Hydrogeological Study, Servicing Options and Terrain Analyses

Proposed Unity Farm, Inn and Spa

2285 Battersea Road, Kingston, Ontario

Prepared for:

BPE Development Inc.

141 Hickson Avenue

Kingston, Ontario

K7K 2N7

Prepared by:

ASC Environmental Inc.

1305 Princess St,

Kingston, ON K7M 3E3

File: ASC-458 101r

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Respectfully submitted on behalf of

ASC Environmental Inc.

LICENSED PROFESSIONAL ENGINEER
05/04/2019
P. N. JOHNSTON
PROVINCE OF ONTARIO

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Project Manager

EXECUTIVE SUMMARY

ASC Environmental Inc. (ASC) was retained by BPE Development Inc. (herein referred to as the Client) to undertake a Hydrogeological Study for a proposed Farm, Inn and Spa development, located at 2285 Battersea Road, Kingston, Ontario (the "Site").

The proposed development will include an agricultural Farm, Inn (30 one-bedroom suites), a 96 seat restaurant and seasonal 60 seat roof-top patio; a corporate venue; 18 one-bedroom cottages and a Spa; occupying 14.0 hectares of the property. The spa will include hot and cold tubs, saunas and treatment rooms.

- The development is proposed to be serviced with private on-site well water supply and a large private on-site sewage works treatment system, that would allow for proportional recycling/beneficial re-use of treated effluent. Based on the maximum occupancy a total daily water taking of **75,375** L/day is initially required, with approximately **29,960** L/day, being recycled for beneficial re-use for laundry, toilets and irrigation purposes, resulting in a net water daily taking of approximately **45,415** L/day. Well water storage is expected; to support daily demands. Beneficial reuse would be allocated to laundry, toilets, and irrigation, and excess treated effluent discharged to a storm pond and overflow would eventually be drained to a storm water outfall, out letting to the adjacent roadside ditch at Battersea and Unity Road.

- Land use within 500 m of the Site consists of rural residential, agricultural/commercial activity (Stone City Performance Horses) located west adjacent, open field agricultural activity, institutional (Battersea Public School) and community (Church of Latter Day Saints) located south east and south adjacent across Unity Road.

- The nearest known surface water body is an unnamed seasonal creek, located approximately 300 m east/south east of the study area and the Rideau River watershed system located approximately 1.8 km to the south east of the Site. These surface water bodies would not be impacted due to distance and existing site development down gradient from the proposed development.

- Existing residential, commercial, agricultural and institutional development in the rural portion of Kingston is currently utilized through individual on-site private services. Existing services in the local area (minimum 500 m radius), consist of private well water supply and individual private septic systems.

- The rural part of Kingston is lacking full municipal or communal services and based on the above conditions and our evaluation of existing development in the rural portion of Kingston, we believe that the proposed development is consistent with the Provincial Policy Statement and recommend the use of individual on-site sewage and water services.

- The portion of the property proposed for development is presently zoned 'A2' General Agricultural. The proposed development will require a new zoning change necessary for site redevelopment, a site-specific commercial/agricultural zoning is being considered in conjunction with a land use designation change from Rural Land to Rural Commercial.

- Seventy – one (71) water well records were available for review from the MECP website, within 500 m of the site. Sixty-one of the wells were reported completed into the upper Middle Ordovician Gull River limestone formation. Based on review of the MECP well records, it is apparent that the majority of the local residents utilize the unconfined limestone bedrock aquifer for domestic water supply.

- The on-site hydrogeological investigation was conducted to assess site groundwater supply conditions to determine support for the proposed development through two 48-hour pumping tests on two (2) recently drilled wells and a six-hour pumping test on a third recently drilled on-site well (to compare on-site interference potential). There is also an existing well on site that was previously used for residential water supply purposes.

- Water quantity was assessed on the basis of the pumping tests; water quality was assessed on the basis of chemical and bacteriological sample collection and analyses for water samples collected near the beginning and at twelve-hour intervals during the 48-hour pumping tests; and potential interference was investigated through monitoring neighbouring and on-site wells.

- Based on our understanding of the development proposal, and sensitivity regarding existing and potential long-term neighbouring water supply concerns (located in the upper unconfined limestone bedrock); the test wells were advanced into the deeper sandstone and granite bedrock aquifers at depths approaching 90 – 92 m below site grade to assess water supply yield and water quality for the development.

- The two 48-hour pumping tests (test wells TW01 and TW02) were conducted in August and September, 2018 to assess and determine whether seasonal stressed water supply conditions (i.e. summer conditions) would impact upon the proposed development. The six-hour pumping test for test well TW03 was undertaken in December 2018, to assess potential on-site interference in the event more than one well was used for water supply. The original on-site well was not included in the pumping test program, considering that it has been demonstrated to provide water quantity and quality to support typical recent residential use purposes.

- Reviewing the drawdown and recovery curves for the three pumping tests, the data indicate that TW01 and TW02 pumping wells reached equilibrium; and a maximum drawdown of approximately 4 meters was shown from pumping Test Wells TW01, TW02 and TW03; and over 90% (46 - 54 m) of well water supply was available in the wells

following the long term 48-hour pumping tests. Recovery of the wells to 95% was attained within 24 hours; 504 minutes for test well TW03.

- Results of interference monitoring of neighbouring wells generally showed a small positive response (interference drawdown) to pumping of approximately 0. 15 m to 1.0 m during the 6-hour and 48-hour pumping tests. Data did show a negative response (recovery) in a number of neighbouring wells that correlate with use during the pumping test. This is to be expected over a 48-hour pumping period. These wells were shown to recover during the pumping tests, clearly confirming that the on-site wells will not have significant impact upon the future use of neighbouring wells. Neighbouring wells showed sufficient water supply remaining following the pumping tests.

  Data did show a negative response (recovery) in a number of neighbouring wells during the Test Well TW01 pumping test, around the 1400-minute mark, that is not likely due to domestic use. This recovery correlates to a precipitation event occurring late afternoon of August 8, 2018 (see climate data appended in Appendix F). It is interesting to note the shallow aquifer response to the precipitation event, suggesting that the limestone bedrock aquifer is indeed unconfined and is likely susceptible to impact from surface contamination.

  On-site observation wells showed a positive response of approximately 2.3 m during pumping tests. Sufficient well supply, was still available to on-site observation wells following pumping tests.

  The measured interference during pumping is an appropriate estimation of the anticipated influence for the proposed development.

- Results of the pumping tests confirm that the lower sandstone and granite bedrock aquifer(s) are able to support sustained pumping rates of 30 – 35 litres per minute. Based on the pumping test results and favourable recovery time following prolonged continuous pumping of 48 hours, sufficient aquifer storage and demonstrated yield is available to supply the wells to meet the demand for the proposed development; without adversely impacting upon neighbouring resident water supply.

- Measured groundwater levels from test wells show hydraulic gradient of approximately 1% to the south east.

- Calculated long-term drawdown at 20 years of continuous pumping at 45,415 L/day shows 0.55 m at a radial distance of 100 m from test well TW03. Therefore, based on the predicted drawdown analyses, adverse impact to neighbouring well water supply is not expected.

- Water quality tests identified Total coliform (6 cfu/100 ml) in the 48-hour sample from test well TW01 in one sample only (TW01d – 48 hr sample); we believe this a field sampling or laboratory handling issue and is not indicative of the site water quality. Total coliform (1 cfu/100 ml) was detected in the one-hour sample from test well TW02 (TW02a), subsequent 12-hour sampling events (3 samples) for TW02 did not identify total coliform. We recommend disinfection (UV treatment or similar) to ensure a bacteriological free water supply.

- Nitrate concentrations were below laboratory detection in the samples from the three test wells. Nitrate concentration of 3.7 mg/L was detected in the raw water sample from the original on-site drinking water well (OW20). This result is probably from past agricultural activity.

- Laboratory turbidity results for Test Well TW01 showed 1.0 NTU, 2.8 NTU to 1.4 NTU (TW02), and 5.4 NTU to 7.1 NTU (TW03). Field turbidity results reduced to 0 NTU during and following pumping tests, indicating improved clarity with well development. Field turbidity readings prior to groundwater sample collection is exercised because turbidity may be influenced by changes in conditions (i.e. temperature, pressure etc.) between the point of collection on site and sample receipt and analyses at the laboratory.

- Herbicide and pesticides analytical results were below laboratory detection limits.

- The water quality data indicates groundwater with aesthetic and health related treatment requirements. Hardness, total dissolved solids and salts (sodium and chlorides) are present at slightly elevated concentrations. Slightly elevated fluoride and iron concentrations were also detected that require treatment. The water is also slightly hard, but not unusually so for the Kingston area. The health-related limit for sodium of 20 mg/L is a “warning level” only and where this level is exceeded it is recommended the local Medical Health officer be notified in order to alert individuals with relevant medical conditions.

  To ensure safe drinking water is provided to the site users, we recommend water treatment of identified aesthetic and health related parameters and disinfection to ensure a long-term source of good quality groundwater for consumption purposes. Reverse osmosis will be required to treat the elevated sodium and chloride concentrations. With appropriate water treatment, well water quality would meet health and aesthetic MECP and ODWS drinking water criteria parameters. We recommend contacting a water quality professional to address treatment requirements.

- The majority of participating neighbours surveyed receive their drinking water supply from the limestone bedrock aquifer, with wells extending to depths of 18 m to 44 m. Treatment systems used on neighbouring drinking water wells include water softeners,

UV lights, reverse osmosis systems and/or meta filters. Neighbouring groundwater quality was shown to be typical for the unconfined limestone bedrock aquifer. No significant water supply concerns were identified during our survey of neighbouring wells and following the pumping tests, no complaints were received regarding well supply.

- Based on an evaluation of the hydrogeological investigative work, it is evident that the down gradient reasonable use of groundwater is primarily for individual domestic consumption; and sewage management is through raised or in ground private leaching bed septic systems for the neighbouring properties. This is not anticipated to change based on existing local site development and the City of Kingston Official Plan.

  The scale of the proposed development makes it more challenging to support in ground/raised leaching beds for conventional large private services. Based on the proposed daily loading, the site will require a large treatment system designed in accordance with MECP regulations, guidelines and Section 53 of the *Ontario Water Resources Act* (OWRA). A higher level of treatment is proposed using a re-circulation system. Preliminary stormwater management and sewage treatment plans for this site are being prepared by Groundwork Engineering Inc. We understand the proposed treatment system would include the following:

  1. In ground balancing and/or pre-treatment tanks
  2. Treatment system with in ground and above ground components (extended aeration or membrane bio-reactor)
  3. Nutrient removal system (recirculation and chemical ad-mixture)
  4. Dis-infection system (UV and/or chlorination)
  5. Effluent distributed to re-use storage tanks in appropriate buildings via smart valving with over-flow diverted to an irrigation pond.
  6. Irrigation pond with overflow to an on-site swale, then to a stormwater management pond, re-use for irrigation purposes and then overflow to a swale which will discharge to the roadside ditch.
  7. The irrigation system is prosed to be via drip irrigation.
  8. Re-use storage tanks will supply toilets and laundry.

- We recommend a monitoring, sampling and analyses program to assess changes in groundwater elevations; groundwater quality during and following site development, and surface discharge water sampling to assess the overall performance of the treatment system and stormwater management system. We recommend conducting quarterly groundwater monitoring of available on-site and neighbouring adjacent monitoring wells during site development (and post development for a period of two years) including collection of groundwater samples each spring, and analyses of surface water parameters identified by MECP to monitor treatment system performance.

- Future on-site wells (if required) shall be fully grouted to minimum MECP Regulation 903 (amended) requirements to provide a seal between the unconfined limestone bedrock aquifer and the underlying sandstone and granite bedrock water supply aquifers to ensure protection of the water supply unit(s) from the upper unconfined aquifer.

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LIST OF ACRONYMS

ASC	ASC Environmental
BH	Borehole
CALA	Canadian Association of Laboratory Accreditation
ha	hectare
m	Metre
m^2	Square metre
m^3	Cubic metre
MDL	Minimum detection limit
MECP	Ministry of Environment, Conservation and Parks (Ontario)
MW	Monitoring well
NTU	Nephelometric Turbidity Units
OW	Observation Well
TW	Test Well

1.0 INTRODUCTION

1.1 Initiation, Objective and Planning Context

ASC Environmental Inc. (ASC) was retained by BPE Development Inc. (herein referred to as the Client) to undertake a Hydrogeological Study for a proposed Farm, Inn and Spa development, located at 2285 Battersea Road, Kingston, Ontario (the "Site"). A site location plan is shown on Drawing No. 1 in Appendix A.

The owner of the property is BPE Development Inc. Their corporate offices are located at 141 Hickson Avenue in Kingston, Ontario. Mr. Ben Pilon, owner was the main point of contact for the study.

The proposed development will consist of a Farm, Inn (27 suites, 26 one-bedroom and one two-bedroom), a 96 seat restaurant and seasonal 60 seat roof-top patio; a corporate venue; 18 one-bedroom cottages and a Spa occupying 14 hectares of the property. The spa will include hot and cold tubs, saunas and treatment rooms.

A concept plan of the proposed development prepared by Shoalts and Zaback Architects Ltd. is shown in Appendix B.

Proposed construction activities will include redevelopment of the existing residential building and new additions to facilitate the restaurant, spa and inn, and construction of 18 one-bedroom cottages.

The current land use designation is Rural Land as shown in the City of Kingston Official Plan. The portion of the property proposed for development is presently zoned 'A2' General Agricultural in the Kingston Township Zoning By-Law Number 76-26. The proposed new zoning change will be necessary for site redevelopment, a site-specific commercial/agricultural zoning is being considered in conjunction with a land use designation change from Rural Land to Rural Commercial. A zoning plan is shown on Drawing No. 11 in Appendix A.

The objective of this Hydrogeological Study was to assess potential soil and groundwater contamination resulting from historical use of the study area and potentially contaminating activities arising from off-site sources. The extent of research to identify and assess potential sources of concern was limited by the scope of services.

1.2 Site Description and Current Land Use

The site (Phase 1 and Phase 2) currently encompasses approximately 14 hectares. The site is located at the northwest corner of the intersection of Battersea Road and Unity Road in Kingston, Ontario. UTM NAD 18 coordinates for centroid of the existing house on the property are 383,415 E and 4908738 N. Land use was previously for rural residential purposes and currently a two-

storey limestone century home, and two wooden barns (outbuildings) and vacant grass covered field occupy the majority of the property. An Ontario hydro easement with overhead power lines is present traversing north/south through the north central portion of the property. A site layout plan showing current structures is presented on Drawing No. 2 in Appendix A.

Renovations and property development are currently on-going by the Client, including interior renovation/demolition of the building structure(s), excavations for footing foundation lines and general property surface reworking/grubbing.

Site topography is generally level in the northern half of the property, sloping downwards approximately 10 – 15 m (Elevation 138 masl – 124 masl) from north west to south east, to open ditches at Battersea and Unity Roads. No surface water bodies are located on the site or within 300 m of the property boundary. A site topographic map is shown on Drawing No. 10 in Appendix A.

The legal description of the property is: Part of Lot 33, Concession 6, Geographic Township of Kingston, City of Kingston. The portion of the property slated for development is approximately 7 hectares. A legal survey plan of the property is shown in Appendix A.

A regional map is shown on Drawing No. 12 in Appendix A showing the site, major/minor roads, environmental protection areas, wetland and watercourse features within 500 m of the site.

1.3 Neighbouring Property Land Use

Adjacent land use consists of a mix of rural residential, commercial, institutional, community and agricultural activity. Immediately adjacent the Site (within 100 m) to the west is residential and agricultural/commercial activity (horse barns and hobby farm – Stone City performance horses), residential to the north, vacant land to the east across Battersea Road, residential and community (Church) to the south across Unity Road and community (Glenburnie Public School) and residential to the south east across Battersea Road. Land use within 500 m of the Site consists of rural residential, open field agricultural, and community (Church).

Potential hydrogeological sources of groundwater contaminants to the Site would likely be associated with nitrate, pesticide and herbicide use from upgradient agricultural crop plantings, and potential nitrate and bacteriological concerns from the cross/upgradient adjacent Stone City performance horse boarding property.

Potential hydrogeological sources down gradient from the Site that may be susceptible to groundwater impacts would be the Glenburnie Public school and residential homes near the Battersea Road and Unity Road intersection.

The nearest known surface water body is an unnamed seasonal drainage course, located approximately 300 m east/south east of the study area; and the Rideau River watershed system

which is located approximately 1.8 km to the south east of the Site, both of these would not likely be impacted due to distance down gradient from the proposed development.

A neighbouring land use plan (within 500 m) is shown on Drawing No. 12 in Appendix A.

1.4 Planning Context

As indicated above, the proposed development will consist of a Farm, Inn, a restaurant and seasonal roof-top patio; a corporate venue; 18 cottages and a spa occupying the southern 14 hectares of the property. The spa will include hot and cold tubs, saunas and treatment rooms. Water for the tubs will be supplied using City of Kingston municipal water, trucked to the site. The proposed development will also include a storm water management pond. Maximum occupancy is expected during summer months and statutory holidays. Table 1 below shows the distribution and breakdown of occupancy for the Inn, cottages, restaurant, corporate venue and spa. Based on the maximum occupancy, a total daily water taking of **75,375** L/day is initially required, with approximately **29,960** L/day, being beneficially recycled for a total net water taking of **45,415** L/day required on a daily basis. Well water storage is anticipated; to support daily peak demands.

The development is proposed to be serviced with private on-site well water supply (with storage) and a large private on-site sewage works treatment system including stormwater ponds that would allow for beneficial reuse of the treated effluent. Beneficial reuse would include treated water for toilets, laundry and for agricultural field irrigation. Well water will not be utilized for direct irrigation purposes. Excess treated effluent not captured for irrigation would eventually be drained to a storm water outfall, that outlets to the adjacent roadside ditch at Battersea and Unity Road.

No well water is proposed to be used for the tubs servicing the spa. Hot and cold tubs servicing the spa are proposed to be supplied using potable water delivered via water trucks from the City of Kingston municipal water supply.

Anticipated Flow Calculations Based on Site Use for Phase 1 and Phase 2 of Development

Building Part	OBC Occupancy Type	Ontario Building Code (O.B.C.) Occupancies	Description	Occupancy	Unit Flow - L	O.B.C Flow L/day	Percentage Diverted to Grey Water L/day	Grey Water Flow L/day	Proposed Resulting Daily Flow L/day
Hotel Suites	Residential	Hotels and Motels (excluding bars and restaurants)	Resort Hotel/Cottage Per person	54	500	27000	33%	8910	18090
Hotel Reception	Commercial	Office Building	per Employee per 8-hour shift	2	75	150	33%	49.5	100.5
Cabins	Residential	Hotels and Motels (excluding bars and restaurants)	Resort Hotel/Cottage Per person	38	500	19000	33%	6270	12730
Restaurant	Commercial	Food Service Operations	Restaurant (not 24 hr), per seat	100	125	12500	33%	4125	8375
Rooftop Patio	Commercial	Food Service Operations	Restaurant (not 24 hr), per seat	60	125	7500	33%	2475	5025
Staff Room, Laundry and Kitchen	Commercial	Office Building	per Employee per 8-hour shift	20	75	1500	33%	495	1005
Laundry	Commercial	Laundry	Laundry Facilities (3 units)	3	2500	7500	100%	7500	0
Spa	Commercial	Public Parks	With Bathhouse, showers and Toilets per person	3	50	150	75%	112.5	37.5
Gift Shop	Commercial	Office Building	per Employee per 8-hour shift	1	75	75	33%	24.75	50.25
			Number of Staff/Patrons	281	**Max Flow L/day**	**75375**	**Recycled Grey Water L/day**	**29,961.75**	**45,413.25**

1.5 Provincial Policy Statement - Servicing Options Statement

Referencing MECP Guideline D-5 Planning for Sewage and Water Services, the legislative authority for this guideline and associated procedures is mandated by the Ontario Environmental Protection Act, Ontario Water Resources Act and the Planning Act. It is consistent with the Provincial goal to manage growth and change to foster communities that are socially, economically, environmentally, and culturally healthy, and that make efficient use of land, new and existing infrastructure and public service facilities.

MECP Hydrogeological Technical Information Requirements for Land Development Applications (April 1995).

The MECP 'Policy on Planning for Sewage and Water Services' and Implementation Guideline for Policy Statement B7, 'Planning for Sewage and Water Services'. These documents support the Comprehensive Set of Policy Statements under Section 3 of the Planning Act, 1995. Municipalities or their equivalents are expected to investigate servicing options by means of a 'servicing options statement' in the absence of municipal wide sewage and water servicing plans that have been adopted in approved official plans.

The Provincial Policy Statement indicates the requirements for servicing new developable areas, specifically Sections 1.6.4.2 to 1.6.4.4, which identify the preferred methods of servicing new developments.

Included in Policy Statement B7 is a hierarchy of servicing preferences in the following order:
a) Municipal services; development on full municipal services be the preferred mode of servicing where there is sufficient uncommitted reserve capacity or where there is the capability for full municipal services to be expanded;
b) Communal services; and in areas lacking full municipal services, communal sewage and water services be the preferred mode of servicing multiunit/lot development;
c) Individual on-site private services. in areas lacking full municipal or communal services where development can be justified consistent with the Provincial Policy Statement, the use of individual on-site sewage and water services, may be considered subject to meeting environmental and public health requirements.

Although, the preferred option would be to service the proposed lands by municipal sewage and water services via sanitary sewers and water mains, unfortunately, the proposed property is too far from the existing municipal serviced area, located approximately 5 km outside the existing municipal serviced area within the City of Kingston, therefore yielding this option not feasible. Existing services in the local area (minimum 500 m radius), consist of private well water supply and individual private septic systems. We offer the following supporting information for individual on-site private services.

- Referencing current City of Kingston on-line data, official plan and zoning by-laws, the closest existing full municipal services are located approximately 5 km to the south of the proposed development, south of Highway 401 at Montreal Street in the City of Kingston. The potential for future connection to full municipal services or communal services for the proposed development area is unlikely given the significant distance and capital costs to extend municipal services a distance of 5 km. Reviewing available documents, the City of Kingston has no future plans to extend municipal services to the proposed development lands.

- Based on our understanding and review of potential development applications for the area which typically include land severance applications for single family residential development or residential subdivision development, these typically require a hydrogeological assessment to address the requirements for individual on-site private services. Reviewing existing City of Kingston planning procedures and future development areas, the subject Site is not part of an established long-term municipal servicing plan or growth management objective.

- The subject property was previously used for rural residential purposes consisting of a 150 year old two storey limestone house, and wooden barns on individual well and in ground septic services. The property was likely used for agricultural growing purposes as evidenced by cleared fields to the south, west and north of the house. Looking at the property from an environmental perspective, the property is currently developed as a rural residential property with open fields, with trees and manicured lawns and gardens adjacent to the residence; no surface water features are present on-site or within 300 m of the property. An unnamed seasonal creek is located approximately 300 m down gradient from the property; the creek appears to flow in an easterly direction towards the Rideau River system located approximately 1.8 km downgradient of the Site.

- Groundwater is the major source of drinking water and individual onsite septic services for neighbouring properties, the groundwater is sourced from the unconfined limestone bedrock or deeper semi-confined sandstone and granite bedrock aquifers. The existing terrain has been described as thin with typically less than 0.5 – 2 m of sandy silty/clayey silt overburden, and topography at the subject property slopes downward at an approximately 10 - 15 m (3-4% gradient) from north west to south east across the property. The soils have been determined to not be suitable for inground septic systems. As such a raised large disposal system with tertiary treatment will likely be necessary for the Site to address the proposed daily use requirements.

- Other residential or commercial developments in the rural portion of the City of Kingston are facilitated with individual services, as is the case with the adjacent Township of South Frontenac where similar developments are serviced with individual private services.
- Municipal offices for the County of Frontenac and Fairmount Homes (retirement

residence) are located approximately 850 m downgradient and south of the proposed development on Battersea Road. Both of these facilities are serviced with individual on-site private services and are located in a similar development area as the proposed development.

- As indicated above the proposed commercial development will consist of an Inn, spa and corporate venue, restaurant, and 18 one-bedroom cottages utilizing the existing 150 year old limestone house, and new construction consisting of additions to the existing house and standalone one-bedroom cottages. The proposed development will encompass an area of approximately 14 hectares.

- Municipal Services Option - The proposed commercial development would be an ideal candidate for municipal services. Municipal services would provide a continuous water supply without the inconvenience and trucking cost for City water for use in the hot and cold tubs for the spa. Unfortunately, the nearest municipal service is approximately 5 km to the south of the proposed development and extending services to the local area is not economical or a part of the future development plans for the City of Kingston.

  Communal Services Option – A communal well and communal wastewater system is identified within the Provincial Policy Statement as an alternative to municipal servicing. At present no communal services are present in the vicinity of the proposed development or surrounding area. The proposed development is a standalone commercial activity, it is not part of a proposed subdivision or multi-lot development, and on these basis, the proposed development is not a candidate for communal water supply.

- Existing residential, commercial, agricultural and institutional development in the rural portion of Kingston is currently utilized through individual on-site private services. The rural part of Kingston is lacking full municipal or communal services and based on the above conditions and our evaluation of existing development in the rural portion of Kingston, we believe that the proposed development is consistent with the Provincial Policy Statement and recommend the use of individual on-site sewage and water services.

The Provincial Policy Statement allows for individual onsite sewage services and onsite water services for uses permitted in Section 1.1.4.1 provided that the onsite activities are suited for the long-term provision of such services. Water service, from groundwater well(s) must be shown to be safe and sustainable.

On this basis, the following hydrogeological study was undertaken with reference to the MECP technical guideline in support of the proposed development. The following sections outline our study, field investigation work, and recommendations.

2.0 SPECIFIC HYDROGEOLOGICAL ISSUES RELATED TO THE PROPOSED DEVELOPMENT AND PROPOSED HYDROGEOLOGICAL SCOPE OF ASSESSMENT

Based on review and evaluation of the existing services in the local area, and development services options, it is apparent that the servicing to support the proposed development is individual private water and septic services.

2.1 Main Elements of the Proposed Development

The main elements of the proposed development include:

- A Farm for agricultural and viticulture purposes
- Inn – 26 one bedroom suites and one two bedroom suite; and hotel reception
- Spa – with hot and cold tubs, sauna, yoga studio, and treatment rooms;
- Restaurant and Roof Top Patio;
- Corporate venue and boardroom space;
- Cabins (18) – 17 one-bedroom and 1 two-bedroom cottage.
- Staff, laundry and kitchen facilities to support the Farm, Inn, Spa, Restaurant, Corporate venue, Cabins, maintenance and a gift shop.

The total anticipated site capacity for Phase 1 and Phase 2 of the development proposal are shown on Table 1 in Section 1.4 above. The expected totals are shown on the Site Statistics Table on the Site Concept Plan prepared by Shoats and Zaback Architects Ltd., as shown in Appendix B.

Referencing Section 8.2 Design Standards of the Ontario Building Code; the total required daily water taking for the proposed development including each proposed use is as shown on Table 1, above. The resulting maximum water use is expected to be **45,415** litres/day.

2.2 Specific Hydrogeological Issues

The specific hydrogeological issues identified and anticipated for the proposed development are as follows:

- Address change in land use and zoning to support proposed development.
- Address whether past on-site land use may be a contributing factor to potential hydrogeological impacts to the proposed development.
- Address existing land use within a 500 m radius (upgradient and down gradient) from property boundary to determine whether there are potential off-site sources of impact present that may adversely impact upon the proposed development.
- Address whether the proposed development will adversely impact upon groundwater recharge to the area.
- Address whether adequate long term groundwater supply is available to support the proposed development without adversely impacting the existing neighbouring

properties, local and regional groundwater supply, and local surface water courses.

- Address whether the existing on site soils and groundwater quality is suitable to support private sewage system design for the proposed development without adversely impacting the groundwater and risk to existing and/or potential downgradient users and receptors. (Conduct a Water Quality Impact Assessment).
- Address whether the Site is suitable for sewage effluent disposal.
- Address the requirement regarding potential application for Permit To take Water with the MECP.

The MECP has the legislative responsibility for the management and protection of ground water and surface water resources in the Province of Ontario. This authority is provided under the Ontario Water Resources Act R.S.O. 1990, the Environmental Protection Act R.S.O. 1990 and the Environmental Assessment Act R.S.O. 1990.

2.3 Proposed Scope of the Hydrogeological Assessment

The proposed scope of work to address the specific issues identified in Section 2.2 above include the following tasks in support of the proposed development.

- Initial meeting(s) with the proponent to understand the development proposal, potential concerns and to discuss potential impacts to existing neighbouring receptors.
- Conduct a desktop survey of existing available documentation regarding surficial and hydrogeological conditions in the local and regional area to consider whether the proposed development may be hydrogeologically suitable and whether local soil conditions are favourable for attenuation of sewage .
- Participate in a community meeting to present the proposed hydrogeological portion of the development and communicate to neighbours regarding participation in the hydrogeological study.
- Conduct an initial pre-survey of neighbouring upgradient and downgradient properties to assess water taking aquifer(s), treatment systems in place, establish baseline groundwater quality, and address potential future water supply concerns potentially from the proposed development and also general communication with neighbours regarding the details of the proposed development.
- Reviewing local geological and hydrogeological conditions within a 500 m radius of the property,
- Review existing land use within 500 m radius to assess for potential impacts to the groundwater supply and whether these may adversely impact the proposed development.
- Advance 3 wells using a licensed well water contractor to facilitate water supply.
- Conduct 48-hour duration pumping tests on two test wells to determine potential

long-term yield of the water supply aquifer, asses potential water quality through sampling and analyses to assess potential water quality from past site use, future use and treatment purposes, and monitor existing neighbouring wells for potential positive response to determine whether the development may adversely impact existing neighbouring water supply wells.

- Conduct a 6-hour duration pumping test of one on-site well to assess the potential for on-site interference of wells during pumping.
- Review local MECP water well records, conduct test pits to assess overburden conditions including soil sampling for grain size analyses purposes and Guelph permeameter tests to assess depth, and hydraulic quality of soils for potential in-ground sewage systems.

The on-site hydrogeological investigation was assessed through two 48-hour pumping tests on two (2) recently drilled wells and a six-hour pumping test on a third on-site well (to compare on-site interference potential). Water quantity was assessed on the basis of the pumping tests; water quality was assessed on the basis of chemical and bacteriological sample collection and analyses for water samples collected near the beginning and at six-hour intervals during the 48-hour pumping tests; and assessing potential interference through monitoring neighbouring and on-site wells.

Based on the information obtained, groundwater data is presented regarding recommendations for the proposed development from a groundwater supply and sustainability perspective.

3.0 CONCEPTUAL SITE MODEL DEVELOPMENT - REGIONAL AND SITE PHYSIOGRAPHY AND GEOLOGICAL SETTING

3.1 Topography, Surface Water and Drainage

The Site is located within the watershed of the Great Cataraqui River (Rideau Canal System). Collins Lake is located approximately 2.25 km northwest of the property and the Rideau River system is located approximately 2 km east. An unnamed water body is also evident upgradient, approximately 800 m to the north west of the site. This was a former operating quarry, since closed.

Topography of the site was assessed using online digital mapping, online City of Kingston KMaps and a site visit conducted in the summer of 2018. Site topography is generally level in the northern half of the property, sloping downwards approximately 10 – 15 m (Elevation 138 masl – 124 masl) over approximately 300 m of the Site from north west to south east. Surface water at the site based on site topography would be directed overland to the east/south east toward adjacent roadside open ditches along Battersea Road and Unity Road.

No surface water features or water bodies are located on the Site or within 300 m of the Site. Local surface drainage appears to be to the south east towards an unnamed seasonal drainage ditch located approximately 300 - 400 m south east of the Site. This drainage ditch flows to the east, and north east towards the Rideau River system located approximately 2 km east of the Site. A copy of the topographic map is shown on Figure No. 10.

Attached in Appendix B is a concept drawing showing the proposed site alterations, ground elevations and change in drainage patterns. Site drainage is not anticipated to be significantly altered based on the proposed development.

3.2 Geology and Soils

3.2.1 Surficial Geology - Physiography

Referencing the Western Cataraqui Regional Groundwater Study, the thickness of the soils overlying bedrock (overburden) in the study area is generally less than one (1) m, with exposed bedrock visible in some areas on the Limestone Plains. The Ontario Department of Mines and Northern Affairs (Map 2227), Physiography of the Eastern Portion of Southern Ontario, shows the subject property as being located in an area described as Limestone Plains and located west of a Clay Plain, which is associated with the Rideau River system located approximately 1.8 km to the east.

Fourteen (14) test pits were excavated May 3, 2018 on the subject property under the supervision of ASC personnel. Results identified heterogeneous overburden deposits consisting primarily of fine sand material with some gravel and boulders. Grain size analyses results are included in Appendix E. Thickness of overburden ranged from approximately 0.35 m to approximately 1.7

m depth where refusal to excavating was encountered on inferred limestone/shale bedrock. The majority of the test pits were found to be less than 1 m depth.

Overburden thickness recorded in the on-site well records identified approximately 0.6 m of soil overlying limestone bedrock. Test pit locations are shown on Drawing No. 9 in Appendix E.

3.2.2 Bedrock Geology

Referencing the Western Cataraqui Regional Groundwater Study (2007). Figure 17., and The Ministry of Northern Development and Mines,(Map 2544), Bedrock Geology of Ontario (Southern Sheet), following geological units underly the Site.

Site topography is generally level in the northern half of the property, sloping downwards approximately 10 – 15 m (Elevation 138 masl – 124 masl) over approximately 300 m of the Site from north west to south east.

The upper unit consists of a strategraphic sequence of Paleozoic, Middle Ordovician age predominantly limestone bedrock, of the Ottawa Group, Simcoe Group and Shadow Lake Formation; overlying Cambrian aged conglomerate, sandstone, shale and dolostone of the Potsdam Group, Nepean Family and Covey Hill Family. Precambrian basement bedrock of the Grenville province, consisting of the Central Metasedimentary belt plutonic rocks: consisting of granodiorite, granite, syenite, pegmatite, alkalic granite and migmatitic gneisses was also identified.

Well records indicate the limestone sedimentary sequence is approximately 45 m thick in the local area overlying the Cambrian sandstone and/or Precambrian granite basement bedrock. Well records indicate that groundwater is present in the limestone, sandstone and granite bedrock formations with the limestone bedrock utilized as the predominant water supply aquifer in the study area.

Exposed limestone bedrock observed in test pits during the investigation for potential septic design options, and was noted to be weathered and friable in the upper 0.2 – 0.3 m. No significant bedrock fractures, joints or discontinuities were observed during the test pit investigation work. Test pits were observed to be dry following excavation, with the exception of test pit TP 6 which exhibited minor infiltration at the base of the excavation. Test pit logs are appended in Appendix E.

Limestone bedrock outcropping exhibiting surficial horizontal and vertical fracturing was observed in the ditch line to the south of the subject property.

Excavations for future building foundations were undertaken during July and August, 2018. These excavations were extended to approximately 3 m below grade, using hoe ramming techniques and were observed to be dry over a period of a few days. Visual observation of the

excavation sidewalls and bedrock base during site visits did not identify significant fracturing or jointing of the limestone bedrock. No karst features such as grikes, large fractures or staining of bedrock suggesting groundwater infiltration/movement was observed during site visits. Based on visual observations the limestone bedrock was observed to be of fair to good quality, with no obvious karst features.

3.3 MECP Water Well Records – 500 m radius

The subject area has been identified as a moderate to highly vulnerable aquifer due to shallow soils and the variable nature of the underlying fractured unconfined limestone bedrock aquifer[1].

ASC Environmental reviewed water well records obtained from MECP Water Well Records database. Seventy – one (71) water well records were available for review within 500 m of the Site. Fifty-four wells were drilled for domestic water supply purposes, and each was completed into bedrock. Four wells were drilled for livestock water supply. Based on review of the MECP well records, conclusions can be drawn regarding subsurface conditions in the local area.

Sixty-one of the seventy-one wells were reported completed into the upper Middle Ordovician Gull River limestone formation, five were reported completed into the Precambrian basement granite bedrock, and five were completed into the sandstone formation. Two were recorded as previously dug, eleven were reported as abandoned.

Reviewing the well logs from the local area, the limestone bedrock is generally overlain by clay or sandy loam overburden ranging from 0.3 m to 4 m depth, with the majority of wells reported with 1 – 2 m of overburden. The limestone bedrock in the area of the site typically ranges from 15 – 49 m below grade. Sandstone underlies the limestone to depths of approximately 79 m, followed by granite to depths greater than 105 m.

The pumping tests conducted on local drilled wells showed pumping rates ranging from a minimum of 4.5 litres/minute to 180 litres/minute. Fresh water was reported in fifty-three of the wells. Fresh water was encountered at depths ranging from approximately 4.9 m to approximately 86.9 m below the ground surface. Based on the well record information; water bearing zones are present in the middle Ordovician limestone bedrock and deeper Precambrian bedrock basement unit. Static water levels typically varied from approximately 1 m to approximately 32 m below ground surface.

Based on the site drilling well records, the unconfined Ordovician limestone, sandstone and Precambrian granite bedrock aquifers are being sourced for drinking water supply in the local area. The majority of the wells are utilizing the upper limestone bedrock for domestic water supply source.

1 Western Cataraqui Regional Groundwater Study. Figure 59.

Groundwater is stored and transmitted by the openings present along horizontal bedding planes (limestone bedrock) and vertical fractures or joints. The spacing of these openings, the size and the interconnection between them is crucial to an adequate supply. In granite, groundwater is stored and transmitted by openings present along fractures, fault lines and joints.

Water wells completed at the Site may to a small extent obtain water from fracture systems in the upper unconfined limestone aquifer; water supply is predominantly from the lower sandstone and granite basement bedrock. The water bearing limestone bedrock aquifer may be vulnerable to surface water influence due to shallow overburden and potential fracturing of the bedrock. No significant surficial bedrock fracturing was observed during the test pit investigation.

Referencing Figure 5 in the Western Cataraqui Regional Groundwater Study, the Site is characterized as having a medium groundwater recharge potential, whereas upgradient to the northwest approximately 800 m is an unnamed pond and this area is shown as a high recharge potential, and to the south of the Site, is characterized as a medium to high recharge potential. Recharge to the shallow unconfined limestone bedrock groundwater aquifer probably occurs with the vertical infiltration of water from near surface seasonal sources and precipitation. Recharge at the subject property would be from precipitation. No permanent surface water supply sources are present on the Site. An unnamed surface water pond (former quarry) is present approximately 800 m northwest of the Site. The nearest discharge source; an unnamed creek is located approximately 300 m down gradient to the south east of the Site. This creek flows to the north east towards the Rideau River watershed system which is located approximately 1.8 km east of the Site.

In the bedrock environment, water flow within the aquifer(s) occurs through a complex network of fractures, joints or other discontinuities within the rock matrix. The bedrock system receives recharge where these fractures intersect the ground surface or shallow overburden flow system. Recharge to the deeper sandstone and granite bedrock water bearing fracture systems may occur in part with the downward vertical migration of groundwater from the upper limestone bedrock aquifer system or where these formations outcrop at the surface.

The location of domestic water supply wells near the site are shown on Drawing No. 4, and the MECP water well records are included in Appendix D. A hydrogeological cross section showing overburden and geological units in the local area is shown on Drawing No. 8 in Appendix A.

4.0 HYDROGEOLOGICAL ASSESSMENT

Groundwater is part of the hydrologic cycle. It is dynamic, moving naturally through the subsurface environment and ultimately discharging at the surface. An understanding of the natural movement of groundwater is important in undertaking an assessment of the potential effects of a proposed development.

4.1 Water Balance Methodology

The MECP Stormwater Planning and Design Manual (2003 – updated 2015) is used as a baseline reference document in the review of stormwater management applications for approval under Section 53 of the *Ontario Water Resources Act* as administered by the MECP.

The manual offers a method to estimate the infiltration on the Site, based on a local infiltration factor "i", which is applied to the available water surplus to determine the groundwater recharge for a given area with pervious cover. The methodology considers factors such as the soil type, topography, and vegetation to arrive at the amount of water infiltrating into the ground. The remaining water surplus is considered runoff.

Under the post-development conditions, the infiltration factor is recalculated to account for changes in soil types, vegetation, and topography after development, and the infiltration and runoff at the pervious land areas are recalculated.

As the land after development will have impervious surfaces that prevent infiltration, such as building footprints, road, and parking areas, the pervious area available for infiltration is generally reduced. Furthermore, there is limited opportunity for evapotranspiration (ETR) on these impervious surfaces, other than evaporative losses from wetting and ponding of water in shallow depressions (estimated at 10% of total precipitation), and so total precipitation is applied to these surfaces instead of the water surplus.

The proposed maximum water taking has been determined to be **45,415** litres/day (see Section 1.4) for the development proposal. The Site has been identified as a low to moderate potential for groundwater recharge. The local area receives on average 938 mm of precipitation per year[2]. The amount of infiltrating water available (minus evapotranspiration etc.) to the aquifer has been estimated at 250 mm/yr.

2 Western Cataraqui Regional Groundwater Study. 2007. Figure 4 Average Annual Precipitation.

Therefore, the total amount of recharge water available to the proposed development, considering impervious structures is determined as follows:

Table 2.0 - Water Balance

Site Area (A)	Impervious Area (A1)	Annual Precipitation	Annual Infiltrating Water Available (i)	Recharge Water Available to Aquifer	Maximum Water Taking	Net Water Balance
(hectares)	(hectares)	(mm/yr)	(mm)	(m^3/yr)	(m^3/yr)	(m^3/yr)
14.0	0.5	938	250	33,750	16,576.5	17,173.5

Total Area (A) – 14.0 ha
Impervious Area (A1) – 0.5 ha
Infiltrating water (i) = 250 mm/yr

Recharge Water Available to Aquifer =
(A – A1) * i * 10,000 m^2/ha * 1000 litres/m^3 = 33,750,000 litres/yr.

The water taking demand based on the proposed development has been established at 45,415 litres/day (16,576,475 litres/yr).

Therefore, the net total average annual recharge to the shallow limestone aquifer within the site under probable post development conditions is 33,750 m^3/year, resulting in a net positive water balance of approximately 17,175 m^3/year available for recharge and sufficient groundwater supply available in the aquifer to meet seasonal variability, peak demand and long-term water taking for the proposed development.

On this basis, the net reduction in water balance from the proposed water taking would result in a less than 50% reduction in recharge. It is recommended that stormwater management techniques including beneficial reuse be designed to enhance the estimated average annual rate of groundwater recharge for the site to maintain support of local groundwater levels. Stormwater management systems should also be designed to protect groundwater quality. Reference should be made to the preliminary stormwater and sewage treatment plans for this site being prepared by Greer Galloway.

4.2 Determination of Present and Future Water Taking Demand

Based on the anticipated daily water requirements per person using the facilities, including employees, as per the Ontario Building Code Table 8.2.1.3. B (other Occupancies), the long term maximum daily requirement is anticipated to be 45,415 litres/day for the proposed development of the site. This is presented on Table 1 (shown above in Section 1.4) for the maximum capacity anticipated for each venue. Pools and baths associated with the daily Spa will be maintained using City of Kingston water from water supply trucks, and not groundwater, and therefore are not included in the future water taking demand balance.

The quantity of groundwater available at the Site was investigated through pumping tests (with recovery). Three wells were advanced on the subject property between July – October 5 2018 by Jack Knox Well Drilling (MECP Licensed Well Drillers) to assess water supply quantity, quality and potential interference with existing neighbouring water supply wells. The locations of the wells was determined based on potential for re-use as development supply wells. Test well locations are shown on Drawing No. 3 in Appendix A.

The Ministry of Environment Conservation and Parks (MECP) Hydrogeological Technical Information Requirements for Land Development Applications (1995) was used for reference purposes to support developing the water supply assessment program. Procedure D-5-5 Technical Guideline for Private Wells: Water Supply Assessment (August 1996) was also referenced for guidance purposes.

4.3 Construction and Development of New and Existing On-Site Water Wells

Based on our understanding of the development proposal at the time of the pumping tests; including anticipated daily maximum water taking capacity for the development, sensitivity regarding existing and potential neighbouring long term water supply concerns, potential interference and potential for groundwater quality concerns resulting from potential surface infiltration into the upper unconfined limestone bedrock aquifer; it was determined that test wells would be advanced into the underlying sandstone and granite bedrock aquifers at depths approaching 90 – 92 m below site grade to assess water supply for the development.

Four wells are currently present on the subject property, three recently advanced by Knox in the summer of 2018 for purposes of water supply assessment and the original well servicing the property. The original well (OW20) was reported advanced into the limestone bedrock to a depth of approximately 26 m with a yield rating of 20.25 lpm (litres per minute). The drilled wells are proposed to be used as water supply sources for the proposed Farm, Inn and Spa development. Well locations are shown on Drawing No. 3 and Drawing No. 5 in Appendix A.

Test well TW01 was drilled to approximately 85.3 m depth, completed July 11, 2018. Well drillers reported encountering native clay overburden to 0.6 m, limestone bedrock to 48.8 m, terminating in sandstone bedrock at 85.3 m. Steel casing extended to 49.4 m into the sandstone bedrock creating a seal from the upper limestone bedrock aquifer. Water was encountered in the sandstone bedrock at 64 m and 84.7 m depth. The well was constructed according to O. Reg. 903, with 49.98 m of steel casing including 0.6 m above the ground surface. The annular space was sealed with cement grout. A one-hour pumping test was conducted by the well driller at a pumping rate of 45 lpm, achieving 100% recovery after one hour. The well is identified with MECP tag # A239694.

Test well TW02 was drilled to a depth of approximately 97.5 m terminating in red/white granite Precambrian bedrock. Steel casing extended to 49.7 m below surface. Water was encountered at a depth of 91.4 m (sandstone/granite bedrock interface). The well was constructed according to O. Reg. 903, 49.7 m of steel casing was advanced to seal the upper limestone aquifer; the annular space was sealed with cement grout. A one-hour pumping test was conducted by the well driller at a pumping rate of 45 lpm, achieving 99% recovery after one hour. The well is identified with MECP tag # A255504.

Test well TW03 was drilled to a depth of approximately 91.44 m terminating in red/grey granite Precambrian bedrock. Steel casing extended to 49.7 m below surface into the granite bedrock. Water was encountered at a depth of 76.2 m in granite bedrock. The well was constructed according to O. Reg. 903, with 50.25 m of steel casing including 0.6 m above the ground surface. The annular space was sealed with cement grout. A one-hour pumping test was conducted by the well driller at a pumping rate of 45 lpm, achieving 90% recovery after one hour. The well is identified with MECP tag # A255532. The well was completed on October 7, 2018.

The water well records are attached in Appendix C. Hydrogeological cross sections for on-site wells is shown on Drawing No. 6 and 7 in Appendix A.

A level survey was also conducted by ASC Environmental to tie-in site wells. A local benchmark was selected for surveying purposes, top of concrete step (Elev. 132.0 m) at north entrance to the existing limestone building (see Drawing No. 5 in Appendix A). Groundwater levels measured in December 2018 from the test wells ranged from approximately 32 me to 33.5 m depth below top of well casing in test wells. The original on-site well water level (terminated in the upper limestone bedrock aquifer) was measured at a depth of 11.45 m below top of steel casing. Static water level measurements and groundwater elevations are presented in Appendix F.

4.4 Neighbouring Wells

Adjacent land use and within 500 m of the site consists of a mix of rural residential, commercial, institutional, community and agricultural land use activity. A pre-survey and post-pumping survey were undertaken for neighbouring properties upgradient and downgradient of the site; that agreed to participate in the study. The furthest participant was located 850 m to the north of the site (2467 Battersea Road).

The purpose of the survey was to establish water taking aquifer(s), treatment systems in place, establish baseline groundwater quality, address potential future water supply concerns potentially from the proposed development and, also general communication with neighbours regarding the details of the proposed development. Drawing No. 4 in Appendix A shows the location of participating neighbours.

Table D1 in Appendix D shows neighbouring water well details including depth, MECP well #, UTM coordinates, lithology, static water level and treatment systems in place. Table H2 in Appendix H shows pre and post pumping water well chemistry results for neighbouring wells.

Results of the pre-survey showed that the majority of neighbouring residential, commercial and institutional land use activities, utilize the upper limestone bedrock aquifer for groundwater resource supply. Only the Church of Latter-Day Saints, located at 2245 Battersea Road, approximately 50 m south of the site, is using the lower granite bedrock aquifer for water supply. Treatment systems typically in place include UV systems for disinfection, water softeners for hard water and/or reverse osmosis filtration for elevated salts and chlorides.

Neighbouring wells were monitored to assess potential interference impact during pumping tests for TW01 (August, 2018), TW02 (September 2018), and TW03 (December 2018). Results are discussed in Section 4.5 below and a tabular summary of neighbouring drawdown and recovery results are presented in Appendix F.

4.5 Pumping Tests and Recovery Data

Three pumping tests were designed to assess groundwater supply and interference potential at the Site. Two 48-hour pumping tests (with recovery) were determined to be reasonable to assess the site hydrogeological conditions regarding long term water supply and potential adverse impacts to existing neighbouring stakeholders. A third pumping test was also undertaken for a period of 6 hours (with recovery) to compare on-site potential interference for the 3 recently drilled wells and the existing on-site well.

Based on our understanding of the development proposal at the time of the pumping tests, including anticipated daily maximum water taking capacity for the development, and the sensitivity regarding existing and potential long-term water supply concerns of neighbours, the wells were advanced into the underlying sandstone and granite bedrock aquifers at depths approaching 90 – 92 m below site grade.

The majority of the local residential neighbours and down gradient school draw water from the upper Ordovician limestone bedrock aquifer, and therefore in order to limit potential interference, the on-site wells were advanced deeper into the underlying sandstone and granite bedrock aquifers to assess potential water supply with the anticipation of limiting potential adverse impacts to neighbours and the limestone aquifer resource. Steel casings were extended into the deeper aquifers to eliminate the potential for connectivity between aquifers and existing neighbouring properties.

Following completion of well construction by Knox, and prior to conducting pumping tests, the wells were not disturbed for a period of at least two weeks to allow the wells to recover from drilling activities. Submersible test well pumping equipment was supplied by Knox Well drilling.

The pumping tests for test wells TW01 and TW02 were conducted in August and September, 2018 to determine potential seasonal stressed water supply conditions (i.e. summer conditions). The pumping test for test well TW03 was undertaken in December 2018, to assess potential on-site interference. Local residential, institutional and community land use water wells were utilized for observation purposes during pumping tests to assess potential positive interference.

The wells were fully developed prior to the pumping tests (see Section 4.2 above). Prior to pumping, static water levels were measured and recorded, and a Solinst Levelogger was installed in the pumping test well; pre-set to record data at 1-minute intervals over the duration of the 48-hour pumping test, including recovery. Test pumping rates were set at a maximum pump runout rate of 33 lpm (±5%) for a period of 48 continuous hours to assess aquifer capacity and confirm potential long term water supply where storage may be required, resulting in maximum water taking of 49,896 lpd (litres per day); therefore, a Permit to Take Water was not required for the test(s) and since the wells penetrated into the sandstone and granite bedrock aquifers, potential off-site impacts to off-site neighbouring groundwater uses was unlikely.

Water was discharged during the pumping tests into a temporary excavation (lined with an impermeable membrane) to eliminate potential artificial recharge, and following a period of two weeks the discharge water was slowly released to the overland environment. Water level recovery was measured following pump shut down for a period of 24 hours or when 95% recovery was achieved. The specific capacity of each well was calculated near the end of each pumping test.

Neighbouring water supply wells upgradient and downgradient were monitored prior to pumping tests, and during the pumping tests and recovery. No high yield well takings were identified within 500 m of the site.

No sources of current or past potential contamination were evident on site during the hydrogeological study (other than potential past agricultural activity). The west adjacent upgradient commercial hobby farm and horse barn located at 874 Unity Road may be a source for nitrate groundwater impact (see Section 5.0 for Groundwater Quality Assessment)

TW01

The pumping test on test well TW01 was initiated on August 7, 2018 with a measured pumping rate of 33 lpm. Water levels were recorded at 1-minute intervals using the down well levelogger during pumping and recovery. Water levels were also measured manually during the pumping test. Pumping was undertaken continuously for 48 hours resulting in a measured drawdown of 4.1 m, quantity of water pumped from the sandstone aquifer approaching 95,000 litres, 90% recovery was attained approximately 18 hours following pump shutdown and recovery to 95% was attained 23.97 hours following pump shutdown. During pumping, steady state was identified after approximately 836 minutes indicating the sandstone water supply aquifer is able to support the designed pumping rate. Approximately 46 m (92%) of initial water supply was

available in the well following pump shutdown. Specific capacity calculated over the final 1300 minutes of pumping showed 428 l/min/m.

TW02

The pumping test on test well TW02 was initiated on September 17, 2018 with a measured pumping rate of 33 lpm. Water levels were recorded at 1-minute intervals using the down well levelogger during pumping and recovery. Water levels were also measured manually during the pumping test. Pumping was undertaken continuously for 48 hours resulting in a measured drawdown of approximately 0.5 m, quantity of water pumped from the granite aquifer approaching 95,000 litres over the two days.

TW03

The pumping test on test well TW01 was initiated on December 4, 2018 with a measured pumping rate of 33 lpm. Water levels were recorded at 0.5-minute intervals using the down well levelogger during pumping and recovery. Water levels were also measured manually during the pumping test. Pumping was undertaken continuously for 6 hours resulting in a measured drawdown of 3.45 m, recovery to 95% was attained 504 minutes following pump shutdown. During pumping, equilibrium was not reached, considering that the well was advanced to similar depths as TW01 and TW02, and comparing pumping tests, we would expect TW03 to have a similar aquifer response if pumping for longer duration. Approximately 54.5 m (94%) of initial water supply was available in the well following pump shutdown. Specific capacity over the final 90 minutes of pumping showed 125 l/min/m.

Reviewing the drawdown curves for the three pumping tests, the data indicate that TW01 and TW02 pumping wells reached equilibrium, with a maximum drawdown of approximately 4 m, and 46 - 54 m of well water supply available in the wells following the pumping tests.

Drawdown and recovery data, and field analysis results are shown in Appendix F. Hydrogeological cross sections for the site is shown on Drawing Nos. 6 and 7 in Appendix A.

Results of the pumping tests confirm that the lower sandstone and granite aquifers are able to support pumping rates in the order of 30 lpm. Based on the pumping test results and favourable recovery time following prolonged continuous pumping of 48 hours, sufficient aquifer storage and demonstrated yield is available to supply the wells to meet the demand for the proposed development; without adversely impacting upon neighbouring resident water supply.

On the basis of the pumping tests, the probable well yields determined are representative of the yields which the development are likely to obtain from the wells in the long term.

We understand that water supply to the proposed development will be using submersible pumps. Pump installations shall be undertaken in accordance with Regulation 903 (as amended).

4.6 Neighbouring and On-site Observation Well Response to Pumping Tests

The effects of interference were monitored during well development and pumping of existing adjacent neighbouring wells extending outward from the proposed development a distance of 100 m to 850 m. On-site wells were also monitored to assess potential interference within the development.

Neighbouring wells were monitored to assess potential interference impact from pumping tests for TW01 (August 2018), TW02 (September 2018), and TW03 (December 2018) to determine whether local well supply would be negatively impacted from the proposed development.

Prior to initiating pumping tests, neighbouring wells were monitored to measure initial static water levels. Some domestic wells were noted to have been in use prior to and during the pumping tests, as evidenced by periodic measured well recovery during the pumping tests, this is to be expected considering the 48-hour duration of pumping and necessary water use by residents especially during early morning and evening (see results of individual neighbouring well water response in Appendix F).

Test Well TW01 – August 7-9, 2018
Positive response (interference drawdown) to pumping was not significant in neighbouring wells during the 48-hour pumping test for test well TW01, for August 7 – 9, 2018 ranging from approximately 0.25 to 1.0 m. Each well was shown to recover prior to the completion of the pumping test, indicating recovery following domestic use.

Data did show a negative response (recovery) in a number of neighbouring wells that access the limestone bedrock aquifer for water supply, around the 1400-minute mark, that is not likely due to domestic use. This correlates to a precipitation event occurring late afternoon of August 8, 2018 (see climate data appended in Appendix F). It is interesting to note the shallow aquifer response to the precipitation event, suggesting that the limestone bedrock aquifer is indeed unconfined and is likely susceptible to impact from surface contamination.

At the time of test well TW01 pumping test, test well TW02 and TW03 had not been constructed, and therefore only the well at 2245 Battersea Road was available for comparison of the lower sandstone and granite bedrock aquifer units. Results from monitoring showed an approximately 0.3 m positive response to pumping. Results also showed that when the well was in use at 2245 Battersea Road, a positive response of approximately 0.75 m was measured.

Test Well TW02 – September 17-19, 2018
At the time of test well TW02 pumping test, test well TW03 had not been constructed. In general, positive response (drawdown) to pumping was not significant in neighbouring wells (0.15 m to 0.5 m) during the 48-hour pumping test of test well TW02, September 17-19, 2018. Data did show a negative response (recovery) in a number of neighbouring wells that correlate with use

during the pumping test. These were shown to recover during the pumping test, confirming that test well TW02 will not impact upon neighbouring wells located in the limestone aquifer.

Test well TW01 showed a 2.26 m positive response during the pumping of test well TW02. A drawdown of approximately 1.9 m was measured after approximately 855 minutes (14.25 hours) of pumping and only approximately 0.4 m of positive response for the remainder of the pumping test (see interference monitoring data for test well TW01 in Appendix E) showing that on-site interference will not be a significant concern to long term on-site water taking. Test well TW01 is located approximately 50 m north east of TW02.

Results from monitoring of 2245 Battersea Road showed an approximately 0.5 m positive response to pumping. Results also showed that when the well was in use at 2245 Battersea Road, an additional positive response of approximately 0.75 m was measured.

Test Well TW03 – December 4, 2018

Positive response (drawdown) to pumping was not significant in neighbouring wells during the 6-hour pumping test for test well TW03, on December 4, 2018, ranging from approximately 0.03 m to 0.8 m. Test well TW01 and TW02 showed on-site positive interference of 2.3 m after approximately 320 minutes of pumping and observation well OW9 (2245 Battersea Road – Church) showed an initial positive response of approximately 6.6 m following 110 minutes of pumping, steadily reducing to 0.32 m at the end of the pumping test. It is apparent that the well was in use during the early stages of the pumping test and recovered during the pumping test.

The measured interference during pumping is an appropriate estimation of the influence.

4.7 Potentiometric Data

Referencing MECP well record database information showing static well depths for neighbouring wells, and results of groundwater monitoring for on-site wells; regional groundwater hydraulic gradient for the limestone bedrock aquifer has been determined to be from north to south at approximately 1 % (14 m over 1400 m) as shown on the hydrogeological cross section on Drawing No. 4 in Appendix A.

Groundwater depths in the on-site test wells ranged from approximately 31.9 m – 35.5 m from measurements conducted from August, 2018 to January 2019 indicating a seasonal variation of approximately 4 m in the deeper test wells. The water depths measured at the test wells from November, December, 2018 and January, 2019 and converting to potentiometric head elevations, indicate that groundwater flow at the site is to the south/south east at a 0.011 (1%) horizontal gradient as shown on Drawing No 5 in Appendix A.

Some neighbouring wells in the upper limestone bedrock aquifer showed a variability in water levels during monitoring from August to December 2018 of 1 m to up to 10 m. Water levels were measured at approximately 4 to 26 m below grade during August, 2018 monitoring (prior to

pumping test) and approximately 0.2 m to 14.8 m (prior to pumping test in December 2018). These variations may be due in part to neighbouring water usage prior to initial static water levels being recorded for pumping tests. We also believe that it is evident that there is seasonal variability in neighbouring water levels due to the unconfining nature of the limestone aquifer and the well(s) ability to interface with water bearing fracture and joints. On-site observation well OW20 (limestone bedrock aquifer) showed water levels ranging from 11.45 m to 14.51 m between September and December, 2018. Groundwater static measurements are shown on Table D1 in Appendix D.

Groundwater depths were measured to be consistently higher in wells terminated in the upper limestone aquifer in comparison to wells terminated in the deeper sandstone and granite aquifers, showing that the vertical groundwater gradient is likely downwards in the study area.

4.8 Determination of Aquifer Supply – Pumping Test Analyses

At completion of the 48-hour pumping tests, total water taking from the sandstone and/or granite bedrock aquifer approached 95,000 litres (47,500 LPD) per pumping test (TW01 and TW02) which represents approximately 100% of the daily design requirement, without observing significant drawdown of well supply.

Drawdown and recovery measurements obtained during the pumping tests are presented in Appendix F.

Values of transmissivity were calculated from the pumping data by the Theis method which assumes the bedrock aquifer is analogous to a homogeneous, confined, porous media aquifer of infinite horizontal extent[3]. Local water supply wells are located in the upper limestone and lower sandstone-granite bedrock formations and are likely to vary in drawdown due to the wells varying ability to interface with water bearing fractures.

Recharge to the deeper sandstone and granite bedrock water bearing fracture systems may occur in a small part with the downward vertical migration of groundwater from the shallower limestone bedrock aquifer system. Recognizing that the sandstone and granite bedrock water bearing units are not totally “confined” the Theis method sufficiently estimates aquifer parameters to assess site hydrogeological conditions.

3 Applied Hydrogeology, Second Edition, Fetter C.W. 1980.

4.8.1 Pumping Test Analyses

The test methods applied to the pumping test data were the Theis Method and Jacob straight line method which are applicable under confined aquifer conditions.

Hydraulic Conductivity (K) values calculated from the Theis and Jacob methods ranged from 1.6 x 10^{-4} m/s to 2.9 x 10^{-5} m/s and Transmissivity (T) values ranged from 1.21 x 10^{-3} m^2/s to 7.5 x 10^{-3} m^2/s. The Theis method data are summarized on Table 1 in Appendix G. The storativity (S) values shown on Table 1 in Appendix G were obtained from observation well data and ranged from 1.7 x 10^{-5} to 8.5 x 10^{-7}. These values are within the range for storativity in confined aquifers.

Results of the calculated analyses show that the K and T values are within a reasonable order of magnitude to be considered representative of the water supply aquifer.

The observed drawdown at the pumping wells (TW01, TW02 and TW03) ranged from 2.3 m to 4.1 m and observed drawdown in the observation well (OW9) ranged from 0.32 m to 2.3 m during the pumping tests (OW02 is the only local well advanced into the lower sandstone or granite bedrock aquifers). The similarity in measured drawdown at the pumping wells is likely the result of the homogeneity of the confined aquifer and similar well depths. The storativity values and the observed drawdowns suggest the local sandstone and granite aquifers are under confined conditions.

AQTESOLVE provides diagnostic plots which allow for comparison of time vs. drawdown data from pumping tests to the various theoretical models. Matching pumping test data to a type curve for the theoretical mode allows for the determination of aquifer type and conditions. Using these diagnostic plots as described above, the drawdown data from pumping test well TW01 indicate the aquifer is under confining conditions showing equilibrium was attained during pumping. Pumping test results from TW03 show similar confining conditions, even though the well had not fully reached equilibrium conditions as shown by the drawdown data during the 6 hours of pumping.

4.8.2 Predicted Potential Well Interference

The Theis solution (using superposition) was utilized to assess the effects on a “residential” well located r = 100 m radial distance from the pumping well TW01 when pumping at the expected daily design demand of Q = 45,415 litres/day. For purposes of evaluating the water supply at the site K, S and T (see Table 1 in Appendix G) were utilized and are summarized as follows:

Hydraulic Conductivity (K) = 2.93 x 10^{-5} m/sec
Storage Coefficient (S) = 1.70 x 10^{-5}
Transmissivity (T) = 1.22 x 10^{-3} m^2/sec

Using the Theis solution, one can estimate the drawdown at a distance "r" for a specified time period. We have chosen, t = 20 years.

$$\text{Drawdown (s)} = \frac{Q}{4\pi T} * W(u)$$

Where the well function, W(u), can be estimated from known values, based on the following relationship:

$$u = \frac{r^2 S}{4Tt}$$

r = distance from pumping well to neighbouring well

Solving for u, after t = 20 years, and a radial distance r = 100 m, and using the average aquifer parameters for T and S, results in a u = 5.057 x 10^{-8} and a corresponding well function W(u) = 16.14. Applying these results to the Theis solution as shown above, the calculation predicts that a drawdown of approximately 0.55 m would occur in the well of interest at a distance of 100 m, after pumping continuously for 20 years. The Theis solution analyses, and input values are presented in Appendix G.

The Jacob method was also utilized for comparison purposes and the data showed similar results following pumping for 20 years at a radial distance – r = 100 m. The solution analyses, and input values are presented in Appendix G.

4.8.3 Potential Long-Term Well Interference

Based on the results from the drawdown curves of the two 48 hour pumping tests, showing drawdown of approximately 3 – 4 m during pumping; resulting available well supply drawdown in the order of 50 m, and test wells attaining equilibrium after approximately 850 minutes of pumping, clearly demonstrates sufficient available drawdown in the test wells to support the proposed pumping conditions.

Neighbouring and on-site observation wells showed a drawdown (positive interference) of no response to 2.5 m during the pumping tests, confirming a sustained yield sufficient to supply the proposed development without interference to neighbouring properties.

Furthermore, favourable recovery rates were measured following the pumping tests showing the hydrogeological ability of the supply aquifers to recover and meet the anticipated daily demand for the proposed development.

Comparing the calculated and predicted drawdown of approximately 0.55 m at a radial distance of 100 m, there is sufficient available drawdown in the site wells to support the proposed pumping conditions without creating adverse effects.

Based on the calculated and predicted drawdown, existing neighbouring water supply wells accessing the sandstone/granite aquifers would not likely experience drawdown resulting from the proposed development, given the calculated assessment was for continuous pumping and clearly conservative; and the actual peak demand required by the down gradient neighbour (OW09) accessing the same aquifer would be considerably less on a daily basis.

In addition, those wells that are terminated in the upper unconfined limestone aquifer, show static water levels at depths of approximately 5 – 25 m, and demonstrated little or no drawdown response during the continuous 48 hour pumping tests, whereas the on-site pumping wells and down gradient well at 2245 Battersea Road (OW09) show water well levels at depths of 30 – 35 m confirming that the neighbouring residents are drawing water from the upper limestone and that the upper and lower aquifers show little potential for connectivity.

On these basis, neighbouring water supply wells will not be adversely impacted regarding well water supply interference from the proposed development. The measured interference during pumping is an appropriate estimation of the potential influence.

5.0 GROUNDWATER QUALITY

Each test well was chlorinated prior to pumping. Residual chlorine was measured from the pump discharge during the pumping tests prior to sample collection using a Hach DR 100 Colorimeter (see Appendix H). Samples were collected following confirmation of chlorine residual (no longer present in groundwater).

Water samples were collected from pumping test well TW01 and TW02 within the first hour of pumping, and at twelve-hour intervals thereafter. This frequency was determined when developing the pumping test program to be reasonable for assessment of potential variations in water quality with continued long-term use. Test well TW03 was pumped for a period of six hours and water samples were collected within the first hour and final hour of pumping as recommended in MECP D-5-5 procedure.

During pumping tests, hourly field readings for conductivity, total dissolved solids, and pH. These were measured from the discharge pipe at each test well using a Hanna HI 98130 Meter as a field screening quality control measure.

Hourly field readings for turbidity were measured from the discharge pipe at each test well using a Hach DR 890 Colorimeter also. Field turbidity readings prior to groundwater sample collection is exercised as turbidity may be influenced by changes in conditions (i.e. temperature, pressure etc.) between the point of collection on site and sample receipt and analyses at the laboratory.

Sterile sample vessels were numbered and recorded prior to sampling. Samples were collected by filling laboratory supplied bottles from the discharge pipe using sterile sampling practices. Samples were recorded on chain of custody records, stored in a cooler with ice and transported directly to a CALA certified laboratory for chemical analyses with comparison to MECP Procedure D-5-5 and the Ontario Drinking Water Standards (ODWS).

Following receipt of laboratory analyses results, field readings were compared to laboratory results; percent difference between laboratory results and field readings were generally +/- 10%.

Results of analyses are presented in the following sections.

5.1 Neighbouring Well Water Quality – Pre-and Post-Pumping Survey

Prior to initiating pumping tests, a water well survey and water sampling program of participating neighbouring water supply systems was undertaken to establish baseline hydrogeological conditions, water systems in place and neighbouring groundwater quality.

Neighbouring observation wells were initially sampled from taps before treatment trains and allowed to flow for a period of 2 -5 minutes.

Following pumping tests, residential wells were re-sampled to assess potential impact and whether pumping tests had adversely influenced existing neighbouring water supply quality and quantity. Results of individual analyses were forwarded to the respective participating neighbours, ASC Environmental offered to discuss results in person with neighbouring participants. Some neighbours confirmed meeting in person, others asked for their results to be forwarded with follow up discussion via telecommunication or no further contact. Neighbouring residential groundwater quality results are presented in Appendix H.

Nineteen (19) participating neighbouring drinking water well systems were monitored, sampled and analyzed for bacteriological parameters and general chemistry parameters including sodium, manganese, sulphide, nitrate and iron. Samples were collected approximately one week prior to the pumping test in August 2018 (pre-pumping test) and again during August 15/17, 2018, approximately one week following the pumping test (post pumping test).

The purpose of the monitoring and sampling program was to develop an initial understanding of the local water supply quality, and to assess whether the pumping tests may influence the neighbouring drinking water quality and supply. Chemistry parameters were selected based on drinking water concerns voiced by residents in the vicinity of the site. A well supply survey was also conducted which included a questionnaire regarding existing well details, pump information, and treatment system use. Results of the survey were forwarded to each individual participating neighbour.

Results of the prepumping sampling program identified Total coliforms in raw drinking water samples obtained from six residential drinking water wells, collected prior to the pumping test for TW01 in August 2018. Following the pumping test, Total coliforms were identified in raw drinking water samples obtained from thirteen residential drinking water wells. The additional wells identifying total coliform in the raw water samples may be due to seasonal dry conditions and a subsequent precipitation event which occurred during the pumping test. E.coli was identified in one well pre-pumping test and in four wells post pumping test. Results for E.coli in the raw water samples showed 1 to 2 cfu/100 ml in the post sampling, which may be attributable to seasonal variation in groundwater quality, and/or influence from surface infiltrating waters during the precipitation event.

Nitrate concentrations pre and post pumping were identified to range from non-detect to a maximum of 2.6 mg/L, the majority of the nitrate concentrations were below 1 mg/L, pre and post pumping showing that nitrate impacts to the local drinking water supply is not a concern.

Sulphate, iron and manganese concentrations were below ODWS and D-5-5 criteria standards for both pre and post pumping. Sodium concentrations ranged from 9.8 mg/L to 450 mg/L from pre-pumping sampling in August 2018; following the pumping test, sodium concentrations ranged from 7.4 mg/L to 458 mg/L . One neighbour at 874 Unity Road was included for the post pumping test sampling only. Results showed 709 mg/L.

The majority of participating neighbours surveyed receive their drinking water supply from the limestone bedrock aquifer, with the exception of the Church located down gradient at 2245 Battersea Road, which access the lower sandstone aquifer unit (72.2 m). Well depths ranged from approximately 10 m to approximately 46 m in the unconfined limestone bedrock aquifer. Treatment systems used on neighbouring drinking water wells included water softeners, UV lights, reverse osmosis systems and meta filters. No water supply concerns were identified during our survey of neighbouring wells. No complaints were received from neighbours regarding well supply, one neighbouring well (796 Unity Road) showed an increase in total coliforms in the raw water sample following the TW01 pumping test. This may have been due to the identified precipitation event or handling during sampling. A subsequent sample was collected for 796 Unity Road post pumping test for TW03 in December, 2018. The result showed a much lower total coliform result, suggesting seasonal variations may influence total coliform in the resident drinking water supply. The water supply at 796 Unity Road is treated with a UV system.

Based on our hydrogeological data and laboratory analyses results from neighbouring drinking water wells, we are of the opinion that the proposed development will not adversely impact upon existing neighbouring well water quality.

5.2 On-Site Groundwater Quality

Samples were collected following confirmation of chlorine residual no longer present in groundwater. Test well water samples were collected from pumping test wells TW01 and TW02 within the first hour of pumping, and at twelve-hour intervals thereafter for the 48-hour pumping tests. Test well TW03 water well samples were collected within the first hour of pumping and during the last hour of pumping (6-hour pumping test).

Tabulated results with comparison to referenced criteria are presented in Appendix H.

5.2.1 Health Related Bacteriological Parameters

Bacteriological chemical results from the three test wells did not detect E coli in the groundwater samples.

Total coliform (6 cfu/100 ml) was identified in one sample only (48-hour sample) from test well TW01 (TW01d), we believe this to be either a field sampling or laboratory handling issue and is not indicative of the site water quality. Total coliform (1 cfu/100 ml) was detected in the one-hour sample from test well TW02 (TW02a), subsequent 12-hour sampling intervals (3 samples) did not identify total coliform.

We recommend disinfection of test wells supplying drinking water to the development and installation of UV treatment (or similar) to ensure a bacteriological free water supply. Laboratory analytical certificates are attached in Appendix H.

5.2.2 Health Related Chemical and Physical Parameters

Nitrate concentrations were below laboratory detection in the samples from the three test wells. Nitrate concentration of 3.7 mg/L was detected in the raw water sample from the original on-site drinking water well (OW20). The nitrate concentration measured is probably representative of the existing shallow background groundwater quality for nitrates at the site. The concentration is likely due to past on-site agricultural activity. Nitrate concentrations in the water samples from sampled test wells and observation wells were below ODWS criteria.

Slightly elevated fluoride concentrations ranging from 1.7 mg/l to 1.9 mg/l were identified in test well TW01, 2.5 mg/l to 3.0 mg/l in test well TW02, and 0.3 mg/l in test well TW03. TW02 showed a fluoride concentration reduction to 2.5 mg/l after 48 hours of pumping.
Fluoride in groundwater typically is associated to the natural geological conditions of an area. Granite rocks have fluoride bearing minerals like apatite, fluorite, biotite and hornblende. Treatment methods including adsorption, ion exchange, and reverse osmosis are effective to reduce fluoride concentrations.

Sodium concentrations ranging from 323 mg/l to 227 mg/l were detected in water samples from test well TW01 showing improvement in sodium concentrations with well development. Sodium concentrations ranging from 494 mg/l to 490 mg/l were detected in water samples from test well TW02 showing a stable concentration with well use. Sodium concentrations ranging from 447 mg/l to 420 mg/l were detected in water samples from test well TW03 during pumping showing a slight improvement with well development. A water sample was also collected from test well TW03 in November, 2018 prior to the pumping test, showing a sodium concentration of 395 mg/l.

The aesthetic objective for sodium is set at 200 mg/L. Sodium concentrations from the test wells exceed the aesthetic objective for sodium. Test wells showed improved or stable sodium concentrations with well development.

The health-related limit for sodium of 20 mg/L is a “warning level” only and where this level is exceeded it is recommended the local Medical Health officer be notified in order to alert individuals with relevant medical conditions. Sodium concentrations are typically treated using reverse osmosis treatment systems.

Field turbidity results showed initially 53 NTU reducing to 0 NTU after 158 minutes of pumping in test well TW01, 78 NTU to 0 NTU after 559 minutes of pumping in test well TW02; the turbidity was measured to increase to 37 NTU after 1474 minutes, reducing to 0 NTU after 1730 minutes for the duration of the pumping test in test well TW02. Test well TW03 field turbidity results showed 48 NTU reducing to 0 NTU after 240 minutes of pumping. Laboratory test well turbidity results for Test Well TW01 showed 1.0 NTU. Laboratory turbidity results ranged from 2.8 NTU to 1.4 NTU (TW02), and 5.4 NTU to 7.1 NTU (TW03).

Based on the results of the field monitoring and laboratory analyses, turbidity concentrations are expected to improve with well development. Where persistent turbidity levels are encountered

installing a pre-filter and ultra violet light system to the drinking water system would be effective in managing turbidity.

Pesticide and herbicide concentrations in groundwater were below laboratory detection limits.

5.2.3 Common Aesthetic, Analytical and Indicator Parameters

Results of the chemical analyses from the test wells identified elevated concentrations of total dissolved solids, conductivity, chlorides, hardness and iron parameters in groundwater samples obtained from the three test wells.

Chloride concentrations ranging from 362 mg/l to 237 mg/l were detected in test well TW01, 656 mg/l to 742 mg/l in test well TW02 and 502 mg/l to 385 mg/l were detected in test well TW03. Test well TW02 showed a slight increase in chloride concentration with well development and Test wells TW01 and TW03 showed a decrease in chloride concentration with well development. Elevated chloride concentrations in drinking water are typically treated using reverse osmosis treatment systems.

The aesthetic objective for total dissolved solids (TDS) is 500 mg/L, calculated results ranged from 878 mg/L (TW01) to 1556 mg/L (TW03). Elevated total dissolved solids (TDS) generally result from elevated inorganic salts (calcium, magnesium, sodium, bicarbonates, chlorides and sulphates) and small amounts of organic matter that are dissolved in water. Elevated TDS concentration is not a health hazard. Typically, a water softener (potassium chloride) may be sufficient to manage TDS concentrations.

The operational guideline for hardness is 80 -100 mg/L (500 mg/L – MECP Procedure D-5- 5). Sample results ranged from 405 mg/L (TW03) to 232 mg/L (TW02) at the end of pumping tests indicating hard water. Hardness in water usually occurs when elevated concentrations of calcium and magnesium are present in water (concentrations of calcium were detected in well water samples). Hardness is not considered a health concern. Elevated concentration may result in scale buildup and mineral deposits on hot water heaters and plumbing fixtures. Hard water can be readily treated through ion exchange water softening.

Iron concentrations ranging from 0.041 mg/l (TW02) to 0.396 mg/l (TW03) were detected in water samples at the end of pumping tests. A concentration of 0.31 mg/l was detected in test well TW01 at the end of the pumping test. Iron concentration in groundwater is treated using filtration.

The water quality data indicates groundwater with minor aesthetic and health related challenges. Hardness, total dissolved solids and salts (sodium and chlorides) are present at slightly elevated concentrations. Slightly elevated fluoride and iron concentrations were also detected that require treatment. The water is also slightly hard, but not unusually so for the Kingston area.

To ensure safe drinking water is provided to the site users, we recommend water treatment of identified aesthetic and health related parameters and disinfection to ensure a long-term source of

good quality groundwater for consumption purposes. Reverse osmosis will be required to treat the elevated sodium and chloride concentrations. With appropriate water treatment, well water quality would meet health and aesthetic MECP and ODWS drinking water criteria parameters.

6.0 SEWAGE SYSTEM ASSESSMENT

6.1 Terrain Analyses

Based on review of local topographic maps and site visits during 2018, the site topography is generally level in the northern half of the property, sloping downwards approximately 10 – 15 m (Elevation 138 masl – 124 masl) at an approximate 3% slope from north west to south east, to open ditches at Battersea and Unity Roads.

Ground cover for the majority of the site consists of scrub grass, with a copse of trees and landscaped lawns surrounding the existing limestone building and outbuildings. Limestone bedrock outcropping is evident at the south property boundary at Unity Road. No surface water bodies are located on the site or within 300 m. Drawing No. 2 shows the property layout. A topographic plan is shown on Drawing No. 10 in Appendix A. A concept drawing is shown in Appendix B.

Review of the recently advanced test wells and the original on-site water well records, show the site to be underlain by approximately 0.3 m to 0.9 m of soil overlying limestone bedrock.

Fourteen (14) test pits were excavated on May 3, 2018 on the site (see test pits locations on Drawing No. 9 in Appendix A, Test Pit logs and Grain size analyses, Appendix E). Results identified heterogeneous overburden deposits consisting primarily of sandy silt, some clay and trace gravel. The thickness of overburden ranged from 0.3 m to approximately 1.7 m depth overlying limestone bedrock. Exposed bedrock in test pits was observed to be competent and moderately resistant to back hoe excavating. No significant bedrock fractures, joints or discontinuities were observed during test pit work. Test pits were observed to be dry following excavation, with the exception of test pit TP6 which had approximately 0.1 m of groundwater infiltration perched at the base of the excavation.

Three test holes were advanced using hand auger techniques on July 30, 2018 to assess soils for potential percolation rates. Test holes were augured by Groundwork personnel and The Constant Head Well (PASK) Permeameter Single Ponded Height Method was used to determine the percolation rate of the soil. Percolation rates of 87 – 264 min/cm were determined based on soil conditions (a copy of the Groundwork data is attached in Appendix E).

6.2 Sewage Disposal and Servicing Options

Sewage works with a design capacity in excess of 10,000 L/d, including subsurface disposal systems, are subject to the requirements of Section 53 of the *Ontario Water Resources Act* (OWRA); administered by the Ministry of Environment Conservation and Parks. Subsurface disposal systems with a design capacity in excess of 10,000 L/d are referred to as large subsurface sewage disposal systems (LSSDS) as described in MECP "Design Guidelines for Sewage Works

2008" (Chapter 22). The following documents were also referenced and utilized when evaluating site characteristics for potential septic system assessment:

- Guideline B-1 Water Management Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of the Environment;
- Guideline B-7 Incorporation of the Reasonable Use Concept into MECP Groundwater Management Activities;
- Procedure B-7-1 Determination of Contaminant Limits and Attenuation Zones;
- Wells Regulation *Ontario Regulation 903*, Revised Regulations of Ontario 1990;
- *Clean Water Act*; and
- Authorship of Water Resource Impact Assessment.

Based on the proposed development; existing shallow soil cover at the property and the Clients' desire to utilize environmental beneficial re-use technologies regarding sewage treatment, an above grade private large sewage works system with recycling of effluent was chosen for purposes of beneficial re-use. Table 1, in Section 1.4 (and see Appendix I) shows the proposed occupancy for the inn, cottages, restaurant, corporate venue and spa, and the expected water taking to support the development. Based on the maximum occupancy, a total daily water taking of **75,375** L/day is initially required, with approximately **29,960** L/day, being beneficially recycled for a net total water taking of **45,415** L/day.

A concept flow-diagram is presented in Appendix I, showing the proposed distribution system, re-circulation/treatment, central discharge pond for irrigating and further discharge of treated effluent to an overflow holding pond, with additional beneficial re-use irrigation purposes and subsequent discharge to ditch. The location of the proposed treatment system is shown as *Building U* on the Concept Drawing attached in Appendix B.

MECP Procedure D-5-4 "Technical Guideline for Individual On-Site Sewage Systems – Water Quality Impact Risk Assessment" was also referenced for nitrate assessment purposes.

The proposed developed site encompasses an area of approximately 14 hectares. Surficial losses from proposed paved areas, rooftops and storm water diversion structures account for approximately 0.5 hectare of impermeable surfaces at the site.

Topography is generally flat in the central portion of the site with a gradient of approximately 3 % to the east/south east. Results from drilling logs, site observations, excavated test pits and percolation tests at the site indicate insufficient overburden depth and quality to support in ground leaching systems for the proposed development. Results of grain size analyses identified site soils to consist predominantly of sand silt with some gravel. Groundwater monitoring measurements conducted during pumping tests in August, September and December 2018

identified shallow groundwater levels at approximately 4 to 5 m below grade for wells advanced into the limestone bedrock (sandstone and granite wells showed static well depths of approximately 32 m), indicating a low potential for saturated conditions for *in-ground* leaching systems. No permanent surface water features are evident within 300 m of the site.

Groundwater sampling results identified residual nitrate concentrations in the groundwater in test wells; results ranged from <0.1 mg/L to 3.0 mg/L, below criteria levels. The nitrate concentration measured at the on-site observation well (OW20) is 3.7 mg/l which is probably influenced from historical on-site agricultural farming practices. Neighbouring nitrate concentrations in drinking water supplies ranged from 1 – 2 mg/L.

Based on site conditions, the most probable flow path of septic system effluent was predicted as vertical through underlying soils to the bedrock surface, with probable horizontal flow until interception with vertical bedrock fractures directing recharge towards the water table. Attenuation of nitrate nitrogen is expected through mixing with infiltrating precipitation and groundwater. The subject area is identified as a moderate to high potential for groundwater recharge.

Based on an evaluation of the hydrogeological investigative work undertaken for the proposed development, it is evident that the down gradient reasonable use of groundwater is primarily for individual domestic consumption purposes; and sewage management is through raised or in ground private leaching bed septic systems. This is not anticipated to change significantly for future local development.

The unconfined limestone bedrock aquifer extending to depths approaching 45 m below grade is the primary aquifer utilized in the local area by neighbours for water supply. This aquifer has a moderate to high vulnerability from surface influences and therefore is susceptible to environmental impact.

On this basis, the on-site test wells were advanced into the underlying confined sandstone and granite bedrock units to investigate as a potential source of water supply for the proposed development. The goal for accessing the lower aquifer(s) was to reduce the potential for long term water supply concerns and potential interference with existing neighbours. Results of the 48-hour pumping tests demonstrated sufficient long-term water supply with no significant positive interference to the neighbouring water wells, effectively demonstrating no water taking concerns with the local neighbours.

Based on the proposed development; existing shallow soil cover at the property, the current quality of groundwater at the subject site and the potential for subsurface impact due to the vulnerability of the site to receive sewage effluent, and the Clients' desire to utilize environmental beneficial re-use technologies regarding sewage treatment; an above grade private large sewage works system including tertiary treatment and recycling of treated effluent

was chosen for purposes of beneficial re-use in accordance with MECP regulations and guidelines. Beneficial re-use would include recycling grey water from toilets, laundry and irrigation and excess treated effluent would then be discharged to an overflow pond (with further irrigation) and eventually draining to a storm water outfall, out letting to surface ditch line near the southern boundary of the property.

Table 1, in Section 1.4 (and see Appendix I) shows the distribution of proposed occupancy for the inn, cottages, restaurant, corporate venue and spa, and the expected water taking. Based on the maximum occupancy for the development, a total daily water taking of **75,375** L/day is initially required, with approximately **29,960** L/day, being beneficially recycled for a total net water taking of **45,415** L/day.

The proposed treatment system would include the following:

1. In ground balancing and/or pre-treatment tanks
2. Treatment system with in ground and above ground components (extended aeration or membrane bio-reactor)
3. Nutrient removal system (recirculation and chemical ad-mixture)
4. Dis-infection system (UV and/or chlorination)
5. Effluent distributed to re-use storage tanks in appropriate buildings via smart valving with over-flow diverted to an irrigation pond.
6. Irrigation pond will overflow to a swale which will discharge to the roadside ditch.
7. The irrigation system is prosed to be via drip irrigation.
8. Re-use storage tanks will supply toilets and laundry.

A concept flow-diagram is shown in Appendix I, showing the proposed treatment distribution system, re-circulation/treatment, central discharge pond for irrigating and further discharge of treated effluent to an overflow holding pond, for additional beneficial re-use irrigation purposes and subsequent discharge to surface ditch. The location of the proposed treatment system is shown as *Building U* on the Concept Drawing attached in Appendix B.

In order to assess the potential impact from the proposed development regarding on-site sewage treatment and potential down gradient receptors, MECP Guideline B-7 Incorporation of the Reasonable Use Concept into MECP groundwater management activities and MECP Procedure B-7-1 Determination of contaminant limits and attenuation zones were referenced to gain an understanding of potential anticipated nitrate concentration at the southern downgradient boundary; which is likely to be the major determinant of subsurface impact from a development. These guidelines and procedures are used when assessing large subsurface disposal systems. It is acknowledged based on the results of the hydrogeological and terrain study, demonstrating insufficient soil cover over bedrock to support attenuation of septic effluent; the existing proposed development is not suitable to support in ground leaching beds for conventional private services or large subsurface disposal systems.

We have conducted a nitrate assessment for comparison purposes for potential groundwater impacts at the nearest downgradient receptor. The maximum allowable concentration at the property boundary for a substance that originates in the sewage is one quarter of the health-related limit and one half of an aesthetic limit. On this basis and based on the results of the hydrogeological study, the reasonable use of groundwater is drinking water, and therefore the maximum concentration for nitrate in groundwater affected by sewage effluent is 2.5 mg/L as N (health-related ODWQS for nitrate is 10 mg/L as N) at the downgradient property boundary. Background concentrations are not typically used in the calculation of allowable concentrations for the purposes of the water resources impact assessment. Determining background concentrations is normally necessary through monitoring purposes (see Nitrate concentrations from neighbouring wells above).

On this basis, applying MECP procedure B-7-1, and using the results of the well water chemistry and neighbouring groundwater quality an assessment of the Nitrate contaminant limits were determined for groundwater under the adjacent neighbouring properties:

Nitrate Cb - background = 2 mg/l,
Nitrate Cr - maximum = 10 mg/l,
x = 0.25 – health related parameters
Nitrate N Cm – maximum in groundwater under down gradient receptor
N Cm = Cb + x(Cr − Cb) = 4.0 mg/l

N Cw – maximum at the proposed development site that can be permitted to reach the adjacent property.
N Cw = 2 mg/l under the proposed development site.

The proposed treatment system incorporating a nutrient removal system is proposed to be designed with an effluent objective of 2.5 mg/l Nitrate for surface water discharge.

To assess potential effluent objectives of the treated effluent for surface water discharge, pre-consultation was undertaken with the MECP. The MECP Kingston District office indicated that for the proposed development, effluent criteria will likely be driven by the receiving stream (i.e. dry ditch criteria) with consideration for nitrate impacts to off-site groundwater, and water reuse criteria, whichever is the most stringent.

On this basis, the MECP provided information from the Standards Development Branch which conducted a jurisdictional scan of water reuse criteria and based on this review the following effluent limits were recommended:

Parameter	Limit	Monitoring
***Critical Parameters**:*		
Turbidity	≤ 2 NTU, 24-hr average; 5 NTU, maximum	Continuous, before disinfection
Total Residual Chlorine	≥ 1 mg/L, after 30 min minimum chlorine contact time	Continuous, after 30 min minimum chlorine contact time
***Confirmatory Parameter**:*		
E. coli	≤ 2.2/100 mL, median of 7 rolling samples; a count of 14/100 mL must not be exceeded by any sample.	Minimum 2 samples/week
Process Assessment Parameters (will also address aesthetic, odour, microbial regrowth aspects):		
TSS	≤ 5 mg/L, monthly average	Minimum weekly
$CBOD_5$	≤ 10 mg/L, monthly average	Minimum weekly

The MECP also recommended the following parameter effluent limits:

TAN	3 mg/L, monthly average	biweekly
TRC	0.02 mg/L	daily
Nitrates	To be determined in consultation with MECP Groundwater Unit.	

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following summarizes the characterization of the hydrogeological conditions for the proposed development site located at 2285 Battersea Road, Kingston, Ontario:

- The proposed development will include an agricultural Farm, Inn (30 one-bedroom suites), a 96 seat restaurant and seasonal 60 seat roof-top patio; a corporate venue; 18 one-bedroom cottages and a Spa; occupying 14.0 hectares of the property. The spa will include hot and cold tubs, saunas and treatment rooms.

- The development is proposed to be serviced with private on-site well water supply and a large private on-site sewage treatment system that would allow for beneficial reuse of the treated effluent. A total daily water taking of **75,375** L/day is initially required, with approximately **29,960** L/day, being beneficially recycled for laundry, toilets and irrigation, resulting in a net water taking of **45,415** L/day. Well water storage is anticipated to manage daily supply requirements.

- The portion of the property proposed for development is presently zoned 'A2' General Agricultural. The proposed development will require a new zoning change necessary for site redevelopment, a site-specific commercial/agricultural zoning is being considered in conjunction with a land use designation change from Rural Land to Rural Commercial.

- Land use within 500 m of the site consists of rural residential, agricultural/commercial activity (Stone City Performance Horses) located west adjacent, open field agricultural activity, institutional (Battersea Public School) and community (Church of Latter Day Saints).

- Existing residential, commercial, agricultural and institutional development in the rural portion of Kingston is currently utilized through individual on-site private services. Existing services in the local area (minimum 500 m radius), consist of private well water supply and individual private septic systems. The rural part of Kingston is lacking full municipal or communal services and based on the above conditions and our evaluation of existing development in the rural portion of Kingston, we believe that the proposed development is consistent with the Provincial Policy Statement and recommend the use of individual on-site sewage and water services.

- The nearest known surface water body is an unnamed seasonal creek, located approximately 300 m east/south east of the study area and the Rideau River watershed system located approximately 1.8 km to the south east of the site, both of these would not likely be impacted due to distance down gradient from the proposed development. An unnamed pond is evident approximately 850 m upgradient of the site, this was a former quarry, since closed.

- The on-site hydrogeological investigation was conducted to assess site groundwater supply conditions through two 48-hour pumping tests on two (2) recently drilled wells and a six-hour pumping test on a third on-site well (to compare on-site interference potential). Water quantity was assessed on the basis of the pumping tests; water quality was assessed on the basis of chemical and bacteriological sample collection and analyses for water samples collected near the beginning and at twelve-hour intervals during the 48-hour pumping tests; and potential interference was investigated through monitoring neighbouring and on-site wells.

- Based on our understanding of the development proposal, and sensitivity regarding existing and potential long-term water supply concerns of neighbours utilizing the upper unconfined limestone bedrock aquifer for water supply; the test wells were advanced into the deeper sandstone and granite bedrock aquifers at depths approaching 90 – 92 m below site grade to assess water supply for the development.

- The 48-hour pumping tests for test wells TW01 and TW02 were conducted in August and September, 2018 to determine potential seasonal stressed water supply conditions (i.e. summer conditions). The six-hour pumping test for test well TW03 was undertaken in December 2018, to assess potential on-site interference.

- Reviewing the drawdown and recovery curves for the three pumping tests, the data indicate that TW01 and TW02 pumping wells reached equilibrium; a maximum drawdown of approximately 4 meters was shown from pumping Test Wells TW01, TW02 and TW03, and 46 - 54 m (over 90%) of well water supply was available in the wells following the pumping tests. Recovery of the wells to 95% was attained within 24 hours; 504 minutes for test well TW03.

- Results of the pumping tests confirm that the lower sandstone and granite aquifers are able to support pumping rates of 30 – 35 litres per minute. Based on the pumping test results and favourable recovery time following prolonged continuous pumping of 48 hours, sufficient aquifer storage and demonstrated yield is available to supply the wells to meet the demand for the proposed development; without adversely impacting upon neighbouring resident water supply.

- Results of interference monitoring of neighbouring wells generally showed a small positive response (interference drawdown) to pumping of approximately 0. 15 m to 1.0 m during the 6-hour and 48-hour pumping tests. Data did show a negative response (recovery) in a number of neighbouring wells that correlate with use during the pumping test. This is to be expected over a 48-hour pumping period. These wells were shown to recover during the pumping tests, clearly confirming that the on-site wells will not have significant impact upon the future use of neighbouring wells. Neighbouring wells showed sufficient water supply remaining following the pumping tests.

- On-site observation wells showed a positive response of approximately 2.3 m during pumping tests. Sufficient well supply was still available to on-site observation wells following pumping tests.

- The measured interference during pumping is an appropriate estimation of the anticipated influence for the proposed Phase 1 and Phase 2 development.

- Measured groundwater levels from test wells and neighbouring water wells, confirm a shallow and deep bedrock aquifer(s). Groundwater levels measured in wells advanced into the upper unconfined limestone bedrock were measured at depths of approximately 4 – 20 m and wells advanced into the lower units showed water levels of approximately 30 – 35 m below grade. The groundwater levels measured from test wells at the site show a hydraulic gradient of approximately 1% to the south east. Neighbouring test well water measurements show a groundwater flow direction in the upper limestone bedrock interpreted to be to the south, at a 1% gradient.

- Calculated long-term drawdown at 20 years of continuous pumping at 45,415 L/day shows 0.55 m at a radial distance of 100 m from test well TW03. Based on the predicted drawdown analyses, long term adverse impact to neighbouring well water supply from the proposed development is not expected.

- Water quality tests identified Total coliforms (6 cfu/100 ml) in the 48-hour sample only from test well TW01 (TW01d); we believe this a field sampling or laboratory handling issue and is not indicative of the site water quality. Total coliforms (1 cfu/100 ml) was detected in the one-hour sample from test well TW02 (TW02a), subsequent 12-hour sampling events (3 samples) for TW02 did not identify total coliform. We recommend disinfection of test wells supplying drinking water to the development and installation of UV treatment (or similar) to ensure a bacteriological free water supply.

- Nitrate concentrations were below laboratory detection in the samples from the three test wells. Nitrate concentration of 3.7 mg/L was detected in the raw water sample from the original on-site drinking water well (OW20). This is probably the results of past on-site agricultural activity or potentially from the hobby farm located west adjacent at 896 Unity Road.

- Laboratory turbidity results for Test Well TW01 showed 1.0 NTU, 2.8 NTU to 1.4 NTU (TW02), and 5.4 NTU to 7.1 NTU (TW03). Field turbidity results reduced to 0 NTU during and following pumping tests, indicating improved clarity with well development.

- Herbicide and pesticides analytical results were below laboratory detection limits.

- The water quality data indicates groundwater with minor aesthetic and health related treatment requirements. Hardness, total dissolved solids and salts (sodium and chlorides) are present at slightly elevated concentrations. Slightly elevated fluoride and iron concentrations were also detected that require treatment. The water is also slightly hard, but not unusually so for the Kingston area. The health-related limit for sodium of 20 mg/L is a "warning level" only and where this level is exceeded it is recommended the local Medical Health officer be notified in order to alert individuals with relevant medical conditions.

- To ensure safe drinking water is provided to the site users, we recommend water treatment of identified aesthetic and health related parameters and disinfection to ensure a long-term source of good quality groundwater for consumption purposes. Reverse osmosis treatment will be required to address the elevated chlorides. We recommend contacting a water quality professional to address treatment requirements.

- The majority of participating neighbours surveyed receive their drinking water supply from the limestone bedrock aquifer, with wells extending to depths of 18 m to 44 m. Treatment systems used on neighbouring drinking water wells include water softeners, UV lights, reverse osmosis systems and/or meta filters. Neighbouring groundwater quality was shown to be typical for the unconfined limestone bedrock aquifer. No significant water supply concerns were identified during our survey of neighbouring wells and following the pumping tests no complaints were received regarding well supply.

- Fourteen (14) test pits excavated at the site show overburden thickness ranging from approximately 0.35 m - 1.7 m depth overlying limestone/shale bedrock. The majority of the test pits were found to be less than 1 m depth and remained dry. Groundwater occurs at depths of approximately 11 m, as observed in test well OW20 at the site.

- Based on an evaluation of the hydrogeological investigative work, it is evident that the down gradient reasonable use of groundwater is primarily for individual domestic consumption; and sewage management is through raised or in ground private leaching bed septic systems. This is not anticipated to change based on existing local site development and the City of Kingston Official Plan.

- The scale of the proposed development is not suitable to support in ground leaching beds for conventional private services. Based on the proposed daily loading, the site will require a large disposal treatment system designed in accordance with MECP regulations, guidelines and Section 53 of the *Ontario Water Resources Act* (OWRA).

- Reference should be made to the proposed stormwater management plans and treatment system being prepared by Groundwork Engineering Inc. We understand that the proposed treatment system would be designed to include the following:

1. In ground balancing and/or pre-treatment tanks
2. Treatment system with in ground and above ground components (extended aeration or membrane bio-reactor)
3. Nutrient removal system (recirculation and chemical ad-mixture)
4. Dis-infection system (UV and/or chlorination)
5. Effluent distributed to re-use storage tanks in appropriate buildings via smart valving with over-flow diverted to an irrigation pond.
6. Irrigation pond will overflow to a swale which will discharge to the roadside ditch.
7. The irrigation system is prosed to be via drip irrigation.
8. Re-use storage tanks with chlorination will supply toilets and laundry.

We recommend a groundwater monitoring program to assess changes in groundwater elevations and quality during and following site development, and assess the performance of the stormwater management and treatment system. We recommend conducting quarterly groundwater monitoring of available on-site and neighbouring adjacent monitoring wells during site development (and post development for a period of two years) including collection of groundwater samples each spring, and samples for analyses of parameters related to stormwater management identified by MECP to monitor treatment system performance.

Future on-site wells (if required) shall be fully grouted to minimum MECP Regulation 903 (amended) requirements to provide a seal between the unconfined limestone bedrock aquifer and the underlying sandstone and granite bedrock water supply aquifers to ensure protection of the water supply unit(s) from the upper unconfined aquifer.

8.0 STUDY LIMITATIONS

ASC Environmental Inc. was retained by BPE Development Inc. (the Client) to undertake a hydrogeological investigation for the development proposal located at 2285 Battersea Road, Kingston, Ontario.

The findings reported in this document are based on the tasks completed by *ASC Environmental Inc.* under the mutually agreed scope of work. Professional judgment, experience with similar investigations, and available data collected within the scope of work form the basis for this report. *ASC Environmental Inc.* has prepared this report using information understood to be factual and correct and shall not be responsible for conditions arising from information or facts that were inaccurate, concealed, or not fully disclosed at the time of investigation. Therefore, ASC cannot be held responsible for environmental conditions at the Property that were not apparent from the available information. No investigation method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level.

ASC Environmental Inc. makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

ASC Environmental Inc. is not able to represent that the site or adjoining lands contain no hazardous waste, oil, or other latent condition beyond that detected or observed. The possibility exists for hazardous substances to migrate through surface water, air, soil, or groundwater. The ability to accurately address the environmental risk associated with these media is beyond the scope of this assessment.

This document has been prepared by *ASC Environmental Inc.* for the sole use of BPE Development Inc. and *assignees* to assess hydrogeological site conditions at the time of the study related to the subject site. Unauthorized reuse of this document for other purposes, or by any other party, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. If additional parties require reliance on this report, written authorization from *ASC Environmental Inc*. will be required. Such reliance will only be provided by *ASC Environmental Inc*. following written authorization from the Client. *ASC Environmental Inc*. disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed.

ASC Environmental Inc. will not be responsible for any consequential or indirect damages. *ASC Environmental Inc*. will only be liable for damages resulting from negligence of *ASC Environmental Inc*. *ASC Environmental Inc*. will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered (Claim Period),

to commence legal proceedings against *ASC Environmental Inc*. to recover such losses or damage unless the laws of the jurisdiction which govern the Claim Period which is applicable to such claim provides that the application Claim Period is greater than two years and cannot be abridged by the contract between the Client and *ASC Environmental Inc*., in which case the Claim Period shall be deemed to be extended by the shortest additional period which results in this provision being legally enforceable.

We thank you for the opportunity to work with you on this project, and trust that this report meets your satisfaction.

9.0 REFERENCES

(1) Ministry of Environment, Conservation and Parks (MECP) 2004. Protocol for Analytical Methods Used in the Assessment of Properties. Ministry of Environment.
(2) RRO 1990; Reg 903: Wells
(3) The Ontario Department of Mines and Northern Affairs (Map 2227), Physiography of the Eastern Portion of Southern Ontario . L. J. Chapman and D. F. Putnam. 1972.
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(5) MECP Hydrogeological Technical Information Requirements for Land Development Applications (April 1995).
(6) MECP Water Well Records Database
(7) MECP Procedure D-5-5 Technical Guideline for Private Wells: Water Supply Assessment (August 1996)
(8) Corporation of the City of Kingston Official Plan.
(9) Ontario Building Code - Section 8.2 Design Standards
(10) O.Reg. 169/03. Ontario Drinking Water Standards (ODWS)
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(14) Google Maps. (2016). Internet: https://www.google.ca/maps
(15) City of Kingston. Kmaps Database. Internet: https://maps.cityofkingston.ca/kmaps/WebPages/Map/FundyViewer.aspx
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(18) MECP Stormwater Planning and Design Manual (2003 – updated 2015)
(19) Ontario Water Resources Act R.S.O. 1990,
(20) Environmental Protection Act R.S.O. 1990
(21) Environmental Assessment Act R.S.O. 1990.
(22) The Planning Act.
(23) The Provincial Policy Statement. 2014
(24) Ministry of Environment Conservation and Parks (MECP) Hydrogeological Technical Information Requirements for Land Development Applications (1995)
(25) Guideline B-1 Water Management Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of the Environment
(26) Guideline B-7 Incorporation of the Reasonable Use Concept into MECP Groundwater Management Activities
(27) Procedure B-7-1 Determination of Contaminant Limits and Attenuation Zones
(28) Authorship of Water Resource Impact Assessment
(29) MECP Procedure D-5-4 “Technical Guideline for Individual On-Site Sewage Systems – Water Quality Impact Risk Assessment” and MECP “Design Guidelines for Sewage Works 2008”

APPENDIX A
Figures 1- 12 And Survey Plan

APPENDIX B
Concept Plan

APPENDIX C
Site Water Well Records

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Tel: (613) 634- 5596

APPENDIX D
Neighbouring Water Wells – 500 M Radius

APPENDIX E
Test Pit Logs And Grain Size Analyses

APPENDIX F
On Site Test Well Drawdown And Recovery Data And Neighbouring Well Response

APPENDIX G
Pumping Test Analyses

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APPENDIX H
Groundwater Quality Results For On-Site And Neighbouring Wells

Appendix I
Proposed Treatment System Flow Diagram And Design Capacity

APPENDIX
A Figures 1 - 12 and Survey Plan

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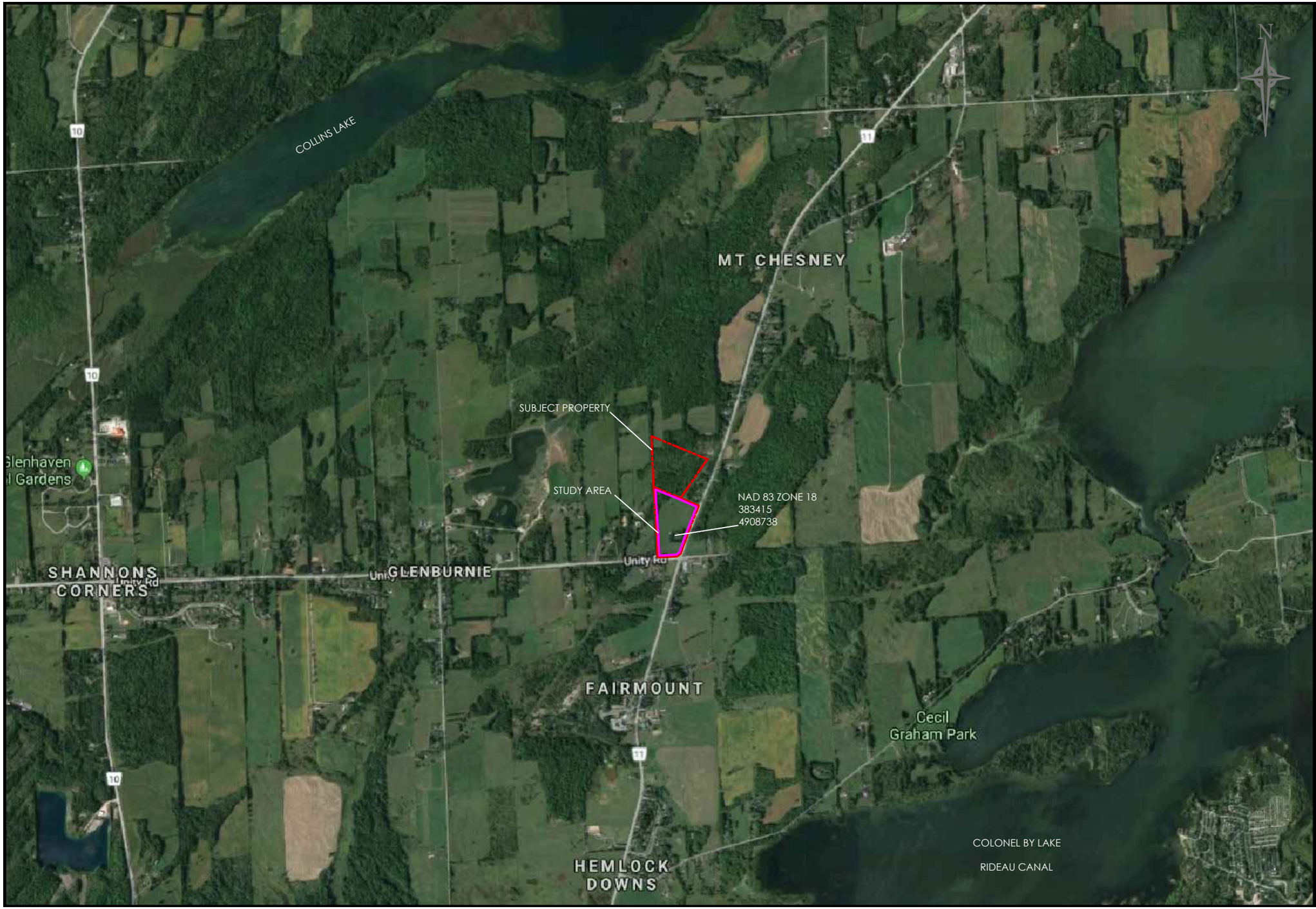

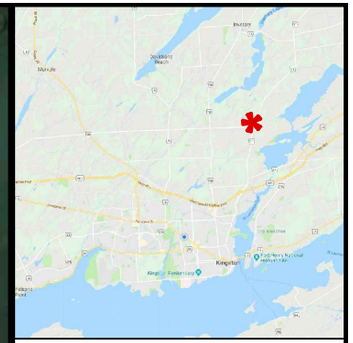

LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)

DRAWING TITLE
Site Location Plan

FIGURE NO.	DRAWN BY
01	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	0 METRES 525
DATE 1-Feb-2019	

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LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- PROPERTY LINE
- BENCHMARK (ASSUMED ELEVATION 132.00 m)

DRAWING TITLE
Site Layout Plan - Phase I & II

FIGURE NO.	DRAWN BY
02	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	0 METRES 45
DATE	
1-Feb-2019	

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LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- PROPERTY LINE
- TW /OW — TEST WELL/OBSERVATION WELL LOCATION
- BENCHMARK (ASSUMED ELEVATION 132.00 m)

DRAWING TITLE
Test Well Location Plan

FIGURE NO.	DRAWN BY
03	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	0 METRES 45
DATE 1-Feb-2019	

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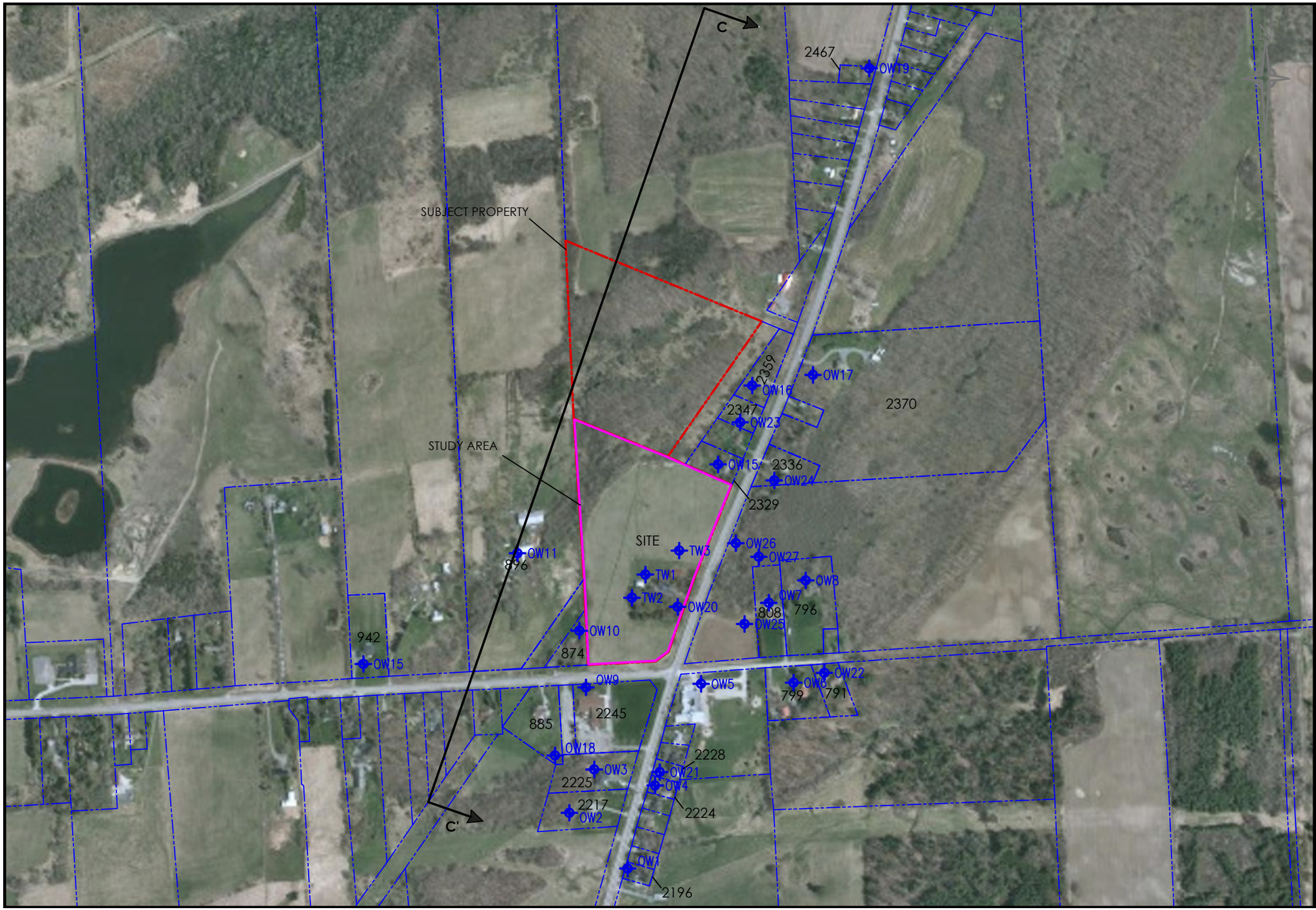

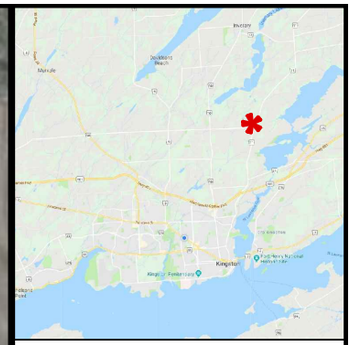

LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- PROPERTY LINE
- TW1 TEST WELL/OBSERVATION WELL LOCATION

DRAWING TITLE
Observation Well Location Plan

FIGURE NO.	DRAWN BY
04	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
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PROJECT NO.	SCALE:
ASC-458	0 METRES 150
DATE 1-Feb-2019	

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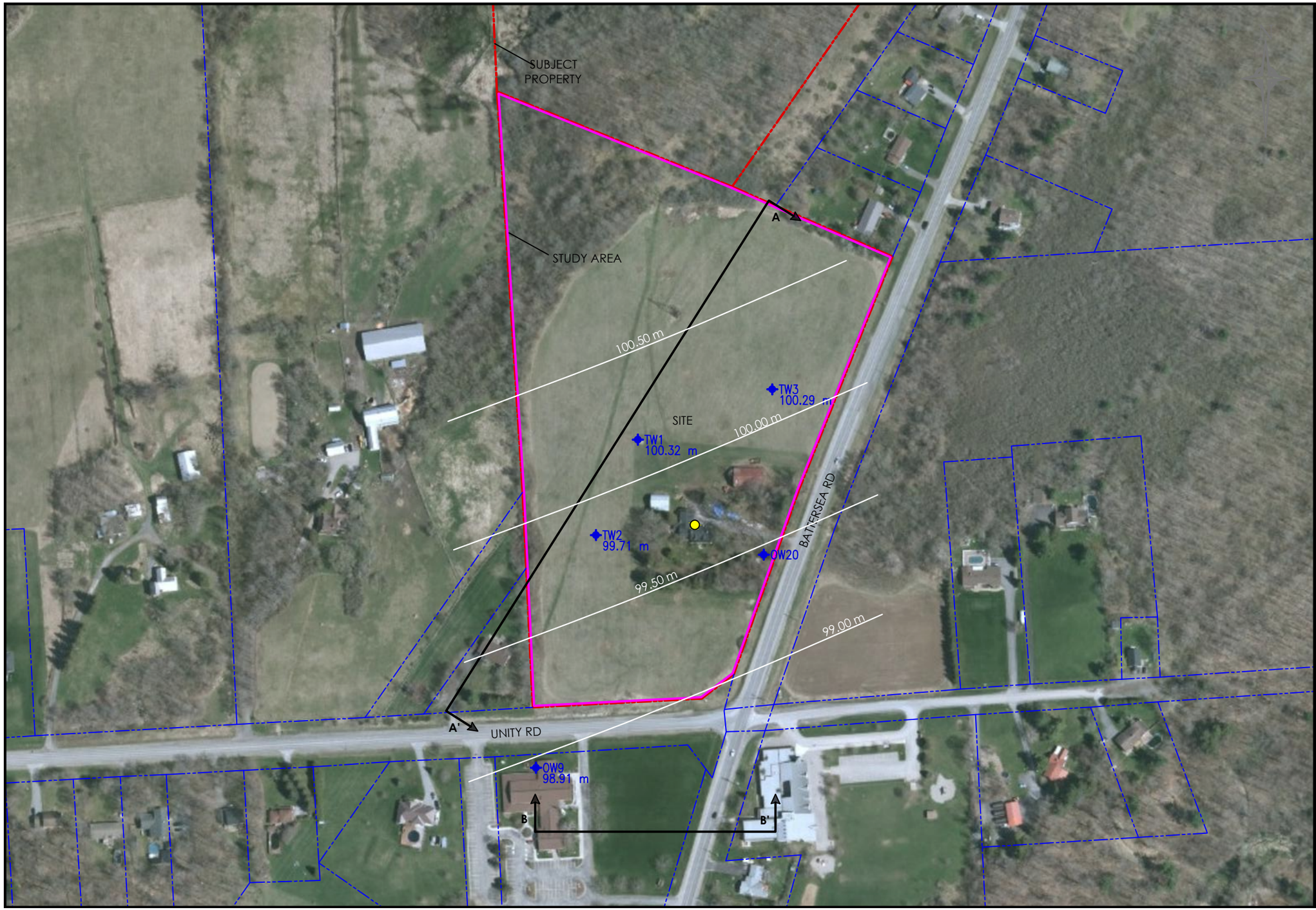

LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- PROPERTY LINE
- TW1 100.32 m — TEST/OBSERVATION WELL LOCATION, GROUNDWATER ELEVATION
- 100.00 m — POTENTIOMETRIC SURFACE
- BENCHMARK (ASSUMED ELEVATION 132.00 m)

DRAWING TITLE
Test Well Location Plan

FIGURE NO.	DRAWN BY
05	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
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DATE 1-Feb-2019	

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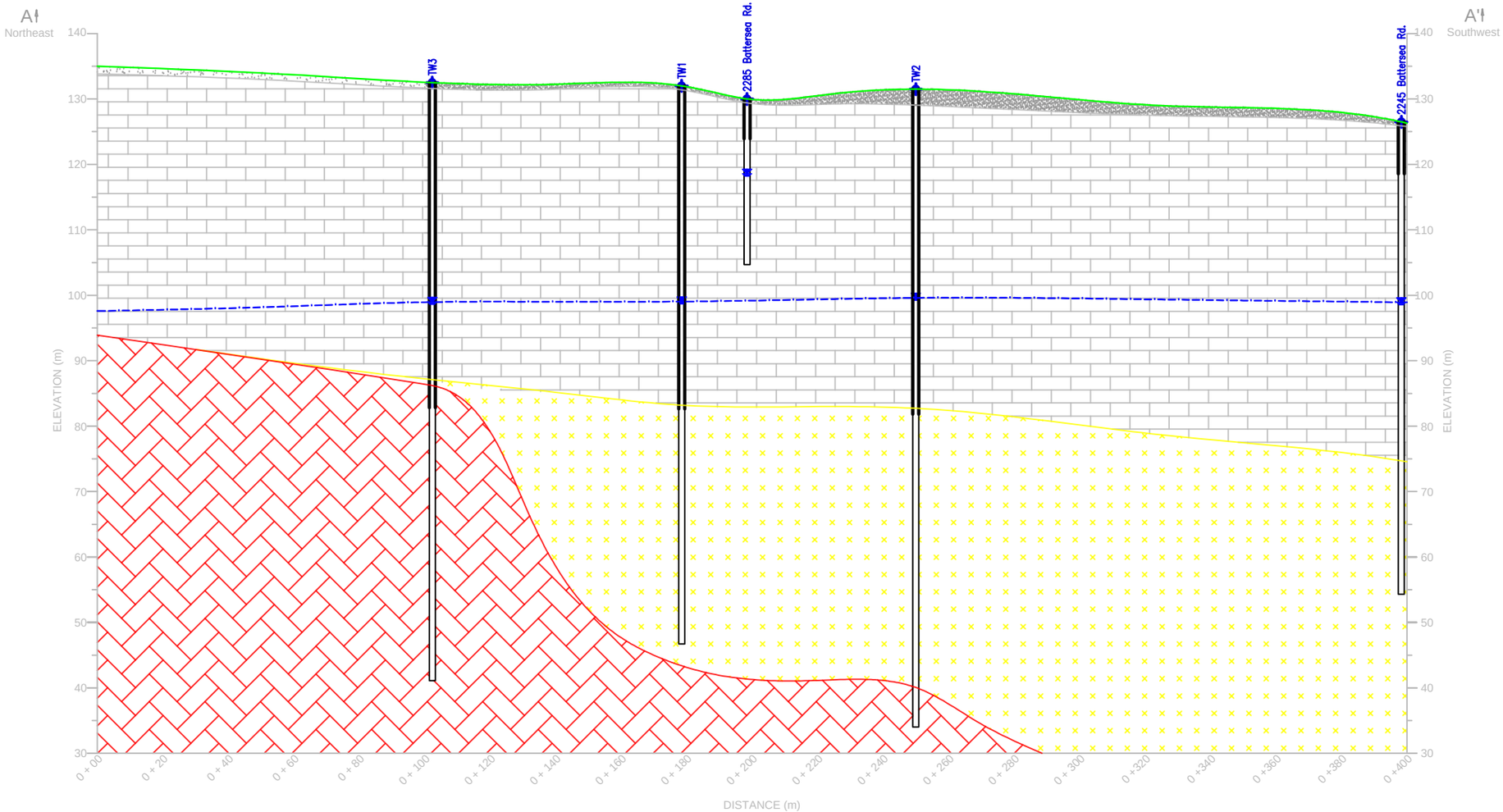
Facing Southeast



LEGEND

- SUBJECT PROPERTY LOCATION
- GROUND SURFACE
- SOIL
- LIMESTONE BEDROCK
- SANDSTONE BEDROCK
- GRANITE BEDROCK
- GROUNDWATER ELEVATION (04-DEC-18)
- TW1 WELL LOCATION
- WELL CASING

DRAWING TITLE
A-A' Northeast-Southwest Hydrogeological Cross-Section - Test Wells

FIGURE NO.	DRAWN BY
06	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	Not to Scale
DATE 1-Feb-2019	

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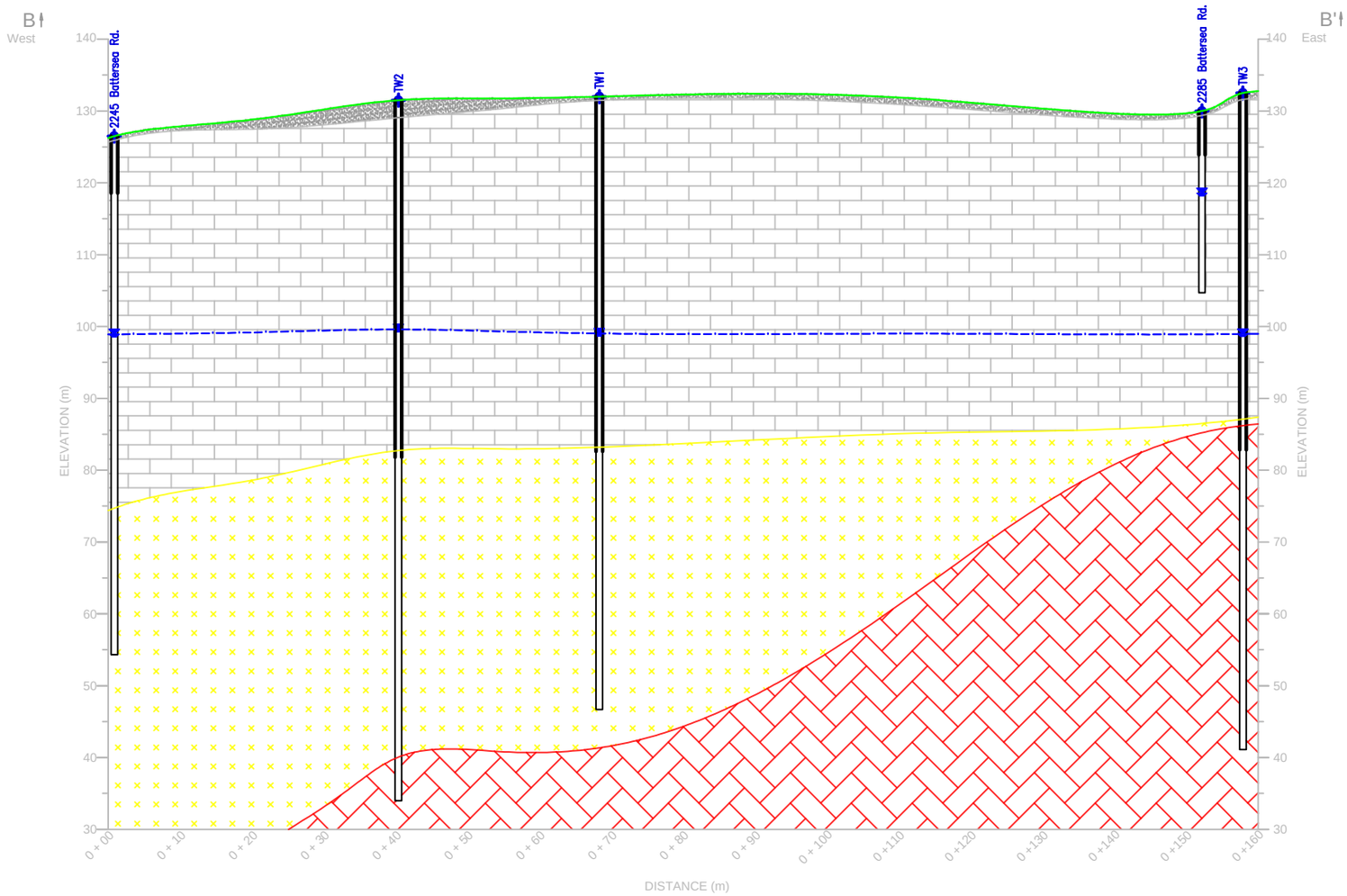
NOTES: ELEVATIONS REFERENCED TO BENCHMARK LOCATED AT TOP OF CONCRETE PAD LOCATED AT NORTH SIDE BUILDING ENTRANCE, WITH AN ASSUMED ELEVATION OF 132.00 m

Facing North



LEGEND

- SUBJECT PROPERTY LOCATION
- GROUND SURFACE
- SOIL
- LIMESTONE BEDROCK
- SANDSTONE BEDROCK
- GRANITE BEDROCK
- GROUNDWATER ELEVATION (04-DEC-18)
- TW1 WELL LOCATION
- WELL CASING

DRAWING TITLE
B-B' Northwest-Southeast Hydrogeological Cross-Section - Test Wells

FIGURE NO.	DRAWN BY
07	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
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PROJECT NO.	SCALE:
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DATE: 1-Feb-2019	

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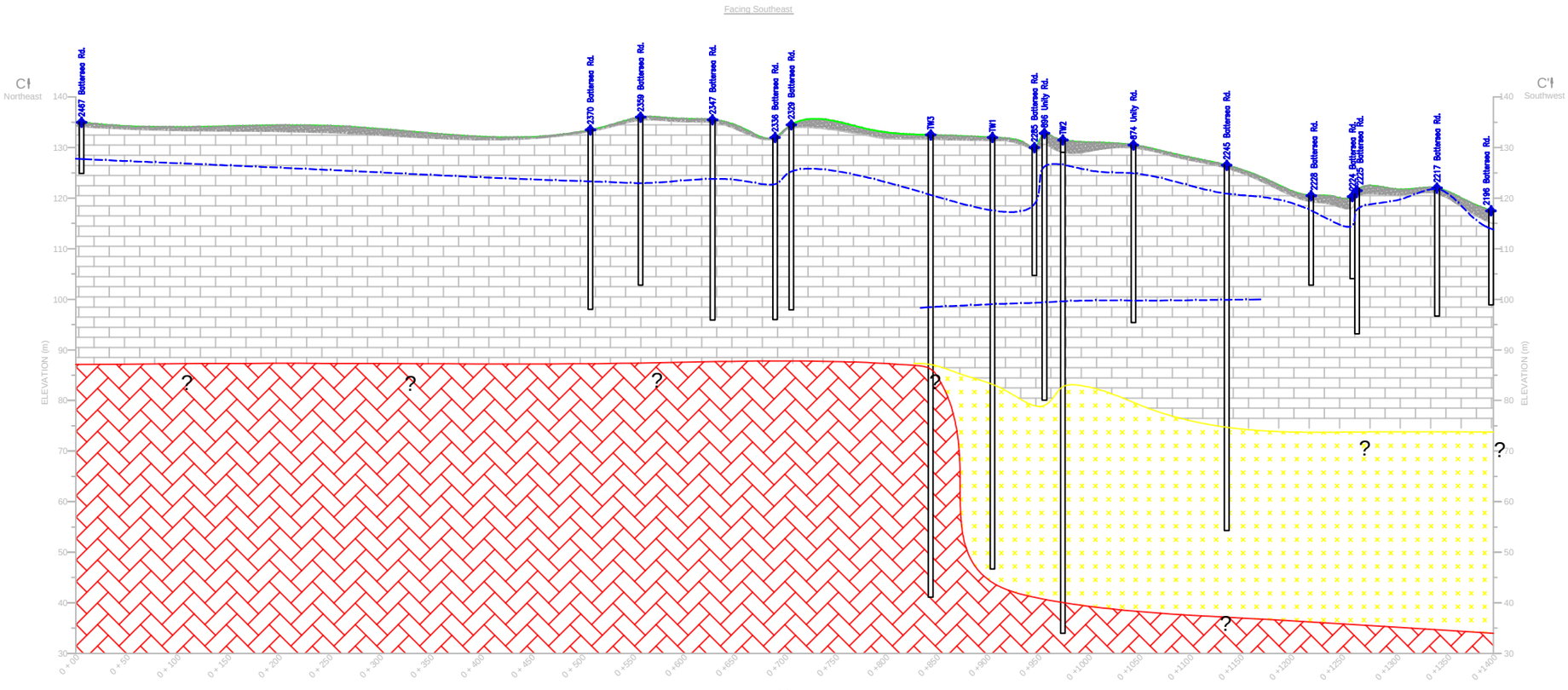
NOTES: ELEVATIONS REFERENCED TO BENCHMARK LOCATED AT TOP OF CONCRETE PAD LOCATED AT NORTH SIDE BUILDING ENTRANCE, WITH AN ASSUMED ELEVATION OF 132.00 m



LEGEND

- SUBJECT PROPERTY LOCATION
- GROUND SURFACE
- SOIL
- LIMESTONE BEDROCK
- SANDSTONE BEDROCK
- GRANITE BEDROCK
- GROUNDWATER ELEVATION (04-DEC-18)
- TW1 WELL LOCATION
- WELL CASING

DRAWING TITLE
C-C' Northeast-Southwest Hydrogeological Cross-Section - Observation Wells

FIGURE NO.	DRAWN BY
08	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	Not to Scale
DATE 1-Feb-2019	

NOTES: ELEVATIONS REFERENCED TO BENCHMARK LOCATED AT TOP OF CONCRETE PAD LOCATED AT NORTH SIDE BUILDING ENTRANCE, WITH AN ASSUMED ELEVATION OF 132.00 m

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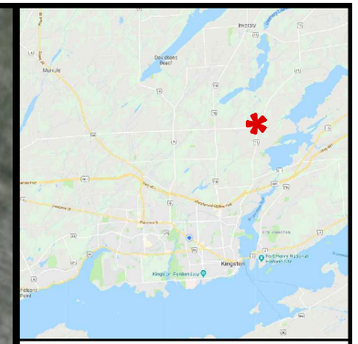
TEST PIT	DEPTH TO BEDROCK (m)
TP1	1.60
TP2	0.90
TP3	0.65
TP4	0.65
TP5	0.95
TP6	1.70
TP7	0.50
TP8	1.20
TP9	1.55
TP10	0.70
TP11	0.65
TP12	0.30
TP13	0.40
TP14	0.40



LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- PROPERTY LINE
- TP1 TEST PIT LOCATION

DRAWING TITLE
Test Pit Location Plan

FIGURE NO.
09

DRAWN BY
J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Developments Inc.

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.
ASC-458

SCALE:
0 METRES 45

DATE
1-Feb-2019

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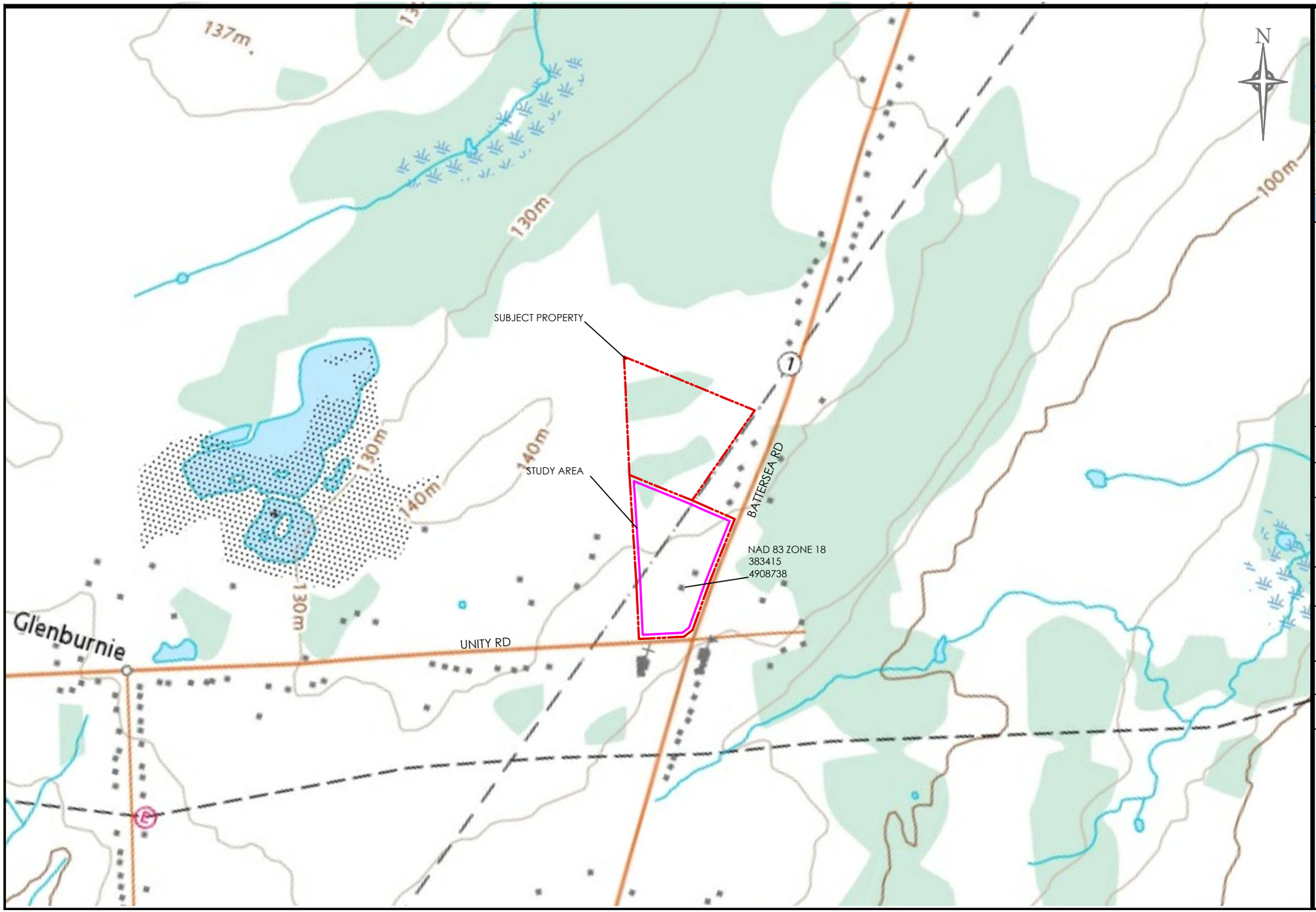

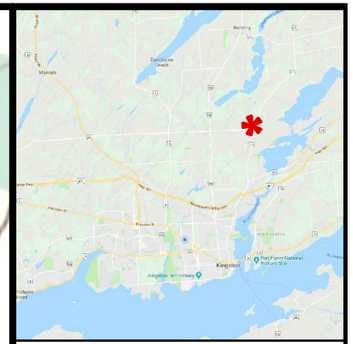

LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)

DRAWING TITLE
Topographic Plan

FIGURE NO.	DRAWN BY
10	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	0 METRES 225
DATE: 1-Feb-2019	

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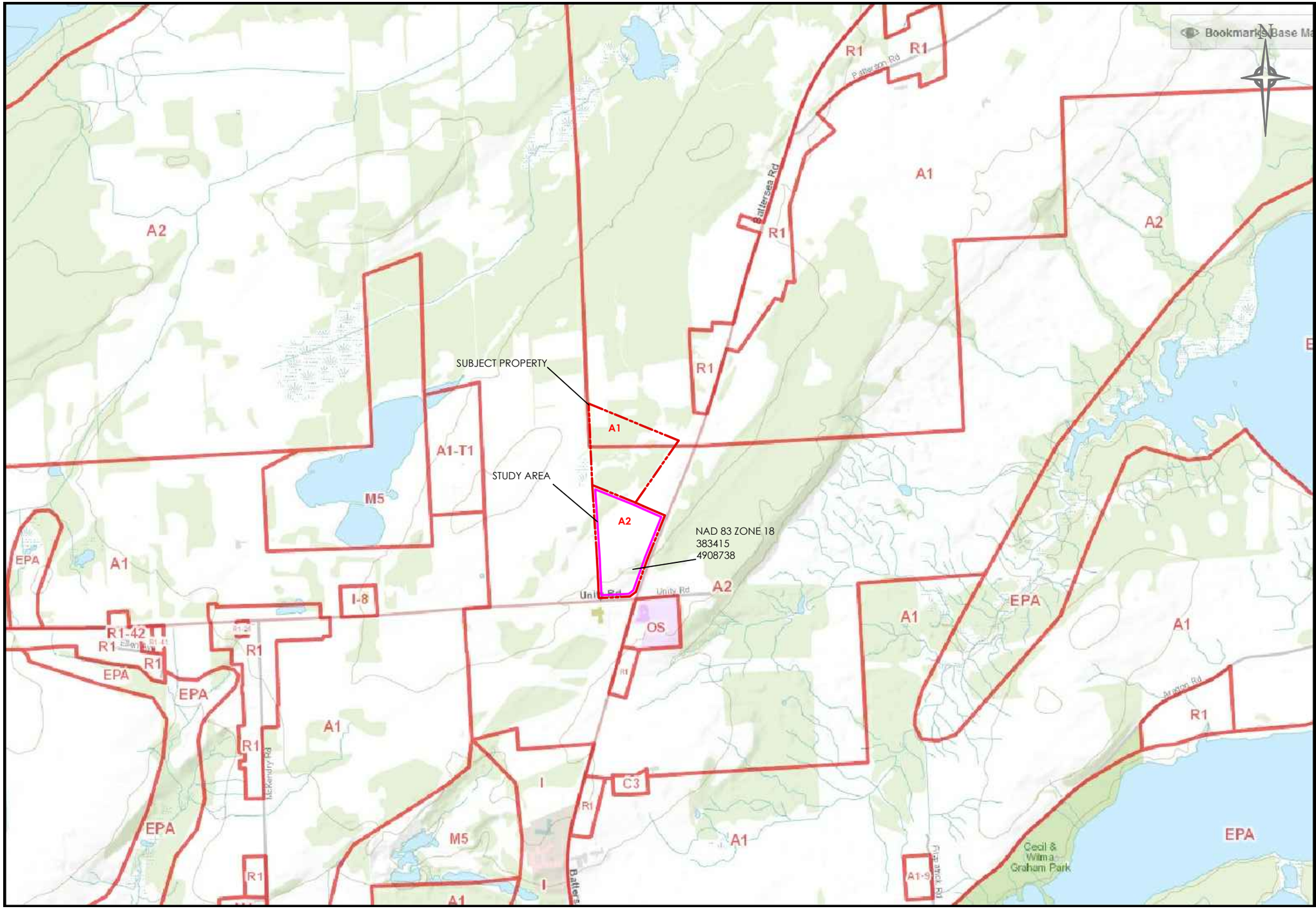
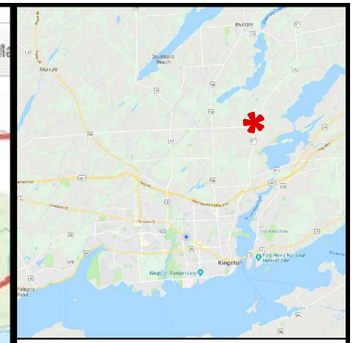
www.ascenvironmental.ca





LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- ZONE BOUNDARY

NOTES

EPA - Environmental Protection Area Zone
OS - Open Space Zone
A1 - Restricted Agricultural Zone
A2 - General Agricultural Zone
C3 - Marine Commercial Zone
R1 - Residential Type 1 Zone
I - Institutional Zone
M5 - Extractive Industrial Zone

DRAWING TITLE
Zoning Plan

FIGURE NO.	DRAWN BY
11	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

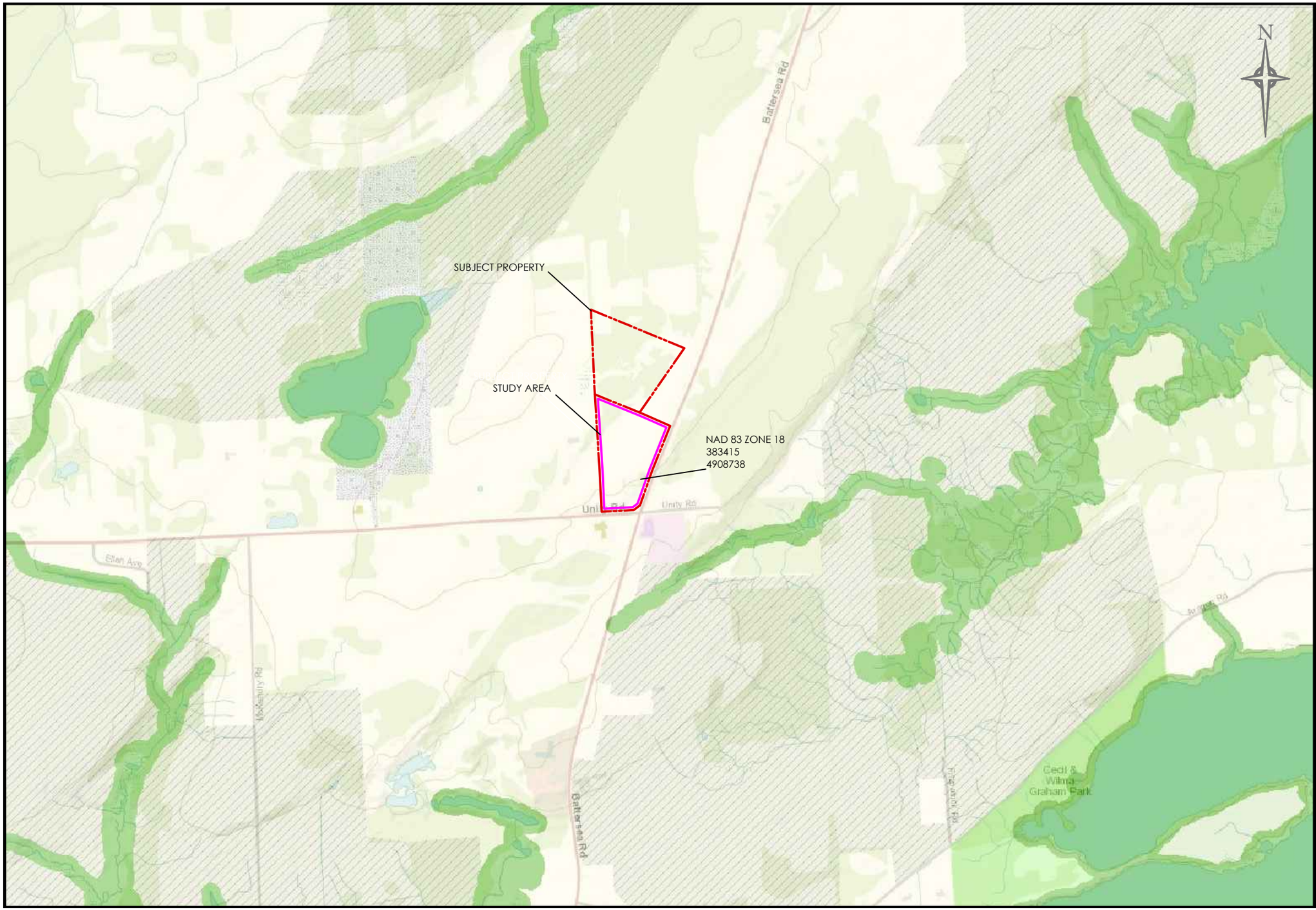
CLIENT
BPE Development

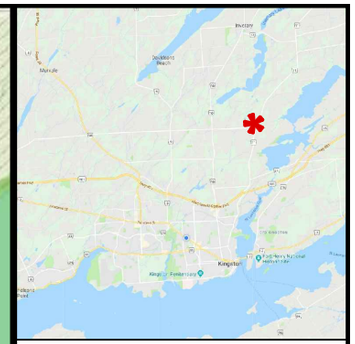
LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	0 METRES 327
DATE	
1-Feb-2019	

ASC ENVIRONMENTAL
1305 Princess Street
Kingston, ON, K7M 3E3

(613)634-5596
www.ascenvironmental.ca





LEGEND

- SUBJECT PROPERTY LOCATION
- SUBJECT PROPERTY LINE
- STUDY AREA (PART 1 AND 2)
- PRIME AGRICULTURAL AREA
- ENVIRONMENTAL PROTECTION AREA
- INSTITUTIONAL
- MINERAL RESOURCE
- OPEN SPACE

DRAWING TITLE
Land-Use Plan

FIGURE NO.	DRAWN BY
12	J. F.

PROJECT
Hydrogeological Study, Servicing Options and Terrain Analysis

CLIENT
BPE Development

LOCATION
2285 Battersea Road, Kingston, ON

PROJECT NO.	SCALE:
ASC-458	0 METRES 315
DATE	
1-Feb-2019	

ASC ENVIRONMENTAL
1305 Princess Street
Kingston, ON, K7M 3E3

(613)634-5596
www.ascenvironmental.ca

PLAN of SURVEY of
PART of LOT 33, CONCESSION 6
Geographic Township of Kingston
CITY OF KINGSTON

COUNTY of FRONTENAC

SCALE = 1:1000

25metres 0 25 50 75 100metres

HOPKINS CHITTY LAND SURVEYORS INC.
–2018–

OBSERVED REFERENCE POINTS (ORP'S) DERIVED FROM GPS OBSERVATIONS USING PRECISE POINT POSITIONING (PPP) SERVICE, UTM ZONE 18, NAD83 (CSRS) (1997.0) COORDINATES TO RURAL ACCURACY PER SEC. 14(2) OF O.REG. 216/10		
POINT ID	NORTHING	EASTING
ORP A	4909025.82	383299.36
ORP B	4908948.41	383478.17
COORDINATES CANNOT, IN THEMSELVES BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.		

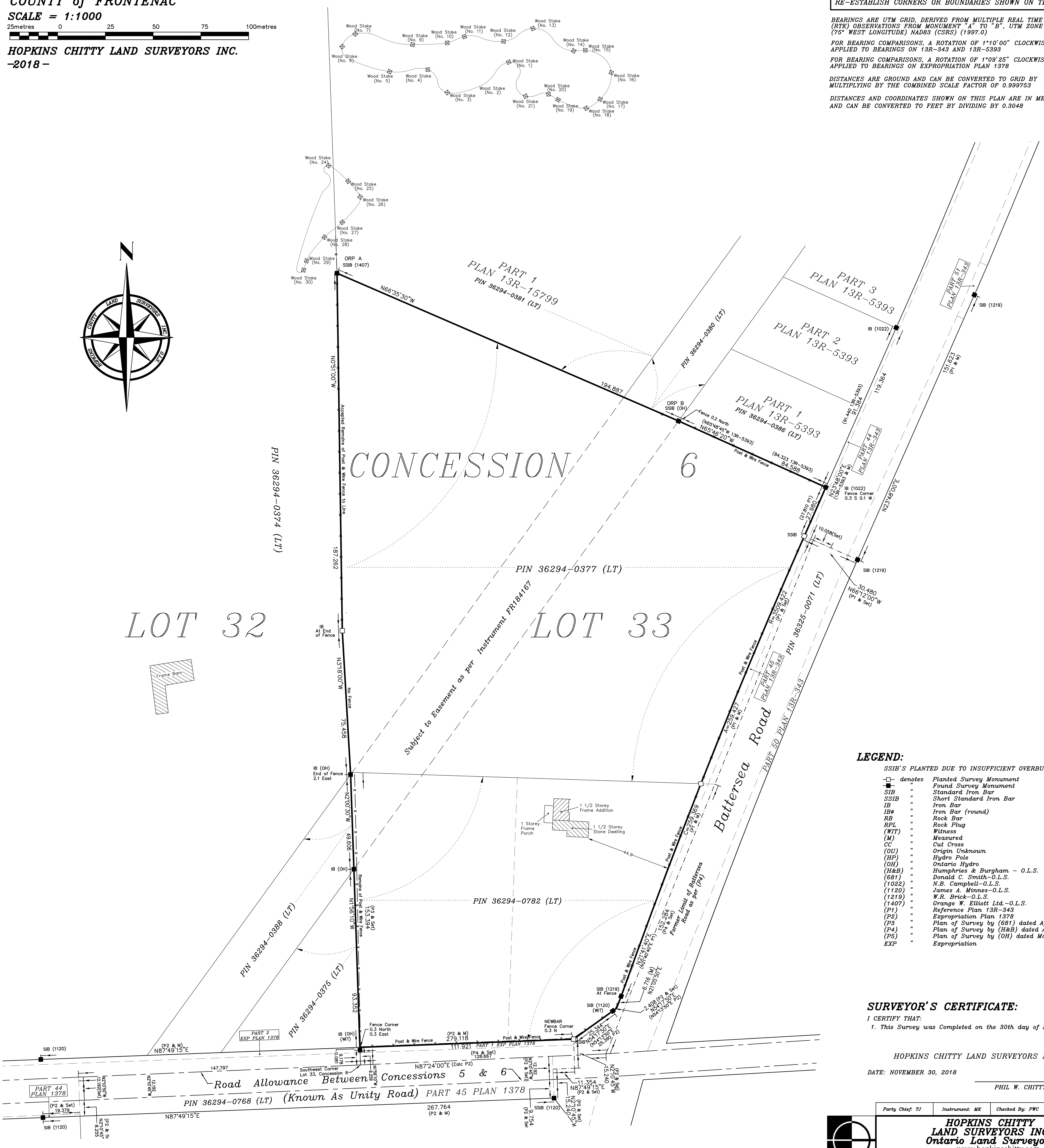
BEARINGS ARE UTM GRID, DERIVED FROM MULTIPLE REAL TIME KINETIC (RTK) OBSERVATIONS FROM MONUMENT "A" TO "B", UTM ZONE 18 (75° WEST LONGITUDE) NAD83 (CSRS) (1997.0)

FOR BEARING COMPARISONS, A ROTATION OF 1°10'00" CLOCKWISE WAS APPLIED TO BEARINGS ON 13R-343 AND 13R-5393

FOR BEARING COMPARISONS, A ROTATION OF 1°09'25" CLOCKWISE WAS APPLIED TO BEARINGS ON EXPROPRIATION PLAN 1378

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999753

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048



LEGEND:

SSIB'S PLANTED DUE TO INSUFFICIENT OVERBURDEN

–□–	denotes	Planted Survey Monument
–■–	"	Found Survey Monument
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
IBø	"	Iron Bar (round)
RB	"	Rock Bar
RPL	"	Rock Plug
(WIT)	"	Witness
(M)	"	Measured
CC	"	Cut Cross
(OU)	"	Origin Unknown
(HP)	"	Hydro Pole
(OH)	"	Ontario Hydro
(H&B)	"	Humphries & Burgham – O.L.S.
(681)	"	Donald C. Smith–O.L.S.
(1022)	"	N.B. Campbell–O.L.S.
(1120)	"	James A. Minnes–O.L.S.
(1219)	"	W.R. Brick–O.L.S.
(1407)	"	Grange W. Elliott Ltd.–O.L.S.
(P1)	"	Reference Plan 13R–343
(P2)	"	Expropriation Plan 1378
(P3	"	Plan of Survey by (681) dated April 26, 1960
(P4)	"	Plan of Survey by (H&B) dated August 18, 1952
(P5)	"	Plan of Survey by (OH) dated March 7, 1968
EXP	"	Expropriation

SURVEYOR'S CERTIFICATE:

I CERTIFY THAT:

1. This Survey was Completed on the 30th day of November 2018.

HOPKINS CHITTY LAND SURVEYORS INC.

DATE: NOVEMBER 30, 2018

PHIL W. CHITTY–O.L.S.

Party Chief: TJ	Instrument: MK	Checked By: PWC	Plan By: RH

HOPKINS CHITTY LAND SURVEYORS INC.
Ontario Land Surveyors
www.hopkinschitty.com

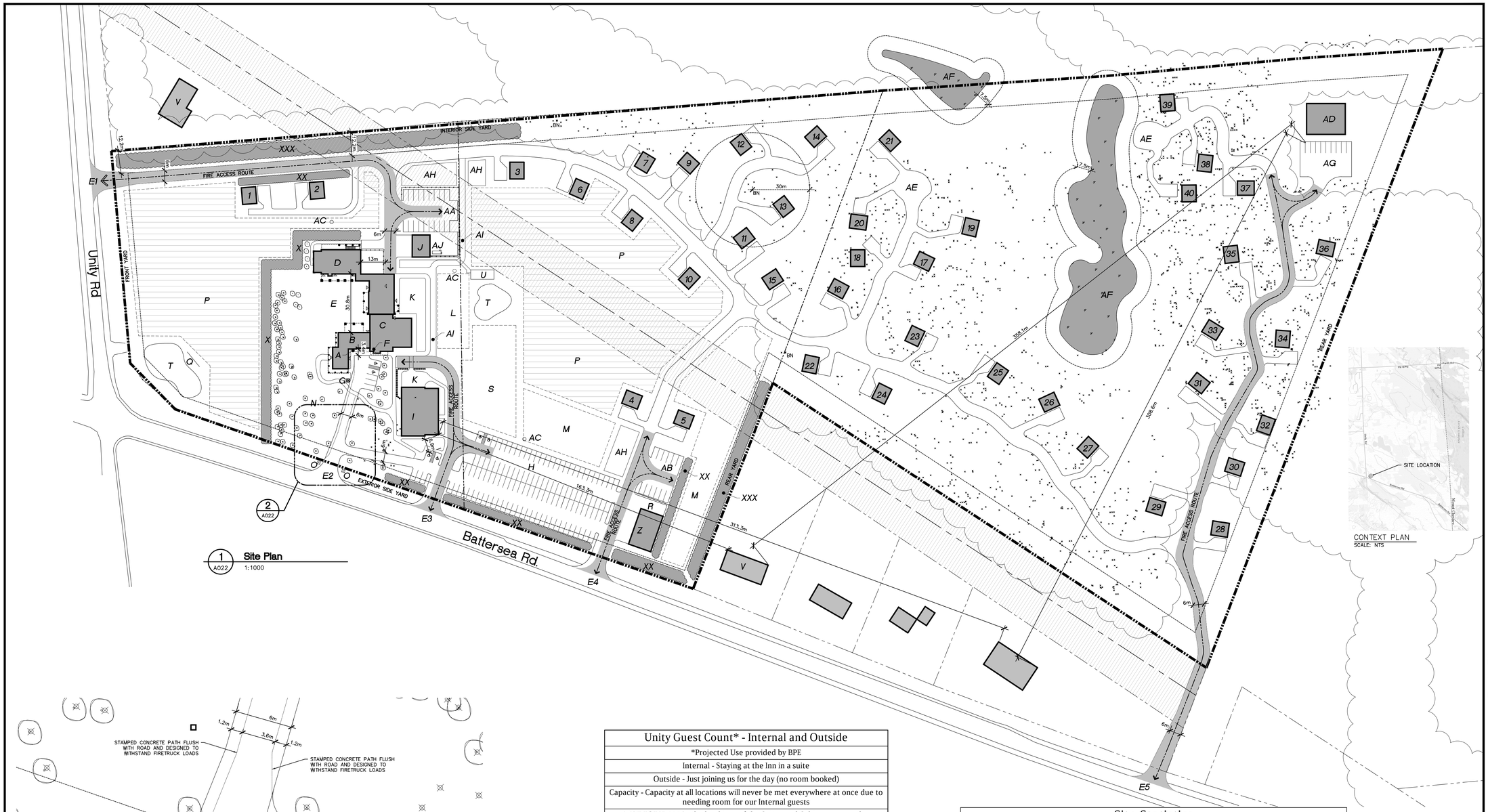
634–636 NORRIS COURT
KINGSTON, ONTARIO K7P–2R9
Tel (613) 384–9266
Fax (613) 384–3513

PROJECT No. 2018–318
LOT 33, CONCESSION 6
TOWNSHIP OF KINGSTON

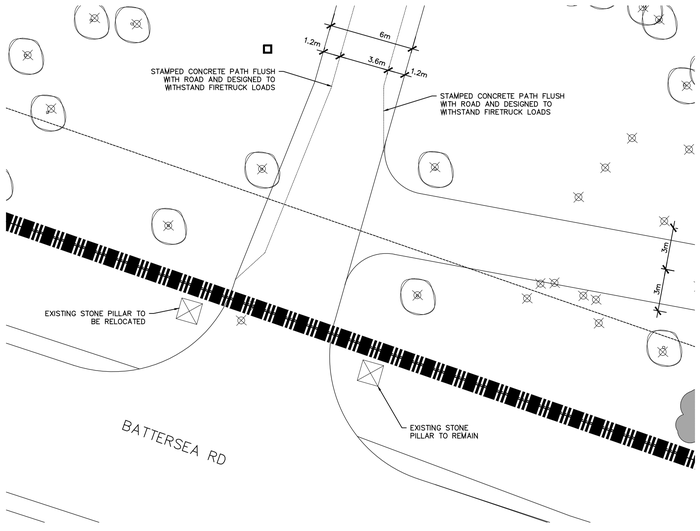
APPENDIX B
Concept Plan

ASC ENVIRONMENTAL

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088



1 A022 **Site Plan**
1:1000



2 A022 **Main Entrance Plan**
1:200

Unity Guest Count* - Internal and Outside					
*Projected Use provided by BPE					
Internal - Staying at the Inn in a suite					
Outside - Just joining us for the day (no room booked)					
Capacity - Capacity at all locations will never be met everywhere at once due to needing room for our Internal guests					
MAX TOTAL ***As the bookings of the Suites and Cabins goes up, the availability for the amenities to the public goes down***					
	Phase 1		Phase 2 & 3		
	Outside	Internal	Internal		Capacity
Hotel Rooms		56		56	56
Cabins		10		80	80
Event Venue			75		150
Restaurant	30		10		100
Roof Patio	30		10		60
Corp BR	15		5		40
Corp Venue	60		20		100
Staff/Laundry/kitch	15		18		18
Hotel Rec/Office	2		2		3
Spa treatment rooms	5		5		5
Spa Sauna/Hot tubs	15		5		40
Spa Mani Pedi	4		2		6
Spa Yoga	5		2		12
Spa Quiet	5		2		20
Giftshop	2		1		10
Maintenance Buildings	0		0		0
	188	66	157	136	700
MAX TOTAL	254		293		

Site Statistics

Building Location (Legend)	Maj. Occ.	Building Uses	Area (m2)	Capacity		
				Phase 1	Phase 2	Phase 3
B,C,D,I	C	Hotel Suites (27)		56	56	56
#	C	Cabins (40)		10	30	80
S	A	Event Venue	TBD			150
C	A	Restaurant	230	60	60	60
C	A	Rooftop Patio	120	60	60	60
I	A	Corporate Boardroom	74	40	40	40
I	A	Corporate Venue Space	126	100	100	100
D	C	Staff Room, Laundry & Kitchen		18	18	18
C	C	Hotel Reception/Office	18	3	3	3
C	D	Spa (Treatment Rooms)	120	5	5	5
D,E	D	Spa (Saunas)	75	40	40	40
D	D	Spa (Mani/Pedi Room)	44	6	6	6
D	D	Spa (Yoga Studio)	53	12	12	12
D	D	Spa (Quiet Room)	95	20	20	20
I	E	Gift Shop	68	10	10	10
J	F2	Maintenance Shed 1				
Z	F2	Maintenance Shed 2				
		Totals	1023	440	460	660

sza
Shoalts and Zaback Architects Ltd

Certificate of Practice Number: 2438
4 Cataraqui Street, Suite 206, Kingston, ON K7K 1Z7
tel. 613 541 0776 fax. 613 541 0804
mail@szarch.com www.szarchitects.ca

DRAWING LEGEND

A. EMERGENCY ENTRANCE & DELIVERIES
B. RENOVATED FARMHOUSE INN
C. INN RECEPTION & RESTAURANT
D. SPA QUIET ROOM, TREATMENT ROOM & YOGA STUDIO
E. SPA COURTYARD
F. MAIN INN RECEPTION/ENTRANCE & FIRE DEPARTMENT ENTRANCE
G. FIRE HYDRANT LOCATION
H. INN & SPA PARKING (123 SPACES)
I. CORPORATE VENUE, GIFT SHOP & SUITES
J. RELOCATED SMALL BARN MAINTENANCE SHED
K. OUTDOOR PATIO
L. FLOWER CUTTING OR AGRICULTURE
M. SUNFLOWER FIELDS OR AGRICULTURE (1 ACRE)
N. OUTDOOR GARDENS AND SEATING
O. EXISTING STONE PILLARS
P. VINEYARD OR AGRICULTURE (5 ACRES)
Q. SIGN
R. BUS PARKING (1)
S. VEGETABLE CUTTING OR AGRICULTURE
T. POND
U. 16'X40' WATER TREATMENT BUILDING
V. APPROXIMATE LOCATION OF NEIGHBOURING HOUSE
W. APPROXIMATE LOCATION OF SEPTIC SYSTEM
X. LILACS OR AGRICULTURE
XX. TREES AND SHRUBS
XXX. TREES AND SHRUBS AND FENCE
Y. RESERVED
Z. NEW MAINTENANCE SHED (RECONSTRUCTED BARN WITH RECLAIMED BARN BOARD CLADDING)
AA. EMPLOYEE PARKING (18)
AB. SERVICE PARKING (12)
AC. NEW WELL LOCATION
AD. EVENT VENUE
AE. TURNAROUND
AF. APPROXIMATE LOCATION OF WETLAND
AG. EVENT PARKING (10 SPACES)
AH. SNOW STORAGE
AI. GOLF CART PATH
AJ. MAIN BUILDING CHILLER

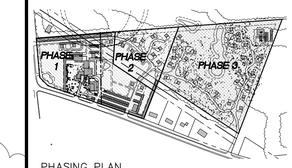
CABINS 1–5 (PHASE 1)
CABINS 6–15 (PHASE 2)
CABINS 16–40 (PHASE 3)

ENTRANCE LEGEND

E1. UNITY ENTRANCE
E2. MAIN GUEST ENTRANCE
E3. APPROX LOCATION OF EXISTING BARN ENTRANCE & FIRE DEPARTMENT ACCESS
E4. APPROX LOCATION OF EXISTING FIELD ENTRANCE & FIRE DEPARTMENT ACCESS
E5. PHASE 3 BACK ACCESS

APPROXIMATE LOCATION OF WETLAND (AS PROVIDED BY BPE)
ELECTRICAL EASEMENT
BUILDING
FUTURE VINEYARD (OR AGRICULTURE)
6m WIDE FIRE ACCESS ROUTE (12m TURNING RADIUS TO CENTRE OF ROAD)
APPROXIMATE LOCATION OF TREE LINE
EXIT DOOR LOCATION

CONTEXT PLAN
SCALE: NTS



PHASING PLAN
SCALE: 1:8000

Revision	Description	Date

Project
Unity Inn & Spa

Location
2285 Battersea Rd
Glenburnie, ON

Client
BPE Development

Drawing
Site Plan Phase 3

Drawn by: ---
Date: January 22, 2019
File Name: A020 Site phase 3b
Scale: 1:1000
Client Project #: Client Proj. #
Drawing Number: A022
Project #: 17091
Revision #: --

APPENDIX C
Site Well Water RecordsO

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088

Ontario

Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

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

Tag#: A 239694

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	BPE DEVELOPMENT		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
141 HICKSON AVE	KINGSTON	ONT	K7K2N1	6136507909

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	KINGSTON	33	6

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

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	383811	4960796		

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	CLAY			0'	2'
GREY	SHALE			2'	10'
BLUE	LIMESTONE			10'	48'
GREEN	LIMESTONE			48'	73'
BLACK	LIMESTONE			73'	110'
GREEN	LIMESTONE			110'	160'
WHITE/BLUE	SANDSTONE			160'	280'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
162	0	CEMENT	20

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
6 1/4"	STEEL	188	+2'	162'
6"	OPEN HOLE		162'	280'

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	Kind of Water	
210' (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, *specify*	
278' (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, *specify*	
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	162'	10"
162'	280'	6"

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): 275

Pumping rate (l/min / GPM): 10 GPM

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 122

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

Recommended pump depth (m/ft): 270

Recommended pump rate (l/min / GPM): 5 GPM

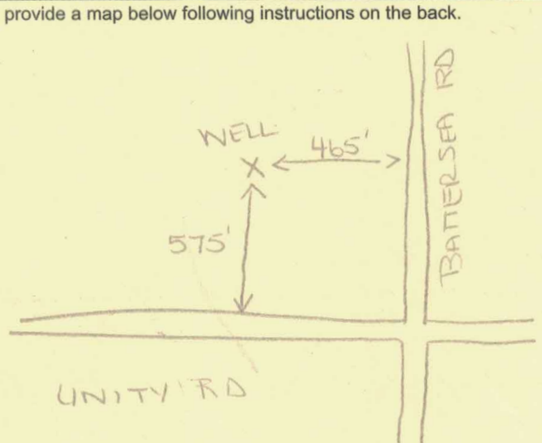
Well production (l/min / GPM): 10 GPM

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	115		
1	117	1	121.2
2	117.5	2	120.8
3	117.9	3	120.4
4	117.9	4	120.1
5	118	5	119.8
10	118.4	10	118.1
15	118.6	15	117
20	118.9	20	116.4
25	119.4	25	116
30	119.8	30	115.6
40	121	40	115.2
50	121.5	50	115
60	122	60	115

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.
JACK KNOX WELL DRILLING LTD	3202

Business Address (Street Number/Name)	Municipality
2580 PERTH 11 RD PO BOX 33	GLENBURNIE

Province	Postal Code	Business E-mail Address
ONT	K0H1S0	

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
6135416664	KNOX, JOHN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2819	Jon Knox	Y Y Y Y M M D D

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☐ No	Y Y Y Y M M D D	Audit No. Z296251
	Date Work Completed	Received
	Y Y Y Y M M D D	

Contractor's Copy

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* Tag#:A255504

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
BPE	DEVELOPMENT		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
141 HICKSON AVE	KINGSTON	ONT	K7K2N7	6138507990

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	KINGSTON	33	6

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

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	383347	4908706		

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	CLAY			0'	4'
SHALE				4'	8'
BLUE	LIMESTONE			8'	54'
BLACK	LIMESTONE			54'	69'
GREEN/BLACK	LIMESTONE			69'	160'
GREY/RED	SANDSTONE			160'	300'
RED/WHITE	GRANITE			300'	320'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
163	0	CEMENT	20

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
6 1/4"	STEEL	188	+2'	163'
6"	OPEN HOLE		163'	320'

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	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
300' (m/ft) ☐ Gas	☑ Untested ☐ Fresh ☐ Other, *specify*	0'	163'	10"
(m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*	163'	320'	6"
(m/ft) ☐ Gas	Kind of Water: ☐ 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)*: 300'

Pumping rate *(l/min / GPM)*: 10GPM

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping *(m/ft)*: 191.4

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

Recommended pump depth *(m/ft)*: 315

Recommended pump rate *(l/min / GPM)*: 5+G.P.M.

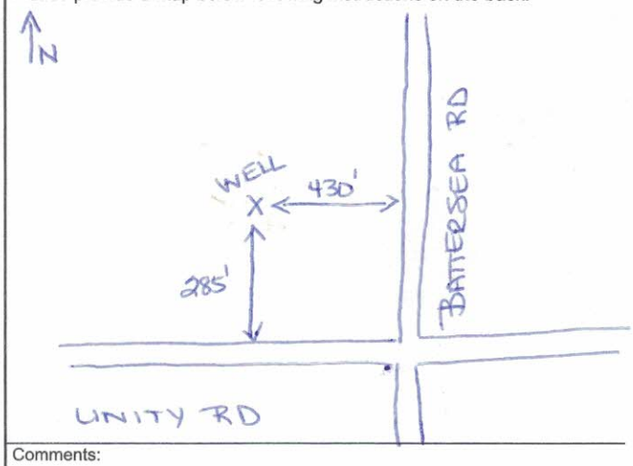
Well production *(l/min / GPM)*: 8 G.P.M.

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		112.3		
1		118.4	1	189.2
2		122.3	2	187.3
3		126.8	3	185.2
4		130.7	4	182.2
5		135.2	5	180.2
10		148.9	10	170.4
15		159.4	15	161.2
20		167.5	20	152
25		173.8	25	143.1
30		178.6	30	135
40		185.9	40	121.4
50		189	50	119.2
60		191.4	60	117

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.
JACK KNOX WELL DRILLING LTD	3202

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
2580 PERTH RD PO BOX 33	GLENBURNIE	ONT	K0H1S0	

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
6138546616	KNOX, JOHN	2819		

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: 2018 08 21

Date Work Completed: Y Y Y Y M M D D

Ministry Use Only

Audit No. Z296262

Received

0506E (2014/11)

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Ontario — Ministry of the Environment and Climate Change

Well Tag No. *(Place Sticker and/or Print Below)* Tag#:A255532

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☑ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
BPE	DEVELOPMENT		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
141 HICKSON AVE	KINGSTON	ONT	K7K2N7	6135570900

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	KINGSTON	33	6

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

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	383467	4908853		

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	CLAY : SHALE			0'	3'
BLUE	LIMESTONE			3'	127'
GREEN	LIMESTONE			127'	149'
RED	SANDSTONE			149'	152'
RED/GREY	GRANITE			152'	300'
		FREE CHLORINE 120.			

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
163'	0	CEMENT	15

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
6 1/4"	STEEL	.188	+2'	163'
6"	OPEN HOLE		163'	300'

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	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
250' (m/ft) ☐ Gas	☐ Fresh ☑ Untested ☐ Other, *specify*	0	163'	10"
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	163'	300	6"
(m/ft) ☐ 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): 296'

Pumping rate (l/min / GPM): 10 GPM

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 125'

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft): 295'

Recommended pump rate (l/min / GPM): 10+ GPM

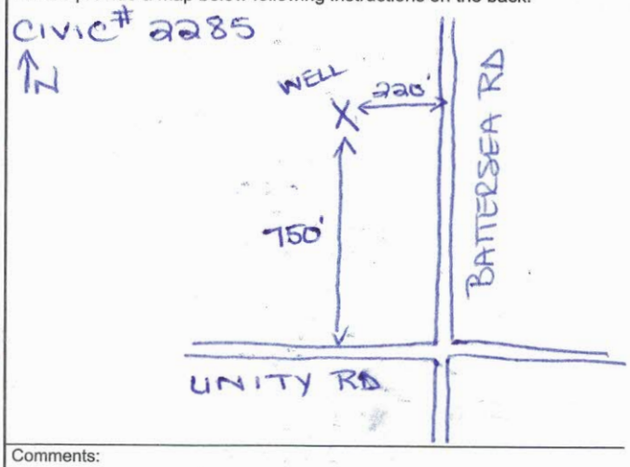
Well production (l/min / GPM): 10+ GPM

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		117.7		
1	120.3		1	124.2
2	121.2		2	123.8
3	121.8		3	123.6
4	122.2		4	123.4
5	122.5		5	123.2
10	123		10	122.0
15	123.4		15	121.5
20	123.5		20	121
25	123.8		25	120.7
30	124		30	120.4
40	124.5		40	120.4
50	124.8		50	120.3
60	125		60	120.3

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.
JACK KNOX WELL DRILLING LTD	3202

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
2580 PERTH ROAD PO BOX 33	GLENBURNIE	ONT	K0H1S0	

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
6138546164	KNOX, JOHN	2819	Ron Knox	Y Y Y Y M M D D

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	2018 MM 07	2018 MM 07

Ministry Use Only

Audit No. Z296347

Received

0506E (2014/11)

Ministry's Copy

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
Tag#: A132872

Well Record
Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2285 BATTERSEA R.D	KINGSTON	33	6
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
FRONTENAC		Ontario	K0H1S0
UTM Coordinates Zone / Easting / Northing	**Municipal Plan and Sublot Number**	**Other**	
NAD 83 / 18 386 724 49 16 351			

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	CLAY			0	2
GREY	SHALE			2	4
				4	35
				35	83

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
20	0	CEMENT	8

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
6¼"	STEEL	188	+2	20
6"	OPEN HOLE		20	83

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
80	☐	☐ Fresh ☑ Untested	
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	20	10"
20	83	

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): 80'

Pumping rate (l/min / GPM): 4.5 G.P.M

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 61.7

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

Recommended pump depth (m/ft): 80'

Recommended pump rate (l/min / GPM): 4.5 G.P.M.

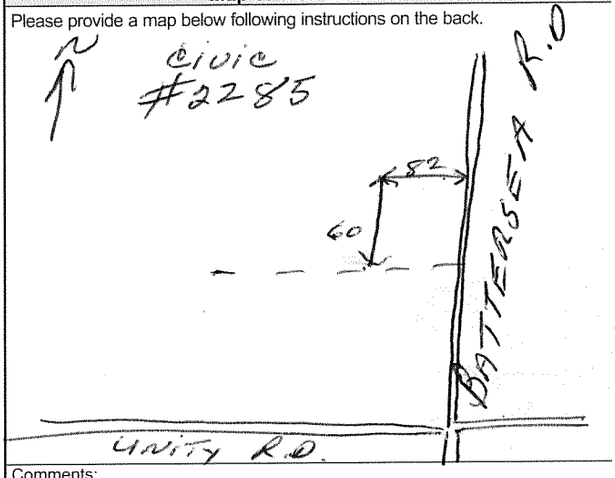
Well production (l/min / GPM): 5 G.P.M.

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	44		
1	48	1	59
2	49.2	2	58.1
3	50.2	3	54.2
4	51	4	52.8
5	51.6	5	52
10	53.9	10	50
15	55.3	15	48
20	57.2	20	46.2
25	58.2	25	45.9
30	58.6	30	45.5
40	60.3	40	45
50	61	50	44.5
60	61.7	60	44.2

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.
JACK KNOX WELL DRILLING	3202
Business Address (Street Number/Name)	**Municipality**
2580 PERTH R.D	GLENBURNIE
Province	**Postal Code**	**Business E-mail Address**
ONT	K0H1S0	
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
4135461164	KNOX John
Well Technician's Licence No.	**Signature of Technician and/or Contractor**	**Date Submitted**
2879	Ken Knox	Y Y Y Y M M D D

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: 2012/10/10

Date Work Completed: 2012/10/10

Ministry Use Only

Audit No. Z147729

Received OCT 22 2012

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APPENDIX D
Neighbouring Water Wells – 500 m Radius

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088

Water Well Records

Thursday, January 24, 2019

2:11:42 PM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
KINGSTON TOWNSHIP 06 032	18 382978 4908715 W	1988/11 3202	6	FR 0032 FR 0078 FR 0082	18/90/6/2:0	DO ST		2211939 (40041)	BRWN SAND 0003 BLUE LMSN 0015 GREY LMSN 0028 BLUE LMSN 0045 GREY LMSN 0062 GREN LMSN 0064 GREY LMSN 0074 BLUE LMSN 0079 GREY LMSN 0115
KINGSTON TOWNSHIP CON 05 032	18 383155 4908562 W	1967/06 1704	6					2201495 () A	LOAM 0003 BLUE LMSN 0111
KINGSTON TOWNSHIP CON 05 032	18 383155 4908518 W	1967/06 1704	6	SA 0160	0/160/1/:	NU		2201496 () A	CLAY 0003 BLUE LMSN 0160
KINGSTON TOWNSHIP CON 05 032	18 383156 4908559 W	1967/06 1704	6					2201497 () A	CLAY 0003 BLUE LMSN 0073
KINGSTON TOWNSHIP CON 05 032	18 383210 4908532 W	1969/06 2402	6					2204759 () A	LOAM 0001 CLAY 0004 BLDR 0007 BLUE LMSN 0083
KINGSTON TOWNSHIP CON 05 032	18 383210 4908482 W	1969/07 2402	6 6	FR 0016 SA 0148	16/132/4/1:0	DO		2204766 ()	LOAM 0001 BRWN CLAY 0003 BLUE LMSN 0150
KINGSTON TOWNSHIP CON 05 032	18 383155 4908562 W	1967/06 1704	6					2201494 () A	LOAM 0003 BLUE LMSN 0127
KINGSTON TOWNSHIP CON 05 033	18 383420 4908432 W	1971/01 2402	6 6	SU 0040 0090	40/72/5/1:0	DO		2205336 ()	FILL 0003 CLAY 0004 BLUE LMSN 0093
KINGSTON TOWNSHIP CON 05 033	18 383290 4908582 W	1979/05 3202	6	FR 0079	24/76/20/2:0			2208633 ()	BRWN LOAM 0002 BLUE LMSN 0082
KINGSTON TOWNSHIP CON 05 033	18 383290 4908582 W	1976/02 1704	6	UK 0028 UK 0170	/237/10/3:0	DO		2207426 ()	BRWN LOAM SHLE 0002 BLUE LMSN 0170 GREY SNDS 0237
KINGSTON TOWNSHIP CON 05 033	18 383023 4908521 W	2014/08 3202	6.25 6	UT 0217	106/117/8/1:0	DO		7227164 (Z182329) A158741	BRWN CLAY 0003 BLUE LMSN 0035 GREN LMSN 0056 BLCK LMSN 0086 GREN LMSN 0169 GREY SNDS 0204 RED SNDS 0220
KINGSTON TOWNSHIP CON 05 033	18 383139 4908573 W	1973/02 3202	6	FR 0078	34/78/12/2:0	DO		2206196 ()	BRWN LOAM 0004 BLUE LMSN 0084
KINGSTON TOWNSHIP CON 05 033	18 383390 4908342 W	1972/07 2402	6 6	FR 0057 FR 0060	8/70//1:0	DO		2205864 ()	LOAM 0001 CLAY 0004 BLUE LMSN 0080
KINGSTON TOWNSHIP CON 05 033	18 383629 4908521 W	1981/05 3202	6	FR 0053	40/61/12/2:0	DO		2209103 ()	BRWN LMSN SHLE 0003 BLUE LMSN 0063 GREN LMSN 0066 BLUE LMSN 0067
KINGSTON TOWNSHIP CON 05 033	18 383195 4908562 W	1971/10 3202	6	FR 0038	21/47/5/2:0	DO		2205576 ()	BRWN LOAM 0002 BRWN LMSN 0010 BLUE LMSN 0052
KINGSTON TOWNSHIP CON 05 033	18 383165 4908567 W	1973/04 3202	6	FR 0230	90/230/6/2:0	DO		2206211 ()	BRWN LOAM 0002 BLUE LMSN 0160 GREY SNDS 0230 BLCK GRNT 0240
KINGSTON TOWNSHIP CON 05 033	18 383450 4908502 W	1970/03 2402	6 6	FR 0030	7/50/9/1:0	DO		2204913 ()	LOAM 0001 BLUE LMSN 0054

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
KINGSTON TOWNSHIP CON 05 033	18 382956 4908555 W	1965/04 3202	6 6	FR 0077	45/76/5/1:0	DO		2201522 ()	MSND GRVL 0005 BLUE LMSN 0082
KINGSTON TOWNSHIP CON 05 033	18 383240 4908552 W	1971/11 3202	6	FR 0037	12/47/5/2:0	DO		2205634 ()	BRWN LOAM 0002 BLUE LMSN 0051
KINGSTON TOWNSHIP CON 05 033	18 383217 4908496 W	1998/07 3202	6	FR 0051 FR 0066	18/60/6/1:0	DO		2216203 (182553)	BRWN CLAY 0001 BRWN SHLE 0004 BLUE LMSN 0072
KINGSTON TOWNSHIP CON 05 033	18 383206 4908572 W	1998/07 3202		UK 0050 SA 0153	20/152/2/:			2216205 (182554) A	BRWN CLAY 0001 BRWN SAND 0003 BRWN SHLE 0006 BLUE LMSN 0133 GREN LMSN 0153
KINGSTON TOWNSHIP CON 05 033	18 383023 4908501 W	1989/08 3202	6	MN 0197	80/270/2/2:0	DO		2212539 (51687)	BRWN CLAY 0001 BRWN SHLE 0006 BLUE LMSN 0141 GREN LMSN 0156 GREY SNDS 0210 GREY GRNT 0251 WHIT QTZ 0290 WHIT GRNT 0350
KINGSTON TOWNSHIP CON 05 033	18 383110 4908572 W	1972/08 3202	6	FR 0040	18/68/4/2:0	DO		2205931 ()	BRWN LOAM 0005 BLUE LMSN 0070
KINGSTON TOWNSHIP CON 05 033	18 383240 4908539 W	1998/07 3202		SU 0064 SA 0070	19/70/3/0:30			2216204 (182556) A	BRWN CLAY 0002 BRWN SHLE 0004 BLUE LMSN 0075
KINGSTON TOWNSHIP CON 05 033	18 383329 4908621 W	1984/08 3202	6	FR 0282	96/210/15/2:0	IR DO		2209974 ()	BRWN CLAY 0001 BRWN LMSN SOFT HARD 0004 BLUE LMSN HARD 0014 BLUE LMSN 0138 GREN LMSN 0165 GREN SNDS 0170 GREY GRNT 0178 GREY SNDS 0264 RED SNDS 0299
KINGSTON TOWNSHIP CON 05 034	18 383410 4908402 W	1972/05 3202	6	FR 0050	14/48/7/2:0	DO		2205820 ()	BLUE CLAY 0008 BLUE LMSN 0053
KINGSTON TOWNSHIP CON 05 034	18 383509 4908589 W	1995/03 1704	6	UK 0103 UK 0116	6/6/10/1:0	PS		2215119 (151522)	LOAM 0003 BLUE LMSN SHLE 0016 BLUE LMSN 0120
KINGSTON TOWNSHIP CON 05 034	18 383450 4908502 W	1970/08 1704	6	FR 0054	16/54/6/1:0	DO		2205238 ()	PRDR 0057 BLUE LMSN 0071
KINGSTON TOWNSHIP CON 05 034	18 383440 4908472 W	1970/09 1704	6	FR 0060	15/71/5/1:0	DO		2205138 ()	PRDR 0063 BLUE LMSN 0082
KINGSTON TOWNSHIP CON 05 034	18 383440 4908522 W	1970/04 1704	6	FR 0060	10/62/4/1:0	DO		2205091 ()	BRWN CLAY 0006 BLUE LMSN 0063
KINGSTON TOWNSHIP CON 05 034	18 383380 4908302 W	1972/07 2402	6 6	FR 0062	50/65/12/1:0	DO		2205858 ()	LOAM 0001 CLAY SAND 0005 BLUE LMSN 0085
KINGSTON TOWNSHIP CON 05 034	18 383462 4908580 W	1995/08 1704	6					2215300 (151598) A	FILL CMTD 0040
KINGSTON TOWNSHIP CON 05 034	18 383430 4908462 W	1971/05 1704	6	FR 0040	12/35/10/1:0	DO		2205500 ()	BRWN CLAY 0003 BLUE LMSN 0044
KINGSTON TOWNSHIP CON 05 034	18 383467 4908541 W	1958/04 3202	6 6	FR 0036	11/20/7/1:0	PS		2201537 ()	LOAM 0006 BLUE LMSN 0040
KINGSTON TOWNSHIP CON 05 034	18 383337 4908583 W	1956/09 1704	6 6	FR 0078	32/40/7/1:0	DO		2201530 ()	MSND GRVL 0020 BLUE LMSN 0082

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
KINGSTON TOWNSHIP CON 05 034	18 383475 4908557 W	1955/08 1704	6 6	FR 0060	12/20/10/1:0	PS		2201529 ()	SHLE 0006 LMSN 0074
KINGSTON TOWNSHIP CON 05 034	18 383258 4908382 W	2010/06 3202	6.25 6	UT 0078	12/27/6/1:0	DO		7148523 (Z107180) A092918	BRWN CLAY 0002 BRWN SHLE 0004 BLUE LMSN 0083
KINGSTON TOWNSHIP CON 05 034	18 383460 4908542 W	1970/04 1704	6	FR 0053	10/49/5/1:0	DO		2205005 ()	BRWN HPAN 0004 BLUE LMSN SHLE 0014 BLUE LMSN 0055
KINGSTON TOWNSHIP CON 05 034	18 383529 4908621 W	1984/08 3202	6	FR 0138 FR 0149	83/126/20/2:0	DO		2209975 ()	BRWN CLAY 0002 BRWN LMSN SHLE 0003 BLUE LMSN 0097 GREN LMSN 0102 BLCK LMSN 0114 GREN LMSN 0120 GREN SNDS 0126 BRWN SNDS 0152
KINGSTON TOWNSHIP CON 05 034	18 383430 4908442 W	1972/03 2402	6 6	FR 0055	3/54/3/1:0	DO		2205878 ()	CLAY 0004 BLUE LMSN 0058
KINGSTON TOWNSHIP CON 05 034	18 383729 4908521 W	1982/05 3202	8	FR 0018 FR 0039	13/40/9/2:0	DO		2209366 ()	BLUE CLAY 0005 BLUE LMSN 0047
KINGSTON TOWNSHIP CON 05 034	18 383402 4908373 W	1973/10 2402	6 6	FR 0025 FR 0049 FR 0055	16/40/9/1:0	DO		2206394 ()	CLAY 0005 BLUE LMSN 0057
KINGSTON TOWNSHIP CON 05 035	18 383598 4908590 W	1985/08 1704			10/132/3/1:0	DO		2210469 ()	PRDG 0132
KINGSTON TOWNSHIP CON 05 035	18 383674 4908581 W	1985/03 3202	6	FR 0032 FR 0080	32/79/8/2:0	DO		2210358 ()	BRWN SHLE LOAM 0002 BRWN SHLE 0003 BLUE LMSN SHLE 0009 BRWN LMSN 0010 BLUE LMSN 0058 GREN LMSN 0062 BLUE LMSN 0083
KINGSTON TOWNSHIP CON 06 031	18 383372 4908696 W	1964/08 1704	6 6	FR 0065	55/140/1/1:0	DO		2201650 ()	LOAM 0010 BLUE LMSN 0140
KINGSTON TOWNSHIP CON 06 031	18 383194 4908681 W	1965/08 2402	6 5 5	SA 0180 FR 0260 FR 0285	67/240/5/8:0	DO		2201651 ()	MSND 0012 BLUE LMSN 0190 SNDS 0260 WHIT LMSN 0298
KINGSTON TOWNSHIP CON 06 032	18 382955 4908632 W	2006/03 3202	6.21	0052 0067	45/50/4/2:0	DO		2218980 (Z37613) A034124	BRWN CLAY 0002 GREY SHLE 0005 BLUE LMSN 0066 GREN LMSN 0067 BLUE LMSN 0084
KINGSTON TOWNSHIP CON 06 032	18 383170 4908502 W	1969/06 2402	6					2204760 () A	LOAM 0001 CLAY 0004 BLUE LMSN 0164
KINGSTON TOWNSHIP CON 06 032	18 383652 4908777 W	1961/10 1704	6 6	FR 0080	8/85/3/1:0	ST		2201653 ()	MSND 0006 BLUE LMSN 0085
KINGSTON TOWNSHIP CON 06 032	18 383296 4908658 W	1973/04 3202	6	FR 0110	30/105/8/2:0	DO		2206215 ()	BRWN LOAM 0002 BLUE LMSN 0115
KINGSTON TOWNSHIP CON 06 032	18 383117 4908699 W	1955/12 1704	6 6	FR 0072 SA 0170	67/173/3/4:0	ST		2201652 ()	LOAM MSND 0007 BLUE LMSN 0173
KINGSTON TOWNSHIP CON 06 033	18 383629 4908921 W	1980/08 3202	6	FR 0112	62/114/5/2:0	DO		2208863 ()	BLUE CLAY 0001 BRWN LMSN SHLE 0003 BLUE LMSN 0118

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
KINGSTON TOWNSHIP CON 06 033	18 383385 4908735 W	1957/08 1704	6 6	FR 0065	24/69/10/1:0	DO		2201654 ()	BLUE CLAY 0015 BLUE LMSN 0069
KINGSTON TOWNSHIP CON 06 033	18 383425 4908695 W	1960/08 1704	6 6	FR 0075	52/95/0/2:0	ST DO		2201655 ()	LOAM 0003 BLUE LMSN 0095
KINGSTON TOWNSHIP CON 06 033	18 383564 4908973 W	1973/09 2402	6					2206395 () A	LOAM 0002 BLUE LMSN 0160 GRNT 0250
KINGSTON TOWNSHIP CON 06 033	18 383629 4909121 W	1983/06 1704	6	UK 0040 UK 0095	49/109/25/1:0	DO		2209607 ()	LOAM 0002 BLUE LMSN 0109
KINGSTON TOWNSHIP CON 06 033	18 383559 4908986 W	1974/06 3202	6 6	FR 0139	70/85/15/2:0	DO		2206707 ()	BRWN FILL 0001 BRWN LMSN SHLE 0003 BLUE LMSN 0138 GREN LMSN 0142
KINGSTON TOWNSHIP CON 06 033	18 383659 4909053 W	1973/10 2402	6 58	FR 0040 FR 0055	18/22/40/1:0	DO		2206380 ()	LOAM 0004 LMSN 0060
KINGSTON TOWNSHIP CON 06 033	18 383570 4908985 W	1973/09 2402	6					2206374 () A	LOAM 0002 BLUE LMSN 0130
KINGSTON TOWNSHIP CON 06 033	18 383540 4908922 W	1971/11 1704	6	FR 0060 FR 0115	18/115/5/1:0	DO		2205703 ()	GREY SHLE 0004 BLUE LMSN 0120
KINGSTON TOWNSHIP CON 06 033	18 383550 4908932 W	1972/02 3202	6	FR 0065 FR 0116	30/115/5/2:0	DO		2205826 ()	BRWN LOAM 0002 BLUE LMSN 0003 BRWN OBDN 0004 BLUE LMSN 0120
KINGSTON TOWNSHIP CON 06 033	18 383625 4908644 W	1974/09 3202	6 6	FR 0060	27/60/9/2:0	DO		2206816 ()	BRWN FILL 0003 BLUE LMSN 0067
KINGSTON TOWNSHIP CON 06 034	18 383695 4909078 W	2004/06 1519	5.90	FR 0052 FR 0115	70/82/4/1:0	DO		2218294 (Z12435) A012361	LOAM 0002 SHLE 0010 LMSN 0116
KINGSTON TOWNSHIP CON 06 034	18 383730 4909122 W	1979/02 2402	6 6	FR 0026	20/54/3/1:0	DO		2208732 ()	CLAY 0004 LMSN 0060
KINGSTON TOWNSHIP CON 06 034	18 383829 4909221 W	1983/06 3202	6	FR 0036 FR 0067	6/66/6/2:0	DO		2209620 ()	BRWN SAND BLDR 0026 BLUE LMSN 0072
KINGSTON TOWNSHIP CON 06 034	18 383653 4909035 W	1955/07 4742	6 6	FR 0035 FR 0045	18/40/3/0:30	DO		2201659 ()	BRWN CLAY 0003 LMSN 0009 BLUE LMSN 0046
KINGSTON TOWNSHIP CON 06 034	18 383600 4908631 W	1992/05 3202	6	FR 0074	36/70/10/2:0	DO		2214043 (120230)	BRWN CLAY 0001 BRWN SHLE 0005 BLUE LMSN 0039 GREN LMSN 0046 BLUE LMSN 0073 BRWN LMSN 0075 BLUE LMSN 0081
KINGSTON TOWNSHIP CON 06 034	18 383750 4909222 W	1978/11 1519	6	FR 0110	75/85/10/0:30	DO		2208393 ()	LOAM 0003 LMSN 0117
KINGSTON TOWNSHIP CON 06 034	18 383057 4908572 W	1989/08 3202	6	FR 0032 FR 0104	30/104/6/2:0	DO		2212538 (53817)	BLUE CLAY 0005 BLUE LMSN 0018 BRWN LMSN 0019 BLUE LMSN 0098 GREN LMSN 0104 GREY LMSN 0114
KINGSTON TOWNSHIP CON 06 034	18 383729 4909121 W	1983/07 1704			50/114/7/1:0	DO		2209594 ()	PRDG 0062 UNKN 0114

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
KINGSTON TOWNSHIP CON 06 034	18 383720 4908658 W	1956/11 1704	6 6	FR 0040	10/10/10/1:0	DO		2201663 ()	CLAY 0012 LMSN 0042

Notes:
UTM: UTM in Zone, Eas□ng, Northing and Datum is NAD83; L: UTM es□mated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Sta□c Water Level in Feet / Water Level A□er Pumping in Feet / Pump Test Rate in GPM / Pump Test Dura□on in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Par□al Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

Neighbour Well Information
Project: ASC-458
Client: BPE Development

Well ID	Address	Well Depth (m)	Initial Static Tape Reading August 7, 2018	Initial Static Tape Reading September 17 , 2018	Initial Static Tape Reading December 4, 2018	Inferred well tag ID	Treatment Systems	Zone	Easting	Northing
OW1	2196 Battersea Road	19.00	5.15	4.90	3.54	2205814	-	18T	383371.82 m E	4908290.10 m N
OW2	2217 Battersea Road	26.15	5.05	5.43	0.22	A092918	Water softner	18T	383259.21 m E	4908376.22 m N
OW3	2225 Battersea Road	26.50	5.62	6.55	3.61	-	Water softner	18T	383319.17 m E	4908441.93 m N
OW4	2224 Battersea Road	21.00	4.95	4.37	4.08	2205336	UV light, particle filter	18T	383415.84 m E	4908414.87 m N
OW5	2252 Battersea Road	36.58	6.82	8.84	-	2215119	-	18T	383496.68 m E	4908582.43 m N
OW6	799 Unity Road	19.00	13.54	13.84	8.45	-	UV light, water softener	18T	383655.45 m E	4908588.49 m N
OW7	808 Unity Road	26.00	12.44	11.65	6.16	2206816	-	18T	383617.45 m E	4908712.50 m N
OW8	796 Unity Road	18.43	10.14	11.41	5.71	-	Water softener (added UV light before December)	18T	383680.21 m E	4908756.60 m N
OW9	2245 Battersea Road	72.23	27.75	29.01	26.59	2207426	UV light, reverse osmosis, some filters, H2O2 for aesthetic	18T	383309.61 m E	4908581.43 m N
OW10	874 Unity Road	35.05	13.34	8.96	5.59	2206215	Reverse osmosis	18T	383293.21 m E	4908690.17 m N
OW11	896 Unity Road	21.64	12.51	12.31	10.11	2206816	Water softener, UV light	18T	383199.89 m E	4908810.94 m N
OW12	904 Unity Road A	34.40	16.57	-	-	2211939	"Shock well"	18T	383038.81 m E	4908733.05 m N
OW13	904 Unity Road B	44.20	18.91	-	-	-	-	18T	383050.04 m E	4908758.85 m N
OW14	942 Unity Road	25.60	17.46	18.01	11.48	A034124	Reverse osmosis, UV light, water softener	18T	382937.40 m E	4908633.86 m N
OW15	2329 Battersea Road	42.34	21.87	22.52	9.24	2205826	-	18T	383533.30 m E	4908954.11 m N
OW16	2359 Battersea Road	33.13	26.68	25.27	13.03	2209607	Water softner	18T	383594.38 m E	4909069.91 m N
OW17	2370 Battersea Road	35.50	22.31	22.70	10.20	A012361	Water softner	18T	383700.26 m E	4909098.91 m N
OW18	885 Unity Road	22.50	8.75	8.38	2.91	-	-	18T	383256.66 m E	4908478.31 m N
OW19	2467 Battersea Road	-	-	10.41	7.28	-	-	18T	383794.35 m E	4909591.64 m N
OW20	2285 Battersea Road	25.29	x	14.51	11.45	A132872	-	18T	383470.59 m E	4908729.52 m N
OW21	2228 Battersea Road	28.35	x	5.72	2.98	2205336	Filter system, water softener	18T	383416.23 m E	4908451.00 m N
OW22	791 Unity Road	40.23	-	19.22	14.02	2210469/2210358	-	18T	383704.29 m E	4908596.81 m N
OW23	2347 Battersea Road	28.01	-	24.46	11.70	2208489	-	18T	383569.13 m E	4909033.31 m N
OW24	2336 Battersea Road	35.97	x	21.26	9.25	220863	Reverse osmosis and water softener	18T	383627.22 m E	4908928.93 m N
OW25	2280 Battersea Road	-	x	x	2.20	-	-	18T	-	-
OW26	2280 Battersea Road	-	x	x	7.99	-	-	18T	-	-
OW27	2280 Battersea Road	-	x	x	5.19	-	-	18T	-	-

Notes			
	1	-	Permission not obtained by property owner/information not available
	2	x	Technical restraint (inacessible well, well under construction, etc)

APPENDIX E
Test Pit Logs and Grain Size Analyses

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088

Test Pit Logs

Project No.:	ASC-438
Project:	Test Pit Investigation
Client:	BPE Development
Date:	May 3rd, 2018
Location:	2285 Battersea Rd., Kingston, ON

TP I.D.	Depth(m)	Moisture	Colour	Soil Type	Sample Number	Rock Depth (m)
TP1	0.0 - 0.2	Dry	Brown	Top Soil	-	
	0.2 - 0.55	Dry	Brown	Sandy Silt	SA-1	
	0.55-1.6	Dry	Light Brown	Clayey Sand Some Limestone and Granite Cobbles	SA-2	1.60
	End of Test Pit at target depth of 1.6 metres on inferred Limestone Bedrock					
TP2	0.0 - 0.25	Dry	Brown	Top Soil	-	
	0.25 - 0.45	Dry	Brown	Sandy Silt	-	
	0.45 - 0.9	Dry	Light Brown	Gravely Sand Some Limeston and Granite Cobbles	-	0.90
	End of Test Pit at target depth of 0.9m on inferred Bedrock					
TP3	0.0 - 0.65	Dry	Brown	Top Soil	SA-1	0.65
	End of Test Pit at target depth of 0.65 metres on inferred Bedrock					
TP4	0.0 - 0.3	Dry	Brown	Top Soil	-	
	0.3 - 0.65	Dry	Brown	Sandy Silt	-	0.65
	End of Test Pit at target depth of 0.65 metres on inferred Bedrock					
TP5	0.0 - 0.25	Dry	Brown	Top Soil	-	
	0.25 - 0.95	Dry	Brown	Sandy Silt some Limestone and Granite Gravel and Cobbles	-	0.95
	End of Test Pit at target depth of 0.95 metres on inferred Bedrock					
TP6	0.0 - 0.25	Dry	Brown	Top Soil	SA-1	
	0.25 - 0.45	Dry	Brown	Sandy Silt	-	
	0.45 - 1.7	Damp to Wet	Light Brown	Gravely Sand Some Limeston and Granite Cobbles	SA-2	1.70
	End of Test Pit at target depth of 1.7 metres on inferred Bedrock					
TP7	0.0 - 0.25	Dry	Brown	Top Soil	-	
	0.25 - 0.50	Dry	Brown	Gravely Sand Some Limeston and Granite Cobbles	-	0.50
	End of Test Pit at target depth of 0.50m on inferred Bedrock					
TP8	0.0 - 0.25	Dry	Brown	Top Soil	-	
	0.25 - 0.50	Dry	Brown	Sandy Silt	-	
	0.50 - 1.2	Dry	Brown	Sand some Gravel and Limestone and Granite Cobbles	SA-1	1.20
	End of Test Pit at target depth of 1.2m on inferred Bedrock					
TP9	0.0 - 0.30	Dry	Brown	Top Soil	SA-1	
	0.30 - 0.7	Dry	Brown	Sandy Silt	-	
	0.7 - 1.55	Dry	Brown	Sand and Gravel some Limestone and Granite Cobbles	SA-2	1.55
	End of Test Pit at target depth of 1.55m on inferred Bedrock					
TP10	0.0 - 0.20	Dry	Brown	Top Soil	-	
	0.20 - 0.70	Dry	Brown	Sandy Silt and Gravel some Limestone and Granite Cobble	-	0.70
	End of Test Pit at target depth of 0.70m on inferred Bedrock					
TP11	0.0 - 0.25	Dry	Brown	Top Soil	-	
	0.30 - 0.45	Dry	Light Brown	Sandy Silt and Gravel some Limestone and Granite Cobble	SA-1	
	0.45 - 0.65	Dry	Light Brown	Shale	-	0.65
	End of Test Pit at target depth of 0.65m on infered Bedrock					
TP12	0.0 - 0.30	Dry	Brown	Top Soil	SA-1	0.30
	End of Test Pit at target depth of 0.30m on inferred Bedrock					
TP13	0.0 - 0.40	Dry	Brown	Top Soil trace Limestone and Granite Cobbles	SA-1	0.40
	End of Test Pit at target depth of 0.40m on inferred Bedrock					
TP14	0.0 - 0.30	Dry	Brown	Top Soil	-	
	0.30 - 0.40	Dry	Brown	Sandy Silt	-	0.40
	End of Test Pit at target depth of 0.40m on inferred Bedrock					

Notes

" - " Denotes no soil sample taken from the test pit for range of depth indicated in table

SNC·LAVALIN

SNC-Lavalin GEM Ontario Inc.
1164 Clyde Court
Kingston, Ontario K7P 2E4
(613) 389-178 (613) 389-4204

Grain Size Analysis Test Report

Project No.: 18-2390-01 **Project Description:** Lab Testing **Date:** May 11, 2018

Project Location: **Contract No.:**

SAMPLE DATA

Material: Sand
Date Sampled: May 10, 2018
Time Sampled:
Sample Type: Stockpile
Sample Location: TPS-SA-2
Lot: **Sublot:**
Source: ASC Enviromental
Sampled By: Client

LAB DATA

Lab No.: 17918 **Date Tested:** May 11, 2018

Specification: ,

PARTICLE ANALYSIS

TEST	Sample	Specification
Percent Crushed:		
% Asphalt Coated:		
% Flat and Elongated		

WASH PASS 0.075mm

TEST	Sample	Specs
Wash Pass 0.075 mm:		
FINENESS MODULUS	3.61	

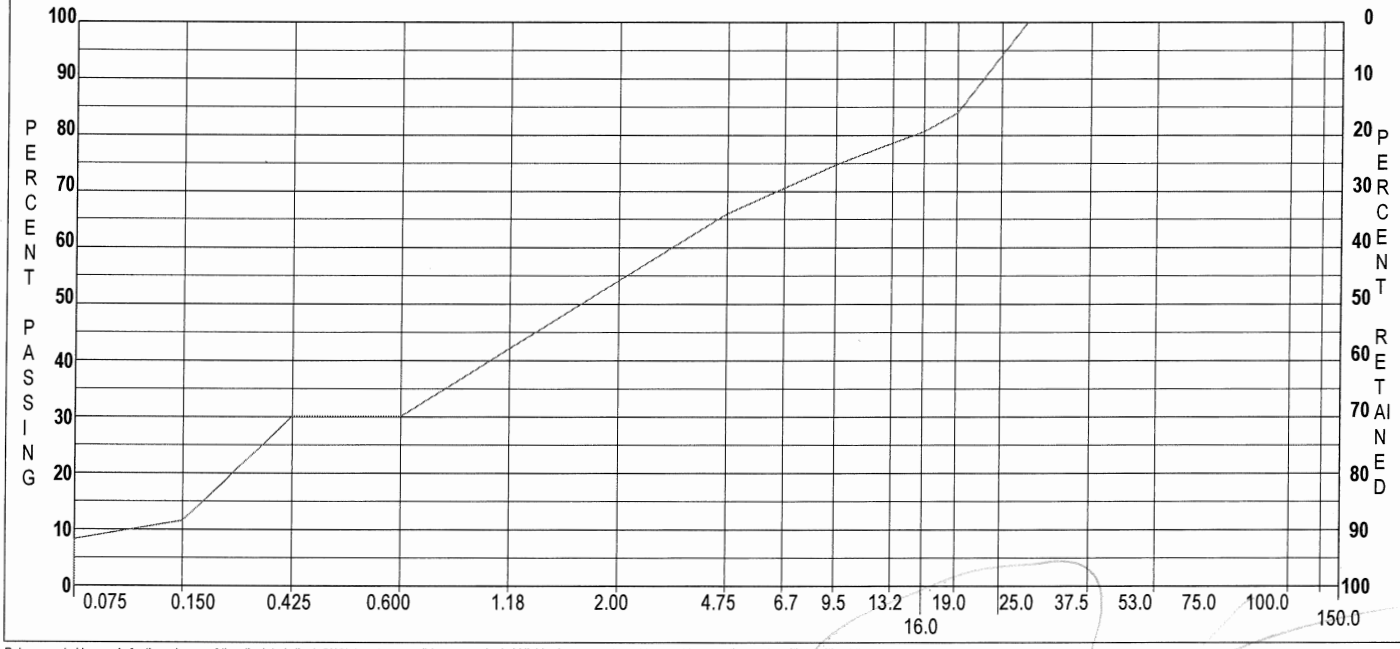
Comments:

Grain Size Analysis

Sieve Sizes (mm)	Percent Passing	
	Sample	Specification
150.0		
100.0		
75.0		
53.0		
50.0		
37.5		
26.5	100	
25.0		
19.0	84	
16.0	80.7	
13.2	78.6	
9.5	75	
6.7		
4.75	66	
2.36	55.5	
2.00		
1.18	42.1	
0.600	30.1	
0.425		
0.300	30.1	
0.150	11.6	
0.075	8.3	

* Indicates Out of Specification

Sample: ..... **Specs:** .....



Project Manager: Mark McClelland, C.E.T

SNC·LAVALIN

SNC-Lavalin GEM Ontario Inc.
1164 Clyde Court
Kingston, Ontario K7P 2E4
(613) 389-178 (613) 389-4204

Grain Size Analysis Test Report

Project No.: 18-2390-01 **Project Description:** Lab Testing **Date:** May 11, 2018

Project Location: **Contract No.:**

SAMPLE DATA

Material: Sand
Date Sampled: May 10, 2018
Time Sampled:
Sample Type: Stockpile
Sample Location: TP#8 SA-1
Lot: **Sublot:**
Source: ASC Eviromental
Sampled By: Client

LAB DATA

Lab No.: 17917 **Date Tested:** May 11, 2018

Specification: ,

PARTICLE ANALYSIS

TEST	Sample	Specification
Percent Crushed:		
% Asphalt Coated:		
% Flat and Elongated		

WASH PASS 0.075mm

TEST	Sample	Specs
Wash Pass 0.075 mm:		

FINENESS MODULUS	2.27

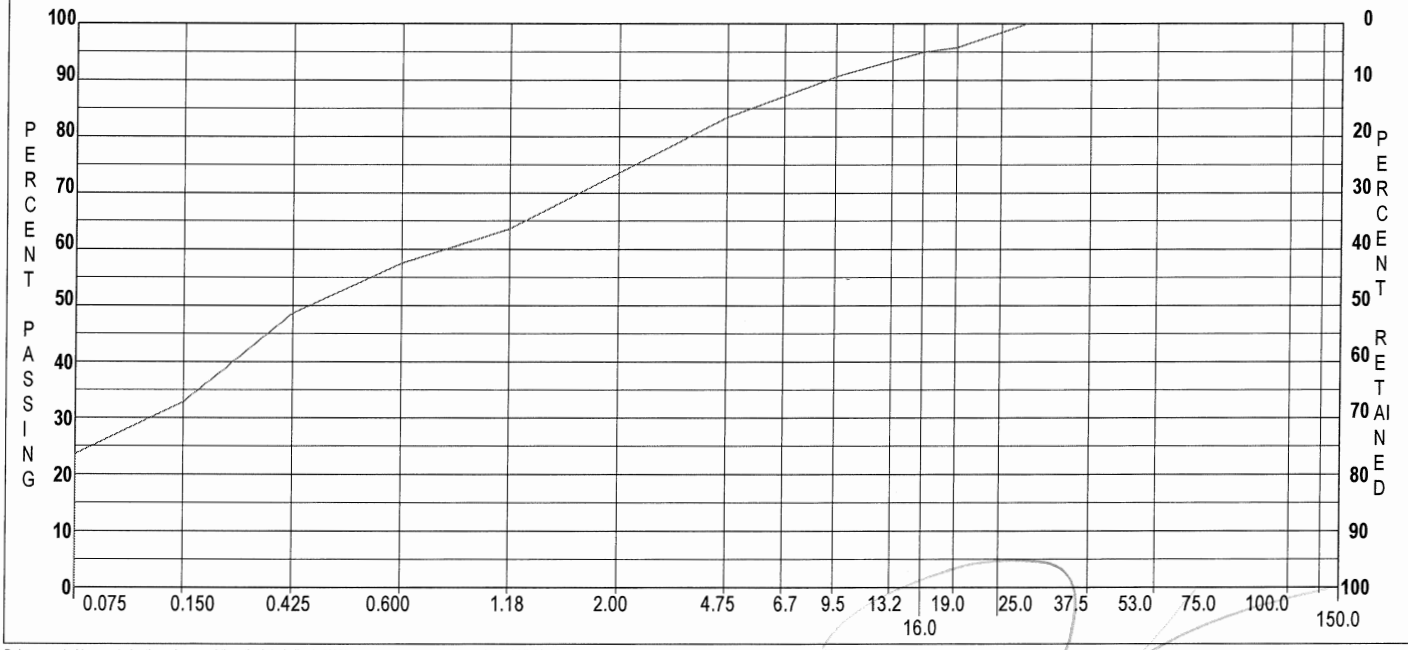
Comments:

Grain Size Analysis

Sieve Sizes (mm)	Percent Passing	
	Sample	Specification
150.0		
100.0		
75.0		
53.0		
50.0		
37.5		
26.5	100	
25.0		
19.0	95.8	
16.0	95	
13.2	93.5	
9.5	90.8	
6.7		
4.75	83.4	
2.36	72.4	
2.00		
1.18	63.6	
0.600	57.5	
0.425		
0.300	48.6	
0.150	32.8	
0.075	23.6	

* Indicates Out of Specification

Sample: ..... **Specs:** .....



Project Manager: Mark McClelland, C.E.T

Groundwork Engineering Limited

Site Inspection

Project Information				
Project Type:	**Geotechnical Investigation**			**Project Number**
Project Name:	**Battersea Road Development**			**GW-18004-7**
Project Address:	**2285 Battersea Road, Kingston, ON**			
Date:	**July 30, 2018**	**Time:**	**9:00 am**	

Site Conditions	
Weather:	**24 C, sunny, light wind**
Labour Force:	**1 Civil Eng. Technologist, 2 ASC Environmental Personnel**
Equipment:	**Permeameter, Shovel, 20L Water tank, Measuring tape, Rubber mallet**

Findings

- **(3) Test oles were augured appro imately 400-500mm deep in specified areas as selected by ASC Env.**
- **The Constant ead Well (PASK) Permeameter Single Ponded eight Method was used to determine the Percolation Rate of the soil in each hole augured. Measurements were ta en of time for nown volume of water to infiltrate soil. These measurements were converted to an infiltration rate.**
- **Test ole 1: Percolation Rate of 104 min cm**
- **Test ole 2: Percolation Rate of 87 min cm**
- **Test ole 3: Percolation Rate of 264 min cm**

Site Inspected By

Inspectors Name: **Ross Lee** **Date:** **31/07/18**

Signature:

Unit 640 – 654 Norris Ct Kingston, ON K7P-2R9
Tel: (613)-634-1789
www.groundengineer.ca

APPENDIX F
On-Site Test Well Drawdown and Recovery Data and Neighbouring Well Responses

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088

Well I.D.	Elevation (m)	Groundwater Elevation (m)									
		7-Aug-18		17-Sep-18		16-Nov-18		4-Dec-18		28-Jan-19	
		Water Depth (m)	Groundwater Elevation (m)	Water Depth (m)	Groundwater Elevation (m)	Water Depth (m)	Groundwater Elevation (m)	Water Depth (m)	Groundwater Elevation (m)	Water Depth (m)	Groundwater Elevation (m)
TW1	133.288	35.220	**98.068**	35.540	**97.748**	32.96	**100.328**	32.964	**100.324**	33.482	**99.806**
TW2	131.609	-	**-**	34.442	**97.167**	31.9	**99.709**	31.897	**99.712**	32.339	**99.270**
TW3	133.818	-	**-**	-	**-**	33.53	**100.288**	33.528	**100.290**	33.437	**100.381**
2196 Battersea Rd. (OW1)	117.500	5.150	**112.350**	4.900	**112.600**	-	**-**	3.540	**113.960**	-	**-**
2217 Battersea Rd. (OW2)	122.000	5.050	**116.950**	5.430	**116.570**	-	**-**	0.220	**121.780**	-	**-**
2225 Battersea Rd. (OW3)	121.500	5.620	**115.880**	6.550	**114.950**	-	**-**	3.610	**117.890**	-	**-**
2224 Battersea Rd. (OW4)	118.500	4.950	**113.550**	5.370	**113.130**	-	**-**	4.080	**114.420**	-	**-**
799 Unity Rd. (OW6)	122.000	13.540	**108.460**	13.840	**108.160**	-	**-**	8.450	**113.550**	-	**-**
808 Unity Rd. (OW7)	123.500	12.435	**111.065**	11.540	**111.960**	-	**-**	6.157	**117.343**	-	**-**
796 Unity Rd. (OW8)	122.500	10.140	**112.360**	11.410	**111.090**	-	**-**	5.710	**116.790**	-	**-**
2245 Battersea Rd. (OW9)	126.500	27.750	**98.750**	29.010	**97.490**	-	**-**	26.594	**99.906**	-	**-**
874 Unity Rd. (OW10)	130.500	13.335	**117.165**	8.961	**121.539**	-	**-**	5.590	**124.910**	-	**-**
896 Unity Rd. (OW11)	136.500	12.512	**123.988**	12.314	**124.186**	-	**-**	10.110	**126.390**	-	**-**
942 Unity Rd. (OW14)	135.000	17.456	**117.544**	18.014	**116.986**	-	**-**	11.480	**123.520**	-	**-**
2329 Battersea Rd. (OW15)	134.500	21.869	**112.631**	22.520	**111.980**	-	**-**	9.240	**125.260**	-	**-**
2359 Battersea Rd. (OW16)	136.000	26.676	**109.324**	25.270	**110.730**	-	**-**	13.030	**122.970**	-	**-**
2370 Battersea Rd. (OW17)	133.500	22.311	**111.189**	22.700	**110.800**	-	**-**	10.200	**123.300**	-	**-**
885 Unity Rd. (OW18)	126.000	8.748	**117.252**	8.380	**117.620**	-	**-**	2.910	**123.090**	-	**-**
2467 Battersea Rd. (OW19)	135.000	-	**-**	10.410	**124.590**	-	**-**	7.280	**127.720**	-	**-**
2285 Battersea Rd. (OW20)	129.818	-	**-**	14.508	**115.310**	-	**-**	11.445	**118.373**	12.110	**117.708**
2228 Battersea Rd. (OW21)	120.500	-	**-**	5.720	**114.780**	-	**-**	2.980	**117.520**	-	**-**
791 Unity Rd. (OW22)	121.500	-	**-**	19.220	**102.280**	-	**-**	14.018	**107.482**	-	**-**
2347 Battersea Rd. (OW23)	135.500	-	**-**	24.460	**111.040**	-	**-**	11.700	**123.800**	-	**-**
2336 Battersea Rd. (OW24)	132.000	-	**-**	21.260	**110.740**	-	**-**	9.250	**122.750**	-	**-**

Notes:

"-" denotes not measured

Groundwater level measurements were taken from top of test well casing, and calculated from casing elevation

Elevations referenced to geodetic datum

Table D1. Water Quality Field Measurements.

	Field Water Quality Analysis		Test Well:	TW1
	Project No.:	ASC-458	Date:	7-Aug-18
	Client:	BPE Development	Recorded By: J.P.	
	Location:	2285 Battersea Road, Kingston, ON		
	Started pumping 30 L/min at 5:12 pm			

Pumping Test Elapsed Time (min)	Odour	Temperature (°C)	pH	Conductivity (µS)	Total Dissolved Solids (ppm)	Turbidity NTU	Chlorine (Total) (mg/L)
5	None	12.6	7.86	2832	1361	53	>2.20
15	None	11.6	7.57	3146	1570	10	0.95
35	None	11.4	7.43	3436	1719	17	0.13
65	None	12.2	7.46	3279	1378	38	0.16
95	None	11.1	7.45	2885	1445	9	0.3
128	None	11.6	7.51	2717	1358	3	0.08
158	None	11.3	7.51	2567	1282	0	0.05
198	None	11.6	7.53	2465	1237	0	0.00
242	None	10.5	7.63	2384	1193	0	0.00
293	None	10.5	7.57	2324	1162	0	0.00
333	None	10.6	7.60	2266	1136	0	0.00
363	None	10.5	7.65	2231	1116	0	0.00
393	None	10.3	7.66	2188	1094	0	0.00
423	None	10.4	7.67	2170	1085	0	0.00
483	None	10.4	7.69	2154	1077	0	0.00
543	None	10.4	7.71	2117	1061	0	0.00
603	None	10.5	7.42	2097	1047	0	0.00
663	None	10.4	7.90	2060	1030	0	0.00
723	None	10.3	7.88	2035	1020	0	0.00
813	None	10.6	8.25	2021	1011	0	0.00
873	None	11.1	8.37	2012	1006	0	0.00
933	None	11.0	8.55	2004	991	0	0.00
963	None	11.0	8.45	1988	994	0	0.00
993	None	11.6	8.46	1981	984	0	0.00
1023	None	11.1	8.47	1959	980	0	0.00
1053	None	11.4	8.51	1958	979	0	0.00
1083	None	11.1	8.36	1959	969	0	0.00
1113	None	11.3	8.57	1975	983	0	0.00
1143	None	11.0	8.67	1853	969	0	0.00
1173	None	11.9	7.56	1934	966	0	0.00
1203	None	11.5	7.58	1972	962	0	0.00
1233	None	12.0	7.91	1980	963	0	0.00
1263	None	11.3	7.80	1920	960	0	0.00
1293	None	11.0	7.50	1909	946	0	0.00
1323	None	10.9	7.42	1898	954	0	0.00
1353	None	10.8	7.51	1895	950	0	0.00
1383	None	11.6	7.62	1882	940	0	0.00
1413	None	11.8	7.58	1886	942	0	0.00
1443	None	11.3	7.65	1889	947	0	0.00
1473	None	11.0	7.70	1886	944	0	0.00
1503	None	11.0	7.69	1909	947	0	0.00
1533	None	11.7	7.65	1884	940	0	0.00
1563	None	10.4	7.67	1873	936	0	0.00
1623	None	10.6	7.72	1861	930	0	0.00
1683	None	10.3	7.74	1860	930	0	0.00
1743	None	10.4	7.79	1853	928	0	0.00
1803	None	10.3	7.75	1850	924	0	0.00
1863	None	10.3	7.20	1838	919	0	0.00
1923	None	10.4	7.77	1837	918	0	0.00
1983	None	10.2	7.64	1827	914	0	0.00
2043	None	10.2	7.64	1821	911	0	0.00
2103	None	10.3	7.73	1816	909	0	0.00
2163	None	10.3	7.76	1810	906	0	0.00
2223	None	10.3	7.80	1803	903	0	0.00
2283	None	10.4	7.81	1795	898	0	0.00
2313	None	10.6	7.86	1804	901	0	0.00
2343	None	10.8	7.66	1800	899	0	0.00
2373	None	10.8	8.55	1803	899	0	0.00
2403	None	11.1	8.56	1804	901	0	0.00
2433	None	11.2	7.65	1805	905	0	0.00
2463	None	11.5	7.80	1780	901	0	0.00
2493	None	11.3	7.65	1800	898	0	0.00
2523	None	11.3	8.14	1843	916	0	0.00
2553	None	11.4	8.77	1783	891	0	0.00
2583	None	12.3	8.22	1778	888	0	0.00
2613	None	11.9	8.17	1750	891	0	0.00
2643	None	12.1	8.19	1755	885	0	0.00
2673	None	13.6	8.02	1781	888	0	0.00
2703	None	11.6	7.84	1844	889	0	0.00
2733	None	11.6	7.67	1799	880	0	0.00
2763	None	11.4	7.57	1753	877	0	0.00
2793	None	11.3	7.85	1754	87	0	0.00
2823	None	11.4	8.77	1760	890	0	0.00
2853	None	11.3	8.50	1766	98	0	0.00
2883	None	11.5	8.60	1741	870	0	0.00

Notes			
	1	<	indicates values lower than minimum detection limits of analysis equipment
	2	-	not analyzed

Field Analysis Equipment	
Chlorine :	Hach DR 890 Colorimeter, DPD Total Chlorine Reagent
Temp./pH/Cond./TDS :	Hanna HI 98130 Meter
Turbidity :	Hach DR 890 Colorimeter

Table D2. Test Well drawdown during pumping test.

	Pumping Test - Drawdown		Test Well: TW1	
	Project No.:	ASC-458	Date:	7-Aug-2018
	Client:	BPE Development	Recorded By: J.P.	
	Location:	2285 Battersea Road, Kingston, ON		

Pumping Rate (Q) (L/min)	Elapsed Time (ET) (min)	Well Level (WL) (m)	Drawdown (DD) (m)
30	0	35.22	0.00
30	1	35.96	0.74
30	2	36.07	0.85
30	3	36.15	0.93
30	4	36.20	0.98
30	5	36.23	1.01
30	6	36.26	1.04
30	7	36.28	1.06
30	8	36.31	1.09
30	9	36.33	1.11
30	10	36.35	1.13
30	15	36.44	1.22
30	20	36.53	1.31
30	25	36.61	1.39
30	30	36.68	1.46
30	40	36.82	1.60
30	50	36.94	1.72
30	60	37.06	1.84
30	70	37.17	1.94
30	80	37.27	2.04
30	90	37.36	2.14
30	100	37.44	2.22
30	125	37.64	2.42
30	150	37.82	2.60
30	175	37.98	2.76
30	200	38.12	2.90
30	250	38.35	3.13
30	300	38.53	3.31
30	350	38.67	3.45
30	400	38.78	3.56
30	450	38.86	3.64
30	500	38.93	3.71
30	1000	39.21	3.99
30	1500	39.25	4.03
30	2000	39.28	4.06
30	2884	39.32	4.10

ASC Environmental Inc.
ASC-458 - BPE Development, 2285 Battersea Road, Kingston, Ontario
Figure 1 TW1 Pumping Test Drawdown

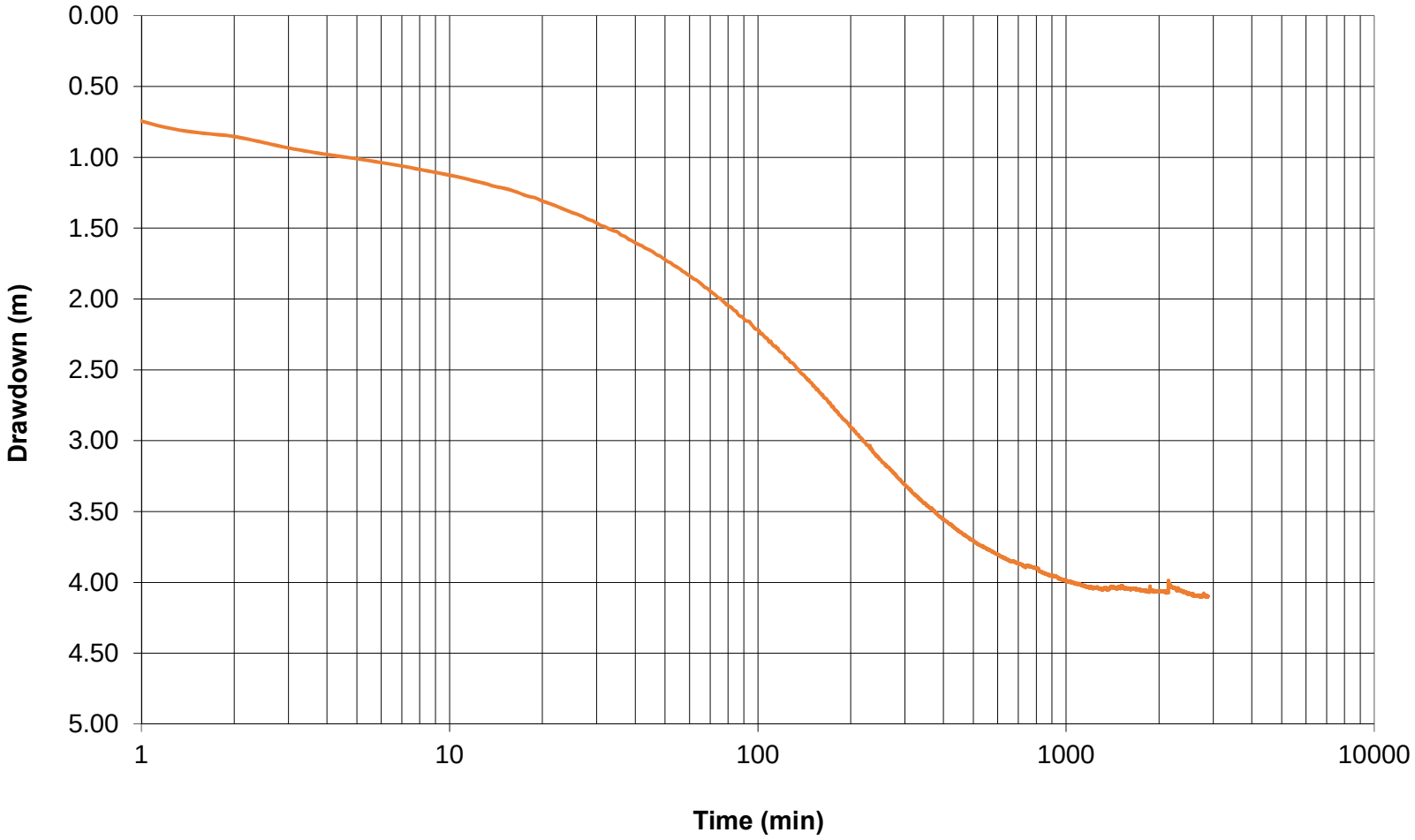


Table D3. Observation well drawdown during pumping test.

	Pumping Test - Drawdown		Test Well:	TW1
	Project No.:	ASC-458	Date:	7-Aug-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	17 12	PM

OW1 (2196 Battersea Rd.)					OW2 (2217 Battersea Rd.)				
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)
16.896	5.150	0.000	12 35	0	16.568	5.050	0.000	12 45	0
16.980	5.176	0.026	18 16	64	16.850	5.136	0.086	18 19	67
16.950	5.166	0.016	20 55	223	17.750	5.410	0.360	21 0	228
17.000	5.182	0.032	22 46	334	18.050	5.502	0.452	22 50	338
16.900	5.151	0.001	24 22	430	17.300	5.273	0.223	24 28	436
16.850	5.136	-0.014	26 10	538	15.900	4.846	-0.204	26 14	542
16.750	5.105	-0.045	28 51	699	16.800	5.121	0.071	28 55	703
16.850	5.136	-0.014	30 16	784	17.200	5.243	0.193	30 20	788
16.800	5.121	-0.029	31 57	885	16.950	5.166	0.116	32 0	888
16.800	5.121	-0.029	33 23	971	16.950	5.166	0.116	33 33	981
26.550	8.092	2.942	35 23	1091	18.500	5.639	0.589	35 28	1096
16.530	5.038	-0.112	36 53	1181	17.050	5.197	0.147	36 57	1185
16.550	5.044	-0.106	38 19	1267	16.200	4.938	-0.112	38 22	1270
16.500	5.029	-0.121	39 57	1365	17.300	5.273	0.223	40 0	1368
16.200	4.938	-0.212	41 54	1482	15.300	4.663	-0.387	41 57	1485
16.050	4.892	-0.258	43 48	1596	15.100	4.602	-0.448	43 50	1598
16.000	4.877	-0.273	45 22	1690	14.650	4.465	-0.585	45 28	1696
15.950	4.862	-0.288	47 17	1805	12.850	3.917	-1.133	47 22	1810
16.000	4.877	-0.273	48 40	1888	14.700	4.481	-0.569	48 45	1893
16.850	5.136	-0.014	51 21	2049	13.200	4.023	-1.027	51 25	2053
15.900	4.846	-0.304	53 25	2173	14.100	4.298	-0.752	53 30	2178
16.450	5.014	-0.136	55 51	2319	13.260	4.042	-1.008	55 56	2324
15.850	4.831	-0.319	57 49	2437	13.200	4.023	-1.027	57 52	2440
15.750	4.801	-0.349	59 22	2530	13.300	4.054	-0.996	59 26	2534
15.000	4.572	-0.578	60 58	2626	13.025	3.970	-1.080	61 4	2632
15.518	4.730	-0.420	62 24	2712	12.795	3.900	-1.150	62 27	2715
18.373	5.600	0.450	63 45	2793	13.419	4.090	-0.960	63 51	2799

OW3 (2225 Battersea Rd.)					OW4 (2224 Battersea Rd.)				
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)
18.438	5.620	0.000	13 33	0	16.240	4.950	0.000	12 55	0
18.500	5.639	0.019	18 40	88	16.850	5.136	0.186	18 45	93
18.550	5.654	0.034	21 5	233	16.850	5.136	0.186	21 10	238
18.500	5.639	0.019	22 57	345	16.850	5.136	0.186	23 0	348
18.300	5.578	-0.042	24 38	446	16.750	5.105	0.155	24 33	441
18.350	5.593	-0.027	26 25	553	16.750	5.105	0.155	26 30	558
18.250	5.563	-0.057	28 59	707	16.600	5.060	0.110	29 2	710
21.600	6.584	0.964	30 25	793	17.200	5.243	0.293	30 27	795
19.750	6.020	0.400	32 3	891	16.910	5.154	0.204	32 6	894
20.950	6.386	0.766	33 43	991	17.400	5.304	0.354	33 40	988
18.700	5.700	0.080	35 35	1103	16.900	5.151	0.201	35 30	1098
18.880	5.755	0.135	37 2	1190	17.500	5.334	0.384	37 5	1193
18.800	5.730	0.110	38 26	1274	16.900	5.151	0.201	38 28	1276
18.830	5.739	0.119	40 4	1372	17.200	5.243	0.293	39 10	1318
18.700	5.700	0.080	42 5	1493	16.500	5.029	0.079	42 0	1488
15.750	4.801	-0.819	43 55	1603	15.650	4.770	-0.180	44 0	1608
15.400	4.694	-0.926	45 37	1705	15.300	4.663	-0.287	45 44	1712
15.300	4.663	-0.957	47 25	1813	14.100	4.298	-0.652	47 28	1816
15.250	4.648	-0.972	48 50	1898	15.100	4.602	-0.348	48 54	1902
15.050	4.587	-1.033	51 27	2055	14.900	4.542	-0.408	51 31	2059
14.900	4.542	-1.078	53 34	2182	15.750	4.801	-0.149	53 38	2186
15.400	4.694	-0.926	56 1	2329	14.750	4.496	-0.454	56 5	2333
15.100	4.602	-1.018	57 57	2445	14.700	4.481	-0.469	58 0	2448
15.100	4.602	-1.018	59 33	2541	14.700	4.481	-0.469	59 30	2538
15.100	4.602	-1.018	61 7	2635	14.800	4.511	-0.439	61 5	2633
14.698	4.480	-1.140	62 32	2720	14.436	4.400	-0.550	62 35	2723
14.698	4.480	-1.140	63 54	2802	14.436	4.400	-0.550	63 56	2804
15.256	4.650	-0.970	64 30	2838	14.469	4.410	-0.540	64 5	2813

	Pumping Test - Drawdown		Test Well:	TW1
	Project No.:	ASC-458	Date:	7-Aug-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	17 12	PM

OW5 (2252 Battersea Rd.)						OW6 (799 Unity Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
22.375	6.820	0.000	13	11	0	44.423	13.540	0.000	13	15	0
22.650	6.904	0.084	18	48	96	45.850	13.975	0.435	17	15	3
22.700	6.919	0.099	21	18	246	49.400	15.057	1.517	21	21	249
22.650	6.904	0.084	23	5	353	44.900	13.686	0.146	23	7	355
22.550	6.873	0.053	24	43	451	44.600	13.594	0.054	24	53	461
22.550	6.873	0.053	26	34	562	44.500	13.564	0.024	26	36	564
22.400	6.828	0.008	29	6	714	44.500	13.564	0.024	29	10	718
22.620	6.895	0.075	30	30	798	44.500	13.564	0.024	30	35	803
24.200	7.376	0.556	32	7	895	44.690	13.622	0.082	32	11	899
24.800	7.559	0.739	33	53	1001	44.700	13.625	0.085	33	57	1005
23.250	7.087	0.267	35	41	1109	45.150	13.762	0.222	35	50	1118
22.950	6.995	0.175	37	8	1196	45.900	13.990	0.450	37	11	1199
22.900	6.980	0.160	38	31	1279	44.900	13.686	0.146	38	34	1282
22.950	6.995	0.175	39	14	1322	45.200	13.777	0.237	39	20	1328
19.950	6.081	-0.739	42	8	1496	44.500	13.564	0.024	42	20	1508
19.500	5.944	-0.876	44	3	1611	43.700	13.320	-0.220	44	8	1616
19.450	5.928	-0.892	47	31	1819	42.650	13.000	-0.540	46	5	1733
19.250	5.867	-0.953	48	57	1905	42.200	12.863	-0.677	47	35	1823
19.050	5.806	-1.014	51	33	2061	41.750	12.725	-0.815	49	0	1908
19.300	5.883	-0.937	53	37	2185	41.440	12.631	-0.909	51	37	2065
19.300	5.883	-0.937	56	9	2337	41.650	12.695	-0.845	53	45	2193
19.200	5.852	-0.968	58	2	2450	41.200	12.558	-0.982	56	12	2340
19.100	5.822	-0.998	59	36	2544	41.050	12.512	-1.028	58	7	2455
19.100	5.822	-0.998	61	12	2640	41.050	12.512	-1.028	59	48	2556
18.734	5.710	-1.110	62	38	2726	41.100	12.527	-1.013	61	15	2643
18.766	5.720	-1.100	63	59	2807	40.568	12.365	-1.175	62	41	2729
18.766	5.720	-1.100	64	30	2838	40.568	12.365	-1.175	64	1	2809
						40.682	12.400	-1.140	65	40	2908

OW7 (808 Unity Rd.)						OW8 (796 Unity Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
40.797	12.435	0.000	13	20	0	33.268	10.140	0.000	13	26	0
41.400	12.619	0.184	19	3	111	39.840	12.143	2.003	19	6	114
41.300	12.588	0.153	21	25	253	40.800	12.436	2.296	21	30	258
41.700	12.710	0.275	23	10	358	40.300	12.283	2.143	23	13	361
41.450	12.634	0.199	24	57	465	40.050	12.207	2.067	25	1	469
41.200	12.558	0.123	26	47	575	39.800	12.131	1.991	26	50	578
41.100	12.527	0.092	29	19	727	39.550	12.055	1.915	29	24	732
41.000	12.497	0.062	30	38	806	39.550	12.055	1.915	30	36	804
42.760	13.033	0.598	32	14	902	40.490	12.341	2.201	32	16	904
40.100	12.222	-0.213	34	4	1012	41.100	12.527	2.387	34	13	1021
39.800	12.131	-0.304	35	58	1126	40.200	12.253	2.113	36	0	1128
41.400	12.619	0.184	37	19	1207	40.050	12.207	2.067	37	23	1211
41.300	12.588	0.153	38	39	1287	40.750	12.421	2.281	38	41	1289
41.600	12.680	0.245	40	35	1403	40.300	12.283	2.143	40	32	1400
42.100	12.832	0.397	42	31	1519	40.600	12.375	2.235	42	28	1516
42.400	12.924	0.489	44	10	1618	40.800	12.436	2.296	44	12	1620
41.500	12.649	0.214	46	8	1736	40.000	12.192	2.052	46	11	1739
41.250	12.573	0.138	47	37	1825	39.750	12.116	1.976	47	41	1829
40.900	12.466	0.031	49	4	1912	39.400	12.009	1.869	49	7	1915
40.450	12.329	-0.106	51	39	2067	39.050	11.902	1.762	51	43	2071
40.250	12.268	-0.167	53	49	2197	38.700	11.796	1.656	53	52	2200
40.700	12.405	-0.030	56	22	2350	38.120	11.619	1.479	56	28	2356
42.000	12.802	0.367	58	21	2469	41.400	12.619	2.479	58	25	2473
40.950	12.482	0.047	59	58	2566	39.500	12.040	1.900	59	55	2563
40.400	12.314	-0.121	61	20	2648	39.200	11.948	1.808	61	8	2636
39.764	12.120	-0.315	62	45	2733	39.698	12.100	1.960	62	49	2737
40.453	12.330	-0.105	64	5	2813	39.764	12.120	1.980	64	10	2818
39.436	12.020	-0.415	67	25	3013	28.740	8.760	-1.380	65	50	2918

ASC ENVIRONMENTAL	Pumping Test - Drawdown		Test Well:	TW1
	Project No.:	ASC-458	Date:	7-Aug-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	17 12	PM

OW9 (2245 Battersea Rd.)					OW10 (874 Unity Rd.)				
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)
91.043	27.750	0.000	13 44	0	43.750	13.335	0.000	14 21	0
91.500	27.889	0.139	19 15	123	42.550	12.969	-0.366	19 20	128
91.450	27.874	0.124	21 35	263	43.600	13.289	-0.046	21 40	268
92.500	28.194	0.444	23 30	378	43.150	13.152	-0.183	23 35	383
92.050	28.057	0.307	25 8	476	42.325	12.901	-0.434	25 22	490
91.900	28.011	0.261	26 55	583	42.400	12.924	-0.411	27 0	588
91.900	28.011	0.261	29 29	737	42.400	12.924	-0.411	29 33	741
91.900	28.011	0.261	30 55	823	44.000	13.411	0.076	31 0	828
93.950	28.636	0.886	32 27	915	43.300	13.198	-0.137	32 30	918
92.050	28.057	0.307	34 24	1032	43.900	13.381	0.046	34 28	1036
92.000	28.042	0.292	36 5	1133	43.900	13.381	0.046	36 20	1148
92.200	28.103	0.353	37 28	1216	43.650	13.305	-0.030	37 31	1219
92.100	28.072	0.322	38 50	1298	43.500	13.259	-0.076	38 56	1304
92.000	28.042	0.292	40 43	1411	44.200	13.472	0.137	41 0	1428
92.050	28.057	0.307	42 34	1522	43.700	13.320	-0.015	42 35	1523
92.050	28.057	0.307	44 27	1635	51.800	15.789	2.454	44 35	1643
92.900	28.316	0.566	46 23	1751	50.450	15.377	2.042	46 28	1756
92.350	28.148	0.398	47 47	1835	44.700	13.625	0.290	47 55	1843
92.300	28.133	0.383	49 13	1921	47.850	14.585	1.250	49 20	1928
94.000	28.651	0.901	51 44	2072	47.450	14.463	1.128	51 53	2081
92.500	28.194	0.444	53 57	2205	48.200	14.691	1.356	54 3	2211
92.450	28.179	0.429	56 34	2362	48.100	14.661	1.326	56 38	2366
93.700	28.560	0.810	58 11	2459	48.150	14.676	1.341	58 30	2478
92.750	28.270	0.520	60 3	2571	45.700	13.929	0.594	60 10	2578
92.700	28.255	0.505	61 23	2651	46.400	14.143	0.808	61 28	2656
94.488	28.800	1.050	62 54	2742	45.932	14.000	0.665	62 59	2747
94.521	28.810	1.060	64 14	2822	46.260	14.100	0.765	64 20	2828
88.583	27.000	-0.750	68 3	3051	46.100	14.051	0.716	68 10	3058

OW11 (896 Unity Rd.)					OW12 (904 Unity Rd. A)				
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)
41.050	12.512	0.000	14 46	0	54.350	16.566	0.000	14 54	0
41.070	12.518	0.006	19 24	132	54.250	16.535	-0.030	19 29	137
41.050	12.512	0.000	21 55	283	54.350	16.566	0.000	10 0	-432
41.050	12.512	0.000	23 40	388	54.300	16.551	-0.015	11 44	-328
41.080	12.521	0.009	25 29	497	54.600	16.642	0.076	25 37	505
41.090	12.524	0.012	27 5	593	54.450	16.596	0.030	27 10	598
40.850	12.451	-0.061	29 38	746	54.400	16.581	0.015	29 44	752
40.850	12.451	-0.061	31 25	853	54.300	16.551	-0.015	31 30	858
41.900	12.771	0.259	32 36	924	54.250	16.535	-0.030	32 37	925
40.800	12.436	-0.076	34 35	1043	54.300	16.551	-0.015	34 45	1053
40.800	12.436	-0.076	36 25	1153	54.300	16.551	-0.015	36 30	1158
40.800	12.436	-0.076	37 35	1223	54.450	16.596	0.030	37 39	1227
40.800	12.436	-0.076	38 57	1305	54.400	16.581	0.015	39 3	1311
40.600	12.375	-0.137	41 5	1433	54.300	16.551	-0.015	41 13	1441
40.600	12.375	-0.137	42 35	1523	54.400	16.581	0.015	42 40	1528
40.800	12.436	-0.076	44 43	1651	54.250	16.535	-0.030	44 48	1656
48.200	14.691	2.179	46 34	1762	54.000	16.459	-0.107	46 40	1768
40.750	12.421	-0.091	48 0	1848	53.700	16.368	-0.198	48 5	1853
40.750	12.421	-0.091	49 30	1938	53.500	16.307	-0.259	49 35	1943
40.950	12.482	-0.030	51 58	2086	53.120	16.191	-0.375	52 2	2090
40.800	12.436	-0.076	54 8	2216	52.850	16.109	-0.457	54 20	2228
40.900	12.466	-0.046	56 43	2371	52.600	16.032	-0.533	56 59	2387
40.800	12.436	-0.076	58 34	2482	52.400	15.972	-0.594	58 40	2488
40.600	12.375	-0.137	60 23	2591	52.200	15.911	-0.655	60 35	2603
40.600	12.375	-0.137	61 35	2663	52.100	15.880	-0.686	61 38	2666
40.518	12.350	-0.162	63 4	2752	51.542	15.710	-0.856	63 8	2756
40.387	12.310	-0.202	64 25	2833	51.345	15.650	-0.916	64 30	2838
40.730	12.415	-0.098	67 56	3044	51.500	15.697	-0.869	65 43	2911

	Pumping Test - Drawdown		Test Well:	TW1
	Project No.:	ASC-458	Date:	7-Aug-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	17 12	PM

OW13 (904 Unity Rd. B)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
62.050	18.913	0.000	14 54	0
60.960	18.581	-0.332	19 29	137
61.350	18.699	-0.213	10 0	-432
54.300	16.551	-2.362	11 44	-328
60.400	18.410	-0.503	25 37	505
60.300	18.379	-0.533	27 10	598
60.400	18.410	-0.503	29 44	752
61.900	18.867	-0.046	31 30	858
61.800	18.837	-0.076	32 37	925
61.600	18.776	-0.137	34 45	1053
61.600	18.776	-0.137	36 30	1158
60.200	18.349	-0.564	39 3	1311
60.400	18.410	-0.503	41 13	1441
61.300	18.684	-0.229	42 40	1528
70.500	21.488	2.576	44 48	1656
57.300	17.465	-1.448	46 40	1768
65.900	20.086	1.173	48 5	1853
65.100	19.842	0.930	49 35	1943
63.950	19.492	0.579	52 2	2090
63.350	19.309	0.396	54 20	2228
63.300	19.294	0.381	56 59	2387
62.500	19.050	0.137	58 40	2488
62.500	19.050	0.137	60 35	2603
63.100	19.233	0.320	61 38	2666
63.123	19.240	0.327	63 8	2756
63.320	19.300	0.387	64 30	2838
62.650	19.096	0.183	65 43	2911

OW14 (942 Unity Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
57.270	17.456	0.000	15 10	0
57.550	17.541	0.085	19 33	141
58.400	17.800	0.344	22 0	288
59.050	17.998	0.543	23 50	398
58.250	17.755	0.299	25 42	510
57.800	17.617	0.162	27 25	613
56.750	17.297	-0.158	29 54	762
58.500	17.831	0.375	31 37	865
59.050	17.998	0.543	32 45	933
57.200	17.435	-0.021	34 56	1064
59.150	18.029	0.573	36 33	1161
57.900	17.648	0.192	37 45	1233
57.830	17.627	0.171	39 10	1318
57.800	17.617	0.162	41 30	1458
57.800	17.617	0.162	42 45	1533
55.400	16.886	-0.570	44 53	1661
54.400	16.581	-0.875	46 45	1773
53.325	16.253	-1.202	48 10	1858
52.950	16.139	-1.317	49 40	1948
53.770	16.389	-1.067	52 8	2096
53.880	16.423	-1.033	54 26	2234
53.400	16.276	-1.180	57 7	2395
54.200	16.520	-0.936	58 44	2492
53.000	16.154	-1.301	60 40	2608
52.600	16.032	-1.423	61 42	2670
52.559	16.020	-1.436	63 13	2761
52.379	15.965	-1.491	64 38	2846
53.400	16.276	-1.180	67 32	3020

OW15 (2329 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
71.750	21.869	0.000	15 50	0
75.787	23.100	1.231	20 35	203
74.950	22.845	0.975	22 20	308
75.150	22.906	1.036	24 0	408
74.950	22.845	0.975	25 53	521
74.350	22.662	0.792	27 32	620
73.950	22.540	0.671	29 59	767
74.750	22.784	0.914	32 56	944
74.800	22.799	0.930	35 4	1072
74.400	22.677	0.808	36 37	1165
74.400	22.677	0.808	37 56	1244
74.100	22.586	0.716	39 21	1329
75.100	22.890	1.021	41 43	1471
74.800	22.799	0.930	43 2	1550
75.450	22.997	1.128	44 58	1666
77.750	23.698	1.829	46 50	1778
79.150	24.125	2.256	48 22	1870
74.300	22.647	0.777	49 45	1953
73.300	22.342	0.472	52 19	2107
73.150	22.296	0.427	54 31	2239
73.150	22.296	0.427	57 21	2409
72.550	22.113	0.244	58 56	2504
73.000	22.250	0.381	60 50	2618
71.700	21.854	-0.015	62 0	2688
71.129	21.680	-0.189	63 18	2766
71.588	21.820	-0.049	64 42	2850
71.850	21.900	0.030	67 16	3004

OW16 (2359 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
87.520	26.676	0.000	16 15	0
84.678	25.810	-0.866	20 30	198
87.850	26.777	0.101	22 29	317
83.990	25.600	-1.076	24 5	413
83.700	25.512	-1.164	26 2	530
83.150	25.344	-1.332	27 35	623
82.750	25.222	-1.454	30 3	771
83.550	25.466	-1.210	33 0	948
83.800	25.542	-1.134	35 0	1068
83.850	25.557	-1.119	36 40	1168
83.850	25.557	-1.119	38 0	1248
83.300	25.390	-1.286	39 24	1332
83.900	25.573	-1.103	41 37	1465
83.500	25.451	-1.225	42 58	1546
87.500	26.670	-0.006	45 2	1670
84.600	25.786	-0.890	46 58	1786
83.750	25.527	-1.149	48 26	1874
83.450	25.436	-1.241	49 50	1958
82.100	25.024	-1.652	52 23	2111
83.000	25.298	-1.378	54 36	2244
82.000	24.994	-1.682	57 26	2414
81.400	24.811	-1.865	59 1	2509
81.700	24.902	-1.774	60 53	2621
80.500	24.536	-2.140	61 56	2684
80.741	24.610	-2.066	63 23	2771
80.151	24.430	-2.246	64 46	2854
82.100	25.024	-1.652	67 11	2999

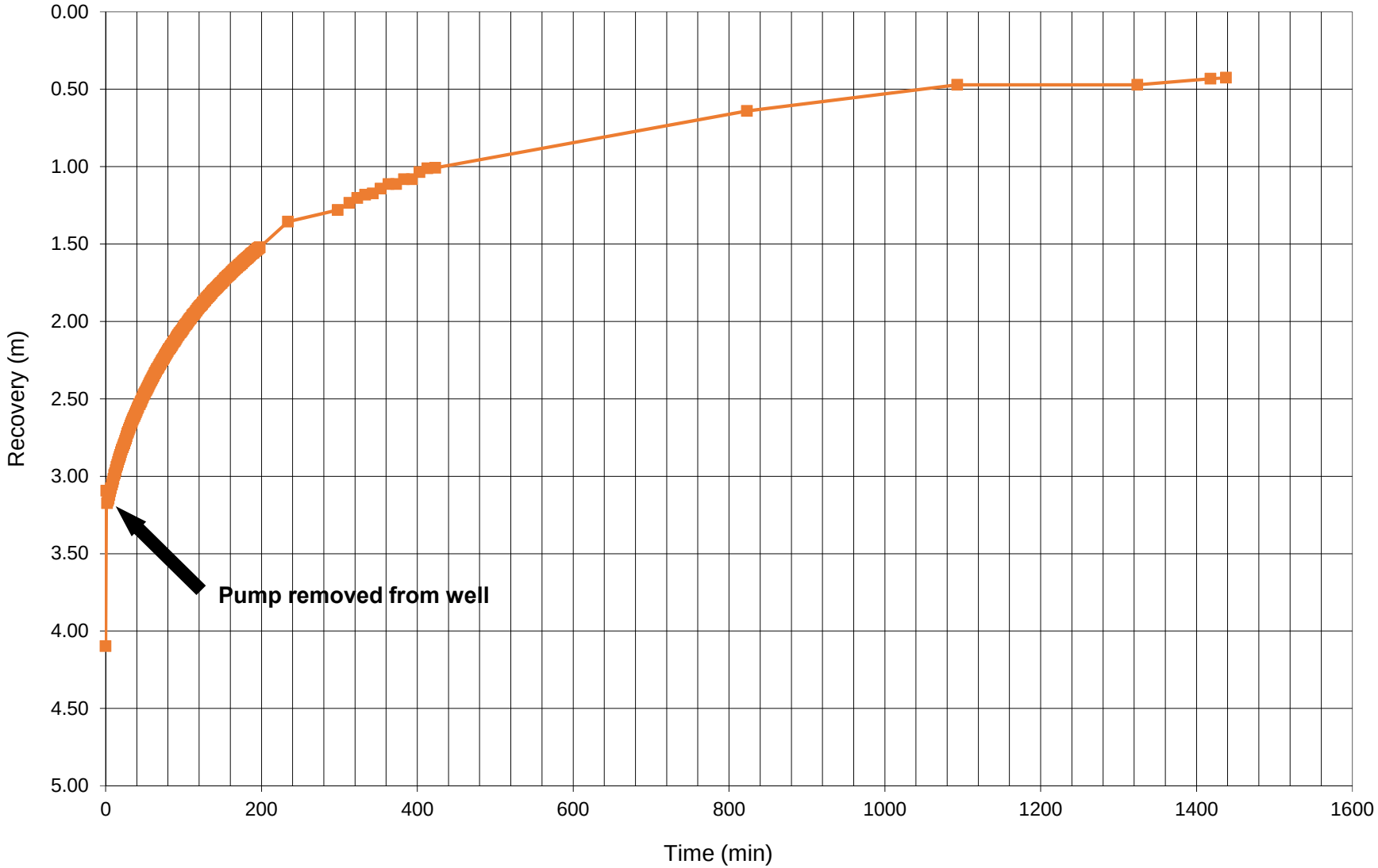
	Pumping Test - Drawdown		Test Well:	TW1
	Project No.:	ASC-458	Date:	7-Aug-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	17 12	PM

OW17 (2370 Battersea Rd.)						OW18 (885 Unity Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
73.200	22.311	0.000	16	24	0	28.700	8.748	0.000	19	55	163
75.525	23.020	0.709	20	20	188	28.733	8.7577	0.010	20	55	223
75.050	22.875	0.564	22	34	322	28.720	8.7539	0.006	22	55	343
74.450	22.692	0.381	24	10	418	28.734	8.758	0.010	24	55	463
73.950	22.540	0.229	25	58	526	28.731	8.757	0.010	25	55	523
73.650	22.449	0.137	27	35	623	28.749	8.763	0.015	27	55	643
73.300	22.342	0.030	30	6	774	28.750	8.763	0.015	30	55	823
74.100	22.586	0.274	33	6	954	28.735	8.758	0.011	33	55	1003
74.000	22.555	0.244	35	20	1088	28.763	8.767	0.019	35	55	1123
74.000	22.555	0.244	36	45	1173	28.795	8.777	0.029	36	55	1183
73.600	22.433	0.122	38	5	1253	28.831	8.788	0.040	38	55	1303
73.850	22.509	0.198	39	30	1338	28.848	8.793	0.045	39	55	1363
74.100	22.586	0.274	41	35	1463	28.882	8.803	0.055	41	55	1483
74.000	22.555	0.244	42	55	1543	28.896	8.8074	0.060	42	55	1543
74.300	22.647	0.335	45	6	1674	28.878	8.802	0.054	45	55	1723
74.300	22.647	0.335	47	0	1788	28.856	8.7953	0.048	47	55	1843
73.200	22.311	0.000	48	31	1879	28.188	8.5917	-0.156	48	55	1903
72.900	22.220	-0.091	49	57	1965	28.930	8.8178	0.070	49	55	1963
72.030	21.955	-0.357	52	27	2115	28.344	8.6391	-0.109	52	55	2143
71.600	21.824	-0.488	54	41	2249	28.909	8.8116	0.064	54	55	2263
72.900	22.220	-0.091	57	32	2420	28.861	8.7967	0.049	57	55	2443
70.750	21.565	-0.747	59	5	2513	28.849	8.7933	0.046	59	55	2563
71.300	21.732	-0.579	60	57	2625	28.846	8.7922	0.044	60	55	2623
69.300	21.123	-1.189	61	53	2681	27.845	8.4871	-0.261	61	55	2683
69.324	21.130	-1.181	63	27	2775	28.311	8.6291	-0.119	63	55	2803
68.996	21.030	-1.281	64	49	2857	27.679	8.4365	-0.311	64	55	2863
69.200	21.092	-1.219	67	4	2992	28.554	8.7034	-0.044	67	40	3028

Table D4. Test well recovery after pumping test.

ASC ENVIRONMENTAL	**Pumping Test - Recovery**			**Test Well:**	**TW1**
	Project No.:	ASC-458		Date:	7-Aug-18
	Client:	BPE Development			Recorded By: J.P.
	Location:	2285 Battersea Road, Kingston, ON			
		Test Well			
Pumping	Elapsed Time (min/sec)	Well Level (WL) (m)	Drawdown (m)		
0	0	39.32	4.10		
0	1	38.31	3.09		
0	2	38.39	3.17		
0	3	38.38	3.16		
0	4	38.37	3.14		
0	5	38.34	3.12		
0	6	38.32	3.10		
0	7	38.30	3.08		
0	8	38.28	3.05		
0	9	38.26	3.04		
0	10	38.24	3.02		
0	15	38.15	2.93		
0	20	38.07	2.84		
0	25	37.99	2.77		
0	50	37.69	2.47		
0	75	37.46	2.23		
0	100	37.26	2.04		
0	150	36.96	1.74		
0	234	36.58	1.36		
0	313	36.45	1.23		
0	234	36.58	1.36		
0	313	36.45	1.23		
0	403	36.26	1.04		
0	823	35.86	0.64		
0	1093	35.69	0.47		
0	1324	35.69	0.47		
0	1438	35.65	0.43		
WL at 95% Recovery =		35.630 m			

ASC Environmental Inc.
ASC-458 - BPE Development, 2285 Battersea Road, Kingston, Ontario
Figure 3 Test Well Recovery



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Home → Environment and natural resources → Weather, Climate and Hazard → Past weather and climate → Historical Data

Daily Data Report for August 2018

HARTINGTON IHD
ONTARIO
Current Station Operator: CCN

Latitude:	44°25'41.028" N
Longitude:	76°41'25.086" W
Elevation:	160.00 m
Climate ID:	6103367
WMO ID:	
TC ID:	

	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
DAY											
01 ‡	26.0	20.0	23.0	0.0	5.0	4.2	0.0	4.2	0		
02 ‡	27.5	19.5	23.5	0.0	5.5	0.0	0.0	0.0	0		
03 ‡	28.0	19.5	23.8	0.0	5.8	0.0	0.0	0.0	0		
04 ‡	29.5	19.0	24.3	0.0	6.3	0.0	0.0	0.0	0		
05 ‡	30.0	18.5	24.3	0.0	6.3	8.2	0.0	8.2	0		
06 ‡	32.0	22.0	27.0	0.0	9.0	0.8	0.0	0.8	0		
07 ‡	28.0	20.0	24.0	0.0	6.0	0.0	0.0	0.0	0		
08 ‡	24.5	18.0	21.3	0.0	3.3	11.2	0.0	11.2	0		
09 ‡	26.5	18.0	22.3	0.0	4.3	0.0	0.0	0.0	0		
10 ‡	25.5	14.5	20.0	0.0	2.0	0.0	0.0	0.0	0		
11 ‡	25.0	12.5	18.8	0.0	0.8	0.0	0.0	0.0	0		

	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
12 ‡	29.0	14.5	21.8	0.0	3.8	0.0	0.0	0.0	0		
13 ‡	28.0	15.5	21.8	0.0	3.8	0.0	0.0	0.0	0		
14 ‡	25.5	20.0	22.8	0.0	4.8	2.4	0.0	2.4	0		
15 ‡	29.5	17.0	23.3	0.0	5.3	16.6	0.0	16.6	0		
16 ‡	26.0	18.0	22.0	0.0	4.0	0.8	0.0	0.8	0		
17 ‡	25.5	21.0	23.3	0.0	5.3	5.4	0.0	5.4	0		
18 ‡	26.0	16.0	21.0	0.0	3.0	0.0	0.0	0.0	0		
19 ‡	26.5	15.0	20.8	0.0	2.8	0.0	0.0	0.0	0		
20 ‡	25.5	15.0	20.3	0.0	2.3	0.0	0.0	0.0	0		
21 ‡	22.0	18.0	20.0	0.0	2.0	26.4	0.0	26.4	0		
22 ‡	22.0	18.0	20.0	0.0	2.0	0.0	0.0	0.0	0		
23 ‡	25.0	11.0	18.0	0.0	0.0	0.0	0.0	0.0	0		
24 ‡	27.0	15.5	21.3	0.0	3.3	0.0	0.0	0.0	0		
25 ‡	25.5	17.0	21.3	0.0	3.3	1.2	0.0	1.2	0		
26 ‡	27.5	19.5	23.5	0.0	5.5	0.0	0.0	0.0	0		
27 ‡	25.0	15.5	20.3	0.0	2.3	24.2	0.0	24.2	0		
28 ‡	29.0	20.0	24.5	0.0	6.5	0.0	0.0	0.0	0		
29 ‡	29.0	20.0	24.5	0.0	6.5	0.0	0.0	0.0	0		
30 ‡	20.0	13.0	16.5	1.5	0.0	0.0	0.0	0.0	0		
31 ‡	22.5	11.0	16.8	1.2	0.0	0.0	0.0	0.0	0		
Sum				2.7	120.8	101.4	0.0	101.4			
Avg	26.4	17.2	21.8								
Xtrm	32.0	11.0									

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0

- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0

ASC ENVIRONMENTAL

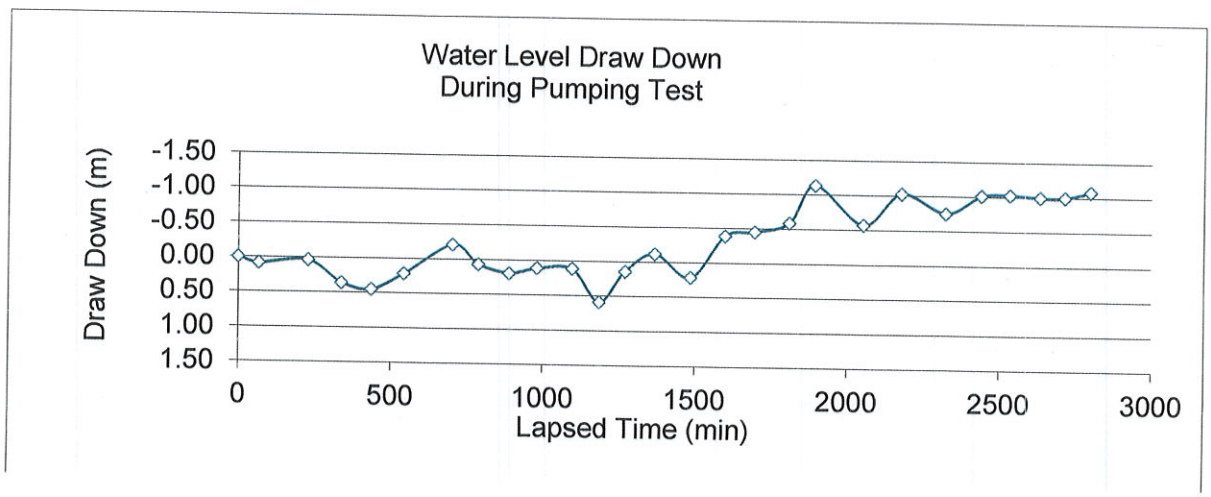
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2217 Battersea Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
5.05

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
16.57	5.05	0.00	07-Aug	12	45	0
16.85	5.14	0.09	07-Aug	18	19	67
16.70	5.09	0.04	07-Aug	21	0	228
17.75	5.41	0.36	07-Aug	22	50	338
18.05	5.50	0.45	08-Aug	0	28	436
17.30	5.27	0.22	08-Aug	2	14	542
15.90	4.85	-0.20	08-Aug	4	55	703
16.80	5.12	0.07	08-Aug	6	20	788
17.20	5.24	0.19	08-Aug	8	0	888
16.95	5.17	0.12	08-Aug	9	33	981
16.95	5.17	0.12	08-Aug	11	28	1096
18.50	5.64	0.59	08-Aug	12	57	1185
17.05	5.20	0.15	08-Aug	14	22	1270
16.20	4.94	-0.11	08-Aug	15	0	1368
17.30	5.27	0.22	08-Aug	17	57	1485
15.30	4.66	-0.39	08-Aug	19	50	1598
15.10	4.60	-0.45	08-Aug	21	28	1696
14.65	4.47	-0.58	08-Aug	23	22	1810
12.85	3.92	-1.13	09-Aug	0	45	1893
14.70	4.48	-0.57	09-Aug	3	25	2053
13.20	4.02	-1.03	09-Aug	5	30	2178
14.10	4.30	-0.75	09-Aug	7	56	2324
13.26	4.04	-1.01	09-Aug	9	52	2440
13.20	4.02	-1.03	09-Aug	11	26	2534
13.30	4.05	-1.00	09-Aug	13	4	2632
13.30	4.05	-1.00	09-Aug	14	27	2715
13.30	3.97	-1.08	09-Aug	15	51	2799
13.02	3.90	-1.15	09-Aug	19	0	2988



Parameters	UNITS	MDL	MECP Criteria[4]	1-Aug-18	15-Aug-18
			ODWQS	2217 Battersea	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	0
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	<	<
Sulphate	mg/L	1	500	149	161
Iron	mg/L	0.005	0.3	<	0.009
Maganese	mg/L	0.001	0.05	<	<
Sodium	mg/L	0.2	20 (200)	263	272

Notes			
	1	MDL indicates the laboratory minimum detection limit	
	2	"<" denotes results below method detection limit	
	3	Results compared to the Ontario Drinking Water Quality Standards	
	4		Exceeding the aesthetic objective outlined in ODWQS. Recommended to notify the local Medical Officer of Health.

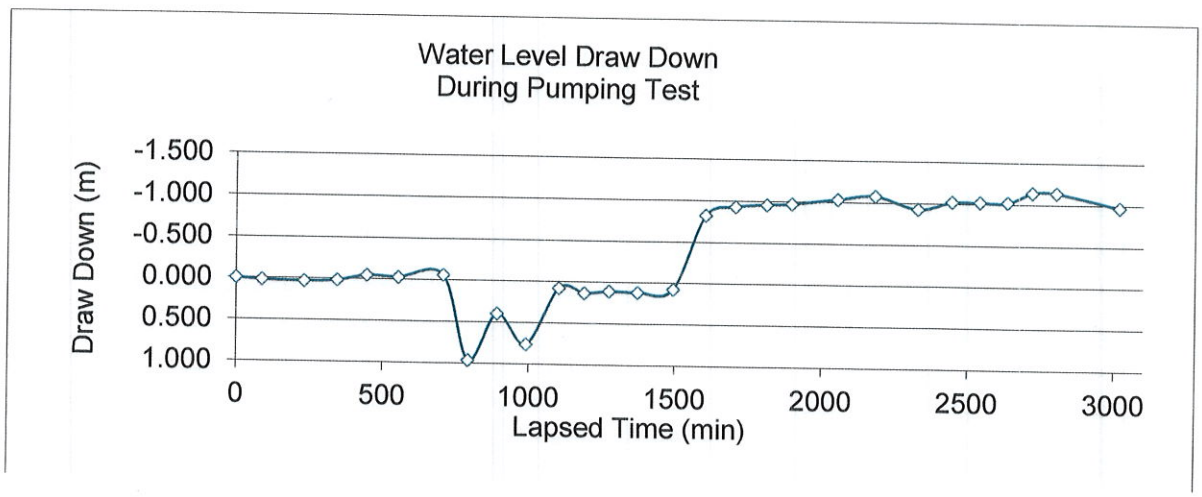
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2225 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	17	12
5.62			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
18.44	5.62	0.000	07-Aug	13	33	0
18.50	5.64	0.019	07-Aug	18	40	88
18.55	5.65	0.034	07-Aug	21	5	233
18.50	5.64	0.019	07-Aug	22	57	345
18.30	5.58	-0.042	08-Aug	0	38	446
18.35	5.59	-0.027	08-Aug	2	25	553
18.25	5.56	-0.057	08-Aug	4	59	707
21.60	6.58	0.964	08-Aug	6	25	793
19.75	6.02	0.400	08-Aug	8	3	891
20.95	6.39	0.766	08-Aug	9	43	991
18.70	5.70	0.080	08-Aug	11	35	1103
18.88	5.75	0.135	08-Aug	13	2	1190
18.80	5.73	0.110	08-Aug	14	26	1274
18.83	5.74	0.119	08-Aug	16	4	1372
18.70	5.70	0.080	08-Aug	18	5	1493
15.75	4.80	-0.819	08-Aug	19	55	1603
15.40	4.69	-0.926	08-Aug	21	37	1705
15.30	4.66	-0.957	08-Aug	23	25	1813
15.25	4.65	-0.972	09-Aug	0	50	1898
15.05	4.59	-1.033	09-Aug	3	27	2055
14.90	4.54	-1.078	09-Aug	5	34	2182
15.40	4.69	-0.926	09-Aug	8	1	2329
15.10	4.60	-1.018	09-Aug	9	57	2445
15.10	4.60	-1.018	09-Aug	11	33	2541
15.10	4.60	-1.018	09-Aug	13	7	2635
14.70	4.48	-1.140	09-Aug	14	32	2720
14.70	4.48	-1.140	09-Aug	15	54	2802
15.26	4.65	-0.970	09-Aug	19	30	3018



Parameters	UNITS	MDL	MECP Criteria[4]	2-Aug-18	19-Aug-18
			ODWQS	2225 Battersea	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	0
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	< 0.1	< 0.1
Sulphate	mg/L	1	500	393	410
Iron	mg/L	0.005	0.3	0.028	0.026
Maganese	mg/L	0.001	0.05	0.003	0.003
Sodium	mg/L	0.2	20 (200)	370	404

1	MDL indicates the laboratory minimum detection limit	
2	"<" denotes results below method detection limit	
3	Results compared to the Ontario Drinking Water Quality Standards	
4		Exceeding the aesthetic objective outlined in ODWQS. Recommended to notify the local Medical Officer of Health.

ASC ENVIRONMENTAL

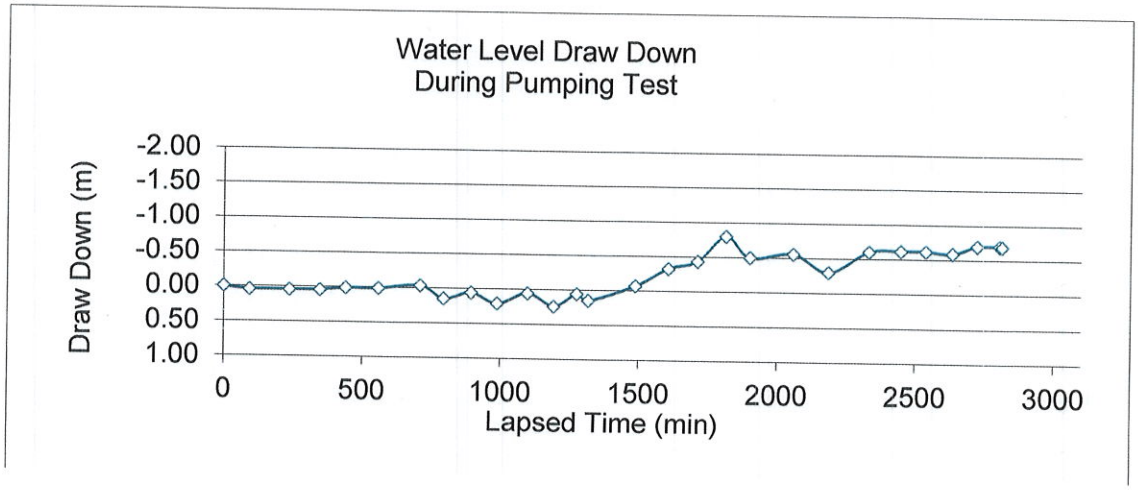
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2224 Battersea Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
5.10

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
16.72	5.10	0.00	07-Aug	12	55	0
16.85	5.14	0.04	07-Aug	18	45	93
16.85	5.14	0.04	07-Aug	21	10	238
16.85	5.14	0.04	07-Aug	22	0	348
16.75	5.11	0.01	08-Aug	0	33	441
16.75	5.11	0.01	08-Aug	2	30	558
16.60	5.06	-0.04	08-Aug	4	2	710
17.20	5.24	0.15	08-Aug	6	27	795
16.91	5.15	0.06	08-Aug	8	6	894
17.40	5.30	0.21	08-Aug	9	40	988
16.90	5.15	0.06	08-Aug	11	30	1098
17.50	5.33	0.24	08-Aug	13	5	1193
16.90	5.15	0.06	08-Aug	14	28	1276
17.20	5.24	0.15	08-Aug	16	10	1318
16.50	5.03	-0.07	08-Aug	18	0	1488
15.65	4.77	-0.32	08-Aug	20	0	1608
15.30	4.66	-0.43	08-Aug	21	44	1712
14.10	4.30	-0.80	08-Aug	23	28	1816
15.10	4.60	-0.49	09-Aug	0	54	1902
14.90	4.54	-0.55	09-Aug	3	31	2059
15.75	4.80	-0.29	09-Aug	5	38	2186
14.75	4.50	-0.60	09-Aug	8	5	2333
14.70	4.48	-0.61	09-Aug	10	0	2448
14.70	4.48	-0.61	09-Aug	11	30	2538
14.80	4.51	-0.58	09-Aug	13	5	2633
14.44	4.40	-0.69	09-Aug	14	35	2723
14.44	4.40	-0.69	09-Aug	15	56	2804
14.47	4.41	-0.69	09-Aug	19	5	2813



ASC ENVIRONMENTAL

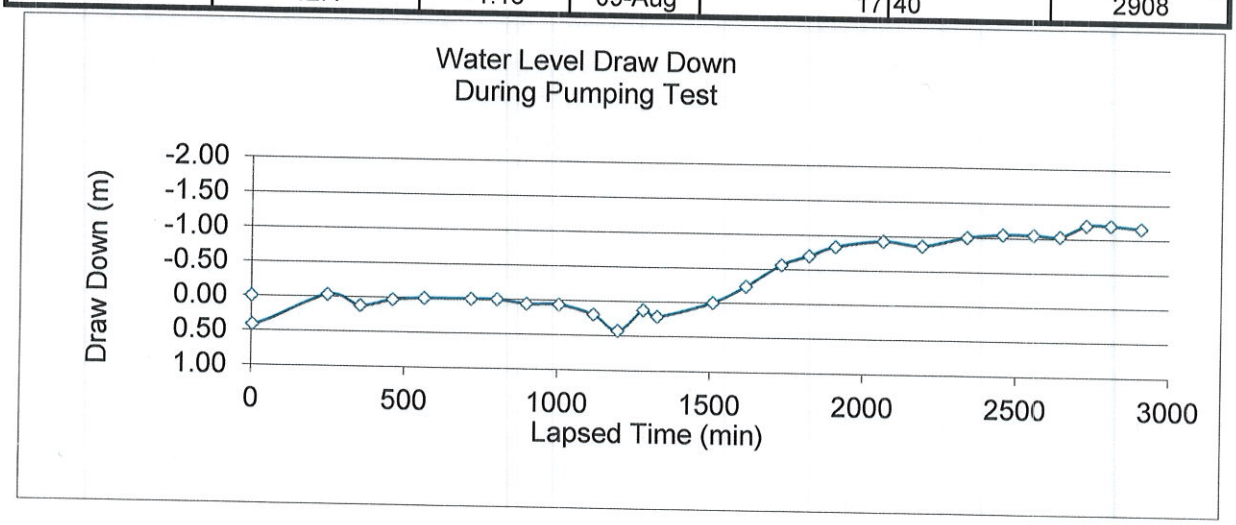
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	799 Unity Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
13.56

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
44.49	13.56	0.00	07-Aug	13	15	0
45.85	13.98	0.42	07-Aug	17	15	3
44.40	13.53	-0.03	07-Aug	21	21	249
44.90	13.69	0.13	07-Aug	23	7	355
44.60	13.59	0.03	08-Aug	0	53	461
44.50	13.56	0.00	08-Aug	2	36	564
44.50	13.56	0.00	08-Aug	5	10	718
44.50	13.56	0.00	08-Aug	6	35	803
44.69	13.62	0.06	08-Aug	8	11	899
44.70	13.62	0.06	08-Aug	9	57	1005
45.15	13.76	0.20	08-Aug	11	50	1118
45.90	13.99	0.43	08-Aug	13	11	1199
44.90	13.69	0.13	08-Aug	14	34	1282
45.20	13.78	0.22	08-Aug	16	20	1328
44.50	13.56	0.00	08-Aug	18	20	1508
43.70	13.32	-0.24	08-Aug	20	8	1616
42.65	13.00	-0.56	08-Aug	22	5	1733
42.20	12.86	-0.70	08-Aug	23	35	1823
41.75	12.73	-0.83	09-Aug	1	0	1908
41.44	12.63	-0.93	09-Aug	3	37	2065
41.65	12.69	-0.87	09-Aug	5	45	2193
41.20	12.56	-1.00	09-Aug	8	12	2340
41.05	12.51	-1.05	09-Aug	10	7	2455
41.05	12.51	-1.05	09-Aug	11	48	2556
41.10	12.53	-1.03	09-Aug	13	15	2643
40.57	12.37	-1.20	09-Aug	14	41	2729
40.57	12.37	-1.20	09-Aug	16	1	2809
40.68	12.4	-1.16	09-Aug	17	40	2908



Parameters	UNITS	MDL	MECP Criteria[4]	2-Aug-18	15-Aug-18
			ODWQS	799 Unity	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	0
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	<	<
Sulphate	mg/L	1	500	398	447
Iron	mg/L	0.005	0.3	<	<
Maganese	mg/L	0.001	0.05	<	0.001
Sodium	mg/L	0.2	20 (200)	450	458

1	MDL indicates the laboratory minimum detection limit
2	"<" denotes results below method detection limit
3	Results compared to the Ontario Drinking Water Quality Standards
4	Exceeding the aesthetic objective outlined in ODWQS. Recommended to notify the local Medical Officer of Health.

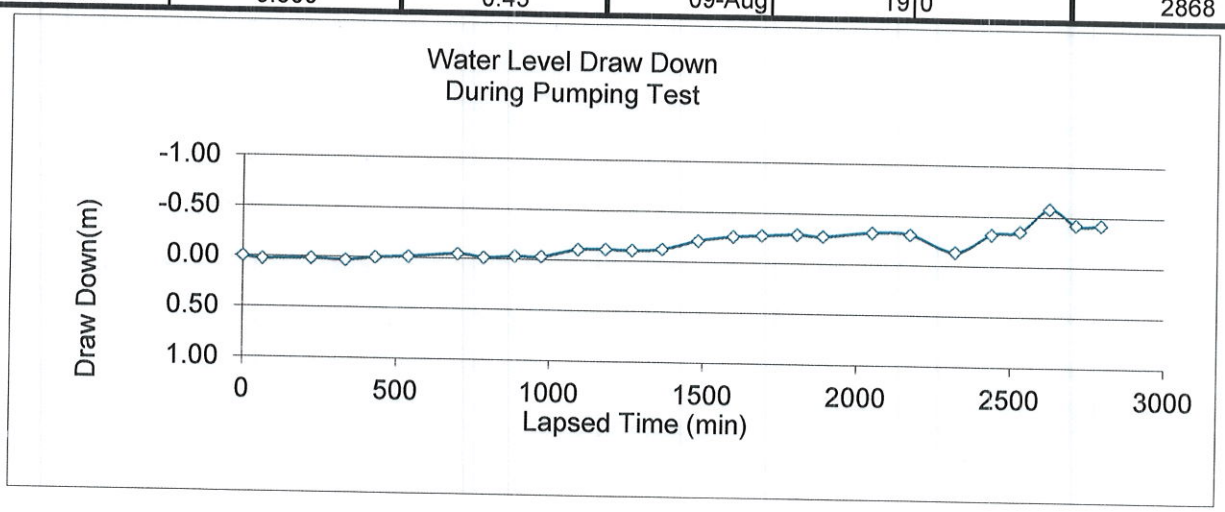
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2196 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	17	12
5.15			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
16.896	5.150	0.00	07-Aug	12	35	0
16.980	5.176	0.03	07-Aug	18	16	64
16.950	5.166	0.02	07-Aug	20	55	223
17.000	5.182	0.03	07-Aug	22	46	334
16.900	5.151	0.00	08-Aug	0	22	430
16.850	5.136	-0.01	08-Aug	2	10	538
16.750	5.105	-0.04	08-Aug	4	51	699
16.850	5.136	-0.01	08-Aug	6	16	784
16.800	5.121	-0.03	08-Aug	7	57	885
16.800	5.121	-0.03	08-Aug	9	23	971
16.550	5.044	-0.11	08-Aug	11	23	1091
16.530	5.038	-0.11	08-Aug	12	53	1181
16.550	5.044	-0.11	08-Aug	14	19	1267
16.500	5.029	-0.12	08-Aug	15	57	1365
16.200	4.938	-0.21	08-Aug	15	54	1482
16.050	4.892	-0.26	08-Aug	19	48	1596
16.000	4.877	-0.27	08-Aug	21	22	1690
15.950	4.862	-0.29	08-Aug	23	17	1805
16.000	4.877	-0.27	09-Aug	0	40	1888
15.850	4.831	-0.32	09-Aug	3	21	2049
15.900	4.846	-0.30	09-Aug	5	25	2173
16.450	5.014	-0.14	09-Aug	7	51	2319
15.850	4.831	-0.32	09-Aug	9	49	2437
15.750	4.801	-0.35	09-Aug	11	22	2530
15.000	4.572	-0.58	09-Aug	12	58	2626
15.518	4.730	-0.42	09-Aug	14	24	2712
15.518	4.730	-0.42	09-Aug	15	45	2793
18.373	5.600	0.45	09-Aug	19	0	2868



Parameters	UNITS	MDL	MECP Criteria[4]	2-Aug-18	15-Aug-18
			ODWQS	2196 Battersea	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	2
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	0.6	0.6
Sulphate	mg/L	1	500	11	13
Iron	mg/L	0.005	0.3	<	0.007
Maganese	mg/L	0.001	0.05	<	<
Sodium	mg/L	0.2	20 (200)	12.3	14

Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality Standards
	4	Exceeding ODWQS

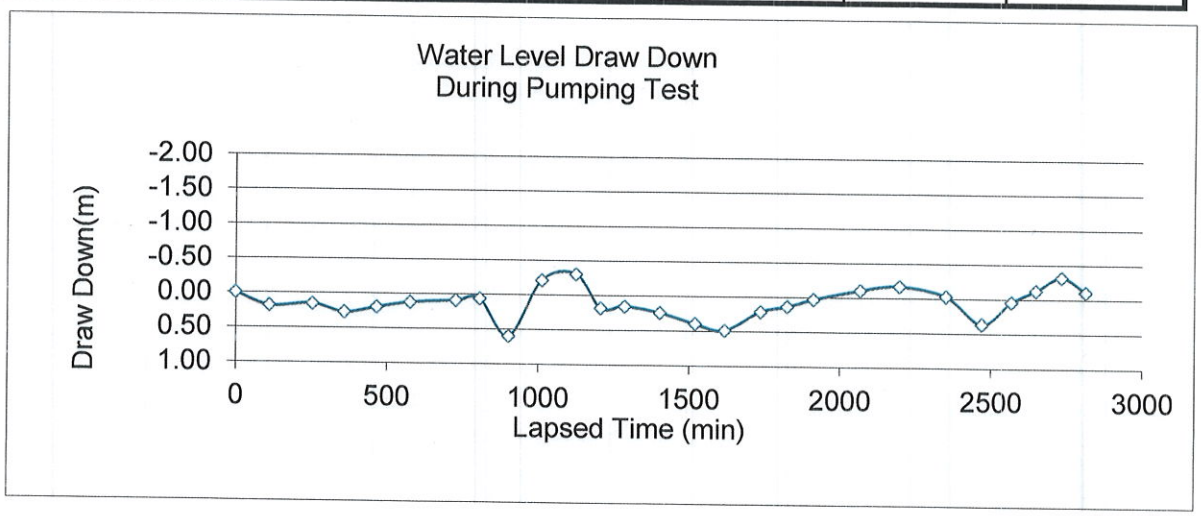
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	808 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	17	12
12.44			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
40.80	12.44	0.00	07-Aug	13	20	0
41.40	12.62	0.18	07-Aug	19	3	111
41.30	12.59	0.15	07-Aug	21	25	253
41.70	12.71	0.28	07-Aug	23	10	358
41.45	12.63	0.20	08-Aug	0	57	465
41.20	12.56	0.12	08-Aug	2	47	575
41.10	12.53	0.09	08-Aug	5	19	727
41.00	12.50	0.06	08-Aug	6	38	806
42.76	13.03	0.60	08-Aug	8	14	902
40.10	12.22	-0.21	08-Aug	10	4	1012
39.80	12.13	-0.30	08-Aug	11	58	1126
41.40	12.62	0.18	08-Aug	13	19	1207
41.30	12.59	0.15	08-Aug	14	39	1287
41.60	12.68	0.24	08-Aug	16	35	1403
42.10	12.83	0.40	08-Aug	18	31	1519
42.40	12.92	0.49	08-Aug	20	10	1618
41.50	12.65	0.21	08-Aug	22	8	1736
41.25	12.57	0.14	08-Aug	23	37	1825
40.90	12.47	0.03	09-Aug	1	4	1912
40.45	12.33	-0.11	09-Aug	3	39	2067
40.25	12.27	-0.17	09-Aug	5	49	2197
40.70	12.41	-0.03	09-Aug	8	22	2350
42.00	12.80	0.37	09-Aug	10	21	2469
40.95	12.48	0.05	09-Aug	11	58	2566
40.40	12.31	-0.12	09-Aug	13	20	2648
39.76	12.12	-0.32	09-Aug	14	45	2733
40.45	12.33	-0.11	09-Aug	16	5	2813
39.44	12.02	-0.42	09-Aug	19	25	3013



Parameters	UNITS	MDL	MECP Criteria[4]	2-Aug-18	17-Aug-18
				808 Unity	
			ODWQS	Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	4	1
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	0.4	0.7
Sulphate	mg/L	1	500	134	40
Iron	mg/L	0.005	50	<	<
Maganese	mg/L	0.001	0.3	<	<
Sodium	mg/L	0.2	20 (200)	51.7	40.5

Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality Standards
	4	Exceeding ODWQS
	5	Recommended to notify the local Medical Officer of Health.

ASC ENVIRONMENTAL

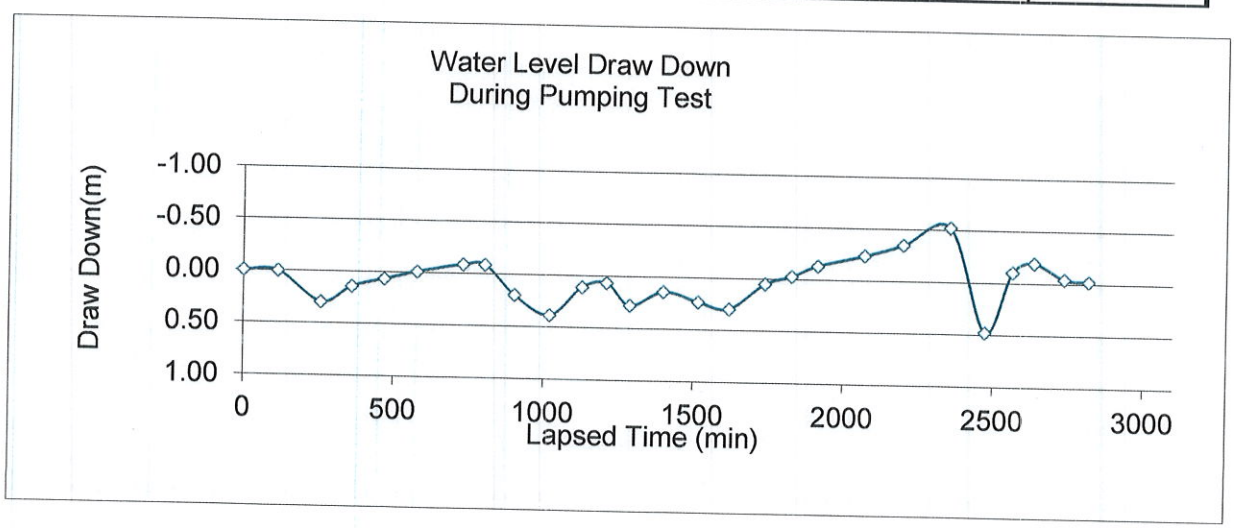
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	796 Unity Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
10.14

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
39.84	12.14	0.00	07-Aug	13	26	0
39.84	12.14	0.00	07-Aug	19	6	114
40.80	12.44	0.30	07-Aug	21	30	258
40.30	12.28	0.14	07-Aug	23	13	361
40.05	12.21	0.07	08-Aug	1	1	469
39.80	12.13	-0.01	08-Aug	2	50	578
39.55	12.05	-0.09	08-Aug	5	24	732
39.55	12.05	-0.09	08-Aug	6	36	804
40.49	12.34	0.20	08-Aug	8	16	904
41.10	12.53	0.39	08-Aug	10	13	1021
40.20	12.25	0.11	08-Aug	0	0	1128
40.05	12.21	0.07	08-Aug	13	23	1211
40.75	12.42	0.28	08-Aug	14	41	1289
40.30	12.28	0.14	08-Aug	16	32	1400
40.60	12.37	0.23	08-Aug	18	28	1516
40.80	12.44	0.30	08-Aug	20	12	1620
40.00	12.19	0.05	08-Aug	22	11	1739
39.75	12.12	-0.02	08-Aug	23	41	1829
39.40	12.01	-0.13	09-Aug	1	7	1915
39.05	11.90	-0.24	09-Aug	3	43	2071
38.70	11.80	-0.34	09-Aug	5	52	2200
38.12	11.62	-0.52	09-Aug	8	28	2356
41.40	12.62	0.48	09-Aug	10	25	2473
39.50	12.04	-0.10	09-Aug	11	55	2563
39.20	11.95	-0.19	09-Aug	13	8	2636
39.70	12.10	-0.04	09-Aug	14	49	2737
39.76	12.12	-0.02	09-Aug	16	10	2818



Parameters	UNITS	MDL	MECP Criteria[4]	3-Aug-18	15-Aug-18
			ODWQS	796 Unity	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	>200
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	1.5	1.8
Sulphate	mg/L	1	500	58	29
Iron	mg/L	0.005	50	<	<
Maganese	mg/L	0.001	0.3	0.001	<
Sodium	mg/L	0.2	20 (200)	207	191

Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality Standards
	4	Exceeding ODWQS
	5	Recommended to notify the local Medical Officer of Health.

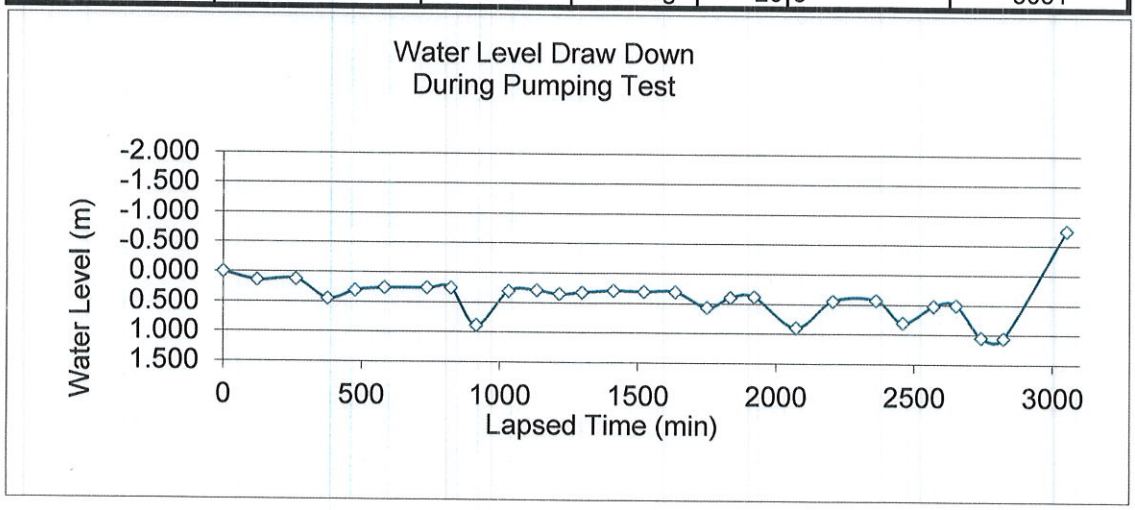
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2245 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	17	12
27.75			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
91.04	27.75	0.000	07-Aug	13	44	0
91.50	27.89	0.139	07-Aug	19	15	123
91.45	27.87	0.124	07-Aug	21	35	263
92.50	28.19	0.444	07-Aug	23	30	378
92.05	28.06	0.307	08-Aug	1	8	476
91.90	28.01	0.261	08-Aug	2	55	583
91.90	28.01	0.261	08-Aug	5	29	737
91.90	28.01	0.261	08-Aug	6	55	823
93.95	28.64	0.886	08-Aug	8	27	915
92.05	28.06	0.307	08-Aug	10	24	1032
92.00	28.04	0.292	08-Aug	12	5	1133
92.20	28.10	0.353	08-Aug	13	28	1216
92.10	28.07	0.322	08-Aug	14	50	1298
92.00	28.04	0.292	08-Aug	16	43	1411
92.05	28.06	0.307	08-Aug	18	34	1522
92.05	28.06	0.307	08-Aug	20	27	1635
92.90	28.32	0.566	08-Aug	22	23	1751
92.35	28.15	0.398	08-Aug	23	47	1835
92.30	28.13	0.383	09-Aug	1	13	1921
94.00	28.65	0.901	09-Aug	3	44	2072
92.50	28.19	0.444	09-Aug	5	57	2205
92.45	28.18	0.429	09-Aug	8	34	2362
93.70	28.56	0.810	09-Aug	10	11	2459
92.75	28.27	0.520	09-Aug	12	3	2571
92.70	28.25	0.505	09-Aug	13	23	2651
94.49	28.80	1.050	09-Aug	14	54	2742
94.52	28.81	1.060	09-Aug	16	14	2822
88.58	27	-0.75	09-Aug	20	3	3051



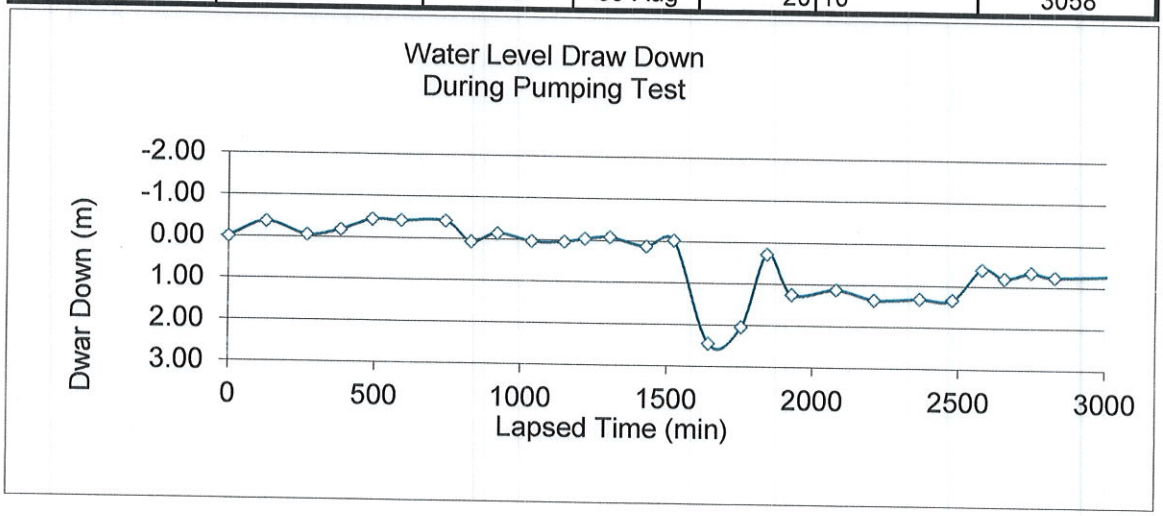
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	874 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	17 12
13.34		

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
43.75	13.34	0.00	07-Aug	14	21	0
42.55	12.97	-0.37	07-Aug	19	20	128
43.60	13.29	-0.05	07-Aug	21	40	268
43.15	13.15	-0.18	07-Aug	23	35	383
42.33	12.90	-0.43	08-Aug	1	22	490
42.40	12.92	-0.41	08-Aug	3	0	588
42.40	12.92	-0.41	08-Aug	5	33	741
44.00	13.41	0.08	08-Aug	7	0	828
43.30	13.20	-0.14	08-Aug	8	30	918
43.90	13.38	0.05	08-Aug	10	28	1036
43.90	13.38	0.05	08-Aug	12	20	1148
43.65	13.30	-0.03	08-Aug	13	31	1219
43.50	13.26	-0.08	08-Aug	14	56	1304
44.20	13.47	0.14	08-Aug	17	0	1428
43.70	13.32	-0.02	08-Aug	18	35	1523
51.80	15.79	2.45	08-Aug	20	35	1643
50.45	15.38	2.04	08-Aug	22	28	1756
44.70	13.62	0.29	08-Aug	23	55	1843
47.85	14.58	1.25	09-Aug	1	20	1928
47.45	14.46	1.13	09-Aug	3	53	2081
48.20	14.69	1.36	09-Aug	6	3	2211
48.10	14.66	1.33	09-Aug	8	38	2366
48.15	14.68	1.34	09-Aug	10	30	2478
45.70	13.93	0.59	09-Aug	12	10	2578
46.40	14.14	0.81	09-Aug	13	28	2656
45.93	14.00	0.66	09-Aug	14	59	2747
46.26	14.10	0.76	09-Aug	16	20	2828
46.10	14.05	0.72	09-Aug	20	10	3058



Parameters	UNITS	MDL	MECP Criteria[4]	5-Sep-18
			ODWQS	874 Unity
Total Coliform	cfu/100mL	1	0	0
E Coli	cfu/100mL	1	0	0
Nitrate (N)	mg/L	0.1	10	<1
Sulphate	mg/L	1	500	474
Iron	mg/L	0.005	50	0.007
Maganese	mg/L	0.001	0.3	<0.001
Sodium	mg/L	0.2	20 (200)	709

Notes			
	1	MDL indicates the laboratory minimum detection limit	
	2	"<" denotes results below method detection limit	
	3	Results compared to the Ontario Drinking Water Quality Standards	
	4		Exceeding the aesthetic objective outlined in ODWQS. Recommended to notify the local Medical Officer of Health.

ASC ENVIRONMENTAL

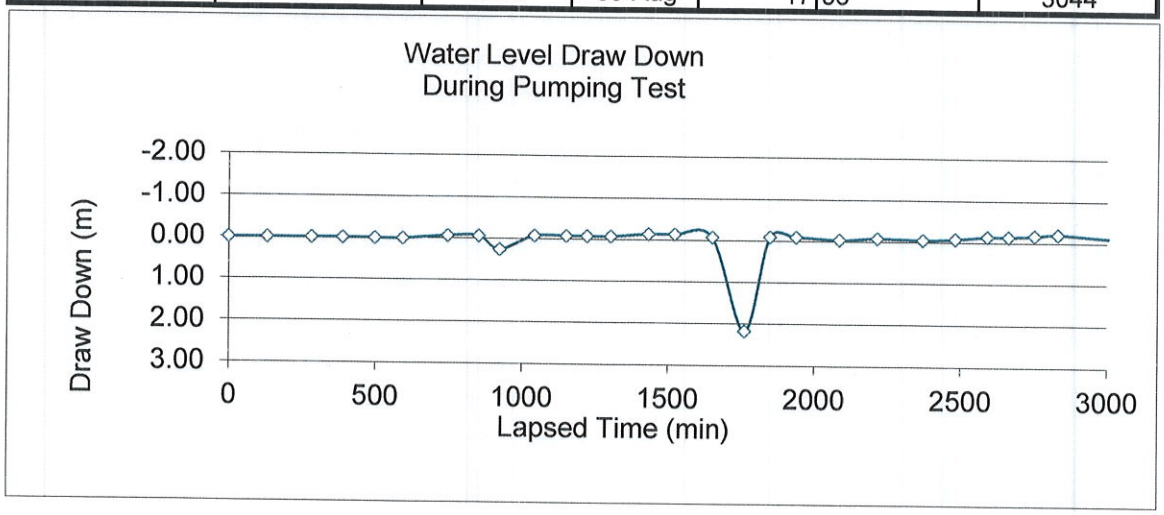
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	896 Unity Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
12.51

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
41.05	12.51	0.00	07-Aug	14	46	0
41.07	12.52	0.01	07-Aug	19	24	132
41.05	12.51	0.00	07-Aug	21	55	283
41.05	12.51	0.00	07-Aug	23	40	388
41.08	12.52	0.01	08-Aug	1	29	497
41.09	12.52	0.01	08-Aug	3	5	593
40.85	12.45	-0.06	08-Aug	5	38	746
40.85	12.45	-0.06	08-Aug	7	25	853
41.90	12.77	0.26	08-Aug	8	36	924
40.80	12.44	-0.08	08-Aug	10	35	1043
40.80	12.44	-0.08	08-Aug	12	25	1153
40.80	12.44	-0.08	08-Aug	13	35	1223
40.80	12.44	-0.08	08-Aug	14	57	1305
40.60	12.37	-0.14	08-Aug	17	5	1433
40.60	12.37	-0.14	08-Aug	18	35	1523
40.80	12.44	-0.08	08-Aug	20	43	1651
48.20	14.69	2.18	08-Aug	22	34	1762
40.75	12.42	-0.09	08-Aug	0	0	1848
40.75	12.42	-0.09	09-Aug	1	30	1938
40.95	12.48	-0.03	09-Aug	3	58	2086
40.80	12.44	-0.08	09-Aug	6	8	2216
40.90	12.47	-0.05	09-Aug	8	43	2371
40.80	12.44	-0.08	09-Aug	10	34	2482
40.60	12.37	-0.14	09-Aug	12	23	2591
40.60	12.37	-0.14	09-Aug	13	35	2663
40.52	12.35	-0.16	09-Aug	15	4	2752
40.39	12.31	-0.20	09-Aug	16	25	2833
40.73	12.41	-0.10	09-Aug	17	56	3044



Parameters	UNITS	MDL	MECP Criteria[4]	1-Aug-18	15-Aug-18
				896 Unity	
			ODWQS	Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	0
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	<	<
Sulphate	mg/L	1	500	342	362
Iron	mg/L	0.005	50	0.01	0.012
Maganese	mg/L	0.001	0.3	0.004	0.003
Sodium	mg/L	0.2	20 (200)	16	16.1

Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality Standards
	4	Exceeding ODWQS

ASC ENVIRONMENTAL

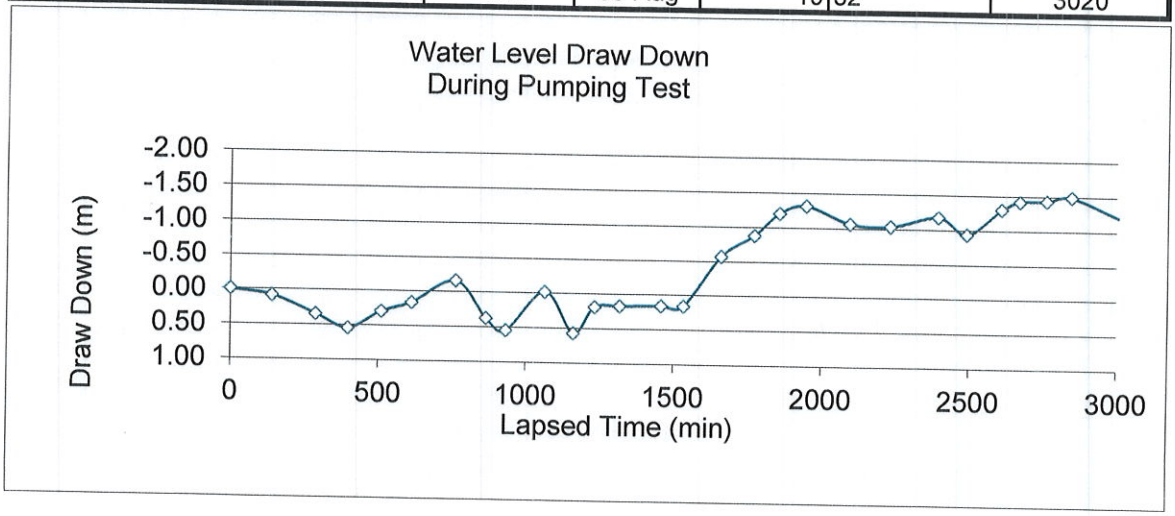
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	942 Unity Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
17.46

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
57.27	17.46	0.00	07-Aug	15	10	0
57.55	17.54	0.09	07-Aug	19	33	141
58.40	17.80	0.34	07-Aug	22	0	288
59.05	18.00	0.54	07-Aug	23	50	398
58.25	17.75	0.30	08-Aug	1	42	510
57.80	17.62	0.16	08-Aug	3	25	613
56.75	17.30	-0.16	08-Aug	5	54	762
58.50	17.83	0.37	08-Aug	7	37	865
59.05	18.00	0.54	08-Aug	8	45	933
57.20	17.43	-0.02	08-Aug	10	56	1064
59.15	18.03	0.57	08-Aug	12	33	1161
57.90	17.65	0.19	08-Aug	13	45	1233
57.83	17.63	0.17	08-Aug	15	10	1318
57.80	17.62	0.16	08-Aug	17	30	1458
57.80	17.62	0.16	08-Aug	18	45	1533
55.40	16.89	-0.57	08-Aug	20	53	1661
54.40	16.58	-0.87	08-Aug	10	45	1773
53.33	16.25	-1.20	08-Aug	0	10	1858
52.95	16.14	-1.32	09-Aug	1	40	1948
53.77	16.39	-1.07	09-Aug	4	8	2096
53.88	16.42	-1.03	09-Aug	6	26	2234
53.40	16.28	-1.18	09-Aug	9	7	2395
54.20	16.52	-0.94	09-Aug	10	44	2492
53.00	16.15	-1.30	09-Aug	12	40	2608
52.60	16.03	-1.42	09-Aug	13	42	2670
52.56	16.02	-1.44	09-Aug	15	13	2761
52.38	15.97	-1.49	09-Aug	16	38	2846
53.40	16.28	-1.18	09-Aug	19	32	3020



Parameters	UNITS	MDL	MECP Criteria[4]	1-Aug-18	15-Aug-18
			ODWQS	942 Unity	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	2
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	<	<
Sulphate	mg/L	1	500	248	243
Iron	mg/L	0.005	0.3	<	<
Maganese	mg/L	0.001	0.005	0.001	0.003
Sodium	mg/L	0.2	20 (200)	9.8	8.9

Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality Standards
	4	Exceeding the ODWQS.

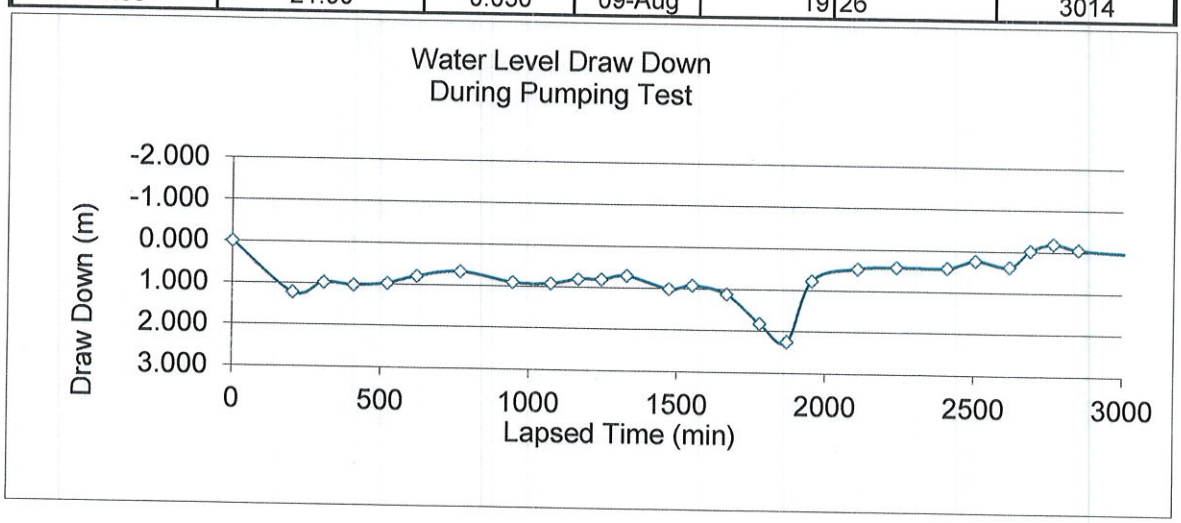
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2329 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	17	12
21.87			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
71.75	21.87	0.000	07-Aug	15	50	0
75.79	23.10	1.231	07-Aug	20	35	203
74.95	22.84	0.975	07-Aug	22	20	308
75.15	22.91	1.036	07-Aug	0	0	408
74.95	22.84	0.975	08-Aug	1	53	521
74.35	22.66	0.792	08-Aug	3	32	620
73.95	22.54	0.671	08-Aug	5	59	767
74.75	22.78	0.914	08-Aug	8	56	944
74.80	22.80	0.930	08-Aug	11	4	1072
74.40	22.68	0.808	08-Aug	12	37	1165
74.40	22.68	0.808	08-Aug	13	56	1244
74.10	22.59	0.716	08-Aug	15	21	1329
75.10	22.89	1.021	08-Aug	17	43	1471
74.80	22.80	0.930	08-Aug	19	2	1550
75.45	23.00	1.128	08-Aug	20	58	1666
77.75	23.70	1.829	08-Aug	22	50	1778
79.15	24.12	2.256	08-Aug	0	22	1870
74.30	22.65	0.777	08-Aug	1	45	1953
73.30	22.34	0.472	09-Aug	4	19	2107
73.15	22.30	0.427	09-Aug	6	31	2239
73.15	22.30	0.427	09-Aug	9	21	2409
72.55	22.11	0.244	09-Aug	10	56	2504
73.00	22.25	0.381	09-Aug	12	50	2618
71.70	21.85	-0.015	09-Aug	14	0	2688
71.13	21.68	-0.189	09-Aug	15	18	2766
71.59	21.82	-0.049	09-Aug	16	42	2850
71.85	21.90	0.030	09-Aug	19	26	3014



Parameters	UNITS	MDL	MECP Criteria[4]	2-Aug-18	15-Aug-18
			ODWQS	2329 Battersea	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	5
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	0.1	<
Sulphate	mg/L	1	500	101	105
Iron	mg/L	0.005	50	0.034	0.011
Maganese	mg/L	0.001	0.3	0.001	0.001
Sodium	mg/L	0.2	20 (200)	14.1	16.3

Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality
	4	Exceeding ODWQS

ASC ENVIRONMENTAL

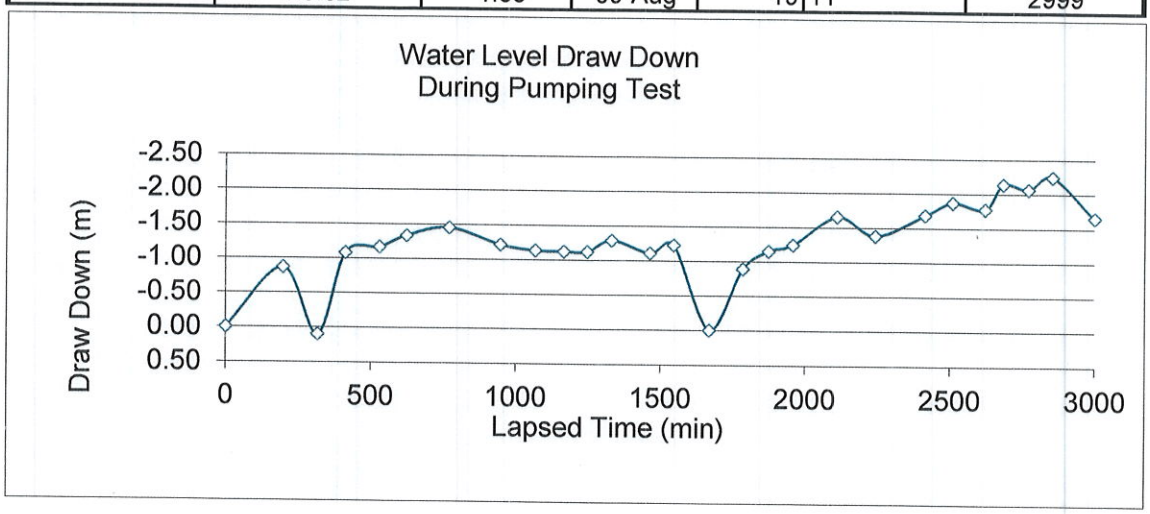
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2359 Battersea Road		

Pumping started at :	17	12

Water Level at Start of Test (m)
26.68

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
87.52	26.68	0.00	07-Aug	16	15	0
84.68	25.81	-0.87	07-Aug	20	30	198
87.85	26.78	0.10	07-Aug	22	29	317
83.99	25.60	-1.08	07-Aug	0	5	413
83.70	25.51	-1.16	08-Aug	2	2	530
83.15	25.34	-1.33	08-Aug	3	35	623
82.75	25.22	-1.45	08-Aug	6	3	771
83.55	25.47	-1.21	08-Aug	9	0	948
83.80	25.54	-1.13	08-Aug	11	0	1068
83.85	25.56	-1.12	08-Aug	12	40	1168
83.85	25.56	-1.12	08-Aug	14	0	1248
83.30	25.39	-1.29	08-Aug	15	24	1332
83.90	25.57	-1.10	08-Aug	17	37	1465
83.50	25.45	-1.23	08-Aug	18	58	1546
87.50	26.67	-0.01	08-Aug	21	2	1670
84.60	25.79	-0.89	08-Aug	22	58	1786
83.75	25.53	-1.15	08-Aug	0	26	1874
83.45	25.44	-1.24	08-Aug	1	50	1958
82.10	25.02	-1.65	09-Aug	4	23	2111
83.00	25.30	-1.38	09-Aug	6	36	2244
82.00	24.99	-1.68	09-Aug	9	26	2414
81.40	24.81	-1.87	09-Aug	11	1	2509
81.70	24.90	-1.77	09-Aug	12	53	2621
80.50	24.54	-2.14	09-Aug	13	56	2684
80.74	24.61	-2.07	09-Aug	15	23	2771
80.15	24.43	-2.25	09-Aug	16	46	2854
82.10	25.02	-1.65	09-Aug	19	11	2999



Parameters	UNITS	MDL	MECP Criteria [4]	2-Aug-18	15-Aug-18
			ODWQS	2359 Battersea	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	10	20
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	<	<
Sulphate	mg/L	1	500	141	141
Iron	mg/L	0.005	50	<	0.12
Maganese	mg/L	0.001	0.3	0.007	0.027
Sodium	mg/L	0.2	20 (200)	248	350

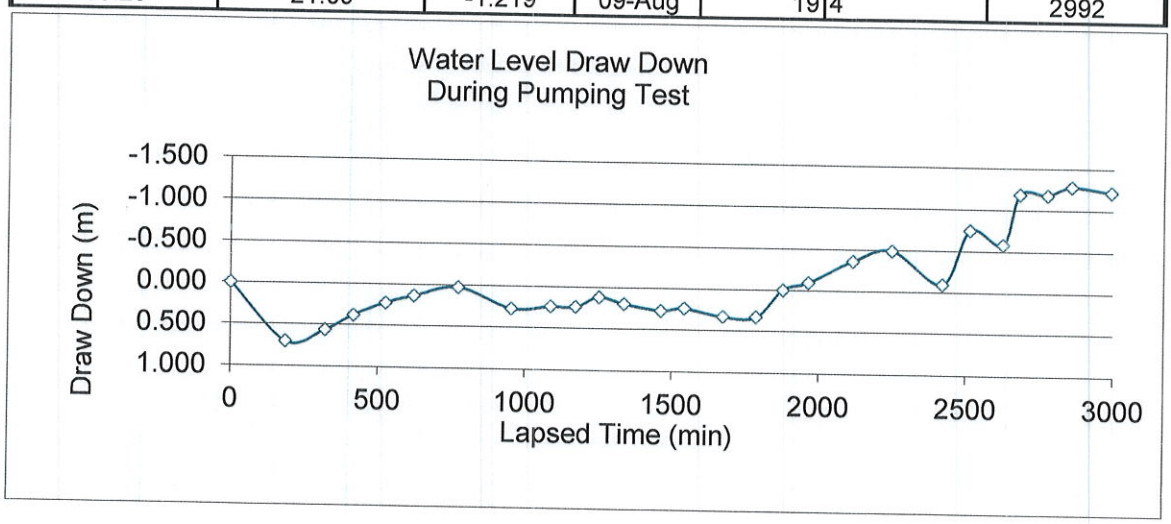
Notes		
	1	MDL indicates the laboratory minimum detection limit
	2	"<" denotes results below method detection limit
	3	Results compared to the Ontario Drinking Water Quality
	4	Exceeding ODWQS

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	2370 Battersea Road.		

Water Level at Start of Test (m)	Pumping started at :	17	12
22.31			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
73.20	22.31	0.000	07-Aug	16	24	0
75.52	23.02	0.709	07-Aug	20	20	188
75.05	22.88	0.564	07-Aug	22	34	322
74.45	22.69	0.381	07-Aug	0	10	418
73.95	22.54	0.229	08-Aug	1	58	526
73.65	22.45	0.137	08-Aug	3	35	623
73.30	22.34	0.030	08-Aug	6	6	774
74.10	22.59	0.274	08-Aug	9	6	954
74.00	22.56	0.244	08-Aug	11	20	1088
74.00	22.56	0.244	08-Aug	12	45	1173
73.60	22.43	0.122	08-Aug	14	5	1253
73.85	22.51	0.198	08-Aug	15	30	1338
74.10	22.59	0.274	08-Aug	17	35	1463
74.00	22.56	0.244	08-Aug	18	55	1543
74.30	22.65	0.335	08-Aug	21	6	1674
74.30	22.65	0.335	08-Aug	23	0	1788
73.20	22.31	0.000	08-Aug	0	31	1879
72.90	22.22	-0.091	08-Aug	1	57	1965
72.03	21.95	-0.357	09-Aug	4	27	2115
71.60	21.82	-0.488	09-Aug	6	41	2249
72.90	22.22	-0.091	09-Aug	9	32	2420
70.75	21.56	-0.747	09-Aug	11	5	2513
71.30	21.73	-0.579	09-Aug	12	57	2625
69.30	21.12	-1.189	09-Aug	13	53	2681
69.32	21.13	-1.181	09-Aug	15	27	2775
69.00	21.03	-1.281	09-Aug	16	49	2857
69.20	21.09	-1.219	09-Aug	19	4	2992



Parameters	UNITS	MDL	MECP Criteria[4]	2-Aug-18	15-Aug-18
				2370 Battersea	
			ODWQS	Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	0	1
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	1.3	0.9
Sulphate	mg/L	1	500	53	186
Iron	mg/L	0.005	50	<	<
Maganese	mg/L	0.001	0.3	0.001	0.001
Sodium	mg/L	0.2	20 (200)	70.1	63.5

Notes			
	1	MDL indicates the laboratory minimum detection limit	
	2	"<" denotes results below method detection limit	
	3	Results compared to the Ontario Drinking Water Quality Standards	
	4		Exceeding ODWQS
	5		Recommended to notify the local Medical Officer of Health.

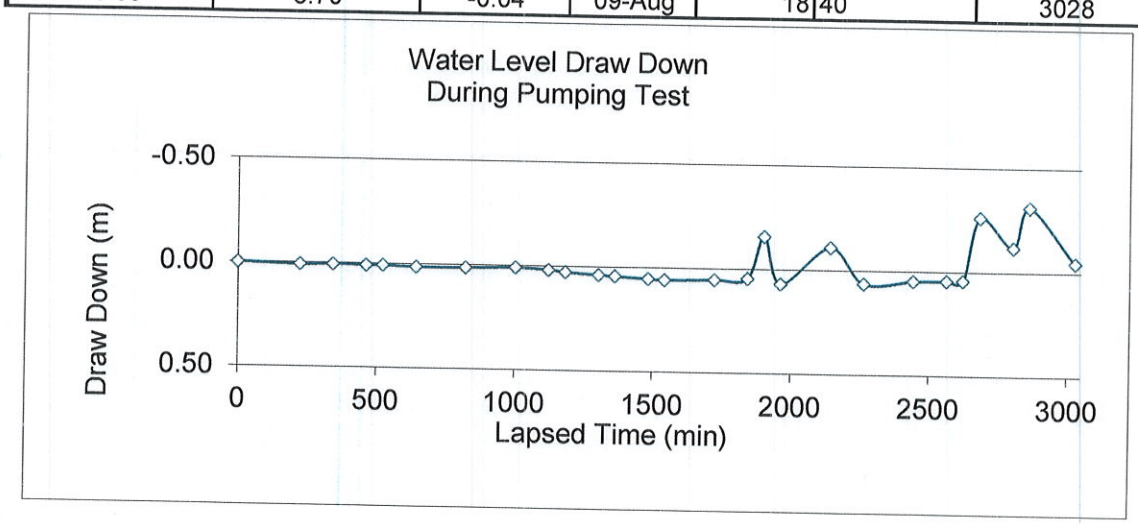
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Aug 7 2018	End Date	Aug 9 2018
Location:	885 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	17	12
28.70			

Water Level (WL) During Pumping		Draw Down	Actual Time			
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
28.70	8.75	0.00	07-Aug	16	0	0
28.73	8.76	0.01	07-Aug	20	55	223
28.72	8.75	0.01	07-Aug	22	55	343
28.73	8.76	0.01	07-Aug	0	55	463
28.73	8.76	0.01	08-Aug	1	55	523
28.75	8.76	0.01	08-Aug	3	55	643
28.75	8.76	0.02	08-Aug	6	55	823
28.73	8.76	0.01	08-Aug	9	55	1003
28.76	8.77	0.02	08-Aug	11	55	1123
28.79	8.78	0.03	08-Aug	12	55	1183
28.83	8.79	0.04	08-Aug	14	55	1303
28.85	8.79	0.05	08-Aug	15	55	1363
28.88	8.80	0.06	08-Aug	17	55	1483
28.90	8.81	0.06	08-Aug	18	55	1543
28.88	8.80	0.05	08-Aug	21	55	1723
28.86	8.80	0.05	08-Aug	23	55	1843
28.19	8.59	-0.16	08-Aug	0	55	1903
28.93	8.82	0.07	08-Aug	1	55	1963
28.34	8.64	-0.11	09-Aug	3	55	2143
28.91	8.81	0.06	09-Aug	5	55	2263
28.86	8.80	0.05	09-Aug	8	55	2443
28.85	8.79	0.05	09-Aug	10	55	2563
28.85	8.79	0.04	09-Aug	11	55	2623
27.84	8.49	-0.26	09-Aug	12	55	2683
28.31	8.63	-0.12	09-Aug	14	55	2803
27.68	8.44	-0.31	09-Aug	15	55	2863
28.55	8.70	-0.04	09-Aug	18	40	3028



Parameters	UNITS	MDL	MECP Criteria[4]	1-Aug-18	15-Aug-18
			ODWQS	885 Unity	
				Pre Pump Test	Post Pump Test
Total Coliform	cfu/100mL	1	0	6	6
E Coli	cfu/100mL	1	0	0	0
Nitrate (N)	mg/L	0.1	10	<	<
Sulphate	mg/L	1	500	216	194
Iron	mg/L	0.005	50	<	0.006
Maganese	mg/L	0.001	0.3	0.005	0.015
Sodium	mg/L	0.2	20 (200)	160	205

Notes			
	1	MDL indicates the laboratory minimum detection limit	
	2	"<" denotes results below method detection limit	
	3	Results compared to the Ontario Drinking Water Quality Standards	
	4		Exceeding ODWQS
	5		Recommended to notify the local Medical Officer of Health.

Table D1. Water Quality Field Measurements.

ASC ENVIRONMENTAL	**Field Water Quality Analysis**				**Test Well:**	**TW2**	
	Project No.:	ASC-458			Date:	17-Sep-18	
	Client:	BPE Development			Recorded By: J.P.		
	Location:	2285 Battersea Road, Kingston, ON					
	Started pumping 30 L/min at 10:33 am						
Pumping Test Elapsed Time (min)	Odour	Temperature (°C)	pH	Conductivity (µS)	Total Dissolved Solids (ppm)	Turbidity NTU	Chlorine (Total) (mg/L)
0	None	12.4	8.22	>3999	>	78	>2.2
50	None	13.3	7.93	3154	1560	53	0.83
128	None	12.6	8.20	3036	1525	14	0.17
170	Sulphur	13.4	8.17	3025	1514	19	0.12
230	None	13.0	8.35	3053	1499	37	0.03
290	None	12.7	8.20	2985	1499	5	0.17
350	None	13.5	8.24	2967	1481	1	0.07
440	None	12.1	8.01	2995	1475	38	0.00
500	None	11.5	8.00	3011	1478	6	0.00
559	None	10.8	7.78	2952	1476	0	0.00
619	None	10.0	7.78	2954	1426	0	0.00
675	None	10.0	7.76	2956	1470	0	0.00
735	None	11.0	7.81	2958	1478	0	0.00
795	None	10.8	7.76	2995	1472	0	0.00
855	None	10.7	7.81	2955	1477	0	0.00
915	None	10.7	7.80	2940	1437	0	0.00
975	None	10.7	7.82	2930	1466	0	0.00
1035	None	10.6	7.80	2949	1474	0	0.00
1095	None	10.7	7.85	2932	1466	0	0.00
1155	None	10.7	7.75	2929	1464	0	0.00
1215	None	10.6	7.86	2920	1460	0	0.00
1280	None	11.3	8.21	2926	1460	4	0.00
1340	None	11.7	8.17	2943	1467	4	0.00
1405	None	12.6	8.42	3002	1468	0	0.00
1474	None	12.1	8.72	2925	1462	31	0.00
1539	None	11.7	8.48	2919	1453	0	0.00
1610	None	13.3	8.54	2925	1465	3	0.00
1670	None	12.8	8.56	2919	1462	2	0.00
1730	None	11.6	8.51	2927	1457	0	0.00
1765	None	11.9	7.49	2902	1440	0	0.00
1850	None	11.7	7.64	2915	1457	0	0.00
1910	None	11.7	8.07	2933	1459	0	0.00
1965	None	10.7	7.88	2910	1456	0	0.00
2025	None	10.7	7.88	2904	1452	0	0.00
2085	None	10.7	7.88	2896	1453	0	0.00
2145	None	10.6	7.89	2905	1453	0	0.00
2205	None	10.5	7.88	2897	1449	0	0.00
2265	None	10.6	7.87	2911	1455	0	0.00
2325	None	10.4	7.90	2906	1452	0	0.00
2385	None	10.4	8.01	2898	1452	0	0.00
2445	None	10.3	7.97	2897	1449	0	0.00
2505	None	10.3	7.98	2909	1454	0	0.00
2565	None	10.3	7.94	2896	1447	0	0.00
2625	None	10.2	7.91	2892	1447	0	0.00
2685	None	10.2	8.15	2892	1446	0	0.00
2745	None	10.5	8.40	2890	1439	0	0.00
2805	None	10.8	8.55	2888	1439	0	0.00
2865	None	11.5	8.48	2876	1438	0	0.00

Notes	1	<	indicates values lower than minimum detection limits of analysis equipment
	2	-	not analyzed

Field Analysis Equipment	
Chlorine :	Hach DR 890 Colorimeter, DPD Total Chlorine Reagent
Temp./pH/Cond./TDS :	Hanna HI 98130 Meter
Turbidity :	Hach DR 890 Colorimeter

Table D2. Test Well drawdown during pumping test.

	Pumping Test - Drawdown		Test Well: TW2	
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Recorded By: J.P.	
	Location:	2285 Battersea Road, Kingston, ON		

Pumping Rate (Q) (L/min)	Elapsed Time (ET) (min)	Well Level (WL) (m)	Drawdown (DD) (m)
30	0	34.44	0.00
30	1	34.44	0.00
30	2	34.44	0.00
30	3	34.44	0.00
30	4	34.45	0.00
30	5	34.45	0.00
30	6	34.44	0.00
30	7	34.45	0.01
30	8	34.45	0.00
30	9	34.45	0.00
30	10	34.45	0.01
30	15	34.45	0.01
30	20	34.45	0.01
30	25	34.46	0.02
30	30	34.46	0.02
30	40	34.46	0.02
30	50	34.46	0.02
30	60	34.46	0.02
30	70	34.46	0.02
30	80	34.46	0.02
30	90	34.46	0.02
30	100	34.46	0.02
30	125	34.46	0.02
30	150	34.46	0.02
30	175	34.47	0.02
30	200	34.47	0.03
30	250	34.48	0.04
30	300	34.48	0.04
30	400	34.50	0.05
30	500	34.50	0.06
30	600	34.51	0.07
30	700	34.51	0.07
30	800	34.51	0.07
30	900	34.52	0.07
30	1000	34.53	0.08
30	1439	34.53	0.09

ASC Environmental Inc.
ASC-458 - BPE Development, 2285 Battersea Road, Kingston, Ontario
Figure 1 TW2 Pumping Test Drawdown

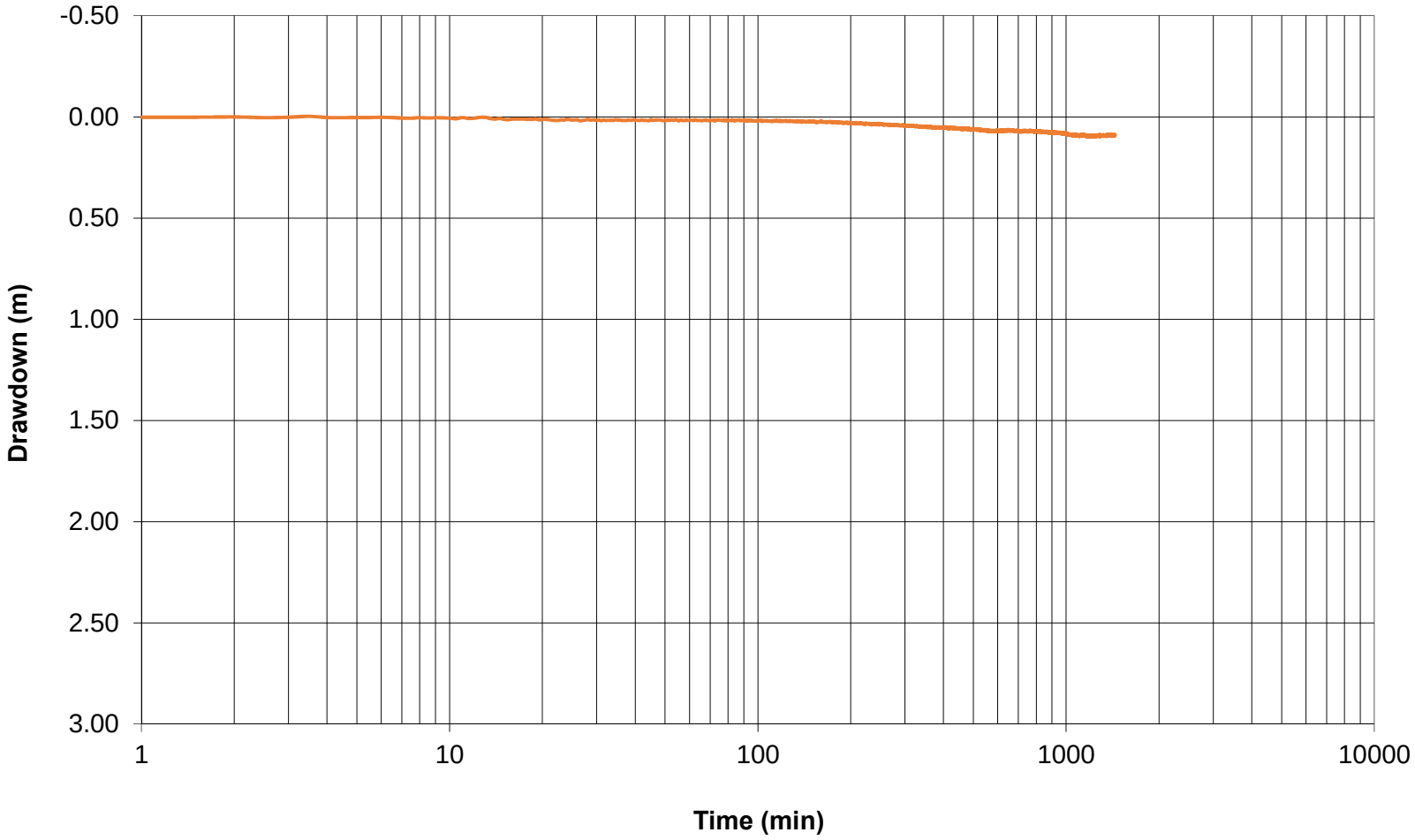


Table D3. Observation well drawdown during pumping test.

	Pumping Test - Drawdown		Test Well:	TW2
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10:33	PM

OW1 (2196 Battersea Rd.)					OW2 (2217 Battersea Rd.)				
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)
16.076	4.900	0.000	9:25	0	17.815	5.430	0.000	9:20	0
16.043	4.890	-0.010	13:0	147	16.371	4.990	-0.440	12:56	143
16.142	4.920	0.020	15:13	280	16.535	5.040	-0.390	15:9	276
16.043	4.890	-0.010	15:26	293	15.748	4.800	-0.630	17:3	390
16.010	4.880	-0.020	19:52	559	16.535	5.040	-0.390	19:55	562
16.076	4.900	0.000	21:57	684	15.781	4.810	-0.620	22:0	687
16.076	4.900	0.000	23:23	770	15.945	4.860	-0.570	23:28	775
16.043	4.890	-0.010	24:53	860	15.650	4.770	-0.660	24:56	863
16.076	4.900	0.000	27:14	1001	15.059	4.590	-0.840	27:17	1004
16.109	4.910	0.010	29:18	1125	15.354	4.680	-0.750	29:21	1128
16.207	4.940	0.040	31:30	1257	15.223	4.640	-0.790	31:38	1265
16.400	4.999	0.099	35:12	1479	17.060	5.200	-0.230	35:15	1482
16.400	4.999	0.099	37:24	1611	16.350	4.983	-0.447	37:30	1617
16.207	4.940	0.040	40:17	1784	16.200	4.938	-0.492	40:20	1787
16.273	4.960	0.060	41:37	1864	15.978	4.870	-0.560	41:40	1867
16.175	4.930	0.030	47:10	2197	15.978	4.870	-0.560	47:13	2200
16.207	4.940	0.040	50:8	2375	15.650	4.770	-0.660	50:13	2380
16.240	4.950	0.050	52:36	2523	15.125	4.610	-0.820	52:40	2527
16.800	5.121	0.221	56:21	2748	15.092	4.600	-0.830	56:27	2754
16.800	5.121	0.221	59:12	2919	16.817	5.126	-0.304	59:33	2940

OW3 (2225 Battersea Rd.)					OW4 (2224 Battersea Rd.)				
WL	WL	DD	Time	ET	WL	WL	DD	Time	ET
(ft)	(m)	(m)	H:Min	(min)	(ft)	(m)	(m)	H:Min	(min)
21.490	6.550	0.000	9:15	0	17.618	5.370	0.000	9:25	0
23.228	7.080	0.530	12:54	141	17.651	5.380	0.010	13:2	149
22.507	6.860	0.310	15:4	271	17.749	5.410	0.040	15:15	282
21.490	6.550	0.000	17:20	407	17.749	5.410	0.040	17:29	416
20.833	6.350	-0.200	20:0	567	17.651	5.380	0.010	20:10	577
23.163	7.060	0.510	22:3	690	17.684	5.390	0.020	22:7	694
20.801	6.340	-0.210	23:30	777	17.684	5.390	0.020	23:33	780
20.866	6.360	-0.190	25:0	867	17.585	5.360	-0.010	25:6	873
20.669	6.300	-0.250	27:22	1009	17.651	5.380	0.010	27:26	1013
20.768	6.330	-0.220	29:25	1132	17.618	5.370	0.000	29:29	1136
22.966	7.000	0.450	31:45	1272	17.881	5.450	0.080	31:48	1275
29.500	8.992	2.442	35:20	1487	18.300	5.578	0.208	35:22	1489
25.000	7.620	1.070	37:33	1620	18.300	5.578	0.208	37:38	1625
23.556	7.180	0.630	40:23	1790	18.143	5.530	0.160	40:26	1793
21.686	6.610	0.060	41:47	1874	18.373	5.600	0.230	41:51	1878
21.030	6.410	-0.140	47:17	2204	17.848	5.440	0.070	47:21	2208
21.096	6.430	-0.120	50:17	2384	17.848	5.440	0.070	50:18	2385
20.965	6.390	-0.160	52:45	2532	17.848	5.440	0.070	52:48	2535
22.100	6.736	0.186	56:31	2758	18.700	5.700	0.330	56:35	2762
23.400	7.132	0.582	59:30	2937	18.400	5.608	0.238	59:50	2957

	Pumping Test - Drawdown		Test Well:	TW2
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10 33	PM

OW5 (2252 Battersea Rd.)						OW6 (799 Unity Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
29.003	8.840	0.000	9	40	0	45.407	13.840	0.000	9	12	0
27.986	8.530	-0.310	11	57	84	45.472	13.860	0.020	11	53	80
28.215	8.600	-0.240	15	20	287	45.440	13.850	0.010	13	54	201
26.575	8.100	-0.740	16	32	359	45.308	13.810	-0.030	16	28	355
27.887	8.500	-0.340	18	40	487	45.374	13.830	-0.010	18	30	477
24.705	7.530	-1.310	20	15	582	45.374	13.830	-0.010	20	18	585
25.197	7.680	-1.160	22	12	699	45.341	13.820	-0.020	22	15	702
24.705	7.530	-1.310	23	40	787	45.276	13.800	-0.040	23	43	790
24.705	7.530	-1.310	25	11	878	45.210	13.780	-0.060	25	14	881
25.000	7.620	-1.220	27	34	1021	45.144	13.760	-0.080	27	38	1025
24.705	7.530	-1.310	29	34	1141	45.899	13.990	0.150	29	37	1144
26.378	8.040	-0.800	31	55	1282	45.505	13.870	0.030	32	0	1287
27.500	8.382	-0.458	35	30	1497	46.800	14.265	0.425	35	33	1500
27.800	8.473	-0.367	37	40	1627	45.800	13.960	0.120	37	48	1635
						45.308	13.810	-0.030	40	34	1801
						45.440	13.850	0.010	41	30	1857
						45.440	13.850	0.010	47	27	2214
						45.341	13.820	-0.020	50	25	2392
						45.341	13.820	-0.020	52	55	2542
						45.800	13.960	0.120	56	45	2772
						45.800	13.960	0.120	60	5	2972

OW7 (808 Unity Rd.)						OW8 (796 Unity Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
38.222	11.650	0.000	9	10	0	37.434	11.410	0.000	20	45	0
38.484	11.730	0.080	11	56	83	37.369	11.390	-0.020	22	20	707
38.255	11.660	0.010	13	46	193	37.270	11.360	-0.050	23	50	797
38.353	11.690	0.040	16	26	353	37.106	11.310	-0.100	25	19	886
43.865	13.370	1.720	18	35	482	36.942	11.260	-0.150	27	47	1034
38.550	11.750	0.100	20	20	587	36.844	11.230	-0.180	29	44	1151
38.550	11.750	0.100	22	18	705	37.172	11.330	-0.080	32	10	1297
38.353	11.690	0.040	23	46	793	37.700	11.491	0.081	35	421	1888
38.287	11.670	0.020	25	17	884	37.700	11.491	0.081	38	1	1648
38.123	11.620	-0.030	27	42	1029	37.336	11.380	-0.030	40	37	1804
37.992	11.580	-0.070	29	40	1147	37.402	11.400	-0.010	41	5	1832
38.287	11.670	0.020	32	5	1292	37.402	11.400	-0.010	47	34	2221
39.000	11.887	0.237	36	38	1565	37.172	11.330	-0.080	50	34	2401
38.900	11.857	0.207	38	58	1705	37.172	11.330	-0.080	53	0	2547
38.419	11.710	0.060	40	34	1801	37.900	11.552	0.142	56	55	2782
38.484	11.730	0.080	42	0	1887	38.000	11.582	0.172	59	55	2962
38.550	11.750	0.100	45	31	2098						
38.320	11.680	0.030	50	28	2395						
38.320	11.680	0.030	53	58	2605						
39.200	11.948	0.298	57	50	2837						
39.100	11.918	0.268	60	50	3017						

	Pumping Test - Drawdown		Test Well:	TW2
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10 33	PM

OW9 (2245 Battersea Rd.)					OW10 (874 Unity Rd.)				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
95.177	29.010	0.000	9 45	0	29.400	8.961	0.000	9 40	0
92.848	28.300	-0.710	12 2	89	28.543	8.700	-0.261	12 23	110
92.651	28.240	-0.770	14 0	207	28.543	8.700	-0.261	14 14	221
93.241	28.420	-0.590	16 36	363	28.806	8.780	-0.181	16 52	379
92.913	28.320	-0.690	18 30	477	28.412	8.660	-0.301	18 35	482
96.621	29.450	0.440	20 51	618	28.314	8.630	-0.331	20 55	622
93.340	28.450	-0.560	22 32	719	28.150	8.580	-0.381	22 36	723
93.176	28.400	-0.610	23 59	806	28.150	8.580	-0.381	24 3	810
93.176	28.400	-0.610	25 29	896	28.084	8.560	-0.401	25 33	900
94.062	28.670	-0.340	27 57	1044	28.117	8.570	-0.391	28 4	1051
93.438	28.480	-0.530	29 53	1160	29.167	8.890	-0.071	29 57	1164
93.406	28.470	-0.540	32 16	1303	29.035	8.850	-0.111	32 19	1306
94.100	28.682	-0.328	36 2	1529	29.700	9.053	0.091	35 57	1524
105.600	32.187	3.177	38 26	1673	29.300	8.931	-0.030	38 31	1678
93.832	28.600	-0.410	40 45	1812	29.265	8.920	-0.041	40 46	1813
93.701	28.560	-0.450	42 10	1897	28.773	8.770	-0.191	42 16	1903
94.029	28.660	-0.350	45 45	2112	28.675	8.740	-0.221	45 49	2116
94.390	28.770	-0.240	50 43	2410	28.543	8.700	-0.261	50 46	2413
94.094	28.680	-0.330	53 9	2556	28.675	8.740	-0.221	53 14	2561
95.100	28.986	-0.024	57 5	2792					
94.700	28.865	-0.145	60 35	3002					

OW11 (896 Unity Rd.)					OW14 (942 Unity Rd.)				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
40.400	12.314	0.000	9 39	0	59.100	18.014	0.000	9 16	0
39.993	12.190	-0.124	12 19	106	57.316	17.470	-0.544	12 6	93
39.961	12.180	-0.134	14 5	212	55.774	17.000	-1.014	14 19	226
41.371	12.610	0.296	16 0	327	55.741	16.990	-1.024	16 40	367
39.928	12.170	-0.144	16 44	371	56.923	17.350	-0.664	18 48	495
39.961	12.180	-0.134	18 58	505	56.004	17.070	-0.944	21 13	640
39.895	12.160	-0.154	21 0	627	56.135	17.110	-0.904	22 44	731
39.928	12.170	-0.144	22 40	727	55.446	16.900	-1.114	24 10	817
39.895	12.160	-0.154	24 6	813	55.085	16.790	-1.224	25 41	908
39.895	12.160	-0.154	25 37	904	55.938	17.050	-0.964	28 11	1058
39.862	12.150	-0.164	28 6	1053	57.054	17.390	-0.624	30 6	1173
40.026	12.200	-0.114	30 0	1167	56.266	17.150	-0.864	32 31	1318
46.457	14.160	1.846	32 25	1312	56.200	17.130	-0.884	35 49	1516
40.250	12.268	-0.046	35 53	1520	56.800	17.313	-0.701	38 40	1687
40.900	12.466	0.152	38 36	1683	56.168	17.120	-0.894	40 57	1824
39.961	12.180	-0.134	40 54	1821	55.709	16.980	-1.034	42 26	1913
40.026	12.200	-0.114	42 20	1907	55.676	16.970	-1.044	45 58	2125
40.092	12.220	-0.094	45 54	2121	55.315	16.860	-1.154	50 53	2420
40.059	12.210	-0.104	50 50	2417	58.850	17.937	-0.076	53 29	2576
40.400	12.314	0.000	53 25	2572	56.600	17.252	-0.762	57 27	2814
40.650	12.390	0.076	57 23	2810	56.400	17.130	-0.884	60 58	3025
40.800	12.436	0.122	60 30	2997					

	Pumping Test - Drawdown		Test Well:	TW2
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10:33	PM

OW15 (2329 Battersea Rd.)					OW16 (2359 Battersea Rd.)				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
73.885	22.520	0.000	9:0	0	82.907	25.270	0.000	8:50	0
74.114	22.590	0.070	12:50	137	83.235	25.370	0.100	12:35	122
74.147	22.600	0.080	14:53	260	83.136	25.340	0.070	14:40	247
74.409	22.680	0.160	17:16	403	83.530	25.460	0.190	17:3	390
74.672	22.760	0.240	21:19	646	83.497	25.450	0.180	21:38	665
74.606	22.740	0.220	22:48	735	83.366	25.410	0.140	23:1	748
73.950	22.540	0.020	24:15	822	82.710	25.210	-0.060	24:30	837
73.491	22.400	-0.120	25:46	913	82.415	25.120	-0.150	25:57	924
72.867	22.210	-0.310	28:17	1064	81.923	24.970	-0.300	28:28	1075
74.869	22.820	0.300	30:10	1177	85.630	26.100	0.830	30:23	1190
73.786	22.490	-0.030	32:36	1323	86.056	26.230	0.960	32:52	1339
74.600	22.738	0.218	36:6	1533	83.300	25.390	0.120	36:23	1550
74.000	22.555	0.035	38:46	1693	83.400	25.420	0.150	39:5	1712
74.475	22.700	0.180	41:0	1827	82.874	25.260	-0.010	41:9	1836
73.983	22.550	0.030	42:30	1917	83.038	25.310	0.040	43:43	1990
73.917	22.530	0.010	48:2	2249	82.743	25.220	-0.050	48:17	2264
73.589	22.430	-0.090	50:58	2425	82.448	25.130	-0.140	51:9	2436
73.800	22.494	-0.026	53:35	2582	82.600	25.176	-0.094	53:48	2595
74.600	22.738	0.218	57:35	2822	83.600	25.481	0.211	57:45	2832
74.400	22.677	0.157	61:5	3032	83.500	25.451	0.181	61:29	3056

OW17 (2370 Battersea Rd.)					OW18 (885 Unity Rd.)				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
74.475	22.700	0.000	8:45	0	27.493	8.380	0.000	8:27	0
74.639	22.750	0.000	12:33	120	28.219	8.601	0.221	12:27	114
74.344	22.660	0.000	14:36	243	31.365	9.56	1.180	14:27	234
74.639	22.750	0.000	17:5	392	30.115	9.179	0.799	17:27	414
74.508	22.710	0.000	21:40	667	30.655	9.344	0.964	21:27	654
74.344	22.660	0.000	23:4	751	31.267	9.530	1.150	23:27	774
73.852	22.510	0.000	24:35	842	31.761	9.681	1.301	24:27	834
73.589	22.430	0.000	26:1	928	31.652	9.6474	1.267	26:27	954
73.228	22.320	0.000	28:32	1079	31.773	9.6845	1.305	28:27	1074
73.983	22.550	0.000	30:27	1194	30.774	9.3799	1.000	30:27	1194
74.700	22.769	0.000	33:51	1398	32.036	9.7646	1.385	33:27	1374
74.700	22.769	0.000	35:6	1473	30.594	9.3251	0.945	35:27	1494
74.800	22.799	0.000	39:15	1722	30.857	9.4052	1.025	39:27	1734
74.147	22.600	0.000	41:15	1842	31.163	9.4986	1.119	41:27	1854
74.475	22.700	0.000	42:47	1934	30.870	9.4091	1.029	42:27	1914
73.983	22.550	0.000	48:21	2268	31.850	9.708	1.328	48:27	2274
74.114	22.590	0.000	51:12	2439	32.039	9.7655	1.386	51:27	2454
73.950	22.540	0.000	53:55	2602	31.096	9.478	1.098	53:27	2574
74.700	22.769	0.000	57:52	2839	30.152	9.1904	0.810	57:27	2814
74.500	22.708	0.000	63:34	3181	29.668	9.0428	0.663	63:27	3174

	Pumping Test - Drawdown		Test Well:	TW2
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10 33	PM

OW19 (2467 Battersea Rd.)						OW20 (2285 Battersea Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
34.154	10.410	0.000	8	40	0	47.600	14.508	0.000	8	51	0
34.022	10.370	-0.040	12	30	117	49.377	15.05	0.542	13	11	158
34.088	10.390	-0.020	14	29	236	48.130	14.67	0.162	15	28	295
34.186	10.420	0.010	16	52	379	46.949	14.310	-0.198	17	35	422
34.088	10.390	-0.020	19	8	515	46.457	14.160	-0.348	19	50	557
34.121	10.400	-0.010	21	46	673	46.457	14.160	-0.348	21	55	682
34.088	10.390	-0.020	23	8	755	46.457	14.160	-0.348	23	19	766
34.022	10.370	-0.040	24	38	845	46.293	14.110	-0.398	24	50	857
34.022	10.370	-0.040	26	9	936	46.293	14.110	-0.398	27	8	995
34.022	10.370	-0.040	28	36	1083	46.490	14.170	-0.338	29	14	1121
34.121	10.400	-0.010	30	31	1198	48.800	14.874	0.366	34	0	1407
34.400	10.485	0.075	33	56	1403	53.600	16.337	1.829	36	27	1554
34.400	10.485	0.075	35	3	1470	46.490	14.170	-0.338	39	22	1729
34.121	10.400	-0.010	39	20	1727	47.671	14.53	0.022	41	22	1849
34.121	10.400	-0.010	41	18	1845	47.080	14.35	-0.158	42	56	1943
34.121	10.400	-0.010	42	51	1938	46.719	14.24	-0.268	47	6	2193
34.121	10.400	-0.010	48	25	2272	46.588	14.2	-0.308	50	3	2370
34.121	10.400	-0.010	51	15	2442	46.719	14.24	-0.268	52	32	2519
34.350	10.470	0.060	53	59	2606	49.800	15.179	0.671	58	0	2847
34.800	10.607	0.197	57	55	2842	50.200	15.301	0.792	61	41	3068
34.500	10.516	0.106	63	30	3177						

TW1						OW21 (2228 Battersea Rd.)					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
116.600	35.540	0.000	9	1	0	18.766	5.720	0.000	9	26	0
119.000	36.271	0.732	12	0	87	18.898	5.76	0.040	12	4	91
121.200	36.942	1.402	15	30	297	18.963	5.78	0.060	15	19	286
122.100	37.216	1.676	18	7	454	18.898	5.760	0.040	17	27	414
122.150	37.231	1.692	19	45	552	18.734	5.710	-0.010	20	12	579
122.450	37.323	1.783	21	53	680	18.734	5.710	-0.010	22	9	696
122.590	37.365	1.826	23	16	763	18.701	5.700	-0.020	23	35	782
122.800	37.429	1.890	24	48	855	18.701	5.700	-0.020	25	8	875
121.900	37.155	1.615	27	6	993	18.668	5.690	-0.030	27	30	1017
122.000	37.186	1.646	29	11	1118	18.635	5.680	-0.040	29	31	1138
122.300	37.277	1.737	33	39	1386	19.127	5.830	0.110	31	51	1278
123.400	37.612	2.073	36	30	1557	19.700	6.005	0.285	35	26	1493
123.400	37.612	2.073	39	30	1737	19.900	6.066	0.346	37	40	1627
123.600	37.673	2.134	41	24	1851	19.357	5.9	0.180	40	24	1791
123.600	37.673	2.134	42	58	1945	19.324	5.89	0.170	41	54	1881
123.750	37.719	2.179	47	3	2190	18.996	5.79	0.070	47	24	2211
123.760	37.722	2.182	50	1	2368	18.832	5.74	0.020	50	23	2390
123.800	37.734	2.195	52	30	2517	18.832	5.74	0.020	52	50	2537
124.000	37.795	2.256	58	2	2849	19.550	5.959	0.239	56	38	2765
120.400	36.698	1.158	61	45	3072	19.500	5.944	0.224	59	0	2907

	Pumping Test - Drawdown		Test Well:	TW2
	Project No.:	ASC-458	Date:	17-Sep-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10 33	PM

OW22 (791 Unity Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
63.058	19.220	0.000	9 5	0
63.025	19.210	-0.010	11 47	74
65.617	20.000	0.780	13 13	160
62.795	19.140	-0.080	16 22	349
63.156	19.250	0.030	18 10	457
63.156	19.250	0.030	20 34	601
62.959	19.190	-0.030	22 25	712
63.058	19.220	0.000	23 55	802
62.861	19.160	-0.060	25 24	891
62.828	19.150	-0.070	27 53	1040
62.861	19.160	-0.060	29 49	1156
66.831	20.370	1.150	32 2	1289
63.300	19.294	0.074	35 36	1503
63.300	19.294	0.074	37 51	1638
62.795	19.140	-0.080	40 31	1798
63.058	19.220	0.000	41 1	1828
64.797	19.750	0.530	47 40	2227
62.927	19.180	-0.040	50 36	2403
63.600	19.180	-0.040	56 5	2732
63.300	19.294	0.074	60 48	3015

OW23 (2347 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
80.249	24.460	0.000	8 55	0
80.413	24.51	0.050	12 34	121
97.999	29.87	5.410	14 47	254
80.938	24.670	0.210	17 6	393
81.102	24.720	0.260	21 33	660
80.873	24.650	0.190	22 56	743
80.184	24.440	-0.020	24 24	831
79.856	24.340	-0.120	25 53	920
79.331	24.180	-0.280	28 24	1071
79.757	24.310	-0.150	30 18	1185
80.249	24.460	0.000	32 50	1337
80.700	24.597	0.137	36 20	1547
80.300	24.475	0.015	37 1	1588
80.282	24.47	0.010	41 7	1834
80.446	24.52	0.060	43 40	1987
80.217	24.45	-0.010	48 12	2259
79.921	24.36	-0.100	51 6	2433
80.100	24.414	-0.046	53 44	2591
102.200	31.151	6.691	57 43	2830
81.000	24.689	0.229	63 21	3168

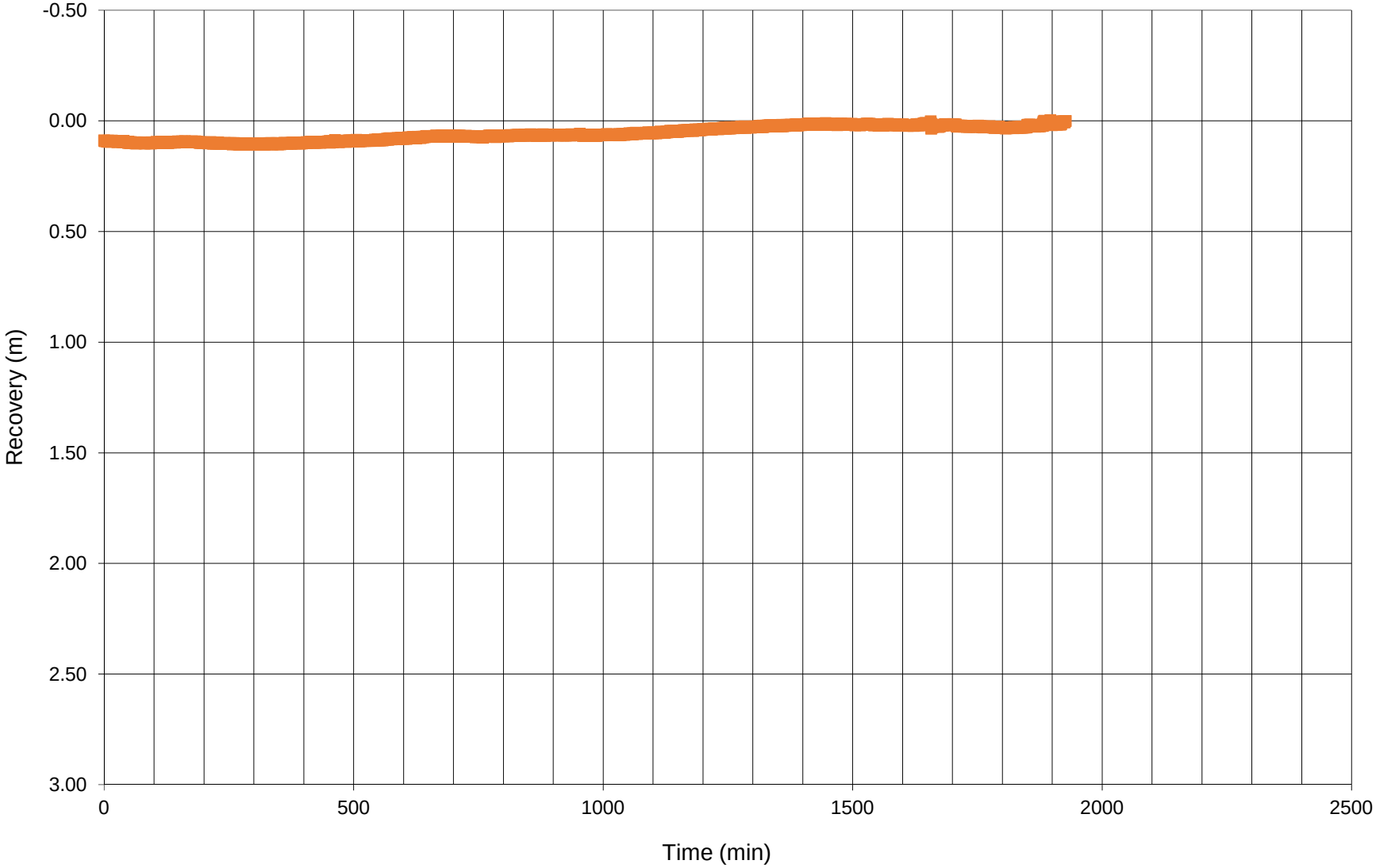
OW24 (2336)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
69.751	21.260	0.000	12 45	0
70.079	21.360	0.100	14 59	266
67.651	20.620	-0.640	17 12	399
72.638	22.140	0.880	21 23	650
72.802	22.190	0.930	22 51	738
71.982	21.940	0.680	24 20	827
71.818	21.890	0.630	25 49	916
71.850	21.900	0.640	28 22	1069
72.375	22.060	0.800	30 14	1181
69.980	21.330	0.070	32 43	1330
70.600	21.519	0.259	36 8	1535
70.300	21.427	0.167	38 53	1700
71.391	21.760	0.500	41 3	1830
70.702	21.550	0.290	42 36	1923
72.178	22.000	0.740	48 6	2253
72.080	21.970	0.710	51 2	2429
72.190	22.004	0.744	53 39	2586
70.100	21.366	0.106	57 40	2827
70.000	21.336	0.076	61 14	3041

Table D4. Test well recovery after pumping test.

ASC ENVIRONMENTAL	**Pumping Test - Recovery**			**Test Well:**	**TW2**
	Project No.:	ASC-458		Date:	17-Sep-18
	Client:	BPE Development			Recorded By: J.P.
	Location:	2285 Battersea Road, Kingston, ON			
		Test Well			
Pumping	Elapsed Time (min/sec)	Well Level (WL) (m)	Drawdown (m)		
0	0	34.53	0.09		
0	1	34.53	0.09		
0	2	34.53	0.09		
0	3	34.53	0.09		
0	4	34.53	0.09		
0	5	34.53	0.09		
0	10	34.53	0.09		
0	20	34.54	0.09		
0	30	34.54	0.09		
0	40	34.54	0.09		
0	50	34.54	0.10		
0	60	34.54	0.10		
0	70	34.54	0.10		
0	80	34.54	0.10		
0	90	34.54	0.10		
0	100	34.54	0.10		
0	200	34.54	0.10		
0	300	34.55	0.11		
0	400	34.54	0.10		
0	500	34.53	0.09		
0	600	34.52	0.08		
0	700	34.51	0.07		
0	800	34.51	0.07		
0	900	34.51	0.06		
0	1000	34.51	0.06		
0	1500	34.46	0.01		
0	1927	34.44	0.00		
WL at 95% Recovery =		34.450 m			

ASC Environmental Inc.
ASC-458 - BPE Development, 2285 Battersea Road, Kingston, Ontario
Figure 3 Test Well 2 Recovery



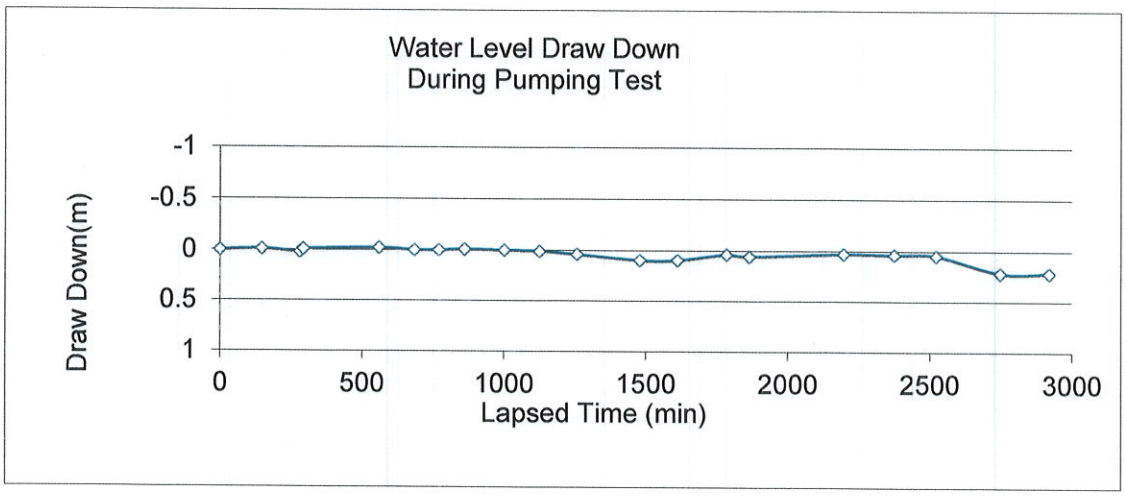
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2196 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
4.90			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
16.08	4.90	-0.25	17-Sep	9	25	0
16.04	4.89	-0.26	17-Sep	13	0	147
16.14	4.92	-0.23	17-Sep	15	13	280
16.04	4.89	-0.26	17-Sep	15	26	293
16.01	4.88	-0.27	17-Sep	19	52	559
16.08	4.90	-0.25	17-Sep	21	57	684
16.08	4.90	-0.25	17-Sep	23	23	770
16.04	4.89	-0.26	18-Sep	0	53	860
16.08	4.90	-0.25	18-Sep	3	14	1001
16.11	4.91	-0.24	18-Sep	5	18	1125
16.21	4.94	-0.21	18-Sep	7	30	1257
16.40	5.00	-0.15	18-Sep	11	12	1479
16.40	5.00	-0.15	18-Sep	13	24	1611
16.21	4.94	-0.21	18-Sep	16	17	1784
16.27	4.96	-0.19	18-Sep	17	37	1864
16.17	4.93	-0.22	18-Sep	23	10	2197
16.21	4.94	-0.21	18-Sep	2	8	2375
16.24	4.95	-0.20	19-Sep	4	36	2523
16.80	5.12	-0.03	19-Sep	8	21	2748
16.80	5.12	-0.03	19-Sep	11	12	2919



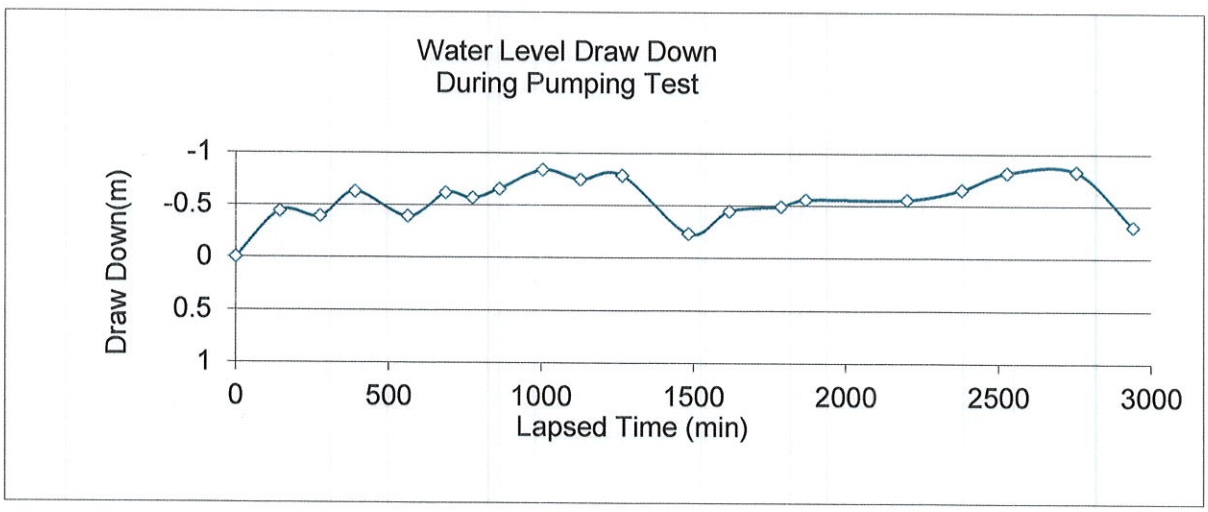
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2217 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
5.43			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
17.81	5.43	0.00	17-Sep	9	20	0
16.37	4.99	-0.44	17-Sep	12	56	143
16.54	5.04	-0.39	17-Sep	15	9	276
15.75	4.80	-0.63	17-Sep	17	3	390
16.54	5.04	-0.39	17-Sep	19	55	562
15.78	4.81	-0.62	17-Sep	22	0	687
15.94	4.86	-0.57	17-Sep	23	28	775
15.65	4.77	-0.66	18-Sep	0	56	863
15.06	4.59	-0.84	18-Sep	3	17	1004
15.35	4.68	-0.75	18-Sep	5	21	1128
15.22	4.64	-0.79	18-Sep	7	38	1265
17.06	5.20	-0.23	18-Sep	11	15	1482
16.35	4.98	-0.45	18-Sep	13	30	1617
16.20	4.94	-0.49	18-Sep	16	20	1787
15.98	4.87	-0.56	18-Sep	17	40	1867
15.98	4.87	-0.56	18-Sep	23	13	2200
15.65	4.77	-0.66	19-Sep	2	13	2380
15.12	4.61	-0.82	19-Sep	4	40	2527
15.09	4.60	-0.83	19-Sep	8	27	2754
16.82	5.13	-0.30	19-Sep	11	33	2940



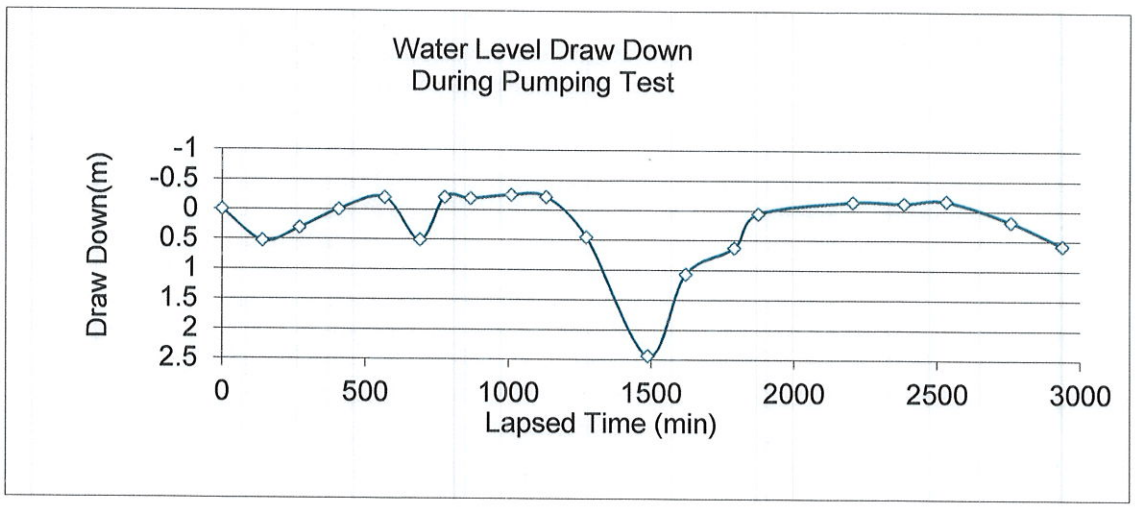
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2225 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
6.55			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
21.49	6.55	0.00	17-Sep	9	15	0
23.23	7.08	0.53	17-Sep	12	54	141
22.51	6.86	0.31	17-Sep	15	4	271
21.49	6.55	0.00	17-Sep	17	20	407
20.83	6.35	-0.20	17-Sep	20	0	567
23.16	7.06	0.51	17-Sep	22	3	690
20.80	6.34	-0.21	17-Sep	23	30	777
20.87	6.36	-0.19	18-Sep	1	0	867
20.67	6.30	-0.25	18-Sep	3	22	1009
20.77	6.33	-0.22	18-Sep	5	25	1132
22.97	7.00	0.45	18-Sep	7	45	1272
29.50	8.99	2.44	18-Sep	11	20	1487
25.00	7.62	1.07	18-Sep	13	33	1620
23.56	7.18	0.63	18-Sep	16	23	1790
21.69	6.61	0.06	18-Sep	17	47	1874
21.03	6.41	-0.14	18-Sep	23	17	2204
21.10	6.43	-0.12	19-Sep	2	17	2384
20.96	6.39	-0.16	19-Sep	4	45	2532
22.10	6.74	0.19	19-Sep	8	31	2758
23.40	7.13	0.58	19-Sep	11	30	2937



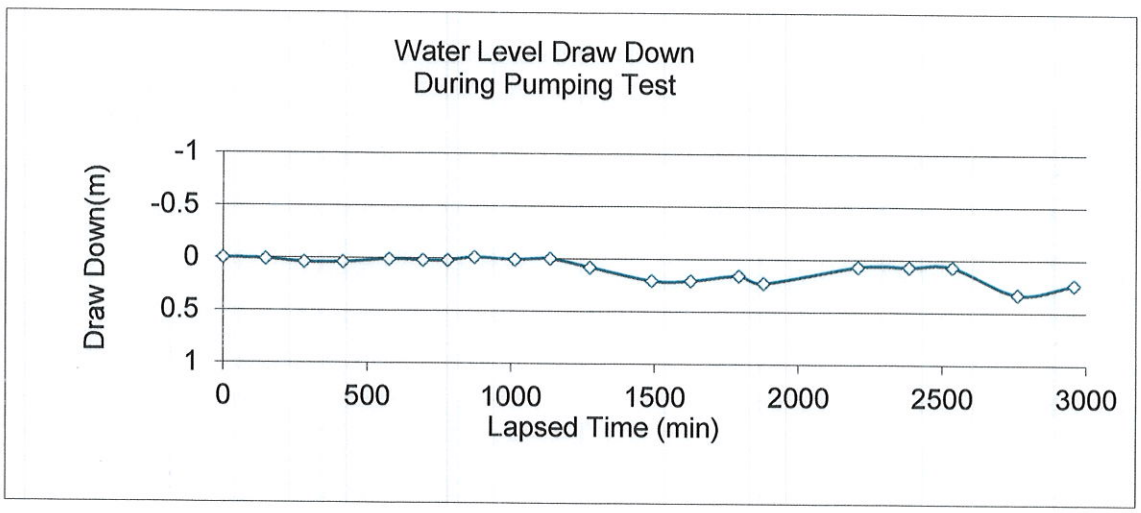
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2224 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
5.37			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
17.62	5.37	0.27	17-Sep	9	25	0
17.65	5.38	0.28	17-Sep	13	2	149
17.75	5.41	0.31	17-Sep	15	15	282
17.75	5.41	0.31	17-Sep	17	29	416
17.65	5.38	0.28	17-Sep	20	10	577
17.68	5.39	0.29	17-Sep	22	7	694
17.68	5.39	0.29	17-Sep	23	33	780
17.59	5.36	0.26	18-Sep	1	6	873
17.65	5.38	0.28	18-Sep	3	26	1013
17.62	5.37	0.27	18-Sep	5	29	1136
17.88	5.45	0.35	18-Sep	7	48	1275
18.30	5.58	0.48	18-Sep	1	22	1489
18.30	5.58	0.48	18-Sep	13	38	1625
18.14	5.53	0.43	18-Sep	16	26	1793
18.37	5.60	0.50	18-Sep	17	51	1878
17.85	5.44	0.34	18-Sep	23	21	2208
17.85	5.44	0.34	19-Sep	2	18	2385
17.85	5.44	0.34	19-Sep	4	48	2535
18.70	5.70	0.60	19-Sep	8	35	2762
18.40	5.61	0.51	19-Sep	11	50	2957



ASC ENVIRONMENTAL

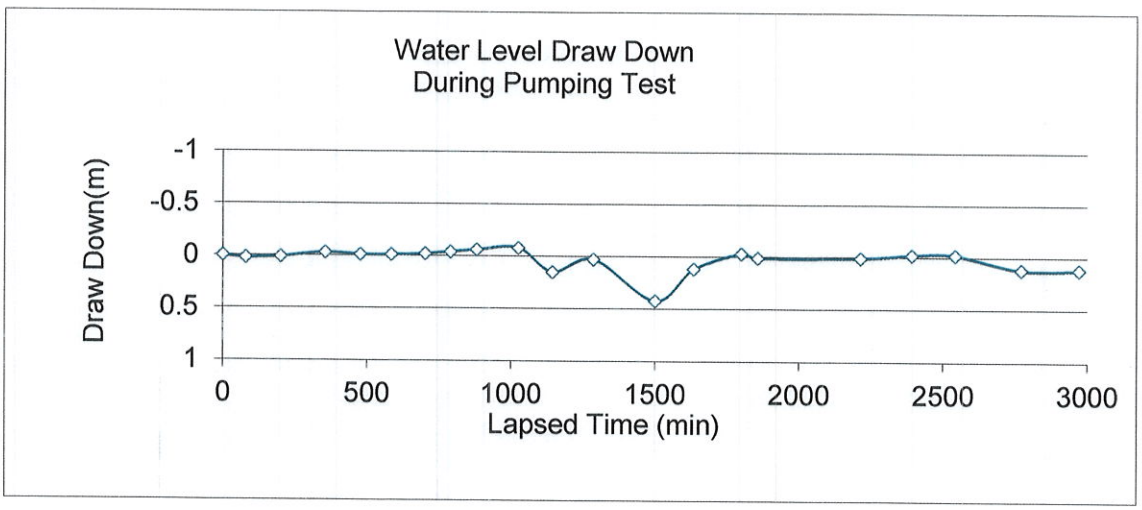
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	799 Unity		

Pumping started at :	10	33

Water Level at Start of Test (m)
13.84

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
45.41	13.84	0.00	17-Sep	9	12	0
45.47	13.86	0.02	17-Sep	11	53	80
45.44	13.85	0.01	17-Sep	13	54	201
45.31	13.81	-0.03	17-Sep	16	28	355
45.37	13.83	-0.01	17-Sep	18	30	477
45.37	13.83	-0.01	17-Sep	20	18	585
45.34	13.82	-0.02	17-Sep	22	15	702
45.28	13.80	-0.04	17-Sep	23	43	790
45.21	13.78	-0.06	18-Sep	1	14	881
45.14	13.76	-0.08	18-Sep	3	38	1025
45.90	13.99	0.15	18-Sep	5	37	1144
45.51	13.87	0.03	18-Sep	8	0	1287
46.80	14.26	0.42	18-Sep	11	33	1500
45.80	13.96	0.12	18-Sep	13	48	1635
45.31	13.81	-0.03	18-Sep	16	34	1801
45.44	13.85	0.01	18-Sep	17	30	1857
45.44	13.85	0.01	18-Sep	23	27	2214
45.34	13.82	-0.02	19-Sep	2	25	2392
45.34	13.82	-0.02	19-Sep	4	55	2542
45.80	13.96	0.12	19-Sep	8	45	2772
45.80	13.96	0.12	19-Sep	12	5	2972



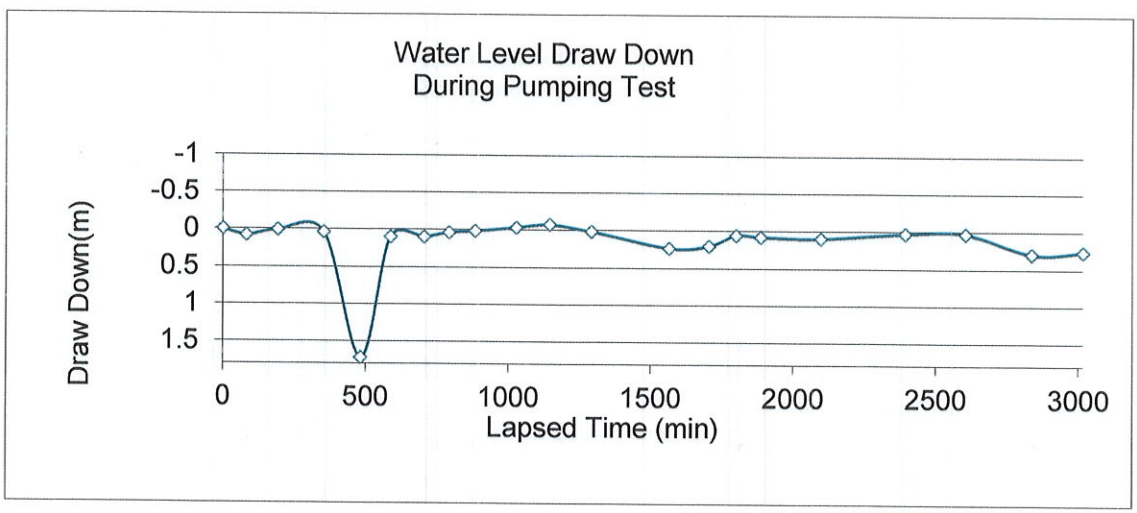
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	808 Unity		

Water Level at Start of Test (m)	Pumping started at :	10	33
11.65			

Water Level (WL) During Pumping		Draw Dowr	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
38.22	11.65	0.00	17-Sep	9	10	0
38.48	11.73	0.08	17-Sep	11	56	83
38.25	11.66	0.01	17-Sep	13	46	193
38.35	11.69	0.04	17-Sep	16	26	353
43.86	13.37	1.72	17-Sep	18	35	482
38.55	11.75	0.10	17-Sep	20	20	587
38.55	11.75	0.10	17-Sep	22	18	705
38.35	11.69	0.04	17-Sep	23	46	793
38.29	11.67	0.02	18-Sep	1	17	884
38.12	11.62	-0.03	18-Sep	3	42	1029
37.99	11.58	-0.07	18-Sep	5	40	1147
38.29	11.67	0.02	18-Sep	8	5	1292
39.00	11.89	0.24	18-Sep	11	38	1565
38.90	11.86	0.21	18-Sep	14	58	1705
38.42	11.71	0.06	18-Sep	16	34	1801
38.48	11.73	0.08	18-Sep	17	0	1887
38.55	11.75	0.10	18-Sep	23	31	2098
38.32	11.68	0.03	19-Sep	2	28	2395
38.32	11.68	0.03	19-Sep	4	58	2605
39.20	11.95	0.30	19-Sep	8	50	2837
39.10	11.92	0.27	19-Sep	11	50	3017



ASC ENVIRONMENTAL

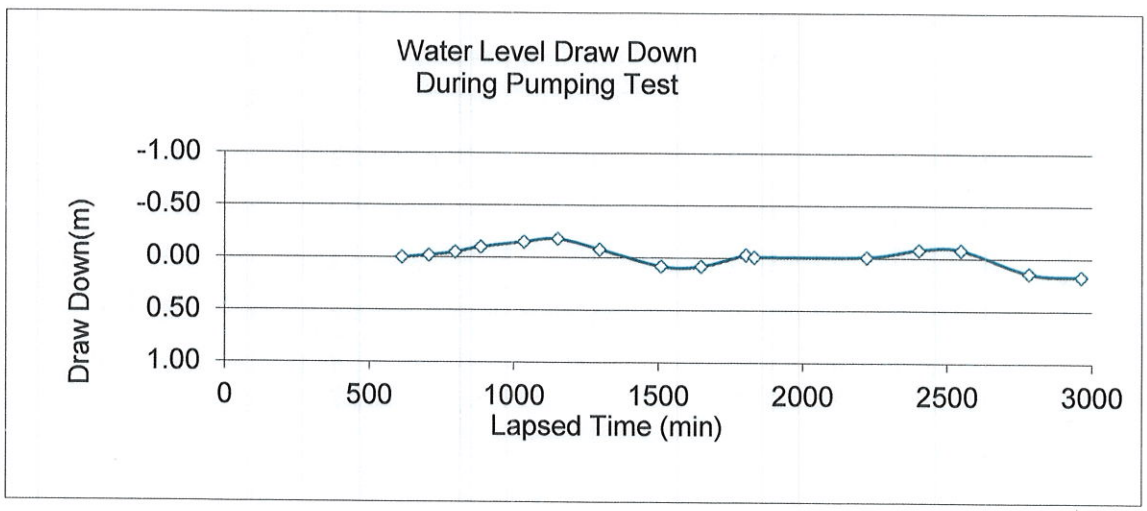
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	796 Unity		

Pumping started at :	10	33

Water Level at Start of Test (m)
11.41

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
37.43	11.41	0.00	17-Sep	20	45	612
37.37	11.39	-0.02	17-Sep	22	20	707
37.27	11.36	-0.05	17-Sep	23	50	797
37.11	11.31	-0.10	18-Sep	1	19	886
36.94	11.26	-0.15	18-Sep	3	47	1034
36.84	11.23	-0.18	18-Sep	5	44	1151
37.17	11.33	-0.08	18-Sep	8	10	1297
37.70	11.49	0.08	18-Sep	11	42	1509
37.70	11.49	0.08	18-Sep	14	1	1648
37.34	11.38	-0.03	18-Sep	16	37	1804
37.40	11.40	-0.01	18-Sep	17	5	1832
37.40	11.40	-0.01	18-Sep	23	34	2221
37.17	11.33	-0.08	19-Sep	2	34	2401
37.17	11.33	-0.08	19-Sep	5	0	2547
37.90	11.55	0.14	19-Sep	8	55	2782
38.00	11.58	0.17	19-Sep	11	30	2962



ASC ENVIRONMENTAL

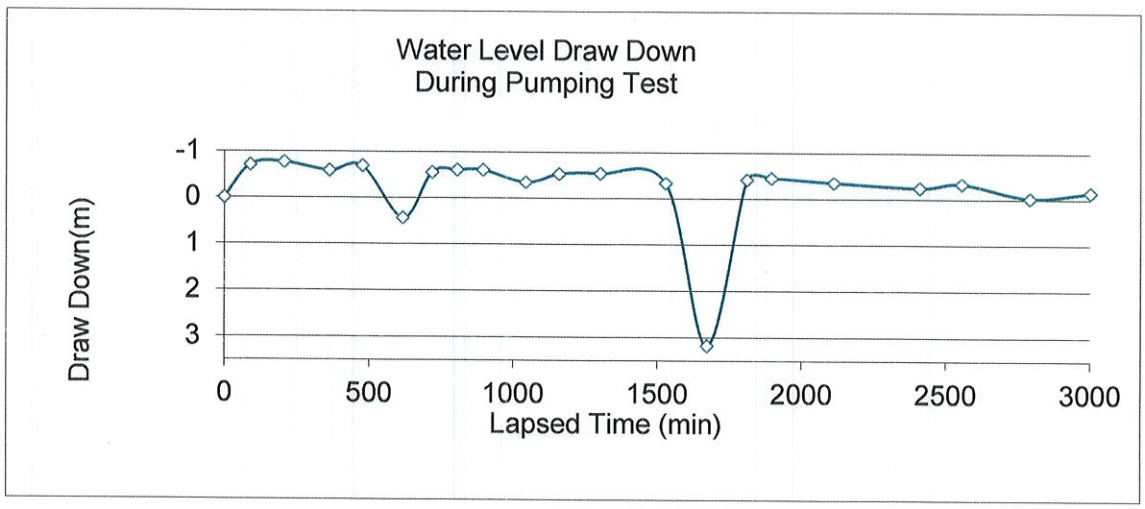
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2245 Battersea Road		

Pumping started at :	10	33

Water Level at Start of Test (m)
29.01

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
95.18	29.01	0.00	17-Sep	9	45	0
92.85	28.30	-0.71	17-Sep	12	2	89
92.65	28.24	-0.77	17-Sep	14	0	207
93.24	28.42	-0.59	17-Sep	16	36	363
92.91	28.32	-0.69	17-Sep	18	30	477
96.62	29.45	0.44	17-Sep	20	51	618
93.34	28.45	-0.56	17-Sep	22	32	719
93.18	28.40	-0.61	17-Sep	23	59	806
93.18	28.40	-0.61	18-Sep	1	29	896
94.06	28.67	-0.34	18-Sep	3	57	1044
93.44	28.48	-0.53	18-Sep	5	53	1160
93.41	28.47	-0.54	18-Sep	8	16	1303
94.10	28.68	-0.33	18-Sep	12	2	1529
105.60	32.19	3.18	18-Sep	14	26	1673
93.83	28.60	-0.41	18-Sep	16	45	1812
93.70	28.56	-0.45	18-Sep	17	10	1897
94.03	28.66	-0.35	18-Sep	23	45	2112
94.39	28.77	-0.24	19-Sep	2	43	2410
94.09	28.68	-0.33	19-Sep	5	9	2556
95.10	28.99	-0.02	19-Sep	9	5	2792
94.70	28.86	-0.15	19-Sep	12	35	3002



ASC ENVIRONMENTAL

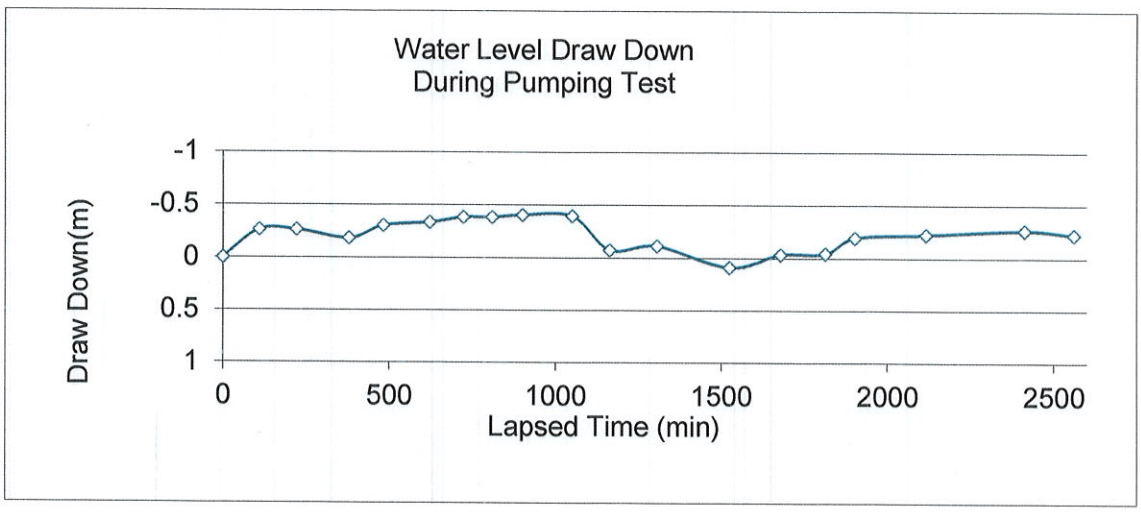
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	874 Unity Road		

Pumping started at :	10	33

Water Level at Start of Test (m)
8.96

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
29.40	8.96	0.00	17-Sep	9	40	0
28.54	8.70	-0.26	17-Sep	12	23	110
28.54	8.70	-0.26	17-Sep	14	14	221
28.81	8.78	-0.18	17-Sep	16	52	379
28.41	8.66	-0.30	17-Sep	18	35	482
28.31	8.63	-0.33	17-Sep	20	55	622
28.15	8.58	-0.38	17-Sep	22	36	723
28.15	8.58	-0.38	18-Sep	0	3	810
28.08	8.56	-0.40	18-Sep	1	33	900
28.12	8.57	-0.39	18-Sep	4	4	1051
29.17	8.89	-0.07	18-Sep	5	57	1164
29.04	8.85	-0.11	18-Sep	8	19	1306
29.70	9.05	0.09	18-Sep	11	57	1524
29.30	8.93	-0.03	18-Sep	14	31	1678
29.27	8.92	-0.04	18-Sep	16	46	1813
28.77	8.77	-0.19	18-Sep	18	16	1903
28.67	8.74	-0.22	18-Sep	23	49	2116
28.54	8.70	-0.26	19-Sep	2	46	2413
28.67	8.74	-0.22	19-Sep	5	14	2561



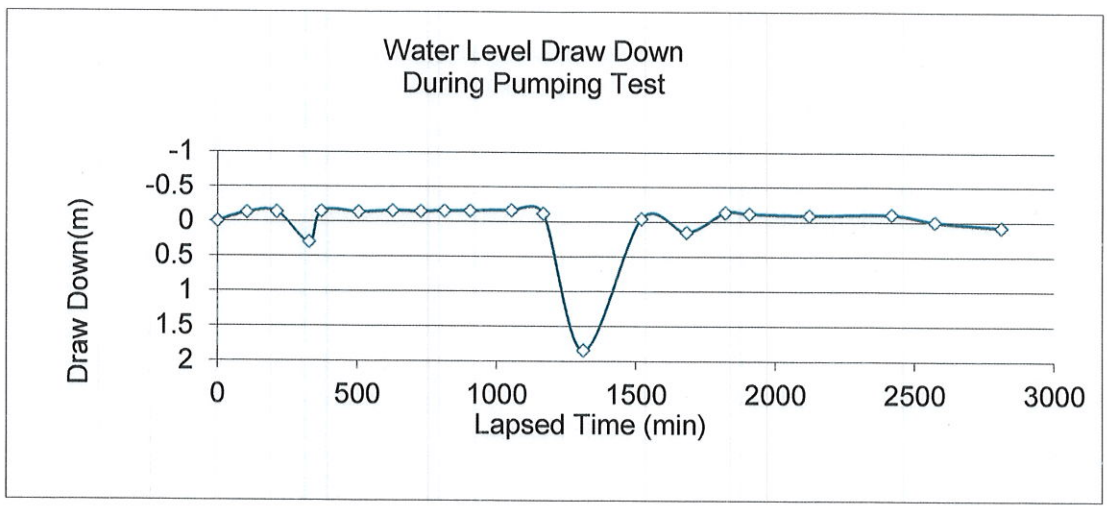
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	896 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10 : 33
12.31		

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
40.40	12.31	0.00	17-Sep	9	39	0
39.99	12.19	-0.12	17-Sep	12	19	106
39.96	12.18	-0.13	17-Sep	14	5	212
41.37	12.61	0.30	17-Sep	16	0	327
39.93	12.17	-0.14	17-Sep	16	44	371
39.96	12.18	-0.13	17-Sep	18	58	505
39.90	12.16	-0.15	17-Sep	21	0	627
39.93	12.17	-0.14	17-Sep	22	40	727
39.90	12.16	-0.15	18-Sep	0	6	813
39.90	12.16	-0.15	18-Sep	1	37	904
39.86	12.15	-0.16	18-Sep	4	6	1053
40.03	12.20	-0.11	18-Sep	6	0	1167
46.46	14.16	1.85	18-Sep	8	25	1312
40.25	12.27	-0.05	18-Sep	11	53	1520
40.90	12.47	0.15	18-Sep	14	36	1683
39.96	12.18	-0.13	18-Sep	16	54	1821
40.03	12.20	-0.11	18-Sep	18	20	1907
40.09	12.22	-0.09	18-Sep	23	54	2121
40.06	12.21	-0.10	19-Sep	2	50	2417
40.40	12.31	0.00	19-Sep	5	25	2572
40.65	12.39	0.08	19-Sep	9	23	2810
40.8	12.44	0.12	19-Sep	12	30	2997



ASC ENVIRONMENTAL

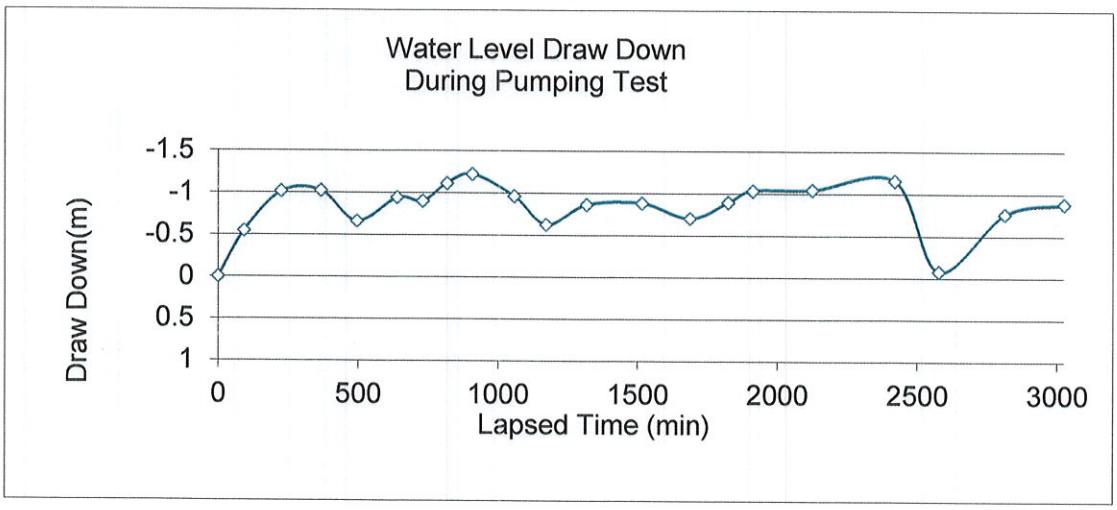
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	942 Unity Road		

Pumping started at :	10	33

Water Level at Start of Test (m)
18.01

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
59.10	18.01	0.00	17-Sep	9	16	0
57.32	17.47	-0.54	17-Sep	12	6	93
55.77	17.00	-1.01	17-Sep	14	19	226
55.74	16.99	-1.02	17-Sep	16	40	367
56.92	17.35	-0.66	17-Sep	18	48	495
56.00	17.07	-0.94	17-Sep	21	13	640
56.14	17.11	-0.90	17-Sep	22	44	731
55.45	16.90	-1.11	18-Sep	0	10	817
55.09	16.79	-1.22	18-Sep	1	41	908
55.94	17.05	-0.96	18-Sep	4	11	1058
57.05	17.39	-0.62	18-Sep	6	6	1173
56.27	17.15	-0.86	18-Sep	8	31	1318
56.20	17.13	-0.88	18-Sep	11	49	1516
56.80	17.31	-0.70	18-Sep	14	40	1687
56.17	17.12	-0.89	18-Sep	16	57	1824
55.71	16.98	-1.03	18-Sep	18	26	1913
55.68	16.97	-1.04	18-Sep	23	58	2125
55.31	16.86	-1.15	19-Sep	2	53	2420
58.85	17.94	-0.08	19-Sep	5	29	2576
56.60	17.25	-0.76	19-Sep	9	27	2814
56.40	17.13	-0.88	19-Sep	12	58	3025



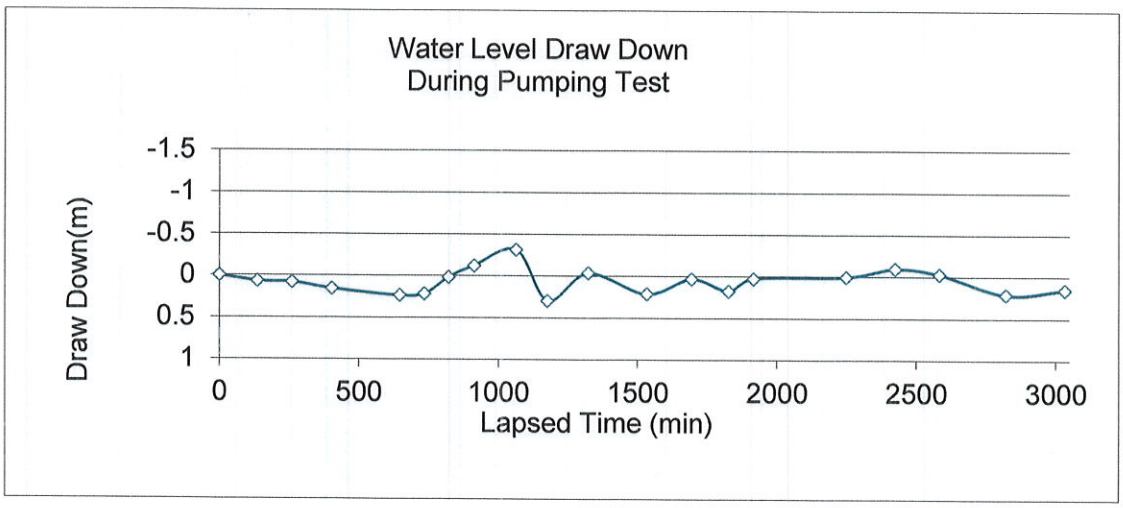
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2329 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
22.52			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
73.88	22.52	0.00	17-Sep	9	0	0
74.11	22.59	0.07	17-Sep	12	50	137
74.15	22.60	0.08	17-Sep	14	53	260
74.41	22.68	0.16	17-Sep	17	16	403
74.67	22.76	0.24	17-Sep	21	19	646
74.61	22.74	0.22	17-Sep	22	48	735
73.95	22.54	0.02	18-Sep	0	15	822
73.49	22.40	-0.12	18-Sep	1	46	913
72.87	22.21	-0.31	18-Sep	4	17	1064
74.87	22.82	0.30	18-Sep	6	10	1177
73.79	22.49	-0.03	18-Sep	8	36	1323
74.60	22.74	0.22	18-Sep	12	6	1533
74.00	22.56	0.04	18-Sep	14	46	1693
74.48	22.70	0.18	18-Sep	17	0	1827
73.98	22.55	0.03	18-Sep	18	30	1917
73.92	22.53	0.01	19-Sep	0	2	2249
73.59	22.43	-0.09	19-Sep	2	58	2425
73.80	22.49	-0.03	19-Sep	5	35	2582
74.60	22.74	0.22	19-Sep	9	35	2822
74.40	22.68	0.16	19-Sep	13	5	3032



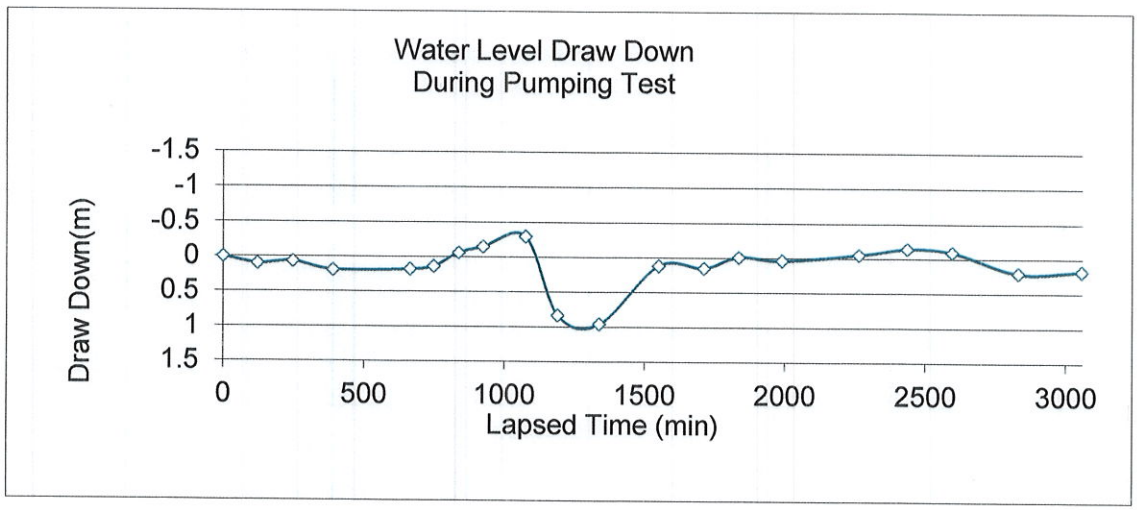
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2359 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
25.27			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
82.91	25.27	0.00	17-Sep	8	50	0
83.23	25.37	0.10	17-Sep	12	35	122
83.14	25.34	0.07	17-Sep	14	40	247
83.53	25.46	0.19	17-Sep	17	3	390
83.50	25.45	0.18	17-Sep	21	38	665
83.37	25.41	0.14	17-Sep	23	1	748
82.71	25.21	-0.06	18-Sep	0	30	837
82.41	25.12	-0.15	18-Sep	1	57	924
81.92	24.97	-0.30	18-Sep	4	28	1075
85.63	26.10	0.83	18-Sep	6	23	1190
86.06	26.23	0.96	18-Sep	8	52	1339
83.30	25.39	0.12	18-Sep	12	23	1550
83.40	25.42	0.15	18-Sep	15	5	1712
82.87	25.26	-0.01	18-Sep	17	9	1836
83.04	25.31	0.04	18-Sep	18	43	1990
82.74	25.22	-0.05	19-Sep	0	17	2264
82.45	25.13	-0.14	19-Sep	3	9	2436
82.60	25.18	-0.09	19-Sep	5	48	2595
83.60	25.48	0.21	19-Sep	9	45	2832
83.50	25.45	0.18	19-Sep	12	29	3056



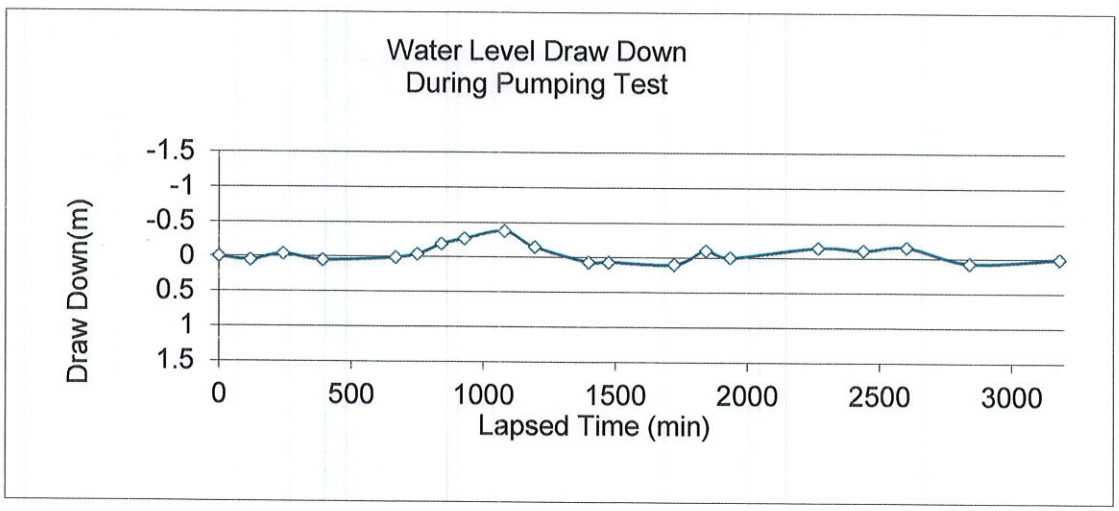
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2370 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
22.70			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
74.48	22.70	0.00	17-Sep	8	45	0
74.64	22.75	0.05	17-Sep	12	33	120
74.34	22.66	-0.04	17-Sep	14	36	243
74.64	22.75	0.05	17-Sep	17	5	392
74.51	22.71	0.01	17-Sep	21	40	667
74.34	22.66	-0.04	17-Sep	23	4	751
73.85	22.51	-0.19	18-Sep	0	35	842
73.59	22.43	-0.27	18-Sep	2	1	928
73.23	22.32	-0.38	18-Sep	4	32	1079
73.98	22.55	-0.15	18-Sep	6	27	1194
74.70	22.77	0.07	18-Sep	9	51	1398
74.70	22.77	0.07	18-Sep	11	6	1473
74.80	22.80	0.10	18-Sep	15	15	1722
74.15	22.60	-0.10	18-Sep	17	15	1842
74.48	22.70	0.00	18-Sep	18	47	1934
73.98	22.55	-0.15	19-Sep	0	21	2268
74.11	22.59	-0.11	19-Sep	3	12	2439
73.95	22.54	-0.16	19-Sep	5	55	2602
74.70	22.77	0.07	19-Sep	9	52	2839
74.50	22.71	0.01	19-Sep	15	34	3181



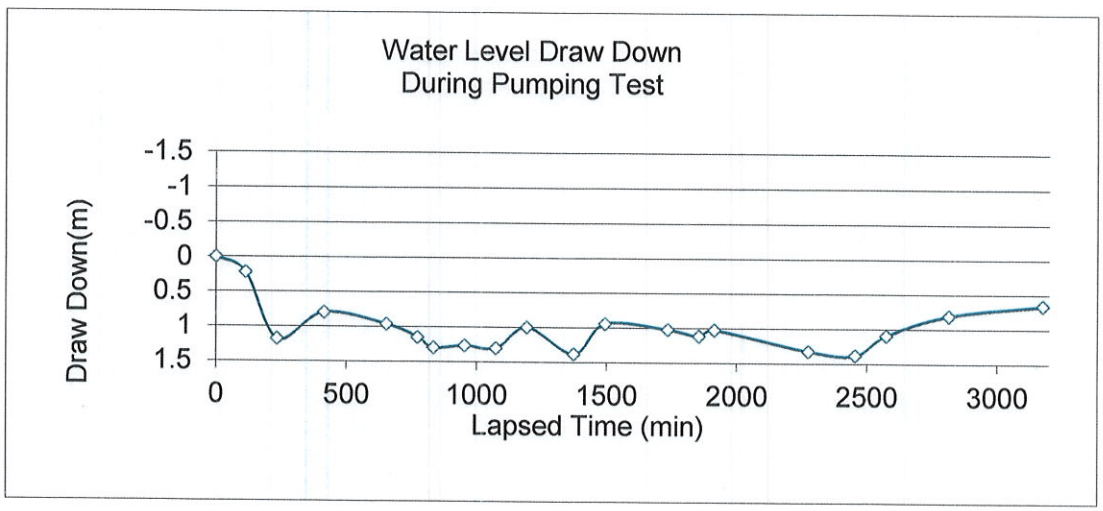
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	885 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
8.38			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
27.49	8.38	0.00	17-Sep	8	27	0
28.22	8.60	0.22	17-Sep	12	27	114
31.36	9.56	1.18	17-Sep	14	27	234
30.11	9.18	0.80	17-Sep	17	27	414
30.65	9.34	0.96	17-Sep	21	27	654
31.27	9.53	1.15	17-Sep	23	27	774
31.76	9.68	1.30	18-Sep	0	27	834
31.65	9.65	1.27	18-Sep	2	27	954
31.77	9.68	1.30	18-Sep	4	27	1074
30.77	9.38	1.00	18-Sep	6	27	1194
32.04	9.76	1.38	18-Sep	9	27	1374
30.59	9.33	0.95	18-Sep	11	27	1494
30.86	9.41	1.03	18-Sep	15	27	1734
31.16	9.50	1.12	18-Sep	17	27	1854
30.87	9.41	1.03	18-Sep	18	27	1914
31.85	9.71	1.33	19-Sep	0	27	2274
32.04	9.77	1.39	19-Sep	3	27	2454
31.10	9.48	1.10	19-Sep	5	27	2574
30.15	9.19	0.81	19-Sep	9	27	2814
29.67	9.04	0.66	19-Sep	15	27	3174



ASC ENVIRONMENTAL

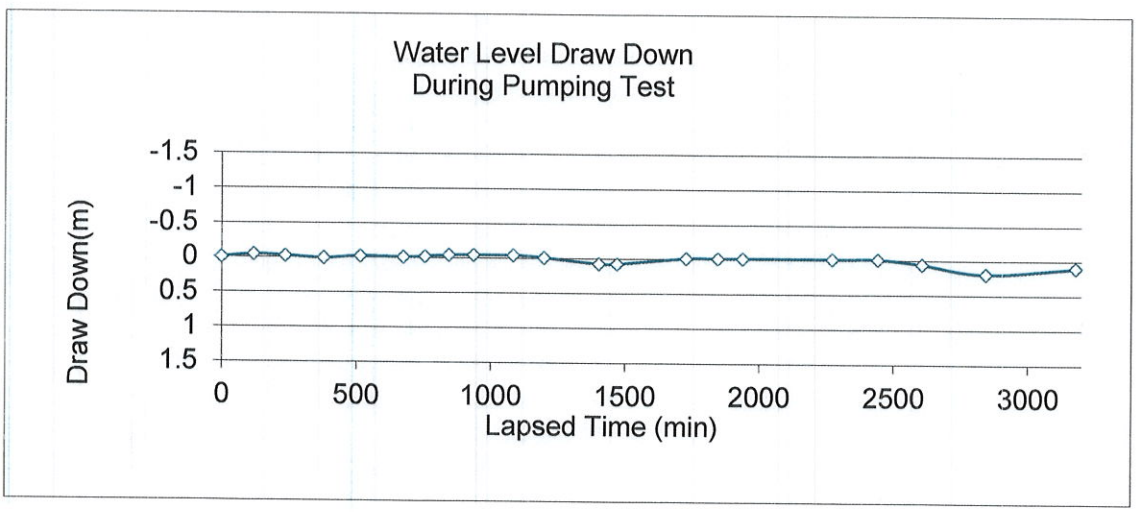
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2467 Battersea Road		

Pumping started at :	10	33

Water Level at Start of Test (m)
10.41

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
34.15	10.41	0.00	17-Sep	8	40	0
34.02	10.37	-0.04	17-Sep	12	30	117
34.09	10.39	-0.02	17-Sep	14	29	236
34.19	10.42	0.01	17-Sep	16	52	379
34.09	10.39	-0.02	17-Sep	19	8	515
34.12	10.40	-0.01	17-Sep	21	46	673
34.09	10.39	-0.02	17-Sep	23	8	755
34.02	10.37	-0.04	18-Sep	0	38	845
34.02	10.37	-0.04	18-Sep	2	9	936
34.02	10.37	-0.04	18-Sep	4	36	1083
34.12	10.40	-0.01	18-Sep	6	31	1198
34.40	10.49	0.08	18-Sep	9	56	1403
34.40	10.49	0.08	18-Sep	11	3	1470
34.12	10.40	-0.01	18-Sep	15	20	1727
34.12	10.40	-0.01	18-Sep	17	18	1845
34.12	10.40	-0.01	18-Sep	18	51	1938
34.12	10.40	-0.01	19-Sep	0	25	2272
34.12	10.40	-0.01	19-Sep	3	15	2442
34.35	10.47	0.06	19-Sep	5	59	2606
34.80	10.61	0.20	19-Sep	9	55	2842
34.5	10.52	0.11	19-Sep	15	30	3177



ASC ENVIRONMENTAL

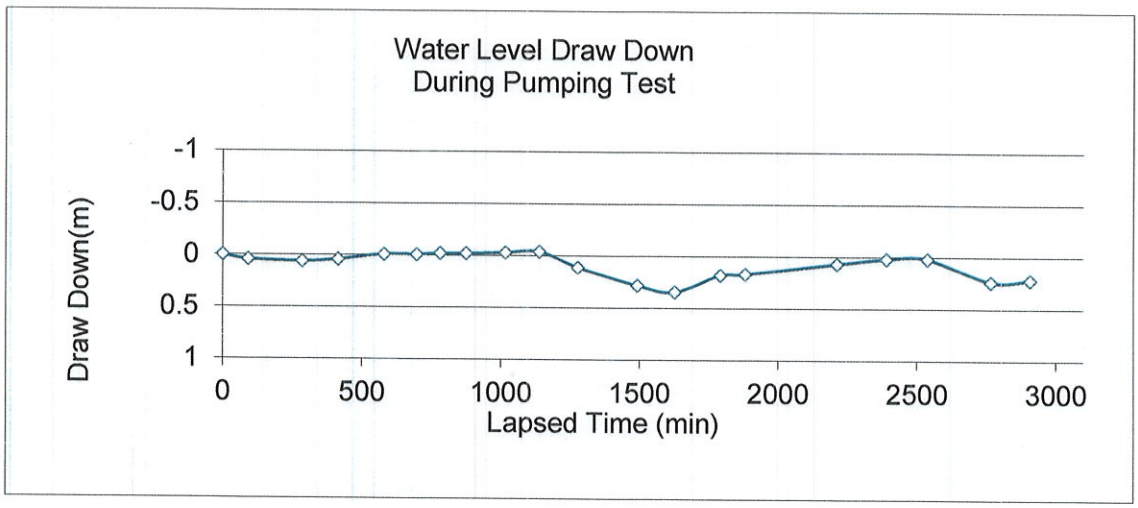
Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2228 Battersea Road		

Pumping started at :	10	33

Water Level at Start of Test (m)
5.72

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
18.77	5.72	0.00	17-Sep	9	26	0
18.90	5.76	0.04	17-Sep	12	4	91
18.96	5.78	0.06	17-Sep	15	19	286
18.90	5.76	0.04	17-Sep	17	27	414
18.73	5.71	-0.01	17-Sep	20	12	579
18.73	5.71	-0.01	17-Sep	22	9	696
18.70	5.70	-0.02	17-Sep	23	35	782
18.70	5.70	-0.02	18-Sep	1	8	875
18.67	5.69	-0.03	18-Sep	3	30	1017
18.64	5.68	-0.04	18-Sep	5	31	1138
19.13	5.83	0.11	18-Sep	7	51	1278
19.70	6.00	0.28	18-Sep	11	26	1493
19.90	6.07	0.35	18-Sep	13	40	1627
19.36	5.90	0.18	18-Sep	16	24	1791
19.32	5.89	0.17	18-Sep	17	54	1881
19.00	5.79	0.07	18-Sep	23	24	2211
18.83	5.74	0.02	19-Sep	2	23	2390
18.83	5.74	0.02	19-Sep	4	50	2537
19.55	5.96	0.24	19-Sep	8	38	2765
19.50	5.94	0.22	19-Sep	12	0	2907



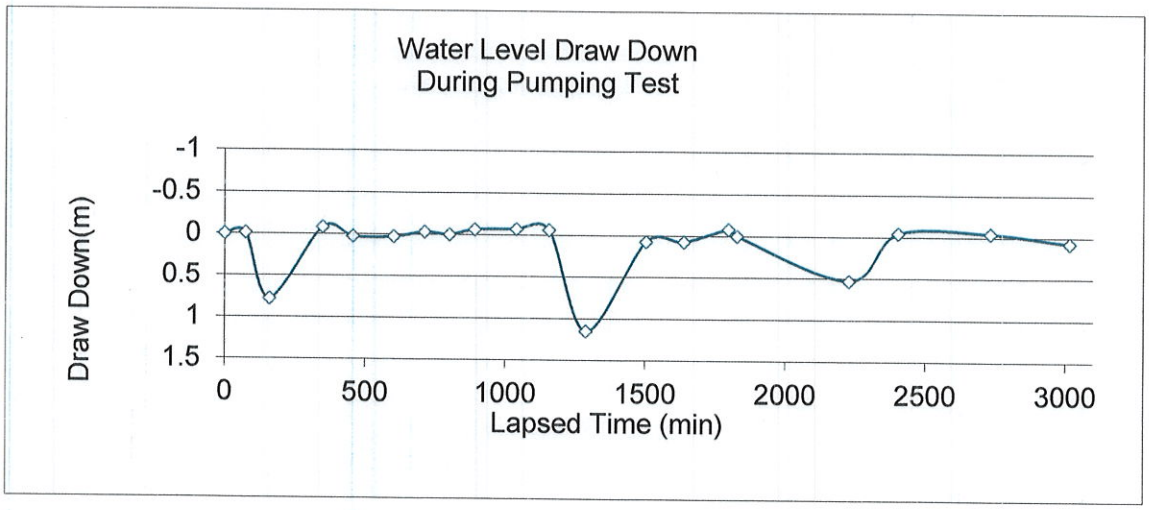
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 18 2018
Location:	791 Unity		

Water Level at Start of Test (m)	Pumping started at :	10	33
19.22			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
63.06	19.22	0.00	17-Sep	9	5	0
63.02	19.21	-0.01	17-Sep	11	47	74
65.62	20.00	0.78	17-Sep	13	13	160
62.80	19.14	-0.08	17-Sep	16	22	349
63.16	19.25	0.03	17-Sep	18	10	457
63.16	19.25	0.03	17-Sep	20	34	601
62.96	19.19	-0.03	17-Sep	22	25	712
63.06	19.22	0.00	18-Sep	23	55	802
62.86	19.16	-0.06	18-Sep	1	24	891
62.83	19.15	-0.07	18-Sep	3	53	1040
62.86	19.16	-0.06	18-Sep	5	49	1156
66.83	20.37	1.15	18-Sep	8	2	1289
63.30	19.29	0.07	18-Sep	11	36	1503
63.30	19.29	0.07	18-Sep	13	51	1638
62.80	19.14	-0.08	18-Sep	16	31	1798
63.06	19.22	0.00	18-Sep	18	1	1828
64.80	19.75	0.53	18-Sep	23	40	2227
62.93	19.18	-0.04	19-Sep	2	36	2403
63.60	19.18	-0.04	19-Sep	5	5	2732
63.30	19.29	0.07	19-Sep	11	48	3015



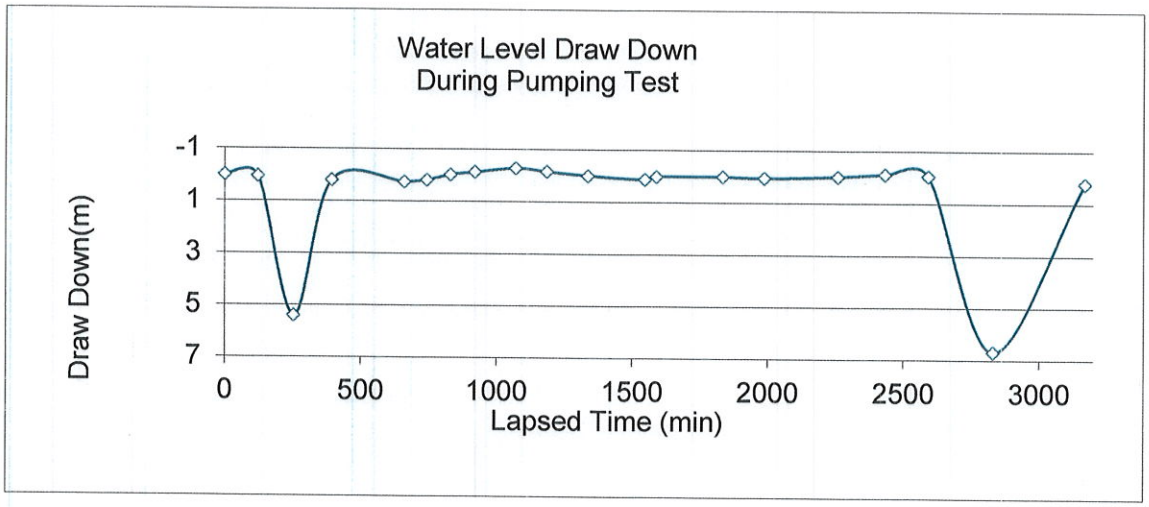
ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2347 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	33
24.46			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
80.25	24.46	0.00	17-Sep	8	55	0
80.41	24.51	0.05	17-Sep	12	34	121
98.00	29.87	5.41	17-Sep	14	47	254
80.938	24.670	0.21	17-Sep	17	6	393
81.10	24.72	0.26	17-Sep	21	33	660
80.87	24.65	0.19	17-Sep	22	56	743
80.18	24.44	-0.02	18-Sep	0	24	831
79.86	24.34	-0.12	18-Sep	1	53	920
79.33	24.18	-0.28	18-Sep	4	24	1071
79.76	24.31	-0.15	18-Sep	6	18	1185
80.25	24.46	0.00	18-Sep	8	50	1337
80.70	24.60	0.14	18-Sep	12	20	1547
80.30	24.48	0.02	18-Sep	15	1	1588
80.28	24.47	0.01	18-Sep	17	7	1834
80.45	24.52	0.06	18-Sep	18	40	1987
80.22	24.45	-0.01	19-Sep	0	12	2259
79.92	24.36	-0.10	19-Sep	3	6	2433
80.10	24.41	-0.05	19-Sep	5	44	2591
102.20	31.15	6.69	19-Sep	9	43	2830
81.00	24.69	0.23	19-Sep	15	21	3168



ASC ENVIRONMENTAL

Residential Water Level Readings (WL) during 48 hour Pumping Test

Project No.:	ASC 458		
Start Date:	Sept 17 2018	End Date	Sept 19 2018
Location:	2336 Battersea		

Water Level at Start of Test (m)	Pumping started at :	10	33
21.26			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
69.75	21.26	0.00	17-Sep	12	45	0
70.08	21.36	0.10	17-Sep	14	59	266
67.65	20.62	-0.64	17-Sep	17	12	399
72.638	22.140	0.88	17-Sep	21	23	650
72.80	22.19	0.93	17-Sep	22	51	738
71.98	21.94	0.68	18-Sep	0	20	827
71.82	21.89	0.63	18-Sep	1	49	916
71.85	21.90	0.64	18-Sep	4	22	1069
72.38	22.06	0.80	18-Sep	6	14	1181
69.98	21.33	0.07	18-Sep	8	43	1330
70.60	21.52	0.26	18-Sep	12	8	1535
70.30	21.43	0.17	18-Sep	14	53	1700
71.39	21.76	0.50	18-Sep	17	3	1830
70.70	21.55	0.29	18-Sep	18	36	1923
72.18	22.00	0.74	19-Sep	0	6	2253
72.08	21.97	0.71	19-Sep	3	2	2429
72.19	22.00	0.74	19-Sep	5	39	2586
70.10	21.37	0.11	19-Sep	9	40	2827
70.00	21.34	0.08	19-Sep	13	14	3041

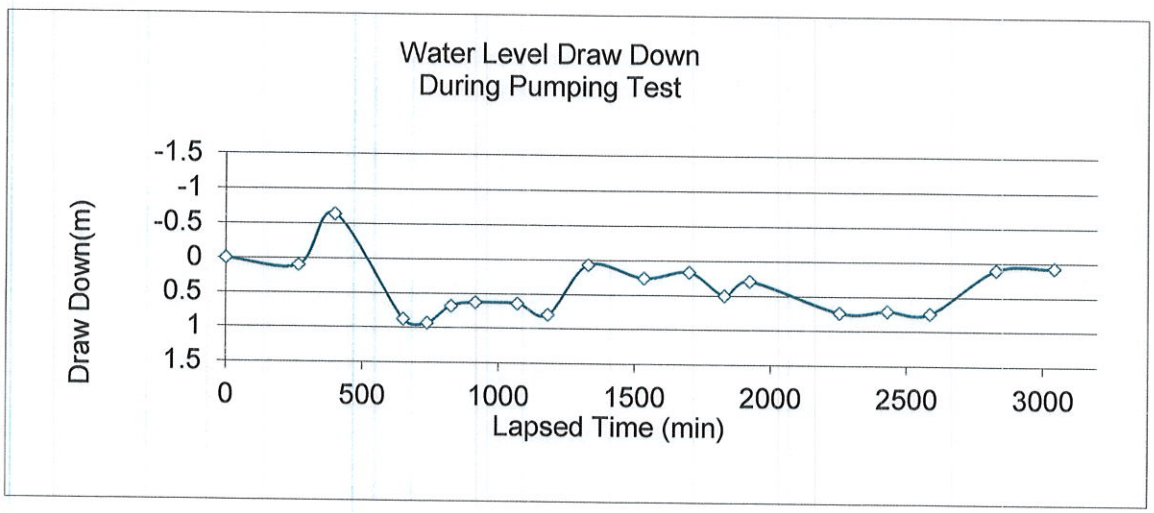


Table D1. Water Quality Field Measurements.

ASC ENVIRONMENTAL		**Field Water Quality Analysis**			**Test Well:**	**TW3**	
		Project No.:	ASC-458		Date:	4-Dec-18	
		Client:	BPE Development		Recorded By: J.P.		
		Location:	2285 Battersea Road, Kingston, ON				
		Started pumping 30 L/min at 10:45 am					
Pumping Test Elapsed Time (min)	Odour	Temperature (°C)	pH	Conductivity (µS)	Total Dissolved Solids (ppm)	Turbidity NTU	Chlorine (Total) (mg/L)
5	None	7.9	8.88	2839	1422	48	>2.20
30	None	9.0	8.82	2954	1491	19	0.03
60	None	9.0	8.61	2946	1477	12	0.09
65	None	-	-	-	-	-	0.03
90	None	8.9	8.92	3023	1517	14	0.1
120	None	9.1	8.73	3056	1531	4	0.13
150	None	8.8	8.74	3018	1514	28	0.00
180	None	8.9	8.91	2988	1496	61	0.00
210	None	8.8	8.73	2936	1470	5	0.00
240	None	8.8	8.83	2899	1455	0	0.00
270	None	9.3	8.37	2869	1435	0	0.00
300	None	8.6	8.43	2823	1422	0	0.00
330	None	8.5	8.20	2783	1387	0	0.00
363	None	8.5	8.11	2762	1391	0	0.00
Collected samples TW3A and TW3B at 11:45 am and 4:30 pm.							
Notes	1	<	indicates values lower than minimum detection limits of analysis equipment				
	2	-	not analyzed				
Field Analysis Equipment							
Chlorine :		Hach DR 890 Colorimeter, DPD Total Chlorine Reagent					
Temp./pH/Cond./TDS :		Hanna HI 98130 Meter					
Turbidity :		Hach DR 890 Colorimeter					

Table D2. Test Well drawdown during pumping test.

	Pumping Test - Drawdown		Test Well: TW3	
	Project No.:	ASC-458	Date:	4-Dec-2018
	Client:	BPE Development	Recorded By: J.P.	
	Location:	2285 Battersea Road, Kingston, ON		

Pumping Rate (Q) (L/min)	Elapsed Time (ET) (min)	Well Level (WL) (m)	Drawdown (DD) (m)
30	0	33.53	0.00
30	1	34.17	0.64
30	2	34.42	0.89
30	3	34.56	1.04
30	4	34.66	1.13
30	5	34.72	1.19
30	6	34.76	1.23
30	7	34.80	1.27
30	8	34.83	1.31
30	9	34.86	1.33
30	10	34.89	1.36
30	15	34.99	1.46
30	20	35.09	1.56
30	25	35.17	1.64
30	30	35.24	1.71
30	40	35.38	1.85
30	50	35.50	1.97
30	60	35.60	2.07
30	70	35.69	2.16
30	80	35.78	2.25
30	90	35.86	2.33
30	100	35.92	2.39
30	110	35.99	2.46
30	120	36.05	2.52
30	130	36.11	2.59
30	140	36.17	2.64
30	150	36.22	2.69
30	160	36.27	2.74
30	170	36.33	2.80
30	180	36.37	2.84
30	190	36.42	2.89
30	200	36.46	2.93
30	225	36.56	3.03
30	250	36.65	3.12
30	275	36.73	3.21
30	364	36.98	3.45

ASC Environmental Inc.
ASC-458 - BPE Development, 2285 Battersea Road, Kingston, Ontario
Figure 1 TW3 Pumping Test Drawdown

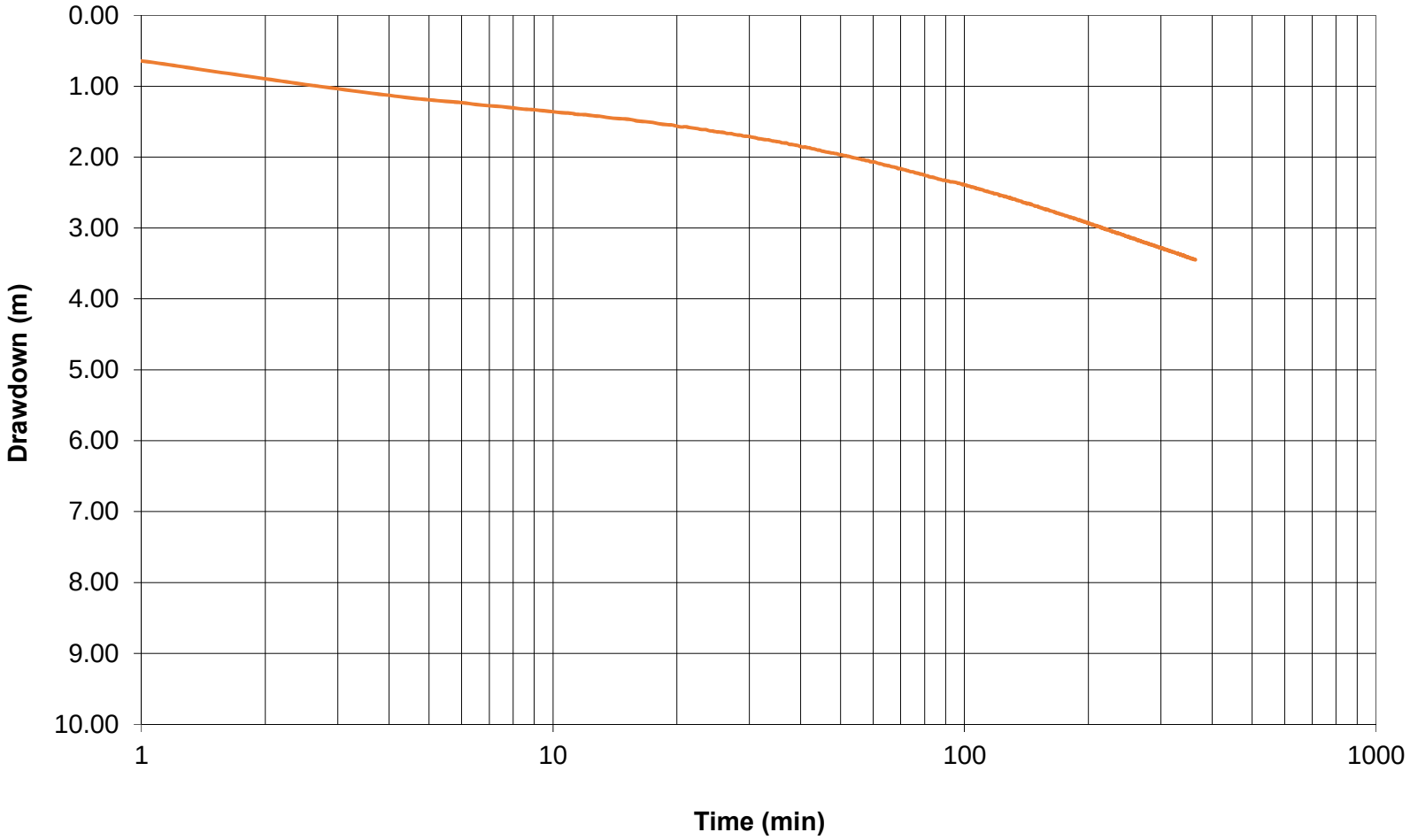


Table D3. Observation well drawdown during pumping test.

	Pumping Test - Drawdown		Test Well:	TW3
	Project No.:	ASC-458	Date:	4-Dec-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10:45	PM

OW1 (2196 Battersea Rd.)					OW2 (2217 Battersea Rd.)				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
11.614	3.540	0.000	7:35	0	0.722	0.220	0.000	7:40	0
11.614	3.540	0.000	11:48	63	0.591	0.180	-0.040	13:51	186
11.581	3.530	-0.010	14:24	219	0.650	0.198	-0.022	16:43	358
11.713	3.570	0.030	18:33	468	0.591	0.180	-0.040	18:30	465
OW3 (2225 Battersea Rd.)					**OW4 (2224 Battersea Rd.)**				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
11.844	3.610	0.000	10:18	0	13.386	4.080	0.000	7:55	0
11.778	3.590	-0.020	13:58	193	11.286	3.440	-0.640	11:53	68
11.900	3.627	0.017	16:41	356	11.319	3.450	-0.630	14:25	220
11.385	3.470	-0.140	18:23	458	11.581	3.530	-0.550	18:36	471
TW2					**OW6 (799 Unity Rd.)**				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
104.650	31.897	0.000	10:9	0	27.723	8.450	0.000	8:55	0
108.800	33.162	1.265	12:22	97	27.756	8.460	0.010	12:6	81
109.900	33.498	1.600	13:27	162	27.723	8.450	0.000	14:0	195
110.900	33.802	1.905	14:32	227	27.800	8.473	0.023	15:30	285
111.500	33.985	2.088	15:25	280	27.840	8.486	0.036	16:20	335
112.200	34.199	2.301	16:39	354	30.900	9.418	0.968	18:0	435
110.600	33.711	1.814	17:28	403					
109.400	33.345	1.448	18:10	445					
108.300	33.010	1.113	19:15	510					
OW7 (808 Unity Rd.)					**OW8 (796 Unity Rd.)**				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
20.200	6.157	0.000	10:16	0	18.734	5.710	0.000	10:0	0
20.604	6.280	0.123	12:24	99	18.963	5.780	0.070	12:18	93
20.997	6.400	0.243	14:48	243	18.832	5.740	0.030	16:5	320
20.850	6.355	0.198	15:33	288	19.000	5.791	0.081	18:20	455
20.800	6.340	0.183	16:22	337					
20.700	6.309	0.152	18:10	445					
OW9 (2245 Battersea Rd.)					**OW10 (874 Unity Rd.)**				
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)	WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
87.250	26.594	0.000	10:15	0	18.340	5.590	0.000	9:51	0
108.850	33.177	6.584	12:35	110	17.946	5.470	-0.120	13:44	179
106.950	32.598	6.005	13:35	170	17.946	5.470	-0.120	15:26	281
99.300	30.267	3.673	14:40	235	18.450	5.624	0.034	15:37	292
90.300	27.523	0.930	15:37	292	18.250	5.563	-0.027	16:28	343
88.300	26.914	0.320	16:45	360	18.500	5.639	0.049	17:46	421
87.650	26.716	0.122	17:52	427					

	Pumping Test - Drawdown		Test Well:	TW3
	Project No.:	ASC-458	Date:	4-Dec-2018
	Client:	BPE Development	Pumping start time	
	Location:	2285 Battersea Road, Kingston, ON	10:45	PM

OW11 (896 Unity Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
33.169	10.110	0.000	8:35	0
33.563	10.230	0.120	13:36	171
33.301	10.150	0.040	15:20	275
33.300	10.150	0.040	16:32	347
33.300	10.150	0.040	17:40	415

OW14 (942 Unity Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
37.664	11.480	0.000	10:8	0
36.417	11.100	-0.380	13:27	162
36.500	11.125	-0.355	16:37	352
36.500	11.125	-0.355	17:45	420

OW15 (2329 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
30.315	9.240	0.000	9:45	0
30.906	9.420	0.180	14:5	200
37.150	11.323	2.083	15:14	269
31.102	9.480	0.240	15:47	302
37.100	11.308	2.068	16:3	318
31.496	9.600	0.360	18:7	442

OW16 (2359 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
42.749	13.030	0.000	8:10	0
43.537	13.270	0.240	14:13	208
45.450	13.853	0.823	15:21	276
43.963	13.400	0.370	15:38	293
43.090	13.134	0.104	16:12	327
45.177	13.770	0.740	17:49	424

OW17 (2370 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
33.465	10.200	0.000	9:30	0
33.497	10.210	0.000	13:10	145
33.793	10.300	0.000	16:32	347
33.924	10.340	0.000	17:44	419

OW18 (885 Unity Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
9.547	2.910	0.000	8:43	0
10.564	3.220	0.310	12:40	115
8.760	2.67	-0.240	13:40	175
8.727	2.660	-0.250	14:45	240
10.400	3.170	0.260	15:45	300
9.350	2.850	-0.060	16:50	365
10.892	3.320	0.410	17:32	407

OW19 (2467 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
23.885	7.280	0.000	9:23	0
23.852	7.270	-0.010	14:20	215
23.885	7.280	0.000	16:53	368
23.950	7.300	0.020	17:35	410

OW20 (2285 Battersea Rd.)

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
37.550	11.445	0.000	10:3	0
39.500	12.040	0.594	12:30	105
38.750	11.811	0.366	13:30	165
37.750	11.506	0.061	14:34	229
37.750	11.506	0.061	15:27	282
37.750	11.506	0.061	16:42	357
36.800	11.217	-0.229	17:50	425

TW1

WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
108.150	32.964	0.000	10:6	0
112.300	34.229	1.265	12:20	95
113.450	34.580	1.615	13:25	160
114.450	34.884	1.920	14:30	225
115.100	35.082	2.118	15:22	277
115.750	35.281	2.316	16:37	352
112.550	34.305	1.341	19:19	514

OW21 (2228 Battersea Rd.)

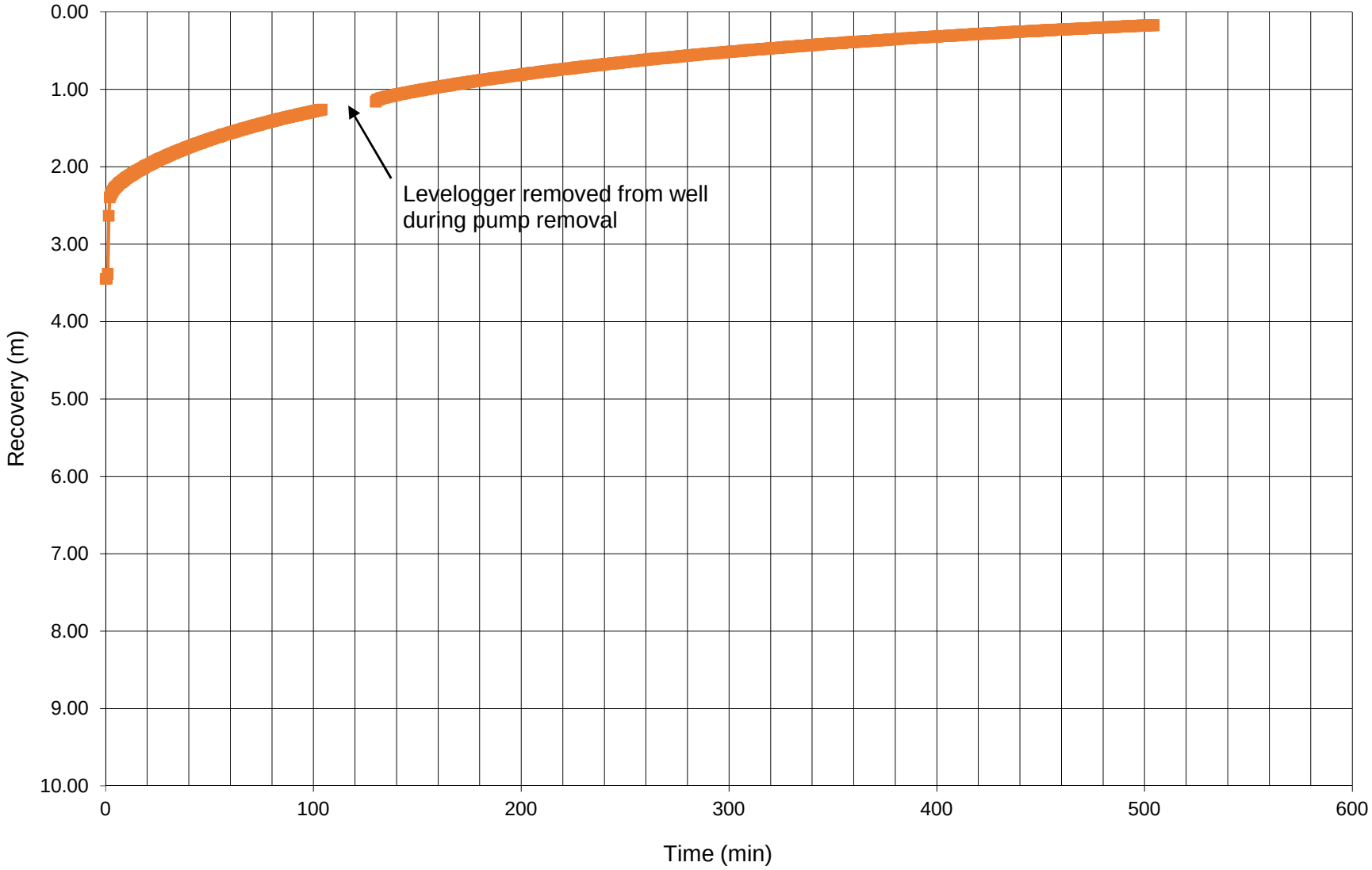
WL (ft)	WL (m)	DD (m)	Time H:Min	ET (min)
9.777	2.980	0.000	10:18	0
9.777	2.98	0.000	11:58	73
9.810	2.99	0.010	14:31	226
9.840	2.999	0.019	15:26	281
9.990	3.045	0.065	16:16	331
9.875	3.010	0.030	18:28	463

ASC ENVIRONMENTAL		**Pumping Test - Drawdown**				**Test Well:**					**TW3**
		Project No.:	ASC-458			Date:					4-Dec-2018
		Client:	BPE Development			Pumping start time					
		Location:	2285 Battersea Road, Kingston, ON			10	45				PM
OW22 (791 Unity Rd.)						**OW23 (2347 Battersea Rd.)**					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
45.990	14.018	0.000	10	18	0	38.386	11.700	0.000	8	5	0
45.669	13.920	-0.098	12	12	87	39.140	11.93	0.230	14	3	198
43.570	13.280	-0.738	16	0	315	39.337	11.99	0.290	15	41	296
46.250	14.097	0.079	18	25	460	39.450	12.024	0.324	15	17	272
						39.300	11.979	0.279	16	9	324
						39.797	12.130	0.430	17	55	430
OW24 (2336 Battersea Rd.)						**OW25 (2280 Battersea Rd.)**					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
30.348	9.250	0.000	10	16	0	7.218	2.200	0.000	10	27	0
33.465	10.200	0.950	13	4	139	7.119	2.170	-0.030	12	32	107
33.530	10.220	0.970	15	5	260	7.152	2.180	-0.020	16	11	326
33.840	10.314	1.064	15	48	303						
33.890	10.330	1.080	16	5	320						
33.694	10.270	1.020	17	59	434						
OW26 (2280 Battersea Rd.)						**OW27 (2280 Battersea Rd.)**					
WL	WL	DD	Time		ET	WL	WL	DD	Time		ET
(ft)	(m)	(m)	H:Min		(min)	(ft)	(m)	(m)	H:Min		(min)
26.200	7.986	0.000	10	30	0	17.040	5.194	0.000	10	32	0
25.919	7.900	-0.086	12	36	111	15.820	4.822	-0.372	12	45	120
25.919	7.900	-0.086	14	56	251	15.850	4.831	-0.363	16	22	337
26.000	7.925	-0.061	15	45	300	16.250	4.953	-0.241	18	47	482
26.000	7.925	-0.061	16	45	360						
26.083	7.950	-0.036	18	42	477						

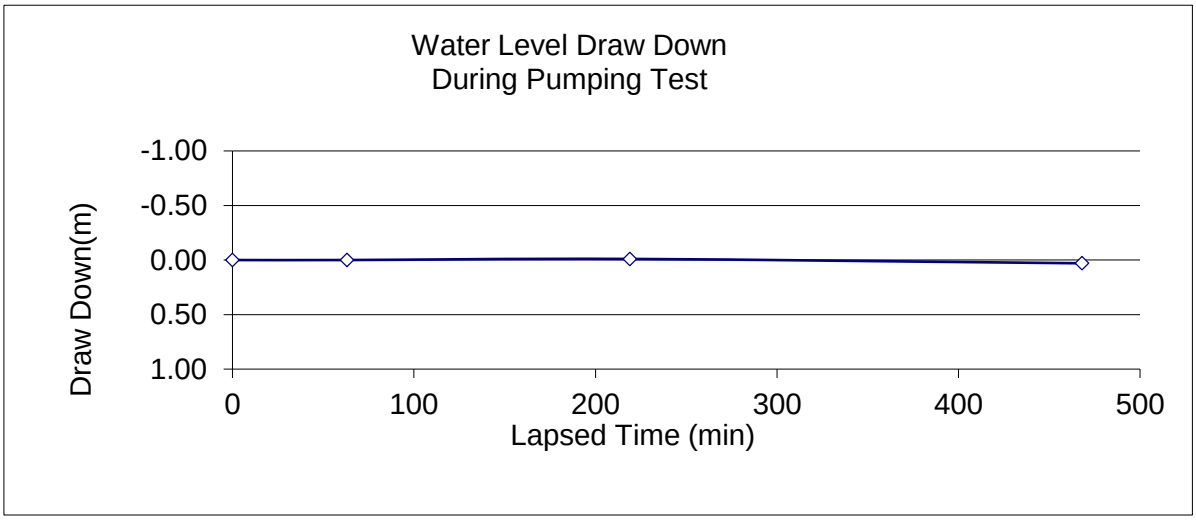
Table D4. Test well recovery after pumping test.

	Pumping Test - Recovery			**Test Well:**	**TW3**
	Project No.:	ASC-458		Date:	4-Dec-18
	Client:	BPE Development			Recorded By: J.P.
	Location:	2285 Battersea Road, Kingston, ON			
		Test Well			
Pumping	Elapsed Time (min/sec)	Well Level (WL) (m)	Drawdown (m)		
0	0	36.98	3.45		
0	1	36.92	3.39		
0	2	35.93	2.40		
0	3	35.87	2.34		
0	4	35.82	2.29		
0	5	35.79	2.26		
0	6	35.76	2.23		
0	7	35.74	2.21		
0	8	35.72	2.19		
0	9	35.70	2.17		
0	10	35.68	2.15		
0	15	35.59	2.06		
0	20	35.52	1.99		
0	25	35.45	1.92		
0	30	35.38	1.86		
0	35	35.33	1.80		
0	40	35.27	1.75		
0	45	35.23	1.70		
0	50	35.18	1.65		
0	60	35.09	1.56		
0	70	35.01	1.48		
0	80	34.94	1.41		
0	90	34.88	1.35		
0	100	34.82	1.29		
0	150	34.55	1.02		
0	175	34.44	0.91		
0	200	34.34	0.81		
0	250	34.18	0.65		
0	300	34.05	0.52		
0	400	33.85	0.32		
0	504	33.70	0.17		
WL at 95% Recovery =		33.880 m			

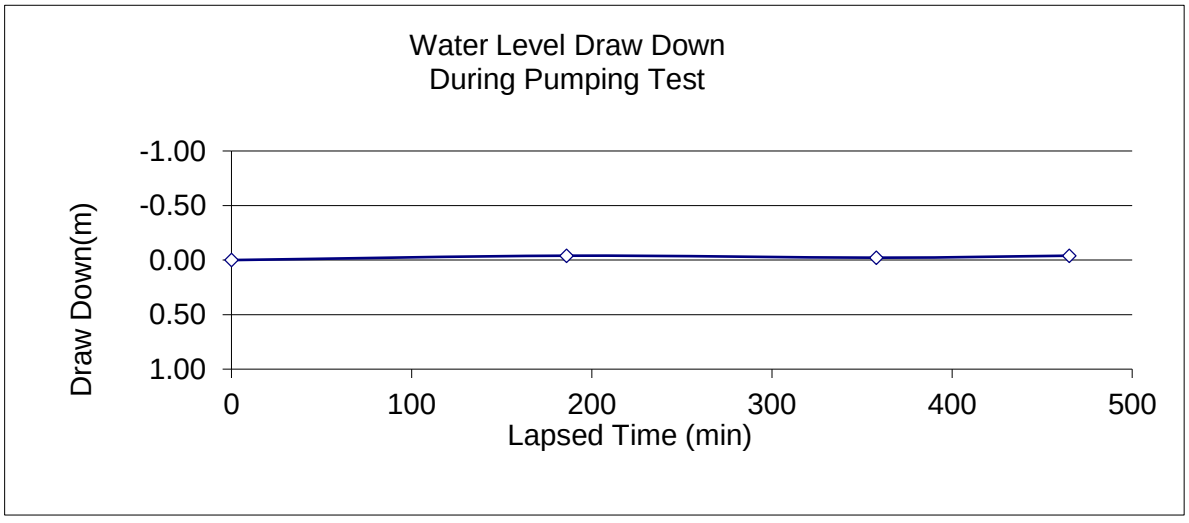
ASC Environmental Inc.
ASC-458 - BPE Development, 2285 Battersea Road, Kingston, Ontario
Figure 4 TW3 Recovery



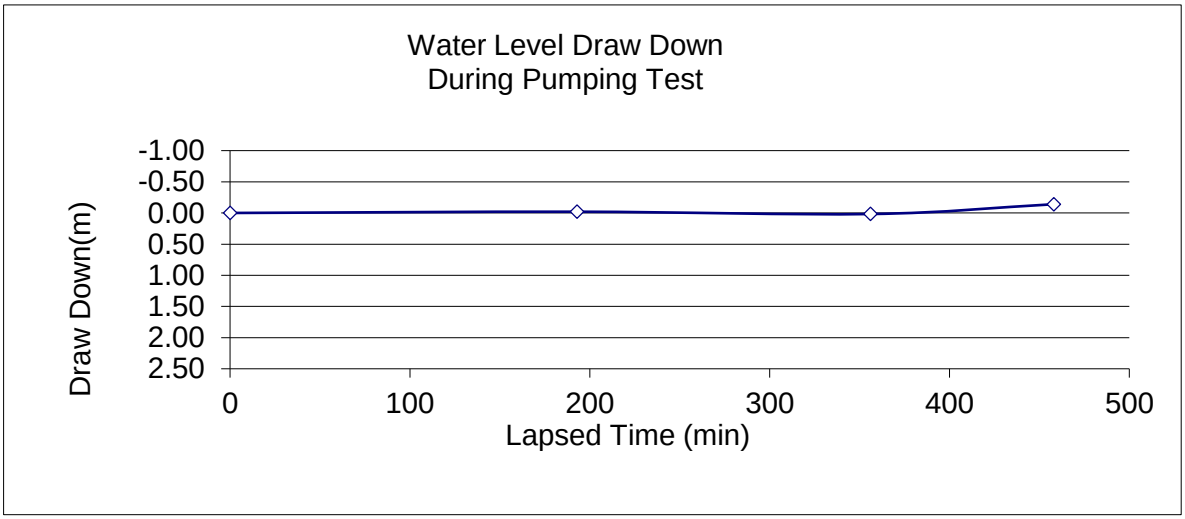
ASC ENVIRONMENTAL		**Residential Water Level Readings (WL) during 6 hour Pumping Test**				
		Project No.:	ASC 458			
		Start Date:	4-Dec-18	End Date	4-Dec-18	
		Location:	2196 Battersea Road			
Water Level at Start of Test (m)		Pumping started at :			10	45
3.54						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
11.61	3.54	0.00	4-Dec	7	35	0
11.61	3.54	0.00	4-Dec	11	48	63
11.58	3.53	-0.01	4-Dec	14	24	219
11.71	3.57	0.03	4-Dec	18	33	468



ASC ENVIRONMENTAL	**Residential Water Level Readings (WL) during 6 hour Pumping Test**					
	Project No.:	ASC 458				
	Start Date:	4-Dec-18	End Date	4-Dec-18		
	Location:	2217 Battersea Road				
Water Level at Start of Test (m)	Pumping started at :			10	54	
0.22						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
0.72	0.22	0.00	4-Dec	7	40	0
0.59	0.18	-0.04	4-Dec	13	51	186
0.65	0.20	-0.02	4-Dec	16	43	358
0.59	0.18	-0.04	4-Dec	18	30	465



ASC ENVIRONMENTAL		**Residential Water Level Readings (WL) during 6 hour Pumping Test**				
		Project No.:	ASC 458			
		Start Date:	4-Dec-18	End Date		4-Dec-18
		Location:	2225 Battersea Road			
Water Level at Start of Test (m)		Pumping started at :			10	45
3.61						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
11.84	3.61	0.00	4-Dec	10	18	0
11.78	3.59	-0.02	4-Dec	13	58	193
11.90	3.63	0.02	4-Dec	16	41	356
11.38	3.47	-0.14	4-Dec	18	23	458

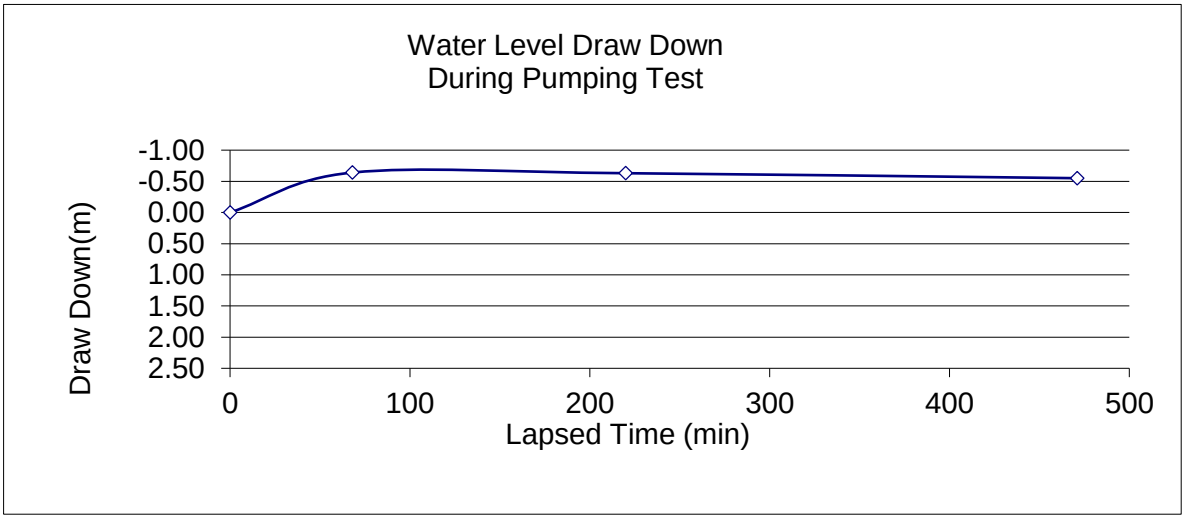


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2224 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
4.08			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
13.39	4.08	0.00	4-Dec	7	55	0
11.29	3.44	-0.64	4-Dec	11	53	68
11.32	3.45	-0.63	4-Dec	14	25	220
11.58	3.53	-0.55	4-Dec	18	36	471

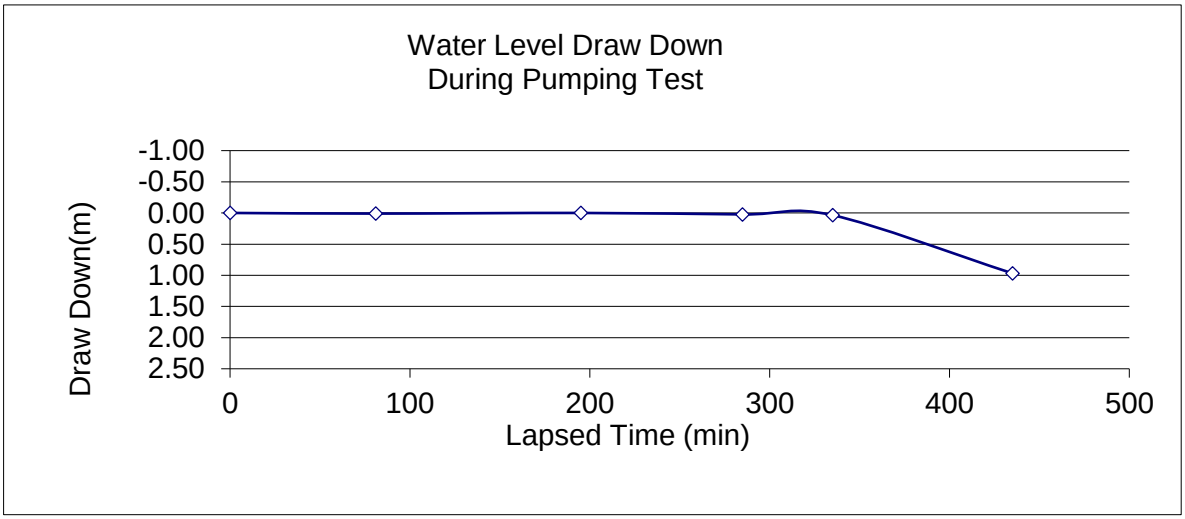


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	799 Unity Road		
Pumping started at :		10	45

Water Level at Start of Test (m)
8.45

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
27.72	8.45	0.00	4-Dec	8	55	0
27.76	8.46	0.01	4-Dec	12	6	81
27.72	8.45	0.00	4-Dec	14	0	195
27.80	8.47	0.02	4-Dec	15	30	285
27.84	8.49	0.04	4-Dec	16	20	335
30.90	9.42	0.97	4-Dec	18	0	435

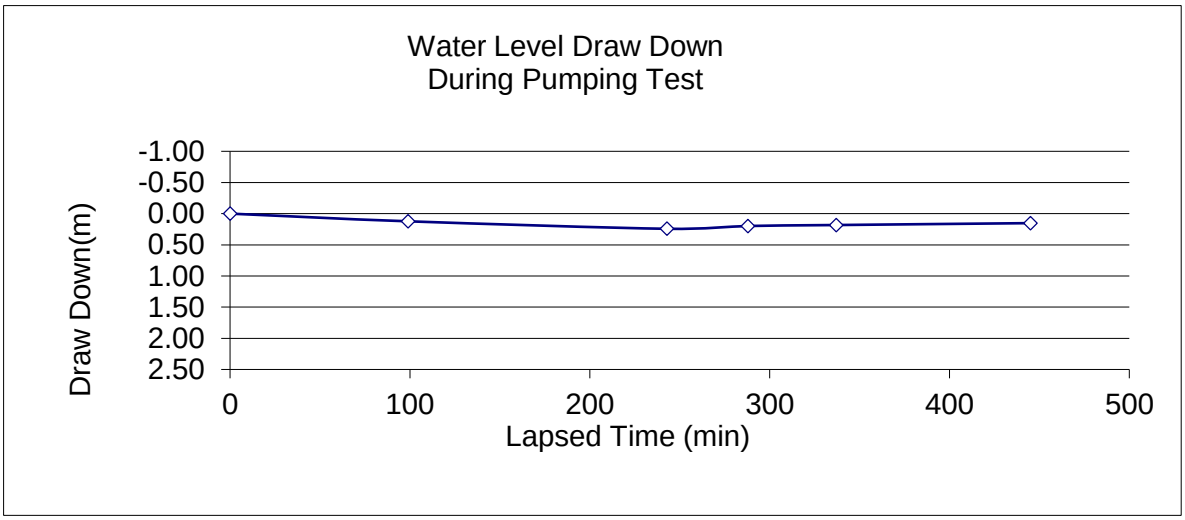


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	808 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
6.16			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
20.20	6.16	0.00	4-Dec	10	16	0
20.60	6.28	0.12	4-Dec	12	24	99
21.00	6.40	0.24	4-Dec	14	48	243
20.85	6.36	0.20	4-Dec	15	33	288
20.80	6.34	0.18	4-Dec	16	22	337
20.70	6.31	0.15	4-Dec	18	10	445

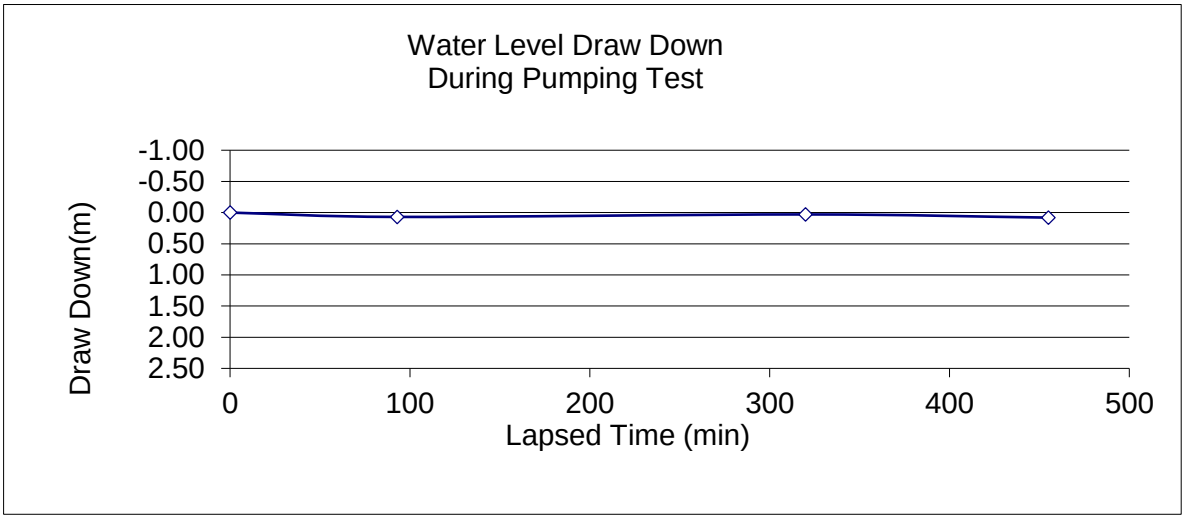


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	796 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
5.71			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
18.73	5.71	0.00	4-Dec	10	0	0
18.96	5.78	0.07	4-Dec	12	18	93
18.83	5.74	0.03	4-Dec	16	5	320
19.00	5.79	0.08	4-Dec	18	20	455

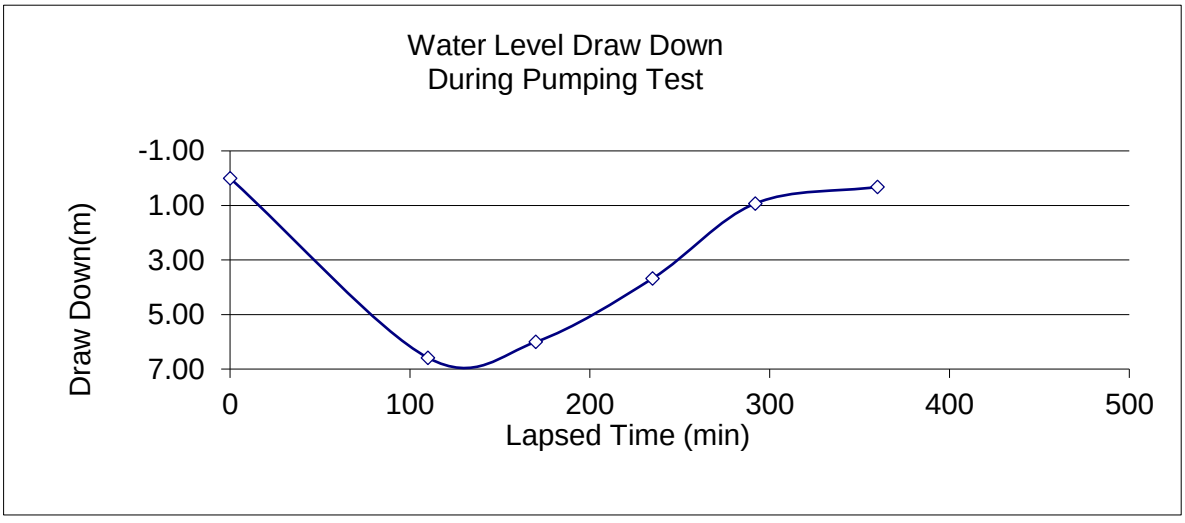


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2245 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
26.59			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
87.25	26.59	0.00	4-Dec	10	15	0
108.85	33.18	6.58	4-Dec	12	35	110
106.95	32.60	6.00	4-Dec	13	35	170
99.30	30.27	3.67	4-Dec	14	40	235
90.30	27.52	0.93	4-Dec	15	37	292
88.30	26.91	0.32	4-Dec	16	45	360
87.65	26.72	0.12	4-Dec	17	52	427

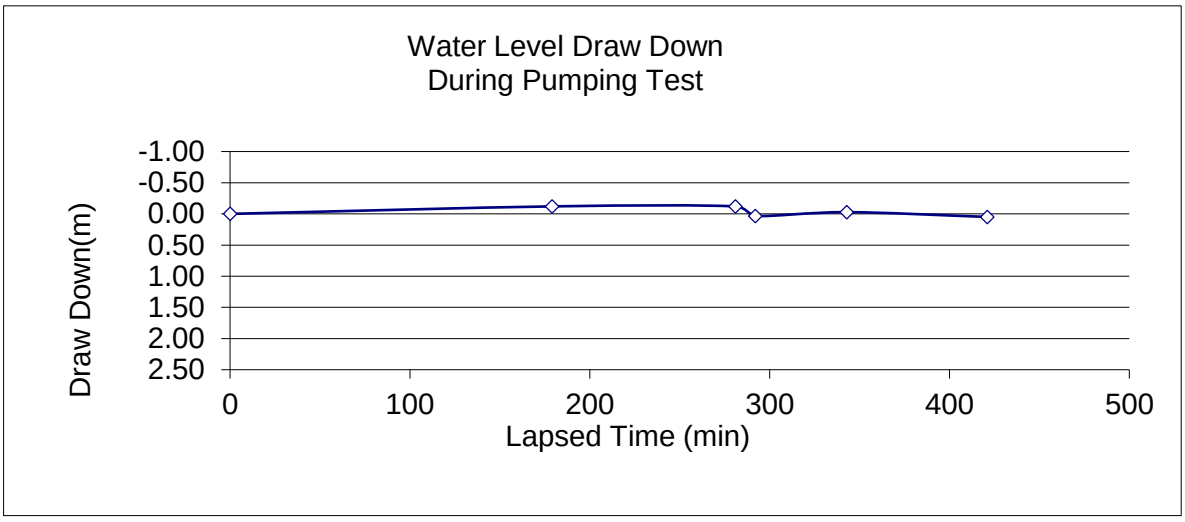


Residential Water Level Readings (WL) during 6 hour Pumping Test

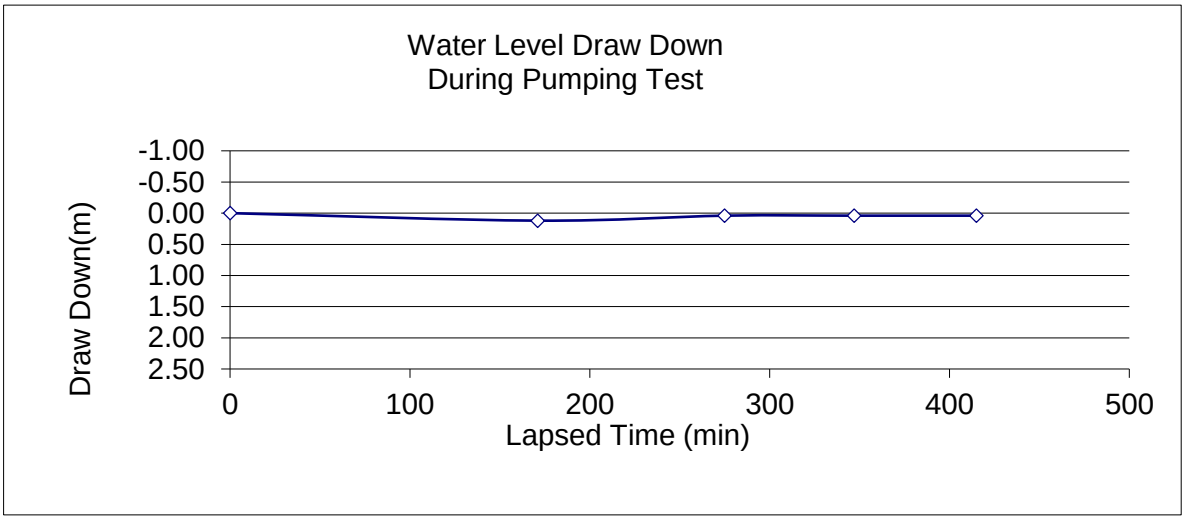
Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	874 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
5.59			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
18.34	5.59	0.00	4-Dec	9	51	0
17.95	5.47	-0.12	4-Dec	13	44	179
17.95	5.47	-0.12	4-Dec	15	26	281
18.45	5.62	0.03	4-Dec	15	37	292
18.25	5.56	-0.03	4-Dec	16	28	343
18.50	5.64	0.05	4-Dec	17	46	421



ASC ENVIRONMENTAL		**Residential Water Level Readings (WL) during 6 hour Pumping Test**				
		Project No.:	ASC 458			
		Start Date:	4-Dec-18	End Date		4-Dec-18
		Location:	896 Unity Road			
Water Level at Start of Test (m)		Pumping started at :			10	45
10.11						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
33.17	10.11	0.00	4-Dec	8	35	0
33.56	10.23	0.12	4-Dec	13	36	171
33.30	10.15	0.04	4-Dec	15	20	275
33.30	10.15	0.04	4-Dec	16	32	347
33.30	10.15	0.04	4-Dec	17	40	415

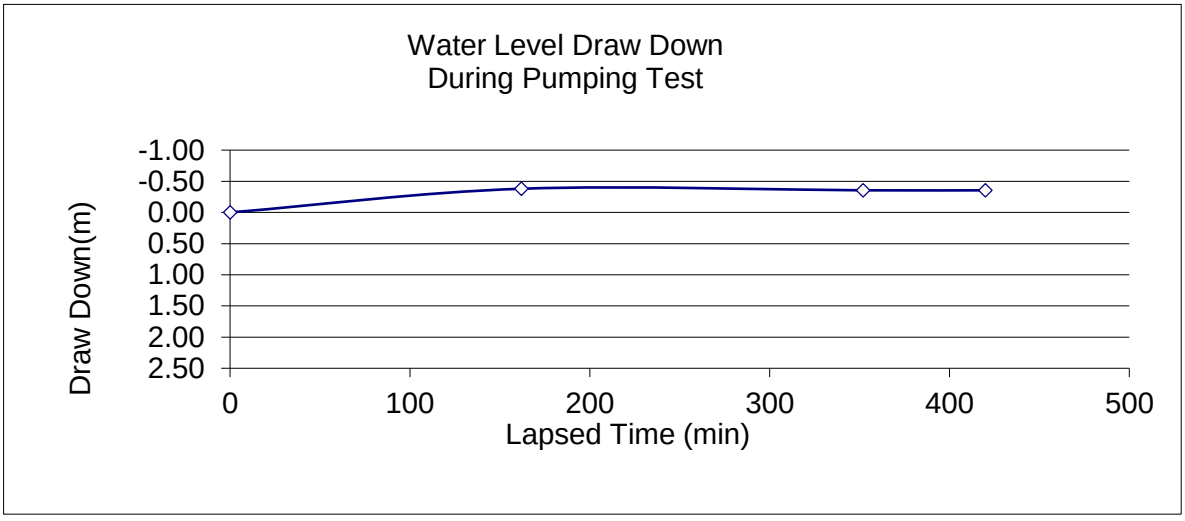


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	942 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
11.48			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
37.66	11.48	0.00	4-Dec	10	8	0
36.42	11.10	-0.38	4-Dec	13	27	162
36.50	11.13	-0.35	4-Dec	16	37	352
36.50	11.13	-0.35	4-Dec	17	45	420

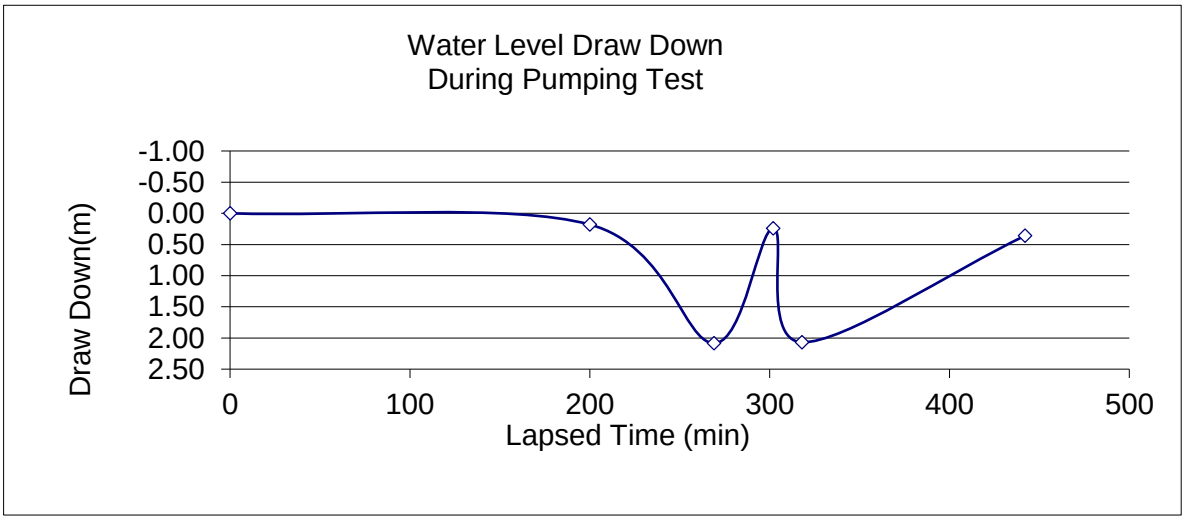


Residential Water Level Readings (WL) during 6 hour Pumping Test

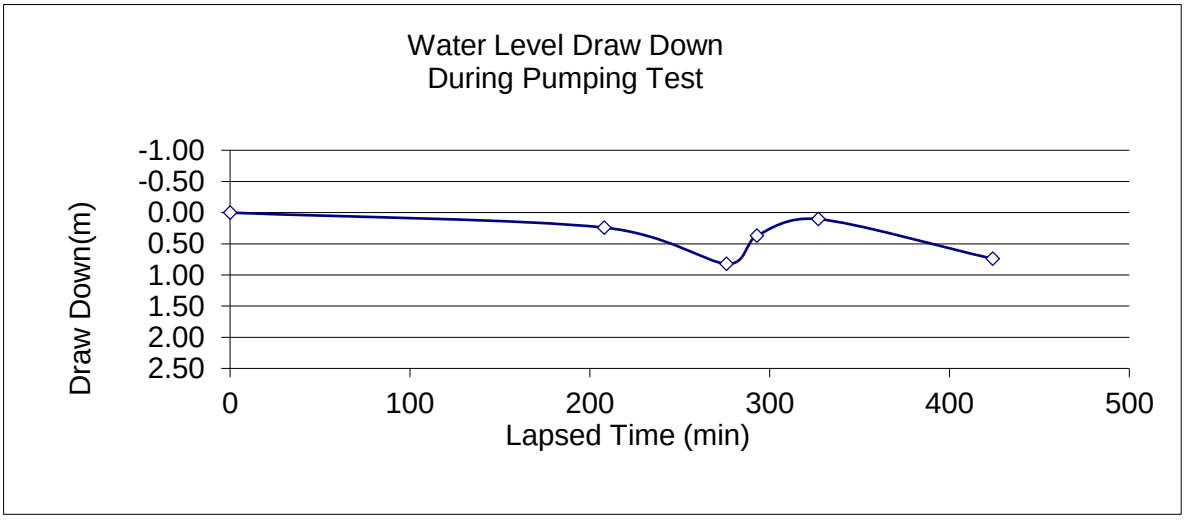
Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2329 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
9.24			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
30.31	9.24	0.00	4-Dec	9	45	0
30.91	9.42	0.18	4-Dec	14	5	200
37.15	11.32	2.08	4-Dec	15	14	269
31.10	9.48	0.24	4-Dec	15	47	302
37.10	11.31	2.07	4-Dec	16	3	318
31.50	9.60	0.36	4-Dec	18	7	442



ASC ENVIRONMENTAL	**Residential Water Level Readings (WL) during 6 hour Pumping Test**					
	Project No.:	ASC 458				
	Start Date:	4-Dec-18	End Date	4-Dec-18		
	Location:	2359 Battersea Road				
Water Level at Start of Test (m)	Pumping started at :			10	45	
13.03						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
42.75	13.03	0.00	4-Dec	8	10	0
43.54	13.27	0.24	4-Dec	14	13	208
45.45	13.85	0.82	4-Dec	15	21	276
43.96	13.40	0.37	4-Dec	15	38	293
43.09	13.13	0.10	4-Dec	16	12	327
45.18	13.77	0.74	4-Dec	17	49	424

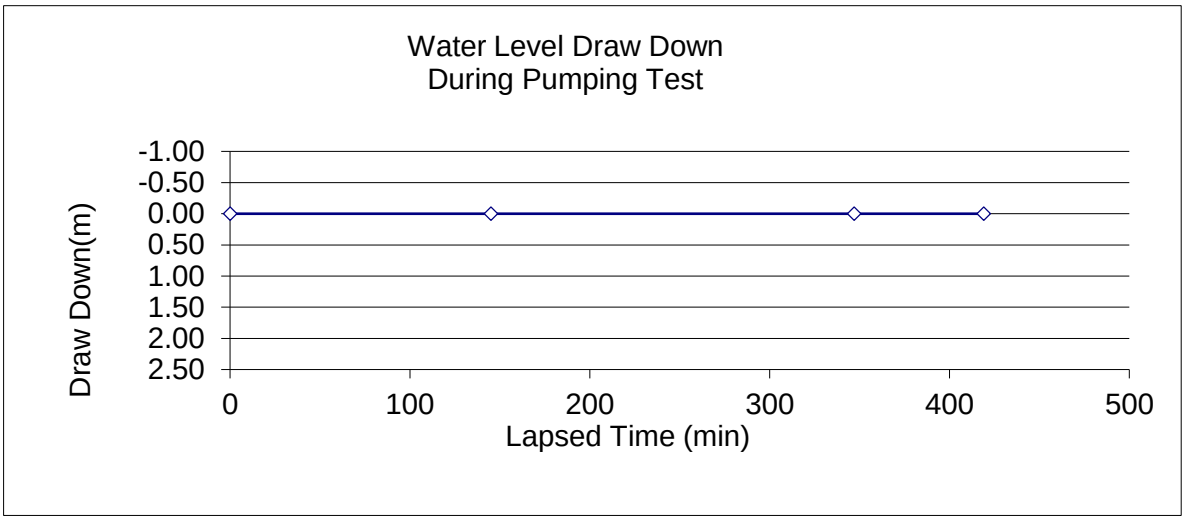


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2370 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
10.20			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
33.46	10.20	0.00	4-Dec	9	30	0
33.50	10.21	0.00	4-Dec	13	10	145
33.79	10.30	0.00	4-Dec	16	32	347
33.92	10.34	0.00	4-Dec	17	44	419

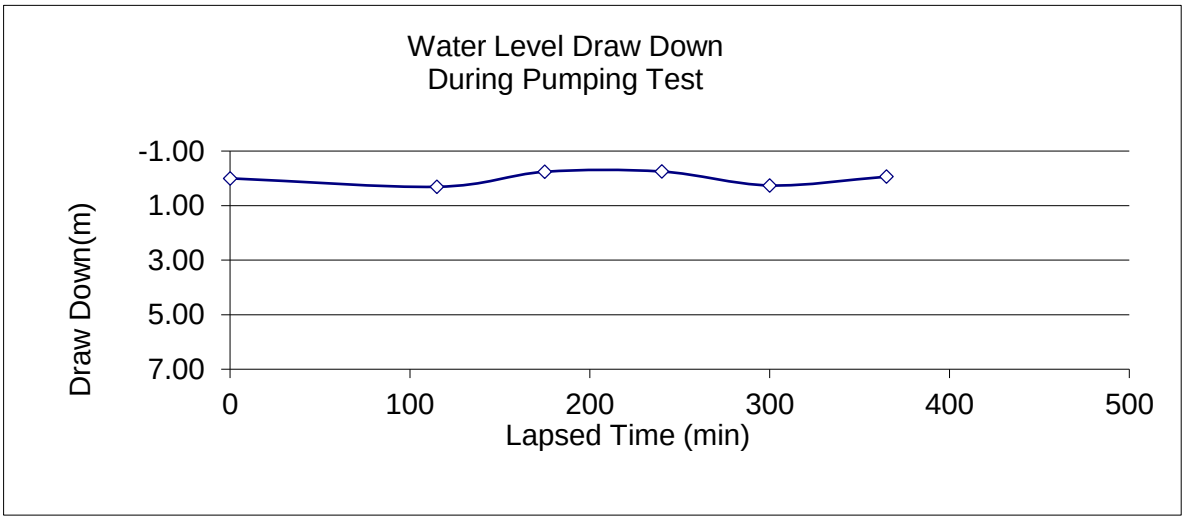


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	885 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
2.91			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
9.55	2.91	0.00	4-Dec	8	43	0
10.56	3.22	0.31	4-Dec	12	40	115
8.76	2.67	-0.24	4-Dec	13	40	175
8.73	2.66	-0.25	4-Dec	14	45	240
10.40	3.17	0.26	4-Dec	15	45	300
9.35	2.85	-0.06	4-Dec	16	50	365
10.89	3.32	0.41	4-Dec	17	32	407

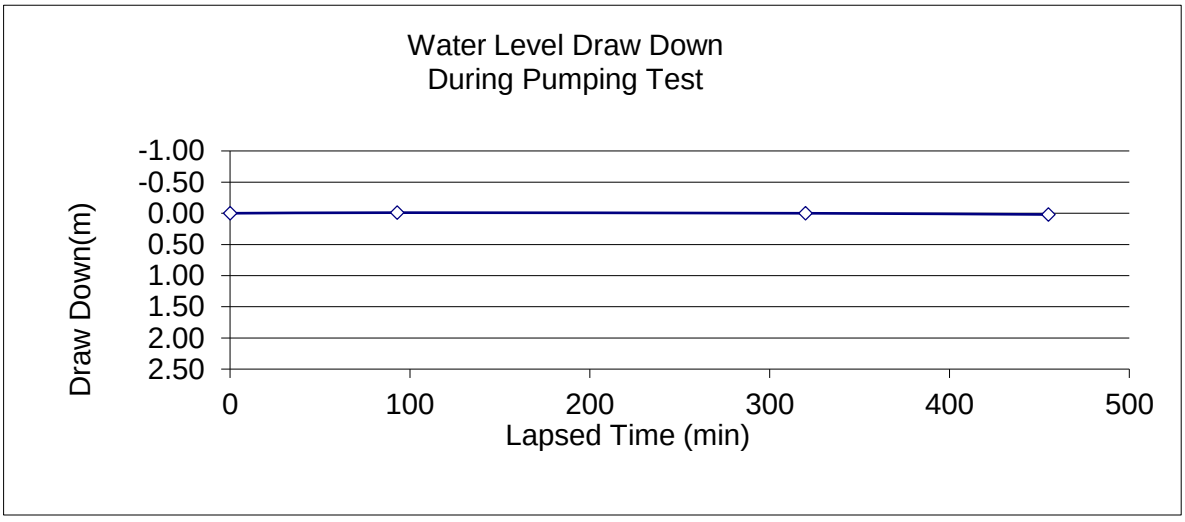


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2467 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
7.28			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
23.88	7.28	0.00	4-Dec	10	0	0
23.85	7.27	-0.01	4-Dec	12	18	93
23.88	7.28	0.00	4-Dec	16	5	320
23.95	7.30	0.02	4-Dec	18	20	455

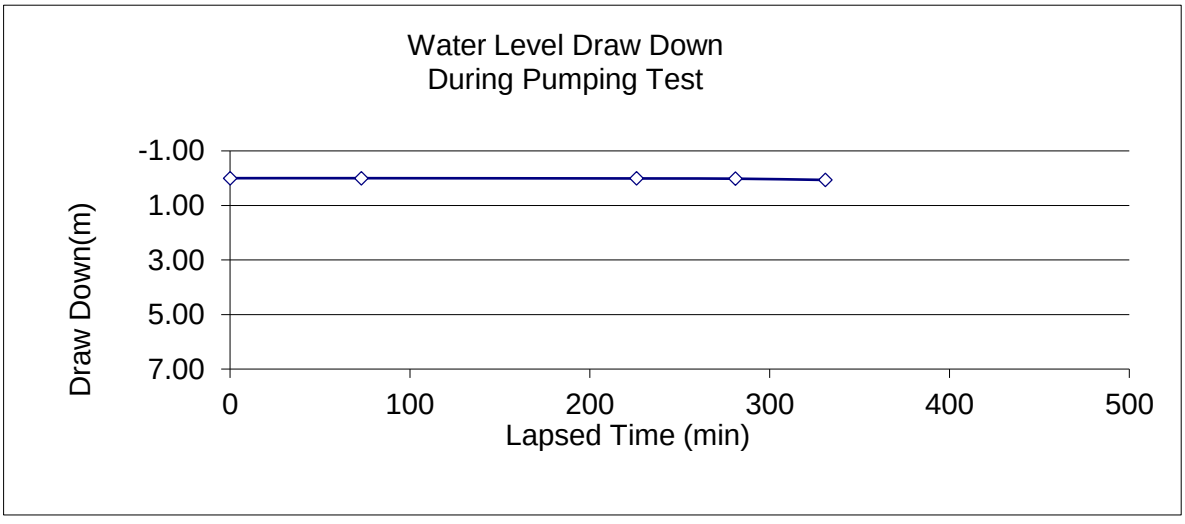


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2228 Battersea Road		
Pumping started at :		10	45

Water Level at Start of Test (m)
2.98

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
9.78	2.98	0.00	4-Dec	10	18	0
9.78	2.98	0.00	4-Dec	11	58	73
9.81	2.99	0.01	4-Dec	14	31	226
9.84	3.00	0.02	4-Dec	15	26	281
9.99	3.04	0.06	4-Dec	16	16	331
9.88	3.01	0.03	4-Dec	18	28	463

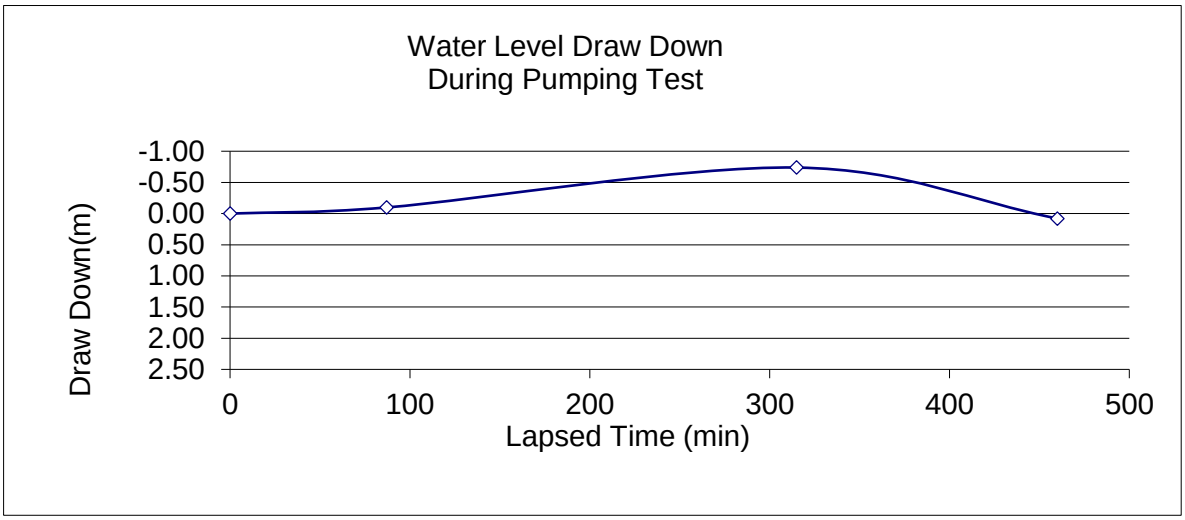


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	791 Unity Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
14.02			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
45.99	14.02	0.00	4-Dec	10	18	0
45.67	13.92	-0.10	4-Dec	12	12	87
43.57	13.28	-0.74	4-Dec	16	0	315
46.25	14.10	0.08	4-Dec	18	25	460

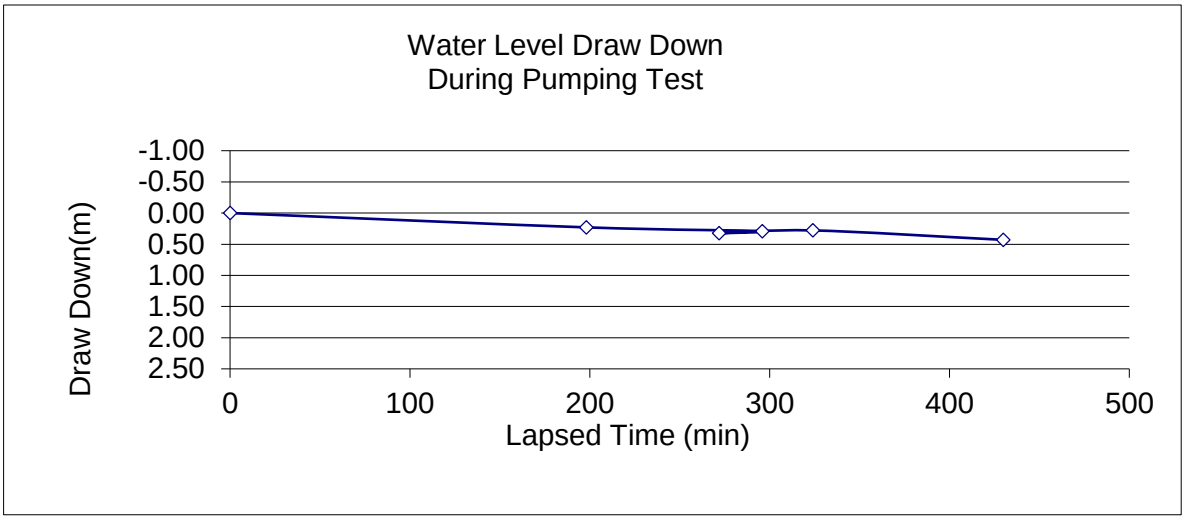


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2347 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
11.70			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
38.39	11.70	0.00	4-Dec	8	5	0
39.14	11.93	0.23	4-Dec	14	3	198
39.34	11.99	0.29	4-Dec	15	41	296
39.45	12.02	0.32	4-Dec	15	17	272
39.30	11.98	0.28	4-Dec	16	9	324
39.80	12.13	0.43	4-Dec	17	55	430

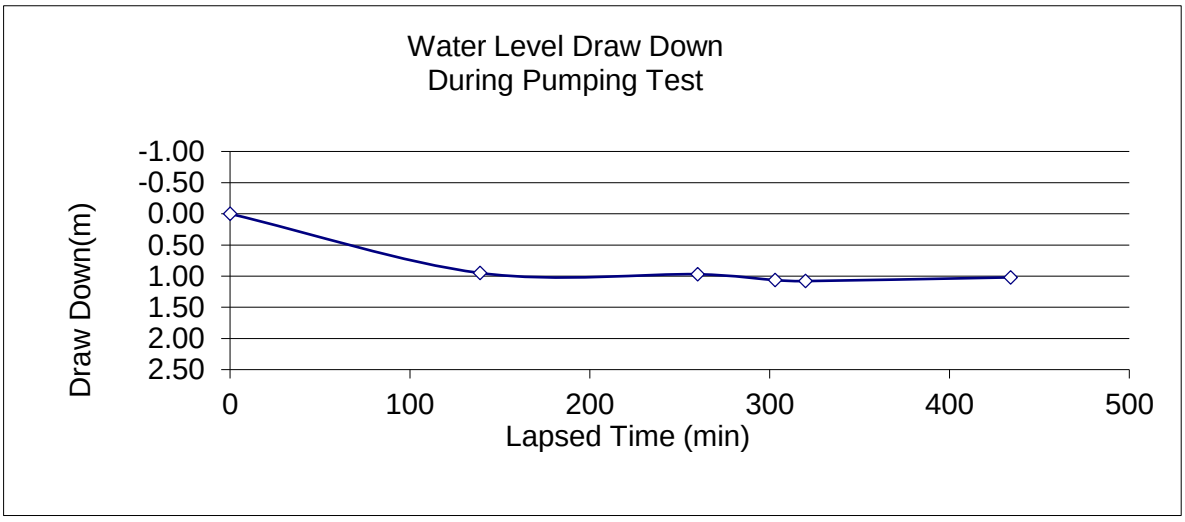


Residential Water Level Readings (WL) during 6 hour Pumping Test

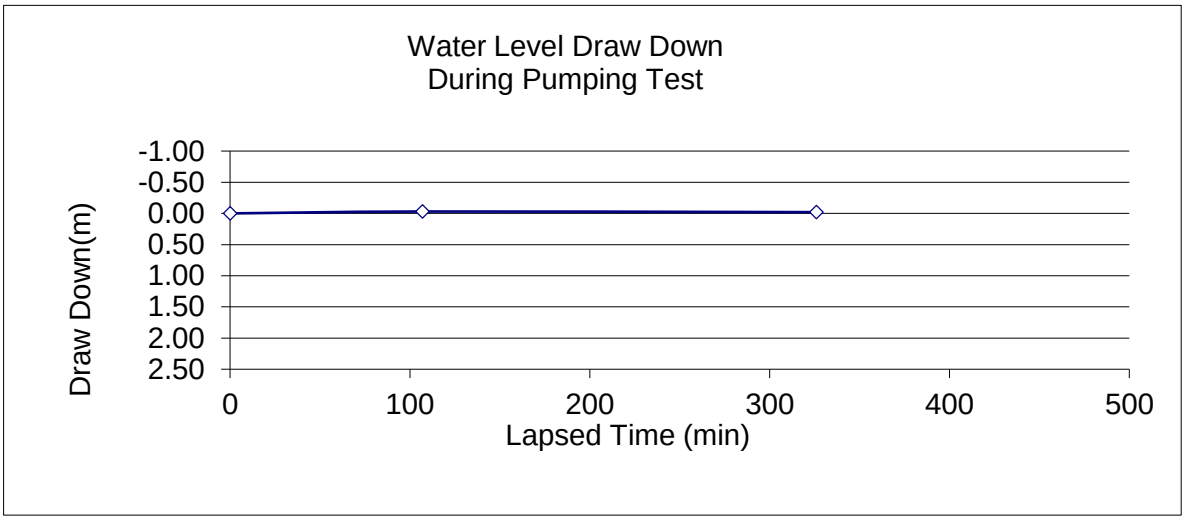
Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2336 Battersea Road		

Water Level at Start of Test (m)	Pumping started at :	10	45
9.25			

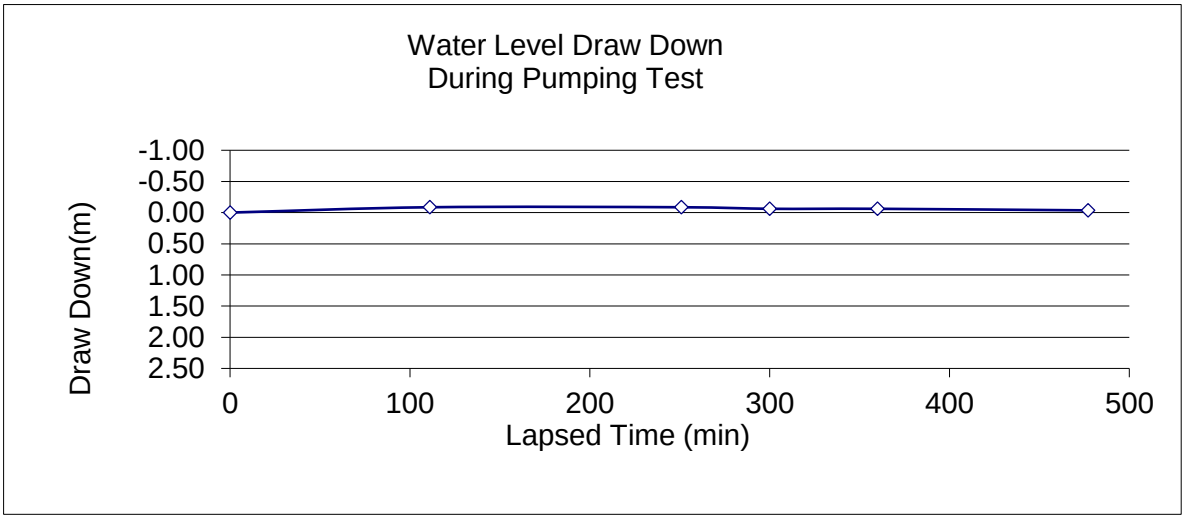
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
30.35	9.25	0.00	4-Dec	10	16	0
33.46	10.20	0.95	4-Dec	13	4	139
33.53	10.22	0.97	4-Dec	15	5	260
33.84	10.31	1.06	4-Dec	15	48	303
33.89	10.33	1.08	4-Dec	16	5	320
33.69	10.27	1.02	4-Dec	17	59	434



ASC ENVIRONMENTAL		**Residential Water Level Readings (WL) during 6 hour Pumping Test**				
		Project No.:	ASC 458			
		Start Date:	4-Dec-18	End Date	4-Dec-18	
		Location:	2280 Battersea Road a			
Water Level at Start of Test (m)		Pumping started at :			10	45
2.20						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
7.22	2.20	0.00	4-Dec	10	27	0
7.12	2.17	-0.03	4-Dec	12	32	107
7.15	2.18	-0.02	4-Dec	16	11	326



ASC ENVIRONMENTAL		**Residential Water Level Readings (WL) during 6 hour Pumping Test**				
		Project No.:	ASC 458			
		Start Date:	4-Dec-18	End Date	4-Dec-18	
		Location:	2280 Battersea Road b			
Water Level at Start of Test (m)		Pumping started at :			10	45
7.99						
Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
26.20	7.99	0.00	4-Dec	10	30	0
25.92	7.90	-0.09	4-Dec	12	36	111
25.92	7.90	-0.09	4-Dec	14	56	251
26.00	7.92	-0.06	4-Dec	15	45	300
26.00	7.92	-0.06	4-Dec	16	45	360
26.08	7.95	-0.04	4-Dec	18	42	477

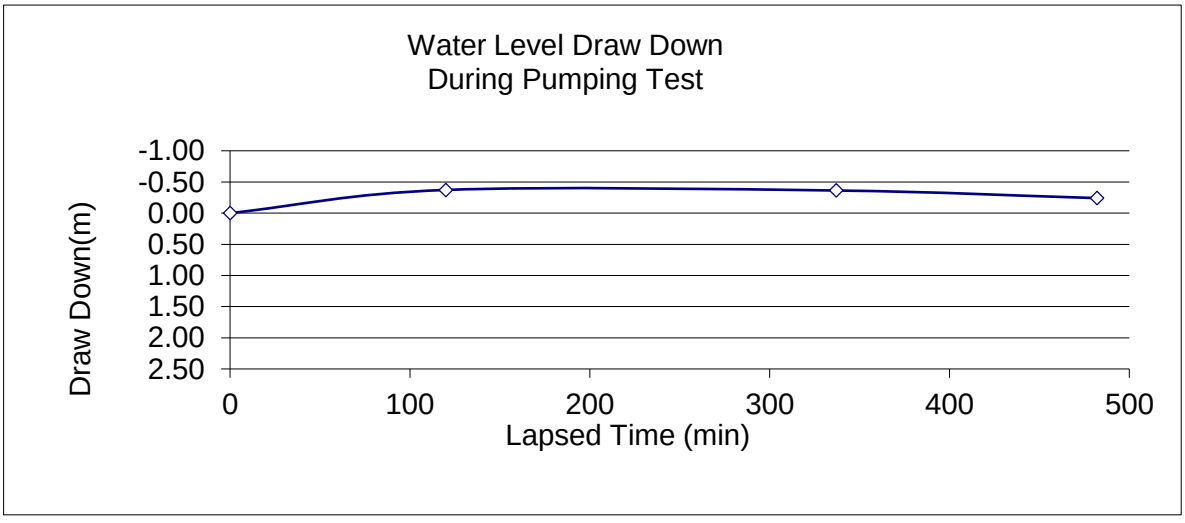


Residential Water Level Readings (WL) during 6 hour Pumping Test

Project No.:	ASC 458		
Start Date:	4-Dec-18	End Date	4-Dec-18
Location:	2280 Battersea Road c		

Water Level at Start of Test (m)	Pumping started at :	10	45
5.19			

Water Level (WL) During Pumping		Draw Down	Actual Time			Elapsed Time
(ft)	(m)	(m)	Date	(Hr)	(min)	(min)
17.04	5.19	0.00	4-Dec	10	32	0
15.82	4.82	-0.37	4-Dec	12	45	120
15.85	4.83	-0.36	4-Dec	16	22	337
16.25	4.95	-0.24	4-Dec	18	47	482



APPENDIX G
Pumping Test Analyses

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088

Appendix H - Table 1 - Theis Method Drawdown Assessment - t = 20 years pumping

	Transmissivity (T) m^2/sec	Storage Coefficient (S)	Q1 -Theis Drawdown s (m)	Q1 - Jacob Drawdown s (m)	Q2 -Theis Drawdown s (m)	Q2 - Jacob Drawdown s (m)	Pumped well	Observation Well	Screen length b (m)	Hydraulic Conductivity - K (m/sec)
			$s = Q*W(u)/4\pi T$	$s = ((2.3Q/4\pi T)* Log_{10}(2.25Tt/Sr^2))$						
Theis	0.006595	0.00000696	0.118700097	0.118578464	0.189491428	0.189297255	TW3	TW1	41.76	0.000157926
	0.001224	**0.000017**	**0.551490998**	0.55093451	**0.880393696**	0.879505325	TW3	TW2	41.76	**2.93103E-05**
	0.00765	0.00000085	0.114638914	0.114520237	0.183008204	0.182818749	TW2	TW1	47.85	0.000159875
	0.162	0.0522	0.003354993	0.003351699	0.005355871	0.005350613	TW1	Church	37.5	0.00432
Average Theis	0.04436725	0.013056203	0.19704625	0.196846227	0.3145623	0.314242985				

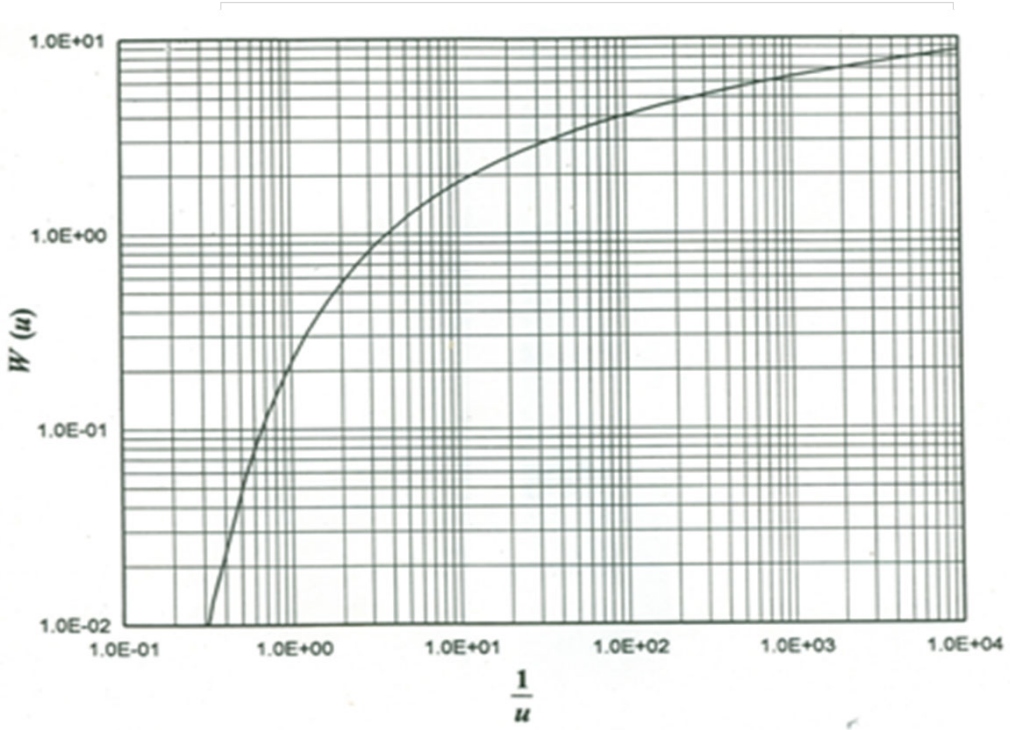
Theis r (m)	Time t (sec)	u	W(u)	Daily Flow Q1 (m^3/sec)	Daily Flow Q2 (m^3/sec)
100	630720000	4.1831E-09	18.71501417	**0.000525637**	**0.00083912**
		5.50517E-08	16.13779275		
		4.40414E-10	20.96610643		
		1.2772E-06	12.99364169		
		1.16643E-06	13.08436601		

Time conversions

enter time here -> years	**20**	
days seconds	1728000	
months to seconds	51840000	
years to seconds	630720000	
Flow rate conversiom	**Q1**	**Q2**
enter flow (Q) rate here in L/day ->	**45,415**	**75,375**
L/day to m^3/s	0.0005256	0.000872396

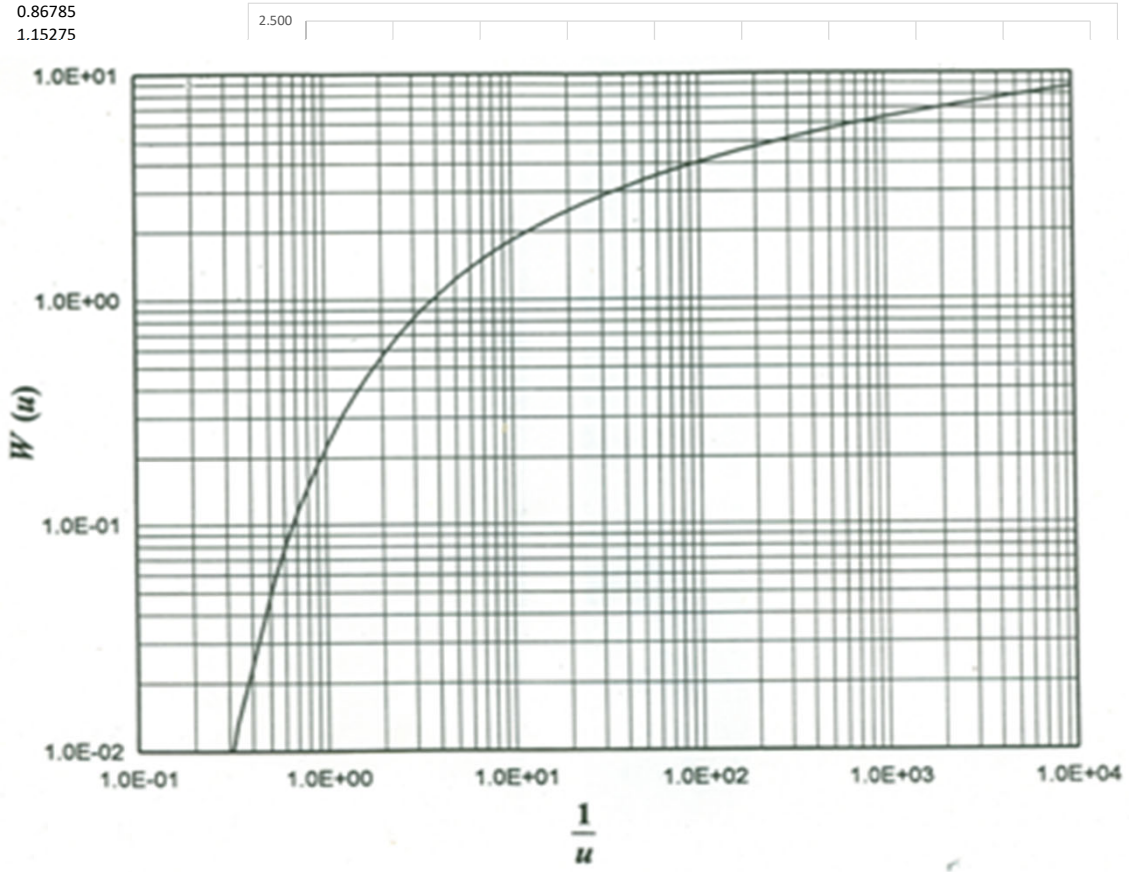
Pumping Well - TW3
Drawdown Well - TW1

WL (ft)	WL (m)	DD (m)	Time H:Min		ET (min)		time (sec)	t/r^2
108.15	32.96412	0	10	6	0	0	0	0
112.3	34.22904	1.26492	12	20	95	5700	1.099537	
113.45	34.57956	1.61544	13	25	160	9600	1.851852	
114.45	34.88436	1.92024	14	30	225	13500	2.604167	
115.1	35.08248	2.11836	15	22	277	16620	3.206019	
115.75	35.2806	2.31648	16	37	352	21120	4.074074	
112.55	34.30524	1.34112	19	19	514	30840	5.949074	



Pumping Well TW 3
Drawdown Well TW2

TW2								
WL	WL	DD	Time		ET		t	t/r^2
(ft)	(m)	(m)	H:Min		(min)		(sec)	
104.650	31.897	0.000	10	9	0		0	0
108.800	33.162	1.265	12	22	133		7980	0.58295
109.900	33.498	1.600	13	27	198		11880	0.86785
110.900	33.802	1.905	14	32	263		15780	1.15275
111.500	33.985	2.088	15	25	316		1896(	
112.200	34.199	2.301	16	39	390		2340(	
110.600	33.711	1.814	17	28	439		2634(	
109.400	33.345	1.448	18	10	481	NO	2886(	
108.300	33.010	1.113	19	15	546		3276(	

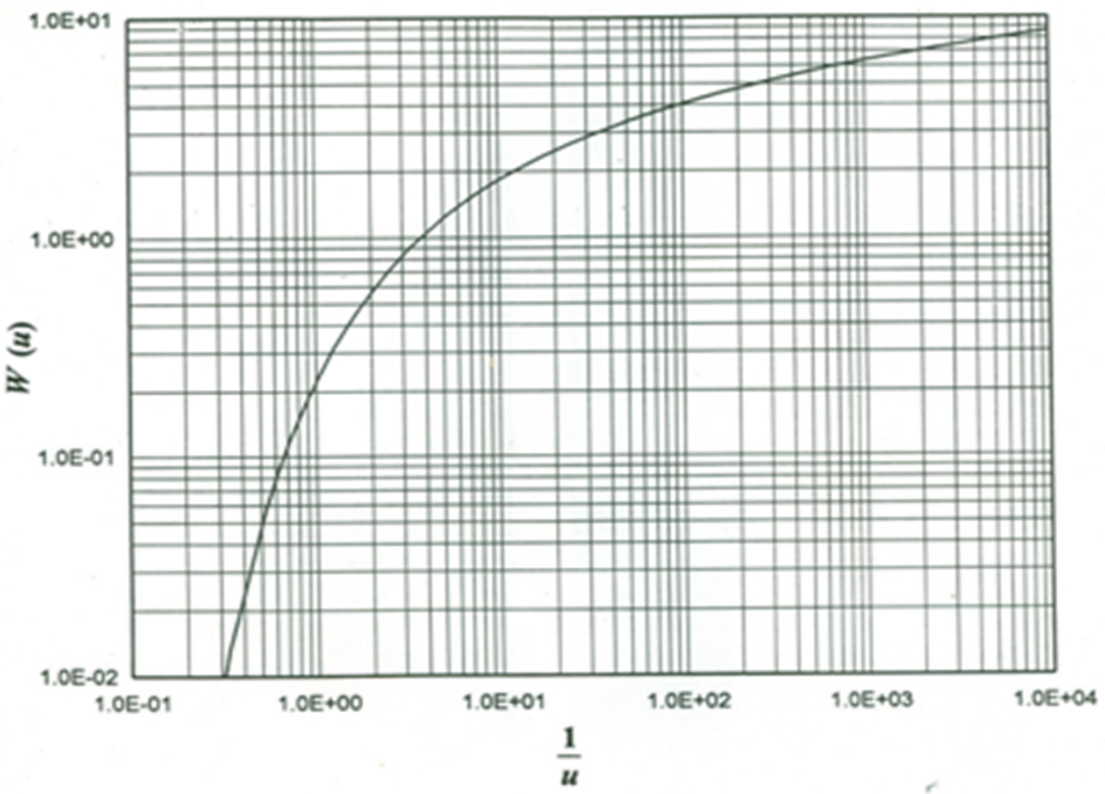


Pumping Well TW2
Drawdown Well TW1

WL	WL	DD	Time		ET
116.600	35.540	0.000	9	1	0
119.000	36.271	0.732	12	0	720
121.200	36.942	1.402	15	30	930
122.100	37.216	1.676	18	7	1087
122.150	37.231	1.692	19	45	1185
122.450	37.323	1.783	21	53	1313
122.590	37.365	1.826	23	16	1396
122.800	37.429	1.890	24	48	1488
121.900	37.155	1.615	27	6	1626
122.000	37.186	1.646	29	11	1751
122.300	37.277	1.737	33	39	2019
123.400	37.612	2.073	36	30	2190
123.400	37.612	2.073	39	30	2370
123.600	37.673	2.134	41	24	2484
123.600	37.673	2.134	42	58	2578
123.750	37.719	2.179	47	3	2823
123.760	37.722	2.182	50	1	3001
123.800	37.734	2.195	52	30	3150
124.000	37.795	2.256	58	2	3482
120.400	36.698	1.158	61	45	3705

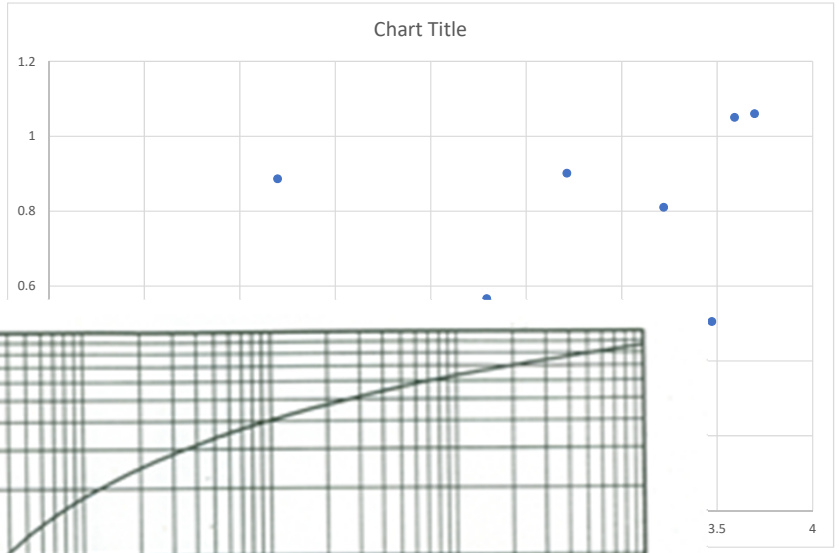
t(sec)	t/(r^2)
0	0
43200	19.14681
55800	24.7313
65220	28
71100	31
78780	34
83760	37
89280	39
97560	43
105060	46
121140	53
131400	58
142200	63
149040	66
154680	68
169380	75
180060	79
189000	83
208920	92

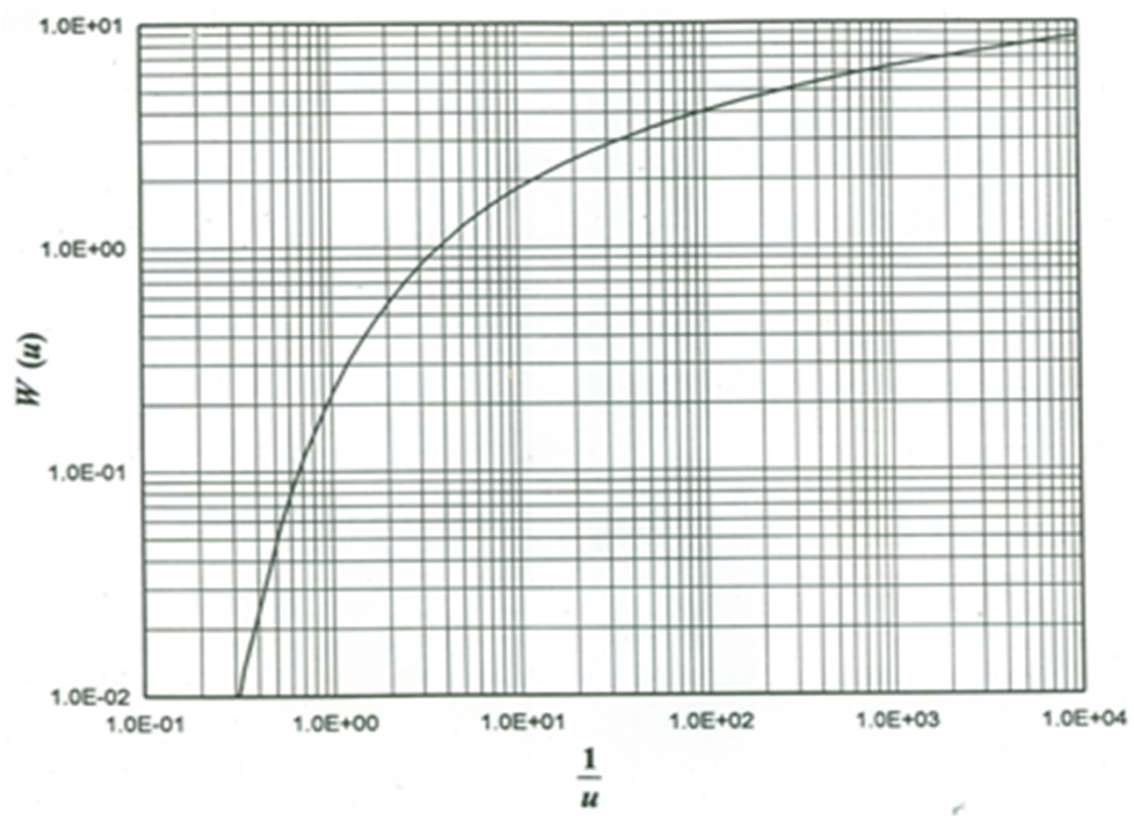
43.2398892



Pumping Well TW 1
Drawdown Well - Church (OW09)

WL (ft)	WL (m)	DD (m)	Time H:Min		ET (min)	t (sec)	t/r^2
91.043	27.75	0	13	44	0	0	0
91.5	27.889	0.139	19	15	123	7380	0.161104
91.45	27.874	0.124	21	35	263	15780	0.344475
92.5	28.194	0.444	23	30	378	22680	0.495101
92.05	28.057	0.307	25	8	476	28560	0.62346
91.9	28.011	0.261	26	55	583	34980	0.763608
91.9	28.011	0.261	29	29	737	44220	0.965316
91.9	28.011	0.261	30	55	823	49380	1.077958
93.95	28.636	0.886	32	27	915	54900	1.198459
92.05	28.057	0.307	34	24	1032	61920	1.351704
92	28.042	0.292	36	5	1133	67980	1.483993
92.2	28.103	0.353	37	28	1216	72960	1.592706
92.1	28.072	0.322	38	50	1298	77880	1.700109
92	28.042	0.292	40	43	1411	84660	1.848115
92.05	28.057	0.307	42	34	1522	91320	1.993502
92.05	28.057	0.307	44	27			
92.9	28.316	0.566	46	23			
92.35	28.148	0.398	47	47			
92.3	28.133	0.383	49	13			
94	28.651	0.901	51	44			
92.5	28.194	0.444	53	57			
92.45	28.179	0.429	56	34			
93.7	28.56	0.81	58	11			
92.75	28.27	0.52	60	3			
92.7	28.255	0.505	61	23			
94.488	28.8	1.05	62	54			
94.521	28.81	1.06	64	14			
88.583	27	-0.75	68	3			





APPENDIX H
Groundwater Quality Results For On-site and Neighbouring Wells

ASC ENVIRONMENTAL

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088

Water Chemistry
Project: ASC-458
Client: BPE Development
Location 2285 Battersea Road.

Parameter	Units	M.D.L.	Reference Method	Ontario Drinking Water Quality Standards	TW1a 08-Aug-18	TW1b 8-Aug-18	TW1c 8-Aug-18	TW1d 9-Aug-18	TW2a 17-Sep-18	TW2b 17-Sep-18	TW2c 18-Sep-18	TW2d 19-Sep-18	TW3a 4-Dec-18	TW3b 4-Dec-18
Total Coliform	cfu/100mL	1	MOE E3407	0	0	0	0	6	1	0	0	0	0	0
E coli	cfu/100mL	1	MOE E3407	0	0	0	0	0	0	0	0	0	0	0
Fecal Coliforms	cfu/100mL	1	SM9222D	0						0	0	0	0	0
Background	cfu/100mL	1	SM9222B		18	17	22	108	0					
Heterotrophic Plate Count	cfu/mL	10	SM9215D		360	80	460	220	290	230	380	500	440	>2000
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B		274	261	243	253	345	343	347	341	217	226
pH @25°C	pH Units		SM 4500H	6.5-8.5	7.9	7.94	7.96	8	7.92	7.93	7.95	8.02	7.84	7.84
Conductivity @25°C	µmho/cm	1	SM 2510B		2130	1800	1680	1580	2690	2610	2650	2610	2630	2510
Colour	TCU	2	SM2120C	5	< 2	2	2	4	2	2	3	2	<2	<2
Turbidity	NTU	0.1	SM2130B	1					2.8	2.4	1.4	1.7	5.7	7.1
Fluoride	mg/L	0.1	SM4110C	1.5	1.7	1.9	1.8	1.8	2.9	2.9	3	2.5	2	2.1
Chloride	mg/L	0.5	SM4110C	250	362	283	262	237	742	666	656	744	502	420
Nitrite (N)	mg/L	0.1	SM4110C	1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (N)	mg/L	0.1	SM4110C	10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	<0.1	<0.1
Sulphate	mg/L	1	SM4110C	500	303	238	206	191	37	37	34	37	513	485
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	5	-	-	-	-	-	1.6	1.5	1.4	0.6	1.2
Total Organic Carbon	mg/L	0.2	EPA 415.1		< 0.2	< 0.2	0.5	0.5	1.4	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1		0.6	0.5	0.41	0.41	0.7	0.7	0.7	0.6	0.6	0.6
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H		0.46	0.42	0.02	0.02	0.52	0.52	0.53	0.54	0.48	0.48
Ammonia (N)-unionized	mg/L	0.01	CALC		0.02	0.02	0.3	< 0.2	0.02	-	-	-	-	-
o-Phosphate (P)	mg/L	0.01	PE4500-S		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	-	-	-	-
Sulphide	mg/L	0.01	SM4500-S2		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	<0.01	0.03
Phenolics	mg/L	0.001	MOEE 3179		< 0.001	< 0.001	0.005	< 0.002	0.012	0.016	0.006	0.005	0.012	0.005
Tannins and Lignins	mg/L	0.5	SM5500B		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5
Hardness (as CaCO3)	mg/L	1	SM 3120	500	395	301	274	265	236	235	232	244	431	405
Calcium	mg/L	0.02	SM 3120	See hardness	113	84.1	76.2	73	46.6	46.4	45.8	46.8	132	125
Iron	mg/L	0.005	SM 3120	0.3	0.919	0.502	0.305	0.315	0.203	0.076	0.05	0.041	0.387	0.396
Magnesium	mg/L	0.02	SM 3120	see hardness	27.3	22.1	20.3	20.1	29.1	-	-	-	-	-
Manganese	mg/L	0.001	SM 3120	0.5	0.017	0.009	0.007	0.007	0.014	0.009	0.007	0.007		
Potassium	mg/L	0.1	SM 3120		10.4	9.4	8.9	8.9	11.5	11.3	11.2	11.7	11	10.3
Sodium	mg/L	0.2	SM 3120	200	323	279	239	227	494	480	482	490	447	420
Anion Sum	meq/L		Calc.		-	-	-	-	-	26.6	26.3	28.7	27.1	25.6
Cation Sum	meq/L		Calc.		-	-	-	-	-	25.9	25.9	26.5	28.4	26.7
% Difference	%		Calc.		-	-	-	-	-	1.27	0.722	3.94	2.29	2.09
Ion Ratio	AS/CS		Calc.		-	-	-	-	-	1.03	1.01	1.08	0.955	0.959
TDS (ion sum calc.)	mg/L	1	Calc.		-	-	-	-	-	1479	1470	1568	1686	1587
Conductivity (calc.)	µmho/cm		Calc.		-	-	-	-	-	2640	2620	2800	2570	2430
TDS (Calc. from Cond.)	mg/L	1	Calc.	500	-	-	-	-	-	1451	1474	1451	1462	1394

Notes			
	1		indicates Ontario Drinking Water Quality Standard Exceedance
	2	-	not analyzed

ASC-458 Table 1.0 Neighbouring Well Results

Parameters			Total Coliform	E Coli	Fecal Coliform	Nitrate (N)	Sulphate	Iron	Maganese	Sodium
UNITS			cfu/100mL	cfu/100m	cfu/100m	mg/L	mg/L	mg/L	mg/L	mg/L
MDL			1	1	1	0.1	1	0.005	0.001	0.2
MECP Criteria[5]		ODWQS	**0**	**0**	**-**	**10**	**500**	**50**	**0.3**	**20 (200)**
1-Aug-18	2217 Battersea Rd.	Pre-Pumping Test	0	0	0	<	149	<	<	263
15-Aug-18		Post-Pumping Test	0	0	0	<	161	0.009	<	272
1-Aug-18	2358 Battersea Rd.	Pre-Pumping Test	0	0	0	1.3	80	0.005	0.001	106
15-Aug-18		Post-Pumping Test	9	1	1	1.2	93	0.01	0.001	116
1-Aug-18	2336 Battersea Rd.	Pre-Pumping Test	8	0	0	1.1	78	<	<	79.2
15-Aug-18		Post-Pumping Test	17	0	0	1.2	100	<	<	97.3
1-Aug-18	885 Unity Rd.	Pre-Pumping Test	6	0	0	<	216	<	0.005	160
15-Aug-18		Post-Pumping Test	6	0	0	<	194	0.006	0.015	205
1-Aug-18	896 Unity Rd.	Pre-Pumping Test	0	0	0	<	342	0.01	0.004	16
15-Aug-18		Post-Pumping Test	0	0	0	<	362	0.012	0.003	16.1
2-Aug-18	808 Unity Rd.	Pre-Pumping Test	4	0	0	0.4	134	<	<	51.7
17-Aug-18		Post-Pumping Test	1	0	0	0.7	40	<	<	40.5
2-Aug-18	2196 Battersea Rd.	Pre-Pumping Test	0	0	0	0.6	11	<	<	12.3
2-May-18		Post-Pumping Test	2	0	0	0.6	13	0.007	<	14
3-Aug-18	796 Unity Rd.	Pre-Pumping Test	0	0	1	1.5	58	<	0.001	207
15-Aug-18		Post-Pumping Test	>200	0	0	1.8	29	<	<	191
5-Dec-18		Post-Pumping Test	15	0	-	-	-	-	-	38.7
1-Aug-18	904 Unity Rd.	Pre-Pumping Test	0	0	0	0.4	676	0.006	0.001	158
15-Aug-18		Post-Pumping Test	5	1	1	0.7	43	0.014	0.002	7.4
3-Aug-18	2236 Battersea Rd.	Pre-Pumping Test	NDOGT	NDOGT	78	1.5	104	<	0.001	91.3
15-Aug-18		Post-Pumping Test	>200	3	6	1.1	116	<	0.001	88.1
1-Aug-18	942 Unity Rd.	Pre-Pumping Test	0	0	0	<	248	<	0.001	9.8
15-Aug-18		Post-Pumping Test	2	0	0	<	243	<	0.003	8.9
2-Aug-18	2359 Battersea Rd.	Pre-Pumping Test	10	0	0	<	141	<	0.007	248
15-Aug-18		Post-Pumping Test	20	0	0	<	141	0.12	0.027	350
2-Aug-18	2329 Battersea Rd.	Pre-Pumping Test	0	0	0	0.1	101	0.034	0.001	14.1
15-Aug-18		Post-Pumping Test	5	0	0	<	105	0.011	0.001	16.3
2-Aug-18	2370 Battersea Rd.	Pre-Pumping Test	0	0	0	1.3	53	<	0.001	16.3
15-Aug-18		Post-Pumping Test	1	0	0	0	186	<	0.001	63.5
2-Aug-18	799 Unity Rd.	Pre-Pumping Test	0	0	0	<	398	<	<	450
15-Aug-18		Post-Pumping Test	0	0	0	<	447	<	0.001	458
3-Aug-18	2413 Battersea Rd.	Pre-Pumping Test	0	0	0	1.3	20	0.007	<	10.4
2-May-18		Post-Pumping Test	10	0	0	2.6	26	<	<	24.8
3-Aug-18	2240 Battersea Rd.	Pre-Pumping Test	3	0	0	1.6	129	0.006	0.001	292
2-May-18		Post-Pumping Test	16	2	2	1.3	148	0.006	0.001	310
2-Aug-18	2225 Battersea Rd.	Pre-Pumping Test	0	0	0	<	393	0.028	0.003	370
19-Aug-18		Post-Pumping Test	0	0	0	<	410	0.026	0.003	404
5-Sep-18	874 Unity Rd.	Post-Pumping Test	0	0	0	<	474	0.007	<	709

Notes		
	1	"-" denotes not analyzed
	2	"MDL" denotes method detection limits
	3	"<" denotes results below method detection limit
	4	"NDOGT" denotes No Data, Overgrown with Target Bacteria
	5	Results compared to MECP Regulation 163/09 – Ontario Drinking Water Quality Standards. 2017.
	6	Exceeding MECP criteria

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G83249 **REPORT No. B18-37220**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 05-Dec-18
DATE REPORTED: 11-Dec-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW3a	TW3b		
			Sample I.D.		B18-37220-1	B18-37220-2		
			Date Collected		04-Dec-18	04-Dec-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	05-Dec-18/K	0	0		
E coli	cfu/100mL	1	MOE E3407	05-Dec-18/K	0	0		
Fecal Coliform	cfu/100mL	1	SM9222D	05-Dec-18/K	0	0		
Heterotrophic Plate Count	cfu/mL	10	SM9215D	05-Dec-18/K	440	> 2000		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Dec-18/O	217	226		
pH @25°C	pH Units		SM 4500H	06-Dec-18/O	7.84	7.84		
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Dec-18/O	2630	2510		
Colour	TCU	2	SM2120C	05-Dec-18/K	< 2	< 2		
Turbidity	NTU	0.1	SM2130B	05-Dec-18/K	5.4	7.1		
Fluoride	mg/L	0.1	SM4110C	06-Dec-18/O	2.0	2.1		
Chloride	mg/L	0.5	SM4110C	06-Dec-18/O	502	420		
Chloride	mg/L	0.5	SM4110C	07-Dec-18/O	425	385		
Nitrite (N)	mg/L	0.1	SM4110C	06-Dec-18/O	< 0.1	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	06-Dec-18/O	< 0.1	< 0.1		
Sulphate	mg/L	1	SM4110C	07-Dec-18/O	513	485		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Dec-18/K	0.6	0.6		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Dec-18/K	0.48	0.48		
TDS (Calc. from Cond.)	mg/L	1	Calc.	10-Dec-18	1462	1394		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	06-Dec-18/O	0.6	1.2		
Sulphide	mg/L	0.01	SM4500-S2	07-Dec-18/K	< 0.01	0.03		
Phenolics	mg/L	0.002	MOEE 3179	06-Dec-18/K	0.012	0.005		
Tannins and Lignins	mg/L	0.5	SM5500B	07-Dec-18/K	< 0.5	< 0.5		
Hardness (as CaCO3)	mg/L	1	SM 3120	10-Dec-18/O	431	405		
Calcium	mg/L	0.02	SM 3120	10-Dec-18/O	132	125		
Iron	mg/L	0.005	SM 3120	10-Dec-18/O	0.387	0.396		
Magnesium	mg/L	0.02	SM 3120	10-Dec-18/O	24.5	22.6		
Potassium	mg/L	0.1	SM 3120	10-Dec-18/O	11.0	10.3		

Richard Lecompte
Lab Supervisor

R.L. = Reporting Limit
Test methods are modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G83249 **REPORT No. B18-37220**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 05-Dec-18
DATE REPORTED: 11-Dec-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW3a	TW3b		
			Sample I.D.		B18-37220-1	B18-37220-2		
			Date Collected		04-Dec-18	04-Dec-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	10-Dec-18/O	447	420		
Anion Sum	meq/L		Calc.	10-Dec-18/O	27.1	25.6		
Cation Sum	meq/L		Calc.	10-Dec-18/O	28.4	26.7		
% Difference	%		Calc.	10-Dec-18/O	2.29	2.09		
Ion Ratio	AS/CS		Calc.	10-Dec-18/O	0.955	0.959		
TDS(ion sum calc.)	mg/L	1	Calc.	10-Dec-18/O	1686	1587		
Conductivity (calc.)	µmho/cm		Calc.	10-Dec-18/O	2570	2430		

R. Lecompte

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G79050 **REPORT No. B18-34589**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: James Frost

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
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DATE RECEIVED: 07-Nov-18
DATE REPORTED: 16-Nov-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC-458
WATERWORKS NO.

			Client I.D.		TW3			
			Sample I.D.		B18-34589-1			
			Date Collected		07-Nov-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	07-Nov-18/K	1			
E coli	cfu/100mL	1	MOE E3407	07-Nov-18/K	0			
Background	cfu/100mL	1	SM9222B	07-Nov-18/K	12			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	07-Nov-18/K	210			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	12-Nov-18/O	219			
pH @25°C	pH Units		SM 4500H	12-Nov-18/O	7.95			
Conductivity @25°C	µmho/cm	1	SM 2510B	12-Nov-18/O	2800			
Colour	TCU	2	SM2120C	09-Nov-18/K	< 2			
Fluoride	mg/L	0.1	SM4110C	09-Nov-18/O	0.3			
Chloride	mg/L	0.5	SM4110C	09-Nov-18/O	80.1			
Nitrite (N)	mg/L	0.1	SM4110C	09-Nov-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	09-Nov-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	09-Nov-18/O	116			
o-Phosphate (P)	mg/L	0.01	PE4500-S	13-Nov-18/K	< 0.01			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Nov-18/K	0.9			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	14-Nov-18/K	0.58			
Ammonia (N)-unionized	mg/L	0.01	CALC	14-Nov-18/K	0.03			
Total Organic Carbon	mg/L	0.2	EPA 415.1	09-Nov-18/O	0.6			
Tannins and Lignins	mg/L	0.5	SM5500B	08-Nov-18/K	< 0.5			
Phenolics	mg/L	0.002	MOEE 3179	13-Nov-18/K	0.003			
Sulphide	mg/L	0.01	SM4500-S2	08-Nov-18/K	0.02			
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-18/O	409			
Calcium	mg/L	0.02	SM 3120	16-Nov-18/O	126			
Iron	mg/L	0.005	SM 3120	16-Nov-18/O	0.449			
Magnesium	mg/L	0.02	SM 3120	16-Nov-18/O	22.8			
Manganese	mg/L	0.001	SM 3120	16-Nov-18/O	0.014			
Potassium	mg/L	0.1	SM 3120	16-Nov-18/O	9.0			

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G79050 **REPORT No. B18-34589**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: James Frost

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Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 07-Nov-18
DATE REPORTED: 16-Nov-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC-458
WATERWORKS NO.

			Client I.D.		TW3			
			Sample I.D.		B18-34589-1			
			Date Collected		07-Nov-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	16-Nov-18/O	395			

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G79083 **REPORT No. B18-28658**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 19-Sep-18
DATE REPORTED: 27-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2d			
			Sample I.D.		B18-28658-1			
			Date Collected		19-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	19-Sep-18/K	0			
E coli	cfu/100mL	1	MOE E3407	19-Sep-18/K	0			
Fecal Coliform	cfu/100mL	1	SM9222D	19-Sep-18/K	0			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	19-Sep-18/K	500			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	20-Sep-18/O	341			
pH @25°C	pH Units		SM 4500H	20-Sep-18/O	8.02			
Conductivity @25°C	µmho/cm	1	SM 2510B	20-Sep-18/O	2610			
Colour	TCU	2	SM2120C	21-Sep-18/K	2			
Turbidity	NTU	0.1	SM2130B	20-Sep-18/K	1.7			
Fluoride	mg/L	0.1	SM4110C	21-Sep-18/O	2.5			
Chloride	mg/L	0.5	SM4110C	25-Sep-18/O	744			
Nitrite (N)	mg/L	0.1	SM4110C	21-Sep-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	21-Sep-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	21-Sep-18/O	37			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	21-Sep-18/K	0.6			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	20-Sep-18/K	0.54			
TDS (Calc. from Cond.)	mg/L	1	Calc.	25-Sep-18	1451			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	21-Sep-18/O	1.4			
Sulphide	mg/L	0.01	SM4500-S2	21-Sep-18/K	< 0.01			
Phenolics	mg/L	0.002	MOEE 3179	21-Sep-18/K	0.005			
Tannins and Lignins	mg/L	0.5	SM5500B	20-Sep-18/K	< 0.5			
Hardness (as CaCO3)	mg/L	1	SM 3120	24-Sep-18/O	244			
Calcium	mg/L	0.02	SM 3120	24-Sep-18/O	46.8			
Iron	mg/L	0.005	SM 3120	24-Sep-18/O	0.041			
Manganese	mg/L	0.001	SM 3120	24-Sep-18/O	0.007			
Potassium	mg/L	0.1	SM 3120	24-Sep-18/O	11.7			
Sodium	mg/L	0.2	SM 3120	24-Sep-18/O	490			

R. Lecompte

Richard Lecompte
Lab Supervisor

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G79083 **REPORT No. B18-28658**

Report To:

ASC Environmental
1305 Princess St.,
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Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 19-Sep-18
DATE REPORTED: 27-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2d			
			Sample I.D.		B18-28658-1			
			Date Collected		19-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	26-Sep-18/O	28.7			
Cation Sum	meq/L		Calc.	26-Sep-18/O	26.5			
% Difference	%		Calc.	26-Sep-18/O	3.94			
Ion Ratio	AS/CS		Calc.	26-Sep-18/O	1.08			
TDS(ion sum calc.)	mg/L	1	Calc.	26-Sep-18/O	1568			
Conductivity (calc.)	µmho/cm		Calc.	26-Sep-18/O	2800			

R. Lecompte

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G72450 **REPORT No. B18-28511**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 19-Sep-18
DATE REPORTED: 26-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2c			
			Sample I.D.		B18-28511-1			
			Date Collected		18-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	19-Sep-18/K	0			
E coli	cfu/100mL	1	MOE E3407	19-Sep-18/K	0			
Fecal Coliform	cfu/100mL	1	SM9222D	19-Sep-18/K	0			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	19-Sep-18/K	380			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	19-Sep-18/O	347			
pH @25°C	pH Units		SM 4500H	19-Sep-18/O	7.95			
Conductivity @25°C	µmho/cm	1	SM 2510B	19-Sep-18/O	2650			
Colour	TCU	2	SM2120C	21-Sep-18/K	3			
Turbidity	NTU	0.1	SM2130B	19-Sep-18/K	1.4			
Fluoride	mg/L	0.1	SM4110C	19-Sep-18/O	3.0			
Chloride	mg/L	0.5	SM4110C	20-Sep-18/O	656			
Nitrite (N)	mg/L	0.1	SM4110C	19-Sep-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	19-Sep-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	19-Sep-18/O	34			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	19-Sep-18/K	0.7			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	19-Sep-18/K	0.53			
TDS (Calc. from Cond.)	mg/L	1	Calc.	25-Sep-18	1474			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	21-Sep-18/O	1.5			
Sulphide	mg/L	0.01	SM4500-S2	21-Sep-18/K	0.01			
Phenolics	mg/L	0.002	MOEE 3179	19-Sep-18/K	0.006			
Tannins and Lignins	mg/L	0.5	SM5500B	20-Sep-18/K	< 0.5			
Hardness (as CaCO3)	mg/L	1	SM 3120	20-Sep-18/O	232			
Calcium	mg/L	0.02	SM 3120	20-Sep-18/O	45.8			
Iron	mg/L	0.005	SM 3120	20-Sep-18/O	0.050			
Manganese	mg/L	0.001	SM 3120	20-Sep-18/O	0.007			
Potassium	mg/L	0.1	SM 3120	20-Sep-18/O	11.2			
Sodium	mg/L	0.2	SM 3120	20-Sep-18/O	482			

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G72450 **REPORT No. B18-28511**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 19-Sep-18
DATE REPORTED: 26-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2c			
			Sample I.D.		B18-28511-1			
			Date Collected		18-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	25-Sep-18/O	26.3			
Cation Sum	meq/L		Calc.	25-Sep-18/O	25.9			
% Difference	%		Calc.	25-Sep-18/O	0.722			
Ion Ratio	AS/CS		Calc.	25-Sep-18/O	1.01			
TDS(ion sum calc.)	mg/L	1	Calc.	25-Sep-18/O	1470			
Conductivity (calc.)	µmho/cm		Calc.	25-Sep-18/O	2620			

R. Lecompte

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G80905 **REPORT No. B18-28311**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Thomas Asuna

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 18-Sep-18
DATE REPORTED: 27-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2B			
			Sample I.D.		B18-28311-1			
			Date Collected		17-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	18-Sep-18/K	0			
E coli	cfu/100mL	1	MOE E3407	18-Sep-18/K	0			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	18-Sep-18/K	230			
Fecal Coliform	cfu/100mL	1	SM9222D	18-Sep-18/K	0			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	19-Sep-18/O	343			
pH @25°C	pH Units		SM 4500H	19-Sep-18/O	7.93			
Conductivity @25°C	µmho/cm	1	SM 2510B	19-Sep-18/O	2610			
Colour	TCU	2	SM2120C	18-Sep-18/K	2			
Turbidity	NTU	0.1	SM2130B	18-Sep-18/K	2.4			
Fluoride	mg/L	0.1	SM4110C	19-Sep-18/O	2.9			
Nitrite (N)	mg/L	0.1	SM4110C	19-Sep-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	19-Sep-18/O	< 0.1			
Chloride	mg/L	0.5	SM4110C	20-Sep-18/O	666			
Sulphate	mg/L	1	SM4110C	19-Sep-18/O	37			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	18-Sep-18/K	0.7			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	19-Sep-18/K	0.52			
TDS (Calc. from Cond.)	mg/L	1	Calc.	21-Sep-18	1451			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	21-Sep-18/O	1.6			
Sulphide	mg/L	0.01	SM4500-S2	21-Sep-18/K	0.01			
Phenolics	mg/L	0.002	MOEE 3179	19-Sep-18/K	0.016			
Tannins and Lignins	mg/L	0.5	SM5500B	25-Sep-18/K	< 0.5			
Hardness (as CaCO3)	mg/L	1	SM 3120	20-Sep-18/O	235			
Calcium	mg/L	0.02	SM 3120	20-Sep-18/O	46.4			
Iron	mg/L	0.005	SM 3120	20-Sep-18/O	0.076			
Manganese	mg/L	0.001	SM 3120	20-Sep-18/O	0.009			
Potassium	mg/L	0.1	SM 3120	20-Sep-18/O	11.3			
Sodium	mg/L	0.2	SM 3120	20-Sep-18/O	480			

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G80905 **REPORT No. B18-28311**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Thomas Asuna

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 18-Sep-18
DATE REPORTED: 27-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2B			
			Sample I.D.		B18-28311-1			
			Date Collected		17-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Anion Sum	meq/L		Calc.	21-Sep-18/O	26.6			
Cation Sum	meq/L		Calc.	21-Sep-18/O	25.9			
% Difference	%		Calc.	21-Sep-18/O	1.27			
Ion Ratio	AS/CS		Calc.	21-Sep-18/O	1.03			
TDS(ion sum calc.)	mg/L	1	Calc.	21-Sep-18/O	1479			
Conductivity (calc.)	µmho/cm		Calc.	21-Sep-18/O	2640			

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Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G79071 **REPORT No. B18-28490**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Paul Johnston

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 18-Sep-18
DATE REPORTED: 26-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2-a			
			Sample I.D.		B18-28490-1			
			Date Collected		17-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	19-Sep-18/K	1			
E coli	cfu/100mL	1	MOE E3407	19-Sep-18/K	0			
Background	cfu/100mL	1	SM9222B	19-Sep-18/K	0			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	19-Sep-18/K	290			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	19-Sep-18/O	345			
pH @25°C	pH Units		SM 4500H	19-Sep-18/O	7.92			
Conductivity @25°C	µmho/cm	1	SM 2510B	19-Sep-18/O	2690			
Colour	TCU	2	SM2120C	21-Sep-18/K	2			
Turbidity	NTU	0.1	SM2130B	19-Sep-18/K	2.8			
Fluoride	mg/L	0.1	SM4110C	19-Sep-18/O	2.9			
Chloride	mg/L	0.5	SM4110C	20-Sep-18/O	742			
Nitrite (N)	mg/L	0.1	SM4110C	19-Sep-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	19-Sep-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	19-Sep-18/O	37			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	19-Sep-18/K	0.7			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	19-Sep-18/K	0.52			
Ammonia (N)-unionized	mg/L	0.01	CALC	20-Sep-18/K	0.02			
o-Phosphate (P)	mg/L	0.01	PE4500-S	20-Sep-18/K	< 0.01			
Phenolics	mg/L	0.002	MOEE 3179	19-Sep-18/K	0.012			
Total Organic Carbon	mg/L	0.2	EPA 415.1	21-Sep-18/O	1.4			
Sulphide	mg/L	0.01	SM4500-S2	21-Sep-18/K	< 0.01			
Tannins and Lignins	mg/L	0.5	SM5500B	20-Sep-18/K	< 0.5			
Hardness (as CaCO3)	mg/L	1	SM 3120	20-Sep-18/O	236			
Calcium	mg/L	0.02	SM 3120	20-Sep-18/O	46.6			
Iron	mg/L	0.005	SM 3120	20-Sep-18/O	0.203			
Magnesium	mg/L	0.02	SM 3120	20-Sep-18/O	29.1			
Manganese	mg/L	0.001	SM 3120	20-Sep-18/O	0.014			

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G79071 **REPORT No. B18-28490**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Paul Johnston

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285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 18-Sep-18
DATE REPORTED: 26-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW2-a			
			Sample I.D.		B18-28490-1			
			Date Collected		17-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Potassium	mg/L	0.1	SM 3120	20-Sep-18/O	11.5			
Sodium	mg/L	0.2	SM 3120	20-Sep-18/O	494			

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: G78994 **REPORT No. B18-23697**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 10-Aug-18
DATE REPORTED: 17-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW1-d			
			Sample I.D.		B18-23697-1			
			Date Collected		09-Aug-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	10-Aug-18/K	6			
E coli	cfu/100mL	1	MOE E3407	10-Aug-18/K	0			
Background	cfu/100mL	1	SM9222B	10-Aug-18/K	108			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	10-Aug-18/K	220			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-Aug-18/O	253			
pH @25°C	pH Units		SM 4500H	13-Aug-18/O	8.00			
Conductivity @25°C	µmho/cm	1	SM 2510B	13-Aug-18/O	1580			
Colour	TCU	2	SM2120C	10-Aug-18/K	4			
Fluoride	mg/L	0.1	SM4110C	13-Aug-18/O	1.8			
Chloride	mg/L	0.5	SM4110C	13-Aug-18/O	237			
Nitrite (N)	mg/L	0.1	SM4110C	13-Aug-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	13-Aug-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	13-Aug-18/O	191			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	14-Aug-18/K	0.5			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	13-Aug-18/K	0.41			
Ammonia (N)-unionized	mg/L	0.01	CALC	13-Aug-18/K	0.02			
Total Organic Carbon	mg/L	0.2	EPA 415.1	16-Aug-18/O	< 0.2			
o-Phosphate (P)	mg/L	0.01	PE4500-S	10-Aug-18/K	< 0.01			
Sulphide	mg/L	0.01	SM4500-S2	14-Aug-18/K	< 0.01			
Phenolics	mg/L	0.002	MOEE 3179	10-Aug-18/K	< 0.002			
Tannins and Lignins	mg/L	0.5	SM5500B	16-Aug-18/K	< 0.5			
Hardness (as CaCO3)	mg/L	1	SM 3120	14-Aug-18/O	265			
Calcium	mg/L	0.02	SM 3120	14-Aug-18/O	73.0			
Iron	mg/L	0.005	SM 3120	14-Aug-18/O	0.315			
Magnesium	mg/L	0.02	SM 3120	14-Aug-18/O	20.1			
Manganese	mg/L	0.001	SM 3120	14-Aug-18/O	0.007			
Potassium	mg/L	0.1	SM 3120	14-Aug-18/O	8.9			

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G78994 **REPORT No. B18-23697**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 10-Aug-18
DATE REPORTED: 17-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW1-d			
			Sample I.D.		B18-23697-1			
			Date Collected		09-Aug-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	14-Aug-18/O	227			

R. Lecompte

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G73700 **REPORT No. B18-23803**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 10-Aug-18
DATE REPORTED: 17-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC 458
WATERWORKS NO.

			Client I.D.		TW1-C			
			Sample I.D.		B18-23803-1			
			Date Collected		08-Aug-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	10-Aug-18/K	0			
E coli	cfu/100mL	1	MOE E3407	10-Aug-18/K	0			
Background	cfu/100mL	1	SM9222B	10-Aug-18/K	22			
Heterotrophic Plate Count	cfu/mL	10	SM9215D	10-Aug-18/K	460			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-Aug-18/O	243			
pH @25°C	pH Units		SM 4500H	13-Aug-18/O	7.96			
Conductivity @25°C	µmho/cm	1	SM 2510B	13-Aug-18/O	1680			
Colour	TCU	2	SM2120C	13-Aug-18/K	2			
Fluoride	mg/L	0.1	SM4110C	13-Aug-18/O	1.8			
Chloride	mg/L	0.5	SM4110C	13-Aug-18/O	262			
Nitrite (N)	mg/L	0.1	SM4110C	13-Aug-18/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	13-Aug-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	13-Aug-18/O	206			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	15-Aug-18/K	0.5			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	14-Aug-18/K	0.41			
Ammonia (N)-unionized	mg/L	0.01	CALC	14-Aug-18/K	0.02			
Total Organic Carbon	mg/L	0.2	EPA 415.1	16-Aug-18/O	0.3			
o-Phosphate (P)	mg/L	0.01	PE4500-S	15-Aug-18/K	< 0.01			
Sulphide	mg/L	0.01	SM4500-S2	14-Aug-18/K	< 0.01			
Phenolics	mg/L	0.002	MOEE 3179	15-Aug-18/K	0.005			
Tannins and Lignins	mg/L	0.5	SM5500B	16-Aug-18/K	< 0.5			
Hardness (as CaCO3)	mg/L	1	SM 3120	14-Aug-18/O	274			
Calcium	mg/L	0.02	SM 3120	14-Aug-18/O	76.2			
Iron	mg/L	0.005	SM 3120	14-Aug-18/O	0.305			
Magnesium	mg/L	0.02	SM 3120	14-Aug-18/O	20.3			
Manganese	mg/L	0.001	SM 3120	14-Aug-18/O	0.007			
Potassium	mg/L	0.1	SM 3120	14-Aug-18/O	8.9			

R. Lecompte

Richard Lecompte
Lab Supervisor

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G73700 **REPORT No. B18-23803**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 10-Aug-18
DATE REPORTED: 17-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC 458
WATERWORKS NO.

			Client I.D.		TW1-C			
			Sample I.D.		B18-23803-1			
			Date Collected		08-Aug-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	14-Aug-18/O	239			

R. Lecompte

Richard Lecompte
Lab Supervisor

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: DW83961 **REPORT No. B18-23322**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 08-Aug-18
DATE REPORTED: 16-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-548
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW1-a	TW1-b		
			Sample I.D.		B18-23322-1	B18-23322-2		
			Date Collected		07-Aug-18	08-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	07-Aug-18/K	0	0		
E coli	cfu/100mL	1	MOE E3407	07-Aug-18/K	0	0		
Background	cfu/100mL	1	SM9222B	07-Aug-18/K	18	17		
Heterotrophic Plate Count	cfu/mL	10	SM9215D	08-Aug-18/K	360	80		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	08-Aug-18/O	274	261		
pH @25°C	pH Units		SM 4500H	08-Aug-18/O	7.90	7.94		
Conductivity @25°C	µmho/cm	1	SM 2510B	08-Aug-18/O	2130	1800		
Colour	TCU	2	SM2120C	08-Aug-18/K	< 2	2		
Fluoride	mg/L	0.1	SM4110C	08-Aug-18/O	1.7	1.9		
Chloride	mg/L	0.5	SM4110C	09-Aug-18/O	362	283		
Nitrite (N)	mg/L	0.1	SM4110C	08-Aug-18/O	< 0.1	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	08-Aug-18/O	< 0.1	< 0.1		
Sulphate	mg/L	1	SM4110C	08-Aug-18/O	303	238		
Total Organic Carbon	mg/L	0.2	EPA 415.1	14-Aug-18/O	< 0.2	< 0.2		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	09-Aug-18/K	0.6	0.5		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	09-Aug-18/K	0.46	0.42		
Ammonia (N)-unionized	mg/L	0.01	CALC	09-Aug-18/K	0.02	0.02		
o-Phosphate (P)	mg/L	0.01	PE4500-S	10-Aug-18/K	< 0.01	< 0.01		
Sulphide	mg/L	0.01	SM4500-S2	08-Aug-18/K	< 0.01	< 0.01		
Phenolics	mg/L	0.001	MOEE 3179	15-Aug-18/O	< 0.001	< 0.001		
Tannins and Lignins	mg/L	0.5	SM5500B	10-Aug-18/K	< 0.5	< 0.5		
Hardness (as CaCO3)	mg/L	1	SM 3120	09-Aug-18/O	395	301		
Calcium	mg/L	0.02	SM 3120	09-Aug-18/O	113	84.1		
Iron	mg/L	0.005	SM 3120	09-Aug-18/O	0.919	0.502		
Magnesium	mg/L	0.02	SM 3120	09-Aug-18/O	27.3	22.1		
Manganese	mg/L	0.001	SM 3120	09-Aug-18/O	0.017	0.009		
Potassium	mg/L	0.1	SM 3120	09-Aug-18/O	10.4	9.4		

R. Lecompte

Richard Lecompte
Lab Supervisor

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: DW83961 **REPORT No. B18-23322**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 08-Aug-18
DATE REPORTED: 16-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-548
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		TW1-a	TW1-b		
			Sample I.D.		B18-23322-1	B18-23322-2		
			Date Collected		07-Aug-18	08-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	09-Aug-18/O	323	279		

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: G79027 **REPORT No. B18-24757**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 20-Aug-18
DATE REPORTED: 21-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 461
P.O. NUMBER: ASC461
WATERWORKS NO.

	Parameter		Turbidity				
	Units		NTU				
	R.L.		0.1				
	Reference Method		SM2130B				
	Date Analyzed/Site		21-Aug-18/K				
Client I.D.	**Sample I.D.**	**Date Collected**					
TW1B	B18-24757-1	20-Aug-18	1.0				

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: DW099871 **REPORT No. B18-37343**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 05-Dec-18
DATE REPORTED: 13-Dec-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		874 Unity	2336 Battersea		
			Sample I.D.		B18-37343-1	B18-37343-2		
			Date Collected		05-Dec-18	05-Dec-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	05-Dec-18/K	2	17		
E coli	cfu/100mL	1	MOE E3407	05-Dec-18/K	0	0		
Fecal Coliform	cfu/100mL	1	SM9222D	05-Dec-18/K	0	0		
Nitrate (N)	mg/L	0.1	SM4110C	06-Dec-18/O	0.7	1.3		
Sulphate	mg/L	1	SM4110C	06-Dec-18/O	494	20		
Iron	mg/L	0.005	SM 3120	12-Dec-18/O	0.008	< 0.005		
Manganese	mg/L	0.001	SM 3120	12-Dec-18/O	0.001	< 0.001		
Sodium	mg/L	0.2	SM 3120	12-Dec-18/O	679	38.1		

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: DW099870 **REPORT No. B18-37340**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 05-Dec-18
DATE REPORTED: 13-Dec-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

	Parameter		Total Coliform	E coli	Sodium		
	Units		cfu/100mL	cfu/100mL	mg/L		
	R.L.		1	1	0.2		
	Reference Method		MOE E3407	MOE E3407	SM 3120		
	Date Analyzed/Site		05-Dec-18/K	05-Dec-18/K	12-Dec-18/O		
Client I.D.	Sample I.D.	Date Collected					
796 Unity	B18-37340-1	05-Dec-18	15	0	38.7		

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: DW099847 **REPORT No. B18-36653**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 29-Nov-18
DATE REPORTED: 06-Dec-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		2336 Battersea			
			Sample I.D.		B18-36653-1			
			Date Collected		29-Nov-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	29-Nov-18/K	22			
E coli	cfu/100mL	1	MOE E3407	29-Nov-18/K	0			
Fecal Coliform	cfu/100mL	1	SM9222D	29-Nov-18/K	0			
Nitrate (N)	mg/L	0.1	SM4110C	30-Nov-18/O	1.1			
Sulphate	mg/L	1	SM4110C	30-Nov-18/O	21			
Iron	mg/L	0.005	SM 3120	05-Dec-18/O	0.028			
Manganese	mg/L	0.001	SM 3120	05-Dec-18/O	< 0.001			
Sodium	mg/L	0.2	SM 3120	05-Dec-18/O	48.7			

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G80889 **REPORT No. B18-26940**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 05-Sep-18
DATE REPORTED: 07-Sep-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		847 Battersea			
			Sample I.D.		B18-26940-1			
			Date Collected		05-Sep-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	05-Sep-18/K	0			
E coli	cfu/100mL	1	MOE E3407	05-Sep-18/K	0			
Fecal Coliform	cfu/100mL	1	SM9222D	05-Sep-18/K	0			
Nitrate (N)	mg/L	0.1	SM4110C	06-Sep-18/O	< 1 [1]			
Sulphate	mg/L	1	SM4110C	06-Sep-18/O	474			
Iron	mg/L	0.005	SM 3120	07-Sep-18/O	0.007			
Manganese	mg/L	0.001	SM 3120	07-Sep-18/O	< 0.001			
Sodium	mg/L	0.2	SM 3120	07-Sep-18/O	709			

1. Elevated detection limit due to high chloride

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: G78995 **REPORT No. B18-25284**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Thomas Asuna

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 22-Aug-18
DATE REPORTED: 27-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		2413	2240		
			Sample I.D.		B18-25284-1	B18-25284-2		
			Date Collected		22-Aug-18	22-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	23-Aug-18/K	10	16		
E coli	cfu/100mL	1	MOE E3407	23-Aug-18/K	0	2		
Fecal Coliform	cfu/100mL	1	SM9222D	23-Aug-18/K	0	2		
Nitrate (N)	mg/L	0.1	SM4110C	23-Aug-18/O	2.6	1.3		
Sulphate	mg/L	1	SM4110C	23-Aug-18/O	26	148		
Iron	mg/L	0.005	SM 3120	24-Aug-18/O	< 0.005	0.006		
Manganese	mg/L	0.001	SM 3120	24-Aug-18/O	< 0.001	0.001		
Sodium	mg/L	0.2	SM 3120	24-Aug-18/O	24.8	310		

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: G80367 **REPORT No. B18-24650**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
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Fax: 613-544-2770

DATE RECEIVED: 20-Aug-18
DATE REPORTED: 24-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC-458
WATERWORKS NO.

			Client I.D.		2225 Battersea			
			Sample I.D.		B18-24650-1			
			Date Collected		19-Aug-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	20-Aug-18/K	0			
E coli	cfu/100mL	1	MOE E3407	20-Aug-18/K	0			
Fecal Coliform	cfu/100mL	1	SM9222D	20-Aug-18/K	0			
Nitrate (N)	mg/L	0.1	SM4110C	20-Aug-18/O	< 0.1			
Sulphate	mg/L	1	SM4110C	21-Aug-18/O	410			
Iron	mg/L	0.005	SM 3120	23-Aug-18/O	0.026			
Manganese	mg/L	0.001	SM 3120	23-Aug-18/O	0.003			
Sodium	mg/L	0.2	SM 3120	23-Aug-18/O	404			

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: G80368 **REPORT No. B18-24619**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Aug-18
DATE REPORTED: 24-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		808 Unity			
			Sample I.D.		B18-24619-1			
			Date Collected		17-Aug-18			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	17-Aug-18/K	1			
E coli	cfu/100mL	1	MOE E3407	17-Aug-18/K	0			
Fecal Coliform	cfu/100mL	1	SM9222D	17-Aug-18/K	0			
Nitrate (N)	mg/L	0.1	SM4110C	20-Aug-18/O	0.7			
Sulphate	mg/L	1	SM4110C	20-Aug-18/O	40			
Iron	mg/L	0.005	SM 3120	23-Aug-18/O	< 0.005			
Manganese	mg/L	0.001	SM 3120	23-Aug-18/O	< 0.001			
Sodium	mg/L	0.2	SM 3120	23-Aug-18/O	40.5			

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: G80362 **REPORT No. B18-24314**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 15-Aug-18
DATE REPORTED: 20-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		942 Unity	904 Unity	896 Unity	885 Unity
			Sample I.D.		B18-24314-1	B18-24314-2	B18-24314-3	B18-24314-4
			Date Collected		15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	15-Aug-18/K	2	5	0	6
E coli	cfu/100mL	1	MOE E3407	15-Aug-18/K	0	1	0	0
Fecal Coliform	cfu/100mL	1	SM9222D	15-Aug-18/K	0	1	0	0
Nitrate (N)	mg/L	0.1	SM4110C	16-Aug-18/O	< 0.1	0.7	< 0.1	< 0.1
Sulphate	mg/L	1	SM4110C	16-Aug-18/O	243	43		194
Sulphate	mg/L	1	SM4110C	17-Aug-18/O			362	
Iron	mg/L	0.005	SM 3120	17-Aug-18/O	< 0.005	0.014	0.012	0.006
Manganese	mg/L	0.001	SM 3120	17-Aug-18/O	0.003	0.002	0.003	0.015
Sodium	mg/L	0.2	SM 3120	17-Aug-18/O	8.9	7.4	16.1	205

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G80362 **REPORT No. B18-24314**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 15-Aug-18
DATE REPORTED: 20-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		2370 Battersea	2359 Battersea	2358 Battersea	2336 Battersea
			Sample I.D.		B18-24314-5	B18-24314-6	B18-24314-7	B18-24314-8
			Date Collected		15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	15-Aug-18/K	1	20	9	17
E coli	cfu/100mL	1	MOE E3407	15-Aug-18/K	0	0	1	0
Fecal Coliform	cfu/100mL	1	SM9222D	15-Aug-18/K	0	0	1	0
Nitrate (N)	mg/L	0.1	SM4110C	16-Aug-18/O	0.9	< 1	1.2	1.2
Sulphate	mg/L	1	SM4110C	16-Aug-18/O	186	141	93	100
Sulphate	mg/L	1	SM4110C	17-Aug-18/O				
Iron	mg/L	0.005	SM 3120	17-Aug-18/O	< 0.005	0.120	0.010	< 0.005
Manganese	mg/L	0.001	SM 3120	17-Aug-18/O	0.001	0.027	0.001	< 0.001
Sodium	mg/L	0.2	SM 3120	17-Aug-18/O	63.5	350	116	97.3

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G80362 **REPORT No. B18-24314**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 15-Aug-18
DATE REPORTED: 20-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		2329 Battersea	799 Unity	796 Unity	2236 Battersea
			Sample I.D.		B18-24314-9	B18-24314-10	B18-24314-11	B18-24314-12
			Date Collected		15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	15-Aug-18/K	5	0	> 200	> 200
E coli	cfu/100mL	1	MOE E3407	15-Aug-18/K	0	0	0	3
Fecal Coliform	cfu/100mL	1	SM9222D	15-Aug-18/K	0	0	0	6
Nitrate (N)	mg/L	0.1	SM4110C	16-Aug-18/O	< 0.1	< 0.1	1.8	1.1
Sulphate	mg/L	1	SM4110C	16-Aug-18/O	105		29	116
Sulphate	mg/L	1	SM4110C	17-Aug-18/O		447		
Iron	mg/L	0.005	SM 3120	17-Aug-18/O	0.011	< 0.005	< 0.005	< 0.005
Manganese	mg/L	0.001	SM 3120	17-Aug-18/O	0.001	0.001	< 0.001	0.001
Sodium	mg/L	0.2	SM 3120	17-Aug-18/O	16.3	458	191	88.1

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G80362 **REPORT No. B18-24314**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 15-Aug-18
DATE REPORTED: 20-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		2212 Battersea	2196 Battersea		
			Sample I.D.		B18-24314-13	B18-24314-14		
			Date Collected		15-Aug-18	15-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	15-Aug-18/K	0	2		
E coli	cfu/100mL	1	MOE E3407	15-Aug-18/K	0	0		
Fecal Coliform	cfu/100mL	1	SM9222D	15-Aug-18/K	0	0		
Nitrate (N)	mg/L	0.1	SM4110C	16-Aug-18/O	< 0.1	0.6		
Sulphate	mg/L	1	SM4110C	16-Aug-18/O	161	13		
Sulphate	mg/L	1	SM4110C	17-Aug-18/O				
Iron	mg/L	0.005	SM 3120	17-Aug-18/O	0.009	0.007		
Manganese	mg/L	0.001	SM 3120	17-Aug-18/O	< 0.001	< 0.001		
Sodium	mg/L	0.2	SM 3120	17-Aug-18/O	272	14.0		

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: DW83963 **REPORT No. B18-23078**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 03-Aug-18
DATE REPORTED: 09-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		796	904	2236	2413
			Sample I.D.		B18-23078-1	B18-23078-2	B18-23078-3	B18-23078-4
			Date Collected		03-Aug-18	03-Aug-18	03-Aug-18	03-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	03-Aug-18/K	0	0	NDOGT [1]	0
E coli	cfu/100mL	1	MOE E3407	03-Aug-18/K	0	0	NDOGT	0
Fecal Coliform	cfu/100mL	1	SM9222D	03-Aug-18/K	1	0	78	0
Nitrate (N)	mg/L	0.1	SM4110C	07-Aug-18/O	1.5	0.4	1.5	1.3
Sulphate	mg/L	1	SM4110C	07-Aug-18/O	58	676	104	20
Iron	mg/L	0.005	SM 3120	08-Aug-18/O	< 0.005	0.006	< 0.005	0.007
Manganese	mg/L	0.001	SM 3120	08-Aug-18/O	0.001	0.001	0.001	< 0.001
Sodium	mg/L	0.2	SM 3120	08-Aug-18/O	207	158	91.3	10.4

1 NDOGT = No Data; Overgrown with target bacteria.

R. Lecompte

Richard Lecompte
Lab Supervisor

R.L. = Reporting Limit
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: DW83963 **REPORT No. B18-23078**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 03-Aug-18
DATE REPORTED: 09-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		2240	2225		
			Sample I.D.		B18-23078-5	B18-23078-6		
			Date Collected		03-Aug-18	03-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	03-Aug-18/K	3	0		
E coli	cfu/100mL	1	MOE E3407	03-Aug-18/K	0	0		
Fecal Coliform	cfu/100mL	1	SM9222D	03-Aug-18/K	0	0		
Nitrate (N)	mg/L	0.1	SM4110C	07-Aug-18/O	1.6	< 0.1		
Sulphate	mg/L	1	SM4110C	07-Aug-18/O	129	393		
Iron	mg/L	0.005	SM 3120	08-Aug-18/O	0.006	0.028		
Manganese	mg/L	0.001	SM 3120	08-Aug-18/O	0.001	0.003		
Sodium	mg/L	0.2	SM 3120	08-Aug-18/O	292	370		

1 NDOGT = No Data; Overgrown with target bacteria.

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: DW83958 **REPORT No. B18-22983**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 02-Aug-18
DATE REPORTED: 09-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		808 Unity	2196 Battersea		
			Sample I.D.		B18-22983-1	B18-22983-2		
			Date Collected		02-Aug-18	02-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	03-Aug-18/K	4	0		
E coli	cfu/100mL	1	MOE E3407	03-Aug-18/K	0	0		
Fecal Coliform	cfu/100mL	1	SM9222D	03-Aug-18/K	0	0		
Nitrate (N)	mg/L	0.1	SM4110C	07-Aug-18/O	0.4	0.6		
Sulphate	mg/L	1	SM4110C	07-Aug-18/O	134	11		
Iron	mg/L	0.005	SM 3120	07-Aug-18/O	< 0.005	< 0.005		
Manganese	mg/L	0.001	SM 3120	07-Aug-18/O	< 0.001	< 0.001		
Sodium	mg/L	0.2	SM 3120	07-Aug-18/O	51.7	12.3		

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: DW87464 **REPORT No. B18-22877**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
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Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 02-Aug-18
DATE REPORTED: 09-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC 458
WATERWORKS NO.

			Client I.D.		2359 Battersea	2329 Battersea	2370 Battersea	799 Unity
			Sample I.D.		B18-22877-1	B18-22877-2	B18-22877-3	B18-22877-4
			Date Collected		02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	02-Aug-18/K	10	0	0	0
E coli	cfu/100mL	1	MOE E3407	02-Aug-18/K	0	0	0	0
Fecal Coliform	cfu/100mL	1	SM9222D	02-Aug-18/K	0	0	0	0
Nitrate (N)	mg/L	0.1	SM4110C	07-Aug-18/O	< 0.1	0.1	1.3	< 0.1
Sulphate	mg/L	1	SM4110C	07-Aug-18/O	141	101	53	398
Iron	mg/L	0.005	SM 3120	07-Aug-18/O	< 0.005	0.034	< 0.005	< 0.005
Manganese	mg/L	0.001	SM 3120	07-Aug-18/O	0.007	0.001	0.001	< 0.001
Sodium	mg/L	0.2	SM 3120	07-Aug-18/O	248	14.1	70.1	450

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: DW87465 **REPORT No. B18-22750**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 01-Aug-18
DATE REPORTED: 08-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER: ASC 458
WATERWORKS NO.

			Client I.D.		2217 Battersea	2358 Battersea	2336 Battersea	885 Unity
			Sample I.D.		B18-22750-1	B18-22750-2	B18-22750-3	B18-22750-4
			Date Collected		01-Aug-18	01-Aug-18	01-Aug-18	01-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	01-Aug-18/K	0	0	8	6
E coli	cfu/100mL	1	MOE E3407	01-Aug-18/K	0	0	0	0
Fecal Coliform	cfu/100mL	1	SM9222D	01-Aug-18/K	0	0	0	0
Nitrate (N)	mg/L	0.1	SM4110C	04-Aug-18/O	< 0.1	1.3	1.1	< 0.1
Sulphate	mg/L	1	SM4110C	04-Aug-18/O	149	80	78	216
Sulphate	mg/L	1	SM4110C	07-Aug-18/O				
Iron	mg/L	0.005	SM 3120	07-Aug-18/O	< 0.005	0.005	< 0.005	< 0.005
Manganese	mg/L	0.001	SM 3120	07-Aug-18/O	< 0.001	0.001	< 0.001	0.005
Sodium	mg/L	0.2	SM 3120	07-Aug-18/O	263	106	79.2	160

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: DW87465 **REPORT No. B18-22750**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 01-Aug-18
DATE REPORTED: 08-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER: ASC 458
WATERWORKS NO.

			Client I.D.		896 Unity	942 Unity		
			Sample I.D.		B18-22750-5	B18-22750-6		
			Date Collected		01-Aug-18	01-Aug-18		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	01-Aug-18/K	0	0		
E coli	cfu/100mL	1	MOE E3407	01-Aug-18/K	0	0		
Fecal Coliform	cfu/100mL	1	SM9222D	01-Aug-18/K	0	0		
Nitrate (N)	mg/L	0.1	SM4110C	04-Aug-18/O	< 0.1	< 0.1		
Sulphate	mg/L	1	SM4110C	04-Aug-18/O		248		
Sulphate	mg/L	1	SM4110C	07-Aug-18/O	342			
Iron	mg/L	0.005	SM 3120	07-Aug-18/O	0.010	< 0.005		
Manganese	mg/L	0.001	SM 3120	07-Aug-18/O	0.004	0.001		
Sodium	mg/L	0.2	SM 3120	07-Aug-18/O	16.0	9.8		

R. Lecompte

Richard Lecompte
Lab Supervisor

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Final Report

C.O.C.: DW87464 **REPORT No. B18-22877**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 02-Aug-18
DATE REPORTED: 09-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC 458
WATERWORKS NO.

			Client I.D.					799 Unity
			Sample I.D.		B18-22877-1	B18-22877-2	B18-22877-3	B18-22877-4
			Date Collected		02-Aug-18	02-Aug-18	02-Aug-18	02-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	02-Aug-18/K				0
E coli	cfu/100mL	1	MOE E3407	02-Aug-18/K				0
Fecal Coliform	cfu/100mL	1	SM9222D	02-Aug-18/K				0
Nitrate (N)	mg/L	0.1	SM4110C	07-Aug-18/O				< 0.1
Sulphate	mg/L	1	SM4110C	07-Aug-18/O				398
Iron	mg/L	0.005	SM 3120	07-Aug-18/O				< 0.005
Manganese	mg/L	0.001	SM 3120	07-Aug-18/O				< 0.001
Sodium	mg/L	0.2	SM 3120	07-Aug-18/O				450

R. Lecompte

Richard Lecompte
Lab Supervisor

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G80362 **REPORT No. B18-24314**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: Jessica Peters

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 15-Aug-18
DATE REPORTED: 20-Aug-18
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC 458
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.			799 Unity		
			Sample I.D.		B18-24314-9	B18-24314-10	B18-24314-11	B18-24314-12
			Date Collected		15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Coliform	cfu/100mL	1	MOE E3407	15-Aug-18/K		0		
E coli	cfu/100mL	1	MOE E3407	15-Aug-18/K		0		
Fecal Coliform	cfu/100mL	1	SM9222D	15-Aug-18/K		0		
Nitrate (N)	mg/L	0.1	SM4110C	16-Aug-18/O		< 0.1		
Sulphate	mg/L	1	SM4110C	16-Aug-18/O				
Sulphate	mg/L	1	SM4110C	17-Aug-18/O		447		
Iron	mg/L	0.005	SM 3120	17-Aug-18/O		< 0.005		
Manganese	mg/L	0.001	SM 3120	17-Aug-18/O		0.001		
Sodium	mg/L	0.2	SM 3120	17-Aug-18/O		458		

R. Lecompte

Richard Lecompte
Lab Supervisor

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77201 **REPORT No. B19-05257**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: James Frost

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 01-Mar-19
DATE REPORTED: 11-Mar-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC-458
WATERWORKS NO.

			Client I.D.		TW1			
			Sample I.D.		B19-05257-1			
			Date Collected		01-Mar-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Atrazine	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Atrazine (Desethyl)	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Alachlor	µg/L	0.3	EPA 8270	07-Mar-19/K	< 0.4			
Atrazine + Metabolites	µg/L	0.5	Calc.	07-Mar-19/K	< 0.8			
Azinphos-methyl	µg/L	1	EPA 8270	07-Mar-19/K	< 2			
Bendiocarb	µg/L	3	EPA 8270	07-Mar-19/K	< 4			
Benzo(a)pyrene	µg/L	0.005	EPA 8270	07-Mar-19/K	< 0.008			
Bromoxynil	µg/L	0.3	EPA 8270	07-Mar-19/K	< 0.4			
Carbaryl	µg/L	3	EPA 8270	07-Mar-19/K	< 4			
Carbofuran	µg/L	1	EPA 8270	07-Mar-19/K	< 2			
Chlorpyrifos	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Cyanazine	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Diazinon	µg/L	1	EPA 8270	07-Mar-19/K	< 2			
Dicamba	µg/L	5	EPA 8270	07-Mar-19/K	< 8			
Dichlorophenol, 2,4-	µg/L	0.1	EPA 8270	07-Mar-19/K	< 0.2			
Dichlorophenoxy acetic acid, 2,4- (2,4-D)	µg/L	5	EPA 8270	07-Mar-19/K	< 8			
Diclofop-methyl	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.7			
Dimethoate	µg/L	1	EPA 8270	07-Mar-19/K	< 2			
Dinoseb	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Diuron	µg/L	5	EPA 8270	07-Mar-19/K	< 8			
Malathion	µg/L	5	EPA 8270	07-Mar-19/K	< 8			
Metolachlor	µg/L	3	EPA 8270	07-Mar-19/K	< 4			
Metribuzin	µg/L	3	EPA 8270	07-Mar-19/K	< 4			
Parathion	µg/L	3	EPA 8270	07-Mar-19/K	< 4			
Pentachlorophenol	µg/L	0.1	EPA 8270	07-Mar-19/K	< 0.2			
Phorate	µg/L	0.3	EPA 8270	07-Mar-19/K	< 0.4			
Picloram	µg/L	5	EPA 8270	07-Mar-19/K	< 8			

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G77201 **REPORT No. B19-05257**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: James Frost

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 01-Mar-19
DATE REPORTED: 11-Mar-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC-458
WATERWORKS NO.

			Client I.D.		TW1			
			Sample I.D.		B19-05257-1			
			Date Collected		01-Mar-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Prometryne	µg/L	0.1	EPA 8270	07-Mar-19/K	< 0.2			
Simazine	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Temephos	µg/L	10	EPA 8270	07-Mar-19/K	< 20			
Terbufos	µg/L	0.3	EPA 8270	07-Mar-19/K	< 0.6			
Tetrachlorophenol, 2,3,4,6-	µg/L	0.1	EPA 8270	07-Mar-19/K	< 0.2			
Triallate	µg/L	10	EPA 8270	07-Mar-19/K	< 20			
Trichlorophenol 2,4,6-	µg/L	0.1	EPA 8270	07-Mar-19/K	< 0.2			
Trichlorophenoxy acetic acid, 2,4,5-	µg/L	10	EPA 8270	07-Mar-19/K	< 20			
Trifluralin	µg/L	0.5	EPA 8270	07-Mar-19/K	< 0.8			
Chlordane (alpha)	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Chlordane (Gamma)	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Chlordane, oxy-	µg/L	0.04	EPA 8080	05-Mar-19/K	< 0.04			
DDD, 2,4-	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
DDD, 4,4-	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
DDE, 2,4-	µg/L	0.01	EPA 8080	05-Mar-19/K	< 0.01			
DDE, 4,4-	µg/L	0.01	EPA 8080	05-Mar-19/K	< 0.01			
DDT, 2,4-	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
DDT, 4,4-	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Endosulfan I	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Endosulfan II	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Endosulfan Sulfate	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Aldrin	µg/L	0.01	EPA 8080	05-Mar-19/K	< 0.01			
Aldrin + Dieldrin	µg/L	0.02	EPA 8080	05-Mar-19/K	< 0.02			
BHC (alpha)	µg/L	0.4	EPA 8080	05-Mar-19/K	< 0.4			
BHC (beta)	µg/L	0.4	EPA 8080	05-Mar-19/K	< 0.4			
BHC (delta)	µg/L	0.4	EPA 8080	05-Mar-19/K	< 0.4			
Chlordane (Total)	µg/L	0.04	EPA 8080	05-Mar-19/K	< 0.04			

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77201 **REPORT No. B19-05257**

Report To:

ASC Environmental
1305 Princess St.,
Kingston ON K7M 3E3 Canada
Attention: James Frost

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 01-Mar-19
DATE REPORTED: 11-Mar-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: ASC-458
P.O. NUMBER: ASC-458
WATERWORKS NO.

			Client I.D.		TW1			
			Sample I.D.		B19-05257-1			
			Date Collected		01-Mar-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
DDT + Metabolites	µg/L	0.01	EPA 8080	05-Mar-19/K	< 0.01			
Dieldrin	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Endosulfan (Total)	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Endrin	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Endrin Aldehyde	µg/L	0.05	EPA 8080	05-Mar-19/K	< 0.05			
Heptachlor	µg/L	0.1	EPA 8080	05-Mar-19/K	< 0.1			
Heptachlor + Heptachlor Epoxide	µg/L	0.1	EPA 8080	05-Mar-19/K	< 0.1			
Heptachlor Epoxide	µg/L	0.1	EPA 8080	05-Mar-19/K	< 0.1			
Hexachlorobenzene	µg/L	0.01	EPA 8080	05-Mar-19/K	< 0.01			
Lindane (Hexachlorocyclohexane, Gamma)	µg/L	0.1	EPA 8080	05-Mar-19/K	< 0.1			
Methoxychlor	µg/L	0.1	EPA 8080	05-Mar-19/K	< 0.1			
Mirex	µg/L	1	EPA 8080	05-Mar-19/K	< 1			

1. Elevated RLs due to sample matrix interferences

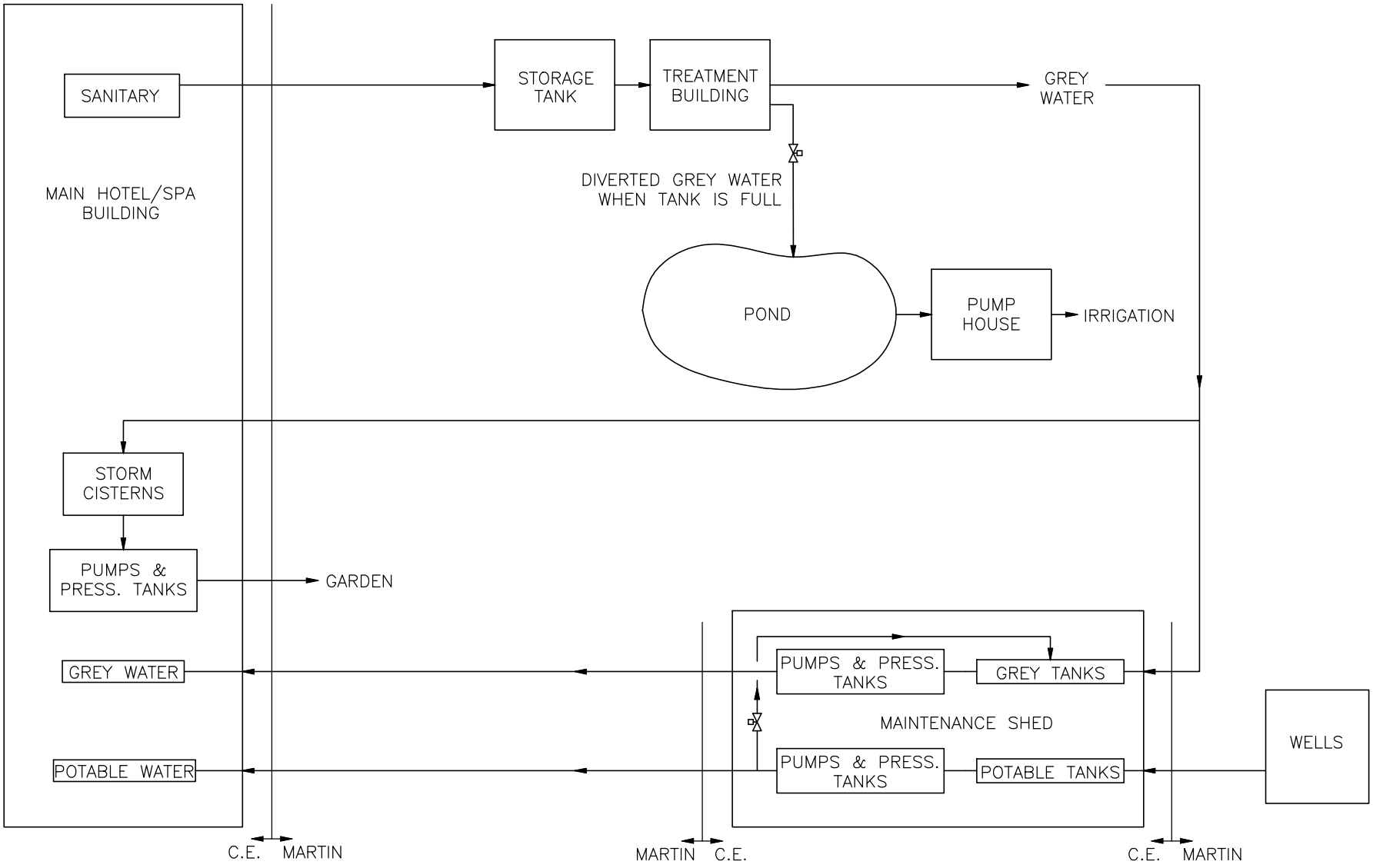
Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

APPENDIX I
Proposed Treatment System Flow Diagram and Design Capacity

ASC ENVIRONMENTAL

1305 Princess Street,
Kingston, ON K7M 3E3
Tel: (613) 561- 7088


SANITARY
STORAGE TANK
TREATMENT BUILDING
GREY WATER
MAIN HOTEL/SPA BUILDING
DIVERTED GREY WATER WHEN TANK IS FULL
POND
PUMP HOUSE
IRRIGATION
STORM CISTERNS
PUMPS & PRESS. TANKS
GARDEN
GREY WATER
POTABLE WATER
PUMPS & PRESS. TANKS
GREY TANKS
MAINTENANCE SHED
PUMPS & PRESS. TANKS
POTABLE TANKS
WELLS
C.E.
MARTIN
MARTIN
C.E.
C.E.
MARTIN

Anticipated Flow Calculations Based on Site Use for Phase 1 and Phase 2 of Development

Building Part	OBC Occupancy Type	Ontario Building Code (O.B.C.) Occupancies	Description	Occupancy	Unit Flow - L	O.B.C Flow L/day	Percentage Diverted to Grey Water L/day	Grey Water Flow L/day	Proposed Resulting Daily Flow L/day
Hotel Suites	Residential	Hotels and Motels (excluding bars and restaurants)	Resort Hotel/Cottage Per person	54	500	27000	33%	8910	18090
Hotel Reception	Commercial	Office Building	per Employee per 8-hour shift	2	75	150	33%	49.5	100.5
Cabins	Residential	Hotels and Motels (excluding bars and restaurants)	Resort Hotel/Cottage Per person	38	500	19000	33%	6270	12730
Restaurant	Commercial	Food Service Operations	Restaurant (not 24 hr), per seat	100	125	12500	33%	4125	8375
Rooftop Patio	Commercial	Food Service Operations	Restaurant (not 24 hr), per seat	60	125	7500	33%	2475	5025
Staff Room, Laundry and Kitchen	Commercial	Office Building	per Employee per 8-hour shift	20	75	1500	33%	495	1005
Laundry	Commercial	Laundry	Laundry Facilities (3 units)	3	2500	7500	100%	7500	0
Spa	Commercial	Public Parks	With Bathhouse, showers and Toilets per person	3	50	150	75%	112.5	37.5
Gift Shop	Commercial	Office Building	per Employee per 8-hour shift	1	75	75	33%	24.75	50.25
			Number of Staff/Patrons	281	**Max Flow L/day**	**75375**	**Recycled Grey Water L/day**	**29,961.75**	**45,413.25**