



June 20, 2019  
Our File: 116115

City of Guelph  
City Hall – 1 Carden Street  
Guelph, ON N1H 3A1

Re: 300 Water Street  
City of Guelph

In response to the comments received from the City of Guelph (dated March 1, 2019 and March 5, 2019), we offer the following responses for your review and consideration:

**Hydrogeological Study (dated March 1, 2019)**

**Comment 1:** The Hydrogeology Report should characterize the vertical gradient of groundwater on site.

**Response:** *Acknowledged.*  
*The vertical gradient is of minimal importance given the high hydraulic conductivity of the surficial gravels compared to the underlying weathered bedrock. The groundwater flow within the soils at this site will be primarily horizontal with very limited vertical flow. Due to the stratigraphic conditions, accurate determination of the vertical gradient is of little importance for this site, but can be determined by comparing with the groundwater levels measured at Membro well by Guelph Water Services. During June 26 to July 6, 2017, no water was reported to be withdrawn from Membro well and the average static water level recorded during this time was approximately 300.8 masl. This water level is representative of hydraulic head in the bedrock system. During the same period, measurements on-site at 300 Water Street in MW-01 indicated groundwater levels to be approximately 311.8 masl. This water level is representative of hydraulic head in the overburden system. This indicates that the vertical gradient favours flow downward, from the overburden to the bedrock (i.e. “recharge” conditions). However, due to the weathering of the bedrock into fine silty material and the presence of silty-clayey infill seams (as observed at MW-01) and the presence of till overlying the bedrock (as observed at MW-02), the communication between the overburden system and the bedrock is minimal at the 300 Water Street site: drainage is interpreted to be preferentially horizontal.*

**Comment 2:** With only two monitoring wells advanced, groundwater flow directions are unobtainable and can only be inferred from regional mapping (provided by the Grand River Conservation Authority) which may not be representative of localized conditions. Requirements within the City of Guelph Guidelines for the Preparation of Environmental Impact Studies (2017) states that groundwater flow directions and gradients are obtained and displayed within the report.

**Response:** *Acknowledged. The shallow depth of groundwater above bedrock indicates that the horizontal flow directions would be controlled by the topography of the bedrock subcrop, similar to how surface runoff flow is controlled by the topography of the ground. Therefore, determination of the horizontal direction of shallow groundwater flow would not be definitively determined through the drilling of additional monitoring wells. The two geotechnical boreholes reported by V.A. Wood (2012) did not encounter bedrock though they were drilled to 5 m depth (bottom elevations of 308.8 masl and 310.6 masl). The two GMBP monitoring wells encountered bedrock at 3.86mbgs and 4.7mbgs (311.52 masl and 310.45 masl). This indicates an bedrock surface of variable slope and potentially irregular flow patterns. One of the V.A. Wood boreholes (BH1, in the westernmost part of the site, toward the end of Water Street) found water within the surficial sand and gravel at an elevation of 309.5 masl. Taken together with the other observations in MW-01 (southeastern part of site, average water level 311.47 masl) and MW-02 (central portion of the site, average water level from manual readings 310.93 masl), this data supports the interpretation of groundwater flowing horizontally toward the northwest, which is consistent with the conceptual model given in Section 4. of the hydrogeological study report.*

**Comment 3:** Hydrographs were not included in the report. This item should include a minimum of one year's worth of data showing groundwater levels that characterize seasonal highs, spring freshet and other storm and melt events with comparison to local precipitation data, per the City of Guelph Guidelines for the Preparation of Environmental Impact Studies (2017).

**Response:** *Acknowledged. A copy of the letter documenting the groundwater level measurements at the site, along with the seasonal high groundwater level has been enclosed.*

**Comment 4:** It appears that water levels from MW-01 may be unreliable to characterize seasonal water level fluctuation due to the well construction. Well screens that straddle multiple stratigraphic units will yield a blended head measurement and not a water level indicative of the glaciofluvial sand and gravel unit. In addition, water levels were collected shortly after drilling, and there is no indication that the well was developed prior to the measurement of water levels or collection of a water quality sample. Please clarify.

**Response:** *Acknowledged. A record of groundwater level data spanning 12 consecutive months has been provided. The well was developed at the time of sampling using Waterra tube to pump the well. Therefore, the well was developed in advance of the period of long-term monitoring. Due to the low hydraulic conductivity of the weathered bedrock (i.e. due to its pulverized consistency and the presence of silt-clay seams has significantly lower hydraulic conductivity than the sand and gravel), the straddling has no significant effect on the accuracy of the groundwater levels at MW-01.*

**Comment 5:** Infiltration testing using a Guelph Permeameter (or equivalent method) has not been provided in support of stormwater management planning. LID technologies have been recommended, however, per the City of Guelph Development Engineering Manual, a minimum of one on-site infiltration test shall be conducted at the proposed bottom elevation of each infiltration gallery.

**Response:** *As discussed with the City of Guelph (Shophan Daniel), permeameter testing to support the clear stone infiltration gallery design will be required as part of a Site Plan Approval process and as per the City of Guelph Development Engineering Manual.*

**Comment 6:** Staff note that the revised Functional Servicing Report indicates a 1.5m separation from the high groundwater elevation, which meets the City's DEM requirement of a minimum of 1m separation distance from the seasonal high groundwater). However, data with respect to seasonal highs of groundwater elevations have not been collected or presented in the report as only one round of water levels appear to have been collected. Consistent with previous comments, groundwater level data should include a minimum of one year's worth of data which encompasses the spring freshet seasonal highs and lows and other storm and melt events.

**Response:** *The design of the clear stone infiltration gallery has been revised to reflect the seasonal high groundwater level of 312.01 and the required 1m separation distance from the seasonal groundwater level.*

### **Revised Functional Servicing Letter**

**Comment 1:** A revised Functional Servicing Letter was prepared by GM BluePlan on May 29, 2018 to address City staff comments related to infiltration and matching pre- to post-development infiltration rates through the use of LID measures. A revised plan was prepared and included a 6.0mx7.0mx1.0m clear stone infiltration gallery to infiltrate clean water from rooftops and rear yards. The revised plan indicates that infiltration rates can be matched, pre- to post-development (638 m<sup>3</sup>/yr pre-development to 660 m<sup>3</sup>/yr post-development, representing a 3% increase in infiltration across the site). Confirmation of the proposed stormwater management approach for the subject property must be provided to reflect updated hydrogeological information. For example, the results of the Guelph Permeameter should be analysed to determine the feasibility of an infiltration gallery in the proposed location.

**Response:** *The design of the clear stone infiltration gallery has been revised to reflect the seasonal high groundwater level of 312.01. In addition to this, and as discussed with the City of Guelph (Shophan Daniel), permeameter testing in support of the clear stone infiltration gallery will be provided as part of the detailed engineering design for the site as per the City of Guelph Development Engineering Manual and in support of site plan approval.*

**Comment 2:** Staff appreciate efforts made to improve the stormwater design to increase infiltration on site. Please ensure that this recommendation is consistently reflected on drawings and in reports, as this element is critical to environmental planning support of this application.

**Response:** *Acknowledged.*

**Engineering Comments (dated March 5, 2019):**

**Road Infrastructure**

**Comment 1:** *Water Street* abutting the subject property is designated as a two (2) lane local road with grass boulevard on both sides, asphalt pavement, curb and gutter and concrete sidewalk on the north sides of the street. The ultimate right-of-way width of *Water Street* abutting the property is approximately 20.00-metres and has not been identified in the City's official plan for road widening.

**Response:** *Acknowledged.*

**Comment 2:** *Denver Road* abutting the subject property is designated as a two (2) lane local road with grass boulevard on both sides, asphalt pavement, curb and concrete sidewalk on the east sides of the street. The right-of-way width of *Denver Road* abutting the property is approximately 20.12-metres and has not been identified in the City's official plan for road widening.

**Response:** *Acknowledged.*

**Comment 3:** To relocate the driveway for the first townhouse on *Water Street* west of *Denver Street*. The driveway falls within the sight triangle area based on the current plan.

**Response:** *The driveway for the first townhouse has been relocated to be outside the limits of the sight triangle at the Water Street and Denver Street intersection.*

**Comment 4:** To provide distance from the proposed driveways to the hydro poles and fire hydrant. The minimum distance is 1.5m.

**Response:** *Existing hydro poles and fire hydrant locations have been shown and labelled on the revised plans. The existing hydro poles and fire hydrant will be relocated to provide the required 1.5m separation from the proposed driveways.*

**On-street Parking Plan**

**Comment 1:** To adjust the plan in light of the above noted modifications to the Development Concept Plan.

**Response:** *No revisions to the on-site parking plan are required.*

## **Municipal Services**

**Comment 1:** Water Street and Denver Rd

Existing services within the right-of-way along Water Street are as follows:

- 525mm diameter storm sewer.
- 200mm diameter sanitary sewer.
- 300mm diameter watermain.

Existing services within the right-of-way along Denver Rd are as follows:

- 525mm diameter storm sewer.
- 200mm diameter watermain.

**Response:** *Acknowledged.*

## **Servicing Capacities**

**Comment 1:** Water Supply and Distribution System

Sufficient (and adequate) capacity is available of the City's existing water supply and distribution system water main pressures, in our system to accommodate the development, for the referenced type development, for the referenced subdivision at the above noted property, for the above noted proposed development (and no water capacity constraints), can be expected for most scenarios according to the City's InfoWater water model. However, there is potential for marginal water supply pressures in proposed development under certain conditions such as peak hour demand scenario at locations with elevation greater than 347 m height above mean sea level (AMSL) and average day demand scenario at locations with elevation greater than 340 m height AMSL in the existing water system.

**Response:** *Acknowledged.*

**Comment 2:** Water pressure in the water mains in vicinity of proposed development under certain conditions such as peak hour demand scenario at locations with elevation at 347 m height above mean sea level (AMSL) could range from 38.0 to 42.0 psi (40 psi + 2.0 psi) and average day demand scenario at locations with elevation at 340 m height AMSL could range from 47.5 to 52.5 psi (50 psi +- 2.5 psi) in the existing water system.

**Response:** *Acknowledged.*

**Comment 3:** The referenced development would have no significant adverse impact to the City's water supply and distribution system according to the City's InfoWater water model.

**Response:** *Acknowledged.*

**Comment 4:** Minimum water service size should be 25 mm for residential and all other services sized appropriately for demand based on potentially low pressures.

**Response:** *Acknowledged.*

### **Sanitary Sewer Wastewater Collection System**

**Comment 1:** Sufficient (and adequate) capacity is available in the existing sanitary sewers adjacent to the above noted site, and of the downstream sanitary sewers, to accommodate discharge of sanitary flows, in our system to accommodate the development, for the referenced type development at the above noted property, for the above noted proposed development, including existing loads (and no sanitary capacity constraints), according to the City's wastewater collection system sanitary sewer model. The referenced development would have no significant adverse impact to the downstream sanitary sewers.

**Response:** *Acknowledged.*

### **Stormwater Management**

**Comment 1:** In the revised FSR, it appears that an infiltration gallery is proposed. We ask the engineer to provide a detail drawing with the next submission package.

**Response:** *A detailed drawing of the clear stone infiltration gallery has been included with this resubmission.*

**Comment 2:** The revised FSR states that the infiltration gallery has a 1.5m separation from the high groundwater table, however due the close proximity of the bedrock and structures; we ask the engineer to investigate groundwater mounding and the bottom of the infiltration gallery.

**Response:** *The elevation of the clear stone infiltration gallery has been revised to provide the required 1m separation from the seasonal groundwater level.*

**Comment 3:** A minimum of one on-site infiltration test shall be conducted at the proposed bottom elevation of each infiltration BMP. In addition, one on-site infiltration test shall be conducted at every other soil horizon encountered within 1.5 meters below the proposed bottom elevation. One of the following methods are to be used to determine the field saturated hydraulic conductivity (Ks):

Guelph Permeameter method (Constant head well permeameter method); and/or Constant head double-ring infiltrometer method.

For further details, please see the multi-step infiltration testing protocol as documented in the Credit Valley Conservation (CVC) Authority Low Impact Development Stormwater Management Planning and Design Guide, "Appendix C- site evaluation and soil testing protocol for stormwater infiltration credit valley conservation (CVC) authority stormwater management criteria". Further in the detail drawing please show the seasonal high groundwater elevation i.e. spring high.

**Response:** *As discussed with the City of Guelph (Shophan Daniel), permeameter testing in support of the clear stone infiltration gallery will be provided as part of the detailed engineering design for the site as per the City of Guelph Development Engineering Manual and in support of site plan approval.*

**Comment 4:** The annual water balance results are not acceptable, site-specific monthly water balance calculations shall be completed using the water balance method developed by Thornthwaite and Mather (1957) as documented in the MECP Stormwater Management Planning and Design Manual (2003), as updated from time to time. In addition, we ask that the (digital) excel sheet be provided for the monthly water balance with the subsequent submission.

**Response:** *The water budget analysis has been updated to utilize the Thornthwaite and Mather (1957) methodology. As discussed with the City of Guelph (Shophan Daniel), permeameter testing in support of the clear stone infiltration gallery will be provided as part of the detailed engineering design for the site as per the City of Guelph Development Engineering Manual and in support of site plan approval.*

**Comment 5:** As per section 5.5 of the DEM, please use 139.29 mm/hr rainfall intensity based on a 5-minute entry time, please revise swm report and the miduss outputs accordingly.

**Response:** *The design storm parameters utilized in the MIDUSS modelling have been updated.*

**Comment 6:** We direct the Engineer to review the comments provided by the City's environment planner, based on our comment and comments provided by other city staff a revised FSR is required and shall be provided to the City. The cost of all the storm water management works and quality controls will be the responsibility of the Owner.

**Response:** *Acknowledged.*

### **Environmental**

**Comment 1:** Based on the findings of the Phase One ESA report, it appears that no actual or potential environmental concerns or risks were associated with the historical or current on-site operations or any off-site impacts. All the environmental reports submitted to the City must also include a "Reliance Letter" from a QP to indicate that despite any limitations or qualifications included in the report, the City is authorized to rely on all information and opinion provided in the reports.

**Response:** *Acknowledged.*

We trust this is the information you require at this time. If you have any questions or require additional information, please do not hesitate to call.

Yours truly,

**GM BLUEPLAN ENGINEERING LIMITED**

Per:

A handwritten signature in blue ink, appearing to read 'AKroetsch'.

Angela Kroetsch, P.Eng.

AK/

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April 23, 2019  
Our File: 116115-3

City of Guelph  
Infrastructure, Development and Enterprise  
ATTN: Lindsay Sulatycki, MCIP, RPP  
1 Carden Street  
Guelph ON, N1H 3A1

*Via E-mail*

Re: Groundwater Level Monitoring Summary -  
Hydrogeological Study, 300 Water Street,  
Guelph, ON

Dear Ms. Sulatycki,

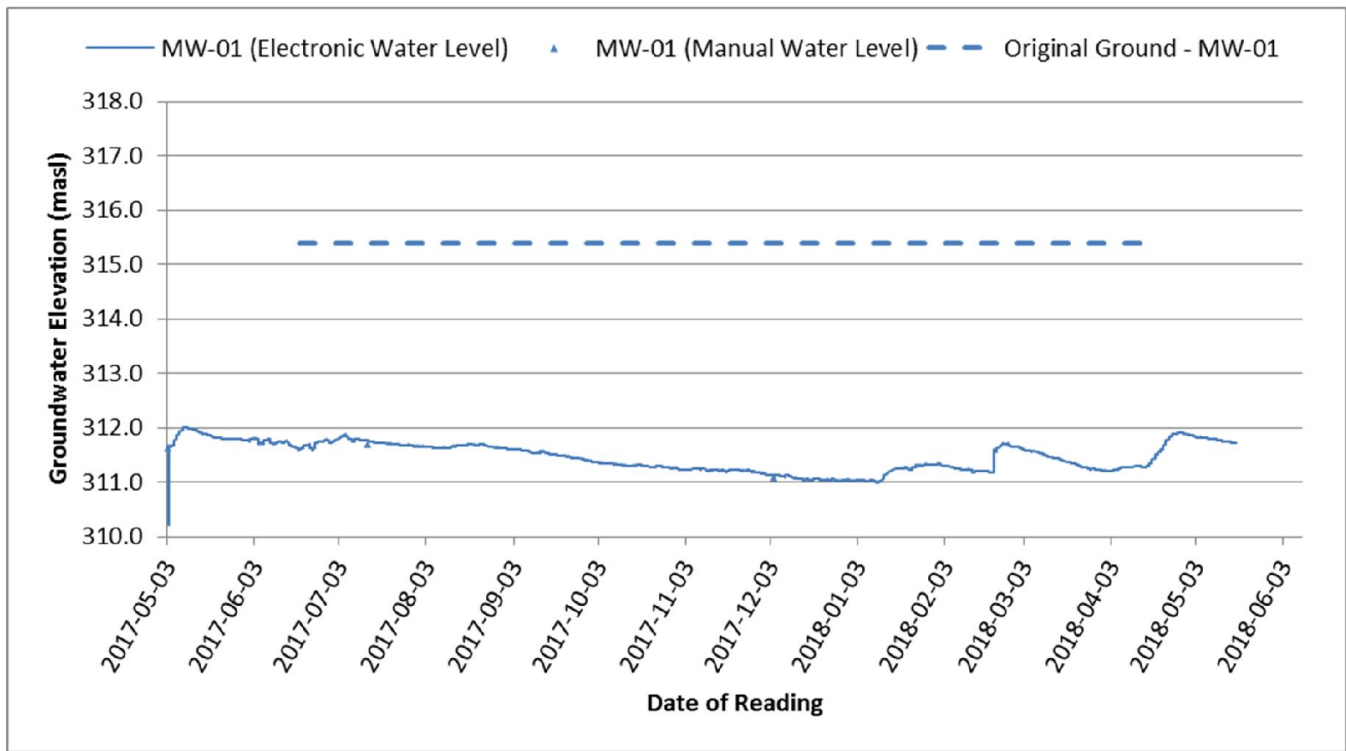
GM BluePlan Engineering Limited are pleased to present the findings from the continuous groundwater level monitoring completed at 300 Water Street, Guelph, ON. This monitoring was undertaken following and in association with the submission of the report *Hydrogeological Study for Proposed Residential Development – 300 Water Street, Guelph* and to support the development and approvals process for the multi-unit residential complex proposed for the 300 Water Street property.

Monitoring well MW-01 was drilled and installed on May 1, 2017 as part of the Hydrogeological Study field investigation. A new groundwater level datalogger manufactured by Solinst Canada was installed in this well. This device is a self-contained pressure transducer equipped with a datalogger which is set to record the pressure of the water column above the unit at a frequency of once every 3 hours. The datalogger began its recordings on May 3, 2017 at 6:00 am. The data was collected through to May 17th, 2018 and is displayed in Figure 1.

From the collected data, we have identified the “seasonal high groundwater level” and other groundwater level parameters as follows:

- The seasonal high groundwater level was determined to be 311.751 metres above sea level (masl);
- The maximum recorded groundwater level at 312.009 masl (May 2017);
- The average groundwater level throughout the entire monitoring period was 311.469 masl; and
- The minimum recorded groundwater level was recorded at 310.997 masl (January 2018).

For the purposes of this assessment, “seasonal high groundwater level” has been taken to mean the highest recorded groundwater level that is sustained for a period of at least four (4) weeks.



**Figure 1: Groundwater Levels Recorded at MW-01.** Solid line represents datalogger data. Triangle marks represent manual readings.

Ontario Regulation 903 set forth by the Ontario government states that wells must be decommissioned if they have been unused for two years. Therefore, we recommend to continue monitoring the wells on an annual basis (i.e. once per year) in order to maintain the usage of the well until site plan approval and the subsequent decommissioning of the well. Please contact the undersigned if you have any questions or if you would like GM BluePlan to arrange for the continued monitoring and/or decommissioning of the monitoring wells.

Yours truly,

**GM BLUEPLAN ENGINEERING LIMITED**

Per:



Abdi Faarah, B.Sc.



Matthew Long, M.Eng., P.Eng.