

# Geotechnical Investigation and Dam Stability Analysis



Project: 1075 Horseshoe Bend Road, Torquay  
Report No: AGTE17463

| Geotechnical | Environmental | Residential | Pavements Investigation & Design |

Adelaide, Ballarat, Brisbane, Dingley Village, Warrnambool



Prepared for:

The Dunes, Torquay

December 2017



## Contents

<b>Contents .....</b>	<b>2</b>
<b>1. Introduction .....</b>	<b>1</b>
<b>2. Site Description .....</b>	<b>1</b>
2.1 Locality .....	1
2.2 Topography .....	2
2.3 Regional Geology .....	2
<b>3. Site Investigation.....</b>	<b>2</b>
3.1 Boreholes Profile.....	2
3.2 Groundwater.....	3
<b>4. Dam .....</b>	<b>3</b>
4.1 Type of Dam (Tank).....	3
4.2 Runoff Estimates .....	3
4.3 Catchment Area .....	3
4.4 Estimation of Flood Flows .....	3
4.5 Water Requirements.....	3
4.6 Homogenous Dam .....	3
4.7 Dam Design .....	4
4.8 Inlet Pipe .....	4
4.9 Outlet Pipe .....	4
4.10 Spillway .....	4
4.11 Field Assessment.....	4
4.11.1 Seepage/Leakage .....	4
4.11.2 Erosion .....	4
4.11.3 Deformation/Movement .....	4
4.11.4 Shrinkage/Cracking .....	4
4.11.5 Shrinkage/Cracking .....	5
4.11.6 Trees.....	5
<b>5. Field and Laboratory Testing .....</b>	<b>5</b>
<b>6. Rainfall Data.....</b>	<b>8</b>
<b>7. Geotechnical Assessment .....</b>	<b>8</b>
7.1 Geotechnical Material Properties .....	8
7.2 Slope/W Assessment .....	9
<b>8. Discussion .....</b>	<b>9</b>



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8.1	Foundations .....	9
8.2	Typical Design Slopes .....	9
8.3	Overflow.....	9
8.4	Structural Integrity .....	9
8.5	Classification of Soils .....	9
8.6	Permeability & Moisture Content of Dam .....	9
8.7	Dispersion .....	10
8.8	Shrinkage and Cracking of Wall .....	10
8.9	Trees.....	10
<b>9.</b>	<b>Recommendations .....</b>	<b>10</b>
9.1	Topsoil.....	10
9.2	Supervision.....	10
	<b>Disclaimer .....</b>	<b>11</b>
	<b>Appendix A – Site Plan .....</b>	<b>12</b>
	<b>Appendix B – Engineering Logs.....</b>	<b>13</b>
	<b>Appendix C Laboratory Testing .....</b>	<b>14</b>
	<b>Appendix D – Rainfall Data .....</b>	<b>15</b>
	<b>Appendix E – Slope/W Analysis.....</b>	<b>16</b>
	<b>Appendix F – Photos .....</b>	<b>17</b>

## 1. Introduction

Australian Geotechnical Testing (AGT) was engaged by The Dunes, Torquay to undertake a Geotechnical investigation and Dam Safety Assessment for the existing Dam at 1075 Horseshoe Bend Road, Torquay.

Specifically, the Dam Safety Assessment was required to due to the following:

- An inspection of the above dam was made by officers from Southern Rural Water on 5th October 2017.
- In accordance with the Water Act 1989 & government policies, your dam is regarded as potentially hazardous. Due to their size and dimensions hazardous dams could cause significant damage to public and private property, the environment, and pose a threat to personal safety if they were to fail. For these reasons the Ministerial Policies require owners of these dams to have the integrity of the dam assessed by an engineer every 5 years, and develop a maintenance and surveillance plan. As the corporation responsible for licensing farm dams in your area, Southern Rural Water is required to implement this requirement for all dams in the above criteria.

From this Dam Safety Assessment Report that includes:

- Integrity of the dam structure and design, and advise any remedial action required.

This Geotechnical Investigation and Dam Safety Assessment report presents a summary of the sub-surface conditions encountered, discusses the results and provides recommendations for remedial action for the dam.

## 2. Site Description

### 2.1 Locality

The site location is located along Horse Blend Road adjacent to the Golf Coarse and within agricultural farming.

Figure 2.1





## 2.2 Topography

The topography of the site was relative level with a maximum slope within the vicinity of the dam of a slope of 1:140.

## 2.3 Regional Geology

Geological Survey of Victoria maps (1:63,360) and information published by the Department of Primary Industries on the GeoVic on-line geological mapping site (1:250,000) shows the site is underlain by:

- Quaternary Sandy clay and clayey quartz sand

In general, the anticipated subsurface conditions have been encountered during this site investigation and are considered to be consistent with the geological map.

## 3. Site Investigation

The field investigation was undertaken on 8-9/12/2017 which involved a site inspection and drilling of 8 boreholes to a depth of up to 6.5-9.0m or refusal. This geotechnical investigation was aimed at providing geotechnical subsurface profile and design parameters to assist with the development of the assessment of the dam stability. Representative sample was collected for laboratory testing.

Engineering Logs of the boreholes are presented as Appendix B.

### 3.1 Boreholes Profile

Table 3.1 presents a summary of subsurface profile for the 8 boreholes.

**Table 3.1 – Summary of Subsurface Profile**

Material	Depth (m)			
	BH 1	BH 2	BH3	BH4
Fill, Sandy Clay	0-7.05	0-6.1	0-6.1	0-7.5
Sandy CLAY	7.05-8.0	6.1-6.5	6.1-6.5	7.5-8.5
Total Depth	8.0	6.5	6.5	8.5

Material	Depth (m)			
	BH5	BH6	BH7	BH8
Fill, Sandy Clay	0-7.5	0-6.8	0-2.9	0-7.1
FILL, Clayey Sand			2.9-3.1	
Fill, Sandy Clay			3.1-6.5	
FILL, Clayey Sand			6.5-8.0	
Sandy CLAY	7.5-8.5	6.8-7.5	8.0-9.0	7.1-7.5
<b>Total Depth</b>	8.5	7.5	9.0	7.5

### 3.2 Groundwater

Groundwater was not encountered at any exploratory location during the on-site field investigation.

## 4. Dam

### 4.1 Type of Dam (Tank)

The dam is a rectangular tank with the wall raised above the natural surface preventing any surface runoff entering the dam. The dam is a storage tank that obtains its water from pumping water from the Black Rock treatment plant. Minimal water is obtained from rainfall over the dam.

### 4.2 Runoff Estimates

As the dam is a tank design that has been raised above the surrounding area, there will be no runoff into the dam.

### 4.3 Catchment Area

The only catchment area is the actual dam itself and the surface area of the extents of the dam walls.

### 4.4 Estimation of Flood Flows

During flooding rains the only impact will be the rain itself. The maximum rainfall according to the Bureau of Meteorology Website for the Torquay Golf Club weather station for a day was 90mm in February 2002. With a minimum freeboard of 1.0m, there would be no risk of flooding of the neighbouring properties due to overtopping of the dam.

### 4.5 Water Requirements

The water requirements are for the watering of the agricultural land of the property.

### 4.6 Homogenous Dam

It is believed that the dam has a homogeneous wall. Within the previous 6 months some additional Sandy Clay material has material been added widening the crest of the dam wall. This material has

been well compacted. On the outer edge of the walls there has been some loose material placed. The thickness of this loose material has been estimated at 0.2-0.5m. This loose material has no impact as the structural integrity of the dam wall.

#### **4.7 Dam Design**

The dimension of the dam is 250x120m with a surface area of the water of 30,000m<sup>2</sup>. The dam height of 7.81m.

It has been assumed that wall of the dam continues at the same slope of the observed wall to a depth of 3m below ground levels outside the dam. It is believed that after the floor of the dam was stripped of all unsuitable material (No unsuitable material was found in the geotechnical investigation of the walls of the dam., the Sandy CLAY was excavated to be used for the walls of the dam.

The estimated volume of the dam at its current water level is 90ML. The potential volume of dam would be approximately 300ML 1m below the crest.

#### **4.8 Inlet Pipe**

An inlet pipe was observed in front of the western embankment. This water is sourced from the Black Rock Treatment Plant which transfers treated water into the dam. The flow of water can be stopped at any time.

#### **4.9 Outlet Pipe**

At the eastern extent of the dam the outlet pipes transfer the dam water throughout the pump to the agricultural site.

#### **4.10 Spillway**

No spillway was observed and due to the type of dam is not required.

#### **4.11 Field Assessment**

A field assessment was undertaken on the 8-9<sup>th</sup> November 2017 for the purpose of assessing the dam in relation to the structural integrity. The walkover survey viewed the entire dam area and surrounding property. Photos of the site indicating the site area and dam were taken to assist in the assessment (refer to Appendix F)

##### **4.11.1 Seepage/Leakage**

No evidence of seepage or leakage of the dam was observed.

##### **4.11.2 Erosion**

No evidence of erosion of the dam was observed.

##### **4.11.3 Deformation/Movement**

No evidence of deformation or movement of the dam was observed.

##### **4.11.4 Shrinkage/Cracking**

Minor shrinkage and cracking was observed in the surface material along the crest of the wall and the outer wall of the dam. This cracking was predominantly observed in the recent material that was placed.

#### **4.11.5 Shrinkage/Cracking**

Minor shrinkage and cracking was observed in the surface material along the crest of the wall and the outer wall of the dam. This cracking was predominantly observed in the recent material that was placed.

#### **4.11.6 Trees**

Trees were observed along the inner wall of the dam (Refer to Appendix B). These trees are estimated to be on the wall for at least 15 years within no detrimental effect on the structural integrity of the dam wall. Due to the width of the dam, the material type and compaction of the dam it is believed that these trees will continue to have no structural detrimental effect on the dam. Large trees were observed in the neighbouring property along the western wall. Due to the distance from the dam, the material type and compaction of the dam it is believed that these trees will also continue to have no structural detrimental effect on the dam.

## **5. Field and Laboratory Testing**

Field testing comprised Standard Penetration Tests (SPT) tests at boreholes at various depths. Laboratory testing comprised 35 moisture content tests, 7 sieve analyses, 7 Atterberg Limits tests, 5 Permeability Tests and 10 Emerson Tests.

A summary of the results obtained is shown within Table 5.1 below. NATA Test Certificates for each of the laboratory tests are attached as Appendix C.



**Table 5.1**

Location	Layer Depth From (m)	Layer Depth To (mm)	Material	USC (AS1726)	Moisture Content (%)	Permeability (x10 <sup>-9</sup> )	Emerson	Maximum Dry Density	OMC	Liquid Limit	Plasticity Index	Linear Shrinkage (%)	(% ) Passing					
													0.075mm	0.425mm	2.36mm	19.0mm		
BH1	1.0		Sandy Clay		19.1													
	2.0		Sandy Clay		18.7													
	3.0		Sandy Clay		25.4													
	3.0	4.0	Sandy CLAY	CH						58	36	12.5	57	82	93	100		
	4.0		Sandy Clay				4											
	5.0		Sandy CLAY		31.8	2x10 <sup>-10</sup>												
	6.0		Sandy Clay		22.7													
	6.0	7.0	Sandy CLAY	CI	20.2					39	21	10.0	60	83	94	100		
	7.0		Sandy Clay		14.3													
	8.0		Sandy Clay		22.7													
BH2	1.0		Sandy Clay		23.7													
	2.0		Sandy Clay		19.0													
	3.0		Sandy Clay		23.0													
	4.0		Sandy Clay		31.2													
	5.0		Sandy Clay		32.0													
	6.0		Sandy Clay				4											
	7.0		Sandy Clay															
	8.0		Sandy Clay															
BH3	1.0		Sandy CLAY		20.0													
	2.0		Sandy CLAY		23.2													
	3.0		Sandy CLAY				4											
	3.0		Sandy CLAY		26.7													
	4.0		Sandy CLAY															





Location	Layer Depth From (m)	Layer Depth To (mm)	Material	USC (AS1726)	Moisture Content (%)	Permeability (x10 <sup>-9</sup> )	Emerson	Maximum Dry Density	OMC	Liquid Limit	Plasticity Index	Linear Shrinkage (%)	(% ) Passing					
													0.075mm	0.425mm	2.36mm	19.0mm		
BH3	5.0		Sandy CLAY		29.5													
	6.0		Sandy CLAY		27.9													
BH4	1.0		Sandy CLAY		18.6													
	2.0		Sandy CLAY				4											
	3.0	4.0	Sandy CLAY	CI	27.5		4			55	31	14.0	72	87	93	100		
	4.0		Sandy CLAY		13.4	4x10 <sup>-11</sup>												
	5.0		Sandy CLAY		23.9													
	6.0		Sandy CLAY		27.4													
	7.0		Sandy CLAY		32.3													
	8.0		Sandy CLAY															
BH5	1.0		Sandy CLAY		20.6													
	2.0		Sandy CLAY		7.0													
	3.0		Sandy CLAY				4											
	4.0		Sandy CLAY		21.6													
	5.0		Sandy CLAY		29.0													
	6.0		Sandy CLAY				4											
	7.0		Sandy CLAY		28.4	3x10 <sup>-10</sup>												
	6.0	7.0	Sandy CLAY	CH						52	29	12.5	75	91	98	100		
	7.0		Sandy CLAY															
	8.0		Sandy CLAY		20.7													
BH6	2.5	6.0	Sandy CLAY	CH						51	32	14.0	65	88	96	100		
	6.6	8.0	Clayey Sand	SC		5x10 <sup>-6</sup>	4	1.904	10.7	31	19	7.0	32	77	100	100		
BH8	1.0		Sandy CLAY		15.4													
	2.0		Sandy CLAY				4											
	2.5	4.0	Sandy CLAY	CH						50	32	14.0	58	81	92	100		
	3.0		Sandy CLAY		23.3	1x10 <sup>-10</sup>												
	4.0		Sandy CLAY		18.0													
	5.0		Sandy CLAY		26.1													
	6.0		Sandy CLAY				4											
BH8	7.0		Sandy CLAY		32.3													

Notes: DCP: Dynamic Cone Penetrometer; CBR: California Bearing Ratio; OMC: Optimum Moisture Content

## 6. Rainfall Data

The following is a summary of the rainfall data for the Torquay Golf Club. Refer to Appendix D for full details

Year	Month	Maximum Daily Rainfall
2002	2	90
2005	2	88.4
2001	4	70
1987	12	61.2
1978	11	58.6
2001	3	56
1981	5	55.4
2001	4	50
2010	3	48
1988	11	45
1988	1	42
1989	3	40.6
1981	10	40.4
1987	10	39.2
2005	8	39.2
1977	5	38.6
2004	11	38.2
1989	4	38
2000	10	38
2008	12	37.4

## 7. Geotechnical Assessment

### 7.1 Geotechnical Material Properties

The following Geotechnical material properties have been determined from the field and laboratory testing and with correlation with AS1726 and published books and journals.

Table 5.1 Geotechnical Material properties

Material	Unit Weight (kN/m <sup>3</sup> )	Cohesion (kPa)	Friction Angle (°)
Sandy CLAY	20	10	25
Clayey Sand	18	2	30

## 7.2 Slope/W Assessment

Material	Section	Dam Level	Embankment Slope	Factor of Safety	Assessment
Sandy Clay	A-A	Existing	1:3.5	2.772	Stable
Sandy Clay	A-A	Crest	1:3.5	2.772	Stable
Sandy Clay	B-B	Existing	1:3.7	2.999	Stable
Sandy Clay	B-B	Crest	1:3.7	2.977	Stable
Sandy Clay	C-C	Existing	1:3.3	2.975	Stable
Sandy Clay	C-C	Crest	1:3.3	2.923	Stable
Sandy Clay	D-D	Existing	1:2.6	3.367	Stable
Sandy Clay	D-D	Crest	1:2.6	3.367	Stable
Sandy Clay/Clayey Sand	E-E	Existing	1:1.9	1.953	Stable
Sandy Clay/Clayey Sand	E-E	Crest	1:1.9	1.963	Stable

The Slope/W Assessment were undertaken on the existing and worst case scenario with the water raising to the top of the crest level. Although this will never happen due to the design of the dam, the dam stability assessment used this as a worst case scenario trial basis. In both instances and with all sections the Slope/W assessment found the dam walls to be stable (Refer to Appendix E)

## 8. Discussion

### 8.1 Foundations

The foundations for the dam were found to be suitable for the design type of the dam.

### 8.2 Typical Design Slopes

The constructed design and well below the typical maximum design limits as recommended by published documents such as Farm Dams (Lewis, 2002), Design and Construction of Small Earth Dams (Nelson, 1995)

### 8.3 Overflow

There is no risk of overflow at its current design

### 8.4 Structural Integrity

The geotechnical investigation found that dam was stripped and keyed into the Sandy CLAY/Clayey SAND material and was compacted well.

### 8.5 Classification of Soils

The wall was constructed of Sandy Clay that had a moderate plasticity and a very low permeability

### 8.6 Permeability & Moisture Content of Dam

The Sandy Clay had a very low permeable material. Typically for dams the minimum requirement for the permeability is less than  $1 \times 10^{-9}$ . The four samples taken met this requirement. The moisture

content of the soils found all the samples were dry to moist. No samples or field observations found the soil to be saturated. No evidence of seepage through the dam was observed.

### **8.7 Dispersion**

This test, developed by Emerson (1967), classifies soil aggregates on the basis of their coherence in water. The interaction with water of clay-sized particles in aggregates may largely determine the structural stability of a soil. The Emerson Aggregate Test is a simple physical test for dividing aggregates into eight main classes.

The laboratory testing found that the Emerson Class was 4 and is not susceptible to tunnel erosion.

### **8.8 Shrinkage and Cracking of Wall**

For earthwork construction, linear shrinkage is used to predict instability due to crack formation through walls or potential leaking problems caused by low clay activity.

The laboratory testing found the material to have a medium shrink-swell potential and is susceptible to minor shrinkage on drying and swelling on wetting.

### **8.9 Trees**

The trees will have no significant detrimental effect on the structural integrity of the dam.

## **9. Recommendations**

The integrity of the structure and the design of the dam at 1075 Horseshoe Bend Road is sound and meets the requirement of the intended use. It is recommended that walls and crest of the dam be topsoiled with inspections as required.

### **9.1 Topsoil**

Prior to the placement of topsoil onto the compacted embankment, the surface should be roughened to assist in combining the different soil types. Topsoil should be placed over the entire embankment to a depth of at least 200 mm and grassed with a good holding grass.

The purpose of the topsoil cover is to:

- reduce surface erosion on either side of the batter slope;
- minimise surface cracking in the embankment;
- lessen the tendency of the surface material in contact with storage water being dispersed;
- lessen wide fluctuations in embankment moisture content.

### **9.2 Supervision**

The purpose of a dam safety surveillance program is to avoid failure of the dam, by giving early warning of any kind of symptom of trouble as early as possible. At this site however, the risk of dam failure at its current design is negligible.

It is therefore recommended that a quick visual inspection be undertaken by the owner on a monthly basis looking for variations to the dam with photos taken at each inspection.

If required a comprehensive inspection by a suitably qualified engineer can be under on a yearly basis.

## Disclaimer

The findings and conclusions contained in this Report are made based on site conditions that existed at the time this work was conducted. The conclusions presented in this report are relevant to the conditions of the site and the state of legislation currently enacted as at the date of this report.

Findings and conclusions are made assuming that the soil, groundwater, geological and chemical conditions detailed within this report are accurate and remain applicable to the site at the time of writing. No other warranties are made or intended.

AGT has used a degree of skill and care ordinarily exercised by reputable members of our profession practicing in the same or similar locality.

does not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.

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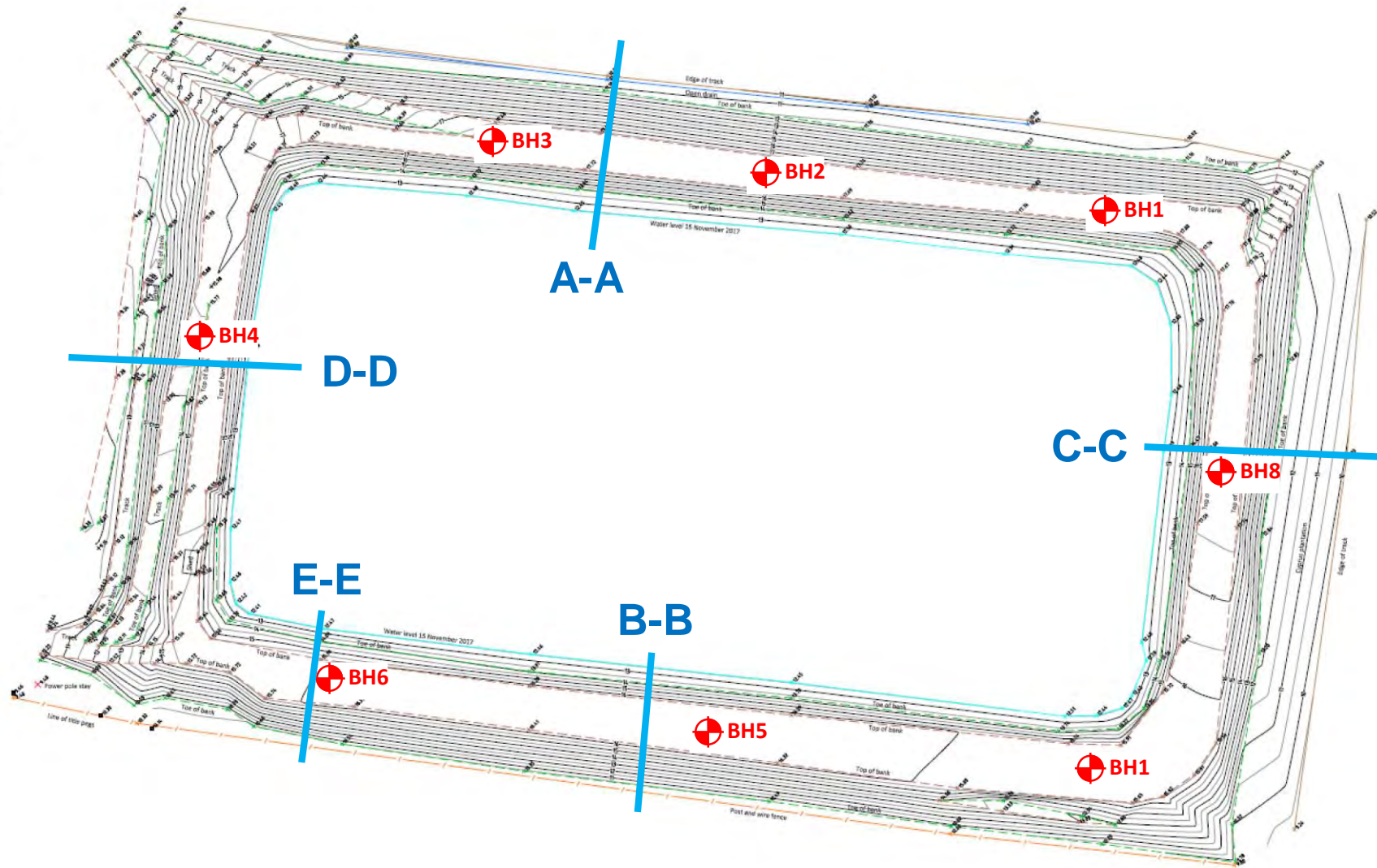
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## Appendix A – Site Plan



 Borehole Location



Report No

AGTE17463

Site Plan, Borehole Locations, and Section Lines  
 1075 Horseshoe Bend Road, Torquay  
 Client: The Dunes Torquay



## Appendix B – Engineering Logs



# ENGINEERING LOG

BOREHOLE No

# BH1

PROJECT: **1075 Horse Bend Road**

PROJECT NO: **AGTE174663**

LOCATION: **Torquay**

DATE OF BOREHOLE: **8.11.2017**

CLIENT: **The Dunes Torquay**

LOGGED BY: **MN**

Chainage:    Direction:    Offset    Latitude: -38.303919                          Longitude: 144.347087

Method	Depth (m)	Depth of Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Sample ID	Tests																																
									DCP (per 100mm)	FIELD CBR	PP (kPa)	SV (kPa)	MC (%)	% passing					LL	PI	LS	CBR	SWELL	OMC	MDD	Additive	UCS	OMC - Add	MDD - Add	Water											
														75µm	0.425mm	2.36mm	19mm	37.5mm																							
Solid Auger	1		[Cross-hatched symbol]		FILL, Sandy CLAY: brown	M	VSt																																		
					- grey mottled orange			SPT 2,3,3 N=6	450	19.1																															
		2				- orange-brown			SPT 3,5,7 N=12	450	18.7																														
		3						SPT 3,6,7 N=13	310	25.4	57	100	58	36	12.5																										
		4						SPT 2,2,3 N=5	320																																
		5				- brown-grey				350	31.8																														
		6				- grey-brown			SPT 3,5,8 N=13	400	22.7	60	100	39	21	10																									
		7	7.05		Cl	- orange-brown Sandy CLAY: orange-brown	M	VSt	SPT 6,6,10 N=16	450	14.3																														
	8							SPT 4,8,10 N=18	500	22.7																															
	8.5				<b>End of BH1 at 8.50m</b>																																				
	9																																								
	10																																								



# ENGINEERING LOG

BOREHOLE No

# BH2

PROJECT: **1075 Horse Bend Road**

PROJECT NO: **AGTE174663**

LOCATION: **Torquay**

DATE OF BOREHOLE: **8.11.2017**

CLIENT: **The Dunes Torquay**

LOGGED BY: **MN**

Chainage:

Direction:

Offset

Latitude: -38.304105

Longitude: 144.34708

Method	Depth (m)	Depth of Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Sample ID	Tests																															
									DCP (per 100mm)	FIELD CBR	PP (kPa)	SV (kPa)	MC (%)	% passing					LL	PI	LS	CBR	SWELL	OMC	MDD	Additive	UCS	OMC - Add	MDD - Add	Water										
														75µm	0.425mm	2.36mm	19mm	37.5mm																						
Solid Auger	1				FILL, Sandy Clay: orange-brown mottled grey	M	VSt				350																													
								SPT 4,3,3 N=6			500		23.7																											
	2				- yellow-brown, white			SPT 2,2,4 N=6			450		19																											
	3				- yellow-orange, red			SPT 3,4,4 N=8			480		23																											
	4				- orange-brown, trace gravel			SPT 2,4,5 N=9			350		31.2																											
	5							SPT 2,4,6 N=10			350		32																											
	6	6.1			Cl	Sandy CLAY: orange-brown	M	VSt																																
	6.5					<b>End of BH2 at 6.50m</b>																																		
	7																																							
	8																																							
9																																								
10																																								

This log should be read in conjunction with the Australian Geotechnical Testing Log Summary Sheet and the Site Plan





# ENGINEERING LOG

BOREHOLE No

# BH3

PROJECT: **1075 Horse Bend Road**

PROJECT NO: **AGTE174663**

LOCATION: **Torquay**

DATE OF BOREHOLE: **8.11.2017**

CLIENT: **The Dunes Torquay**

LOGGED BY: **MN**

Chainage: Direction: Offset Latitude: -38.304129 Longitude: 144.349075

Method	Depth (m)	Depth of Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Sample ID	Tests																													
									DCP (per 100mm)	FIELD CBR	PP (kPa)	SV (kPa)	MC (%)	% passing					LL	PI	LS	CBR	SWELL	OMC	MDD	Additive	UCS	OMC - Add	MDD - Add	Water								
											75µm	0.425mm	2.36mm	19mm	37.5mm																							
Solid Auger	1				FILL, Sandy Clay: brown-orange					600																												
								SPT 4,3,3 N=6		600	20																											
	2				- yellow-orange, brown, grey					500	23.2																											
	3				- orange-brown					450	26.7																											
	4								SPT 2,3,5 N=8		520																											
	5					- thin sand layers					550	29.5																										
	6	6.1			Cl	Sandy CLAY: orange-brown					600	27.9																										
	6.5				<b>End of BH3 at 6.50m</b>																																	
	7																																					
	8																																					
	9																																					
	10																																					



# ENGINEERING LOG

BOREHOLE No

# BH4

PROJECT: 1075 Horse Bend Road

PROJECT NO: AGTE174663

LOCATION: Torquay

DATE OF BOREHOLE: 8.11.2017

CLIENT: The Dunes Torquay

LOGGED BY: MN

Chainage:

Direction:

Offset:

Latitude: -38.303599

Longitude: 144.349743

Method	Depth (m)	Depth of Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Sample ID	Tests																							
									DCP (per 100mm)	FIELD CBR	PP (kPa)	SV (kPa)	MC (%)	% passing					LL	PI	LS	CBR	SWELL	OMC	MDD	Additive	UCS	OMC - Add	MDD - Add	Water		
										75µm	0.425mm	2.36mm	19mm	37.5mm																		
Solid Auger	1				FILL, Sandy Clay: brown, grey, white, orange	M	VSt		550																							
								SPT 4,5,7 N=12	500	18.6																						
	2							SPT 6,11,11 N=22	450																							
	3							SPT 3,8,15 N=23	600	27.5	72		100			55	31	14														
	4								450	13.4																						
	5					- orange-brown, mottled red, grey			450	23.9																						
	6					- brown-orange, grey, some fine sand			600	27.4																						
	7					- orange-brown, mottled grey, red			250	32.3																						
	8	7.6			Cl	Sandy CLAY: orange-brown	M	VSt		500																						
		8.5				End of BH4 at 8.50m																										
9																																
10																																





# ENGINEERING LOG

BOREHOLE No  
**BH6**

<b>PROJECT:</b> 1075 Horse Bend Road	<b>PROJECT NO:</b> AGTE174663
<b>LOCATION:</b> Torquay	<b>DATE OF BOREHOLE:</b> 9.11.2017
<b>CLIENT:</b> The Dunes Torquay	<b>LOGGED BY:</b> MN

**Chainage:**                      **Direction:**                      **Offset**                      **Latitude:** -38.302837                      **Longitude:** 144.349305

Method	Depth (m)	Depth of Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Sample ID	Tests																							
									DCP (per 100mm)	FIELD CBR	PP (kPa)	SV (kPa)	MC (%)	% passing					LL	PI	LS	CBR	SWELL	OMC	MDD	Additive	UCS	OMC - Add	MDD - Add	Water		
													75µm	0.425mm	2.36mm	19mm	37.5mm															
	1				FILL, Silty Clay: orange-brown, grey	M	VSt																									
	2																															
Solid Auger	3												65		100			51	32	14												
	4				- grey mottled orange-brown																											
	5				- orange-brown mottled grey																											
	6																															
	7	6.8		Cl	Sandy CLAY: grey mottled orange	M	VSt																									
	7.5				<b>End of BH6 at 7.50m</b>																											
	8																															
	9																															
	10																															

This log should be read in conjunction with the Australian Geotechnical Testing Log Summary Sheet and the Site Plan







# ENGINEERING LOG

BOREHOLE No  
**BH8**

PROJECT: **1075 Horse Bend Road** PROJECT NO: **AGTE174663**  
 LOCATION: **Torquay** DATE OF BOREHOLE: **9.11.2017**  
 CLIENT: **The Dunes Torquay** LOGGED BY: **MN**

Chainage: Direction: Offset Latitude: **-38.302918** Longitude: **144.346743**

Method	Depth (m)	Depth of Unit	Graphic Log	Classification Symbol	Material Description	Moisture Condition	Consistency / Strength	Sample ID	Tests																																	
									DCP (per 100mm)	FIELD CBR	PP (kPa)	SV (kPa)	MC (%)	% passing					LL	PI	LS	CBR	SWELL	OMC	MDD	Additive	UCS	OMC - Add	MDD - Add	Water												
														75µm	0.425mm	2.36mm	19mm	37.5mm																								
Solid Auger	1				FILL, Silty Clay: brown-grey	M	VSt																																			
					- orange-brown mottled grey, red			SPT 4,5,7 N=12	500	15.4																																
	2							SPT 4,6,9 N=15	600																																	
	3				- orange-brown					58			100		50	32	14																									
	4				- orange-brown mottled red, trace gravel			SPT 2,4,2 N=6	600	18																																
	5							SPT 2,4,4 N=8	300	26.1																																
	6				- orange brown mottled red, grey, trace gravel			SPT 4,6,7 N=13	400																																	
	7	7.1			Cl	Sandy CLAY: orange-brown	M	VSt	SPT 7,16,17 N=33	600	32.3																															
	7.5				<b>End of BH8 at 7.50m</b>																																					
	8																																									
	9																																									
	10																																									

This log should be read in conjunction with the Australian Geotechnical Testing Log Summary Sheet and the Site Plan



## Appendix C Laboratory Testing



# Moisture Content Report

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	TG51066
Project:	1075 Horseshoe Bend Road Dam	Report:	1
Location:	Torquay	Test Date:	16-Nov-17

Test No:	51066-1	51066-2	51066-3	51066-4	51066-5	51066-6
Location:	BH 1	BH 1	BH 1	BH 1	BH 1	BH 1
Depth:	1m	2m	3m	6m	7m	8m
Moisture Content %	19.1	18.7	25.4	22.7	14.3	22.7
Material:						

Test No:	51066-7	51066-8	51066-9			
Location:	BH 4	BH 4	BH 3			
Depth:	1m	2m	3m			
Moisture Content %	20.0	23.2	26.7			
Material:						

Notes:

Test Method	AS1289.2.1.1	Sampling Method	As provided
Site Selection	N/A		

	Accreditation for compliance with ISO/IEC 17025 - Testing	Approved Signatory	
	The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards		Jon Lillecrapp
	NATA Accredited Laboratory No. 20245	Date:	29-Nov-17



# Moisture Content Report

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	TG51066
Project:	1075 Horseshoe Bend Road Dam	Report:	11
Location:	Torquay	Test Date:	03-Dec-17

Test No:	51066-25	51066-26	51066-27	51066-28	51066-29	51066-30
Location:	BH 2	BH 8	BH 5	BH 5	BH 8	BH 4
Depth:	4m	4m	2m	1m	<b>1m</b>	3m
Moisture Content %	31.2	<b>14.9</b>	<b>19.5</b>	20.6	15.4	27.5
Material:						

Test No:	51066-31	51066-32	51066-33	51066-34	51066-35	51066-36
Location:	BH 3	BH 4	BH 3	BH 5	BH 2	BH 3
Depth:	1m	5m	6m	4m	5m	5m
Moisture Content %	18.6	23.9	27.9	21.6	32.0	29.5
Material:						

Notes:

Test Method	AS1289.2.1.1	Sampling Method	As provided
Site Selection	N/A		

	Accreditation for compliance with ISO/IEC 17025 - Testing	Approved Signatory	
	The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards		
	NATA Accredited Laboratory No. 20245	Date:	05-Dec-17



# Moisture Content Report

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	TG51066
Project:	1075 Horseshoe Bend Road Dam	Report:	12
Location:	Torquay	Test Date:	03-Dec-17

Test No:	51066-37	51066-38	51066-39	51066-40	51066-41	51066-42
Location:	BH 4	BH 5	BH 1	BH 5	BH 5	BH 3
Depth:	6m	8m	6m	5m	7m	2m
Moisture Content %	27.4	20.7	20.2	29.0	16.9	22.8
Material:						

Test No:	51066-43	51066-44	51066-45	51066-46	51066-47	
Location:	BH 2	BH 2	BH 2	BH 4	BH 8	
Depth:	1m	2m	3m	7m	5m	
Moisture Content %	23.7	19.0	23.0	32.3	26.1	
Material:						

Notes:

Test Method	AS1289.2.1.1	Sampling Method	As provided
Site Selection	N/A		

	Accreditation for compliance with ISO/IEC 17025 - Testing	Approved Signatory	
	The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards		
	NATA Accredited Laboratory No. 20245	Date:	05-Dec-17

# Material Test Report

Report Number: AGT11654-1  
 Issue Number: 1  
 Date Issued: 17/11/2017  
 Client: The Dunes Torquay (AGTE)



Australian Geotechnical Testing

Warrnambool Laboratory

2/1109 Raglan Parade Warrnambool Vic 3280

Phone: (03) 5023 2870

Email: daniel.t@ausgeotest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Daniel Talbot  
 Senior Geotechnician

NATA Accredited Laboratory Number: 20246

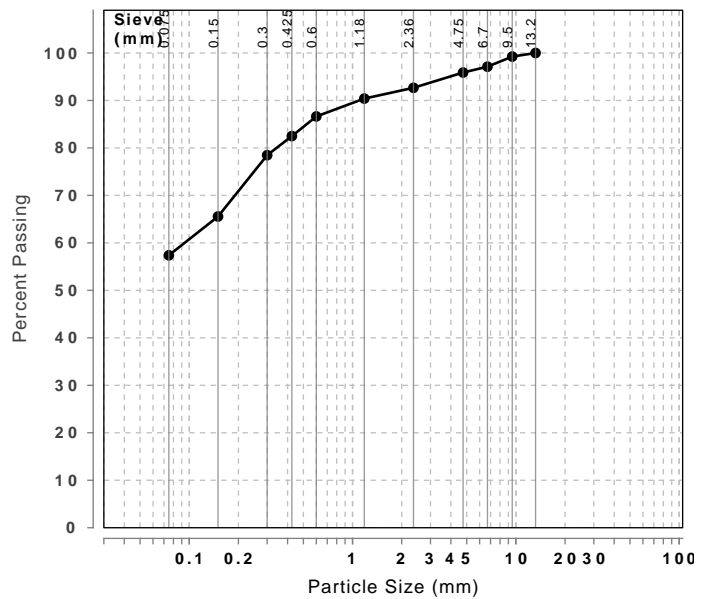
Contact: Matt Noonan  
 Project Number: AGT11654  
 Project Name: 1075 Horseshoes Bend Road Dam  
 Project Location: The Dunes Torquay  
 Work Request: 106  
 Sample Number: 11654-1  
 Date Sampled: 13/11/2017  
 Sampling Method: AS1289 1.2.1 6.5.4 - Machine excavated pit or trench  
 Sample Location: BH1 (3.0 - 4.0m)

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Preparation Method	Dry Sieve		
Sample History	Oven Dried		
Liquid Limit (%)	58		
Plastic Limit (%)	22		
Plasticity Index (%)	36		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	12.5		
Cracking Crumbling Curling	Cracking		

Particle Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
13.2 mm	100		0	
9.5 mm	99		1	
6.7 mm	97		2	
4.75 mm	96		1	
2.36 mm	93		3	
1.18 mm	90		2	
0.6 mm	87		4	
0.425 mm	82		4	
0.3 mm	78		4	
0.15 mm	66		13	
0.075 mm	57		8	

Particle Size Distribution



# Material Test Report

Report Number: AGT11654-1  
 Issue Number: 1  
 Date Issued: 17/11/2017  
 Client: The Dunes Torquay (AGTE)



Contact: Matt Noonan  
 Project Number: AGT11654  
 Project Name: 1075 Horseshoes Bend Road Dam  
 Project Location: The Dunes Torquay  
 Work Request: 106  
 Sample Number: 11654-2  
 Date Sampled: 13/11/2017  
 Sampling Method: AS1289 1.2.1 6.5.4 - Machine excavated pit or trench  
 Sample Location: BH1 (6.0 - 7.0m)

Australian Geotechnical Testing  
 Warrnambool Laboratory  
 2/1109 Raglan Parade Warrnambool Vic 3280  
 Phone: (03) 5023 2870  
 Email: danielt@ausgeotest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



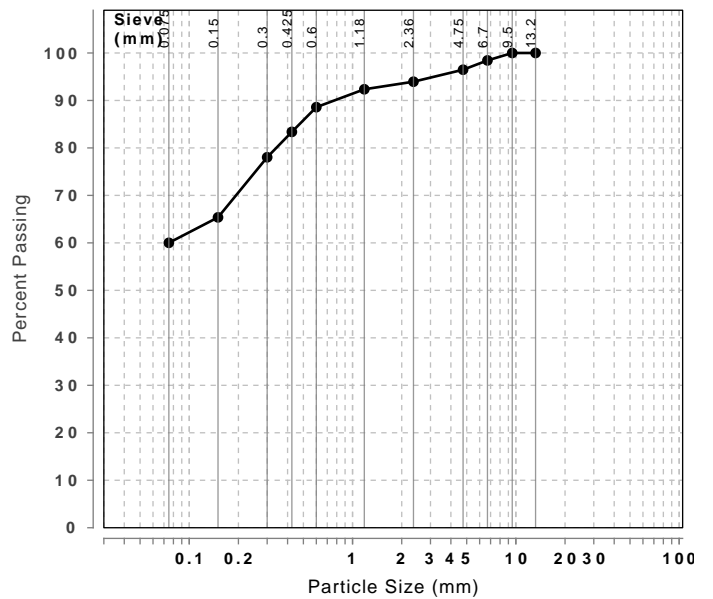
Approved Signatory: Daniel Talbot  
 Senior Geotechnician  
 NATA Accredited Laboratory Number: 20246

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Preparation Method	Dry Sieve		
Sample History	Air Dried		
Liquid Limit (%)	39		
Plastic Limit (%)	18		
Plasticity Index (%)	21		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	10.0		
Cracking Crumbling Curling	None		

Particle Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
13.2 mm	100		0	
9.5 mm	100		0	
6.7 mm	98		2	
4.75 mm	96		2	
2.36 mm	94		3	
1.18 mm	92		2	
0.6 mm	89		4	
0.425 mm	83		5	
0.3 mm	78		5	
0.15 mm	65		13	
0.075 mm	60		5	

Particle Size Distribution



# Material Test Report

Report Number: AGT11654-1  
 Issue Number: 1  
 Date Issued: 17/11/2017  
 Client: The Dunes Torquay (AGTE)



Contact: Matt Noonan  
 Project Number: AGT11654  
 Project Name: 1075 Horseshoes Bend Road Dam  
 Project Location: The Dunes Torquay  
 Work Request: 106  
 Sample Number: 11654-3  
 Date Sampled: 13/11/2017  
 Sampling Method: AS1289 1.2.1 6.5.4 - Machine excavated pit or trench  
 Sample Location: BH4 (3.0 - 4.0m)

Australian Geotechnical Testing  
 Warrnambool Laboratory  
 2/1109 Raglan Parade Warrnambool Vic 3280  
 Phone: (03) 5023 2870  
 Email: daniel.t@ausgeotest.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Daniel Talbot  
 Senior Geotechnician

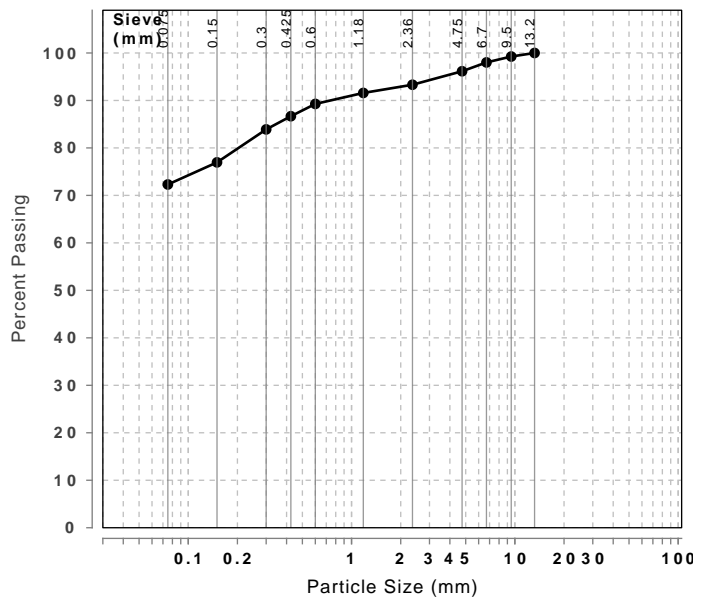
NATA Accredited Laboratory Number: 20246

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Preparation Method	Dry Sieve		
Sample History	Oven Dried		
Liquid Limit (%)	55		
Plastic Limit (%)	24		
Plasticity Index (%)	31		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	14.0		
Cracking Crumbling Curling	None		

Particle Distribution (AS1289 3.6.1)					
Sieve	Passed %	Passing Limits	Retained %	Retained Limits	
13.2 mm	100		0		
9.5 mm	99		1		
6.7 mm	98		1		
4.75 mm	96		2		
2.36 mm	93		3		
1.18 mm	92		2		
0.6 mm	89		2		
0.425 mm	87		3		
0.3 mm	84		3		
0.15 mm	77		7		
0.075 mm	72		5		

Particle Size Distribution





# Material Test Report

Report Number: AGT11654-1  
 Issue Number: 1  
 Date Issued: 17/11/2017  
 Client: The Dunes Torquay (AGTE)



Contact: Matt Noonan  
 Project Number: AGT11654  
 Project Name: 1075 Horseshoes Bend Road Dam  
 Project Location: The Dunes Torquay  
 Work Request: 106  
 Sample Number: 11654-4  
 Date Sampled: 13/11/2017  
 Sampling Method: AS1289 1.2.1 6.5.4 - Machine excavated pit or trench  
 Sample Location: BH5 (6.0 - 7.0m)

Australian Geotechnical Testing  
 Warrnambool Laboratory  
 2/1109 Raglan Parade Warrnambool Vic 3280  
 Phone: (03) 5023 2870  
 Email: daniel.t@ausgeotest.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



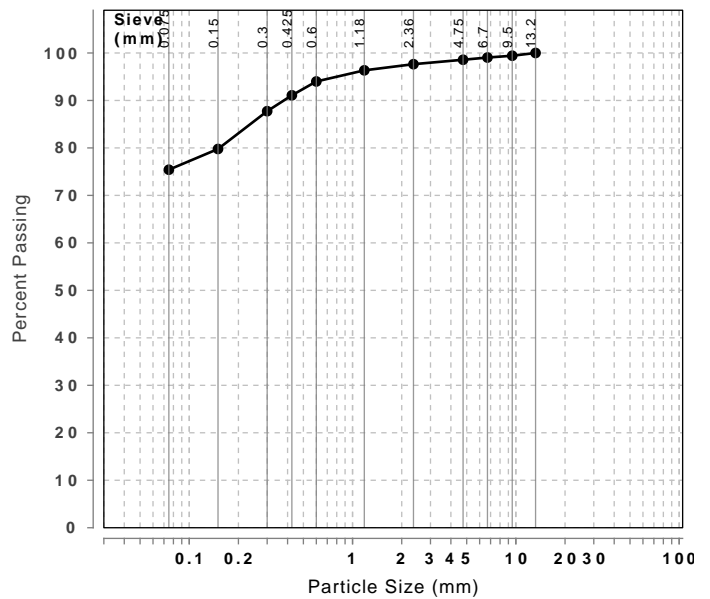
Approved Signatory: Daniel Talbot  
 Senior Geotechnician  
 NATA Accredited Laboratory Number: 20246

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Preparation Method	Dry Sieve		
Sample History	Oven Dried		
Liquid Limit (%)	52		
Plastic Limit (%)	23		
Plasticity Index (%)	29		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	12.5		
Cracking Crumbling Curling	Cracking		

Particle Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
13.2 mm	100		0	
9.5 mm	99		1	
6.7 mm	99		0	
4.75 mm	99		0	
2.36 mm	98		1	
1.18 mm	96		1	
0.6 mm	94		2	
0.425 mm	91		3	
0.3 mm	88		3	
0.15 mm	80		8	
0.075 mm	75		4	

Particle Size Distribution



# Material Test Report

Report Number: AGT11654-1  
 Issue Number: 1  
 Date Issued: 17/11/2017  
 Client: The Dunes Torquay (AGTE)



Contact: Matt Noonan  
 Project Number: AGT11654  
 Project Name: 1075 Horseshoes Bend Road Dam  
 Project Location: The Dunes Torquay  
 Work Request: 106  
 Sample Number: 11654-5  
 Date Sampled: 13/11/2017  
 Sampling Method: AS1289 1.2.1 6.5.4 - Machine excavated pit or trench  
 Sample Location: BH6 (2.5 - 6.0m)

Australian Geotechnical Testing  
 Warrnambool Laboratory  
 2/1109 Raglan Parade Warrnambool Vic 3280  
 Phone: (03) 5023 2870  
 Email: daniel.t@ausgeotest.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Daniel Talbot  
 Senior Geotechnician

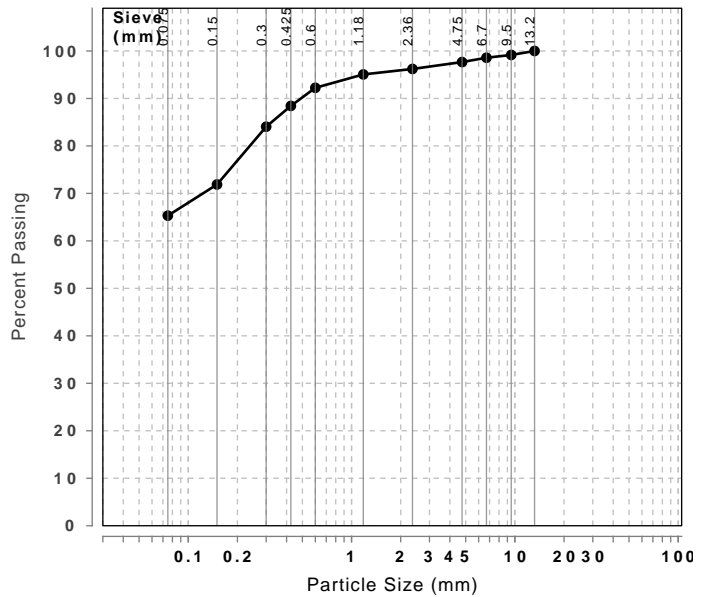
NATA Accredited Laboratory Number: 20246

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Preparation Method	Dry Sieve		
Sample History	Oven Dried		
Liquid Limit (%)	51		
Plastic Limit (%)	19		
Plasticity Index (%)	32		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	14.0		
Cracking Crumbling Curling	Cracking		

Particle Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
13.2 mm	100		0	
9.5 mm	99		1	
6.7 mm	99		1	
4.75 mm	98		1	
2.36 mm	96		1	
1.18 mm	95		1	
0.6 mm	92		3	
0.425 mm	88		4	
0.3 mm	84		4	
0.15 mm	72		12	
0.075 mm	65		7	

Particle Size Distribution



# Material Test Report

Report Number: AGT11654-1  
 Issue Number: 1  
 Date Issued: 17/11/2017  
 Client: The Dunes Torquay (AGTE)



Australian Geotechnical Testing

Warrnambool Laboratory

2/1109 Raglan Parade Warrnambool Vic 3280

Phone: (03) 5023 2870

Email: daniel.t@ausgeotest.com.au

Contact: Matt Noonan  
 Project Number: AGT11654  
 Project Name: 1075 Horseshoes Bend Road Dam  
 Project Location: The Dunes Torquay  
 Work Request: 106  
 Sample Number: 11654-6  
 Date Sampled: 13/11/2017  
 Sampling Method: AS1289 1.2.1 6.5.4 - Machine excavated pit or trench  
 Sample Location: BH8 (2.5 - 4.0m)

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Daniel Talbot  
 Senior Geotechnician

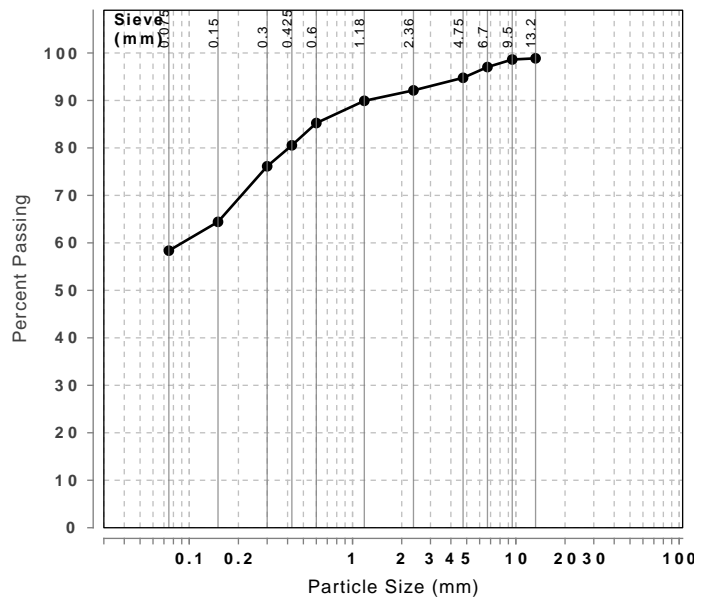
NATA Accredited Laboratory Number: 20246

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Preparation Method	Dry Sieve		
Sample History	Oven Dried		
Liquid Limit (%)	50		
Plastic Limit (%)	18		
Plasticity Index (%)	32		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	14.0		
Cracking Crumbling Curling	None		

Particle Distribution (AS1289 3.6.1)					
Sieve	Passed %	Passing Limits	Retained %	Retained Limits	
13.2 mm	99		1		
9.5 mm	99		0		
6.7 mm	97		2		
4.75 mm	95		2		
2.36 mm	92		3		
1.18 mm	90		2		
0.6 mm	85		5		
0.425 mm	81		5		
0.3 mm	76		4		
0.15 mm	64		12		
0.075 mm	58		6		

Particle Size Distribution





# Particle Size Distribution and Atterberg Limits Report

Australian Geotechnical Testing  
 21 Garden Boulevard  
 Dingley Village VIC 3172  
 PO Box 221 Hallam, VIC 3803  
 ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job Number:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	10
Location:	Torquay	Test Date:	24-Nov-17
Material:	Clayey SAND		
Sample Number:	51066-17	Sample Location:	BH 7 6.6-8.0

Sample Source:	N/A	Client Test Req. No.:	N/A
Product Designation:	N/A	Lot Identification:	N/A
Product Specification:	N/A	Sampling Method:	0

### Atterberg Limits

**SAMPLE HISTORY:**  
 Test Methods:  
 Liquid Limit: AS1289.3.1.2      Linear Shrinkage: AS1289.3.4.1  
 Plasticity Index: AS1289.3.3.1      Moisture Content: AS1289.2.1.1  
 Plastic Limit: AS1289.3.2.1      Moisture Content % 12.5  
 Weighted PI: RC326.01

Plasticity Index Results		Limits
LIQUID LIMIT:	31	
PLASTIC LIMIT:	12	
PLASTICITY INDEX:	19	
LINEAR SHRINKAGE:	7.0	
WPI (% passing 0.425mm x PI):	1464	
0.075mm X 0.425mm SIEVE:	2464	
L.S. X 0.425mm SIEVE:	540	
Linear Shrinkage Remarks:		

Plasticity Chart  Sample Plot

### Particle Size Distribution

**SAMPLE HISTORY:** Oven Dried (105-110 deg C), -19.0mm Washed  
 Test Method: AS1289.3.6.1

Grading Envelope			
SIEVE SIZE (mm)	Lower Limits	% PASSING (by mass)	Upper Limits
75.0		100	
53.0		100	
37.5		100	
26.5		100	
19.0		100	
13.2		100	
9.5		100	
6.70		100	
4.75		100	
2.36		100	
1.18		99	
0.600		87	
0.425		77	
0.300		66	
0.150		40	
0.075		32	

AUSTRALIAN STANDARD SIEVE APERTURES (mm)

NOTES:

<p>Accreditation for compliance with ISO/IEC 17025 - Testing        The results of tests, calibrations and/or measurements included        in this document, are traceable to Australian / national standards        NATA Accredited Laboratory No. 20245</p>	<p>Approved Signatory</p> <p>Marcus Green - Manager        Date: 29-Nov-17</p>
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# Permeability Report

## Constant Head Permeability

Australian Geotechnical Testing

21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client: The Dunes Torquay	Job No: AGT51066
Project: 1075 Horseshoe Bend Road Dam	Report No: 9
Location: Torquay	Date of Test: 19-Nov-17
Test Number: 51066-17	
Material Description: Clayey SAND	
Sample Location: BH 7 - 6.6-8.0m	
<b>Compaction Details</b>	
AS1289.5.1.1	
Maximum Dry Density t/m <sup>3</sup>	1.904
Optimum Moisture Content %	10.7
<b>Compactive Effort</b>	
Standard	
Oversize material retained on 19.0mm sieve %	0
Dry Density Ratio Required %	98
Moisture Ratio Required %	100
Achieved Dry Density t/m <sup>3</sup>	1.904
Achieved Density Ratio %	100
Achieved Moisture Content %	10.7
Achieved Moisture Ratio %	100
<b>Percolation Details</b>	
Surcharge Pressure kPa	3228.8
Permeant Used	Water
<b>Coefficient of Permeability</b>	<b>m/sec</b>
	<b>-5E-06</b>
Notes:	note: 1.0E-13 = 1 x 10 <sup>-13</sup>
Test Methods: AS1289 1.2.1, 2.1.1, 5.1.1, AS1289.6.7.1	Sampling Method: N/A
	Sampling Date: 13-Nov-17
 <p>Accreditation for compliance with ISO/IEC 17025 The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards</p> <p>NATA Accredited Laboratory No. 20245</p>	<p>Approved Signatory</p>  <p>Marcus Green - Manager</p> <p>Date: 29-Nov-17</p>



TRIAxIAL PERMEABILITY TEST  
AS 1289.6.7.3

47 National Avenue, Pakenham VIC 3810  
ph 03 5943 0980 www.terrafirmalabs.com.au

job No 9999  
report No 9999-4  
issue date 27-Nov-2017

<b>Client:</b>	Australian Geotechnical Testing	<b>date tested</b>	17/11/17 - 24/11/17
<b>Address:</b>	21 Garden Boulevard, Dingley Village, 3803	<b>tested by</b>	PP
<b>Project:</b>	1075 Horseshoe Bend Rd Dam	<b>checked</b>	SB
<b>Location:</b>	Torquay		
<b>IDENTIFICATION</b>		(AGT51066-16) BH8 - 3.0m	
<b>SAMPLE DESCRIPTION</b>		Silty CLAY	
<b>PERMEANT USED</b>		Deaired water	
<b>CONFINING PRESSURE</b>		600	
kPa			
<b>HEAD PRESSURE</b>		590	
kPa			
<b>BOTTOM PRESSURE</b>		570	
kPa			
<b>MEAN PRESSURE</b>		20	
kPa			
<b>SPECIMEN HEIGHT</b>		6.90	cm
<b>SPECIMEN DIAMETER</b>		6.30	cm
<b>LENGTH TO HEIGHT RATIO</b>		110	
<b>DENSITY RATIO</b>		N/A	
<b>MOISTURE RATIO</b>		N/A	
<b>PERCENTAGE OVERSIZE (19.0 mm sieve)</b>		N/A	
<b>MOISTURE INITIAL</b>		23.3	
<b>MOISTURE FINAL</b>		27.8	
<b>PERMEABILITY</b>			
<b>M/SEC</b>		<b>1 x 10<sup>-10</sup></b>	



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian national standards  
Accredited for compliance with ISO/IEC 17025- Testing  
LABORATORY ACCREDITATION No 15357

Approved Signature

S Benbow



**TRIAXIAL PERMEABILITY TEST**  
AS 1289.6.7.3

47 National Avenue, Pakenham VIC 3810  
ph 03 5943 0980 www.terrafirmalabs.com.au

job No 9999  
report No 9999-3  
issue date 27-Nov-2017

<b>Client:</b>	Australian Geotechnical Testing	<b>date tested</b>	17/11/17 - 24/11/17
<b>Address:</b>	21 Garden Boulevard, Dingley Village, 3803	<b>tested by</b>	PP
<b>Project:</b>	1075 Horseshoe Bend Rd Dam	<b>checked</b>	SB
<b>Location:</b>	Torquay		
<b>IDENTIFICATION (AGT51066-15) BH5 - 7.0m</b>			
<b>SAMPLE DESCRIPTION Silty CLAY</b>			
<b>PERMEANT USED Deaired water</b>			
CONFINING PRESSURE	600		
kPa			
HEAD PRESSURE	590		
kPa			
BOTTOM PRESSURE	570		
kPa			
MEAN PRESSURE	20		
kPa			
SPECIMEN HEIGHT	6.83	cm	
SPECIMEN DIAMETER	6.30	cm	
LENGTH TO HEIGHT RATIO	108		
DENSITY RATIO	N/A		
MOISTURE RATIO	N/A		
PERCENTAGE OVERSIZE (19.0 mm sieve)	N/A		
MOISTURE INITIAL	28.4		
MOISTURE FINAL	32.9		
<b>PERMEABILITY</b>			
<b>M/SEC</b>	<b>3 x 10<sup>-10</sup></b>		



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian national standards  
Accredited for compliance with ISO/IEC 17025- Testing  
LABORATORY ACCREDITATION No 15357

Approved Signature

S Benbow



TRIAxIAL PERMEABILITY TEST  
AS 1289.6.7.3

47 National Avenue, Pakenham VIC 3810  
ph 03 5943 0980 www.terrafirmalabs.com.au

job No 9999  
report No 9999-2  
issue date 27-Nov-2017

<b>Client:</b>	Australian Geotechnical Testing	<b>date tested</b>	17/11/17 - 24/11/17
<b>Address:</b>	21 Garden Boulevard, Dingley Village, 3803	<b>tested by</b>	PP
<b>Project:</b>	1075 Horseshoe Bend Rd Dam	<b>checked</b>	SB
<b>Location:</b>	Torquay		
<b>IDENTIFICATION</b>		(AGT51066-14) BH4 - 4.0m	
<b>SAMPLE DESCRIPTION</b>		Silty CLAY	
<b>PERMEANT USED</b>		Deaired water	
<b>CONFINING PRESSURE</b>		600	
kPa			
<b>HEAD PRESSURE</b>		590	
kPa			
<b>BOTTOM PRESSURE</b>		570	
kPa			
<b>MEAN PRESSURE</b>		20	
kPa			
<b>SPECIMEN HEIGHT</b>		6.57	cm
<b>SPECIMEN DIAMETER</b>		6.28	cm
<b>LENGTH TO HEIGHT RATIO</b>		105	
<b>DENSITY RATIO</b>		N/A	
<b>MOISTURE RATIO</b>		N/A	
<b>PERCENTAGE OVERSIZE (19.0 mm sieve)</b>		N/A	
<b>MOISTURE INITIAL</b>		13.4	
<b>MOISTURE FINAL</b>		26.9	
<b>PERMEABILITY</b>			
<b>M/SEC</b>		<b>4 x 10<sup>-11</sup></b>	



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian national standards  
Accredited for compliance with ISO/IEC 17025- Testing

LABORATORY ACCREDITATION No 15357

Approved Signature

S Benbow





TRIAxIAL PERMEABILITY TEST  
AS 1289.6.7.3

47 National Avenue, Pakenham VIC 3810  
ph 03 5943 0980 www.terrafirmalabs.com.au

job No 9999  
report No 9999-1  
issue date 27-Nov-2017

<b>Client:</b>	Australian Geotechnical Testing	<b>date tested</b>	17/11/17 - 24/11/17
<b>Address:</b>	21 Garden Boulevard, Dingley Village, 3803	<b>tested by</b>	PP
<b>Project:</b>	1075 Horseshoe Bend Rd Dam	<b>checked</b>	SB
<b>Location:</b>	Torquay		
<b>IDENTIFICATION</b>	(AGT51066-13) BH1 - 5.0m		
<b>SAMPLE DESCRIPTION</b>	Silty CLAY		
<b>PERMEANT USED</b>	Deaired water		
<b>CONFINING PRESSURE</b>	600		
kPa			
<b>HEAD PRESSURE</b>	590		
kPa			
<b>BOTTOM PRESSURE</b>	570		
kPa			
<b>MEAN PRESSURE</b>	20		
kPa			
<b>SPECIMEN HEIGHT</b>	6.99	cm	
<b>SPECIMEN DIAMETER</b>	6.28	cm	
<b>LENGTH TO HEIGHT RATIO</b>	111		
<b>DENSITY RATIO</b>	N/A		
<b>MOISTURE RATIO</b>	N/A		
<b>PERCENTAGE OVERSIZE (19.0 mm sieve)</b>			
<b>MOISTURE INITIAL</b>	31.8		
<b>MOISTURE FINAL</b>	33.2		
<b>PERMEABILITY</b>			
<b>M/SEC</b>	$2 \times 10^{-10}$		



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian national standards  
Accredited for compliance with ISO/IEC 17025- Testing

LABORATORY ACCREDITATION No 15357

S Benbow  
Approved Signature



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	4
Location:	Torquay		

Sample Number:	51066-19	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 1 - 4.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	<small>Accreditation for compliance with ISO/IEC 17025 - Testing</small> <small>The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards</small>	Approved Signatory   Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 04-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	3
Location:	Torquay		

Sample Number:	51066-17	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 7 - 6.5-8.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 WORLD RECOGNISED ACCREDITATION	Accreditation for compliance with ISO/IEC 17025 - Testing	Approved Signatory 
	The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards	Marcus Green - Manager
NATA Accredited Laboratory No. 20245	Date:	04-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	2
Location:	Torquay		

Sample Number:	51066-11	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 5 - 3.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	<small>Accreditation for compliance with ISO/IEC 17025 - Testing</small> <small>The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards</small>	Approved Signatory  Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 04-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	8
Location:	Torquay		

Sample Number:	51066-24	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 3 - 3.0m

Material Description: Clayey SAND


**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	Accreditation for compliance with ISO/IEC 17025 - Testing The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards	Approved Signatory  Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 04-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	7
Location:	Torquay		

Sample Number:	51066-23	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 2 - 6.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	<small>Accreditation for compliance with ISO/IEC 17025 - Testing</small> <small>The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards</small>	Approved Signatory   Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 04-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	6
Location:	Torquay		

Sample Number:	51066-22	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 8 - 2.0m

Material Description: Clayey SAND



**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 WORLD RECOGNISED ACCREDITATION	Accreditation for compliance with ISO/IEC 17025 - Testing	Approved Signatory	 Marcus Green - Manager
	The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards	NATA Accredited Laboratory No. 20245	



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	5
Location:	Torquay		

Sample Number:	51066-21	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	SH
Date Sampled:	9/Nov/17	Date Tested:	1-Dec-17

Sample Location: BH 5 - 6.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 23 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	<small>Accreditation for compliance with ISO/IEC 17025 - Testing</small> <small>The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards</small>	Approved Signatory   Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 04-Dec-17





# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	13
Location:	Torquay		

Sample Number:	51066-10	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	MG
Date Sampled:	9/Nov/17	Date Tested:	5-Dec-17

Sample Location: BH 4 - 2.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 24 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	<small>Accreditation for compliance with ISO/IEC 17025 - Testing</small> <small>The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards</small>	Approved Signatory   Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 05-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	15
Location:	Torquay		

Sample Number:	51066-20	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	MG
Date Sampled:	9/Nov/17	Date Tested:	5-Dec-17

Sample Location: BH 4 - 3.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 24 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 <small>WORLD RECOGNISED ACCREDITATION</small>	Accreditation for compliance with ISO/IEC 17025 - Testing The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards	Approved Signatory   Marcus Green - Manager
	NATA Accredited Laboratory No. 20245	Date: 05-Dec-17



# Emerson Class Report

## AS1289.3.8.1

Australian Geotechnical Testing  
21 Garden Boulevard  
Dingley Village VIC 3172  
PO Box 221 Hallam, VIC 3803  
ph 1300 026 583

info@ausgeotest.com.au

Client:	The Dunes Torquay	Job No:	AGT51066
Project:	1075 Horseshoe Bend Road Dam	Report:	14
Location:	Torquay		

Sample Number:	51066-12	Sampled By:	MN
Sampling Method:	AS 1289.1.2.1.6.4(b)	Tested By:	MG
Date Sampled:	9/Nov/17	Date Tested:	5-Dec-17

Sample Location: BH 8 - 6.0m

Material Description: Clayey SAND

**Emerson Class Number** 4

Water Used: Distilled Water      Water Temperature: 24 °C

Notes:

2% solution of barium chloride showed that gypsum is present.

Test Method: AS1289.3.8.1

 WORLD RECOGNISED ACCREDITATION	Accreditation for compliance with ISO/IEC 17025 - Testing The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / national standards	Approved Signatory 
	NATA Accredited Laboratory No. 20245	Marcus Green - Manager Date: 05-Dec-17



## Appendix D – Rainfall Data

# Daily Rainfall (millimetres)

## TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

1974	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st												0
2nd												0
3rd												0
4th												0.8
5th												0
6th												0
7th												0
8th												0
9th												0
10th												0.1
11th												2.1
12th												3.4
13th												0
14th												0
15th												0
16th												0.6
17th												0
18th											9.0	0
19th											0	0
20th											0	3.3
21st											0	0
22nd											0	0
23rd											0	0
24th											0	0
25th											0	0
26th											0	0
27th											0.2	7.6
28th											0.6	4.6
29th											1.4	0.6
30th											1.0	0
31st												0
<b>Highest daily</b>											9.0	7.6
<b>Monthly Total</b>											12.2	23.1

↓ This day is part of an accumulated total

Quality control: 12.3 Done & acceptable, **12.3** Not completed or unknown

Product code: IDCJAC0009 reference: 33779642



## Daily Rainfall (millimetres)

### TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

#### Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Mean</b>	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
<b>Median</b>	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
<b>Highest daily</b>	42.0	90.0	56.0	70.0	38.6	25.0	30.8	39.2	35.8	40.4	45.0	61.2
<b>Date of highest daily</b>	1st 1988	8th 2002	22nd 2001	23rd 2001	6th 1977	9th 1998	10th 1981	31st 2005	22nd 1976	3rd 1981	22nd 1988	2nd 1987

#### 1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

#### 2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

#### 3) Further information

<http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml>.

Product code: IDCJAC0009 reference: 33779642 Created on Sat 09 Dec 2017 20:07:08 PM EST

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<http://www.bom.gov.au/other/copyright.shtml>



## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	12.0	0	7.5					
2nd	0	0	0	0	↓	0	0					
3rd	0	2.6	0	0	↓	0	0					
4th	0	0.6	0	0	2.5 3 days	6.5	2.5					
5th	0	0	0	0	0	↓	1.5					
6th	0	0	0	5.0	0	3.0 2 days	23.0					
7th	0	0	1.0	3.0	0	0	0					
8th	0	0	0	0	↓	↓	8.0					
9th	0	0	0	0	3.5 2 days	4.5 2 days	0					
10th	0	0	3.0	0	28.0	2.0	0					
11th	0	0	4.0	0	3.0	↓	4.5					
12th	1.0	0	0	↓	1.5	4.0 2 days	0					
13th	0	0	0	2.5 2 days	0	0	16.5					
14th	1.0	0	0	0	0	0	1.0					
15th	0	0	0	0	0	0	0					
16th	0	0	0	↓	0	0	0					
17th	0	0	0	1.5 2 days	6.0	3.5	0					
18th	0	1.0	26.0	0	0	5.5	0					
19th	0	0	↓	0	0	0	0					
20th	1.0	0	2.0 2 days	0	2.5	1.5	0					
21st	0	0	0	0	0	1.5	0					
22nd	0	0	0	5.0	0	1.0	24.0					
23rd	12.0	1.0	0	0	3.0	4.0	9.0					
24th	0	0	0	0	3.0	6.0	0					
25th	1.0	7.5	0	0.5	0	↓	0					
26th	0		0	0	↓	7.0 2 days	7.5					
27th	0		0.5	0	12.5 2 days	0						
28th	17.0		0	0	↓	0						
29th	1.0		0	1.0	2.5 2 days	0						
30th	9.0		0	6.0	0	4.0						
31st	3.0		0									
Highest Daily	17.0	7.5	26.0	6.0	28.0	6.5	24.0					
Monthly Total	46.0	12.7	36.5	24.5	80.0	54.0	105.0					

Annual total for 2016 = n.a

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in *italics* represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	9.6	22.0	0.6	0	0	0	0	5.2				
2nd	0	0	0	0	0	0	0	11.2				
3rd	0	0	0	0	0	0	0	2.0				
4th	0	0	0	0	0	0	0	0				
5th	0	12.2	0	0.6	3.2	0	0	8.8				
6th	0	0	48.0	0	1.2	8.2	0	2.0				
7th	0	0	7.0	11.0	0	1.0	0	0				
8th	0	0	19.0	1.4	2.2	0	0	0				
9th	0	0	3.6	0	0	0	0	0				
10th	0	0	0	↓	0	5.2	0	0				
11th	0	0	0	↓	4.2	0	↓	↓				
12th	0	15.0	0	2.6 3 days	3.0	↓	5.0 2 days	30.4 2 days				
13th	↓	0	0	0	2.5	↓	0	3.2				
14th	↓	0	0	0	3.0	↓	4.4	0				
15th	↓	6.0	0	0	2.0	9.8 4 days	9.8	↓				
16th	↓	0	0	0	0	0	1.2	6.4 2 days				
17th	↓	0	0	0	0	5.2	0	0				
18th	7.8 6 days	0	0	0	0	4.0	0	0				
19th	5.8	0	1.0	0	0	0.6	0.8	10.0				
20th	0	0	0	0	0	2.2	0	2.6				
21st	0	0	0	1.2	4.6	0	1.5	↓				
22nd	0	0	0	0	0	0	0.6	2.2 2 days				
23rd	0	0	0	2.0	0	0	0	0				
24th	0	0	0	5.5	0	0	0	0				
25th	0	0	0	0	0.5	5.0	0	6.6				
26th	0	0	0	0	2.5	6.8	1.0	0.5				
27th	0	0	↓	0	0	3.8	0	2.8				
28th	0	0	↓	0	0	0	0	1.0				
29th	0	10.8 3 days	1.5	↓	0	7.0	0	0				
30th	0	0	0	0	6.0 2 days	15.2	1.0	0				
31st	0	0	0	0	0	0	9.2	0				
Highest Daily	9.6	22.0	48.0	11.0	4.6	15.2	9.8	11.2				
Monthly Total	23.2	55.2	90.0	25.8	34.9	67.0	41.5	94.9				

Annual total for 2010 = n.a

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0.8	0	0	0	3.4	↓				
2nd	1.0	0	0	0	0	↓	7.0	↓				
3rd	0	0	0	0	0	6.0 2 days	6.4	3.8 3 days				
4th	0	0	1.0	↓	0	6.0	↓	0				
5th	0	0	6.0	↓	0	0	↓	0				
6th	0	0	4.0	1.6 3 days	0	↓	3.0 3 days	0				
7th	1.2	↓	0	1.8	0	↓	5.2	3.0				
8th	0	↓	0	0	0	↓	0	↓				
9th	0	1.6 3 days	0	0	0	4.0 4 days	0	↓				
10th	0	0	0	0	0	13.4	0	1.8 3 days				
11th	0	0	0	0	0	2.2	↓	3.0				
12th	0	0	0	0	0	0	13.0 2 days	2.6				
13th	0	0	10.0	0	0	0	0	0				
14th	0	0	0	↓	↓	1.4	7.4	0				
15th	0	0	7.0	↓	↓	0	0	↓				
16th	0	0	1.0	4.8 3 days	8.0 3 days	0	5.0	↓				
17th	0	0	1.4	0.2	0	0	0	3.6 3 days				
18th	0	0	0	0	0	0	0	0				
19th	0	0	0	1.2	0	0	0	0				
20th	0	0	0	0	0	0	0	5.6				
21st	0	0	0	0	0	↓	0	8.0				
22nd	0	0	0	0	0	↓	0	↓				
23rd	0	0	0	0	0	↓	11.2	↓				
24th	0	0	0	4.2	0	2.8 4 days	0.6	3.4 3 days				
25th	0	0.4	↓	4.8	0	0	0	5.0				
26th	0	0	6.2 2 days	5.0	14.0	0	0	10.0				
27th	0	0	0	8.0	0	0	0	0				
28th	0	0	0	7.0	0	0	0	0				
29th	0	0	0	2.0	2.0	0	2.0	↓				
30th	0	0	0	0	0	1.0	0.4	↓				
31st	0	0	0	0	0	0	2.2	20.4 3 days				
Highest Daily	1.2	0.4	10.0	8.0	14.0	13.4	11.2	10.0				
Monthly Total	2.2	2.0	37.4	40.6	24.0	36.8	66.8	70.2				

Annual total for 2009 = n.a

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in *italics* represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2008	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	1.0	0	0	0	0	12.3	2.2	0	0	0	2.0
2nd	0	0	0	0	2.0	0	0	↓	1.2	0	0	0
3rd	0	0	0	2.0	1.8	0	0	2.0 2 days	5.8	0	2.0	0
4th	0	0	0	0	0	0	0	1.6	0	↓	0	0
5th	0	0	0	0	0	0	0	0	0	↓	0	2.5
6th	0	0	0	0	0	0	0	0	0	5.6 3 days	0	0
7th	0	4.5	0	0	0	0	5.6	0	0	↓	0	0
8th	0	2.7	0	0	0	1.2	5.0	0	↓	2.0 2 days	↓	0
9th	0	1.0	0	0	0	0	0	↓	4.2 2 days	0	↓	0
10th	0		0	0	0	3.8	↓	↓	0	0	15.2 3 days	6.4
11th	0	0	0	0	0	1.0	8.0 2 days	20.0 3 days	0	0	0	0
12th	0	0	0	0	0	0	0	4.2	0	0	0	0
13th	0	0	0	0	0	7.0	0	2.0	0	0	0	37.4
14th	0	0	0	0	0	2.0	0	0	0	0	7.4	13.8
15th	0	0	0	0	0	0	0	0	2.4	0	0	0
16th	0	0	0	0	0	0	0	↓	5.0	0	0	0
17th	0	0	0	0	9.0	0	0	4.0 2 days	1.8	0	0	1.6
18th	0	0	0	0	8.4	0	2.4	3.5	0	0	0	0
19th	↓	0	0	0	1.2	0	0	2.4	0	0	↓	1.2
20th	4.6 2 days	↓	0	0	0	3.0	5.6	0	↓	0	↓	0
21st	1.4	7.0 2 days	0	0	0	0.4	11.4	4.2	↓	0	4.2 3 days	0
22nd	0	0	0	0	0	5.4	↓	6.2	↓	2.0	7.5	0
23rd	0	1.0	0	0	0	0	↓	0	10.0 4 days	0	2.5	0
24th	0	0	0	0	0	7.2	↓	0	1.0	0	0	0
25th	0	0	↓	0	0	0	↓	0	0	0	0	0
26th	0	0.5	17.2 2 days	0	0	5.0	↓	0	0	0	0	0
27th	0	0	↓	↓	4.2	0	↓	0	0	0	0	1.0
28th	0	9.0	14.0 2 days	5.0 2 days	0	0	5.6 7 days	2.0	0	0	0	0
29th	0	1.2	0	↓	0	0	0	0	2.5	0	0	0
30th	0		0	3.0 2 days	0	2.0	0	0	0.5	2.2	0	4.0
31st	2.4		0		0		1.2	5.0		0		0
Highest Daily	2.4	9.0	0.0	2.0	9.0	7.2	12.3	6.2	5.8	2.2	7.5	37.4
Monthly Total	8.4		31.2	10.0	26.6	38.0	57.1	59.3	34.4	11.8	38.8	69.9

Annual total for 2008 = n.a

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2007	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	↓	0	0	0	0	0	5.0	1.0	0	↓	0	0
2nd	3.0 2 days	0	0	0	0	0	↓	0	0	↓	14.0	0
3rd	0	0	0	0	5.5	↓	4.0	2.5	4.4	↓	0	7.0
4th	0	0	0	0	4.5	9.0 4 days	↓	↓	0	↓	36.0	0
5th	0	0	2.0	0	0	0	↓	↓	0	4.6 5 days	20.0	0
6th	0	0	0	0	7.2	4.8	↓	12.0 3 days	0	2.8	0	0
7th	↓	0	0	0	0	0	25.0 4 days	0	0	0	0	↓
8th	7.0 2 days	0	0	0	0	0	25.0	0	0	0	0	↓
9th	0	0	0	0	0	0	3.5	0	0	0	0	↓
10th	0	0	0	0	0	0	0	4.5	3.0	0	0	4.0 4 days
11th	0	3.4	0	0	0	8.0	0	0	3.0	3.4	0	0
12th	0	0	0	0	0	9.0	3.6	8.0	0	↓	0	0
13th	0	0	0	0	0	8.0	6.7	2.0	0	↓	0	0
14th	0	0	0	0	0	0	11.6	0	0	4.0 3 days	0	0
15th	0	0	0	0	0	0	6.0	1.5	0	0	0	↓
16th	0	0	1.6	0	8.6	0	0	0	0	0	0	8.0 2 days
17th	0	0	0	0	0	0	↓	0	5.5	0	0	0
18th	0	0	0	0	4.5	19.0	12.0 2 days	↓	0	0	0	0
19th	↓	5.8	0	0	0	6.0	6.5	↓	0	0	0	0
20th	↓	0	0	0	0	3.0	1.5	3.0 3 days	6.0	0	0	7.0
21st	25.0 3 days	0	0	0	0	10.5	0	0	0	0	14.0	9.4
22nd	3.0	0	0	7.6	2.4	0	0	0	0	0	3.6	16.0
23rd	0	0	0	0	0	0	0	0	0	7.6	0	9.6
24th	0	0	9.5	0	0	0	0	0	0	0	0	↓
25th	0	0	8.8	0	0	0	0	0	0	0	0	↓
26th	0	0	2.6	0	0	0	0	0	0	3.0	1.0	↓
27th	0	0	0	0	0	3.0	7.0	0	4.4	0	0	3.0 4 days
28th	0	4.2	0	11.0	0	0	↓	0	7.6	0	0	0
29th	0	0	1.2	8.0	0	0	↓	0	9.0	0	0	0
30th	0	0	1.8	0	7.0	1.6	3.0 3 days	0	3.0	0	0	0
31st	0	0	0	0	7.6	0	0	0	0	0	0	0
Highest Daily	3.0	5.8	9.5	11.0	8.6	19.0	25.0	8.0	9.0	7.6	36.0	16.0
Monthly Total	38.0	13.4	27.5	26.6	47.3	81.9	120.4	34.5	45.9	25.4	88.6	64.0

Annual total for 2007 = 613.5 mm

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2006	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0.8	0	8.4	6.2	0	0	0	0	0	0	0
2nd	9.4	7.5	0	0	21.2	2.5	3.0	0	0	0	2.5	0
3rd	0	0	0	2.0	0	2.0	1.0	1.4	0	0	0.8	0
4th	0	0	0	1.4	4.5	0	1.2	4.6	0	0	0	0
5th	0	0	0	0	1.0	0	0	0	0	1.5	0	0
6th	0	0	0	2.0	13.6	0	0.8	0	↓	0	0	0
7th	0	0	0	2.5	5.0	0	0	1.0	6.6 2 days	0	0	0
8th	0	0	0	1.0	1.6	0	↓	0	↓	0	0	0
9th	0	↓	0	0	0	0	1.2 2 days	0	↓	0	0	0
10th	0	8.2 2 days	0	0	1.0	0	0	0.5	5.0 3 days	0	0	0
11th	8.2	0	0	0	0	2.8	0	0	0	0	0	0
12th	0.8	0	0	0	0	0	3.6	0	0	0	0.8	0
13th	1.0	0	8.4	0	0	0	1.8	0	0	0	0	0
14th	0	0	0	0	0	0	0	0	0	0	4.0	0
15th	0	0	0	9.5	1.6	0	3.4	1.0	0	0	3.0	0
16th	0	0	0	2.5	0	↓	3.6	0	0	0	4.0	0
17th	0	0	0	0	0	↓	1.4	2.0	0	0	0	0
18th	0	0	0	0	0.5	8.2 3 days	0	0	0	0	0	0
19th	0	0	0	0	0	0	0	0	0	0	0	0
20th	0	0	0	3.0	1.6	0	0	0	5.6	0	0	0
21st	0	0	0	6.6	0	0	0	0	0	4.0	0	0
22nd	0	0	0	0	3.5	0	0	1.4	0	0	0	0
23rd	0	0	0	0	0	4.2	↓	0	0	0	0	4.8
24th	0	0	0	0	↓	0	1.8 2 days	10.0	5.2	0	0	0
25th	0	↓	0	0	6.4 2 days	0	0	1.8	3.0	0	0	↓
26th	0	6.6 2 days	0	0	0	0	0	1.8	0	0	0	20.0 2 days
27th	0	0	0	0	0	0	0	0	0	0	0	0
28th	0	0	0	0	0	0	0	0	0	↓	0	0
29th	6.5		0	0	2.4	0	0	0	0	7.6 2 days	0	0
30th	4.8		0	0	0	0.8	0	0	0	0	0	0
31st	0.8		2.0		0		3.0	0		0		0
Highest Daily	9.4	7.5	8.4	9.5	21.2	4.2	3.6	10.0	5.6	4.0	4.0	4.8
Monthly Total	31.5	23.1	10.4	38.9	70.1	20.5	25.8	25.5	25.4	13.1	15.1	24.8

Annual total for 2006 = 324.2 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799210

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160    Opened: 1974    Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

2005	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	1.2	1.0	3.5	0		1.8	0	0
2nd	0	26.6	0.5	0	0	0	0	0	0	0	0	0
3rd	0	88.4	0	4.0	0	0	0	0	0	0	0	9.8
4th	5.0	5.0	0	0	0	0	0	10.8	0	0	0	0
5th	3.2	0	7.0	0	0	0	0	3.8	0	0	0	0
6th	0.8	0.8		0	0	0	0	0	0	0	0	0
7th	0.2	0	0.5	0	0	0	1.5	0.4	0	0	0	26.8
8th	0	3.4	0	3.0	0	0	0	2.7	0	19.0	8.0	0
9th	0	1.8	0	0	0	7.2	3.2	0	3.0	3.4	1.4	0
10th	0	0	0	0	0	1.5	6.4	3.0	3.0	0	0	0
11th	0	0	0	0	0	12.0	2.2	4.0	0	6.3	4.1	0
12th	0	0.2	0	0	0	0	0	2.2	22.5	0	0	0
13th	0	0	0	0	0.8	0	0	0	1.0	0	0	1.5
14th	0	0	0	6.5	0	6.2	4.2	0	0	0	0	0
15th	0	0.2	0	0	0	0	↓	2.0	1.0	0	18.5	0
16th	0	0	1.0	0	0	3.2	4.0 2 days	0	4.0	0	0	0
17th	0	0	0	0	0	0	4.8	0	↓	0	0	0
18th	0	0	0	0	0	0	0	0	8.0 2 days	0	0	2.6
19th	0.4	0	0	0	0	4.4	0	0	1.3	0	3.0	0
20th	0	0	0	0	0	4.6	0	5.4	0.5	8.4	0.5	0
21st	0	0	0	0	0	0.2	0	0	0	2.0	0	0
22nd	0	0	0	0	0	0.8	0	7.8	0	↓	0	0
23rd	0	0	0	0	0	0	3.2	1.7	1.6	↓	0	0
24th	0	0.2	0	0	2.0	0	1.2	0.8	0.4	4.4 3 days	0	3.6
25th	0	0	1.2	0	0	0	6.6	0	0	0	0	0
26th	0	0	0	0	0.7	0	5.5	0	0	0	2.3	1.6
27th	27.4	0	0	0	2.0	0	0	0	0	1.0	0	0
28th	0	0	0.4	0	0	0	0.2	0	0	0	0	0
29th	1.4		0	1.6	0	0	0	0	10.0	0.8	0	0
30th	2.2		0	0	1.6	0	0	4.8	0.8	0	0	0
31st	0		0		1.3		0	39.2		0		0
Highest Daily	27.4	88.4	7.0	6.5	2.0	12.0	6.6	39.2	22.5	19.0	18.5	26.8
Monthly Total	40.6	126.6		15.1	9.6	41.1	46.5	88.6		47.1	37.8	45.9

Annual total for 2005 = n.a

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799230

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

2004	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0.5	0	0	4.2	0	7.6	0	1.4	0	0	7.0
2nd	0	2.0	0	0	0.4	0	0.2	1.0	0	0	0	0
3rd	0	0	0	0	0	0	0	6.6	0	0	10.4	0
4th	0	0	0	0	0.3	0	0.5	0	6.5	2.0	0	0
5th	10.0	0	0	0	2.0	0.6	0.2	3.0	0.1	0.4	11.6	0
6th	0	0	0	0	0	0	1.2	5.0	0	0	4.2	0
7th	0.2	0	0	0	0	0	4.0	0.8	0	0.2	8.0	0
8th	2.4	0	0	0	0.8	0	2.2	0	9.2	4.4	0.6	0.8
9th	0.4	0	7.4	0	0	7.0	0	0.8	0.8	0	0	2.8
10th	0	0	4.0	0	0	9.2	0	0.8	0	0	0	1.8
11th	0	14.6	0	0.5	0	1.2	0	0	13.2	0	0.2	3.0
12th	0	5.0	0	0	0	0	2.0	0	11.2	0	38.2	2.0
13th	0	0	0	0	0	2.2	0.8	2.8	0	0	18.0	0.6
14th	0.5	0	0	0	0	4.2	0.1	7.2	1.5	0	2.4	0.6
15th	0	0	0	0	0	1.0	0.6	8.4	3.6	0.6	0.8	0
16th	0	0	0	1.2	1.2	0	0	0.8	2.4	0	0	0
17th	0	0	0	0	0	0.2	6.8	0	0	0	0	0
18th	3.0	0	0	1.0	5.2	4.4	1.4	0	0	0	0	0
19th	0	0	0	0	3.8	1.0	0.8	0	0.2	0	1.4	0.4
20th	0	0	0	0	0	8.6	0.5	0.5	0	0	0.6	0
21st	0	0	0	0	0.4	0.4	0	0	0	0	0	0
22nd	0	0	0	0	0	0.2	0	1.3	0	0	0	0
23rd	0	0	0	23.4	0	0	0	0.8	3.6	0.4	0	0
24th	0	0	0	8.6	3.4	1.2	8.6	0	0	0	0	0
25th	0.8	0	0	0.4	0	2.0	0	0	0.4	0	0	0
26th	0	0	0	0	0.6	4.4	1.6	0	0	0	0	0
27th	0	0	0	7.4	7.8	1.0	1.6	0.8	0.6	36.0	0	2.4
28th	1.4	0	0	0	1.4	0	5.0	0	0	3.8	0	4.8
29th	1.0	0.6	10.2	0	1.0	2.0	0	0	5.2	0	0	1.4
30th	6.2		3.2	1.5	0	0	0	9.8	0	0	0.2	0
31st	0		0		1.2		0	9.6		0		0
Highest Daily	10.0	14.6	10.2	23.4	7.8	9.2	8.6	9.8	13.2	36.0	38.2	7.0
Monthly Total	25.9	22.7	24.8	44.0	33.7	50.8	45.7	60.0	59.9	47.8	96.6	27.6

Annual total for 2004 = 539.5 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 <small>1st 1988</small>	<i>90.0</i> <small>8th 2002</small>	56.0 <small>22nd 2001</small>	70.0 <small>23rd 2001</small>	38.6 <small>6th 1977</small>	25.0 <small>9th 1998</small>	30.8 <small>10th 1981</small>	39.2 <small>31st 2005</small>	35.8 <small>22nd 1976</small>	40.4 <small>3rd 1981</small>	45.0 <small>22nd 1988</small>	61.2 <small>2nd 1987</small>

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2003	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	10.0	0	↓	0	1.6	0	2.4	0	4.0	0	3.4	4.0
2nd	0	0	5.8 2 days	0	0	1.2	0	0	1.6	24.2	2.6	0
3rd	0	0	0	0	0	0.6	0	0	0.5	1.0	0	0
4th	0	0	0	0	0	0.3	0	0	0	0.4	0	0
5th	0	0	1.2	0	0	1.8	0	0	0	0	0	2.4
6th	0	0	0	0	0	4.2	0	1.6	3.0	0	0	0
7th	0	0	0	0	0	6.2	0	0	0	0	0	0
8th	0	0	2.4	3.4	0	0	0.3	0	0	1.4	0	0
9th	0	0	1.0	0.4	0	0.3	0	5.2	0	0.2	1.0	0
10th	0	0	0	0	0	0	0	2.0	0.2	2.6	0	0
11th	0	0	0	16.0	0	0	0	2.0	1.0	2.0	0	0
12th	0	0	0	5.0	0	0	0.3	2.4	8.6	1.2	0	0
13th	0	0	0	0.8	0	1.4	1.6	8.8	0	0	0	3.0
14th	0	0	0	18.4	0	1.3	0	2.0	5.0	0	0	0
15th	0	0	0	2.4	0.5	0	0	2.2	6.0	4.2	0	0
16th	0	0	0	4.4	0.4	0	8.2	0	1.4	0	0	0
17th	0	0	0	0	0	1.0	0.3	0	0.4	0	0	0
18th	0	0	0	0	7.0	0	0	2.2	3.2	0	0	0
19th	0	0	0	0	1.4	0.4	1.0	1.4	0.4	0	0	3.6
20th	0	0	10.2	0	1.0	0.5	0	0	0	2.0	2.6	0
21st	0	6.6	4.6	0	4.5	0	0	0	0	4.5	0	0
22nd	0	17.0	5.0	0	0.3	1.0	3.8	6.0	0	2.5	0	24.0
23rd	0	0	0	0	0	1.5	0	0	0.2	5.3	11.0	0
24th	0	0	0	0.3	0	0	12.4	18.0	3.0	4.4	0	0
25th	0	0.8	0	0	0	0	11.0	9.0	4.0	0	0	0
26th	0	0	0	0	0.6	0	9.4	2.0	4.2	3.2	0	0
27th	2.4	0	0	0	0	5.0	1.0	3.8	2.4	0	0	0
28th	0	0	0	0	0	3.0	0	0	2.0	0	0	0
29th	0		0	0	0	2.0	13.0	0	0.6	10.6	0	0
30th	0.8		0	0	0	0.6	24.0	5.6	1.6	0.4	0	0
31st	6.0		0		0		0.3	3.0		17.8		0
Highest Daily	10.0	17.0	10.2	18.4	7.0	6.2	24.0	18.0	8.6	24.2	11.0	24.0
Monthly Total	19.2	24.4	30.2	51.1	17.3	32.3	89.0	77.2	53.3	87.9	20.6	37.0

Annual total for 2003 = 539.5 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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Product Code: IDCJAC0009 reference: 33799284

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2002	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	5.0	0	0	0	0	3.0	0	0	0	0	0	0
2nd	2.0	0	0	0	0	0	0	5.0	0	0	0	0
3rd	2.0	0	2.0	0	0	0	8.0	7.0	3.0	0	2.0	0
4th	0	0	0	3.0	0	0	3.0	6.0	1.0	↓	2.0	0
5th	0	0	0	0	0	0	0	0	0	1.0 2 days	1.0	4.0
6th	0	0	0	0	0	0	0	0	1.0	0	0	8.0
7th	0	0	0	0	0	0	0	3.0	1.0	0	0	1.0
8th	2.0	90.0	0	0	0	1.0	3.0	2.0	0	1.0	0	0
9th	0	0	0	0	0	3.0	1.4	0	6.0	2.0	0	0
10th	0	4.0	0	0	1.0	0	0	0	3.0	0	0	0
11th	0	0	0	0	0	2.0	0	0	3.0	0	0	0
12th	0	0	0	0	0	0	0	6.0	0	0	0	0
13th	0	0	0	24.0	2.0	7.0	0	13.0	0	11.0	2.0	0
14th	0	0	0	1.0	0	3.0	0	8.0	0	5.0	0	0
15th	0	0	0	0	0	3.0	0	1.0	0	0	0	0
16th	0	2.0	0	0	7.0	1.0	0	0	5.0	0	0	0
17th	0	0	0	0	5.0	8.0	0	0	3.0	0	0	0
18th	0	0	0	0	0	5.0	0	0	1.0	0	0	0
19th	0	0	0	0	10.0	0	0	0	3.0	0	0	0
20th	0	0	0	0	10.0	0	0	0	0	0	0	0
21st	0	0	10.0	0	17.0	0	9.0	0	0	0	0	0
22nd	6.0	0	0	0	5.0	0	2.0	0	0	0	0	0
23rd	4.0	0	0	0	0	0	0	2.0	0	6.0	0	0
24th	0	0	0	0	0	0	4.0	0	0	4.0	0	0
25th	0	0	0	6.0	0	1.0	0	0	0	9.0	0	0
26th	0	0	4.0	0	0	1.0	0	0	0	0	24.0	0
27th	0	0	0	0	3.0	0	0	0	0	↓	0	0
28th	2.0	0	0	0	9.0	16.0	0	0	4.0	2.0 2 days	0	0
29th	0	0	0	0	3.0	4.0	3.3	9.0	7.0	0	0	0
30th	0	0	0	0	0	0	0	0	0	0	0	2.0
31st	0	0	0	0	0	0	0	2.0	0	0	0	10.0
Highest Daily	6.0	90.0	10.0	24.0	17.0	16.0	9.0	13.0	7.0	11.0	24.0	10.0
Monthly Total	23.0	96.0	16.0	34.0	72.0	58.0	33.7	64.0	41.0	41.0	31.0	25.0

Annual total for 2002 = 534.7 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 <small>1st 1988</small>	90.0 <small>8th 2002</small>	56.0 <small>22nd 2001</small>	70.0 <small>23rd 2001</small>	38.6 <small>6th 1977</small>	25.0 <small>9th 1998</small>	30.8 <small>10th 1981</small>	39.2 <small>31st 2005</small>	35.8 <small>22nd 1976</small>	40.4 <small>3rd 1981</small>	45.0 <small>22nd 1988</small>	61.2 <small>2nd 1987</small>

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2001	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0	0	0	7.0	0	10.0	0	0
2nd	0	0	0	0	0	0	8.0	2.0	4.0	0	0	↓
3rd	0	0	0	0	0	0	0	0	0	25.0	0	16.0 2 days
4th	0	↓	0	0	0	0	0	0	↓	4.0	0	4.0
5th	2.0	25.0 2 days	0	0	0	0	0	8.0	6.0 2 days	0	0	0
6th	0	0	0	0	0	6.0	2.0	0	0	5.0	10.0	0
7th	0	0	0	0	0	6.0	14.0	0	0	3.0	0	12.0
8th	0	0	0	0	0	0	↓	↓	4.0	↓	3.0	0
9th	0	8.0	0	5.0	0	3.0	5.0 2 days	6.0 2 days	↓	↓	0	0
10th	0	0	0	0	0	5.0	2.0	0	6.0 2 days	↓	0	0
11th	0	0	0	0	0	0	0	0	0	↓	16.0	↓
12th	0	0	0	0	0	4.0	2.0	0	3.0	8.0 5 days	10.0	2.0 2 days
13th	0	10.0	0	0	0	0	3.0	0	0	↓	8.0	0
14th	0	0	0	0	0	5.0	0	0	0	5.0 2 days	0	0
15th	0	0	0	0	0	7.0	0	0	0	0	0	0
16th	0	0	0	0	0	↓	↓	0	0	6.0	0	0
17th	0	0	↓	0	0	5.0 2 days	3.0 2 days	14.0	0	0	0	0
18th	0	0	16.0 2 days	0	10.0	0	0	10.0	0	↓	19.0	0
19th	0	0	0	0	0	0	4.0	↓	0	8.0 2 days	0	0
20th	0	0	0	0	0	0	↓	10.0 2 days	0	0	0	0
21st	0	0	10.0	4.0	2.0	↓	4.0 2 days	4.0	0	0	0	0
22nd	0	0	56.0	50.0	0	6.0 2 days	0	12.0	0	0	0	0
23rd	0	0	6.0	70.0	0	0	0	6.0	↓	0	0	0
24th	0	0	0	28.0	0	0	0	0	↓	18.0	12.0	0
25th	4.0	0	6.0	0	0	0	0	0	12.0 3 days	2.0	0	0
26th	0	0	0	0	0	0	0	0	4.0	↓	4.0	2.0
27th	12.0	0	0	0	3.0	0	0	0	0	7.0 2 days	0	6.0
28th	0	0	0	9.0	4.0	0	7.0	0	0	↓	0	6.0
29th	0	0	0	0	↓	0	0	0	0	↓	0	0
30th	0	0	0	0	5.0 2 days	0	0	0	0	4.0 3 days	0	0
31st	0	0	0	0	4.0	0	0	0	0	0	0	0
Highest Daily	12.0	10.0	56.0	70.0	10.0	7.0	14.0	14.0	4.0	25.0	19.0	12.0
Monthly Total	18.0	43.0	94.0	166.0	28.0	47.0	54.0	79.0	39.0	105.0	82.0	48.0

Annual total for 2001 = 803.0 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in *italics* represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799320

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

2000	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	4.0	0	0	12.5	0	2.2	↓	0	0	9.0	0	0
2nd	0	0	0	0	0	0	↓	0	0	0	24.0	0
3rd	0	0	0	0	0	0	↓	0	0	0	0	0
4th	1.5	0	2.0	0	3.0	0	↓	0	0	0	0	0
5th	0	0	0		15.0	10.0	↓	0	11.2	0	0	0
6th	0	0	1.0	0	22.0	2.0	15.0 6 days	0	0	0	0	0
7th	0	0	2.0	0	0	18.0	0	0	0	0	0	0
8th	0	0	0	0	0	3.0	0	0	19.0	2.0	0	0
9th	0	0	0	0	0	0	0	0	0	0	0	0
10th	0	0	0	0	0	0	0	0	0	3.0	0	0
11th	0	5.5	0	0	0	0	2.6	0	8.8	0	0	0
12th	0	0	0	0	0	0	0	0	0	0	0	0
13th	0	0	0	0	0	0	0	7.0	0	0	0	0
14th	0	0	3.0	0	0	0	0	0	0	0	0	0
15th	0	0	0	0	2.0	0	0	5.8	0	↓	0	0
16th	3.0	0	0	4.0	0	0	0	0	0	11.4 2 days	0	0
17th	0	0	0	0	0	4.0	0	0	0	0	0	0
18th	0	0	0	0	0	0	0	0	0	↓	0	0
19th	0	0	0	0	0	0	16.0	0	0	↓	0	0
20th	0	0	0	0	0	0	↓	0	0	11.6 3 days	0	0
21st	0	0		0	0	4.2	5.0 2 days	0	0	0	0	0
22nd	↓	0	0	0	0	0	0	0	0	0	0	5.0
23rd	5.0 2 days	0	0	0	0	0	0	9.4	0	0	0	17.0
24th	0	0	0	0	0	0	2.6	3.0	0	↓	0	0
25th	↓	0	0	0	0	0	3.8	0	8.5	38.0 2 days	0	0
26th	↓	0	0	0	0	0	14.8	0	6.5	0	0	0
27th	15.0 3 days	0	0	0	↓	↓	6.0	0	4.0	0	0	5.0
28th	0	0	0	0	↓	↓	6.2	4.0	0	0	0	0
29th	0	0	0	0	24.0 3 days	↓	0	0	↓	0	0	0
30th	0		0	6.0	11.0	12.5 4 days	0	0	1.6 2 days	0	0	0
31st	0		0		5.8		0	7.0		0		0
Highest Daily	4.0	5.5	3.0	12.5	22.0	18.0	16.0	9.4	19.0	9.0	24.0	17.0
Monthly Total	28.5	5.5			82.8	55.9	72.0	36.2	59.6	75.0	24.0	27.0

Annual total for 2000 = n.a

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799328

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club Number: 87160 Opened: 1974 Now: Open  
Lat: 38.34° S Lon: 144.31° E Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1999	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0	0	0	0	0	0	0	0
2nd	0	0	0	0	0	0	0	0	0	0	0	0
3rd	0	0	17.0	0	0	0	0	0	0	0	0	0
4th	0	0	0	0	0	0	0	0	0	0	0	0
5th	4.2	0	0	0	0	0	0	0	5.0	0	↓	0
6th	0	↓	0	0	0	0	0	0	2.4	0	19.0 2 days	0
7th	9.8	↓	0	0	0	0	0	↓	5.0	0	↓	0
8th	11.0	3.0 3 days	0	0	1.5	0	0	↓	0	0	5.4 2 days	0
9th	0	0	0	0	0	0	0	↓	0	0	0	0
10th	0	0	0	0	0	0	0	10.4 4 days	3.0	↓	0	0
11th	0	2.6	0	0	0	0	↓	0	0	15.5 2 days	0	0
12th	0	5.0	0	0	0	0	↓	0	0	↓	0	0
13th	0	0	0	0	0	0	↓	6.0 3 days	0	0	↓	0
14th	0	0	0	0	↓	11.0 2 days	0	↓	0	↓	0	0
15th	0	0	0	0	↓	0	0	20.0 2 days	0	↓	0	0
16th	0	0	0	↓	↓	0	0	0	2.0	↓	0	0
17th	0	4.0	0	3.0 2 days	21.0 4 days	0	0	0	0	↓	0	0
18th	0	0	0	0	0	0	4.6	0	3.0	↓	0	0
19th	4.5	0	0	0	0	0	↓	0	0	↓	0	0
20th	0	0	↓	0	0	0	↓	0	0	↓	0	0
21st	0	0	↓	2.0	↓	0	2.4 3 days	0	0	↓	0	0
22nd	0	0	32.0 3 days	0	↓	0	0	0	0	↓	8.0	0
23rd	0	0	0	0	↓	0	0	0	0	22.0 12 days	0	0
24th	0	0	↓	0	11.4 4 days	0	0	0	0	0	0	0
25th	0	0	↓	0	9.2	0	0	0	0	0	0	0
26th	0	0	2.0 3 days	0	4.5	0	0	7.0	0	0	0	0
27th	1.0	0	↓	↓	2.0	0	0	23.0	0	0	0	0
28th	0	0	↓	↓	0	0	0	0	0	0	0	0
29th	3.0	9.0 3 days	6.0 3 days	↓	0	0	0	0	0	0	0	0
30th	0	1.6	0	15.5 2 days	13.0	0	0	12.4	0	0	0	0
31st	0	0	0	1.4	0	0	0	0	0	0	0	0
Highest Daily	11.0	5.0	17.0	2.0	9.2	13.0	4.6	23.0	12.4	0.0	8.0	0
Monthly Total	33.5	14.6			66.5			60.4	32.8		32.4	

Annual total for 1999 = n.a.

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799330

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1998	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0	0	0	0	0	0	0	0
2nd	0	0	0	0	1.0	0	0	0	0	↓	0	0
3rd	0	0	0	0	0	0	↓	0	0	↓	0	0
4th	0	0	0	0	0	0	↓	0	4.6	10.0 3 days	0	0
5th	0	0	0	0	0	0	7.0 3 days	0	0	10.0	0	0
6th	0	0	0	0	0	0	0	0	0	8.0	0	0
7th	0	0	0	0	0	0	0	0	0	1.6	0	0
8th	0	18.4	0	0	0	0	0	0	0	0	0	0
9th	0	0	0	0	0	25.0	7.8	0	0	0	0	0
10th	0	0	0	0	0	0	8.0	0	0	0	0	0
11th	0	0	0	0	0	0	0	0	0	0	0	0
12th	0	0	0	↓	0	1.8	0	↓	0	↓	0	0
13th	18.0	0	0	↓	0	0	0	6.0	11.2 2 days	↓	25.0 2 days	↓
14th	35.0	0	0	17.0 3 days	0	0	0	0	↓	↓	25.0	7.6 2 days
15th	7.4	0	5.0	0	0	0	0	0	↓	17.0 3 days	4.8	0
16th	0	↓	0	0	0	7.0	0	0	16.8 3 days	0	0	0
17th	0	26.0 2 days	0	0	0	0	0	0	0	0	0	0
18th	0	0	0	0	0	0	0	0	0	2.0	0	0
19th	0	0	0	0	0	0	0	0	0	↓	0	0
20th	0	0	0	22.0	9.2	0	0	0	1.0	↓	0	0
21st	0	0	0	0	0	↓	3.2	3.5	0	8.0 3 days	0	0
22nd	0	0	0	0	0	15.8 2 days	0	↓	↓	0	0	0
23rd	0	0	0	0	↓	0	0	2.2 2 days	5.0 2 days	2.0	0	0
24th	0	0	0	0	↓	4.8	0	0	↓	6.0	0	0
25th	↓	0	0	5.0	4.2 3 days	0	↓	0	2.0 2 days	0	0	0
26th	24.2 2 days	0	0	↓	0	0	7.0 2 days	0	0	0	0	0
27th	0	0	0	3.0 2 days	0	0	4.2	0	0	0	2.6	0
28th	0	0	0	0	0	0	0	0	0	0	12.8	0
29th	0	0	0	0	0	18.0	0	0	0	0	0	0
30th	0	0	0	0	0	5.0	10.0	0	0	0	0	0
31st	0	0	3.0	0	0	0	1.6	0	0	0	0	0
Highest Daily	35.0	18.4	5.0	22.0	9.2	25.0	10.0	6.0	4.6	10.0	25.0	0.0
Monthly Total	84.6	44.4	8.0	47.0	14.4	77.4	48.8		40.6			

Annual total for 1998 = n.a

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799332

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1997	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	6.4	0	↓		0		12.0	0	22.0	0
2nd	0	0	0	0	↓		0	1.0	3.0	2.0	0	0
3rd	0	0	0	0	30.0 3 days		4.0	0	8.0	0	0	0
4th	0	0	0	0	17.0		1.8	0	5.2	0	0	0
5th	↓	0	0	↓	0		0	0	0	0	0	4.5
6th	5.2 2 days	0	0	↓	0		0	0	↓	0	0	0
7th	0	0	0	2.0 3 days	13.8		0	0	↓	0	0	0
8th	0	0	0	0	3.8		0	8.8	15.0 3 days	2.0	0	0
9th	0	↓	0	0	0		9.8	↓	0	0	0	0
10th	0	5.4 2 days	0	0	0		0	↓	0	0	0	0
11th	0	0	0	0	0		0	7.0 3 days	0	↓	11.6	0
12th	0	0	0	0	0		0	3.8	0	↓	0	0
13th	0	0	0	0	0		0	0	↓	2.2 3 days	0	0
14th	1.2	0	0	0	0		0	0	↓	0	18.0	0
15th	0	0	0	0	0		0	0	14.2 3 days	0	9.0	0
16th	0	0	0	0	0		5.0	↓	0	0	0	0
17th	0	0	0	0	↓		2.6	↓	0	0	1.4	0
18th	0	0	0	0	↓		0	10.4 3 days	0	↓	0	0
19th	0	0	0	0	11.2 3 days		0	1.4	0	↓	0	0
20th	0	0	0	0	0		0	0	0	7.0 3 days	0	0
21st	0	0	0	0	0		0	0	0	0	0	0
22nd	18.0	4.8	↓	4.0	0		0	0	0	0	0	0
23rd	14.0	0.2	↓	0	0		0	↓	0	0	0	0
24th	0	0	2.0 3 days	0	↓		0	↓	0	0	0	0
25th	1.4	0	0	0	↓		0	18.8 3 days	0	0	0	0
26th	6.0	0	0	0	11.8 3 days		0	0	0	0	0	0
27th	0	0.6	0	0	1.2		0	1.0	↓	0	0	0
28th	0	0	0	0	0		0.8	0	↓	0	0	0
29th	0		3.0	0	3.2		0	0	6.0 3 days	2.5	0	0
30th	0		2.8	0	2.8		0	0	0	0	3.6	0
31st	0		0		0.4		4.0	15.2		25.0		0
Highest Daily	18.0	4.8	6.4	4.0	17.0		9.8	15.2	12.0	25.0	22.0	4.5
Monthly Total	45.8	11.0	14.2	6.0	95.2	20.8	28.0	67.4	63.4	40.7	65.6	4.5

Annual total for 1997 = 462.6 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799333

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

1989	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	5.0	0	0	0					
2nd	0	0	0	3.6	0	0	10.8					
3rd	0	0	0	5.4	0	0	0					
4th	30.2	0	0	0	0	0	3.4					
5th	10.6	0	0	38.0	0	0	0.6					
6th	0	0	0	0	0	0	0					
7th	0	0	0	0	0	↓	0					
8th	0	5.0	4.6	0	0	↓	0					
9th	0	0	0	0	26.2	16.6 3 days	0					
10th	0.4	0	40.6	0	0	3.8	0					
11th	2.6	0	0	0	1.2	3.4	18.2					
12th	0	0	2.8	12.8	0	0.6	0					
13th	0	0	0	0	0	0	0					
14th	0	0	0	0	0	↓	0					
15th	0	15.0	0	0	0	7.6 2 days	0					
16th	0	0	0	0	0	0	0					
17th	3.6	0	0	0	0	8.2	0					
18th	0	0	0	0	0	5.2	8.0					
19th	0	0	0	0.6	0	1.2	1.6					
20th	0	0	0	0	0	0	2.2					
21st	0	0	16.0	0	0	0	3.0					
22nd	0	0	0	0	↓	0	0					
23rd	0	0	0	0	12.6 2 days	0	0					
24th	0	0	0	0	0	13.2	0					
25th	0	0	0	0	0	1.8	0					
26th	0	0	0	0	0	0	0					
27th	0	0	0	0	0	0	0					
28th	0	0	8.6	15.4	0	0	0					
29th	0	0	0	4.4	0	0	0					
30th	0	0	0	4.2	↓	0	↓					
31st	0	0	0	0	14.0 2 days	0	15.0 2 days					
Highest Daily	30.2	15.0	40.6	38.0	26.2	13.2	18.2					
Monthly Total	47.4	20.0	72.6	89.4	54.0	61.6	62.8					

Annual total for 1989 = n.a

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799334

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160    Opened: 1974    Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

1988	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	42.0	0	0	0	0	0	0	0	0	0	0	0
2nd	0	0	0	0	0	0	0	0	2.8	↓	0	3.4
3rd	0	0	0	0	0	0	0	0	0	↓	0	0
4th	0	0	0	0	0	0	0	0	4.6	↓	0	0
5th	0	0	0	0	8.6	8.2	0	0	0	↓	6.8	4.0
6th	0	6.4	0	0	28.4	0	0	0	0	↓	0	0
7th	0	0	0	0	0.6	16.6	2.2	0	0	↓	0	0
8th	0	0	0	0	2.0	6.6	0	6.6	0	↓	0	0
9th	0	0.8	0	0	0	0	0	0.2	0	↓	0	0
10th	11.2	0	0	0	0	0	0	0	0	↓	0	16.4
11th	0	0	0	0	0	3.6	0	0	14.4	17.2 10 days	0	0
12th	0	0	0	0	0	1.8	0	0	0	0	0	0
13th	0	1.2	0	0	0	0	0	0	0	0	0	0
14th	0.8	0	0	0	0	6.6	0	0	0	0	↓	0
15th	0	0	0	0	2.2	0	16.0	0	8.0	2.8	14.8 2 days	0
16th	0	0	0	0	0.8	0	0	17.8	0	0	0	0
17th	0	0	0	0	↓	0	0	0	0	8.0	0	0
18th	0	0	0	0	↓	8.4	0	0	6.4	0	0	0
19th	0	0	0	0	26.4 3 days	0	0	↓	0	0	0	0
20th	0	0	0	0	1.8	0	5.8	↓	0	0	0	0
21st	0	0	0	0	0.6	7.4	0.4	↓	0	0	8.2	0
22nd	0	0	0	0	0	1.4	0	↓	0	0	45.0	0
23rd	0	0	0	0	6.4	0	0	↓	0	0	20.6	0
24th	19.2	0	0	4.6	0	0	0	12.6 6 days	0	0	0.6	0
25th	1.2	0	0	0	2.0	0	8.8	0	0	0	0	0
26th	0	0	0	0	0	0	4.0	0	0	0	0	9.8
27th	0	0	0	0	0	0	2.0	0	0	0	0	8.9
28th	0	0	0	0	0	↓	0	4.4	19.2	0	3.2	0
29th	0	0	0	0	0	2.8 2 days	0	0	0	0	0	0
30th	0	0	0	0	0	3.4	0	0	0	0	0	0
31st	0	0	5.8	0	0	0	0	0	0	0	0	0
Highest Daily	42.0	6.4	5.8	4.6	28.4	16.6	16.0	17.8	19.2	8.0	45.0	16.4
Monthly Total	74.4	8.4	5.8	4.6	79.8	66.8	39.2	41.6	55.4	28.0	99.2	42.5

Annual total for 1988 = 545.7 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	<i>90.0</i> 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in *italics* represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799337

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

1987	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	4.0	0	0	0	0	0	6.6	0	0	0
2nd	0	0	0	0	0	0	0	0	0	0	0	61.2
3rd	29.0	0	0	0	8.8	0	0	0	0	0	0	3.2
4th	24.0	0	0	0	0	0	0	0	0	0	0	0
5th	4.6	0	0	0	0	0	0	2.0	0	6.4	0	0
6th	0	0	0	↓	0	0	0	0	0	0	0	0
7th	0	0	0	2.6 2 days	0	0	0	0	0	0	0	0
8th	0	0	0	0	0	0	0	0	2.1	0	0	0
9th	0	0	0	2.2	0	0	0	0	0	0	19.0	0
10th	0	0	0	0	0	0	0	0	2.3	0	0	0
11th	0	0	0	0	0	0	3.0	0	0	0	0	0
12th	0	0	0	0	0	0	0	0	0	0	0	0
13th	0	0	4.8	0	20.0	5.0	0	0	0	0	0	0
14th	0	0	0	0	5.8	0	0	0	0	0	0	0
15th	0	0	0	0	7.8	3.6	8.6	0	0	0	0	0
16th	0	0	0	0	21.0	0	1.8	0	0	6.4	0	0
17th	0	0	0	0	2.6	0	2.8	2.0	0	2.0	0	0
18th	0	0	0	0	0	0	0	0	0	0	0	0
19th	0	0	2.2	0	0	1.8	5.8	0	0	39.2	0	0
20th	0	0	0	0	0	4.2	5.6	1.6	14.6	0	6.0	0
21st	0	30.4	0	0	0	0	4.0	0	0	0	0	0
22nd	0	0	0	0	0	12.6	0.6	0	0	0	0	0
23rd	0	0	0	0	0	1.2	0	0	0	0	0	0
24th	0	0	0	0	0	1.8	0	17.4	0	0	0	0
25th	4.6	0	0	0	8.6	0	0	0	0	0	↓	0
26th	0	0	0	0	6.0	0.8	0	0	0	0	3.2 2 days	0
27th	0	0	0	0	4.2	0	0	0	0	0	0	0
28th	0	24.0	0	0	7.2	0.8	0	0	0	0	0	11.0
29th	0	0	0	10.0	0.6	0	0	0	9.0	0	0	0
30th	0	0	0	0	0	0	16.0	0	6.2	0	0	0
31st	0	0	17.6	0	0	0	1.0	0	0	0	0	0
Highest Daily	29.0	30.4	17.6	10.0	21.0	12.6	16.0	17.4	14.6	39.2	19.0	61.2
Monthly Total	62.2	54.4	28.6	14.8	92.6	31.8	49.2	23.0	40.8	54.0	28.2	75.4

Annual total for 1987 = 555.0 mm

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 <small>1st 1988</small>	<i>90.0</i> <small>8th 2002</small>	56.0 <small>22nd 2001</small>	70.0 <small>23rd 2001</small>	38.6 <small>6th 1977</small>	25.0 <small>9th 1998</small>	30.8 <small>10th 1981</small>	39.2 <small>31st 2005</small>	35.8 <small>22nd 1976</small>	40.4 <small>3rd 1981</small>	45.0 <small>22nd 1988</small>	61.2 <small>2nd 1987</small>

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799379

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160    Opened: 1974    Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

1986	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	5.2	0	0	3.2	0	8.2	0	0
2nd	0	0	0	0	0	0	11.2	0	1.8	8.6	0	0
3rd	0	0	0	0	0	1.4	5.0	0	0	14.8	0	0
4th	0	0	0	0	0	0	2.6	0	0	0	0	0
5th	0	0	0	0	0	0	0	0	0	5.2	0	0
6th	0	0	0	0	0	0	0	0	0	5.2	0	0
7th	0	0	0	0	14.8	0	0	0	0	2.4	0	20.0
8th	0	0	↓	0	5.6	0	3.0	0	4.8	0	0	15.4
9th	0	0	↓	5.0	8.2	0	7.8	0	0	0	0	0
10th	7.4	0	↓	0	5.4	0	8.8	0	0	0	0	0
11th	0	0	3.4 4 days	0	0	0	6.6	0	0	0	0	0
12th	0	0	0	0	0	2.6	0	0	3.6	0	0	5.0
13th	0	0	0	0	0	0	0	0	0	0	0	4.8
14th	0	0	0	0	0	0	0	0	13.2	5.8	0	4.0
15th	0	0	0	0	0	0	0	6.4	0	0	0	0
16th	11.0	0	0	13.2	12.8	0	0.4	↓	0	4.4	0	0
17th	0	0	0	4.0	1.6	0	5.0	↓	15.6	0	0	25.6
18th	0	3.2	0	8.4	3.4	4.6	6.0	7.4 3 days	0	0	0	0
19th	0	2.2	1.0	↓	5.4	6.8	0	0	0	9.8	0	0
20th	0	0	0	↓	0	8.6	0	0	0	0	0	0
21st	0	0	0	3.2 3 days	0	1.2	0	0	0	0	0	0
22nd	0	0	0	0	2.0	0.8	0	0.6	0	0	0	0
23rd	0	0	0	0	0	1.8	12.6	0	0	33.4	0	0
24th	0	0	0	9.2	6.2	1.8	1.8	7.4	0	0	0	0
25th	0	0	0	1.2	0	0	12.2	0.4	0	1.4	0	0
26th	0	0	0	2.2	0	1.4	0	0	0	0	0	0
27th	0	0	0	0	0	0	0	0	0	0	0	0
28th	0	0	0	0.8	0	1.8	0.6	0	0	0	0	0
29th	0	0	0	0	0	0	0.4	2.2	0	0	0	0
30th	0	0	0	2.4	0	0	0	2.0	0	0	0	0
31st	0	0	0	0	0	0	0	3.4	0	0	0	0
Highest Daily	11.0	3.2	1.0	13.2	14.8	8.6	12.6	7.4	15.6	33.4	0.0	25.6
Monthly Total	18.4	5.4	4.4	49.6	70.6	32.8	84.0	33.0	39.0	99.2	0.0	74.8

Annual total for 1986 = 511.2 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1985	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	1.4	10.3	0	0	0	0	1.3	0	0	0
2nd	0	0	0	30.0	0	0	0	0	2.6	0	0	1.0
3rd	0	0	0	7.0	0	0	0	0	6.8	0	0	19.0
4th	0	0	2.2	0	0	19.4	0	0	2.0	0	0	0
5th	0	0	2.8	0	0	0	0	3.0	1.4	4.2	5.4	0
6th	5.0	3.0	2.6	0	0	0	0	0	0	0	9.6	0
7th	0	0	0	0	0	0	1.4	2.4	0	0	7.2	10.0
8th	0	0	0	0	11.4	0	0	2.0	0	0	0	6.0
9th	0	0	0	0	0	0	0	8.0	0	0	23.0	5.0
10th	0	0	0	0	0	0	0	4.0	0	0	0	6.4
11th	0	0	0	0	1.4	13.0	2.6	0	0	0	0	0
12th	0	0	0	0	0	0	0	0	0	0	0	0
13th	0	0	0	0	0	0	0	0	1.8	0	0	0
14th	0	0	0	↓	0	0	6.2	0	0	0	0	0
15th	0	0	0	21.0 2 days	4.6	1.0	3.2	1.6	0	0	8.0	0
16th	0	0	20.0	0	0	0	13.4	11.0	0	2.6	0	8.0
17th	0	0	6.4	2.2	0	0	3.8	5.0	0	9.0	5.4	0
18th	0	0	1.0	12.5	12.2	0	0	5.6	0	4.0	0	0
19th	0	0	0	17.5	0	0	0	4.2	2.0	1.2	0	0
20th	0	0	0	0	0	12.4	0	3.6	0	0	0	0
21st	0	0	0	0	0	1.2	7.4	0	0	0	2.4	0
22nd	0	0	0	0	1.5	11.6	7.0	0	0	3.8	0	4.0
23rd	0	0	0	0	0	3.4	0	12.6	0	0	0	2.0
24th	0	↓	1.2	0	0	0	0	0	0	28.6	0	0
25th	0	3.4 2 days	0	0	0	0	2.8	0	0	0	1.0	0
26th	0	1.4	0	0	0	0	0	8.4	5.8	0	0	0
27th	0	1.8	0	0	0	1.5	0	1.8	3.2	0	1.0	0
28th	0	0	0	0	17.0	1.8	4.4	8.2	0	0	0	0
29th	0	0	0	0	0	0	1.4	0	0	0	0	0
30th	0	0	0	0	2.4	0	7.0	1.2	0	4.0	0	0
31st	0	0	0	0	0	0	2.0	0	0	4.4	0	0
Highest Daily	5.0	3.0	20.0	30.0	17.0	19.4	13.4	12.6	6.8	28.6	23.0	19.0
Monthly Total	5.0	9.6	37.6	100.5	50.5	65.3	62.6	82.6	26.9	61.8	63.0	61.4

Annual total for 1985 = 626.8 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1984	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	↓	0	0	0	0	3.0	0	0	0	4.0	0	0
2nd	17.8 2 days	0	0	0	0	0	0	0	↓	14.0	0	0
3rd	0	0	0	0	0	0	5.8	0	2.6 2 days	0	0	0
4th	0	0	0	0	0	0	3.0	0	9.4	0	0	0
5th	0	0	0	0	12.8	0	0	↓	0	0	0	0
6th	0	0	0	0	↓	0	0	16.4 2 days	0	0	0	15.2
7th	0	0	0	0	5.2 2 days	0	10.2	0	0	0	0	0
8th	0	0	0	0	0	0	6.0	0	0	0	0	0
9th	0	0	0	0	0	0	0	0	0	0	0	0
10th	0	0	0	0	0	0	0	6.4	0	9.4	0	0
11th	0	0	0	0	0	0	0	0	0	5.4	14.0	0
12th	0	0	0	0	4.6	0	4.2	0	0	0	4.0	0
13th	0	0	6.4	0	0	0	0	0	0	0	0	0
14th	0	0	↓	0	0	0	0	0	2.2	0	0	0
15th	↓	0	↓	↓	0	0	↓	4.0	0	0	0	0
16th	23.2 2 days	0	7.0 3 days	4.8 2 days	0	0	15.4 2 days	0	↓	0	0	12.2
17th	0	0	0	0	0	↓	1.0	0	16.4 2 days	0	0	0
18th	0	0	0	0	0	3.2 2 days	0	0	9.2	0	0	0
19th	0	0	0	0	0	3.8	0	0	29.2	0	0	0
20th	0	0	0	15.2	0	0	0	0	3.8	0	0	12.2
21st	0	35.6	0	0	0	0	0	30.0	0	0	0	0
22nd	0	0	0	↓	5.6	0	↓	4.6	0	0	0	0
23rd	0	0	0	7.6 2 days	0	0	11.4 2 days	0	↓	0	0	0
24th	6.8	0	0	0	0	0	11.4	0	11.4 2 days	0	0	0
25th	0	0	↓	0	0	0	0	0	1.2	0	0	0
26th	0	0	28.8 2 days	0	0	0	0	10.2	0	0	0	0
27th	12.6	0	19.4	0	0	1.2	6.4	0	0	0	0	0
28th	0	7.4	4.6	0	0	4.6	0	3.0	3.6	0	0	0
29th	0	0	0	0	0	0	0	3.8	↓	0	0	0
30th	0	0	0	0	0	0	0	0	1.0 2 days	0	0	0
31st	0	0	0	0	0	0	0	0	0	0	0	0
Highest Daily	12.6	35.6	19.4	15.2	12.8	4.6	11.4	30.0	29.2	14.0	14.0	15.2
Monthly Total	60.4	43.0	66.2	27.6	28.2	15.8	74.8	78.4	90.0	32.8	18.0	39.6

Annual total for 1984 = 574.8 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1983	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	↓	0	3.8	0	0	0	0	0
2nd	0	0	0	0	6.4 2 days	0	2.2	3.2	0	0	0	0
3rd	0	0	0.2	0	↓	0	0	0	1.8	0	2.6	0
4th	0	0	0	0	33.8 2 days	0	0	0	0	2.2	0	0
5th	0	0	10.4	0	0	0	0	0	0	0	0	0
6th	0	0	0	12.4	0	0	0	0	9.8	0	0	0
7th	0	0	0	0	0	0	↓	0	10.4	0	0	0
8th	0	0	2.8	0	0	↓	17.4 2 days	0	↓	0	0	0
9th	0	0	0	↓	0	↓	0	↓	17.4 2 days	0	0	0
10th	0	0	0	↓	0	12.8 3 days	0	6.2 2 days	7.2	0	0	0
11th	1.8	0	0	9.4 3 days	0	7.0	0	0	↓	0	0	0
12th	0	0	0	0	0	0	0	0	2.2 2 days	0	0	0
13th	0	0	0	2.0	0	0	0	0	0	↓	↓	0
14th	3.4	0	0	↓	0	0	0	0	30.2	10.8 2 days	6.6 2 days	0
15th	0	0	0	5.0 2 days	0	4.6	0	0	0	26.8	0	0
16th	0	0	1.6	1.2	0	0	0	0	0	↓	2.6	0
17th	0	0	0	0	0	0	0	9.4	0	19.2 2 days	0	0
18th	0	0	0	0	0	0	0	0	0	0	0	0
19th	0	0	0	0	0	0	0	0	0	0	0	0
20th	0	0	0	0	0	0	7.2	0	0	0	0	0
21st	0	0	0	0	↓	0	↓	0	6.2	0	0	0
22nd	0	0	18.4	0	13.4 2 days	0	2.8 2 days	0	0	0	0	0
23rd	0	0	12.0	↓	0	0	0	0	0	0	2.2	0
24th	0	0	↓	↓	0	0	0	↓	0	0	0	0
25th	0	0	5.2 2 days	↓	0	↓	0	↓	0	0	0	0
26th	0	0	0	14.0 4 days	0	↓	0	↓	0	9.6	0	0
27th	0	0	0	0	0	16.6 3 days	5.8	16.2 4 days	0	0	0	0
28th	11.4	0	0	0	0	0	0	0	15.6	0	0	0
29th	0	0	0	0	0	3.8	↓	0	0	0	0	0
30th	0	0	0	0	0	18.4	16.4 2 days	0	0	0	0	0
31st	0	0	0	0	7.6	0	0	3.4	0	0	0	0
Highest Daily	11.4	0.0	18.4	12.4	7.6	18.4	7.2	9.4	30.2	26.8	2.6	0.0
Monthly Total	16.6	0.0	50.6	44.0	61.2	63.2	55.6	38.4	100.8	68.6	14.0	0.0

Annual total for 1983 = 513.0 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

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Product Code: IDCJAC0009 reference: 33799356

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1982	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0	0	0	0	0	0	0	0
2nd	0	0	0	0	0	0	0	0	0	0	0	0
3rd	0	0	0	0	0	0	2.2	0	10.6	↓	0	0
4th	3.0	0	0	0	0	0	0	0	2.6	2.6 2 days	0	0
5th	0	0	0	0	2.6	0	0	0	0	0	0	0
6th	0	0	↓	0	↓	0	0	0	0	0	0	0
7th	0	0	↓	0	4.0 2 days	0	5.2	0	3.4	0	0	2.6
8th	0	0	9.0 3 days	0	0	24.0	0	0	0.4	0	0	30.2
9th	0	0	0	0	0	0	0	0	↓	0	0	↓
10th	0	0	0	0	0	↓	0	0	8.8 2 days	0	0	7.4 2 days
11th	0	0	0	0	0	4.6 2 days	↓	3.8	1.0	0	↓	0
12th	0	0	0	0	0	0	2.8 2 days	↓	0	0	1.0 2 days	0
13th	0	0	0	0	0	0	3.6	4.8 2 days	0	0	0	0
14th	0	0	0	0	0	0	0	0	0	0	0	0
15th	0	0	0	0	0	0	0	0	0	0	0	0
16th	0	0	0	0.8	0	0	0	0	0	0	6.8	0
17th	0	0	3.0	0	0	0	↓	0	0.4	↓	0	0
18th	0	0	0	0	0	0	↓	0	1.0	8.4 2 days	0	0
19th	0	0	0	0	4.2	↓	6.0 3 days	0	↓	0	0	0
20th	0	0	0	0	↓	↓	0	0	2.2 2 days	4.8	0	0
21st	0	0	0	0	8.8 2 days	5.0 3 days	0	0	0	0	0	0
22nd	0	0	0	0	4.8	5.4	0	0	0	3.4	0	0
23rd	0	0	8.2	0	0	0	0	0	0	0	0	0
24th	0	0	0	0	0	0	0	0	0	0	0	0
25th	6.4	0	0	↓	0	0	0	0	0	0	0	0
26th	11.0	0	0	4.4 2 days	0	0	0	0	↓	0	0	0
27th	0	0	↓	0.8	0	0	0	0	3.2 2 days	0	0	0
28th	0	0	↓	27.2	0	0	0	0	0	0	0	0
29th	0	0	23.0 3 days	0	0	0	↓	0	9.8	0	0	0
30th	0	0	0	0	↓	0	5.0 2 days	0	0	0	0.6	3.6
31st	0	0	0	0	21.8 2 days	0	0	0	0	0	0	0
Highest Daily	11.0	0.0	8.2	27.2	4.8	24.0	5.2	3.8	10.6	4.8	6.8	30.2
Monthly Total	20.4	0.0	43.2	33.2	46.2	39.0	24.8	8.6	43.4	19.2	8.4	43.8

Annual total for 1982 = 330.2 mm

### Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799355

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm 12.3 = Not quality controlled. ↓ = Part of accumulated total

1981	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	↓	0.3	0	3.4	0	0	0	0	0	0
2nd	0.2	0	5.6 2 days	0	0	↓	0	0	0	0	0	0
3rd	0	0	0	0	0	3.2 2 days	0	0	0	40.4	0	0
4th	0	0	0	0	0	0	↓	6.2	0	0	3.2	0
5th	0	15.4	0	↓	↓	0	↓	0	0	0	0	0
6th	0	0	0	22.2 2 days	↓	0	↓	0	0	0	0	0
7th	0	0	0	0	↓	↓	20.2 4 days	0	0	0	0	0
8th	0	↓	0	0	↓	↓	0	0	0	0	0	0
9th	5.0	0.6 2 days	0	0	↓	↓	0	↓	0	0	0	0
10th	18.4	0	4.0	0	↓	25.0 4 days	30.8	10.8 2 days	0	0	12.0	0
11th	0	0	0	0	↓	0	0	0	0.2	0	0	0
12th	0	0	0	↓	↓	0	0	5.2	0	0	↓	4.4
13th	0	0	0	3.0 2 days	↓	0	0	0	0	0	7.0 2 days	↓
14th	0	0	0	0	↓	0	0	0	0	0	↓	9.6 2 days
15th	0	0	0	0	↓	0	1.8	3.2	0	0	↓	0
16th	2.6	0	0	0	↓	16.6	0	0	0	0	0.4 3 days	0
17th	0	0	0	0	↓	↓	0	0	0	3.0	0	0
18th	↓	0	0	0	↓	↓	0	0	0	0	0	0
19th	6.4 2 days	0	0	0	↓	↓	0	0	0	0	0	0
20th	0	0	0	0	↓	↓	↓	0	0	0	4.8	0
21st	0	0	2.2	0	↓	↓	↓	27.0	0	5.4	0	0
22nd	0	0	0	0	↓	↓	15.6 3 days	3.2	0	0	0	0
23rd	0	0	0	0	↓	↓	0	0	0	0	0	0
24th	0	0	0	0	↓	19.2 8 days	0	0	0	0	1.0	0
25th	0	0	0	0	55.4 21 days	0	0	0	0	0	0	0
26th	0	0	0	0	13.4	0	0	0	0	0	0	0
27th	↓	0	0	0	0	4.8	↓	↓	0	0	0	0
28th	33.0 2 days	0	23.6	0	0	11.4	↓	20.4 2 days	0	13.0	↓	0
29th	↓	0	0	5.2	↓	0	10.0 3 days	3.2	0	0	↓	0
30th	2.0 2 days	0	0	0	4.2 2 days	0	0	↓	0	0	16.4 3 days	0
31st	0	0	2.8	0	0	0	0	4.4 2 days	0	0	0	0
Highest Daily	18.4	15.4	23.6	5.2	13.4	16.6	30.8	27.0	0.2	40.4	12.0	4.4
Monthly Total	67.6	16.0	38.2	30.7	73.0	83.6	78.4	83.6	0.2	61.8	44.8	14.0

Annual total for 1981 = 591.9 mm

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799351

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## Daily rainfall

Observations of Daily rainfall are nominally made at 9 am local clock time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow. [About rainfall data](#)

Station: Torquay Golf Club      Number: 87160      Opened: 1974      Now: Open  
 Lat: 38.34° S      Lon: 144.31° E      Elevation: 15 m

Key: Units = mm    12.3 = Not quality controlled. ↓ = Part of accumulated total

1978	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	5.8	0	0	0	0	7.0	0	0	0
2nd	0	0	0	5.6	0	1.8	0	0	0	0	0	0
3rd	0	0	0	0	0	7.4	17.2	0	4.2	2.6	0	0
4th	0	0	0	0	0	10.4	0.8	0	0	0	0	15.6
5th	0	0	0	0	0	0	1.2	0	0	0	0	4.2
6th	0	3.0	0	0	0	0	14.8	0	0	0	27.2	0
7th	0	0.4	0	0	8.6	0	1.8	27.4	1.6	0	0	0
8th	0	0	0	0	0	1.4	0	9.2	0	0	0	0
9th	0	1.4	0	0	0	0	0	15.0	0	0	0	0
10th	0	0	0	27.8	4.4	4.6	0	5.8	0	0	0	0
11th	0	9.2	0	3.2	7.0	0	0	0	0	0	28.6	0
12th	0	0	0	2.8	0	4.2	8.2	3.6	23.4	0	0	17.2
13th	0	1.0	14.8	0	14.4	0	0	9.2	8.4	2.8	0	31.0
14th	0	0	0	0	↓	0	0	0.2	14.6	0	0	1.2
15th	0	0	0	0	3.4 2 days	0	↓	0.4	0.6	0	0	0
16th	0	0	0	0	0	0	↓	0	0	0	0	0
17th	0	0	0	0	12.6	0	5.0 3 days	1.2	0	0	0	29.4
18th	0	0	0	0	6.0	6.0	0	0	7.6	12.6	0	4.0
19th	0	0	0	0	0	1.4	2.8	0	3.4	0.6	↓	0
20th	0	0	0	0	6.4	0	11.6	0	0	0	58.6 2 days	0
21st	0	0	3.8	0	0	0	0	0	0	0	0	0
22nd	0	0.6	0.2	0	0	0	↓	2.0	0	0	0	0
23rd	0	0	12.8	0	3.4	0	↓	3.0	0	0	0	0
24th	3.8	0	0	0	0	1.8	9.2 3 days	0	0	0	0	0
25th	0	0	0	0	4.0	0	1.8	0	0	0	0	0
26th	0	0	2.4	0	0	0	0	0	0	16.6	0	20.2
27th	0	0	0	7.0	0	0	0	0	9.8	26.0	0	0
28th	0	5.4	0	0	0	0	5.8	0	0.2	0	0	0
29th	1.8		0	0	0	0	0	0	0	0	1.0	0
30th	15.2		4.2	0	12.2	0	0	0	0	0	0	0
31st	8.4		17.6		0		0	0	0	0	0	0
Highest Daily	15.2	9.2	17.6	27.8	14.4	10.4	17.2	27.4	23.4	26.0	28.6	31.0
Monthly Total	29.2	21.0	55.8	52.2	82.4	39.0	80.2	77.0	80.8	61.2	115.4	122.8

Annual total for 1978 = 817.0 mm

## Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
Median	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
Highest Daily	42.0 1st 1988	90.0 8th 2002	56.0 22nd 2001	70.0 23rd 2001	38.6 6th 1977	25.0 9th 1998	30.8 10th 1981	39.2 31st 2005	35.8 22nd 1976	40.4 3rd 1981	45.0 22nd 1988	61.2 2nd 1987

Data within the table which are in italics represent observations which have not been fully quality controlled, a process which may take a number of months to complete. While these data may be correct, you should exercise caution in their use. For observations of daily rainfall which span more than one day it indicates that there is some uncertainty associated with the exact date on which the daily rainfall occurred.

Gaps occur in the table where a valid observation is not available. This is frequently associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data.

Product Code: IDCJAC0009 reference: 33799342

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# Daily Rainfall (millimetres)

## TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

1977	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	3.2	0	0	0	3.4	17.2	0.2	1.0	0	0	0	0
2nd	0	0	0	0	0	4.6	0	0	0	25.8	0	0
3rd	0.4	0	0	0	0	1.0	0	0	5.4	0	0	0
4th	0	0	0	0	0	0	0	5.8	5.0	0	2.0	0
5th	0	0	0	0	0	0	0	0	0	3.0	0	0
6th	0	0	0	0	38.6	0	0	0	0	7.0	0	0
7th	0	0	0	0	0	0	0	0	0	0	0	0
8th	0	0.8	0	4.2	0	8.0	0	1.2	0	0	0	0
9th	0	0	0	0	0.4	2.4	0	0	0	0	0	0
10th	0	0	0	0	0	0	0	0	7.2	0	22.0	0
11th	0	0	0	0	5.0	8.8	1.0	0	0	0	0	0
12th	0	0	0	0	2.8	1.2	0	1.0	0	0	0	0
13th	0	14.0	0	0	0.2	0	0	1.6	10.2	0	0	0
14th	1.2	0	0	0	0	0	12.6	0	0.8	0.6	3.0	0
15th	13.2	0	0	0	0	1.6	6.4	0	5.0	0	0	0
16th	5.2	0	8.4	0	0	3.2	0.4	1.8	1.2	0	0	0
17th	20.4	0	0	0	0	1.8	0	0	0	0	0	0
18th	3.2	3.2	0	0	2.4	24.4	0	0	0	0	0	0
19th	0	0	0	0.2	0	12.2	0	0	0	5.0	0	0.4
20th	0	0	0	0	1.8	0.8	0	0	0	0	0	0
21st	0	0	0	0	0	2.2	0	5.0	0	0	0	0
22nd	0	0	0	0	0	0	0	8.8	0	0	0	0
23rd	0	0	0	0	10.6	1.6	0.2	0	0	0	0	0
24th	0	23.8	1.6	0	6.4	8.2	0	0	0	0	0	0
25th	0	0	0	0	0.6	0	6.6	0	0	0	0	0
26th	0	0	11.2	0	0.2	0	14.8	0	0	0	0	2.8
27th	0	0	3.8	0	0	0	1.8	0	0	0	0	2.0
28th	0	1.4	0	0	0	7.6	1.2	0	0	5.6	9.2	5.2
29th	0		0	3.4	0	13.2	0	0	0	0	0	1.4
30th	0		1.4	0	6.2	7.4	4.0	0	0	0	0	0
31st	0		0		9.8		0	3.6		0		0
<b>Highest daily</b>	20.4	23.8	11.2	4.2	38.6	24.4	14.8	8.8	10.2	25.8	22.0	5.2
<b>Monthly Total</b>	46.8	43.2	26.4	7.8	88.4	127.4	49.2	29.8	34.8	47.0	36.2	11.8

Annual total for 1977 = 548.8mm

↓ This day is part of an accumulated total

Quality control: 12.3 Done & acceptable, 12.3 Not completed or unknown

Product code: IDCJAC0009 reference: 33779718



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## Daily Rainfall (millimetres)

### TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

#### Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Mean</b>	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
<b>Median</b>	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
<b>Highest daily</b>	42.0	90.0	56.0	70.0	38.6	25.0	30.8	39.2	35.8	40.4	45.0	61.2
<b>Date of highest daily</b>	1st 1988	8th 2002	22nd 2001	23rd 2001	6th 1977	9th 1998	10th 1981	31st 2005	22nd 1976	3rd 1981	22nd 1988	2nd 1987

#### 1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

#### 2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

#### 3) Further information

<http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml>.

Product code: IDCJAC0009 reference: 33779718 Created on Sat 09 Dec 2017 20:08:56 PM EST

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# Daily Rainfall (millimetres)

## TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

1976	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	18.2	0	0	0	0	0	3.4	0	0	1.4
2nd	0	0	0	0	0	5.8	0	15.0	5.2	0	8.8	0
3rd	0	0	0	0	0	0.2	0	1.6	0.4	9.2	19.4	0
4th	0	0	0	0	1.4	0.6	0	0	2.6	10.6	0.6	5.8
5th	2.2	0	0	1.4	1.0	0	2.2	0	0	0.2	0	0
6th	0	0	0	0	1.4	0	1.4	1.8	0	4.2	0	0
7th	0	0	0	0	5.0	6.0	0.2	↓	0	2.0	0	0.4
8th	0	0	0	0	2.2	0.2	0	↓	0	7.4	0	0
9th	0	3.8	0	2.0	0	0	0	7.2	9.8	6.6	2.8	0
10th	0	0	0	0	0	0.2	0	1.8	6.0	0.3	0	0
11th	0	0	0	0	0	0	0	8.8	1.6	0	0	0
12th	0	0	0	0	0	0	1.2	4.4	0.8	0	1.8	4.2
13th	2.6	0	0	0	0	0	0	9.6	2.0	0	0	1.6
14th	0	0	0	0	0	0	0	0	1.6	3.8	0	0
15th	1.0	0	0	12.8	0	0	2.2	0	0	4.4	0	11.6
16th	0	0	0	0	3.4	4.6	0	0	0	13.8	10.8	3.4
17th	0	0	11.0	0	1.8	4.2	0	0	0.6	0.6	3.4	2.6
18th	0	0	0	0	0	0	0	0.2	0	0	2.6	0
19th	0	4.2	0	0	0.4	0	0	0	0	0	1.4	0
20th	0	0	0	0	0	0	0	0	4.2	0	0	0
21st	0	0	0	0	0	0	0	0	18.4	0	0	0
22nd	0	0	0	0	2.8	0	0	0	35.8	0	0	0
23rd	0	0	0	0	1.2	0	0	8.6	14.4	5.0	0	1.2
24th	0	0	0	0	0	0	0	9.8	0	0	0	8.4
25th	1.2	0	0	0	0	0	0	0	0	0	2.6	0
26th	1.4	0	0	0	2.6	0	0	0	0	0	0	0
27th	0	0	0	0	0	0	0.4	0	0	0	0	0
28th	0	0	2.2	0	0	10.6	0	0	0	0	0	0
29th	0	0.6	0.8	5.4	0	4.8	2.4	0	3.4	0	0	0
30th	0		0	0.6	0	0	1.2	1.2	0	0	10.6	0
31st	0		0		0		0	0		0		0
<b>Highest daily</b>	2.6	4.2	18.2	12.8	5.0	10.6	2.4	15.0	35.8	13.8	19.4	11.6
<b>Monthly Total</b>	8.4	8.6	32.2	22.2	23.2	37.2	11.2	70.0	110.2	68.1	64.8	40.6

Annual total for 1976 = 496.7mm

↓ This day is part of an accumulated total

Quality control: 12.3 Done & acceptable, 12.3 Not completed or unknown

Product code: IDCJAC0009 reference: 33779697



Australian Government  
Bureau of Meteorology

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## Daily Rainfall (millimetres)

### TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

#### Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Mean</b>	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
<b>Median</b>	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
<b>Highest daily</b>	42.0	90.0	56.0	70.0	38.6	25.0	30.8	39.2	35.8	40.4	45.0	61.2
<b>Date of highest daily</b>	1st 1988	8th 2002	22nd 2001	23rd 2001	6th 1977	9th 1998	10th 1981	31st 2005	22nd 1976	3rd 1981	22nd 1988	2nd 1987

#### 1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

#### 2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

#### 3) Further information

<http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml>.

Product code: IDCJAC0009 reference: 33779697 Created on Sat 09 Dec 2017 20:08:24 PM EST

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# Daily Rainfall (millimetres)

## TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

1975	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	2.8	0	1.6	0	0.1	0	0	2.8	0
2nd	0	0	0	0	0	0	0	0.2	0	2.0	0	0
3rd	0	0	3.4	0.2	0	0	0	9.0	18.6	9.8	1.2	0.4
4th	0	0	0	0	0	1.6	0	0	3.6	1.4	8.4	7.6
5th	0	0	0	2.0	2.2	7.4	2.0	1.6	0.8	0	2.6	0
6th	0	0	0	0.1	0.4	7.6	2.0	1.0	0.2	0	8.6	0
7th	0	0	4.2	0	2.6	0	3.0	0.8	0.2	0	2.2	0
8th	0	0	0	0	1.6	0	0	0	0	16.0	0	0
9th	4.2	0	0.6	0	0	0	0	0	0	6.4	0	0
10th	2.4	0	0	0	2.4	0	0.8	0	0	4.2	0.4	0
11th	8.0	0	2.2	0.2	0	2.6	0	9.8	0	5.8	0	0
12th	0	0	0	0	2.6	2.4	5.8	6.6	0	5.8	0.4	0.4
13th	1.1	0.1	0	0	0	2.0	0.4	2.6	20.6	5.0	0	0.2
14th	0	0	0	0	6.8	0	6.8	0.6	0.6	1.0	0	3.8
15th	0	0	11.2	0	2.8	0	1.1	1.0	0	0	0	0
16th	0	0	10.4	0	0	0	0	0	8.8	4.6	0	0
17th	0	0	0	0	0	0	0	0	5.0	0.6	0	0
18th	0	0	0	0	6.8	0	0.2	0.4	8.8	0	0	3.8
19th	0	0	14.9	0	1.8	0	1.0	3.2	1.4	0	0	0
20th	0	0	2.9	0	0	0	4.2	0	0	6.0	2.4	0
21st	0	0	1.2	0	0	0	0	5.0	1.2	9.4	11.6	0
22nd	0	0	0	0	0	0	0	1.2	5.2	0	0	0
23rd	0	0	0	0	0	0	0	9.4	1.6	0	0	0
24th	0	0	2.4	0	1.2	0	0.8	1.2	0	14.2	15.8	0
25th	0.4	0	0	2.0	0	0	0.6	1.0	0	0	0.6	0
26th	0.8	0	0	0	0	0	0	3.0	0	11.0	3.0	0
27th	0	6.6	0	0	4.8	0.2	0	9.0	0	0	0	0
28th	0	0	0	1.2	0	0	0	7.8	13.2	0	0	0
29th	0		0	1.2	0	1.8	8.4	0.8	0	0	0	2.2
30th	0		2.8	0	0	0	0	0.2	0.2	7.8	0	6.0
31st	0		2.4		0		11.0	0		22.2		0
<b>Highest daily</b>	8.0	6.6	14.9	2.8	6.8	7.6	11.0	9.8	20.6	22.2	15.8	7.6
<b>Monthly Total</b>	16.9	6.7	58.6	9.7	36.0	27.2	48.1	75.5	90.0	133.2	60.0	24.4

Annual total for 1975 = 586.3mm

↓ This day is part of an accumulated total

Quality control: 12.3 Done & acceptable, 12.3 Not completed or unknown

Product code: IDCJAC0009 reference: 33779678



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## Daily Rainfall (millimetres)

### TORQUAY GOLF CLUB

Station Number: 087160 · State: VIC · Opened: 1974 · Status: Open · Latitude: 38.34°S · Longitude: 144.31°E · Elevation: 15 m

#### Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Mean</b>	33.6	27.1	37.6	39.1	53.2	50.8	57.6	58.3	52.5	55.9	45.7	41.2
<b>Median</b>	28.9	16.0	32.2	32.0	52.2	47.0	54.0	64.0	43.4	50.9	37.0	39.6
<b>Highest daily</b>	42.0	90.0	56.0	70.0	38.6	25.0	30.8	39.2	35.8	40.4	45.0	61.2
<b>Date of highest daily</b>	1st 1988	8th 2002	22nd 2001	23rd 2001	6th 1977	9th 1998	10th 1981	31st 2005	22nd 1976	3rd 1981	22nd 1988	2nd 1987

#### 1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

#### 2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

#### 3) Further information

<http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml>.

Product code: IDCJAC0009 reference: 33779678 Created on Sat 09 Dec 2017 20:07:56 PM EST

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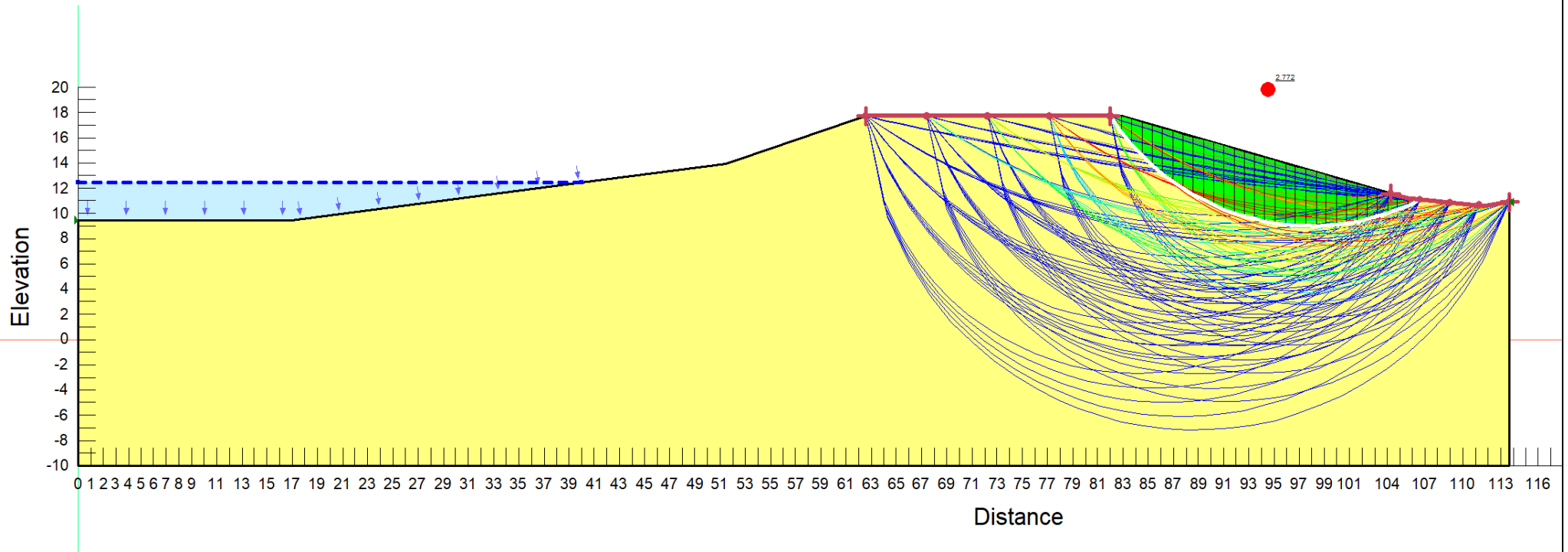
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## Appendix E – Slope/W Analysis



Report No

AGTE17463

Section A-A

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay



# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 12  
Date: 10/12/2017  
Time: 04:48:01 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section A-A.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 04:51:49 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (62.582, 17.72) m  
Left-Zone Right Coordinate: (81.98522, 17.69133) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (104.28865, 11.5693) m  
Right-Zone Right Coordinate: (113.706, 10.9) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.45) m  
Right Coordinate: (113.706, 10.9) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	12.45 m
Coordinate 2	40 m	12.45 m

### Points

	X	Y
Point 1	40 m	12.45 m

Point 2	51.455 m	13.94 m
Point 3	62.582 m	17.72 m
Point 4	82.885 m	17.69 m
Point 5	105.65 m	11.18 m
Point 6	111.706 m	10.6 m
Point 7	113.706 m	10.9 m
Point 8	113.706 m	-10 m
Point 9	0 m	-10 m
Point 10	0 m	9.45 m
Point 11	16.936 m	9.45 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,10,9,8,7,6,5,4,3,2	2,652.5 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 108

Factor of Safety: 2.772

Volume: 86.264875 m<sup>3</sup>

Weight: 1,725.2975 kN

Resisting Moment: 21,061.32 kN·m

Activating Moment: 7,596.7759 kN·m

Resisting Force: 1,011.0572 kN

Activating Force: 364.67802 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (106.61019, 11.08804) m

Entry: (81.98522, 17.69133) m

Radius: 19.06101 m

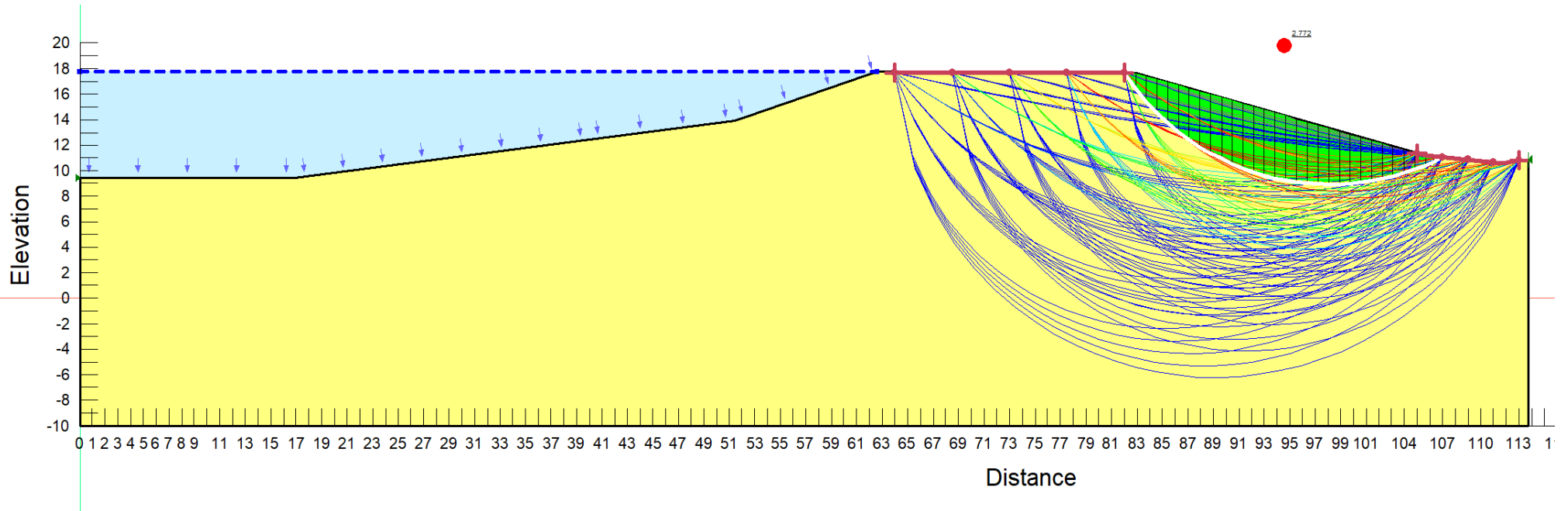
Center: (97.968109, 28.077347) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	82.43511 m	17.057205 m	0 kPa	6.0320123 kPa	2.8127735 kPa	10 kPa
Slice 2	83.291518 m	15.931846 m	0 kPa	22.572139 kPa	10.525561 kPa	10 kPa
Slice 3	84.104554 m	15.009345 m	0 kPa	33.775957 kPa	15.749987 kPa	10 kPa

Slice 4	84.917589 m	14.195895 m	0 kPa	43.245522 kPa	20.165718 kPa	10 kPa
Slice 5	85.730625 m	13.473074 m	0 kPa	51.404979 kPa	23.970535 kPa	10 kPa
Slice 6	86.543661 m	12.827886 m	0 kPa	58.550258 kPa	27.302433 kPa	10 kPa
Slice 7	87.356696 m	12.250772 m	0 kPa	64.891357 kPa	30.259337 kPa	10 kPa
Slice 8	88.169732 m	11.734482 m	0 kPa	70.576659 kPa	32.910437 kPa	10 kPa
Slice 9	88.982768 m	11.273382 m	0 kPa	75.707651 kPa	35.303057 kPa	10 kPa
Slice 10	89.795804 m	10.863021 m	0 kPa	80.348158 kPa	37.466961 kPa	10 kPa
Slice 11	90.608839 m	10.499832 m	0 kPa	84.530314 kPa	39.417133 kPa	10 kPa
Slice 12	91.421875 m	10.180936 m	0 kPa	88.258559 kPa	41.155642 kPa	10 kPa
Slice 13	92.234911 m	9.9039922 m	0 kPa	91.512518 kPa	42.672988 kPa	10 kPa
Slice 14	93.047946 m	9.6671044 m	0 kPa	94.249359 kPa	43.949198 kPa	10 kPa
Slice 15	93.860982 m	9.468739 m	0 kPa	96.406131 kPa	44.954917 kPa	10 kPa
Slice 16	94.674018 m	9.3076718 m	0 kPa	97.902476 kPa	45.652674 kPa	10 kPa
Slice 17	95.487054 m	9.1829471 m	0 kPa	98.644064 kPa	45.998483 kPa	10 kPa
Slice 18	96.300089 m	9.0938472 m	0 kPa	98.527018 kPa	45.943903 kPa	10 kPa
Slice 19	97.113125 m	9.0398708 m	0 kPa	97.443474 kPa	45.438638 kPa	10 kPa
Slice 20	97.926161 m	9.020719 m	0 kPa	95.288275 kPa	44.433652 kPa	10 kPa
Slice 21	98.739196 m	9.0362866 m	0 kPa	91.96657 kPa	42.884716 kPa	10 kPa
Slice 22	99.552232 m	9.0866589 m	0 kPa	87.40186 kPa	40.756157 kPa	10 kPa
Slice 23	100.36527 m	9.1721149 m	0 kPa	81.543779 kPa	38.024489 kPa	10 kPa
Slice 24	101.1783 m	9.2931342 m	0 kPa	74.374732 kPa	34.681507 kPa	10 kPa
Slice 25	101.99134 m	9.4504113 m	0 kPa	65.914405 kPa	30.736392 kPa	10 kPa
Slice 26	102.80437 m	9.6448762 m	0 kPa	56.221272 kPa	26.21641 kPa	10 kPa
Slice 27	103.61741 m	9.8777236 m	0 kPa	45.390484 kPa	21.16593 kPa	10 kPa
Slice 28	104.43045 m	10.150453 m	0 kPa	33.54796 kPa	15.643671 kPa	10 kPa
						10 kPa

Slice 29	105.24348 m	10.46492 m	0 kPa	20.841008 kPa	9.7183216 kPa	
Slice 30	106.13009 m	10.860443 m	0 kPa	8.1294925 kPa	3.7908446 kPa	10 kPa



Report No

AGTE17463

Section A-A Dam water at Crest

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 16  
Date: 10/12/2017  
Time: 04:47:40 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section A-A Water at top of Dam.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:49:09 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (64, 17.7179) m  
Left-Zone Right Coordinate: (82, 17.69131) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (105, 11.36588) m  
Right-Zone Right Coordinate: (113, 10.7941) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.45) m  
Right Coordinate: (113.706, 10.9) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	17.72 m
Coordinate 2	62.582 m	17.72 m

## Points

	X	Y
Point 1	40 m	12.45 m



Point 2	51.455 m	13.94 m
Point 3	62.582 m	17.72 m
Point 4	82.885 m	17.69 m
Point 5	105.65 m	11.18 m
Point 6	111.706 m	10.6 m
Point 7	113.706 m	10.9 m
Point 8	113.706 m	-10 m
Point 9	0 m	-10 m
Point 10	0 m	9.45 m
Point 11	16.936 m	9.45 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,10,9,8,7,6,5,4,3,2	2,652.5 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 108

Factor of Safety: 2.772

Volume: 88.046528 m<sup>3</sup>

Weight: 1,760.9306 kN

Resisting Moment: 21,729.131 kN·m

Activating Moment: 7,839.1083 kN·m

Resisting Force: 1,030.6451 kN

Activating Force: 371.81207 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (106.9849, 11.052153) m

Entry: (82, 17.691308) m

Radius: 19.294269 m

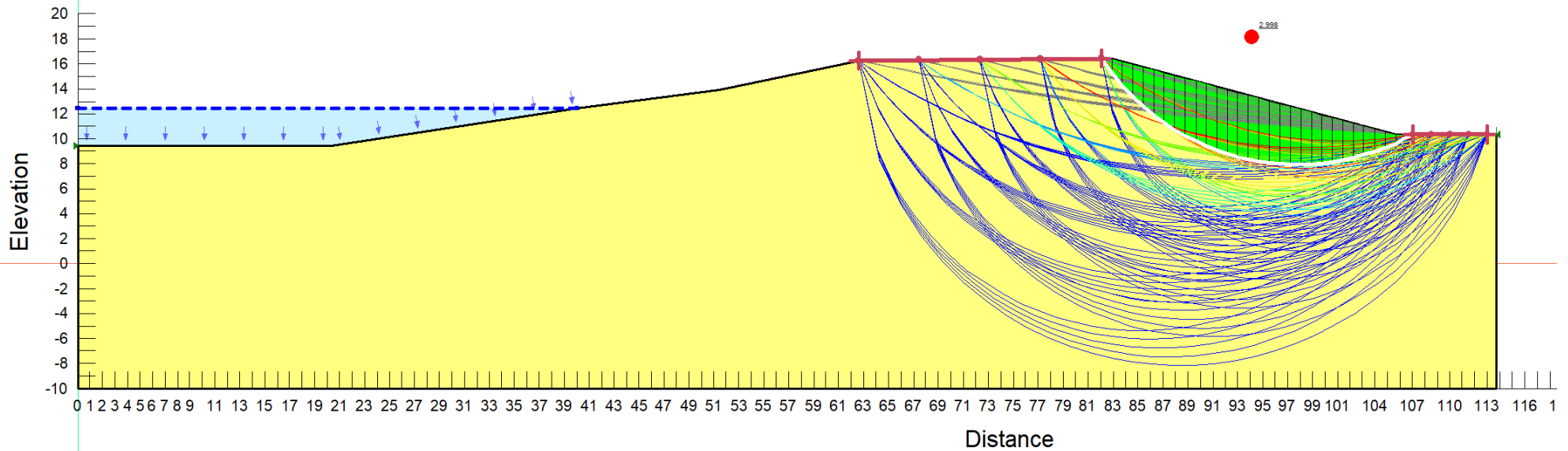
Center: (98.171157, 28.215684) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	82.4425 m	17.067024 m	0 kPa	5.8753863 kPa	2.7397376 kPa	10 kPa
Slice 2	83.306574 m	15.932566 m	0 kPa	22.496067 kPa	10.490088 kPa	10 kPa
Slice 3	84.149722 m	14.975929 m	0 kPa	34.121136 kPa	15.910947 kPa	10 kPa

Slice 4	84.99287 m	14.134911 m	0 kPa	43.908382 kPa	20.474815 kPa	10 kPa
Slice 5	85.836019 m	13.389612 m	0 kPa	52.314411 kPa	24.394611 kPa	10 kPa
Slice 6	86.679167 m	12.726093 m	0 kPa	59.655353 kPa	27.817748 kPa	10 kPa
Slice 7	87.522315 m	12.134163 m	0 kPa	66.153809 kPa	30.848028 kPa	10 kPa
Slice 8	88.365463 m	11.606123 m	0 kPa	71.965582 kPa	33.558102 kPa	10 kPa
Slice 9	89.208611 m	11.13602 m	0 kPa	77.195712 kPa	35.996952 kPa	10 kPa
Slice 10	90.051759 m	10.719165 m	0 kPa	81.908475 kPa	38.194549 kPa	10 kPa
Slice 11	90.894907 m	10.351816 m	0 kPa	86.133799 kPa	40.16485 kPa	10 kPa
Slice 12	91.738056 m	10.030964 m	0 kPa	89.871569 kPa	41.907801 kPa	10 kPa
Slice 13	92.581204 m	9.7541778 m	0 kPa	93.09476 kPa	43.4108 kPa	10 kPa
Slice 14	93.424352 m	9.5194954 m	0 kPa	95.752088 kPa	44.649932 kPa	10 kPa
Slice 15	94.2675 m	9.3253438 m	0 kPa	97.77073 kPa	45.59124 kPa	10 kPa
Slice 16	95.110648 m	9.1704805 m	0 kPa	99.059581 kPa	46.192241 kPa	10 kPa
Slice 17	95.953796 m	9.053951 m	0 kPa	99.51342 kPa	46.40387 kPa	10 kPa
Slice 18	96.796944 m	8.9750574 m	0 kPa	99.018277 kPa	46.172981 kPa	10 kPa
Slice 19	97.640093 m	8.9333368 m	0 kPa	97.458121 kPa	45.445468 kPa	10 kPa
Slice 20	98.483241 m	8.9285475 m	0 kPa	94.722784 kPa	44.16996 kPa	10 kPa
Slice 21	99.326389 m	8.9606619 m	0 kPa	90.716769 kPa	42.301924 kPa	10 kPa
Slice 22	100.16954 m	9.0298656 m	0 kPa	85.368286 kPa	39.807885 kPa	10 kPa
Slice 23	101.01269 m	9.1365631 m	0 kPa	78.637604 kPa	36.669317 kPa	10 kPa
Slice 24	101.85583 m	9.2813895 m	0 kPa	70.52361 kPa	32.8857 kPa	10 kPa
Slice 25	102.69898 m	9.4652302 m	0 kPa	61.06746 kPa	28.476224 kPa	10 kPa
Slice 26	103.54213 m	9.689249 m	0 kPa	50.35239 kPa	23.479705 kPa	10 kPa
Slice 27	104.38528 m	9.9549283 m	0 kPa	38.499202 kPa	17.952473 kPa	10 kPa
Slice 28	105.22843 m	10.264122 m	0 kPa	25.657492 kPa	11.964285 kPa	10 kPa
						10 kPa

Slice 29	105.98372 m	10.577675 m	0 kPa	14.881522 kPa	6.9393675 kPa	
Slice 30	106.65117 m	10.888824 m	0 kPa	6.3774621 kPa	2.9738594 kPa	10 kPa



Report No

AGTE17463

Section B-B

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 16  
Date: 10/12/2017  
Time: 04:47:04 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section B-B.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:31:52 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (62.582, 16.28) m  
Left-Zone Right Coordinate: (82.07605, 16.40482) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (107.02658, 10.35) m  
Right-Zone Right Coordinate: (113.02256, 10.35) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.46) m  
Right Coordinate: (113.706, 10.35) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	12.46 m
Coordinate 2	40 m	12.46 m

### Points

	X	Y
Point 1	40 m	12.46 m

Point 2	51.455 m	13.91 m
Point 3	62.582 m	16.28 m
Point 4	82.885 m	16.41 m
Point 5	105.65 m	10.35 m
Point 6	111.706 m	10.35 m
Point 7	113.706 m	10.35 m
Point 8	113.706 m	-10 m
Point 9	0 m	-10 m
Point 10	0 m	9.46 m
Point 11	20.403 m	9.46 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,10,9,8,7,6,5,4,3,2	2,583.7 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 103

Factor of Safety: 2.998

Volume: 87.230107 m<sup>3</sup>

Weight: 1,744.6021 kN

Resisting Moment: 21,153.281 kN·m

Activating Moment: 7,056.0959 kN·m

Resisting Force: 1,028.7174 kN

Activating Force: 343.1397 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (107.02658, 10.35) m

Entry: (82.07605, 16.40482) m

Radius: 18.848878 m

Center: (97.806111, 26.789682) m

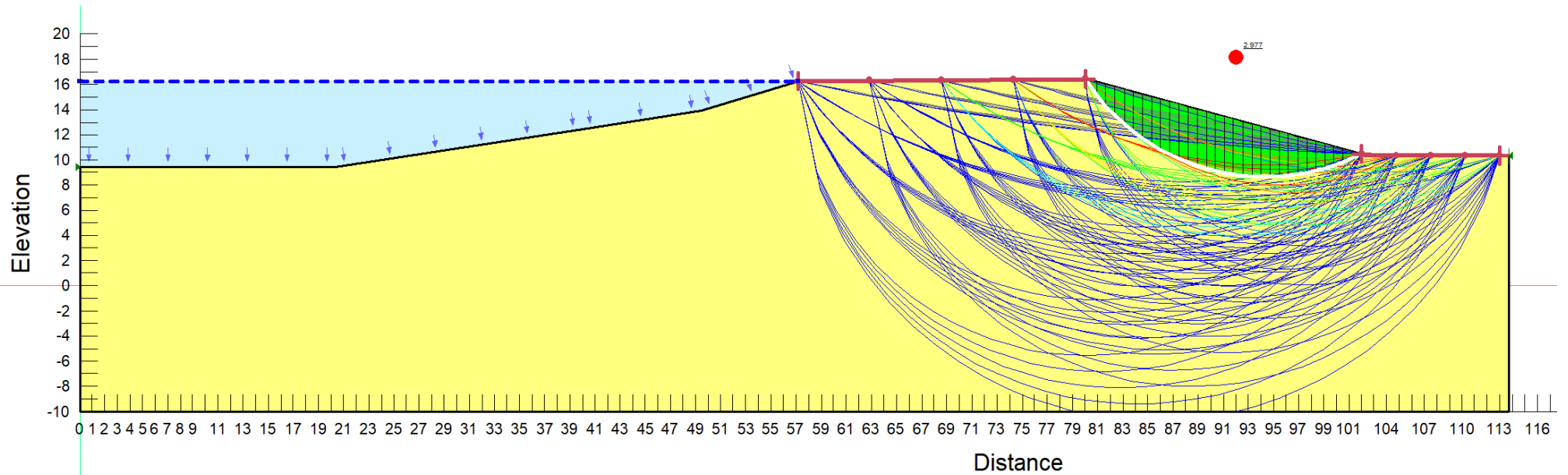
## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	82.480525 m	15.838766 m	0 kPa	5.4333012 kPa	2.5335899 kPa	10 kPa
Slice 2	83.306574 m	14.764396 m	0 kPa	21.508103 kPa	10.029393 kPa	10 kPa
Slice 3	84.149722 m	13.812445 m	0 kPa	33.520154 kPa	15.630705 kPa	10 kPa

Slice 4	84.99287 m	12.977718 m	0 kPa	43.623116 kPa	20.341793 kPa	10 kPa
Slice 5	85.836019 m	12.239801 m	0 kPa	52.285776 kPa	24.381258 kPa	10 kPa
Slice 6	86.679167 m	11.584473 m	0 kPa	59.831927 kPa	27.900086 kPa	10 kPa
Slice 7	87.522315 m	11.001377 m	0 kPa	66.489433 kPa	31.004532 kPa	10 kPa
Slice 8	88.365463 m	10.482719 m	0 kPa	72.417995 kPa	33.769066 kPa	10 kPa
Slice 9	89.208611 m	10.02249 m	0 kPa	77.725784 kPa	36.244128 kPa	10 kPa
Slice 10	90.051759 m	9.615974 m	0 kPa	82.479819 kPa	38.460971 kPa	10 kPa
Slice 11	90.894907 m	9.2594198 m	0 kPa	86.71269 kPa	40.434792 kPa	10 kPa
Slice 12	91.738056 m	8.9498223 m	0 kPa	90.427105 kPa	42.166852 kPa	10 kPa
Slice 13	92.581204 m	8.6847657 m	0 kPa	93.599236 kPa	43.646041 kPa	10 kPa
Slice 14	93.424352 m	8.4623122 m	0 kPa	96.181538 kPa	44.850188 kPa	10 kPa
Slice 15	94.2675 m	8.2809222 m	0 kPa	98.105574 kPa	45.747381 kPa	10 kPa
Slice 16	95.110648 m	8.1393945 m	0 kPa	99.285284 kPa	46.297488 kPa	10 kPa
Slice 17	95.953796 m	8.0368248 m	0 kPa	99.621039 kPa	46.454053 kPa	10 kPa
Slice 18	96.796944 m	7.9725747 m	0 kPa	99.004738 kPa	46.166667 kPa	10 kPa
Slice 19	97.640093 m	7.9462513 m	0 kPa	97.326052 kPa	45.383883 kPa	10 kPa
Slice 20	98.483241 m	7.9576953 m	0 kPa	94.479736 kPa	44.056624 kPa	10 kPa
Slice 21	99.326389 m	8.0069758 m	0 kPa	90.37369 kPa	42.141944 kPa	10 kPa
Slice 22	100.16954 m	8.0943928 m	0 kPa	84.937206 kPa	39.60687 kPa	10 kPa
Slice 23	101.01269 m	8.2204859 m	0 kPa	78.128594 kPa	36.431962 kPa	10 kPa
Slice 24	101.85583 m	8.3860518 m	0 kPa	69.941219 kPa	32.614126 kPa	10 kPa
Slice 25	102.69898 m	8.5921703 m	0 kPa	60.406969 kPa	28.168232 kPa	10 kPa
Slice 26	103.54213 m	8.8402418 m	0 kPa	49.596315 kPa	23.127142 kPa	10 kPa
Slice 27	104.38528 m	9.132039 m	0 kPa	37.614468 kPa	17.539915 kPa	10 kPa
Slice 28	105.22843 m	9.4697782 m	0 kPa	24.593615 kPa	11.468191 kPa	10 kPa
						10 kPa



Slice 29	105.99414 m	9.8164592 m	0 kPa	14.041227 kPa	6.5475315 kPa	
Slice 30	106.68243 m	10.166239 m	0 kPa	6.1328942 kPa	2.8598155 kPa	10 kPa



Report No

AGTE17463

Section B-B Dam water at Crest

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 19  
Date: 10/12/2017  
Time: 04:48:18 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section B-B Water at top of Dam.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:51:49 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (57.139, 16.28) m  
Left-Zone Right Coordinate: (80.05635, 16.40913) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (102, 10.48115) m  
Right-Zone Right Coordinate: (113.02256, 10.35) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.46) m  
Right Coordinate: (113.706, 10.35) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	16.28 m
Coordinate 2	57.139 m	16.28 m

## Points

	X	Y
Point 1	40 m	12.46 m

Point 2	49.472 m	13.91 m
Point 3	57.139 m	16.28 m
Point 4	80.21 m	16.41 m
Point 5	102.482 m	10.35 m
Point 6	111.706 m	10.35 m
Point 7	113.706 m	10.35 m
Point 8	113.706 m	-10 m
Point 9	0 m	-10 m
Point 10	0 m	9.46 m
Point 11	20.403 m	9.46 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,10,9,8,7,6,5,4,3,2	2,576.7 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 103

Factor of Safety: 2.977

Volume: 68.206704 m<sup>3</sup>

Weight: 1,364.1341 kN

Resisting Moment: 15,354.569 kN·m

Activating Moment: 5,158.629 kN·m

Resisting Force: 825.98086 kN

Activating Force: 277.49676 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (102, 10.481148) m

Entry: (80.05635, 16.409134) m

Radius: 17.018351 m

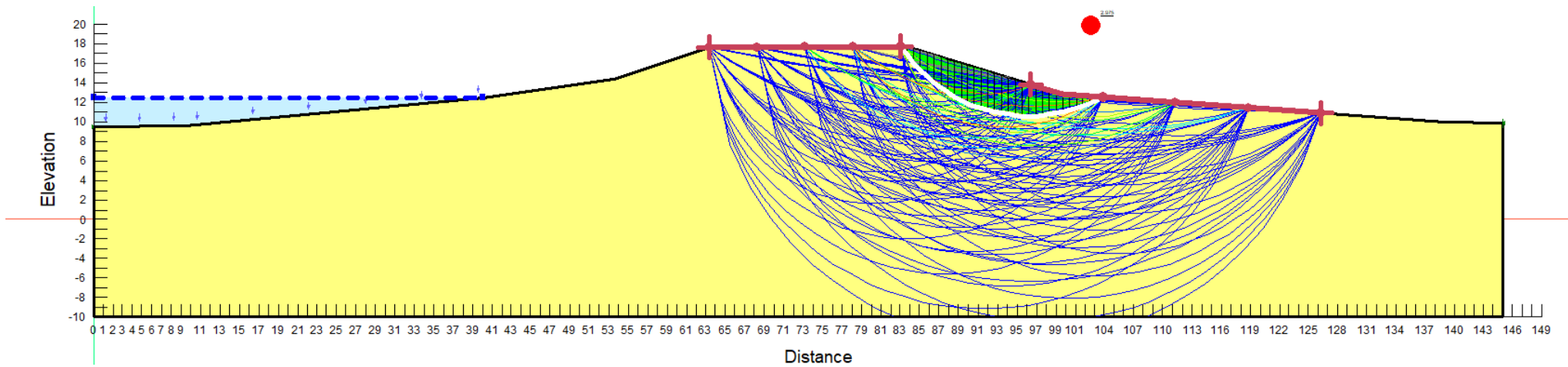
Center: (94.331745, 25.67398) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	80.133175 m	16.292858 m	0 kPa	-2.193302 kPa	-1.0227535 kPa	10 kPa
Slice 2	80.573167 m	15.676776 m	0 kPa	6.5381288 kPa	3.0487795 kPa	10 kPa
Slice 3	81.2995 m	14.743954 m	0 kPa	18.808221 kPa	8.7704176 kPa	10 kPa

Slice 4	82.025833 m	13.930382 m	0 kPa	28.965811 kPa	13.506979 kPa	10 kPa
Slice 5	82.752167 m	13.212364 m	0 kPa	37.566595 kPa	17.517591 kPa	10 kPa
Slice 6	83.4785 m	12.574021 m	0 kPa	44.985108 kPa	20.9769 kPa	10 kPa
Slice 7	84.204833 m	12.004099 m	0 kPa	51.483387 kPa	24.007098 kPa	10 kPa
Slice 8	84.931167 m	11.494293 m	0 kPa	57.247818 kPa	26.695096 kPa	10 kPa
Slice 9	85.6575 m	11.038287 m	0 kPa	62.410421 kPa	29.102457 kPa	10 kPa
Slice 10	86.383833 m	10.631166 m	0 kPa	67.061786 kPa	31.271424 kPa	10 kPa
Slice 11	87.110166 m	10.269039 m	0 kPa	71.259252 kPa	33.228735 kPa	10 kPa
Slice 12	87.8365 m	9.9487879 m	0 kPa	75.032227 kPa	34.988102 kPa	10 kPa
Slice 13	88.562833 m	9.6678905 m	0 kPa	78.385819 kPa	36.551907 kPa	10 kPa
Slice 14	89.289166 m	9.4243006 m	0 kPa	81.303475 kPa	37.912433 kPa	10 kPa
Slice 15	90.0155 m	9.2163576 m	0 kPa	83.749192 kPa	39.05289 kPa	10 kPa
Slice 16	90.741833 m	9.0427213 m	0 kPa	85.669687 kPa	39.948431 kPa	10 kPa
Slice 17	91.468166 m	8.9023238 m	0 kPa	86.996875 kPa	40.567309 kPa	10 kPa
Slice 18	92.1945 m	8.794334 m	0 kPa	87.650946 kPa	40.872307 kPa	10 kPa
Slice 19	92.920833 m	8.7181316 m	0 kPa	87.544233 kPa	40.822546 kPa	10 kPa
Slice 20	93.647166 m	8.6732883 m	0 kPa	86.585993 kPa	40.375712 kPa	10 kPa
Slice 21	94.3735 m	8.6595556 m	0 kPa	84.688063 kPa	39.490692 kPa	10 kPa
Slice 22	95.099833 m	8.6768581 m	0 kPa	81.771201 kPa	38.130537 kPa	10 kPa
Slice 23	95.826166 m	8.7252909 m	0 kPa	77.771713 kPa	36.265545 kPa	10 kPa
Slice 24	96.5525 m	8.8051227 m	0 kPa	72.647794 kPa	33.876223 kPa	10 kPa
Slice 25	97.278833 m	8.9168032 m	0 kPa	66.384859 kPa	30.955768 kPa	10 kPa
Slice 26	98.005166 m	9.0609757 m	0 kPa	58.9991 kPa	27.511732 kPa	10 kPa
Slice 27	98.731499 m	9.2384973 m	0 kPa	50.538585 kPa	23.566529 kPa	10 kPa
Slice 28	99.457833 m	9.450465 m	0 kPa	41.081415 kPa	19.156578 kPa	10 kPa
						10 kPa

Slice 29	100.18417 m	9.698253 m	0 kPa	30.730825 kPa	14.330019 kPa	
Slice 30	100.9105 m	9.9835629 m	0 kPa	19.607494 kPa	9.1431246 kPa	10 kPa
Slice 31	101.63683 m	10.30849 m	0 kPa	7.8397142 kPa	3.6557188 kPa	10 kPa



Report No

AGTE17463

Section C-C

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay



# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 19  
Date: 10/12/2017  
Time: 04:50:57 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section C-C.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:35:09 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (63.377, 17.66) m  
Left-Zone Right Coordinate: (83.03952, 17.73771) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (96.4588, 13.84343) m  
Right-Zone Right Coordinate: (126.27574, 10.90975) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.45) m  
Right Coordinate: (145, 9.93) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	12.49 m
Coordinate 2	40 m	12.49 m

### Points

	X	Y
Point 1	40 m	12.49 m

Point 2	53.462 m	14.47 m
Point 3	63.377 m	17.66 m
Point 4	83.62 m	17.74 m
Point 5	99.765 m	12.84 m
Point 6	138.908 m	9.99 m
Point 7	145 m	9.93 m
Point 8	145 m	-10 m
Point 9	0 m	-10 m
Point 10	0 m	9.45 m
Point 11	9.49 m	9.603 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,10,9,8,7,6,5,4,3,2	3,330.8 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 108

Factor of Safety: 2.975

Volume: 55.338124 m<sup>3</sup>

Weight: 1,106.7625 kN

Resisting Moment: 12,098.604 kN·m

Activating Moment: 4,066.8428 kN·m

Resisting Force: 698.47712 kN

Activating Force: 234.78224 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (103.80819, 12.545616) m

Entry: (83.03952, 17.737706) m

Radius: 15.798625 m

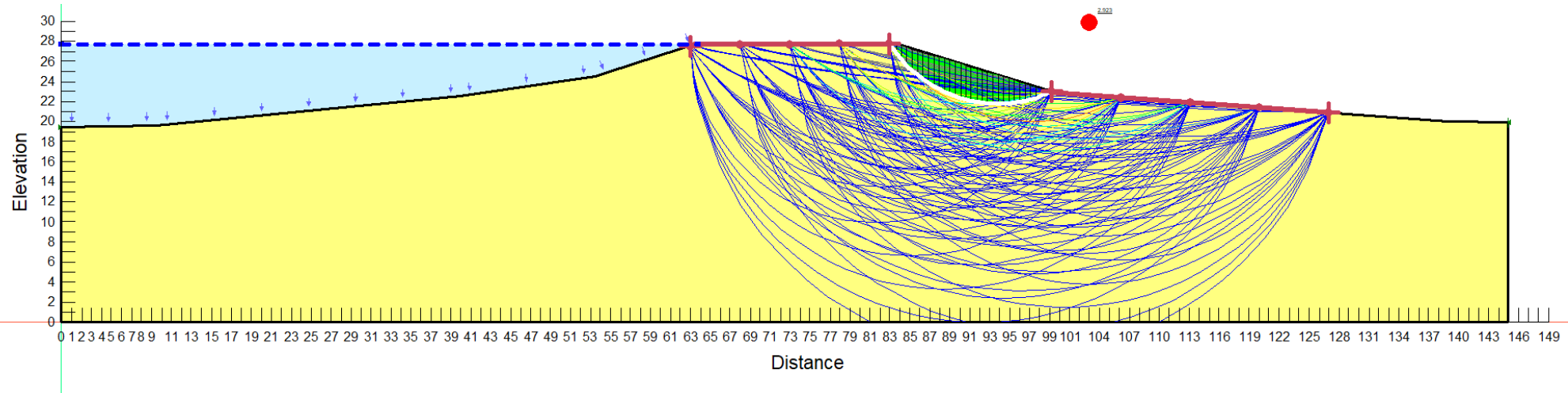
Center: (96.242062, 26.414656) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	83.32976 m	17.325388 m	0 kPa	2.8534822 kPa	1.3306006 kPa	10 kPa
Slice 2	83.970978 m	16.479568 m	0 kPa	15.301696 kPa	7.1352981 kPa	10 kPa
Slice 3	84.672935 m	15.668219 m	0 kPa	25.278137 kPa	11.787389 kPa	10 kPa

Slice 4	85.374891 m	14.957468 m	0 kPa	33.577787 kPa	15.657579 kPa	10 kPa
Slice 5	86.076848 m	14.329348 m	0 kPa	40.615343 kPa	18.939245 kPa	10 kPa
Slice 6	86.778804 m	13.771431 m	0 kPa	46.67443 kPa	21.764644 kPa	10 kPa
Slice 7	87.480761 m	13.274708 m	0 kPa	51.953241 kPa	24.226194 kPa	10 kPa
Slice 8	88.182717 m	12.832426 m	0 kPa	56.590078 kPa	26.388387 kPa	10 kPa
Slice 9	88.884674 m	12.439389 m	0 kPa	60.67856 kPa	28.294877 kPa	10 kPa
Slice 10	89.58663 m	12.091527 m	0 kPa	64.277096 kPa	29.972902 kPa	10 kPa
Slice 11	90.288587 m	11.785605 m	0 kPa	67.41503 kPa	31.436145 kPa	10 kPa
Slice 12	90.990543 m	11.519031 m	0 kPa	70.096825 kPa	32.686686 kPa	10 kPa
Slice 13	91.6925 m	11.289719 m	0 kPa	72.305143 kPa	33.716442 kPa	10 kPa
Slice 14	92.394457 m	11.095989 m	0 kPa	74.003429 kPa	34.508366 kPa	10 kPa
Slice 15	93.096413 m	10.936504 m	0 kPa	75.13844 kPa	35.03763 kPa	10 kPa
Slice 16	93.79837 m	10.81021 m	0 kPa	75.64309 kPa	35.272952 kPa	10 kPa
Slice 17	94.500326 m	10.716305 m	0 kPa	75.439895 kPa	35.178201 kPa	10 kPa
Slice 18	95.202283 m	10.654208 m	0 kPa	74.445226 kPa	34.714379 kPa	10 kPa
Slice 19	95.904239 m	10.623544 m	0 kPa	72.574429 kPa	33.842012 kPa	10 kPa
Slice 20	96.606196 m	10.62413 m	0 kPa	69.747771 kPa	32.52392 kPa	10 kPa
Slice 21	97.308152 m	10.655967 m	0 kPa	65.896923 kPa	30.72824 kPa	10 kPa
Slice 22	98.010109 m	10.719248 m	0 kPa	60.97153 kPa	28.431491 kPa	10 kPa
Slice 23	98.712065 m	10.814355 m	0 kPa	54.945216 kPa	25.621375 kPa	10 kPa
Slice 24	99.414022 m	10.941877 m	0 kPa	47.82024 kPa	22.298944 kPa	10 kPa
Slice 25	100.10193 m	11.098742 m	0 kPa	41.521945 kPa	19.362001 kPa	10 kPa
Slice 26	100.7758 m	11.284617 m	0 kPa	36.153252 kPa	16.858538 kPa	10 kPa
Slice 27	101.44966 m	11.503248 m	0 kPa	29.892471 kPa	13.939088 kPa	10 kPa
Slice 28	102.12353 m	11.756104 m	0 kPa	22.798498 kPa	10.631114 kPa	10 kPa
				14.94418 kPa		10 kPa

Slice 29	102.79739 m	12.044998 m	0 kPa		6.9685858 kPa	
Slice 30	103.47126 m	12.37216 m	0 kPa	6.4096737 kPa	2.98888 kPa	10 kPa



Report No

AGTE17463

Section C-C Water at Crest

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 21  
Date: 10/12/2017  
Time: 04:49:22 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section C-C Water at top of Dam.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:59:36 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (63, 27.53871) m  
Left-Zone Right Coordinate: (83, 27.73755) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (99.23782, 23) m  
Right-Zone Right Coordinate: (127, 20.85702) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 19.45) m  
Right Coordinate: (145, 19.93) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	27.66 m
Coordinate 2	63.77 m	27.66 m

### Points

	X	Y
Point 1	40 m	22.49 m



Point 2	53.462 m	24.47 m
Point 3	63.377 m	27.66 m
Point 4	83.62 m	27.74 m
Point 5	99.765 m	22.84 m
Point 6	138.908 m	19.99 m
Point 7	145 m	19.93 m
Point 8	145 m	0 m
Point 9	0 m	0 m
Point 10	0 m	19.45 m
Point 11	9.49 m	19.603 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,10,9,8,7,6,5,4,3,2	3,330.8 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 103

Factor of Safety: 2.923

Volume: 38.184594 m<sup>3</sup>

Weight: 763.69189 kN

Resisting Moment: 7,044.7854 kN·m

Activating Moment: 2,409.3894 kN·m

Resisting Force: 498.25278 kN

Activating Force: 170.45591 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (99.23782, 22.999999) m

Entry: (83, 27.73755) m

Radius: 12.863183 m

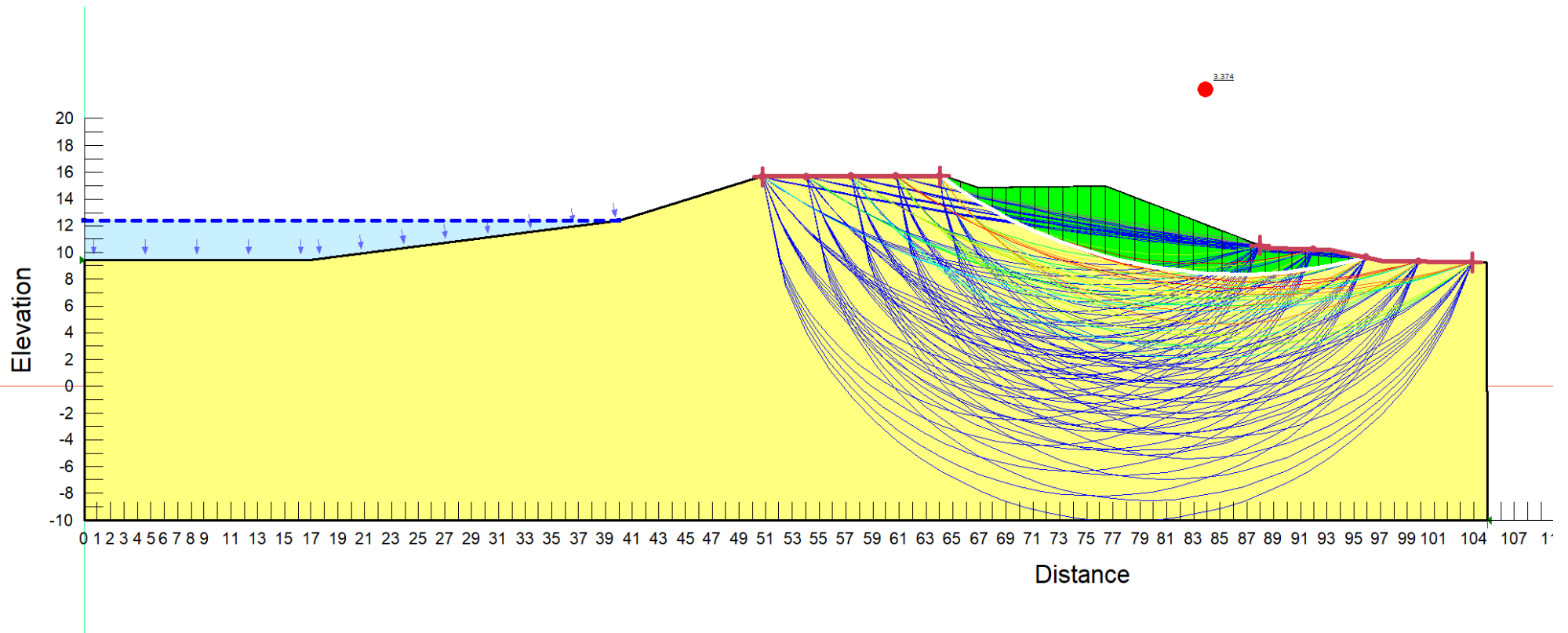
Center: (93.833455, 34.672802) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	83.31 m	27.295355 m	0 kPa	3.2321308 kPa	1.5071673 kPa	10 kPa
Slice 2	83.889273 m	26.524538 m	0 kPa	14.812981 kPa	6.9074066 kPa	10 kPa
Slice 3	84.427818 m	25.906989 m	0 kPa	22.32466 kPa	10.41016 kPa	10 kPa

Slice 4	84.966364 m	25.361631 m	0 kPa	28.640993 kPa	13.355514 kPa	10 kPa
Slice 5	85.504909 m	24.876278 m	0 kPa	34.061305 kPa	15.883047 kPa	10 kPa
Slice 6	86.043455 m	24.442317 m	0 kPa	38.792778 kPa	18.08937 kPa	10 kPa
Slice 7	86.582 m	24.053406 m	0 kPa	42.981612 kPa	20.042655 kPa	10 kPa
Slice 8	87.120546 m	23.704727 m	0 kPa	46.730757 kPa	21.79091 kPa	10 kPa
Slice 9	87.659091 m	23.392533 m	0 kPa	50.110588 kPa	23.366951 kPa	10 kPa
Slice 10	88.197637 m	23.113854 m	0 kPa	53.165554 kPa	24.791505 kPa	10 kPa
Slice 11	88.736182 m	22.866309 m	0 kPa	55.918472 kPa	26.075212 kPa	10 kPa
Slice 12	89.274728 m	22.647971 m	0 kPa	58.373388 kPa	27.219958 kPa	10 kPa
Slice 13	89.813273 m	22.457268 m	0 kPa	60.51762 kPa	28.21983 kPa	10 kPa
Slice 14	90.351819 m	22.292921 m	0 kPa	62.323432 kPa	29.061894 kPa	10 kPa
Slice 15	90.890364 m	22.153889 m	0 kPa	63.74965 kPa	29.72695 kPa	10 kPa
Slice 16	91.42891 m	22.039334 m	0 kPa	64.74353 kPa	30.190404 kPa	10 kPa
Slice 17	91.967455 m	21.948594 m	0 kPa	65.2431 kPa	30.423357 kPa	10 kPa
Slice 18	92.506001 m	21.881162 m	0 kPa	65.180162 kPa	30.394009 kPa	10 kPa
Slice 19	93.044546 m	21.836668 m	0 kPa	64.48405 kPa	30.069406 kPa	10 kPa
Slice 20	93.583092 m	21.814876 m	0 kPa	63.086143 kPa	29.417551 kPa	10 kPa
Slice 21	94.121637 m	21.815668 m	0 kPa	60.924975 kPa	28.409782 kPa	10 kPa
Slice 22	94.660183 m	21.83905 m	0 kPa	57.951624 kPa	27.023286 kPa	10 kPa
Slice 23	95.198728 m	21.885145 m	0 kPa	54.134895 kPa	25.243516 kPa	10 kPa
Slice 24	95.737274 m	21.9542 m	0 kPa	49.465706 kPa	23.066237 kPa	10 kPa
Slice 25	96.275819 m	22.046594 m	0 kPa	43.960011 kPa	20.49889 kPa	10 kPa
Slice 26	96.814365 m	22.162844 m	0 kPa	37.659695 kPa	17.561004 kPa	10 kPa
Slice 27	97.35291 m	22.303625 m	0 kPa	30.631039 kPa	14.283488 kPa	10 kPa
Slice 28	97.891456 m	22.469786 m	0 kPa	22.960669 kPa	10.706736 kPa	10 kPa
				14.74926 kPa		10 kPa

Slice 29	98.430001 m	22.662385 m	0 kPa		6.8776931 kPa	
Slice 30	98.968547 m	22.882719 m	0 kPa	6.1035763 kPa	2.8461444 kPa	10 kPa



Report No

AGTE17463

Section D-D

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 19  
Date: 10/12/2017  
Time: 04:49:39 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section D-D.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:39:01 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (50.75385, 15.66334) m  
Left-Zone Right Coordinate: (64.04935, 15.72897) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (88, 10.53052) m  
Right-Zone Right Coordinate: (103.86049, 9.29522) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.45) m  
Right Coordinate: (105, -10) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	12.38 m
Coordinate 2	40 m	12.38 m

### Points

	X	Y
Point 1	40 m	12.38 m

Point 2	50.684 m	15.663 m
Point 3	64.259 m	15.73 m
Point 4	66.89 m	14.82 m
Point 5	76.408 m	14.94 m
Point 6	88.422 m	10.37 m
Point 7	93.324 m	10.14 m
Point 8	97.068 m	9.39 m
Point 9	104.951 m	9.28 m
Point 10	0 m	9.45 m
Point 11	16.936 m	9.45 m
Point 12	105 m	-10 m
Point 13	0 m	-10 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	10,13,12,9,8,7,6,5,4,3,2,1,11	2,318.9 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 112

Factor of Safety: 3.374

Volume: 89.518973 m<sup>3</sup>

Weight: 1,790.3795 kN

Resisting Moment: 43,862.64 kN·m

Activating Moment: 13,000.775 kN·m

Resisting Force: 1,123.4653 kN

Activating Force: 332.99582 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (95.899161, 9.6241425) m

Entry: (64.04935, 15.728965) m

Radius: 37.511784 m

Center: (86.341991, 45.898023) m

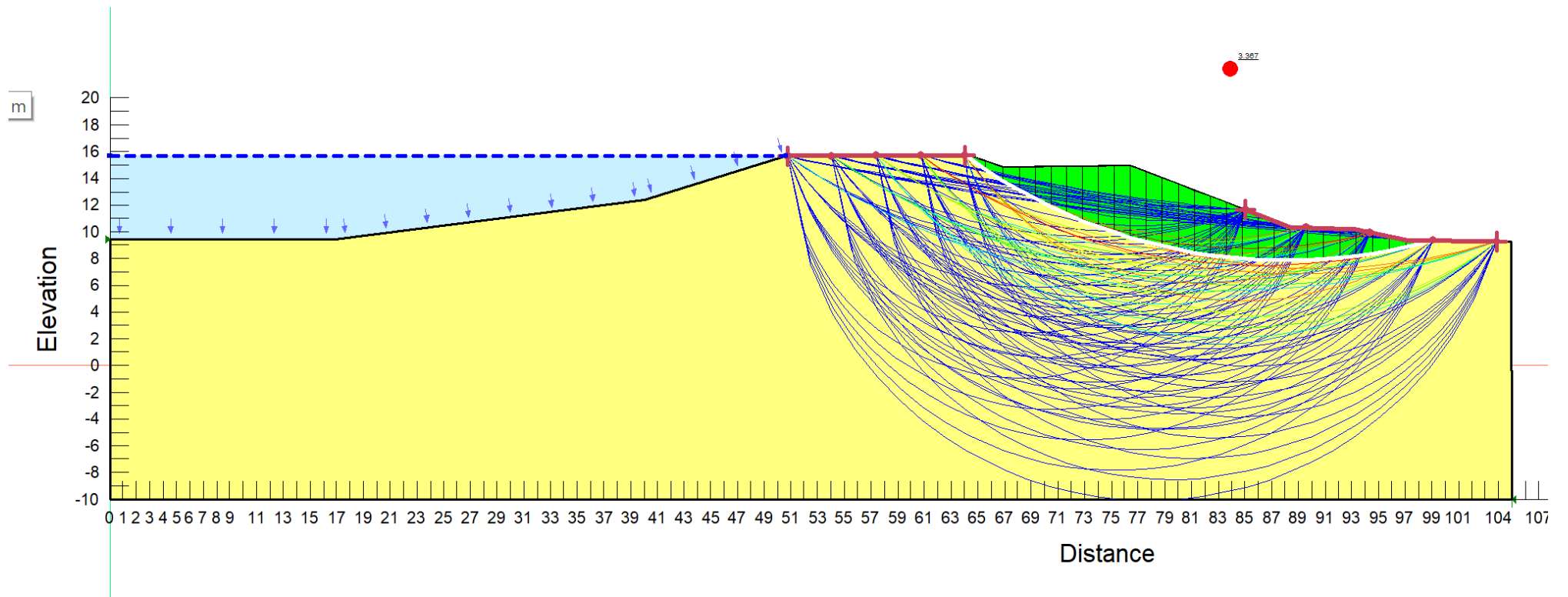
## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	64.154175 m	15.652068 m	0 kPa	-0.55680022 kPa	-0.25964021 kPa	10 kPa

Slice 2	64.91675 m	15.117336 m	0 kPa	5.1589695 kPa	2.405667 kPa	10 kPa
Slice 3	66.23225 m	14.241665 m	0 kPa	12.935311 kPa	6.0318347 kPa	10 kPa
Slice 4	67.418778 m	13.514836 m	0 kPa	22.168887 kPa	10.337522 kPa	10 kPa
Slice 5	68.476333 m	12.919386 m	0 kPa	33.228278 kPa	15.494601 kPa	10 kPa
Slice 6	69.533889 m	12.367862 m	0 kPa	43.533647 kPa	20.300073 kPa	10 kPa
Slice 7	70.591444 m	11.858124 m	0 kPa	53.179883 kPa	24.798187 kPa	10 kPa
Slice 8	71.649 m	11.38832 m	0 kPa	62.244906 kPa	29.025276 kPa	10 kPa
Slice 9	72.706556 m	10.956835 m	0 kPa	70.790535 kPa	33.010168 kPa	10 kPa
Slice 10	73.764111 m	10.562265 m	0 kPa	78.863188 kPa	36.774509 kPa	10 kPa
Slice 11	74.821667 m	10.203384 m	0 kPa	86.494471 kPa	40.333034 kPa	10 kPa
Slice 12	75.879222 m	9.879123 m	0 kPa	93.701716 kPa	43.693828 kPa	10 kPa
Slice 13	76.954091 m	9.5843469 m	0 kPa	96.531632 kPa	45.013439 kPa	10 kPa
Slice 14	78.046273 m	9.3193216 m	0 kPa	94.851283 kPa	44.22988 kPa	10 kPa
Slice 15	79.138455 m	9.0886042 m	0 kPa	92.529239 kPa	43.147093 kPa	10 kPa
Slice 16	80.230636 m	8.8915521 m	0 kPa	89.521731 kPa	41.744669 kPa	10 kPa
Slice 17	81.322818 m	8.7276297 m	0 kPa	85.783732 kPa	40.001611 kPa	10 kPa
Slice 18	82.415 m	8.5963996 m	0 kPa	81.271683 kPa	37.897608 kPa	10 kPa
Slice 19	83.507182 m	8.4975174 m	0 kPa	75.946351 kPa	35.414365 kPa	10 kPa
Slice 20	84.599364 m	8.4307269 m	0 kPa	69.775674 kPa	32.536931 kPa	10 kPa
Slice 21	85.691545 m	8.3958563 m	0 kPa	62.737437 kPa	29.254947 kPa	10 kPa
Slice 22	86.783727 m	8.3928166 m	0 kPa	54.821556 kPa	25.563711 kPa	10 kPa
Slice 23	87.875909 m	8.4216001 m	0 kPa	46.03176 kPa	21.464962 kPa	10 kPa
Slice 24	88.9122 m	8.477621 m	0 kPa	40.295257 kPa	18.789987 kPa	10 kPa
Slice 25	89.8926 m	8.5579025 m	0 kPa	37.751439 kPa	17.603785 kPa	10 kPa
Slice 26	90.873 m	8.6641675 m	0 kPa	34.573586 kPa	16.121928 kPa	10 kPa
	91.8534 m			30.770662 kPa		10 kPa



Slice 27		8.7966394 m	0 kPa		14.348595 kPa	
Slice 28	92.8338 m	8.9556003 m	0 kPa	26.357632 kPa	12.290766 kPa	10 kPa
Slice 29	93.96779 m	9.1754313 m	0 kPa	18.418636 kPa	8.5887509 kPa	10 kPa
Slice 30	95.25537 m	9.4666315 m	0 kPa	6.8157015 kPa	3.1782138 kPa	10 kPa



Report No

AGTE17463

Section D-D Dam water at Crest

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Slope Stability

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 22  
Date: 10/12/2017  
Time: 04:49:04 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section D-D Water at top of Dam.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 10/12/2017  
Last Solved Time: 05:55:39 PM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Slope Stability

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (50.75385, 15.66334) m  
Left-Zone Right Coordinate: (64.04935, 15.72897) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (85.03854, 11.65703) m  
Right-Zone Right Coordinate: (103.86049, 9.29522) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.45) m  
Right Coordinate: (105, -10) m

## Piezometric Lines

### Piezometric Line 1

#### Coordinates

	X	Y
Coordinate 1	0 m	15.663 m
Coordinate 2	50.684 m	15.663 m

## Points

	X	Y
Point 1	40 m	12.38 m

Point 2	50.684 m	15.663 m
Point 3	64.259 m	15.73 m
Point 4	66.89 m	14.82 m
Point 5	76.408 m	14.94 m
Point 6	88.422 m	10.37 m
Point 7	93.324 m	10.14 m
Point 8	97.068 m	9.39 m
Point 9	104.951 m	9.28 m
Point 10	0 m	9.45 m
Point 11	16.936 m	9.45 m
Point 12	105 m	-10 m
Point 13	0 m	-10 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	10,13,12,9,8,7,6,5,4,3,2,1,11	2,318.9 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 117

Factor of Safety: 3.367

Volume: 101.23961 m<sup>3</sup>

Weight: 2,024.7923 kN

Resisting Moment: 53,586.278 kN·m

Activating Moment: 15,915.611 kN·m

Resisting Force: 1,261.4287 kN

Activating Force: 374.66059 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (99.07623, 9.361977) m

Entry: (64.04935, 15.728965) m

Radius: 40.820542 m

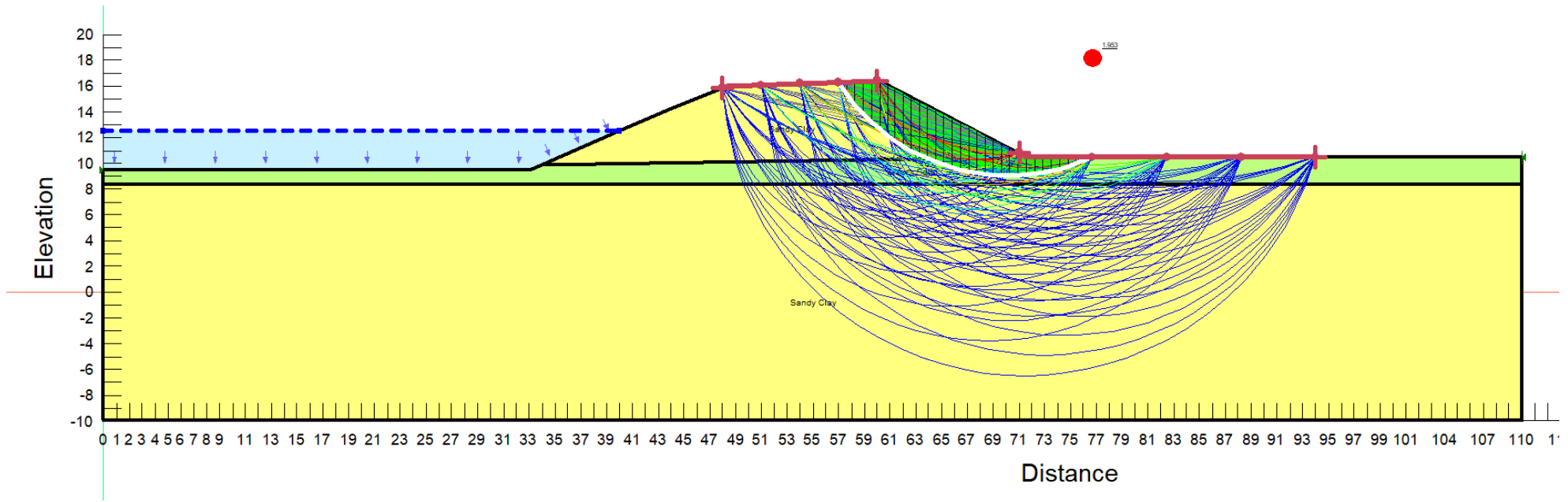
Center: (88.132616, 48.688227) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	64.154175 m	15.652879 m	0 kPa	-0.55641138 kPa	-0.25945889 kPa	10 kPa

Slice 2	64.91675 m	15.121866 m	0 kPa	5.086465 kPa	2.3718576 kPa	10 kPa
Slice 3	66.23225 m	14.248671 m	0 kPa	12.817715 kPa	5.9769986 kPa	10 kPa
Slice 4	67.484875 m	13.481525 m	0 kPa	22.804825 kPa	10.634065 kPa	10 kPa
Slice 5	68.674625 m	12.810027 m	0 kPa	35.283195 kPa	16.452824 kPa	10 kPa
Slice 6	69.864375 m	12.189659 m	0 kPa	46.87766 kPa	21.859412 kPa	10 kPa
Slice 7	71.054125 m	11.617851 m	0 kPa	57.700326 kPa	26.906104 kPa	10 kPa
Slice 8	72.243875 m	11.092383 m	0 kPa	67.842983 kPa	31.635703 kPa	10 kPa
Slice 9	73.433625 m	10.611335 m	0 kPa	77.378175 kPa	36.082036 kPa	10 kPa
Slice 10	74.623375 m	10.17304 m	0 kPa	86.360051 kPa	40.270353 kPa	10 kPa
Slice 11	75.813125 m	9.7760512 m	0 kPa	94.825088 kPa	44.217665 kPa	10 kPa
Slice 12	77.0087 m	9.4175595 m	0 kPa	98.390807 kPa	45.880387 kPa	10 kPa
Slice 13	78.2101 m	9.0968542 m	0 kPa	96.941004 kPa	45.204333 kPa	10 kPa
Slice 14	79.4115 m	8.8149194 m	0 kPa	94.806201 kPa	44.208857 kPa	10 kPa
Slice 15	80.6129 m	8.5709367 m	0 kPa	91.944746 kPa	42.874539 kPa	10 kPa
Slice 16	81.8143 m	8.3642167 m	0 kPa	88.311392 kPa	41.180278 kPa	10 kPa
Slice 17	83.0157 m	8.194188 m	0 kPa	83.860049 kPa	39.104583 kPa	10 kPa
Slice 18	84.2171 m	8.0603897 m	0 kPa	78.546744 kPa	36.626948 kPa	10 kPa
Slice 19	85.4185 m	7.9624642 m	0 kPa	72.33266 kPa	33.729273 kPa	10 kPa
Slice 20	86.6199 m	7.900153 m	0 kPa	65.187148 kPa	30.397266 kPa	10 kPa
Slice 21	87.8213 m	7.8732929 m	0 kPa	57.090491 kPa	26.621733 kPa	10 kPa
Slice 22	89.03475 m	7.8822577 m	0 kPa	52.127719 kPa	24.307554 kPa	10 kPa
Slice 23	90.26025 m	7.927789 m	0 kPa	50.34889 kPa	23.478073 kPa	10 kPa
Slice 24	91.48575 m	8.0102833 m	0 kPa	47.651312 kPa	22.220172 kPa	10 kPa
Slice 25	92.71125 m	8.1299666 m	0 kPa	44.029771 kPa	20.53142 kPa	10 kPa
Slice 26	93.948 m	8.2889636 m	0 kPa	37.447056 kPa	17.461849 kPa	10 kPa
	95.196 m			27.911734 kPa		10 kPa

Slice 27		8.4884281 m	0 kPa		13.015455 kPa	
Slice 28	96.444 m	8.7278554 m	0 kPa	17.512276 kPa	8.1661084 kPa	10 kPa
Slice 29	97.570057 m	8.9769563 m	0 kPa	9.4212941 kPa	4.3932216 kPa	10 kPa
Slice 30	98.574172 m	9.229124 m	0 kPa	3.795612 kPa	1.7699229 kPa	10 kPa



Report No

AGTE17463

Section E-E  
 Clayey Sand Layer  
 1075 Horseshoe Bend Road, Torquay  
 Client: The Dunes Torquay



# Clayey Sand

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 25  
Date: 10/12/2017  
Time: 07:52:37 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section E-E.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 11/12/2017  
Last Solved Time: 07:33:44 AM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Clayey Sand

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

### Clayey Sand

Model: [Mohr-Coulomb](#)  
Unit Weight: 18 kN/m<sup>3</sup>  
Cohesion': 2 kPa  
Phi': 30 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (48, 15.83419) m  
Left-Zone Right Coordinate: (60, 16.38362) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (71, 10.79286) m  
Right-Zone Right Coordinate: (94, 10.51) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.47) m  
Right Coordinate: (110, 10.51) m

## Piezometric Lines

### Piezometric Line 1

Coordinates

	X	Y
--	---	---

Coordinate 1	0 m	12.49 m
Coordinate 2	40 m	12.49 m

## Points

	X	Y
Point 1	40 m	12.47 m
Point 2	43.744 m	14.09 m
Point 3	48.307 m	15.96 m
Point 4	60.176 m	16.39 m
Point 5	71.547 m	10.51 m
Point 6	110 m	10.51 m
Point 7	110 m	-10 m
Point 8	0 m	-10 m
Point 9	0 m	9.47 m
Point 10	33.0667 m	9.47 m
Point 11	33.96945 m	9.86061 m
Point 12	0 m	8.39 m
Point 13	110 m	8.39 m

## Regions

	Material	Points	Area
Region 1	Sandy Clay	1,11,5,4,3,2	147.79 m <sup>2</sup>
Region 2	Clayey Sand	10,9,12,13,6,5,11	185.85 m <sup>2</sup>
Region 3	Sandy Clay	8,7,13,12	2,022.9 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 83

Factor of Safety: 1.953

Volume: 49.187049 m<sup>3</sup>

Weight: 959.5182 kN

Resisting Moment: 9,726.6361 kN·m

Activating Moment: 4,980.2654 kN·m

Resisting Force: 555.45852 kN

Activating Force: 284.50158 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (76.698394, 10.51) m

Entry: (56.99386, 16.274715) m

Radius: 15.621786 m

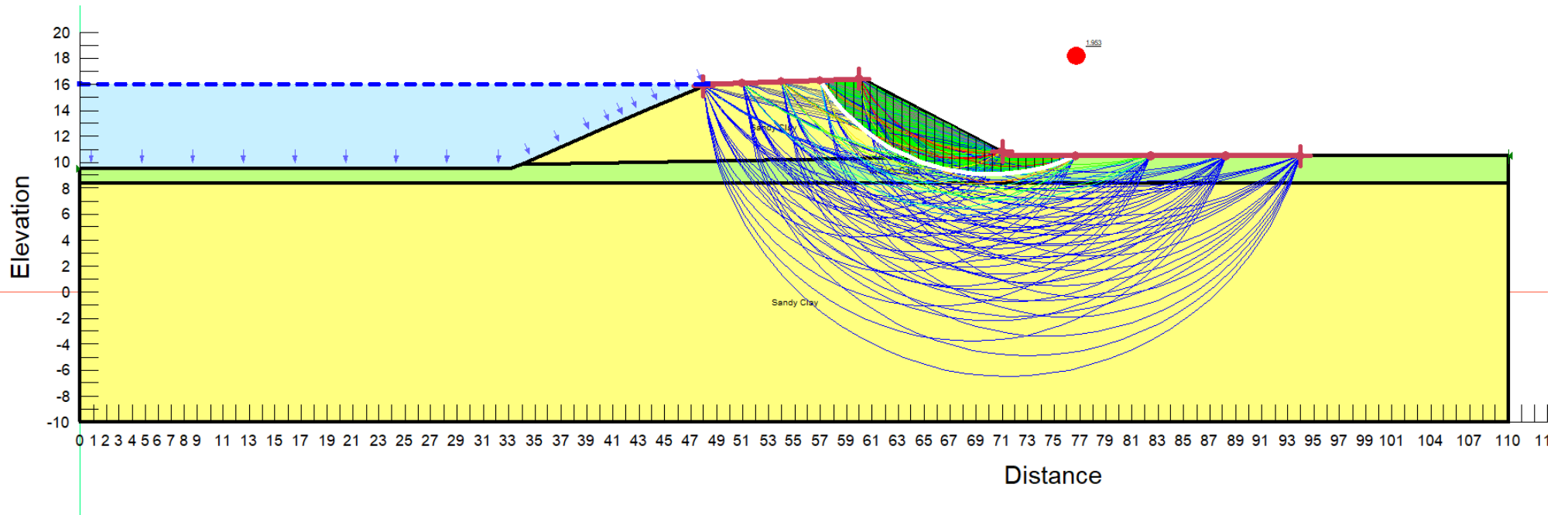
Center: (70.152579, 24.694234) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	57.312074 m	15.81456 m	0 kPa	1.5931883 kPa	0.74291589 kPa	10 kPa

Slice 2	57.948502 m	14.95563 m	0 kPa	15.432752 kPa	7.1964103 kPa	10 kPa
Slice 3	58.58493 m	14.205895 m	0 kPa	27.503465 kPa	12.825076 kPa	10 kPa
Slice 4	59.221358 m	13.542999 m	0 kPa	38.308393 kPa	17.863497 kPa	10 kPa
Slice 5	59.857786 m	12.952073 m	0 kPa	48.202651 kPa	22.477265 kPa	10 kPa
Slice 6	60.486419 m	12.428454 m	0 kPa	54.688407 kPa	25.501623 kPa	10 kPa
Slice 7	61.107258 m	11.963273 m	0 kPa	57.863793 kPa	26.98233 kPa	10 kPa
Slice 8	61.728096 m	11.543858 m	0 kPa	60.590893 kPa	28.253997 kPa	10 kPa
Slice 9	62.348935 m	11.165934 m	0 kPa	62.923804 kPa	29.341852 kPa	10 kPa
Slice 10	62.969774 m	10.826094 m	0 kPa	64.890644 kPa	30.259004 kPa	10 kPa
Slice 11	63.590612 m	10.521592 m	0 kPa	66.497586 kPa	31.008334 kPa	10 kPa
Slice 12	64.219614 m	10.247037 m	0 kPa	67.52588 kPa	38.986085 kPa	2 kPa
Slice 13	64.856778 m	10.001379 m	0 kPa	67.889748 kPa	39.196164 kPa	2 kPa
Slice 14	65.493942 m	9.7869913 m	0 kPa	67.817683 kPa	39.154557 kPa	2 kPa
Slice 15	66.131106 m	9.6025394 m	0 kPa	67.241526 kPa	38.821913 kPa	2 kPa
Slice 16	66.76827 m	9.4469342 m	0 kPa	66.082619 kPa	38.152818 kPa	2 kPa
Slice 17	67.405434 m	9.3192981 m	0 kPa	64.255295 kPa	37.097812 kPa	2 kPa
Slice 18	68.042598 m	9.2189378 m	0 kPa	61.671472 kPa	35.606041 kPa	2 kPa
Slice 19	68.679762 m	9.1453241 m	0 kPa	58.246405 kPa	33.628578 kPa	2 kPa
Slice 20	69.316926 m	9.0980777 m	0 kPa	53.905501 kPa	31.122355 kPa	2 kPa
Slice 21	69.95409 m	9.0769588 m	0 kPa	48.591812 kPa	28.054496 kPa	2 kPa
Slice 22	70.591254 m	9.0818612 m	0 kPa	42.273574 kPa	24.406659 kPa	2 kPa
Slice 23	71.228418 m	9.1128096 m	0 kPa	34.950865 kPa	20.178891 kPa	2 kPa
Slice 24	71.868962 m	9.1704041 m	0 kPa	30.424452 kPa	17.565566 kPa	2 kPa
Slice 25	72.512886 m	9.255223 m	0 kPa	28.83743 kPa	16.649298 kPa	2 kPa
Slice 26	73.156811 m	9.3675532 m	0 kPa	26.429987 kPa	15.25936 kPa	2 kPa
						2 kPa

Slice 27	73.800735 m	9.5080064 m	0 kPa	23.221425 kPa	13.406896 kPa	
Slice 28	74.444659 m	9.6773731 m	0 kPa	19.256254 kPa	11.117603 kPa	2 kPa
Slice 29	75.088584 m	9.8766468 m	0 kPa	14.600272 kPa	8.4294708 kPa	2 kPa
Slice 30	75.732508 m	10.107056 m	0 kPa	9.3339166 kPa	5.3889393 kPa	2 kPa
Slice 31	76.376432 m	10.370107 m	0 kPa	3.5436844 kPa	2.0459471 kPa	2 kPa



Report No

AGTE17463

Section E-E Dam water at Crest

1075 Horseshoe Bend Road, Torquay

Client: The Dunes Torquay

# Clayey Sand

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## File Information

File Version: 9.00  
Title: Torquay  
Created By: Matt Noonan  
Last Edited By: Matt Noonan  
Revision Number: 27  
Date: 10/12/2017  
Time: 08:11:13 PM  
Tool Version: 9.0.2.15352  
File Name: Torquay Section E-E Water at top of Dam.gsz  
Directory: C:\Users\mattn\Documents\AGT\~ Projects\AGTE17463 The Dunes Torquay - 1075 Horseshoe Bend Road, Torquay\Slope W\  
Last Solved Date: 11/12/2017  
Last Solved Time: 07:35:05 AM

## Project Settings

Unit System: International System of Units (SI)

## Analysis Settings

### Clayey Sand

Kind: SLOPE/W  
Method: Morgenstern-Price  
Settings  
Side Function  
Interslice force function option: Half-Sine  
PWP Conditions from: Piezometric Line  
Apply Phreatic Correction: No  
Use Staged Rapid Drawdown: No  
Unit Weight of Water: 9.807 kN/m<sup>3</sup>  
Slip Surface  
Direction of movement: Left to Right  
Use Passive Mode: No  
Slip Surface Option: Entry and Exit  
Critical slip surfaces saved: 1  
Optimize Critical Slip Surface Location: No  
Tension Crack Option: (none)  
Distribution  
F of S Calculation Option: Constant  
Advanced  
Geometry Settings  
Minimum Slip Surface Depth: 0.1 m  
Number of Slices: 30  
Factor of Safety Convergence Settings  
Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001  
Solution Settings  
Search Method: [Root Finder](#)  
Tolerable difference between starting and converged F of S: 3  
Maximum iterations to calculate converged lambda: 20  
Max Absolute Lambda: 2

## Materials

### Sandy Clay

Model: [Mohr-Coulomb](#)  
Unit Weight: 20 kN/m<sup>3</sup>  
Cohesion': 10 kPa  
Phi': 25 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

### Clayey Sand

Model: [Mohr-Coulomb](#)  
Unit Weight: 18 kN/m<sup>3</sup>  
Cohesion': 2 kPa  
Phi': 30 °  
Phi-B: 0 °  
Pore Water Pressure  
Piezometric Line: 1

## Slip Surface Entry and Exit

Left Type: [Range](#)  
Left-Zone Left Coordinate: (48, 15.83419) m  
Left-Zone Right Coordinate: (60, 16.38362) m  
Left-Zone Increment: 4  
Right Type: [Range](#)  
Right-Zone Left Coordinate: (71, 10.79286) m  
Right-Zone Right Coordinate: (94, 10.51) m  
Right-Zone Increment: 4  
Radius Increments: 4

## Slip Surface Limits

Left Coordinate: (0, 9.47) m  
Right Coordinate: (110, 10.51) m

## Piezometric Lines

### Piezometric Line 1

Coordinates

	X	Y
--	---	---



Coordinate 1	0 m	15.96 m
Coordinate 2	48.307 m	15.96 m

## Points

	X	Y
Point 1	40 m	12.47 m
Point 2	43.744 m	14.09 m
Point 3	48.307 m	15.96 m
Point 4	60.176 m	16.39 m
Point 5	71.547 m	10.51 m
Point 6	110 m	10.51 m
Point 7	110 m	-10 m
Point 8	0 m	-10 m
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Point 12	0 m	8.39 m
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## Regions

	Material	Points	Area
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Region 3	Sandy Clay	8,7,13,12	2,022.9 m <sup>2</sup>

## Current Slip Surface

Slip Surface: 83

Factor of Safety: 1.953

Volume: 49.187049 m<sup>3</sup>

Weight: 959.5182 kN

Resisting Moment: 9,726.6361 kN·m

Activating Moment: 4,980.2654 kN·m

Resisting Force: 555.45852 kN

Activating Force: 284.50158 kN

Slip Rank: 1 of 125 slip surfaces

Exit: (76.698394, 10.51) m

Entry: (56.99386, 16.274715) m

Radius: 15.621786 m

Center: (70.152579, 24.694234) m

## Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength
Slice 1	57.312074 m	15.81456 m	0 kPa	1.5931883 kPa	0.74291589 kPa	10 kPa

Slice 2	57.948502 m	14.95563 m	0 kPa	15.432752 kPa	7.1964103 kPa	10 kPa
Slice 3	58.58493 m	14.205895 m	0 kPa	27.503465 kPa	12.825076 kPa	10 kPa
Slice 4	59.221358 m	13.542999 m	0 kPa	38.308393 kPa	17.863497 kPa	10 kPa
Slice 5	59.857786 m	12.952073 m	0 kPa	48.202651 kPa	22.477265 kPa	10 kPa
Slice 6	60.486419 m	12.428454 m	0 kPa	54.688407 kPa	25.501623 kPa	10 kPa
Slice 7	61.107258 m	11.963273 m	0 kPa	57.863793 kPa	26.98233 kPa	10 kPa
Slice 8	61.728096 m	11.543858 m	0 kPa	60.590893 kPa	28.253997 kPa	10 kPa
Slice 9	62.348935 m	11.165934 m	0 kPa	62.923804 kPa	29.341852 kPa	10 kPa
Slice 10	62.969774 m	10.826094 m	0 kPa	64.890644 kPa	30.259004 kPa	10 kPa
Slice 11	63.590612 m	10.521592 m	0 kPa	66.497586 kPa	31.008334 kPa	10 kPa
Slice 12	64.219614 m	10.247037 m	0 kPa	67.52588 kPa	38.986085 kPa	2 kPa
Slice 13	64.856778 m	10.001379 m	0 kPa	67.889748 kPa	39.196164 kPa	2 kPa
Slice 14	65.493942 m	9.7869913 m	0 kPa	67.817683 kPa	39.154557 kPa	2 kPa
Slice 15	66.131106 m	9.6025394 m	0 kPa	67.241526 kPa	38.821913 kPa	2 kPa
Slice 16	66.76827 m	9.4469342 m	0 kPa	66.082619 kPa	38.152818 kPa	2 kPa
Slice 17	67.405434 m	9.3192981 m	0 kPa	64.255295 kPa	37.097812 kPa	2 kPa
Slice 18	68.042598 m	9.2189378 m	0 kPa	61.671472 kPa	35.606041 kPa	2 kPa
Slice 19	68.679762 m	9.1453241 m	0 kPa	58.246405 kPa	33.628578 kPa	2 kPa
Slice 20	69.316926 m	9.0980777 m	0 kPa	53.905501 kPa	31.122355 kPa	2 kPa
Slice 21	69.95409 m	9.0769588 m	0 kPa	48.591812 kPa	28.054496 kPa	2 kPa
Slice 22	70.591254 m	9.0818612 m	0 kPa	42.273574 kPa	24.406659 kPa	2 kPa
Slice 23	71.228418 m	9.1128096 m	0 kPa	34.950865 kPa	20.178891 kPa	2 kPa
Slice 24	71.868962 m	9.1704041 m	0 kPa	30.424452 kPa	17.565566 kPa	2 kPa
Slice 25	72.512886 m	9.255223 m	0 kPa	28.83743 kPa	16.649298 kPa	2 kPa
Slice 26	73.156811 m	9.3675532 m	0 kPa	26.429987 kPa	15.25936 kPa	2 kPa
						2 kPa

Slice 27	73.800735 m	9.5080064 m	0 kPa	23.221425 kPa	13.406896 kPa	
Slice 28	74.444659 m	9.6773731 m	0 kPa	19.256254 kPa	11.117603 kPa	2 kPa
Slice 29	75.088584 m	9.8766468 m	0 kPa	14.600272 kPa	8.4294708 kPa	2 kPa
Slice 30	75.732508 m	10.107056 m	0 kPa	9.3339166 kPa	5.3889393 kPa	2 kPa
Slice 31	76.376432 m	10.370107 m	0 kPa	3.5436844 kPa	2.0459471 kPa	2 kPa

## Appendix F – Photos



Photo 1



Photo 2





Photo 3



Photo 4

---





Photo 5



Photo 6

---





Photo 6



Photo 7





Photo 8



Photo 9





Photo 10



Photo 11





Photo 12



Photo 13