


Ontario's Draft Guidance on GUDI: A City of Guelph Case Study

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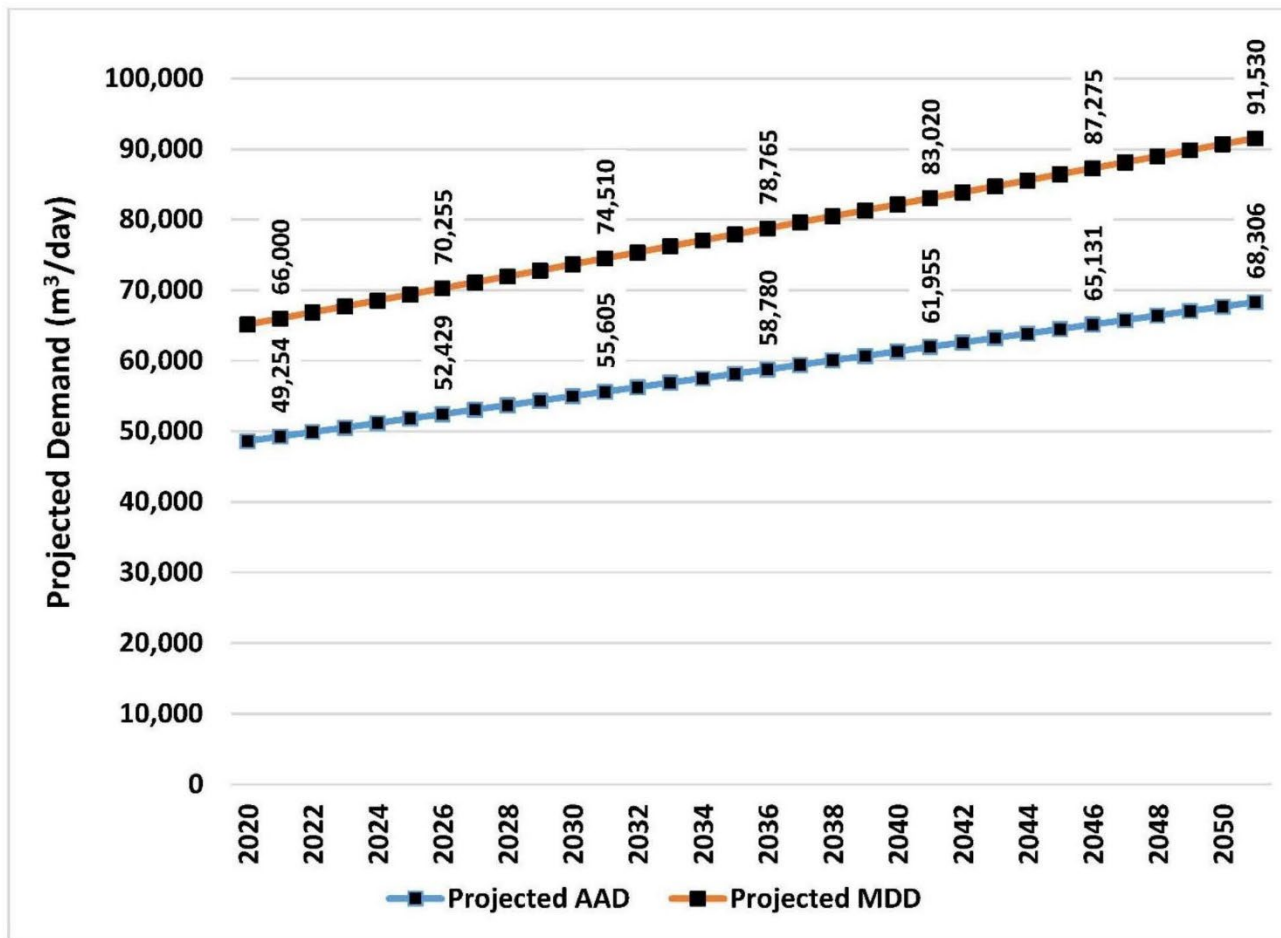
November 14, 2023

City of Guelph

- 
- **Population**
 - 2021: 145,777
 - 2051: 203,000
 - **Groundwater dependent community since 1879**
 - **Average Water Demand**
 - 2021: 49,254 m³/day
 - 2051: 68,306 m³/day
 - **Additional Water Supply Capacity Required for 2051**
 - 12,108 m³/day

Water Supply Master Planning – Restoration of Existing Offline Municipal Wells

Figure ES-1: Total Projected Average Annual Day and Maximum Day Water Demands – Reference Growth Scenario



Maximum Day Demand in 2051: 91,530 m³/day



Average Day Demand in 2051: 68,306 m³/day

Existing System Capacity in 2023: 79,422 m³/day



Restoration of the Clythe Well

- Northeast quadrant of the City
- Existing PTTW (39.3 L/s up to 3,395 m³/day)
- Treatment to be added to address aesthetics:
 - Hydrogen Sulphide
 - Manganese
 - Iron

Clythe Well

- Originally drilled in 1976
- Anticipated pumping rate of 61 L/s
- Put into service in 1990
- Taken offline in 1999



Water Well Record (1976)

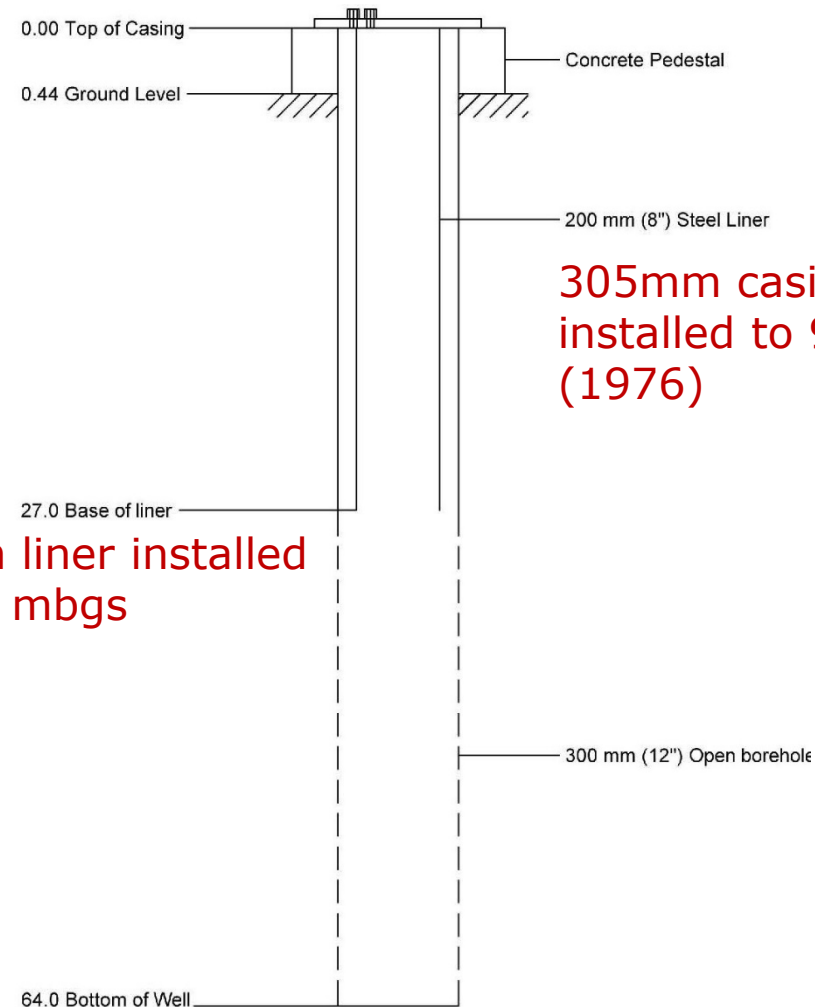
COUNTY OF DISTRICT: **NELTINGTON GUELPH**
 CONC 3 DIVISION: **5**
 CITY OF GUELPH: **CARDEN ST**
 LOT: **117** AREA: **564000** ELEVATION: **4823700** DATE COMPLETED: **05 05 76**

DEPTH - FEET	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
0	Bolder clay	0	12
12	shale	12	14
14	Dark rock	14	9.2
9.2	rock mud streaks	9.2	11.6
11.6	rock Hard soft	11.6	14.4
14.4	rock soft	14.4	17.6
17.6	rock	17.6	19.6
19.6	shale rock	19.6	21.0

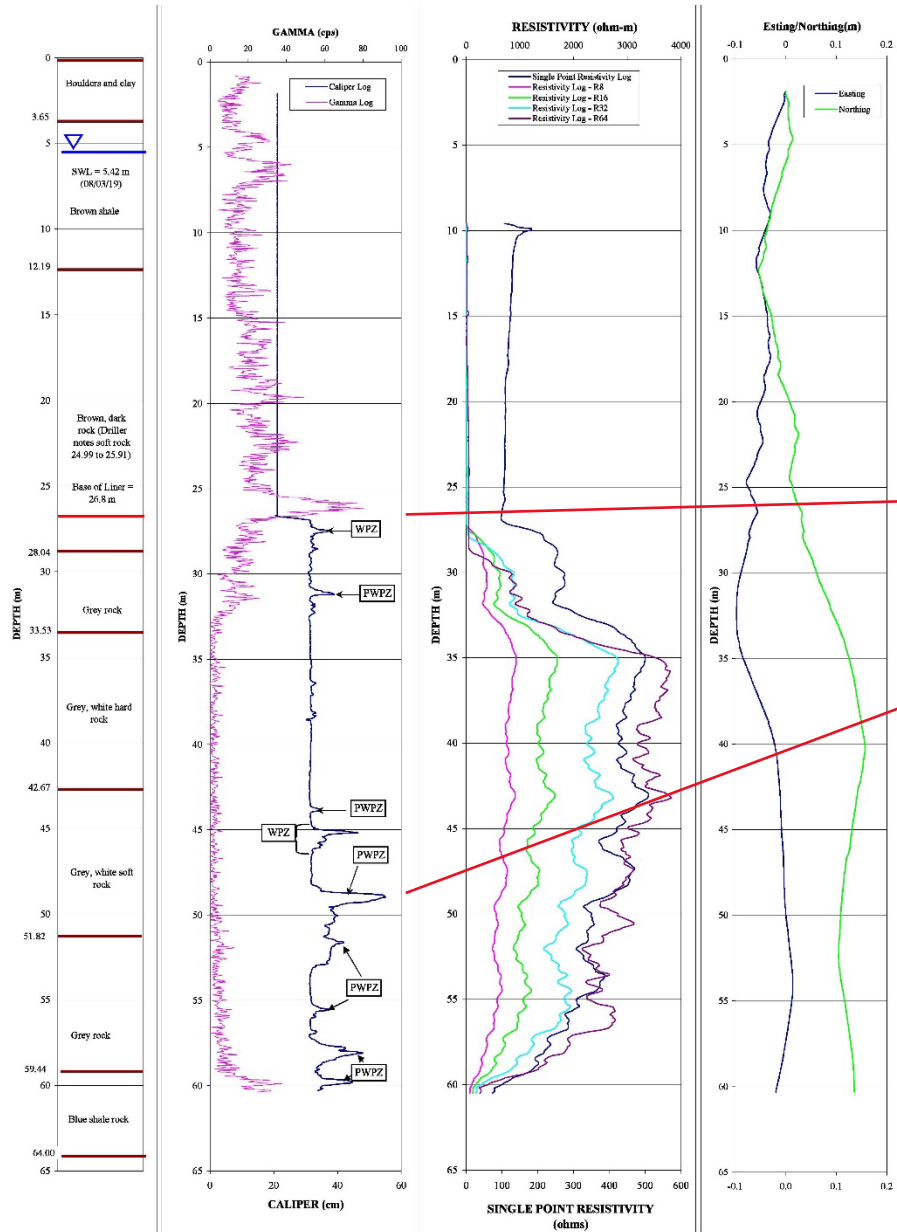
WATER RECORD
 FOUND: **05 0** KIND OF WATER: **FRESH**
08 0 **12 8** **13 8** **14 0** **16 5**
 MINUTE RATE: **0800**
 FINAL STATUS OF WELL: **3**
 WATER USE: **69**
 METHOD OF: **1**

LOCATION OF WELL 6423
 CITY OF GUELPH
 WATSON RD.
 60' 20' 15' 10'
 7 9 7 9 9 9

Liner Installation (1999)



Geophysical Borehole Logging of Clythe Well



- Significant fracture zones
 - 28.6 mbgs
 - 44.8 to 48.0 mbgs

Clythe Well Rehabilitation and Assessment (Stantec, 2008)



Objectives related to 2001 GUDI Studies:

- Complete a detailed assessment of well condition with respect to current regulations (O.Reg 903)
- Conduct a continuous 72-hour pumping test to assess well performance and water quality

GUDI Assessment Conclusions:

- The well meets the current requirements of Ontario Regulation 903 as well as the AWWA A100 specifications for plumbness and alignment
- Monitoring wells completed in overburden and Guelph formation did not respond to pumping
- Water quality meets all health-related Ontario Drinking Water Standards
- No evidence of surface water influence

Clythe Well Treatability Study (Gamsby and Mannerow, 2010)



- Treatment of Hydrogen Sulphide, Manganese and Iron
- Note that these are aesthetic objectives and not health-related parameters

File No. 109-030

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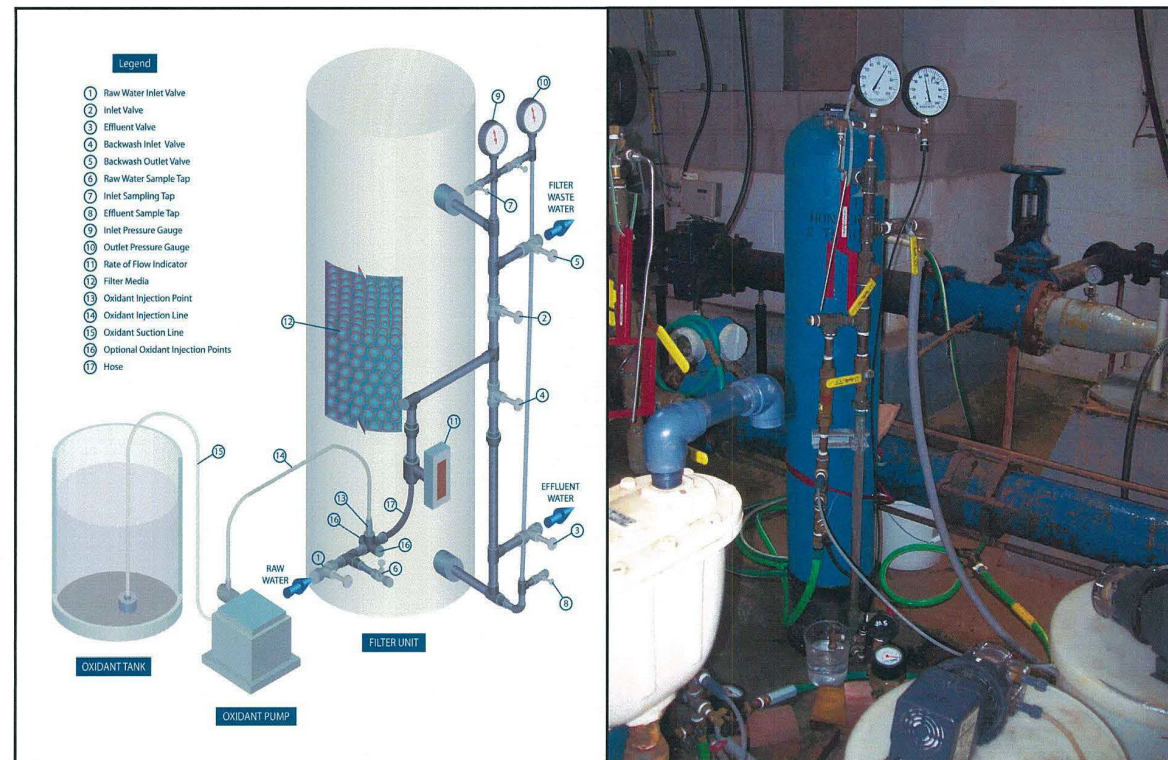


Figure 3: Schematic and Photograph of Pilot Testing Equipment (typical for both pilot systems)

Stage 1 AVCP Hydrogeological Study (Matrix, 2023)

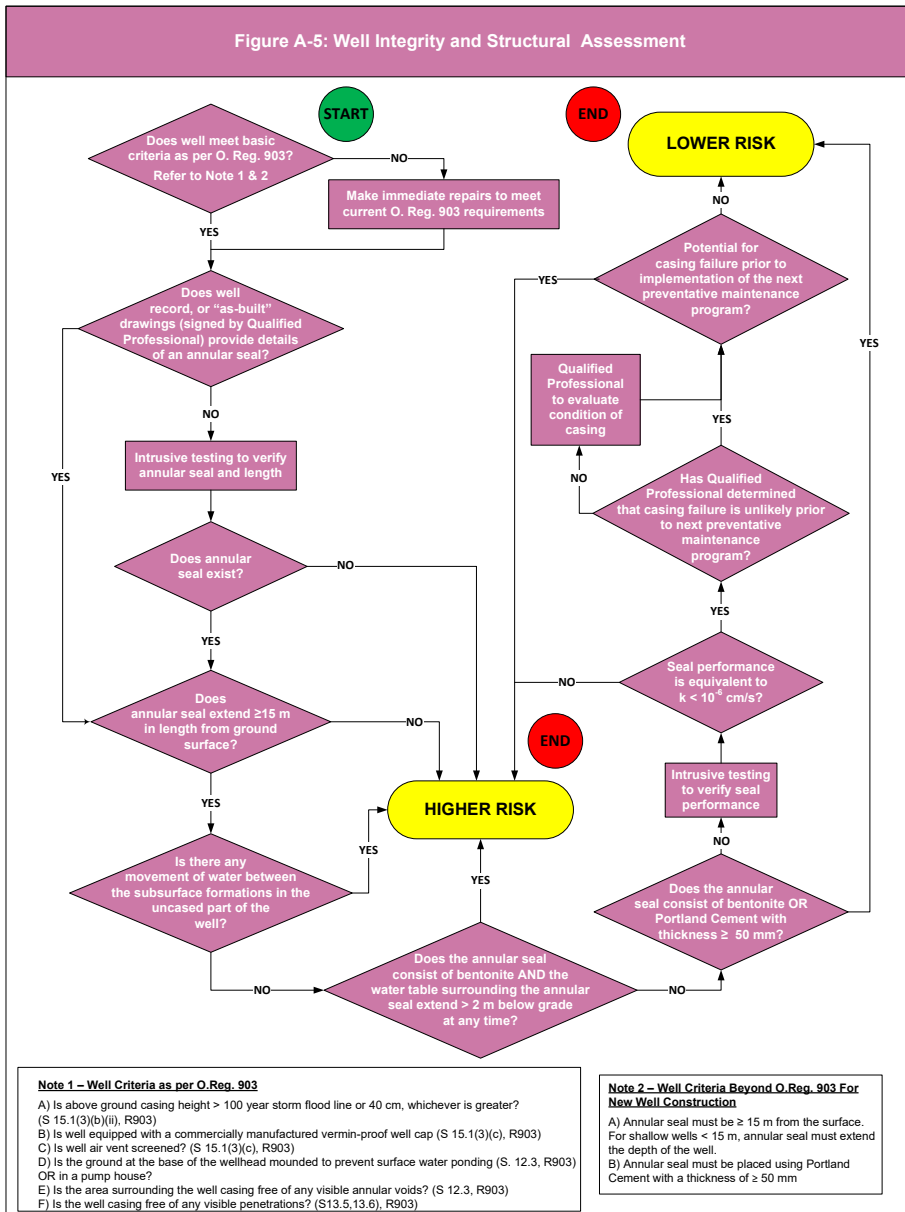


Objectives related to Stage 1 AVCP Studies:

- Collect key water quality data and provide a preliminary categorization of Clythe Well
- Determine data collection requirements for any operational confirmation period for the well to verify the provisional category (i.e Stage 2 AVCP)
- Evaluate potential for groundwater-surface water interactions
- Support renewal of PTTW



Figure A-5: Well Integrity and Structural Assessment

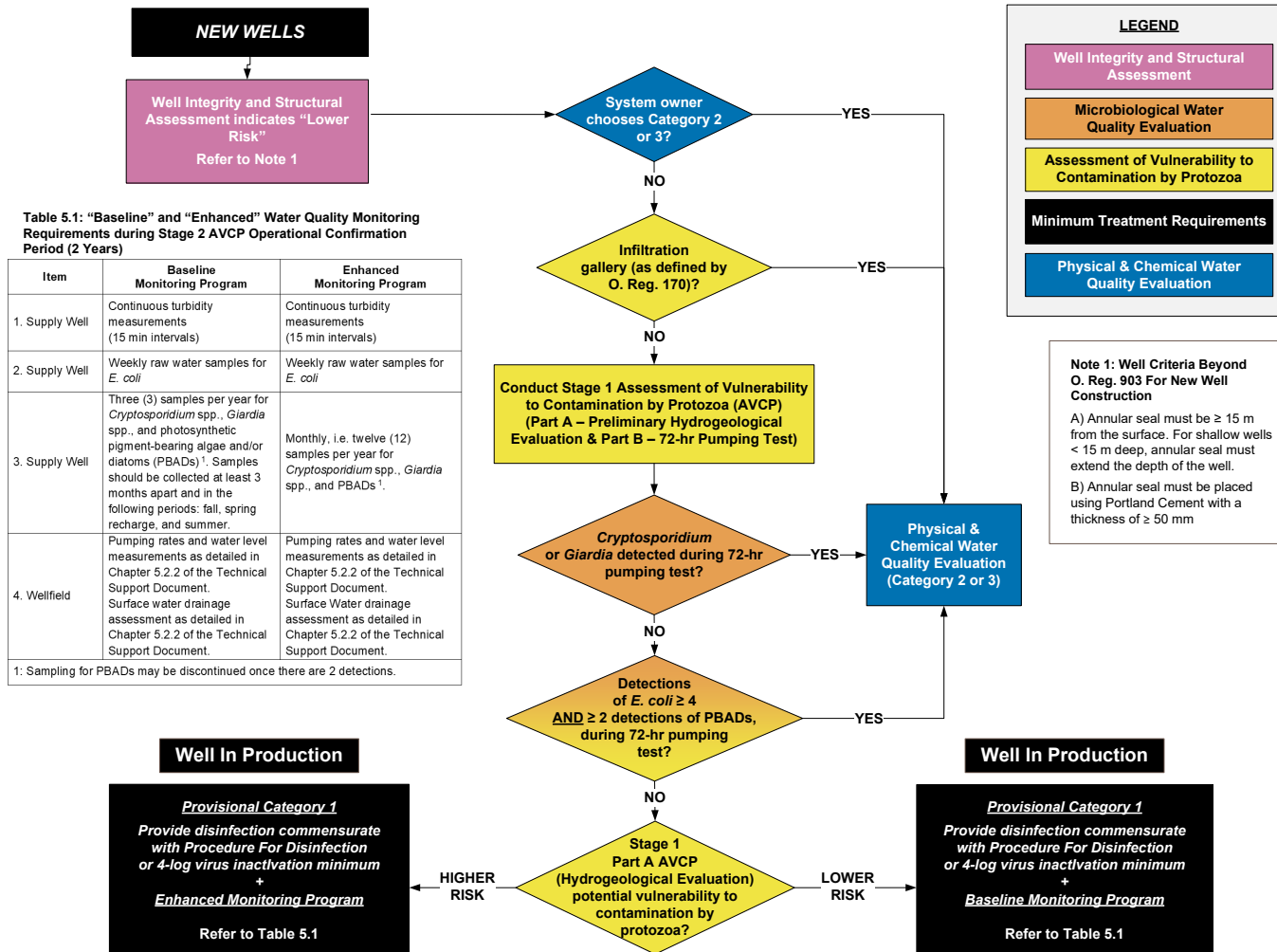


Well Integrity and Structural Assessment

- 2008 Stantec Feasibility study confirmed that the well met Ontario Regulation 903
 - Reaffirmed through 2022 Geophysical logging by Lotowater
- Details of the annual seal were documented in the installation of the liner, which extended down to 26.8m bgs and is thicker than 50mm

LOWER RISK

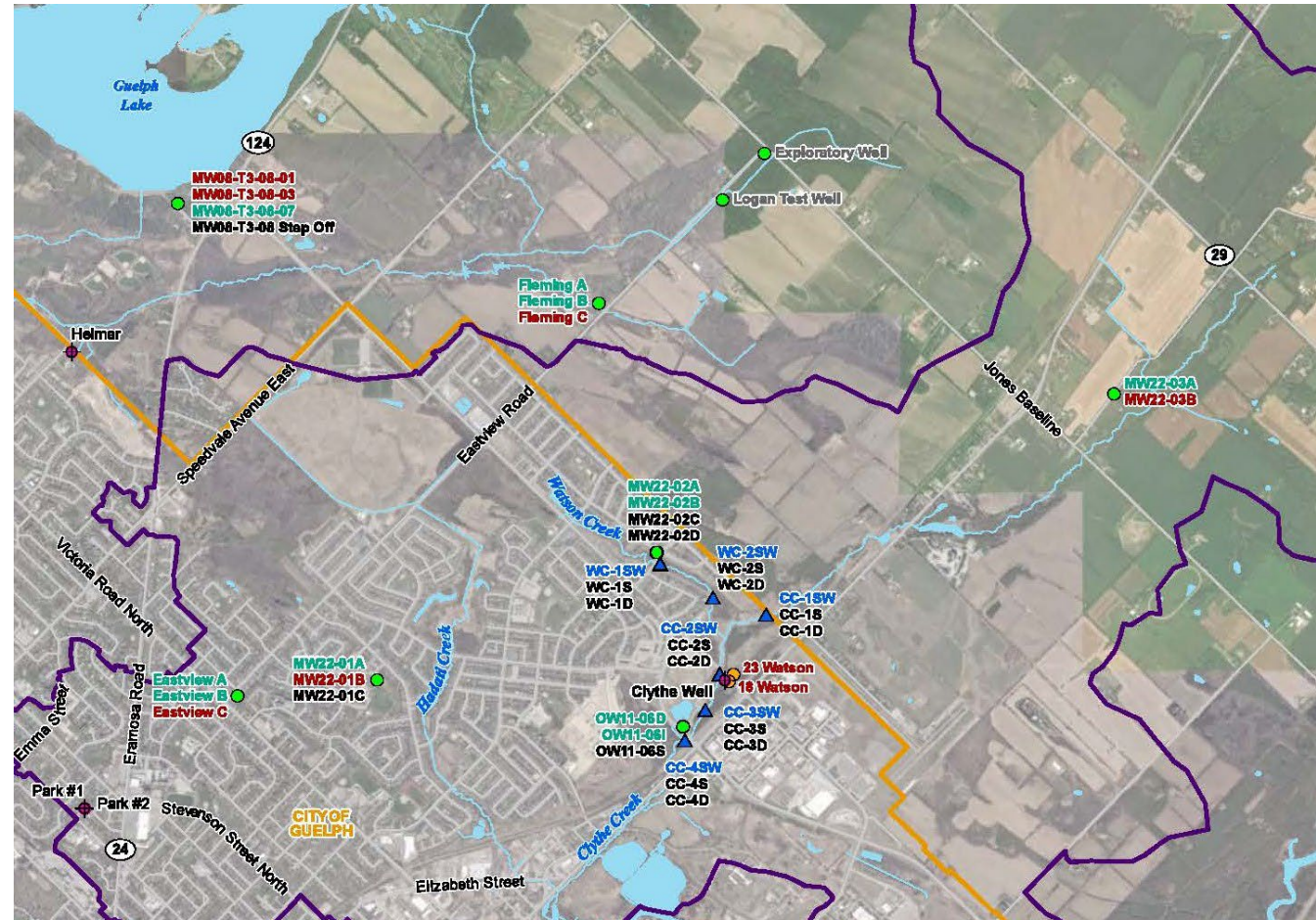
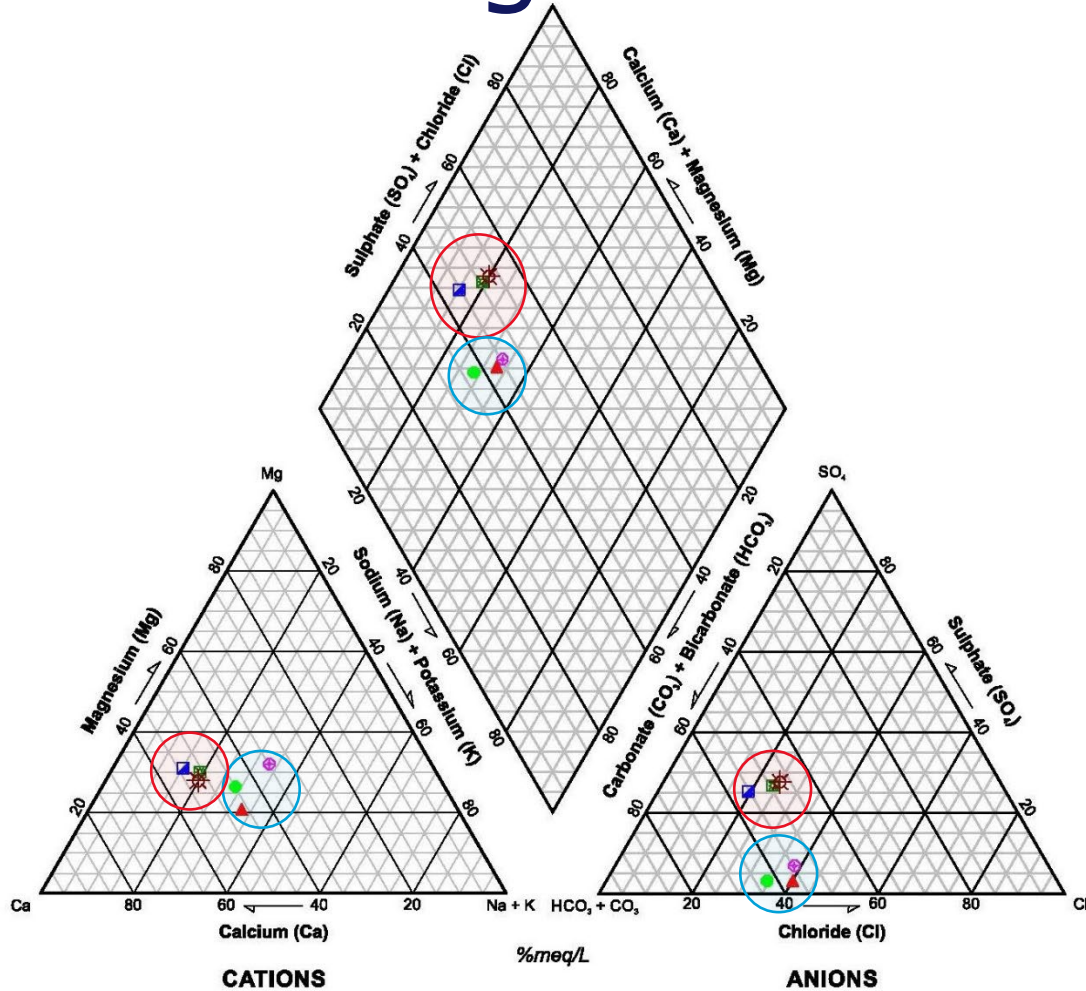
Figure A-1: Determining Treatment Requirements for New Wells



Stage 1 AVCP

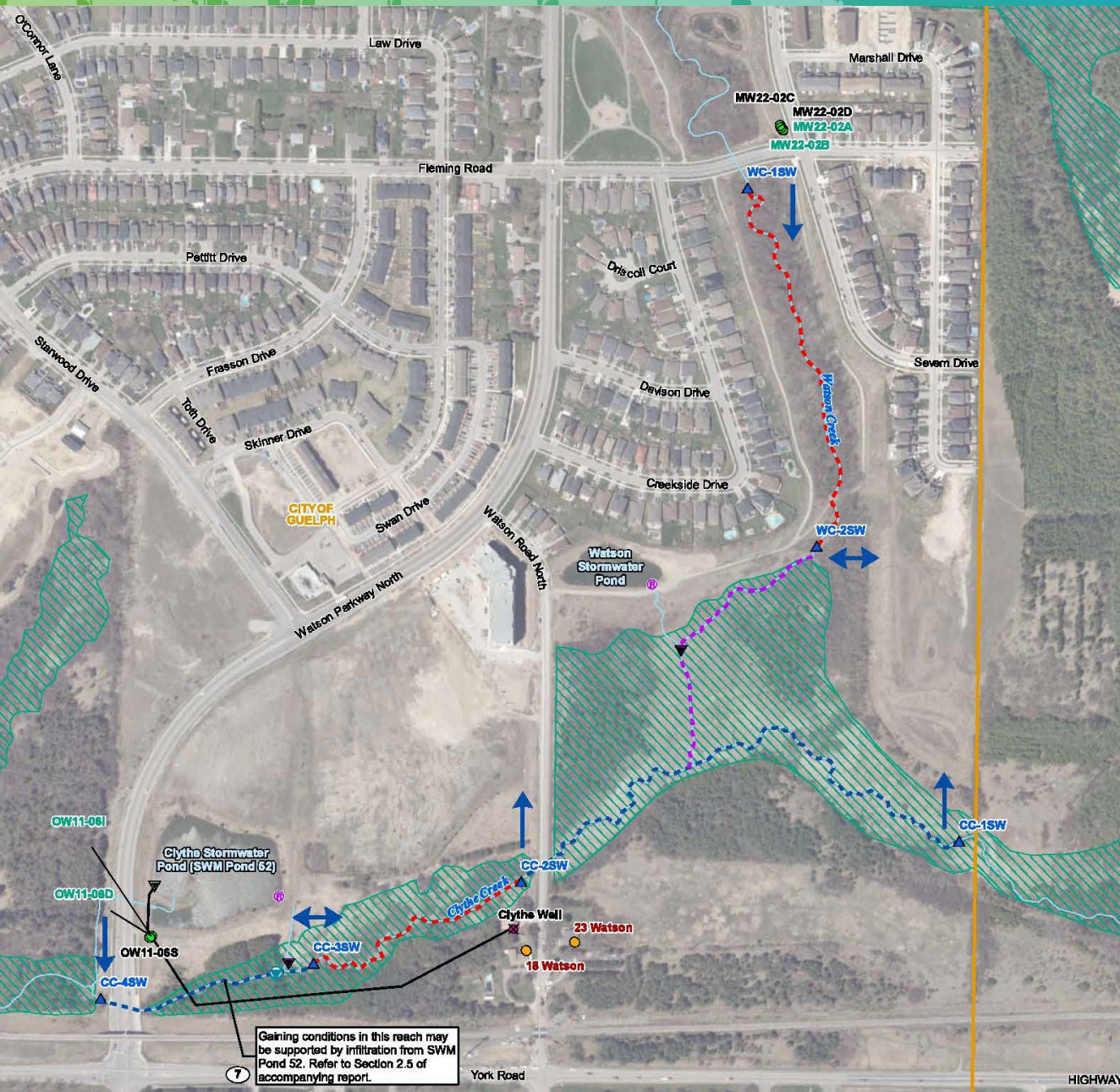
- Baseline Water Quality monitoring program
 - 5 samples for E.Coli
 - 3 samples for General Chemistry
 - 3 samples for Cryptosporidium, Giardia and PBADs
 - Continuous measurement of UV Transmittance and turbidity
- Water Level Monitoring

Stage 1 AVCP Monitoring Program

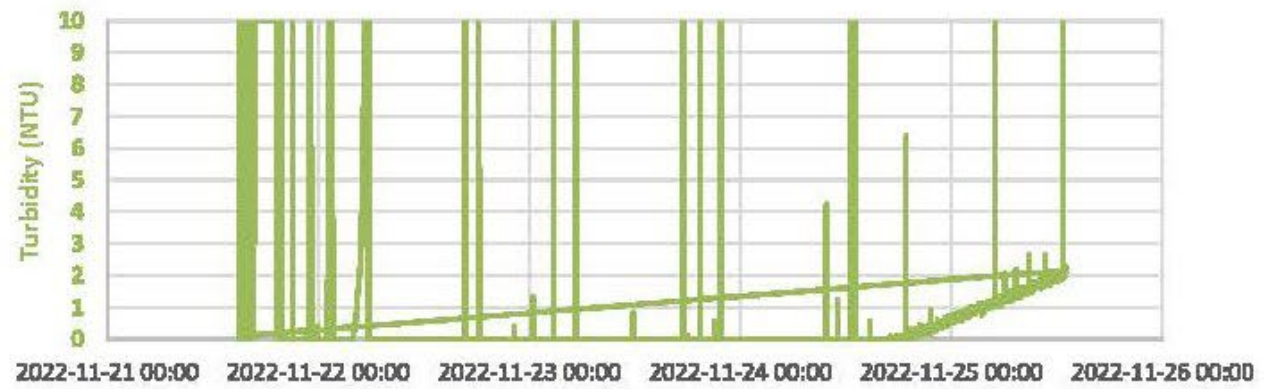
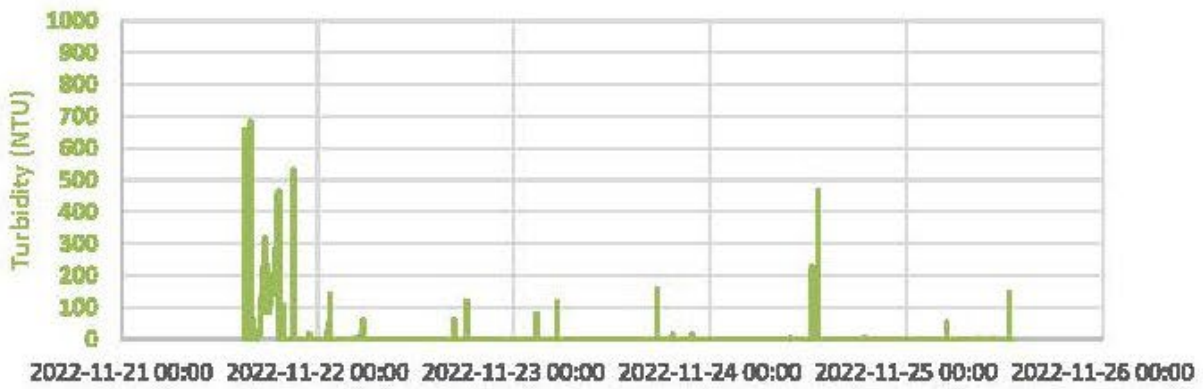
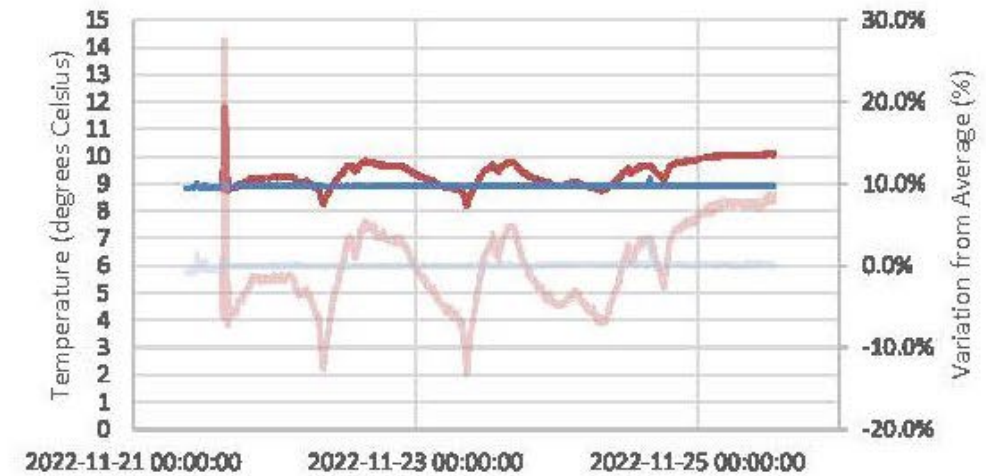
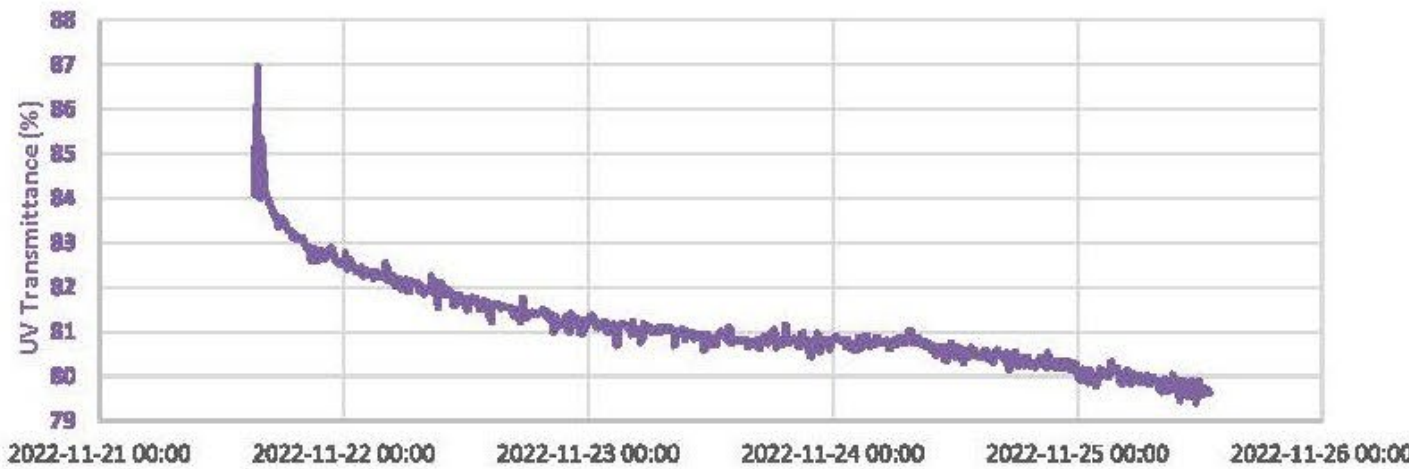


Surface Water Monitoring Program

- Upward gradient in Clyde Creek at CC-1 (upstream) and CC-2 (adjacent to Clyde Well)
- Groundwater supports baseflow in Clyde Creek at these locations

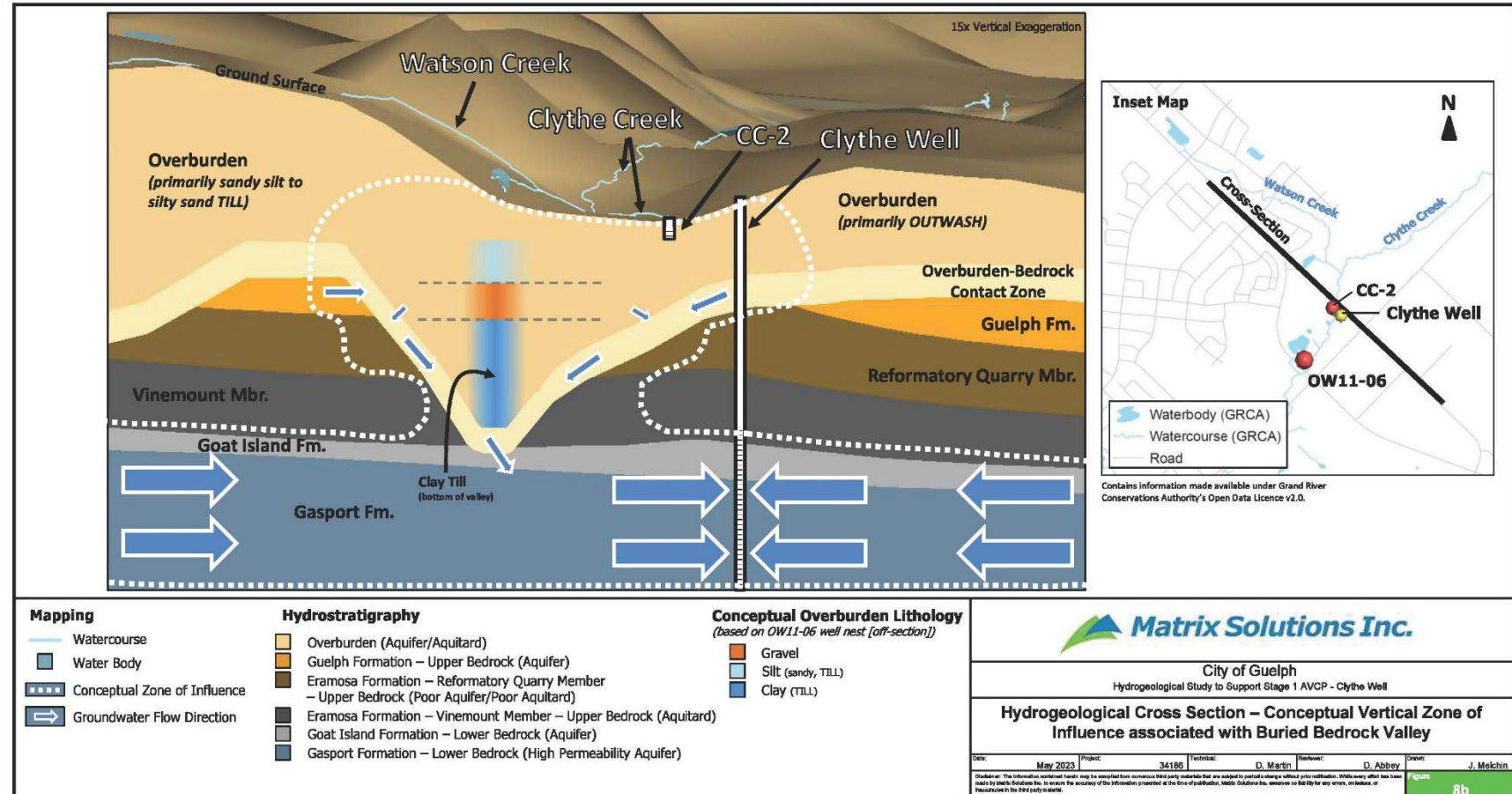


Summary of Stage 1 AVCP Results



Conclusions and Recommendations

- Continue to monitor surface and groundwater levels
- Put the well into long-term operation for a minimum of 2-years
- Complete “Enhanced Monitoring Program”



What's Next?

- Renew PTTW (2024)
- Build Water Treatment Plant (2027)
- Complete Stage 2 AVCP following construction of the WTP



Guelph

Thanks to contributing Partners:



Questions/Comments

