



November 24, 2022

Our File: 219112

Ron Davidson Land Use Planning Consultant Inc.  
265 Beattie Street  
Owen Sound, ON  
N4K 6X2

Attention: Mr. Ron Davidson

Re: Hydrogeological Review and Impact Assessment  
for Proposed Sydenham Square Development  
2275 -16<sup>th</sup> Street East, Owen Sound

Dear Ron,

This letter report provides a Hydrogeological Review in relation to the proposed Sydenham Square Development located at the municipal address of 2275 16<sup>th</sup> Street East, Owen Sound. In particular, this report provides a review of the hydrogeologic conditions and potential impacts to a seep area identified in the watercourse that crosses the site as part of the Natural Heritage Environmental Impact Study completed by Aquatic Wildlife Services (AWS) and dated April, 2021, hereafter referred to as the EIS. The EIS provides a 120 m radius around the seep feature identified within the tributary to Bothwell Creek and provides the following recommendation:

*Any site development or site alterations within this Constraint Zone must demonstrate no adverse changes to groundwater flow patterns or impairment to the springs discharge waters for quantity and/or quality (including thermal).*

Figure 9 from the EIS has been enclosed and shows the seep feature, as well as the 120 m Constraint Zone.

This hydrogeological review was completed to assess the potential impacts of the proposed development within the 120 m constraint zone identified in the EIS.

### **Development Overview**

The proposed development consists of residential and commercial spaces. The northern portion of the site is to be developed with four (4) buildings for commercial spaces with a central parking lot. The southern and eastern portions of the lot is proposed to consist of three (3) residential multi-unit residential buildings and one (1) commercial building based on the most recent conceptual site plan supplied to GMBP by G.M. Diemert Architect Inc. Parking is proposed in the basement level of the residential buildings as well as on the westerly side of the buildings. A naturalized development buffer along the east and south, between tributary to Bothwell Creek and the development of approximately 50 m (or more) is to be maintained. The Conceptual Development Plan is enclosed.

A Servicing Feasibility Study (GM BluePlan Engineering, November 2022) was completed to develop the stormwater management servicing options for the site. Under existing conditions, the 2.46 ha property is undeveloped and has generally pervious ground cover with the exception of the buildings. The northwesterly corner of the property is elevated such that all run off from the subject property drains easterly to the Rail Trail and then northerly towards the West branch of the Bothwell Creek watershed.

Under Post Development conditions, the 2.46 ha subject property is proposed with six (6) buildings. The parking/driving areas around the buildings and at the centre of the site will be mostly paved. With the increase in the imperviousness, the runoff draining easterly towards the tributary to Bothwell Creek greatly increases. To attenuate the increased runoff to the allowable release rates, a large stone storage gallery is proposed to be installed under the middle of the parking area. In addition, Rooftop ponding is also to be utilized on top of the three (3) easterly residential buildings. The two catchments in-between the residential buildings will also drain to small attenuation ponds to mitigate and achieve the desired flow before final discharge at these two (2) main outlet locations. By direction all surface runoff to a subsurface stone storage gallery, runoff that may have been heated from the asphalt surface will be cooled down prior to draining to the watercourse.

An emergency overland flow route is proposed within the South Easterly and North Easterly corners of the parking area. This will permit runoff to spill from the parking area before the parking lot ponding depth exceeds 0.3m.

An oil/grit separator (OGS) unit is proposed to be installed upstream of the outlets from the subject property. This OGS unit will provide storm water quality treatment for runoff from a majority of the site prior to discharging to the tributary of Bothwell Creek.

### **Hydrogeologic Setting**

A site-specific Geotechnical Investigation completed with boreholes, testholes, and the installation of monitoring wells has been completed (*Geotechnical Investigation Telfer Creek Square*, GM BluePlan Engineering, April 2021). Additionally, GM BluePlan has been involved with several construction projects and studies in the area, including the Trunk Sanitary Sewer that is oriented south-north along the rail trail, directly east of the property. The Hydrogeologic setting is established from this combined information.

The “Physiography of Southern Ontario”, Chapman and Putnam, 1985, identifies the Study Area as being within the “Shale Plains” of the Cape Rich Steps, along a former beach ridge, with a few drumlins. The Shale Plains are described as having minimal overburden underlain by grey-brown dolostone bedrock of the Lower Silurian-Fossil Hill formation. The Quaternary Geology of Canada Mapping (Map 2556) indicates that the soil within the area consists predominantly of moderately stony, calcareous clayey silt till. Based on the “Soils of Grey County”, Soil Survey Report No. 17, local area soils are Vincent series; described as fine textured limestone till comprised of stony silty clay loam with good drainage.

A brief review of MOECC Well Records was conducted to get a sense of the overburden soils and depth to bedrock in the area. Based on that review, the overburden soils are described as 0.3m to 5.4 m of clay with gravel and boulders, near 16<sup>th</sup> Street East; thickening to 9m to 15m south-westerly toward Superior Street. The clay till is reported to be underlain by layers of grey limestone, blue shale and red shale. Based on the well records, the bedrock elevation in the study area is generally consistent, in the range of 210 m asl.

Boreholes and excavations along the boreholes found a consistent occurrence of a low permeability stiff clay/silt till. Water management during excavation of deep trenches did not require notable dewatering, or was managed with small sump pumps. On-site the geotechnical study found similar conditions.

At the subject property, a surficial layer of black topsoil and organic material was encountered across the site at depths of 0.2m to 0.4m. The topsoil was underlain by a clayey silt with varying amounts of sand and gravel with a thickness of approximately 1.2 m to 2.8 m. Beneath the silty clay soils was a sandy silt with a little clay and no gravel and then deeper was a clayey silt till.

The shallow groundwater table is inferred to be associated with the elevation of the tributary to Bothwell Creek. Based on the monitoring completed in the area, the base flow in the tributary and Bothwell Creek appears to be controlled primarily by low levels of groundwater seepage along its length, in combination with storage in the peripheral low-lying wet areas adjacent to the creek and in larger wetland areas.

### **Impact Assessment**

Based on this review, the proposed development within the Constraint Zone is not expected to cause impacts to the identified seep feature (quality, thermal, or quantity). Based on our review, the seep feature is controlled by the overall, or broader shallow groundwater system. No impacts to the tributary to Bothwell Creek and the associated seep are expected for the following reasons:

- The proposed development that includes for a 50 m naturalized setback from the Creek and Seep feature that allows for continued groundwater infiltration and vegetative protection,
- The proposed stormwater management system that:
  - Maintains flows towards the Bothwell Creek drainage system,
  - Includes for stone galleries to promote infiltration,
  - Has water quality controls including an Oil Grit separator,
  - Includes continued run-off and ground flows towards the tributary through the buffer area.
- The overall groundwater elevations in the area (beyond the development area) are not expected to be influenced and thus the seepage feature will remain pre- to post- development.

Therefore, it is our opinion that the proposed development (as described herein) within the constraint zone will not cause impact and may proceed.

Yours truly,

**GM BLUEPLAN ENGINEERING LIMITED**

Per:

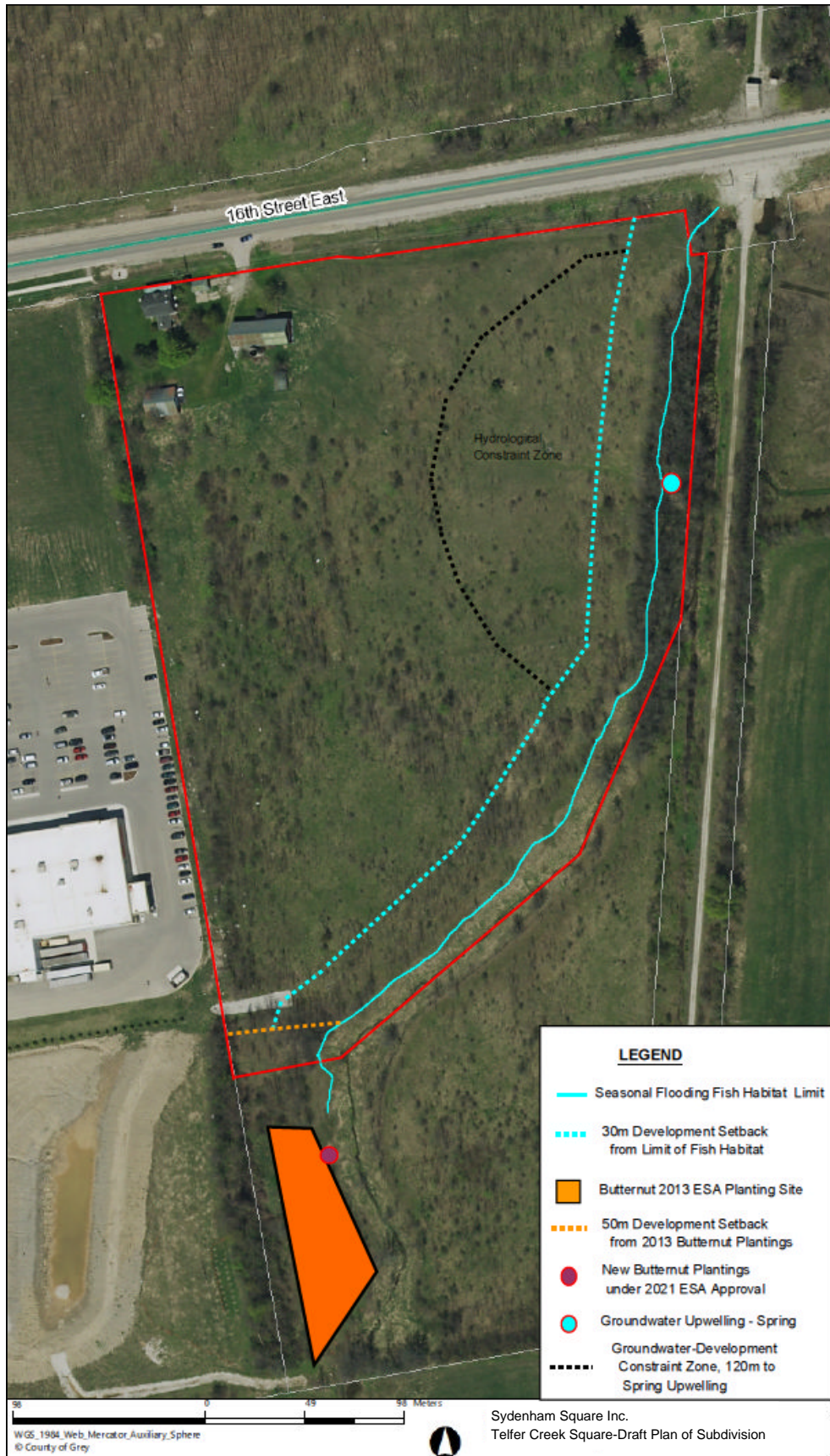
A handwritten signature in black ink, appearing to read 'Matthew Nelson', with a long horizontal flourish extending to the right.

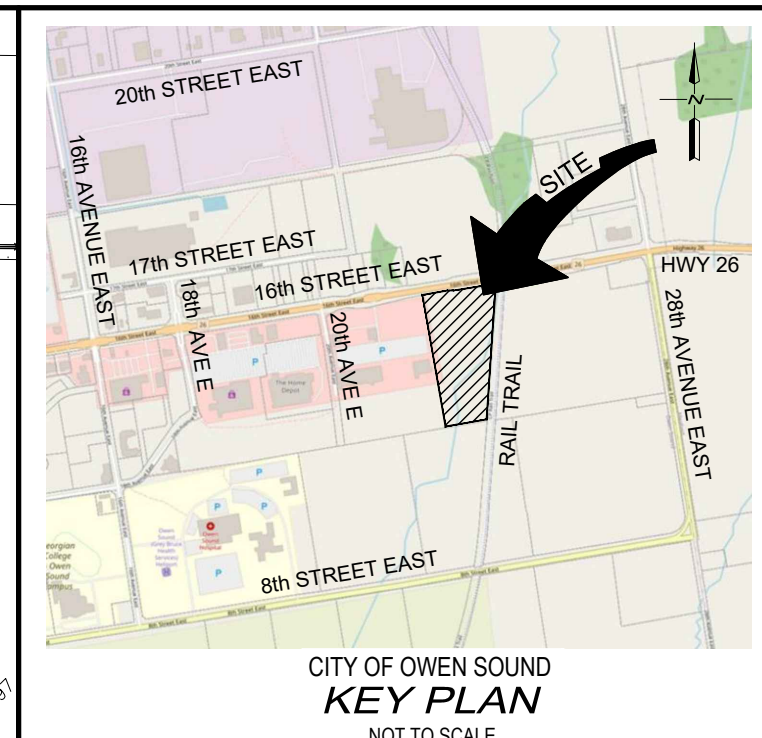
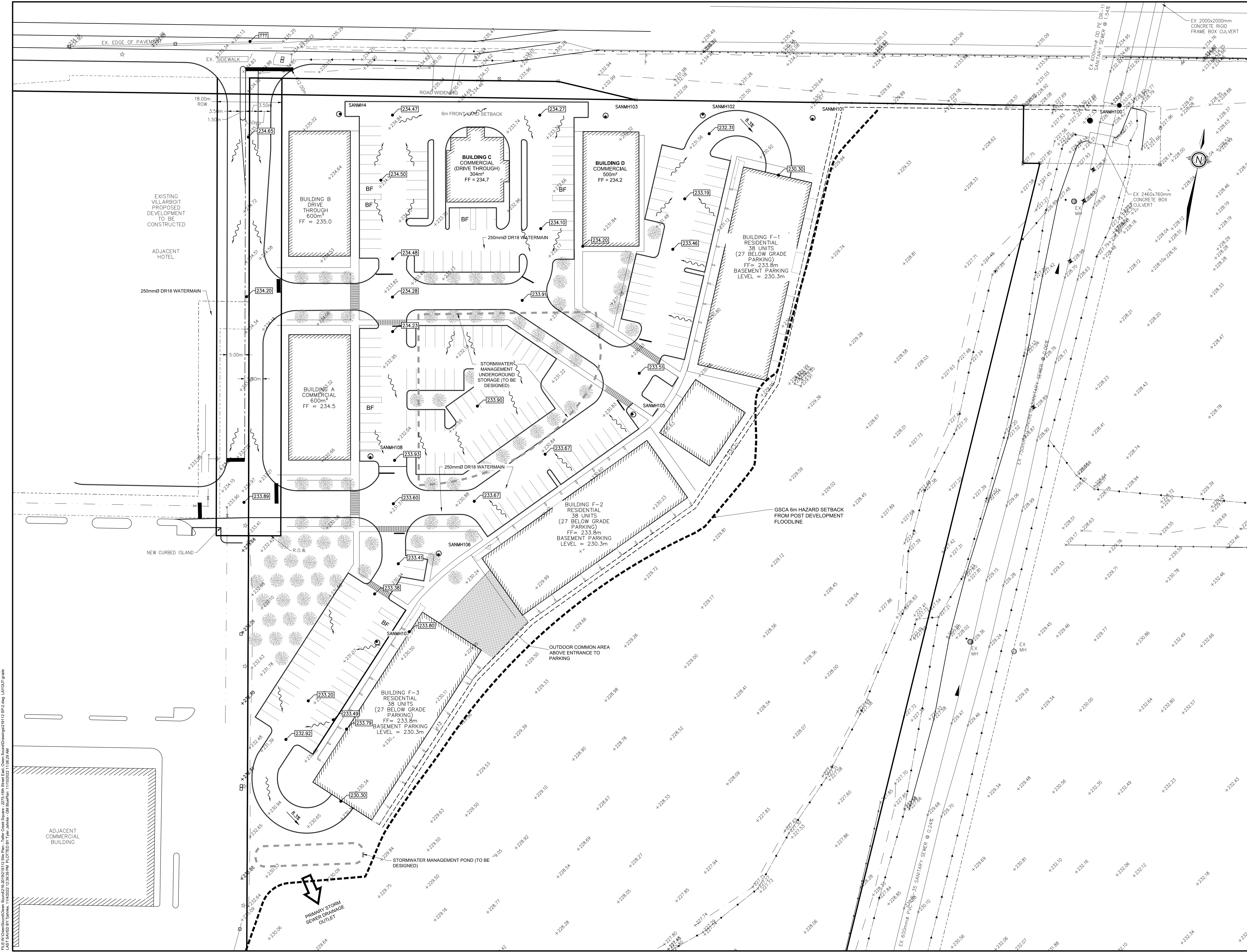
Matthew Nelson, M.Sc., P.Eng., P.Geo  
MN/mn

Enclosures:

- Figure 9: EIS – Natural Heritage
- SP3: GMBP – Grading and Drainage Plan

**Figure 9: Natural Heritage – Development Setbacks & Constraint Zone**





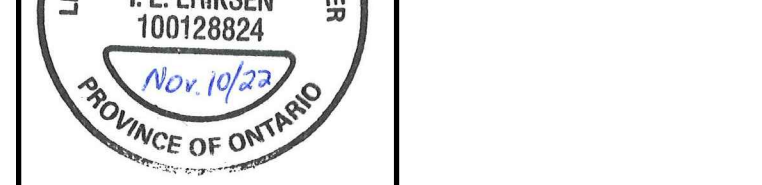
- NOTES :**
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRIC UNLESS OTHERWISE NOTED.
  2. INFORMATION FOR LEGAL BOUNDARY WAS REFERENCED FROM OCTOBER 6th, 2011 SURVEY BY HEWETT AND MILNE LIMITED, PLAN 16R-10096.
  3. TOPOGRAPHIC SURVEY COMPLETED ON DECEMBER 15th, 2020 BY GM BLUEPLAN ENGINEERING LTD.

- LEGEND:**
- Existing Elevation
  - Proposed Final Elevation
  - Proposed Grade and Direction of Surface Flow

- BENCHMARKS :**
- BENCHMARK No. 1 - ELEVATION 234.79**  
TOP OF SPINDLE ON FIRE HYDRANT LOCATED AT THE NORTHEAST CORNER OF THE VALUE VILLAGE PARKING LOT WEST OF THE SUBJECT PROPERTY.
  - BENCHMARK No. 2 - ELEVATION 233.01**  
TOP OF CONCRETE ON THE SOUTHEAST CORNER OF THE 8050x4000mm BOX CULVERT UNDER 16th STREET EAST (HWY 26).
  - BENCHMARK No. 3 - ELEVATION 229.74**  
TOP OF NAIL IN FENCE POST ON THE WEST SIDE OF THE GREY COUNTY RAIL TRAIL APPROXIMATELY 250m SOUTH OF THE HIGHWAY 26 RIGHT OF WAY.

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM.



NO.	DATE	REVISION DESCRIPTION	CHKD
2	11/10/2022	ISSUED FOR CITY COMMENT	IEE
1	02/25/2022	ISSUED FOR CLIENT REVIEW	IEE



**SYDENHAM SQUARE**  
**EXQUISITE REAL ESTATE HOLDINGS LTD.**  
2275 16th STREET EAST,  
CITY OF OWEN SOUND

**GRADING AND DRAINAGE PLAN**

DRAWN BY: T.J.	APPROVED BY: I.E.E.	PROJECT NO.: 219112	DRAWING NO.: SP3
DESIGNED BY: I.E.E.	DATE: DEC 2020	SCALE: 1:500	

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