DILLON CONSULTING

TAGGART INVESTMENTS AND ALGONQUINS OF ONTARIO

Tewin Lands

Existing Conditions Hydrogeological Study

April 2024 (Revised March 2025) – 22-3674

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1.0 Introduction

This Tewin Lands: Existing Conditions Hydrogeological Study is part of a set of technical reports which have been prepared as part of Phase 1 of the Tewin study process. The Tewin Study Area ("Study Area") lands were identified as a future urban development area in the new City of Ottawa Official Plan (2022). The Study Area is located in southeast Ottawa, generally bordered by Leitrim Road to the north, Farmers Way to the east, Thunder Road to the south, and Anderson Road and Ramsayville Road to the west. The Study Area is outlined in Figure 1. These technical reports are intended to establish an understanding of the existing physical, social and ecological conditions that characterize the Study Area. Where appropriate, these reports also identify preliminary opportunities to help guide the next phase of the master planning process.

This information will be used to identify opportunities and strategic considerations that will inform the Tewin community design process going forward, as well as frame the preparation of additional site-specific technical studies and recommendation reports. Development at Tewin will explore new approaches to planning, design and development, including alternative strategies and solutions that can successfully implement the key community objectives.

1.1 Integrated Master Plan & Municipal Class EA Process

The ambition and scale of Tewin requires ongoing internal and external consultation. The purpose of the integrated Master Plan and Municipal Class EA process is to consolidate the various technical and community planning elements of the project to promote coordinated community engagement through streamlined and aligned decision making. This format will ensure critical partners, consultants and stakeholders are brought together at major milestones to identify and track challenges and opportunities through the development process.

The integrated Master Plan and Municipal Class EA process will include a public consultation strategy and technical study review timeline that achieves the requirements of the Master Plan and Municipal Class EA concurrently. The statutory Municipal Class EA meetings will be timed to align with the development of the community objectives, urban framework, preferred plans, and the draft secondary plan. Additional public and targeted consultations will be planned to complement the statutory consultation requirements. The development of the One Planet Action Plan (OPAP) will occur in parallel, with the final OPAP available at the time of final secondary plan Council approval. One Planet Living endorsement will follow Council approval of the secondary plan.

1.2 Tewin Overview and Community Vision

Tewin is planned to be a community of approximately 45,000 people and thousands of jobs. It will be more compact and dense than existing suburbs in Ottawa, with new urban areas integrated alongside valuable natural areas. Tewin will be an inclusive community, anchored in Algonquin wisdom and

placekeeping principles, and welcoming to all. The community will have a meaningful mix of land uses and support active mobility, to achieve a complete, future ready community. The Tewin Project Team and City of Ottawa have committed to exploring appropriate options, alternatives and standards to enable Tewin to become a model of best practices in sustainable and inclusive community design in the North American context.

The integrated Master Plan and Municipal Class EA process will bring together various technical and community planning considerations.

The key objectives for Tewin are to create a community that is:

- Anchored in Algonquin wisdom, principles and placekeeping;
- A benchmark for community design, demonstrating achievement of the 5 Big Moves identified in the Ottawa Official Plan;
- Mobility-oriented and supportive, promoting a broad range of active forms of movement, where personal vehicles are optional;
- Characterized by a meaningful mix of housing, community amenities, jobs and services in order to achieve a complete, future-ready community;
- Designed to protect and integrate alongside valuable natural areas and agricultural lands; and
- Affordable, inclusive, healthy, welcoming and accessible to all.

1.3 Tewin Intent: A Forward-Thinking Framework

Development at Tewin will explore new approaches to planning, design and development, finding successful options and alternatives to implement the key community objectives, in some cases likely going beyond what current development standards would allow for. The Tewin Project Team and the City of Ottawa have articulated these in the “Tewin Intent” which sets out the following:

1. Bold and Innovative Thinking:
Tewin is about creating a new kind of community, a future-focused model for smart, healthy and sustainable development. It will be a people-centred place that seeks to create the conditions for well-being. The Tewin Project Team will be open to bold ideas, innovative approaches, creative solutions, efficient use of land and resources, emerging technologies, smart city infrastructure that advances the City’s goals and objectives, and other future-forward ideas and opportunities that will enable Tewin to reach its full potential.

2. Integrating Algonquin Values and Principles:
Algonquin principles, values and teachings will guide the planning, consultation, design and development process for Tewin. The integration of Algonquin principles and design intentions will ensure the community is nature-based and sensitive to Mother Earth while creating capacity-building and economic development opportunities for the Algonquin people.

3. Sustainability and Resilience:
Tewin will be a model community that will position Ottawa as a leader in integrated sustainable design with the goal of being a resilient and holistic community. Tewin will be guided by the One Planet Living framework and Algonquin values of respect for the earth. The Community Design Plan will respond to the City's High Performance Development Standard and Climate Change Master Plan, and will result in a Community Energy Plan. A Community Energy Plan and performance-based sustainability metrics that address climate mitigation and adaptation, and the other categories of the High Performance Development Standards will be established from the start and monitored over time.

4. Systems-Based Environmental Planning
Tewin's organization and functions will be designed to respect nature and integrate natural features and landscapes into its form, character, and spirit. To that end, the Tewin Project Team is committed to pursuing a systems-based approach to natural heritage protection, environmental management, and water management in a way that is inclusive and integrated and encourages stewardship and a positive relationship with the natural world. Natural features are regarded as opportunities rather than constraints, will be woven into the fabric of the community, and will be central to its design and character.

5. Alternative Design Solutions:
Designing a community of the future requires progressive and forward-thinking infrastructure solutions. The Tewin Project Team is committed to being solutions-oriented and will consider alternative design and engineering standards that prioritize natural systems, pedestrians, cyclists and transit users, and which efficiently use available land and resources.

Surface water management strategies that achieve quality, conveyance and storage objectives will be based on the fundamentals of natural cycles, green/soft infrastructure, and multi-use opportunities that complement the human realm. Infrastructure design will consider the needs of those involved in the construction, operation and maintenance of municipal services to find opportunities to efficiently service the community and showcase sustainable practices while meeting the community's needs.

A framework for assessing alternative design standards will be established to consider and review alternatives against existing standards within the context of goals and objectives for the City and Tewin.

6. Cost-Effectiveness and Efficiency:
Tewin will demonstrate best practices in efficient and compact development. As a dense, mixed-use community of scale, Tewin will achieve a critical mass of people and jobs to support new infrastructure investments. The Tewin Project Team is committed to exploring opportunities to optimize the community's efficiency through a range of strategies, including prioritizing space-efficient modes of transportation, use of technology, green infrastructure, innovative construction practices, shared-use agreements, and mixed-use forms of development that will promote the efficient use and optimization

of land; housing affordability; and supporting the long-term financial viability of the community and city resources.

7. Integrated Planning Process:
We are committed to advancing Tewin through a comprehensive and integrated planning and environmental assessment process where possible or applicable. The process will bring together various planning, environmental, transportation, urban design, infrastructure, economic, financial, social and technical considerations. The process will be underpinned by engagement with the Algonquin people, other stakeholders, and the public.

8. Collaboration and Problem Solving:
The Tewin Project Team and City of Ottawa Project Team are committed to working collaboratively together to move Tewin forward in an expedited way. We will plan with a spirit of collaboration and joint problem-solving to ensure that the development of Tewin meets the best interests of the City of Ottawa and the Algonquins of Ontario.

9. Communication and Transparency
The Tewin Project Team and the City of Ottawa Project Team commit to open and transparent communication throughout the project. This will require proactively sharing information between the groups as decisions are made and to ensure relevant communication materials are distributed in a timely manner.

The Tewin Project Team and the City of Ottawa Project Team will ensure that all parties, including City Council, residents, and other stakeholders, are provided with pertinent details. Effective information sharing will ensure the project achieves outcomes that are, to the greatest extent possible, known by all involved.

1.4 Existing Conditions Technical Reports

A range of specialized consultants have been studying the physical environment of the Study Area to support community design, servicing strategies and the future development of Tewin. This data has been collected and reported on in a set of Existing Conditions and Opportunities Reports, of which this document is one. The full suite of reports includes the following:

- Tewin Existing Conditions and Preliminary Opportunities Report dated September 2024 and prepared by Urban Strategies
- Fluvial Geomorphology Study - Tewin Lands: Existing Conditions Summary Report - Bear Brook and Ramsay Creek Watersheds dated September 2024 and prepared by GEO Morphix Ltd.
- Tewin Lands: Existing Conditions Hydrogeological Study dated September 2024 and prepared by Dillon Consulting
- Existing Conditions - Geotechnical: Tewin Lands dated September 2024 and prepared by Paterson Group

- Tewin Lands: Natural Heritage Preliminary Existing Conditions Report dated April 2024 and prepared by Kilgour and Associates
- Tewin Lands: Cumulative Hydrologic Impact Assessment dated April 2024 and prepared by J.F. Sabourin and Associates
- Tewin Lands: 2021-22 Field Monitoring Report dated April 2024 and prepared by J.F. Sabourin and Associates
- Tewin Lands – Existing Conditions Water Budget dated September 2024 and prepared by J.F. Sabourin and Associates
- Tewin Mobility Existing Conditions dated May 2024 and prepared by CGH Transportation
- Stage 1 Archaeological Assessment Tewin Lands dated July 14, 2023 and prepared by WSP Canada Inc.

1.5 Framework for Identifying Preliminary Opportunities

Given the unique scale, vision and project goals for Tewin, as well as the shared commitment to exploring new ways of advancing the community design process as expressed in the Tewin Intent, the Phase 1 reports for Tewin include a discussion of potential opportunities to be explored in subsequent stages of the integrated Master Plan and Municipal Class EA process. The identification of preliminary constraints and opportunities, as well as a preliminary community structure, is required in Phase 1 of the integrated Master Plan and Municipal Class EA process as per specific Terms of Reference that were established for each of the Tewin planning, environmental and transportation studies.

The opportunities introduced within these reports are based on a series of key policy directions and strategic considerations, including:

- Ottawa's new Official Plan, which promotes the creation of complete, transit-supportive communities;
- Algonquin values and principles, underscored by respect for nature, integration of water, and planning the natural environment to achieve long-term vitality over many generations;
- The Tewin Intent, which promotes innovative thinking and alternative, performance-based solutions;
- One Planet Living, a holistic framework for achieving environmental resiliency, sustainable development, and reduced carbon emissions;
- Provincial policy direction focused on supporting housing development and facilitating growth, in order to address the province's housing supply challenges; and,
- An integrated, systems-based approach to planning at Tewin that brings together diverse planning, environmental, technical and economic considerations.

1.6 Tewin Lands: Existing Conditions Hydrogeological Study Introduction

Dillon Consulting Limited (Dillon) is part of the Tewin Lands consulting team responsible for completing existing conditions assessments for the future Tewin Lands area in Ottawa, Ontario. Dillon's scope of work was to complete an assessment of existing hydrogeological conditions within the Study Area. Additional land parcels to the west, east and southeast of the Study Area were also included as part of the assessment. The boundaries of the Study Area are shown on Figure 1.

The scope of work for the existing conditions hydrogeological assessment of the Study Area includes:

- A review of background records relevant to hydrogeology
- Borehole drilling, piezometer installation, groundwater level monitoring
- Development of a geological and a groundwater flow model
- Data interpretation (including select data provided by the broader consulting team) and reporting

The objective of this report is to provide an assessment of the existing hydrogeological conditions at the Study Area and identify preliminary potential issues to development, if any, along with potential mitigating measures.

2.0 Methodology

2.1 Literature Review

A literature review of available geological reports, scientific studies and local geological mapping was conducted to develop an understanding of geological and hydrogeological framework for the Tewin Study Area. Key sources that were reviewed are listed below:

- Ministry of the Environment, Conservation and Parks (MECP). 2018. Water Well Information System (Well Location and Summary). Time Period: 1899 – September 30, 2017 (Data Last Updated: February 2, 2018)
- South Nation Conservation Authority (SNCA). 2016. Source Protection Plan, Raisin-South Nation Source Protection Region – Version 1.4.0
- Rideau Valley Conservation Authority (RVCA). 2022. Mississippi-Rideau Source Protection Plan (approved) - Revision 1.3
- Ontario Geological Survey (OGS). 1997. Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14
- Ontario Geological Survey (OGS). 2003. Surficial Geology of Southern Ontario
- Ontario Geological Survey (OGS). 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release – Data 126-Revision 1. ISBN 978-1-4435-5704-7 (CD) ISBN 978-1-4435-5705-4 [zip file]
- Ontario Ministry of Natural Resources and Forestry (OMNR). 2022. Land Information Ontario (LIO) Warehouse, Data Class Name: Wetland Documentation

2.2 Field Activities

2.2.1 Drilling and Mini Piezometer Installation

Dillon and Paterson coordinated to implement a comprehensive drilling program across the Study Area and select adjacent properties. This included dozens of geotechnical boreholes, some installed with monitoring wells, that were completed by Paterson and 17 mini piezometers completed by Dillon targeting the perimeter of the Study Area and locations adjacent to surface water features within the neighbouring properties. Mini piezometers are shallow, small diameter monitoring wells that are completed by hand held equipment in areas where drill rig access is not practical. The mini piezometer locations were also coordinated with other members of the Tewin Lands consulting team such that collocated data could be collected (e.g., surface water gauges and groundwater monitoring locations).

Utility locating activities were conducted prior to the initiation of Dillon's intrusive activities. Premier Locates was retained by Dillon to complete public and private locates for each proposed drilling location. Utility locates for drilling locations were reviewed by Dillon personnel and subcontractors prior to undertaking ground breaking activities at the Study Area.

Boreholes for the mini piezometers were drilled by Ohlmann Geotechnical Services, a licensed well contractor, using a combination of a pionjar hand held drill and a hand-auger. During the drilling program, soil was logged for colour, grain size, moisture content, density, structures and textures. Piezometers were installed in each borehole within the shallow stratigraphy and intercepting the water table. The mini piezometers consisted of 32mm outside diameter; Schedule 40 PVC, with No.10 well screens connected to riser pipe.

A total of 17 mini piezometers were installed as part of Dillon's drilling program. These were installed on two separate occasions; late May and late June 2022. The mini piezometers were drilled to nominal depths ranging from approximately 1.7 to 2.4 meters below ground surface (m bgs). The location of Dillon's piezometers are shown on Figure 1 and borehole logs are included in Appendix A.

A summary of the findings from the geotechnical assessment can be found in the Paterson Group (2024) report.

2.2.2 Water Level Monitoring

To continuously monitor the water levels at each mini piezometer, as well as select geotechnical monitoring wells installed by Paterson, a Solinst Levelogger was installed at each location. The Leveloggers were programmed to record water column pressure at 5 minute intervals; a total of 34 Leveloggers were installed as part of the water level monitoring program, the locations are shown on Figure 1. A Solinst Barologger was installed at a location (Piezometer: P10) to record atmospheric pressure changes to allow for atmospheric compensation of the pressure head data collected by the Leveloggers. Manual water level measurements were taken at each data download event.

It is noted that on June 2nd, 2022, mini piezometer P7 was found to be broken and Levelogger missing.

2.2.3 Geological Model

A 3D geological model for the Study Area was generated using Leapfrog Works 2022.1 software, based on the lithological data collected at the time of drilling each mini piezometer (Dillon) and geotechnical piezometer (Paterson). A total of 112 borehole locations were incorporated into the model, in addition to DEM (Digital Elevation Model) data, topographic and surface water features. Using the borehole and elevation data, Leapfrog interpolates the geological layers and lateral extents into a three-dimensional geological model.

A finite-element mesh was then constructed in Leapfrog, incorporating a sufficient level of refinement (i.e., elemental sizing and node spacing) as a means to appropriately characterize varying geological/hydrogeological/hydrological conditions in pertinent areas of interest (e.g., surficial water features, inferred geological contacts). The geological model and finite-element mesh were then exported into FEFLOW for the development of a numerical groundwater flow model.

2.2.4 Groundwater Model

FEFLOW (Version 7.2) was used to develop the numerical groundwater flow model. This included assigning input parameters such as aquifer recharge rates, boundary conditions and hydraulic properties to corresponding elements and nodes within the flow model. FEFLOW simulations were run and parameters were adjusted to calibrate to model existing conditions (i.e., steady-state conditions based on the available ongoing monitoring data). The methodology and findings of the groundwater model is included as part of a technical memo in Appendix E.

2.2.5 Groundwater Quality

Dillon collected groundwater samples from four monitoring wells and one mini piezometer in January 2024, the sampling locations were selected based on spatial distribution across the Study Area. Groundwater samples were collected from monitoring wells BH14-22, BH22-22, BH47-22 and BH63-22 and, mini piezometer P2. Groundwater samples were collected with newly installed 13-mm LDPE tubing and a peristaltic pump. Samples analyzed for metal parameters were field filtered using 0.45-micron disposable filters.

Disposable nitrile gloves were used during sample collection and changed between each sample to minimize the potential for cross-contamination. Groundwater samples were collected directly into laboratory-supplied bottles and stored in a cooler containing ice. The groundwater samples were submitted to the analytical laboratory under the standard chain of custody procedures.

Six groundwater samples, including one field duplicate, were submitted for laboratory analysis, as summarized in the following table.

Table 1: Summary of Groundwater Samples Submitted for Laboratory Analysis

Sample ID	Laboratory Analyses	Additional Information
BH14-22	Anions, General Inorganics, Metals	-
BH22-22	Anions, General Inorganics, Metals	-
BH47-22	Anions, General Inorganics, Metals	-
BH63-22	Anions, General Inorganics, Metals	Field duplicate (Dup1) collected at this location
P2	Anions, General Inorganics, Metals	-

3.0 Findings

Results of the desktop literature review, drilling program, groundwater level monitoring, geological model and groundwater model are provided in the following sections.

3.1 Study Area Topography and Drainage

The ground surface within the Study Area generally slopes to the northwest from an elevation of approximately 80 metres above sea level (m asl) to 70 m asl. Within the Study Area, surface drainage is relatively poor, resulting in the development of saturated areas and ephemeral pooling of surface water.

More detailed mapping and characterization of the Study Area was completed by others on the Tewin Lands consulting team.

Surface water within the Study Area is interpreted to drain into two major surface water features; Ramsay Creek and Bear Brook. Ramsay Creek flows north from the northwestern portion of the Study Area, and Bear Brook cross cuts (north/south) an area east of the Study Area.

For further information on the surface water regime, please refer to the JFSA (2024) surface water and cumulative hydrologic impact assessment, and Geomorphix (2024) reports.

A topographic map of the Study Area is provided in Figure 2.

3.2 Background Geology and Hydrogeology

3.2.1 Regional Surficial Geology

Surficial geology of Southern Ontario mapping by OGS (2003), indicates the predominant surficial geology within the Study Area consist of fine textured glaciomarine deposits, composed of well laminated silt and clay with minor sand and gravel. These are indicative of the Champlain Sea sediments found throughout the Ottawa area. To the east/northeast of the Study Area, are coarse textured glaciomarine deltaic deposits composed of sand, gravel and minor silt and clay. To the west/southwest of the Study Area, coarse textured glaciomarine, foreshore and basinal deposits composed of sand, gravel and minor silt and clay occur.

Provincial surficial geological mapping is provided in Figure 3. Observations made during project drilling programs (Dillon and Paterson) are summarized in Section 3.3.1.

3.2.2 Regional Bedrock Geology

According to bedrock geology mapping of Ontario by OGS (2011), the Study Area is underlain by Upper Ordovician grey shale (with some dolomitic layers) of the Carlsbad Formation. Water Well Records (WWR) within the Study Area and surrounding properties show that bedrock is encountered at depths ranging from 34.8 m bgs to 51.1 m bgs.

3.2.3 Source Protection Area and Aquifer Vulnerability

According to the Source Protection Atlas by the Ministry of the Environment, Conservation and Parks (MECP), the Study Area is located within two Source Protection Areas. The Mississippi-Rideau Valley Source Protection Area (SPA) extends about 850 m south into the Study Area from the northwest boundary (Leitrim Road) and covers a relatively small area of approximately 1.7 km^2. The remainder of the Study Area lies in the Raisin-South Nation SPA.

The Study Area does not lie within a vulnerable aquifer, intake protection zone, or wellhead protection area as defined by the Mississippi-Rideau Valley and Raisin-South Nation Source Protection Plans; however, the majority of the area east and southwest of the Study Area, is classified as a Highly Vulnerable Aquifer zone with a vulnerability score of 6 in the Raisin-South Nation Source Protection Plan. The score of 6 is defined as an area where there may be some degree of natural protection overlying the aquifer (i.e., layers of clay), which can restrict vertical movement of contaminants.

3.2.4 Water Records Well Search

Water wells from the MECP Water Well Record database within the Study Area are summarized in Table 2, shown in Figure 4 and found in Appendix B. There were 22 well records identified with depths ranging from 1.5 m to 85.3 m. A total of seven water supply wells three active domestic wells and one abandoned domestic well were observed. A shallow sand unit encountered near surface was noted in seven records, with thicknesses ranging from 0.1 to 10.6m.

Note that the locations of the wells are based on the MECP water well record database, which often contains inaccurate location coordinates. Actual well locations and potential unregistered wells should be verified in the field, as needed.

Table 2 – Water Well Records

Well ID	Ground Elevation (masl)	Latitude	Longitude	Static Water Level (m)	Well Depth (m)	Sand Unit Depth (m)	Well Use
7053152	-	45.357	-75.529	1.75	5.49	0 - 1.22	-
7268066	-	45.358	-75.536		5.05	0.15 - 0.25	Monitoring
1516399	79.25	45.358	-75.536	1.24	42.36	-	Water Supply
1501573	77.72	45.357	-75.538	1.22	64.62	0 - 10.67	Water Supply
1511284	79.25	45.354	-75.519	2.13	85.34	-	Water Supply

1534582	82.3	45.349	-75.550	-	6.70	-	Domestic (abandoned)
1501575	82.3	45.346	-75.553	10.67	66.75	12.2 - 51.2	Water Supply
1501574	82.3	45.346	-75.551	3.05	47.55	0 - 1.22	Domestic
7271498	-	45.345	-75.545	-	-	-	-
1520517	-	45.345	-75.552	1.44	5.18	-	Water Supply
1527377	-	45.343	-75.549	2.44	7.01	0.30 - 1.82	Water Supply
7147912	-	45.351	-75.505	2.10	6.27	-	Domestic
7223479	-	45.349	-75.512	2.85	34.84	0 - 0.9	Water Supply
7138987	-	45.347	-75.512	-	6.10	-	-
1501578	80.16	45.347	-75.510	-	35.01	-	-
7168182	-	45.346	-75.519	-	5.79	-	-
1501579	80.77	45.339	-75.522	2.13	42.70	-	-
7240518	-	45.338	-75.521	-	5.49	-	-
1513762	81.08	45.330	-75.514	3.66	68.58	-	Domestic
7200420	-	45.337	-75.501	-	1.50	0 - 1.22	Monitoring
7347066	-	45.334	-75.495	-	-	-	-
7334281	-	45.334	-75.495	-	-	-	-

masl – Meters Above Sea Level

Note: all water wells installed in limestone bedrock except for 1520517, 1527377 and 7147912 (installed in grey clay)

3.3 Field Investigation

3.3.1 Geology

A total of 17 mini piezometers were installed as part of Dillon's drilling program. These were installed on two separate occasions in May and June 2022. As part of the mini piezometer installation, soil was logged for colour, grain size, moisture content, density, structures and textures. In addition to Dillon's subsurface investigation, Paterson drilled and installed numerous boreholes and geotechnical piezometers / monitoring wells within the Study Area boundary. Dillon's mini piezometers targeted areas close to surface water features and near areas of standing surface water within the Study Area and adjacent properties; Paterson's geotechnical piezometers / monitoring wells targeted areas within the Study Area boundaries. A total of 18 geotechnical monitoring wells installed by Paterson were included in Dillon's hydrogeological investigation. The geotechnical monitoring wells were selected due to depth, location and general Study Area coverage.

The field investigations completed by Dillon and Paterson indicated that the soil stratigraphy within the Study Area consists of two distinct units comprised of silty sand and silty clay. The overlaying silty sand unit was found at depths between surface and 3.0 m bgs. The underlying silty clay unit can be split into two distinct zones based primarily by colour; shallow brown and deeper grey. The brown colour suggests intermittent oxidative conditions within the clay. The brown clay is typically weathered and fractured. The brown silty clay was found at depths between surface and 3.8 m bgs. The grey colour in

the underlying clay suggests an anoxic environment with the degree of fractures quickly diminishing. The grey silty clay was found at depths between 0.7 and 47.6 m bgs.

Borehole logs detailing the construction and soil description in mini piezometers (Dillon) and geotechnical monitoring wells (Paterson) included in Dillon's hydrogeological investigation are found in Appendix A, with locations shown on Figure 1.

3.3.2 Groundwater: Elevations

Water level data was collected on numerous occasions from the mini piezometers and monitoring wells (Dillon's and Paterson's) within the Study Area since April 2022. Shallow piezometers and monitoring wells, as well as select collocated deep monitoring wells (i.e., nested monitoring wells), were selected as part of the monitoring program to monitor fluctuations in the water table. Water levels were monitored with the use of leveloggers to collect water column pressure data, and a barologger was installed within the Study Area (at P10) to allow for atmospheric pressure compensation of the data collected by the leveloggers. Manual water level measurements taken during the data download were used to calibrate the data collected from the leveloggers and to convert level measurements into groundwater elevations. The hydrographs produced are presented in Appendix C and water level elevations are shown on Table 3 below:

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Table 3 - Water Level Elevations

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Piezometer ID	Date	Water Level (masl)
P1 (silty clay)	June 28, 2022	77.01
	October 7, 2022	77.72
P2 (silty sand)	May 9, 2022	79.31
	June 2, 2022	79.60
	October 6, 2022	78.50
P3 (silty sand)	May 9, 2022	78.63
	June 2, 2022	79.72
	June 28, 2022	78.61
	October 6, 2022	77.95
P4 (silty clay)	May 3, 2022	72.84
	June 2, 2022	72.82
	October 6, 2022	72.45
P5 (silty clay)	May 3, 2022	73.08
	June 2, 2022	73.06
	October 6, 2022	72.86
P6 (silty clay)	May 3, 2022	75.23
	June 2, 2022	75.31
	October 7, 2022	75.00
P7 (silty clay)	May 3, 2022	77.76
	June 2, 2022	Destroyed
P8 (silty clay)	May 4, 2022	69.04
	June 2, 2022	70.30
	October 6, 2022	69.86
P9 (silty clay)	May 3, 2022	79.35
	June 2, 2022	79.14
	October 7, 2022	78.92
P10 (silty clay)	May 3, 2022	79.55
	June 2, 2022	79.60
	October 7, 2022	79.54
P11 (silty clay)	May 3, 2022	67.93
	June 2, 2022	67.90
	October 7, 2022	67.98
P12 (silty sand)	June 28, 2022	75.62
	October 7, 2022	76.29
P13 (silty sand)	July 5, 2022	76.35
	October 6, 2022	76.23
P14 (silty clay)	June 28, 2022	76.96
	October 5, 2022	77.26
P15 (silty sand)	June 28, 2022	76.64
	October 5, 2022	77.2
P16 (silty clay)	June 28, 2022	74.59
	October 5, 2022	75.36
P17 (silty sand)	July 5, 2022	76.42
	October 7, 2022	77.13

Piezometer ID	Date	Water Level (masl)
BH13A-22 (silty clay)	May 10, 2022	80.89
	May 27, 2022	80.79
	July 28, 2022	80.32
	October 5, 2022	80.28
BH13-22 (silty clay)	May 27, 2022	80.72
	July 28, 2022	80.29
	October 5, 2022	80.25
BH22A-22 (silty clay)	May 4, 2022	78.57
	May 27, 2022	78.04
	August 3, 2022	77.27
	October 6, 2022	77.11
BH26A-22 (silty sand)	August 8, 2022	79.1
	May 26, 2022	79.27
BH29A-22 (silty clay)	May 26, 2022	77.81
BH29-22 (silty clay)	May 11, 2022	78.09
	May 26, 2022	77.87
	August 8, 2022	77.73
	October 6, 2022	77.65
BH35A-22 (silty sand)	May 11, 2022	78.135
	May 24, 2022	78.24
	August 9, 2022	78.22
	October 6, 2022	77.46
BH38A-22 (silty clay)	May 11, 2022	76.89
	May 24, 2022	77.05
	August 9, 2022	76.96
	October 6, 2022	76.92
BH42A-22 (silty clay)	May 10, 2022	76.85
	May 26, 2022	76.78
	August 15, 2022	76.89
	October 5, 2022	76.86
BH45A-22 (silty clay)	April 14, 2022	79.87
	May 27, 2022	80.06
	October 5, 2022	79.17
BH47A-22 (silty sand)	April 14, 2022	78.79
	May 26, 2022	78.07
	August 15, 2022	77.75
	October 5, 2022	78.31
BH49A-22 (silty sand)	May 4, 2022	78.94
	May 27, 2022	78.94
	August 15, 2022	78.49
	October 5, 2022	78.48
BH49-22 (silty clay)	May 4, 2022	78.96
	May 27, 2022	78.91
	August 15, 2022	78.47
	October 5, 2022	78.29
BH56A-22 (silty sand)	May 10, 2022	80.09
	May 27, 2022	80.01
	August 12, 2022	79.35
	October 5, 2022	79.25
BH56-22 (silty clay)	May 11, 2022	79.90
	May 27, 2022	79.85
	August 12, 2022	79.29
	October 5, 2022	79.25
BH60A-22 (silty sand)	May 25, 2022	79.1
BH63A-22 (silty sand)	April 14, 2022	78.79
	May 25, 2022	78
	October 6, 2022	78.17

Notes:
MASL Meters Above Sea level

Daily precipitation measurements from the Ottawa International Airport Climate Station (Climate ID 6106001) were plotted on hydrographs to assess the influence of precipitation in water level elevations. The hydrographs indicate a strong correlation between water level elevations and daily precipitation volumes. The relationship between the two can be clearly observed in late July and early August, where two rainfall events in excess of 40 mm occurred. The late July and early August rainfall events increased water level elevations at nearly every monitoring location, with increases typically ranging from 5 cm to 50 cm; however, locations P5, P6, P8, BH13A-22, BH35A-22 and BH45A-22 recorded water level increases of nearly 100 cm.

Groundwater levels were observed to fluctuate according to rainfall events throughout the monitoring period; however, the increase in water level was not observed to be sustained. Rather, high water levels returned to pre-rainfall levels within a few days at most monitoring locations.

Data from mini piezometers located adjacent to surface water monitoring locations were compared to the surface water level data to illustrate the existing hydrogeological relationship of precipitation, groundwater, and surface water. Mini piezometer labels and corresponding adjacent surface water monitoring site labels are summarized in Table 4 below. The surface water monitoring locations are shown on Figure 1.

Table 4 – Piezometer and Adjacent Surface Water Monitoring Site Locations

Location	Mini Piezometer	Surface Water Monitoring Site
Location 1	P1	S7
Location 2	P4	S4
Location 3	P5	S4
Location 4	P6	S5
Location 5	P8	S3
Location 6	P9	S8
Location 7	BH22A-22	S6

In general, the hydrographs of the monitoring wells / piezometers and the surface water monitoring sites display very similar responses to precipitation events with a sharp in increase in water level following the major precipitation events throughout the monitoring period. At locations 2 through 7, the groundwater levels were consistently above the water levels reported at the surface water monitoring sites; typically between 0.5 m and 3 m, indicating the potential for groundwater discharge to surface water.

At location 1, the water level reported at surface monitoring site S7 is at a higher elevation than the groundwater level in the mini piezometer at P1 for most of the monitoring period, indicating a slight potential surface water recharge condition from surface water to groundwater. Therefore, there is a limited area to assess the groundwater and surface water interactions within Location 1; given that other surface water features (aside from Ramsay Creek, where only its headwaters fall within the Study Area) are ephemeral and/or poorly defined; additional monitors were not assessed to be useful.

Groundwater level data from nearby monitoring wells (BH13-22 and BH22-22) were also used to evaluate the existing groundwater conditions within Location 1.

During dryer months, water levels in both mini piezometers and surface water level monitoring locations were below the leveloggers for several periods, corresponding with no flow measurements at the stream gauges. Recorded periods with no stream flow, corresponding to low groundwater levels suggest that potential groundwater discharge conditions are not persistent (i.e., ephemeral/ intermittent) in Bear Brook. Hydrographs produced with a comparison between mini piezometer groundwater levels, adjacent surface water monitoring site water levels, and daily precipitation are presented in Appendix C.

Vertical gradients at three nested monitoring well locations were calculated and are summarized in Table 5 below. The shallow piezometers (indicated by the "A" in the name) were installed within the upper brown clay. The deep piezometers were installed in the deeper grey clay.

Table 5 – Nested Piezometer Vertical Gradients

Nested Piezometers	Vertical Gradient	
	May 2022	October 2022
BH13A-22 / BH13-22	0.02	0.01
BH29A-22 / BH29-22	-0.02	-0.03
BH49A-22 / BH49-22	0.01	0.06

Notes:
-Positive vertical gradient indicates a downward gradient
-Negative vertical gradient indicates an upward gradient

3.3.3 Groundwater: Laboratory Analysis

Groundwater samples were submitted to Paracel Laboratories in Ottawa, Ontario, for the chemical analysis as summarized in Section 2.2.5. Paracel Laboratories is accredited by the Canadian Association for Laboratory Accreditation (CALA) for the analytical testing completed as part of this investigation.

The groundwater analytical results are presented in Appendix D. Further monitoring and analysis of the groundwater quality within the Study Area will be completed during the future design phases of the development.

3.4 Geological Model

Using data collected during the drilling programs, the 3D geological model calculated the extent of the four lithologic layers (top soil, silty sand, brown silty clay and grey silty clay). The results from the model indicate that the grey and brown silty clay layers are laterally extensive throughout the Study Area, with the exception of the area near three monitoring wells in the northern portion of the Study Area (BH34-

22, BH35-22 and BH36-22) where only grey silty clay was noted to be present beneath the overlying sand.

The silty sand layer is also laterally extensive, with the exception of where the river channels appear to have eroded through the sand, and in select boreholes in the south (BH59-22, BH44-22, BH43-22, BH40-22, BH46-22, BH54-22, BH45-22 and BH48-22). The thickness of the silty sand layer was modeled to have a non-uniform thickness across the Study Area that ranged from 0 to 2.82 m. The silty sand unit as modeled, is shown on Figure 5. Cross-sections generated from the model are included in Appendix E.

This geological model was then used as a base framework for the hydrogeologic model in FEFLOW.

3.5 Groundwater Model

The findings of the groundwater model discussed in a technical memo are attached in Appendix F.

4.0 Discussion

4.1 Existing Hydrogeological Conditions

The intrusive field investigations and geological model indicate that a thin sand unit is present through most of the Study Area and the surrounding region, underlain by a thick clay unit that can be subdivided into a shallow upper brown silty clay and an underlying grey silty clay, as discussed in Section 3.3.1. The sand appears to act as the most active hydrogeological unit due to its permeability, while the underlying grey silty clay acts as a 'floor' with low permeability characteristics. The brown silty clay has a higher hydraulic conductivity than the underlying grey silty clay but the silty sand unit is significantly more permeable than the brown silty clay. The silty sand unit is somewhat discontinuous and in particular is very thin over large areas. Therefore, the significance of the silty sand unit to be a major groundwater flow pathway is limited.

The groundwater levels within the shallow overburden are subject to seasonal and precipitation changes; following a significant rain event, increases in the elevation of the water table by several tens of centimeters and in some areas up to 1 metre were measured, as noted in Section 3.3.2. However, the increased water levels were not sustained, indicating high hydrogeological activity within the shallow overburden. The silty clay underlying the sand unit suggests the shallow groundwater system is laterally active as the low permeability grey silty clay unit does not allow for significant vertical flow.

The groundwater flow system is therefore a shallow system and groundwater will discharge to local surface water features. The amount of baseflow groundwater discharge to surface is limited due to the relatively low permeability of the brown silty clay and the thin and discontinuous sand hydrostratigraphic unit.

4.2 Tewin Lands: Summary of Preliminary Opportunities

Based on the information provided in this report, the strategic planning and community design objectives for Tewin, and the commitment to exploring bold and innovative strategies for Tewin, the following section identifies a series of preliminary opportunities for consideration. These preliminary opportunities may help inform the next phase of the integrated master planning and EA process and can be used to frame community design options and technical solutions.

Overall, the hydrogeology of the development area is dominated by low permeability silty clay soils. There is no significant deep movement of groundwater due to a thick layer of very low permeability grey clay. The shallow groundwater flow system is dominated by horizontal movement towards surface water features. Development will alter the shallow groundwater flow system including the potential alterations to existing surface drainage features. The groundwater flow model will be used to simulate the effect of deeper sewers and changes to surface water features. While localized decreases in the water table is commonly observed in development projects in Ottawa, post-development water table

impacts will nonetheless be thoroughly assessed during future stages of the study to identify required impact mitigation measures. For example, strategies to manage surface water runoff and promote natural infiltration will be assessed and incorporated into the development during future phases of the project, as needed.

Due to the observed relatively low permeability and saturated nature of the majority of the soils located throughout the study area, infiltration-based LID measures are not expected to be generally adequate from a hydrogeological perspective. However, an evaluation of the effectiveness of LID measures will be required once the development plans are further advanced.

While small amounts of groundwater recharge and discharge associated with LIDs could potentially take place on a localized scale within the clay deposit, neither the topographical or geological conditions are suitable for recharge or discharge to be occurring on a large scale at the study area.

Shallow groundwater levels have fluctuated by up to 1 m, indicating seasonality effects. Additional water level monitoring data will be used to confirm the degree of seasonal water table fluctuations.

5.0 Reference

- Ministry of the Environment, Conservation and Parks (MECP). 2018. Water Well Information System (Well Location and Summary). Time Period: 1899 – September 30, 2017 (Data Last Updated: February 2, 2018)
- South Nation Conservation Authority (SNCA). 2016. Source Protection Plan, Raisin-South Nation Source Protection Region – Version 1.4.0
- Rideau Valley Conservation Authority (RVCA). 2022. Mississippi-Rideau Source Protection Plan (approved) - Revision 1.3
- Ontario Geological Survey (OGS). 1997. Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14
- Ontario Geological Survey (OGS). 2003. Surficial Geology of Southern Ontario
- Ontario Geological Survey (OGS). 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release – Data 126-Revision 1. ISBN 978-1-4435-5704-7 (CD) ISBN 978-1-4435-5705-4 [zip file]
- Ontario Ministry of Natural Resources and Forestry (OMNR). 2022. Land Information Ontario (LIO) Warehouse, Data Class Name: Wetland Documentation
- Paterson Group. 2024. Existing Conditions - Geotechnical: Tewin Lands
- J.F. Sabourin and Associates. 2024. Tewin Lands: 2021-22 Field Monitoring Report

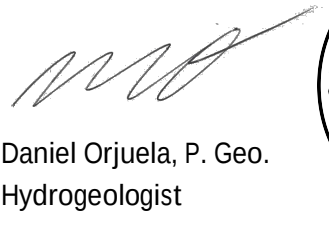
Closure

This report was prepared exclusively for the purposes, project, and project location outlined in the report. The report is based on available information provided to, or obtained by Dillon as indicated in the report and represents a reasonable review of this information within an established work scope, work schedule, and budget. In preparing this report, we have relied on data collected by others and we accept no responsibility for the accuracy and completeness of that data.

This report was prepared by Dillon for the sole benefit and use of Taggart Investments and Algonquins of Ontario. The material in it reflects Dillon's best judgment in light of the information available to it at the time of preparation. Any use that a third party makes of this report, or any reliance on or decision made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Respectfully Submitted,

DILLON CONSULTING LIMITED



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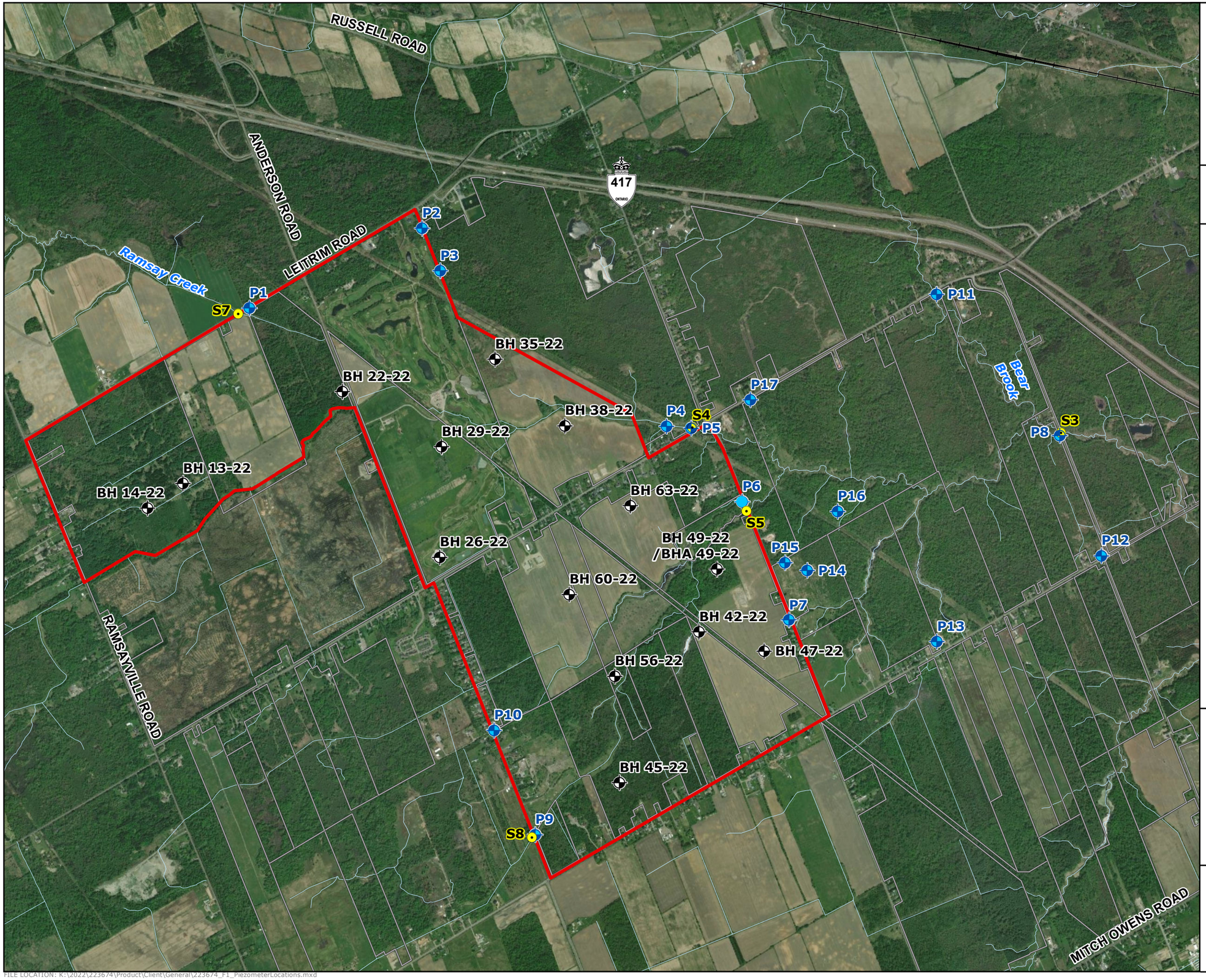
Figures

TEWIN HYDROGEOLOGY ASSESSMENT

PIEZOMETER AND SURFACE WATER MONITORING

FIGURE 1



- Borehole Locations (Paterson)
- Piezometer Location (Dillon)
- Surface Water Monitoring Sites (JFSA)
- Study Area
- Railway
- Watercourse
- Property Boundary

SCALE 1:23,000

0 0.25 0.5 1 km

N W E S

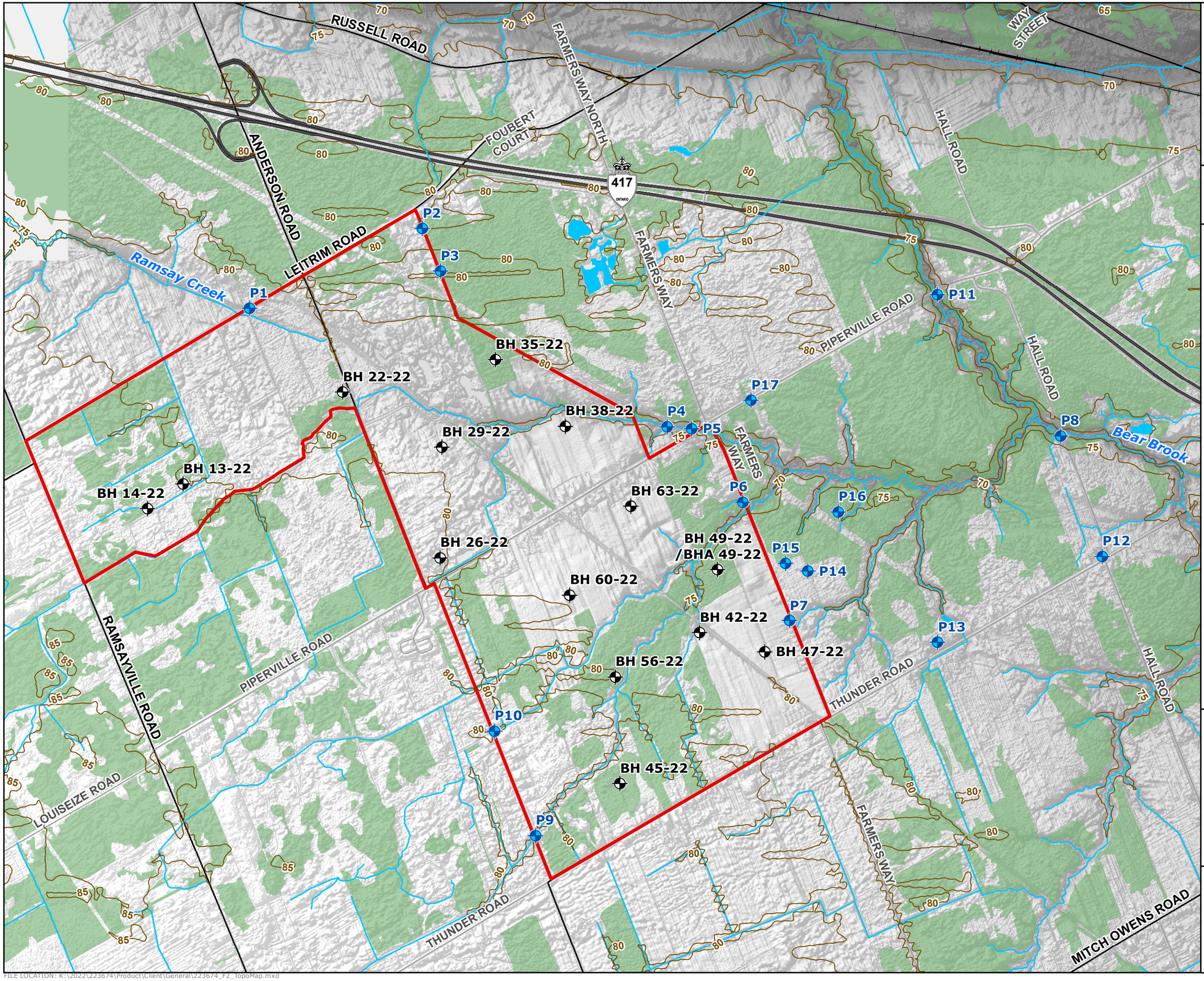
MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, Dillon Consulting Limited, Imagery by ESRI basemaps

MAP CREATED BY: LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 MTM 9

DILLON CONSULTING

PROJECT: 22-3674
STATUS: FINAL
DATE: 2024-04-24

FILE LOCATION: K:\2022\223674\Product\Client\General\223674_F1_PiezometerLocations.mxd



TEWIN HYDROGEOLOGY ASSESSMENT

TOPOGRAPHIC MAP

FIGURE 2

- Borehole Locations (Paterson)
- Piezometer Location (Dillon)
- Contour (LIO) [m]
- Study Area
- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Water Body
- Wooded Area

Elevation

- High : 119.27m

Low : 51.17m

SCALE 1:23,000

0 0.25 0.5 1 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, Dillon Consulting Limited, Elevation from JFSA, Imagery by ESRI basemaps

MAP CREATED BY: LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 MTM 9

DILLON CONSULTING

PROJECT: 22-3674
STATUS: FINAL
DATE: 2024-04-24

FILE LOCATION: K:\2022\223674\Product\Client\General\223674_F2_TopoMap.mxd

TEWIN HYDROGEOLOGY ASSESSMENT

SURFICIAL GEOLOGY

FIGURE 3

- Borehole Locations (Paterson)
- Piezometer Location (Dillon)
- Study Area
- Highway
- Major Road
- Minor Road
- Railway
- Property Boundary

Surficial Geology

- 10a: Massive-well laminated
- 11a: Deltaic deposits
- 11c: Foreshore-basinal deposits
- 12: Older alluvial deposits
- 17: Eolian deposits
- 20: Organic deposits

SCALE 1:23,000

0 0.25 0.5 1 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, Dillon Consulting Limited, MRD128 Ontario Surficial Geology, Imagery by ESRI basemaps

MAP CREATED BY: LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 MTM 9

DILLON CONSULTING

PROJECT: 22-3674
STATUS: FINAL
DATE: 2024-04-24

FILE LOCATION: K:\2022\223674\Product\Client\General\223674_F3_SurficialGeology.mxd

TEWIN HYDROGEOLOGY ASSESSMENT

WELL WATER RECORDS

FIGURE 4

- Well Water Record
- Study Area
- Railway
- Property Boundary

SCALE 1:30,000

0 0.25 0.5 1 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, Dillon Consulting Limited, Ontario Well Water Inrformation System 2022, Imagery by ESRI basemaps

MAP CREATED BY: LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 MTM 9

DILLON CONSULTING

PROJECT: 22-3674
STATUS: FINAL
DATE: 2024-04-24

FILE LOCATION: K:\2022\223674\Product\Client\General\223674_G1_WellWaterRecords.mxd

TEWIN HYDROGEOLOGY ASSESSMENT

SAND THICKNESS

FIGURE 5

- Borehole Locations (Paterson)
- Piezometer Location (Dillon)
- Sand Sample Point (Thickness Value)
- Study Area
- Highway
- Major Road
- Minor Road
- Watercourse
- Property Boundary

Sand Layer Thickness (m)

High : 2.77

Low : 0.00

SCALE 1:23,000

0 0.25 0.5 1 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, Dillon Consulting Limited, MRD128 Ontario Surficial Geology, Imagery by ESRI basemaps

MAP CREATED BY: LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 MTM 9

DILLON CONSULTING

PROJECT: 22-3674
STATUS: FINAL
DATE: 2024-04-24

FILE LOCATION: K:\2022\223674\Product\Client\General\223674_F4_SandThickness.mxd

Appendix A

Borehole Logs

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-6-28 Date Completed: 22-6-28

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
	Elevation (m): 78.22			
	Topsoil Dark brown, some fine grained sand, rootlets		Solid PVC through bentonite seal	
	Sand Medium brown, fine grained, some minor grey clay	0.2		78.0
0.5			Solid PVC through fine sand pack	
				77.5
	Clay Grey clay, high content of fine grained brown sand, damp to dry Damp to wet on 0.91 m bgs	0.74		
1.0				
	No sand present, increased silt content, damp to wet at 1.22 m bgs			77.0
			Slotted PVC through fine sand pack	
1.5				
	Transition to wet at 1.57 m bgs			76.5
2.0	Transition to saturated at 1.98 m bgs			
	Notes: Borehole terminated at 2.21 m bgs	2.21		

Lithology
Method

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-9 Date Completed: 22-5-9

Depth (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Method	Elevation (m)
	Elevation (m): 79.59					
	Top Soil Dark brown, wet, roots present			Solid PVC through bentonite seal		79.5
	Sand Medium brown, fine grained, transitions from wet to saturated at 0.46 m bgs, loose		0.2	Solid PVC through fine sand pack		79.0
0.5						
1.0				Slotted PVC through fine sand pack		78.5
1.5						78.0
			1.83			

Notes:
Borehole terminated at 2.44 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Organics, Sand

SAMPLE TYPE: Split Spoon, Manual Auger

P3

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-9 Date Completed: 22-5-9

Depth (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Method	Elevation (m)
0.5	**Sand** Medium brown, fine grained, damp to wet			Solid PVC through bentonite seal Solid PVC through fine sand pack		
			0.91			
1.0	**Clay** Brown, some sand throughout Increased clay content below 1.12 m bgs			Slotted PVC through fine sand pack		
1.5	Transitions from brown to grey, increased silt content below 1.5 m bgs					
			1.73			

Notes:
Borehole terminated at 2.44 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Sand; Sandy Clay

SAMPLE TYPE: Split Spoon

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-4-28 Date Completed: 22-4-28

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Method	Elevation (m)
	Elevation (m): 73.97				
	Top Soil Dark brown, sandy with organics, damp to dry				
	Sand Medium grained, some clay lenses, damp to dry	0.23			
0.5			Solid PVC through bentonite seal		73.5
1.0					73.0
	Clay Grey, increased sand content between 1.27 - 1.52 m bgs	1.27	Solid PVC through fine sand pack		
1.5	Transition from wet to saturated at 1.52 m bgs				72.5
2.0			Slotted PVC through fine sand pack		72.0
		2.44			

Notes:
Borehole terminated at 2.44 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Organics; Sand; Sandy Clay

SAMPLE TYPE: Split Spoon; Manual Auger

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-4-28 Date Completed: 22-4-28

Depth (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Method	Elevation (m)
	Elevation (m): 73.57					
0.5	**Clay** Brown-grey, damp transitioning to wet at 0.9 m bgs, soft			Solid PVC through bentonite seal		73.5
						73.0
1.0	Grey sand lens from 1.07 - 1.19 m bgs Transition from wet to saturated at 1.19 m bgs			Solid PVC through fine sand pack		72.5
1.5				Slotted PVC through fine sand pack		72.0
			1.83			

Notes:
Borehole terminated at 2.44 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Clay

SAMPLE TYPE: Split Spoon; Manual Auger

P6

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-21 Date Completed: 22-5-21

Elevation (m): 76.17

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
	Top Soil Sandy with rootlets and organics	0.08	Solid PVC through bentonite seal	76.0
	Sand Fine grained, some wood material present	0.33		
0.5	**Clay** Dark brown-grey with some spots of rust color, dry to damp between 0.33 to 0.53 m bgs		Solid PVC through fine sand pack	75.5
1.0	Becomes wet at 1.1 m bgs			75.0
1.5	Transition from wet to saturated and becomes more compact at 1.52 m bgs		Slotted PVC through fine sand pack	74.5
2.0				74.0
	Note: Borehole terminated at 2.21 mbgs	2.21		

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Split Spoon, Manual Auger

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

P7

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-2
Date Completed: 22-5-2

Elevation (m): 78.35

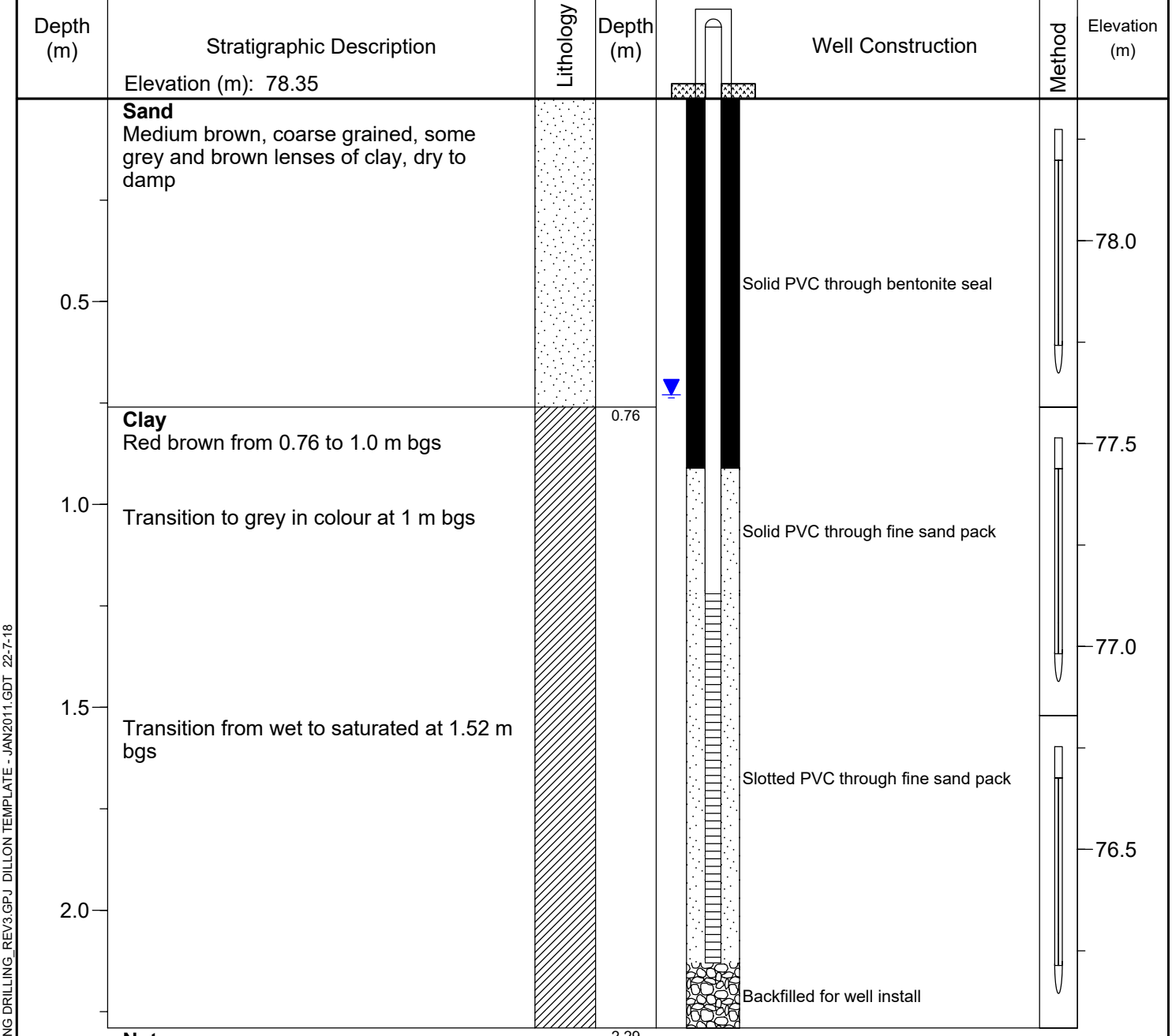
Sand
Medium brown, coarse grained, some grey and brown lenses of clay, dry to damp

Clay
Red brown from 0.76 to 1.0 m bgs

Transition to grey in colour at 1 m bgs

Transition from wet to saturated at 1.52 m bgs

Notes:
Borehole terminated at 2.29 m bgs
Borehole backfilled to 2.13 m bgs for well install



Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Sand, Clay

SAMPLE TYPE: Split Spoon

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-4 Date Completed: 22-5-4

Elevation (m): 70.79

Top Soil
Dark brown, sandy with organics and rootlets

0.15

Sand
Reddish brown, sand, high clay content between 0.15 - 0.32 m bgs, damp

0.5

0.76

Clay
Red-brown transition to grey at 1.27 m bgs

1.0

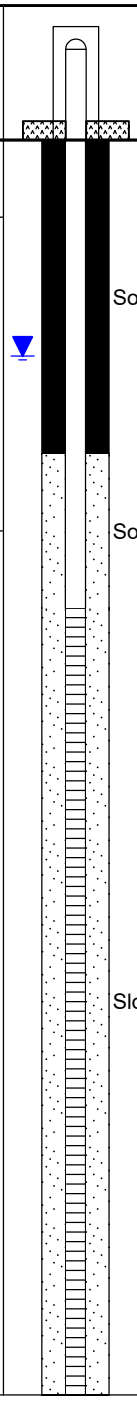
1.5

Increased silt content and saturated below 1.75 m bgs

2.0

2.44

Notes:
Borehole terminated at 2.44 m bgs



70.5
70.0
69.5
69.0
68.5

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Split Spoon, Manual Auger

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-4-28 Date Completed: 22-4-28

Elevation (m): 80.70

Depth (m)	Stratigraphic Description	Depth (m)
	Top Soil Dark brown, sand, clay and gravel present, rootlets present, dry to damp	
	Sand Medium brown, fine grained	0.24
1.0	**Clay** Red brown, damp to wet	1.09
1.5	Transitions to red/brown/grey	
2.0		2.13

Well Construction: Solid PVC through bentonite seal; Solid PVC through fine sand pack; Slotted PVC through fine sand pack

Method

Elevation (m): 80.5, 80.0, 79.5, 79.0

Notes:
Borehole terminated at 2.13 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Split Spoon

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-2 Date Completed: 22-5-2

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
	Elevation (m): 80.49			
	Top Soil Dark brown, some sand and organics, dry to damp			
0.5	**Sand** Light brown, medium grained, transitioning from dry/damp to saturated at 0.76 m bgs	0.3	Solid PVC through bentonite seal	80.0
1.0	**Clay** Grey-red-brown clay, wet to saturated, compact	0.89	Solid PVC through fine sand pack	79.5
1.5				79.0
2.0			Slotted PVC through fine sand pack	78.5
	Notes: Borehole terminated at 2.44 m bgs	2.44		

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Split Spoon, Manual Auger

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Pionjar - Split Spoon
Supervised by: EB
Date Started: 22-5-2 Date Completed: 22-5-2

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
	Elevation (m): 69.02			69.0
0.5	**Sand** Light brown to grey, fine grained, some clay and silt throughout Transition from dry to damp at 0.61 m bgs		Solid PVC through bentonite seal	68.5
1.0		1.02		68.0
1.5	**Clay** Dark grey, becoming lighter grey at 1.22 m bgs Increased silt and sand content below 1.63 m bgs		Solid PVC through fine sand pack	67.5
2.0	Transition from damp to wet at 1.83 m bgs, becomes soft with increased moisture content		Slotted PVC through fine sand pack	67.0
	Notes: Borehole terminated at 2.44 m bgs	2.44		

Static Water Level (June 2. 2022)

LITHOLOGY SYMBOLS: Sand, Clay

SAMPLE TYPE: Split Spoon, Manual Auger

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

P12

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-6-28 Date Completed: 22-6-28

Elevation (m): 77.47

Depth (m)	Stratigraphic Description	Depth (m)
	Topsoil	0.05
	Sand Brown, fine grained, some grey clay, damp to wet at 0.86 m bgs	
0.5		
	Clay Grey, some coarse grained sand and silt	0.91
1.0		
1.5	Transition from wet to saturated at 1.52 m bgs	
		1.98

Well Construction: Solid PVC through bentonite seal; Solid PVC through fine sand pack; Slotted PVC through fine sand pack

Method

Elevation (m): 77.0, 76.5, 76.0, 75.5

Notes:
Borehole terminated at 1.98 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

P13

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-7-5 Date Completed: 22-7-5

Elevation (m): 77.99

Depth (m)	Stratigraphic Description	Depth (m)
	Topsoil Dark brown, sandy, organics present	
	Sand Medium brown, fine grained, very compact, dry	0.2
1.5	**Clay** Brown-grey, high content of sand, damp to dry Damp at 1.37 m bgs Wet at 1.83 m bgs	1.22
2.0	**Notes:** Borehole terminated at 2.03 m bgs	2.03

Well Construction:
- Solid PVC through bentonite seal
- Solid PVC through fine sand pack
- Slotted PVC through fine sand pack

Elevation (m)
77.5
77.0
76.5
76.0

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-6-28 Date Completed: 22-6-28

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
	Elevation (m): 78.02			
	Topsoil Dark brown, organics present		Solid PVC through bentonite seal	78.0
	Sand Light brown, medium grained	0.3		
0.5	**Clay** Grey-red-brown, high content of sand, damp	0.46	Solid PVC through fine sand pack	77.5
1.0	Increasing silt content and less sandy, more compact, damp to wet at 0.91 m bgs		Slotted PVC through fine sand pack	77.0
1.5	Less compact, saturated at 1.37 m bgs			76.5
		1.65		

Notes:
Borehole terminated at 1.65 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

P15

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-6-28 Date Completed: 22-6-28

Elevation (m): 78.03

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
0	**Topsoil** Dark brown, organics present	0.15	Solid PVC through bentonite seal	78.0
0.5	**Sand** Medium brown, medium grained, some clay present, dry			77.5
	Darker brown, increased amount of sand content, becoming more compact, damp at 0.76 m bgs	0.91		
1.0	**Clay** Dark brown, high content of clay, damp, compact Becoming more sandy and silty at 1.1 m bgs		Slotted PVC through fine sand pack	77.0
1.5				76.5
	Lenses of grey sand present			
2.0	**Notes:** Borehole terminated at 2.01 m bgs	2.01		

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-6-28 Date Completed: 22-6-28

Depth (m)	Stratigraphic Description	Depth (m)	Well Construction	Elevation (m)
	Elevation (m): 76.17			
	Topsoil Dark brown, roots and organics			
	Sand Medium brown, fine grained, high content of silt	0.2	Solid PVC through bentonite seal	76.0
0.5	**Clay** Brown-grey, high content of sand, damp, compact	0.46		75.5
	Damp to wet, very compact at 0.76 m bgs			
1.0			Slotted PVC through fine sand pack	75.0
	More red brown than grey, becoming more compact at 1.22 m bgs			
1.5				74.5
	Light to medium brown, Increasing amounts of sand, saturated, loose at 1.71 m bgs			
		1.98		

Notes:
Borehole terminated at 1.98 m bgs

Lithology
Method

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

DILLON CONSULTING

Client: Taggart Investments and Algonquins of Ontario
Project: Tewin Hydrogeological Assessment
Project No.: 22-3674
Location: Ottawa, Ontario
Drilling Co.: OGS Inc.
Drilling Method: Hand Auger
Supervised by: EB
Date Started: 22-7-5 Date Completed: 22-7-5

Depth (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Method	Elevation (m)
	Elevation (m): 78.40					
	Topsoil Dark brown, some sand, rootlets and organics, dry			Solid PVC through bentonite seal		
	Sand Medium brown, fine grained, dry		0.3	Solid PVC through fine sand pack		78.0
0.5	increasing clay content at 0.61 m bgs					
	no clay content, medium grained between 0.91 to 1.22 m bgs					77.5
1.0				Slotted PVC through fine sand pack		
	Clay Brown and grey, high content of sand, damp to wet, soft		1.37			77.0
1.5	Transitioning to saturated at 1.73 m bgs Increasing silt content					76.5
2.0			2.06			

Notes:
Borehole terminated at 2.06 m bgs

DILLON MW DEPTH TEWIN SPRING DRILLING_REV3.GPJ DILLON TEMPLATE - JAN2011.GDT 22-7-18

Static Water Level (June 28. 2022)

LITHOLOGY SYMBOLS: Organics, Clay, Sand

SAMPLE TYPE: Auger

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

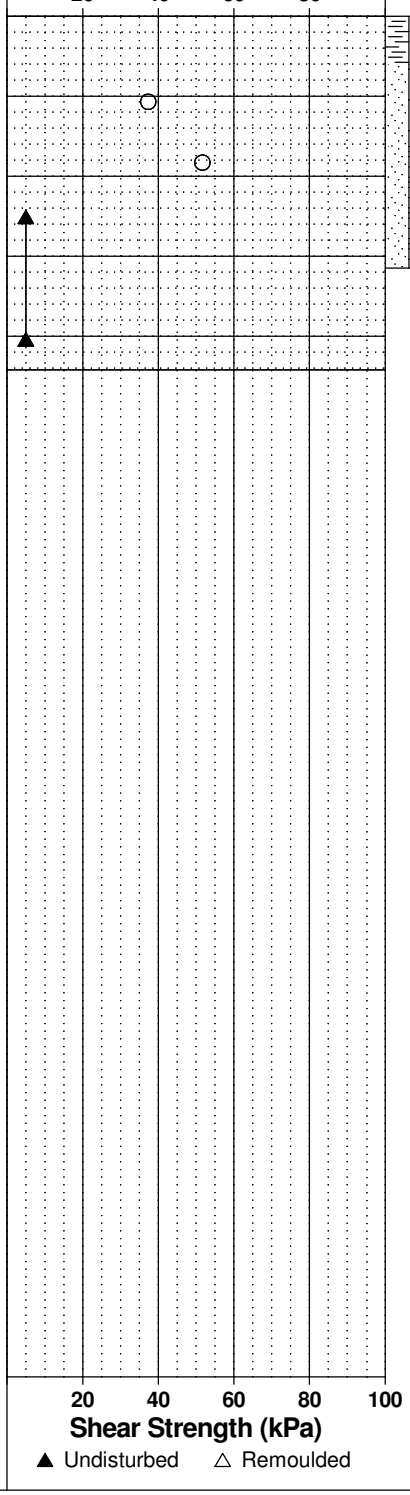
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 28, 2022

FILE NO. PG5827

HOLE NO. BH13A-22

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE										
TOPSOIL	0.20						0	80.97		
Brown **SILTY SAND** with clay	0.76		SS	1	42	P	1	79.97		
			SS	2	83	P	2	78.97		
Very stiff to stiff, brown **SILTY CLAY,** trace sand										
- very soft to soft and grey by 2.0m depth			TW	3	92		3	77.97		
	4.42						4	76.97		
End of Borehole										
(GWL @ 0.18m - May 27, 2022)										



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

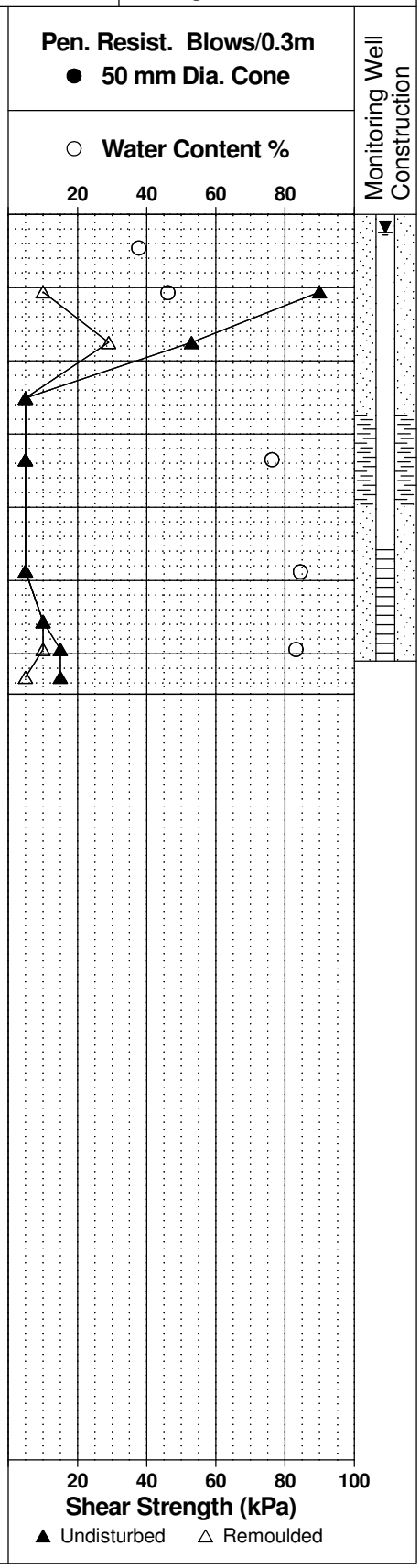
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 28, 2022

FILE NO. PG5827

HOLE NO. BH13-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	80.97
TOPSOIL 0.20		G	1				
Brown **SILTY SAND** with clay 0.76		SS	2	67	P	1	79.97
Very stiff to stiff, brown **SILTY CLAY,** trace sand						2	78.97
- very soft to soft and grey by 2.0m depth		SS	3	75	P	3	77.97
		SS	4	100	P	4	76.97
		G	5			5	75.97
6.55						6	74.97
End of Borehole							
(GWL @ 0.25m - May 27, 2022)							



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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 11, 2022

FILE NO. PG5827

HOLE NO. BH22A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.70
TOPSOIL 0.15		SS	1	50	3		
Loose, brown **SILTY SAND** 0.69		SS	2	67	3	1	77.70
Very stiff to stiff, brown **SILTY CLAY,** some sand seams		SS	3	100	P	2	76.70
- soft to firm and grey by 2.2m depth 2.90		TW	4	100			
End of Borehole							
(GWL @ 0.66m - May 27, 2022)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 6, 2022

FILE NO. PG5827

HOLE NO. BH26A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.15		SS	1	62	4	0	79.77
Loose, brown **SILTY SAND,** trace clay 0.30		SS	2	54	28	1	78.77
Very stiff, brown **SILTY CLAY** 0.91		SS	3	100	P	2	77.77
Compact, grey **SILTY SAND** 1.83		SS	4	100	P	3	76.77
Firm, grey **SILTY CLAY,** trace sand		TW	5	100			
3.66							
End of Borehole							
(GWL @ 0.50m - May 26, 2022)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**

20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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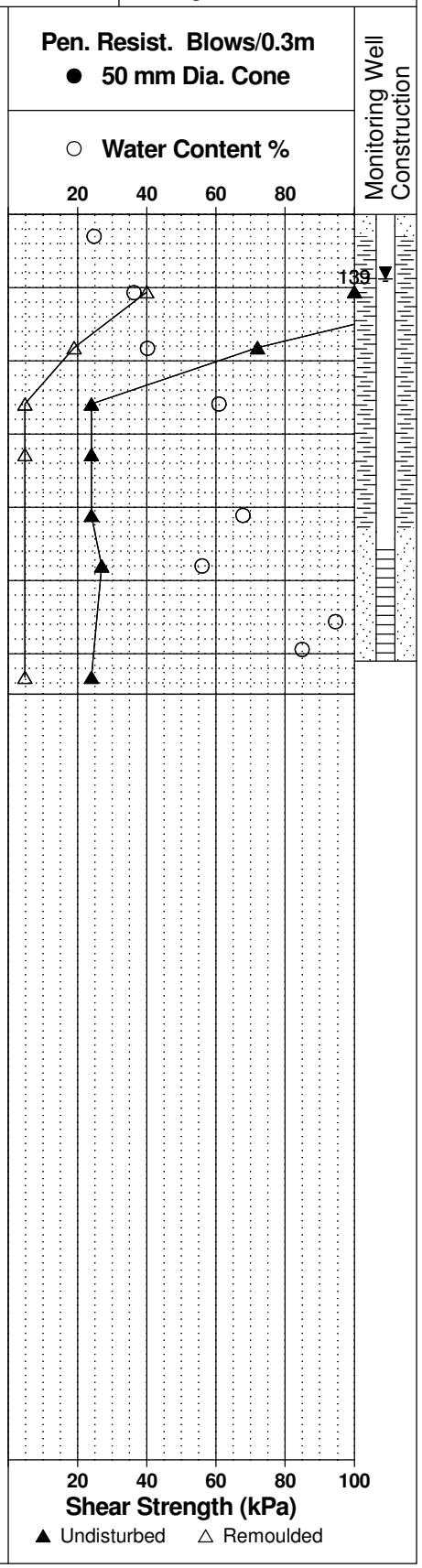
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 7, 2022

FILE NO. PG5827

HOLE NO. BH29-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.73
TOPSOIL 0.25		SS	1	25	7		
Brown **SILTY CLAY** with sand 0.69		SS	2	33	P	1	77.73
		SS	3	100	P	2	76.73
Very stiff to stiff, brown **SILTY CLAY**		SS	4	100	P		
		G	5			3	75.73
- soft and grey by 2.2m depth		SS	6	75	P	4	74.73
		G	7			5	73.73
		G	8				
		G	9			6	72.73
6.55							
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 13.82m depth, borehole terminated.							
(GWL @ 0.88m - May 26, 2022)							



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SOIL PROFILE AND TEST DATA

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DATUM Geodetic

REMARKS

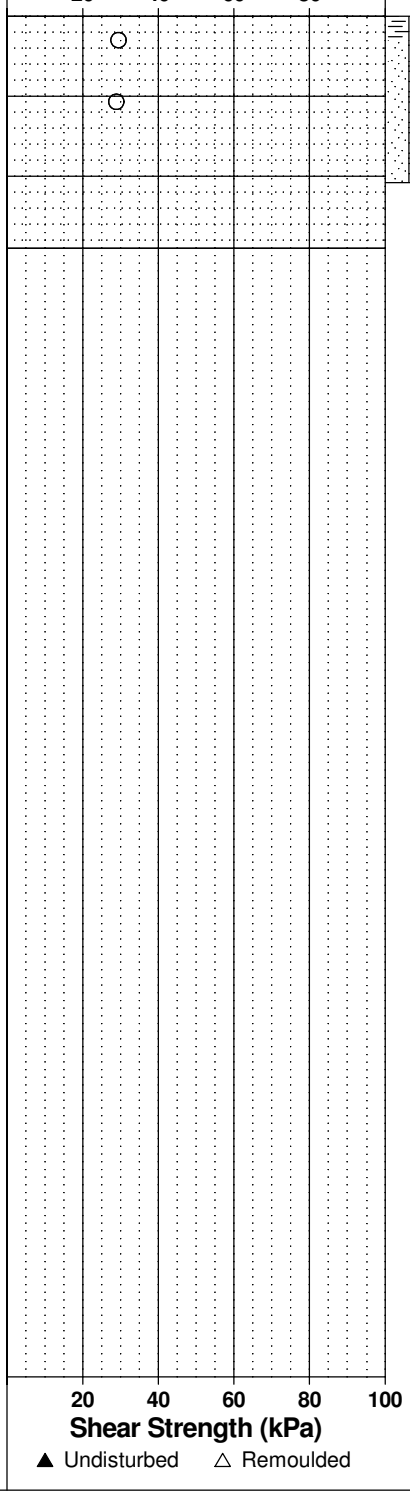
BORINGS BY Track-Mount Power Auger **DATE** April 7, 2022

FILE NO. PG5827

HOLE NO. BH29A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	78.73
TOPSOIL 0.25		SS	1	33			
Brown **SILTY CLAY** with sand 0.69						1	77.73
Very stiff to stiff, brown **SILTY CLAY**		SS	2	42	6		
- soft and grey by 2.2m depth		SS	3	0	0	2	76.73
2.90		SS	4	100	0		
End of Borehole							
(GWL @ 0.92m - May 26, 2022)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %



Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

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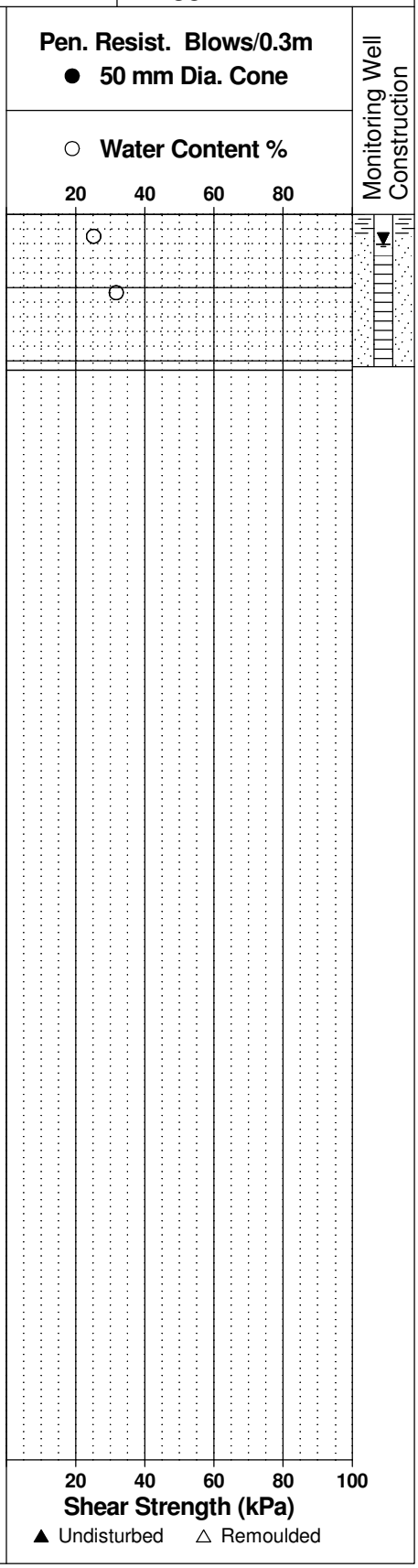
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 5, 2022

FILE NO. PG5827

HOLE NO. BH35A-22

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE								
TOPSOIL	0.15		SS	1	17	3	0	78.65
Loose, brown **SILTY SAND**	1.45		SS	2	42	6	1	77.65
Soft, grey **SILTY CLAY**	2.13		TW	3	100		2	76.65
End of Borehole								
(GWL @ 0.41m - May 24, 2022)								



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SOIL PROFILE AND TEST DATA

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Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger **DATE** April 1, 2022

FILE NO. PG5827

HOLE NO. BH38A-22

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE								
TOPSOIL	0.25		SS	1	42	24	0	77.77
Compact, brown **SILTY SAND**	0.69		SS	2	100	4	1	76.77
Very stiff to stiff, reddish brown **SILTY CLAY**			SS	3	100	P	2	75.77
- firm to soft by 1.5m depth			TW	4	100			
- grey by 2.2m depth			TW	5	100		3	74.77
	3.66							
End of Borehole								
(GWL @ 0.72m - May 24, 2022)								

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 17, 2022

FILE NO. PG5827

HOLE NO. BH42A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						0	77.61		
OVERBURDEN						1	76.61		
1.52						2	75.61		
Firm, grey **SILTY CLAY**		SS	1	100	P	3	74.61		
		SS	2	100	P	4	73.61		
4.42		TW	3	100					
End of Borehole									
(GWL @ 0.84m - May 26, 2022)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

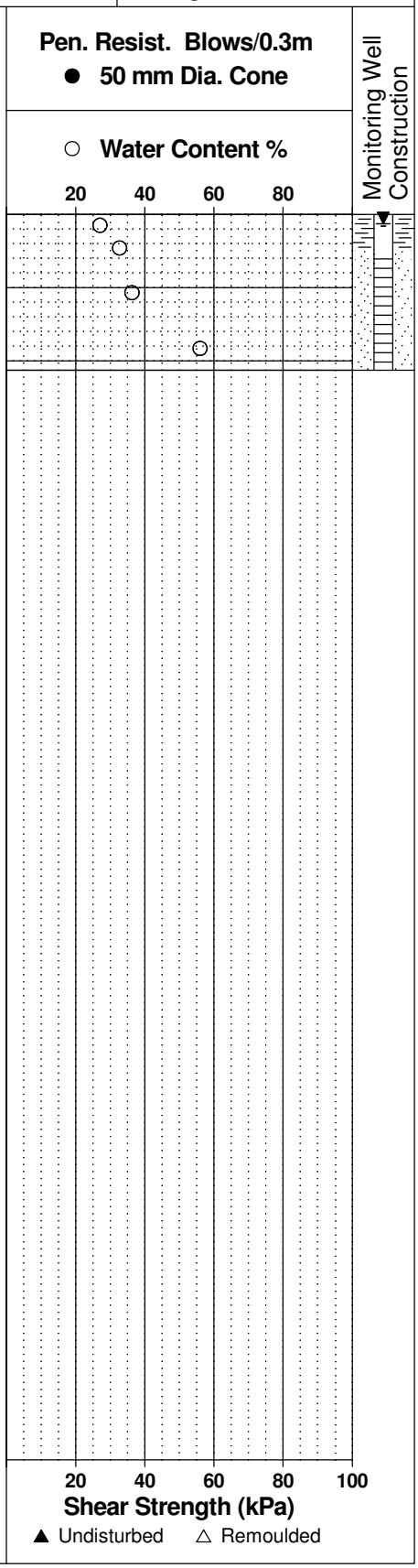
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 18, 2022

FILE NO. PG5827

HOLE NO. BH45A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.15		SS	1	33	2	0	80.19
Brown **SILTY SAND,** some clay 0.25							
Reddish brown **SILTY CLAY** with sand seams		SS	2	33	7	1	79.19
2.13		SS	3	100	0	2	78.19
End of Borehole							
(GWL @ 0.13m - May 27, 2022)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

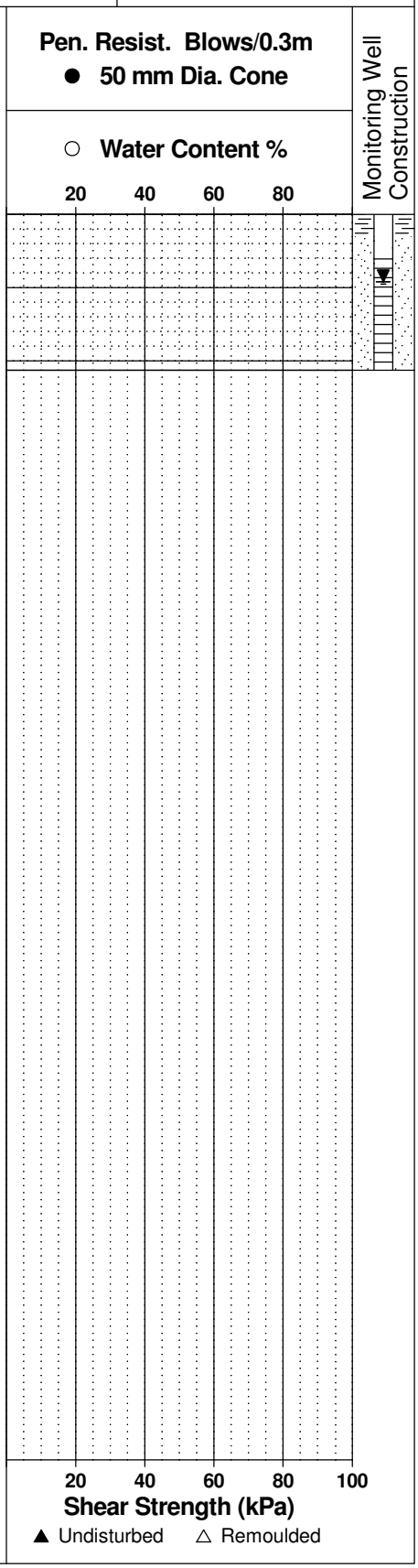
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 21, 2022

FILE NO. PG5827

HOLE NO. BH47A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						0	78.99		
OVERBURDEN						1	77.99		
2.13						2	76.99		
End of Borehole									
(GWL @ 0.92m - May 26, 2022)									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

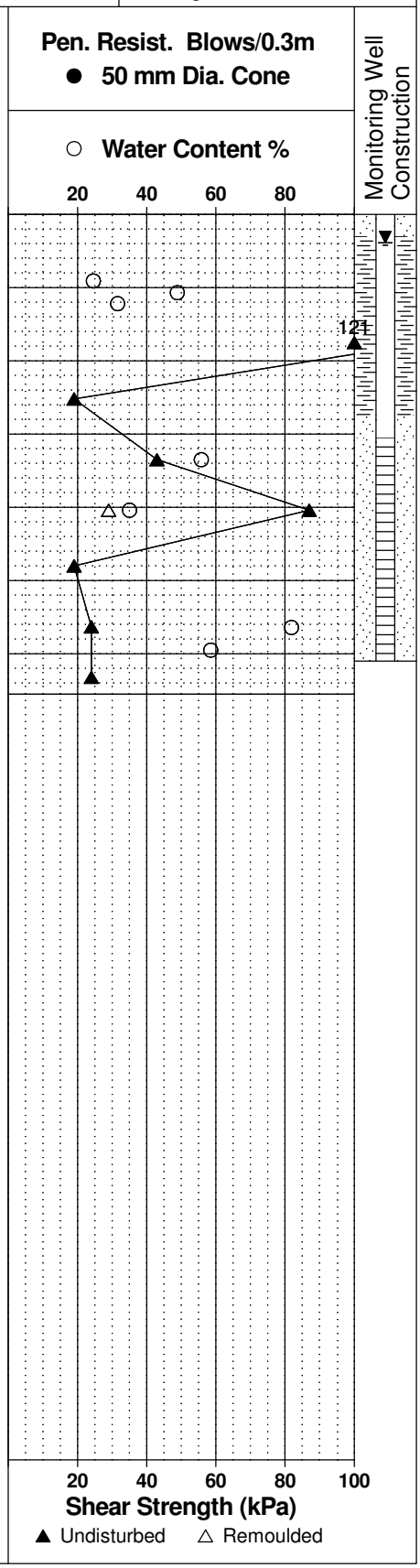
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 22, 2022

FILE NO. PG5827

HOLE NO. BH49-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	79.26
TOPSOIL 0.25		SS	1	0	3		
Compact, brown **SILTY SAND** 1.07		SS	2	83	11	1	78.26
Very stiff to stiff, brown **SILTY CLAY** with sand seams		G	3			2	77.26
- soft to firm and grey by 2.3m depth		G	4				
		SS	5	100	P	3	76.26
		G	6			4	75.26
		G	7			5	74.26
		SS	8	87	P		
		G	9			6	73.26
6.55							
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 10.97m depth, borehole terminated.							
(GWL @ 0.39m - May 27, 2022)							



patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

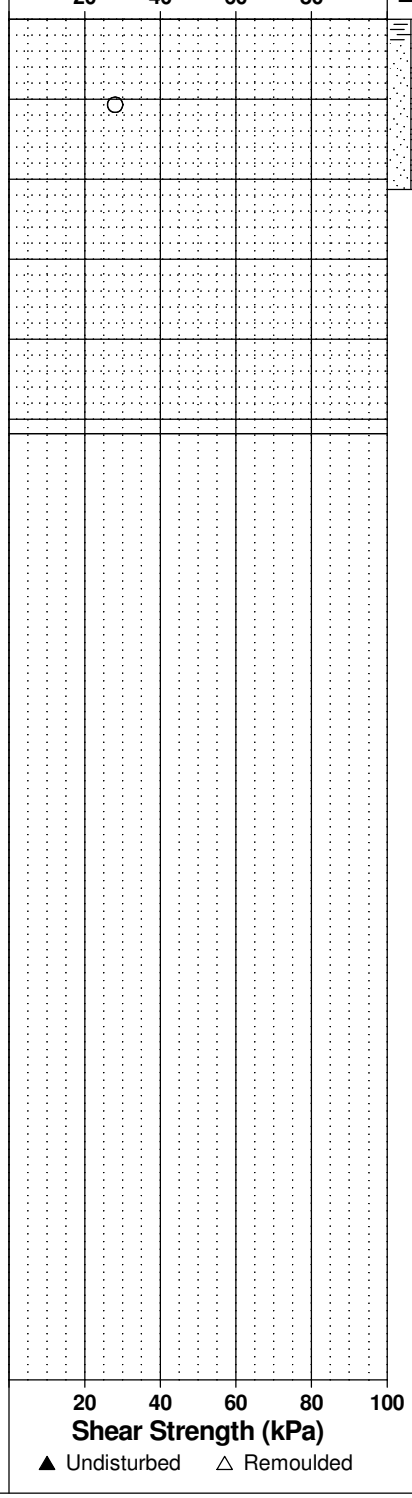
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 22, 2022

FILE NO. PG5827

HOLE NO. BH49A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						0	79.26		
Compact, brown **SILTY SAND**									
0.76									
Very stiff to stiff, brown **SILTY CLAY**		SS	1		10	1	78.26		
		SS	2						
- firm and grey by 2.3m depth						2	77.26		
		TW	3	92					
						3	76.26		
						4	75.26		
		TW	4	100		5	74.26		
5.18									
End of Borehole									
(GWL @ 0.36m - May 27, 2022)									



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 25, 2022

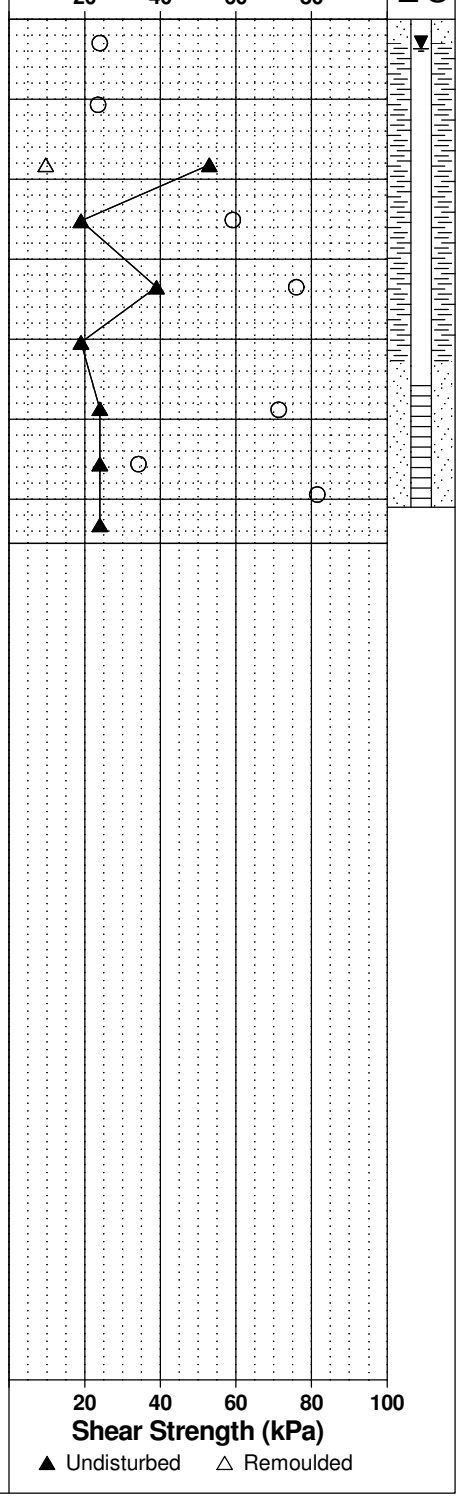
FILE NO. PG5827

HOLE NO. BH56-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	80.21
TOPSOIL 0.18		SS	1	8	2		
Very loose to compact, brown **SILTY SAND**		SS	2	42	10	1	79.21
1.45		SS	3	100	P	2	78.21
		G	4				
		SS	5	67	P	3	77.21
Stiff to soft, grey **SILTY CLAY**		G	6			4	76.21
		SS	7	67	P	5	75.21
		G	8				
		G	9			6	74.21
6.55							

Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 14.02m depth, borehole terminated.

(GWL @ 0.37m - May 27, 2022)



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

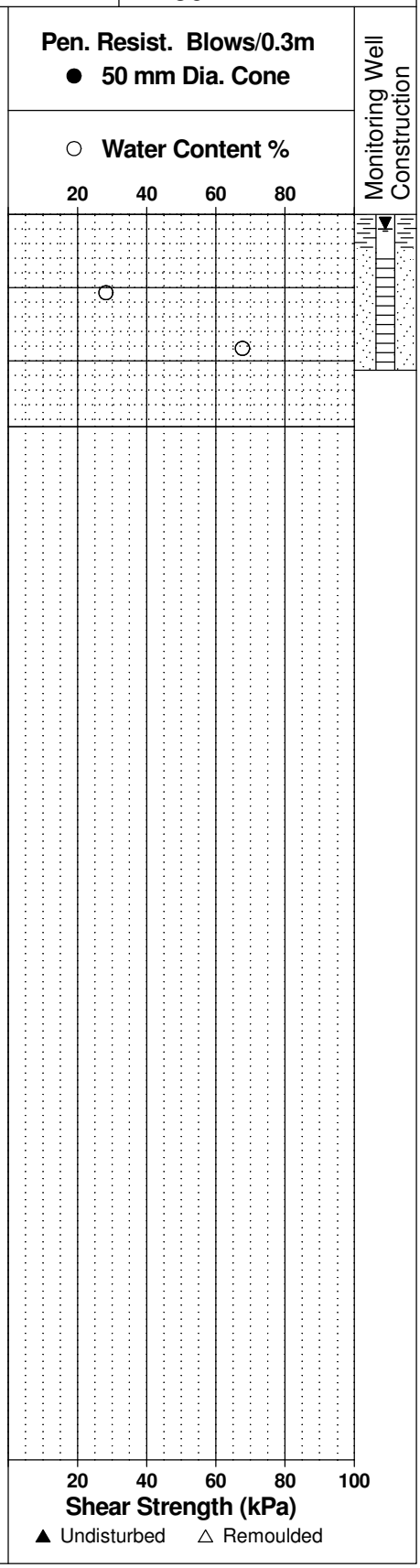
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 25, 2022

FILE NO. PG5827

HOLE NO. BH56A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	80.21
TOPSOIL 0.18							
Very loose to compact, brown **SILTY SAND**		SS	1	50	10	1	79.21
1.45							
Stiff to soft, grey **SILTY CLAY**		SS	2	100	P	2	78.21
		TW	3	100			
2.90							
End of Borehole							
(GWL @ 0.20m - May 27, 2022)							



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

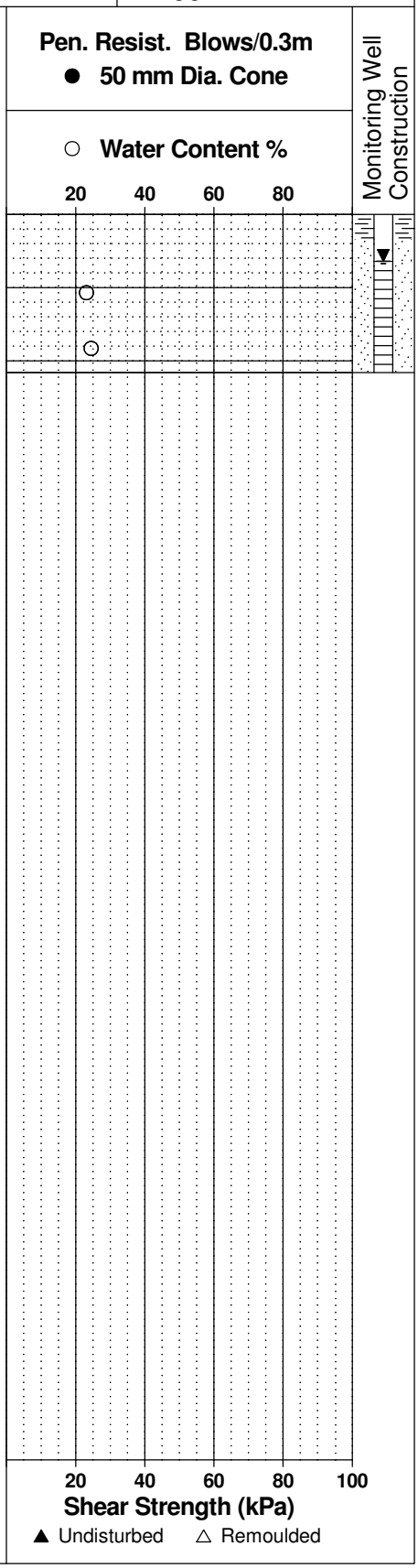
REMARKS

BORINGS BY Track-Mount Power Auger **DATE** March 29, 2022

FILE NO. PG5827

HOLE NO. BH60A-22

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	79.74
TOPSOIL 0.25							
Very stiff, brown **SILTY CLAY,** trace sand 0.69		SS	1	50	22	1	78.74
Compact, brown **SILTY SAND** 1.58							
Soft, grey **SILTY CLAY** 2.13		SS	2	8	P	2	77.74
End of Borehole							
(GWL @ 0.64m - May 25, 2022)							



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9 Auriga Drive, Ottawa, Ontario K2E 7T9

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Mixed-Use Community Development
Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS

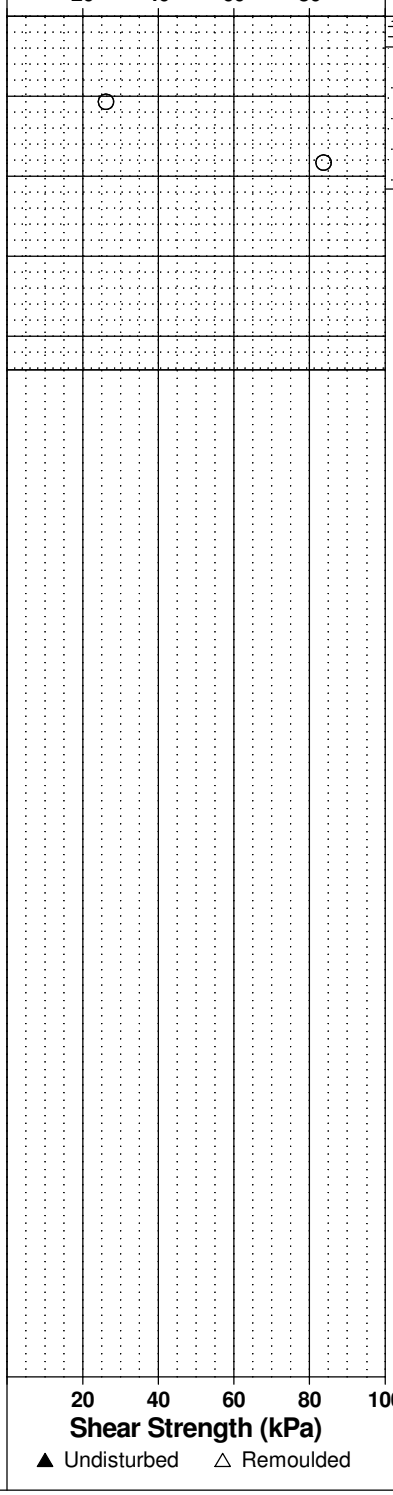
BORINGS BY Track-Mount Power Auger **DATE** March 30, 2022

FILE NO. PG5827

HOLE NO. BH63A-22

SOIL DESCRIPTION		STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							0	78.66
TOPSOIL	0.30							
Stiff, brown **SILTY CLAY**	0.69							
Compact, brown **SILTY SAND**	1.45		SS	1	33	14	1	77.66
			SS	2	33	P	2	76.66
Soft, grey **SILTY CLAY** with sand seams			TW	3	96		3	75.66
	4.42		SS	4	100	0	4	74.66
End of Borehole								
(GWL @ 0.66m - May 25, 2022)								

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %



Monitoring Well Construction

Appendix B

Water Well Records

Ontario — Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)*

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
4950 8th line Rd	Ottawa Region	13	Con 8 Parts 5

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Region	Carlsbad Spring	Ontario	K0A1K0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	459855	5021584	Plan SR 12245	

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Hole Plug	6 Bags	3/4	17	20
	Clean Native Clay			0	17
	Abandone 36 inch Diam Dug well Cement Casing 20 Ft Depth				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☒ Digging ☐ Air percussion ☐ Other, specify

Well Use

☐ Public ☐ Commercial ☒ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Status of Well

☐ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☒ Abandoned, other, specify — Not in use ☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: Fresh	Untested	Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

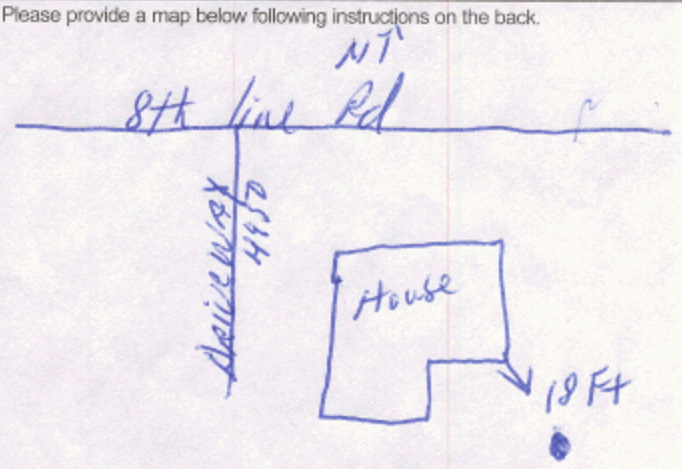
Well production (l/min / GPM)

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Raymond Pump + Well	7260

Business Address (Street Number/Name)	Municipality
147 main st, St Albert	Nation

Province	Postal Code	Business E-mail Address
Ontario	K0A3C0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139872399	Raymond Jacques

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0264		2009/12/04

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☒ No	2009/12/04	2009/12/04

Ministry Use Only

Audit No. Z099957

Received FEB 02 2010

0506E (12/2007)

Ministry's Copy

Ontario Ministry of the Environment

Well (number below) A 036935

A036935

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

5100 8th Line Cedarbrae Spring | Ottawa Carleton | 12 | 6

RR#/Street Number/Name: 5100 8th Line Cedarbrae Spring | City/Town/Village: Cedarbrae Springs | Site/Compartment/Block/Tract etc.: Part 6

GPS Reading: NAD 83 | Zone 18 | Easting 460365 | Northing 5021777 | Unit Make/Model: Spot Track | Mode of Operation: UTM | ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
Brown	Top Soil			0	46
Grey	Clay			46	690

Hole Diameter

Depth From	Depth To (Metres)	Diameter Centimetres

Water Record

Water found at 210 m | Kind of Water: ☑ Fresh ☐ Salty ☐ Gas ☐ Sulphur ☐ Minerals ☐ Other:

___ m | ☐ Fresh ☐ Salty ☐ Gas ☐ Sulphur ☐ Minerals ☐ Other:

___ m | ☐ Fresh ☐ Salty ☐ Gas ☐ Sulphur ☐ Minerals ☐ Other:

After test of well yield, water was: ☑ Clear and sediment free ☐ Other, specify

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
91	☐ Steel ☐ Fibreglass ☐ Plastic ☑ Concrete ☐ Galvanized	7	0	627
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method: Pump

Pump intake set at - (metres) 186 cm

Pumping rate - (litres/min) 11

Duration of pumping 1 hrs + ___ min

Final water level end of pumping ___ metres

Recommended pump type: ☑ Shallow ☐ Deep

Recommended pump depth. 602 cm metres

Recommended pump rate. 18 (litres/min)

If flowing give rate - (litres/min)

If pumping discontinued, give reason.

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level		395		
1		396	1	434
2		397	2	434
3		398	3	434
4		398	4	433
5		399	5	433
10		404	10	430
15		407	15	429
20		410	20	428
25		414	25	427
30		412	30	426
40		423	40	424
50		429	50	422
60		434	60	420

Plugging and Sealing Record ☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	300	Clay	60

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☑ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☑ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☑ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: Terry Jefforge | Well Contractor's Licence No.: 7199

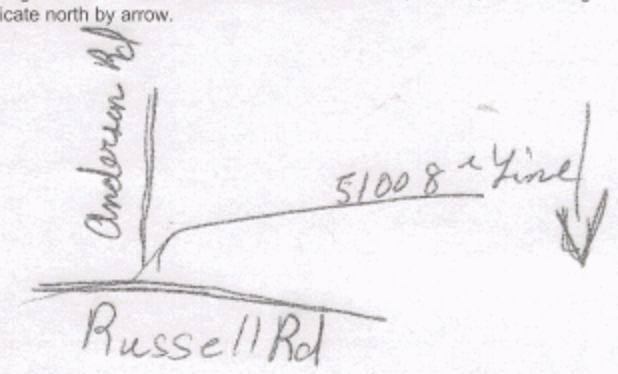
Business Address (street name, number, city etc.): Box 208 Clarence Creek

Name of Well Technician (last name, first name): Terry Jefforge | Well Technician's Licence No.: 7986

Signature of Technician/Contractor: X Terry Jefforge | Date Submitted YYYY MM DD: 2010 06 26

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 40786 | Date Well Completed YYYY MM DD: 2010 06 14

Was the well owner's information package delivered? ☐ Yes ☐ No | Date Delivered YYYY MM DD

Ministry Use Only

Data Source | Contractor

Date Received YYYY MM DD: JUL 08 2010 | Date of Inspection YYYY MM DD

Remarks | Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☑ Well Owner's Copy ☐ *Cette formule est disponible en français*

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
4794 8th line Rd	Ottawa Region	15	8
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
Ottawa Region	Carlsbad Spring	Ontario	K0A1K0
UTM Coordinates Zone / Easting / Northing	**Municipal Plan and Sublot Number**	**Other**	
NAD 83 18 459311 5021284			

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Native	Clay		3 cubic yard	0	15
Bentonite	Hole Plug		6 Bag	15	19

Decomitified Dug well 30 inch Diam Cement Casing, Depth 19 Ft Removed to Casing

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☒ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☒ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☒ Abandoned, other, *specify* NOT used
☐ Other, *specify* _____

Water Details

Water found at Depth (m/ft)	Kind of Water	Other, specify
☐ Gas	☐ Fresh ☐ Untested	
☐ Gas	☐ Fresh ☐ Untested	
☐ Gas	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

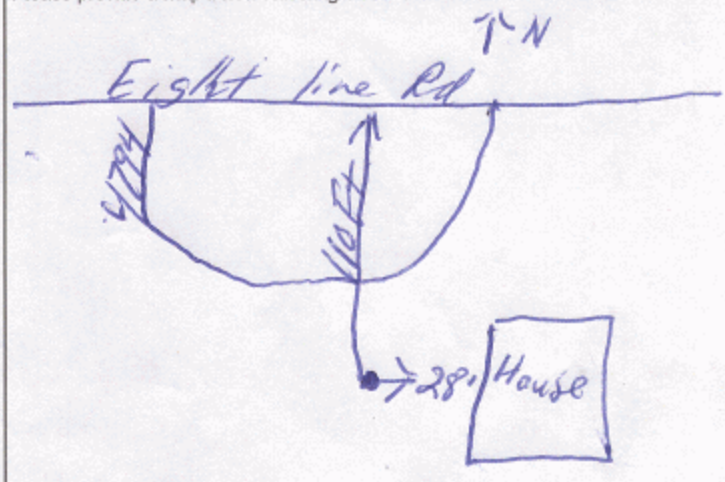
Well production *(l/min / GPM)*

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Raymond Pump + Well	7260
Business Address (Street Number/Name)	**Municipality**
147 main st, St Albert	Nation
Province	**Postal Code**	**Business E-mail Address**
Ontario	K0A3C0	
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
6139872399	Raymond Jacques
Well Technician's Licence No.	**Signature of Technician and/or Contractor**	**Date Submitted**
0264	[signature]	2011/05/17

Well owner's information package delivered: ☐ Yes ☒ No

Date Package Delivered: 2011/05/17

Date Work Completed: 2011/05/17

Ministry Use Only

Audit No. z128694

SEP 01 2011

Received

0506E (2007/12)

Ministry's Copy

Ontario — Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)* **Tag#: A141838** A141838

5-13803

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: [X] Metric [ ] Imperial

Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	Well Constructed by Well Owner
Capital region	Resource Recovery Centre ltd.		[ ]

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
708-225 Metcalfe St.	Ottawa	ON	K2P1P9	6134545850

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Frontier rd.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	446970	5026532		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
~~Gen~~ Brown	Sand			0	1.22
Red	clay			1.22	1.5

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
~~1.5~~	.31	Silica Sand	
.31	0	Bensea/	

Results of Well Yield Testing

After test of well yield, water was:
[ ] Clear and sand free
[ ] Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

Well production *(l/min / GPM)*

Disinfected? [ ] Yes [ ] No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Method of Construction

[ ] Cable Tool [ ] Diamond
[ ] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[X] Other, *specify* D.P.

Well Use

[ ] Public [ ] Commercial [ ] Not used
[ ] Domestic [ ] Municipal [ ] Dewatering
[ ] Livestock [X] Test Hole [X] ~~Monitoring~~
[ ] Irrigation [ ] Cooling & Air Conditioning
[ ] Industrial
[ ] Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
~~4.03~~	PVC	.356	0	~~.61~~
3.45				-5

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.21	PVC	10	~~.61~~	1.5
			-5	

Status of Well

[ ] Water Supply
[ ] Replacement Well
[X] ~~Test Hole~~
[ ] Recharge Well
[ ] Dewatering Well
[X] ~~Observation and/or~~ Monitoring Hole
[ ] Alteration (Construction)
[ ] Abandoned, Insufficient Supply
[ ] Abandoned, Poor Water Quality
[ ] Abandoned, other, *specify*
[ ] Other, *specify*

Map of Well Location

Please provide a map below following instructions on the back.

Labelled

P on Map

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
	[ ] Fresh [ ] Untested	[ ]	
	[ ] Fresh [ ] Untested	[ ]	
	[ ] Fresh [ ] Untested	[ ]	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	1.5	17.93

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7214

Business Address (Street Number/Name)	Municipality
147 West Beaver Creek	Richmond Hill

Province	Postal Code	Business E-mail Address
ON	L4B1C6	Wrecords@stratapsa.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
	Parsons, Rob

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3722		2013/03/13

Comments:

Well owner's information package delivered: [ ] Yes [ ] No

Date Package Delivered: YYYY MM DD

Date Work Completed: 2013/03/25

Ministry Use Only

Audit No. Z152748

Received APR 16 2013

Ministry's Copy

S-13803

12-1125-0045-1000

Boundary Road Site

C-7241
Z1527418

Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

We Tag #: A166286 (see below)

A166286

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 3

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
4951 - 8TH Line Rd	Gloucester	13	7

County/District/Municipality	City/Town/Village	Province	Postal Code
OTTAWA. ~~City~~ City	OTTAWA	Ontario	K0A1K0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	459843	5021696		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand		Soft	0	0.80
Grey	Clay		Soft	0.80	34.84
Grey	Limestone		Hard	34.84	67.27

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
6.06	0	Cement Grout	120 kg

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☑ Rotary (Reverse) AIR ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☑ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
25:40	Open Hole		0	6.06
5:55	Steel	0.48	+ 0.60	34.84

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Other, specify
	☐	☑ Fresh ☐ Untested	SALT
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	67.27	15:55

Results of Well Yield Testing

After test of well yield, water was:
☑ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 51.51

Pumping rate (l/min / GPM): 13.50

Duration of pumping: 1 hrs + 00 min

Final water level end of pumping (m/ft): 34.42

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 65.00

Recommended pump rate (l/min / GPM): 18.00

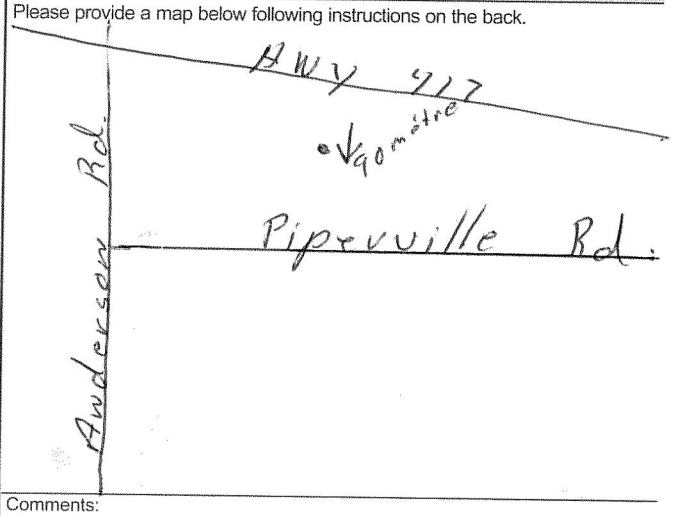
Well production (l/min / GPM): 3 Litre

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	2.45		34.42
1	3.81	1	33.38
2	4.82	2	33.16
3	5.62	3	32.81
4	6.86	4	32.33
5	7.36	5	31.79
10	10.37	10	31.06
15	13.24	15	30.78
20	15.96	20	29.93
25	18.42	25	29.24
30	20.82	30	28.47
40	25.44	40	27.02
50	30.16	50	25.66
60	34.42	60	24.34

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
D&R-well-Drilling	6006

Business Address (Street Number/Name)	Municipality
1763 - Route 600 west	Nation

Province	Postal Code	Business E-mail Address
ON	K0A3C0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
613 9825598	Desnoyers Louis

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T625	Louis Desnoyers	2014 06 04

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2014 06 04	2014 06 04

Ministry Use Only

Audit No. Z 175592

Received JUL 10 2014

0506E (2007/12)

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Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* N/A

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
#4635 Anderson Road	Gloucester	P/L 15	8

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa - Carleton	Carlsbad Springs	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	459181	5020654		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Dug Well Abandonment (18' x 24" Diam)			0'	18'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
18'	16'	3/8 Hole Plug	10 Bags
16'	14'	Stone Dust	—
14'	12'	3/8 Hole Plug	10 Bags
12'	10'	Stone Dust	—
10'	8'	3/8 Hole Plug	10 Bags
8'	0'	Backfill	

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☐ Air percussion ☐ Other, *specify*

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, *specify*

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☐ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☒ Abandoned, other, *specify*

Not to 903 Regs Newfoundland Const.

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, *specify*

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

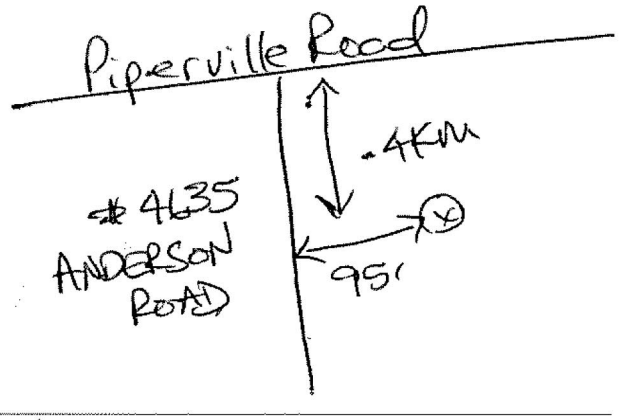
Well production (l/min / GPM)

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
AIR ROCK DRILLING CO LTD	1119

Business Address (Street Number/Name)	Municipality
RR#1	RICHMOND

Province	Postal Code	Business E-mail Address
ONT	K0A2Z0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6138382170	DESAULNIERS Ken

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T4		20150227

Well owner's information package delivered ☐ Yes ☒ No

Date Package Delivered

Date Work Completed 20150210

Ministry Use Only

Audit No Z191359

APR 24 2015

Received

0506E (2007/12)

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Ontario — Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)*

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☒ Metric ☐ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	City of Ottawa		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
100 Constellation Dr., 6th Floor	Ottawa	ON	K2G6J8	6135802410

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
N/A (Leitrim Rd)	Geographic Township of Gloucester	17	6 on Ottawa River

County/District/Municipality	City/Town/Village	Province	Postal Code
	City of Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	457775	5022860		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Abandonment (no well tag or well ID)			Coarse Sand	0.15	0.25m
			Bensead® (Bentonite), Hydrated	0.25	5.05m
June 23, 2016					

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used *(Material and Type)*	Volume Placed (m^3/ft^3)

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☐ Air percussion ☐ Other, *specify*

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, *specify*

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
1.9	PVC Riser		0	4.05
	Casing Removed			

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
1.9	PVC Screen	unknown	4.05	5.05
	Removed			

Status of Well

☐ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, *specify* ☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth (m/ft) From	To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, *specify*

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

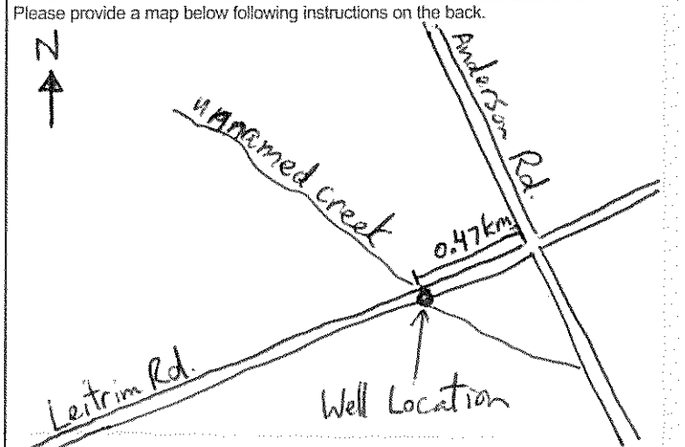
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: Well in eastbound lane, directly east of culvert crossing

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
McIntosh Perry Consulting Engineers Ltd. (853921 Ontario Ltd.)	7177

Business Address (Street Number/Name)	Municipality
115 Walgreen Rd. RR3	Carp

Province	Postal Code	Business E-mail Address
ON	K0A1L0	info@mcintoshperry.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
6138362184	Leblanc, Patrick, P.Eng

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
		2016/07/26

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2016/06/23

Ministry Use Only

Audit No. Z170983

Received AUG 02 2016

Ministry's Copy

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Del Management Solutions		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
310 Hwy 7 Green River	Locust Hill	Ont	L0H 1J0	9054727300

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
4091 Ramsayville Road	Ottawa	6	7

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	07	532790	4520720		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Decommissioned a Fieldstone water holding chamber 8'x8'x12' deep incased in Concrete.				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
		See Above	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☑ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
	See Above.			

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth (m/ft) From	To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

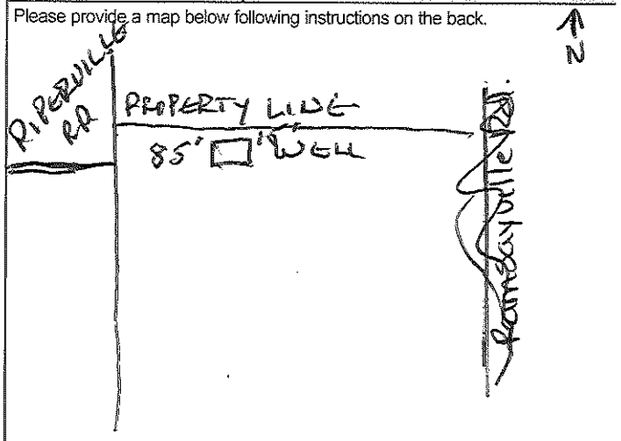
Well production *(l/min / GPM)*

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: NOT TO CODE 903 AND NO LONGER REQUIRED.

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Smith Water Systems Inc	7407

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
P.O. Box 787	Erin	Ont	N0B 1T0	

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
5198332000	Smith, Simon	T3146		20160714

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	20160714	20160712

Ministry Use Only

Audit No. Z216904

SEP 15 2016 Received

0506E (2014/11)

Ministry's Copy

Ontario (https://www.ontario.ca/page/government-ontario)

Map: Well records

This map allows you to search and view well record information from reported wells in Ontario.

Full dataset is available in the Open Data catalogue (https://data.ontario.ca/dataset/well-records) .

Go Back to Map

Well ID

Well ID Number: 7334281
Well Audit Number: *C30145*
Well Tag Number: *A203656*
This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location		

Township	GLOUCESTER TOWNSHIP
Lot	011
Concession	OF 08
County/District/Municipality	OTTAWA-CARLETON
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 18 Easting: 461202.00 Northing: 5020160.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed

Method of Construction & Well Use

Method of Construction	Well Use

Status of Well

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 1844

Results of Well Yield Testing

After test of well yield, water was		
If pumping discontinued, give reason		
Pump intake set at		
Pumping Rate		
Duration of Pumping		
Final water level		
If flowing give rate		
Recommended pump depth		
Recommended pump rate		
Well Production		
Disinfected?		

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	

25		25	
30		30	
40		40	
45		45	
50		50	
60		60	

Water Details

Water Found at Depth	Kind

Hole Diameter

Depth From	Depth To	Diameter

Audit Number: C30145

Date Well Completed: May 15, 2018

Date Well Record Received by MOE: June 04, 2019

Related

How to use a Ministry of the Environment map (https://www.ontario.ca/page/how-use-ministry-environment-map#wells)

Technical documentation: Metadata record (https://data.ontario.ca/dataset/well-records/resource/3031344e-e3f2-48d5-888c-c1deadfd2f77)

Updated: October 18, 2021

Ontario (https://www.ontario.ca/page/government-ontario)

Map: Well records

This map allows you to search and view well record information from reported wells in Ontario.

Full dataset is available in the Open Data catalogue (https://data.ontario.ca/dataset/well-records) .

Go Back to Map

Well ID

Well ID Number: 7334281
Well Audit Number: *C30145*
Well Tag Number: *A203656*
This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location		

Township	GLOUCESTER TOWNSHIP
Lot	011
Concession	OF 08
County/District/Municipality	OTTAWA-CARLETON
City/Town/Village	
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 18 Easting: 461202.00 Northing: 5020160.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed

Method of Construction & Well Use

Method of Construction	Well Use

Status of Well

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 1844

Results of Well Yield Testing

After test of well yield, water was		
If pumping discontinued, give reason		
Pump intake set at		
Pumping Rate		
Duration of Pumping		
Final water level		
If flowing give rate		
Recommended pump depth		
Recommended pump rate		
Well Production		
Disinfected?		

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	

25		25	
30		30	
40		40	
45		45	
50		50	
60		60	

Water Details

Water Found at Depth	Kind

Hole Diameter

Depth From	Depth To	Diameter

Audit Number: C30145

Date Well Completed: May 15, 2018

Date Well Record Received by MOE: June 04, 2019

Related

How to use a Ministry of the Environment map (https://www.ontario.ca/page/how-use-ministry-environment-map#wells)

Technical documentation: Metadata record (https://data.ontario.ca/dataset/well-records/resource/3031344e-e3f2-48d5-888c-c1deadfd2f77)

Updated: October 18, 2021

3165a

UTM 18 Z 415716415 E
15 R 5012151010 N

Elev. 14 R 02551

Basin 251

County or District Carleton

Township, Village, Town or City Gloucester

Lot 17

Date completed 18th (day) January (month) 1966 (year)

[redacted] ress Ramsayville, Ont.

The Ontario Water Resources Commission Act

WATER WELL RECORD

WATER RESOURCES ... FEB 1 ... ONTARIO WATER RESOURCES COMMISSION

15 No. 1573

Casing and Screen Record

Inside diameter of casing 6 3/16"

Total length of casing 212

Type of screen -

Length of screen -

Depth to top of screen -

Diameter of finished hole 6 3/16"

Pumping Test

Static level 4

Test-pumping rate 1000 G.P.H. ~~XXM~~

Pumping level 100

Duration of test pumping 3 hours

Water clear or cloudy at end of test clear

Recommended pumping rate 25 G.P.M.

with pump setting of 120 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
sand	0	35	212	salty
clay	35	200		
gravel-sand	200	212		
Very slight touch of salt				

For what purpose(s) is the water to be used? barn

Is well on upland, in valley, or on hillside? valley

Drilling or Boring Firm J.B. DUFRESNE & CO. LIMITED

Address 1014 Maitland Ave., Ottawa 5, Ont.

Licence Number ~~1907~~ 2030

Name of Driller or Borer W. Roy

Address 79 St-Jean Baptiste - Deschesnes, P.Q.

Date January 18th 1966

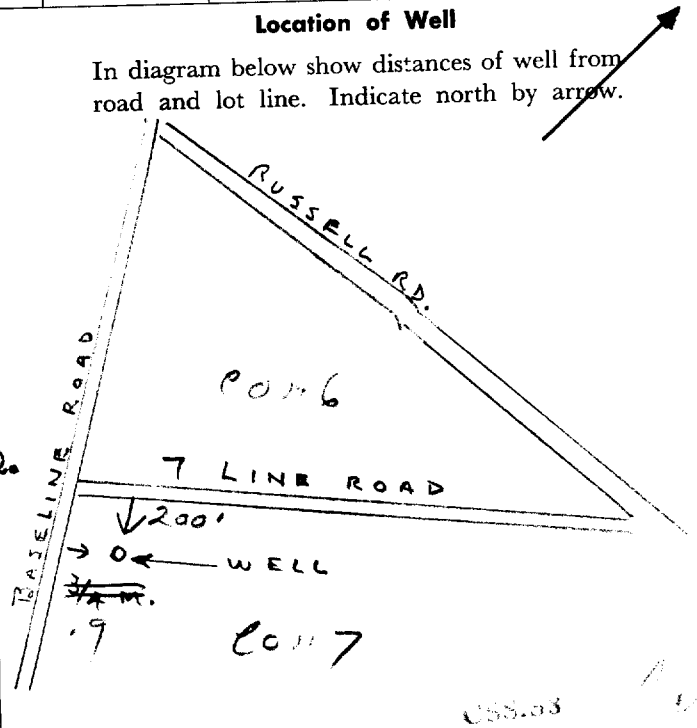
(Signature of Licensed Drilling or Boring Contractor)
for J.B. Dufresne & Co. Limited

Form 7 15M-60-4138

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



1955 31G5a

UTM 18 | 4 5 6 7 1 1 0 | E

19 | R | 5 0 2 1 1 1 1 0 | N

Elev. 19 | R | 0 2 7 0

Basin 25

OTTAWA Front

ONTARIO

The Water-well Drillers Act, 1954

Department of Mines

Water-Well Record

County or Territorial District Carleton Township, Village, Town or City Gloucester

[redacted] Village, Town or City)

[redacted] dress Ramsayville

Date completed [redacted]
(day) (month) (year)

Pipe and Casing Record

Casing diameter(s) 4 inch
Length(s) 156 feet
Type of screen
Length of screen

Pumping Test

Static level 10 feet
Pumping rate 175 gal GPH
Pumping level 20 feet
Duration of test 30 min

Well Log

Overburden and Bedrock Record	From ft.	To ft.
Red Sand	0	4 feet
blue Clay	4	142
fine Sand & gravel	142	156
Black Slate Bedrock	156	253

Water Record

Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
between 142 and 156	145 feet	Slight touch of Salt

For what purpose(s) is the water to be used? house hold use

Is water clear or cloudy? Clear

Is well on upland, in valley, or on hillside? upland

Drilling firm James Kettles
Address Ramsayville Ont

Name of Driller James Kettles
Address Ramsayville

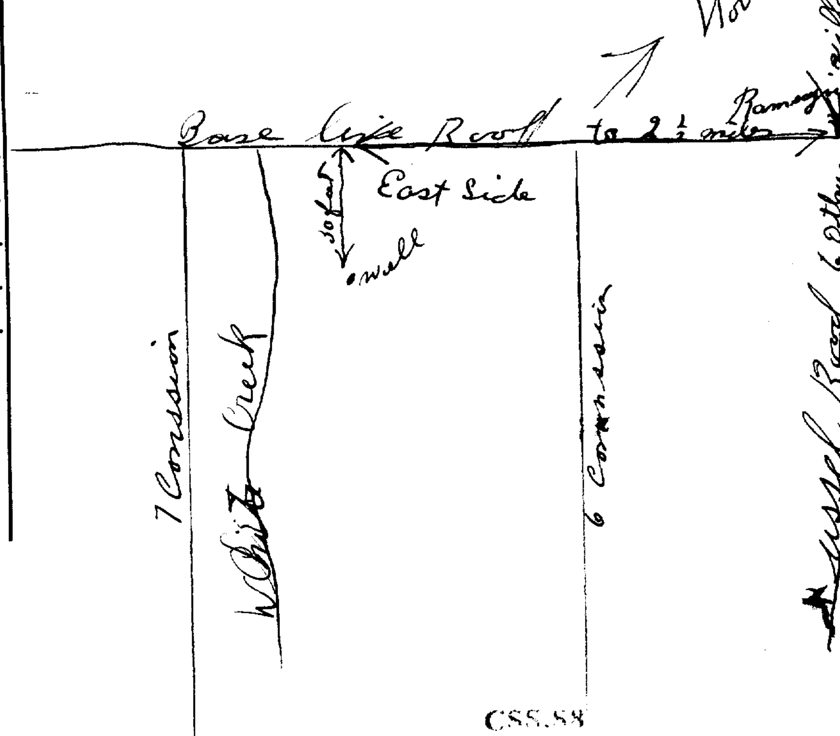
Licence Number 537

I certify that the foregoing statements of fact are true.

Date Jul 21 James Kettles
Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 5

CSS.58

UTM | 18 | Z | 4516161510 | E
15 | 15.02.1 · 3010 | N
Elev. 4 ,021710
Basin 25 011

31G5a

15 No 1575

GROUND WATER BRANCH
APR 6 1960
ONTARIO WATER RESOURCES COMMISSION

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

County or District CARLETON Township, Village, Town or City GLOUCESTER

[redacted] Date completed 21 (day) MARCH (month) 60 (year)

[redacted] Address

Casing and Screen Record

Inside diameter of casing 4 INCH
Total length of casing 168 FEET
Type of screen NONE
Length of screen
Depth to top of screen
Diameter of finished hole 4 INCH

Pumping Test

Static level 35
Test-pumping rate 5 G.P.M.
Pumping level 90 FEET
Duration of test pumping 2 HOURS
Water clear or cloudy at end of test CLEAR
Recommended pumping rate 5 G.P.M.
with pumping level of 90'

Well Log

Overburden and Bedrock Record	From ft.	To ft.
CLAY	0	40
SAND	40	168
BROWN SHALE	168	219

Water Record

Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
200	150	FRESH
219	184	"

For what purpose(s) is the water to be used?
FARM

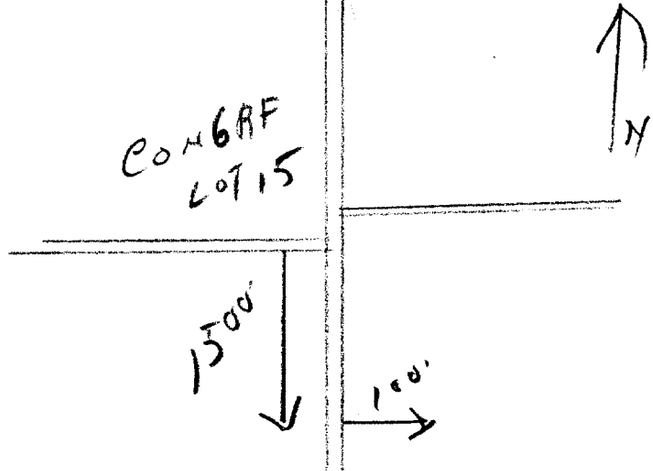
Is well on upland, in valley, or on hillside? UPLAND

Drilling Firm MAHOUGANEY
Address 51 McEWEN AVE
OTTAWA
Licence Number 479
Name of Driller E. MAHOUGANEY
Address
Date March 21/60

E. Mahoughney
(Signature of Licensed Drilling Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 5
15M-58-4149

CSS.58

UTM 1 18 z 4 6 0 0 0 0 0 E   31G5a

5 5 0 2 1 4 4 5 N

Ele 4 0263

Basin 25 3

ONTARIO

15 No. 1578

The Water-well Drillers Act, 1954

Department of Mines

Water-Well Record

[redacted]ip, Village, Town or City Gloucester

[redacted] Village, Town or City)

Owner [redacted] Address Ottawa

Date completed 2 (day) Oct (month) 59 (year)

Pipe and Casing Record		Pumping Test	
Casing diameter(s)	~~none~~ 8"	Static level	flowing
Length(s)	None	Pumping rate	flowing approx 50 gals per min
Type of screen	None	Pumping level	No measurement taken
Length of screen	None	Duration of test	

Well Log: Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
Brown till	0	8			
Blue clay	8	102	105 to 115	flowing	salty
shaley limestone	102	115			
GAS EXPLOSION	HERE.	WELL	ABANDONED.		

For what purpose(s) is the water to be used? Test hole of Sub.

Is water clear or cloudy? Cloudy

Is well on upland, in valley, or on hillside? Upland

Drilling firm R C Johnston Drilling Co Ltd

Address 1340 Bank Ottawa

Name of Driller R. A. Fenwick

Address Pakenham

Licence Number 158

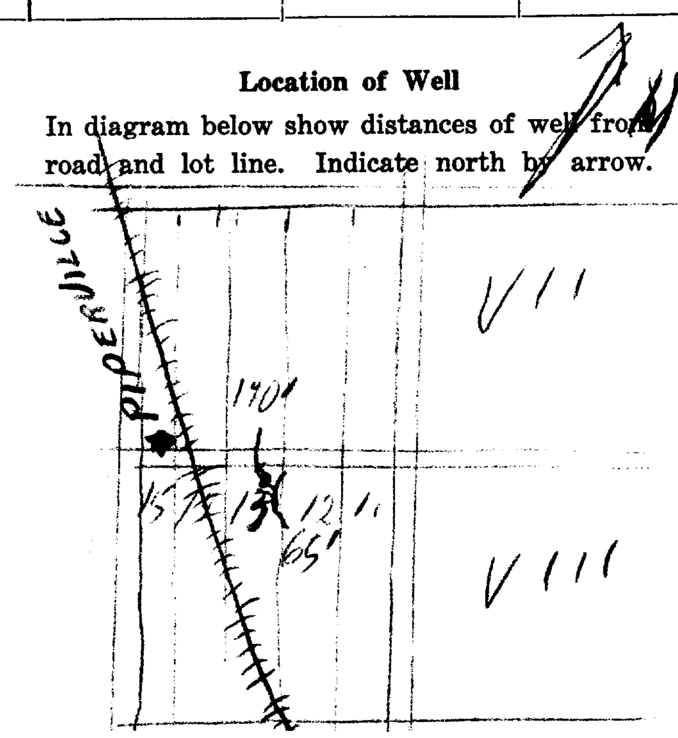
I certify that the foregoing statements of fact are true.

Date Oct 30/59

Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 5

UTM | 18 | 459010 | E
| 5 | 5022015165 | N
Elev. | 14 | 02165 |

3165a

15 No. 1579

The Ontario Water Resources Commission Act

WATER WELL RECORD

Basin | 25 | CARLETON County or District

Township, Village, Town or City Gloucester

Con. 8 O.F. Lot N½ #6 15'

Date completed 12 (day) Sept (month) 67 (year)

Owner [redacted] (print in block letters)

Address RR1 Anderson Rd Carlsbad Springs

Casing and Screen Record

Inside diameter of casing 3 inch

Total length of casing 135 feet

Type of screen

Length of screen

Depth to top of screen

Diameter of finished hole

Pumping Test

Static level 7 feet

Test-pumping rate 4 G.P.M.

Pumping level 25 feet

Duration of test pumping 2 hours

Water clear or cloudy at end of test clear

Recommended pumping rate 4 G.P.M.

with pump setting of 22 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
~~Black~~ Grey Clay	0	135	140	Fresh sand
Limestone	135	140		

Water Record

For what purpose(s) is the water to be used? HOUSE

Is well on upland, in valley, or on hillside? VALLEY

Drilling or Boring Firm C DUFRESNE

Address 136 Sweetland Ave Ottawa

Licence Number 2676

Name of Driller or Borer C. Dufresne

Address

Date May 21/68

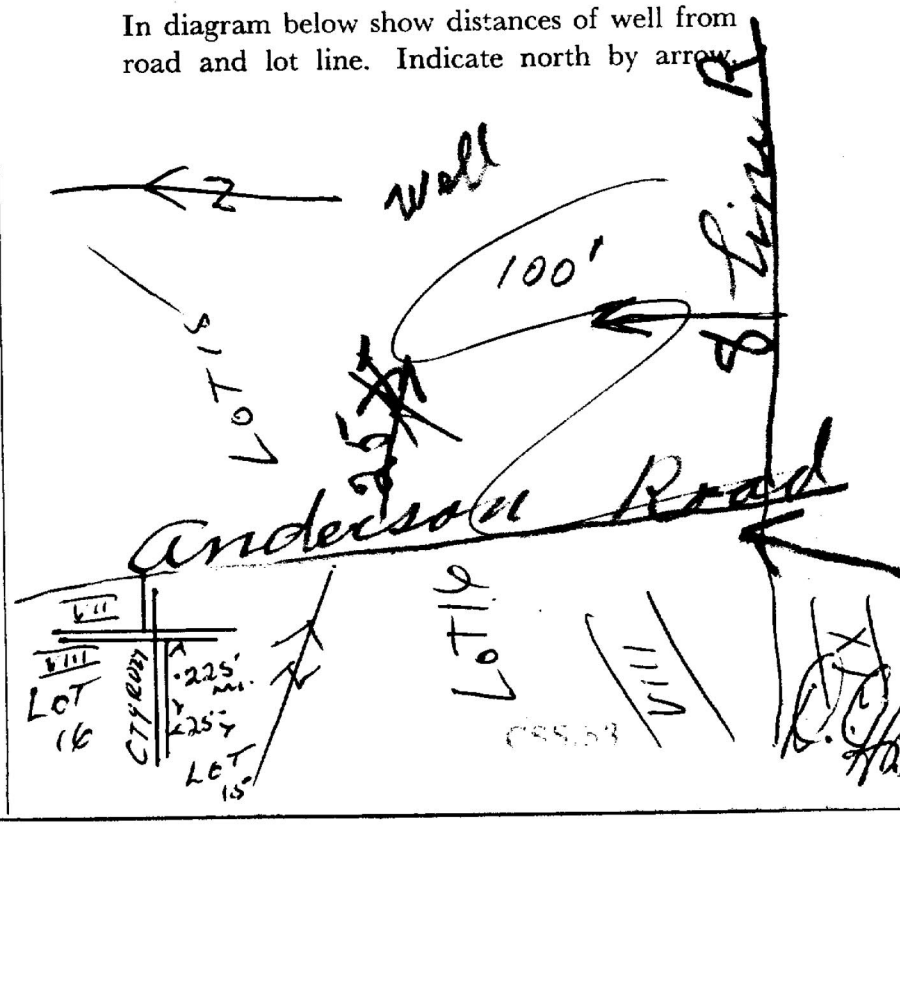
C. Dufresne
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



The Ontario Water Resources Commission Act

WATER WELL RECORD

315 5a

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
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11 | 1511284 | MUNICIP. 15002 | CON. OF | C | 07

COUNTY OR DISTRICT: Carleton

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Gloucester

CON., BLOCK, TRACT, SURVEY, ETC.: VII O.F.

LOT: 014

DATE COMPLETED: DAY 24 MO. 07 YR. 71

[redacted] lsbad Springs, Ont.

UTM: 322098 | RC. 4 | ELEVATION: 02608 | RC. 5 | BASIN CODE: 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
grey	clay			0	140
	hard pan			140	163
grey	shale			163	280

31: 0140205 | 0163 14 | 0280217

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0188	1 ☐ FRESH 3 ☐ SULPHUR 2 ☒ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	3/16	0	0165
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		0165	0280
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE: | DEPTH TO TOP OF SCREEN FEET:

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0001 GPM. DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
007 FEET	280 FEET		265 FEET	230 FEET	200 FEET	175 FEET

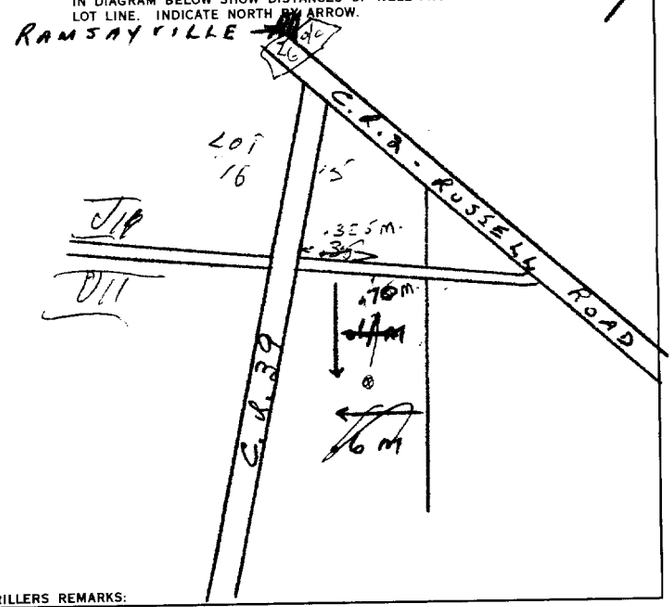
IF FLOWING, GIVE RATE: GPM. | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 200 FEET | RECOMMENDED PUMPING RATE: 0001 GPM.

000.0 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: J.B. DUFRESNE & CO. LIMITED | LICENCE NUMBER: 1802

ADDRESS: 1014 Maitland Ave., Ottawa, Ont.

NAME OF DRILLER OR BORER: R. Laniel | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: R. Laniel | SUBMISSION DATE: DAY 24 MO. 7 YR. 71

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1802 | DATE RECEIVED: 300771

DATE OF INSPECTION: | INSPECTOR: Km.

REMARKS:

P K

WI

OWRC COPY

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

Ontario

Russell - B-95

Gloucester 315

Zone 18

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11 | 1513762 | MUNICIP. 15002 | CC | F | 08

COUNTY OR DISTRICT: Carleton

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Gloucester

CON., BLOCK, TRACT, SURVEY, ETC.: 8 OE

LOT: 015

OWNER: [redacted]

ADDRESS: Richmond

DATE COMPLETED: DAY 12 MO 06 YR 78

21 | UTM ZONE 18 | EASTING 459661 | NORTHING 5019238 | RC 4 | ELEVATION 0266 | RC 4 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay		Packed	0	3
Brown	~~Clay~~		Soft	3	20
Gray	Clay		Soft (Plastic)	20	130
Grey	Limestone		Med hard	130	225

31 | 00036 05 | 00206 05 | 01302 05 | 02252 15

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0135	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ ~~SALTY~~ 4 ☐ MINERAL — #5
0208	1 ☐ ~~FRESH~~ 3 ☐ SULPHUR; 2 ☐ ~~SALTY~~ 4 ☐ MINERAL — #5
0225	1 ☐ ~~FRESH~~ 3 ☐ SULPHUR; 2 ☐ ~~SALTY~~ 4 ☐ MINERAL — #5
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~06~~	1 ☐ ~~STEEL~~; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ ~~OPEN HOLE~~	.188	0	0133
~~06~~	~~OPEN HOLE~~		~~133~~	~~225~~
06	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE			0225
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0010 GPM	02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
012 FEET	120 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	120 FEET	120 FEET	120 FEET	120 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	120 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	120 FEET	0005 GPM

50-53: 000.1

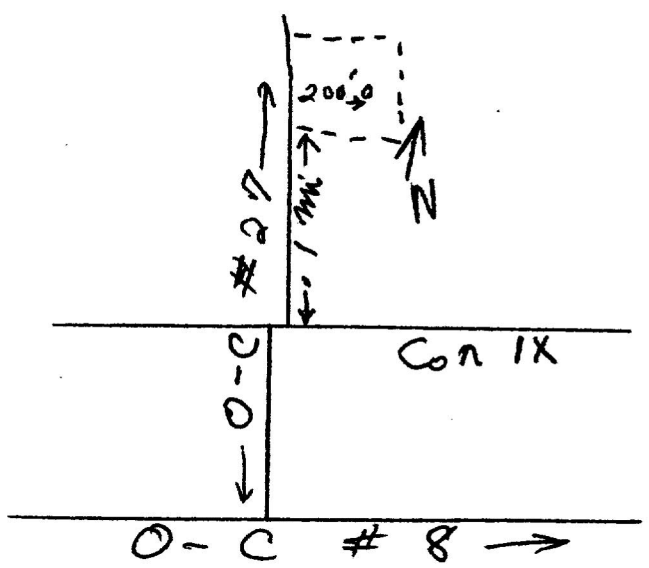
FINAL STATUS OF WELL 54: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING 57: 5 — 1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☒ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

LOCATION OF WELL 5919

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Maple Leaf Drilling — LICENCE NUMBER: 3658

ADDRESS: 409-465 Richmond Rd

NAME OF DRILLER OR BORER: R Bisson — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: R Bisson — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 3658 — DATE RECEIVED 63-68: 110274 — 69-80

DATE OF INSPECTION — INSPECTOR: K

REMARKS: CSS.SS

OF THE ENVIRONMENT COPY

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

31G52

Ontario

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11 1516399

MUNICIP. 15002 CON. ØF 07

COUNTY OR DISTRICT: Carleton

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Gloucester

CON., BLOCK, TRACT, SURVEY, ETC: VII ~~L~~ ~~R.F.~~ O.F.

LOT: ~~10~~ 17

OWNER (SURNAME FIRST): [redacted]

ADDRESS: Leitrim, Ont.

DATE COMPLETED: DAY 20 MO 06 YR 77

THING 022560 RC 4 ELEVATION 0260 RC 4 BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
yellow	hardpan			0	2
yellow	clay			2	15
blue	clay			15	130
grey	sand + gravel			130	136
grey	slate			136	149

31 000251/4 00155/05 01303/05 01362/28 01492/19

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0 149	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~6~~ 06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0139
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0008 GPM

DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING
019 FEET	080 ~~80~~ FEET

WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
030 FEET	019 FEET	019 FEET	019 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: 80 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

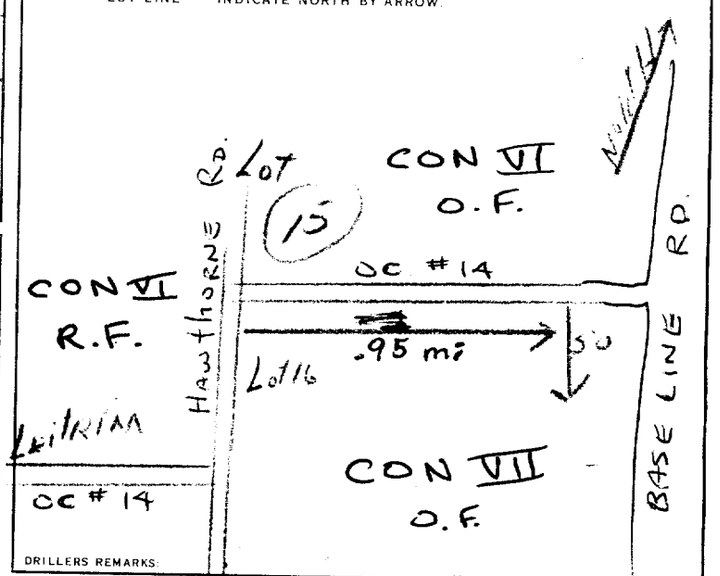
RECOMMENDED PUMP SETTING: 080 FEET

RECOMMENDED PUMPING RATE: 0005 GPM

GPM/FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 4

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: G.Charbonneau+Son Drilling Ltd

LICENCE NUMBER: 1504

ADDRESS: R.R. 2, Box 194, Orleans, Ont. K1C 1T1

NAME OF DRILLER OR BORER: Raymond Charbonneau

LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Gerard Charb

SUBMISSION DATE: DAY 20 MO 6 YR 77

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1504 | DATE RECEIVED: 100278

DATE OF INSPECTION: 22/5/79 | INSPECTOR: J.F.P.

REMARKS:

P

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

1520517

MUNICIP

CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	GLOUCEATER, Ontario	07	20

ADDRESS: [redacted] asline Rd. RAMSAYVILLE, Ont.

DATE COMPLETED: DAY 24 MO 04 YR. 86

SHING | RC | ELEVATION | RC | BASIN CODE | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
		DUG WATER WELL 4' in DIAMETER 17' DEEP			

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
15'	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
4'	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE	3½"	+1'	17'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE

DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	4.5 GPM	2 HOURS ___ MINS

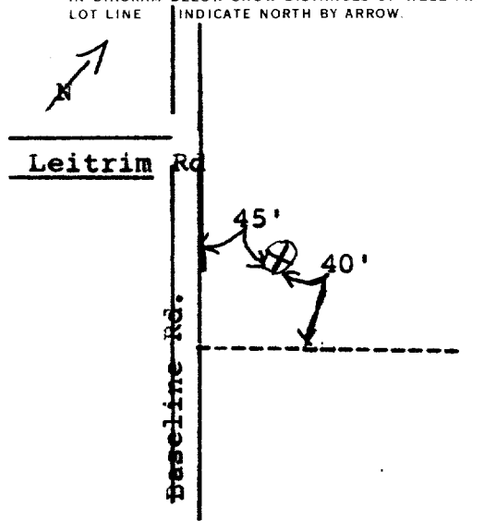
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
4.72' FEET	5.95' FEET		5.15' FEET	5.30' FEET	5.43' FEET	5.57' FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	15' FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☒ SHALLOW ☐ DEEP	FEET	4.5' GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☐ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: OLYMPIC DRILLING CO. LIMITED — LICENCE NUMBER: 4006

ADDRESS: Box 9180 Terminal "1" OTTAWA, Ont.

NAME OF DRILLER OR BORER: TEST PUMPING BY Roy W. Renwick — LICENCE NUMBER

SIGNATURE OF CONTRACTOR: D. W. Renwick Sec.

SUBMISSION DATE: DAY 24 MO. 04 YR. 86

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED

010686

DATE OF INSPECTION | INSPECTOR

REMARKS

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FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1527377 MUNICIP 15002 CON. CON 07

COUNTY OR DISTRICT: [redacted] CARLETON
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: GLOUCESTER
CON, BLOCK, TRACT, SURVEY, ETC.: CONCESSION 7
LOT: PART 20
ADDRESS OF WELL LOCATION: 73 BASELINE RD, GLOUCESTER K1G3N4
DATE COMPLETED: DAY 26 MO 08 YR 93
THING | RC | ELEVATION | RC | BASIN CODE | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	top Soil			0''	1'
Red	Sand			1'	3'
yellow	sand			3'	6'
Blue	Clay			6'	23'

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
6'	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
48''	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	4''	0'	23'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	9	cement CS. 665
9'	15'	clay joint sealant sand clay cement CS 665
15'	23'	filter sand CS. 665

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☑ PUMP 2 ☐ BAILER	5 GPM	1 HOURS ___ MINS

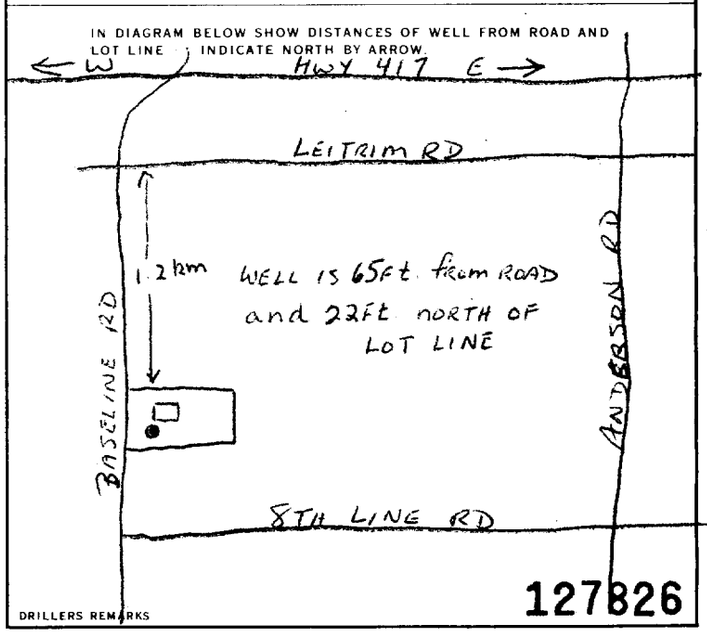
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
8'3'' FEET	11' FEET		9' FEET	9'9'' FEET	10'5'' FEET	11' FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	21' FEET	1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☑ SHALLOW ☐ DEEP	21' FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 127826

FINAL STATUS OF WELL
1 ☑ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED; ☐ DEWATERING

WATER USE
1 ☑ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF CONSTRUCTION
1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING; ☑ DIGGING; ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Denis Sarrazin — WELL CONTRACTOR'S LICENCE NUMBER: 6712
ADDRESS: Box 222 Embrun Ont.
NAME OF WELL TECHNICIAN: Denis Sarrazin — WELL TECHNICIAN'S LICENCE NUMBER: T2265
SIGNATURE OF TECHNICIAN/CONTRACTOR: Denis Sarrazin — SUBMISSION DATE: DAY 26 MO 8 YR 93

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 6712 | DATE RECEIVED AUG 31 1993
DATE OF INSPECTION | INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1527513 — MUNICIP 15002 — CON. CF — LOT 07 — 20

COUNTY OR DISTRICT: Ottawa Carl[redacted] — TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Gloucester — CON. BLOCK, TRACT, SURVEY, ETC: Conc. 7 O.F. — LOT: 20

63 BASELINE Road Gloucester

DATE COMPLETED: DAY 24 MO 9 YR 93

RC — ELEVATION — RC — BASIN CODE: RIGBNH

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	top Soil			0'	1'
Red	Sand			1'	4'
Grey	Sand			4'	7'
Blue	Clay			7'	23'

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
7'	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
48"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	4"	0'	21'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
0'	9'	cement joint C.S. 665 sealant
9'	15'	Sand. Blue clay. cement joint C.S. 665 sealant
15'	23'	filter sand. C.S. 665 joint

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	5 GPM	1 HOURS — MINS

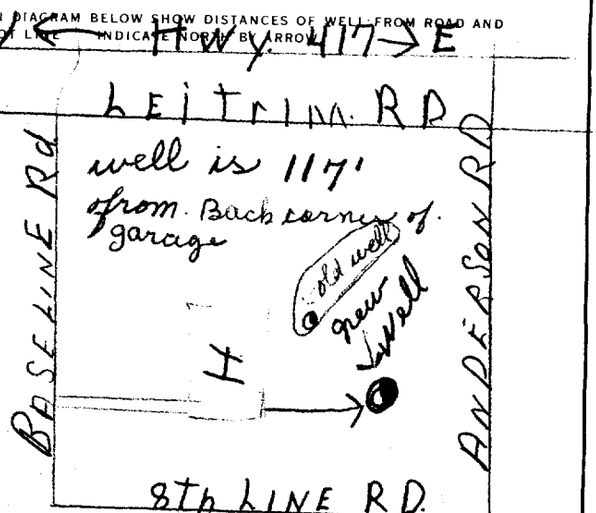
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
5' 9" FEET	8' 5" FEET		6' 7" FEET	FEET	7' 11" FEET	8' 5" FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	21 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☒ SHALLOW ☐ DEEP	21 FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW. W ← HWY 417 → E



DRILLERS REMARKS: 127830

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☒ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Denis Larrazin — WELL CONTRACTOR'S LICENCE NUMBER: 6712

ADDRESS: Box 222 Embrun Ont.

NAME OF WELL TECHNICIAN: Denis Larrazin — WELL TECHNICIAN'S LICENCE NUMBER: T2265

SIGNATURE OF TECHNICIAN/CONTRACTOR: Denis Larrazin — SUBMISSION DATE: DAY 27 MO 9 YR 93

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR: 6712 — DATE RECEIVED: OCT 04 1993

DATE OF INSPECTION — INSPECTOR

REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): Ottawa | Township: Gloucester | Lot: 20 | Concession: 7

RR#/Street Number/Name: 4085 Ramsyville Rd | City/Town/Village: Gloucester | Site/Compartment/Block/Tract etc.: 4085 Ramsyville Rd

GPS Reading: NAD 83 | Zone 18 | Easting 456695 | Northing 5021639 | Unit Make/Model: MAGELLAN | Mode of Operation: UTM | ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	6.7	91.44

Water Record

Water found at ___ Metres | Kind of Water

- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was: ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
91.44	☐ Steel ☐ Fibreglass ☐ Plastic ☒ Concrete ☐ Galvanized	10.16	0	6.7
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☐ Annular space ☒ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	5.0	Clay Fill	
5	6.7	Bentonite hole plug	9 Bags

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☒ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☒ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☒ Abandoned, (Other) Municipal Water
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☒ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: Raymond Pump + Wells | Well Contractor's Licence No.: 7260

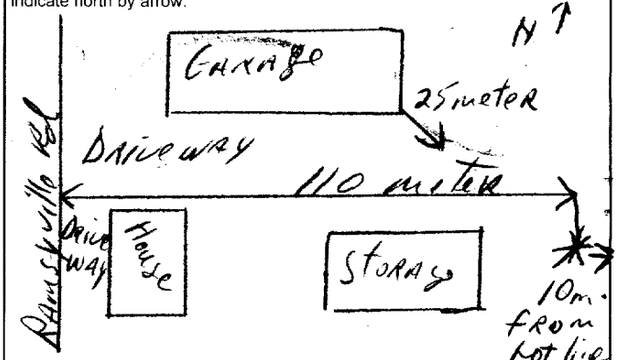
Business Address (street name, number, city etc.): 147 main ST St-Albert Ont. K0A 3C0

Name of Well Technician (last name, first name): Raymond Jacques | Well Technician's Licence No.: T-0264

Signature of Technician/Contractor: X Jacques Raymond | Date Submitted (YYYY MM DD): 2004 02 13

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 01796 | Date Well Completed (YYYY MM DD): 2004 01 30

Was the well owner's information package delivered? ☐ Yes ☒ No | Date Delivered (YYYY MM DD): 2004 02 14

Ministry Use Only

Data Source | Contractor: 7260

Date Received (YYYY MM DD): MAR 2 6 2004 | Date of Inspection (YYYY MM DD)

Remarks | Well Record Number: 1534582

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☒ Well Owner's Copy ☐ *Cette formule est disponible en français*

Ontario Ministry of the Environment

Well Tag No. (Sticker below) A 065304

A 065304

Well Record

Regulation 903 Ontario Water Resources Act

Instructions for Completing Form

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- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): 4041 Anderson Rd. Gloucester | Township: oTtown Carleton | Lot: 15 | Concession: 7

RR#/Street Number/Name: 4041 Anderson Rd. | City/Town/Village: Gloucester | Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 18 | Easting 458308 | Northing 5029921 | Unit Make/Model: EXPLOBUS 100 / Explorer 100 | Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
BROWN	TOP SOIL	SANDY		0	12"
YELLOW/GREY	SAND			12"	4'
BLUE	CLAY			4'	18'

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)

Water Record

Water found at 64 Metres / Kind of Water

- ☐ m ☐ Fresh ☐ Sulphur
- ☐ Gas ☐ Salty ☐ Minerals
- ☐ Other:
- ☐ m ☐ Fresh ☐ Sulphur
- ☐ Gas ☐ Salty ☐ Minerals
- ☐ Other:
- ☐ m ☐ Fresh ☐ Sulphur
- ☐ Gas ☐ Salty ☐ Minerals
- ☐ Other:

After test of well yield, water was ☑ Clear and sediment free ☐ Other, specify

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
	☐ Steel ☑ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	3½"	0	18'
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen	☐ Open hole			

Test of Well Yield

Pumping test method: Pump

Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level	69"		80"
1	68"	1	81½
2	68½	2	81½
3	69"	3	82"
4	69½	4	82½
5	70"	5	82½
10	73	10	83
15	75½	15	83½
20	77½	20	84
25	78½	25	84½
30	79½	30	85
40	82"	40	86
50	85½	50	87"
60	88"	60	88"

Pump intake set at - (metres) 16

Pumping rate - (litres/min) 3.5

Duration of pumping 1 hrs + 00 min

Final water level end of pumping 88" metres

Recommended pump type. ☑ Shallow ☐ Deep

Recommended pump depth. 17' metres

Recommended pump rate. 3.5 GPM (litres/min)

If flowing give rate - (litres/min)

If pumping discontinued, give reason.

Plugging and Sealing Record ☐ Annular space ☐ Abandonment

Depth set at - From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	18'	DRUE CLAY	20 YARDS
0'	18'	Filter Cloth - Filter Sand	
		Seal Joints	

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☑ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☑ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☑ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: M+S Sarrazin Excavation Inc | Well Contractor's Licence No.: 6632

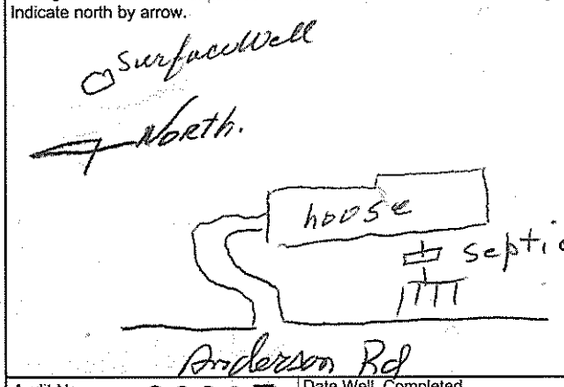
Business Address (street name, number, city etc.): 6155 County Rd. 17 POBox 312, Plantagenet, ON K0B1L0

Name of Well Technician (last name, first name): DSarrazin, Marcel @Sarrazin, Stephane | Well Technician's Licence No.: 2072

Signature of Technician/Contractor | Date Submitted YYYY MM DD

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 28317

Date Well Completed: YYYY 2007 MM 07 DD 18

Was the well owner's information package delivered? ☑ Yes ☐ No

Date Delivered: YYYY 2007 MM 10 DD 03

Ministry Use Only

Data Source | Contractor

Date Received: DEC 03 2007 | Date of Inspection YYYY MM DD

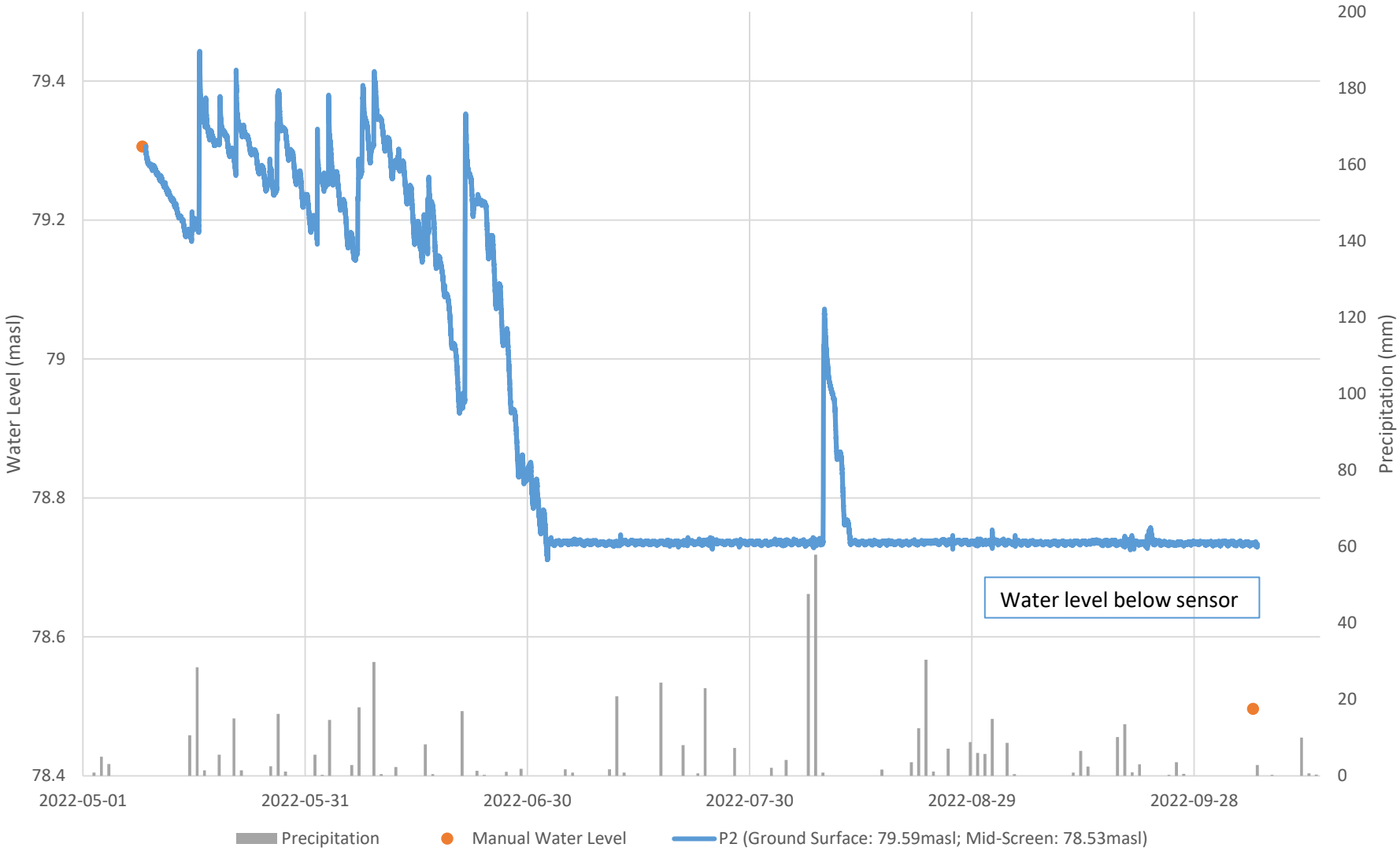
Remarks | Well Record Number

Appendix C

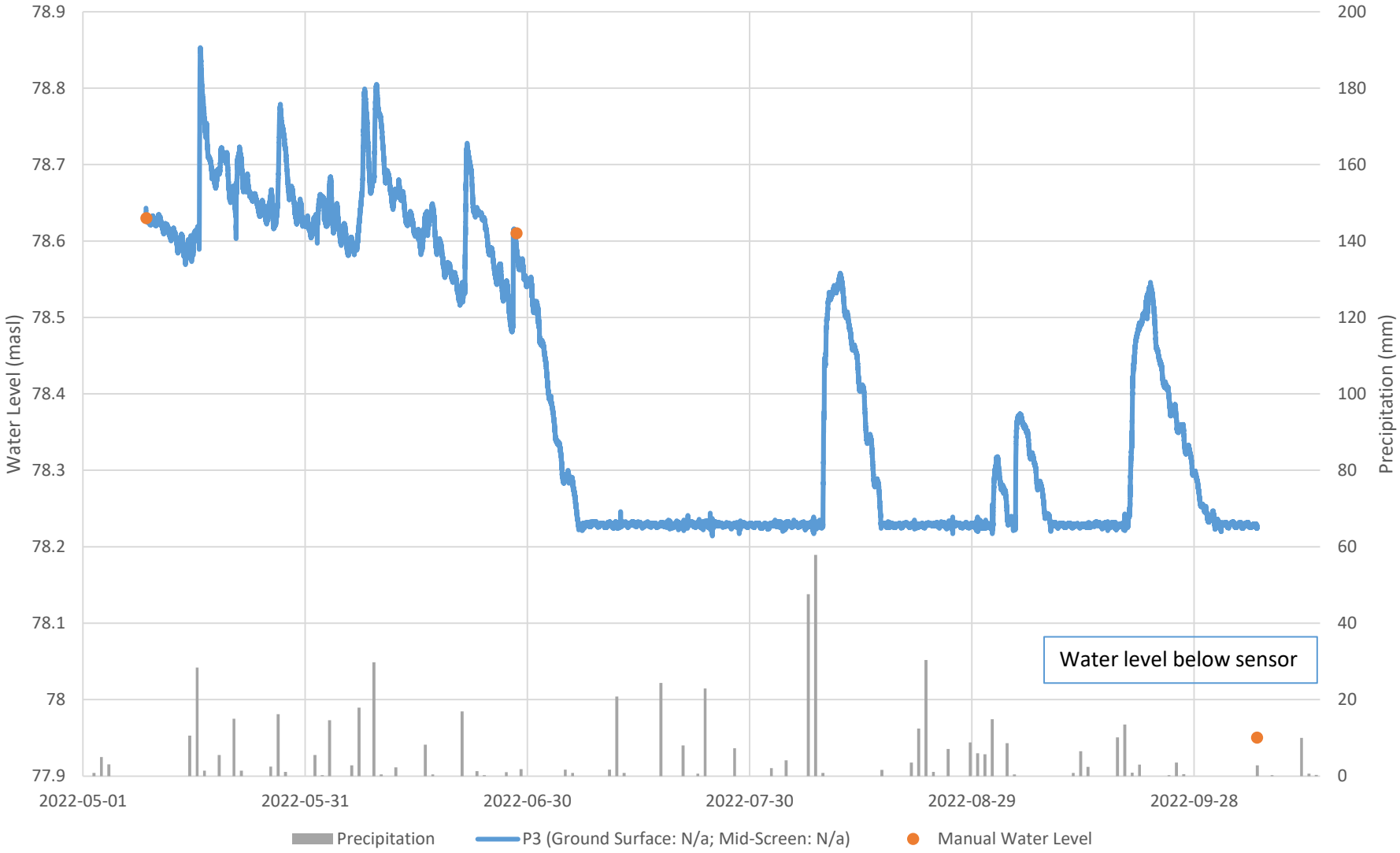
Hydrographs

Appendix C
Monitoring Location: P1
Tewin - Existing Conditions Hydrogeological Report

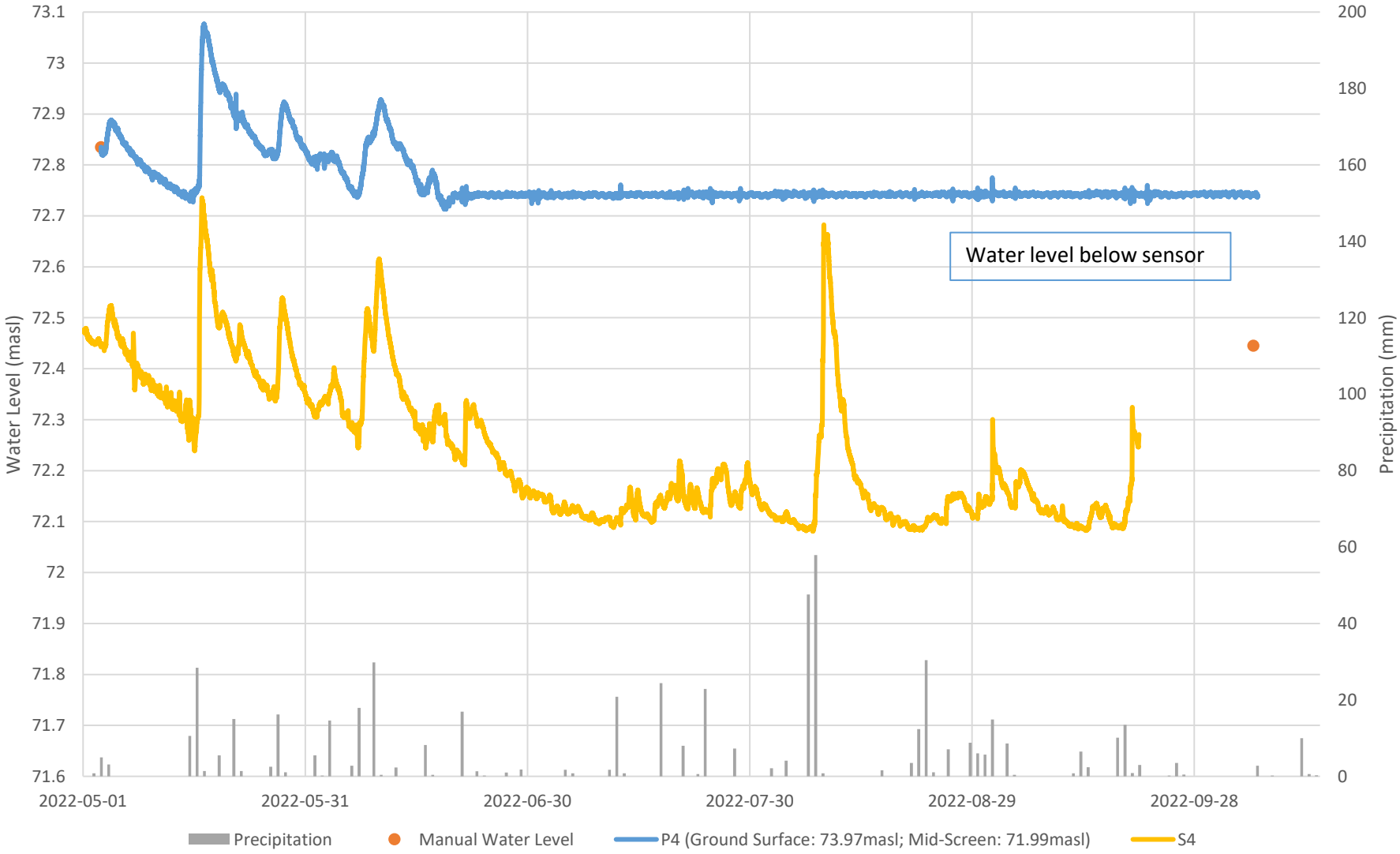
Appendix C
Monitoring Location: P2
Tewin - Existing Conditions Hydrogeological Report



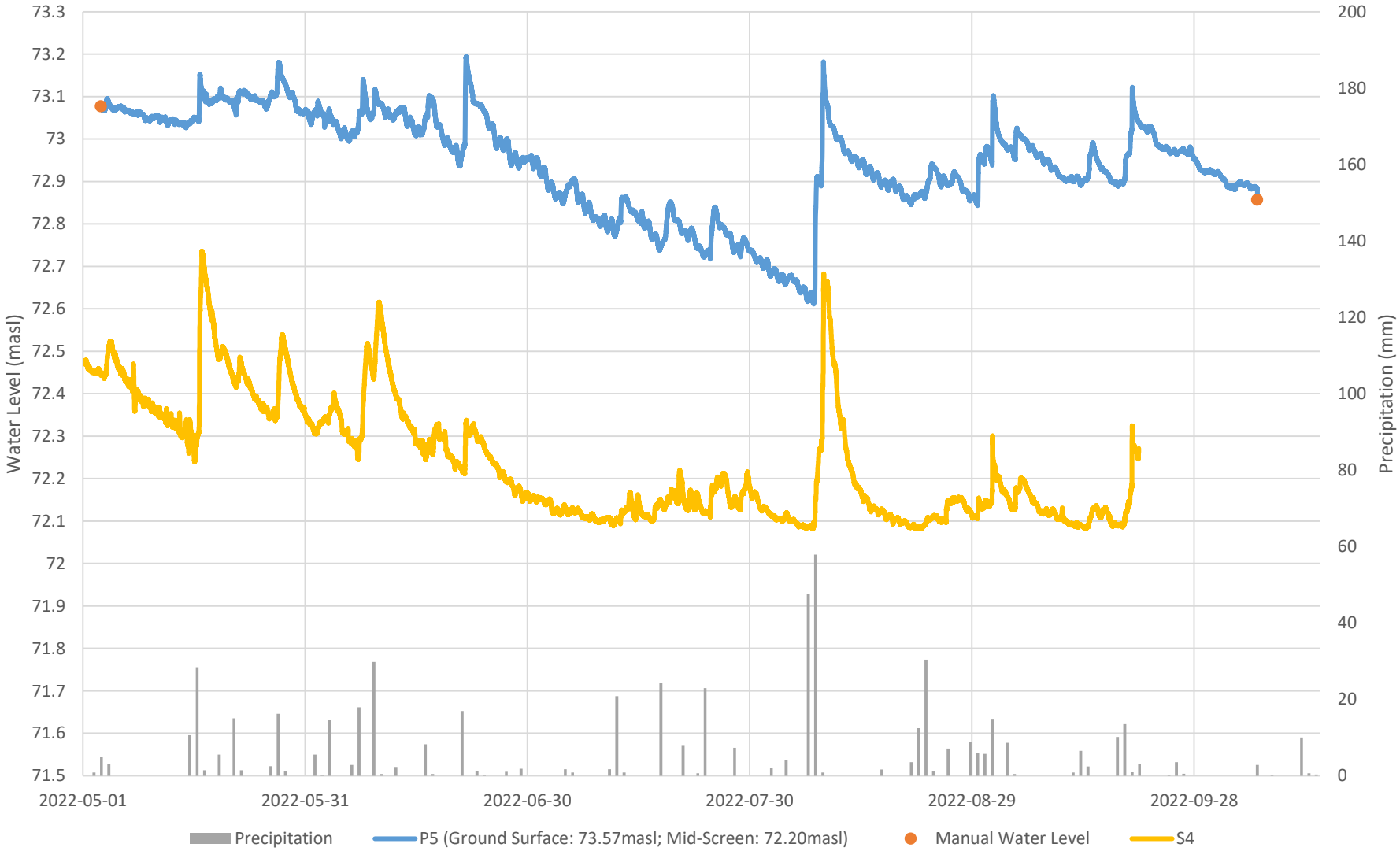
Appendix C
Monitoring Location: P3
Tewin - Existing Conditions Hydrogeological Report



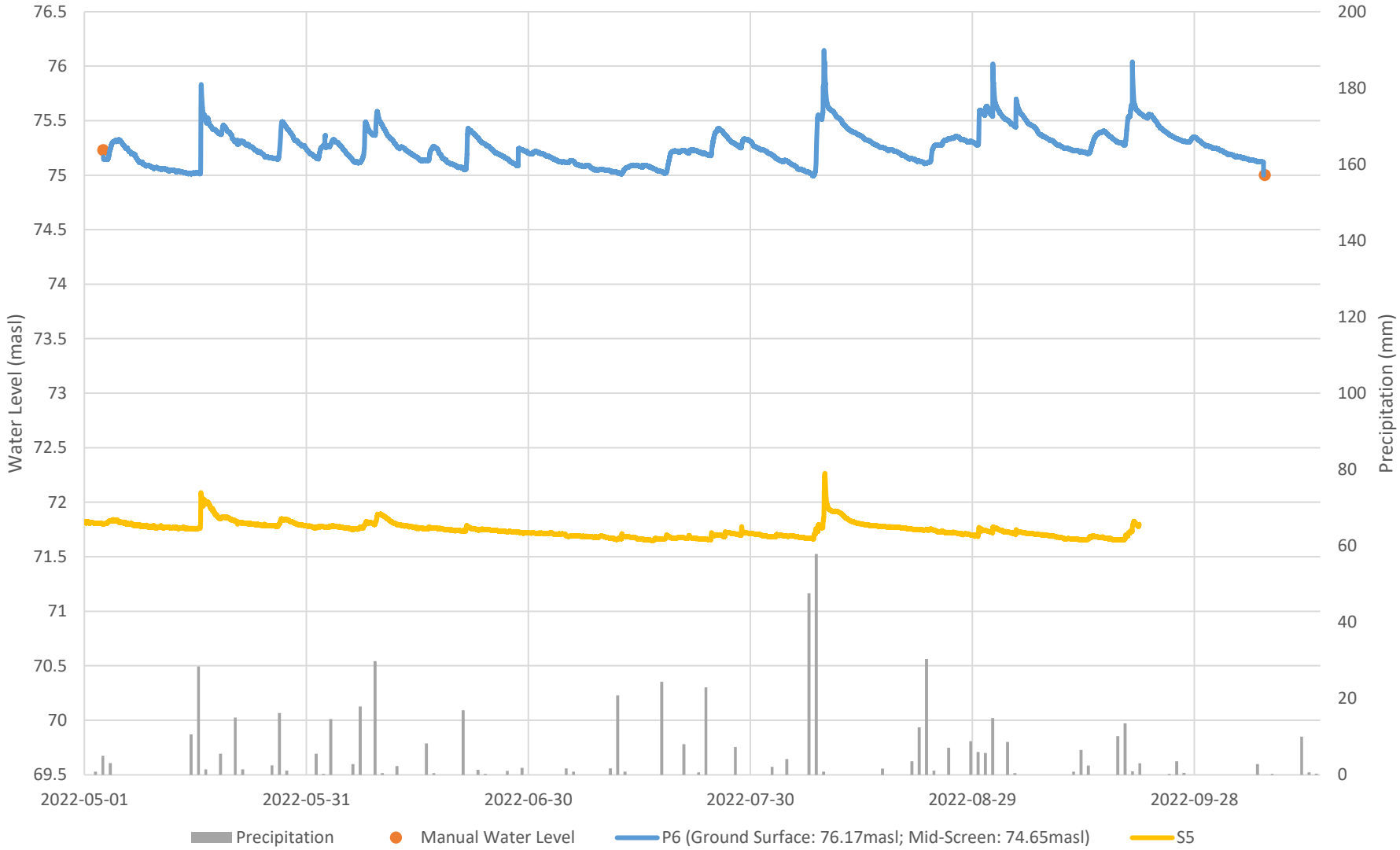
Appendix C
Monitoring Location: P4
Tewin - Existing Conditions Hydrogeological Report



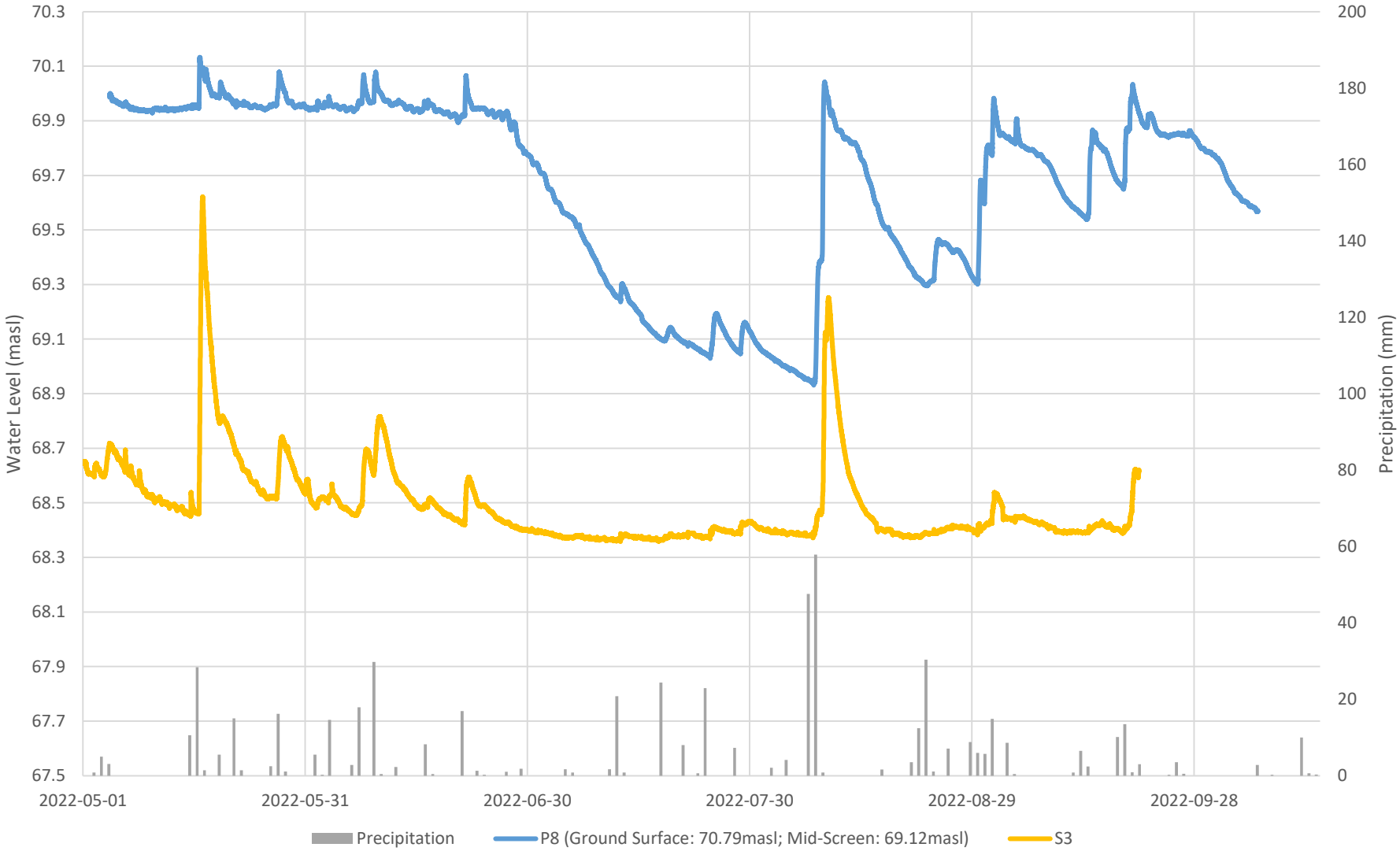
Appendix C
Monitoring Location: P5
Tewin - Existing Conditions Hydrogeological Report



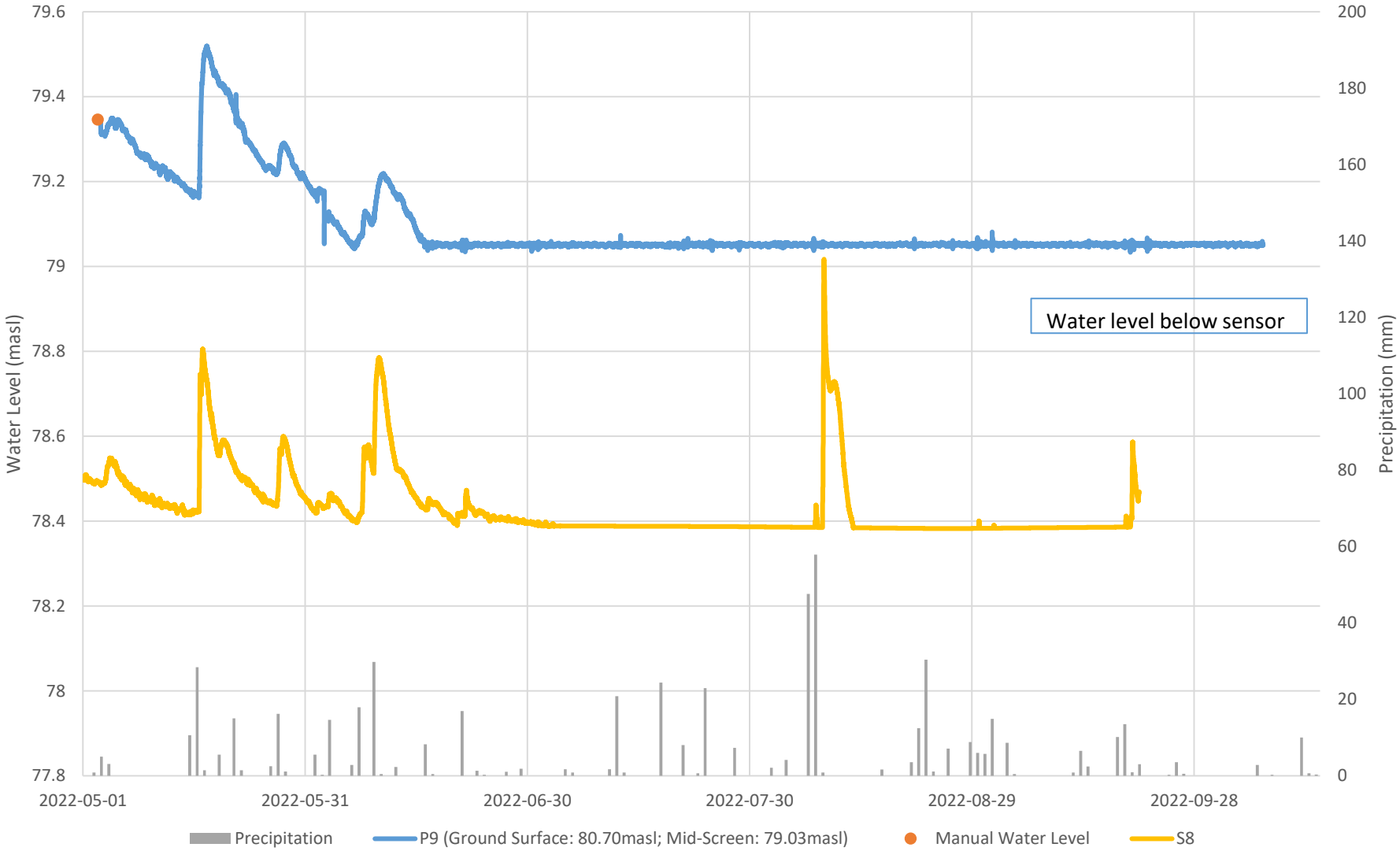
Appendix C
Monitoring Location: P6
Tewin - Existing Conditions Hydrogeological Report



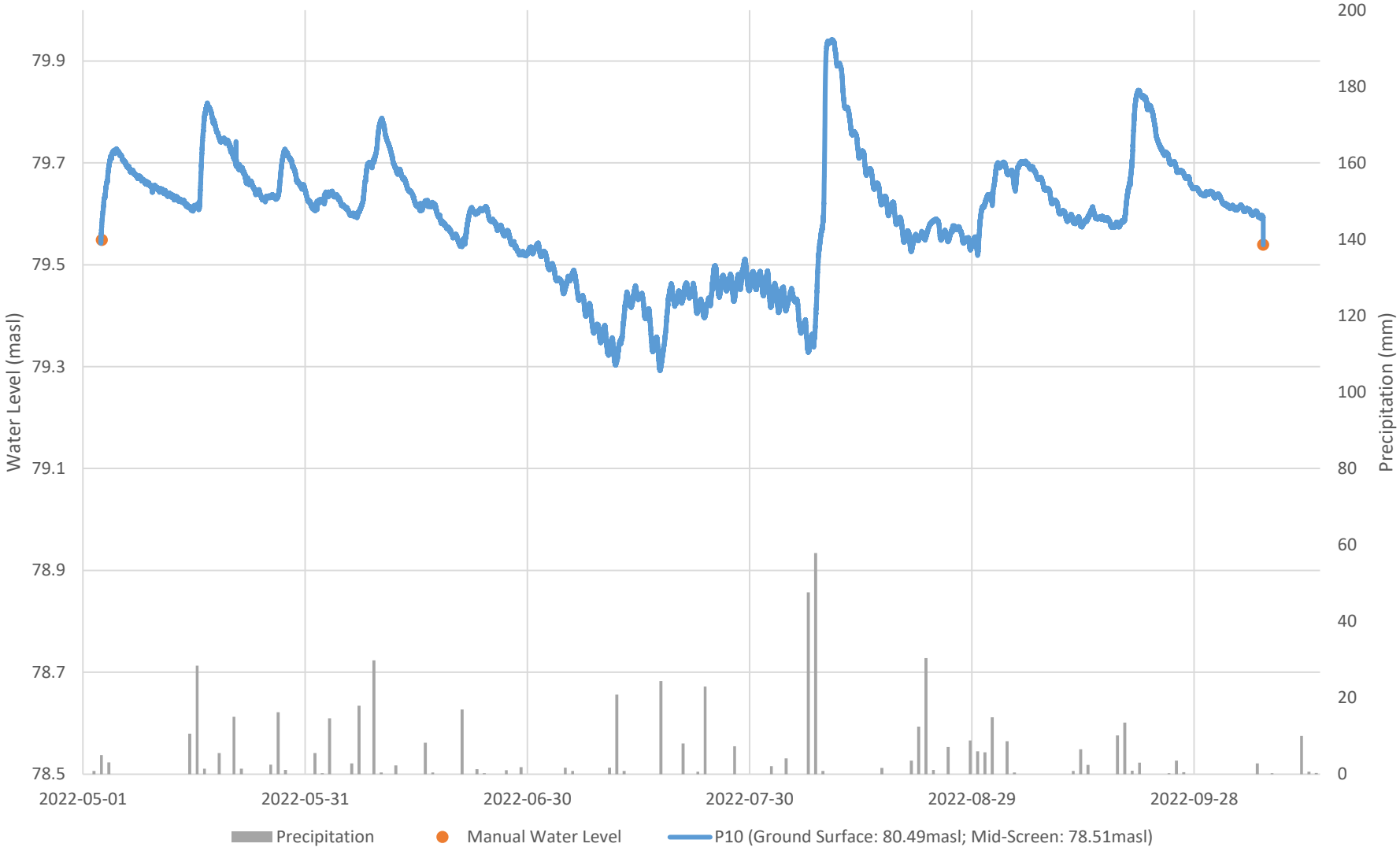
Appendix C
Monitoring Location: P8
Tewin - Existing Conditions Hydrogeological Report



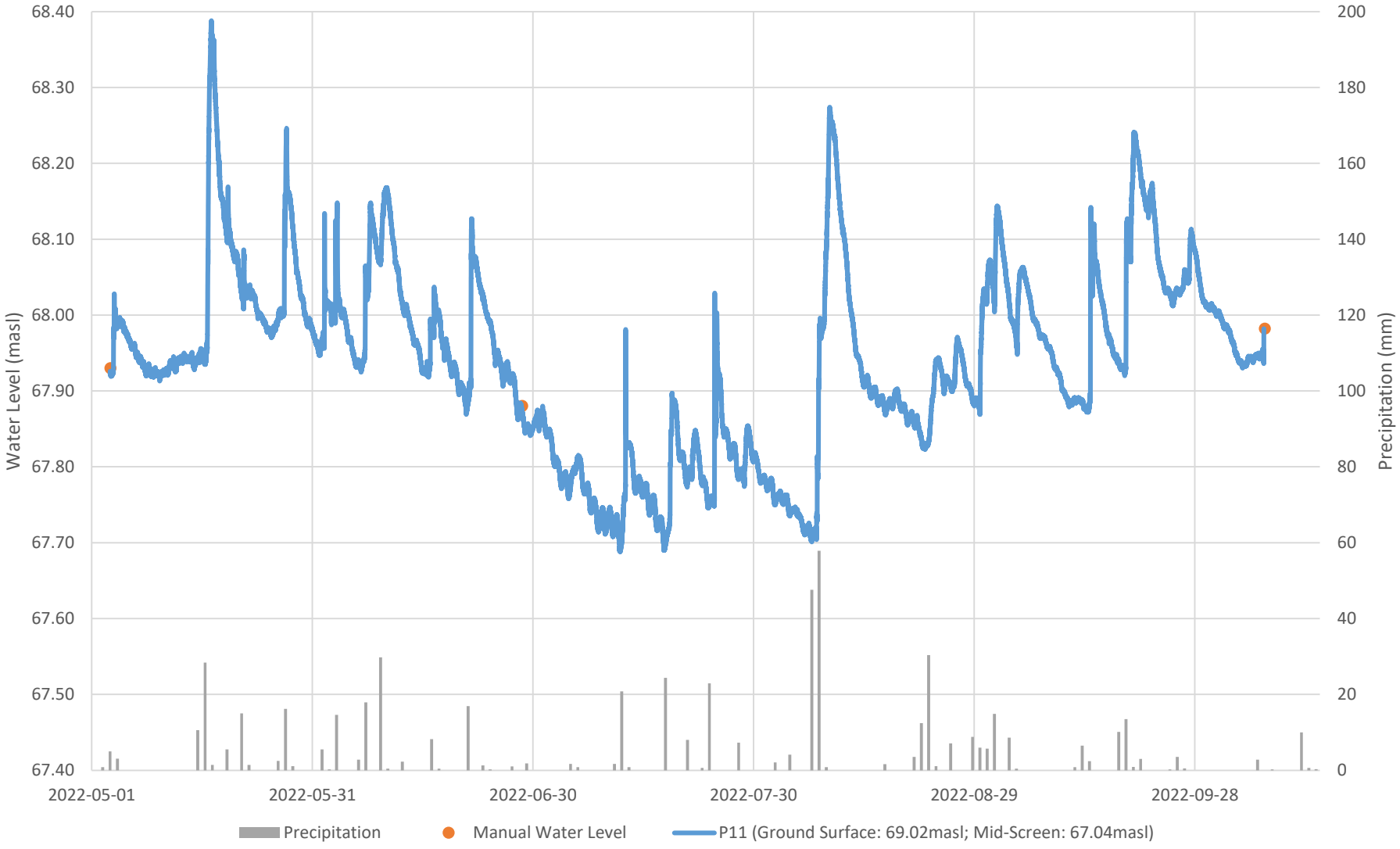
Appendix C
Monitoring Location: P9
Tewin - Existing Conditions Hydrogeological Report



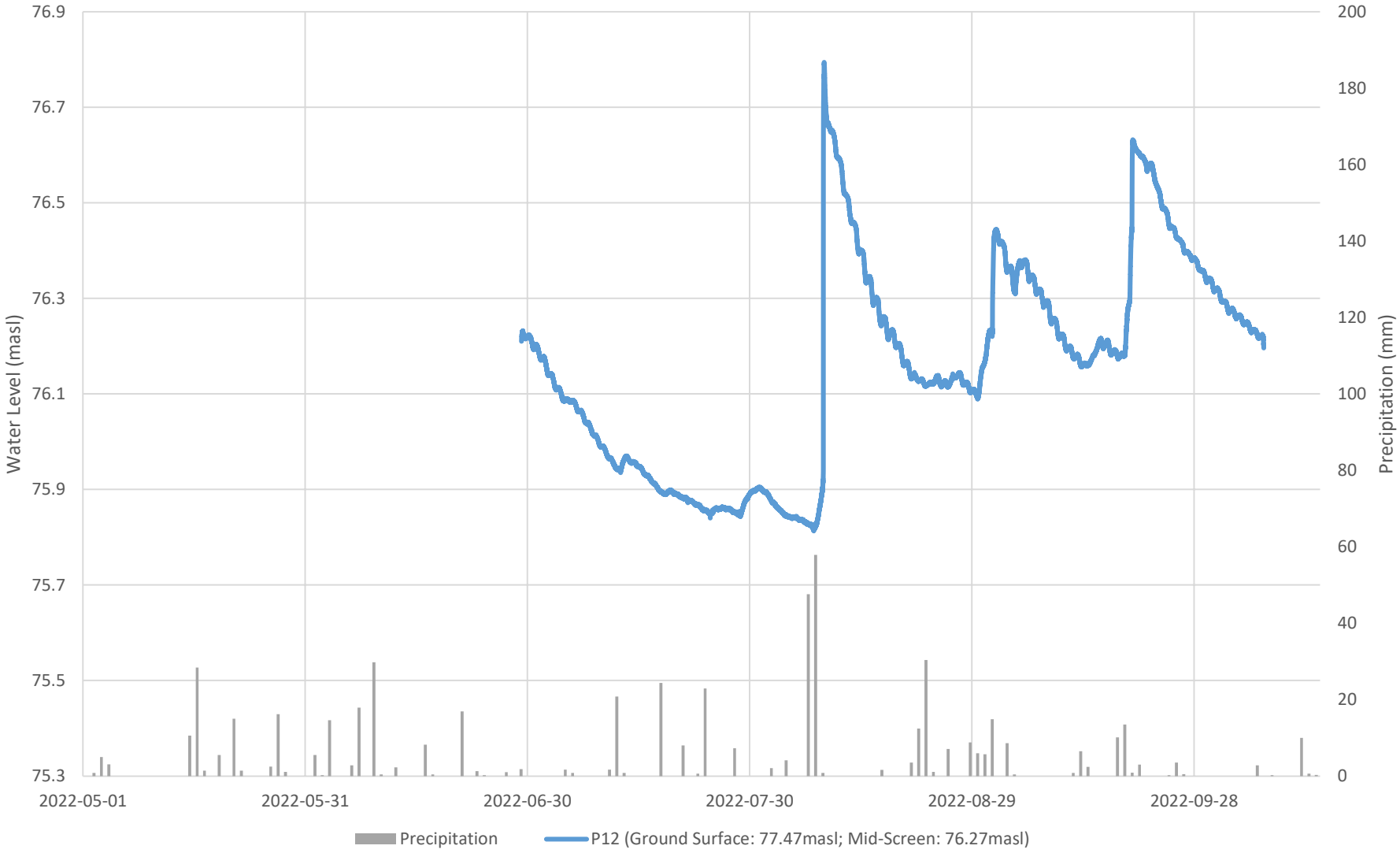
Appendix C
Monitoring Location: P10
Tewin - Existing Conditions Hydrogeological Report



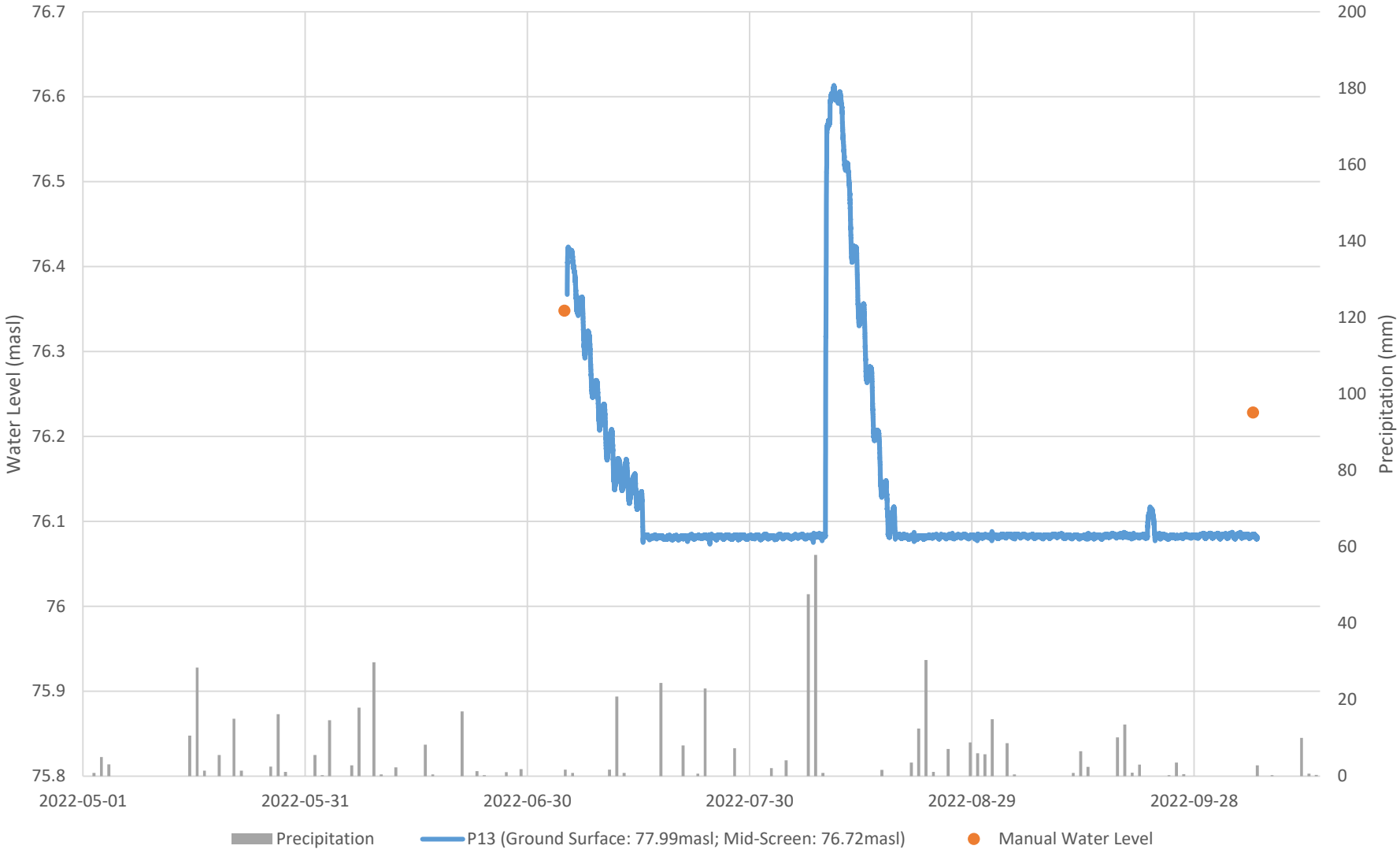
Appendix C
Monitoring Location: P11
Tewin - Existing Conditions Hydrogeological Report



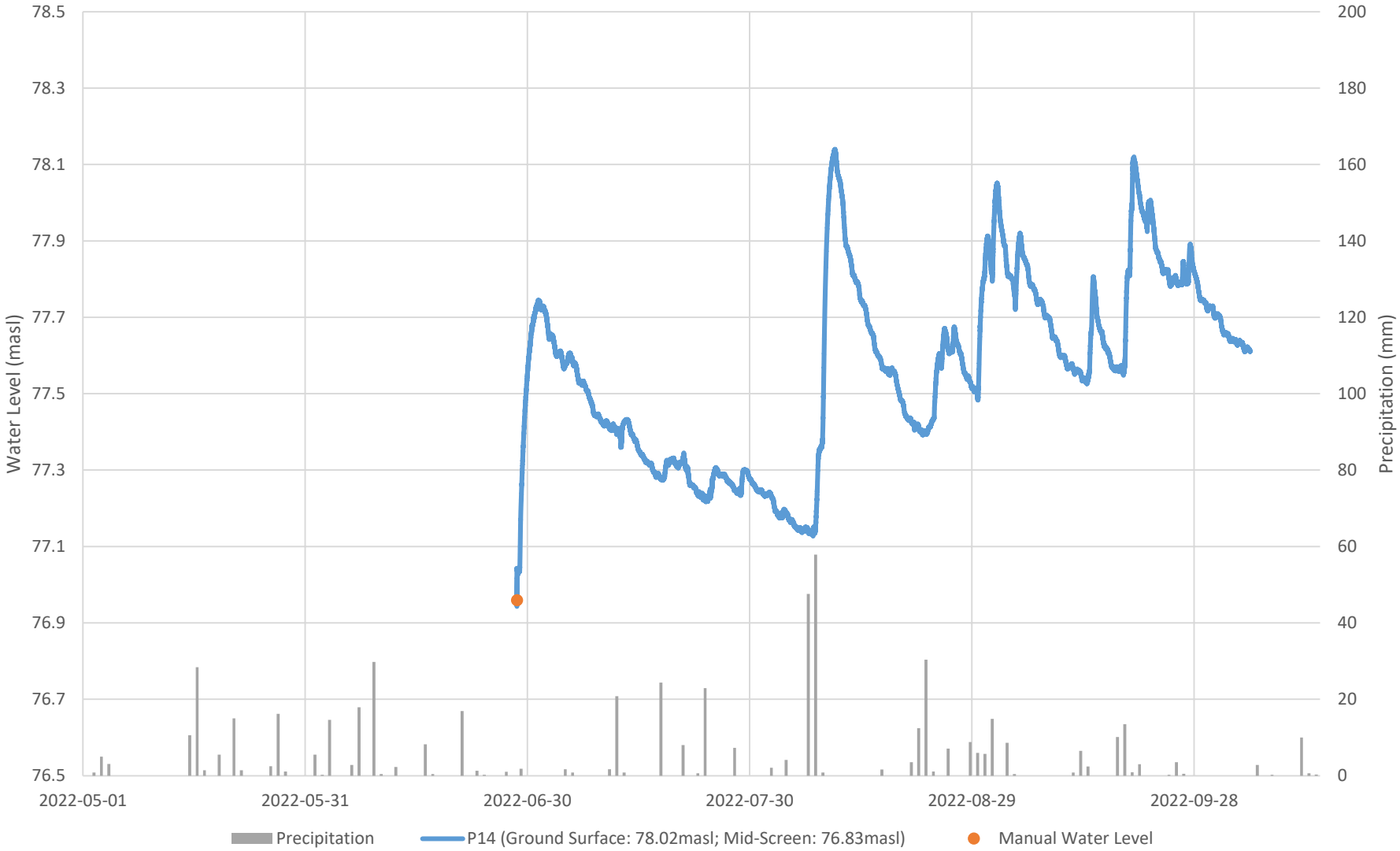
Appendix C
Monitoring Location: P12
Tewin - Existing Conditions Hydrogeological Report



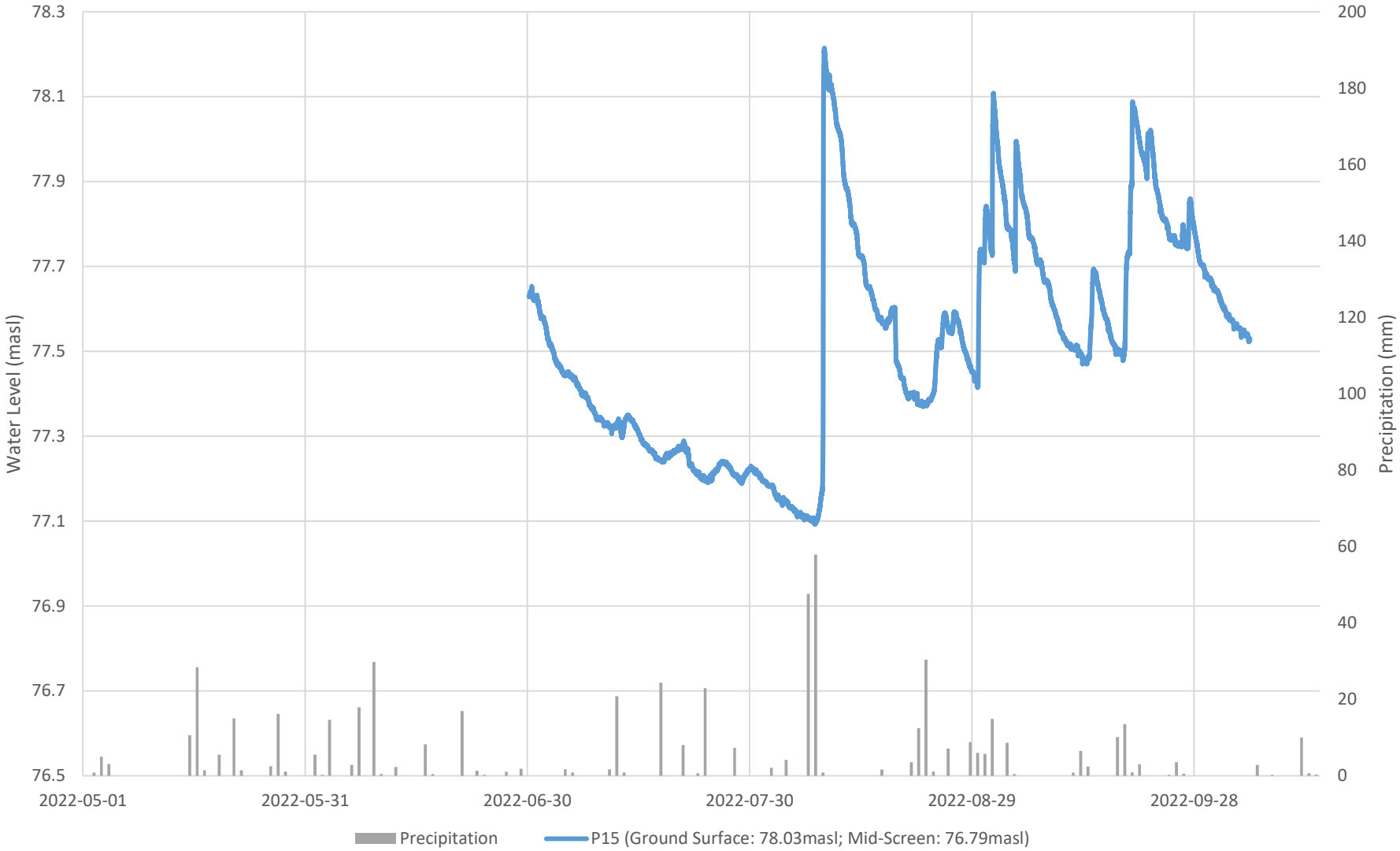
Appendix C
Monitoring Location: P13
Tewin - Existing Conditions Hydrogeological Report



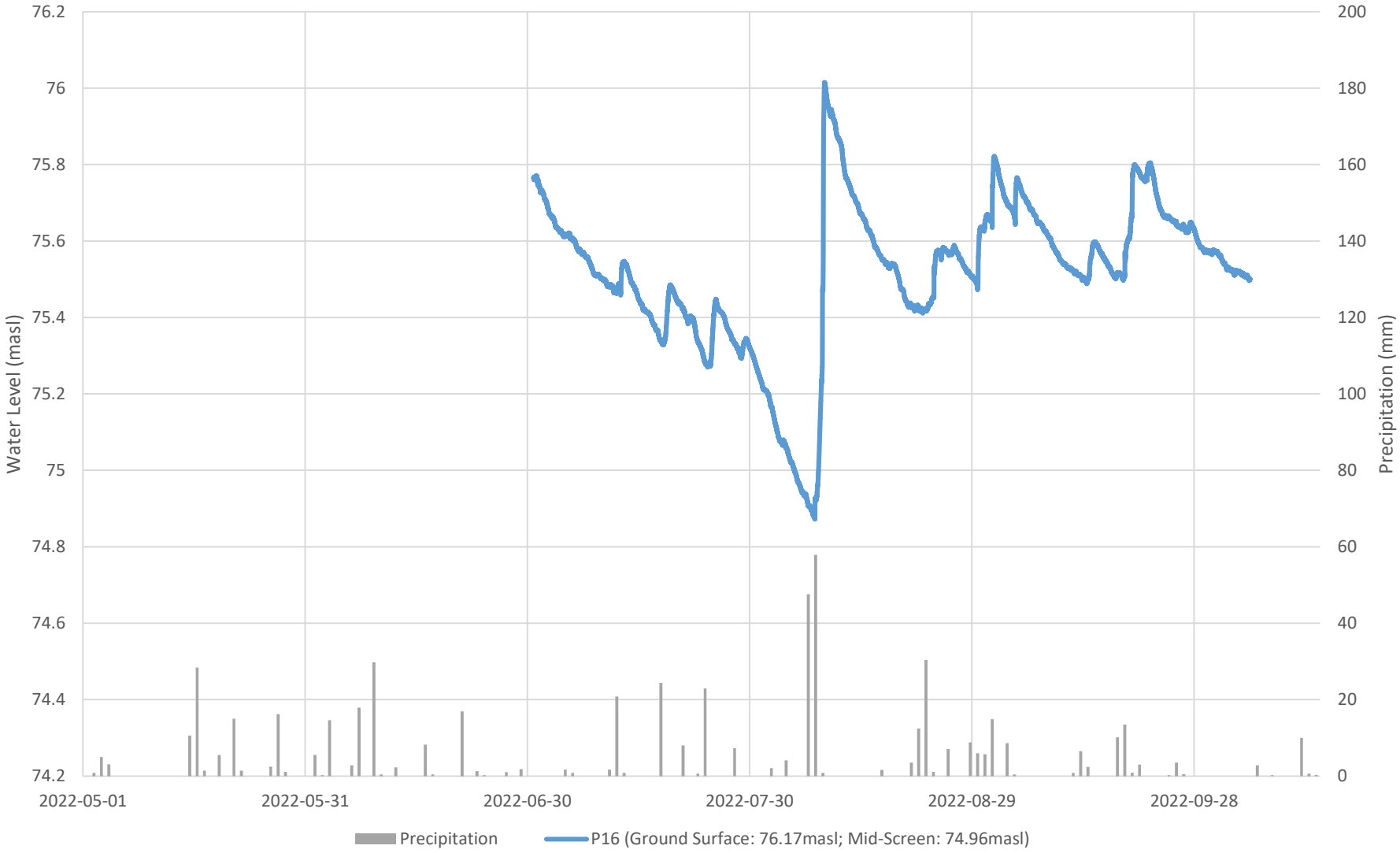
Appendix C
Monitoring Location: P14
Tewin - Existing Conditions Hydrogeological Report



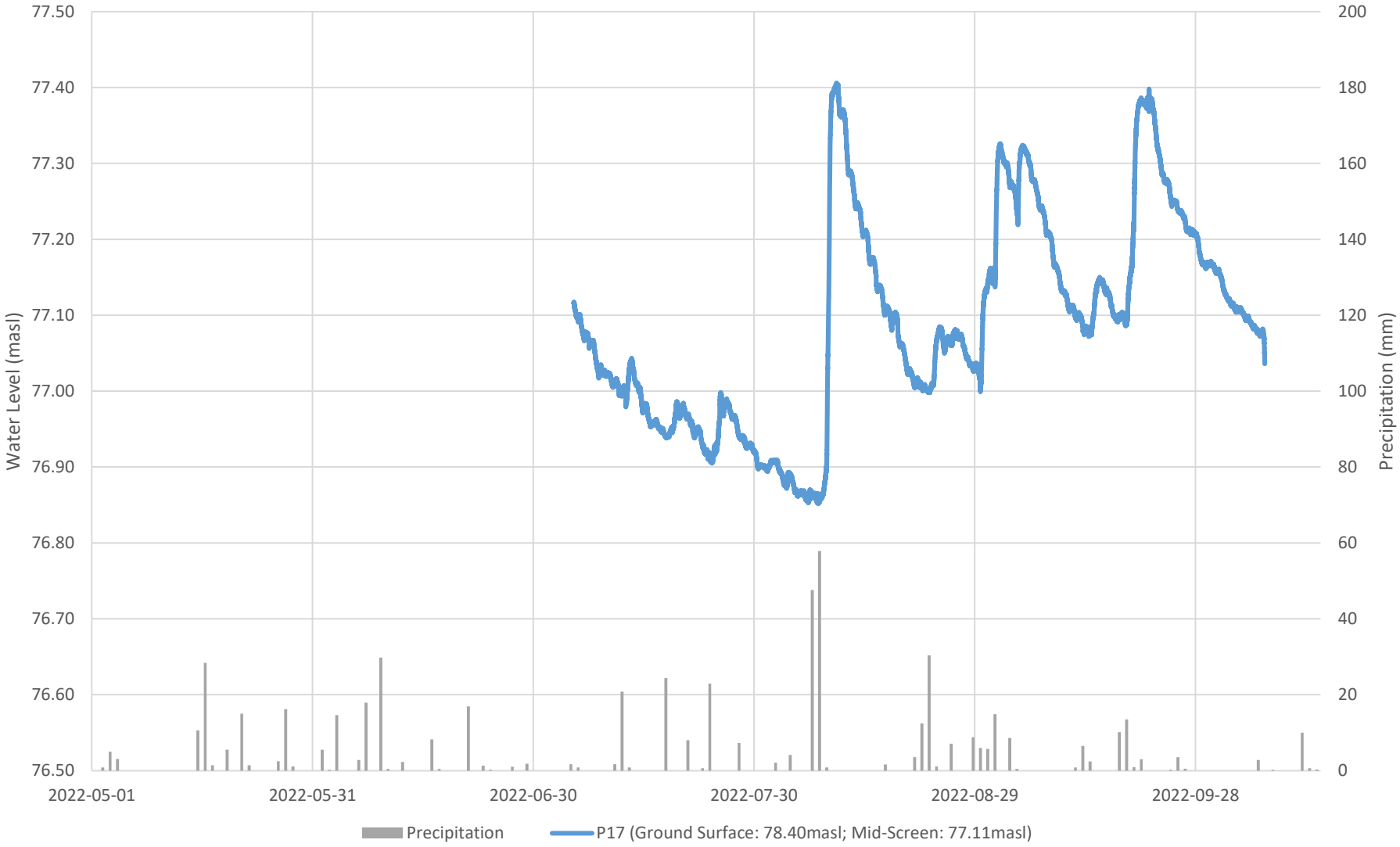
Appendix C
Monitoring Location: P15
Tewin - Existing Conditions Hydrogeological Report



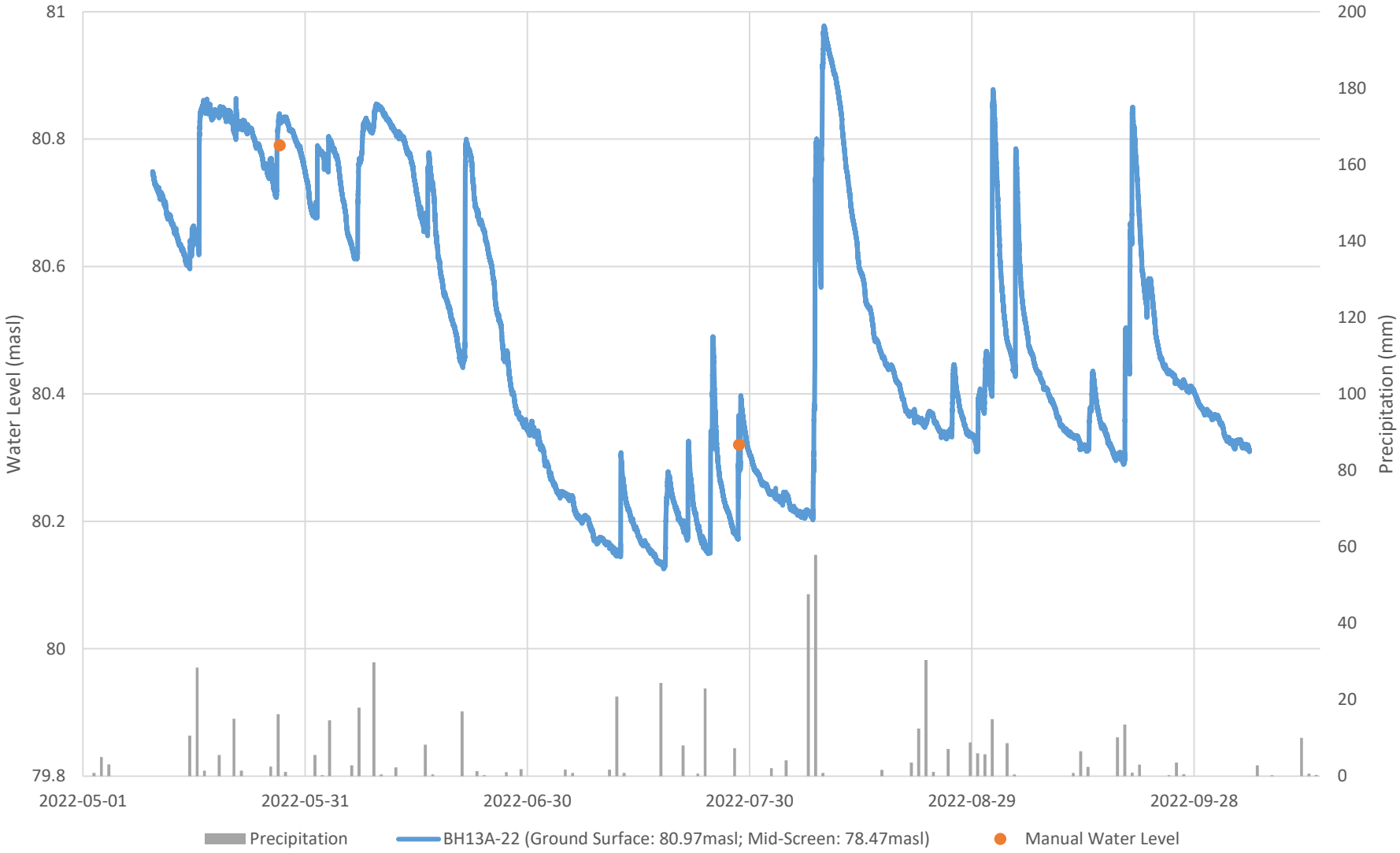
Appendix C
Monitoring Location: P16
Tewin - Existing Conditions Hydrogeological Report



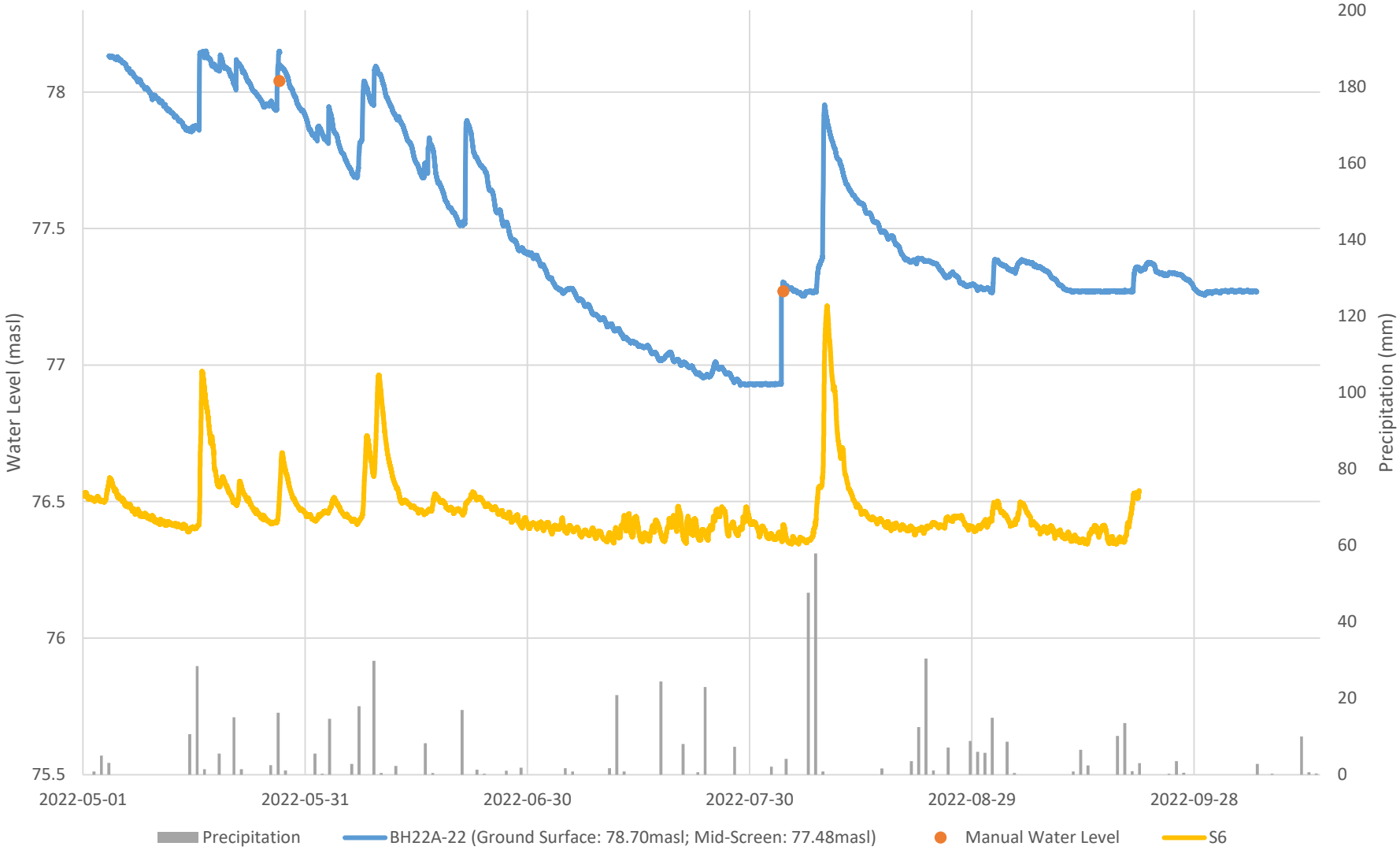
Appendix C
Monitoring Location: P17
Tewin - Existing Conditions Hydrogeological Report



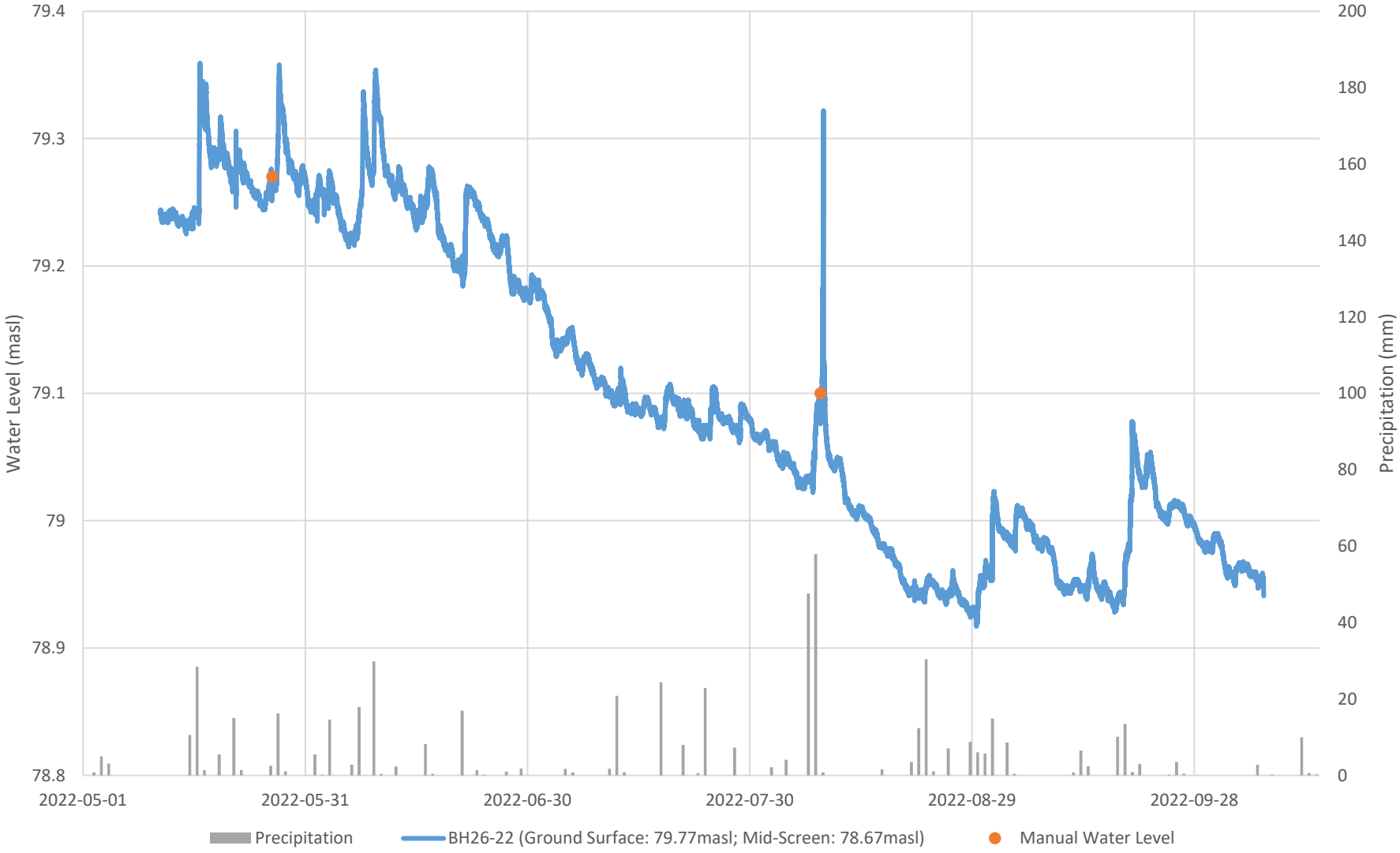
Appendix C
Monitoring Location: BH13A-22
Tewin - Existing Conditions Hydrogeological Report



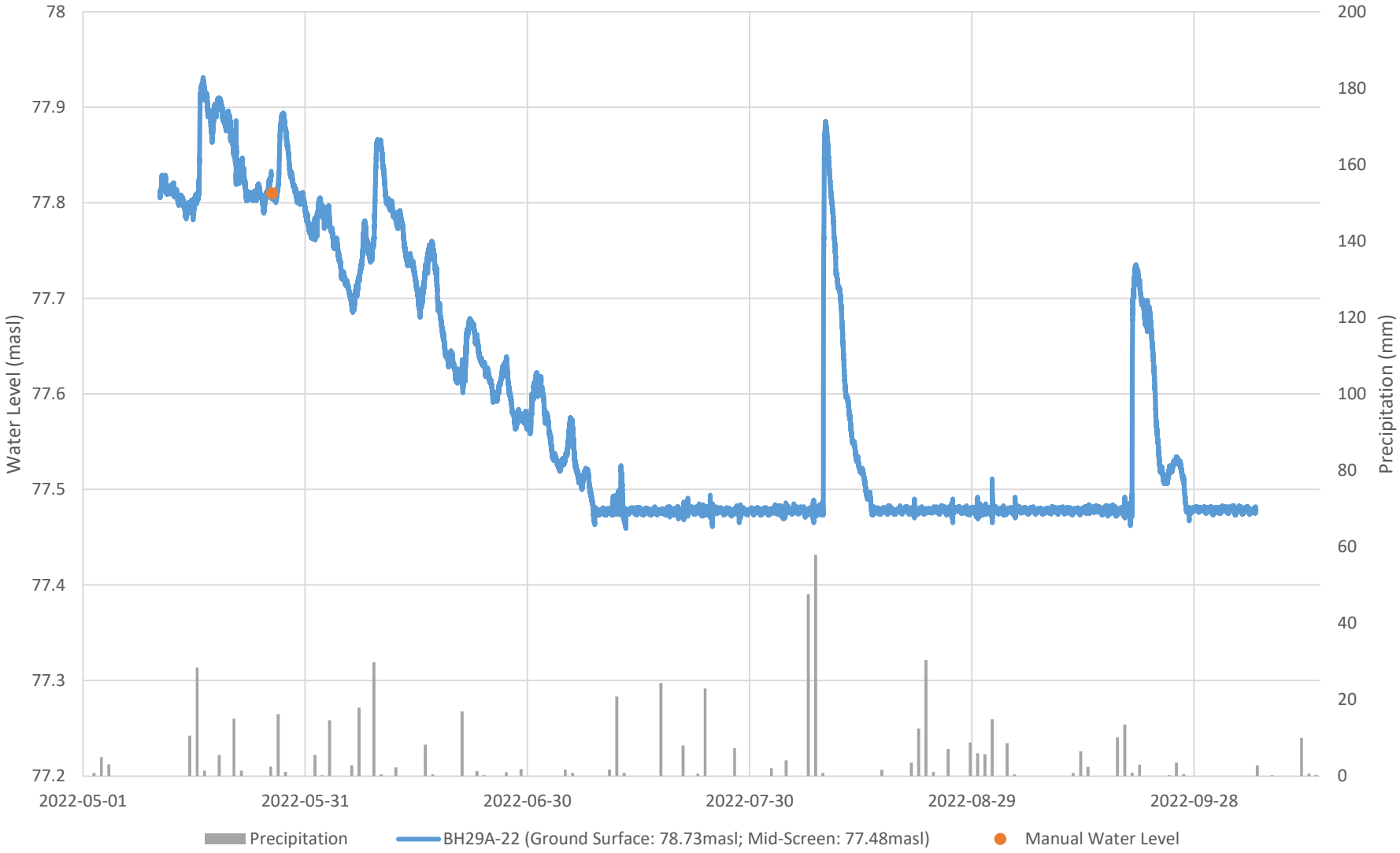
Appendix C
Monitoring Location: BH22A-22
Tewin - Existing Conditions Hydrogeological Report



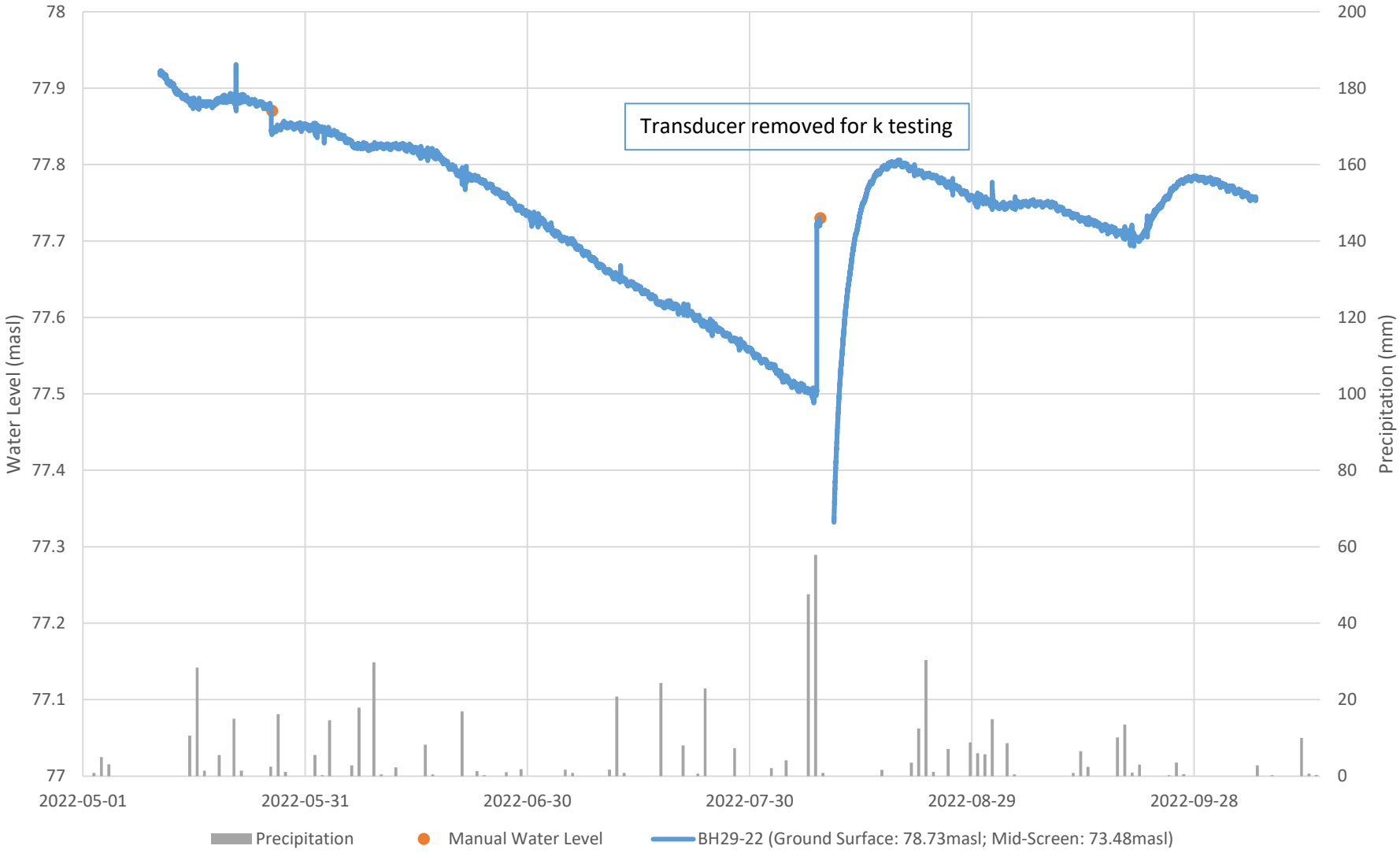
Appendix C
Monitoring Location: BH26A-22
Tewin - Existing Conditions Hydrogeological Report



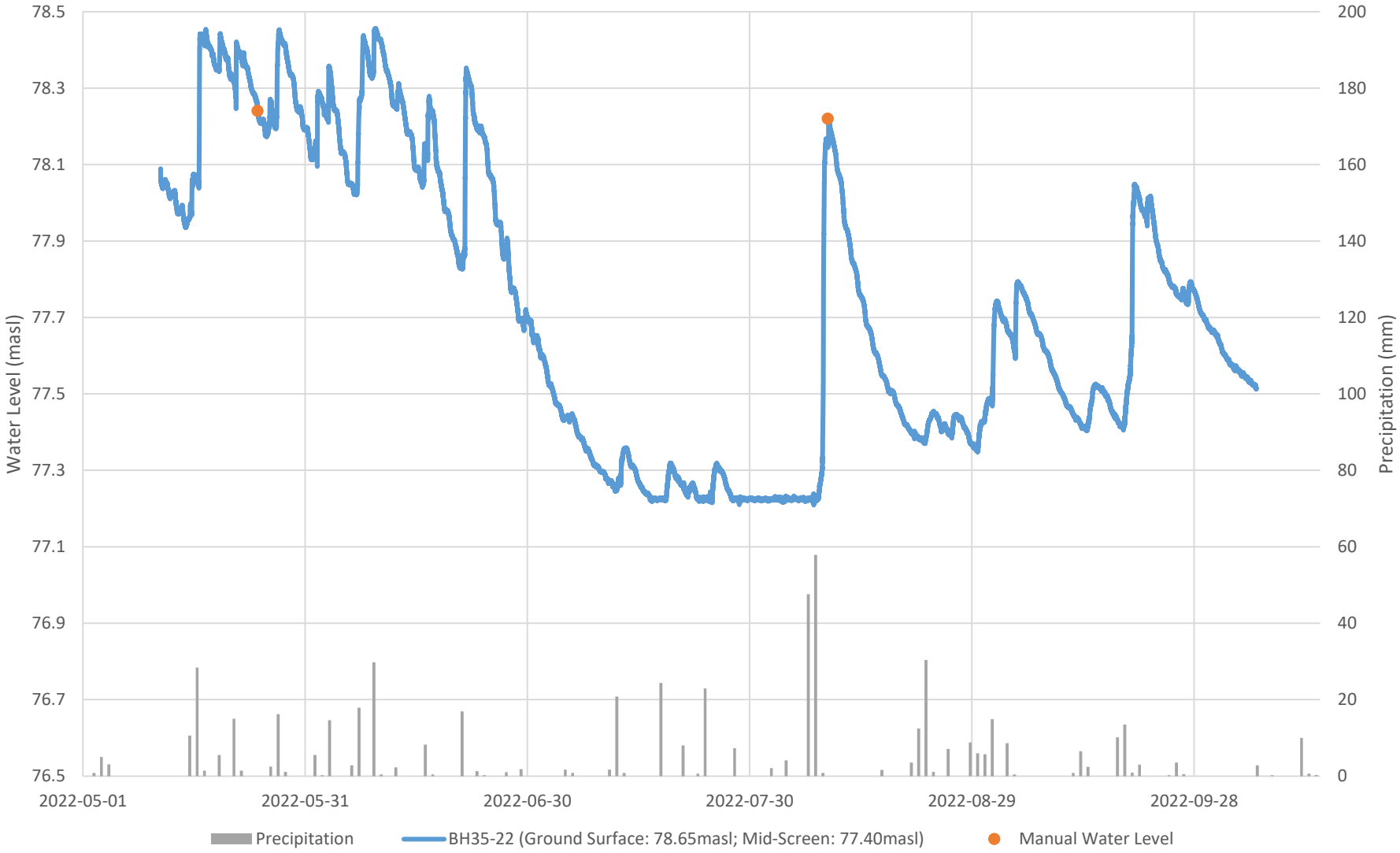
Appendix C
Monitoring Location: BH29A-22
Tewin - Existing Conditions Hydrogeological Report



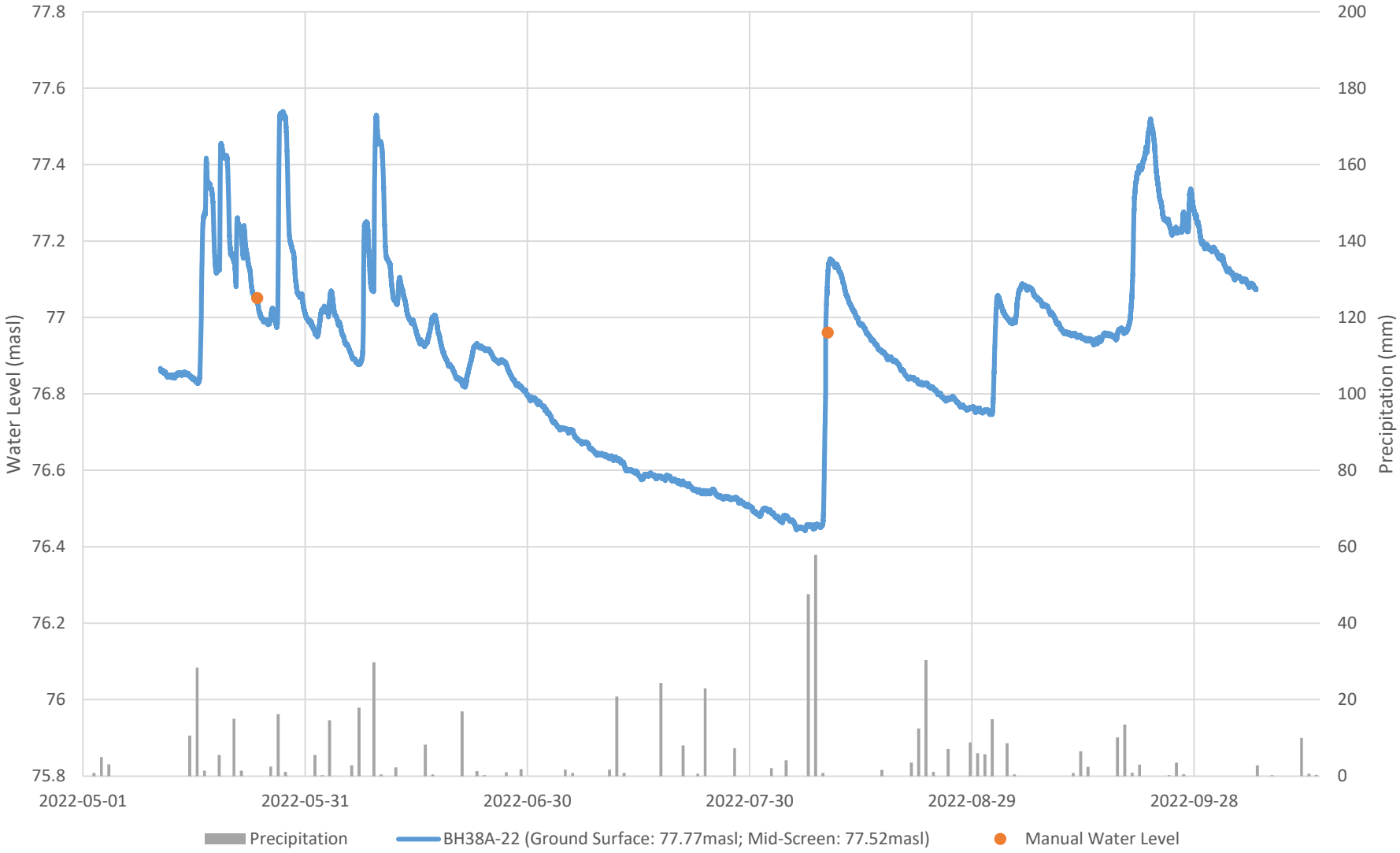
Appendix C
Monitoring Location: BH29-22
Tewin - Existing Conditions Hydrogeological Report



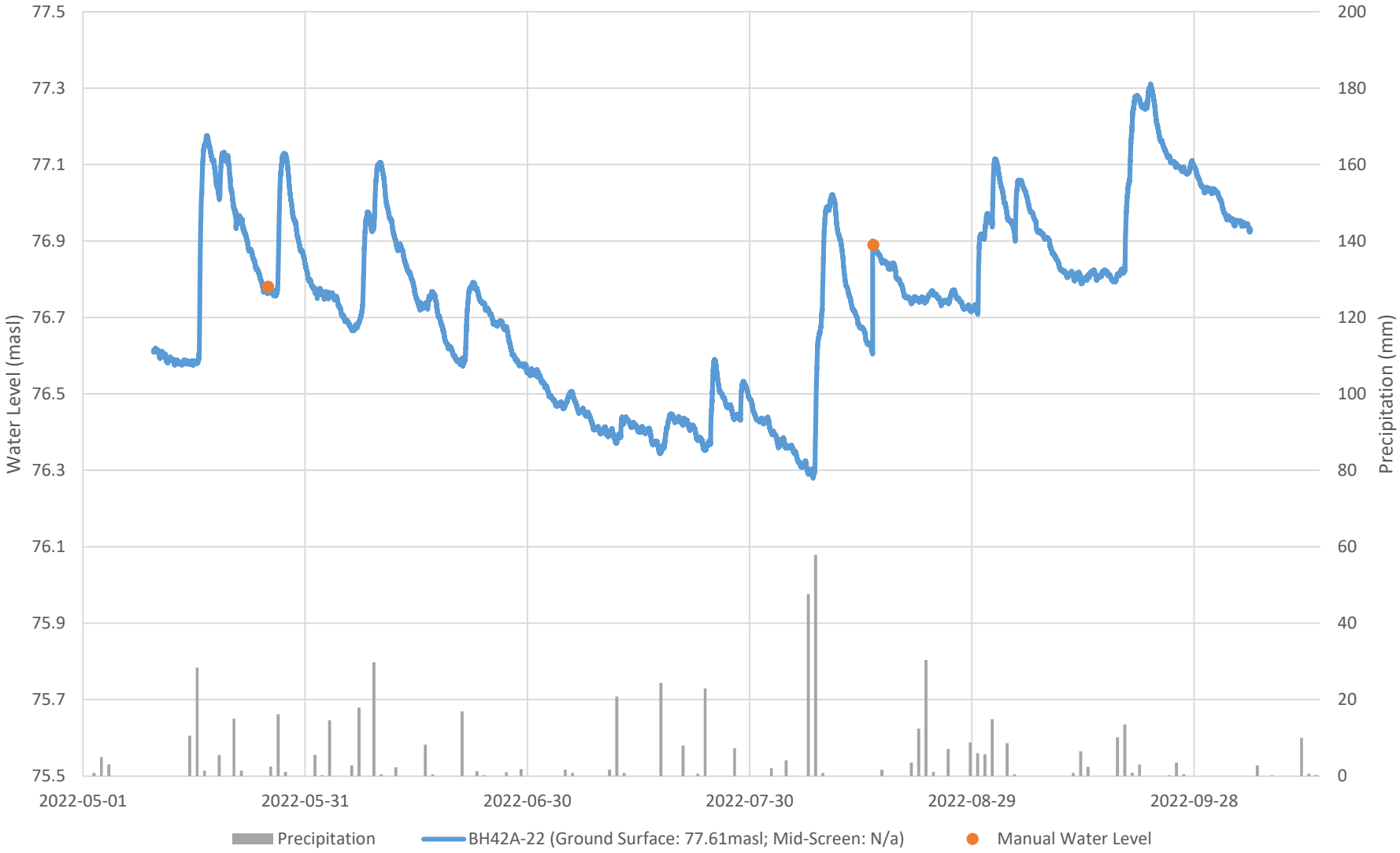
Appendix C
Monitoring Location: BH35A-22
Tewin - Existing Conditions Hydrogeological Report



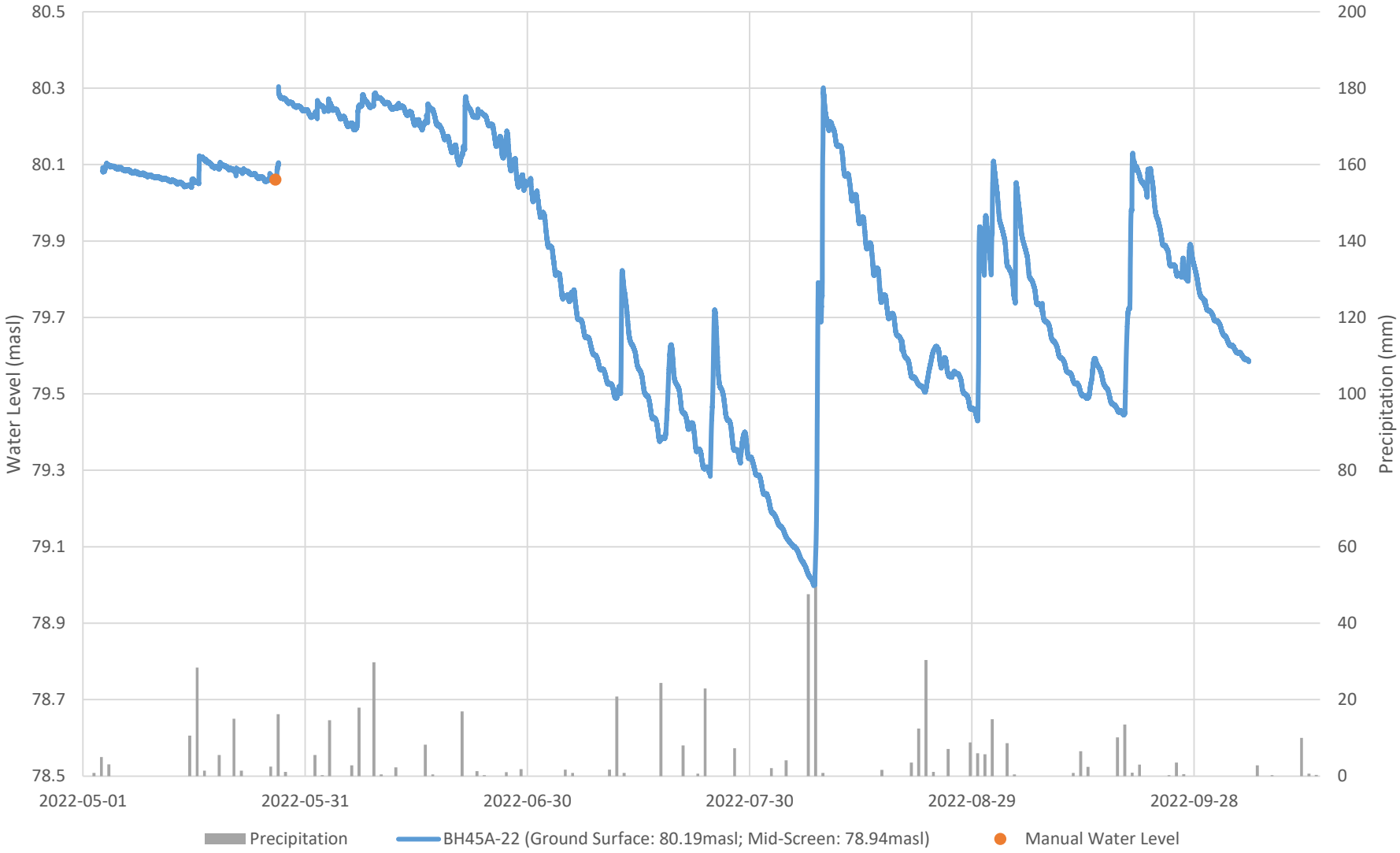
Appendix C
Monitoring Location: BH38A-22
Tewin - Existing Conditions Hydrogeological Report



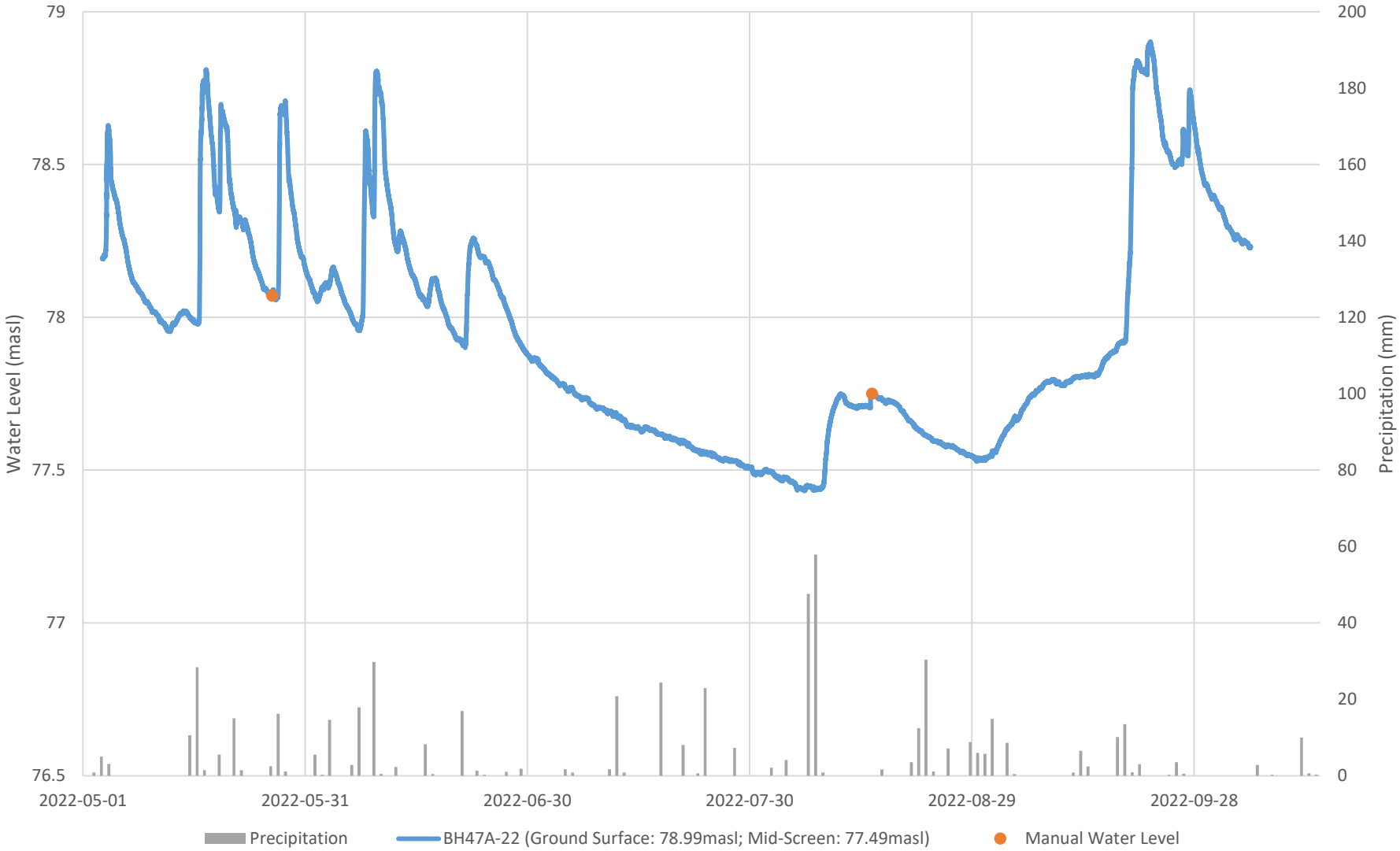
Appendix C
Monitoring Location: BH42A-22
Tewin - Existing Conditions Hydrogeological Report



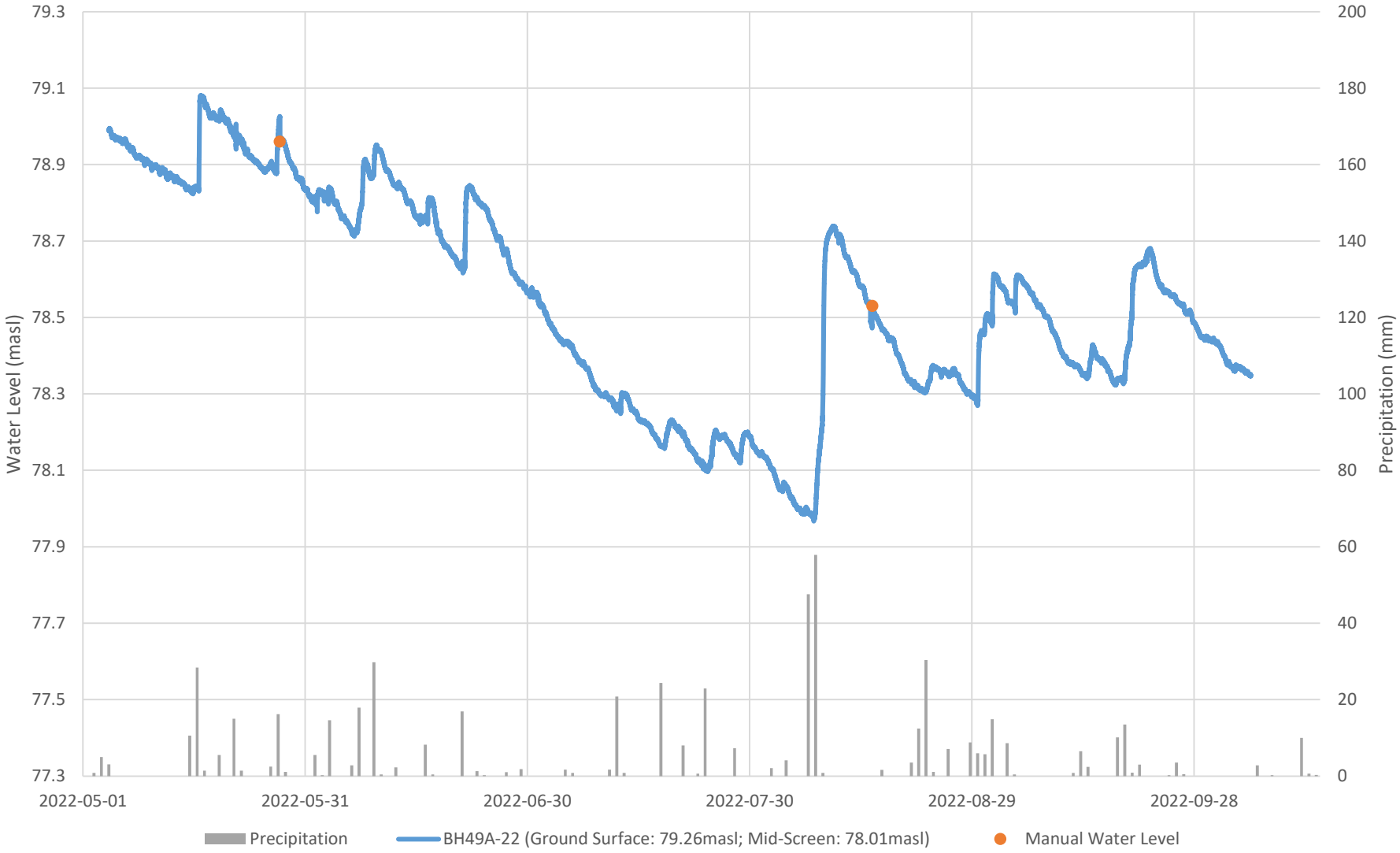
Appendix C
Monitoring Location: BH45A-22
Tewin - Existing Conditions Hydrogeological Report



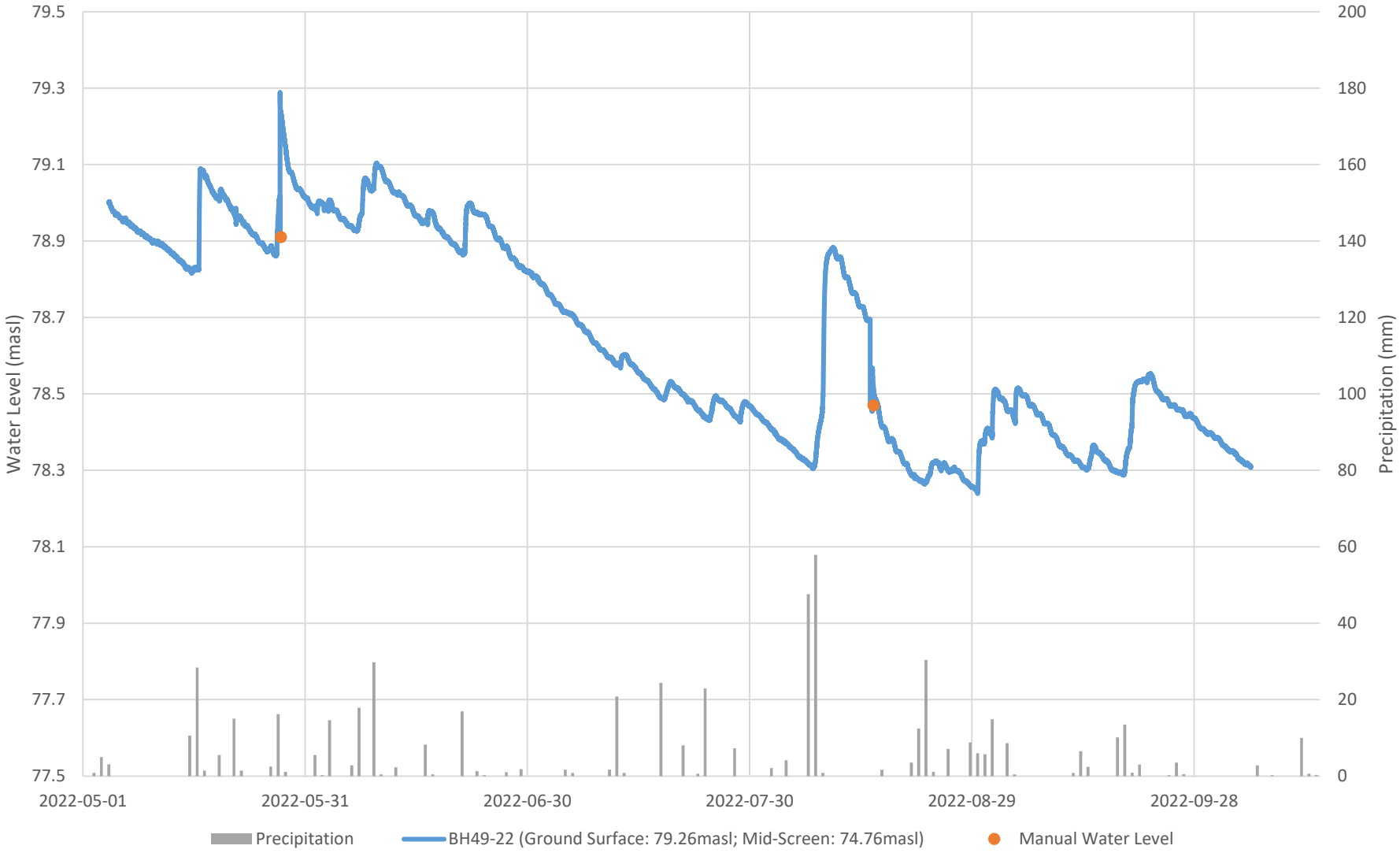
Appendix C
Monitoring Location: BH47A-22
Tewin - Existing Conditions Hydrogeological Report



Appendix C
Monitoring Location: BH49A-22
Tewin - Existing Conditions Hydrogeological Report

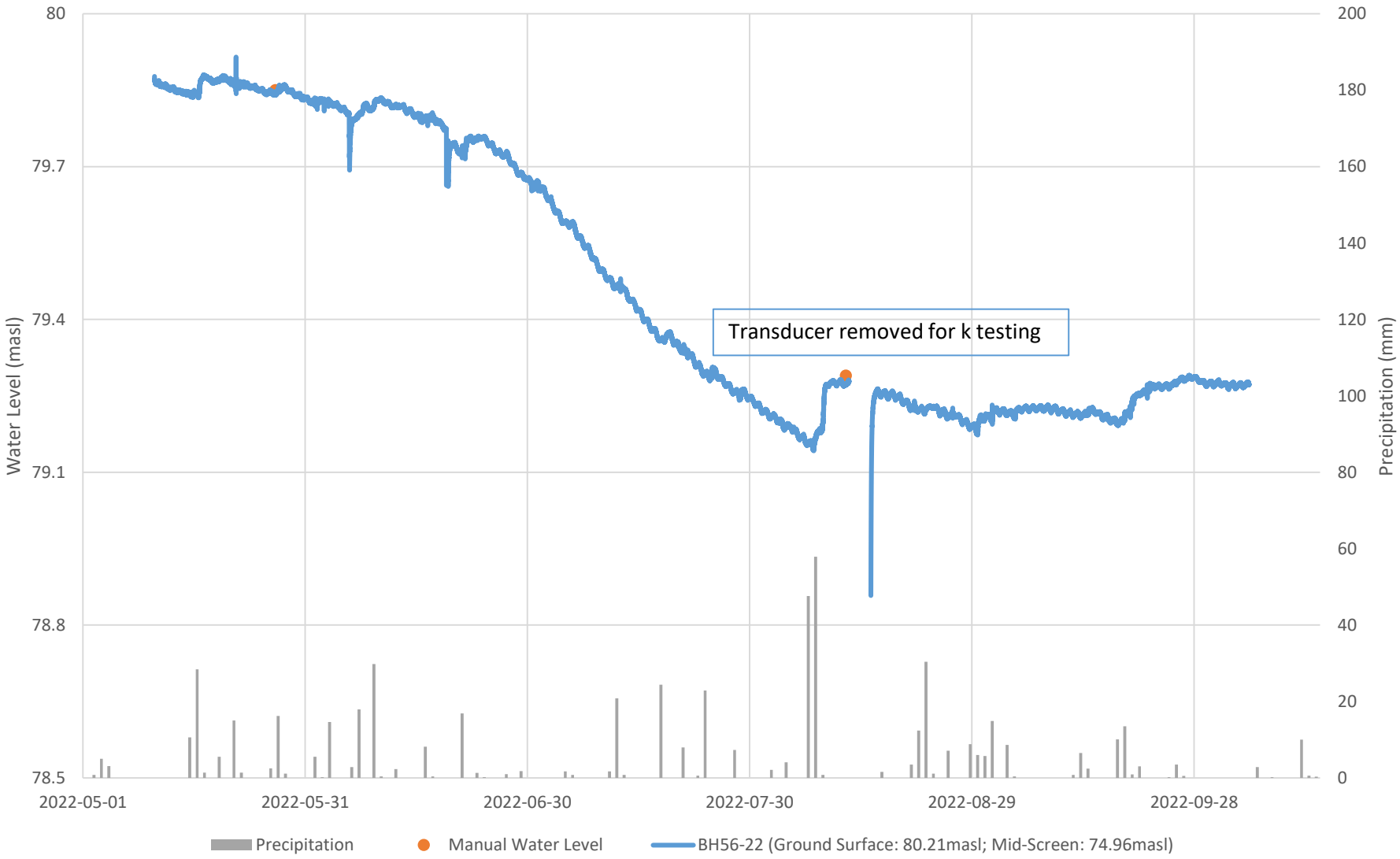


Appendix C
Monitoring Location: BH49-22
Tewin - Existing Conditions Hydrogeological Report

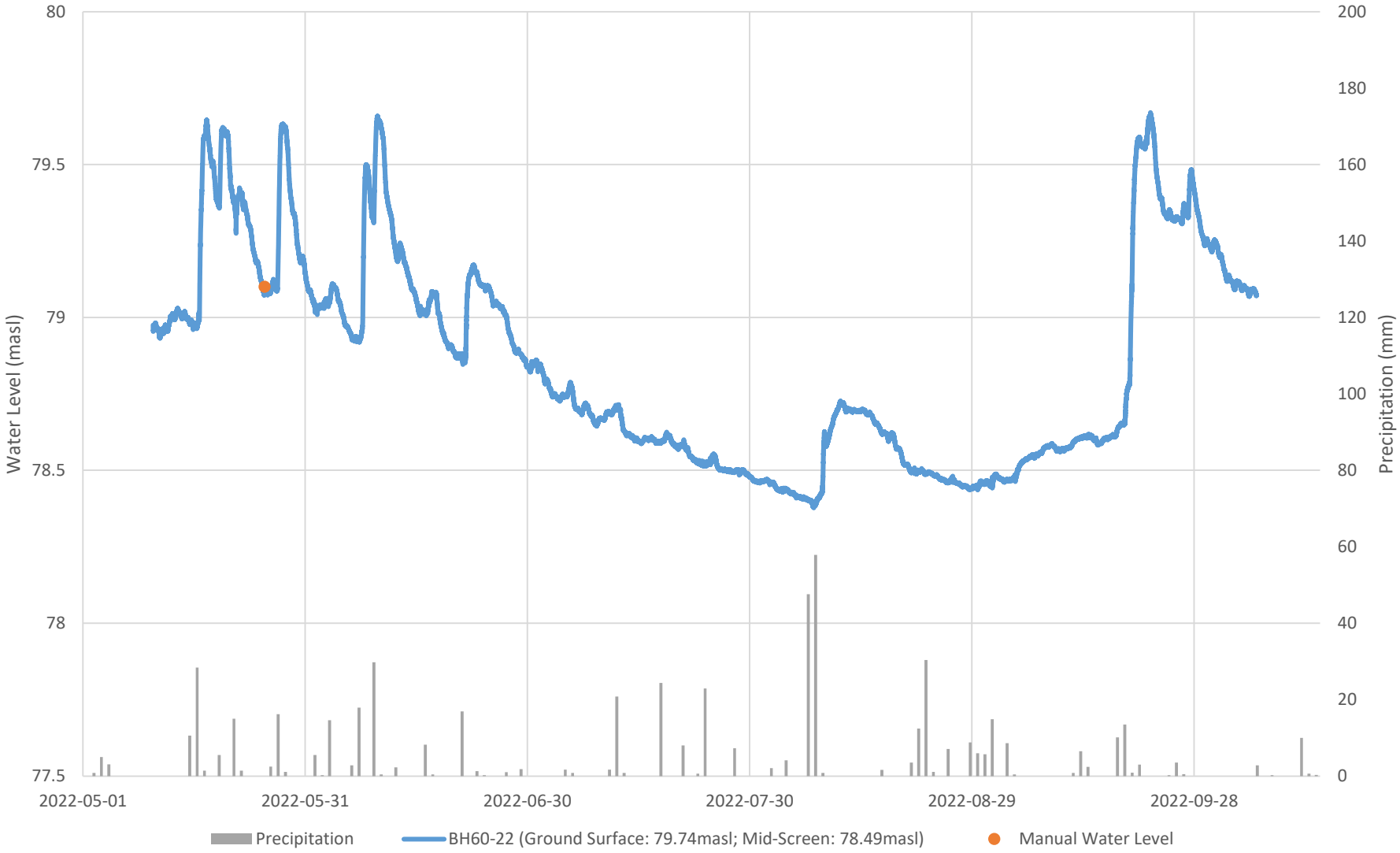


Appendix C
Monitoring Location: BH56A-22
Tewin - Existing Conditions Hydrogeological Report

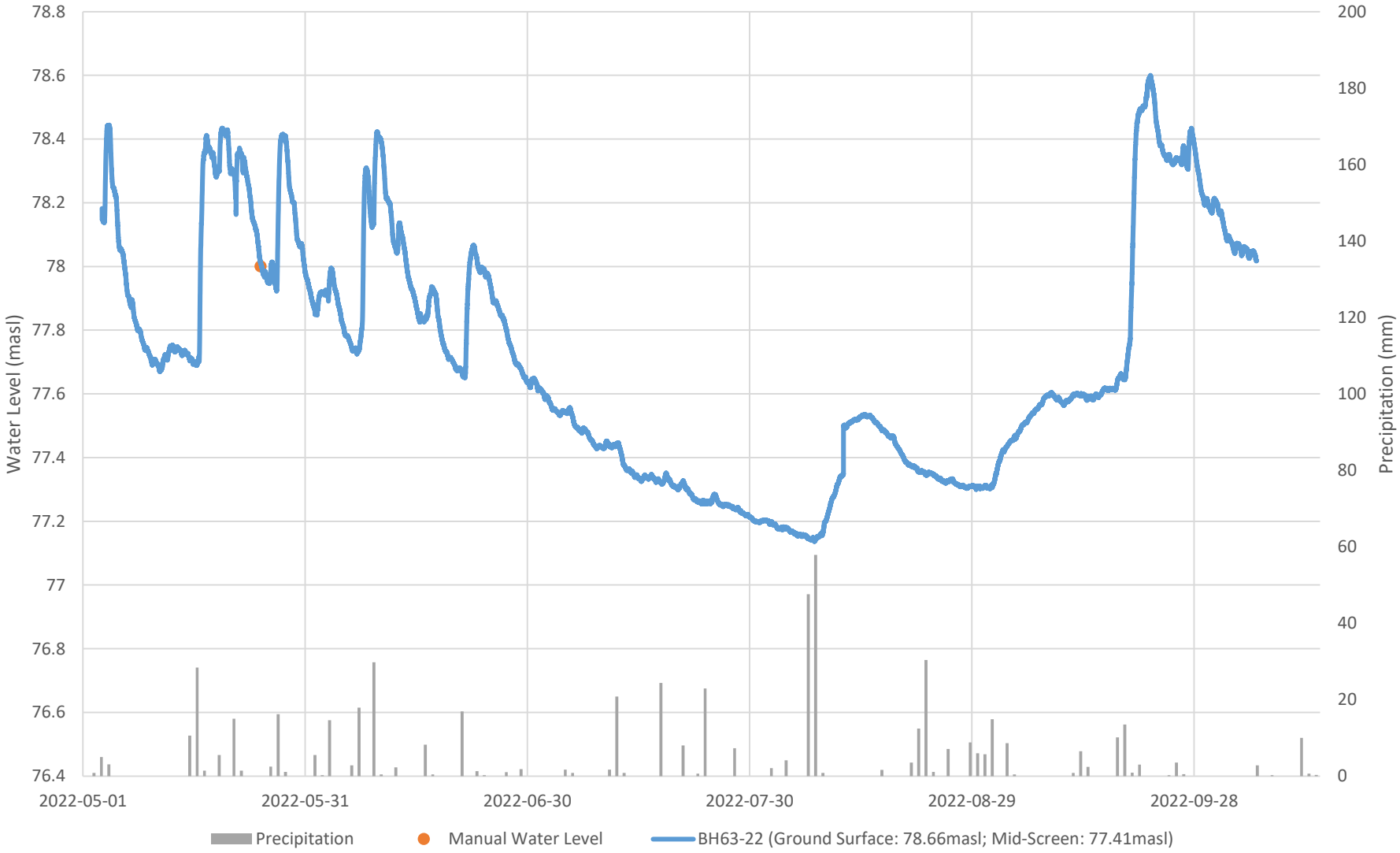
Appendix C
Monitoring Location: BH56-22
Tewin - Existing Conditions Hydrogeological Report



Appendix C
Monitoring Location: BH60A-22
Tewin - Existing Conditions Hydrogeological Report



Appendix C
Monitoring Location: BH63A-22
Tewin - Existing Conditions Hydrogeological Report



Appendix D

Groundwater Analytical Results

Appendix D - Groundwater Analytical Results

DILLON CONSULTING

Parameter	Units	RDL	Sample					
			BH14-22	BH22-22	BH47-22	BH63-22	Dup1	P2 2404197-04
Sample Date (m/d/y)			01/17/2024	01/23/2024	01/23/2024	01/23/2024	01/23/2024	01/23/2024
General Inorganics								
Alkalinity, total	mg/L	5	317	N/A	306	487	483	102
Ammonia as N	mg/L	0.01	0.08	N/A	0.06	ND (0.01)	ND (0.01)	0.04
Phosphorus, total	mg/L	0.01	0.11	N/A	0.66	0.02	0.02	1.39
Total Kjeldahl Nitrogen	mg/L	0.1	0.3	N/A	0.8	0.2	0.2	1.0
Anions								
Chloride	mg/L	1	414	N/A	138	701	720	10
Nitrate as N	mg/L	0.1	0.7	N/A	2.7	0.8	0.7	ND (0.1)
Nitrite as N	mg/L	0.05	ND (0.05)	N/A	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Sulphate	mg/L	1	20	N/A	42	87	85	70
Metals								
Mercury	ug/L	0.1	ND (0.1)	N/A	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Antimony	ug/L	0.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Arsenic	ug/L	1	1	ND (1)	2	ND (1)	ND (1)	ND (1)
Barium	ug/L	1	58	38	124	122	126	22
Beryllium	ug/L	0.5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Boron	ug/L	10	69	63	22	65	65	ND (10)
Cadmium	ug/L	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Calcium	ug/L	100	49200	95400	72700	84300	83700	37300
Chromium	ug/L	1	ND (1)	ND (1)	8	ND (1)	ND (1)	2
Chromium (VI)	ug/L	1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1
Cobalt	ug/L	0.5	ND (0.5)	ND (0.5)	3.6	ND (0.5)	ND (0.5)	ND (0.5)
Copper	ug/L	0.5	0.9	0.6	12.6	1.2	1.7	0.8
Lead	ug/L	0.1	ND (0.1)	ND (0.1)	2.9	0.1	ND (0.1)	ND (0.1)
Magnesium	ug/L	200	37000	83600	33000	66300	66500	10500
Molybdenum	ug/L	0.5	4.6	1.0	ND (0.5)	1.5	1.4	ND (0.5)
Nickel	ug/L	1	ND (1)	ND (1)	7	ND (1)	ND (1)	ND (1)
Potassium	ug/L	100	11200	9110	1500	8000	7720	745
Selenium	ug/L	1	ND (1)	ND (1)	3	ND (1)	ND (1)	ND (1)
Silver	ug/L	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Sodium	ug/L	200	257000	485000	89700	465000	463000	15000
Thallium	ug/L	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Uranium	ug/L	0.1	1.3	7.2	1.9	3.2	3.2	ND (0.1)
Vanadium	ug/L	0.5	1.4	ND (0.5)	14.7	1.1	1.2	0.9
Zinc	ug/L	5	21	ND (5)	18	ND (5)	ND (5)	ND (5)

Notes:

Dup1	Field duplicate of BH63-22
NV	No Value
ug/L	Microgram per litre
mg/L	Milligram per litre
ND	No data
RDL	Reportable Detection Limit
N/A	Not applicable
*	Dependent on Hardness as CaCO3

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www.paracellabs.com

Certificate of Analysis

Dillon Consulting Ltd. (Ottawa)
177 Colonnade Road, Suite 101
Ottawa, ON K2E 7J4
Attn: Matthew McCurdy

Client PO:
Project: 223674
Custody: 72074

Report Date: 29-Jan-2024
Order Date: 23-Jan-2024

Order #: 2404197

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2404197-01	BH14-22
2404197-02	BH47-22
2404197-03	BH63-22
2404197-04	P2
2404197-05	Dup1
2404197-06	BH22-22

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	24-Jan-24	24-Jan-24
Ammonia, as N	EPA 351.2 - Auto Colour	29-Jan-24	29-Jan-24
Anions	EPA 300.1 - IC	24-Jan-24	24-Jan-24
Chromium, hexavalent, water, low level	MOE E3056 - colourimetric	25-Jan-24	25-Jan-24
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	24-Jan-24	24-Jan-24
Metals, ICP-MS	EPA 200.8 - ICP-MS	25-Jan-24	25-Jan-24
Phosphorus, total, water	EPA 365.4 - Auto Colour, digestion	24-Jan-24	25-Jan-24
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	24-Jan-24	25-Jan-24

PARACEL LABORATORIES LTD.

Order #: 2404197

Certificate of Analysis

Report Date: 29-Jan-2024

Client: **Dillon Consulting Ltd. (Ottawa)**

Order Date: 23-Jan-2024

Client PO:

Project Description: 223674

	Client ID:	BH14-22	BH47-22	BH63-22	P2	-	-
	Sample Date:	17-Jan-24 11:07	23-Jan-24 09:55	23-Jan-24 11:15	23-Jan-24 13:00		
	Sample ID:	2404197-01	2404197-02	2404197-03	2404197-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
General Inorganics							
Alkalinity, total	5 mg/L	317	306	487	102	-	-
Ammonia as N	0.01 mg/L	0.08	0.06	<0.01	0.04	-	-
Phosphorus, total	0.01 mg/L	0.11	0.66	0.02	1.39	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.3	0.8	0.2	1.0	-	-
Anions							
Chloride	1 mg/L	414	138	701	10	-	-
Nitrate as N	0.1 mg/L	0.7	2.7	0.8	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05	-	-
Sulphate	1 mg/L	20	42	87	70	-	-
Metals							
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Arsenic	1 ug/L	1	2	<1	<1	-	-
Barium	1 ug/L	58	124	122	22	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Boron	10 ug/L	69	22	65	<10	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Calcium	100 ug/L	49200	72700	84300	37300	-	-
Chromium (VI)	1 ug/L	<1	<1	<1	1	-	-
Chromium	1 ug/L	<1	8	<1	2	-	-
Cobalt	0.5 ug/L	<0.5	3.6	<0.5	<0.5	-	-
Copper	0.5 ug/L	0.9	12.6	1.2	0.8	-	-
Lead	0.1 ug/L	<0.1	2.9	0.1	<0.1	-	-
Magnesium	200 ug/L	37000	33000	66300	10500	-	-
Molybdenum	0.5 ug/L	4.6	<0.5	1.5	<0.5	-	-

	Client ID:	BH14-22	BH47-22	BH63-22	P2	-	-
	Sample Date:	17-Jan-24 11:07	23-Jan-24 09:55	23-Jan-24 11:15	23-Jan-24 13:00		
	Sample ID:	2404197-01	2404197-02	2404197-03	2404197-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Metals							
Nickel	1 ug/L	<1	7	<1	<1	-	-
Potassium	100 ug/L	11200	1500	8000	745	-	-
Selenium	1 ug/L	<1	3	<1	<1	-	-
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Sodium	200 ug/L	257000	89700	465000	15000	-	-
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Uranium	0.1 ug/L	1.3	1.9	3.2	<0.1	-	-
Vanadium	0.5 ug/L	1.4	14.7	1.1	0.9	-	-
Zinc	5 ug/L	21	18	<5	<5	-	-

	Client ID:	Dup1	BH22-22			-	-
	Sample Date:	23-Jan-24 12:00	23-Jan-24 16:20				
	Sample ID:	2404197-05	2404197-06				
	Matrix:	Ground Water	Ground Water				
	MDL/Units						
General Inorganics							
Alkalinity, total	5 mg/L	483	-	-	-	-	-
Ammonia as N	0.01 mg/L	<0.01	-	-	-	-	-
Phosphorus, total	0.01 mg/L	0.02	-	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.2	-	-	-	-	-
Anions							
Chloride	1 mg/L	720	-	-	-	-	-
Nitrate as N	0.1 mg/L	0.7	-	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-	-	-
Sulphate	1 mg/L	85	-	-	-	-	-
Metals							
Mercury	0.1 ug/L	<0.1	-	-	-	-	-
Antimony	0.5 ug/L	<0.5	<0.5	-	-	-	-
Arsenic	1 ug/L	<1	<1	-	-	-	-
Barium	1 ug/L	126	38	-	-	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	-	-	-	-
Boron	10 ug/L	65	63	-	-	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	-	-	-	-
Calcium	100 ug/L	83700	95400	-	-	-	-
Chromium	1 ug/L	<1	<1	-	-	-	-
Chromium (VI)	1 ug/L	<1	<1	-	-	-	-
Cobalt	0.5 ug/L	<0.5	<0.5	-	-	-	-
Copper	0.5 ug/L	1.7	0.6	-	-	-	-
Lead	0.1 ug/L	<0.1	<0.1	-	-	-	-
Magnesium	200 ug/L	66500	83600	-	-	-	-
Molybdenum	0.5 ug/L	1.4	1.0	-	-	-	-

	Client ID:	Dup1	BH22-22			-	-
	Sample Date:	23-Jan-24 12:00	23-Jan-24 16:20				
	Sample ID:	2404197-05	2404197-06				
	Matrix:	Ground Water	Ground Water				
	MDL/Units						
Metals							
Nickel	1 ug/L	<1	<1	-	-	-	-
Potassium	100 ug/L	7720	9110	-	-	-	-
Selenium	1 ug/L	<1	<1	-	-	-	-
Silver	0.1 ug/L	<0.1	<0.1	-	-	-	-
Sodium	200 ug/L	463000	485000	-	-	-	-
Thallium	0.1 ug/L	<0.1	<0.1	-	-	-	-
Uranium	0.1 ug/L	3.2	7.2	-	-	-	-
Vanadium	0.5 ug/L	1.2	<0.5	-	-	-	-
Zinc	5 ug/L	<5	<5	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Phosphorus, total	ND	0.01	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Metals								
Mercury	ND	0.1	ug/L					
Antimony	ND	0.5	ug/L					
Arsenic	ND	1	ug/L					
Barium	ND	1	ug/L					
Beryllium	ND	0.5	ug/L					
Boron	ND	10	ug/L					
Cadmium	ND	0.1	ug/L					
Calcium	ND	100	ug/L					
Chromium (VI)	ND	1	ug/L					
Chromium	ND	1	ug/L					
Cobalt	ND	0.5	ug/L					
Copper	ND	0.5	ug/L					
Lead	ND	0.1	ug/L					
Magnesium	ND	200	ug/L					
Molybdenum	ND	0.5	ug/L					
Nickel	ND	1	ug/L					
Potassium	ND	100	ug/L					
Selenium	ND	1	ug/L					
Silver	ND	0.1	ug/L					
Sodium	ND	200	ug/L					
Thallium	ND	0.1	ug/L					
Uranium	ND	0.1	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Vanadium	ND	0.5	ug/L					
Zinc	ND	5	ug/L					

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	716	5	mg/L	720			0.6	20	
Nitrate as N	0.69	0.1	mg/L	0.69			0.3	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Sulphate	86.5	1	mg/L	84.6			2.3	10	
General Inorganics									
Alkalinity, total	314	5	mg/L	317			1.0	14	
Ammonia as N	0.081	0.01	mg/L	0.081			0.6	18	
Phosphorus, total	ND	0.01	mg/L	ND			NC	15	
Total Kjeldahl Nitrogen	0.27	0.1	mg/L	0.26			6.1	16	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Antimony	0.66	0.5	ug/L	ND			NC	20	
Arsenic	1.2	1	ug/L	1.4			11.1	20	
Barium	96.1	1	ug/L	98.0			2.0	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	160	10	ug/L	164			2.3	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	60400	100	ug/L	61000			1.1	20	
Chromium (VI)	ND	1	ug/L	ND			NC	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	6.68	0.5	ug/L	6.73			0.6	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Magnesium	24900	200	ug/L	25200			1.1	20	
Molybdenum	23.0	0.5	ug/L	22.8			1.0	20	
Nickel	ND	1	ug/L	ND			NC	20	
Potassium	2160	100	ug/L	2210			2.1	20	
Selenium	1.4	1	ug/L	1.4			0.9	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	64500	200	ug/L	66300			2.8	20	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Thallium	ND	0.1	ug/L	ND			NC	20	
Uranium	3.6	0.1	ug/L	3.6			1.0	20	
Vanadium	1.29	0.5	ug/L	1.36			5.3	20	
Zinc	ND	5	ug/L	ND			NC	20	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	10.6	1	mg/L	ND	106	78-114			
Nitrate as N	1.70	0.1	mg/L	0.69	101	77-126			
Nitrite as N	0.892	0.05	mg/L	ND	89.2	82-115			
Sulphate	94.1	1	mg/L	84.6	95.5	74-126			
General Inorganics									
Ammonia as N	1.11	0.01	mg/L	0.081	102	81-124			
Phosphorus, total	1.05	0.01	mg/L	ND	105	80-120			
Total Kjeldahl Nitrogen	1.31	0.1	mg/L	0.26	105	81-126			
Metals									
Mercury	2.91	0.1	ug/L	ND	97.1	70-130			
Arsenic	53.4	1	ug/L	1.4	104	80-120			
Barium	143	1	ug/L	98.0	89.9	80-120			
Beryllium	46.1	0.5	ug/L	ND	92.3	80-120			
Boron	46	10	ug/L	ND	91.3	80-120			
Cadmium	48.4	0.1	ug/L	ND	96.7	80-120			
Calcium	67100	100	ug/L	61000	61.4	80-120			QM-07
Chromium (VI)	155	1	ug/L	ND	77.5	70-130			
Chromium	49.0	1	ug/L	ND	97.9	80-120			
Cobalt	46.9	0.5	ug/L	ND	93.7	80-120			
Copper	50.8	0.5	ug/L	6.73	88.2	80-120			
Lead	43.4	0.1	ug/L	ND	86.7	80-120			
Magnesium	31700	200	ug/L	25200	65.7	80-120			QM-07
Molybdenum	67.2	0.5	ug/L	22.8	88.8	80-120			
Nickel	46.5	1	ug/L	ND	92.3	80-120			
Potassium	11500	100	ug/L	2210	93.2	80-120			
Selenium	48.0	1	ug/L	1.4	93.2	80-120			
Silver	42.6	0.1	ug/L	ND	85.2	80-120			
Sodium	9170	200	ug/L	ND	91.7	80-120			
Thallium	44.4	0.1	ug/L	ND	88.7	80-120			
Uranium	51.4	0.1	ug/L	3.6	95.6	80-120			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Vanadium	51.4	0.5	ug/L	1.36	100	80-120			
Zinc	49	5	ug/L	ND	89.1	80-120			

Qualifier Notes:

QC Qualifiers:

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

PARACE LABORATORIES LT

Paracel ID: 2404197

vd.
J8
com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2404197	№ 72074

Client Name: Dillon Consulting Ltd
Contact Name: Matthew McCurdy
Address: 177 Colonnade Rd, Nepean, ON K2E 7J4 Suite 101
Telephone: 613-745-6338 ext. ~~650~~ 6038

Project Ref: 223674
Quote #: 24-060-GW
PO #:
E-mail: mmccurdy@dillon.ca

Page __ of __

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☑ Regular
Date Required: _____

☐ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☑ PWQO
☑ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun: _____
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Gen Chem as per quote	Metals as per quote	Nutrients as per quote
1	BH14-22	GW		5	17-01-24	11:07	/	/	/
2	BH47-22	GW		5	23-01-24	09:55	/	/	/
3	BH63-22	GW		5	23-01-24	11:15	/	/	/
4	P2	GW		5	23-01-24	13:00	/	/	/
5	Dup1	GW		5	23-01-24	12:00	/	/	/
6	BH22-22	GW		2	23-01-24	16:20		/	
7									
8									
9									
10									

Comments: Metals are field filtered

Method of Delivery: Walk In

Relinquished By (Sign): Nancy Daniel	Received at Depot:	Received at Lab: CB 1648 Jan 23/24
Relinquished By (Print): Nancy Daniel	Date/Time:	Verified By: CB
Date/Time: 23-01-24 16:50	Temperature: °C	Date/Time: Jan 24 0148
		Temperature: 1.3 °C
		pH Verified: ☐ By:

Appendix E

Geological Model Cross-Sections

TEWIN HYDROGEOLOGY ASSESSMENT

Cross-**S**ections

- Borehole Locations (Paterson)
- Piezometer Location (Dillon)
- Surface Water Monitoring Sites (JFSA)
- Study Area
- Railway
- Watercourse
- Property Boundary

SCALE 1:23,000

0 0.25 0.5 1 km

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, Dillon Consulting Limited, Imagery by ESRI basemaps

MAP CREATED BY: LMM
MAP CHECKED BY: -
MAP PROJECTION: NAD 1983 MTM 9

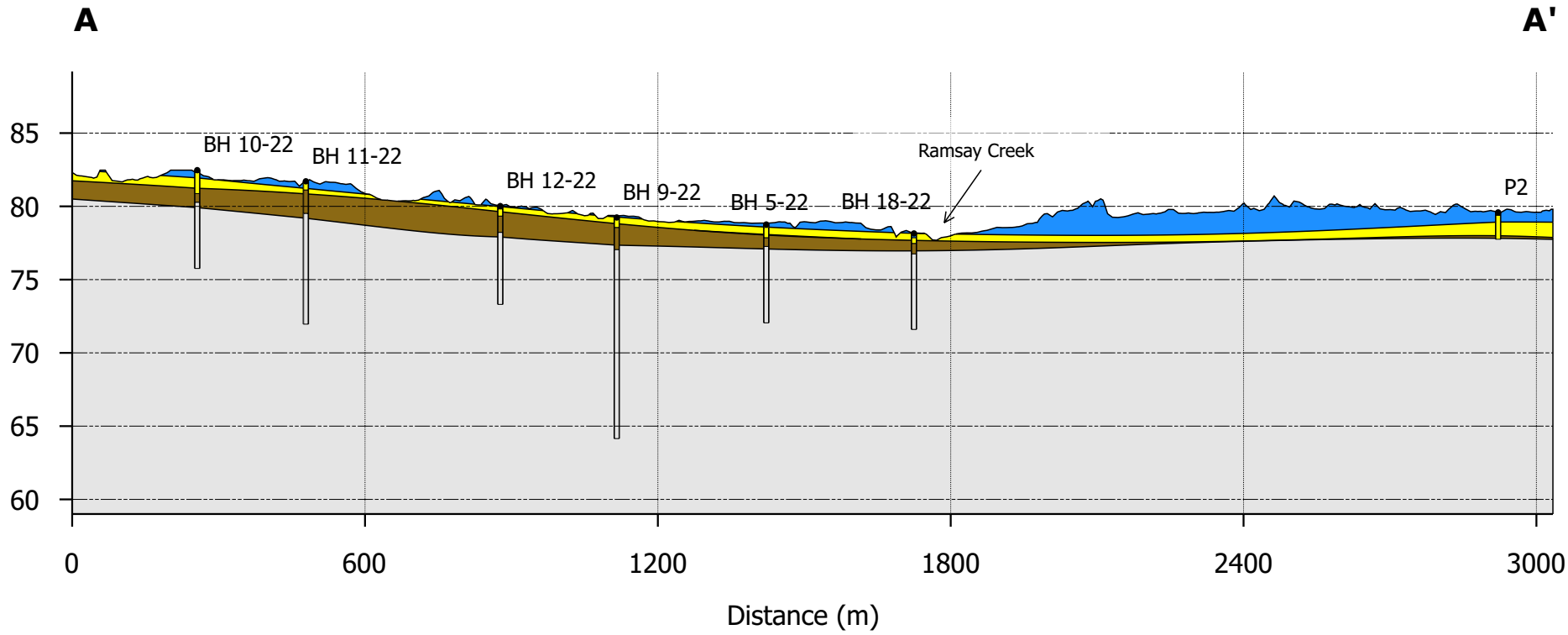
DILLON CONSULTING

PROJECT: 22-3674
STATUS: FINAL
DATE: 2024-04-25

FILE LOCATION: K:\2022\223674\Product\Client\General\223674_F1_PiezometerLocations.mxd

DILLON CONSULTING

Cross Section: A-A'



Lithology

- Brown Clay
- Grey Clay
- Sand
- Topsoil

Scale: 1:13,000

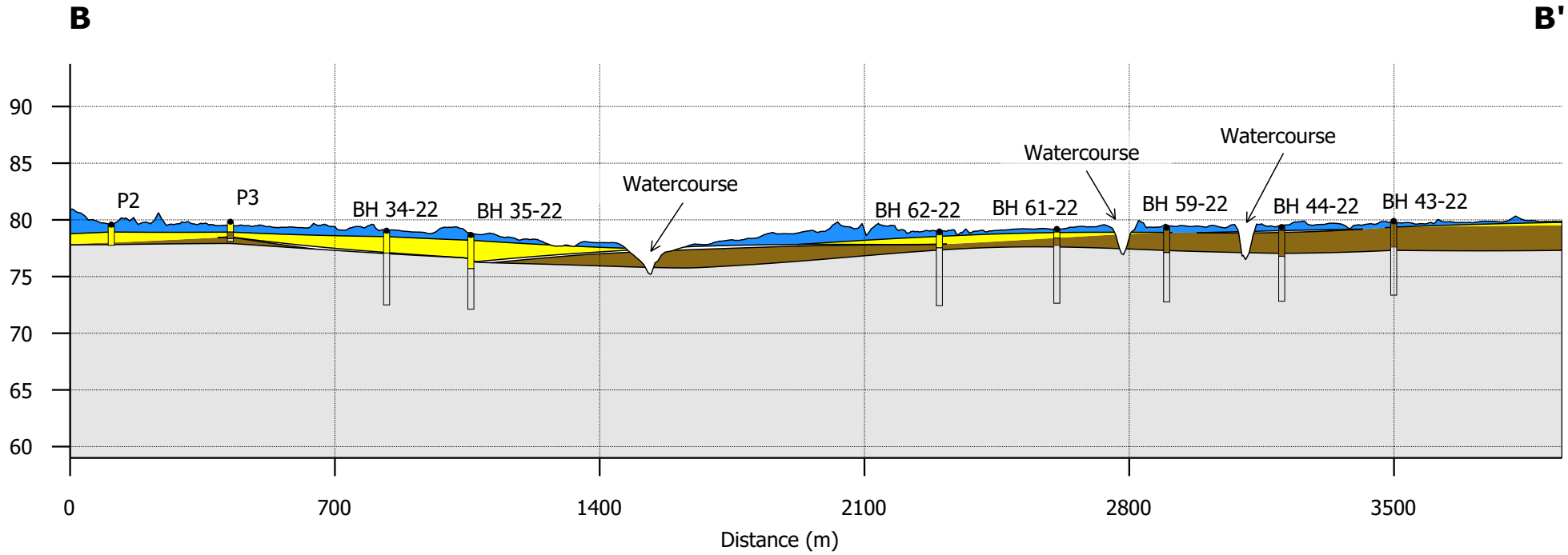
Vertical exaggeration: 30x

0m 1000m

Project: Tewin Lands
Project #: 22-3674
Created by: DO
Date: December 15, 2022

DILLON CONSULTING

Cross Section: B-B'



Lithology

- Brown Clay
- Grey Clay
- Sand
- Topsoil

Scale: 1:16,000

Vertical exaggeration: 30x

0m 1000m

Project: Tewin Lands
Project #: 22-3674
Created by: DO
Date: December 15, 2022

Note: Watercourses are unnamed

Appendix F

Groundwater Flow Modelling Memo

Memo

To: Taggart Investments and Algonquins of Ontario

From: Dillon Consulting Limited

Date: April 25, 2024

Subject: Tewin Existing Hydrogeological Conditions Assessment - Groundwater Flow Modelling Component

Our File: 22-3674

Dillon Consulting Limited (Dillon), part of the Tewin Lands consulting team, is responsible for completing an existing conditions hydrogeological assessment for the future Tewin Lands (herein the "Study Area") in Ottawa, Ontario. This submission describes the development of the hydrogeological Conceptual Site Model (CSM) supporting the development of the groundwater flow model for the Study Area.

The hydrogeological CSM describes the geological and hydrogeological environment within the Study Area, including expected groundwater recharge areas and points of groundwater discharge. This in turn informs the development of the groundwater flow model, including the selection of hydrostratigraphic units to be simulated, and boundary conditions.

Conceptual Site Model

The CSM was developed using existing data from ongoing monitoring at the site, and available pertinent databases (e.g., climate data, provincial geological/hydrogeological mapping). The CSM was used to aid in the development of a numerical, three-dimensional, groundwater flow model for the assessment.

Leapfrog software (Version 3.0.4) was used to prepare the geological information and existing boreholes/monitoring wells, topography, surficial geology, bedrock geology information for incorporation into a three-dimensional geological model. A finite-element mesh was then constructed in Leapfrog, incorporating a sufficient level of refinement (i.e., elemental sizing and node spacing) as a means to appropriately characterize varying geological/hydrogeological/hydrological conditions in pertinent areas of interest (e.g., surficial water features, inferred geological contacts). The geological model and finite-element mesh were then exported into FEFLOW.

FEFLOW (Version 7.2) was then used to develop the numerical groundwater flow model. This included assigning input parameters such as the shallow permeable unit recharge rates, boundary conditions and hydraulic properties to corresponding elements and nodes within the flow model. FEFLOW simulations were run and parameters were adjusted to calibrate to model existing conditions (i.e., steady-state conditions based on the available ongoing monitoring data).

The CSM domain is based upon the proximal extents of the surface water catchment defined by the topography and drainage around the site, as well as the surface water features and hydrogeological properties of the deposits at the site. The approximate limits of the CSM domain are illustrated on Figure 1, below.

Figure 1 - Approximate Limits of CSM Domain

Data Sources

The data sources used for the development of the model are listed in Table 1 below.

Table 1 - Summary of Input Data and Sources

Data Type	Source
Digital Elevation Model (DEM)	The province of Ontario Digital Elevation Model
Well Logs and Stratigraphy	Dillon, 2022 Paterson Group, 2022 MECP Water Well Information System, 2022

Data Type	Source
Hydraulic Conductivity Data	Paterson / Dillon 2022 Permeability and Slug Tests
Base Overlay	ESRI, Maxar, Earthstar Geographics
Watercourse/Water Body Mapping	Ontario Ministry of Natural Resources and Forestry Mapping (MNRF)

Site Setting and Surficial Geology

The site is located on a relatively uniform northeast-southwest trend of Champlain Sea sediments which consist of clay and silty clay marine deposits with upper sections consisting of brown silty clay, overlain by pockets of sand, and move towards medium to fine sand and gravelly-sand deltaic and nearshore deposits in the northeastern section of the site. The overburden sands are typically 1-2 metres thick, whereas the clays reach up to 30 metres in thickness. The surficial geology was provided by the Geological Survey of Canada, and the details describing the sequence by Gadd (1963, and 1986).

The sand deposits overlying the silty clay represent a shallow permeable unit, and the silty clays represent aquitard conditions, therefore it is reasonable to assume that the site receives relatively lower amounts of recharge in a given year. Borehole data is provided in Appendix A, and additional details regarding the shallow permeable unit recharge are provided in the section below.

Hydrostratigraphic Units

From a hydrogeological perspective, it is more instructive to classify units in terms of hydrostratigraphy (i.e., units with similar hydrogeological properties), herein referred to as “HGUs”. This is typically broadly similar to the stratigraphic units based strictly on geological properties, but may vary where adjoining units behave similarly in terms of groundwater flow, or where there are differences in hydrogeological properties within units. The hydrostratigraphic profile for the area can be described as follows (starting from surface, or youngest to oldest):

· Shallow silty sands (HGU1) – this unit consists of silty sands that range in fine to medium grain size, contains trace gravels and clay, and transitions into the underlying brown silty clay unit. This unit also represents the shallow permeable unit overlying the clay aquitard and is fairly continuous throughout the site, although the layer is relatively thin. The sands generally outcrop along the river banks.

· Silty clays (HGU2 and HGU3) – The silty clays encompass the majority of the subsurface in the Study Area (the CSM domain) and represent the aquitard. These finer grained materials represent Champlain Sea sediments deposited while deeper water conditions prevailed following glacial retreat. The clays are

separated into two units: brown silty clay (HGU2) and grey clay (HGU3), based on stiffness and the degree of weathering and fracturing with depth – the grey clay being much less weathered and fractured than the overlying brown clay.

Hydrogeologic Properties

Hydraulic conductivity values were calculated using slug test data collected by Paterson within the Study Area, which were then used to represent the varying hydrogeological conditions throughout the model domain. A brief summary of hydraulic conductivity values from the recent assessment work (i.e., 2022 slug and permeameter tests) and other sources, is provided below in Table 2.

Table 2 - Measured Hydraulic Conductivity

Hydrostratigraphic Unit	Measured Hydraulic Conductivity (m/s)		
	Average	Maximum	Minimum
Silty Sands (HGU1)	3.7×10^{-6}	6.3×10^{-5}	8.1×10^{-9}
Silty Brown Clay (HGU2)	1.7×10^{-7}	6.3×10^{-7}	8.1×10^{-9}
Silty Grey Clay (HGU3)	8.7×10^{-7}	2.0×10^{-5}	6.4×10^{-9}

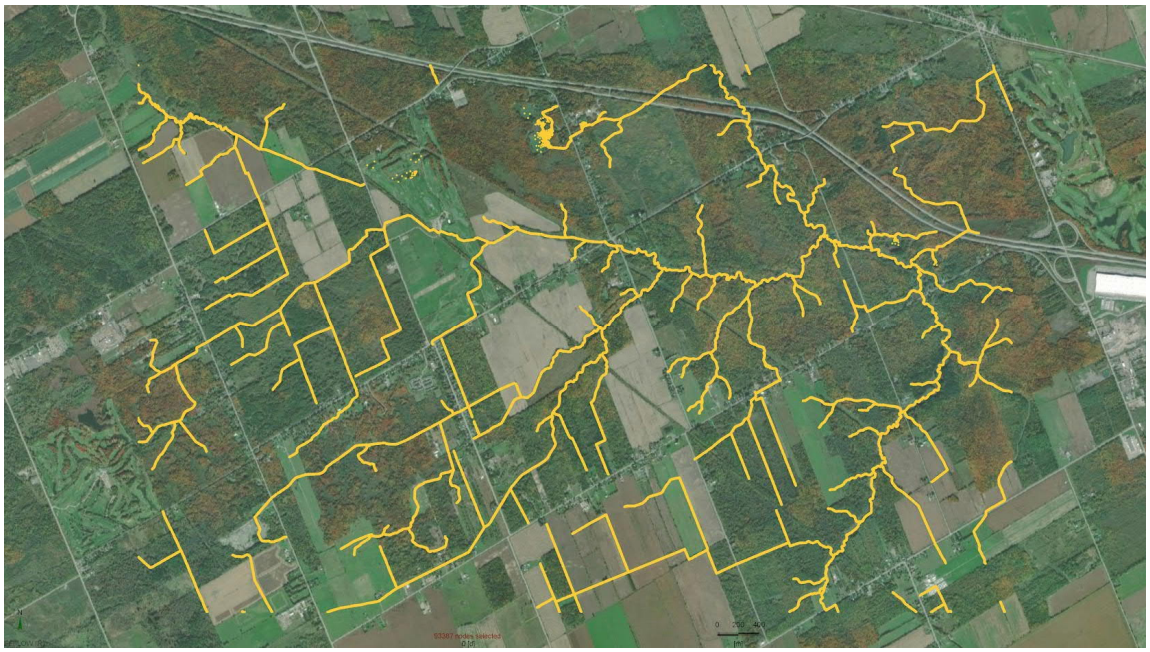
Surface Water Features

Nodes and elements representing surficial water features (e.g. creeks, streams, and larger water bodies) were selected in the groundwater model (GWM) using high-resolution mapping data sourced from the MNRF and by reviewing available aerial photography. The surficial water features were distributed throughout the GWM, and are illustrated on Figure 2.

The surficial water and drainage features were then represented in the GWM by applying boundary conditions. These conditions included constant-head (1st kind/Dirichlet, including seepage faces). In some areas, boundary condition types (i.e., 1st kind or 3rd kind) were varied for selected features during the sensitivity analysis/model calibration stages of the assessment. Additional details regarding model calibration are presented in the section below.

In general, where a feature was known or suspected to have a direct hydraulic connection to the shallow permeable unit (e.g., main watercourses and water bodies, as well as the perimeter nodes), constant-head boundary conditions were applied. Where applicable, known water stage elevations were used for the boundary condition head reference value. Where water stages were unknown, the elevations were interpolated between observation locations and applied as constant head boundary conditions.

Figure 2 - Surface Water Features



Groundwater Model Calibration and Sensitivity Analyses

The steady state GWM is calibrated to static conditions. This process consists of adjusting hydraulic properties (e.g., hydraulic conductivity, recharge) such that modelled water levels agree with measured data from the Site. During this process, a sensitivity analysis is also completed, where the degree to which changes in the solution, relative to changes in the input parameters, are monitored. The GWM for this site showed sensitivity to the brown silty clay and silty sand hydraulic conductivities, due to the increased flow towards the river nodes, as well as recharge values.

In FEFLOW, the recharge rate is applied as an elemental property and is applied to the top and bottom layers of the model. This value was adjusted to representative values for the HGUs, i.e. a model that is predominantly clay would tend to have relatively lower infiltration rates and higher run off, evapotranspiration, etc. Infiltration rates within the model were only applied to areas without watercourses. The recharge rate was applied to the entire top layer of the GWM, except where there were suspected river "banks" (areas where seepage face boundary conditions were applied).

Model calibration is completed using known water level data. During this assessment, in consideration of the assortment of hydrological, hydrogeological and conceptual site knowledge, a robust calibration is in the process of being completed. This process includes:

- Calibration of hydraulic head solutions to known water level readings across the site;
- Comparison of calibrated hydraulic properties (e.g., hydraulic conductivity) in the GWM to field measured data (i.e., slug tests, permeameter tests); and,
- Calibration of discharge at river nodes.

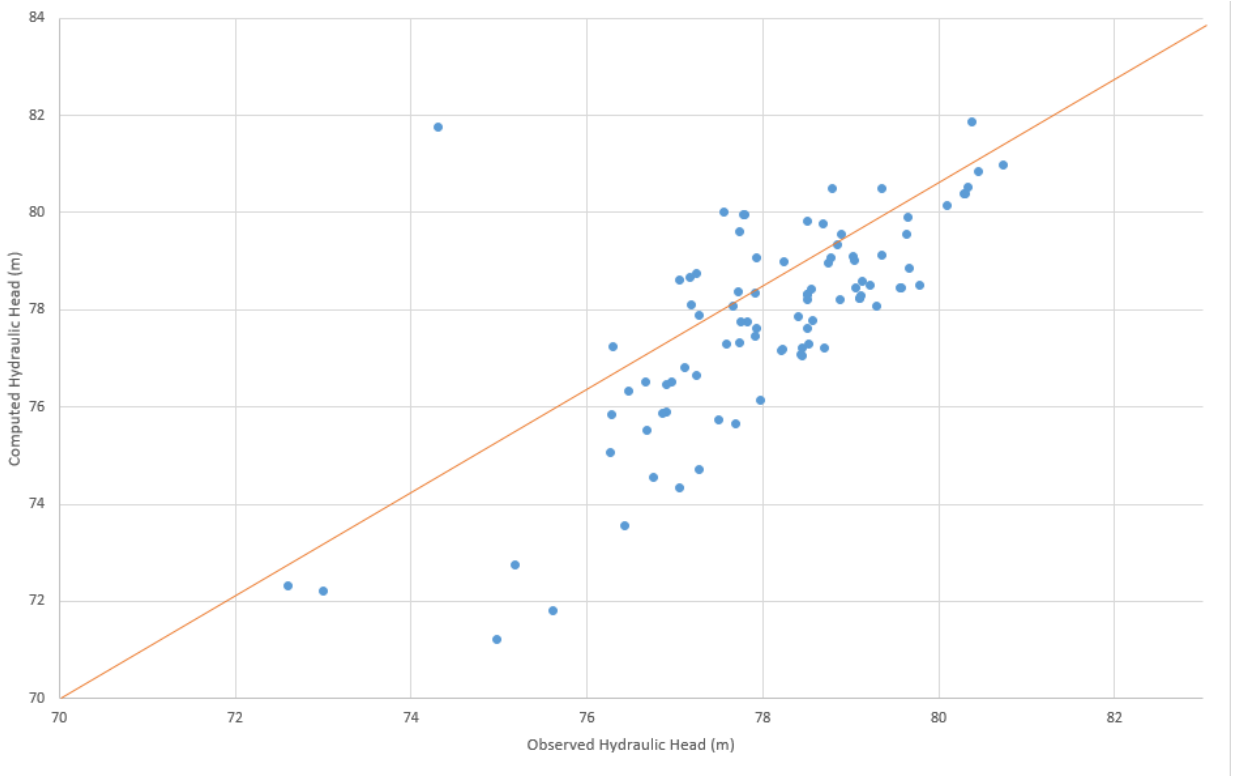
The calibrated parameter (hydraulic conductivity, and recharge) values are presented in Table 3, below:

Table 3 - Calibrated Parameter Values

Parameter		Value
Recharge (mm/a)		20
Horizontal and Vertical Hydraulic Conductivity (m/s)	Topsoil	1.6×10^{-4}
	HGU1 (silty sand)	1.0×10^{-5}
	HGU2 (silty brown clay)	5.5×10^{-7}
	HGU3 (silty grey clay – upper layers)	5.0×10^{-8}
	HGU3 (silty grey clay – mid layers)	1.0×10^{-9}
	HGU3 (silty grey clay – lower layers)	1.0×10^{-10}

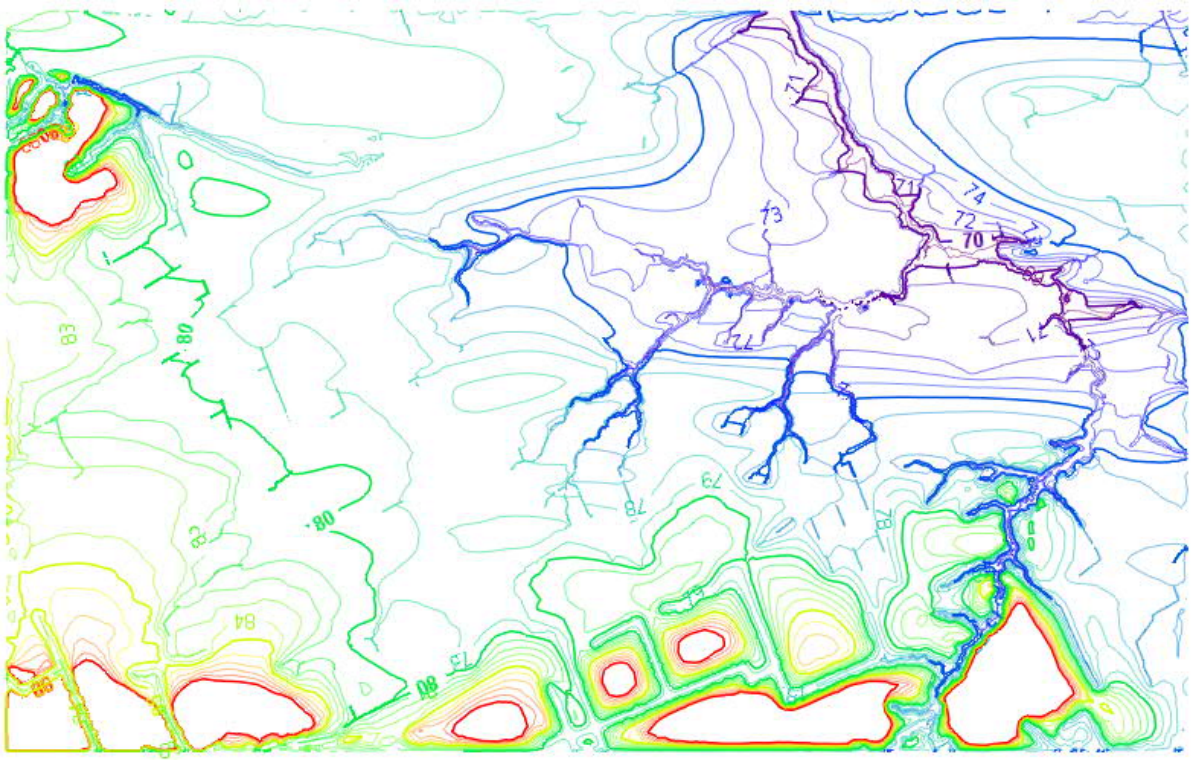
Scatter plots are used to assess the statistical agreement between modelled solutions and known data. A scatter plot of the modelled static solution (prior to sewer integration) compared to the known water level data is presented below on Figure 3. The modelled results (i.e., computed head values from each observation well) is presented along the vertical axis, while the corresponding observed result (i.e., actual head value at each observation well) is presented along the horizontal axis. Calculated statistical values based on the scatter plot include normalized error ($\bar{E}$) with a value of 1.04, root mean square (RMS) with a value of 1.47, and standard deviation (σ) with a value of 1.48. These results are within standard acceptable norms for groundwater flow model calibration. The resulting scatter plot is shown in Figure 3, below.

Figure 3 - Scatter Plot



A water table map for the current steady-state model conditions is presented in Figure 4, below:

Figure 4 - Current Steady-State Hydraulic Head Conditions



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