

ISSUED:

January 29, 2025

189 Kearney Lake Road Development, Halifax, NS

Site Stormwater and Servicing Review

Dear Dean,

Fathom Studio carried out preliminary assessment of site stormwater management requirements and site servicing for the proposed development at 189 Kearney Lake Road. Existing servicing data was obtained from Halifax Water in the vicinity of the development and evaluated for its ability to accommodate the proposed development. An illustration of existing and proposed services are shown on the following page and are summarized in the discussions below.

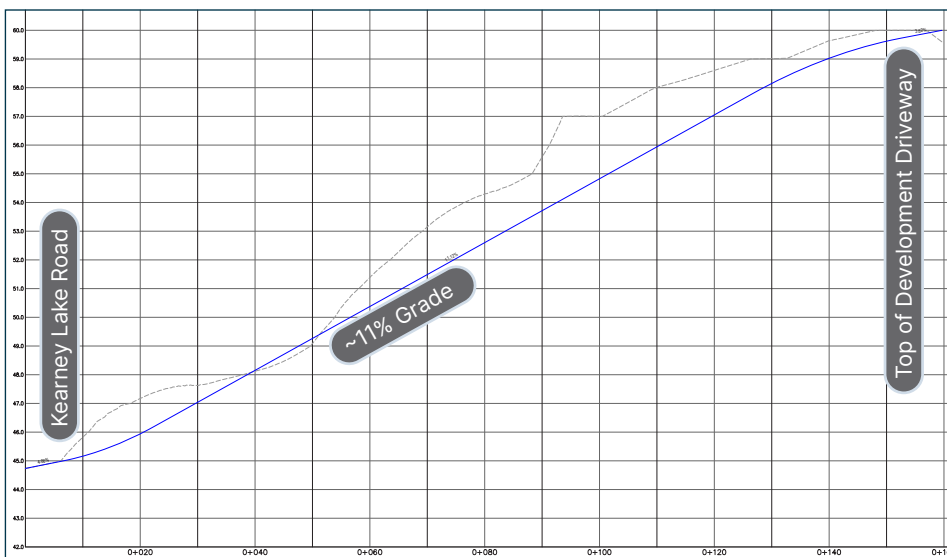
Servicing Schematic

Existing infrastructure along Kearney Lake Road includes sanitary (gravity and pressurized), water, and stormwater services.

Sanitary Services: The area is served by a 375mm diameter PVC sanitary main, along with four (4) forcemains originating from the 243 Kearney Lake Road pumping station. These forcemains consist of two (2) 600mm PVC pipes and two (2) 400mm ductile iron pipes. It is anticipated that the new multi-unit building will include a service connection along the new driveway down to Kearney Lake Road. As shown below, the driveway slope will be in the 10 - 12% range suggesting that some drop manholes may

be necessary to manage flow velocities. The 4 new houses along Kearney Lake Road are expected to have new direct services to the sanitary main along Kearney Lake Drive.

Water Services: The water distribution system includes a 400mm diameter ductile iron watermain. Two (2) fire hydrants are present—one located at the southwest corner of Kearney Lake Road and Hamshaw Drive intersection, and the other just south of the REgroup contractor site.



WATER CALCULATIONS:

Pre - Development Water Demands									
Building Type	Units	People	ICI (L/s)	Average Day Demand + ICI (L/s)	Max Day Demand + FF + ICI (L/s)	Max Hour Demand + ICI (L/s)	Min Hour Demand + ICI (L/s)	Design Flow (L/s)	Design Flow US GPM
Single Unit Dwelling	0	0	0.00	0.00	227.00	0.00	0.00	227.00	3,398.02

Post - Development Water Demands									
Building Type	Units	People	ICI (L/s)	Average Day Demand + ICI (L/s)	Max Day Demand + FF + ICI (L/s)	Max Hour Demand + ICI (L/s)	Min Hour Demand + ICI (L/s)	Design Flow (L/s)	Design Flow US GPM
Multi Unit Dwellings	98	221	0.00	0.96	228.24	2.89	0.80	228.24	3,617.74

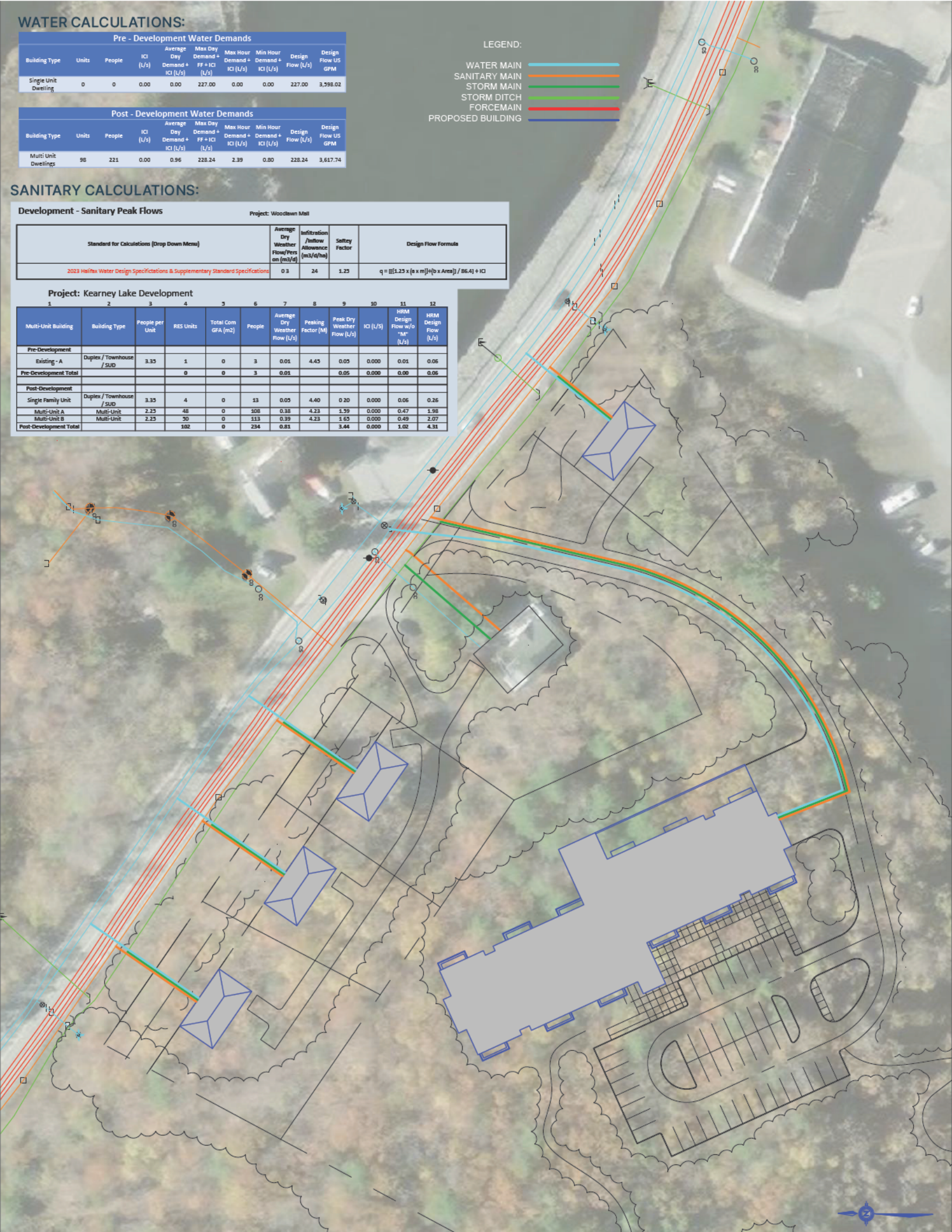
LEGEND:

WATER MAIN
SANITARY MAIN
STORM MAIN
STORM DITCH
FORCEMAIN
PROPOSED BUILDING

SANITARY CALCULATIONS:

Development - Sanitary Peak Flows				
Project: Woodlawn Mall				
Standard for Calculations (Drop Down Menu)	Average Dry Weather Flow/Person on (m3/d)	Infiltration /sofflow Allowance (m3/d/ha)	Safety Factor	Design Flow Formula
2023 Halifax Water Design Specifications & Supplementary Standard Specifications	0.3	24	1.25	$q = [(1.25 \times (p \times m)]H^0.75 \times Area / 36.4] + ICI$

Project: Kearney Lake Development											
1	2	3	4	5	6	7	8	9	10	11	12
Multi-Unit Building	Building Type	People per Unit	RES Units	Total Com GFA (m2)	People	Average Dry Weather Flow (L/s)	Peaking Factor (M)	Peak Dry Weather Flow (L/s)	ICI (L/s)	HRM Design Flow w/o "M" (L/s)	HRM Design Flow (L/s)
Pre-Development											
Existing - A	Duplex / Townhouse / SUD	3.35	1	0	3	0.01	4.45	0.05	0.000	0.01	0.06
Pre-Development Total			0	0	3	0.01		0.05	0.000	0.00	0.06
Post-Development											
Single Family Unit	Duplex / Townhouse / SUD	3.35	4	0	13	0.05	4.40	0.20	0.000	0.05	0.25
Multi-Unit A	Multi-Unit	2.25	48	0	108	0.38	4.23	1.59	0.000	0.47	1.98
Multi-Unit B	Multi-Unit	2.25	30	0	113	0.39	4.23	1.65	0.000	0.49	2.07
Post-Development Total			102	0	234	0.81		3.44	0.000	1.02	4.31



Water service connections are expected to parallel sanitary service down the driveway for the larger building and have new direct services connections between Kearney Lake Road and the 4 new houses. Due to the distance and grade of the new driveway, it is anticipated that a new private fire hydrant may be required on the new building site.

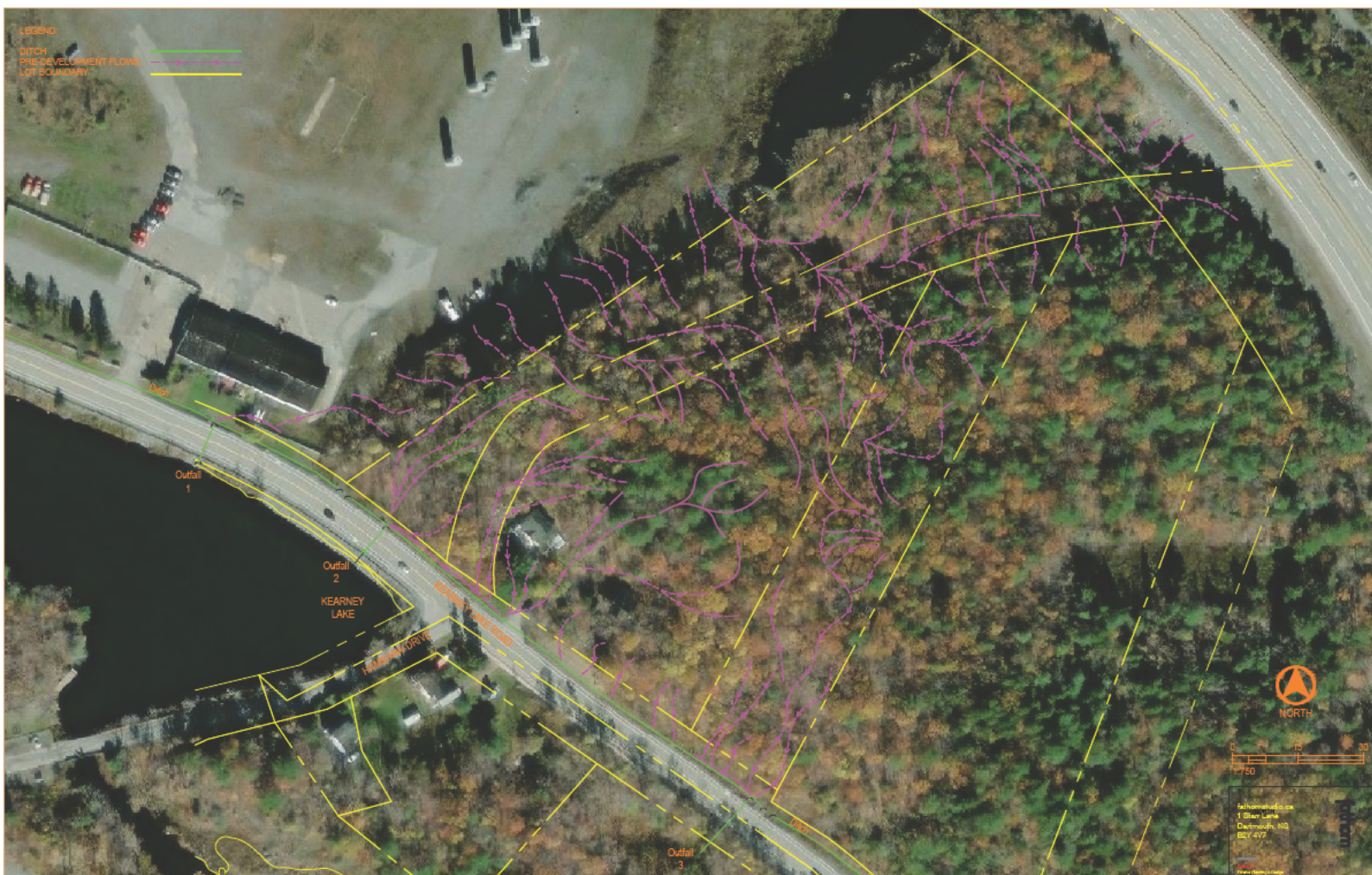
Stormwater Services: Stormwater management in the area consists of an existing roadside ditch, a stormwater headwall, and a 375mm concrete outfall pipe from the north side of Kearney Lake Road to Kearney Lake on the south side.

Stormwater Pre-Development Flows

The existing watershed surrounding the existing area is characterized by a forested landscape. As depicted in the accompanying figure, runoff from this area flows directly into the existing ditch situated along Kearney Lake Road. The development site exhibits three outfall points:

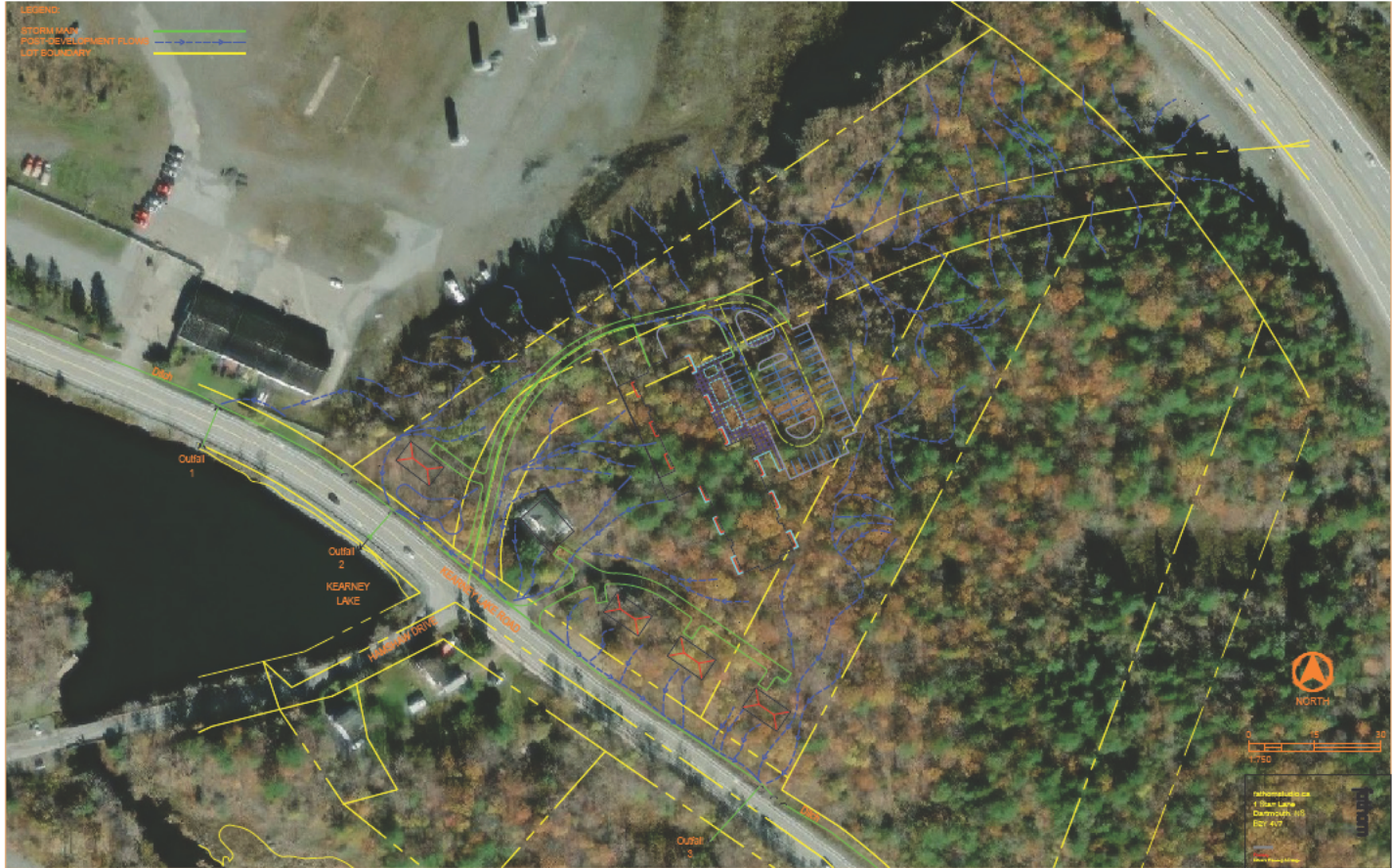
1. Located directly south of the REgroup contractor's premises.
2. Situated west of the intersection of Kearney Lake Road and Hamshaw Drive.
3. Positioned across Kearney Lake Road about 130 meters southeast of the development.

Prior to development, stormwater flow (illustrated by magenta lines on the figure) converges towards the existing stormwater ditch and subsequently discharges through the 375mm concrete pipe designated as outfall 2 & 3.



Stormwater Post-Development Flows

The watershed encompassing the proposed development site exhibits a mixed land cover, comprising both paved surfaces and forested areas. As illustrated in the accompanying figure above, stormwater flows (blue lines) from the development predominantly follows sheet flow patterns, directly converging onto paved surfaces and subsequently entering the existing stormwater system and ditch, which ultimately discharges into Kearney Lake. A small isolated low spot was identified just north of the proposed building which will require a small capture



area to ensure no stormwater migration to the adjacent REgroup property. This area will likely include some storage with overflow discharge to the piped network in the new buildings parking lot, and conveyance to Kearney Lake.

A preliminary assessment of stormwater runoff was conducted, covering the pre- and post-development scenarios for a range of storm events with return periods of 5, 10, 25, 50, and 100 years. This analysis was undertaken to evaluate the necessity for stormwater balancing measures and included a comprehensive set of evaluation parameters, including:

1. Surface runoff coefficients (C-values) specific to various project area surface types.
2. Catchment area delineations.
3. Time of concentration estimates for stormwater flow paths.
4. The most recent Intensity-Duration-Frequency (IDF) data as outlined in the Halifax Water Specifications.

Pre - Development Summary

Location	Flow (m ³ /s) 1:5	Flow (m ³ /s) 1:10	Flow (m ³ /s) 1:25	Flow (m ³ /s) 1:50	Flow (m ³ /s) 1:100
Sewer Shed 1	0.072	0.083	0.096	0.107	0.115

Post - Development Summary

Location	Flow (m ³ /s) 1:5	Flow (m ³ /s) 1:10	Flow (m ³ /s) 1:25	Flow (m ³ /s) 1:50	Flow (m ³ /s) 1:100
Sewer Shed 1	0.097	0.117	0.134	0.148	0.164

The difference in pre- and post-development flows will be managed on site using a number of stormwater managements features that include:

- The rear stormwater retention area size appropriate to manage the majority of additional stormwater flows, including the first 10% on-site retention requirements,
- Parking area surface storage as required for major storm events,
- Building rooftop storage, if required,
- Overland flow path along the development driveway for major storm events, and
- Stormwater diversion from the new driveway to an energy dissipation discharge point prior to entering the ditched network along Kearney Lake Road to prevent damage or erosion from concentrated stormwater runoff.

Conclusions and Discussion

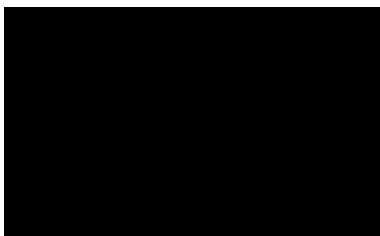
This Servicing Schematic provides an overview of the existing infrastructure within the Kearney Lake Road area, including sanitary, water, and stormwater services. The existing system comprises gravity sanitary mains, a water distribution network, and a stormwater drainage system that discharges into Kearney Lake.

The proposed development will introduce minor modifications to the existing stormwater runoff patterns. A preliminary assessment indicates that the anticipated increase in runoff volume following development can be adequately managed on-site.

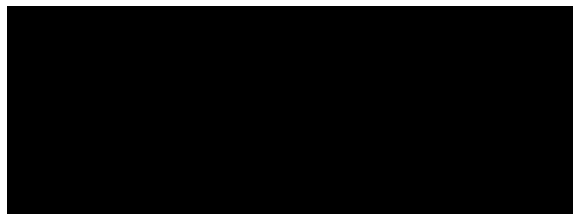
This analysis provides a foundational understanding of the existing site conditions and serves as a basis for further detailed engineering and design considerations for the proposed development.

Should there be any questions or comments regarding the content of this review, please don't hesitate to get in touch.

Sincerely,



Civil Engineering Technologist (pending)
Roel@Trans4m.ca



Roger N. Boychuk, P. Eng.

Senior Infrastructure Engineer
roger.boychuk@fathomstudio.ca