

Subject: Strada - Model Layer 4 and 6 High Quality Hydraulic Surfaces (Potentials) and Subtraction - Offset Model Inferred Zones of Increased Flow.
From: Garry Hunter <ghunter@hunter-gis.com>
Date: 2025-03-10, 4:52 p.m.
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Sean,

At our Mar 6 meeting you indicated it would be desireable to subtract hydraulic surfaces for the Upper (Guelph) and Deep Aquifer (Gasport) Hydraulic surfaces. We have already performed this task as described for the referenced Figures below.

1. Previously Prepared Tables and Figures

I am providing three previously prepared figures and one table from our project files. Original versions, as prepared circa May / June 2024, informed our early conceptual Alternative Site Plan as circulated to NDACT and Strada about July 2024. These 'patched up' dry weather hydraulic surfaces appear to be the best currently available for incorporation into the Strada May 2024 updated groundwater model calibration (unless Strada wants to install additional groundwater monitors).

2. Modellers Inferred Zone of Increased Flow

A number of these Figures include the modeller's 'Inferred Zone of Increased Flow' between Horning's Mills and the proposed Strada quarry site. I agree with this concept but I am puzzled why this 'Inferred Zone' is not informed by the Tatham now high quality site groundwater monitoring data. **Have the modellers actually incorporated this data into the Model? As far as I am aware, in May 2024, Tatham had only released about 3 months of data to Mar 2024 for the recently installed Gasport monitor wells. Where are the on site Deep Gasport Aquifer transients coming from?**

3. Table H.1 GIS Database Driver

The enclosed Table H.1 dated July 30, 2024 is the 'GIS driver' for the

accompanying water level plots. This Table required considerable effort to prepare as patching of data gaps was required (Tatham has always denied the existence of data gaps).

Error trapping was introduced as part of our due diligence and data edited (mixed up wells and data entry) with Tatham support. Monitor wells were reclassified by this Peer Review as A1 Water Table, B1 Epikarst, C1 Guelph and D1 Gasport more or less. Available dry season water levels, mainly manual data, from Oct to Mar were entered into the Table. Trial plots were undertaken to identify anomalies. Some Upper Aquifer monitor wells with water levels similar (connecting) to the underlying Gasport Aquifer static levels were reclassified to the Gasport Aquifer.

4. Fig HA 3.6 Upper Guelph / Epikarst Aquifer

Enclosed Fig HA 3.6 includes mainly B1 monitors and LiDAR water level elevations. Even with supplementary water levels added there are still 'data gap areas'. Synthetic points were added to control the underground stream corridor.

The lowest convergent flow water level elevations are at about 484 m asl along the east side of Melancthon Pit No 1 and the Bonnefield Pits. This is the area of maximum groundwater flow on the proposed quarry site and the desirable areas for locations of replacement groundwater infiltration areas. There are 'data gap areas' along this corridor.

The Earthfx Model 'Inferred Increased Flow Zone' is included as an overlay. This inferred zone is shifted (offset) to the north and not informed by the Tatham now high quality site data (10 to 20 cm vertical accuracy range).

5. Fig HA 3.7 Gasport Aquifer Model Layer 6 Hydraulic Potentials

Enclosed Fig HA 3.7 illustrates the Strada Quarry Site Gasport Water Level Potentials. Logical synthetic points were applied to the Underground Stream. Monitor Wells from higher Model Layers at OW2C (Open Hole), OW9B, OW16C and OW19C were reclassified as hydraulically equivalent connected Gasport Aquifer Monitor Wells (D1).

The smooth hydraulic contours indicate a very good mathematical result. However, notwithstanding Tatham claims to the contrary, data gaps are still apparent on the site perimeters. Lowest groundwater flow is under the high contours on the north part of the Prince Pit and on the west part of the Bonnefield and Melancthon Pit # 2. Highest groundwater flow is through the 'Underground Stream' area.

Considering bedrock formation dip and low groundwater inflow potential the logical hydrogeological location for the proposed Quarry Phase 1 is in the southwest corner of the Bonnefield Pit. Based on hydrogeology, the Strada Jan 31, 2025 Site Plan is the worst location in the Quarry footprint area for Phase 1. Furthermore these lands are required for Infiltration Infrastructure Adaptive Management (See Peer Review Feb 7, 2025 submissions).

OW 16C-D1 at 477.8 m asl is the lowest Gasport potential water level on site and is the flow convergence zone near the underground stream where Pine River headwater replacement infiltration should be located.

The Groundwater Model Inferred Increased Flow Zone is incorrectly offset to the north and would result in not optimally located infiltration infrastructure. This modeller 'inferred zone' location is also not informed by the Tatham now high quality groundwater hydraulic potentials.

6. Fig HA 3.8 Subtraction of Model Layers 4 and 6.

Enclosed Fig HA 3.8 is the result of subtracting the Upper Guelph (Model Layer 4) and Gasport Aquifer (Layer 6) hydraulic surfaces. This plot demonstrates upward vertical gradients in the west part of W 1/2 Lot 11 along the 4 th Line, neutral gradients through the centre of W 1/2 lots 11 and 12 and downward gradients in Prince Pit and Melancthon Pit No 1. The highest downward gradient at 9 m is along the Fourth Line at the front of the Prince Pit in the Underground Stream area. The downward gradient is about 4 m at the east side of the Melancthon Pit No 1.

The 0 m vertical gradient at the west side of the Bonnefield Pit area again indicates favourable groundwater conditions for Quarry Phase 1 opening.

7. Northerly Shift of Model Layer 6 (Gasport) Potentials

Enclosed Fig H.26 further demonstrates the northerly shift of the groundwater model potentials contours informed by the 'Model Inferred Zone' versus the now high quality Tatham site groundwater potentials.

This concludes my follow up response to our Mar 6 virtual meeting.

Thank you.

Yours truly,

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----- Forwarded Message -----
Subject:Strada: 4 Figures from Peer Review
Date:Fri, 7 Mar 2025 13:08:39 -0500
From:Rachel Li rl@hunter-gis.com
To:'Garry Hunter' ghunter@hunter-gis.com

Hello Garry,

Attached PDF file has the four figures you picked from the Jan 23, 2025 peer review report.

Thank you
Rachel

— Attachments: —	
Figures from Peer Review.pdf	9.4 MB
Table H.1 Revised from Strada Model Calibration Report V8_20240730.pdf	754 KB