FUNCTIONAL SERVICING REPORT

HUMBER STATION DISTRIBUTION CENTRE

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR:

PROLOGIS

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

NOVEMBER 2024

CFCA FILE NO. 0624-6777

CROZIER

Revision Number	Date	Comments
Rev.0	November 22, 2024	Issued for SPA Submission 1B

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Prologis to prepare a Functional Servicing Report to support the Site Plan Application for a proposed Industrial development located at 12519-12713 Humber Station Road within the Humber Station Employment Area in the Town of Caledon (the Property). This report demonstrates how the proposed development's functional servicing will conform with the requirements of the Town of Caledon (Town) and Region of Peel (Region).

This report has been prepared to document details associated with the servicing strategy for the proposed development. Contained in this report is a description of the Subject Property (Section 2.0); the proposed water servicing strategy (Section 3.0); proposed sanitary servicing strategy (Section 4.0); the proposed stormwater servicing strategy (Section 5.0); proposed grading and road access (Section 6.0); a summary of erosion and sediment control (ESC) measures during construction (Section 7.0); and conclusions and recommendations (Section 8.0). Details regarding the stormwater management design are captured under the "Stormwater Management Implementation Report" prepared by Crozier dated November 2024 under a separate cover.

2.0 Background

2.1 Existing Conditions

The property encompasses an area of approximately 78.5 ha and currently consists of agricultural lands. The property lies within the approved Regional Official Plan Amendment (ROPA) 30 Bolton Expansion Area, referred to as "Option 6", which formally designates the lands within the Bolton Rural Service Centre area. The property is bound by Humber Station Road to the west, agricultural land to the north and south, and existing industrial facilities to the east.

An existing tributary known as the Clarkway Drive Tributary runs north-south along the east property line. A second tributary known as the Goreway Road Tributary Reach 1 runs north-south, west of Humber Station Road. An existing headwater drainage feature (HDF-3) extends from the north to the southwest area of the property, connecting to an existing wetland, with an existing natural pond area. This HDF will be re-aligned through a proposed channel, to be designed and constructed by others. Refer to the Humber Station Comprehensive Environmental Impact Study and Management Plan prepared by GEI dated July 2024.

2.2 Proposed Conditions

The proposed development will ultimately consist of six slab-on grade buildings (Buildings 1 to 6), at-grade asphalt parking and loading areas, access driveways, and landscaped areas. The development will be constructed in phases, including Phase 1A, Phase 1B, and Phase 2. Refer to Figures 1 and 2 for the delineation of these areas. This report focuses on the detailed design of Phase 1A within the property, with consideration for the Phase 1B area from a functional servicing perspective. Phase 1A occupies approximately 33.99 ha of the property, and Phase 1B occupies approximately 29.16 ha of the property.

Phase 1A of the proposed development as outlined in the Site Plan prepared by Petroff Partnership Architects (Petroff), November 14, 2024, includes the development of a 1-storey industrial Building (Building 1) located on the northeast side of the property. The total gross area for Building 1 is 143,222 m^2. The Phase 1A area will also include loading docks on the east and west sides of the building, trailer parking on the east and west property limits, an internal drive aisle that wraps around the extents of the building, and a passenger vehicle parking lot south of the building. Access for passenger vehicles and trucks is proposed via two driveway accesses to a proposed 'Street A' (designed by others) which will run east-west through the property area connecting Phase 1A to Humber Station Road.

Phase 1B of the development includes the development of three smaller 1-storey industrial buildings (Buildings 2, 3 and 4), located on the northwest side of the property. The total gross building area for Phase 1B will be approximately 108,600 m^2. The concept plan for Phase 2 of the development will be determined through a subsequent submission.

The following sections of this report outline the servicing strategy for Phase 1A of the development, with consideration for Phase 1B.

2.3 Related Studies & Reports

This report has been completed in accordance with the guidelines, standards, and policies of the Town of Caledon, Peel Region, and TRCA. The relevant background studies and reports include:

- Ministry of Environment (MOE) Stormwater Management Planning and Design Manual, dated March 2003
- Town of Caledon Development Standards Manual (2019)
- Region of Peel Public Works Watermain Design Criteria Manual (June 2010)
- Region of Peel Public Works Sanitary Sewer Design Criteria Manual (July 2009)
- Region of Peel Public Works Stormwater Design Criteria Manual (June 2019)
- Master Site Plan (Petroff, November 2024)
- Topographic Survey (David B. Searles Surveying Ltd., April 2022)
- Humber Station – Comprehensive Environmental Impact Study and Management Plan (July 2024)

3.0 Water Services

The Region of Peel is responsible for the operation and maintenance of the public water system in the Town of Caledon, and any local system connecting to this public system. The following sections outline the existing and proposed design of water servicing.

The existing and future municipal domestic and fire-fighting water supply infrastructure surrounding the property includes:

- An existing 200 mm diameter watermain within Humber Station Road (PP04-D, Region of Peel, December 2022)

- A future 400 mm diameter watermain within Humber Station Road (PP04-D, Region of Peel, December 2022)

- A future 300 mm diameter watermain within 'Street A' (designed by others)

3.1 Proposed Water Demands

Region of Peel Watermain Design Criteria was referenced to calculate water demands for the Phase 1A and 1B areas of the development. An average water demand of 300 L/capita/day was used in conjunction with a population density of 70 persons/ha for industrial sites. The table below summarizes the water demands.

Table 1: Domestic Water Demands

Phase	Building	Area (ha)	Building Gross Floor Area (ha)	Equivalent Population	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Peak Hourly Demand (L/s)
1A	1	33.99	14.32	1003	3.48	4.87	10.44
1B	2	5.69	3.15	220	0.77	1.07	2.30
	3	5.69	2.79	195	0.68	0.95	2.03
	4	10.92	4.92	344	1.20	1.67	3.59
Total		**56.29**	**14.32**	**1762**	**6.12**	**8.57**	**18.36**

As shown in the table above, the total peak hourly demand for Phase 1A is 10.44 L/s, for Phase 1B is 7.92 L/s, and for the total Phase 1 area is 18.36 L/s.

Refer to Appendix A for the detailed domestic water demand calculations and for the Region's Demand table which summarize the Phase 1A proposed domestic demand.

3.2 Fire Flow Demand

Fire Underwriters Survey (FUS, 2020) criteria was used to estimate fire flow demands for the proposed building in Phase 1A, and the three proposed buildings in Phase 1B. Estimated flows are based on the total building floor areas, one-storey building equivalents, non-combustible construction type, free burning content, automated sprinkler system, and distances to adjacent buildings. The required fire flows per FUS 2020 guidelines are presented in Table 2.

Table 2: Fire Water Demands

Phase	Building	Building Gross Floor Area (ha)	Required Fire Flow (L/s)	Duration (hr)
1A	1	14.32	316.67	4.5
1B	2	3.15	316.67	4.5
	3	2.79	316.67	4.5
	4	4.92	316.67	4.5

The required fire flow for each of the proposed buildings in the Phase 1A and 1B areas is 316.67 L/s. The maximum day demand plus fire protection required for Building 1 is 321.54 L/s, for Building 2 is 317.74 L/s, for Building 3 is 317.62 L/s, and for Building 4 is 318.34. Refer to Appendix A for FUS fire flow calculations.

As the proposed development's watermain system will connect to a future watermain proposed and constructed by Peel Region. It is our understanding that the Region will review and comment on the proposed domestic and fire water demands from the proposed development.

3.3 Proposed Water Servicing

The Phase 1A building is proposed to be serviced by a 300 mm diameter PVC watermain for fire and a 150 mm watermain for domestic flows. The proposed 300 mm diameter fire water line will connect to the proposed 300 mm watermain in 'Street A' (designed by others) and will tee off internal to the Phase 1A area for the 150 mm diameter domestic water line per Region of Peel standard 1-8-6. The 150 mm diameter domestic water line will tie directly into the building to service the proposed offices, and the 300 mm diameter fire water line will be looped around the proposed building to service the building and the fire hydrants. Note that a detector check valve in chamber will be placed on the 300 mm fire line and a water meter will be placed in the water meter room located at the south end of the building.

The Phase 1B area will be fed by the proposed 400 mm diameter watermain within Humber Station Road. Buildings 2 and 3 have frontage directly to Humber Station Road and will be serviced by a fire water line that connects directly to the proposed 400 mm diameter watermain on Humber Station Road. Building 4 will be serviced by a fire water line that is connected to the proposed 300 mm diameter watermain within 'Street A' (designed by others). Both the fire water line proposed to service Buildings 2 and 3, and the fire water line proposed to service Building 4 will tee off to domestic water lines that tie directly into the proposed buildings. Sizing for the proposed fire and domestic water lines for the Phase 1B area will be completed at the detailed design stage for Phase 1B.

Refer to Drawing C200 for the overall water servicing strategy for Phase 1A, and Drawings C201 to C208 for the detailed water servicing strategy for Phase 1A. Refer to Figure 1 in this report for a depiction of the high-level water servicing strategy for the entirety of Phase 1 including Phase 1B.

4.0 Sanitary Servicing

The Region of Peel is responsible for the operation and maintenance of the public sewage collection and treatment systems in the Town of Caledon, and any local sewage system that connects to this public system.

4.1 Existing Sanitary System

The municipal sanitary infrastructure surrounding the property includes:

- A proposed 1200 mm diameter sanitary sewer on Humber Station Road (PP04-D, Region of Peel, December 2022)
- A proposed 250 mm diameter sanitary sewer within 'Street A' (to be designed by others)

4.2 Design Sanitary Demand

To estimate the sanitary design flows from the proposed development, the Region of Peel Design Standards were referenced. The calculated design flows are based on the building areas provided on the Site Plan by Petroff. A summary of the calculated design flows is shown in the following table and detailed calculations are provided in Appendix B.

Table 3: Proposed Sanitary Flows

Phase	Building	Equivalent population	Average Daily Flow (L/s)	Peak Factor	Peak Daily Flow (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)
1A	1	1003	3.51	3.80	13.35	6.80	20.15
1B	2	220	0.77	4.00	3.09	1.14	4.23
	3	195	0.68	4.00	2.74	1.14	3.87
	4	344	1.21	4.00	4.83	2.18	7.01
Total		**1762**	**6.17**	**-**	**24.00**	**11.26**	**35.26**

The total sanitary design flow for the Phase 1A area is 20.15 L/s, and for the Phase 1B area is 15.11 L/s. The total sanitary design flow for the total Phase 1 area is 35.26 L/s.

Refer to Appendix B for the detailed sanitary demand calculations and the Region's Demand table which summarize the proposed sanitary demand.

4.3 Proposed Sanitary Servicing

Sanitary servicing for Phase 1A will be achieved via a 250 mm diameter gravity sanitary sewer system that collects sanitary flows from various points along the proposed building. The 250 mm diameter sanitary sewer system internal to the Phase 1A area will drain to the proposed 250 mm diameter sanitary sewer within 'Street A' (designed by others). Refer to Drawing C123 for the sanitary sewer drainage plan and Appendix B sanitary sewer design sheet.

Sanitary flows from Phase 1B will be discharged through two different systems, both ultimately discharging to the proposed 1200 mm diameter sanitary sewer on Humber Station Road. Sanitary flows from Buildings 2 and 3 will be conveyed through a gravity sanitary sewer system designed for both buildings and will drain directly to the proposed 1200 mm diameter sanitary sewer on Humber Station Road. Sanitary flows from Building 4 will be conveyed through a sanitary sewer system that will drain to the proposed 250 mm diameter sanitary sewer within 'Street A' (designed by others). Sizing for the sanitary sewer systems for Phase 1B will be completed at the detailed design stage for Phase 1B.

Refer to Drawing C200 for the overall sanitary servicing strategy for Phase 1A and Drawings C201 to C208 for the detailed sanitary servicing for Phase 1A. Refer to Figure 1 for the high-level sanitary servicing strategy for the entirety of Phase 1, including Phase 1B.

5.0 Stormwater Servicing

The proposed storm drainage design for the Phase 1A area is detailed in the Stormwater Management Implementation Report, prepared by Crozier in November 2024. The proposed stormwater management strategy has been prepared in accordance with the quantity, quality, and water balance requirements of the Town, Region, and TRCA. Refer to the Stormwater Management Implementation Report (under separate cover) for details.

5.1 Existing Drainage Conditions

The property is located in a rural area of the West Humber Watershed (sub-basin 36) and is bordered by industrial lands to the east. Under existing conditions, the property consists primarily of agricultural fields with residential dwellings fronting Humber Station Road.

Based on the topographic survey, the property drainage is delineated into three separate drainage patterns. The center area of the property drains south to the existing HDF-8. The east area of the property drains east through the existing east wetland, and outlets to the Clarkway Drive Tributary. The northwest area of the property drains west through the existing culvert under Humber Station Road, and outlets to the Goreway Road Tributary reach 1. The southwest area of the property drains south to the existing HDF-3, the west wetland, and the roadside ditch along Humber Station Road.

5.2 Proposed Storm Sewer System

The proposed stormwater management strategy for the Phase 1A area of the property includes the use of underground detention tanks, surface ponding, and a temporary stormwater management pond located on the Phase 2 lands to provide stormwater quantity control. Storm sewers internal to the Phase 1A area will capture and convey the 100-year storm event from the drive aisle, loading docks, and parking areas, such that the 100-year storm event can be controlled and stored within the underground stormwater storage tanks, with some surface ponding for only the 100-year storm event.

Rooftop runoff from catchments C201R, C202R and C203R will be conveyed to open-infiltration tanks located within the proposed trailer parking on the east side of the building. Rooftop runoff from catchment C204R will be controlled on the building rooftop and routed directly to an underground detention tank. Catchments C205R and C206R will be conveyed to open-bottom infiltration tanks within the proposed drive aisle on the west side of the building. Overflow from the infiltration tanks is proposed to be directed to the proposed detention tanks. Refer to the Post Development Drainage plan C121.

Figure 1 illustrates the general stormwater sewer design for Phase 1, with the detailed storm sewer system layout for Phase 1A shown on Drawings C201 to C208. Refer to Drawing C122 for the storm sewer design sheet.

Quality control requirements will be achieved through the proposed temporary stormwater management pond, which has a TSS removal rate of 80%. Further details are provided in the Stormwater Management Implementation Report prepared by Crozier in November 2024.

The proposed stormwater management strategy for the Phase 1B area of the property will include the use of underground detention tanks for stormwater quantity control. Stormwater from Phase 1B will ultimately outlet to the realigned channel that runs through the property. The detailed design for stormwater management for Phase 1B will be described further in a subsequent submission.

6.0 Grading

The grading of the Phase 1A area of the property will be governed by the overall storm drainage system for the proposed development, with consideration of the following:

- Provide safe overland conveyance of emergency flows exceeding the capacity of the storm sewer system to the proposed 'Street A' right-of-way.
- Match existing grades along property limits, and future grades at 'Street A', and realigned channel limits.
- Maintain minimum cover requirements over storm sewers, sanitary sewers, and watermains, while considering the ground water elevations of the property.
- Satisfy the Town's requirement for containing stormwater flows within the property, while ensuring a maximum of 0.3 m of emergency stormwater ponding at low points.

Based on review of the existing topographic survey, the property generally falls from north to south. The proposed grading strategy for Phase 1A will match this existing drainage condition, with the emergency overland flow route directing drainage to the south to the proposed Street A right-of-way. Existing elevations will be matched at the north, east, and south part of the west Phase 1A limits, utilizing 3:1 sloping to match existing grades. The north part of the west Phase 1A limit will match the proposed top of channel elevations for the realigned channel west of the Phase 1A area through the use of a retaining wall. The south Phase 1A limit will match the proposed elevations at the limit of Street A, through the use of 3:1 sloping within the proposed landscape buffer.

The proposed loading docks on either side of the proposed building will slope away from the building at a 1.0% slope. The proposed trailer parking along the east and west Phase 1A limit will be sloped at 0.5% from the property lines towards the internal drive aisle. Due to the significant size of the building footprint, the proposed grading strategy uses "sawtooth grading". Low points at 237.22 and high points at 237.43 are proposed along the length of the building on both the east and west sides. Drainage will be contained within the drive aisle, as the minimum top of curb elevations at the back of the trailer parking stalls are 237.62, and the spill elevations at the south end of the Phase 1A area are 237.45. Building 1 has a proposed finished floor elevation of 239.00.

The grading design for Phase 1B will maintain the grading strategy for Phase 1A, matching existing elevations at the property lines where possible, and proposed elevations around the proposed realigned channel and 'Street A' (designed by others). Emergency overland flow will be directed to Humber Station Road and 'Street A', and emergency ponding over low points will be less than 0.3 m. Detailed grading for the Phase 1B area will be provided in a subsequent application.

Refer to Figure 2 for the overall grading design for Phase 1, and Drawings C301 to C308 for the detailed grading design for Phase 1A.

7.0 Erosion & Sediment Control During Construction

Erosion and sediment controls will be installed prior to the commencement of any construction activities and will be maintained until the property is stabilized or as directed by the Site Engineer and/or the City, Region, and the TRCA. The Removals and Erosion & Sediment Control Plans (Drawing C801 and C802) identify the location of the recommended control features. Controls will be inspected each week and after each significant rainfall events and maintained in proper working condition.

ESC measures will be applied to Phase 1A and Phase 1B with two (2) stages. Stage 1 is topsoil stripping, and Stage 2 is channel realignment and pre-grade. Assuming Street A is pre-graded, there will be one construction access from Humber Station Road. Drawings C801 and C802 show the topsoil stripping and mass grading of Phase 1A only within the 10m Pre-Grading Setback provided by Palmer. Detailed ESC measures, topsoil removal and mass grading plans for Phase 1B will be provided at detailed design stage of Phase 1B.

The following sediment and erosion controls will be included during construction on the property:

Heavy Duty Silt Fencing

Heavy duty silt fence will be installed surrounding the perimeter of the area where pre-grading will occur to intercept sheet flow. Additional silt fence may be added based on field decisions by the Site Engineer and Owner, prior to, during and following construction.

Mud Mat

Mud mats will be installed at the construction entrances to prevent mud tracking from the property onto the surrounding lands and perimeter roadway network. All construction traffic will be restricted to this access only.

Interceptor Swale with Rock Check Dam

Interceptor swales utilize the existing drainage features on the property. These conveyance systems collect and convey runoff to the downstream sediment control pond. The rock check dams are designed to reduce velocities within the swales to prevent channel erosion.

Temporary Sediment Control Ponds

Temporary sediment control ponds will be implemented during construction to promote settling of suspended sediment particles and to prevent erosion.

A Grading Permit set has been issued to the Town of Caledon including the ESC drawings C801 and C802 which outline the topsoil management, pre-grade design and erosion and sediment control measures. A temporary pond is located on Phase 2 lands south of the proposed ‘Street A’ which ultimately discharges to HDF-8. The temporary pond is designed in a manner to receive flows during the topsoil removal stage and pre-grading phase. Refer to drawings C801 and C802 for additional details.

8.0 Conclusions and Recommendations

We conclude that the proposed development of the subject property can be readily serviced from a functional servicing perspective. The proposed civil engineering servicing design outlined in this report can meet the objectives of the regulatory agencies and will be subject to further detailed design.

Based on the information contained in this report, we offer the following conclusions:

1. Domestic water and fire flows will be provided for the Phase 1A area of the property by a proposed 150 mm diameter domestic line and 300 mm diameter fire line that are proposed to connect to the proposed 300 mm watermain within 'Street A' (designed by others) which will ultimately connect to the proposed 400 mm diameter watermain within Humber Station Road. The peak domestic water demand for Phase 1A is 10.44 L/s and the maximum fire flow requirement is 316.67 L/s.

2. Sanitary servicing for Phase 1A will discharge to the proposed 250 mm diameter sanitary sewer within 'Street A' (designed by others), before ultimately discharging to the proposed 1200 mm diameter sanitary sewer on Humber Station Road. The peak sanitary demand for the Phase 1A is 20.15 L/s.

3. The proposed stormwater management strategy for the Phase 1A area includes the use of rooftop storage, underground stormwater detention tanks, infiltration tanks, a temporary stormwater management pond. Storm sewers internal to the Phase 1A area will capture and convey the 100-year storm event. Refer to the Stormwater Management Implementation Report prepared by Crozier dated November 2024 under a separate cover for details.

4. Grading will be governed by the overall drainage system for the proposed development, while matching into existing elevations at the north, east, and south part of the west Phase 1A limits, and matching into future elevations at the north part of the west Phase 1A limit and south Phase 1A limit.

Based on the conclusions provided, the property can be serviced according to Town of Caledon and Region of Peel requirements. We recommend approval of the Site Plan Application for the proposed development from the perspective of functional servicing requirements. If you have any questions about this report, please call us.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

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LE:KW/stm:tc

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APPENDIX A

Water Demand Calculations

Project: Humber Station | **Design:** L.E. | **Date:** 2024-03-18
Project No.: 0624-6777 | **Check:** K.W./M.I. | **Updated:** 2024-11-20

Water Demand - Building - 1

Block Area	33.99	ha
Building Area	14.32	ha
Population Density	70	persons/ha
Population	1,003	persons

Design Criteria:

Average Daily Demand:	300	L/employee.day
Maximum Daily Demand Peaking Factor:	1.40	-
Peak Hourly Demand Peaking Factor:	3.00	-

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Watermain Design Criteria (June 2010)

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 1 shown on the Site Plan prepared by Petroff Partnership Architects

Domestic Water Demand:

Average Daily Demand:	300766	L/day
	3.48	L/s
Maximum Daily Demand:	421073	L/day
	4.87	L/s
Peak Hourly Demand:	902299	L/day
	10.44	L/s

Water Demand - Building - 2

Block Area	5.69	ha
Building Area	3.15	ha
Population Density	70	persons/ha
Population	220	persons

Design Criteria:

Average Daily Demand:	300	L/employee.day
Maximum Daily Demand Peaking Factor:	1.40	-
Peak Hourly Demand Peaking Factor:	3.00	-

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Watermain Design Criteria (June 2010)

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 2 shown on the Site Plan prepared by Petroff Partnership Architects

Domestic Water Demand:

Average Daily Demand:	66128	L/day
	0.77	L/s
Maximum Daily Demand:	92579	L/day
	1.07	L/s
Peak Hourly Demand:	198384	L/day
	2.30	L/s

Water Demand - Building - 3

Block Area	5.69	ha
Building Area	2.79	ha
Population Density	70	persons/ha
Population	195	persons

Design Criteria:

Average Daily Demand:	300	L/employee.day
Maximum Daily Demand Peaking Factor:	1.40	-
Peak Hourly Demand Peaking Factor:	3.00	-

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Watermain Design Criteria (June 2010)

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 3 shown on the Site Plan prepared by Petroff Partnership Architects

Domestic Water Demand:

Average Daily Demand:	58556	L/day
	0.68	L/s
Maximum Daily Demand:	81978	L/day
	0.95	L/s
Peak Hourly Demand:	175668	L/day
	2.03	L/s

Water Demand - Building - 4

Block Area	10.92	ha
Building Area	4.92	ha
Population Density	70	persons/ha
Population	344	persons

Design Criteria:

Average Daily Demand:	300	L/employee.day
Maximum Daily Demand Peaking Factor:	1.40	-
Peak Hourly Demand Peaking Factor:	3.00	-

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Watermain Design Criteria (June 2010)

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 4 shown on the Site Plan prepared by Petroff Partnership Architects

Domestic Water Demand:

Average Daily Demand:	103284	L/day
	1.20	L/s
Maximum Daily Demand:	144598	L/day
	1.67	L/s
Peak Hourly Demand:	309852	L/day
	3.59	L/s

CROZIER & ASSOCIATES
Consulting Engineers

0624-6777 Humber Station
Water Demand - Phase 1

Date: 2024-03-18
Designed By: L.E.
Checked By: K.W./M.I.
Updated: 2024-11-20

Building	Equivalent Population	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
1	1003	3.48	4.87	10.44
2	220	0.77	1.07	2.30
3	195	0.68	0.95	2.03
4	344	1.20	1.67	3.59
Total	1762	6.12	8.57	18.36

CROZIER CONSULTING ENGINEERS

PROJECT: Humber Station
PROJECT NO.: 0624-6777

CREATED BY: K.W.
CHECKED BY: M.I.

DATE: 2024-03-18
UPDATED: 2024-11-20

Water Demand Table (Region of Peel)

Connection Demand Table - Phase 1a				
Water Connection				
Connection point				
Humber Station Road				
Pressure zone of connection point			N/A	
Total equivalent population to be serviced			1,003	persons
Total lands to be serviced (Phase 1a)			33.99	Ha
Hydrant flow test				
Hydrant flow test location:				
	N/A			
		Pressure (kPa)	Flow (in l/s)	Time
Humber Station Road				
Minimum water pressure				
Maximum water pressure				

No.	Water Demands			
		Demand (in l/s)		
	Demand Type	**Domestic**	**Use 2**	**Total**
1	Average day flow	3.48		3.48
2	Maximum day flow	4.87		4.87
3	Peak hour flow	10.44		10.44
4	Fire flow	316.67		316.67
Analysis				
5	Maximum day plus fire flow	321.54		321.54

WASTEWATER CONNECTION			
			Total
Connection Point	Sanitary Manhole 21A		
Total equivalent population to be serviced	1003		1003
Total lands to be serviced	33.99		33.99
6 Wastewater sewer effluent (in l/s)	20.15		20.15

1 Please refer to design criteria for population equivalencies
2 Please reference the Fire Underwriters Survey Document
3 Please specify the connection point ID
4 Please specify the connection point (wastewater line or manhole ID)
Also, the "total equivalent population to be serviced" and the "total lands to be serviced" should reference the connection point. (The FSR should contain one copy of Site Servicing Plan)
5 Please complete as many uses are necessary for the development
(Please specify each use)
6 A hydrant flow test will be conducted prior to detailed design

Please include the graphs associated with the hydrant flow test information table.
Please provide Professional Engineer's signature and stamp on the demand table.
All required calculations must be submitted with the demand table submission.

Humber Station Building 1
Fire Protection Volume Calculation
CFCA File: 624-6777

Date: 2024-11-20
Design: L.E.
Check: K.W./M.I.

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for Type V Wood Frame Construction
=	0.8	for Type IV-A Mass Timber Construction
=	0.9	for Type IV-B Mass Timber Construction
=	1.0	for Type IV-C Mass Timber Construction
=	1.5	for Type IV-D Mass Timber Construction
=	1.0	for Type III Ordinary Construction
=	0.8	for Type II Non-combustible Construction
=	0.6	for Type I Fire-Resistive constructio

A = The total floor area in square metres

Proposed Buildings

	GFA	143222 sq.m	100%
High Storey Building GFA equivalent		143222 sq.m	100% (refer to High One Storey Building in FUS 2020)
High Storey Building GFA equivalent		143222 sq.m	100% (refer to High One Storey Building in FUS 2020)
	Total Area =	429666.0 sq.m	

C = 1.0 Assume non-combustible construction (fully protected frame, floors, roof)

Therefore F = 30,000 L/min

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No Change)		

Rapid Burning	25% addition

7,500 L/min occupancy
37,500 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, building is assumed to have sprinkler protection (50% reduction),

-18,750 L/min reduction

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation		Charge	Separation	Charge
0 to 3 m	Max.	25%	20.1 to 30 m Max.	10%
3.1 to 10 m	Max.	20%	> 30m	0%
10.1 to 20 m	Max.	15%		

Per Table 6 "Exposure Adjustment Factors for Subject Building considering Construction Type of Exposed Building Face", the above table of exposure factors is the maximum to be used. The length to height ratio for the exposed wall on each side of the building, including the construction type of the exposed building, and whether or not the exposed building has protected openings, was taken into account for each wall of the proposed buildings, in addition to the distance between the subject building and the exposed building.

	Distance (m)	Length of Exposed Building Face	Height of exposed building in stories	Length-Height Ratio	Building Type	Protected Openings?	Exposure Charge	Surcharge
North	>30	-	-	-	-	-	0%	0.0
South	>30	-	-	-	-	-	0%	0.0
East	>30	-	-	-	-	-	0%	0.0
West	>30	-	-	-	-	-	0%	0.0
								0.0 L/min Surcharge

Determine Required Fire Flow

No.1	30,000			
No. 2	7,500	addition		
No. 3	-18,750	reduction		
No. 4	0	surcharge		
Required Flow:	**18,750**	**L/min**		
Rounded to nearest 1000 L/min:	**19,000**	**L/min**	or	316.67 L/s
				5,019 USGPM

Required Duration of Fire Flow	
Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Humber Station Building 2
Fire Protection Volume Calculation
CFCA File: 624-6777

Date: 2024-11-20
Design: L.E.
Check: K.W./M.I.

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for Type V Wood Frame Construction
=	0.8	for Type IV-A Mass Timber Construction
=	0.9	for Type IV-B Mass Timber Construction
=	1.0	for Type IV-C Mass Timber Construction
=	1.5	for Type IV-D Mass Timber Construction
=	1.0	for Type III Ordinary Construction
=	0.8	for Type II Non-combustible Construction
=	0.6	for Type I Fire-Resistive constructio

A = The total floor area in square metres

Proposed Buildings

GFA	31489.5 sq.m	100%
High Storey Building GFA equivalent	31489.5 sq.m	100% (refer to High One Storey Building in FUS 2020)
High Storey Building GFA equivalent	31489.5 sq.m	100% (refer to High One Storey Building in FUS 2020)
Total Area =	94468.5 sq.m	

C = 1.0 Assume non-combustible construction (fully protected frame, floors, roof)

Therefore F = 30,000 L/min

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No Change)		

Rapid Burning	25% addition

7,500 L/min addition
37,500 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, building is assumed to have sprinkler protection (50% reduction),

-18,750 L/min reduction

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation		Charge	Separation	Charge
0 to 3 m	Max.	25%	20.1 to 30 m Max.	10%
3.1 to 10 m	Max.	20%	> 30m	0%
10.1 to 20 m	Max.	15%		

Per Table 6 "Exposure Adjustment Factors for Subject Building considering Construction Type of Exposed Building Face", the above table of exposure factors is the maximum to be used. The length to height ratio for the exposed wall on each side of the building, including the construction type of the exposed building, and whether or not the exposed building has protected openings, was taken into account for each wall of the proposed buildings, in addition to the distance between the subject building and the exposed building.

	Distance (m)	Length of Exposed Building Face	Height of exposed building in stories	Length-Height Ratio	Building Type	Protected Openings?	Exposure Charge	Surcharge
North	>30	-	-	-	-	-	0%	0.0
South	>30	-	-	-	-	-	0%	0.0
East	>30	-	-	-	-	-	0%	0.0
West	>30	-	-	-	-	-	0%	0.0
								0.0 L/min Surcharge

Determine Required Fire Flow

No.1	30,000			
No. 2	7,500	addition		
No. 3	-18,750	reduction		
No. 4	0	surcharge		
Required Flow:	**18,750**	**L/min**		
Rounded to nearest 1000 L/min:	**19,000**	**L/min**	or	316.67 L/s
				5,019 USGPM

Required Duration of Fire Flow	
Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Humber Station Building 3
Fire Protection Volume Calculation
CFCA File: 624-6777

Date: 2024-11-20
Design: L.E.
Check: K.W./M.I.

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for Type V Wood Frame Construction
=	0.8	for Type IV-A Mass Timber Construction
=	0.9	for Type IV-B Mass Timber Construction
=	1.0	for Type IV-C Mass Timber Construction
=	1.5	for Type IV-D Mass Timber Construction
=	1.0	for Type III Ordinary Construction
=	0.8	for Type II Non-combustible Construction
=	0.6	for Type I Fire-Resistive constructio

A = The total floor area in square metres

Proposed Buildings

GFA	37833.8 sq.m	100%
High Storey Building GFA equivalent	37833.8 sq.m	100% (refer to High One Storey Building in FUS 2020)
High Storey Building GFA equivalent	37833.8 sq.m	100% (refer to High One Storey Building in FUS 2020)
Total Area =	113501.4 sq.m	

C = 1.0 Assume non-combustible construction (fully protected frame, floors, roof)

Therefore F = 30,000 L/min

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No Change)		

Rapid Burning	25% addition

7,500 L/min addition
37,500 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, building is assumed to have sprinkler protection (50% reduction),

-18,750 L/min reduction

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation		Charge	Separation	Charge
0 to 3 m	Max.	25%	20.1 to 30 m Max.	10%
3.1 to 10 m	Max.	20%	> 30m	0%
10.1 to 20 m	Max.	15%		

Per Table 6 "Exposure Adjustment Factors for Subject Building considering Construction Type of Exposed Building Face", the above table of exposure factors is the maximum to be used. The length to height ratio for the exposed wall on each side of the building, including the construction type of the exposed building, and whether or not the exposed building has protected openings, was taken into account for each wall of the proposed buildings, in addition to the distance between the subject building and the exposed building.

	Distance (m)	Length of Exposed Building Face	Height of exposed building in stories	Length-Height Ratio	Building Type	Protected Openings?	Exposure Charge	Surcharge
North	>30	-	-	-	-	-	0%	0.0
South	>30	-	-	-	-	-	0%	0.0
East	>30	-	-	-	-	-	0%	0.0
West	>30	-	-	-	-	-	0%	0.0
								0.0 L/min Surcharge

Determine Required Fire Flow

No.1	30,000			
No. 2	7,500	addition		
No. 3	-18,750	reduction		
No. 4	0	surcharge		
Required Flow:	**18,750**	**L/min**		
Rounded to nearest 1000 L/min:	**19,000**	**L/min**	or	316.67 L/s
				5,019 USGPM

Required Duration of Fire Flow	
Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Humber Station Building 4
Fire Protection Volume Calculation
CFCA File: 624-6777

Date: 2024-11-20
Design: L.E.
Check: K.W./M.I.

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for Type V Wood Frame Construction
=	0.8	for Type IV-A Mass Timber Construction
=	0.9	for Type IV-B Mass Timber Construction
=	1.0	for Type IV-C Mass Timber Construction
=	1.5	for Type IV-D Mass Timber Construction
=	1.0	for Type III Ordinary Construction
=	0.8	for Type II Non-combustible Construction
=	0.6	for Type I Fire-Resistive constructio

A = The total floor area in square metres

Proposed Buildings

GFA	49182.9 sq.m	100%
High Storey Building GFA equivalent	49182.9 sq.m	100% (refer to High One Storey Building in FUS 2020)
High Storey Building GFA equivalent	49182.9 sq.m	100% (refer to High One Storey Building in FUS 2020)
Total Area =	147548.7 sq.m	

C = 1.0 Assume non-combustible construction (fully protected frame, floors, roof)

Therefore F = 30,000 L/min

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No Change)		

Rapid Burning	25% addition

7,500 L/min addition
37,500 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, building is assumed to have sprinkler protection (50% reduction),

-18,750 L/min reduction

Water Supply for Public Fire Protection - 2020
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 30 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation		Charge	Separation	Charge
0 to 3 m	Max.	25%	20.1 to 30 m Max.	10%
3.1 to 10 m	Max.	20%	> 30m	0%
10.1 to 20 m	Max.	15%		

Per Table 6 "Exposure Adjustment Factors for Subject Building considering Construction Type of Exposed Building Face", the above table of exposure factors is the maximum to be used. The length to height ratio for the exposed wall on each side of the building, including the construction type of the exposed building, and whether or not the exposed building has protected openings, was taken into account for each wall of the proposed buildings, in addition to the distance between the subject building and the exposed building.

	Distance (m)	Length of Exposed Building Face	Height of exposed building in stories	Length-Height Ratio	Building Type	Protected Openings?	Exposure Charge	Surcharge
North	>30	-	-	-	-	-	0%	0.0
South	>30	-	-	-	-	-	0%	0.0
East	>30	-	-	-	-	-	0%	0.0
West	>30	-	-	-	-	-	0%	0.0
								0.0 L/min Surcharge

Determine Required Fire Flow

No.1	30,000			
No. 2	7,500	addition		
No. 3	-18,750	reduction		
No. 4	0	surcharge		
Required Flow:	**18,750**	**L/min**		
Rounded to nearest 1000 L/min:	**19,000**	**L/min**	or	316.67 L/s
				5,019 USGPM

Required Duration of Fire Flow	
Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Katrina Weel

From: Katrina Weel
Sent: April 19, 2024 1:36 PM
To: Katrina Weel
Subject: FW: Prologis - Humber Station - Concept Plan DBS FILE 19-22

Katrina Weel, EIT
Engineering Intern, Land Development
DID: 416.842.0026 | Cell: 416.420.9768

From: Rizalyn Corciega Bismonte <Rcorciega@petroff.com>
Sent: Wednesday, April 10, 2024 5:01 PM
To: Mena Iskander <miskander@cfcrozier.ca>
Cc: Jongmin Kim <Jkim@petroff.com>
Subject: RE: Prologis - Humber Station - Concept Plan DBS FILE 19-22

Hi Mena,

See architectural response below highlighted with RED text. Please let us know if you have any further questions.

Regards,

Rizalyn Corciega Bismonte
Senior Project Manager

P E T R O F F

260 Town Centre Blvd, Suite 300
Markham, Ontario
Canada L3R 8H8

t: 416-795-0317
rcorciega@petroff.com
www.petroff.com

From: Jongmin Kim <Jkim@petroff.com>
Sent: Tuesday, April 9, 2024 10:37 AM

To: Rizalyn Corciega Bismonte <Rcorciega@petroff.com>
Subject: FW: Prologis - Humber Station - Concept Plan DBS FILE 19-22

From: Mena Iskander <miskander@cfcrozier.ca>
Sent: Tuesday, April 9, 2024 10:31 AM
To: Jongmin Kim <Jkim@petroff.com>
Subject: RE: Prologis - Humber Station - Concept Plan DBS FILE 19-22

Good morning Jongmin,

To complete the fire flow calculations for this site, we require confirmation regarding the building construction type, vertical openings and firewalls, occupancy fire hazards, and sprinkler systems. If known, please provide answers to the following questions:

1. *What is the construction type of the proposed buildings as defined in the attached FUS document on pages 20 and 21?*
    a. *Type V Wood Frame Construction*
    b. *Type IV-A Mass Timber Construction (Encapsulated Mass Timber)*
    c. *Type IV-B Mass Timber Construction (Rated Mass Timber)*
    d. *Type IV-C Mass Timber Construction (Ordinary Mass Timber)*
    e. *Type IV-D Mass Timber Construction (Un-Rated Mass Timber)*
    f. *Type III Ordinary Construction (Jointed Masonry) >>> Type III, Precast concrete exterior walls, Non-rated roof*
    g. *Type II Non-Combustible Construction*
    h. *Type I Fire Resistance Construction*

2. *Do vertical openings (i.e. walls of masonry or other limited or non-combustible construction) have a fire resistance rating of at least 1 hour? >>> No – Shell Design Only in Current Scope*

3. *Do all vertical firewalls have a fire resistance rating of at least 2 hours and meet the requirements of the National Building Code? >>> No – Shell Design Only in Current Scope*

4. *What is the occupancy fire hazard for the buildings?*
    a. *Non-Combustible*
    b. *Limited Combustible*
    c. *Combustible*
    d. *Free Burning >>> Current design for F2 Warehouse (Med Hazard)*
    e. *Rapid Burning >>> Current design for F2 Warehouse (Med Hazard)*

    **Refer to Table 3: Recommended Occupancy/Contents Charges by Major Occupancy Examples in the attached FUS 2020 document for further clarification*

5. *Are there any sprinkler systems provided for the building? >>> Response below is based on previous Prologis projects*
    a. *If so, is it an automatic sprinkler protection design and installed in accordance with NFPA 13? >>> Yes*
    b. *Is the water supply standard for both the system and Fire Department hose lines? >>> Status of flow test pending*
    c. *Is it a fully supervised system? >>> Yes*

Attached is the Fire Underwriter's Survey (2020) which outlines the requirements and provides more detail for the questions above.

Thanks,

Mena

Mena Iskander, P.Eng.
Project Engineer, Land Development
Office: 416.868.5211
Collingwood | Milton | Toronto | Bradford | Guelph

Proudly named one of Canada's Top Small & Medium Employers for 2024. Read more here.

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APPENDIX B

Sanitary Flow Calculations

Proposed Sanitary Design Flow - Building 1

Block Area:	33.99	ha
Building GFA:	14.32	ha
Population Density:	70	persons/ha
Population*	1,003	persons

Design Criteria

Total Peak Flow = Average Daily Flow + Infiltration Allowance

Peak Factor =	3.8	Harmon Peaking Factor
Average Industrial Flow =	302.8	L/cap/d
Infiltration =	0.20	L/s/ha

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Sanitary Sewer Design Criteria (March 2017)

Sanitary Design Flow - Unit Sewage Flow Rate:

Average Daily Flow =	**3.51**	L/s
Peak Factor =	**3.80**	
Peak Daily Flow =	**13.35**	L/s
Infiltration Flow =	**6.80**	L/s
Total Peak Flow =	**20.15**	L/s

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 1 shown on the Site Plan prepared by Petroff Partnership Architects

Proposed Sanitary Design Flow - Building 2

Block Area:	5.69	ha
Building GFA:	3.15	ha
Population Density:	70	persons/ha
Population*	220	persons

Design Criteria

Total Peak Flow = Average Daily Flow + Infiltration Allowance

Peak Factor =	4.1	Harmon Peaking Factor
Average Industrial Flow =	302.8	L/cap/d
Infiltration =	0.20	L/s/ha

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Sanitary Sewer Design Criteria (March 2017)

Sanitary Design Flow - Unit Sewage Flow Rate:

Average Daily Flow =	**0.77**	L/s
Peak Factor =	**4.00**	
Peak Daily Flow =	**3.09**	L/s
Infiltration Flow =	**1.14**	L/s
Total Peak Flow =	**4.23**	L/s

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 1 shown on the Site Plan prepared by Petroff Partnership Architects

Proposed Sanitary Design Flow - Building 3

Block Area:	5.69	ha
Building GFA:	2.79	ha
Population Density:	70	persons/ha
Population*	195	persons

Design Criteria

Total Peak Flow = Average Daily Flow + Infiltration Allowance

Peak Factor =	4.2	Harmon Peaking Factor
Average Industrial Flow =	302.8	L/cap/d
Infiltration =	0.20	L/s/ha

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Sanitary Sewer Design Criteria (March 2017)

Sanitary Design Flow - Unit Sewage Flow Rate:

Average Daily Flow =	**0.68**	L/s
Peak Factor =	**4.00**	
Peak Daily Flow =	**2.74**	L/s
Infiltration Flow =	**1.14**	L/s
Total Peak Flow =	**3.87**	L/s

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 1 shown on the Site Plan prepared by Petroff Partnership Architects

Proposed Sanitary Design Flow - Building 4

Block Area:	10.92	ha
Building GFA:	4.92	ha
Population Density:	70	persons/ha
Population*	344	persons

Design Criteria

Total Peak Flow = Average Daily Flow + Infiltration Allowance

Peak Factor =	4.1	Harmon Peaking Factor
Average Industrial Flow =	302.8	L/cap/d
Infiltration =	0.20	L/s/ha

Region of Peel - Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Sanitary Sewer Design Criteria (March 2017)

Sanitary Design Flow - Unit Sewage Flow Rate:

Average Daily Flow =	**1.21**	L/s
Peak Factor =	**4.00**	
Peak Daily Flow =	**4.83**	L/s
Infiltration Flow =	**2.18**	L/s
Total Peak Flow =	**7.01**	L/s

*Population calculation is based on the total Gross Floor Area (GFA) of the proposed Building 1 shown on the Site Plan prepared by Petroff Partnership Architects

0624-6777 Humber Station
Proposed Sanitary Design Flow - Phase 1

Date: 2024-03-18
Designed By: L.E.
Checked By: K.W./M.I.
Updated: 2024-11-20

Building	Block Area	Building GFA	Equivalent Population	Peak Flow	Infiltration Flow	Total Flow	Outlet
	ha	ha		(L/s)	(L/s)	(L/s)	
1	33.99	14.32	1003	13.35	6.80	20.15	Humber Station Road
2	5.69	3.15	220	3.09	1.14	4.23	Humber Station Road
3	5.69	2.79	195	2.74	1.14	3.87	Humber Station Road
4	10.92	4.92	344	4.83	2.18	7.01	Humber Station Road
Total	**33.99**	**25.18**	**1762**	**24.00**	**11.26**	**35.26**	

Sanitary Sewer Design Sheet

CFCA File No.: 0624 - 6777

Regional File No.:

HUMBER STATION DISTRIBUTION CENTRE
TOWN OF CALEDON, Region of Peel

CROZIER CONSULTING ENGINEERS

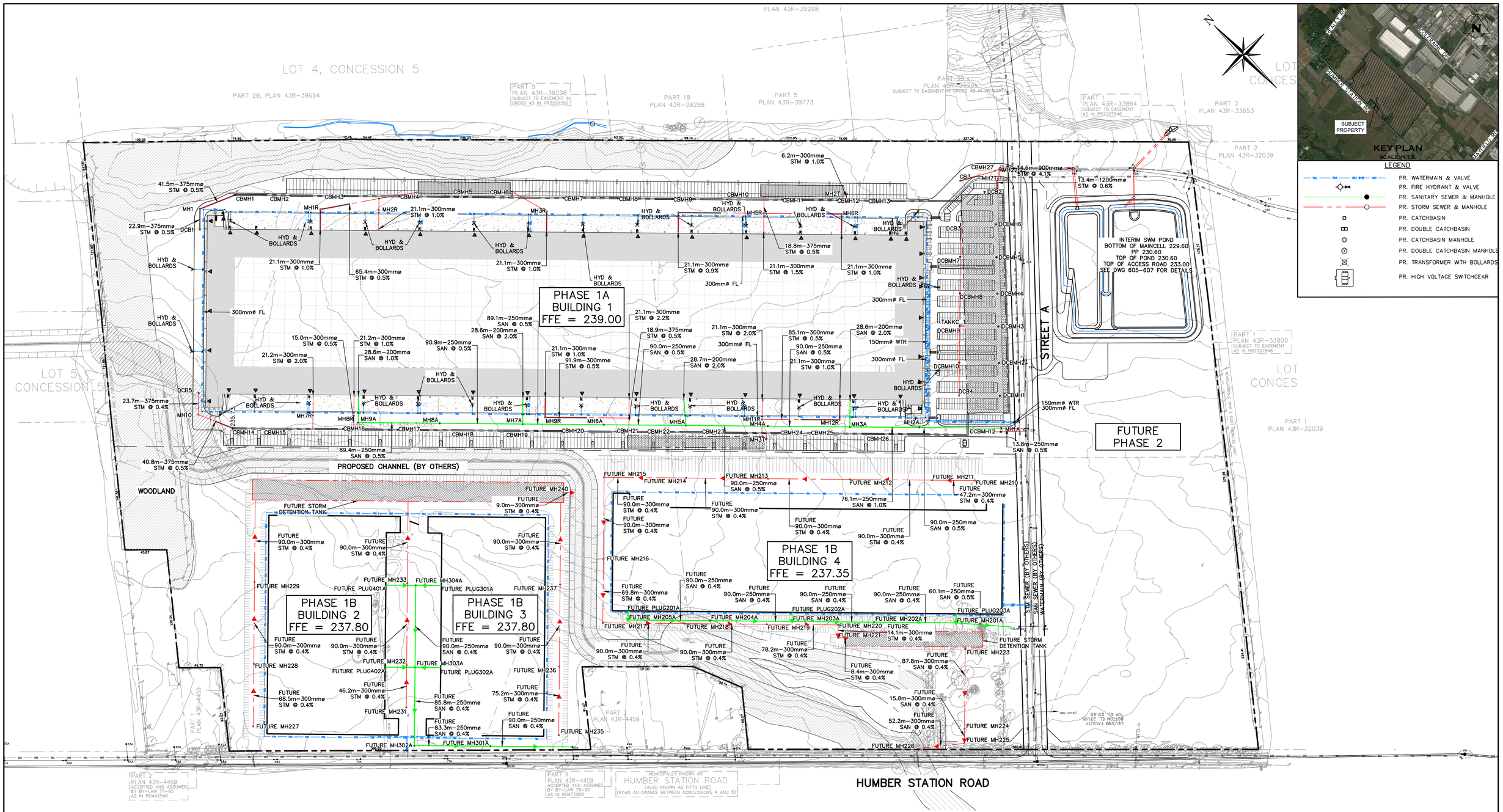
Manning's "n":	0.013
Peak Factor (M):	1+(14/(4+(P/1000)^0.5))
Industrial Avg. Daily/Capita Flow (L/cap.d):	302.8
Infiltration Q (L/ha.s):	0.2

Prepared by: KW
Checked by: MI
Date: 2024-11-20

CATCHMENT I.D.	FROM MH NO	TO MH NO	AREA[2] (Ha)	POP.[1]	TOTAL TRIB. POP.	PEAK FACTOR	AVG. FLOW (l/s)	MAX. FLOW (l/s)	INFILT. (l/s)	TOTAL INFILT. (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	PIPE DIAM. (mm)	SLOPE (%)	CAP. (l/s)	CAP. (%)	FULL FLOW VELOCITY (m/s)
1	PLUG1A	MH9A	3.58	251	251	4.11	0.88	3.61	6.80	6.80	**10.41**	28.6	200	1.00%	**32.80**	**31.74%**	1.04
	MH9A	MH8A		0	251	4.11	0.88	3.61	6.80	6.80	**10.41**	89.4	250	0.50%	**42.05**	**24.75%**	0.86
	MH8A	MH7A		0	251	4.11	0.88	3.61	6.80	6.80	**10.41**	90.9	250	0.50%	**42.05**	**24.75%**	0.86
2	PLUG2A	MH7A	3.58	251	501	3.97	1.76	6.98	6.80	6.80	**13.78**	28.6	200	2.00%	**46.38**	**29.71%**	1.48
	MH7A	MH6A		0	501	3.97	1.76	6.98	6.80	6.80	**13.78**	89.1	250	0.50%	**42.05**	**32.77%**	0.86
	MH6A	MH5A		0	501	3.97	1.76	6.98	6.80	6.80	**13.78**	90.0	250	0.50%	**42.05**	**32.77%**	0.86
3	PLUG3A	MH5A	3.58	251	752	3.88	2.64	10.21	6.80	6.80	**17.01**	28.7	200	2.00%	**46.38**	**36.68%**	1.48
	MH5A	MH4A		0	752	3.88	2.64	10.21	6.80	6.80	**17.01**	90.0	250	0.50%	**42.05**	**40.46%**	0.86
	MH4A	MH3A		0	752	3.88	2.64	10.21	6.80	6.80	**17.01**	90.0	250	0.50%	**42.05**	**40.46%**	0.86
4	PLUG4A	MH3A	3.58	251	1003	3.80	3.51	13.35	6.80	6.80	**20.15**	28.6	200	2.00%	**46.38**	**43.43%**	1.48
	MH3A	MH2A		0	1003	3.80	3.51	13.35	6.80	6.80	**20.15**	76.1	250	0.50%	**42.05**	**47.91%**	0.86
	MH2A	MH1A		0	1003	3.80	3.51	13.35	6.80	6.80	**20.15**	90.0	250	0.50%	**42.05**	**47.91%**	0.86
	MH1A	MH24A		0	1003	3.80	3.51	13.35	6.80	6.80	**20.15**	13.8	250	0.50%	**42.05**	**47.91%**	0.86
	MH24A	MH23A		0	1003	3.80	3.51	13.35	6.80	6.80	**20.15**	15.9	250	5.00%	**132.97**	**15.15%**	2.71

1. Note: Populations calculated based on 70 persons/ha [Region of Peel Public Works Design, Specifications & Procedures Manual - Linear Infrastructure Sanitary Sewer Design Criteria (March 2017) Section 2.1]
2. Sanitary Drainage Areas for each plug based on 25% of building area
3. Flow velocity to be within 0.75 m/s to 3.5 m/s per Region of Peel Sanitary Design Criteria (March 2017)

FIGURES



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TEMPORARY BENCHMARKS:

ELEVATION ARE REFERRED TO THE REGION OF PEEL BENCHMARK No. 40 LOCATED ON THE SOUTH FACE AT THE WEST CORNER OF SOUTH END OF A CONCRETE BOX CULVERT ACROSS MAYFIELD ROAD APPROXIMATELY 0.56 km EAST OF CLARKWAY DRIVE, HAVING AN ELEVATION OF 222.165 m. VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928 (1978 SOUTHERN ONTARIO READJUSTMENT)

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN PETROFF.
DRAWING No.: A100.0, DATED: 19/APR/2024
PROJECT No.: 22095.00

Town

No.	ISSUE	DATE: MMM/DD/YYYY
1B	ISSUED FOR SPA SUBMISSION 1B	NOV/22/2024

Engineer

Engineer

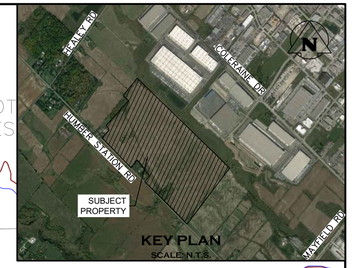
Project: HUMBER STATION DISTRIBUTION CENTRE
TOWN OF CALEDON

Drawing: PHASE 1 FUNCTIONAL SERVICING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	S.C./D.G.	Design By	S.C./H.L.
Check By	M.I./R.A.	Check By	M.I./R.A.

Project: 624-6777
Drawing: FIG1



WETLAND 30m BUFFER

PHASE 1

PHASE 1A
BUILDING 1
FFE = 239.00

PHASE 1B
BUILDING 2
FFE = 237.80

PHASE 1B
BUILDING 3
FFE = 237.80

PHASE 1B
BUILDING 4
FFE = 237.35

FUTURE
PHASE 2

PROPOSED CHANNEL (BY OTHERS)

WOODLAND

STREET A

HUMBER STATION ROAD

LOT 4, CONCESSION 5

LOT 5
CONCESSION 5

LOT 3

LOT 2
CONCESSION 5

PART 29, PLAN 43R-39651

PART 9
PLAN 43R-39298
SUBJECT TO EASEMENT IN GROSS AS IN PR3239292

PART 10
PLAN 43R-39298

PART 5
PLAN 43R-39273

PLAN 43R-39298
SUBJECT TO EASEMENT IN GROSS AS IN PR3606174

PART 1
PLAN 43R-33861
SUBJECT TO EASEMENT AS IN PR2007846

PART 3
PLAN 43R-33653

PART 2
PLAN 43R-32039

PART 1
PLAN 43R-33800
SUBJECT TO EASEMENT AS IN PR2007846

PART 1
PLAN 43R-32039

PART 1
PLAN 43R-31559

PART 1
PLAN 43R-4459

PART 3
PLAN 43R-4459

PART 2
PLAN 43R-4459
ACCEPTED AND ASSUMED BY BY-LAW 77-95
AS IN RO442546

PART 4
PLAN 43R-4459
ACCEPTED AND ASSUMED BY BY-LAW 78-50
AS IN RO475800

MUNICIPALLY KNOWN AS
HUMBER STATION ROAD
(ALSO KNOWN AS FIFTH LINE)
(ROAD ALLOWANCE BETWEEN CONCESSIONS 4 AND 5)

50 0m 50 100 150
SCALE: 1:2000

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PHASE 1 FUNCTIONAL GRADING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
S.C./D.G.	S.C./H.L.	624-6777
Check By	Check By	Drawing
M.I./R.A.	M.I./R.A.	FIG 2