings, all with automatic sprinkler systems. All buildings will fall under OBC Section 3.10, F-2 or F3 occupancy and combustibility. The sprinkler system will be designed and installed in accordance with NFPA-13 requirements. The sprinkler system will be supplied from the city water connection and the demand will be calculated using the hazard classification plus the appropriate inside/outside hose allowances.

Calculations using the Fire Underwriting Survey (FUS version 2020) were conducted to determine the fire flow requirement for the site. Results of the analysis provides a maximum fire flow rate of 12,000 l/min or 200.0 l/s is required which is used in the hydraulic analysis. A copy of the FUS calculations is included in **Appendix B**.

2.2.4 Boundary Conditions

The City of Ottawa has provided the hydraulic boundary conditions at Dairy Drive. A copy of the boundary conditions is included in **Appendix B** and summarized as follows:

Table 2-1 Hydraulic Boundary Conditions

Criteria	Hydraulic Head - Dairy Drive	Pressure
Max HGL (Basic Day)	114.1 m	74.4 psi
Peak Hour	109.4 m	67.7 psi
Max Day + Fireflow (12,000 L/m)	102.1 m	57.3 psi

Ground elevation: 61.7 m

2.2.5 Hydraulic Model

A computer model for the subject site has been developed using the InfoWater program by Innovyze. The model includes the existing watermain and boundary condition at Dairy Drive.

2.3 Proposed Water Plan

2.3.1 Proposed Water Plan

A 200 mm watermain is proposed with a double connection to the existing 406mm watermain at the North site entrance on Dairy Drive. The 200mm watermain is looped with a parallel run back out to Dairy Drive, and three private hydrants are provided.

Each building is provided with a 150mm un-metered fire service and a 50mm metered water service. To provide service to a janitorial closet and the mechanical room, where an automatic trap seal primer for the floor drain is required in facilities with combustion heating equipment.

Refer to the general plan of services **Drawing C-001** for detailed watermain layout for the subject site.

2.3.2 Hydraulic Analysis

The hydraulic model was run under basic day conditions to determine the maximum pressure for the site. The minimum pressure for the site is determined in the peak hour analysis using the provided boundary condition. Results of the analysis for the site are summarized in Section 2.3.2 and the water model schematic and model results are included in **Appendix B**.

2.3.3 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Results of the hydraulic model are included in **Appendix B** and summarized as follows:

- Basic Day (Max HGL) Pressure Range 531.12 kPa to 540.91 kPa
- Peak Hour (Min HGL) Pressure Range 485.06 kPa to 494.86 kPa
- Max Day Pressure Range 413.52 kPa to 423.32 kPa

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	No nodes in basic day scenario exceed 552 kPa (80 psi), therefore no pressure reducing control is required for the buildings in this development.
Minimum Pressure	All nodes in the model exceed the minimum value of 276 kPa (40 psi).
Fire Flow	The required fire flow will be provided through a combination of a proposed new private hydrant and the surrounding public hydrants. There are 3 existing public hydrants around the site, 2 located on Dairy Drive and 1 on Old Montreal Road. All 3 hydrants are rated Class AA, which can provide 1500 GPM (5678 L/min) and above flow rate. Two new private fire hydrants are proposed, one from the proposed watermain on site, and one connecting to the Dairy Drive ROW watermain. The new hydrants are located within 45m of the doors, and Siamese connections. According to Table 18.5.4.3 Maximum Fire Flow Hydrant Capacity - Ottawa Design Guidelines, a total of 5678 L/min + 5678 L/min + 3785 L/min = 15141 L/min fire flow can be provided, which is larger than required fire flow 12000 L/min. Therefore, the existing public can provide sufficient fire flow for the site.

Water Age

Two parallel 200mm watermain service the site through a looped connection out to Dairy Drive, between buildings A and D. North of the valve box, a 200 mm dead-end watermain services building B. A Water Quality Analysis is included in Appendix B, which calculates the required flow rate to empty the pipe in 5 days. The required flow rate is then compared to the average daily demand to determine if there is a water quality concern. As mentioned in section 2.2.2, a total travel time of 5 days or less during basic day demand is reasonable for maintaining adequate water age.

The calculations provided in **Appendix B** conclude that the flow rate required to empty the pipes in 5 days is 0.01 L/s, which is significantly less than the average daily demand of 0.83 L/. Therefore, there is no concern for water quality as the average daily demand, calculated using Consumption rates from Tables 4.1 and 4.2 of the Ottawa Design Guidelines – Water Distribution, is greater than what is required to maintain adequate water age.

3 Wastewater Disposal

3.1 Existing Conditions

There is an existing 250mm diameter sanitary sewer along Dairy Drive, which flows north and west along Dairy Drive and connects to Trim Road. This sewer has been designed to provide wastewater service to the subject development site.

3.2 Design Criteria

The sanitary sewers for the subject site will be based on the City of Ottawa design criteria. It should be noted that the sanitary sewer design for this study incorporates the latest City of Ottawa design parameters identified in Technical Bulletin ISTB-2018-01. Some of the key criteria will include the following:

- Average commercial flow = 28,000 l/s/ha
- Peak ICI flow factor = 1.5 if ICI area is > 20% total area
  1.0 if ICI area is ≤ 20% total area
- Inflow and Infiltration Rate = 0.33 l/s/ha
- Minimum Full Flow Velocity = 0.60 m/s
- Maximum Full Flow Velocity = 3.0 m/s
- Minimum Pipe Size = 250 mm diameter (for ICI lands per OSDG)

3.3 Recommended Wastewater Plan

The on-site sanitary system will consist of 250mm PVC sewer installed at normal depth and slope and will provide 150mm service connections to all buildings. The sewers have been designed using the criteria noted above in section 3.2 and outlet via a connection to the sanitary sewer within the Diary Drive right of way to the west of the site.

A copy of the sanitary sewer design sheet can be found in **Appendix C.** Please refer to the General Plan of Services **Drawing C-001** for further details.

4 Site Stormwater Management

4.1 Existing Conditions

The existing undeveloped subject lands currently drain north away from Old Montreal Road to the northwest corner of the development lands and into the Dairy processing plant. There is an existing 375mm diameter storm sewer along Dairy Drive, and to the south of the site, an 825mm diameter storm sewer along Old Montreal Road. The Dairy Drive storm sewer eventually increases to a 1200mm diameter storm and has been designed to capture restricted minor system flows from the subject development.

4.2 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow. The on-site minor system design criteria identified below is consistent with the current City of Ottawa Sewer Design Guidelines

Some of the key criteria include the following:

- Design Storm — 1:5year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.25
  - Asphalt/Concrete — C = 0.90
  - Roof — C = 0.90
- Pipe Velocities — 0.80 m/s to 6.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads)

4.3 Proposed Minor System

Where possible, the minor system storm sewers for the subject site will be sized based on the rational method and the City of Ottawa 5-year event. Minor storm flow to the downstream storm sewer network will be controlled by Inlet Control Devices (ICDs) to limit flow and prevent sewer surcharging downstream (see section 4.4 for Stormwater Management Criteria and Design).

The system concept includes four primary stormwater management control areas. A small area along Old Montreal Road, two even smaller areas along Dairy Drive and the north property line, and a larger area comprising of the remainder of the site.

A small area along Old Montreal Road, at the southern limits of the subject lands, is conveyed by surface routing to multiple catch basins located upstream of a control structure. Flows exceeding the control structures' release rate will surcharge the storm sewer system, and ponding will occur in designated ponding areas. The control structure outlet, located in the drive aisle west of the proposed buildings, is free-flowing to Dairy Drive and can receive drainage from the foundations of the four proposed buildings.

Most of the remaining site area is conveyed north, through the drive aisles to underground storage (UGS) tanks located in the parking area/ drive aisle west of Building B. The outlet from the UGS system is controlled upstream of the free-flowing connection to Dairy Drive. Parallel storm sewers are required in the drive aisle to ensure that the small area controlled at the southern limits and foundation drains remains free-flowing.

The building roof drains are to connect to the minor storm sewer system and discharge into the controlled UGS system. Building roof drains must be serviced separately from foundation drains.

As directed by the client, Rooftop storage cannot be utilized on this site.

Services are provided to each building for foundation drains. Its connections are to the free-flowing storm sewer in the drive aisle.

The existing storm sewer on Dairy Drive is a 375mm storm sewer. The maximum pipe size for sewers downstream of control structures is set to match the outlet condition. A 5-year sewer size for the full development flows would require a 750 mm diameter sewer. It is impractical to connect such a large sewer to the smaller diameter of the existing sewer on Dairy Drive. Therefore, the outlet sewers downstream of control structures have been sized to convey the fixed flow based on the SWM release rate. These flows are provided in the Storm Sewer Design sheet.

The controlled sewers, which are intended to convey the roof drainage to the UGS, have been designed to provide a 5-year level of service.

A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in **Appendix D**. The General Plan of Services, depicting all on-site storm sewers can be found in **Appendix A**.

4.4 Stormwater Management

The subject site will be limited to a release rate established using the criteria described in section 4.2 and the Stormwater Design Plan – Cardinal Creek Business Park – Township of Cumberland prepared by Paul Wisner & Associates Inc., July 1992. This will be achieved by implementing inlet control devices (ICDs) at strategic control locations.

The CCPB Stormwater Design Plan identifies development plots as requiring a post-development 5-year flow control to 26.4L/s/Ha. The report identifies a typical on-site storage requirement of approximately 250m3/Ha. It also notes that flows exceeding the 5-year controlled release are to discharge to the City ROW (Dairy Drive).

Flows generated that are in excess of the site's allowable release rate will be stored on-site in strategic UGS tanks and gradually released into the minor system so as not to exceed the site's allocation.

The maximum surface retention depth located within the accessible developed areas will be limited to 300mm during a 5-year event. Overland flow routes will be provided in the grading to permit emergency overland flow towards the City's ROW as described in the CCPB Stormwater Design Plan.

At the south-east corner of the site, the opportunity to capture and/or store runoff is limited due to grading constraints and site plan geometry. This "uncontrolled" area – 0.002 hectares in total, have a C value of 0.25 and increased by 25% during 100-year events (as per City SDG).

The site grading and ponding have been designed to control water generated during the 1:5-year event per the CCPB Stormwater Management Report, with no 5-year overflow. Refer to the SWM calculations in **Appendix D**.

4.5 Inlet Control

The allowable 5-year post-development release rate for the 2.48 Ha site can be calculated as follows:

$\mathbf{Q_{allowable}}$ = 26.4 L/s/Ha as per CCPB SWM Report

Area = 2.48 Ha

= **65.47 L/s**

As noted in Section 4.4, a small, landscaped area along the southeast property line will drain off-site uncontrolled.

Based on a 100-year event, the flow from the 0.002 Ha uncontrolled area can be determined as:

$\mathbf{Q_{uncontrolled}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A** where:

C = Average runoff coefficient of uncontrolled area = 0.25 x 1.25

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= $1735.688 / (T_c + 6.014)^{0.820}$ = 178.56 mm/hr; where T_c = 10 minutes

A = Uncontrolled Area = 0.002 Ha

The maximum allowable release rate from the remainder of the site can then be determined as:

$\mathbf{Q_{max\ allowable}}$ = $\mathbf{Q_{restricted} - Q_{uncontrolled}}$

= 66.26 L/s – 0.31 L/s

= **65.16 L/s**

Based on the flow allowance at the various inlet locations, a combination of various sizes of inlet control devices (ICDs) were chosen in the design. The design of the inlet control devices is unique to each drainage area and is determined based on various factors, including hydraulic head and allowable release rate. The inlet control devices were sized according to the manufacturer's design charts. The restrictions will cause the on-site catch basins and manholes to surcharge to facilitate use of the UGS, surface ponding in parking, landscaped and dry pond areas. Ponding locations and elevations are summarized on the Ponding Plan **Drawing C-600**, and included in **Appendix D**.

4.6 On-Site Detention

The site was designed to limit runoff to the allowable release rate up to the 5-year post-development storm event. Flows exceeding the maximum permissible release rate will be contained on-site via underground and surface storage at strategic locations. Orifices are proposed in manholes to control runoff from the site. The modified rational method determined the resulting storage volumes during a 2-year, 5-year and 100-year storm event. Available surface ponding volumes at each inlet were determined using CAD surface volume tools. As per the Ottawa SDG, when underground storage is considered available storage, the ICD release rate is reduced by 50% to account for the head loss during the initial part of the rainfall event while the underground portion of the storage fills with runoff.

Major flow beyond the 5-year storm event is routed through the site along the major overland flow route to the designated outlet at the northwest corner. The outlet is to the Dairy Drive right-of-way, as intended in the CCBP

stormwater management report. The City of Ottawa had also requested that overland flow discharging from the site be controlled to the site's 100-year pre-development flow rate.

The site's stormwater management plan has ensured that surface ponding will not occur in parking areas and drive aisles during the 2-year storm event.

Stormwater management and on-site underground storage volume calculations, and manufacturers' spec sheets are included in **Appendix D**.

A summary of the ICD type for each drainage area and corresponding storage details is provided in Table 4.1 below.

Table 4-1 Post-Development Storage Summary Table

Post – Development Flows							
Location	ICD Type	Drainage Area (Ha)	Restricted / Uncontrolled Flow (L/s)	Storage Required (m^3)	Storage Provided (m^3)		
			5 - Year	5 - Year	Surface	UGS	Total
Uncontrolled Flow							
UN	N/A	0.002		N/A	N/A	N/A	
Controlled Storm Sewer System							
CBMH8	IPEX LMF	0.164	6.00	6.01	9.81	11.71	21.52
MH4	IPEX LMF	0.227	6.00	19.87	137.94	N/A	137.94
MH23	IPEX MHF	2.022	47.00	540.20	11.90	563.91	575.81
CBMH9	IPEX LMF	0.067	6.00	1.16	0.35	3.22	3.57
Total Restricted Release Rate							
		2.48	65.47	567.24	160.00	563.91	723.91

4.7 100-Year Overflow

A cursory review of the 100-year event, and overflow depth has been performed using the modified rational method. The calculations are included in the modified rational stormwater management sheets **Appendix D.**

A summary of the require storage volumes, and overflow balances is provided below.

Table 4-2 Post-Development 100yr Storage Summary Table

Drainage Area	ICD Restricted Flow (L/s)	100 Year Storage Required (m^3)	Total Storage Provided (m3)	Upsteam Overflow (m^3)	100 – Year Overflow (m^3)
MH23	47.00	1201.60	563.91	0	625.79
CBMH8	6.00	18.50	21.52	625.79	625.79
MH4	6.00	57.80	137.94	0	0
CBMH9	6.00	4.79	3.57	625.79	627.01

The overland flow from the area tributary to MH23 is directed to the area upstream of CBMH8. The overflow overtops the curb and retaining wall during infrequent events. The overflow volume from MH23 is 625.79m3 at peak. Based on a peak Tc of 215 minutes, the volume can be reverse calculated to **48.51 L/s**. A channel depth conveyance calculation has been provided to determine the overflow depth of **0.008m** above the static ponding elevation.

Due to the lengthy time to peak for the area from MH23, the overflow rate has been carried as a fixed flow through all downstream areas.

The overland flow from the tributary area to CBMH8 is directed to CBMH9. The overflow volume calculated from CBMH8 is a sum of the overflow volume tributary to CBMH8 and MH23. The 100-year overflow from MH23 was carried as a fixed flow to the downstream areas. There is no overflow calculated for CBMH8 individually; therefore, the overflow volume to CBMH9 is the fixed flow carried from MH23. A swale along the north property line has been provided for 100-year conveyance, which is proposed to outlet to CBMH9 and then to the Dairy Drive ROW. A channel depth conveyance calculation has been provided to determine the overflow depth of **0.08m** above the static ponding elevation. The retaining wall elevation has been designed to ensure the 100-year flow is retained on-site.

The overland flow from the area tributary to CBMH9 is directed to the Dairy Drive ROW. The volume of overflow from CBMH9 is 1.22m3 at peak. Based on a peak Tc of 15 minutes, this volume can be reverse calculated to **1.35 L/s**. The total overflow volume to the Dairy Drive ROW is a sum of the overflow volumes from the upstream areas and the area tributary to CBMH9, which amounts to 627.01m3 or 49.86 L/s. A channel depth conveyance calculation has been provided to determine the overflow depth of **0.04m** above the static ponding elevation.

The 100-year flow from areas upstream of MH4 are contained onsite, with no overland flow offsite or to other areas.

The City has requested that Arcadis review the 100-year pre-development flow versus the total restricted flow + 100-year overflow. The 100-year predevelopment flow can be calculated as;

$\mathbf{Q_{100\ predev}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A** where:

C = Average runoff coefficient of uncontrolled area = 0.25 x 1.25

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= $1735.688 / (T_c + 6.014)^{0.820}$ = 119.95 mm/hr; where T_c = 20 minutes

A = Uncontrolled Area = 2.48 Ha

Therefore, the 100year pre-development flow can be determined as:

$Q_{100\ predev}$ = **2.78** x **1.25C** x i_{100yr} x **A**

= 2.78 x 1.25 x 0.25 x 119.95 x 2.48

= **258.43 L/s**

The sum of the uncontrolled flow (0.31 L/s), the restricted flow (65.47 L/s), and the 100-year overflow (49.86 L/s) is **115.64 L/s**. This is less than the pre-development 100-year flow.

4.8 100-Year + 20% Stress Test

A cursory review of the 100-year event + 20% has been performed using the modified rational method. The Peak flow from each area during a 100-year event has been increased by 20%. The calculations have been included in **Appendix D.**

A summary of the require storage volumes, and overflow balances is provided below.

Table 4-3 Post-Development 100yr+20% Stress Test Storage Summary Table

Drainage Area	ICD Restricted Flow (L/s)	100 Year + 20% Storage Required (m^3)	Total Storage Provided	Upsteam Overflow (m^3)	100 – Year Overflow (m^3)
MH23	47.00	1502.54	563.91		926.73
CBMH8	6.00	23.67	21.52	926.73	929.24
MH4	6.00	82.03	154.59		0
CBMH9	6.00	6.28	3.57	929.24	931.95

The overland flow from the area tributary to MH23 is directed to the area upstream of CBMH8. The overflow overtops the curb and retaining wall during infrequent events. The 100-year +20% overflow volume from MH23 is 926.73m3 at peak. Based on a peak Tc of 215 minutes, the volume can be reverse calculated to **71.84 L/s**. A channel depth conveyance calculation has been provided to determine the overflow depth of **0.01m** above the static ponding elevation.

Due to the lengthy time to peak for the area from MH23, the overflow rate has been carried as a fixed flow through all downstream areas.

The overland flow from the area tributary to CBMH8 is directed to CBMH9, then Dairy Drive. The volume of overflow from CBMH8 is 2.15m3. Based on the time to peak of 41 minutes, this volume can be reverse calculated to **0.88L/s**. Combined with the fixed flow from MH23, the total overflow is **72.72L/s**. A swale along the north property line retaining wall has been provided for 100-year conveyance, which is proposed to outlet to CBMH9 and then to the Dairy Drive ROW. A channel depth conveyance calculation has been provided to determine the overflow depth of

0.1m above the static ponding elevation. The retaining wall elevation has been designed to match the stress test elevation.

The overland flow from the area tributary to CBMH9 is directed to Dairy Drive. The overflow volume from CBMH9 is 2.71m3. Based on the time to peak of 15 minutes, this volume can be reverse calculated to 3.01L/s. Combined with the fixed flow rates from the upstream area (MH23 and CBMH8), the total overflow is **75.73 L/s**. CBMH9 is located adjacent to the West property line and outlets the 100+20% event to the Dairy Drive ROW. A channel depth conveyance calculation has been provided to determine the overflow depth of **0.05m** above static ponding elevation.

The 100year+20% flow from areas upstream of MH4 is contained onsite, with no overland flow offsite.

4.9 Under Ground Storage

Due to the site's constraints and the stormwater management plan, underground storage was deemed the best option to contain the 5-year storm event on site. The table below summarizes underground storage, and additional information about the underground storage structures is found in **Appendix D.**

Table 4-3 Underground Storage Summary Table

Storage Name	Structure Type	Storage Provided (m^3)
MH23	Stormtech MC-7200 or approved equivalent	563.91
CBMH8	Pipe storage plus structure	11.71
CBMH9	CBMH	3.22

4.10 Quality Control

According to Cardinal Creek Business Park—Stormwater Management Report, a water quality pond has been provided for the business park outlet. As noted in section 7.1 of the report, it provides a TSS removal of about 85%, exceeding the MECP-enhanced level of treatment.

No additional quality control measures are required for the subject development.

4.11 Dairy Drive ROW

At the request of the City of Ottawa, the owner has agreed to construct a sidewalk along the eastern portion of Dairy Drive, connecting Old Montreal Road with its secondary entrance, located approximately at the mid-block location. The sidewalk construction will require a new barrier curb to be installed, and the infilling of the existing ditch. This section of Dairy Drive will effectively be urbanized with the boulevard draining onto the roadway.

The area being urbanized is 0.155 Ha and has a run-off coefficient of 0.65.

The 2-year flows can be calculated as follows.

$\mathbf{Q_{2yr}}$ = **2.78** x **C** x $\mathbf{i_{2yr}}$ x **A** where:

C = Average runoff coefficient of 0.65

$\mathbf{I_{2yr}}$ = Intensity of 2-year storm event (mm/hr)

= $732.951 / (T_c + 6.199)^{0.810}$ = 76.805 mm/hr; where T_c = 10 minutes

A = 0.155 Ha

Therefore, the 2-year flow can be determined as:

$\mathbf{Q_{2yr}}$ = **2.78** x **C** x $\mathbf{i_{2yr}}$ x **A**

= 2.78 x 0.65 x 76.805 x 0.155

= **21.51 L/s**

Using the channel depth conveyance calculation, the 2-year depth of flow is **0.07 m**. These calculations have been provided in the Overflow Depth Calculations in **Appendix D**.

The 100-year flows can be calculated as follows;

$\mathbf{Q_{100yr}}$ = **2.78** x **1.25C** x $\mathbf{i_{100yr}}$ x **A** where:

C = Average runoff coefficient of 0.65

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= $1735.688 / (T_c + 6.014)^{0.820}$ = 178.569 mm/hr; where T_c = 10 minutes

A = 0.155 Ha

Therefore, the 100year flow can be determined as:

$\mathbf{Q_{100yr}}$ = **2.78** x **1.25C** x $\mathbf{i_{100yr}}$ x **A**

= 2.78 x 1.25 x 0.65 x 178.569 x 0.155

= **62.52 L/s**

Using the channel depth conveyance calculation, the 100-year depth of flow is **0.1m**. These calculations have been provided in the Overflow Depth Calculations in **Appendix D**.

A new catch basin has been proposed at the secondary site entrance to facilitate capture into the existing storm sewer on Dairy Drive. Flows exceeding the capacity of the existing catch basin will continue north, and spill into the existing roadside ditch. A rip-rap spillway has been provided north of the side entrance to minimize erosion potential.

Additionally, upon completing a field visit, a 150mm diameter shallow depth culvert was observed to be draining into the existing ditch. After consultations with the City, it was determined that this culvert drains the road subgrade. A new subdrain is proposed along the alignment of the existing ditch to facilitate and convey the existing roadbed subdrainage. The subdrain will outlet to the existing ditch, north of the secondary site entrance. This subdrain will

be backfilled with suitable material as part of the urbanization works for this section of road. A detail has been provided on DWG C-200.

5 Grading and Roads

5.1 Site Grading

The existing grades within portions of the proposed development lands vary significantly due to the existing topography of the site. The grading plan will require the balancing of various requirements, including but not limited to geotechnical constraints, minimum/maximum slopes, overland routing of stormwater, all to ensure the site is graded in accordance with municipal and accessibility standards.

Refer to the grading plan provided in **Appendix E**.

A retaining wall exceeding 2.0m in height is anticipated along the south-eastern property lines. A retaining wall approximately 1.0m in height is anticipated along Dairy Drive. Both walls will require a detailed design by a structural engineer prior to municipal approval. To meet the stringent stormwater management criteria, every effort was made to reduce uncontrolled discharge from the site. In landscape areas where typical 2-7% grading cannot be met, 3:1 maximum terracing has been utilized to tie the proposed grading into the existing.

5.2 Road Network

No public roads are proposed through the site. A minimum 9.0m wide drive aisle has been provided, as shown on the Site Plan in **Appendix A.** An internal Fire route has been shown where fire truck access is required, as determined by the site architect.

There are 100 parking stalls provided on the site, of which 4 are barrier-free.

Pedestrian access facilities are provided in the unsecured area of the site nearest to Old Montreal Road and provide access to the site office.

A bicycle parking facility has been proposed adjacent to each building entrance.

Earth-bin (or similar approved type) garbage facilities have been provided throughout.

Noise attenuation features and indoor noise clause provisions will not be required for commercial use lands for road noise generated by the adjacent roads.

Stationary noise investigation is to be provided by Gradient Wind for commercial rooftop mechanical equipment.

6 Source Controls

6.1 General

Since an end of pipe treatment facility is already provided for the development lands, stormwater site management for the subject lands will focus on site level or source control management of runoff. Such controls or mitigative measures are proposed for this development not only for final development but also during construction and build out. Some of these measures are:

- Flat site grading where possible
- Vegetation planting
- Groundwater recharge in landscaped areas

6.2 Lot Grading

Where possible, all of the proposed blocks within the development will make use of gentle surface slopes on hard surfaces such as asphalt and concrete. In accordance with local municipal standards, all grading will be between 0.5 and 5.0 percent for hard surfaces and 2.0 and 7.0 percent for all landscaped areas. Significant grade changes will be accomplished through the use of terracing (3:1 max slope), ramps and/or retaining walls. All street and parking lot catchbasins shall be equipped with 3.0m subdrains on opposite sides of a curbside catchbasin running parallel to the curb, and with 3.0m subdrains extending out from all 4 sides of parking lot catchbasins.

6.3 Vegetation

As with most site plans, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within the individual blocks provides opportunities to re-create lost vegetation.

6.4 Groundwater Recharge

Groundwater recharge targets have not been identified for this site. Perforated sub-drain systems will be implemented at capture locations in all vegetated areas. This will promote increased infiltration during low flow events before water is collected by the storm sewer system.

7 Conveyance Controls

7.1 Generals

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- Vegetated swales
- Catchbasin sumps and manhole sumps

7.2 Catchbasins and Maintenance Hole Sumps

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be to OPSD 705.02. All storm sewer maintenance holes serving local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

8 Sediment and Erosion Control Plan

8.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to possibly introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These may include:

- Until the local storm sewer is constructed, groundwater in construction trenches shall be pumped into a filter mechanism prior to release to the environment
- Vegetated swale sediment capture filter socks will remain on open surface structures such as maintenance holes and catchbasins until these structures are commissioned and put into use
- Silt fence on the site perimeter will be installed

8.2 Trench Dewatering

Any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed, including sediment removal and disposal and material replacement as needed. It should be noted that that the contractor will be responsible for the design and management of the trap(s).

8.3 Seepage Barriers

In order to further reduce sediment loading to the stormwater management facility, seepage barriers will be installed on any surface water courses at appropriate locations that may become evident during construction. These barriers will be Light Duty Straw Bale Barriers per OPSD 219.100 and Heavy-Duty Silt Fence Barriers per OPSD 219.130; locations are shown on the Sediment and Erosion Control Plan included in **Appendix E**. They are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

8.4 Surface Structure Filters

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Until streets are asphalted and curbed, all catchbasins and manholes will be constructed with sediment capture inserts or equivalent located between the structure frame and cover. These will stay in place and be maintained during construction and build until it is appropriate to remove same.

9 Conclusion

This report has illustrated that the proposed Dairy Drive Self Storage development can be serviced via existing municipal services. The water network will be extended to provide necessary service. All sanitary and storm sewer designs for this development will be completed in conformance with City of Ottawa standards while acknowledging downstream constraints. By limiting flow into the minor storm sewer system as per the applicable local stormwater management criteria and allowing for excess surface storage on-site, all stormwater management requirements will be met. Adherence to the Sediment and Erosion Control Plan during construction will minimize harmful impacts on surface water.

Based on the information provided within this report, the plans prepared for the subject development can be serviced to meet City of Ottawa requirements.

Demetrius Yannoulopoulos, P. Eng.

Director – Office Lead

Ryan Magladry, C.E.T

Associate – Manager, Land Engineering

Angela Soward

Engineering Intern

Appendix A

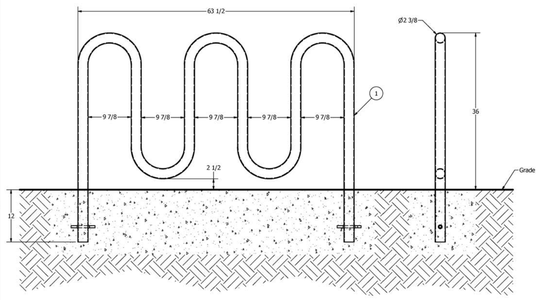
Site Plan

Site Servicing Plan 142817-C-001

AOV Legal Plan – 2022-05-13

Pre-Consultation City Comments

Bike Rack, R-8240-EM-SS



General Description:

The R-8240-EM-SS Stainless Steel Wave Bike Rack is a high-capacity, corral-style bike stand that accommodates up to 7 bikes at a time. Bikes can be secured using a U-lock or cable between the frame and front or rear wheel. Stainless steel bike racks are made from 316-grade stainless steel for premium aesthetics and high resistance to corrosion and wear. Embedded in-ground for new concrete installation.

Specifications:

Height: 36"

Cross Span: 63 1/2"

Weight: 65 lbs

Material: Stainless Steel AISI 316

Finish Options:
- ⊗ Polished with a satin surface finish
- ○ Available polyester powdercoated option

See Reliance Foundry's standard color options at www.reliance-foundry.com/bollard/colors-bollards

Notes:

- Embedment details are for reference illustration only. Minimum foundation sizes depend on local soil conditions, weather conditions and engineering requirements.
- Bike rack is provided as shown with parts listed below. Concrete foundation and/or installation not provided by Reliance Foundry.
- This drawing is not drawn to scale. Dimensions provided herein are for reference only. Please consult Reliance Foundry sales professionals if any dimension is critical to your particular installation.
- Reliance Foundry reserves the right to amend design and specifications without prior notice for product improvement.

RELIANCE FOUNDRY

Unit 207, 6450 - 148 Street, Surrey, BC V3S 7G7, Canada
1-877-799-5245 info@reliance-foundry.com
www.reliance-foundry.com

TITLE: Bike Rack, R-8240-EM-SS

PARTS LIST						
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	WEIGHT	
1	1	R8240EMSS	Bike Rack R8240EMSS	Stainless Steel 316	65 lbs	

SIZE: C | DWG NO: R8240EMSS | REV: C1
NOT TO SCALE | SHEET 1 OF 2

2 A101 BIKE RACK DETAIL

LEGEND:

SYMBOL	DESCRIPTION
	PROPERTY LINE
	DEMOLITION OF EXISTING FEATURE
	FIRE ROUTE
	REQUIRED LANDSCAPED AREA SETBACK
	REQUIRED YARD SETBACK
	NEW CONTINUOUS CONCRETE CURBING.
	CURB CUT C/W DEPRESSED CURB
	BOLLARDS
	NEW BUILDING FOOTPRINT
	NEW LANDSCAPING
	NO PARKING, PAINTED LINES.
	DIRECTION OF TRAFFIC
	MAIN BUILDING ENTRANCE / EXITS
	SECONDARY BUILDING ENTRANCE / EXITS
	TYPICAL PARKING STALL (2.6m x 5.8m)
	BARRIER-FREE PARKING STALL (4.4m x 5.8m)
	ACCESSIBLE PARKING SIGN
	FIRE DEPARTMENT CONNECTION

PROPERTY BOUNDARY AND TOPOGRAPHIC INFORMATION DERIVED FROM TOPOGRAPHICAL PLAN OF

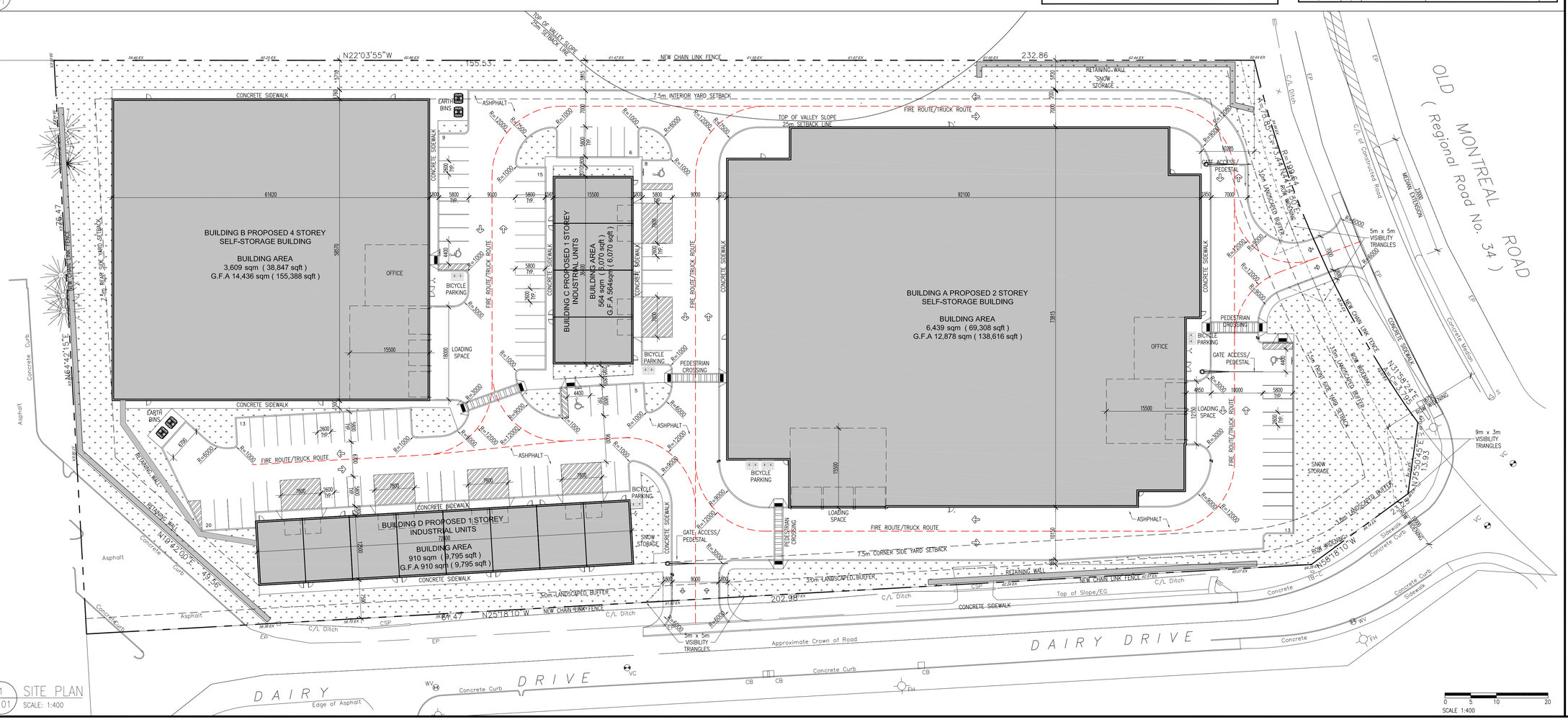
PART OF LOT 29
CONCESSION 1 (OLD SURVEY)
GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA
PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

PROPERTY IDENTIFICATION NUMBER – PART 1 AND 2 ON 4R-23578

DATED MAY 13, 2022

SITE STATISTICS:

	REQUIREMENTS	PROPOSED (based on newly proposed property line)	COMPLYING TO MUNICIPAL BYLAW
ZONING DESIGNATION	"IL-4 H21"	"IL-4 H21"	Y
MIN LOT AREA	2,000 m²	25,476 m²	Y
MIN LOT WIDTH	N/A	97.8 m	Y
MAX. LOT COVERAGE	65%	45%	Y
BUILDING AREA (BLDG FOOTPRINT)	N/A	11,522 m²	Y
GROSS FLOOR AREA	N/A	WAREHOUSE: BLDG A= 12,878 m², BLDG B= 14,436 m², TOTAL = 27,314 m²; LIGHT INDUSTRIAL: BLDG C= 564 m², BLDG D= 910 m², TOTAL = 1,474 m²	Y
FLOOR SPACE INDEX	MAXIMUM FSI OF 2	28,788 m² / 25,476 m² = 1.13	Y
BUILDING USES	AS PERMITTED BY IL-4 H21	SELF STORAGE FACILITY	Y
MINIMUM YARD REQUIREMENTS	FRONT YARD = 7.5 m; CORNER SIDE YARD = 7.5 m INTERIOR SIDE YARD = 7.5 m REAR YARD = 7.5 m	FRONT YARD (S) = 7.5m INTERIOR SIDE YARD (W) = 7.5m CORNER SIDE YARD (E) = 10.2m REAR YARD (N) = 7.5m	Y
SETBACK FROM WATERCOURSE & WATERBODIES (SEC. 69)	SETBACK TO HIGH WATER MARK – 30m REQUIRED SETBACK TO TOP OF BANK – 13m REQUIRED	30m PROVIDED 13m PROVIDED	Y
MAXIMUM BUILDING HEIGHT	21m	4 STOREYS 13.2m	Y
LANDSCAPING	PROPERTY LINE ABUTTING A RESIDENTIAL OR INSTITUTIONAL ZONE, 3m; MAY BE REDUCED TO ONE METRE IF A 1.4 METRE HIGH OPAQUE SCREEN IS PROVIDED ABUTTING A STREET, 3m IN ALL OTHER CASES, NO MINIMUM	MINIMUM 3m LANDSCAPING BUFFER ALONG DAIRY DRIVE AND OLD MONTREAL ROAD	Y
PARKING	WAREHOUSE BLDG A & B: 0.8 SPACES PER 100 SQUARE METRES FOR THE FIRST 5,000 SQUARE METRES OF GROSS FLOOR AREA; 0.4 SPACES PER 100 SQUARE METRES ABOVE 5,000 SQUARE METRES OF GROSS FLOOR AREA; LIGHT INDUSTRIAL BLDG C & D: 0.8 SPACES PER 100 SQUARE METRES FOR THE FIRST 5,000 SQUARE METRES OF GROSS FLOOR AREA;	BLDG A & B REQUIRED: (5,000m²/100m²)*0.8 = 40 ((27,314m²-5000m²)/100m²)*0.4 = 89 Total = 129 BLDG C & D REQUIRED: (1,474m²/100m²) = 14.74 14.74*0.8 = 11.792 Total = 12 TOTAL: 141 PARKING SPACES REQUIRED PROPOSED: 89 PARKING SPACES	N
BARRIER FREE PARKING	76-100 PARKING SPACES 4 SPACES REQUIRED	4 BF SPACE PROVIDED	Y
BICYCLE PARKING	1 PER 2000 m² 28,788/2000 = 14 REQUIRED	24 PROVIDED	Y



1 A101 SITE PLAN SCALE: 1:400

NO DRAWING DIVISION SHALL BE VIEWED INDEPENDENTLY. CONTRACTOR AND ALL SUB CONTRACTORS TO REVIEW AND BE FAMILIAR WITH ENTIRE DRAWING SET.

Revisions

No.:	For:	Date:
6	SITE PLAN APPROVAL	06/17/2025
5	SITE PLAN APPROVAL	04/07/2024
4	SITE PLAN APPROVAL	12/05/2024
3	SITE PLAN APPROVAL	09/24/2024
2	PHASE 2 PRE-CON SUBMISSION	06/13/2024
1	REVISED FOR PHASE 3 PRE-CON SUBMISSION	02/15/2024
To: (Version)	For:	Date:

Issue Table

NOTE:
CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH WORK. DO NOT SCALE DRAWINGS.

CONTRACTORS AND SUBCONTRACTORS SHALL USE THIS DRAWING IN CONJUNCTION WITH OTHER DISCIPLINARY ENGINEER DRAWINGS AND TENANT FIT-UP DRAWINGS.

THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSE UNTIL ISSUED FOR CONSTRUCTION BY DESIGN PROFESSIONAL UNDER ISSUE COLUMN.

ALL DRAWINGS ARE TO BE REVIEWED AS A FULL PACKAGE SET.

Seal: ONTARIO ASSOCIATION OF ARCHITECTS — SAM M. ESPOSITO LICENCE 5726

North Arrow: TRUE NORTH — NORTH

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Applicant:
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50 KING STREET EAST,
HAMILTON, ONTARIO L8N 1 A6

Engineer:
ARCADIS
333 PRESTON STREET
OTTAWA, ONTARIO K1S 5N4

Project:

PROPOSED SELF-STORAGE BUILDINGS

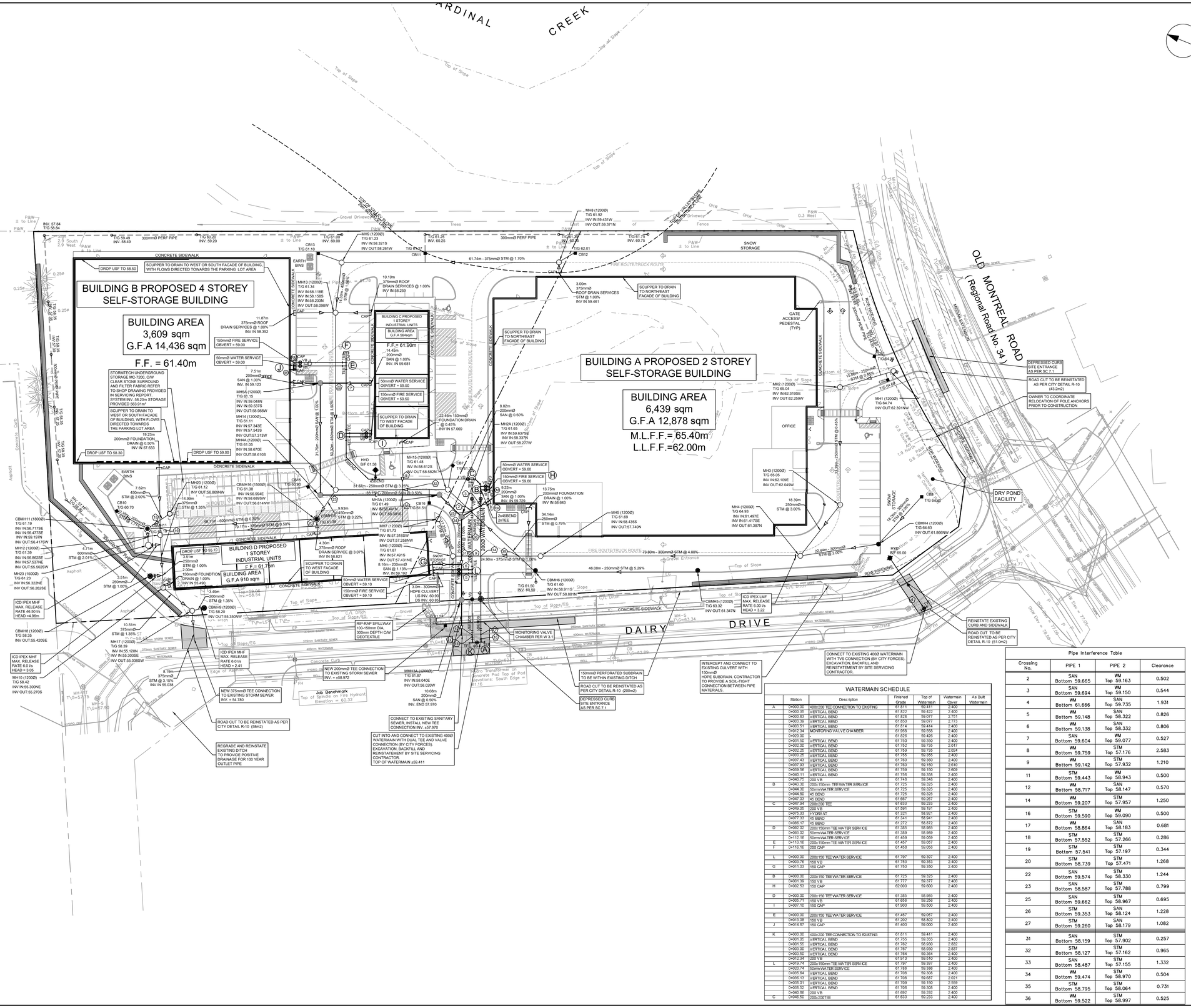
1015-1045 DAIRY DRIVE, OTTAWA, ON.

FILE NUMBER: D07-24-0122
PLAN NUMBER: 19229

Drawing Title:

SITE PLAN

Drawn By:	MG	Scale:	AS NOTED
Checked By:	SE	Plot Date:	
Project Date:	07.13.2023		
Project No:	23-104		
Drawing No:	A101	Sheet Version:	0



WATERMAIN SCHEDULE

	Station	Description	Finished Grade	Top of Watermain	Watermain Cover	As Built Watermain
A	0+000.00	400x200 TEE CONNECTION TO EXISTING	61.811	59.411	2.400	
	0+000.35	VERTICAL BEND	61.822	59.422	2.400	
	0+000.83	VERTICAL BEND	61.828	59.077	2.751	
	0+001.39	VERTICAL BEND	61.850	59.077	2.773	
	0+001.51	VERTICAL BEND	61.814	59.414	2.400	
	0+012.34	MONITORING VALVE CHAMBER	61.958	59.558	2.400	
	0+020.00		61.826	59.426	2.400	
	0+031.92	VERTICAL BEND	61.750	59.350	2.400	
	0+032.00	VERTICAL BEND	61.752	59.735	2.017	
	0+032.25	VERTICAL BEND	61.759	59.735	2.024	
	0+031.25	VERTICAL BEND	61.755	59.355	2.400	
	0+037.43	VERTICAL BEND	61.760	59.360	2.400	
	0+037.93	VERTICAL BEND	61.760	59.150	2.610	
	0+039.56	VERTICAL BEND	61.759	59.150	2.609	
	0+040.11	VERTICAL BEND	61.758	59.358	2.400	
	0+040.75	200 VB	61.748	59.348	2.400	
B	0+043.30	200x150mm TEE WATER SERVICE	61.725	59.325	2.400	
	0+044.30	50mm WATER SERVICE	61.725	59.325	2.400	
	0+044.92	45 BEND	61.725	59.325	2.400	
	0+047.03	45 BEND	61.667	59.267	2.400	
C	0+047.94	200x200 TEE	61.633	59.233	2.400	
	0+049.05	200 VB	61.591	59.191	2.400	
	0+075.33	HYDRANT	61.321	58.921	2.400	
	0+077.33	45 BEND	61.341	58.941	2.400	
	0+086.17	45 BEND	61.272	58.872	2.400	
D	0+092.02	200x150mm TEE WATER SERVICE	61.355	58.955	2.400	
	0+093.02	50mm WATER SERVICE	61.389	58.989	2.400	
	0+112.16	50mm WATER SERVICE	61.459	59.059	2.400	
E	0+113.16	200x150mm TEE WATER SERVICE	61.457	59.057	2.400	
F	0+116.16	200 CAP	61.458	59.058	2.400	
L	0+000.00	200x150 TEE WATER SERVICE	61.797	59.397	2.400	
	0+003.76	150 VB	61.753	59.353	2.400	
G	0+011.03	150 CAP	61.750	59.350	2.400	
B	0+000.00	200x150 TEE WATER SERVICE	61.725	59.325	2.400	
	0+001.38	150 VB	61.777	59.377	2.400	
H	0+002.53	150 CAP	62.000	59.600	2.400	
D	0+000.00	200x150 TEE WATER SERVICE	61.385	58.985	2.400	
	0+005.71	150 VB	61.658	59.256	2.400	
I	0+007.10	150 CAP	61.900	59.500	2.400	
E	0+000.00	200x150 TEE WATER SERVICE	61.457	59.057	2.400	
	0+013.08	150 VB	61.202	58.802	2.400	
J	0+014.87	150 CAP	61.400	59.000	2.400	
K	0+000.00	400x200 TEE CONNECTION TO EXISTING	61.811	59.411	2.400	
	0+001.00	VERTICAL BEND	61.755	59.355	2.400	
	0+001.55	VERTICAL BEND	61.762	58.930	2.832	
	0+003.00	VERTICAL BEND	61.767	58.930	2.837	
	0+003.50	VERTICAL BEND	61.764	59.364	2.400	
	0+012.34	200 VB	61.910	59.510	2.400	
L	0+019.74	200x150mm TEE WATER SERVICE	61.797	59.397	2.400	
	0+020.74	50mm WATER SERVICE	61.786	59.386	2.400	
	0+035.64	VERTICAL BEND	61.708	59.308	2.400	
	0+036.13	VERTICAL BEND	61.708	59.687	2.021	
	0+036.01	VERTICAL BEND	61.709	59.150	2.559	
	0+035.52	VERTICAL BEND	61.708	59.308	2.400	
	0+040.56	200 VB	61.692	59.292	2.400	
C	0+046.56	200x200TEE	61.633	59.233	2.400	

Pipe Interference Table

Crossing No.	PIPE 1	PIPE 2	Clearance
2	SAN Bottom 59.665	WM Top 59.163	0.502
3	SAN Bottom 59.694	WM Top 59.150	0.544
4	WM Bottom 61.666	SAN Top 59.735	1.931
5	WM Bottom 59.148	SAN Top 58.322	0.826
6	WM Bottom 59.138	SAN Top 58.332	0.806
7	SAN Bottom 59.604	WM Top 59.077	0.527
8	WM Bottom 59.759	STM Top 57.176	2.583
9	WM Bottom 59.142	STM Top 57.932	1.210
11	STM Bottom 59.443	WM Top 58.943	0.500
12	WM Bottom 58.717	SAN Top 58.147	0.570
14	WM Bottom 59.207	STM Top 57.957	1.250
16	STM Bottom 59.590	WM Top 59.090	0.500
17	WM Bottom 58.864	SAN Top 58.183	0.681
18	STM Bottom 57.552	STM Top 57.266	0.286
19	STM Bottom 57.541	STM Top 57.197	0.344
20	STM Bottom 58.739	STM Top 57.471	1.268
22	SAN Bottom 59.574	STM Top 58.330	1.244
23	SAN Bottom 58.587	STM Top 57.788	0.799
25	SAN Bottom 59.662	STM Top 58.967	0.695
26	STM Bottom 59.353	SAN Top 58.124	1.228
27	STM Bottom 59.260	SAN Top 58.179	1.082
31	SAN Bottom 58.159	STM Top 57.902	0.257
32	STM Bottom 58.127	STM Top 57.162	0.965
33	STM Bottom 58.487	STM Top 57.155	1.332
34	WM Bottom 59.474	STM Top 58.970	0.504
35	STM Bottom 58.795	STM Top 58.064	0.731
36	WM Bottom 59.522	STM Top 58.997	0.525

CLIENT

TSL DAIRY INC.

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2024-02-14
2	SUBMISSION NO. 2 FOR CITY REVIEW	2024-06-27
3	SUBMISSION NO. 3 FOR CITY REVIEW	2024-10-04
4	SUBMISSION NO. 3 FOR CITY REVIEW	2025-06-25
5		
6		

SEE 010, FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

SEAL

PRIME CONSULTANT

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

1015 DAIRY DRIVE

1015 DAIRY DRIVE

PROJECT NO: 142817	
DRAWN BY: M.M./A.B.	CHECKED BY: R.M./D.Y.
PROJECT MGR: R.M.	APPROVED BY: D.Y.

SHEET TITLE

GENERAL PLAN OF SERVICES

SHEET NUMBER C-001

ISSUE 4

SCALE CHECK 1 in / 10mm

File Location: J1142817_1015_Dairy_D7\7.0_Production\7.03_Design\04_Civil\Sheets\C-001 GENERAL PLAN.dwg Last Saved: June 23, 2025, by siumak3150 Plotted: June 25, 2025 5:22:57 PM by Siuma, Don

D07-12-13-0249

XXXXX

TOPOGRAPHICAL PLAN OF

PART OF LOT 29
CONCESSION 1 (OLD SURVEY)
Geographic Township of Cumberland
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 500

20 15 10 5 0 10 20 Metres

Metric

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

May 13, 2022 — Date

E.H. Herweyer O.L.S.

Notes & Legend

	Denotes	
MH-ST	"	Maintenance Hole (Sanitary)
MH-S	"	Maintenance Hole (Storm Sewer)
VC	"	Valve Chamber (Watermain)
LS	"	Light Standard
CB	"	Catch Basin
DI	"	Ditch Inlet
CSP	"	Corrugated Steel Pipe
CCP	"	Concrete Pipe
PO-W	"	Wooden Pole
PO-C	"	Concrete Pole
AN	"	Anchor
FH	"	Fire Hydrant
WV	"	Water Valve
Inv.	"	Invert
T\G	"	Top of Grate
T\P	"	Top of Pipe
TB-T	"	Traffic Terminal Box
TB-C	"	Cable Terminal Box
HH	"	Handhole
	"	Coniferous Tree
S	"	Sign
CLF	"	Chain Link Fence
P&W	"	Post and Wire Fence
BH	"	Borehole
Ø	"	Diameter
+ 65.00	"	Location of Elevations
+ 65.00	"	Top of Concrete Curb Elevation
C/L	"	Centreline
EP	"	Edge of Pavement
EG	"	Edge of Gravel
C/L	"	Centreline
	"	Property Line
MH-T	"	Maintenance Hole (Traffic)

AREAS
Part 1 Plan 4R-25378 = 1.300 Hectares
Part 2 Plan 4R-25378 = 1.214 Hectares
TOTAL SITE AREA = 2.514 Hectares

BOUNDARY INFORMATION COMPILED FROM PLAN 4R-23578 AND OFFICE RECORDS.

ELEVATION NOTES

1. Elevations shown are referred to geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. E2503-22 Pt Lt29 CI OS CU T DI | JG

From: Murshid, Shoma <Shoma.Murshid@ottawa.ca>
Sent: Monday, February 27, 2023 4:12 PM
To: James Webb
Cc: Elsby, Cam; Rehman, Sami; Giampa, Mike; Murray, Hayley; Moise, Christopher; 'Alex Shafran'; Demetrius Yannoulopoulos; 'christopher.gordon@cghtransportation.com'; 'andrew.harte@cghtransportation.com'; 'sam@searchitect.com'; 'shafranspencer31@gmail.com'
Subject: 1015 to 1045 Dairy Drive - Site Plan Control Pre-Consultation Follow-up
Attachments: 1015 Dairy Drive.Pre-Application Consultation Form.Jan 20.2023.pdf; Peoposed site plan and floor plan for 1015 Dairy Dr, Orleans, ON.pdf; Dairy, 1015-1045_Design Brief.pdf; 1015-1045 Dairy Drive Pre-con Meeting Checklist.docx

Importance: High

Good morning James,

Thank you for meeting with us on February 21, 2023 to discuss a self-storage unit business at the northeast corner of Dairy Drive and Old Montreal Road. This use is permitted within the IL4 H(21) zone for the subject lands as it is classified under warehouse use definition. This is for nine storage buildings that will provide an alternative to a fully enclosed storage building for self-storage. The combined floor area for the buildings is 12,913 square metres. Building A includes administration offices. A total of two access points are proposed.

I offer the **following planning notes and comments** for your consideration when preparing a final formal submission for the site plan control:

- Please consider the provision of shade/canopy trees along the street frontages and consider any setbacks to existing hydro wires.
- Please bring the main building as close as possible to the street to provide a more pedestrian friendly public realm, after considering the soil volumes and setbacks required for the potential street trees.
- We recommend the portions of the site that are visible from the City's public realm are well considered for quality of materials, facade treatments, and generally being a positive contribution to the surrounding community.
- We recommend the hard surfacing on the site be reduced as much as possible to reduce the urban heat island effect and to promote natural stormwater management and filtration.
- We recommend the hard surfaces internal to the site include additional green edges and landscaping with strategic landscaping for screening around the edges of the site to improve the image of the proposed fencing to the public realm.
- Ensure this proposal takes into account the new Official Plan.
- Please do not forget to design and identify locations of temporary (and/or permanent) snow storage, garbage/green-bin/recyclable pick-up, emergency and

protective service turn-arounds (in other words, demonstrate truck turning movements) on your submission documents.

- At time of site plan approval, cash in lieu of parkland will apply.

Site Plan Control, Required Plans/Studies and Fees for Submission:

This proposal triggers Application for "New Development, Complex" site plan control. This site plan control category has a submission fee requirement that is (planning fee component) $49,964.88 + the Initial Design Review and Inspection Fee, based on the value of Infrastructure and Landscaping (sliding scale between $1,000 to $10K) plus an Initial Conservation Authority Fee of $1,065.00.

Plans and reports required at the time of site plan control submission (PDFs only) shall be:
Site Plan
Design Brief (scoped)
Planning Rationale
Elevations
Floor Plans
Grading & Drainage Plan
Erosion & Sediment Control Plan
Site Servicing Study
Stormwater Management Report
Site Servicing Plan
Geotechnical Report including a slope stability analysis
EIS (can be combine with TCR)
Landscape Plan (can alternatively be combined with TCR)
Legal Survey Plan
Topographical Plan of Survey Plan with a published Bench Mark
Noise Study
TIA
Synchro Files
Environmental Site Assessment(s)

Urban Design Review Comments

from
Christopher Moise OAA MRAIC
Architect | Urban Designer
christopher.moise@ottawa.ca

- This proposal does not run along or does not meet the threshold in one of the City's Design Priority Areas and need not attend the City's UDRP. Staff will be responsible for evaluating the proposal and providing design direction.
- We appreciate the drawings submitted for discussion and have the following comments/questions regarding the proposal:

- **Visibility to public realm**: We recommend the portions of the site that are visible from the City's public realm are well considered for quality of materials, facade treatments, and generally being a positive contribution to the surrounding community.
- **Reduction in hard surfaces**: We recommend the hard surfacing on the site be reduced as much as possible to reduce heat island effect.
- **Additional landscaping especially for screening**: We recommend the hard surfaces internal to the site include additional green edges and landscaping and strategic landscaping for screening around the edges of the site to improve the image of the proposed fencing to the public realm.

- A scoped Design Brief is a required submittal for all Site Plan/Re-zoning applications and can be combined with the Planning Rationale. Please see the Design Brief's Terms of Reference that has been attached.
    - ***Note. The Design Brief submittal should have a section which addresses these pre-consultation comments.***

This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Good luck.

Engineering Review Comments:

from

Cam Elsby, EIT
Cam.Elsby@ottawa.ca | (613) 580-2424, ext. 21443

Please note the following information regarding the engineering design for the above noted site:

Water:

Frontage charges apply ($190.00 per metre) ☐ **Yes** ☒ **No**

Accessible Water Main: direct access to 403mm PVC municipal watermain on Dairy Drive.

Submission documents must include:

- Boundary Conditions - civil consultant to request boundary conditions from the City's assigned Project Manager, Development Review. Water boundary conditions request must include the location of the service and the expected loads required by the proposed development. Please provide all the following information:

    - Location of service (show on a plan or map)
    - Type of development
    - Average daily demand: ___ l/s.
    - Maximum daily demand: ___l/s.

- Maximum hourly daily demand: ___ l/s.
- Required fire flow and completed FUS Design Declaration if applicable
- Supporting Calculations for all demands listed above and required fire flow as per Ontario Building Code or Fire Underwriter Surveys (See technical Bulletin ISTB-2021-03.

- Watermain system analysis demonstrating adequate pressure as per section 4.2.2 of the Water Distribution Guidelines.
- Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant
- Any proposed emergency route (to be satisfactory to Fire Services)

Sanitary Sewers:

Accessible Sanitary Sewer: direct access to 250mm PVC municipal sanitary sewer on Dairy Drive.
Is a monitoring maintenance hole required on private property? ☒ yes ☐ no

- Provide an analysis to demonstrate that there is adequate residual capacity in the receiving and downstream wastewater system to accommodate the proposed development.
- Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

Storm Sewers:

Accessible Storm Sewer: direct access to 375mm PVC municipal storm sewer on Dairy Drive.
Is a monitoring maintenance hole required on private property? ☒ yes ☐ no

Storm Water Management:

- Quality Control:
    - Conservation Authority to provide quality control requirements. Please reach out to the Conservation Authority prior to submission and include correspondence in the Stormwater Management Report
- Quantity Control:
    - Control 5-year post-development flow to 26.4 L/s/ha as per Cardinal Creek Business Park Stormwater Design Plan, dated July 1992 using on-site detention storage as required.

- Must also conform to criteria outlined in the Greater Cardinal Creek Subwatershed Management Plan, dated August 2014.

- MECP ECA requirements

An MECP Environmental Compliance Approval would be required (Municipal/Private Sewage Works) due to shared services between sites, unless the sites were to be merged. Please contact Ontario Ministry of the Environment and Climate Change, Ottawa District Office to arrange a pre-submission consultation.

Additional Notes:

- No Capital Work Project that would impact the application has been identified at this time
- No road moratorium that would impact the application has been identified
- Any easement identified should be shown on all plans
- For any proposed exterior light fixtures, please provide certification from a licensed professional engineer confirming lighting has been designed only using fixtures that meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America and result in minimal light spillage onto adjacent properties (maximum allowable spillage is 0.5 fc). Additionally, include in the submission the location of the fixtures, fixture type (make, model, part number and mounting height
- Sensitive Marine Clay (SMC) is widely found across Ottawa- geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane

Refer to following list of required supporting plans and studies required for the infrastructure component of your submission

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

Servicing and site works shall be in accordance with the following documents:

- Ottawa Sewer Design Guidelines (October 2012)
- Ottawa Design Guidelines – Water Distribution (2010)
- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- City of Ottawa Park and Pathway Development Manual (2012)
- City of Ottawa Accessibility Design Standards (2012)
- Ottawa Standard Tender Documents (latest version)

Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455

Transportation Engineering Comments:

from

Mike Giampa, P.Eng., Senior Transportation Engineer
mike.giampa@ottawa.ca

A TIA is warranted- proceed to scoping.

The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended. Synchro files are required at Step 4.

ROW protection on Old Montreal Road is 37.5 metres.
ROW protection on Dairy Drive is 20 metres.

A Stationary Noise Impact Study is required (residential within 100m).
Ensure that the clear throat requirements meet TAC guidelines (arterial access)

On site plan:
Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.

Turning templates are required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
Show lane/aisle widths.

Environmental Policy Comments:

From

Sami Rehman
Environmental Planner | Planificateur environnemental
613.580.2424 ext./poste 13364 | Sami.Rehman@ottawa.ca

Please accept this message as a summary of my comments at the pre-development consultation for a site plan control application at 1015 & 1045 Dairy Dr., held on 21 Feb 2023.

The proposal would require a detailed Environmental Impact Study (EIS) because the subject property is part of, and adjacent to the natural heritage features overlay and an Urban Natural Feature (UNF). See Official Plan Schedule C11-C & C12). The EIS needs to address:

-extent of and impacts on natural heritage feature & UNF
-potential significant habitat for threatened or endangered species
-appropriate setbacks from watercourse, see OP Section 4.9.3
-adjacent to steep slopes,
-adjacent to Cardinal Creek,
-Review and draw recommendations from Greater Cardinal Creek Subwatershed Mgmt Study (2014)
-Recommendations to plant native trees/shrubs and contribute to urban canopy

For further guidance, please the EIS guidelines:
Environmental Impact Statement Guidelines (ottawa.ca)

I would recommend that the applicant discuss their proposal with the RVCA to discuss if any permits are required under their regulations.

I also noticed that the subject property has many trees growing on it that appear to be greater than 10 cm in diameter. I would recommend a Tree Conservation Report but will leave it to the Forestry Planner's recommendations. If the EIS is required, it can be combined with the EIS to avoid duplications.

Forestry Unit's Comments:

From

Hayley Murray
Planning Forester (T), 613.580.2424 ext. | poste 24616 | Murray.Hayley@ottawa.ca

ottawa.ca/urbanforest / ottawa.ca/treebylaw

Here are my comments as well as the TCR/LP requirements to pass along.

Project Comments:

- A TCR is required for this application.
- Adjacent and boundary (co-owned) trees should be retained. Removal of one of these trees would require written permission from the landowner.
- Establishing/maintaining a treed buffer between properties is a priority to reach canopy cover targets, provide a visual and noise barrier, and for wildlife habitat.

TCR requirements

1. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
    a. please identify trees by ownership – private onsite, private on adjoining site, city owned, boundary (trees on a property line)
2. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
3. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
4. The location of tree protection fencing must be shown on the plan
5. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
6. For more information on the process or help with tree retention options, contact Hayley Murray hayley.murray@ottawa.ca or on City of Ottawa

LP tree planting requirements

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when **planting around overhead primary conductors.**

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage

- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Tree Canopy

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.

At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate. Indicate on the plan the projected future canopy cover at 40 years for the site.

Committee of Adjustment – Minor Variances:

To review whether the reduction in parking spaces will be supported by the Committee of Adjustment Planner, please contact Cass.Sclauzero@ottawa.ca to pre-consult. Please do not forget to cc me, should you require any other variances from the Zoning By-law.

Addressing:
In order to seek information and/or the process to change the address(es), please contact addressingandsigns@ottawa.ca .

Closing Comments:

Minimum Drawing and File Requirements- All Plans

Plans are to be submitted on standard **A1 size** (594mm x 841mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).

With all submitted hard copies provide individual PDF of the DWGs and for reports please provide one PDF file of the reports. **All PDF documents are to be unlocked and flattened.**

Please keep in mind that this pre-consultation follow-up and its requirements are subject to change. If you are to make a submission for the current proposal before April 2023, the current regime of reviewing development applications and the notes from this follow-up will remain current and valid. However when the new phased pre-consultation procedures are passed by the City of Ottawa Council, sometime as of April 2023, if you have not yet submitted the identified applications, you will then be subject to a new phased pre-consultation process, prior to a formal development review submission, as per the new Bill 109 timelines.

If you find any competing objectives and need my advice or have any further questions, please do not hesitate to contact me.

Hope this information helps you plan accordingly.

Best wishes,

Shoma
Shoma Murshid, MCIP, RPP
(she/ her/ elle)
File Lead, Planner II
Responsable de dossier, urbaniste II
City of Ottawa/ Ville d'Ottawa
Development Review (Suburban Services, East)/ Examen des projets d'aménagement (Services suburbains Est)
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique
110 Laurier Avenue West, 4th Floor, Ottawa ON K1P 1J1/ 110, avenue Laurier Ouest, 4e étage, Ottawa (Ontario) K1P 1J1
Mail Code/ Code de courrier : 01-14
Tel/ Tél: (613) 580-2424 ext. 15430
Fax/ Téléc. : (613) 580-4751
e-mail/ courriel : shoma.murshid@ottawa.ca
www.ottawa.ca

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File No.: PC2024-0299

August 22, 2024

James Webb
WEBB Planning Consultants
Via email: jwebb@webbplanning.com

Subject: Phase 2 Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application – 1015/1045 Dairy Drive

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 8, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. As of June 6, 2024, planning pre-consultations are no longer mandatory as per the Province of Ontario's Bill 185. If the applicant chooses to proceed with further pre-consultation, please complete a Phase 3 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, it is recommended that you complete the Phase 2 pre-consultation process.

Submission Requirements and Fees

1. Fees related to planning applications can be found here.

2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

3. All of the below comments or issues should be addressed to ensure the effectiveness of the application submission review.

Planning

List of Studies and Plans Reviewed:

- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Building A Elevations**, dwg A400, prepared by Sam Esposto Architect Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Building B Elevations**, dwg A401, prepared by Sam Esposto Architect Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.

Comments:

1. The applicant has previously completed a Phase 2 pre-application consultation on October 4, 2023 and a Phase 3 pre-application review on March 7, 2024 for a proposed storage facility containing two buildings with a combined 26,998 m^2 of gross floor area. Since the Phase 3 review, the applicant has proposed a major revision to the plans. In addition to the two buildings for the self-storage facility at a combined 27,314 m^2 of gross floor area, there are two additional buildings proposed for fourteen units of an industrial condominium at a combined 1,474 m^2 gross floor area.

    a. The Official Plan policies and Zoning By-law provisions discussed in previous pre-consultations are still applicable.

    b. Staff have no concerns with the proposed light industrial land uses on the site given these uses are permitted by the current Zone. The Zoning Information table on the site plan lists that the land use does not conform; this row should be updated.

2. Since the time of the previous pre-application consultation, a possible retrogressive landslide risk has been flagged for the property (see Engineering Comment 13 below). While the City will review other required plans and studies for the proposed development if the applicant chooses to move ahead with an

application submission prior to the City adopting a methodology for reviewing a retrogressive landslide risk analysis study, the applicant must understand the risk of potential significant design changes to be required due to the eventual conclusions from the retrogressive landslide hazard risk assessment. Staff can move forward with the review of the other documentation for the site plan application, but once these reports and plans are deemed satisfactory the application will be placed on hold. This hold will remain in place until such time as the retrogressive landslide report to be submitted meets the City's Technical Bulletins and any site changes (if required) are updated on all submitted documents.

3. As the applicant is aware, a variance will need to be approved by the Committee of Adjustment for a reduction in parking on the site. The parking study and planning rationale will need to justify a reduction from required 143 parking spaces to the proposed 93 parking spaces given the additional light industrial land uses.

   Given the complexity added by the potential retrogressive landslide risk, staff advise waiting to apply to the Committee of Adjustment until the retrogressive landslide risk has been evaluated by the City. The minor variance process can be coordinated to occur concurrently with the site plan control approval process. As discussed in previous meetings, the site plan application cannot be approved with the reduction in parking without a minor variance approved by the Committee.

4. The application submission will require an updated Zoning Confirmation Report.

   a. Please ensure that all deficiencies identified by Building Code Services below are addressed on aisle width, loading spaces, and refuse screening.

5. Please ensure that all plans reference both 1015 and 1045 Dairy Drive. This comment was provided on the last submission, and some of the engineering plans still only reference 1015.

6. Staff appreciate the locations of the accessible vehicle parking spaces. The plan should also show an accessible parking sign at the front of each space. A depressed curb should also be included for the space west of Building C like the other two accessible parking spaces included on the plan (see Figure 1 below).

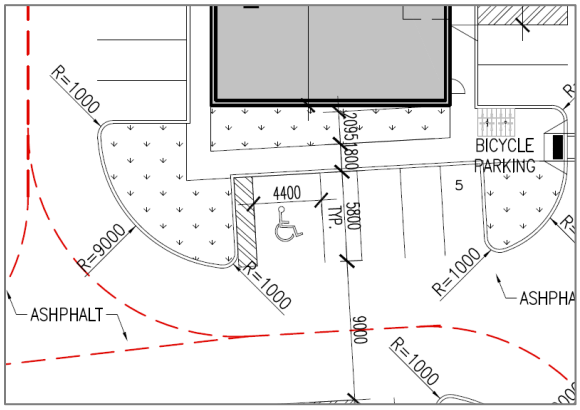


Figure 1: Image clip from the site plan highlighting the AODA parking space west of Building C that requires a depressed curb and signage.

Please contact Jerrica Gilbert, Planner II, for follow-up questions related to application procedures and planning policies.

Building Code Services

List of Studies and Plans Reviewed:

- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.

Deficiencies:

7. The minimum required parking spaces for the proposed uses is 141. Only 93 parking spaces are proposed.

8. The Minimum Required Aisle Width for a parking angle 71 – 90 is 6.7m. The proposed aisle is 6.0m

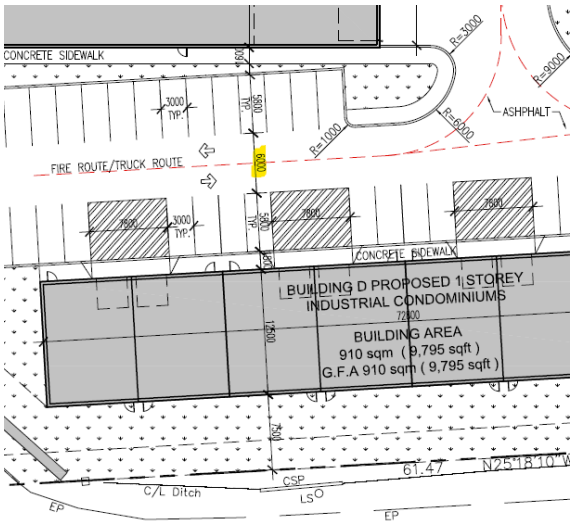


Figure 2: Image clip from the Site Plan showing where the minimum aisle width is shown to be less than the required 6.7m.

9. The minimum length in metres of the required oversize loading space is 13m, the length of the proposed loading parking spaces is approximately 12.20m.

10. All outdoor refuse collection and refuse loading areas contained within or accessed via a parking lot must be: c) screened from view by an opaque screen with a minimum height of 2.0 metres, (d) where an in-ground refuse container is provided, the screening requirement of Section (3)(c) above may be achieved with soft landscaping.

Comments:

11. The proposed construction is partially located within the Rideau Valley Conservation Authority Regulated limit. A permit from the RVCA is required.

12. Where four or more bicycle parking spaces are provided in a common parking area, each bicycle parking space must contain a parking rack that is securely anchored to the ground and attached to a heavy base such as concrete.

Please contact Dina Belarbi, Zoning Plans Examiner, for more information.

Urban Design
List of Studies and Plans Reviewed:

- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Building A Elevations**, dwg A400, prepared by Sam Esposto Architect Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Building B Elevations**, dwg A401, prepared by Sam Esposto Architect Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Landscape Plan**, dwg L.1, prepared by James B. Lennox & Associates Inc., dated 02/06/2024, revision 2 dated 07/15/2024.
- **Landscape Plan**, dwg L.2, prepared by James B. Lennox & Associates Inc., dated 02/06/2024, revision 2 dated 07/15/2024.

Comments:

13. No additional design comments.

Please contact Christopher Moise, Planner II, for follow-up questions.

Engineering

List of Studies and Plans Reviewed:

- **General Plan of Services**, C-001, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Notes Details CB Data Table**, C-010, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Grading Plan**, C-200, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Sanitary Drainage Area Plan**, C-400, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Storm Drainage Area Plan,** C-500, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Ponding Plan**, C-600, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Erosion and Sediment Control Plan**, C-900, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Design Brief**, prepared by Arcadis, dated June 27, 2024.
- **Geotechnical Investigation,** prepared by Paterson Group, dated June 10, 2024.

Comments:

Retrogressive Landslide Hazard Risk:

14. There are currently no methodologies at the Provincial level to effectively deal with new developments along slopes where retrogressive landslide hazards might exist. As you may be aware, the City has retained a consultant to assist in consulting with subject matter experts from various fields of practice and jurisdictions, with the goal of deriving interim guidance documents to identify and deal with landslide hazard risk.

    Landslides Hazard Risk Assessments had historically been reviewed based on an interim technical guidance document produced by the RVCA for landslide

hazard risk assessments. The RVCA's interim guidance is based on an approach from Western Canada (Frasier Valley and Town of Canmore); however, there exist other approaches, including those from Quebec and Norway, among others. The City needs to review all the state-of-the-art approaches and produce City-specific guidance documents. Ultimately, it is the City that is responsible for responding to and addressing landslide hazard risk; therefore, the City must ensure that the approach used to evaluate risk is appropriate.

As a result, the City is putting all applications with retrogressive landslide risk on hold until such time as Technical Bulletin 1 is available in early fall to confirm and/or rule out whether the onsite clay is sensitive enough to sustain a retrogressive landslide. In accordance with Technical Bulletin 1, if the clay is not shown to have potential for landslide hazard risk, further study will not be required. If landslide hazard risk is possible, based on the sensitivity of the clay alone, the applicant will be required to wait for Technical Bulletin 2, which is expected by year-end. Technical Bulletin 2 will provide interim methodologies and approaches to either the project as proposed or to the portion of the site available for development. Eventually, the City's slope stability guidelines will be updated to reflect the City's new approach for addressing landslide hazard risk.

Please note that the City will review other required plans and studies for the proposed development during this time, provided that the applicant understands the risk of potential significant design changes to be required as a result of the eventual conclusions from the retrogressive landslide hazard risk assessment. If the applicant wishes to proceed with review of other plans/studies during this time, an acknowledgement in writing must be provided stating that the applicant is aware of the risk of proceeding with further review while the design may be subject to change from the result of the retrogressive landslide hazard assessment conclusions. If the acknowledgement in writing is not provided with application submission, the application would be deemed incomplete and remain on hold until Technical Bulletin 1 is released in early fall.

Water:

15. Frontage charges do not apply.

16. Location of Accessible Water Main: 403mm PVC municipal watermain on Dairy Drive.

17. Submission documents must include:

    a. Boundary Conditions - civil consultant to request boundary conditions from the City's assigned Project Manager, Development Review. Water boundary conditions request must include the location of the service and the expected loads required by the proposed development. Please provide all the following information:

        I. Location of service (show on a plan or map).

II. Type of development.

III. Average daily demand: ___ l/s.

IV. Maximum daily demand: ___l/s.

V. Maximum hourly daily demand: ___ l/s.

VI. Required fire flow and completed FUS Design Declaration (if applicable).

VII. Supporting Calculations for all demands listed above and required fire flow as per Ontario Building Code or Fire Underwriter Surveys (See technical Bulletin ISTB-2021-03)

b. Watermain system analysis demonstrating adequate pressure as per Section 4.2.2 of the Water Distribution Guidelines.

c. Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I Table 1 – maximum flow to be considered from a given hydrant.

d. Any proposed emergency route (to be satisfactory to Fire Services).

e. Service areas with a basic demand greater than 50 m3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.

f. A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.

Sanitary Sewers:

18. Location of Accessible Sanitary Sewer: 250mm PVC municipal sanitary sewer on Dairy Drive.

19. A monitoring maintenance hole shall be required just inside the property line for all non-residential and multi residential building connections from a private sewer to a public sewer. See the Sewer Use By-law for details.

20. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

21. For laterals connecting to main with 50% pipe diameter or over, provide a manhole.

22. Provide the proposed peak wet weather sanitary flow rate, along with supporting calculations, to our Asset Management team for analysis to demonstrate that there is adequate residual capacity in the receiving and downstream wastewater

system to accommodate the proposed development. This information can be provided in an email to the Project Manager, and we will circulate internally.

Storm Sewers:

23. Location of Accessible Storm Sewer: direct access to 375mm PVC municipal storm sewer on Dairy Drive.

24. A monitoring maintenance hole shall be required just inside the property line for all non-residential and multi residential building connections from a private sewer to a public sewer. See the Sewer Use By-law for details.

25. For laterals connecting to main with 50% pipe diameter or over, provide a manhole.

Stormwater Management:

26. Quality Control**:**

    a. Suspended Solids: Provide Enhanced level of protection (80%) for suspended solids removal. Demonstrate ISO 14034 Environmental Technology Verification (ETV) protocol if OGS units are used.

27. Quantity Control:

    a. Control 5-year post-development flow to 26.4 L/s/ha as per Cardinal Creek Business Park Stormwater Design Plan, dated July 1992 using on-site detention storage as required. Any post-development flow in excess of the 5-year storm event must be directed towards the Right-of-Way.

    b. Must also conform to criteria outlined in the Greater Cardinal Creek Subwatershed Management Plan, dated August 2014.

28. Ponding Notes

    a. Permissible ponding of 350mm for the 100-year storm event. No spilling to adjacent sites.

    b. Beyond the 100-year ponding elevation, all drainage must be spilled to the Right-of-Way.

    c. 100-year spill elevation must be 300mm lower than any building opening or ramp.

    d. Demonstrate that the stress test spill elevation (100-year +20% event) does not spill onto any permanent structures.

29. MECP ECA Requirements:

a. An MECP Environmental Compliance Approval would be required (Municipal/Private Sewage Works) due to shared services between sites, unless the sites were to be merged. Please contact Ontario Ministry of the Environment and Climate Change, Ottawa District Office to arrange a pre-submission consultation.

30. Additional Notes:

    a. No Capital Work Project that would impact the application has been identified at this time.

    b. No road moratorium that would impact the application has been identified.

    c. Any easement identified should be shown on all plans.

31. For any proposed exterior light fixtures, please provide certification from a licensed professional engineer confirming lighting has been designed only using fixtures that meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America and result in minimal light spillage onto adjacent properties (maximum allowable spillage is 0.5 fc). Additionally, include in the submission the location of the fixtures, fixture type (make, model, part number and mounting height.

32. Sensitive Marine Clay (SMC) is widely found across Ottawa - geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane shear testing.

33. A remediation plan must be detailed and executed as outlined in any recommendations identified in the most recent Phase II ESA conducted for the subject site.

34. No work can be done within the limits of hazard lands as identified in the slope stability analysis and EIS for the subject site, including but not limited to walkways, structures, stormwater management units (including OGS), etc.

35. For ease of reference, please see the following list of required supporting plans and studies required for the infrastructure component of your Site Plan Control Approval application:

    a. Servicing & Stormwater Management Report, including:

        I. Demonstrated servicing capacity for all of water, sanitary and storm.

        II. Pre-development and post-development drainage area plans for both sanitary and storm.

III. Ponding Plan

b. Geotechnical Investigation

c. Environmental Site Assessment(s)

d. Grading & Drainage Plan

e. Servicing Plan

f. Erosion & Sediment Control Plan

36. The following comments are with respect to the submitted plans and studies after a preliminary review. While not comprehensive due to time constraints with this phase of review, these comments are meant to guide the required plans and studies towards timely approval. Note that further comments may be identified in subsequent phases of review. The preliminary comments are as follows:

37. Erosion & Sediment Control Plan:

    a. Please specify heavy-duty silt fence barriers for entire site due to surrounding sensitive uses.

    b. Please show mud mats at all proposed site entrances during construction.

38. Grading & Drainage Plan:

    a. Please provide TOW/BOW elevations in a minimum of 3 locations for each proposed retaining wall (BOW elevations are missing). Provide a 0.3 m setback from the property line.

    b. Grades in excess of 7% will require terracing at a maximum of 3:1 slope. Please remove the slopes greater than 7% in the terraced area.

    c. Please clearly provide the location of all roof downspouts on the plan. Note that roof runoff must be directed towards a suitable outlet, and downspouts closer than 1.5m to a property line must be equipped with a splash pad.

    d. Please show the TOF and USF elevations on the plan, and ensure sufficient cover from surrounding surface elevations.

    e. Please show all emergency overland flows and ensure they are directed towards the Right-of-Way.

    f. Note that sheet draining over retaining walls is not permitted (between buildings B and D); please revise to provide a suitable outlet for drainage in all areas where sheet drainage over retaining walls is proposed.

g. Please demonstrate a minimum 0.15m swale depth using adjacent elevations. Swales with less 1.5% slope require a perforated subdrain.

h. Please ensure all slopes on-site maintain a minimum to 1% positive slope.

39. Ponding Plan:

a. Please show on the plan all ponding areas for the 100-year storm event.

b. Please note that the extent of the 100-year ponding shouldn't encroach on the Right of Way.

c. Please note that there shall be no encroachment to any structure for the 100 year +20% storm stress test ponding elevation.

40. Servicing Plan:

a. Please show the storm and sanitary manholes in the Right-of-Way, and ensure that reported manhole inverts match City as-built drawings as per GeoOttawa.

b. Please ensure that flow is not constricted from larger to smaller sewer sizes where an ICD is not provided.

c. Please note that since there are three proposed road cuts on Dairy Drive, an asphalt overlay agreement is required.

d. Please add a note that water services are to be connected to City mains as per standard W11.1.

e. Please show the proposed hydrant connecting directly from the main rather than from the private water service, while maintaining the hydrant on private property.

Please contact Cam Elsby, Infrastructure Project Manager, for follow-up questions related to engineering.

Noise

List of Studies and Plans Reviewed:

- **Stationary Noise Assessment**, #23-098, prepared by Gradient Wind Engineering Inc., dated January 22, 2024.

Comments:

41. No comments.

Please contact Mike Giampa, Transportation Project Manager, for follow-up questions related to Noise Assessment Requirements.

Transportation
List of Studies and Plans Reviewed:

- **Traffic Impact Assessment – Step 1 Screening Report, Step 2 Scoping Report**, prepared by CGH Transportation, dated June 2024.

Comments:

42. A second Dairy Drive access should be used to replace the Montreal Road private approach.

43. Right-of-way protection (Montreal Road/Dairy Drive).

    a. See Schedule C16 of the Official Plan.

    Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

44. The Transportation Impact Assessment (TIA) process is currently underway. A TIA Strategy report with Synchro files is required at submission.

Please contact Mike Giampa, Transportation Project Manager, for follow-up questions.

Environment
List of Studies and Plans Reviewed:

- **Environmental Impact Study**, prepared by Kilgour & Associates Ltd., dated June 7, 2024.
- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Landscape Plan**, dwg L.1, prepared by James B. Lennox & Associates Inc., dated 02/06/2024, revision 2 dated 07/15/2024.
- **Landscape Plan**, dwg L.2, prepared by James B. Lennox & Associates Inc., dated 02/06/2024, revision 2 dated 07/15/2024.
- **Geotechnical Investigation,** prepared by Paterson Group, dated June 10, 2024.

Comments:

45. Previous concerns regarding the interpretation of City policies with regard to watercourse setbacks (Comment #21 from the Feedback letter for PC2024-0054, dated March 7, 2024) have been resolved in the latest Environmental Impact Study (EIS) submission. Section 5.1 of the now accurately describes the

setback policies and the relationship between the Official Plan and the Greater Cardinal Creek Subwatershed Management Plan.

46. Previous comments regarding the interpretation of the "stable top of slope," as required in the watercourse setback policies, have been partially, but not fully addressed. The stable top of slope has been identified in geotechnical studies, per the revised Geotechnical report: "Further, as requested by City of Ottawa staff, a 'Top of Stable Slope' line has been added to Drawing PG6498-3 – Slope Setback Plan. This line is indicative of the stable slope allowance of up to 5 m plus the toe erosion allowance of 2 m".

    While the stable top of slope has been accurately portrayed in the Geotechnical Report, it is not represented in the EIS. The stable top of slope setback is a critical component of the watercourse setbacks, which the EIS is designed to address. **A revised EIS must be submitted** that includes the correct stable top of slope setbacks as shown in Drawing PG6498-3.

47. The provided landscape plans now show a strip of vegetation along the eastern edge of the site between the development and Cardinal Creek. This addition satisfies the conditions of the EIS and the concerns previously expressed in Comment #23 from the Feedback letter for PC2024-0054.

48. Section 6.0 of the EIS now provides direction for the implementation of the City's Bird Safe Design Guidelines. This addition resolves the concerns raised in Comment #24 from the Feedback letter for PC2024-0054.

49. The EIS now includes the correct interpretation of the watercourse setback policies in section 4.1.1 of the report. Comment #25 from the Feedback letter for PC2024-0054 is resolved.

50. As requested, section 7.1 of the EIS now includes ESC inspections daily and after a precipitation event. Comment #26 from the Feedback letter for PC2024-0054 is resolved.

51. Section 7.2 of the EIS has been updated to show the correct timing window for breeding bird season and a 2-day validity period for inspections. Comments #27, #28, and #29 from the Feedback letter for PC2024-0054 are resolved.

52. With the exception of a revised EIS to demonstrate the stable top of slope (as noted above), all previous concerns and comments have been resolved to the City's satisfaction.

Please contact Mark Elliott, Environmental Planner, for follow-up questions related to environmental policy.

Forestry
List of Studies and Plans Reviewed:

- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.
- **Environmental Impact Study**, prepared by Kilgour & Associates Ltd., dated June 7, 2024.
- **Tree Conservation Report**, prepared by Kilgour & Associates Ltd., dated June 7, 2024.
- **Landscape Plan**, dwg L.1, prepared by James B. Lennox & Associates Inc., dated 02/06/2024, revision 2 dated 07/15/2024.
- **Landscape Plan**, dwg L.2, prepared by James B. Lennox & Associates Inc., dated 02/06/2024, revision 2 dated 07/15/2024.
- **Geotechnical Investigation,** prepared by Paterson Group, dated June 10, 2024.
- **General Plan of Services**, C-001, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.
- **Grading Plan**, C-200, prepared by Arcadis Professional Services (Canada) Inc., dated 2024-02-14, revision 2 dated 2024-06-27.

Deficiencies:

Tree Conservation Report (Reference Schedule E of the Tree Protection By-law)

53. Incorporate tree ownership of all existing trees into the inventory tables. Removal of an adjacent or boundary owned tree would not be permitted without written consent from the adjacent landowner.

54. Include the green and orange dashed lines shown in Figure 3 in the legend. Natural elements and relevant setbacks must be identified.

55. The map in the Tree Conservation Report (TCR) does not incorporate elements of other plans accurately (i.e. the grading plan). The retaining walls and terracing are not shown on the TCR as required. There appear to be conflicts between adjacently owned trees and the proposed retaining walls. Revise the TCR and civil plans to address this detail. Provide a suitable retention solution for adjacently owned and boundary trees. Show the tree protection fencing on the grading plan.

56. The TCR appears to be missing adjacently owned trees from the inventory in proximity to the proposed retaining wall. Please address. Photo included below for reference.

Figure 3: Aerial photo with markings showing the proposed development and the trees identified both on and adjacent to the site.

57. Describe mitigation measures that will be used to promote the long-term survival of retained trees.

58. Tree protection fencing locations for the retained trees is not shown.

Landscape Plan (Review the Landscape Plan Terms of Reference)

59. Retained trees identified in the TCR must be shown on the Landscape Plan (LP).

60. Show the extent of the snow storage area on the LP. It appears to conflict with the rooting area for proposed plants on the eastern property boundary.

61. The legend does not align with the plan. For example, the green line identifying tree planting setbacks appears to be red.

62. The Geotechnical Report was updated, June 10,2024, revision 4. The LP references revision 1 (April 05, 2023).

63. Please provide the tree size classes (e.g. stature, small, medium or large) in the proposed plant list and provide a source. An American hornbeam, for example, is not supported as being a large canopy species as presented. Trees in Canada by John Laird Farrar identifies this species as a very small tree, up to 8m in height.

Civil Plan

64. Show the location of tree protection fencing on the northern property edge.

Comments:

65. The scale of the site makes it difficult to see detail on Figure 3 provided in the TCR. It is recommended that an additional map be added to the TCR focusing on the tree protection area. This addition will allow the viewer to clearly see the location of tree protection fencing and any mitigation measure notes, beyond tree protection fencing.

66. In the TCR, it is unclear why Table 2 and Appendix A have different tree counts. If Table 2 summarizes all trees requiring removal, make this clear and include ownership as a column.

67. The EIS requires a row of trees be planted along the eastern property boundary. Provide enough space in this area to fit large canopy trees rather than the BP, AA, and RT currently shown. The EIS states freeman maple is an ideal tree for the required planting strip. This species has not been incorporated within the plan. Consider conifers in the mix. Can the width of the truck route surrounding building A be reduced to the minimum requirement to provide better space for the infrastructure and trees proposed in this area? Please work with your Geotechnical team to confirm whether the tree planting setbacks apply when there are meters of separation from the building by asphalt.

68. A retaining wall was redesigned to not conflict with the watercourse setback. Explain why this change cannot be done along the entire eastern boundary?

69. Tree planting is restricted on this site due to development and parking proposed. The City is working towards a 40% canopy cover target. Increase tree cover on the site. Review section 4.1.4 of the Official Plan (policy 11), requiring the incorporation of tree planting within surface parking lots.

70. What is the purpose of the painted line, no parking areas? Can these areas be used to plant trees instead? This change would help the application better align with section 4.1.4 of the Official Plan.

71. Can the foundations of any of the buildings proposed be designed to reduce the setback requirements associated with residential foundations the Sensitive Marine Clay Soil Guidelines (2017) are based on? There is open planting space between the proposed one-storey industrial condominiums and Dairy Drive.

72. Being adjacent to a natural heritage feature, native species must be prioritized on the site. Honey locust varieties are more appropriate in more urbanized landscapes. Please remove the thornless honey locust from the site and incorporate locally native species.

73. The canopy cover calculation in the LP will need to be updated to account for the existing trees on the northern property boundary if jointly owned.

Please contact Hayley Murray, Planning Forester, for follow-up questions related to existing trees and proposed trees.

Parkland

List of Studies and Plans Reviewed:

- **Site Plan**, Proposed Self-Storage Buildings, dwg A101, prepared by Sam Esposto Architect, Inc., dated 02/14/ 2024, revision 2 dated 06/13/2024.

Comments:

74. As currently proposed, the application will be required to make a Cash-in-Lieu of Parkland payment in accordance with the active parkland dedication rate in force at that time, as well as the fee for appraisal services. The value of the land will be determined in accordance with the Planning Act, as of the day before the day the building permit is issued in respect of the development or redevelopment or, where more than one building permit is required for the development or redevelopment, as of the day before the day the first permit is issued.

    a. The value of the land shall be determined by market appraisal approved by the City, and appraisals submitted to or obtained by the City for the purposes of this by-law shall be considered valid for a maximum period of one year from the date the appraisal was completed, or such lesser time as may be specified in the appraisal.

Please contact Jessica Button, Parks Planner, for follow-up questions related to parks.

Conservation Authority

Comments:

75. The subject lands are located within RVCA's Regulated Area due to a valley corridor associated with the Cardinal Creek and the presence of sensitive marine clays/landslide risks. Any site alteration or development would require a permit pursuant to Section 28.1 of the Conservation Authorities Act. Further details regarding the permit process can be provided to the proponent as they advance through the planning process.

76. RVCA's focus is on ensuring the proposed development is appropriately setback from the erosion hazard associated with the adjacent valley and that the landslide hazard risk that exists due to the presence of sensitive marine clays and steep slopes is assessed.

77. As part of the current pre-consultation phase, the proponent submitted a landslide hazard assessment and geotechnical report including a slope stability analysis. A cursory review of the documents has been done by RVCA. Staff can confirm they meet the quality standards for review by the RVCA. A fulsome review of the methodology and results of the reports will be undertaken by RVCA's technical reviewers as a part of any future Planning Act application process.

78. Additionally, RVCA will also provide a fulsome review of the stormwater management details and civil engineer drawings to confirm our regulatory interests related to flooding and erosion control have been adequately addressed as a part of the future Planning Act application process.

Please contact Stephen Bohan, Rideau Valley Conservation Authority, for follow-up questions related to RVCA's permits and processes.

We look forward to further discussing your project with you.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Jerrica Gilbert, Planner II

Encl. Supplementary Development Information, Study and Plan Identification List, Site Plan Checklist – City of Ottawa Accessible Design Standards, High Performance Development Standard Handout

c.c. Cam Elsby, PM (Infrastructure Approvals)
Rafic Fadel, Engineering Intern (Infrastructure Approvals)
Kris Haynes, Senior Engineer (Infrastructure Approvals)
Mark Elliott, PL (Environmental)
Katie Turk, PL (DR)
Mike Giampa, PM (Transportation)
Hayley Murray, PL (Forestry)
Christopher Moise, PL (Urban Design)
Jessica Button, Planner (Parks)

SUPPLEMENTARY DEVELOPMENT INFORMATION

The following details have been compiled to provide additional information on matters for consideration throughout the application approval and development process. Please note, this document is updated from time to time and should be reviewed for each project proposed to be undertaken.

General

- Refer to Planning application submission information and materials and fees for further information on preparing for application submission. Be aware that other fees and permits may be required, outside of the development review process.
- Additional information is available related to building permits, development charges, and the Accessibility Design Standards.
- You may obtain background drawings by contacting geoinformation@ottawa.ca.
- Plans are to be standard A1 size (594 mm x 841 mm) or Arch D size (609.6 mm x 914.4 mm) sheets, dimensioned in metric and utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400 or 1:500).
- All PDF submitted documents are to be unlocked, flattened and not saved as a portfolio file.
- Where private roads are proposed:
    - Submit a Private Roadway Street Naming application to Building Code Services Branch for any internal private road network.
    - Applications are available at all Client Service Centres and the private roadway approval process takes three months.

Servicing and Site Works

Servicing and site works shall be in accordance with the following documents:

- Ottawa Sewer Design Guidelines (October 2012)
- Ottawa Design Guidelines – Water Distribution (2010)
- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- City of Ottawa Park and Pathway Development Manual (2012)
- City of Ottawa Accessibility Design Standards (2012)
- Ottawa Standard Tender Documents (latest version)

- Ontario Provincial Standards for Roads & Public Works (2013)

Exterior Site Lighting

Where proposed, requires certification by an acceptable professional engineer, licensed in the Province of Ontario, which states that the exterior site lighting has been designed to meet the following criteria:

- It uses only fixtures that meet the criteria for Full Cut-Off (Sharp cut-off) classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and
- It results in minimal light spillage onto adjacent properties. As a guideline, 0.5 foot-candle is normally the maximum allowable spillage.

The location of the fixtures, fixture type (make, model, part number and the mounting height) must be shown on one of the approved plans.

City Surveyor Direction

- The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
- Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

  Questions regarding the above requirements can be directed to the City's Surveyor, Andre Roy, at Andre.Roy1@ottawa.ca.

Waste Management

- New multi-unit residential development, defined as containing six (6) or more units, intending to receive City waste collection services will be required, as of June 1, 2022, to participate in the City's Green Bin program in accordance with Council's approval of the multi-residential waste diversion strategy. The development must include adequate facilities for the proper storage of allocated garbage, recycling, and green bin containers and such facilities built in accordance with the approved site design. Questions regarding this change and requirements can be directed to Andre.Laplante@ottawa.ca.

- For sites containing:
  - One or more buildings with a total GFA greater than 2000 square metres;
  - Retail shopping complexes with a total GFA greater than 10,000 square metres;
  - Sites containing office buildings with total GFA greater than 10,000 square metres;
  - Hotels and motels with more than 75 units;
  - Hospitals (human);
  - Educational institutions with more than 350 students; or
  - Manufacturing establishments working more than 16,000 person-hours in a month

A Waste Reduction Workplan Summary is required for the construction project as required by O.Reg. 102/94, being "Waste Audits and Waste Reduction Work Plans" made under the Environmental Protection Act, RSO 1990, c E.19, as amended.

Fire Routes

- Fire routes are required to be designated by By-law for Fire Services to establish them as a legal fire route. Where a development proposes to establish a fire route, an Application for Fire Route Designation is to be made. Questions regarding the designation of fire routes and required process can be directed to fireroutes@ottawa.ca.

Dewatering Activities

- Project contractors and/or your engineers are required to contact the Sewer Use Program to arrange for the proper agreements or approvals to allow for the discharge of water from construction dewatering activities to the City's sanitary or storm sewer system. Please contact the Sewer Use Duty Officer at 613-580-2424 ext. 23326 and/or suppue@ottawa.ca.

Backflow Prevention Devices for Premise Isolation

- Buildings or facilities installing a backflow preventer for premise isolation of the drinking water system must register with the City's Backflow Prevention Program where a moderate or severe hazard may be caused in accordance with CSA B64.10 "Selection and Installation of Backflow Preventers". Please contact the Backflow Prevention Program at 613-580-2424 ext. 22299 or backflow@ottawa.ca to submit a Premise Isolation Survey.

Energy Considerations

- Are you considering harvesting thermal energy from the wastewater infrastructure or harvesting geothermal energy?
    - Additional information can be found on the City website or by contacting Melissa Jort-Conway.

Flood Plain Mapping and Climate Change

- An interactive map, for informational purposes only, showing the results of on-going flood plain mapping work completed by the Conservation Authorities in partnership with the City is now available. This mapping may be used to identify known riverine flood hazards for a property or area. The map and additional related information can be found on Ottawa.ca.

Blasting

- Where blasting may take place:
    - Blasting activities will be required to conform to the City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.
    - To avoid future delays in process, including the Municipal Consent process for shoring, ensure communication with necessary entities, including utilities, is undertaken early.

- Blasting and pile driving activities in the vicinity of Enbridge Gas Distribution and Storage (GDS) facilities require prior approval by GDS. The Blasting and Pile Driving Form, referenced in Enbridge's Third Party Requirements in the Vicinity of Natural Gas Facilities Standard, must be provided to mark-ups@enbridge.com by the Owner of the proposed work for all blasting and pile driving operations. In addition, a licensed blasting consultant's stamped validation report must be submitted to GDS for review if blasting is to occur within thirty (30) metres of GDS facilities. The request must be submitted a minimum of four weeks prior to the beginning of work to allow sufficient time for review.

Archaeological

- Archaeological Resources
    - Should potential archaeological resources be encountered during excavation activities, all Work in the area must stop immediately and the Owner shall contact a provincially licensed archaeologist.
    - If during the process of development deeply buried/undetected archaeological remains are uncovered, the Owner shall immediately notify the Archaeology Section of the Ontario Ministry of Tourism, Culture and Sport.
    - In the event that human remains are encountered during construction, the Owner shall immediately contact the police, the Ministry of Tourism, Culture and Sport and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Consumer and Business Services, Consumer Protection Branch.

Trees

- The City's Tree Protection Bylaw, being By-Law No. 2020-340, as amended, requires that any trees to be removed shall be removed in accordance with an approved Tree Permit and Tree Conservation Report and that all retained trees will be protected in accordance with an approved Tree Conservation Report.

Limiting Distance and Parks

- A Limiting Distance Agreement may be required by Building Code Services before building permit(s) can be issued with respect to the proximity of the building to a park block. The City will consider entering into a Limiting Distance Agreement with the Owner with such Agreement to be confirmed through the City's Reality Initiatives & Development Branch. A Limiting Distance Agreement is at the expense of the Owner.

Development Constructability

How a development is constructed, its constructability, is being looked at earlier in the development review process to raise awareness of potential impacts to the City's right of way and facilitate earlier issue resolution with stakeholders. Where a construction management plan is required as part of the site plan or subdivision application approval, conditions will be included that set out the specific parameters to be addressed for the specific project. However, please note the following construction and traffic management requirements and considerations in the development of your project.

- **Open Lane (includes all vehicular lanes, transit lanes and cycling lanes) Requirements**
    - Unless specified in the site-specific conditions to be provided by City of Ottawa Traffic Management at the time of approval, the following requirements must be adhered to and accommodated as part of any proposed encroachments and construction management plan. The standard requirements outlined in this section shall further apply to cycling facilities and Transit.
        - All lanes are to function uninterrupted at all times.
        - No interruption or blockage of traffic is permitted.
        - No loading or unloading from an open lane is permitted.
        - All vehicular travel lanes are to be a minimum of 3.5 metres in width.
        - All cycling lanes are to be a minimum of 1.5 metres.
- **Pedestrian Requirements**
    - Unless specified in the site-specific conditions provided by City of Ottawa Traffic Management at the time of approval, the contractor is required to maintain a minimum width of 1.5 metres for a pedestrian facility on one side of the corridor at all times; even in instances where a pedestrian facility was not present prior to construction.
    - The facility shall include a free and unobstructed hard surface acceptable for the use of all pedestrians including those with accessibility challenges and shall maintain access to all buildings and street crossings.
    - The facility must always be maintained in a clean condition and in a good state of repair to the satisfaction of the City.
    - Any change of level which is over 13 millimetres in height is to be provided with a smooth non-tripping transition.
    - Any temporary barriers or fencing shall include a cane detectable boundary protection with edge or barrier at least 75 millimetres high above the ground surface.
    - If works overhead are required, a 2.1 metre minimum clear headroom must be provided.
    - If overhead protection is required above the pedestrian facility, it is to be offset a minimum of 600 millimetres from any travel lane.
- **Transit Requirements**
    - Travel lanes accommodating OC Transpo must be a minimum of 3.5 metres in width and have a minimum 4.5 metre vertical clearance at all times.
    - Should access to a bus stop be impacted, the developer will be required to email TOPConstructionandDetours@ottawa.ca a minimum of 20 working days prior to work commencing to coordinate any site-specific conditions as part of the work. This includes temporary relocation of transit stops, removal of bus shelters or stops and transit detour routes.
    - The contractor may be required to relocate and provide a suitable alternative to OC Transpo's bus stop to the satisfaction of OC Transpo

- The Contractor shall provide OC Transpo with a minimum of ten (10) working days' notice to coordinate temporary relocation of bus stops. When a bus stop and/or shelter must be temporarily relocated, the contractor may be required to provide stop infrastructure (i.e. bench, bus and/or shelter pads), to the satisfaction of OC Transpo.
- All temporary stop locations including infrastructure are to be fully accessible in accordance with City of Ottawa Accessibility Design Standards and to the satisfaction of the OC Transpo.
- Temporary bus stops are to be constructed and ready for use prior to the start of any works that would impact the regular bus stop location(s).

- **Public Consultation**
  - May include, but not be limited to, proponent lead public meeting(s), letter notification(s) and information dissemination via print, electronic means or social media, to impacted properties above and beyond the notification requirements specified in the Road Activity By-law.
- **General Considerations for all Applications**
  - A comprehensive construction management plan should include and consider the following:
    - The proposed stages of construction and the anticipated durations of each stage and any impact to existing travel lanes, pedestrian facilities, cycling facilities and/or transit facilities. Any proposed encroachment should be identified and dimensioned on the site plan for review of feasibility.
    - The proposed constructability methods being used as part of the proposed development (ie: fly forming, Peri forming etc.) and any additional traffic impacts/interruptions anticipated with proposed methods. If a crane is being placed on site, the location should be identified, and show the overhead impacts of the crane.
    - Consideration that any tie-backs and/or shoring within the City of Ottawa Right of Way are subject to Municipal Consent in advance of commencement of the project. Approval for encroachments is not guaranteed if impacts to transportation facilities cannot be addressed to the City's satisfaction.
    - Identify any truck hauling routes to and from the proposed development site and any proposed accesses. Designated heavy truck routes are to be followed at all times, however, if a deviation is required from the existing heavy truck route network, then a structural review may be required as part of an Over-dimensional Vehicle Project Permit.
    - Identify the location of any site trailers and the location. Note, if placing a site trailer above any walk-through scaffolding or on the second floor (or above), an engineering drawing must be submitted to building code services for review. More information can be found on the Building Permit Approval process.
    - Identify equipment and/or materials storage locations as required. Storage is not permitted on the road or the roadway shoulders or boulevards, unless

the storage areas are identified in the traffic control plan and appropriate traffic control devices protect the equipment or materials.

- Any work as part of the development that requires a road cut, road closure or encroachment will be subject to the Road Activity By-law and potential site-specific conditions identified at site plan or subdivision approval which will be noted on the subsequent Permit(s). Information about construction in the right-of-way including applying for permits and associated fees can be found on the City's website.

1. Accessible Parking Spaces

The terms Type A and Type B Parking Spaces have the same meaning as within O. Reg 191/11

This section applies to:

1) *Parking garages and related structures*
2) *Surface parking*
3) *On-street parking*

Standard Ref.	Requirements	Compliance	Comments
3.1.1.	**Provision:** 1 Type A accessible parking space must be provided where there are 12 or fewer spaces (see Table 3 for a complete list)	Y N N/A	
3.1.2	**Provision:** 4% of the total number of parking spaces should be accessible	Y N N/A	
3.1.2	**Provision:** if the total number of spaces is greater than 1001, provide 11 accessible parking spaces plus an addition 1% of the total number of spaces	Y N N/A	
3.1.3	**Access Aisle:** minimum of 1.5 m (see Figure 25)	Y N N/A	
3.1.3	**Location:** a maximum of 30 m from nearest accessible entrance	Y N N/A	
3.1.3	**Surface:** firm, stable and slip resistant	Y N N/A	
3.1.3	**Running slope:** maximum of 1:50 (2%)	Y N N/A	
3.1.3	**Cross slope:** maximum of 1:50 (2%)	Y N N/A	
3.1.3	**Type A spaces:** Length 5.2 m Width 3.4 m Type B spaces Length: 5.2 m Width: 2.4 m	Y N N/A	
3.1.3	**Overhead clearance:** minimum of 2.1 m	Y N N/A	
3.1.3	**Access Aisle:** minimum of 1.5 m. Must be clearly marked and adjacent to accessible parking space	Y N N/A	
3.1.4.1	**Vertical Signage:** **Width:** 0.3 m **Height:** 0.6 m (minimums)	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

	Mounted: 1.5 m to 2.0 m high at centre • Marked with International Symbol of Accessibility (see Figure 25)		
3.1.4.2	**Pavement Markings** • Marked with the International Symbol of Accessibility • 15.25 m wide by 15.25 m deep • Locate near the back of the space for 90 degree or angled parking spaces • Locate in the centre for parallel parking spaces (see Figure 27)	Y N N/A	

2. Passenger Loading Zone

Standard Ref.	Requirements	Compliance	Comments
3.2.1	**Location:** maximum of 30 m from nearest accessible entrance	Y N N/A	
3.2.1	**Side Access Aisle** **Length:** 7.4 m **Width:** 2.4 m (minimums) (see Figure 28)	Y N N/A	
3.2.1	**Vertical Clearance:** 3.6 m	Y N N/A	
3.2.1	**Path of Travel:** minimum of 1.8 m wide to nearest accessible entrance	Y N N/A	
3.2.1.1	**Vertical Signage** **Width**: 0.3 m by 0.6 m **Mount:** 1.5 m to 2.0 m high at centre (see Figure 29)	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

3. Exterior Paths of Travel

Where stairs are located on an accessible Exterior route or walkway, an alternative Accessible route is to be provided immediately adjacent to the stairs

This section applies to:

1) *Pedestrian routes that serve facility entrances*
2) *Pedestrian routes that serve as a connection between a site boundary and entrance into the site*
3) *Public Rights-of-Way*
4) *Ramps and Curb Ramps*

Standard Ref.	Requirements	Compliance	Comments
3.3.1	**Surface:** firm, stable and slip resistant	Y N N/A	
3.3.1	**Lighting**: Provide in accordance with Section 5.7 (Lighting)	Y N N/A	
3.3.2	**Path of travel:** minimum 1.8 m wide	Y N N/A	
3.3.3.1	**Running Slope:** 1:20 (5%) (maximum)	Y N N/A	
3.3.3.2	**Cross Slope:** 1:20 (2%) (maximum) where surface is concrete or asphalt. 1:10 (10%) in all other cases.	Y N N/A	
3.3.1	**Rest Area:** If width is less than 1.8 m, provided every 30 m along path of travel. Rest area to be 1.8 m by 1.8 m (minimums)	Y N N/A	
3.3.4	**Guards:** Provide when change in level is more than 0.6 m	Y N N/A	
2.1.4	**Gratings or Openings:** 13 mm (maximum) wide in direction of travel. Longest side, if rectangular, must be perpendicular with the direction of travel	Y N N/A	

4. Curb Ramps

A curb ramp provides a transition where there is a change in level between exterior path of travel and adjacent vehicular route

This section applies to:

1) *Pedestrian crossings at intersections*
2) *Parking spaces, passenger loading zones and related access aisles*
3) *Any other exterior route where there is a grade change.*

Standard Ref.	Requirements	Compliance	Comments
3.4.1	**Surface:** firm, stable and slip resistant	Y N N/A	
3.4.2	**Clear width:** 1.5 m (minimum), exclusive of flares	Y N N/A	
3.4.3	**Running Slope**: 1:12 (8.33%) (maximum)	Y N N/A	
3.4.3	**Cross Slope:** 1:50 (2%) (maximum) (see Figure 33b)	Y N N/A	
3.4.6	**Tactile Surface Walking Indicators (TWSI):** minimum depth of 610mm, at 150 mm to 200 mm from edge of curb (see 33b)	Y N N/A	
3.4.2.2	**Flared Side:** 1m wide; slope 1:15 to 1:10.	Y N N/A	

5. Ramps

Ramps are provided when the slope of a path of travel exceeds a gradient of 1:20 (5%)

Refer to the Ontario Building Code for all applied requirements for ramps.

For all ramp standards, see Figure 3

Standard Ref.	Requirements	Compliance	Comments
2.2.1.1	**Running Slope:** 1:15 (6.67%)	Y N N/A	
2.2.1.2	**Cross-Slope:** 1:50 (2%)	Y N N/A	
2.2.1	**Surface:** firm, stable and slip-resistant	Y N N/A	
2.2.1	**Clear Width:** 1.1 m (minimum)	Y N N/A	
2.2.1.4	**Colour Contrasting Strip:** to be provided at slope changes. 50 mm wide colour-contrasted and slip resistant strip equal to the width of the ramp	Y N N/A	
2.2.1	**Lighting:** provide in accordance with Section 5.7 (Lighting)	Y N N/A	
2.2.2	**Length:** 9 m, or less, or provide landing	Y N N/A	
2.2.2	**Landing:** to be provided at top, bottom or intermediate level, or where there is directional change. **(**see Figure 5)	Y N N/A	
2.2.3.1	**Handrail:** 865 to 965 mm high on both sides. **Clear width**: 1.1 m between handrails (see Figure 8)	Y N N/A	

Note – this Checklist must be read in conjunction with the City of Ottawa's Accessible Design Standards Document, 2015. All figures referenced in this document can be found in the City's Accessible Design Standards document.

6. Stairs

This section applies to stairs provided for exterior or interior environments

Refer to the Ontario Building Code for all applied requirements for stairs.

For all stair standards, see Figure 10

Standard Ref.	Requirements	Compliance	Comments
2.3	**Stairs:** where provided, an alternative accessible route is to be provided immediately adjacent, and may include a ramp or other accessible means of negotiating grade change	Y N N/A	Note which alternative to stairs is provided.
2.3.1	**Surface:** firm, stable and slip-resistant	Y N N/A	
2.3.1.1	**Tread:** 280 mm to 355 mm deep	Y N N/A	
2.3.1.1	**Riser:** 125 mm to 180 mm high	Y N N/A	
2.3.1	**Open Riser:** not permitted	Y N N/A	
2.3.1.2	**Nosing Projection:** 38 mm (maximum) (see Figure 10)	Y N N/A	
2.3.1.2	**Nosing Strip**: 50 mm deep, colour contrasted, at leading edge of tread and extending the full length of the tread	Y N N/A	
2.3.1.3	**Tactile Surface Walking Indicators (TWSI):** minimum of 610 mm deep, one tread back (see Figure 11)	Y N N/A	
2.3.1	**Lighting:** to be provided in accordance with Section 5.7	Y N N/A	
2.3.2.2	**Handrail:** 865 mm to 965 mm high on both sides. (see Figure 12)	Y N N/A	

7. Building Entrance			This section does not apply ☐
Standard Ref	Requirements	Compliance	Comments
4.1.1	**Provision:** at least one (1) accessible entrance 50% of the total number of building entrances (see Figure 36)	Y N N/A	
4.1.1	**Provision:** 50% of the total number of building entrances must be accessible (see Figure 36)	Y N N/A	
4.1.1	**Provision:** 30 m or less from nearest accessible parking space, or passenger loading or drop off zones	Y N N/A	

8. Benches and Seats

This section applies to
1) Rest areas and accessible routes
2) Outdoor public use eating areas
3) Waiting areas

Standard Ref	Requirements	Compliance	Comments
2.10.1	Seat height between 450 mm and 500 mm above finished floor (see Figure 23)	Y N N/A	
2.10.1	Seat depth between 330 mm and 510 mm	Y N N/A	
2.10.1	Back support extending 320 mm (minimum) above seat surface	Y N N/A	
2.10.1	Provide at least one (1) armrest at a height between 220 mm and 300 mm from the seat for additional support	Y N N/A	

High Performance Development Standard
Tier 1 Site Plan Checklist
Example

General Project Description

Project Name	
Contact	
Site Plan Control Application Subtype	
Proposed Total Gross Floor Area (m2)	
Total number residential units	
Building Use	
Total number residential units	

This document is for illustrative purposes only to provide projects context of the information that will be required to be submitted on the HPDS Checklist

1.1 **Energy Use**

Is the project a Complex Site Plan? (if no energy requirements are not required)	

	EUI	TEDI	GHGI
Residential Building	147	62	19
Office Building	142	42	19
Retail Building	132	52	12
Energy Intensity Required* (area weighted average in a mixed use building)			
Energy Intensity of Proposed Building			

Energy thresholds become mandatory June 1, 2023.

OR

	Required	Proposed
Proposed Building Energy Use		
Reference Building Energy Use		
Percent Improvement	25%	0

OR

Commitment to pursue certification program	
Reference to Drawing, Plans, or Report	

1.2 **Site Plan Accessibility**

Are the main entrances equally accessible to all users?	
Brief Description of how accessibility is achieve on the site	
Reference to Drawing, Plans, or Report	

Accessible Grate Design

	Maximum grate	Number of grates
Grates located on path of travel	13mm diameter	
Grates located away from path of travel	20x20mm or 10x40	
Has the requirement been met and identified on the plan?		
Reference to Drawing, Plans, or Report		

Alternately grates may be screened

High Performance Development Standard
Tier 1 Site Plan Checklist
Example

1.3 **Fresh Air Intake**

Is the project located within:

150 metres of a road with an average of 50,000 vehicles or more per day	
100 metres of road with an average of 15,000 vehicles or more per day	
100 metres of idling areas (this includes onsite idling areas)	
If answered yes to any of the above provide a brief description of how the site will protect outdoor amenity and fresh air intakes from these sources of air pollution.	
Reference to Drawing, Plans, or Report	

1.4 **Tree Planting**

	Required	Proposed
Total site area (m^2)		
Total Soil Volume (m3)	0	
Total number of planting areas (minimum of $30m^3$ soil)		
Total number of trees planted		

Requirement to come in effect with the release of tree planting guidelines.

Reference to Drawing, Plans, or Report

1.5

Plant Species	Required (m^2)	Proposed (m^2)	Proposed %
Total landscaped site area			
Landscaped site area planted with drought-tolerant plants (minimum 50%)	0		
Total number of plants			
Total number of native plants and % of total plants planted (minimum 50%)	0		

Reference to Drawing, Plans, or Report

1.6 **Exterior Lighting**

All exterior lighting fixtures Dark Sky compliant	
Reference to Drawing, Plans, or Report	

1.7 **Bird Safe Design**

	Required (m^2)	Proposed (m^2)	Proposed %
Total area of glazing of all elevations within 12m above grade (including glass balcony railings)			
Total area of treated glazing (minimum 85% of total area of glazing within 12m above grade)	0		
Percentage of glazing within 12m above grade treated with:			
a) Low reflectance opaque materials			
b) Visual markers			
c) Shading			

Reference to Drawing, Plans, or Report

1.8 **Sustainable Roofing**

Does the project have a flat roof over 500 m2? If no project is not subject to cool roof requirement	Y/N

	Required (m^2)	Proposed (m^2)	Proposed %
Available Roof Space			
Available Roof Space provided as Green Roof			
Available Roof Space provided as Reflective Roof			
Available Roof Space designated Solar Ready If reflective roof path is chosen and roof area is over 2,500m2, Minimum 1,000m2 of solar ready area must be provided	1000		
Available Roof Space provided as Solar Panels			
Available Roof Space provided as Accessible Green Roof This is counted at 120% of area provided			
Available Roof Space provided as Food growing space This includes entire garden area included pathways and adjacent terraces			
Metric requirement met? (50% green, 90% white, or a combination of strategies amounting to 75%)	yes/no		
Reference to Drawing, Plans, or Report			

1.9 **Cool Landscape and Paving**

Industrial work yards or similar areas that limit the available options for shading or reflective surfaces may be excluded from the hard surface area calculation.

Projects must meet one of the following

	Required by Zoning (m2)	Proposed (m^2)	Proposed exceeding minimum %
Total non roof soft landscape area (minimum 20%)			

OR

	Required (m^2)	Proposed (m^2)	Proposed %
Total non-roof hardscape area			
Total non-roof hardscape area treated for Urban Heat Island (minimum 50%)			
Area of non-roof hardscape treated with:			
a) high-albedo surface material			
b) open-grid pavement			
c) shade from tree canopy			
d) shade from high-albedo structures			
e) shade from energy generation structures			
f) At grade parking lot area with more than 1 tree per 5 parking spaces			

Reference to Drawing, Plans, or Report	

1.10. **Common Area Waste Storage**

	Required	Proposed
Total Waste Storage Area		
Garbage		
Recycling Paper		
Recycling Plastic Metal Glass		
Compost		
Reference to Drawing, Plans, or Report		

Construction Waste Management Plan Provided	
Reference to Drawing, Plans, or Report	

1.11 **Electric Vehicle Parking**

	None Required	Proposed
Number of Resident Parking Spaces		
Number of Visitor Parking Spaces		
Number of Commercial Parking Spaces		

Number of EV Ready Parking Spaces		

Reference to Drawing, Plans, or Report	

1.12 **Bike Access and Storage**

	Required by Zoning	Proposed
Number of Resident Bike Parking Spaces		
Number of Visitor Bike Parking Spaces		
Number of Commercial Bike Parking Spaces		

Does the bike parking plan meet accessibility, safety and proximity requirements?	
Reference to Drawing, Plans, or Report	

What is the High Performance Development Standard?

The High Performance Development Standard (HPDS) is a collection of mandatory and voluntary standards or "metrics" that raise the performance of new building projects to achieve "sustainable and resilient design" objectives. The HPDS consists of three tiers of performance. The standards, also known as 'metrics' in Tier 1 are mandatory. Tiers 2 and 3 contain higher level voluntary standards.

"Sustainable and resilient design is defined as "*Principles in site and building design to protect against the depletion of critical resources like energy, water, land, and raw materials, reduce greenhouse gas emissions, prevent environmental degradation throughout its life cycle, and create built environments that are liveable and comfortable while being safe and resilient to the impacts of a changing climate" (see new Official Plan, Section 13).*

What is the purpose of the HPDS?

Buildings are a major source of greenhouse gas emissions in Ottawa. Designing new buildings to be energy efficient from the outset will help reduce greenhouse gas emissions and save on costly retrofits in the future. The HPDS will also help build resiliency to our changing climate through tree canopy, ecology and urban heat island mitigation strategies.

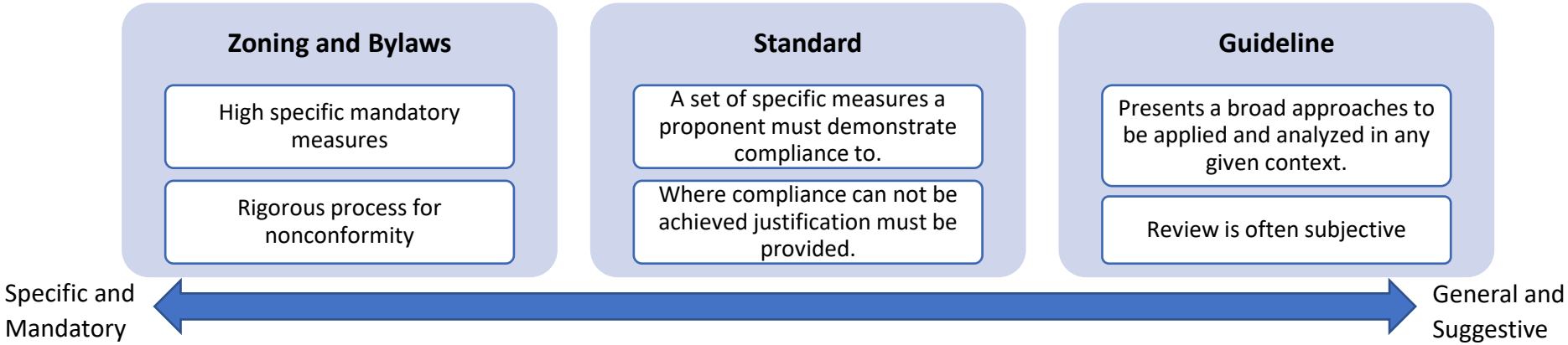
Collectively, the metrics aim to advance the climate change mitigation and adaption priorities of the Climate Change Master Plan, Energy Evolution and the Climate Resiliency Strategy as well as the City's objectives related to public health, ecology and accessibility.

Tier 1 Metrics

Category	Energy	Health	Ecology	Resiliency	Waste	Transportation
Site Plan Tier 1	• Energy Efficiency	• Accessibility • Fresh Air Intake Location	• Tree Planting • Plant Species • Exterior Lighting • Bird Safe Design	• Sustainable Roofing • Cool Landscape and Paving	• Common Area Waste Storage	• Electric Vehicle Charging • Bike Parking
Plan of Subdivision Tier 1	• Community Energy Plan	N/A	• Tree Planting • Plant Species	• Community Energy Plan	N/A	N/A

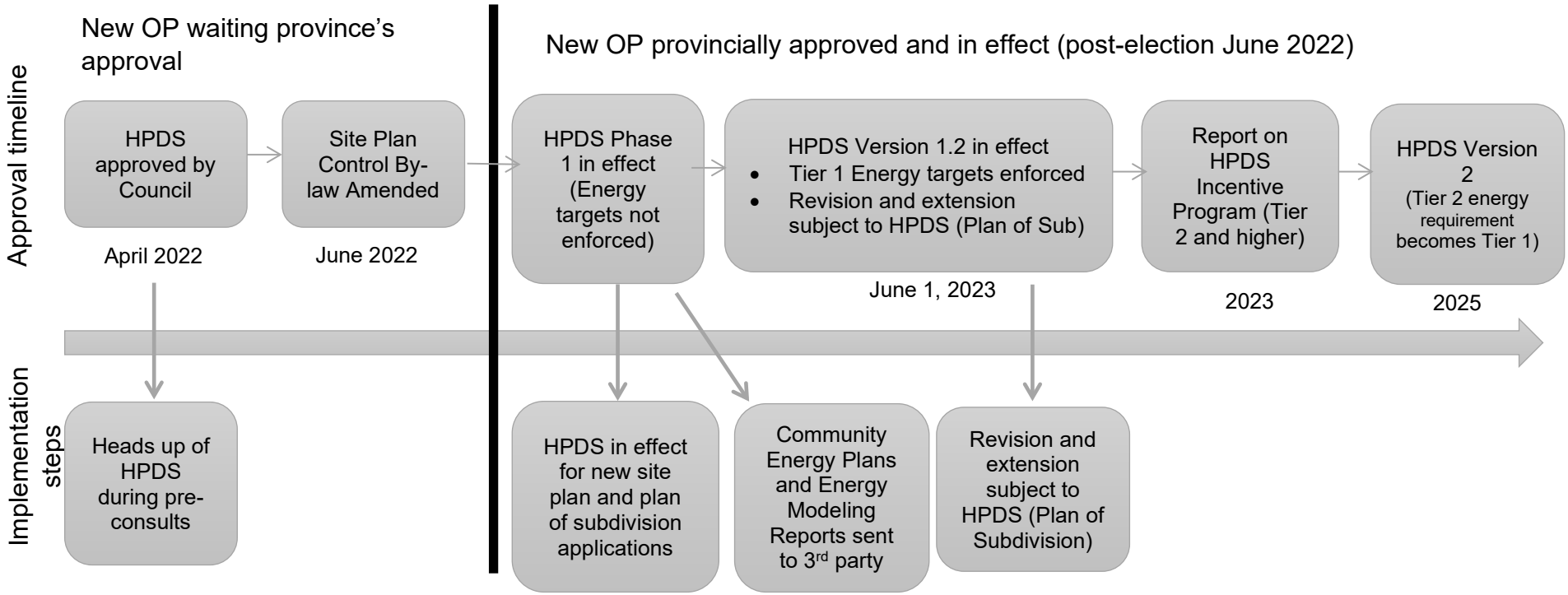
What is the difference between a standard and other planning tools?

- A standard is a set of specific measures to which a proponent must implement to the fullest extent.
- Whereas a guideline is suggestive and general in nature, a standard is prescriptive and mandatory.
- Whereas the Zoning By-law sets out a separate process to review nonconformity through the Committee of Adjustment, relief from a standard is subject to the review and approval by the Department based on justification provided by the applicant through the development approval process.



Some design elements may have criteria that are covered in all these tools where there are associated guidelines or bylaws the HPDS will reference these

Timing of requirements coming into effect



Frequently Asked Questions

1. When will the HPDS be fully implemented?

The HPDS is being rolled out in a phased approach as follows:

- Tier 1 (mandatory) building energy efficiency metrics will not apply until June 1, 2023 (i.e. Energy Modeling Reports will be "Report-Only" – see FAQ below)
- Tier 1 metrics will apply to applications for extension and revision of plan of subdivision effective June 1, 2023

- Tier 1 requirements for bike and electric vehicle parking will be proposed as part of the new Zoning By-law (post Official Plan adoption)
- The mandatory metrics are expected to be updated in 2025 and will come into effect in 2026.

2. What about ongoing applications?

We encourage projects, including those that have already been through pre-consultation or submitted an application, to comply with the HPDS. The HPDS will not apply to projects that have been through pre-consultation where the HPDS was not introduced OR are submitting an application prior to the new Official Plan receiving provincial approval. The HPDS will apply to applications for an extension or revision of draft plan approval (Plan of Subdivision) that are submitted on or after June 1, 2023.

3. How will the HPDS impact the Development Review process?

The HPDS will impact the development review process steps as follows:

	Site Plan applications	**Plan of Subdivision applications**
Pre-application Consultation	The HPDS will be flagged during the pre-application consultation for awareness. For Complex Site Plan applications, it is recommended that applicants engage an energy consultant at the same time as the building architectural drawings are being developed.	The HPDS will be flagged during the pre-application consultation for awareness. A new requirement is that a completed Community Energy Plan be submitted as a condition of draft approval. As indicated in the Terms of Reference, a letter is required at application submission which outlines the energy commitments and proposed energy strategy as well as confirmation of an established working group (as applicable).
Application Submission:	A completed HPDS Checklist is required at submission.	A completed HPDS Checklist is required at submission. Where a complete Community Energy Plan Report or Brief is not complete at time of application submission, projects are permitted to provide a letter which identifies the following project elements: • project partners, joint working group and key stakeholders • qualified professional completing the Community Energy Plan • proposed Community Energy Plan compliance pathway, prescriptive or a complete plan;

		• intended target level of performance for the community
Issue Resolution:	The File Lead will identify issues of non-conformity to the HPDS as part of the circulation comments. Following circulation, all resubmission packages shall include an updated HPDS Checklist. For Complex Site Plan applications, the resubmission package shall also include a draft Energy Modeling Report (EMR), which is to be sent for review by a third-party consultant.	The File Lead will identify issues of non-conformity to the HPDS as part of the circulation comments. Following circulation, all resubmission packages shall include an updated HPDS Checklist.
Approval / Post-approval:	The final EMR is submitted once the Delegated Authority Report (DAR) is prepared. The DAR will include conditions pertaining to the HPDS.	A completed Community Energy Plan is to be submitted as a condition of draft approval. The Delegated Authority Report (DAR) will include conditions pertaining to the HPDS.

4. What is the timing on incentives for Tier 2 projects?

There are currently no financial or process related incentives available to be implemented. Staff have been directed to investigate incentive options and report back to Council in 2023.

5. What does "Report Only" mean for Energy Modeling Reports submitted before June 1, 2023?

The term "Report Only" describes an interim period until June 1, 2023 when Tier 1 energy targets must be met. The "Report Only" period will help staff and industry become more familiar with energy modeling reports and how energy efficiency is to be reviewed during the approval process. It is also for industry to gain a better understanding of the types measures projects can apply to achieve energy targets.

6. Are deviations from the mandatory metrics permitted?

The expectation is for projects to demonstrate full compliance with the HPDS metrics. Where full compliance cannot be achieved, documentation will be required that provides sufficient justification why a deviation from the HPDS is necessary. Permission to deviate from the HPDS shall be subject to the review and approval of the GM, Planning, Real Estate and Economic Development Department. Example: A project has several separate roof spaces and is treating most of podium roof area which nearly meets the sustainable roofing requirement of the HPDS but to become in full compliance would have to treat the entire other roof area, resulting in significant cost.

7. Will the City provide training to the community on the HPDS?

Yes. More details are to be provided on training in Q3 2022. Until that time, specific questions should be directed to: hpds@ottawa.ca

Appendix B

Watermain Boundary Conditions

Water Demand Calculations

FUS Calculations

Water Model Results

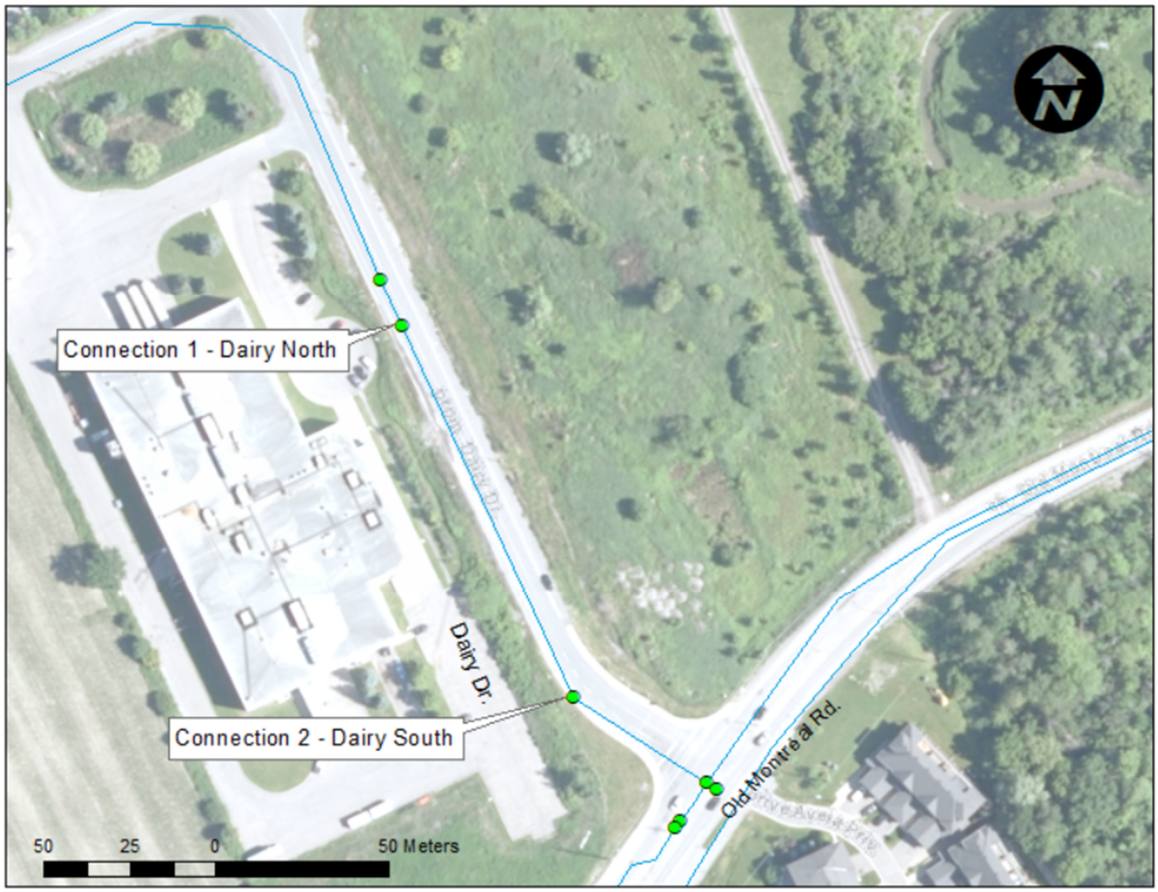
Water Quality Calculations

Boundary Conditions
1015 - 1045 Dairy Drive – June 2024 Update

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	50	0.83
Maximum Daily Demand	75	1.25
Peak Hour	134	2.24
Fire Flow Demand #1	12,000	200.00

Location



Results

Connection 1 – Dairy North

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.1	74.4
Peak Hour	109.4	67.7
Max Day plus Fire Flow	102.1	57.3

[1] Ground Elevation = 61.7 m

Connection 2 – Dairy South

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.1	71.2
Peak Hour	109.4	64.5
Max Day plus Fire Flow	102.1	54.1

[1] Ground Elevation = 64.0 m

Notes

1. The Ottawa Water Distribution Design Guideline (OWDG) – Technical Bulletin ISTB-2021-03 Section 4.3.1 specifies number of connections required as follows:

   Industrial, commercial, institutional service areas with a basic day demand greater than 50 m³/day (0.58 L/s) and residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, ***separated by an isolation valve****, to avoid the creation of a vulnerable service area. Individual residential facilities with a basic day demand greater than 50 m3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area.*

2. Any connection to a watermain 400 mm or larger should be approved by Drinking Water Services as per the Water Design Guidelines Section 2.4.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

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WATERMAIN DEMAND CALCULATION SHEET

1015 Dairy Drive | Effort Trust
142817-6.0 | Rev #0 | 2024-06-05
Prepared By: AB | Checked By: RM

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	3 bedroom UNITS	2 bedroom UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
BUILDING A						1.29			0.37	0.37		0.56	0.56		1.01	1.01	12,000
BUILDING B						1.44			0.42	0.42		0.62	0.62		1.12	1.12	9,000
BUILDING C					0.09				0.03	0.03		0.04	0.04		0.07	0.07	3,000
BUILDING D					0.06				0.02	0.02		0.02	0.02		0.04	0.04	4,000
TOTAL					**0**	**2.72**				**0.83**			**1.25**			**2.24**	**12,000**

ASSUMPTIONS

POPULATION DENSITY

Single Family	3.4 persons/unit
3 Bedroom Units	2.7 persons/unit
2 Bedroom Units	1.8 persons/unit

WATER DEMAND RATES

Industrial	35,000 L/gross ha/day
Shopping Centres	2,500 L/1000 m2/day

PEAKING FACTORS

Maximum Daily		
	Industrial	1.5 x avg. day
	Commercial	1.5 x avg. day
Maximum Hourly		
	Industrial	1.8 x max. day
	Commercial	1.8 x max. day

FIRE DEMANDS

Single Family	10,000 l/min (166.7 l/s)
Semi Detached & Townhouse	10,000 l/min (166.7 l/s)
Medium Density	15,000 l/min (250 l/s)

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FIRE UNDERWRITERS SURVEY

1015 Dairy Drive | Effort Trust
142817-6.0 | Rev #0 | 2024-06-05
Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A**	1st Floor Area		Height 3.0m	1	6439	m2
	(2-storey)	25% of 2nd Floor Area		Height 3.0m	1	1609.8	m2
	Total Effective Floor Area	(Storage space exceeding 3m in height, floor area X 3)				**8049**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**16000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Combustible - F2 Storage Rooms	0%	0	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**16000**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-4800	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-4800**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	18	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
		Length X Height Factor (m.storeys)	36				
		Construction Type	Type II				
	South	Separation (m)	>30	Seperation larger than 30 m	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	East	Separation (m)	25	Forest	2%	320	L/min
		Length X Height Factor (m.storeys)	73				
		Construction Type	Type II				
	West	Separation (m)	>30	Seperation larger than 30 m	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	Fire Flow					**11520**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**12000**	L/min
						200	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building B** (4-storey)	1st Floor Area		Height 3.0m	1	3609	m2
		25% of 2nd Floor Area		Height 3.0m	1	902.25	m2
		25% of 3rd Floor Area		Height 3.0m	1	902.25	m2
	Total Effective Floor Area	(Storage space exceeding 3m in height, floor area X 3)				**5414**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**13000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Combustible - F2 Storage Rooms	0%	0	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**13000**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-3900	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No	0%		
		Fully Supervised System	-10%	No	0%		
	Total Sprinkler Adjustment					**-3900**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	33	Permanent structure seperation is larger than 30m	0%	0	L/min
		Length X Height Factor (m.storeys)	16				
		Construction Type	Type II				
	South	Separation (m)	24	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
		Length X Height Factor (m.storeys)	37				
		Construction Type	Type II				
	East	Separation (m)	19	Neighbouring garage seperation is larger than 30m	0%	0	L/min
		Length X Height Factor (m.storeys)	12				
		Construction Type	Type II				
	West	Separation (m)	>30	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	Fire Flow					**9100**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**9000**	L/min
						150	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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FIRE UNDERWRITERS SURVEY

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Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A**	1st Floor Area		Height 3.0m	1	564	m2
	(1-storey)						m2
	Total Effective Floor Area					**564**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**4000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Combustible - F3	0%	0	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**4000**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-1200	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-1200**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	24	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
		Length X Height Factor (m.storeys)	36				
		Construction Type	Type II				
	South	Separation (m)	18	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
		Length X Height Factor (m.storeys)	36				
		Construction Type	Type II				
	East	Separation (m)	>30	Seperation larger than 30 m	0%	0	L/min
		Length X Height Factor (m.storeys)	95				
		Construction Type	Type II				
	West	Separation (m)	26	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
		Length X Height Factor (m.storeys)	15				
		Construction Type	Type II				
	Fire Flow					**2800**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**3000**	L/min
						50	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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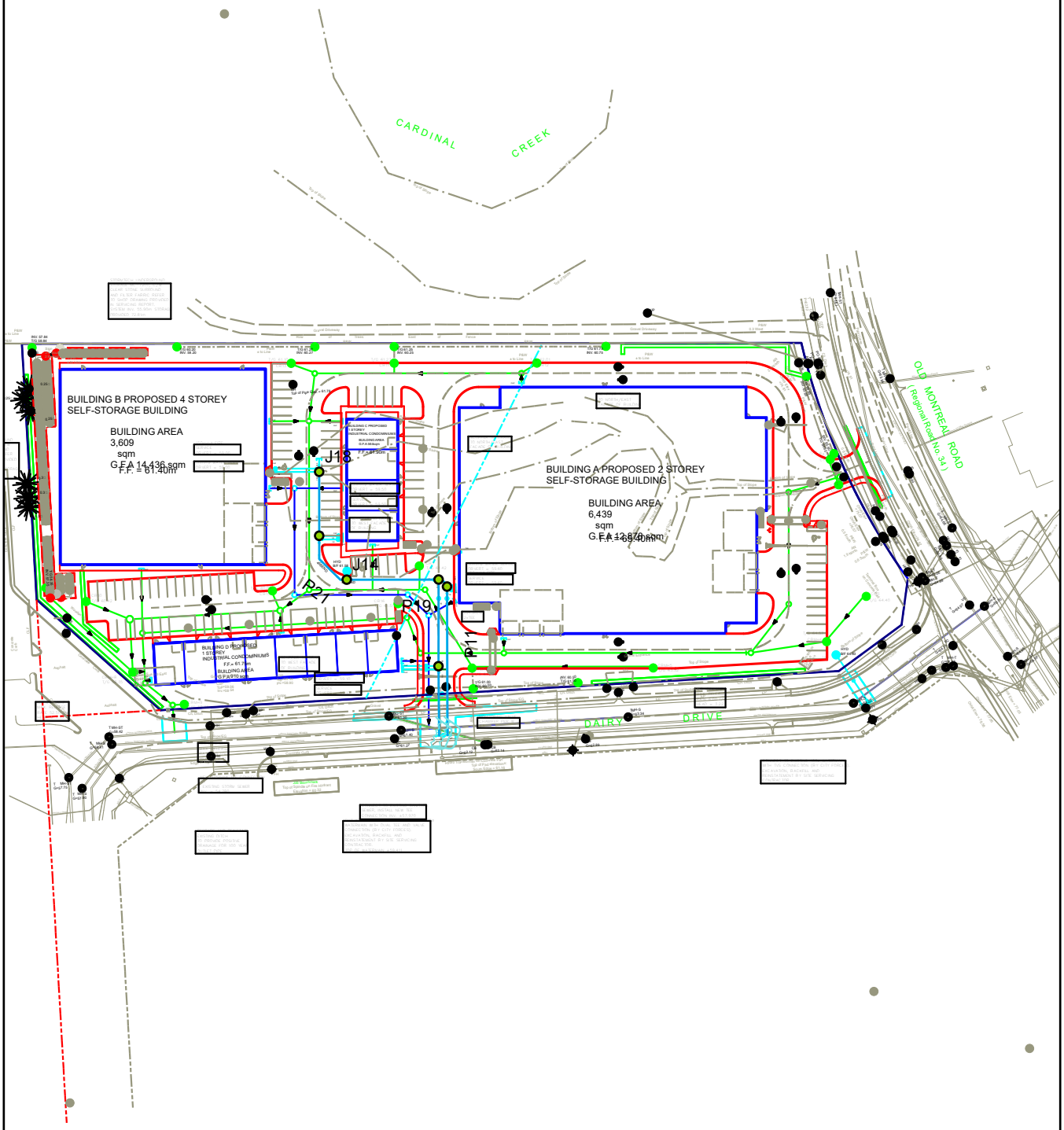
FIRE UNDERWRITERS SURVEY

1015 Dairy Drive | Effort Trust
142817-6.0 | Rev #0 | 2024-06-05
Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (1-storey) **Total Effective Floor Area**	1st Floor Area (Storage space exceeding 3m in height, floor area X 3)		Height 3.0m	1	910 **910**	m2 m2
2	**Type of Construction**	**Type V** Wood Frame **Type III** Ordinary Construction **Type II** Noncombustible Construction **Type I** Fire Resistive Construction	1.5 1.0 0.8 0.6	Type II Noncombustible Construction	0.8		
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**5000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents Limited Conbustible Contents Combustible Contents Free Burning Contents Rapid Burning Contents	-25% -15% 0% 15% 25%	Combustible - F3	0%	0	L/min
	Fire Flow					**5000**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13 Standard Water Supply for both the system and Fire Department Hose Lines Fully Supervised System	-30% -10% -10%	Yes No No	-30%	-1500	L/min
	Total Sprinkler Adjustment					**-1500**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m) Length X Height Factor (m.storeys) Construction Type	>30 154 Type II	Seperation larger than 30 m	0%	0	L/min
	South	Separation (m) Length X Height Factor (m.storeys) Construction Type	>30 0 Type II	Seperation larger than 30 m	0%	0	L/min
	East	Separation (m) Length X Height Factor (m.storeys) Construction Type	21 49 Type II	Both Subject and Exposed Buildings have automatic sprinklers, reduced to 0%	0%	0	L/min
	West	Separation (m) Length X Height Factor (m.storeys) Construction Type	>30 0 Type II	Seperation larger than 30 m	0%	0	L/min
	Fire Flow					**3500**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**4000**	L/min
						67	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

1015 - 1045 Dairy Drive - Water Model



		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.02	59.40	114.10	536.02
2	☐	J12	0.37	59.40	114.10	536.02
3	☐	J14	0.00	58.90	114.10	540.91
4	☐	J16	0.03	59.00	114.10	539.93
5	☐	J18	0.42	59.05	114.10	539.44
6	☐	J20	0.00	59.90	114.10	531.12

Diary Drive - Average Daily Demand Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	☐	P11	RES9000	J12	44.32	204.00	110.00	0.42	0.01	0.00	0.00	Open	0
2	☐	P13	J12	J20	3.65	204.00	110.00	0.05	0.00	0.00	0.00	Open	0
3	☐	P15	RES9002	J10	20.66	204.00	110.00	0.42	0.01	0.00	0.00	Open	0
4	☐	P17	J10	J20	25.86	204.00	110.00	0.40	0.01	0.00	0.00	Open	0
5	☐	P19	J20	J14	27.44	204.00	110.00	0.45	0.01	0.00	0.00	Open	0
6	☐	P21	J14	J16	17.67	204.00	110.00	0.45	0.01	0.00	0.00	Open	0
7	☐	P23	J16	J18	19.12	204.00	110.00	0.42	0.01	0.00	0.00	Open	0

Dairy Drive - Peak Hour

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.02	59.40	109.40	489.96
2	☐	J12	0.56	59.40	109.40	489.96
3	☐	J14	0.00	58.90	109.40	494.86
4	☐	J16	0.04	59.00	109.40	493.88
5	☐	J18	0.62	59.05	109.40	493.39
6	☐	J20	0.00	59.90	109.40	485.06

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	☐	P11	RES9000	J12	44.32	204.00	110.00	0.62	0.02	0.00	0.00	Open	0
2	☐	P13	J12	J20	3.65	204.00	110.00	0.06	0.00	0.00	0.00	Open	0
3	☐	P15	RES9002	J10	20.66	204.00	110.00	0.62	0.02	0.00	0.00	Open	0
4	☐	P17	J10	J20	25.86	204.00	110.00	0.60	0.02	0.00	0.00	Open	0
5	☐	P19	J20	J14	27.44	204.00	110.00	0.66	0.02	0.00	0.01	Open	0
6	☐	P21	J14	J16	17.67	204.00	110.00	0.66	0.02	0.00	0.01	Open	0
7	☐	P23	J16	J18	19.12	204.00	110.00	0.62	0.02	0.00	0.00	Open	0

		ID	Total Demand (L/s)	Critical Node ID	Critical Node Pressure at Fire Demand (kPa)	Critical Node Head at Fire Demand (m)	Hydrant Available Flow (L/s)
1	☐	J14	200.00	J14	340.05	93.60	388.82

		ID	Hydrant Pressure at Available Flow (kPa)	Hydrant Head at Available Flow (m)
1	☐	J14	139.96	73.28

		ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Hydrant Available Flow (L/s)
1	☐	J14	0.00	423.32	102.10	200.00	340.05	388.82

		ID	Hydrant Pressure at Available Flow (kPa)	Junctions with Pressure Violation	Node with the Lowest Pressure Violation	Lowest Pressure Violation (kPa)
1	☐	J14	139.96	0		

		ID	Average Pressure Violation (kPa)
1	☐	J14	

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	J10	0.07	59.40	102.10	418.42
2	☐	J12	1.01	59.40	102.10	418.42
3	☐	J14	0.00	58.90	102.10	423.32
4	☐	J16	0.04	59.00	102.10	422.33
5	☐	J18	1.12	59.05	102.10	421.84
6	☐	J20	0.00	59.90	102.10	413.52

1015 Dairy Drive Water Quality Analysis

Watermain Volume

Street	Pipe Size (mm)	Pipe Length (m)	Volume of Water in Pipe (liters)
1015 Dairy Drive	200	158.8	4,989
Total			4,989

Flow Rate for 5 Day Turnover Time

Street	Volume of Water in Pipe (liters)	Flow Rate to empty pipe in 5 days	
		l/day	l/s
1015 Dairy Drive	4,989	998	0.01

Appendix C

Sanitary Sewer Design Sheet

Sanitary Drainage Area Plan 142817-C-400

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SANITARY SEWER DESIGN SHEET

1015 Dairy Drive - TSL Dairy Inc.
City of Ottawa

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES	PEAK	AREA (Ha)						ICI	PEAK	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	TH/SD	1 Bed APT	2 Bed APT	w/o Units (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	PEAK FACTOR	FLOW (L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
		BLDG C	MH5A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0	0.09	0.1	1.50	0.05	0.09	0.1	0.03	0.00	0.0	0.08	59.26	14.45	200	3.00	1.828	59.18	99.86%
		BLDG B	MH5A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	1.44	1.4	0.00	0.0	1.50	0.70	1.44	1.4	0.48	0.00	0.0	1.18	34.22	7.51	200	1.00	1.055	33.04	96.57%
		MH5A	MH4A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	1.4	0.00	0.1	1.50	0.75	0.00	1.5	0.50	0.00	0.0	1.26	34.22	31.79	200	1.00	1.055	32.96	96.32%
		MH4A	MH3A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	1.4	0.00	0.1	1.50	0.75	0.00	1.5	0.50	0.00	0.0	1.26	24.19	33.76	200	0.50	0.746	22.94	94.79%
		MH3A	MH2A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	1.4	0.00	0.1	1.50	0.75	0.00	1.5	0.50	0.00	0.0	1.26	24.19	8.82	200	0.50	0.746	22.94	94.79%
		BLDG A	MH2A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	1.29	1.3	0.00	0.0	1.50	0.63	1.29	1.3	0.43	0.00	0.0	1.05	34.22	9.22	200	1.00	1.055	33.16	96.92%
		MH2A	MM3A	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	2.7	0.00	0.1	1.50	1.38	0.00	2.8	0.93	0.00	0.0	2.31	34.22	23.65	200	1.00	1.055	31.90	93.24%
		BLDG D	TEE	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	0.0	0.06	0.1	1.50	0.04	0.06	0.1	0.02	0.00	0.0	0.06	34.22	9.22	200	1.00	1.055	34.16	99.84%
	A-4	MM3A	TEE	0.00						0.0	0.0	3.80	0.00	0.00	0.0	0.00	2.7	0.00	0.2	1.50	1.42	0.00	2.9	0.95	0.00	0.0	2.37	24.19	10.08	200	0.50	0.746	21.83	90.21%
																													0.00	250	0.00			

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	
1 Bed	1.4	p/p/u	COM	28,000	L/Ha/day	
2 Bed	2.1	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:

1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: AB/AS

Checked: RM/DY

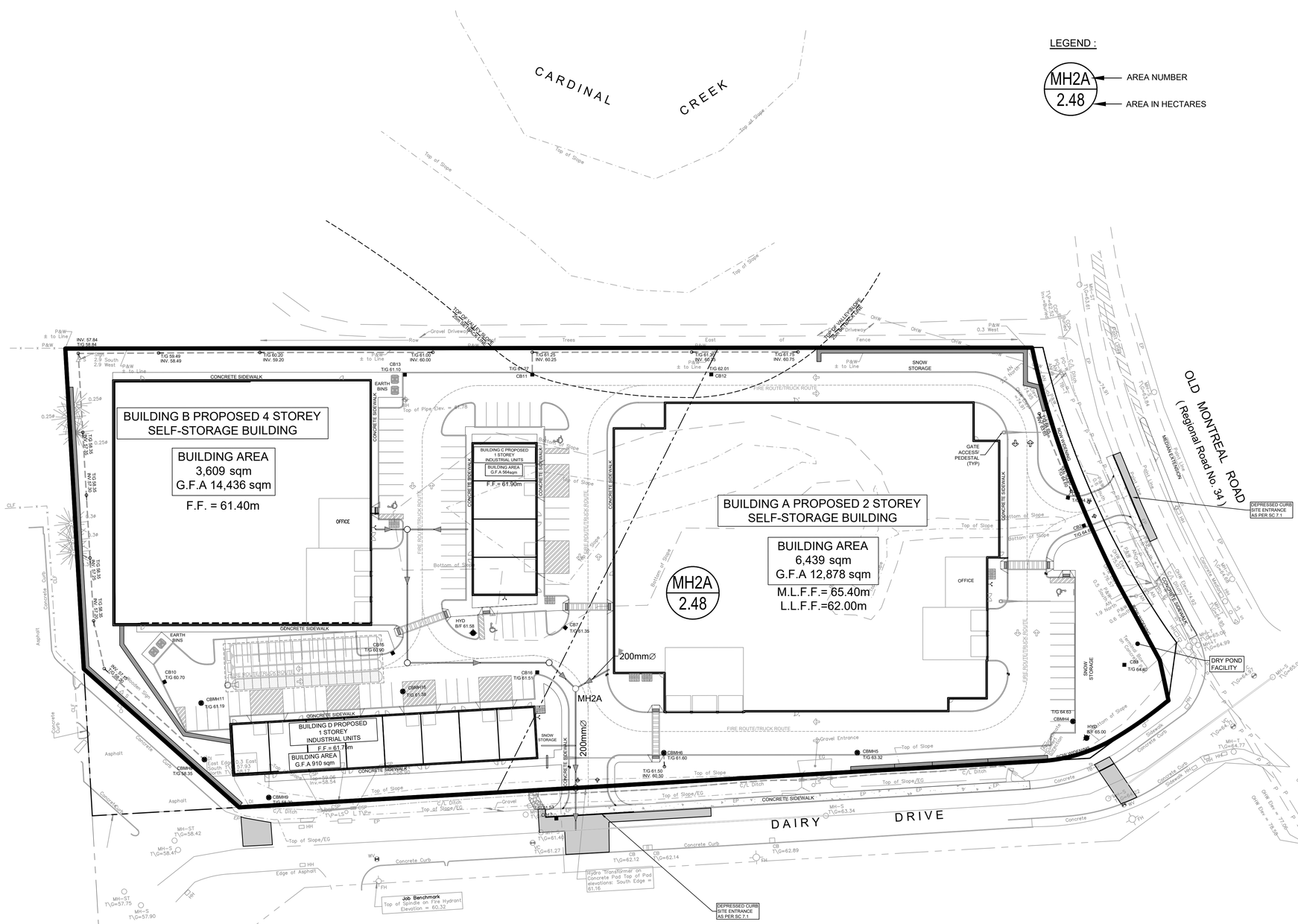
Dwg. Reference: 142817-400

No.	Revision	Date
1.	Dairy Drive Servicing Brief - Submission No. 1	2024-02-13
2	Dairy Drive Servicing Brief - Submission No. 2	2024-06-21
3.	Dairy Drive Servicing Brief - Submission No. 3	2024-10-24
4.	Dairy Drive Servicing Brief - Submission No. 4	2025-06-25

File Reference: 142817-6.04.04

Date: 2025-06-25

Sheet No: 1 of 1



CLIENT

TSL DAIRY INC.

ISSUES

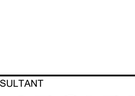
No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2024-02-14
2	SUBMISSION NO. 2 FOR CITY REVIEW	2024-06-27
3	SUBMISSION NO. 3 FOR CITY REVIEW	2024-10-04
4	SUBMISSION NO. 3 FOR CITY REVIEW	2025-06-25
5		
6		

SEE 010, FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

1:500 0 5 15 25m

SEAL



PRIME CONSULTANT

ARCADIS

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Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

1015 DAIRY DRIVE

1015 DAIRY DRIVE

PROJECT NO: 142817	
DRAWN BY: **M.M./A.B.**	CHECKED BY: **R.M./D.Y.**
PROJECT MGR: **R.M.**	APPROVED BY: **D.Y.**

SHEET TITLE

SANITARY DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-400	4

SCALE CHECK 1 in XXXXX 10mm

D07-12-13-0249

File Location: J:\142817_1015_Dairy_D7\0_Production\7.03_Design\04_Civil\Sheets\C-400 SANITARY DRAINAGE AREA PLAN.dwg Last Saved: June 25, 2025, by siurma3150 Plotted: June 25, 2025 5:29:33 PM by Siurma, Don

Appendix D

Storm Sewer Design Sheet

Cardinal Creek Park Business Plan – Stormwater Design Plan Release Rate Excerpt

Cardinal Creek Park Business Plan – Stormwater Design Plan Quality Control Excerpt

Storm Water Management Sheet

Storm Drainage Area Plan 142817-C-500

Ponding Plan 142817-C-600

Storage Calculations

Orifice Sizing Calculations

Overflow Depth Calculations

UGS 1 Details

500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
arcadis.com

STORM SEWER DESIGN SHEET

1015 Dairy Drive - TSL Dairy Inc.
City of Ottawa

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.25	C= 0.30	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.76	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Building A Roof	RD01	BA ROOF	MH8										0.643	1.61	1.61	10.00	0.03	10.03	76.81	104.19			123.56	167.62				0.00	167.62	182.93	3.00	375			1.00	1.605	15.31	8.37%
	CB11, CB12	MH8	MH9										0.233	0.58	2.19	10.03	0.49	10.52	76.69	104.03			168.08	228.01				0.00	228.01	238.49	61.74	375			1.70	2.092	10.48	4.40%
	CB13	MH9	MH13										0.074	0.19	2.38	10.52	0.13	10.65	74.85	101.51			177.92	241.28				0.00	241.28	297.43	14.33	450			1.00	1.812	56.16	18.88%
Building B Roof	RD02	BB ROOF	MH13										0.361	0.90	0.90	10.00	0.12	10.12	76.81	104.19			69.37	94.11				0.00	94.11	182.91	11.87	375			1.00	1.604	88.80	48.55%
Building C Roof	RD03	BC ROOF	MH13										0.056	0.14	0.14	10.00	0.10	10.10	76.81	104.19			10.84	14.70				0.00	14.70	182.92	10.10	375			1.00	1.604	168.21	91.96%
		MH13	MH14											0.00	3.42	10.65	0.38	11.03	74.38	100.86			254.47	345.05				0.00	345.05	364.28	50.32	450			1.50	2.219	19.23	5.28%
	CBMH5	CBMH5	CBMH6										0.038	0.10	0.10	10.00	0.27	10.27	76.81	104.19			7.30	9.91				0.00	9.91	142.62	46.08	250			5.29	2.815	132.72	93.05%
	CBMH6	**CBMH6**	**MH15**										**0.095**	**0.24**	**0.33**	**10.27**	**0.52**	**10.80**	**75.77**	**102.77**			**25.21**	**34.20**				**0.00**	**34.20**	**55.14**	**34.14**	**250**			**0.79**	**1.088**	**20.94**	**37.98%**
	CB7, CB16	MH15	MH14										0.108	0.27	0.60	10.80	0.24	11.04	73.88	100.17			44.55	60.40				0.00	60.40	112.01	31.87	250			3.26	2.211	51.61	46.08%
Building D Roof	RD04	BD ROOF	CBMH16										0.091	0.23	0.23	0.00	0.03	0.03	167.22	230.48			38.07	52.48				0.00	52.48	320.55	4.30	375			3.07	2.812	268.08	83.63%
	CB15	MH14	CBMH16										0.201	0.50	4.53	11.03	0.05	11.08	73.05	99.04			330.73	448.35				0.00	448.35	533.49	9.93	450			3.22	3.250	85.14	15.96%
		CBMH16	CBMH11											0.00	4.75	11.08	0.44	11.52	72.88	98.80			346.53	469.76				0.00	469.76	535.93	48.11	600			0.70	1.836	66.17	12.35%
		CB10	CBMH11										0.122	0.31	0.31	10.00	0.12	10.12	76.81	104.19			23.44	31.80				0.00	31.80	44.81	10.35	200			1.71	1.382	13.00	29.02%
UGS Parking		MH20	CBMH11											0.00	0.00	10.00	0.05	10.05	76.81	104.19			0.00	0.00				0.00	0.00	420.63	7.62	450			2.00	2.562	420.63	100.00%
		CBMH11	MH23											0.00	5.06	11.52	0.04	11.56	71.42	96.79			361.40	489.78				0.00	489.78	535.93	4.71	600			0.70	1.836	46.15	8.61%
		MH23	TEE											0.00	5.06	11.56	0.05	11.61	71.28	96.60			360.69	488.81			**47.00**	47.00	47.00	62.04	3.51	250			1.00	1.224	15.04	24.24%
		CBMH8	TEE	0.164										0.11	0.11	10.00	0.05	10.05	76.81	104.19			8.75	11.88			**6.00**	6.00	6.00	62.04	3.51	250			1.00	1.224	56.04	90.33%
	CB1	MH1	MH2	0.012									0.040	0.11	0.11	10.00	0.32	10.32	76.81	104.19			8.33	11.30				0.00	11.30	41.62	15.86	250			0.45	0.821	30.32	72.86%
	MH2	MH2	MH3											0.00	0.11	10.32	0.68	11.00	75.59	102.52			8.20	11.12				0.00	11.12	41.62	33.39	250			0.45	0.821	30.50	73.29%
		MH3	MH4										0.110	0.28	0.38	11.00	0.14	11.14	73.17	99.19			28.07	38.05				0.00	38.05	107.45	18.39	250			3.00	2.121	69.40	64.58%
	POND	S POND	CBMH4	0.065										0.05	0.05	10.00	0.16	10.16	76.81	104.19			3.47	4.71				0.00	4.71	142.67	18.26	300			2.00	1.955	137.96	96.70%
		CBMH4	MH4											0.00	0.05	10.16	0.19	10.35	76.21	103.38			3.44	4.67				0.00	4.67	142.68	22.44	300			2.00	1.955	138.01	96.73%
ICD (South Area)	MH4	MH4	MH5											0.00	0.43	11.14	0.44	11.59	72.67	98.52			31.16	42.24			**6.00**	6.00	**6.00**	201.76	73.80	300			4.00	2.765	195.76	97.03%
Building A Foundation		BA FDN	MH5											0.00	0.00	10.00	0.22	10.22	76.81	104.19			0.00	0.00				0.00	0.00	34.22	13.75	200			1.00	1.055	34.22	100.00%
		MH5	MH6											0.00	0.43	11.59	0.26	11.85	71.20	96.49			30.53	41.38				6.00	41.38	182.91	24.90	375			1.00	1.604	141.54	77.38%
		MH6	MH7											0.00	0.43	11.85	0.12	11.97	70.37	95.35			30.18	40.89				6.00	40.89	182.91	11.31	375			1.00	1.604	142.02	77.65%
Building C Foundation		BC FDN	TEE											0.00	0.00	10.00	0.30	10.30	76.81	104.19			0.00	0.00				0.00	0.00	13.76	13.54	150			0.75	0.754	13.76	100.00%
		MH7	MH12											0.00	0.43	11.97	1.16	13.13	70.00	94.85			30.02	40.67				6.00	40.67	129.34	79.17	375			0.50	1.134	88.67	68.55%
Building B Foundation		BB FDN	MH12											0.00	0.00	10.00	0.43	10.43	76.81	104.19			0.00	0.00				0.00	0.00	24.19	19.23	200			0.50	0.746	24.19	100.00%
ICD (North Area)		MH12	MH10											0.00	5.60	13.13	0.13	13.26	66.57	90.14			372.98	505.02			**0.00**	59.00	**59.00**	212.53	14.99	375			1.35	1.864	153.53	72.24%
	CBMH9	CBMH9	MH17	0.067										0.05	0.05	10.04	0.05	10.09	76.66	103.99			3.57	4.84			**6.00**	6.00	**6.00**	39.76	3.50	200			1.35	1.226	33.76	84.91%
Building D Foundation		BD FDN	MH10											0.00	0.00	10.00	0.04	10.04	76.81	104.19			0.00	0.00				0.00	0.00	15.91	2.00	150			1.00	0.872	15.91	100.00%
		MH10	MH17											0.00	5.60	13.26	0.09	13.36	66.20	89.63			370.90	502.17			**0.00**	65.00	**65.00**	212.51	10.51	375			1.35	1.864	147.51	69.41%
Connect to Existing		MH17	EX											0.00	5.65	13.36	0.05	13.40	65.94	89.27			372.53	504.34			**0.00**	65.00	**65.00**	324.68	8.19	375			3.15	2.848	259.68	79.98%
				0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.17	5.65	TRUE																375						
													Site Area=	2.48																							
													Avg C=	0.82																							

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: AB/AS
Checked: RM/DY
Dwg. Reference: 142817-500

No.	Revision	Date
1.	Dairy Drive Servicing Brief - Submission No. 1	2023-09-11
2	Dairy Drive Servicing Brief - Submission No. 2	2024-06-20
3.	Dairy Drive Servicing Brief - Submission No. 3	2024-10-03
4.	Dairy Drive Servicing Brief - Submission No. 4	2025-06-25

File Reference: 142817-6.04.04
Date: 2025-06-25
Sheet No: 1 of 1

2.2 Approvals Required

In accordance with the Stormwater Design Plan Requirements outlined by the MNR the following list outlines the approvals required for the CCBP:

- MOE approval for the storm sewer and stormwater management pond design. A "Certificate of Approval" is required from the MOE.
- Approval of the engineering drawings for the storm sewer outlet to the creek and the SWM pond is required from the MNR.
- Approval by the Township of Cumberland for all on-site controls and storm drainage works.

Note that due to the relatively small area to be diverted from the unnamed creek watershed, MNR has indicated that an approval for the diversion is not required.

3.0 STORM DRAINAGE

3.1 Proposed Drainage Scheme

The roadway through the business park (Ault Drive) is designed with a 'saw tooth' road profile. As illustrated in Figures 5, 6 and 7 the overall downward slope will be towards an overland flow ditch north of Ault Drive.

The proposed drainage scheme will reduce the 1 in 5 year post-development flow from all the lot areas to 26.4 L/s/ha using on-site detention storage. As presented in detail Appendix B, the on-site storage volume required during the 5 year event is about 250 m^3/ha. During larger events, flows exceeding the 5 year control level will drain to Ault Drive and then to the overland flow ditch (overland flow from the Ault site will drain directly to the ditch). Consequently, storm sewers for the CCBP are sized to convey the 5 year flow from the road right-of-way and from the lots based on the 26.4 L/s/ha control. This on-site detention storage concept is similar to that implemented in the 'Taylor Creek Business Park' located on the west side of Regional Road 57.

3.2 Need for Quantity Control

A hydrologic analysis has been conducted to determine the peak flows under three development scenarios: pre-development, CCBP developed and rural conditions upstream, and full development conditions (CCBP and upstream developed - Alternative C in Master Drainage Plan). Table 1 shows the results of the hydrologic analysis for the four storm distributions: 24 hour SCS, 3 hour Chicago, AES 12 hour, and the July 1, 1979

As shown in Table 3, the erosion potential decreases under post-development conditions (CCBP and Alternative C). Slight increases occur under interim development conditions, but since these analyses correspond to discrete, infrequent events, the increase (about 1%) is not expected to have significant impacts on erosion in Cardinal Creek.

7.0 WATER QUALITY

The water quality assessment addresses the water quality concerns associated with the warm-water fishery in Cardinal Creek. In addition to the permanent controls with the proposed development in place, water quality protection must be provided during construction in accordance with good municipal practice for the control of erosion and sediment.

7.1 Water Quality Pond

As indicated in Section 6.0, the MNR's General Guidelines for Development related to urban stormwater stipulate that the first 10 mm of runoff from impervious areas must be detained for 72 hours. For the proposed CCBP, this corresponds to a storage volume of about 2500 m^3. As discussed above, because of erosion concerns the proposed storage volume is doubled to 5000 m^3. This storage corresponds to the runoff from about 20 mm event from the impervious areas in the CCBP.

Because of slope stability concerns it is proposed to provide an extended detention dry pond located on the east side of the CCBP. The location and configuration of the pond is illustrated in Figure 9. The pond site is within the table lands adjacent to the Cardinal Creek's valley slope. Setbacks have been established by Golder Associates based on slope stability concerns.

The outlet alignment has also been selected based on slope stability considerations as recommended by Golder Associates Ltd. Recommendations on erosion protection works at the outlet and in the overland flow ditch are provided by Golder Associates Ltd. More details describing the operation of the inlet and outlet structures are included in Appendix B.

The performance of the pond was evaluated assuming dynamic hydraulic conditions during storage. Details of the method are provided in appendix E. The results show that the TSS removal efficiency will be about 85%. Assuming a critical TSS concentration in the influent runoff of 300 mg/l[1] the effluent concentration will be about 45 mg/l.

1 300 mg/l = 90th percentile median "event mean concentration" of all the urban sites monitored in the NURP study (ie. the median EMC was determined from all the events in each site and 90th percentile of all the sites was selected).

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STORMWATER MANAGEMENT
1015 Dairy Drive - TSL Dairy Inc.
142817-6.0 | Rev #4 | 2025-06-19
Prepared By: AS | Checked By: RM

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = 732.951 / $(T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = 998.071 / $(T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = 1735.688 / $(T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
R = Restriction (L/s/ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Restricted Flowrate ($Q_{restricted}$ = 2.78*C*i_{5yr}*A_{site} based on C=0.39, Tc=20min)

C =	0.25	
T_c =	20	min
i_{5yr} =	70.25	mm/hr
A_{site} =	2.480	Ha

$Q_{restricted}$ = 121.08 L/s

Restricted Flowrate ($Q_{restricted}$ = 26.4 L/s/ha*A_{site} based on Cardinal Creek Business Park Restriction)

R =	26.4	L/s/ha
A_{site} =	2.480	Ha

$Q_{restricted}$ = 65.47 L/s

Uncontrolled Release ($Q_{uncontrolled}$ = 2.78*1.25*C*i_{100yr}*$A_{uncontrolled}$)

C =	0.25	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.002	Ha

$Q_{uncontrolled}$ = 0.31 L/s

100 Year Pre-Development Restricted Flowrate ($Q_{restricted}$ = 2.78*1.25*C*i_{100yr}*A_{site} based on C=0.39, Tc=20min)

C =	0.25	
T_c =	20	min
i_{100yr} =	119.95	mm/hr
A_{site} =	2.480	Ha

$Q_{restricted}$ = 258.43 L/s

Maximum Allowable Release Rate ($Q_{max\ allowable}$ = $Q_{restricted}$ - $Q_{uncontrolled}$) using Cardinal Creek Business Park

$Q_{max\ allowable}$ = 65.16 L/s

SWM Statistics of Modified Site Areas

Controlled	Area	ICD Flow
MH23	2.022	47.00
CBMH8	0.164	6.00
CBMH9	0.067	6.00
MH4	0.227	6.00
Sum	2.480	65.00

Uncontrolled	Area	Flow
UNC 01	0.002	0.31
Sum	**0.002**	**0.31**

Total Sum	**2.482**	**65.310**
Allowable		**65.47**
		TRUE

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Ottawa, Ontario K1S 5N4 Canada
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STORMWATER MANAGEMENT
1015 Dairy Drive - TSL Dairy Inc.
142817-6.0 | Rev #4 | 2025-06-19
Prepared By: AS | Checked By: RM

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	MH23	CB12, CB11, MH9, RD01, RD02, RD03, CBMH6, CBMH5, CB10, CB15, CB16, CB7, RD04		
Area (Ha)	2.022	Restricted Flow ICD $_{Actual}$ (L/s)=	47.00	
C =	1.00	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	23.50	50% reduction for sub-surface storage

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
205	21.55	121.16	23.50	97.66	1201.23
210	21.14	118.86	23.50	95.36	1201.49
215	20.75	116.65	23.50	93.15	**1201.60**
220	20.37	114.53	23.50	91.03	1201.55
225	20.01	112.49	23.50	88.99	1201.37

100-Year +20% Ponding

$100YRQ_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
139.98	116.48	**1502.54**

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	1201.60	11.90	563.91	625.79	0.00	1502.54	926.73
		convert to flow with peak Tc (L/s)		48.51	convert to flow with peak Tc (L/s)		71.84

overflows to: CBMH8

Drainage Area	MH23		
Area (Ha)	2.022		
C =	0.90	Restricted Flow Q_r (L/s)=	23.50

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
108	21.12	106.84	23.50	83.34	540.06
110	20.82	105.34	23.50	81.84	540.15
112	20.53	103.89	23.50	80.39	**540.20**
114	20.26	102.48	23.50	78.98	540.19
116	19.99	101.11	23.50	77.61	540.14

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	540.20	11.90	563.91	0.00

overflows to: CBMH8

Drainage Area	MH23		
Area (Ha)	2.022		
C =	0.90	Restricted Flow Q_r (L/s)=	23.50

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
83	19.29	97.58	23.50	74.08	368.91
84	19.11	96.70	23.50	73.20	368.93
85	18.94	95.84	23.50	72.34	**368.94**
86	18.78	95.00	23.50	71.50	368.93
87	18.61	94.17	23.50	70.67	368.91

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	368.94	11.90	563.91	0.00

overflows to: CBMH8

Drainage Area	CBMH8	CBMH8		
Area (Ha)	0.164	Restricted Flow ICD $_{Actual}$ (L/s)=	6.00	
C =	0.31	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	3.00	50% reduction for sub-surface storage

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
37	79.42	11.31	3.00	8.31	18.46
39	76.51	10.90	3.00	7.90	18.49
41	73.83	10.52	3.00	7.52	**18.50**
43	71.35	10.17	3.00	7.17	18.49
45	69.05	9.84	3.00	6.84	18.46

100-Year +20% Ponding

$100YRQ_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
12.62	9.62	**23.67**

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	18.50	9.81	11.71	0.00	0.00	23.67	2.15
		convert to flow with peak Tc (L/s)		0.00	convert to flow with peak Tc (L/s)		0.88
		plus overflow from upstream (L/s)		48.51	plus overflow from upstream (L/s)		72.72

overflows to: CBMH9

Drainage Area	CBMH8		
Area (Ha)	0.164		
C =	0.25	Restricted Flow Q_r (L/s)=	3.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
16	80.46	9.17	3.00	6.17	5.92
18	74.97	8.55	3.00	5.55	5.99
20	70.25	8.01	3.00	5.01	**6.01**
22	66.15	7.54	3.00	4.54	5.99
24	62.54	7.13	3.00	4.13	5.94

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	6.01	9.81	11.71	0.00

overflows to: CBMH9

Drainage Area	CBMH8		
Area (Ha)	0.164		
C =	0.25	Restricted Flow Q_r (L/s)=	3.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
13	66.93	7.63	3.00	4.63	3.61
14	64.23	7.32	3.00	4.32	3.63
15	61.77	7.04	3.00	4.04	**3.64**
16	59.50	6.78	3.00	3.78	3.63
17	57.42	6.54	3.00	3.54	3.62

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	3.64	9.81	11.71	0.00

overflows to: CBMH9

Drainage Area	CBMH9	CBMH9		
Area (Ha)	0.067	Restricted Flow ICD $_{Actual}$ (L/s)=	6.00	
C =	0.31	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	3.00	50% reduction for sub-surface storage

100-Year Ponding

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
5	242.70	14.13	3.00	11.13	3.34
10	178.56	10.39	3.00	7.39	4.44
15	142.89	8.32	3.00	5.32	**4.79**
20	119.95	6.98	3.00	3.98	4.78
25	103.85	6.04	3.00	3.04	4.57

100-Year +20% Ponding

$100YRQ_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
9.98	6.98	**6.28**

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	4.79	0.35	3.22	1.22	0.00	6.28	2.71
		convert to flow with peak Tc (L/s)		1.35	convert to flow with peak Tc (L/s)		3.01
		plus overflow from upstream (L/s)		49.86	plus overflow from upstream (L/s)		75.73

overflows to: offsite

Drainage Area	CBMH9		
Area (Ha)	0.067		
C =	0.25	Restricted Flow Q_r (L/s)=	3.00

5-Year Ponding

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
4	152.51	7.10	3.00	4.10	0.98
6	131.57	6.13	3.00	3.13	1.13
8	116.11	5.41	3.00	2.41	**1.16**
10	104.19	4.85	3.00	1.85	1.11
12	94.70	4.41	3.00	1.41	1.01

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	1.16	0.35	3.22	0.00

overflows to: offsite

Drainage Area	CBMH9		
Area (Ha)	0.067		
C =	0.25	Restricted Flow Q_r (L/s)=	3.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
3	121.46	5.66	3.00	2.66	0.48
4	111.72	5.20	3.00	2.20	0.53
5	103.57	4.82	3.00	1.82	**0.55**
6	96.64	4.50	3.00	1.50	0.54
7	90.66	4.22	3.00	1.22	0.51

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	0.55	0.35	3.22	0.00

overflows to: offsite

500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
arcadis.com

STORMWATER MANAGEMENT
1015 Dairy Drive - TSL Dairy Inc.
142817-6.0 | Rev #4 | 2025-06-19
Prepared By: AS | Checked By: RM

Drainage Area	***MH4***	***POND, MH2, MH4, CB1***	
Area (Ha)	0.227	Restricted Flow ICD $_{Actual}$ (L/s)=	6.00
C =	0.63	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	6.00

50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	***i_{100yr} (mm/hour)***	***Peak Flow Q_p=2.78x$Ci_{100yr}A$ (L/s)***	***Q_r (L/s)***	***Q_p-Q_r (L/s)***	***Volume 100yr (m^3)***	***100YRQ_p 20% (L/s)***	***Qp - Qr (L/s)***	***Volume 100+20 (m^3)***
48	65.89	25.99	6.00	19.99	57.56			
53	61.28	24.17	6.00	18.17	57.77			
58	57.32	22.61	6.00	16.61	**57.80**	27.13	21.13	**73.53**
63	53.89	21.26	6.00	15.26	57.67			
68	50.89	20.07	6.00	14.07	57.41			

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	57.80	137.94	0	0.00

100+20

Overflow	Required	Balance
0.00	73.53	0.00
convert to flow with peak Tc (L/s)		0.00

overflows to: offsite

Drainage Area	***MH4***		
Area (Ha)	0.227		
C =	0.50	Restricted Flow Q_r (L/s)=	6.00

5-Year Ponding					
T_c Variable (min)	***i_{5yr} (mm/hour)***	***Peak Flow Q_p=2.78x$Ci_{5yr}A$ (L/s)***	***Q_r (L/s)***	***Q_p-Q_r (L/s)***	***Volume 5yr (m^3)***
24	62.54	19.73	6.00	13.73	19.78
26	59.35	18.73	6.00	12.73	19.85
28	56.49	17.82	6.00	11.82	**19.87**
30	53.93	17.02	6.00	11.02	19.83
32	51.61	16.28	6.00	10.28	19.75

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	19.87	137.94	0	0.00

overflows to: offsite

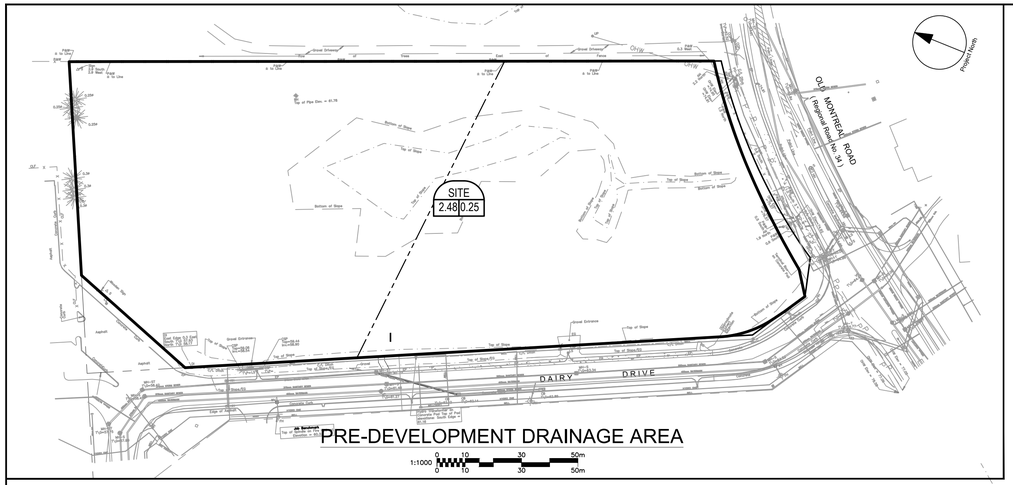
Drainage Area	***MH4***		
Area (Ha)	0.227		
C =	0.50	Restricted Flow Q_r (L/s)=	6.00

2-Year Ponding					
T_c Variable (min)	***i_{2yr} (mm/hour)***	***Peak Flow Q_p=2.78x$Ci_{2yr}A$ (L/s)***	***Q_r (L/s)***	***Q_p-Q_r (L/s)***	***Volume 2yr (m^3)***
19	53.70	16.94	6.00	10.94	12.48
20	52.03	16.42	6.00	10.42	12.50
21	50.48	15.93	6.00	9.93	**12.51**
22	49.02	15.47	6.00	9.47	12.50
23	47.66	15.04	6.00	9.04	12.47

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	12.51	137.94	0	0.00

overflows to: offsite



PRE-DEVELOPMENT DRAINAGE AREA

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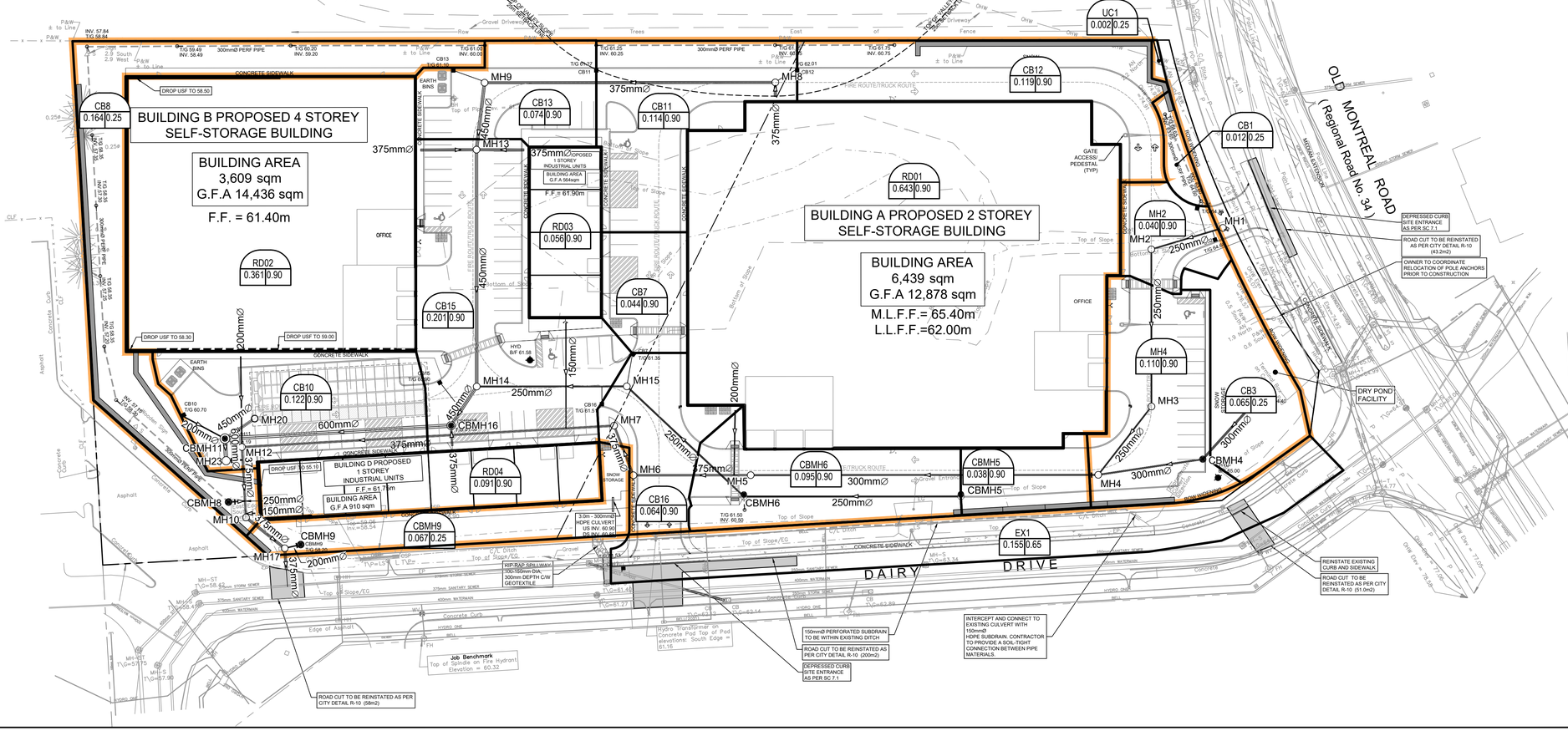
LEGEND :

UC1 — AREA NUMBER
0.004 0.20 — RUNOFF COEFFICIENT
AREA IN HECTARES
ICD AREAS

CARDINAL CREEK

Top of Slope



1:500 0 5 15 25m

CLIENT

TSL DAIRY INC.

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2024-02-14
2	SUBMISSION NO. 2 FOR CITY REVIEW	2024-06-27
3	SUBMISSION NO. 3 FOR CITY REVIEW	2024-10-04
4	SUBMISSION NO. 3 FOR CITY REVIEW	2025-06-25
5		
6		

SEE 010, FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

SEAL

LICENSED PROFESSIONAL ENGINEER
L.I.D. #: Yannoulopoulos
2025/06/25
PROVINCE OF ONTARIO

PRIME CONSULTANT

ARCADIS

333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

1015 DAIRY DRIVE

1015 DAIRY DRIVE

PROJECT NO: 142817	
DRAWN BY: **M.M./A.B.**	CHECKED BY: **R.M./D.Y.**
PROJECT MGR: **R.M.**	APPROVED BY: **D.Y.**

SHEET TITLE

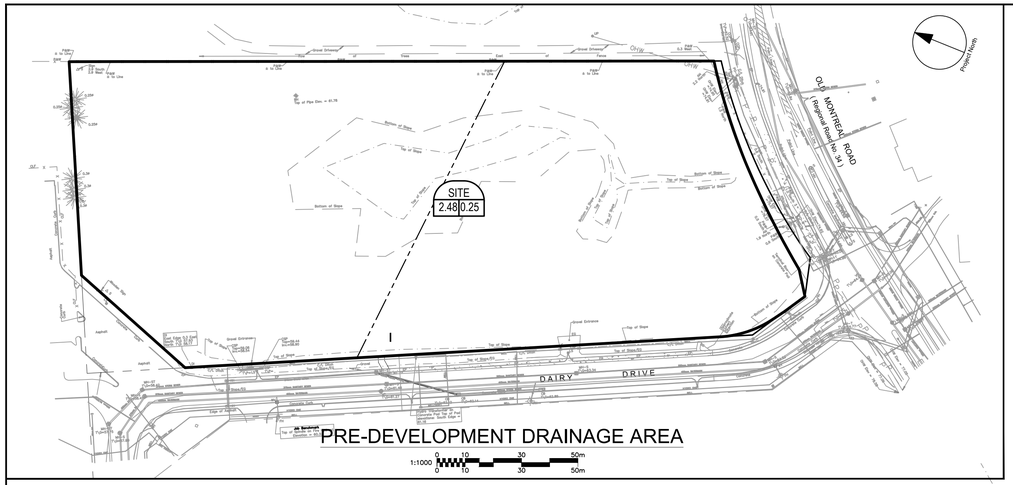
STORM DRAINAGE AREA PLAN

SHEET NUMBER **C-500** ISSUE **4**

SCALE CHECK 1 in XXXXX 20mm

File Location: J:\142817_1015_Dairy_D7.0_Production\7.03_Design\04_Civil\Sheets\C-500 STORM DRAINAGE AREA PLAN.dwg Last Saved: June 25, 2025, by slumad3150 Plotted: June 25, 2025 5:31:12 PM by Suma, Don

D07-12-13-0249



PRE-DEVELOPMENT DRAINAGE AREA

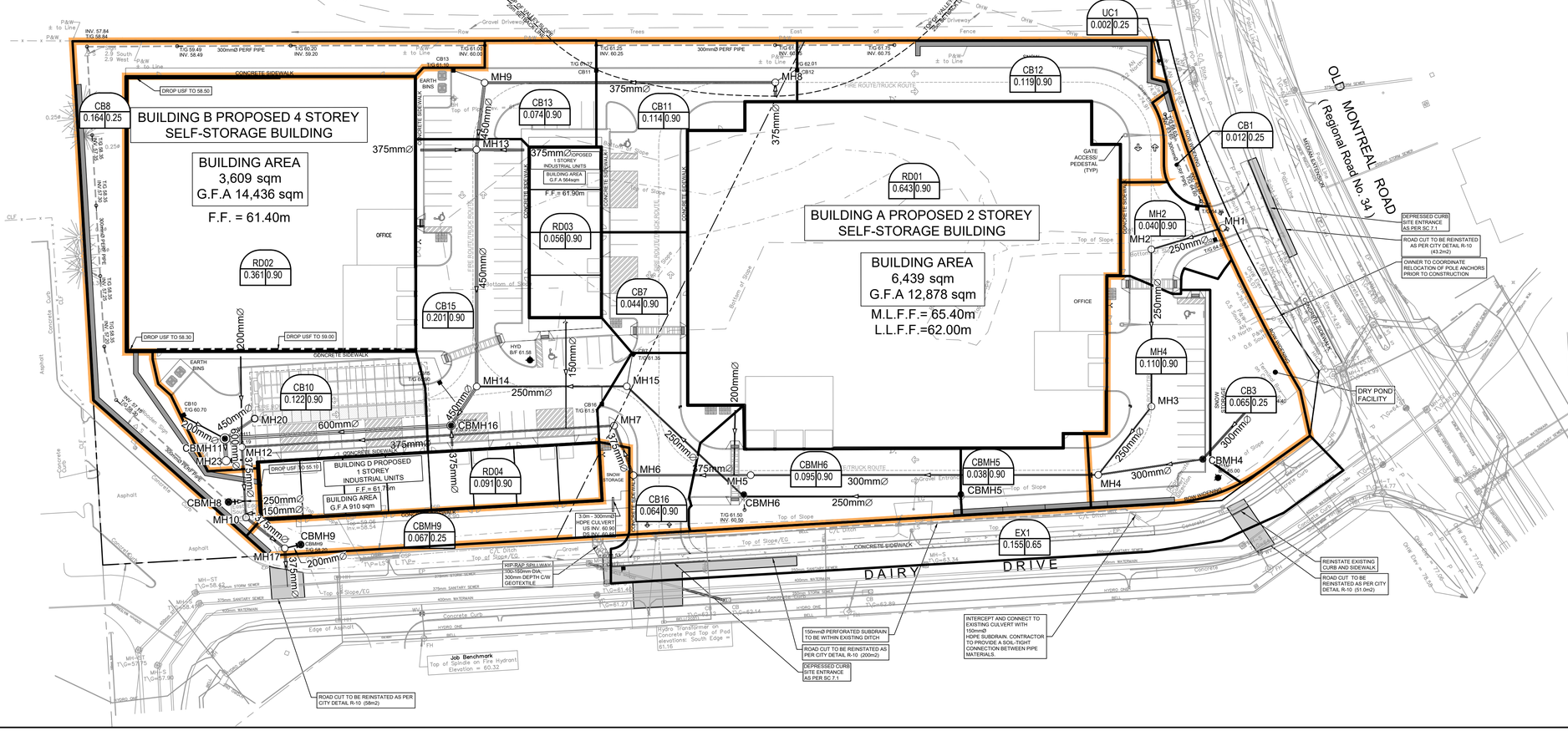
1:1000 0 10 30 50m

LEGEND :

UC1 — AREA NUMBER
0.004 0.20 — RUNOFF COEFFICIENT
AREA IN HECTARES
ICD AREAS

CARDINAL CREEK

Top of Slope



1:500 0 5 15 25m

CLIENT

TSL DAIRY INC.

ISSUES

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5		
6		

SEE 010, FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

SEAL

LICENSED PROFESSIONAL ENGINEER
L.I.D. #: Yannoulopoulos
2025/06/25
PROVINCE OF ONTARIO

PRIME CONSULTANT

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333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
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PROJECT

1015 DAIRY DRIVE

1015 DAIRY DRIVE

PROJECT NO: 142817	
DRAWN BY: **M.M./A.B.**	CHECKED BY: **R.M./D.Y.**
PROJECT MGR: **R.M.**	APPROVED BY: **D.Y.**

SHEET TITLE

STORM DRAINAGE AREA PLAN

SHEET NUMBER **C-500** ISSUE **4**

SCALE CHECK 1 in XXXXX 20mm

File Location: J:\142817_1015_Dairy_D7.0_Production\7.03_Design\04_Civil\Sheets\C-500 STORM DRAINAGE AREA PLAN.dwg Last Saved: June 25, 2025, by slumad3150 Plotted: June 25, 2025 5:31:12 PM by Suma, Don

D07-12-13-0249

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500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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UNDERGROUND STORAGE CALCULATIONS
1015 - 1045 Dairy Drive | The Effort Trust Company
142817-6.0 | Rev #2 | 2025-06-24
Prepared By: AS | Checked By: RM

Pipe Storage					***CBMH8***
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CBMH8	ECB	105.23	300	0.071	7.44
				Total	7.44

Structure Storage						***CBMH8***
	Base	**Top**	**Height**	**Dia. / Width**	**X-sec Area**	**Volume**
CBMH8	55.420	58.35	2.93	1200	1.131	3.31
ECB/TCBs (x6)	57.350	58.35	1.00	450	0.159	0.95
					Total	**4.27**

TOTAL CBMH8	**11.71**

Pipe Storage					***CBMH9***
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
				Total	0.00

Structure Storage						***CBMH9***
	Base	**Top**	**Height**	**Dia. / Width**	**X-sec Area**	**Volume**
CBMH9	55.350	58.20	2.85	1200	1.131	3.22
					Total	**3.22**

TOTAL CBMH9	**3.22**

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ORIFICE SIZING
1015 - 1045 Dairy Drive | The Effort Trust Company
142817-6.0 | Rev #2 | 2025-06-25
Prepared By: AS | Checked By: RM

Orifice coefficients	
Cv =	0.60

							Theoretical		Recommended	
	Invert	Diameter	Centre ICD	Max. Pond Elevation	Hydraulic Slope	Target Flow	Orifice	Actual Flow	Orifice	Actual Flow
	(m)	(mm)	(m)	(m)	(m)	(l/s)	(m)	(l/s)	(m)	(l/s)
CBMH8	56.262	250	56.387	61.000	4.613	47.00	0.0900	46.24	0.090	46.24
						47.00				**46.24**

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OVERFLOW DEPTH CALCULATIONS

1015 - 1045 Dairy Drive | The Effort Trust Company
142817-6.0 | Rev #4 | 2025-06-20
Prepared By: AS | Checked By: RM

Overflow Area MH23

New Flow Section Required 1:100 year flow =			**48.51**	l/s	or	**0.049**	Cu m/sec			
New Flow Section Required 1:100 year + 20% flow			**71.84**	l/s	or	**0.072**	Cu m/sec			
Overflow Slope			Overflow X-Section						Overflow Capacity - Q	
Length =	**5.00**	m	Side Slope 1 =	**33.00**	%				From Seelye n =	0.040 (Channels)
Up Stream Ground Elev =	**60.90**	m	Side Slope 2 =	**33.00**	%					
Down Stream Ground Elev =	**58.45**	m	Bottom Width =	**9.00**	m				100 Year Q =	**0.050** Cu M/sec
Difference =	2.45	m		100 Year		100 Year + 20%			100 Year Velocity =	0.70 M/s
Ditch Slope =	49.00	%	Water depth =	**0.008**	m	**0.010**	m			
			X-Sect. Area =	0.07	m^2	0.09	m^2		100 Y +20% Q =	**0.073** Cu M/sec
			Wetted Per. =	9.05	m	9.06	m		100 Y + 20% Velocity =	0.81 M/s

Overflow Area CBMH8

New Flow Section Required 1:100 year flow =			**48.51**	l/s	or	**0.049**	Cu m/sec			
New Flow Section Required 1:100 year + 20% flow			**72.72**	l/s	or	**0.073**	Cu m/sec			
Overflow Slope									Overflow Capacity - Q	
Length =	**6.00**	m	Side Slope 1 =	**33.00**	%				From Seelye n =	0.040 (Channels)
Up Stream Ground Elev =	**58.45**	m	Side Slope 2 =	**33.00**	%					
Down Stream Ground Elev =	**58.35**	m	Bottom Width =	**1.00**	m				100 Year Q =	**0.052** Cu M/sec
Difference =	0.10	m		100 Year		100 Year + 20%			100 Year Velocity =	0.53 M/s
Ditch Slope =	1.67	%	Water depth =	**0.080**	m	**0.100**	m			
			X-Sect. Area =	0.10	m^2	0.13	m^2		100 Y +20% Q =	**0.078** Cu M/sec
			Wetted Per. =	1.51	m	1.64	m		100 Y + 20% Velocity =	0.60 M/s

Overflow Area CBMH9

New Flow Section Required 1:100 year flow =			**49.86**	l/s	or	**0.050**	Cu m/sec			
New Flow Section Required 1:100 year + 20% flow			**75.73**	l/s	or	**0.076**	Cu m/sec			
Overflow Slope			Overflow X-Section						Overflow Capacity - Q	
Length =	**1.70**	m	Side Slope 1 =	**2.30**	%				From Seelye n =	0.040 (Channels)
Up Stream Ground Elev =	**58.35**	m	Side Slope 2 =	**3.11**	%					
Down Stream Ground Elev =	**58.00**	m	Bottom Width =	**0.00**	m				100 Year Q =	**0.051** Cu M/sec
Difference =	0.35	m		100 Year		100 Year + 20%			100 Year Velocity =	0.84 M/s
Ditch Slope =	20.59	%	Water depth =	**0.040**	m	**0.050**	m			
			X-Sect. Area =	0.06	m^2	0.09	m^2		100 Y +20% Q =	**0.092** Cu M/sec
			Wetted Per. =	3.03	m	3.78	m		100 Y + 20% Velocity =	0.97 M/s

Dairy Drive Area

New Flow Section Required 1:2 year flow =			**21.51**	l/s	or	**0.022**	Cu m/sec			
New Flow Section Required 1:100 year			**62.52**	l/s	or	**0.063**	Cu m/sec			
Overflow Slope			Overflow X-Section						Overflow Capacity - Q	
Length =	**156.61**	m	Side Slope 1 =	**100.00**	%				From Seelye n =	0.040 (Channels)
Up Stream Ground Elev =	**64.60**	m	Side Slope 2 =	**3.00**	%					
Down Stream Ground Elev =	**61.53**	m	Bottom Width =	**0.00**	m				2 Year Q =	**0.031** Cu M/sec
Difference =	3.07	m		2 Year		100 Year			2 Year Velocity =	0.37 M/s
Ditch Slope =	1.96	%	Water depth =	**0.070**	m	**0.100**	m			
			X-Sect. Area =	0.08	m^2	0.17	m^2		100 Year Q =	**0.081** Cu M/sec
			Wetted Per. =	2.43	m	3.48	m		100 Year Velocity =	0.47 M/s

Q = A*(1.0/n)*R^2/3*S^1/2 where: A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A/wetted perimetre (wp) in 6p

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

ADS SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

DD - SUB 3 - PARKING

OTTAWA, ON, CANADA

MC-7200 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-7200.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-7200 CHAMBER SYSTEM

1. STORMTECH MC-7200 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-7200 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-7200 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-7200 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

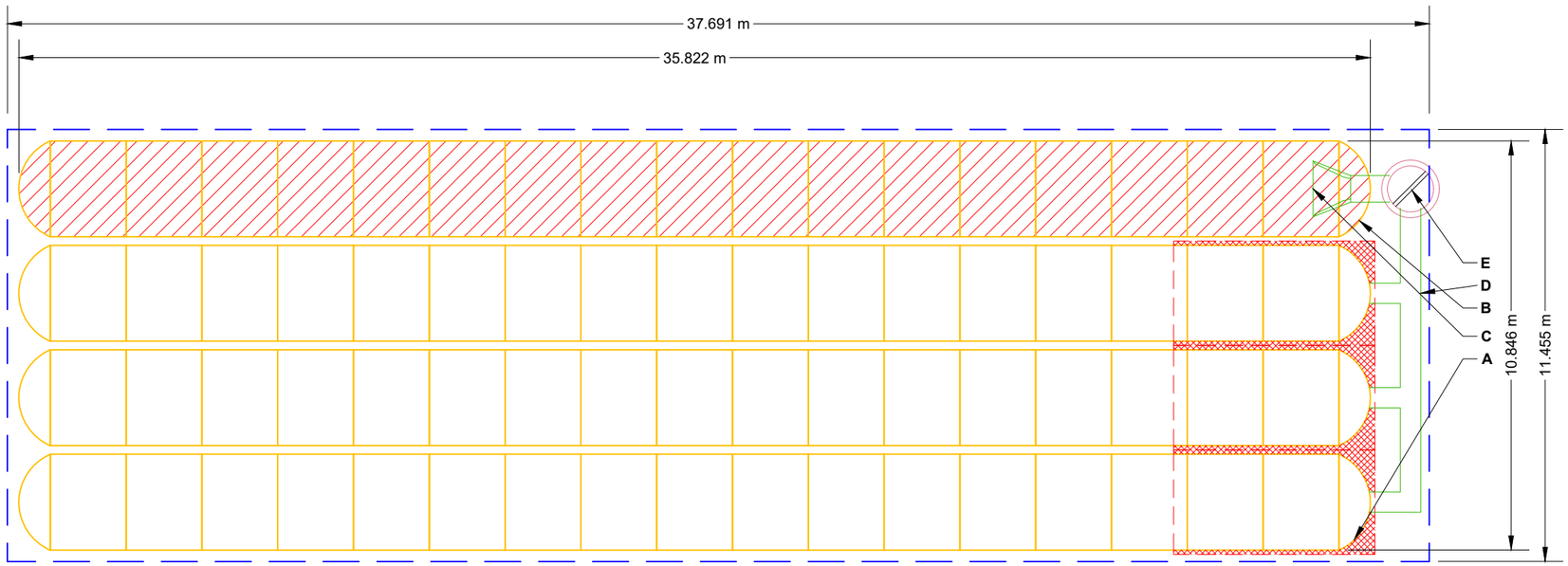
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS:	
68	STORMTECH MC-7200 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.886
8	STORMTECH MC-7200 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	2.515
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	2.362
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	2.362
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	2.362
563.9	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	2.057
		TOP OF MC-7200 CHAMBER:	1.753
		600 mm ISOLATOR ROW PLUS INVERT:	0.286
		450 mm x 450 mm BOTTOM MANIFOLD INVERT:	0.279
431.8	SYSTEM AREA (m^2)	BOTTOM OF MC-7200 CHAMBER:	0.229
98.3	SYSTEM PERIMETER (m)	BOTTOM OF STONE:	0.000

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	450 mm BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP18B / TYP OF ALL 450 mm BOTTOM CONNECTIONS	50 mm	
PREFABRICATED END CAP	B	600 mm BOTTOM PARTIAL CUT END CAP, PART#: MC7200IEPP24B / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	57 mm	
FLAMP	C	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP		
MANIFOLD	D	450 mm x 450 mm BOTTOM MANIFOLD, ADS N-12	50 mm	
CONCRETE STRUCTURE W/WEIR	E	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		467 L/s IN



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 5.334 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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DATE: 09/24/2024 | DRAWN: AB | CHECKED: N/A
PROJECT #:

DESCRIPTION	CHK	DRW	DATE

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

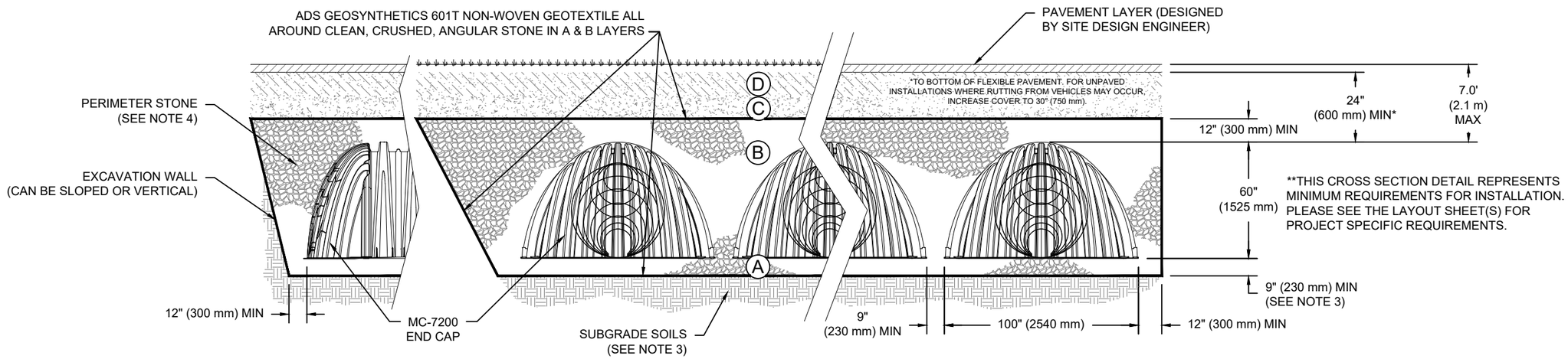
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 150

ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-7200 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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OTTAWA, ON, CANADA
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PROJECT #:

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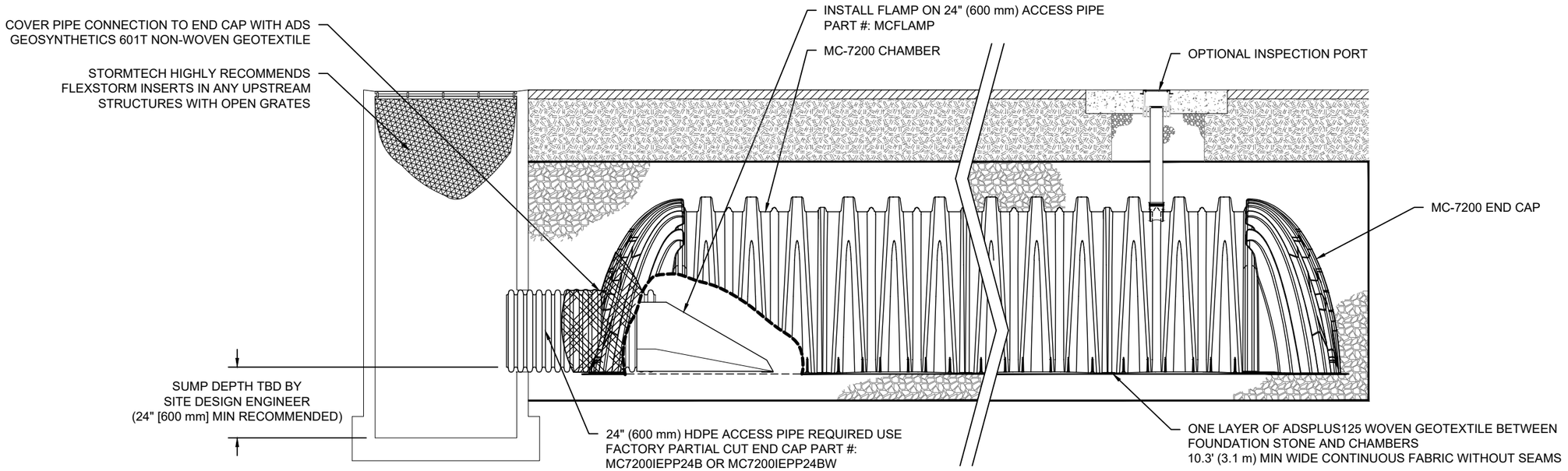
StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



MC-7200 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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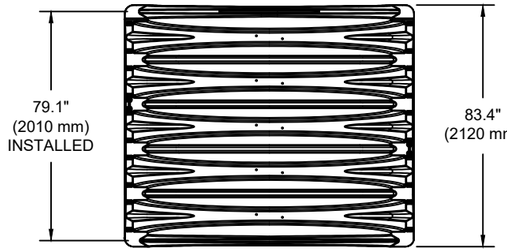
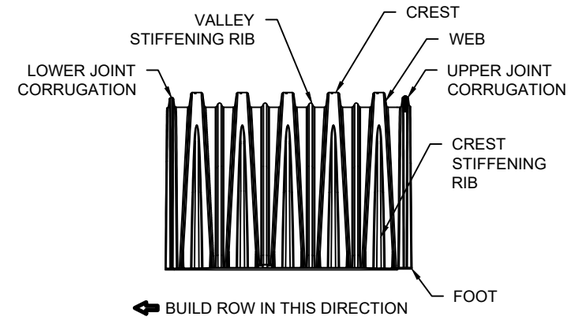
StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

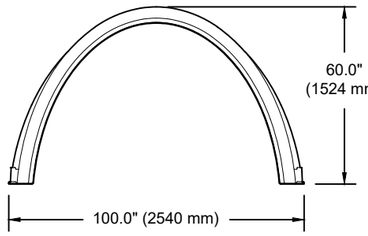
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

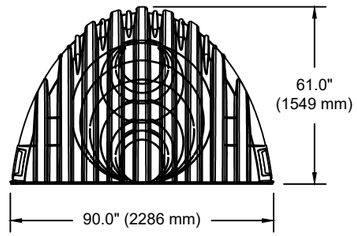
MC-7200 TECHNICAL SPECIFICATION

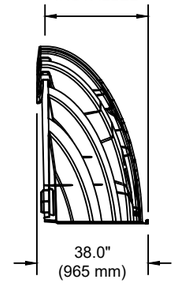
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 79.1"	(2540 mm X 1524 mm X 2010 mm)
CHAMBER STORAGE	175.9 CUBIC FEET	(4.98 m³)
MINIMUM INSTALLED STORAGE*	267.3 CUBIC FEET	(7.56 m³)
WEIGHT (NOMINAL)	205 lbs.	(92.9 kg)

NOMINAL END CAP SPECIFICATIONS

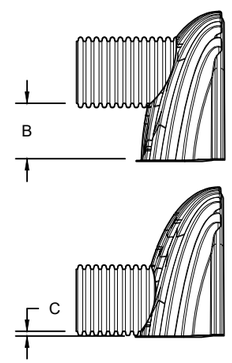
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC7200IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC7200IEPP06B		---	0.86" (22 mm)
MC7200IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC7200IEPP08B		---	1.01" (26 mm)
MC7200IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC7200IEPP10B		---	1.33" (34 mm)
MC7200IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC7200IEPP12B		---	1.55" (39 mm)
MC7200IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC7200IEPP15B		---	1.70" (43 mm)
MC7200IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC7200IEPP18TW			
MC7200IEPP18B		---	1.97" (50 mm)
MC7200IEPP18BW			
MC7200IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC7200IEPP24TW			
MC7200IEPP24B		---	2.26" (57 mm)
MC7200IEPP24BW			
MC7200IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC7200IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC7200IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

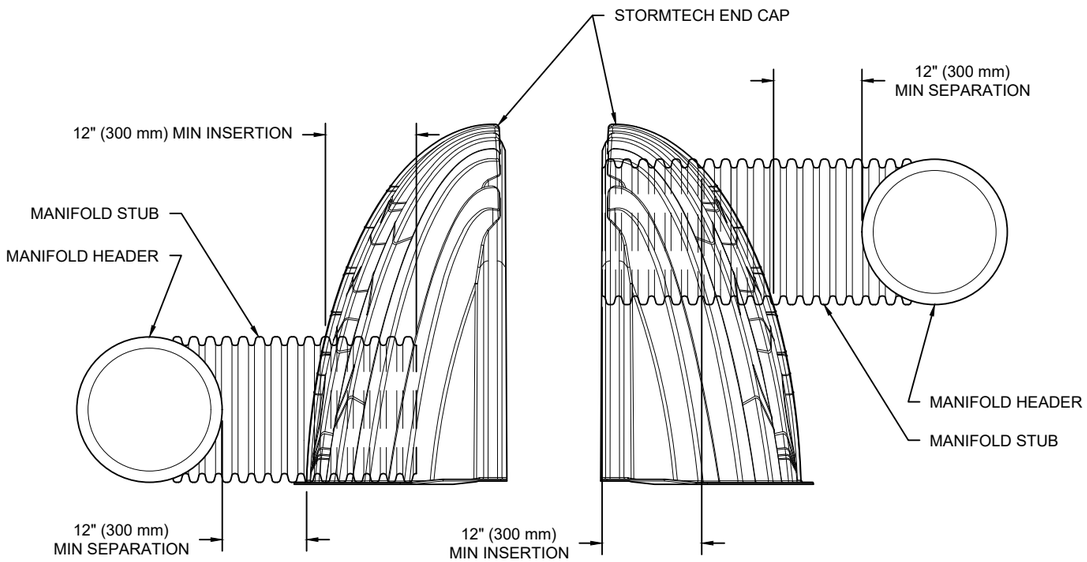
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-7200 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

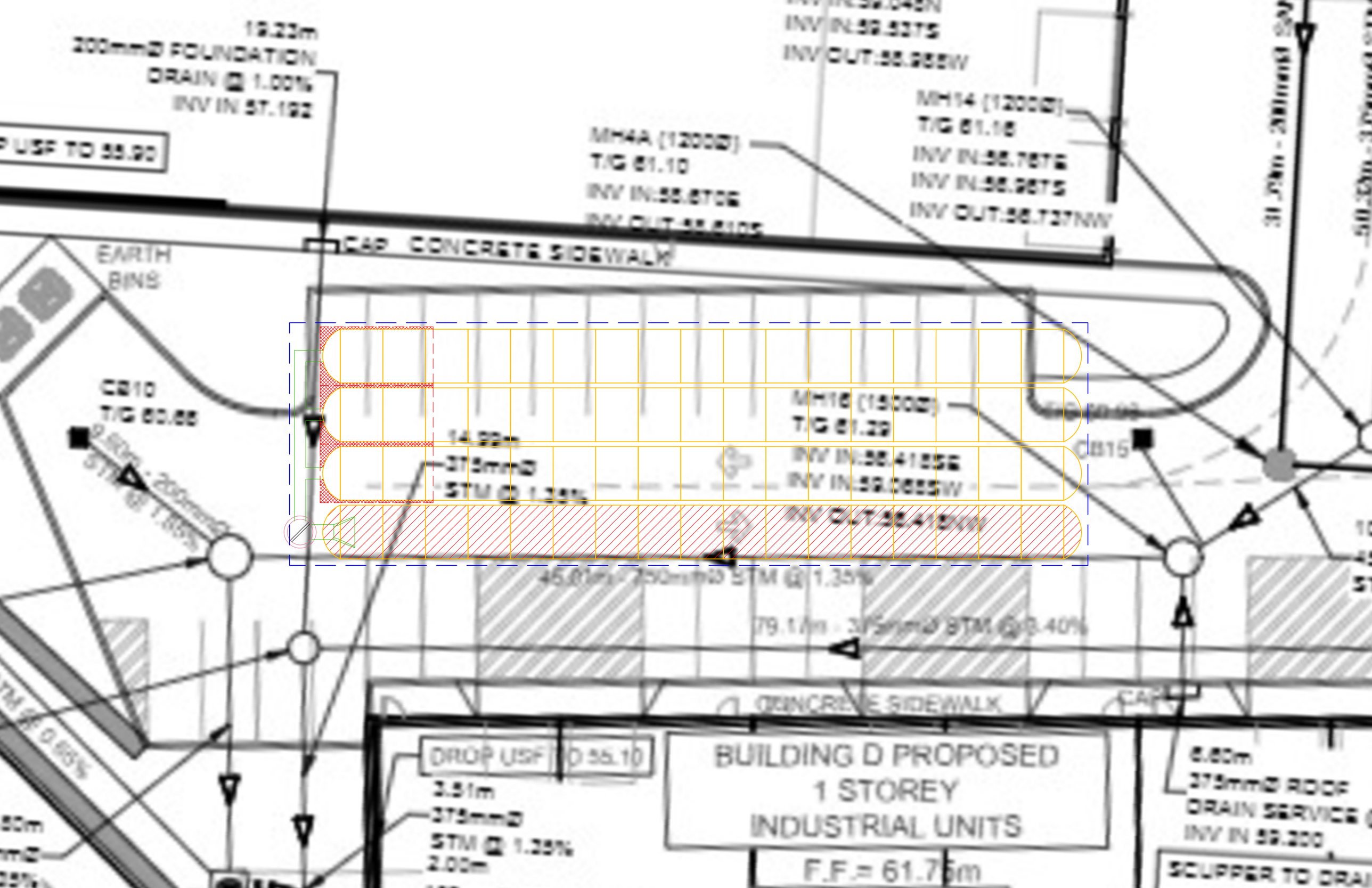
DD - SUB 3 - PARKING
OTTAWA, ON, CANADA
DATE: 09/24/2024 | DRAWN: AB | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

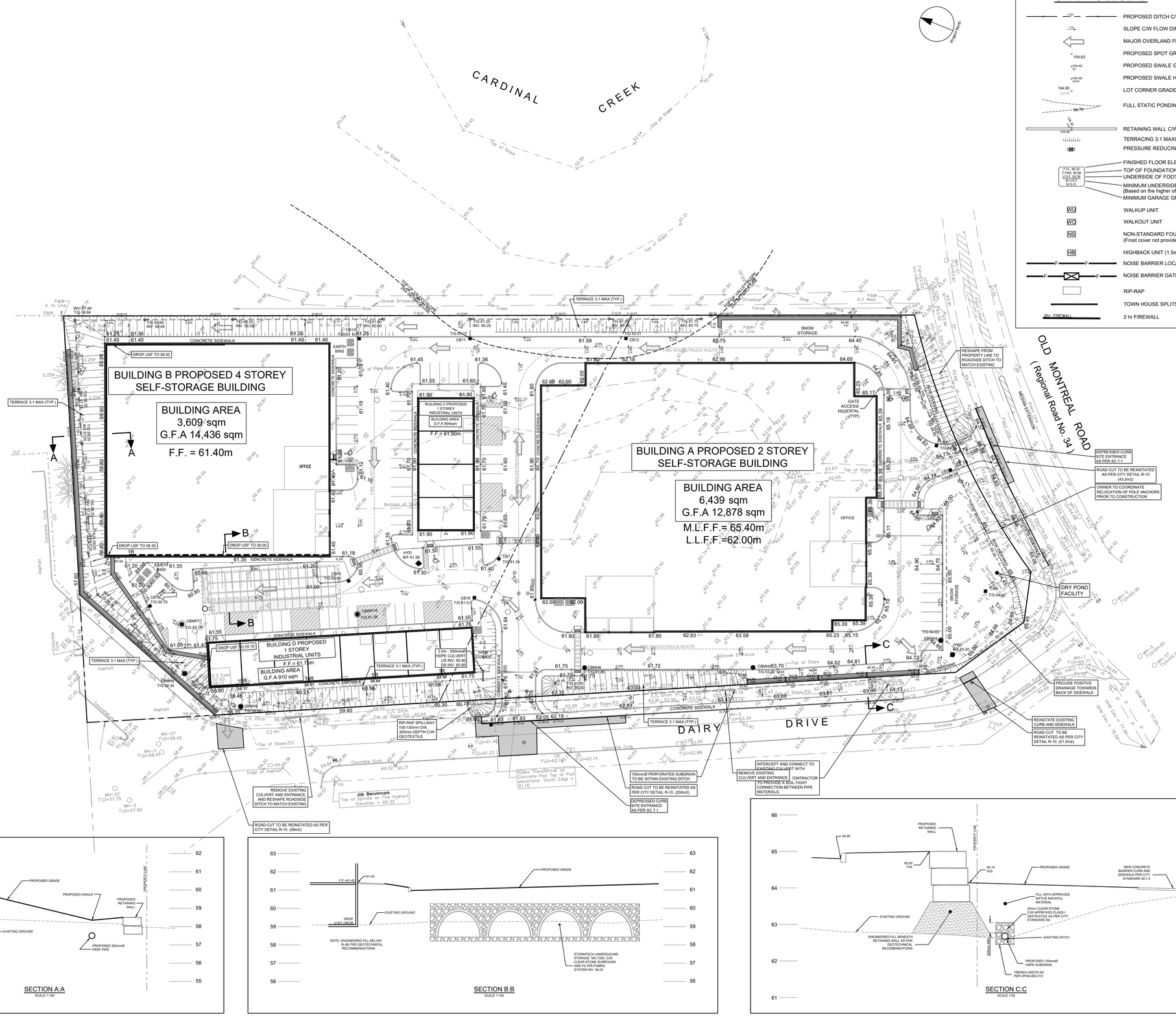
SHEET
5 OF 5


19.23m
200mmØ FOUNDATION
DRAIN @ 1.00%
INV IN 57.192
P USF TO 55.90
MH4A (1200Ø)
T/G 61.10
INV IN:55.870S
INV OUT:55.610S
MH14 (1200Ø)
T/G 61.16
INV IN:55.787S
INV IN:55.987S
INV OUT:55.737NW
INV IN:56.045N
INV IN:56.537S
INV OUT:56.955W
CAP CONCRETE SIDEWALK
EARTH
BINS
CB10
T/G 60.66
MH16 (1800Ø)
T/G 61.29
INV IN:56.415S
INV IN:56.665W
INV OUT:56.415NW
CB15
14.22m
375mmØ
STM @ 1.35%
45.01m - 250mmØ STM @ 1.35%
79.17m - 375mmØ STM @ 0.40%
CONCRETE SIDEWALK
CAP
DROP USF TO 55.10
3.51m
375mmØ
STM @ 1.35%
2.00m
BUILDING D PROPOSED
1 STOREY
INDUSTRIAL UNITS
F.F.= 61.75m
6.60m
375mmØ ROOF
DRAIN SERVICE
INV IN 59.200
SCUPPER TO DRAI

Appendix E

Grading Plan 142817-C-200

Erosion and Sediment Control Plan 142817-C-900



GRADING LEGEND

- PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
- SLOPE C/W FLOW DIRECTION
- MAJOR OVERLAND FLOW ROUTE
- PROPOSED SPOT GRADE
- PROPOSED SWALE GRADE
- PROPOSED SWALE HIGH POINT GRADE
- LOT CORNER GRADE C/W EXISTING GRADE
- FULL STATIC PONDING GRADE
- RETAINING WALL C/W TOP OF WALL AND GRASS GRADE
- TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
- PRESSURE REDUCING VALVE
- FINISHED FLOOR ELEVATION
- TOP OF FOUNDATION ELEVATION
- UNDERSIDE OF FOOTING ELEVATION
- MINIMUM UNDERSIDE OF FOOTING (Based on the higher of the sewer obverts, or hydraulic grade line)
- MINIMUM GARAGE GRADE
- WALKUP UNIT
- WALKOUT UNIT
- NON-STANDARD FOUNDATION (Frost cover not provided for standard unit)
- HIGHBACK UNIT (1.5m frost cover on footings)
- NOISE BARRIER LOCATION
- NOISE BARRIER GATE
- RIP-RAP
- TOWN HOUSE SPLITS
- 2 hr FIREWALL

CLIENT

TSL DAIRY INC.

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2024-02-14
2	SUBMISSION NO. 2 FOR CITY REVIEW	2024-06-27
3	SUBMISSION NO. 3 FOR CITY REVIEW	2024-10-04
4	SUBMISSION NO. 3 FOR CITY REVIEW	2025-06-25
5		
6		

SEE 010, FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
L.I.D. #S. Yannoulopoulos
2025/06/25
PROVINCE OF ONTARIO

PRIME CONSULTANT
ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

1015 DAIRY DRIVE

1015 DAIRY DRIVE

PROJECT NO: 142817	
DRAWN BY: **M.M./A.B.**	CHECKED BY: **R.M./D.Y.**
PROJECT MGR: **R.M.**	APPROVED BY: **D.Y.**

SHEET TITLE

GRADING PLAN

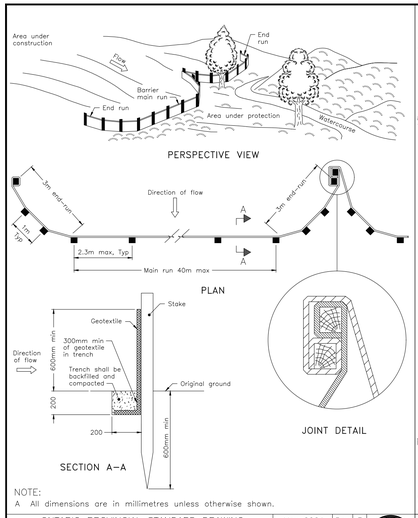
SHEET NUMBER **C-200**

ISSUE **4**

SCALE CHECK 1 in XXXXX 12mm

File Location: J:\142817_1015_Dairy_DI\7.0_Production\7.03_Design\04_Civil\Sheets\C-200 GRADING.dwg Last Saved: June 25, 2025, by slumia.Don Plotted: June 25, 2025 5:24:55 PM by Slumia, Don

D07-12-13-0249

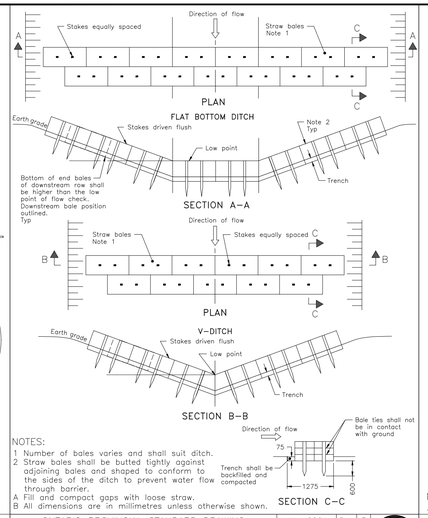


NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2021 | Rev 3

LIGHT–DUTY
SILT FENCE BARRIER

OPSD 219.110

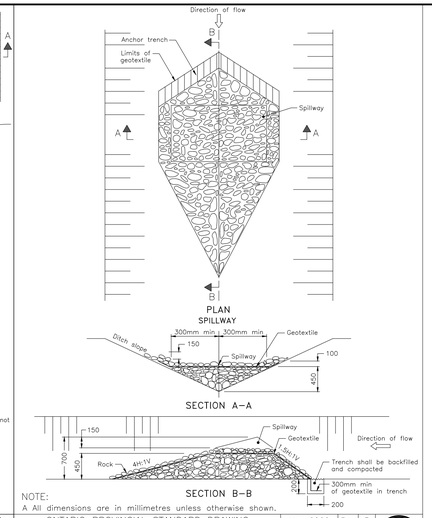


NOTES:
1 Number of bales varies and shall suit ditch.
2 Straw bales shall be butted tightly against adjoining bales and shaped to conform to the sides of the ditch to prevent water flow through barrier.
A Fill and compact gaps with loose straw.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2021 | Rev 3

STRAW BALE FLOW CHECK DAM

OPSD 219.180



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2022 | Rev 3

TEMPORARY
ROCK FLOW CHECK DAM
V–DITCH

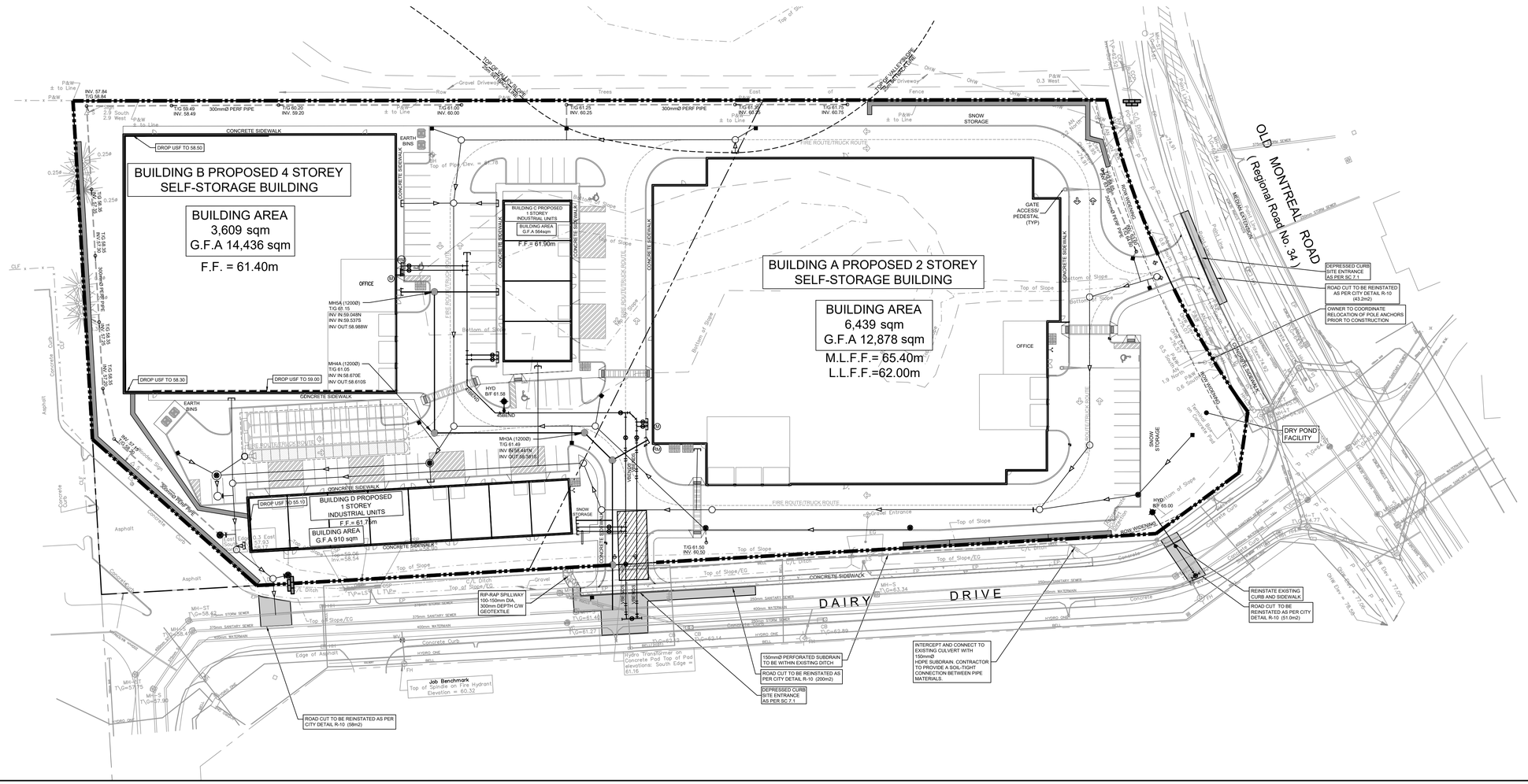
OPSD 219.210

NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY,
2. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
3. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
4. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
5. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
6. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
7. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
8. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT

LEGEND:

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (15.0)



CLIENT

TSL DAIRY INC.

Arcadis Professional Services (Canada) Inc.
formerly IBI Group Professional Services (Canada) Inc

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PROJECT MGR: **R.M.**	APPROVED BY: **D.Y.**

SHEET TITLE

EROSION AND SEDIMENT CONTROL PLAN

SHEET NUMBER **C-900** | ISSUE **4**

SCALE CHECK 1 in XXXXX 50mm

D07-12-13-0249

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