

Groundwater Monitoring Well Installation - Infiltration Basin Earnshaw Street, Golden Beach





Prepared for: Yolanda Burt Transport and Infrastructure Policy Regional Strategy and Planning Sunshine Coast Council

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1.0 INTRODUCTION

Core Consultants Pty Ltd (Core) was requested by Sunshine Coast Council (SCC) (Yolanda Burt) to install a groundwater monitoring well within the infiltration basin located at Earnshaw Street, Golden Beach. The groundwater monitoring well was installed to access groundwater levels and fluctuations within the infiltration basin. The location of the site is shown on Plate 1.

2.0 SITE DESCRIPTION

The infiltration basin is located at the junction of Earnshaw Street and The Esplanade, Golden Beach. The site is owned and maintained by Sunshine Coast Council and is surrounded by parkland and recreational facilities with Pumicestone Passage located approximately 10 metres to the east. The infiltration basin is vegetated with a mixture of typical wetland species both native and introduced grasses and reeds.

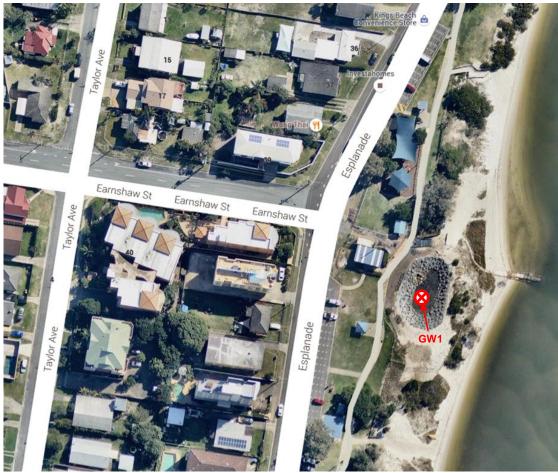


Plate 1: Site and Borehole Location.

3.0 INVESTIGATION METHODOLOGY

3.1 Field Investigation

To allow for ongoing groundwater level assessment within the infiltration basin, one groundwater monitoring well (designated GW1) was installed using hand coring/augering methods to a depth of approximately 0.7 m below ground level (m BGL) (refer Plate 1). Construction details of the groundwater monitoring well are shown in the attached borehole report. The well comprised 50 mm class 18 PVC screw jointed blank and screened sections machine slotted with 0.5mm aperture size. The groundwater monitoring well was completed with a lockable steel monument designed to blend in with the surrounding environment.

Following initial well installation, a LevelTROLL was installed to allow for continual groundwater level monitoring.

To determine approximate infiltration rates, Core conducted 'Falling Head Tests' within the groundwater monitoring well. The tests were undertaken at both low and high tide to identify any potential tidal influence on infiltration rates.

The fieldwork was carried out by an experienced environmental scientist from Core on 4 and 11 March 2016. The approximate location of the borehole was recorded using a hand-held GPS unit with a differential correction signal, having an accuracy of ± 3 m. Borehole coordinates are presented on the borehole reports and accompanying photographs in Appendix A. Subsurface conditions are discussed in Section 4.1.

4.0 RESULTS OF THE INVESTIGATION

4.1 Subsurface Conditions

The subsurface soil profile encountered within the infiltration basin generally consisted of:

- Organic Clay Silt: comprising very dark grey, very soft, low plasticity, clayey silt with abundant organics to depths of 0.05 m BGL; overlying
- Geo-fabric; overlying
- Sand: generally comprising grey, wet, medium dense, predominantly fine to medium grained sand to depth of investigation (0.75 m BGL)

No visual or olfactory evidence of contamination was observed within the sediment profiles during drilling/coring (Refer Appendix A).

It should be noted that very low to negligible levels of fine sediment was observed within the underlying sand material (most likely a result of the geo-fabric). This is further supported and confirmed by the results of the particle size distribution testing which are presented in Core's Sediment Analysis Report (Core Reference No: J000196-002-I-Rev0).

4.2 Falling Head Test Results

The results of the falling head tests are provided in Table 1 below.

Location	Tidal Phase	Interpreted screened in-situ soils	Estimated Hydraulic Conductivity (K _h) (m/sec)
GW1	High Tide	Sands	3.1 x 10 ⁻⁴
GW1	Low Tide	Sands	3.1 x 10 ⁻⁴

Table 1: Falling Head Test Results

These results are consistent with indicative k value ranges for clean sands which have a k value in the order of 10^{-3} m/s to 10^{-4} m/s.

5.0 CONCLUSION

Based on the results of this assessment, the hydraulic conductivity values of the sub surface sand material, encountered beneath the infiltration basin appear to be suitable to allow for sufficient infiltration. However, it should be noted that a good quality geo-fabric material was encountered at the base of the infiltration basin which was overlain with a layer of organic clay silt sediment. It is more than likely that the combination of organic clay silt sediment and the heavy duty geo-fabric material is having an adverse impact on the permeability on the infiltration basin in restricting excess water from permeating through the base of the basin.

It is recommended that Council develop and implement a regular (6 monthly) maintenance program for the removal and appropriate disposal of the surface sediments on top of the geo-fabric material and/or assess the replacement of the geo-fabric material with a product more suitable for the desired outcome.

6.0 LIMITATIONS

Should you require any further information please contact the undersigned. We draw your attention to the document, Limitations, which is included in Appendix D.

Core Consultants Pty Ltd

Yours sincerely,

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LG/JM/Ig

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APPENDIX A Borehole Log and Well Construction Report



REPORT OF HAND AUGERED BOREHOLE: GW1

SHEET: 1 OF 1

CLIENT:	Sunshine Coast Council
PROJECT:	Infiltration Basin
LOCATION:	Earnshaw St, Golden Beach
JOB NO:	J000196

COORDS: 512095.0 m E 7033997.0 m N MGA94 56 SURFACE RL: DATUM: AHD INCLINATION: -90° HOLE DIA: 100 mm HOLE DEPTH: 0.75 m

LOGGED: LG CHECKED: JM DATE: 4/3/16 DATE: 24/3/16

Drilling Sampling **Field Material Description** MOISTURE CONDITION CONSISTENCY DENSITY PENETRATION RESISTANCE **USCS SYMBOL** RECOVERED SAMPLE OR FIELD TEST GRAPHIC LOG METHOD SOIL/ROCK MATERIAL DESCRIPTION PIEZOMETER DETAILS WATER DEPTH (metres) DEPTH RL -1.0 -0.5 Stickup -0.0-M Clayey SILT dark grey, low plasticity clay, abundant organics s x encountered at 0.01 m depth 0.05 Backfill SF SAND fine to medium grained, grey CORE 8_08.04 LIB.GLB Log NON-CORED FULL PAGE J196.GPJ <<DrawingFile>> 24/03/2016 13:02 8.30.004 Datget Tools Bentonite Groundwater Slotted screen W MD 0.5 Sand filter pack END OF HAND AUGER @ 0.75 m REFUSAL STANDPIPE INSTALLED 1.0 This report of hand augered borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of GAP gINT FN. F01d the materials encountered. As such it should not be relied upon for geotechnical purposes. RL3



EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

conouncomo								
DRILLING/E	EXCAVATION M	ETHOD						
AS*	Auger Screwin	g	RD	Rotary blade o		NQ	Diamond Core - 4	7 mm
AD*	Auger Drilling		RT	Rotary Tricone	bit	NMLC	Diamond Core - 52	2 mm
*V	V-Bit		RAB	Rotary Air Blas	st	HQ	Diamond Core - 6	
T	TC-Bit, e.g. Al	ОТ	RC	Reverse Circul	ation	HMLC	Diamond Core – 6	3mm
ΗA	Hand Auger		PT	Push Tube		BH	Tractor Mounted E	Backhoe
ADH 🛛	Hollow Auger		СТ	Cable Tool Rig	1	EX	Tracked Hydraulic	Excavator
DTC	Diatube Coring	9	JET	Jetting		EE	Existing Excavatio	n
NB	Washbore or E	Bailer	NDD	Non-destructiv	e digging	HAND	Excavated by Han	d Methods
PENETRAT	ION/EXCAVATI	ON RESIST	ANCE					
L	Low resistance	ce. Rapid pe	enetration	possible with litt	le effort from t	the equipment	used.	
М	Medium resis	tance. Exc	avation/po	ossible at an acc	eptable rate w	vith moderate	effort from the equipme	ent used.
н		High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment.						
R	Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine.							
	ssments are subj or drilling tools, a				ctors including	g the equipme	nt power, weight, cond	ition of
WATER	J			•				
		level at dat	e shown		\triangleleft	Partial water lo	DSS	
¥	Water					Complete wate	er loss	
\mathbf{F}		inflow				•		
	- Water	The			er, whether pr	resent or not,	was not possible due	to drilling wate
	- Water ATER NOT	The surfa	ice seepa	ge or cave in of t	er, whether pr the borehole/t	resent or not, est pit.		-
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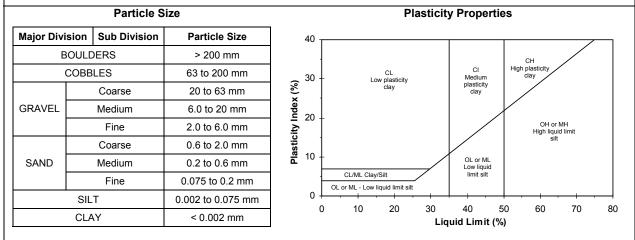
METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT REPORTS

	FILL		CLAY (CL, CI or CH)
00000	GRAVEL (GP or GW)		ORGANIC SOILS (OL or OH or Pt)
0000	SAND (SP or SW)	000	COBBLES or BOULDERS
× × × × × × × × × × × × × × × × × × ×	SILT (ML or MH)		

Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay.

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil and Rock is classified and described in Reports of Boreholes and Test Pits using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. The material properties are assessed in the field by visual/tactile methods.



MOISTURE CONDITION

Symbol	
D	

Term Description

- AS1726 1993
- DDrySands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery.MMoistSoils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere.WWetSoils exude free water. Sands and gravels tend to cohere.

_	Undrained Shear Strength	Symbol	Term	Density Index %	SPT "N" #
Very Soft	0 to 12 kPa	VL	Very Loose	Less than 15	0 to 4
Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50
Hard	Above 200 kPa				
	Soft Firm Stiff Very Stiff Hard	Very Soft 0 to 12 kPa Soft 12 to 25 kPa Firm 25 to 50 kPa Stiff 50 to 100 kPa Very Stiff 100 to 200 kPa Hard Above 200 kPa	Very Soft0 to 12 kPaVLSoft12 to 25 kPaLFirm25 to 50 kPaMDStiff50 to 100 kPaDVery Stiff100 to 200 kPaVDHardAbove 200 kPa	Very Soft0 to 12 kPaVLVery LooseSoft12 to 25 kPaLLooseFirm25 to 50 kPaMDMedium DenseStiff50 to 100 kPaDDenseVery Stiff100 to 200 kPaVDVery DenseHardAbove 200 kPaII	Very Soft0 to 12 kPaVLVery LooseLess than 15Soft12 to 25 kPaLLoose15 to 35Firm25 to 50 kPaMDMedium Dense35 to 65Stiff50 to 100 kPaDDense65 to 85Very Stiff100 to 200 kPaVDVery DenseAbove 85

SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

APPENDIX B Limitations



LIMITATIONS

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