

**FUNCTIONAL SERVICING REPORT  
WANDER THE RESORT**

**March 24, 2023**



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## 1 Background

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Jewell Engineering Inc. (Jewell) was retained by Wander the Resort to assist with a proposed Official Plan Amendment (OPA) and severances. The subject lands are located at 15841 Loyalist Parkway in Bloomfield, Ontario. (Figure 1-1).



Figure 1-1: Site Location

The following services have been reviewed as part of this functional servicing report:

- Water Supply
- Private Septic Servicing
- Stormwater Management (under separate cover)
- Traffic (under separate cover)

## **1.1 Site Description**

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The resort consists of three separate properties. The land of interest falls between the two, has an approximate area equal to 2.0 ha, and is located on the part of Lot 8, Concession 1, which abuts West Lake to the south, in the township of Hallowell, Prince Edward County. The township of Hallowell is east of Wellington and west of Bloomfield. The site is currently designated as Tourist Commercial, TC-24

Presently, the site includes ten (10) cabins and one (1) club house. The site is composed of primarily grassy areas with buildings, driveways, gravel roads, and a beath. The lands primarily drain southwest towards West Lake.

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## **1.2 Proposed Site Development**

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The proposed OPA would see the limit of TC-24 lands be extended into the Tourist Commercial, TC. The change in land designation areas is summarized below:

Existing zoning designation - TC-24:

- A tourist establishment limited to 18 tourist cabins/cottages
- Minimum lot area 1.9 ha

Proposed zoning designation TC which includes but not limited to the following:

- Tourist establishment or commercial accommodation use;
- Public uses facilities.

This Functional Servicing Report (FSR) and Site Plan is based on the probable site layout, see Figure 1-2.

The review of the proposed servicing for the site was completed using the specifications outlined by the following:

- Ministry of Environment, Conservation, and Parks (MECP)
  - Design Guidelines for Drinking-Water Systems, 2008
- Ontario Building Code, O. Reg 332/12

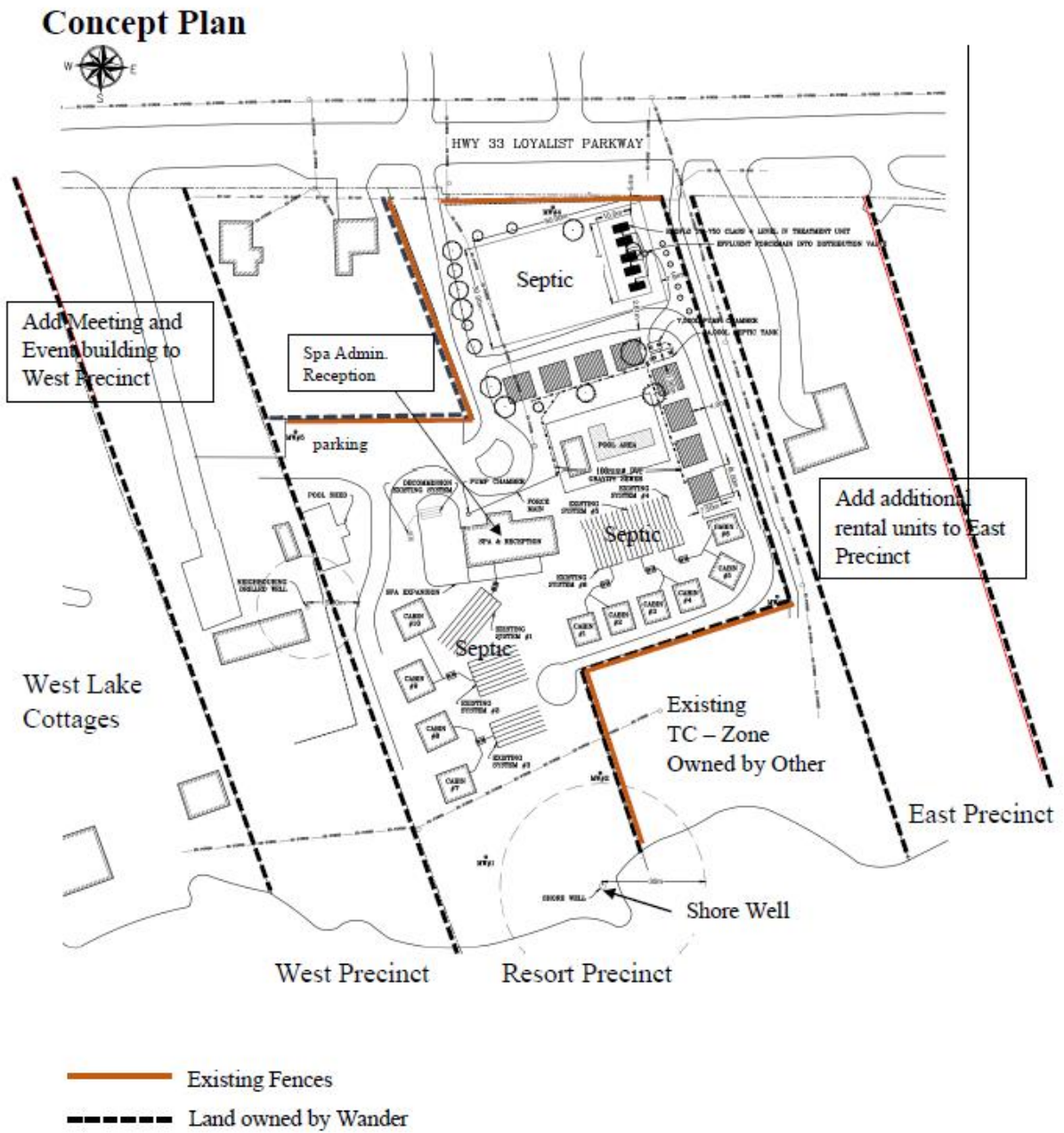


Figure 1-2: Proposed Configuration

## 2 Private Servicing

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There is no municipal water or sanitary servicing available on the resort which obtains supply from wells and disposes sewage using septic systems. The proposed re-development will include a total of 8 new cabins, pool, and spa.

### 2.1 Water Servicing

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There are three known wells on site. One shore well on the southern shoreline, two drilled wells located to the west and northeast corner of lot of interest. The shore well provides supply for the existing development.

From the Ontario Well Record website the shore well, well ID # 5307383, reports this well is capable of pumping 18 US GPM (1.1 L/s).

#### 2.1.1 Demand

Both Groundwork Engineering (GW) and ASC Environmental (ASC) completed independent calculations of demand for the proposed development.

GW determined water demand from Table 8.2.1.3.B. of the Ontario Building Code and assumed sanitary flow to be equal. ASC completed an independent calculation for water demand slightly higher than GW.

Their daily average flow rates are summarized below:

- GW = **26,000 L/day**
- ASC = **32,250 L/day (0.37 L/s)**

Jewell used the higher value and considered an average water demand of 0.37 L/s in the calculations. ASC water demand was calculated using 26,000 L/d demand plus 6,250 L/d for pool losses through evaporation for a total of 32,250 L/d.

ASC followed the D-5-5 procedure for peak demand and reviewed the capacity of the well to meet the demand in Section 2.1.2.

#### 2.1.2 Water Supply

ASC completed a 10-hr stepped pump test and confirmed that the shore well has a sustainable yield of 40-45 L/min (0.67-0.75 L/s).

The measured drawdown in the well during the pump test performed by ASC was only 0.70 m and it recovered quickly.

### **2.1.3 Fire Protection**

Greer Galloway prepared fire flow calculations and determined that the resort would require 81,000 L of water during a fire event. Two fire/water storage tanks are proposed on the northern portion of the site. The proposed tanks have a volume of approximately 112,833 L and will be equipped with dry hydrants for use during a fire event. The Greer Galloway fire protection drawing is attached in Appendix C.

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## **2.2 Summary of Findings**

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There are three existing wells on site. A drilled well on the northeastern corner, a second drilled well-with low yield located to the west of the lot, and a shore well in the southern region close to the lake that currently supplies the resort.

There is sufficient water to service the proposed expansion from the current system. Following the D-5-5 methodology ASC found the well could supply 0.75L/s which exceeds the demand of 0.37 L/s. The shore well has adequate to meet the expected resort demand.

Two storage tanks are proposed on-site to provide adequate supply for a fire event.

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## **2.3 Septic Servicing**

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There are seven (7) conventional absorption bed wastewater treatment systems currently located on site. The existing systems are utilizing a traditional septic tank and an inground leaching bed. The system located west of the proposed spa and reception is to be decommissioned and removed.

GW prepared a design for a new system that will be located along the north property line. The footprint of the new system is shown on the site plan and grading plan. Septage from the cabins will be collected in a sewer system and discharge to the septic system. They sized the system for 26,000L/d. A raised bed measuring 1,500 m<sup>2</sup>, 24,000L tank, dosing chamber and five Ecoflo treatment units will achieve the treatment requirements and can be situated in the space provided on the site plan.

The proposed expansion may be adequately serviced with a Class-4 private sewage disposal and sufficient space is achievable for situating the system.



### 3 Conclusion

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Jewell studied the site and proposed development to review feasibility of servicing the proposed development with private servicing. The conclusions are as follows:

#### **Water Service**

There are currently three wells on-site, two drilled and one shore well. The development will obtain supply from the shore well.

The hydrogeological testing of the shore well was completed by ASC and followed MOE D-5-5 methodology. Their study indicated a sustainable supply of 0.75L/s may be obtained from the shore well. The supply is in excess of the projected demand of 32,250 L/d or 0.37L/s and is sufficient for the proposed development.

Greer Galloway prepared a fire protection report and concluded 81,000 L of water would be required for a fire event. Two storage tanks with a combined 112,833 L are proposed on-site to provide adequate supply for a fire event.

#### **Septic**


The resort's sewage daily design flow rate of the proposed expansion was estimated by GW to be equal to the 26,000 L/day rates. The proposed septic treatment system will be located along the north limit of the property and will include a 1,500m<sup>2</sup> leaching bed, a 24,000L tank, a dosing tank and five Ecoflow treatment systems.

The site plan indicates that there is sufficient space to situate the facility. The sewage system is subject to the approval process through the Ministry.

On site septic treatment can be provided.



Prepared by:



Nick Gliddon, EIT

Jewell Engineering Inc.

Approved by:



Bryon Keene, P. Eng

Jewell Engineering Inc.

## **4 References**

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The information used to prepare this report is based on the following documents and information provided as noted below:

- Hydrogeology report, ASC Environmental, 2022
- Design Brief, Groundwork Engineering Ltd.
- Ontario Building Code O. Reg 332/12
- Ontario Ministry of Environment
  - Design Guidelines for Sewage Works, 2008
  - Design Guidelines for Drinking-Water Systems, 2008

**APPENDIX A**

## Executive Summary

This design brief is for a new Environmental Compliance Approval (ECA) for Wander the Resort (WTR) that includes one (1) new sewage works on a site with six (6) existing wastewater treatment systems. The total proposed Daily Design Sewage Flow (DDSF) for the resort is 26,000 L/day with 12,000 L/day coming from the proposed expansion.

WTR is a resort that operates year-round and is assumed to be at full occupancy at any given time. The site is positioned on the shores of West Lake. The property is located at 15841 Loyalist Parkway, Bloomfield and can legally be described as part of Lot 8, Concession 1, North of West Lake Hallowell, Prince Edward County.

The WTR facility currently consists of a total of ten (10) cottages rated at 1,100 L/day, and one (1) club house rated at 3,000 L/day.

There are seven (7) conventional absorption bed wastewater treatment systems currently located on the site.

System 1 services the clubhouse utilizing a traditional septic tank and an inground leaching bed with absorption trenches.

System 2 services cottages 9 & 10 utilizing a traditional septic tank and an inground leaching bed with absorption trenches.

System 3 services cottages 7 & 8 utilizing a traditional septic tank and an inground leaching bed with absorption trenches.

System 4 services Poolside Cottages 5 & 6 utilizing a traditional septic tank and an inground leaching bed with absorption trenches.

System 5 services Poolside Cottages 3 & 4 utilizing a traditional septic tank and an inground leaching bed with absorption trenches.

System 6 services Poolside Cottages 1 & 2 utilizing a traditional septic tank and an inground leaching bed with absorption trenches.

System 7 (to be decommissioned and removed)

The proposed expansion consists of eight (8) two-bedroom cottages, one (1) pool house and a spa attached to the club house with a daily design sewage flow of 12,000 L/day.

A 24,000 litre septic tank, 7,500 litre dosing chamber, 3,600 litre settling tank, five (5) new Ecoflo® STB-730 PR Class 4 Level IV treatment units with effluent pumped to a raised bed of septic stone and Type A sand with an area of 1,500 m<sup>2</sup> and 16 runs of perforated pvc pipe 12m in length are being proposed to service the eight (8) new cabins, pool house and spa. This system will be augmented with an alum dosing system for phosphorus reduction.

Six (6) monitoring wells are proposed around the site to monitor groundwater around existing systems as well as the proposed system.

**APPENDIX B**



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Via: email (shannon@wandertheresort.com)

July 20, 2022  
File: ASC-743 100I

Ms. Shannon Hunter, President  
Wander the Resort  
15841 Loyalist Parkway  
Bloomfield, ON K0K 3L0

Subject: Preliminary Results of Hydrogeological Pumping Test  
Wander the Resort, 15841 Loyalist Parkway, Bloomfield, ON

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Dear Ms. Hunter:

ASC Environmental was retained by Wander the Resort to conduct a preliminary hydrogeological assessment (as per ASC Proposal #749p) of the existing water distribution system in preparation for redevelopment at the subject property located at 15841 Loyalist Parkway, Bloomfield, Ontario. The purpose of the hydrogeological study is to assess whether the existing shore well distribution system is adequate to provide water quantity sufficient to support the proposed development without adversely impacting existing neighbouring operations.

We understand that the proposed re-development will include cottages, spa facility and day use guests (75 day use) with an estimated sewage flow requirement of 29,500 litres per day; based on information supplied by Groundwork Engineering Inc.

We understand that the proposed Spa pools associated with the Spa were not included in the sewage flow design. Based on our understanding of the project and email from you (dated June 30, 2022), the approximated total volume of the five (5) Spa pools would be 125,000 litres. We understand that these pools would initially be filled using a third party source and future daily top-up being managed from the existing water distribution system. Therefore, we have estimated an approximate 5 % daily water loss from pool Spa usage etc., resulting in approximately 6,250 litres required on a daily top-up basis.

The pumping test included the following efforts:

- Review available Ministry of Environment, Conservation and Parks (MECP) well water records and historical data for the local area.
- Undertake one 10-hour pumping test (with recovery) on the existing shore well in accordance with MECP D-5-5 guidelines to assess potential long term quantity.
- Monitor water levels in neighbouring wells during pumping.
- Collect test well water samples near the first hour of pumping (if possible) and near the end of the pumping test (approximate 10-hour duration) from the test well TW1 to assess raw water quality.
- Submit water samples to a certified laboratory for the required suite of parameters, as indicated in the MECP D-5-5 Procedure.
- Reinstate neighbouring wells following completion of pumping test.



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Prior to the initiation of pumping, the static water level in the test well (shore well) was measured to be approximately 1.79 m from the top of the well casing. The water in the well was initially pumped at a rate of 40 litres/minute for 175 minutes, and then increased to 45 litres/per minute for a period of 425 minutes, for a total of 600 minutes (10 hours), yielding approximately 26.125 litres of water during the period of the pumping test.

Drawdown was measured at approximately 0.32 m over the duration of the pumping test. Specific capacity calculated over the final 250 minutes of the pumping test was found to be approximately 450 litres/minute/metre. A plot of drawdown versus time (log) shows a semi linear relationship (attached).

Section 4.3.1 of the Ministry of Environment, Conservation and Parks (MECP) (previously known as the Ministry of Environment) D-5-5 Procedure, Technical Guideline for Private Wells: Water Supply Assessment requires that water level recovery must be monitored in the test wells for the lesser of 95% recovery or 24 hours. Ninety-five percent (95%) recovery was reached approximately 115 minutes following pump shutdown, demonstrating that the well is sufficiently able to recover in accordance with MECP D-5-5 procedure to meet sustained yield during peak conditions.

The transmissivity (T) after approximately 100 minutes of pumping was calculated to be approximately  $5.32 \times 10^{-4}$  m<sup>2</sup>/s. Hydraulic Conductivity (K = T/b), where b = 2.2 m (represents approximate aquifer thickness available), was determined to be approximately K =  $2.4 \times 10^{-4}$  m/s.. The test well recovery and transmissivity data may be found attached to this letter.

Results of the 10 hour pumping test and favourable recovery time suggest that the existing water distribution system is able to support pumping rates in the order of 40 - 45 litres per minute; without adversely impacting upon neighbouring resident water supply.

The effects of interference were monitored during well development and pumping through periodic measurement of adjacent neighbouring wells. On-site wells were also monitored to assess potential interference within the development. Results of interference monitoring showed a maximum positive response of approximately 0.15 m, which is not considered significant for a 10 hour pumping test.

Furthermore while the pumping test was being conducted the resort was fully operational with water taking from the same well supply source, suggesting that the existing system is likely able to supply the proposed development, and at the very least able to provide additional supply during off hours to meet design demand. Present daily water taking from the resort should be confirmed prior to finalizing the Hydrogeological report. Results of the pumping test are attached.

Yours truly,

**ASC Environmental Inc.**


Paul N. Johnston, M.Sc., P. Eng.  
President – Project Manager




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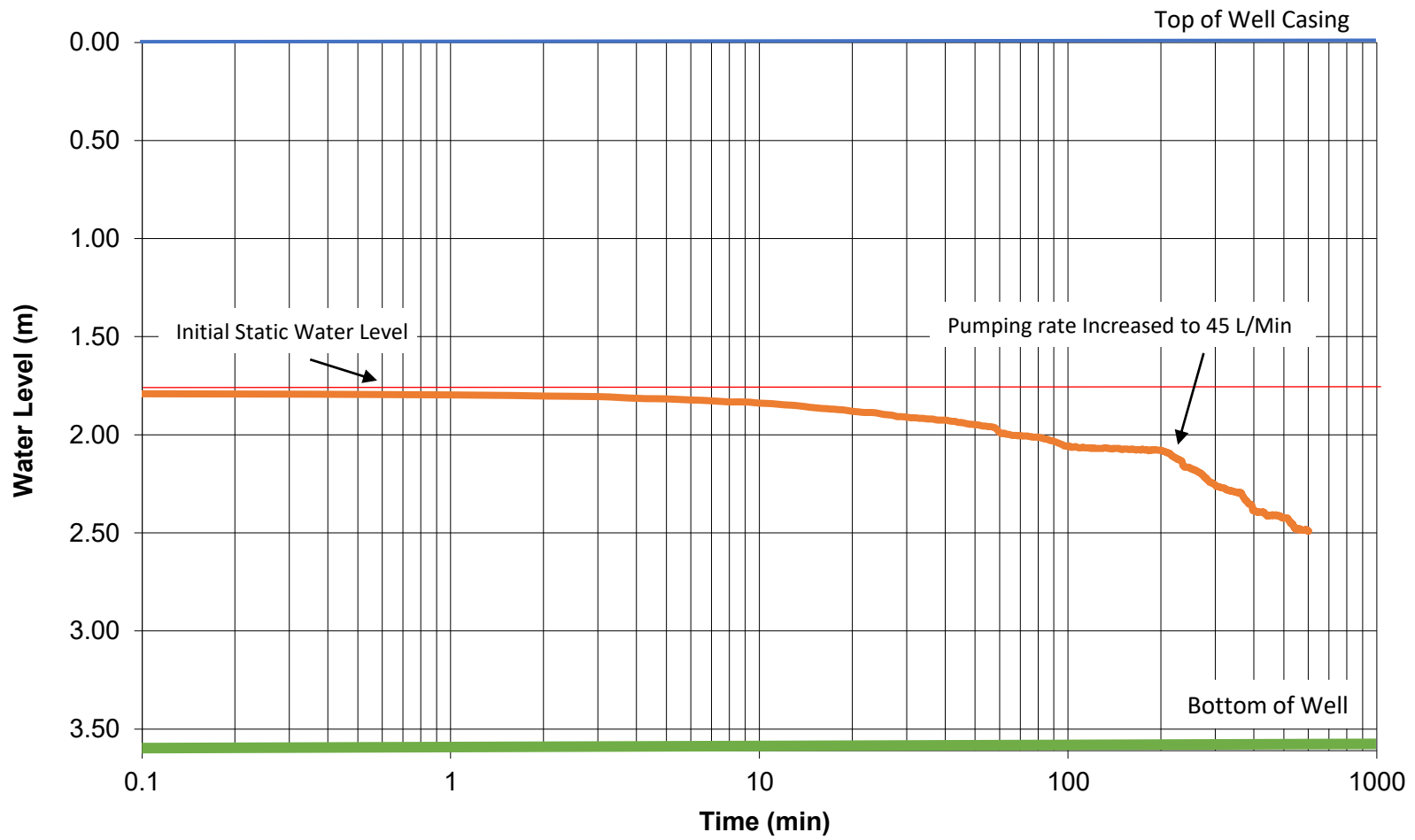
**Table D1. Water Quality Field Measurements.**

		<b>Field Water Quality Analysis</b>			<b>Test Well:</b>	<b>TW1</b>		
		Project No.:	ASC-743		Date:	19-Jul-22		
		Client:				Recorded By:	T.Cook	
		Location:	Wander the Resort, Bloomfield, ON					
Started pumping 40 L/min at 9.52 AM								
Pumping Test Elapsed Time	Odour	Temperature	pH	Conductivity	Total Dissolved Solids	Turbidity	Chlorine (Total)	
(min)		(°C)		(µS)	(ppm)	NTU	(mg/L)	
0	No Odour	11.00	7.94	3070	1527	143	150	
30	No Odour	12.10	7.26	925	411	895	50.00	
60	No Odour	PUMP RATE DECREASED TO 15L/MIN						
90	No Odour	PUMP RATE DECREASED TO 13L/MIN						
120	No Odour	13.10	6.77	885	447	123	-	
150	No Odour	12.90	7.01	917	456	30	-	
180	No Odour	13.20	6.34	902	451	14	-	
150	No Odour	PUMP RATE DECREASED TO 12L/MIN						
150	No Odour	12.90	6.96	919	454	14	-	
180	No Odour	12.80	6.89	908	454	0	-	
208	No Odour	13.40	7.03	925	458	0	-	
210	No Odour	PUMP RATE INCREASED TO 13.5L/MIN						
240	No Odour	12.20	7.04	918	460	0	-	
240	No Odour	PUMP RATE DECREASED TO 12L/MIN						
270	No Odour	12.60	6.86	919	459	0	-	
300	No Odour	12.30	6.92	918	460	0	-	
330	No Odour	11.60	7.05	930	462	0	-	
359	No Odour	11.60	7.04	932	463	0	-	
Notes	1	<	indicates values lower than minimum detection limits of analysis equipment					
	2	-	not analyzed					
Field Analysis Equipment								
Chlorine :		Hach DR 900 Colorimeter, DPD Total Chlorine Reagent						
Temp./pH/Cond./TDS :		Horiba U-52						
Turbidity :		Hach DR 900 Colorimeter						


**Table D2. Test Well drawdown during pumping test.**

	Pumping Test - Drawdown			Test Well: TW1	
	Project No.:	ASC-743	Date:	19-Jul-2022	
	Client:	Recorded By: T.Cook			
	Location:	Wander the Resort, Bloomfield, ON			
Pumping Rate (Q) (L/min)	Elapsed Time (ET) (min)	Well Level (WL) (m)	Drawdown (DD) (m)		
40	0	1.79	0.00		
40	2	1.80	0.01		
40	5	1.82	0.03		
40	10	1.84	0.05		
40	15	1.86	0.07		
40	20	1.88	0.09		
40	25	1.90	0.11		
40	35	2.00	0.21		
40	45	2.01	0.22		
40	55	2.06	0.27		
40	65	2.07	0.28		
40	75	2.08	0.29		
40	100	2.08	0.29		
40	125	2.09	0.30		
40	150	2.12	0.33		
40	175	2.17	0.38		
45	208	2.21	0.42		
45	225	2.26	0.47		
45	250	2.28	0.49		
45	275	2.29	0.50		
45	300	2.33	0.54		
45	325	2.38	0.59		
45	350	2.39	0.60		
45	375	2.41	0.62		
45	400	2.41	0.62		
45	425	2.42	0.63		
45	450	2.45	0.66		
45	475	2.48	0.69		
45	500	2.49	0.70		
45	525	2.49	0.70		
45	550	2.49	0.70		
45	575	2.49	0.70		
45	600	2.49	0.70		
	(m)		L/min	m3/day	
$\Delta s_{0-1min}$	0.01	Q0-1min	40	57.6	
$\Delta s_{1-10min}$	0.04	Q1-10min	40	57.6	
$\Delta s_{10-100min}$	0.23	Q10-100min	40	57.6	
$\Delta s_{100-1000min}$	0.69	Q100-1000min	44	63.4	
	m2/day	m2/s			
T0-1min	1756.80	2.03E-02			
T1-10min	244.80	2.83E-03			
T10-100min	45.96	5.32E-04			
T100-1000min	16.69	1.93E-04			
Notes					
1		$\Delta s$	Drawdown over one Log Cycle based on Trend Line		
Q	Volumetric Flow Rate		L/min	Litres per Minute	
T	Coefficient of Transmissivity		gpm	Gallon per Minute	

ASC Environmental Inc.  
ASC-743, Wander the Resort, Bloomfield, ON  
Figure D1. TW1 Pumping Test Water Level



**Table D4. Test well recovery after pumping test.**

		<b>Pumping Test - Recovery</b>		<b>Test Well:</b>	<b>TW1</b>
		Project No.:	ASC-743	Date:	19-Jul-22
		Client:	0	Recorded By: T.Cook	
		Location:	Wander the Resort, Bloomfield, ON		
		Test Well			
Pumping	Elapsed Time (min)	Well Level (WL) (m)	Drawdown (m)		
0	0	2.49	0.70		
0	1	2.474	0.68		
0	2	2.465	0.68		
0	5	2.447	0.66		
0	10	2.42	0.63		
0	15	2.384	0.59		
0	20	2.348	0.56		
0	25	2.315	0.53		
0	35	2.234	0.44		
0	45	2.156	0.37		
0	55	2.081	0.29		
0	65	2.012	0.22		
0	75	1.946	0.16		
0	85	1.889	0.10		
0	95	1.85	0.06		
0	105	1.814	0.02		
0	115	1.793	0.00		
0	117	1.79	0.00		
WL at 95% Recovery =		1.79			

ASC Environmental Inc.  
ASC-743, Wander the Resort, Bloomfield, ON  
Figure D3. TW1 Recovery

