Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Assessment of Groundwater Resources

Great Keppel Island Resort Revitalisation Plan

Prepared for
GKI Resort Pty Ltd

Project 74586.00
August 2011

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	74586.00	Document No.	3
Document title	Report on Assessment of Groundwater Resources, Great Keppel Island Resort Revitalisation Plan		
Site address	Great Keppel Island		
Report prepared for	GKI Resort Pty Ltd		
File name	P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Docs\Groundwater\74586.00 GW Resources Summary Report - REV 2.doc		

Document status and review

Revision	Prepared by	Reviewed by	Date issued
0	Karen Hager/ Carl Deegan	Iain Hair	22/12/2010
1	Karen Hager/ Carl Deegan	Iain Hair	05/05/2011
2	Karen Hager/ Carl Deegan	Iain Hair	31/08/2011

Distribution of copies

Revision	Electronic	Paper	Issued to
0	1	0	GKI Resort Pty Ltd, CQ Consulting Group
1	1	0	GKI Resort Pty Ltd, CQ Consulting Group
2	1	0	GKI Resort Pty Ltd, CQ Consulting Group

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		31 August 2011
Reviewer		31 August 2011

NCS INTERNATIONAL CERTIFIED QUALITY MANAGEMENT SYSTEM

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
439 Montague Road
West End QLD 4101
Phone (07) 3237 8900
Fax (07) 3237 8999

Table of Contents

List of Attachments

Drawings

- Drawing 1 – Proposed Development Precincts
- Drawing 2 – Great Keppel Island Geology
- Drawing 3 – Great Keppel Island Revised Geological Plan
- Drawing 4 – Great Keppel Island Aquifers
- Drawing 5 – Northeast Aquifer & Bore Location Plan
- Drawing 6 – Long Beach Aquifer & Bore Location Plan
- Drawing 7 – Resort Aquifer & Bore Location Plan
- Drawing 8 – Central Dune Sand Aquifer & Bore Location Plan

Appendices

- Appendix A - About this Report
- Appendix B - DERM Groundwater Database Search
- Appendix C - Borehole Reports, Groundwater Bores

Report on Assessment of Groundwater Resources
Great Keppel Island Resort Revitalisation Plan

1. Introduction

Douglas Partners Pty Ltd (DP) was commissioned by GKI Resort Pty Ltd (GKI Resort) to conduct an assessment of groundwater resources within the footprint of redevelopment works for the proposed Great Keppel Island (GKI) Resort Revitalisation Plan (the "Project"). It is understood that redevelopment will include demolition of the existing resort, as well as construction of new resort facilities, a golf course and a marina.

This assessment has been requested as part of an Environmental Impact Statement (EIS) for the Project to describe the exiting groundwater resources on the island and the potential impacts to those resources from the proposed development.

1.1 Objectives

The objectives of this investigation were to:

- Provide a description and summary of the existing groundwater resources that may be affected by the Project;
- Outline potential groundwater impacts likely to be caused by the Project; and
- Outline possible mitigation strategies to minimise the potential impacts on groundwater resources.

1.2 EIS Terms of Reference

This assessment has been conducted with reference to the requirements of the terms of reference (TOR) issued for development of the EIS for the Project (Coordinator General, 2011; GBRMPA, 2011; Section 5). The assessment included a desktop review of the available historical groundwater information, a site visit to assess existing groundwater bores and assess the extent of sand dune deposits in the central region of the island, groundwater monitoring, and review of the previous three groundwater resource assessments carried out across the island.

2. Site Information

Great Keppel Island is the largest island in the Keppel group of islands, and is located approximately 19 km east of Yeppoon off the Central Queensland coastline. It is located within the Mackay/ Capricorn region of the Great Barrier Reef Marine Park.

The former Great Keppel Island resort is located on a dune sand deposit on the western side of the island between Fisherman's Beach and Long Beach. The main accommodation and resort facilities are situated near Fisherman's Beach where the topography is generally flat with some elevated villas on a hill immediately south of the former resort. The former resort is enclosed by a wire mesh fence for security and safety purposes and includes several swimming pools, tennis, squash, and volleyball courts, a golf course, as well as communal and office buildings.

A sealed landing strip is located to the east of the former resort aligned approximately northwest to southeast. The landing strip is near level and raised above the surrounding ground at the northern end and rises at an angle of approximately 5 degrees to the south. It is adjoined by sand dunes on either side. Former staff quarters are located to the northeast of the landing strip and also to the northeast of the lookout access road. The existing resort, villas and staff accommodation generally comprise a mixture of block work and reinforced concrete structures and elevated timber structures on concrete piers and/or plinths. Several industrial sheds and a desalination plant are also located on the northern side of the landing strip and are in various states of disrepair.

Residential houses, some retail properties and accommodation facilities including the Keppel Haven Resort and Keppel Island Village are also located on the dune sand deposit between Fisherman's Beach and Putney Beach.

2.1 Site Description

The "site" considered in this investigation is limited to the areas of proposed disturbance for Project related activities. According to the proposed development plans provided by GKI Resort (dated October 2010), three regions of the island will experience disturbance as follows:

Precinct 1: Proposed marina precinct, northern section of Putney Beach and off-shore area;

Precinct 2: Proposed Fisherman's Beach precinct, footprint of existing resort, air strip, and vegetated areas east of the airstrip; and

Precinct 3: Proposed Clam Bay precinct, north of Clam Bay from the eastern base of Mount Wyndham and Wyndham Cove north to the historical Homestead, and east to the base of the mountain.

An overview of the proposed development precincts is shown on Drawing 1.

2.2 Geology

Published geological maps for the Rockhampton region (DNRM&W 2006) indicate that Great Keppel Island is primarily underlain by the Carboniferous aged Shoalwater Formation of the Curtis Island Group (Drawing 2). Late Palaeozoic quartose, arenite and mudstone of the Shoalwater formation make up the major hills and slopes on Great Keppel Island. The Shoalwater Formation overlies the early Palaeozoic Wandilla formation which is quite widespread along the mainland coast facing the Keppel Isles.

Thin veneers of Quaternary sand, alluvium and estuarine mud overlie the Carboniferous sequence in three separate lower lying areas of the island. The north-eastern area of the island between Wreck Beach and Butterfish Bay, as well as the south-western area between Long Beach, Fisherman's Beach and Putney Beach, are mapped as containing Quaternary deposits including fore dune, beach ridge, and dune sands. Central areas of the island are mapped as comprising fine grained alluvial sediments such as estuarine mud and sand, clay, silt, and minor gravel. Sands and other alluvial deposits occur in the drainage basin of Leeke's Creek and Blackall Creek (Max Winders & Associates, 2006).

Recent geotechnical and groundwater site investigations (DP 2011a and 2011b) encountered a sand deposit which was much more extensive than indicated by the published geological map (DNRMW, 2006) reproduced on Drawing 2. Sand in this central region of the island was found to comprise dune sand on the surface with minor colluvium and alluvium. Based on these recent site investigation results, a revised interpretation of the geology across the island is provided on Drawing 3 .

2.3 Climate and Rainfall

Great Keppel Island is located in a subtropical climate. According to data from the Bureau of Meteorology (BOM) for Heron Island[4] (the closest island weather station), mean annual temperatures vary between 20.8ºC and 26.2ºC. January is the hottest month of the year with a mean maximum temperature of 29.8ºC. Mean annual rainfall for Heron Island was reported to be 1027 mm. February to May are the wettest months of the year.

Based on interpolated rainfall data sourced from the BOM SILO Database, the average annual rainfall for the island is 1070 mm (based on data from 1960-2011). Total annual rainfall has ranged from as low as 480 mm in 2001 up to 1854 mm in 2010. Data indicate that the island receives the highest rainfall between December and March.

Average monthly rainfall and pan evaporation data are listed in Table 1. The pan evaporation data have been corrected by a factor of 0.7 to obtain the actual evaporation for the region as recommended by BOM. Average monthly rainfall exceeds the average actual monthly evaporation between the months of January and March. Data in Table 1 show that the average evaporation deficit, i.e. total evaporation minus total rainfall, is approximately 220 mm/year.

[4] Source: http://www.bom.gov.au/climate/averages/tables/cw_039122.shtml accessed on 17 December 2010.

Table 1: Great Keppel Island Average Monthly Rainfall & Evaporation

Month	Rainfall (mm)	Pan Evaporation (mm)	Actual Evaporation (mm)
January	153	169	140
February	176	140	116
March	136	128	120
April	95	94	97
May	96	64	78
June	57	53	65
July	44	61	70
August	40	81	84
September	31	108	105
October	45	143	131
November	70	153	137
December	128	172	145
Annual Average	1070	1842	1289

The Cumulative Rainfall Residual Mass Balance (CRRMB) was calculated by DP (2011b) as a means of observing long-term trends in rainfall and relating these to observed shallow groundwater levels. An increasing gradient in the CCRMB curve reflects an above average rainfall period where above average recharge results in an increase (rise) in shallow groundwater levels. The curve shows a sharp upward trend during 2010 (DP 2011b) as it was the wettest year on record, indicating that the groundwater levels towards the end of 2010 would have risen to some of the highest levels over the past 50 years.

2.4 Topography and Drainage

Topography on Great Keppel Island is dominated by two northwest to southeast trending ridges. The southern ridgeline is relatively steep and is dominated by Mt Wyndham with a maximum elevation of approximately 175 m AHD. Elevations along the northern ridgeline range between approximately 75 m AHD in the northwest and 155 m AHD in the southeast. These ridges extend to the beaches to form rocky headlands and cliffs. A series of sandy beaches and beach ridges exist between the headlands.

Coastal sand dunes exist between Wreck Bay and Butterfish Bay on the eastern side of the island, as well as in the southwest area of the island between Long Beach, Fisherman's Beach and Putney Beach. A flat to undulating topography is present in the dune sand areas. The topography becomes slightly undulating on the eastern side of the island towards Wreck Bay.

A valley exists in the central area of the island between the two major ridges. It falls from an elevation of approximately 65 m AHD behind Clam Bay to sea level at Leeke's Beach in the northwest.

Leeke's Creek, Putney Creek, and Blackall Creek drain the ridges toward the west. Some tidal wetlands exist behind Putney Beach and Leeke's Beach. Other minor perennial creeks are relatively short and flow directly into the Pacific Ocean.

3. Previous Investigations

DP carried out three investigations into the potential groundwater resources on Great Keppel Island, two in 2007 (DP 2007a, 2007b) and one in 2011 (DP 2011b). Although multiple reports and plans have been published relating to the island, only the DP reports contain information regarding groundwater resources. Results of the investigations are detailed in the following reports:

- Douglas Partners Pty Ltd (2007a) *Report on Groundwater Supply Investigation, Great Keppel Island*. Project No. 33976. Brisbane.
- Douglas Partners Pty Ltd (2007b) *Report on Production Bore Installation and Testing, Long Beach Aquifer, Great Keppel Island*. Project No. 33976A. Brisbane.
- Douglas Partners Pty Ltd (2011b) *Report on Additional Groundwater Investigation, Central Dune Sand Deposit, Great Keppel Island*. Revision 1. Project No. 74586.01. Brisbane.

Relevant information from these reports is summarised in the following sub-sections.

3.1 Douglas Partners Pty Ltd (2007a)

DP conducted a groundwater supply investigation on Great Keppel Island in 2006-2007 for major redevelopments of the island that were proposed at the time. Groundwater was previously extracted from the dune sand deposit in the south-western end of the island as a water supply for the former resort. Hydrogeological investigations were carried out to determine whether potential potable water supplies exist elsewhere on the island as well as to assess their sustainable yields and water quality.

The investigation included a review of existing information, assessment of existing groundwater bores, mapping of dune sand deposits, an electromagnetic geophysical survey, installation and construction of 10 groundwater monitoring bores, groundwater quality sampling and analysis, development of conceptual hydrogeological models, and groundwater modelling to assess sustainable yields.

Based on the geology of the island, it was considered likely that potential aquifers containing potable groundwater would be located within the north-eastern and south-western parts of the island. It was expected that these areas would contain unconfined aquifers with fresh groundwater. Areas of the island mapped as being underlain by a Carboniferous sequence were not considered to be potential viable aquifers and were not considered in the hydrogeological investigation. Fine grained Quaternary sediments in the central western region adjacent to Leeke's Beach were also not considered as a potentially viable aquifer due to the low permeability of the sediments.

An electromagnetic geophysical survey was carried out over the north-eastern and south-western dune sand deposits at depths of 7.5 m and, in some areas, 15 m. Results indicated that a salt water interface (i.e. broad transition zone between salt and fresh water) was present approximately 50 m-100 m inland of the high tide mark on Long Beach. This indicated the presence of a fresh water aquifer from approximately 150 m inland of the high tide mark on Long Beach to the southern end of the air strip.

A salt water interface was also identified 40 m inland the high tide marks of Wreck Beach and Butterfish Bay. This indicated a substantial storage of fresh water within the dune sand aquifer with a depth in excess of 21.5 m.

A total of 11 bores were drilled and groundwater wells were constructed in ten of the bores. Six of the wells were located in the south-western aquifer (MB1, MB2, MB7-MB11) and four in the northeast aquifer (MB3-MB6). MB1 and MB2 were located near existing underground fuel storage tanks to investigate for possible fuel leakage and contamination of groundwater. Soil samples were collected from selected bores to provide an indication of the hydraulic conductivity (permeability) of the aquifers.

Groundwater samples were collected from the new and existing bores. Samples were assessed for their field parameters and in a laboratory for total dissolved salts (TDS), hardness, major cations, major anions, dissolved metals (As, Ba, Be, Cd, Cr, Co, Cu, Mn, Hg, Ni, Pb, V, Zn), and iron as well as total petroleum hydrocarbons (TPH) and BTEX (benzene, toluene, ethylbenzene, xylene) in MW1 and MW2.

Field water quality data for the south-western aquifer indicated substantial salt water intrusion had occurred from Long Beach, Fisherman's Beach and Putney Beach whilst the groundwater in MB2 and MB7 was fresh. A hydro-chemical assessment indicated water was of a sodium-chloride type. Laboratory analysis indicated that water in the south-western sand dune deposit (MB1, MB2, MB7, MB8, MB10) is potable.

Field water quality data for the northeast aquifer indicated that the water was fresh. A hydro-chemical assessment indicated that the aquifer contains two distinct types of water, sodium-chloride (MB4) and calcium-bicarbonate (MB3, MB5). Laboratory analysis indicated that water in the northeast sand dune deposit (MB3-MB6) is potable.

Conceptual hydrogeological models were developed to determine sustainable yields for both aquifers based on the information available. Both aquifers were considered to be unconfined, would receive the their recharge via direct infiltration of rainfall, and would discharge to the Pacific Ocean via the local beaches. It was estimated that the sustainable yield of the northeast aquifer would be between 110 kL/day in a year of drought and 250 kL/day in a year of average rainfall.

The south-western dune sand aquifer was considered to consist of two distinct aquifer areas divided by a bedrock ridge beneath the southern end of the air strip. These two distinct aquifer areas were referred to as the "Mercure Resort aquifer" draining to Putney Beach and Fisherman's Beach, and the "Long Beach aquifer" draining to Long Beach. It was considered that the Mercure Resort aquifer should not be considered as a potential water supply due to its poor water quality from salt water intrusion.

Only the Long Beach aquifer was considered a potential water supply in the south-western area of the island. It was estimated that the sustainable yield of the Long Beach aquifer would be 180 kL/day in a year of average rainfall. However, due to salt water intrusion from Long Beach, it was considered that the actual sustainable yield would be less than this estimate as it was based only on rainfall recharge.

Groundwater modelling was conducted using Visual MODFLOW for the northeast aquifer and the Long Beach aquifer based on the results of the conceptual hydrogeological model to aid in optimising the sustainable aquifer yields and bore field design. A sustainable yield of approximately 100 kL/day (50 kL/day in each bore) was determined for two production bores in the south-western aquifer that were approximately 100 m apart. A sustainable yield of approximately 270 kL/day was determined for three production bores (two at 100 kL/day, one at 70 kL/day) in the northeast aquifer that were between 100 m and 150 m apart.

Groundwater modelling results and the estimated sustainable yield of the aquifers is dependent on the location and flow rates of production bores comprising the bore field. The simulated production rates should not be exceeded and the installation of production bores should occur at the locations specified. Production bore construction requirements were specified.

It was recommended that additional monitoring bores be installed with the production bores to monitor potential intrusion of salt water from the beaches. Approximate monitoring bore locations were given. It was also recommended that step drawdown and 48 hour pumping tests be carried out on each production bore to compare the individual sustainable bore yields with those simulated. Ongoing monitoring of water levels and electrical conductivity in all wells, installation of data loggers in two wells within each aquifer, and monitoring of rainfall was also recommended.

3.2 Douglas Partners Pty Ltd (2007b)

Based on the results and recommendations of DP (2007a), two production wells were installed within the Long Beach aquifer on Great Keppel Island. Test pumping and analysis was carried out to assess the hydraulic parameters of the Long Beach aquifer and to confirm the maximum long term yields of the production bores.

Test pumping included step drawdown tests on both bores and a constant rate and recovery test on PB1 to allow an assessment of the long term maximum yield of the bore/bore field, to confirm the accuracy of the predictive modelling results (DP 2007a), and to provide an estimate of aquifer transmissivity. Data confirmed that the aquifer is unconfined, the aquifer has a transmissivity of approximately 220 m^2/day and a hydraulic conductivity of 20 m/day. As these parameters are similar to those used in predictive modelling, it was considered that the simulated results are accurate.

Water quality monitored during the pumping tests indicated that groundwater is fresh and salinity levels remained constant. Groundwater is acidic with a pH of 5.7.

Due to the potential for salt water intrusion and the simulated intrusion process, it was recommended that the maximum long term yield of the bore field should not exceed 100 kL/day, i.e. 50 kL/day/bore. Recommendations for pump installation and ongoing water level and flow rate monitoring were provided.

A groundwater management plan and recommendations for long term protection and monitoring of the bore field and Long Beach aquifer were also provided. These included the decommissioning of nine old water bores in the Long Beach aquifer, maintaining two monitoring bores for future monitoring purposes, installation of an additional monitoring bore, installation of protective covers and fencing, regulation and monitoring of flow rates, exclusion of any potential contaminating activities over the surface of the aquifers, as well as monitoring of groundwater quality and rainfall.

3.3 Douglas Partners Pty Ltd (2011b)

Recent geotechnical investigations in 2010 (DP 2011a) had identified a sand deposit in the central area of Great Keppel Island more extensive than that previously mapped by DNRMW (2006) indicating it had a potential to provide a sustainable groundwater resource.

An additional groundwater supply investigation within the central dune sand deposit was conducted by DP in 2011. Hydrogeological investigations were carried out to determine whether a potential groundwater resource exists within the central dune sand and to assess its long term sustainable yield. The investigation included a review of existing information, mapping of the extent of the dune sand deposit, drilling and installation of five groundwater monitoring bores (MB12-MB16), groundwater quality sampling and analysis, development of the conceptual hydrogeological model, and groundwater modelling to assess sustainable yields.

A viable aquifer or groundwater resource was identified within the central dune sand which extends from Leeke's Beach to approximately half way along the central valley towards Clam Bay. It is an unconfined (or water table) aquifer and is relatively thin in part, varying between 3 m and 10 m in thickness. The basement is residual sandy clay or weathered bedrock (Shoalwater Formation).

Groundwater quality was found to be generally fresh at Bores MB12, MB14, and MB16, and found to be slightly brackish and non-potable at Bore MB13. The groundwater is acidic indicating it would require treatment prior to being used as a potable water supply. Levels of chloride exceeded the ADWG aesthetic guideline in the three samples tested and hardness exceeded the ADWG aesthetic guideline in MB13. None of the heavy metals tested reported levels which exceeded the drinking water guidelines, with the exception of nickel in MB13. It was concluded that if the groundwater resource was to be used as a water supply, then additional water quality testing would be required to confirm its suitability as a potable water source.

Groundwater modelling conducted using Visual MODFLOW indicated a long term sustainable yield of approximately 90 kL/day was possible using two production bores in the central dune sand aquifer. Modelling results and estimated sustainable yield are dependent on the location of production bores comprising the bore field and the extraction flow rates. Recommendations were provided for the location and construction requirements of production bores (water bores), as well as for ongoing monitoring of groundwater levels and quality.

4. Existing Groundwater Resources

According to the Groundwater Resources Map of Queensland published by the Queensland Department of Mines (1987), groundwater quality on the island is fresh to slightly brackish with a total dissolved salt content of 500-1500 mg/L. Groundwater would be suitable for most purposes, but would be marginal for human consumption and for the irrigation of low salt tolerant crops. Aquifer lithology is depicted as unconsolidated sediments e.g. sand, gravel.

Previous hydrogeological investigations on the island (DP 2007a, 2007b, 2011b) confirmed the presence of four aquifers containing fresh, potable groundwater within the Quaternary dune sand deposits located in the north-eastern, south-western and central regions of the island (Drawing 4). Aquifers are described in detail in the following sub-sections.

The Carboniferous Shoalwater Formation and the Resort aquifer were not considered to be potentially viable aquifers and were not investigated further during the field investigations carried out as part of this and previous assessments.

4.1 Northeast Aquifer

4.1.1 Geological Setting

The northeast aquifer is composed of Quaternary dune sand containing well-sorted light orange-brown fine to medium grained sand underlain by light grey-yellow, fine to medium grained sand. Based on available bore log information (DP 2007a), the thickness of sand ranges from 7.5 m to greater than 21.5 m.

Topography of the aquifer basement was inferred from the available bore logs (DP 2007a). The aquifer basement comprises residual sandy clay/ clayey sand or weathered rock which overlies the metamorphic quartzose and lithic sandstones of the Carboniferous Shoalwater formation.

The dune sand deposit extends from Wreck Bay to Butterfish Bay and is bound to the north and south by outcrops of the Shoalwater Formation. Its approximate lateral extent, which occupies ~0.7 km^2, was inferred from available information in DP (2007a) and is shown on Drawing 5.

4.1.2 Hydrogeology

The northeast aquifer is an unconfined aquifer that receives the majority of its recharge through direct infiltration of rainfall over its entire surface (Drawing 5). Groundwater is expected to flow from a central groundwater mound developed through the infiltration of rainfall, and discharges to the Pacific Ocean via both Butterfish Bay and Wreck Bay. As no creeks or rivers are present on the surface of the aquifer, there is no direct interaction with between groundwater and surface water.

According to the previous investigation (DP 2007a), the saturated thickness of the aquifer varies from 5 m to approximately 18 m in the proximity of Wreck Bay. Permeability estimates indicated a hydraulic conductivity of 21 m/day, which is typical and is within published estimates for a clean medium grained sand.

4.1.3 Groundwater Flow

Standing water levels measured in July 2006 and survey levels of the bores were used to generate the piezometric surface reported in DP (2007a). According to this information, a groundwater divide is located midway between Wreck Bay and Butterfish Bay. It would be expected that groundwater would flow from this divide to the southeast toward Wreck Bay, as well as to the northwest toward Butterfish Bay.

The relative high permeability of the sands causes a low hydraulic gradient and a relatively flat water table. It would therefore be expected that the water table would have a maximum elevation of approximately 1.5 m AHD. Steady state contours were predicted in DP (2007a).

4.1.4 Aquifer Recharge

Rainfall infiltration and, to a lesser degree, stormwater runoff from the slopes to the north and south of the aquifer are the main sources of aquifer recharge. Runoff from the surrounding slopes was considered to be a negligible recharge source for aquifer assessment and modelling purposes DP (2007a).

Rainfall recharge is considered to be the percentage of rainfall that percolates into the ground that is not being taken up by the vegetation through transpiration, lost through direct evaporation (collectively known as evapotranspiration), or lost as surface runoff. Based on available rainfall data, the following estimates of recharge volumes for the entire northeast aquifer were estimated in DP (2007a):

Recharge for a wet year	=	295 ML/ year
Recharge for an average year	=	180 ML/ year
Recharge for a dry (drought) year	=	80 ML/ year

Outputs and losses from the aquifer are evapotranspiration from the vegetation across the surface of the aquifer as well as discharge to Wreck Bay and Butterfish Bay.

4.1.5 Sustainable Aquifer Yield

Based on the results of predictive modelling DP (2007a), the total sustainable yield of the Northeast aquifer was estimated at 270 kL/day from three production bores (i.e. 100 kL/day from two bores, 70 kL/day from one bore) located in the central region of the aquifer. This was based on a continuous extraction from the bore field. However, the sustainable yield is dependent upon the location and pumping rate of each production bore.

4.2 Long Beach Aquifer

4.2.1 Geological Setting

The Long Beach aquifer is composed of Quaternary dune sand containing relatively well-sorted light orange-brown, fine to medium grained sand underlain by light grey-yellow, fine to medium grained sand. Based on available bore log information (DP 2007a), the thickness of sand ranges from 6 m to 17 m.

Topography of the aquifer basement was inferred from the available bore logs (DP 2007a). The aquifer basement comprises residual sandy clay/ clayey sand or weathered rock which overlies the metamorphic quartzose and lithic sandstones of the Carboniferous Shoalwater formation. The aquifer basement rises beneath the southern end of the air strip to divide the south-western dune sand deposit into two distinct aquifers, the Resort aquifer and the Long Beach aquifer.

The south-western dune sand deposit extends from Fisherman's Beach to Long Beach and is bound to the northeast and southwest by outcrops of the Shoalwater Formation. The approximate lateral extent of the Long Beach aquifer was inferred from available information in DP (2007a) and is shown on Drawing 6.

4.2.2 Hydrogeology

The Long Beach aquifer is an unconfined aquifer that receives the majority of its recharge through direct infiltration of rainfall over its entire surface (Drawing 6). It is assumed that groundwater flows from central groundwater mounds developed through the infiltration of rainfall, and discharges to the Pacific Ocean via Long Beach. As no creeks or rivers are present on the surface of the aquifer, there is no direct interaction with between groundwater and surface water.

According to the previous investigation (DP 2007a), the saturated thickness of the aquifer varies from 5 m to approximately 11 m. Permeability estimates indicated a hydraulic conductivity of between 20 m/day and 21 m/day, which is characteristic of clean medium grained sands.

4.2.3 Groundwater Flow

Standing water levels measured in July 2006 and survey levels of the bores were used to generate the piezometric surface reported in DP (2007a). It would be expected that groundwater flow from the Long Beach aquifer is to the southeast toward Long Beach. Steady state contours were predicted in DP (2007a).

4.2.4 Aquifer Recharge

Rainfall infiltration and, to a lesser degree, stormwater runoff from the slopes to the northeast and southwest of the aquifer are the main sources of aquifer recharge. Runoff from the surrounding slopes was considered to be a negligible recharge source for aquifer assessment and modelling purposes DP (2007a).

Rainfall recharge is considered to be the percentage of rainfall that percolates into the ground that is not being taken up by the vegetation through transpiration, lost through direct evaporation (collectively known as evapotranspiration), or lost as surface runoff. Based on available rainfall data and its surface area as a proportion of the south-western dune sand deposit, the following estimates of recharge for the Long Beach aquifer were estimated:

Recharge for a wet year	=	215 ML/ year
Recharge for an average year	=	135 ML/ year
Recharge for a dry (drought) year	=	60 ML/ year

Outputs and losses from the aquifer are evapotranspiration from the vegetation across the surface of the aquifer, discharge to Long Beach, as well as groundwater extraction through spears or bores.

4.2.5 Sustainable Aquifer Yield

Based on the results of predictive modelling (DP 2007a), the total sustainable aquifer yield of the Long Beach aquifer was estimated at 100 kL/day pumping from two production bores (i.e. 50 kL/day/bore). Although pumping tests indicated the maximum yields would be in excess of 500 kL/day from each bore (DP 2007b), these high extraction rates are considered to be unsustainable due to the high potential for salt water intrusion to occur from Long Beach.

4.3 Resort Aquifer

4.3.1 Geological Setting

The resort aquifer is composed of Quaternary dune sand containing relatively well-sorted light orange-brown, fine to medium grained sand underlain by light grey-yellow, fine to medium grained sand. Based on available bore log information (DP 2007a), a shell layer was encountered in Bore MB1 and the thickness of sand ranges from 6 m to 12 m. The aquifer is separated from the Long Beach aquifer by a rise in the bedrock underlying the sand deposit beneath the southern end of the air strip.

The dune sand deposit extends from Fisherman's Beach to Long Beach and is bound to the northeast and southwest by outcrops of the Shoalwater Formation. The approximate lateral extent of the resort aquifer was inferred from available information in DP (2007a) and is shown on Drawing 7.

4.3.2 Hydrogeology & Flow Patterns

The resort aquifer is an unconfined aquifer that receives the majority of its recharge through direct infiltration of rainfall over its entire surface (Drawing 7). It is assumed that groundwater flows from the eastern end of the airstrip and flows to the west where it discharges to the Pacific Ocean via Fisherman's Beach and Putney Beach. During wet climatic periods, when groundwater levels are high, groundwater may also discharge into Putney Creek. Standing water levels measured in July 2006 and survey levels of the bores were used to generate the piezometric surface reported in DP (2007a).

According to the previous investigation (DP 2007a), the saturated thickness of the aquifer is relatively thin and varies from 2 m to approximately 5 m. Permeability estimates were obtained for the south-western sand dune deposit from the Long Beach aquifer and are detailed in Section 4.2.2.

4.3.3 Aquifer Recharge

Rainfall infiltration and, to a lesser degree, stormwater runoff from the slopes to the northeast and southwest of the aquifer are the main sources of aquifer recharge DP (2007a). Rainfall recharge was estimated for the entire south-western sand dune deposit and is described in Section 4.2.4. Based on available rainfall data and its surface area as a proportion of the south-western dune sand deposit, the following estimates of recharge for the Resort aquifer were estimated:

Recharge for a wet year	=	430 ML/ year
Recharge for an average year	=	270 ML/ year
Recharge for a dry (drought) year	=	120 ML/ year

Outputs and losses from the aquifer are evapotranspiration from the vegetation across the surface of the aquifer, discharge to the beaches, as well as groundwater extraction through spears or bores.

4.3.4 Sustainable Aquifer Yield

It was concluded in DP (2007a) that the resort aquifer should not be considered for a potential water supply due to its relatively thin geometry and its poor water quality caused by salt water intrusion. Only the Long Beach aquifer was considered as a potential water supply from the south-western dune deposit.

4.4 Central Dune Sand Aquifer

4.4.1 Geological Setting

The central dune sand aquifer is composed of Quaternary dune sand. The sand deposit is a relatively poorly-sorted fine to medium grained sand and grades into a silty sand in some areas. The sand deposit also contains some colluvium sediments derived from the surrounding hills. The sand deposit varies from between 2.5 m (MB17) to greater than 17 m (MB12a) in thickness. The basement of the aquifer is comprised of residual silty clay/ clayey sand which overlies the metamorphic quartzose and lithic sandstones of the Carboniferous Shoalwater Formation.

The sand deposit is bounded to the north, east and south by outcrops of the Shoalwater Formation. The full extent of the dune sand deposit was inferred from recent field investigations, onsite geological mapping, and is shown on Drawing 8.

4.4.2 Hydrogeology & Flow Patterns

The central dune sand aquifer extends from Leeke's Beach to approximately half way along the valley towards Clam Bay, as shown on Drawing 8. It is an unconfined aquifer which receives the majority of its recharge through direct infiltration of rainfall over its entire surface area. The aquifer would also receive additional recharge through the infiltration of rainfall into the unsaturated sand deposit between its eastern boundary and Clam Bay. This infiltration of rainfall would seep through the sands, along the top of the bedrock, and into the eastern boundary of the aquifer.

Groundwater generally flows to the northwest through the aquifer towards the tidal wetland and Leeke's Beach. Groundwater within the aquifer will discharge directly into surface water associated with the wetland. During wet climatic periods, when groundwater levels are high, groundwater may also discharge into Blackall Creek and Leeke's Creek.

The previous groundwater investigation (DP 2011b) indicated that the saturated thickness of the aquifer is relatively thin and varies between 3 m at MB13 up to 10 m at MB16. Hydraulic testing indicated a low to medium permeability of between 0.6 m/day and 8 m/day depending on the silt content of the sand, and an average of 5 m/day. In comparison to the other three aquifers, this central dune sand aquifer has a lower permeability which is within published estimates for a fine grained sand with some silt.

Water inputs to the aquifer are:

- Rainfall infiltration over the entire surface area of the aquifer;
- Rainfall infiltration and seepage through the unsaturated sands to the southeast; and
- Minor component of stormwater runoff from the slopes to the north and south of the aquifer.

Water outputs or losses from the aquifer include evapotranspiration, and groundwater discharge to the tidal wetland and Leeke's Beach.

4.4.3 Aquifer Recharge

Aquifer recharge can be estimated as the percentage of rainfall that percolates into the ground that is not being taken up by the vegetation through transpiration, lost through direct evaporation (collectively known as evapotranspiration), or lost as surface runoff. Based on available rainfall data, the following estimates of recharge for the central dune sand aquifer were estimated in DP (2011b):

Recharge for a wet year	=	265 ML/ year
Recharge for an average year	=	150 ML/ year
Recharge for a dry (drought) year	=	70 ML/ year

4.4.4 Sustainable Aquifer Yield

Based on the results of predictive modelling DP (2011b), the total sustainable yield of the central dune sand aquifer was estimated at 90 kL/day from two production bores nominally located in the central region and towards the eastern boundary of the aquifer. Numerical modelling showed that the key sustainability criterion which limited the bore field yield was the drying out of the aquifer around the simulated production bores.

The sustainable yield of 90 kL/day represents the average long term yield for the aquifer. Higher (short term) extraction rates may be possible when varied between the wet and dry months of the year, or if extraction occurs over shorter time periods instead of the bore field operating continuously throughout each year.

This sustainable yield is less in comparison to the Northeast and Long Beach dune sand aquifers because of its smaller size, i.e. the surface areal extent is smaller, its lesser saturated thickness, and its lower permeability compared to the other aquifer systems.

4.5 DERM Groundwater Database Search

A search of the DERM groundwater database identified nine registered groundwater bores on the island. Bores are located in the former resort area (Resort aquifer) and near Long Beach (Long Beach aquifer). Subsurface conditions reportedly comprised sand, more specifically Keppel dune sands in the Long Beach aquifer, and sand beach ridges in the Resort aquifer. Depth of the sand deposit was reported to vary between 6 m and 19 m depth within this south-western region of the island. Standing groundwater levels varied between 1 m and 9 m depth depending on the location and surface elevation of the bores. Available information relating to the DERM registered groundwater bore conditions is summarised in Table 2.

Copies of the DERM bore card reports and a map showing the locations of the bores are attached in Appendix B.

Table 2: Summary of DERM Groundwater Database Information

DERM Bore ID	Location (GDA94)	Date Drilled	Total Bore Depth (m BGL)	Depth of Sand (m BGL)	Aquifer Formation	Bore Yield (L/s)	SWL (m BGL)*	Water Quality	
								pH	EC (µS/cm)
62672 (Desal Plant Bores 1 & 2)	289164 mE; 7434813 mN	1986	7.0	6.0	Sand Beach Ridges	NR	3.87	NR	NR
62679 (Oval Bore 1)	288890 mE; 7434740 mN	1983	6.0	6.0	Sand Beach Ridges	NR	1.72	NR	NR
84902	290012 mE; 7434013 mN	25/11/1985	10.8	10.8	Dune Sand	NR	8.26	potable	
88366 (Golf Course Bore)	288960 mE; 7434527 mN	4/10/1979	6.0	6.0	Dune Sand	NR	NR	NR	NR
88367 (Long Beach Pump House 1)	290067 mE; 7434041 mN	20/09/1987	13.0	15.0	Dune Sand	NR	NR	5.7^	340^
88368	289998 mE; 7434091 mN	22/09/1987	14.0	15.0	Dune Sand	NR	NR	6.0^	370^
88369	289964 mE; 7434118 mN	24/09/1987	18.0	19.0	Dune Sand	NR	NR	5.8^	425^
88370 (Long Beach Bore1)	289929 mE; 7434144 mN	1/08/1990	13.6	>16.0	Dune Sand	NR	NR	NR	NR
88696 (Oval Bore2)	288972 mE; 7434939 mN	1984	6.0	6.0	Sand Beach Ridges	NR	NR	NR	NR

Notes

* Most recent data as reported by DERM, dated 14/07/2002

^ Recorded on 15/01/1988

NR Not recorded

m BGL Metres below ground level

5. Baseline Groundwater Quality

5.1 Groundwater Quality, Northeast Aquifer

Groundwater quality assessment of the northeast aquifer was carried out after installation and development of four monitoring bores (MB3, MB4, MB5 and MB6) in 2006 (DP 2007a). Bore locations are shown on Drawing 5.

Results of reported field parameters (DP 2007a) indicate that groundwater in the northeast aquifer is fresh, has a low dissolved salt content, and a pH which varied from slightly acidic within the central region of the aquifer to slightly alkaline close to the beaches.

A hydro-chemical assessment of the groundwater (DP 2007a) indicated that two distinct types of water were present in the aquifer, a sodium-chloride type and a calcium-bicarbonate type.

Laboratory results indicated that the groundwater is considered potable or fit for human consumption (DP 2007a). None of the water quality parameters or concentrations of heavy metals analysed were at levels which exceeded the drinking water guidelines. Relatively high total hardness levels were reported in MB3 (208 mg/L) and MB4 (126 mg/L).

Previous investigations did not include an assessment of the biological characteristics of this aquifer. As this it is located outside of the proposed development precincts (Drawing 1), no further assessment of this aquifer has been carried out.

5.1.1 Environmental Values

The environmental values (EVs) and beneficial use of groundwater in the northeast aquifer can be described as follows:

- Raw drinking water (for human consumption)
- Irrigating crops
- Stock watering
- Groundwater dependent ecosystems

It can be assumed that vegetation along the edges of the aquifer and deep rooted vegetation may be dependent on groundwater from this aquifer. Marine ecosystems at Butterfish Bay and Wreck Bay may also be dependent on the discharge of fresh water from the aquifer into the marine environment.

Due to the shallow depth to groundwater and the high permeability of the sand, the groundwater is vulnerable to any surface spills of chemicals and contaminants. A groundwater management plan for the aquifer would provide recommendations for minimising the effects of potential contamination of the groundwater.

At present there are no existing or proposed users of groundwater that would extract groundwater from the northeast aquifer.

5.2 Groundwater Monitoring, Long Beach and Resort Aquifers

Groundwater quality monitoring was carried out for this current assessment on accessible pre-existing groundwater wells (Drawing 6) by DP on 22 November 2010.

5.2.1 Reference Guidelines

Groundwater monitoring was conducted with reference to the following guidelines and standards:

- Environmental Protection Agency[6] (DERM) (1999) *Water Quality Sampling Manual – For use in testing for compliance with the Environmental Protection Act 1994*. 3rd Edition. Brisbane.
- Murray-Darling Basin Commission (MDBC) (1997) *Murray-Darling Basin Groundwater Quality Sampling Guidelines*. Adelaide.

5.2.2 Sampling Procedure

Groundwater sampling was carried out with reference to the standard operating procedures described in DP's Field Procedures Manual, as well as the DERM (1999) and MDBC (1997) guidelines to ensure the samples are representative and to maintain their integrity. Well and sample details were recorded on DP sample registers, and the general sampling procedure comprised:

- Gauging for the depth to groundwater using a dip meter.
- Using a disposable bailer to purge the wells by removing approximately 1-3 well volumes of groundwater.
- Allowing the groundwater level to recover to within 15% of its natural level prior to sampling.
- Collection of a representative groundwater sample using a disposable bailer; and
- Transfer of the sample directly into a pre-prepared container for measurement of field parameters.

5.2.3 Regulatory Criteria

The following guidelines were considered in assessing water quality from the site in the following order of priority:

- DERM (2009) *Queensland Water Quality Guidelines (QWQG) 2009*, Version 3. Brisbane.
- ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1: The Guidelines*. Canberra.

5.2.4 Adopted Water Quality Objectives

Guidelines listed in Section 5.2.3 identify water quality objectives (WQOs) at the point of use/discharge for various physical and chemical indicators. In the context of this project, the guidelines have been applied to assess the suitability of water for supporting aquatic ecosystems.

[6] Currently the Department of Environment and Resource Management (DERM)

Surface water quality objectives have been used to assess groundwater quality for this project "…*since the environmental values which they protect relate to above-ground uses (e.g. …maintenance of aquatic ecosystems). Hence groundwater should be managed in such a way that when it comes to the surface… it will not cause the established water quality objectives for these* [surface] *waters to be exceeded, nor compromise their designated environmental values*" (QWQG 2009:23). Where groundwater interacts with surface waters, groundwater quality should meet the water quality objectives set for those surface waters.

Regional guidelines were prioritised to allow assessment against local conditions. Relevant sections of each guideline are described in the subsections below.

QWQG (2009)
The Queensland Central Coast regional guideline values for physico-chemical indicators were adopted to assess water quality at the site in comparison with the expected regional conditions (Table 3.2.1a, freshwater lakes and reservoirs).

ANZECC (2000)
Trigger values for physical and chemical stressors provided in the ANZECC guidelines for freshwater lakes and reservoirs (Tables 3.3.4 and 3.3.5) were used to give an indication of the benchmark water quality within the Long Beach and Resort aquifers.

5.2.5 Field Sampling Results

Field parameters measured have been compared with the adopted thresholds and are summarised in Table 3 and Table 5 for the Long Beach and resort aquifers respectively. Historical field monitoring results from previous investigations (DP 2007a, 2007b) are summarised and compared with current results and the adopted thresholds in Table 4 and Table 6 for the Long Beach and resort aquifers respectively. Groundwater well locations are shown on Drawing 6 (Long Beach aquifer) and Drawing 7 (resort aquifer). Results are discussed in the following sub-sections.

5.3 Groundwater Quality, Long Beach Aquifer

Groundwater quality assessment of the Long Beach aquifer was carried out for two pre-existing monitoring bores (Long Beach pump house 1, Long Beach Bore 1) and after installation and development of four new bores (MB10, MB11, PB1, PB2) in 2006 (DP 2007a). These bores were monitored again after installation and development of two new production bores (PB1, PB2) in 2007 (DP 2007b) and during field investigations in 2010 (Section 5.2). Bore locations are shown on Drawing 6.

Results of reported field parameters (DP 2007a, 2007b, Table 3, Table 4) indicate that groundwater in the Long Beach aquifer is generally fresh, has a low dissolved salt content, and a slightly acidic pH, with the exception of groundwater in the Long Beach Pump House.

Table 3: Summary of Groundwater Field Parameters – Long Beach Aquifer, 2010

Bore ID	Location (GDA94)^	Date Sampled	Elevation (m AHD)^	Total Bore Depth (m BGL)	SWL		Temp. (ºC)	pH	EC (µS/cm)	Observations
					(m BGL)	(m AHD)				
MB10	289826 mE, 7434203 mN	22/11/2010	8.64	17.3	7.24	1.40	25.3	5.4	560	No odour, clear colour, fast recharge
PB1	289828 mE, 7434205 mN	22/11/2010	8.73	18.4	7.16	1.57	24.8	5.7	530	No odour, clear colour, fast recharge
PB2	289776 mE, 7434244 mN	22/11/2010	12.81	22.1	11.25	1.56	25.4	6.0	720	No odour, clear colour, fast recharge
Long Beach Bore 1 (LBB1)	-	22/11/2010	-	9.60	4.76	-	24.3	11.3	510	No odour, clear colour, fast recharge
Long Beach Pump House 1 (LBPH1)	290042 mE, 7434057 mN	22/11/2010	9.12	15.70	7.61	-	25.6	5.9	1,130	No odour, clear colour, fast recharge. Four water supply bores in compound not grouted or sealed.
Site Assessment Criteria										
QWQG[1]								6.5-8.0	375*	
ANZECC[2]								6.0-8.0	90-900	

Notes

1	Queensland Water Quality Guidelines (2009) Guideline values for physico-chemical indicators (Table 3.2.1a Central Coast region freshwater lakes and reservoirs).
2	ANZECC (2000) trigger values for physical and chemical stressors (Tables 3.3.4 and 3.3.5, Freshwater lakes and reservoirs)
SWL	Standing water level
m BGL	metres below ground level
^	As surveyed by Schlencker Surveying Pty Ltd. Coordinates in GDA94 coordinate system.
-	Not measured
*	QWCQ 75th percentile of EC for Queensland Central Coast North salinity region - to be compared with median EC value for each aquifer
~	No guideline available at time of investigation
Yellow	cells contain levels of an analyte outside than the QWQG (2009) range of guideline values
Blue	cells contain levels of an analyte outside the ANZECC (2000) range of default trigger values for freshwater lakes and reservoirs in northern Queensland
	This table has been produced in colour to indicate exceedences of relevant criteria. Reproduction should be carried out in colour.

Table 4: Summary of Historical Field Parameters – Long Beach Aquifer

Bore ID	Location (GDA94)^	Elevation (m AHD)^	Date Sampled	Total Bore Depth (m BGL)	SWL		Temp. (ºC)	pH	EC (µS/cm)	Observations
					(m BGL)	(m AHD)				
MB10	289826 mE, 7434203 mN	8.64	26/07/2006	17.2	7.35	1.29	27.5	6.3	450	
			26/10/2007	-	7.52	1.12	26.1	5.7	430	
			22/11/2010	17.3	7.24	1.40	25.3	5.4	560	No odour, clear colour, fast recharge
PB1	289828 mE, 7434205 mN	8.73	26/10/2007	18.5	7.44	1.29	26.1	5.8	430	
			22/11/2010	18.4	7.16	1.57	24.8	5.7	530	No odour, clear colour, fast recharge
PB2	289776 mE, 7434244 mN	12.81	25/10/2007	22.0	11.48	1.33	25.1	5.7	490	
			22/11/2010	22.1	11.25	1.56	25.4	6.0	720	No odour, clear colour, fast recharge
Long Beach Bore 1 (LBB1)	-	-	12/07/2006	-	5.00	1.16	27.4	6.8	510	
			26/10/2007	-	5.12	1.04	26.6	5.9	430	
			22/11/2010	9.6	4.76	-	24.3	11.3	510	No odour, clear colour, fast recharge
Long Beach Pump House 1 (LBPH1)	290042 mE, 7434057 mN	9.12	12/07/2006	-	7.95	0.87	28.0	8.0	10,100	
			26/10/2007	-	8.07	0.75	26.4	7.1	14,450	
			22/11/2010	15.7	7.61	1.51	25.6	5.9	1,130	No odour, clear colour, fast recharge. Four water supply bores in compound not grouted or sealed.
Site Assessment Criteria										
QWQG[1]								6.5-8.0	375*	
ANZECC[2]								6.0-8.0	90-900	

Notes	
1	Queensland Water Quality Guidelines (2009) Guideline values for physico-chemical indicators (Table 3.2.1a Central Coast region freshwater lakes and reservoirs).
2	ANZECC (2000) trigger values for physical and chemical stressors (Tables 3.3.4 and 3.3.5, Freshwater lakes and reservoirs)
SWL	Standing water level
m BGL	metres below ground level
^	As surveyed by Schlencker Surveying Pty Ltd. Coordinates in GDA94 coordinate system.
-	Not measured
*	QWCQ 75th percentile of EC for Queensland Central Coast North salinity region - to be compared with median EC value for each aquifer
~	No guideline available at time of investigation
Yellow	cells contain levels of an analyte outside than the QWQG (2009) range of guideline values
Blue	cells contain levels of an analyte outside the ANZECC (2000) range of default trigger values for freshwater lakes and reservoirs in northern Queensland
	This table has been produced in colour to indicate exceedences of relevant criteria. Reproduction should be carried out in colour.

Groundwater in the Long Beach Pump House was saline in both 2006 (10,100 µS/cm) and 2007 (14,450 µS/cm) with an alkaline pH, which indicated substantial salt water intrusion had occurred from Long Beach. Salt water intrusion was considered to be a result of historical water extraction in the area. Field monitoring results from the most recent monitoring event in 2010 (Table 3) indicate that the groundwater is slightly acidic and fresh with an electrical conductivity of 1,130 µS/cm. The pH value recorded is similar to those recorded for other bores in the aquifer. This indicates that the aquifer is recovering from salt water intrusion due to the higher rainfall over the previous year and no groundwater extraction.

A hydro-chemical assessment of groundwater in the Long Beach aquifer (DP 2007a) indicated groundwater is of a sodium-chloride type.

Laboratory results indicated that the groundwater is considered potable (DP 2007a). None of the water quality parameters or concentrations of heavy metals analysed were at levels which exceeded the drinking water guidelines.

Previous investigations did not include an assessment of the biological characteristics of this aquifer. Due to the short holding times (<24 hours) of biological parameters in groundwater samples, an assessment of the biological characteristics was not carried out in 2010.

5.3.1 Environmental Values

The environmental values (EVs) and beneficial use of groundwater in the Long Beach aquifer can be described as follows:

- Raw drinking water (for human consumption)
- Irrigating crops
- Stock watering
- Groundwater Dependent Ecosystems

It can be assumed that vegetation along the edges of the aquifer and deep rooted vegetation may be dependent on groundwater from this aquifer. Marine ecosystems at Long Beach may also be dependent on the discharge of fresh water from the aquifer into the marine environment.

Due to the shallow depth to groundwater and the high permeability of the sand, the groundwater is vulnerable to any surface spills of chemicals and contaminants. A groundwater management plan for the aquifer would provide recommendations for minimising the effects of potential contamination of the groundwater.

At present there are no users or extractors of groundwater from the Long Beach aquifer. However, extraction of groundwater is a future potential option as a supplementary potable water supply for the Project. Any extraction of groundwater from this aquifer should be conducted in accordance with the recommendations in DP (2007a, 2007b) and a detailed groundwater management plan developed for the aquifer.

5.4 Groundwater Quality, Resort Aquifer

Groundwater quality assessment of the resort aquifer was carried out for eight pre-existing monitoring bores, and after installation and development of four new bores (MB1, MB2, MB7, MB8) in 2006 (DP 2007a). These bores were monitored again during field investigations in 2010 (Section 5.2). Bore locations are shown on Drawing 7.

Results of reported field parameters (DP 2007a, 2007b, Table 5, Table 6) indicate that groundwater varied in quality due to salt water intrusion from the beaches bordering the aquifer. Groundwater was generally brackish to saline with a neutral pH in regions of the aquifer near Fisherman's Beach (MB1, OB1, OB2, Desal2). Whereas groundwater in the upper reaches of the aquifer (MB2, MB7, MB8) was generally fresh with a slightly acidic pH. This indicated substantial salt water intrusion had occurred from Fisherman's Beach. Salt water intrusion was considered to be a result of historical over extraction of groundwater in the area.

Field monitoring results from the most recent monitoring event (Table 5) indicate that the groundwater in Desal1 has recovered to slightly acidic and fresh state. The pH value recorded is similar to those recorded for other bores in the aquifer. This indicates that this area of the aquifer is recovering from salt water intrusion. Monitoring of bores MB1, OB1, OB2 and Desal2 was not possible during the most recent monitoring event.

Due to the relatively shallow and thin nature of the aquifer and high potential for salt water intrusion, the resort aquifer was not considered to be a potential sustainable source of groundwater (DP 2007a). Therefore, no laboratory analysis of groundwater samples or assessment of biological characteristics was carried out for this aquifer.

5.4.1 Environmental Values

The environmental values (EVs) and beneficial use of groundwater in the Resort aquifer can be described as follows:

- Raw drinking water (for human consumption)
- Irrigating crops
- Stock watering

Due to the shallow depth to groundwater and the high permeability of the sand, the groundwater is vulnerable to any surface spills of chemicals and contaminants. A groundwater management plan for the aquifer would provide recommendations for minimising the effects of potential contamination of the groundwater.

At present, local island residents and businesses are users and extractors of groundwater from the resort aquifer. Extraction of groundwater may be also required as a supplementary irrigation water supply for the Project in the future. If extraction of groundwater is required in the future, then it should be conducted in accordance with a groundwater management plan developed specifically for the aquifer.

Table 5: Summary of Groundwater Field Parameters – Resort Aquifer, 2010.

Bore ID	Location (GDA94)^	Date Sampled	Elevation (m AHD)^	Total Bore Depth (m BGL)	SWL		Temp. (ºC)	pH	EC (µS/cm)	Observations
					(m BGL)	(m AHD)				
MB1	288785 mE, 7434995 mN	22/11/2010	4.28	-	-	-	-	-	-	Well destroyed
MB2	289195 mE, 7434893 mN	22/11/2010	5.4	3.65	2.75	2.65	25.4	5.8	460	Located near disused fuel bowser and storage tank, organic odour, brown colour, fast recharge
MB7	289102 mE, 7434740 mN	22/11/2010	9.39	13.71	7.18	2.21	26.9	5.0	220	Organic odour, brown colour, fast recharge, slightly turbid
MB8	289265 mE, 7434616 mN	22/11/2010	13.92	14.58	11.78	2.14	25.7	5.7	340	Organic odour, brown colour, fast recharge, slightly turbid
MB11	289682 mE, 7434566 mN	22/11/2010	34.34	-	-	-	-	-	-	Well could not be located
Oval Bore 1 (OB1)	288916 mE, 7434642 mN	22/11/2010	2.77	-	-	-	-	-	-	Well could not be located
Oval Bore 2 (OB2)	288973 mE, 7434696 mN	22/11/2010	3.37	-	-	-	-	-	-	Well could not be located
Desal. Plant Bore 1	289068 mE, 7434815 mN	22/11/2010	-	4.93	2.50	-	25.1	6.3	670	Organic, slightly sulfuric odour, clear colour, fast recharge
Site Assessment Criteria										
QWQG[1]								6.5-8.0	375*	
ANZECC[2]								6.0-8.0	90-900	

Notes

1	Queensland Water Quality Guidelines (2009) Guideline values for physico-chemical indicators (Table 3.2.1a Central Coast region freshwater lakes and reservoirs).
2	ANZECC (2000) trigger values for physical and chemical stressors (Tables 3.3.4 and 3.3.5, Freshwater lakes and reservoirs)
SWL	Standing water level
m BGL	metres below ground level
^	As surveyed by Schlencker Surveying Pty Ltd. Coordinates in GDA94 coordinate system.
-	Not measured
*	QWCQ 75th percentile of EC for Queensland Central Coast North salinity region - to be compared with median EC value for each aquifer
~	No guideline available at time of investigation
Yellow	cells contain levels of an analyte outside than the QWQG (2009) range of guideline values
	This table has been produced in colour to indicate exceedences of relevant criteria. Reproduction should be carried out in colour.

Table 6: Summary of Historical Field Parameters – Resort Aquifer

Bore ID	Location (GDA94)^	Elevation (m AHD)^	Date Sampled	Total Bore Depth (m BGL)	SWL		Temp. (ºC)	pH	EC (µS/cm)	Observations
					(m BGL)	(m AHD)				
MB1	288785 mE, 7434995 mN	4.28	11-27/07/2006	7.6	3.38	0.90	27.3	7.3	21,750	
			22/11/2010	-	-	-	-	-	-	Well destroyed
MB2	289195 mE, 7434893 mN	5.4	11-27/07/2006	6.0	4.00	1.40	27.8	5.8	550	
			22/11/2010	3.65	2.75	2.65	25.4	5.8	460	Located near disused fuel bowser and storage tank, organic odour, brown colour, fast recharge
MB7	289102 mE, 7434740 mN	9.39	11-27/07/2006	14.0	8.15	1.24	29.0	8.9	450	
			22/11/2010	13.71	7.18	2.21	26.9	5.0	220	Organic odour, brown colour, fast recharge, slightly turbid
MB8	289265 mE, 7434616 mN	13.92	11-27/07/2006	14.0	11.75	2.17	-	-	-	
			22/11/2010	14.58	11.78	2.14	25.7	5.7	340	Organic odour, brown colour, fast recharge, slightly turbid
MB11	289682 mE, 7434566 mN	34.34	11-27/07/2006	23.0	18.15	16.19	-	-	-	
			22/11/2010	-	-	-	-	-	-	Well could not be located
Oval Bore 1 (OB1)	288916 mE, 7434642 mN	2.77	11-27/07/2006	-	2.50	1.23	26.7	7.2	1,340	
			22/11/2010	-	-	-	-	-	-	Well could not be located
Oval Bore 2 (OB2)	288973 mE, 7434696 mN	3.37	11-27/07/2006	-	-	-	24.6	7.2	3,810	
			22/11/2010	-	-	-	-	-	-	Well could not be located
Desal. Plant Bore 1	289068 mE, 7434815 mN	-	11-27/07/2006	-	3.70	-	30.0	6.9	2,100	
			22/11/2010	4.93	2.50	-	25.1	6.3	670	Organic, slightly sulfuric odour, clear colour, fast recharge
Desal. Plant Bore 2	-	-	11-27/07/2006	-	3.65	-	30.0	6.7	3,610	
Site Assessment Criteria										
QWQG[1]								6.5-8.0	375*	
ANZECC[2]								6.0-8.0	90-900	

Notes	
1	Queensland Water Quality Guidelines (2009) Guideline values for physico-chemical indicators (Table 3.2.1a Central Coast region freshwater lakes and reservoirs).
2	ANZECC (2000) trigger values for physical and chemical stressors (Tables 3.3.4 and 3.3.5, Freshwater lakes and reservoirs)
SWL	Standing water level
m BGL	metres below ground level
^	As surveyed by Schlencker Surveying Pty Ltd. Coordinates in GDA94 coordinate system.
-	Not measured
*	QWCQ 75th percentile of EC for Queensland Central Coast North salinity region - to be compared with median EC value for each aquifer
~	No guideline available at time of investigation
Yellow	cells contain levels of an analyte outside than the QWQG (2009) range of guideline values
Blue	cells contain levels of an analyte outside the ANZECC (2000) range of default trigger values for freshwater lakes and reservoirs in northern Queensland
	This table has been produced in colour to indicate exceedences of relevant criteria. Reproduction should be carried out in colour.

5.5 Groundwater Quality, Central Dune Sand Aquifer

Groundwater quality monitoring was carried out on the groundwater monitoring bores MB12, MB13 and MB16 (Drawing 8) in February 2011 (DP 2011b). Sampling was carried out as described in Sections 5.2.1 to 5.2.4.

Field and laboratory testing (DP 2011b) confirmed the groundwater quality in the central dune sand is generally fresh (MB12, MB14, and MB16) however within the more silty sand lithology the salt content increases to become slightly brackish at MB13. Salinity is expected to increase beneath the tidal wetland and along Leeke's Beach. Water quality reported total dissolved salt contents of between 452 mg/L at MB16 up to 1170 mg/L at MB13. The pH is acidic and below the drinking water guidelines, however it is typical of groundwater quality within coastal sand aquifers. Beneath the tidal wetland and Leeke's Beach this is expected to become slightly alkaline due to the natural mixing with saline water from the ocean.

A hydro-chemical assessment of the groundwater (DP 2011b) indicated a sodium-chloride type of water is present in the aquifer.

DP (2011b) reported that the groundwater is generally potable or fit for human consumption, however the quality varies across the aquifer and was found to be brackish at MB13. Levels of chloride exceeded the aesthetic Australian Drinking Water Guidelines (ADWG) in the three samples tested. Hardness exceeded the aesthetic ADWG guideline in MB13. None of the other water quality parameters or heavy metals tested reported levels which exceeded the drinking water guidelines, with the exception of nickel in MB13. Iron levels are low and should not cause iron staining. The actual water quality of a water supply from this aquifer will depend on the location of the extraction points (or production bores) within the aquifer.

The previous investigation did not include an assessment of the biological characteristics of this aquifer due to the short holding times (<24 hours) for biological parameters in groundwater samples, No further assessment of this aquifer has been carried out as it is not proposed to be used as a water supply for the Project.

5.5.1 Environmental Values

The environmental values (EVs) and beneficial use of groundwater in the central dune sand aquifer can be described as follows:

- Raw drinking water (for human consumption)
- Irrigating crops
- Stock watering
- Groundwater dependent ecosystems

As with the other dune sand aquifers on the island, vegetation along the edges of the aquifer and deep rooted vegetation may be dependent on fresh groundwater from this aquifer. Marine ecosystems within the tidal wetland and along Leeke's Beach may also be dependent on the discharge of fresh water from the aquifer into the marine environment.

Due to the shallow depth to groundwater and the high permeability of the sand, the groundwater is vulnerable to any surface spills of chemicals and contaminants. A groundwater management plan for the aquifer would provide recommendations for minimising the effects of potential contamination of the groundwater.

At present there are no existing or proposed users of groundwater which rely on this groundwater resource.

6. Groundwater Supply Facilities

There are currently no Water Resource Plans (WRPs) for the Project precincts or for any of the four individual aquifers on Great Keppel Island. However, groundwater was previously used by the former resort as a supplementary water supply, and continues to be used by local residents and businesses.

The existing groundwater supply facilities for each of the four aquifers are described in the following sub-sections.

6.1 Northeast Aquifer

Groundwater resources in the northeast aquifer are currently not utilised. No groundwater supply facilities have been installed in the northeast aquifer. As this aquifer is located outside the proposed development footprint, it is not expected that installation of groundwater supply facilities would be required in this aquifer for the Project.

6.2 Long Beach Aquifer

Groundwater from the Long Beach aquifer has historically been extracted as a supplementary potable water supply for the former resort. The following groundwater supply facilities remain in-situ and are shown on Drawing 6:

- Long Beach Pump House – a fenced pumping compound comprising four production bores and one monitoring bore (LBPH1). Associated pumping infrastructure, pipe work, an above ground concrete storage tank, and a storage shed were also in place. The production bores and pump house are currently not in use.
- Long Beach Bores – three former production wells exist in the vicinity of Long Beach Bore 1 (LBB1). Wells consist of above ground concrete covers with pumps and pipe work installed. None of these production wells are currently in use.
- Production Bores – two production bores (PB1, PB2) were installed by DP in 2007 according to the results of predictive modelling (DP 2007a). These bores currently consist of 250 mm diameter PVC casing and screens. No pumps, pipe work or protective infrastructure exists at either of these wells.

According to DP (2007b), former production bores at the Long Beach pump house and in the vicinity Long Beach bore 1 should not be used for extraction of groundwater due to the high potential for salt water intrusion. It was recommended that extraction of groundwater only occur at the production bores PB1 and PB2 at the specified rates (Section 4.2.5) to ensure sustainability of the groundwater resource. It was recommended that the former production bores and associated infrastructure be removed and the bores be sealed with a cement grout by a qualified and licensed drilling contractor to prevent contamination of the groundwater.

It was recommended in DP (2007b) that Monitoring bores LBPH1, LBB1 and MB10 should remain intact and two additional groundwater bores should be installed between the pump house and Long Beach to allow ongoing monitoring of groundwater quality and the potential for salt water intrusion.

6.3 Resort Aquifer

Groundwater from the resort aquifer has historically been extracted as a supplementary water supply for the former resort, local island residents, and local businesses. The following groundwater supply facilities remain in-situ and their approximate locations can be inferred from Drawing 7:

- Golf Course Bore – A DERM registered production bore was formerly used for groundwater extraction for irrigation purposes near the resort golf course. Pumping and pipe work infrastructure remain in situ.
- Oval Bores – Two DERM registered production bores (OB1, OB2) were formerly used for groundwater extraction for irrigation purposes within the resort. These bores could not be located during the most recent monitoring event. It is assumed that some pumping infrastructure and pipe work remains in-situ.
- Residential Bores and/or Spears – Multiple bores are currently used for groundwater extraction by local island residents, and local businesses as a supplementary water supply. As these bores are located on private property, the in-situ groundwater supply facilities could not be assessed.

No detailed assessment including numerical modelling to estimate the sustainable yield of this aquifer has been conducted as it is not considered a viable source of groundwater for extraction. A hydrogeological assessment should be conducted prior to use of any groundwater from this aquifer to ensure the adverse impacts caused by salt water intrusion (e.g. salinity, ecosystem collapse) are minimised.

Due to the brackish nature of the aquifer and salt water intrusion identified in previous investigations (DP 2007a), it could be expected that any groundwater supply facilities and infrastructure remaining in-situ from the former resort has been subjected to some degree of corrosion. A detailed assessment would be required prior to re-use of any in-situ facilities.

6.4 Central Dune Sand Aquifer

Groundwater resources in the central dune sand aquifer are currently not utilised and no groundwater supply facilities have been installed in the aquifer. This aquifer occupies part of the proposed golf course footprint, it is understood that the groundwater resource is not going to be used as a water supply and the installation of groundwater supply facilities is not required in this aquifer for the Project.

7. Groundwater Impact Assessment

7.1 Potential Groundwater Impacts

It would be expected that a range of potential groundwater impacts are likely to occur due to the proposed Project development. Potential impacts would result form the development of a groundwater supply, and operational activities with the potential to cause contamination at the surface or subsurface due to the storage or use of chemicals/fuels.

The groundwater resources within the dune sand deposits on Great Keppel Island are considered to be highly vulnerable to surface contamination sources due to the shallow depth of groundwater, nature of the highly permeable sandy soils, and high hydraulic conductivity of the aquifer. These characteristics of the systems allow for any potential surface contamination to infiltrate into the subsurface and be dispersed through the aquifer relatively easily, thereby impacting upon the groundwater quality and its potential beneficial use (potable water supply, irrigation, or dependent ecosystems).

The potential impacts to the existing groundwater resources would include:

1. *Salt water intrusion*

Extraction of groundwater from the aquifers above the sustainable yield may reverse the hydraulic gradient along the coastline and boundary of the aquifers, thereby inducing saltwater to migrate into the aquifer, decreasing the quality by increasing the salt content and diminishing the volume of groundwater available for potential beneficial use and existing groundwater users.

2. *Contamination from effluent irrigation*

Effluent irrigation will be a form of disposal of sewage effluent from the proposed resort. If the effluent is irrigated over the proposed aquifers above the estimated sustainable rates for the soil conditions, it may cause the effluent to infiltrate into the aquifer and contaminate the groundwater. Contamination of the aquifer could also occur if a breakdown in the treatment of effluent occurs and an accidental release of non-treated effluent is irrigated, or from leaking sewerage pipelines during the operation of the proposed resort.

3. *Contamination from leakage or runoff from surface activities*

Contamination from leakage or run-off during the operation of the proposed resort could infiltrate into the subsurface and contaminate the groundwater. The following are considered to be the main potential sources of contamination:

- Chemical and/or fuel storage,
- Existing underground fuel tanks, bowsers, and associated infrastructure from the former resort;
- Desalinisation plant effluent (brine); and
- Uncontrolled leachate seepage from the former landfill.

4. *Degradation of groundwater dependent ecosystems and vegetation*

Extraction of groundwater from the aquifers above the sustainable yield may reverse the hydraulic gradient along the coastline and boundary of the aquifers. Extraction at or below the sustainable yield may also reduce the volume of fresh groundwater discharging at the freshwater/saltwater interface along the coastline. This may reduce the volume of groundwater available for estuarine/coastal ecosystems and deep rooted vegetation.

5. *Reduction in water supply available for existing users*

Drawdown induced by the extraction of groundwater from the aquifers may impact on existing groundwater supply bores, decreasing their groundwater levels and the volume of groundwater available for extraction. This may reduce the volume of groundwater available or may even dry out some of the shallow bores. However, as the only existing groundwater users are located along Fisherman's Beach and Putney Beach, this potential impact would only occur if groundwater was extracted from the resort aquifer.

As the final project design details have not yet been confirmed, it is not possible to determine the relative risk of each impact to groundwater quality and supply. Management plans should be developed for each aquifer once the Project design details have been confirmed.

7.2 Groundwater Mitigation Measures

Measures to mitigate groundwater impacts should be developed in detail and implemented prior to commencement of the Project. This would ensure sustainability and protection of the groundwater aquifers. Based on the available information regarding the Project, mitigation measures should include the following:

- Development and implementation of Groundwater Management Plans (GMPs) for each of the four identified aquifers. This would include recommendations relating to sustainable yields, water supply extraction, well-head protection plans and ongoing groundwater monitoring requirements to enable the detection any adverse impact to the groundwater resource.

- Establishment of well-head protection plans as part of the GMP to include well-head protection zones around any production bores or future production bore locations, restriction of the storage of any chemicals/fuels within 200 m of any water supply or production bore. In addition to limiting any surface activity with the potential to cause contamination from occurring.
- Monitoring and management of groundwater extraction rates for each bore field.
- Development and implementation of an Effluent Disposal Management Plan to minimise potential for effluent to enter the groundwater system.
- Maintaining appropriate general management practices, including appropriate storage of fuels/ chemicals and spill prevention.
- Removal/decommissioning of existing underground storage tanks by a licensed tank removal contractor, and validation that any contaminated soil has been removed from the site.
- Decommissioning of old water bores and infrastructure at the Long Beach pump house and near Long Beach Bore 1 (LBB1) to minimise the potential for contamination (DP 2007b).
- Design and implementation of a groundwater quality monitoring program around the former landfill to assess whether it is impacting on groundwater.

8. Conclusions

The following shallow groundwater resources have been identified on Great Keppel Island within the sand dune deposits at the locations shown on Drawing 4:

- Northeast Aquifer;
- Long Beach Aquifer (part of the south-western sand dune deposit);
- Central Dune Sand Aquifer; and
- Resort Aquifer (part of the south-western sand dune deposit).

Previous investigations by DP in 2006 and 2007 identified the Northeast and Long Beach aquifers as containing viable groundwater resources based upon the quantity and quality of the groundwater contained within each aquifer. The Resort aquifer was discounted as a water supply option for the resort due to the saltwater intrusion impact over most of the aquifer. Initially the central region was not investigated through the drilling of test bores as it was not mapped as an extensive sand dune deposit and was mostly mapped as rock belonging to the Shoalwater Formation. However, the recent additional investigation carried out by DP (2011b) confirmed the presence of a groundwater resource within the north-western part of this dune sand deposit.

Numerical modelling was used to estimate the sustainable yield of the three viable groundwater resources. The long term sustainable yields were estimated to be:

- 270 kL/day for the Northeast aquifer extracted from three production bores (i.e. 100 kL/day from two bores, 70 kL/day from one bore) located in the central region of the aquifer;
- 100 kL/day for the Long Beach aquifer pumping from two production bores (i.e. 50 kL/day/bore); and
- 90 kL/day for the Central Dune Sand aquifer pumping from two production bores (70 kL/day from one and 20 kL/day the other) located near MB16 (Drawing 8).

Long-term sustainable yields were estimated assuming a uniform and continuous extraction rate from each bore field. Higher extraction rates may be possible over shorter time periods, however additional modelling work would be required to confirm the higher rates and duration of pumping.

All the shallow groundwater resources on Great Keppel Island are considered to be highly vulnerable to contamination due to the shallow depth to groundwater and permeable soils.

Potential impacts to the existing groundwater resources from the proposed development are considered to be:

- Salt water intrusion through over-extraction of groundwater;
- Contamination from effluent irrigation;
- Contamination from leakage or run-off from surface activities including chemical and/or fuel storage, existing underground fuel tanks and associated infrastructure, desalinisation plant effluent (brine) and leachate from the former landfill;
- Degradation of groundwater dependent ecosystems and vegetation; and
- Reduction in water supply available for existing users.

Mitigation of these potential impacts is considered possible with the implementation of detailed GMPs for each aquifer as outlined in Section 7.2. In addition to the GMPs, appropriate management practices and environmental management plans will be required for the storage of any chemicals/fuels, and for the proposed effluent irrigation. These measures to mitigate groundwater impacts should be developed in detail and implemented prior to commencement of the Project. This would ensure sustainability of the groundwater aquifers.

9. Recommendations

DP recommends the following:

- Mitigation measures listed in Section 7.2 be implemented including the development of Groundwater Management Plans for each aquifer following the finalisation of the resort design.

10. References

Australian Government Department of Sustainability, Water, Population and Communities & Great Barrier Reef Marine Park Authority (GBRMPA) (2011) *Guidelines for an Environmental Impact Statement for the Great Keppel Island Tourism and Marina Development, Queensland*. Document Number EPBC 2010/5521/GBRMPA G33652.1.

Coordinator-General, The (2011) *Great Keppel Island Resort project, Terms of reference for the environmental impact statement* issued under part 4 of the Queensland State Development and Public Works Organisation Act 1971.

Douglas Partners Pty Ltd, (2007a), *Report on Groundwater Supply Investigation, Great Keppel Island*, Document No. 33976, Douglas Partners Pty Ltd, Brisbane.

Douglas Partners Pty Ltd, (2007b), *Report on Production Bore Installation & Testing, Long Beach Aquifer, Great Keppel Island*, Document No. 33976A, Douglas Partners Pty Ltd, Brisbane.

Douglas Partners Pty Ltd, (2011a), *Report on Preliminary Geotechnical Assessment, Proposed Great Keppel Island Resort, Great Keppel Island*. Revision 2. Project 74586.00. Brisbane.

Douglas Partners Pty Ltd, (2011b), *Report on Additional Groundwater Investigation, Central Dune Sand Deposit, Great Keppel Island*. Revision 1. Project No. 74586.01. Brisbane.

Environmental Protection Agency[7] (DERM), (1999), *Water Quality Sampling Manual – For use in testing for compliance with the Environmental Protection Act 1994*. 3rd Edition. Brisbane.

Max Winders & Associates Pty Ltd, (2006), *Preliminary Review, Environmental Planning Issues, Great Keppel Island*, Document No. 06-020, Max Winders & Associates Pty Ltd, Brisbane.

Murray-Darling Basin Commission (MDBC), (1997), *Murray-Darling Basin Groundwater Quality Sampling Guidelines*. Adelaide.

National Health & Medical Research Council (NHMRC)/ Natural Resource Management Ministerial Council (NRMMC), (2004), *Australian Drinking Water Guidelines 6*.

Queensland Department of Mines, (1987), *Groundwater Resources of Queensland Map* Mines Department State Series: Map 4, 1:2,500,000 scale. Brisbane: Queensland Water Resources Commission.

Queensland Department of Natural Resources, Mines & Water, (2006), *Australia 1:100,000 Geological Series, Rockhampton, Queensland*, Sheet 9051 (map). Brisbane.

[7] Currently the Department of Environment and Resource Management (DERM)

11. Limitations of this Report

Douglas Partners (DP) has prepared this report for this project on Great Keppel Island in accordance with DP's proposal BNE100639, Revision 1 dated 20 October 2010 and acceptance received from Mr. Anthony Aiossa of GKI Resort Pty Ltd on 9 November 2010. This report is provided for the exclusive use of GKI Resort Pty Ltd for the specific project and purpose as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party.

This report must be read in conjunction with any attached explanatory notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions from review by others of this report or test data, which are not otherwise supported by an expressed statement, interpretation, outcome or conclusion stated in this report. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions only at the specific sampling or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of anthropogenic influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be limited by undetected variations in ground conditions between sampling locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Drawings

Notes:-

1. Plan adapted from drawings provided by GKI Resort Pty Ltd.
2. Proposed development areas as specified by GKI Resort Pty Ltd (October 2010).
3. Coordinate system used is GDA94.

Douglas Partners
Geotechnics | Environment | Groundwater

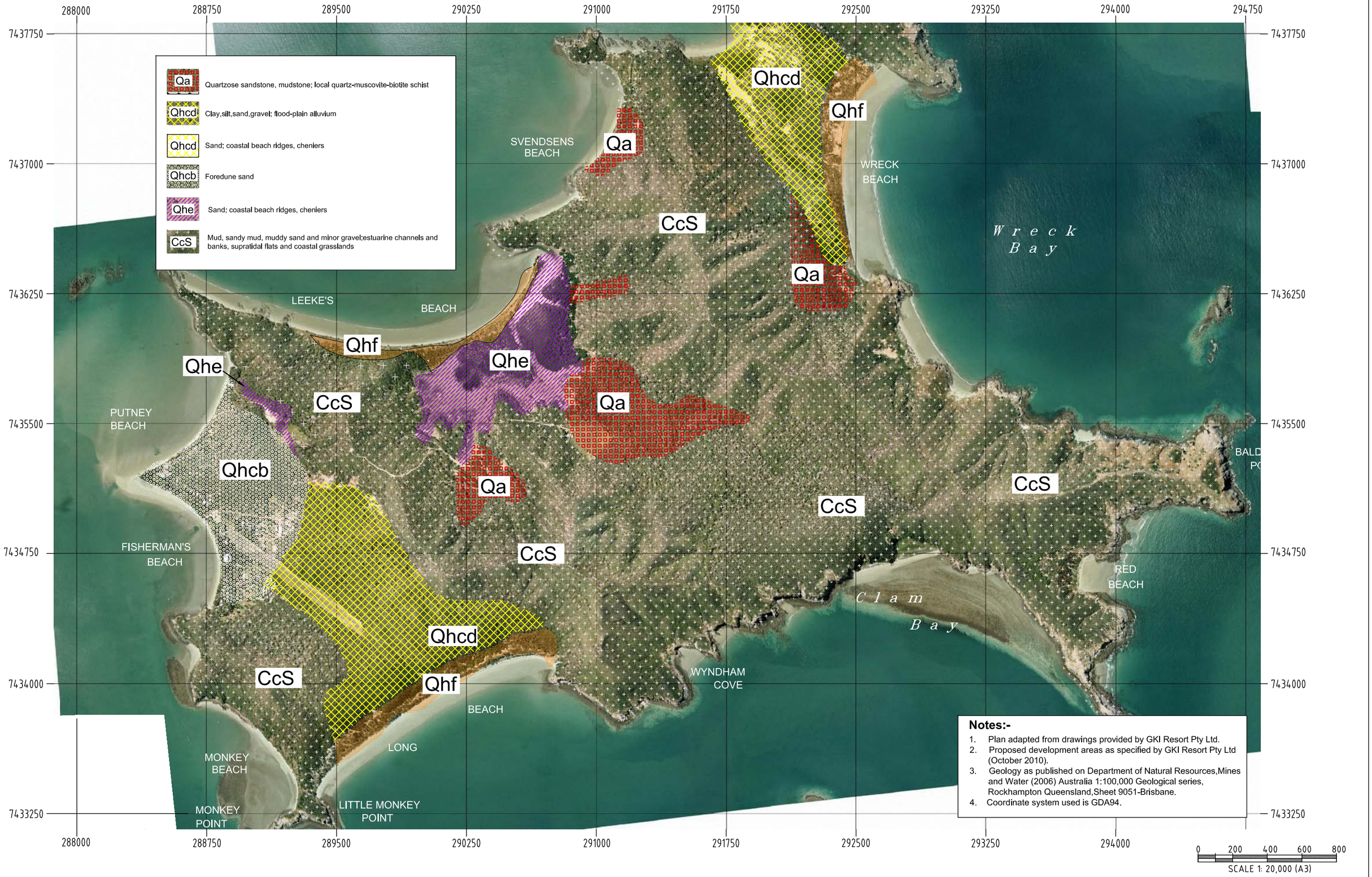
CLIENT: GKI Resort Pty Ltd		
OFFICE: Brisbane	DRAWN BY: JT	
SCALE: As shown	DATE: 31 August 2011	

TITLE: **Proposed Areas of Development**
Assessment of Groundwater Resources
Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	1
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 1 - Gw Res Summ Rep.dwg



Douglas Partners
Geotechnics | Environment | Groundwater

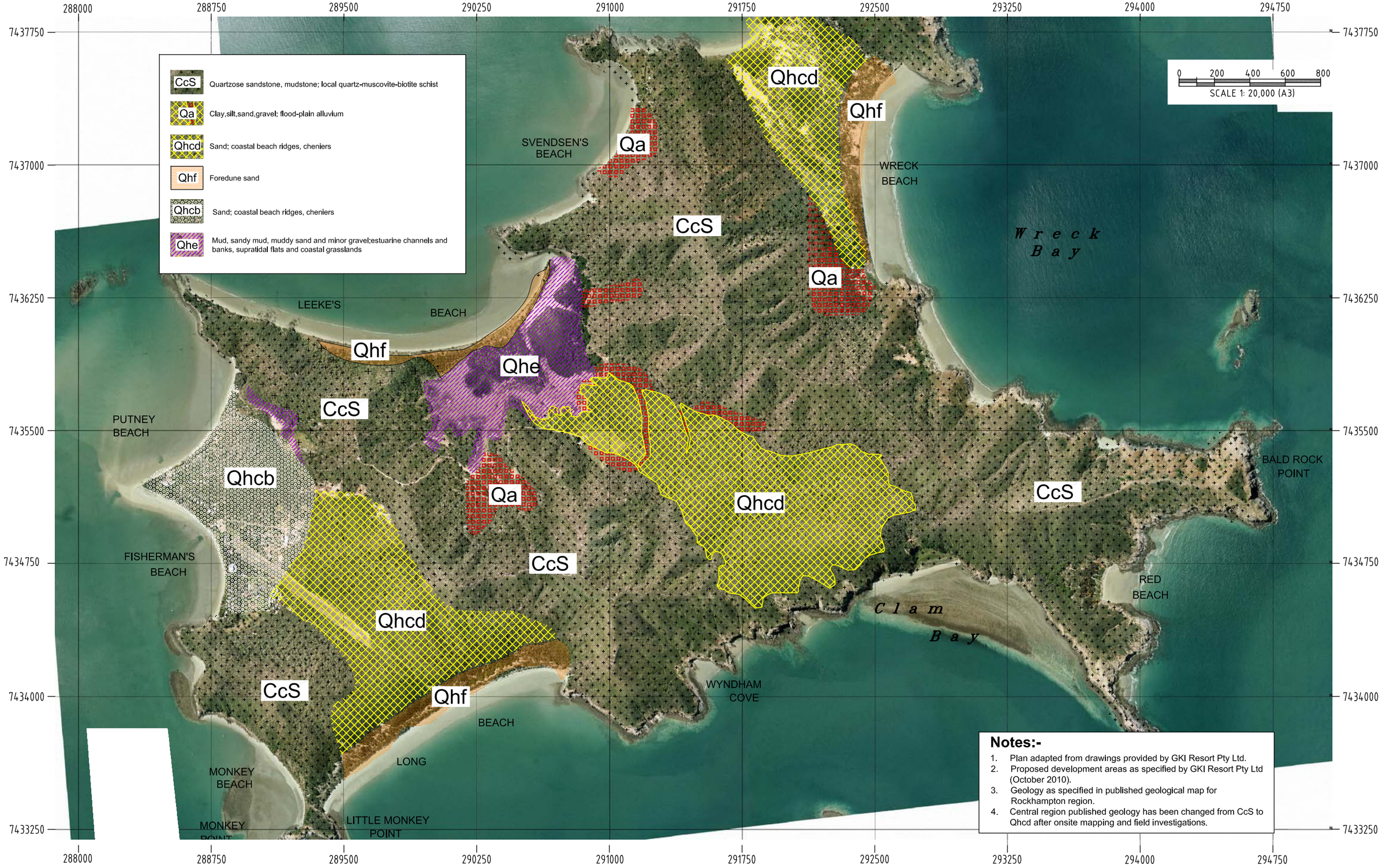
CLIENT: GKI Resort Pty Ltd	
OFFICE: Brisbane	DRAWN BY: JT
SCALE: As shown	DATE: 31 August 2011

TITLE: **Great Keppel Island Geology**
Assessment of Groundwater Resources
Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	2
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 2 - GW Res Summ Rep.dwg



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: GKI Resort Pty Ltd	
OFFICE: Brisbane	DRAWN BY: JT
SCALE: As shown	DATE: 31 August 2011

TITLE: **Great Keppel Island Revised Geological Map**
Assessment of Groundwater Resources
Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	3
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 3 - GW Res Summ Rep.dwg

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: GKI Resort Pty Ltd		
OFFICE: Brisbane	DRAWN BY: JT	
SCALE: As shown	DATE: 31 August 2011	

TITLE: **Great Keppel Island Aquifers**
Assessment of Groundwater Resources
Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	4
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 4 - GW Res Summ Rep.dwg

NTS

0 50 100 150

SCALE 1: 4,000 (A3)

Legend:-

Monitoring Well Location And Number

Notes:-

1. Plan adapted from drawings provided by GKI Resort Pty Ltd.
2. Proposed development areas as specified by GKI Resort Pty Ltd (October 2010).
3. Test Locations are approximate only and are based on field GPS co-ordinates.
4. Coordinate system used is GDA94.

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: GKI Resort Pty Ltd	
OFFICE: Brisbane	DRAWN BY: JT
SCALE: 1:4,000(A3)	DATE: 31 August 2011

TITLE: **Northeast Aquifer & Bore Location Plan**
Assessment of Groundwater Resources
Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	5
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 5 - GW REs Summ Rep.dwg

Legend:-

- Monitoring Well Location And Number
- Production Bore Location And Number

Notes:-

1. Plan adapted from drawings provided by GKI Resort Pty Ltd.
2. Proposed development areas as specified by GKI Resort Pty Ltd (October 2010).
3. Test Locations are approximate only and are based on field GPS co-ordinates.
4. Coordinate system used is GDA94.

Douglas Partners
Geotechnics | Environment | Groundwater

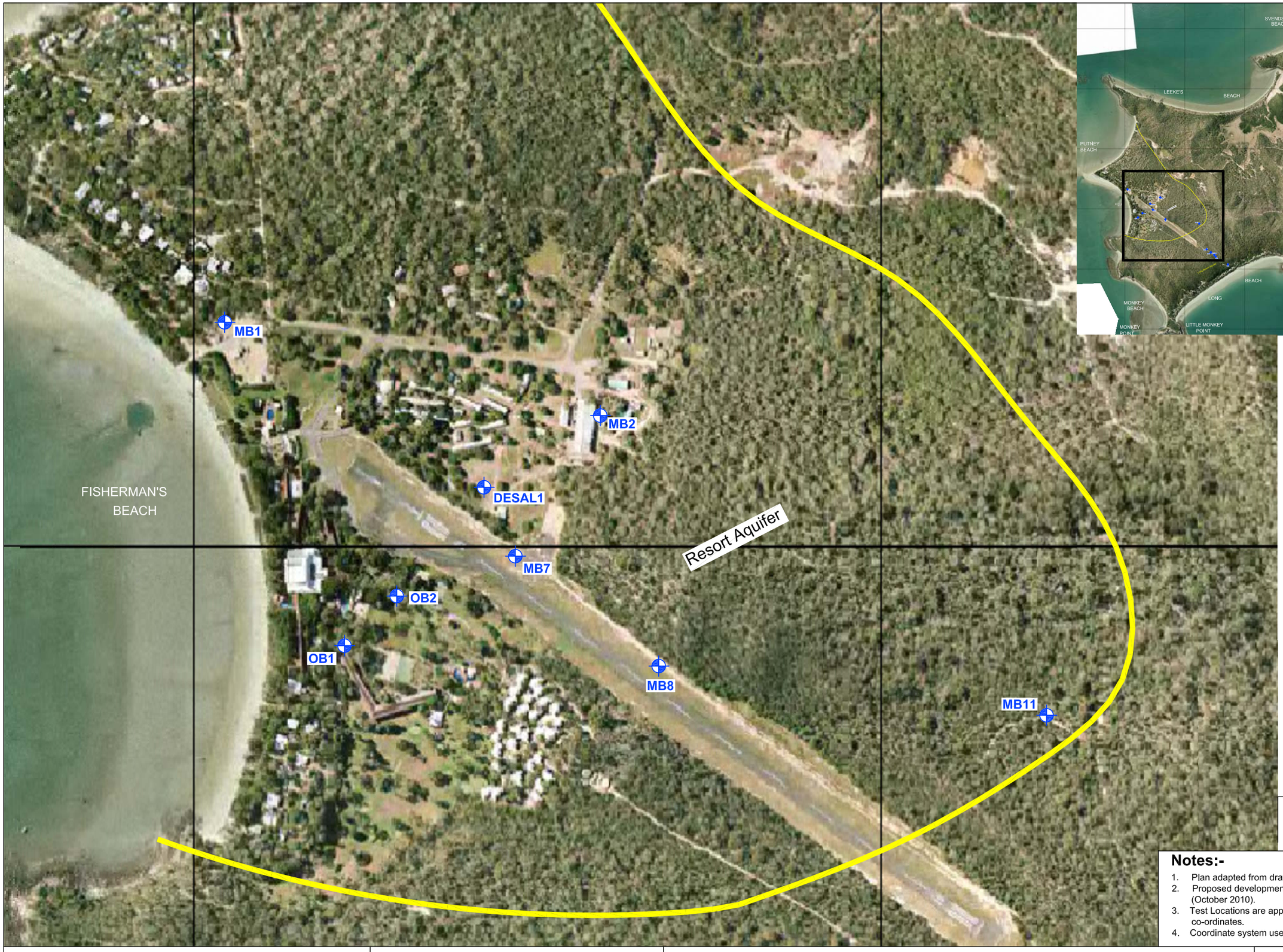
CLIENT: GKI Resort Pty Ltd		
OFFICE: Brisbane	DRAWN BY: JT	
SCALE: 1:4,000(A3)	DATE: 31 August 2011	

TITLE: **Long Beach Aquifer & Bore Location Plan**
Assessment of Groundwater Resources
Proposed Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	6
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 6 - GW Res Summ Rep.dwg



NTS

0 50 100 150

SCALE 1: 4,000 (A3)

Legend:-

Monitoring Well Location And Number

Notes:-

1. Plan adapted from drawings provided by GKI Resort Pty Ltd.
2. Proposed development areas as specified by GKI Resort Pty Ltd (October 2010).
3. Test Locations are approximate only and are based on field GPS co-ordinates.
4. Coordinate system used is GDA94.

Douglas Partners
Geotechnics | Environment | Groundwater

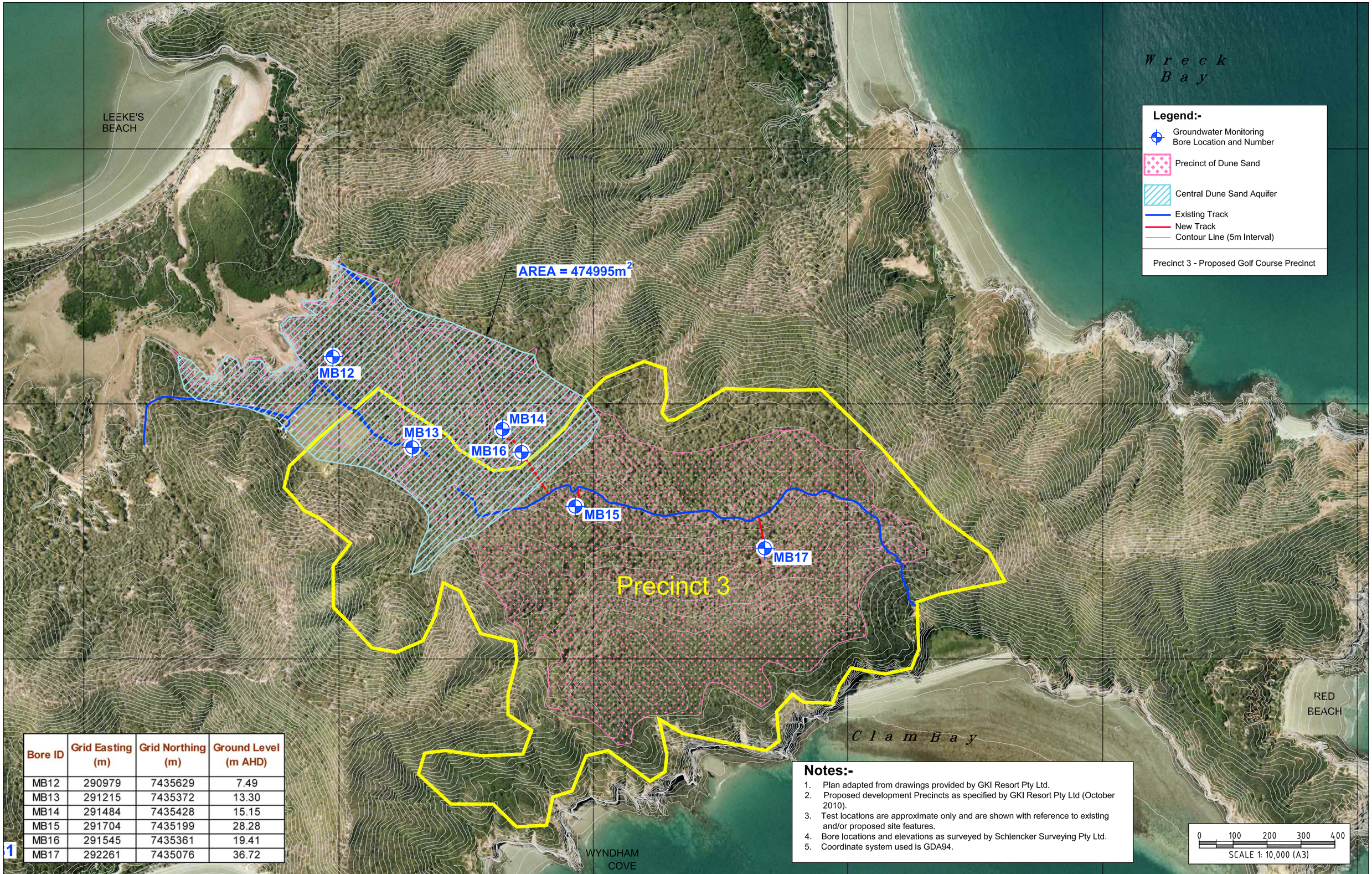
CLIENT: GKI Resort Pty Ltd	
OFFICE: Brisbane	DRAWN BY: JT
SCALE: 1:4,000(A3)	DATE: 31 August 2011

TITLE: **Resort Aquifer & Bore Location Plan**
Assessment of Groundwater Resources
Proposed Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.00
DRAWING No:	7
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 7 - GW Res Summ Rep.dwg



Bore ID	Grid Easting (m)	Grid Northing (m)	Ground Level (m AHD)
MB12	290979	7435629	7.49
MB13	291215	7435372	13.30
MB14	291484	7435428	15.15
MB15	291704	7435199	28.28
MB16	291545	7435361	19.41
MB17	292261	7435076	36.72

Notes:-

1. Plan adapted from drawings provided by GKI Resort Pty Ltd.
2. Proposed development Precincts as specified by GKI Resort Pty Ltd (October 2010).
3. Test locations are approximate only and are shown with reference to existing and/or proposed site features.
4. Bore locations and elevations as surveyed by Schlencker Surveying Pty Ltd.
5. Coordinate system used is GDA94.

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: GKI Resort Pty Ltd		
OFFICE: Brisbane	DRAWN BY: JT	
SCALE: As shown	DATE: 31 August 2011	

TITLE: **Central Dune Sand Aquifer & Bore Location Plan**
Assessment of Groundwater Resources
Proposed Great Keppel Island Resort Revitalisation Plan

N

PROJECT No:	74586.01
DRAWING No:	8
REVISION:	2

P:\Groundwater Projects\74586.00 Great Keppel Island EIS\Drawings\GW Drawings\Revision 02\Drawing 8 - GW Res Summ Rep.dwg

Appendix A

About this Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

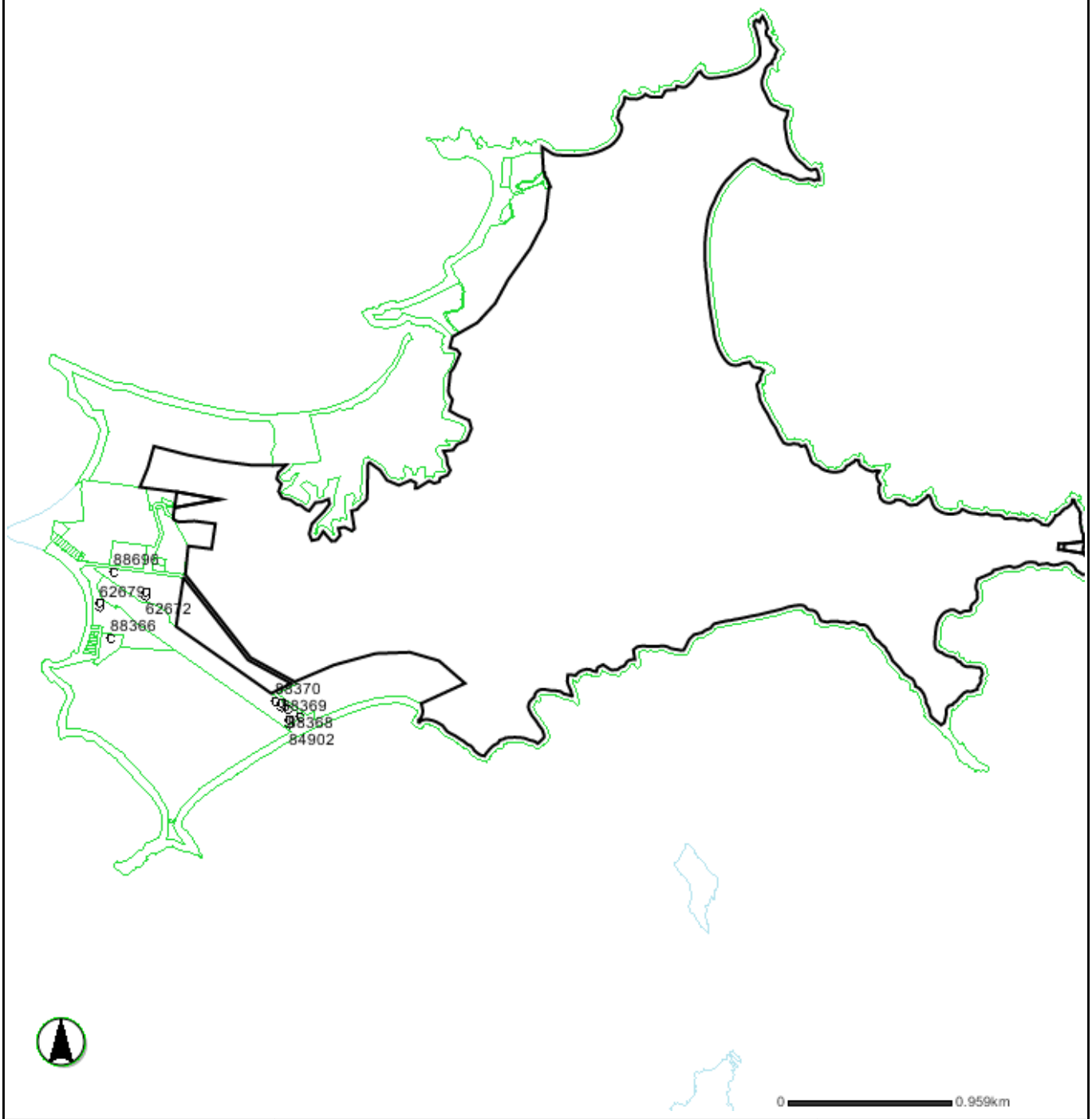
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

DERM Groundwater Database Search



Department of Environment and Resource Management

Map Title: bores on Great Keppel Island

Datum: GDA_1994

Queensland Government

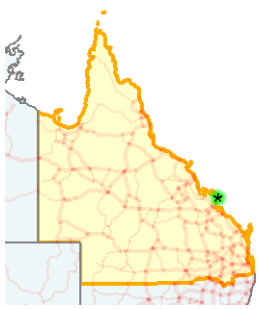
PLAN NUMBER: BLS301

Digital Cadastral Database(DCDB) is current at November 2010.

Positional accuracy of cadastre is between +/- 0.1 metres and +/- 5.0 metres.

Bore locations are obtained from a variety of sources and vary in accuracy. Please refer to the accompanying information.

Produced by the Department of Environment and Resource Management 10/11/2010.



GROUNDWATER DATABASE

DATE 10/11/2010

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 62672

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-10-56	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-25	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	289164	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	2	**NORTHING**	7434813	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2615	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	L2 LN2615	**ACCURACY**	SKET	**PRES EQUIPMENT**	
				GPS ACC			
GIS LAT	-23.182248865	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	ORCHARD BORE - OLO
GIS LNG	150.94022121	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	01/01/1986			**DATA OWNER**	
STATUS	AU	**DRILLERS NAME**	G CUE			**CONFIDENTIAL**	N
ROLES	SM	**DRILL COMPANY**	HILLGROVE DRILLING				
	WS	**METHOD OF CONST.**	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	01/01/1986	1	Polyvinyl Chloride		WT	160	0.00	7.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	4.00	FINE WHITE SAND
2	4.00	4.50	FINE WHITE SAND AND SHELLS
3	4.50	5.50	COARSE WHITE SAND AND SHELLS
4	5.50	6.00	MUDDY COARSE WHITE SAND AND SHELLS
5	6.00	6.50	SANDY SHELL GRIT VERY MUDDY
6	6.50	7.00	YELLOW CLAY

STRATIGRAPHY DETAILS

DNR	1	0.00	7.00	SAND GT. KEPPEL IS.

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 62672

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	0.00	6.50	SAND	09/11/1987	-4.24	N			Y	UC	SAND GT. KEPPEL IS.

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

PIPE	DATE	ELEVATION	PRECISION	DATUM	MEASUREMENT POINT	SURVEY SOURCE
A	01/JAN/86	102.48	EST	ASD	R	
X	01/JAN/86	101.88	EST	ASD	N	

WATER ANALYSIS PART1

****** NO RECORDS FOUND ******

WATER ANALYSIS PART 2

****** NO RECORDS FOUND ******

WATER LEVEL DETAILS

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	09/11/1987	-4.24	R			A	16/11/1987	-4.30	R			A	24/11/1987	-4.30	R		
A	30/11/1987	-4.22	R			A	08/12/1987	-4.25	R			A	14/12/1987	-4.21	R		
A	22/12/1987	-4.30	R			A	29/12/1987	-4.26	R			A	04/01/1988	-4.95	R		
A	11/01/1988	-4.42	R			A	18/01/1988	-4.40	R			A	25/01/1988	-4.36	R		
A	02/02/1988	-4.32	R			A	08/02/1988	-4.25	R			A	15/02/1988	-4.33	R		
A	22/02/1988	-4.32	R			A	29/02/1988	-4.35	R			A	07/03/1988	-3.95	R		
A	14/03/1988	-3.89	R			A	21/03/1988	-3.95	R			A	29/03/1988	-3.96	R		

REG NUMBER 62672

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	05/04/1988	-3.95	R			A	12/04/1988	-3.95	R			A	18/04/1988	-3.85	R		
A	26/04/1988	-3.85	R			A	03/05/1988	-3.55	R			A	09/05/1988	-4.05	R		
A	16/05/1988	-3.65	R			A	23/05/1988	-3.65	R			A	30/05/1988	-3.72	R		
A	06/06/1988	-2.95	R			A	13/06/1988	-2.95	R			A	20/06/1988	-2.98	R		
A	27/06/1988	-3.21	R			A	04/07/1988	-3.25	R			A	11/07/1988	-2.94	R		
A	18/07/1988	-2.99	R			A	25/07/1988	-3.10	R			A	01/08/1988	-3.11	R		
A	08/08/1988	-3.19	R			A	15/08/1988	-3.19	R			A	22/08/1988	-3.24	R		
A	29/08/1988	-3.25	R			A	05/09/1988	-3.26	R			A	12/09/1988	-3.35	R		
A	19/09/1988	-3.15	R			A	26/09/1988	-3.25	R			A	03/10/1988	-4.06	R		
A	10/10/1988	-4.15	R			A	17/10/1988	-3.75	R			A	24/10/1988	-3.87	R		
A	31/10/1988	-3.62	R			A	07/11/1988	-3.55	R			A	14/11/1988	-3.48	R		
A	21/11/1988	-3.47	R			A	28/11/1988	-3.49	R			A	05/12/1988	-3.49	R		
A	12/12/1988	-3.45	R			A	19/12/1988	-3.31	R			A	26/12/1988	-3.30	R		
A	02/01/1989	-3.31	R			A	09/01/1989	-3.31	R			A	16/01/1989	-3.15	R		
A	23/01/1989	-3.15	R			A	30/01/1989	-3.31	R			A	06/02/1989	-3.15	R		
A	13/02/1989	-2.85	R			A	20/02/1989	-2.75	R			A	27/02/1989	-2.85	R		
A	06/03/1989	-2.85	R			A	13/03/1989	-2.80	R			A	20/03/1989	-2.83	R		
A	27/03/1989	-3.22	R			A	03/04/1989	-2.40	R			A	10/04/1989	-2.70	R		
A	17/04/1989	-2.75	R			A	24/04/1989	-1.95	R			A	01/05/1989	-2.45	R		
A	05/06/1989	-1.62	R			A	12/06/1989	-1.62	R			A	19/06/1989	-2.15	R		
A	26/06/1989	-2.41	R			A	03/07/1989	-2.41	R			A	10/07/1989	-2.38	R		
A	17/07/1989	-2.41	R			A	24/07/1989	-2.52	R			A	31/07/1989	-2.46	R		
A	07/08/1989	-2.55	R			A	14/08/1989	-2.60	R			A	21/08/1989	-2.58	R		
A	28/08/1989	-2.65	R			A	04/09/1989	-2.66	R			A	11/09/1989	-2.73	R		
A	18/09/1989	-2.75	R			A	25/09/1989	-2.85	R			A	02/10/1989	-2.67	R		
A	09/10/1989	-2.60	R			A	16/10/1989	-2.54	R			A	23/10/1989	-2.54	R		
A	30/10/1989	-2.54	R			A	06/11/1989	-2.55	R			A	13/11/1989	-2.92	R		
A	20/11/1989	-2.73	R			A	27/11/1989	-2.71	R			A	04/12/1989	-2.75	R		
A	11/12/1989	-2.72	R			A	18/12/1989	-2.93	R			A	01/01/1990	-3.04	R		
A	08/01/1990	-3.16	R			A	15/01/1990	-3.35	R			A	22/01/1990	-3.40	R		
A	29/01/1990	-2.93	R			A	05/02/1990	-2.90	R			A	12/02/1990	-3.17	R		
A	19/02/1990	-3.04	R			A	26/02/1990	-3.15	R			A	05/03/1990	-2.96	R		
A	12/03/1990	-2.83	R			A	19/03/1990	-2.80	R			A	26/03/1990	-2.90	R		

REG NUMBER 62672

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	02/04/1990	-1.53	R			A	09/04/1990	-1.25	R			A	16/04/1990	-1.37	R		
A	23/04/1990	-1.44	R			A	30/04/1990	-1.55	R			A	07/05/1990	-1.65	R		
A	14/05/1990	-1.74	R			A	21/05/1990	-1.85	R			A	28/05/1990	-1.52	R		
A	04/06/1990	-1.64	R			A	11/06/1990	-1.56	R			A	18/06/1990	-1.66	R		
A	25/06/1990	-1.74	R			A	02/07/1990	-1.81	R			A	09/07/1990	-1.67	R		
A	16/07/1990	-1.65	R			A	23/07/1990	-1.65	R			A	30/07/1990	-1.65	R		
A	06/08/1990	-1.83	R			A	13/08/1990	-1.85	R			A	20/08/1990	-1.86	R		
A	27/08/1990	-1.81	R			A	03/09/1990	-1.77	R			A	10/09/1990	-1.77	R		
A	17/09/1990	-1.77	R			A	24/09/1990	-1.82	R			A	01/10/1990	-1.85	R		
A	08/10/1990	-2.05	R			A	15/10/1990	-2.14	R			A	22/10/1990	-2.26	R		
A	29/10/1990	-2.08	R			A	05/11/1990	-2.03	R			A	19/11/1990	-2.39	R		
A	26/11/1990	-2.53	R			A	03/12/1990	-2.58	R			A	10/12/1990	-2.54	R		
A	17/12/1990	-2.36	R			A	24/12/1990	-2.34	R			A	31/12/1990	-1.45	R		
A	07/01/1991	-1.24	R			A	14/01/1991	-1.45	R			A	21/01/1991	-1.59	R		
A	28/01/1991	-1.59	R			A	04/02/1991	-1.37	R			A	11/02/1991	-1.15	R		
A	18/02/1991	-1.23	R			A	25/02/1991	-1.46	R			A	04/03/1991	-1.61	R		
A	11/03/1991	-1.71	R			A	18/03/1991	-1.83	R			A	25/03/1991	-2.13	R		
A	01/04/1991	-2.05	R			A	08/04/1991	-2.11	R			A	15/04/1991	-2.15	R		
A	22/04/1991	-2.21	R			A	29/04/1991	-2.28	R			A	06/05/1991	-2.33	R		
A	13/05/1991	-2.32	R			A	20/05/1991	-2.23	R			A	27/05/1991	-2.05	R		
A	01/06/1991	-2.07	R			A	10/06/1991	-1.97	R			A	17/06/1991	-2.20	R		
A	24/06/1991	-2.22	R			A	01/07/1991	-2.12	R			A	08/07/1991	-2.11	R		
A	15/07/1991	-2.07	R			A	21/07/1991	-2.07	R			A	29/07/1991	-2.37	R		
A	05/08/1991	-2.41	R			A	12/08/1991	-2.52	R			A	19/08/1991	-2.53	R		
A	26/08/1991	-2.59	R			A	02/09/1991	-2.67	R			A	09/09/1991	-2.53	R		
A	16/09/1991	-2.50	R			A	23/09/1991	-2.49	R			A	30/09/1991	-2.49	R		
A	07/10/1991	-2.51	R			A	14/10/1991	-2.51	R			A	21/10/1991	-2.53	R		
A	28/10/1991	-2.53	R			A	11/11/1991	-2.89	R			A	18/11/1991	-2.95	R		
A	25/11/1991	-3.02	R			A	02/12/1991	-3.15	R			A	09/12/1991	-2.93	R		
A	16/12/1991	-2.61	R			A	23/12/1991	-2.50	R			A	30/12/1991	-2.50	R		
A	06/01/1992	-2.50	R			A	13/01/1992	-2.62	R			A	20/01/1992	-2.67	R		
A	27/01/1992	-2.92	R			A	03/02/1992	-2.91	R			A	10/02/1992	-2.90	R		
A	17/02/1992	-2.43	R			A	24/02/1992	-2.34	R			A	02/03/1992	-1.84	R		

REG NUMBER 62672

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	09/03/1992	-1.86	R			A	17/03/1992	-1.65	R			A	24/03/1992	-1.54	R		
A	30/03/1992	-1.60	R			A	06/04/1992	-1.27	R			A	13/04/1992	-1.48	R		
A	20/04/1992	-1.55	R			A	27/04/1992	-1.65	R			A	04/05/1992	-1.71	R		
A	11/05/1992	-1.75	R			A	18/05/1992	-1.50	R			A	25/05/1992	-1.63	R		
A	01/06/1992	-1.71	R			A	08/06/1992	-1.77	R			A	15/06/1992	-1.81	R		
A	22/06/1992	-1.87	R			A	29/06/1992	-1.87	R			A	06/07/1992	-1.95	R		
A	13/07/1992	-1.93	R			A	20/07/1992	-1.94	R			A	27/07/1992	-1.94	R		
A	03/08/1992	-2.02	R			A	10/08/1992	-2.05	R			A	17/08/1992	-2.05	R		
A	24/08/1992	-2.20	R			A	31/08/1992	-2.32	R			A	07/09/1992	-2.40	R		
A	14/09/1992	-2.53	R			A	21/09/1992	-2.62	R			A	28/09/1992	-2.72	R		
A	05/10/1992	-2.63	R			A	12/10/1992	-2.49	R			A	19/10/1992	-2.55	R		
A	26/10/1992	-2.75	R			A	02/11/1992	-2.79	R			A	09/11/1992	-2.70	R		
A	16/11/1992	-2.65	R			A	23/11/1992	-2.67	R			A	30/11/1992	-2.67	R		
A	07/12/1992	-2.75	R			A	21/12/1992	-2.65	R			A	28/12/1992	-2.65	R		
A	04/01/1993	-2.91	R			A	11/01/1993	-1.85	R			A	18/01/1993	-2.45	R		
A	25/01/1993	-2.52	R			A	01/02/1993	-2.43	R			A	08/02/1993	-2.51	R		
A	15/02/1993	-2.43	R			A	22/02/1993	-2.74	R			A	01/03/1993	-2.55	R		
A	08/03/1993	-2.69	R			A	15/03/1993	-2.67	R			A	22/03/1993	-2.65	R		
A	29/03/1993	-2.65	R			A	05/04/1993	-2.73	R			A	12/04/1993	-2.70	R		
A	19/04/1993	-2.75	R			A	26/04/1993	-2.67	R			A	03/05/1993	-2.70	R		
A	10/05/1993	-2.75	R			A	17/05/1993	-2.72	R			A	24/05/1993	-2.66	R		
A	31/05/1993	-2.68	R			A	07/06/1993	-2.68	R			A	14/06/1993	-2.69	R		
A	28/06/1993	-2.87	R			A	05/07/1993	-2.83	R			A	13/07/1993	-2.95	R		
A	19/07/1993	-3.02	R			A	26/07/1993	-2.90	R			A	02/08/1993	-2.90	R		
A	09/08/1993	-2.90	R			A	16/08/1993	-2.90	R			A	23/08/1993	-3.09	R		
A	30/08/1993	-3.09	R			A	06/09/1993	-3.05	R			A	13/09/1993	-3.00	R		
A	20/09/1993	-3.00	R			A	27/09/1993	-3.00	R			A	11/10/1993	-2.95	R		
A	18/10/1993	-2.95	R			A	25/10/1993	-3.35	R			A	01/11/1993	-3.16	R		
A	08/11/1993	-3.20	R			A	15/11/1993	-3.15	R			A	22/11/1993	-3.40	R		
A	29/11/1993	-3.20	R			A	03/12/1993	-3.20	R			A	13/12/1993	-3.34	R		
A	20/12/1993	-3.38	R			A	27/12/1993	-3.40	R			A	03/01/1994	-3.45	R		
A	10/01/1994	-3.65	R			A	17/01/1994	-3.65	R			A	24/01/1994	-3.60	R		
A	31/01/1994	-3.43	R			A	08/02/1994	-3.05	R			A	14/02/1994	-3.03	R		

REG NUMBER 62672

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	21/02/1994	-3.05	R			A	28/02/1994	-3.05	R			A	07/03/1994	-3.05	R		
A	14/03/1994	-3.15	R			A	21/03/1994	-3.00	R			A	28/03/1994	-3.00	R		
A	04/04/1994	-3.00	R			A	11/04/1994	-3.00	R			A	18/04/1994	-3.05	R		
A	25/04/1994	-3.10	R			A	02/05/1994	-3.05	R			A	09/05/1994	-3.10	R		
A	30/05/1994	-3.10	R			A	27/06/1994	-3.10	R			A	04/07/1994	-3.10	R		
A	01/08/1994	-3.20	R			A	08/08/1994	-3.40	R			A	15/08/1994	-3.40	R		
A	22/08/1994	-3.50	R			A	29/08/1994	-3.40	R			A	05/09/1994	-3.50	R		
A	12/09/1994	-3.60	R			A	19/09/1994	-3.70	R			A	26/09/1994	-3.60	R		
A	03/10/1994	-3.60	R			A	10/10/1994	-3.50	R			A	14/11/1994	-3.50	R		
A	21/11/1994	-3.55	R			A	28/11/1994	-3.70	R			A	05/12/1994	-3.70	R		
A	12/12/1994	-3.60	R			A	01/01/1995	-3.60	R			A	16/01/1995	-3.60	R		
A	23/01/1995	-3.50	R			A	30/01/1995	-3.50	R			A	06/02/1995	-3.50	R		
A	14/02/1995	-3.15	R			A	28/02/1995	-3.35	R			A	14/03/1995	-3.33	R		
A	28/03/1995	-3.49	R			A	04/04/1995	-3.65	R			A	11/04/1995	-3.55	R		
A	18/04/1995	-3.54	R			A	25/04/1995	-3.51	R			A	02/05/1995	-3.54	R		
A	16/05/1995	-3.45	R			A	23/05/1995	-3.46	R			A	30/05/1995	-3.41	R		
A	06/06/1995	-3.25	R			A	13/06/1995	-3.24	R			A	20/06/1995	-3.25	R		
A	27/06/1995	-3.25	R			A	04/07/1995	-3.32	R			A	11/07/1995	-3.28	R		
A	18/07/1995	-3.25	R			A	25/07/1995	-3.29	R			A	01/08/1995	-3.51	R		
A	08/08/1995	-3.58	R			A	15/08/1995	-3.63	R			A	22/08/1995	-3.58	R		
A	29/08/1995	-3.62	R			A	05/09/1995	-3.66	R			A	12/09/1995	-3.53	R		
A	19/09/1995	-3.51	R			A	26/09/1995	-3.50	R			A	03/10/1995	-3.49	R		
A	10/10/1995	-3.50	R			A	17/10/1995	-3.51	R			A	24/10/1995	-3.54	R		
A	31/10/1995	-3.46	R			A	07/11/1995	-3.48	R			A	14/11/1995	-3.51	R		
A	21/11/1995	-3.54	R			A	28/11/1995	-3.69	R			A	06/12/1995	-3.58	R		
A	12/12/1995	-3.50	R			A	19/12/1995	-3.50	R			A	26/12/1995	-3.51	R		
A	02/01/1996	-3.61	R			A	09/01/1996	-3.27	R			A	16/01/1996	-3.06	R		
A	23/01/1996	-3.12	R			A	30/01/1996	-3.11	R			A	06/02/1996	-3.20	R		
A	13/02/1996	-3.33	R			A	20/02/1996	-3.50	R			A	27/02/1996	-3.40	R		
A	12/03/1996	-3.41	R			A	19/03/1996	-3.44	R			A	26/03/1996	-3.48	R		
A	02/04/1996	-3.51	R			A	09/04/1996	-3.52	R			A	16/04/1996	-3.52	R		
A	23/04/1996	-3.50	R			A	30/04/1996	-3.32	R			A	07/05/1996	-2.81	R		
A	14/05/1996	-2.86	R			A	21/05/1996	-2.96	R			A	28/05/1996	-3.01	R		

REG NUMBER 62672

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	04/06/1996	-3.08	R			A	11/06/1996	-3.11	R			A	18/06/1996	-3.11	R		
A	25/06/1996	-3.16	R			A	02/07/1996	-3.20	R			A	09/07/1996	-3.20	R		
A	16/07/1996	-3.26	R			A	23/07/1996	-3.26	R			A	31/07/1996	-3.31	R		
A	07/08/1996	-3.34	R			A	15/08/1996	-3.35	R			A	21/08/1996	-3.37	R		
A	28/08/1996	-3.37	R			A	04/09/1996	-3.40	R			A	12/09/1996	-3.43	R		
A	21/09/1996	-3.38	R			A	28/09/1996	-3.38	R			A	05/10/1996	-3.39	R		
A	12/10/1996	-3.43	R			A	19/10/1996	-3.47	R			A	26/10/1996	-3.89	R		
A	17/11/1996	-3.74	R			A	24/11/1996	-3.74	R			A	01/12/1996	-3.76	R		
A	08/12/1996	-3.79	R			A	14/12/1996	-3.69	R			A	21/12/1996	-3.71	R		
A	29/12/1996	-3.77	R			A	04/01/1997	-3.77	R			A	13/01/1997	-4.00	R		
A	19/01/1997	-4.09	R			A	27/01/1997	-4.14	R			A	02/02/1997	-4.07	R		
A	10/02/1997	-3.99	R			A	16/02/1997	-4.00	R			A	23/02/1997	-3.98	R		
A	02/03/1997	-3.96	R			A	09/03/1997	-4.07	R			A	16/03/1997	-4.13	R		
A	23/03/1997	-4.25	R			A	02/04/1997	-4.21	R			A	06/04/1997	-4.08	R		
A	13/04/1997	-4.02	R			A	20/04/1997	-4.00	R			A	27/04/1997	-3.99	R		
A	04/05/1997	-4.00	R			A	11/05/1997	-3.99	R			A	18/05/1997	-3.89	R		
A	25/05/1997	-3.83	R			A	01/06/1997	-3.84	R			A	08/06/1997	-4.03	R		
A	15/06/1997	-4.09	R			A	22/06/1997	-4.16	R			A	30/06/1997	-4.12	R		
A	06/07/1997	-4.01	R			A	13/07/1997	-4.00	R			A	20/07/1997	-3.97	R		
A	27/07/1997	-3.97	R			A	03/08/1997	-4.01	R			A	10/08/1997	-4.12	R		
A	17/08/1997	-4.19	R			A	24/08/1997	-4.27	R			A	31/08/1997	-4.36	R		
A	07/09/1997	-4.18	R			A	14/09/1997	-4.13	R			A	21/09/1997	-4.12	R		
A	28/09/1997	-4.07	R			A	05/10/1997	-4.06	R			A	12/10/1997	-4.07	R		
A	19/10/1997	-4.07	R			A	26/10/1997	-4.09	R			A	02/11/1997	-4.07	R		
A	09/11/1997	-4.07	R			A	16/11/1997	-4.12	R			A	23/11/1997	-4.07	R		
A	30/11/1997	-4.07	R			A	06/12/1997	-4.10	R			A	14/12/1997	-4.12	R		
A	21/12/1997	-4.07	R			A	28/12/1997	-4.07	R			A	04/01/1998	-4.07	R		
A	11/01/1998	-4.07	R			A	18/01/1998	-4.13	R			A	25/01/1998	-4.00	R		
A	01/02/1998	-3.97	R			A	08/02/1998	-3.97	R			A	15/02/1998	-3.91	R		
A	22/02/1998	-3.92	R			A	01/03/1998	-3.97	R			A	08/03/1998	-4.17	R		
A	15/03/1998	-4.11	R			A	22/03/1998	-4.27	R			A	29/03/1998	-4.37	R		
A	07/04/1998	-4.14	R			A	12/04/1998	-4.13	R			A	19/04/1998	-4.22	R		
A	25/04/1998	-4.17	R			A	03/05/1998	-3.86	R			A	10/05/1998	-3.81	R		

REG NUMBER 62672

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	17/05/1998	-3.79	R			A	24/05/1998	-3.82	R			A	31/05/1998	-3.87	R		
A	07/06/1998	-3.84	R			A	14/06/1998	-3.73	R			A	21/06/1998	-3.73	R		
A	28/06/1998	-3.75	R			A	05/07/1998	-3.73	R			A	19/07/1998	-3.65	R		
A	26/07/1998	-3.80	R			A	02/08/1998	-3.87	R			A	09/08/1998	-3.80	R		
A	16/08/1998	-3.80	R			A	23/08/1998	-3.81	R			A	30/08/1998	-3.82	R		
A	06/09/1998	-3.63	R			A	12/09/1998	-3.57	R			A	20/09/1998	-3.52	R		
A	27/09/1998	-3.52	R			A	04/10/1998	-3.56	R			A	11/10/1998	-3.50	R		
A	19/10/1998	-3.84	R			A	25/10/1998	-3.92	R			A	01/11/1998	-3.85	R		
A	08/11/1998	-3.70	R			A	15/11/1998	-3.65	R			A	29/11/1998	-3.63	R		
A	06/12/1998	-3.86	R			A	13/12/1998	-3.89	R			A	20/12/1998	-4.00	R		
A	03/01/1999	-3.77	R			A	10/01/1999	-3.76	R			A	17/01/1999	-3.74	R		
A	24/01/1999	-3.70	R			A	07/02/1999	-3.76	R			A	14/02/1999	-3.85	R		
A	21/02/1999	-3.78	R			A	28/02/1999	-3.73	R			A	07/03/1999	-3.65	R		
A	15/03/1999	-3.60	R			A	21/03/1999	-3.65	R			A	29/03/1999	-3.53	R		
A	15/04/1999	-3.67	R			A	18/04/1999	-3.78	R			A	25/04/1999	-3.94	R		
A	02/05/1999	-3.96	R			A	09/05/1999	-3.98	R			A	16/05/1999	-3.99	R		
A	23/05/1999	-3.98	R			A	30/05/1999	-3.95	R			A	06/06/1999	-3.97	R		
A	13/06/1999	-3.97	R			A	20/06/1999	-3.95	R			A	27/06/1999	-3.96	R		
A	04/07/1999	-3.83	R			A	11/07/1999	-3.77	R			A	18/07/1999	-3.78	R		
A	25/07/1999	-3.81	R			A	01/08/1999	-3.83	R			A	08/08/1999	-3.40	R		
A	15/08/1999	-3.46	R			A	22/08/1999	-3.72	R			A	29/08/1999	-3.67	R		
A	05/09/1999	-4.04	R			A	12/09/1999	-3.86	R			A	26/09/1999	-4.10	R		
A	03/10/1999	-3.87	R			A	10/10/1999	-3.89	R			A	24/10/1999	-4.14	R		
A	31/10/1999	-3.94	R			A	07/11/1999	-3.95	R			A	14/11/1999	-3.98	R		
A	21/11/1999	-4.22	R			A	28/11/1999	-4.09	R			A	05/12/1999	-4.28	R		
A	12/12/1999	-4.10	R			A	19/12/1999	-3.99	R			A	26/12/1999	-3.02	R		
A	02/01/2000	-3.67	R			A	09/01/2000	-3.74	R			A	16/01/2000	-3.80	R		
A	23/01/2000	-3.87	R			A	30/01/2000	-3.77	R			A	05/02/2000	-3.82	R		
A	12/02/2000	-3.83	R			A	19/02/2000	-3.74	R			A	26/02/2000	-3.22	R		
A	05/03/2000	-3.67	R			A	11/03/2000	-3.77	R			A	19/03/2000	-3.78	R		
A	26/03/2000	-3.82	R			A	02/04/2000	-3.84	R			A	09/04/2000	-3.86	R		
A	23/04/2000	-3.87	R			A	30/04/2000	-3.70	R			A	07/05/2000	-3.59	R		
A	14/05/2000	-3.61	R			A	21/05/2000	-3.65	R			A	28/05/2000	-3.71	R		

REG NUMBER 62672

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	04/06/2000	-3.77	R			A	11/06/2000	-3.79	R			A	18/06/2000	-3.77	R		
A	25/06/2000	-3.80	R			A	02/07/2000	-3.84	R			A	09/07/2000	-3.85	R		
A	16/07/2000	-3.86	R			A	23/07/2000	-3.88	R			A	30/07/2000	-3.90	R		
A	06/08/2000	-3.91	R			A	13/08/2000	-3.91	R			A	20/08/2000	-3.93	R		
A	27/08/2000	-3.96	R			A	03/09/2000	-3.98	R			A	10/09/2000	-3.99	R		
A	17/09/2000	-4.01	R			A	01/10/2000	-4.10	R			A	08/10/2000	-4.11	R		
A	15/10/2000	-4.15	R			A	22/10/2000	-4.15	R			A	29/10/2000	-4.12	R		
A	05/11/2000	-3.70	R			A	12/11/2000	-3.70	R			A	19/11/2000	-3.70	R		
A	26/11/2000	-3.70	R			A	03/12/2000	-3.84	R			A	11/12/2000	-3.94	R		
A	18/12/2000	-3.92	R			A	24/12/2000	-3.95	R			A	31/12/2000	-3.74	R		
A	07/01/2001	-3.67	R			A	14/01/2001	-3.68	R			A	21/01/2001	-3.79	R		
A	28/01/2001	-3.86	R			A	04/02/2001	-3.79	R			A	11/02/2001	-3.82	R		
A	18/02/2001	-3.24	R			A	25/02/2001	-3.89	R			A	04/03/2001	-3.92	R		
A	11/03/2001	-3.94	R			A	18/03/2001	-3.95	R			A	25/03/2001	-3.97	R		
A	01/04/2001	-4.01	R			A	08/04/2001	-4.01	R			A	15/04/2001	-4.01	R		
A	22/04/2001	-4.02	R			A	29/04/2001	-4.06	R			A	06/05/2001	-4.09	R		
A	13/05/2001	-4.09	R			A	20/05/2001	-4.11	R			A	27/05/2001	-4.12	R		
A	03/06/2001	-4.14	R			A	10/06/2001	-4.13	R			A	17/06/2001	-4.13	R		
A	24/06/2001	-4.15	R			A	01/07/2001	-4.15	R			A	08/07/2001	-4.17	R		
A	15/07/2001	-4.17	R			A	22/07/2001	-4.18	R			A	29/07/2001	-4.18	R		
A	05/08/2001	-4.18	R			A	12/08/2001	-4.22	R			A	19/08/2001	-4.13	R		
A	26/08/2001	-4.22	R			A	02/09/2001	-4.25	R			A	09/09/2001	-4.24	R		
A	16/09/2001	-4.27	R			A	23/09/2001	-4.27	R			A	30/09/2001	-4.18	R		
A	07/10/2001	-4.22	R			A	14/10/2001	-4.13	R			A	21/10/2001	-4.27	R		
A	28/10/2001	-4.33	R			A	04/11/2001	-4.33	R			A	11/11/2001	-4.33	R		
A	18/11/2001	-4.33	R			A	25/11/2001	-4.33	R			A	02/12/2001	-4.32	R		
A	09/12/2001	-4.32	R			A	16/12/2001	-4.33	R			A	23/12/2001	-4.32	R		
A	30/12/2001	-4.29	R			A	06/01/2002	-4.29	R			A	13/01/2002	-4.30	R		
A	20/01/2002	-4.30	R			A	27/01/2002	-4.30	R			A	03/02/2002	-4.31	R		
A	10/02/2002	-4.04	R			A	17/02/2002	-4.04	R			A	24/02/2002	-4.04	R		
A	03/03/2002	-4.03	R			A	10/03/2002	-4.13	R			A	17/03/2002	-4.03	R		
A	24/03/2002	-4.02	R			A	31/03/2002	-4.12	R			A	07/04/2002	-4.14	R		
A	14/04/2002	-4.20	R			A	21/04/2002	-4.25	R			A	28/04/2002	-4.39	R		

REG NUMBER 62672

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	05/05/2002	-4.30	R			A	12/05/2002	-4.24	R			A	19/05/2002	-4.27	R		
A	26/05/2002	-4.27	R			A	02/06/2002	-4.27	R			A	09/06/2002	-3.72	R		
A	16/06/2002	-3.73	R			A	23/06/2002	-3.73	R			A	30/06/2002	-3.77	R		
A	07/07/2002	-3.86	R			A	14/07/2002	-3.87	R								

WIRE LINE LOG DETAILS

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 12/09/2000	Y 28/06/1991	Y 12/09/2000	Y 12/09/2000	Y 28/06/1991	Y 28/06/1991	Y 28/06/1991	Y 28/06/1991

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 28/06/1991		Y 28/06/1991		Y 28/06/1991			

GENERAL NOTES

****** NO RECORDS FOUND ******

REG NUMBER 62679

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-10-58	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-15	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	288890	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	8	**NORTHING**	7434740	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2832	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	L8 LN2703	**ACCURACY**	SKET	**PRES EQUIPMENT**	
				GPS ACC			
GIS LAT	-23.182870876	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	PLAYGROUND BORE
GIS LNG	150.937544048	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**				**DATA OWNER**	
STATUS	AU	**DRILLERS NAME**	G CUE			**CONFIDENTIAL**	N
ROLES	SM	**DRILL COMPANY**					
	WS	**METHOD OF CONST.**	HAND AUGER				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	01/01/1983	1	Polyvinyl Chloride		WT	100	0.00	6.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	6.00	FINE DUNE SAND
2			CALCAREOUS SHELL LAYERS AT 3 & 4.5M

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	6.00	SAND GT. KEPPEL IS.

AQUIFER DETAILS

REG NUMBER 62679

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	0.00	6.00	SAND	02/01/1984	-0.74	N			Y	UC	SAND GT. KEPPEL IS.

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

PIPE	DATE	ELEVATION	PRECISION	DATUM	MEASUREMENT POINT	SURVEY SOURCE
A	01/JAN/77	99.38	EST	ASD	R	
X	01/JAN/77	99.38	EST	ASD	N	

WATER ANALYSIS PART1

****** NO RECORDS FOUND ******

WATER ANALYSIS PART 2

****** NO RECORDS FOUND ******

WATER LEVEL DETAILS

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	02/01/1984	-0.74	R			A	10/01/1984	-0.55	R			A	17/01/1984	-0.25	R		
A	24/01/1984	-0.28	R			A	31/01/1984	-0.03	R			A	07/02/1984	-0.10	R		
A	14/02/1984	-0.17	R			A	21/02/1984	-0.22	R			A	06/03/1984	-0.07	R		
A	17/03/1984	-0.13	R			A	20/03/1984	-0.14	R			A	27/03/1984	-0.20	R		
A	03/04/1984	-0.49	R			A	11/04/1984	-0.43	R			A	17/04/1984	-0.51	R		
A	01/05/1984	-0.81	R			A	08/05/1984	-0.59	R			A	15/05/1984	-0.59	R		
A	22/05/1984	-0.80	R			A	29/05/1984	-0.98	R			A	05/06/1984	-0.80	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	12/06/1984	-0.89	R			A	19/06/1984	-0.57	R			A	27/06/1984	-0.92	R		
A	04/07/1984	-0.92	R			A	10/07/1984	-0.95	R			A	17/07/1984	-0.92	R		
A	24/07/1984	-0.91	R			A	31/07/1984	-0.74	R			A	07/08/1984	-0.74	R		
A	21/08/1984	-0.77	R			A	28/08/1984	-0.97	R			A	04/09/1984	-0.94	R		
A	11/09/1984	-1.04	R			A	18/09/1984	-1.01	R			A	25/09/1984	-1.07	R		
A	01/10/1984	-1.04	R			A	09/10/1984	-1.12	R			A	16/10/1984	-1.09	R		
A	24/10/1984	-1.19	R			A	30/10/1984	-0.91	R			A	06/11/1984	-1.06	R		
A	13/11/1984	-1.07	R			A	20/11/1984	-1.07	R			A	03/12/1984	-1.19	R		
A	08/02/1985	-1.13	R			A	21/03/1985	-0.59	R			A	07/04/1985	-0.76	R		
A	27/06/1985	-0.80	R			A	16/10/1985	-0.97	R			A	06/01/1986	-1.35	R		
A	13/01/1986	-1.37	R			A	20/01/1986	-1.37	R			A	27/01/1986	-1.40	R		
A	03/02/1986	-1.37	R			A	10/02/1986	-1.17	R			A	17/02/1986	-1.32	R		
A	24/02/1986	-1.35	R			A	03/03/1986	-1.37	R			A	09/03/1986	-1.37	R		
A	17/03/1986	-1.42	R			A	24/03/1986	-1.22	R			A	31/03/1986	-1.30	R		
A	06/04/1986	-1.35	R			A	14/04/1986	-1.37	R			A	21/04/1986	-1.27	R		
A	28/04/1986	-1.19	R			A	05/05/1986	-0.94	R			A	12/05/1986	-0.91	R		
A	19/05/1986	-1.01	R			A	26/05/1986	-1.07	R			A	03/06/1986	-1.07	R		
A	09/06/1986	-0.94	R			A	16/06/1986	-0.91	R			A	23/06/1986	-1.03	R		
A	30/06/1986	-1.30	R			A	07/07/1986	-1.30	R			A	14/07/1986	-1.30	R		
A	21/07/1986	-1.37	R			A	28/07/1986	-1.40	R			A	04/08/1986	-1.40	R		
A	11/08/1986	-1.35	R			A	18/08/1986	-1.24	R			A	25/08/1986	-1.32	R		
A	01/09/1986	-1.32	R			A	08/09/1986	-1.37	R			A	15/09/1986	-1.40	R		
A	22/09/1986	-1.40	R			A	29/09/1986	-1.30	R			A	06/10/1986	-1.55	R		
A	13/10/1986	-1.65	R			A	20/10/1986	-1.70	R			A	27/10/1986	-1.65	R		
A	03/11/1986	-1.62	R			A	10/11/1986	-1.60	R			A	17/11/1986	-1.62	R		
A	24/11/1986	-1.70	R			A	01/12/1986	-1.62	R			A	08/12/1986	-1.47	R		
A	15/12/1986	-1.52	R			A	22/12/1986	-1.55	R			A	29/12/1986	-1.60	R		
A	05/01/1987	-1.70	R			A	12/01/1987	-1.62	R			A	19/01/1987	-1.62	R		
A	26/01/1987	-1.45	R			A	02/02/1987	-1.57	R			A	09/02/1987	-1.14	R		
A	16/02/1987	-1.68	R			A	23/02/1987	-1.68	R			A	02/03/1987	-1.65	R		
A	09/03/1987	-1.65	R			A	16/03/1987	-1.78	R			A	23/03/1987	-1.78	R		
A	30/03/1987	-1.78	R			A	06/04/1987	-1.73	R			A	13/04/1987	-1.58	R		
A	20/04/1987	-1.58	R			A	02/05/1987	-1.57	R			A	11/05/1987	-1.65	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	19/05/1987	-1.65	R			A	25/05/1987	-1.65	R			A	01/06/1987	-1.65	R		
A	08/06/1987	-1.68	R			A	15/06/1987	-1.71	R			A	22/06/1987	-1.71	R		
A	27/06/1987	-1.73	R			A	06/07/1987	-1.73	R			A	13/07/1987	-1.73	R		
A	20/07/1987	-1.74	R			A	27/07/1987	-1.73	R			A	03/08/1987	-1.64	R		
A	10/08/1987	-1.66	R			A	24/08/1987	-1.52	R			A	31/08/1987	-1.47	R		
A	08/09/1987	-1.44	R			A	14/09/1987	-1.57	R			A	21/09/1987	-1.55	R		
A	28/09/1987	-1.55	R			A	12/10/1987	-1.55	R			A	19/10/1987	-1.83	R		
A	26/10/1987	-1.88	R			A	02/11/1987	-1.60	R			A	09/11/1987	-1.70	R		
A	16/11/1987	-1.82	R			A	24/11/1987	-1.74	R			A	30/11/1987	-1.80	R		
A	08/12/1987	-1.88	R			A	14/12/1987	-1.90	R			A	22/12/1987	-1.94	R		
A	29/12/1987	-1.55	R			A	04/01/1988	-1.88	R			A	11/01/1988	-1.70	R		
A	18/01/1988	-1.75	R			A	25/01/1988	-1.75	R			A	02/02/1988	-1.55	R		
A	08/02/1988	-1.33	R			A	15/02/1988	-1.70	R			A	22/02/1988	-1.72	R		
A	29/02/1988	-1.85	R			A	07/03/1988	-1.34	R			A	14/03/1988	-1.36	R		
A	21/03/1988	-1.36	R			A	29/03/1988	-1.22	R			A	05/04/1988	-1.40	R		
A	12/04/1988	-1.40	R			A	18/04/1988	-1.20	R			A	26/04/1988	-1.22	R		
A	03/05/1988	-1.00	R			A	09/05/1988	-1.09	R			A	16/05/1988	-1.15	R		
A	23/05/1988	-1.15	R			A	30/05/1988	-1.22	R			A	06/06/1988	-1.05	R		
A	13/06/1988	-1.22	R			A	20/06/1988	-1.23	R			A	27/06/1988	-1.24	R		
A	04/07/1988	-1.19	R			A	11/07/1988	-0.93	R			A	18/07/1988	-0.95	R		
A	25/07/1988	-0.96	R			A	01/08/1988	-1.01	R			A	08/08/1988	-1.06	R		
A	15/08/1988	-1.01	R			A	22/08/1988	-1.01	R			A	29/08/1988	-0.89	R		
A	05/09/1988	-0.89	R			A	12/09/1988	-0.88	R			A	19/09/1988	-0.90	R		
A	26/09/1988	-1.12	R			A	03/10/1988	-1.22	R			A	10/10/1988	-1.40	R		
A	17/10/1988	-1.47	R			A	24/10/1988	-1.57	R			A	31/10/1988	-1.40	R		
A	07/11/1988	-1.47	R			A	14/11/1988	-1.47	R			A	21/11/1988	-1.39	R		
A	28/11/1988	-1.32	R			A	05/12/1988	-1.22	R			A	12/12/1988	-1.17	R		
A	19/12/1988	-0.94	R			A	26/12/1988	-0.87	R			A	09/01/1989	-0.84	R		
A	16/01/1989	-0.90	R			A	23/01/1989	-0.79	R			A	30/01/1989	-0.72	R		
A	06/02/1989	-0.74	R			A	13/02/1989	-0.60	R			A	20/02/1989	-0.62	R		
A	27/02/1989	-0.66	R			A	06/03/1989	-0.53	R			A	13/03/1989	-0.39	R		
A	20/03/1989	-0.61	R			A	27/03/1989	-0.59	R			A	03/04/1989	-0.38	R		
A	10/04/1989	-0.35	R			A	17/04/1989	-0.40	R			A	24/04/1989	-0.15	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	01/05/1989	-0.30	R			A	05/06/1989	0.00	R			A	12/06/1989	0.00	R		
A	19/06/1989	0.00	R			A	26/06/1989	-0.07	R			A	03/07/1989	-0.11	R		
A	10/07/1989	-0.05	R			A	17/07/1989	0.00	R			A	24/07/1989	-0.04	R		
A	31/07/1989	-0.10	R			A	07/08/1989	-0.08	R			A	14/08/1989	-0.10	R		
A	21/08/1989	-0.08	R			A	28/08/1989	-0.10	R			A	04/09/1989	-0.10	R		
A	11/09/1989	-0.16	R			A	18/09/1989	-0.15	R			A	25/09/1989	-0.23	R		
A	02/10/1989	-0.24	R			A	09/10/1989	-0.25	R			A	16/10/1989	-0.06	R		
A	23/10/1989	-0.07	R			A	30/10/1989	-0.15	R			A	06/11/1989	-0.15	R		
A	13/11/1989	-0.25	R			A	20/11/1989	-0.05	R			A	27/11/1989	-0.11	R		
A	04/12/1989	-0.14	R			A	11/12/1989	-0.07	R			A	18/12/1989	-0.10	R		
A	25/12/1989	-0.09	R			A	01/01/1990	-0.05	R			A	09/04/1990	0.00	R		
A	16/04/1990	0.00	R			A	23/04/1990	0.00	R			A	30/04/1990	0.00	R		
A	07/05/1990	0.00	R			A	14/05/1990	0.00	R			A	21/05/1990	0.00	R		
A	28/05/1990	0.00	R			A	04/06/1990	0.00	R			A	02/07/1990	0.00	R		
A	09/07/1990	-0.02	R			A	25/03/1991	-0.30	R			A	01/04/1991	-0.29	R		
A	08/04/1991	-0.33	R			A	15/04/1991	-0.30	R			A	22/04/1991	-0.38	R		
A	29/04/1991	-0.40	R			A	06/05/1991	-0.39	R			A	13/05/1991	-0.44	R		
A	20/05/1991	-0.29	R			A	27/05/1991	-0.28	R			A	01/06/1991	-0.32	R		
A	10/06/1991	-0.16	R			A	17/06/1991	-0.44	R			A	24/06/1991	-0.48	R		
A	01/07/1991	-0.45	R			A	08/07/1991	-0.45	R			A	15/07/1991	-0.31	R		
A	21/07/1991	-0.33	R			A	29/07/1991	-0.56	R			A	05/08/1991	-0.65	R		
A	12/08/1991	-0.68	R			A	19/08/1991	-0.64	R			A	26/08/1991	-0.73	R		
A	02/09/1991	-0.78	R			A	09/09/1991	-0.70	R			A	16/09/1991	-0.67	R		
A	23/09/1991	-0.69	R			A	30/09/1991	-0.70	R			A	07/10/1991	-0.68	R		
A	14/10/1991	-0.72	R			A	21/10/1991	-0.78	R			A	28/10/1991	-0.78	R		
A	11/11/1991	-1.04	R			A	18/11/1991	-1.10	R			A	25/11/1991	-1.05	R		
A	02/12/1991	-1.00	R			A	09/12/1991	-0.89	R			A	16/12/1991	-0.74	R		
A	23/12/1991	-0.65	R			A	30/12/1991	-0.70	R			A	06/01/1992	-0.70	R		
A	13/01/1992	-0.80	R			A	20/01/1992	-0.80	R			A	27/01/1992	-0.98	R		
A	03/02/1992	-1.07	R			A	10/02/1992	-0.84	R			A	17/02/1992	-0.58	R		
A	24/02/1992	-0.50	R			A	02/03/1992	-0.22	R			A	09/03/1992	-0.22	R		
A	17/03/1992	0.00	R			A	24/03/1992	0.00	R			A	30/03/1992	0.00	R		
A	06/04/1992	0.00	R			A	27/04/1992	0.00	R			A	04/05/1992	-0.17	R		

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	11/05/1992	-0.19	R			A	18/05/1992	0.00	R			A	25/05/1992	-0.10	R		
A	01/06/1992	-0.22	R			A	08/06/1992	-0.22	R			A	13/07/1992	-0.35	R		
A	20/07/1992	-0.50	R			A	27/07/1992	-0.50	R			A	03/08/1992	-0.45	R		
A	10/08/1992	-0.43	R			A	17/08/1992	-0.60	R			A	24/08/1992	-0.65	R		
A	31/08/1992	-0.65	R			A	28/09/1992	-1.00	R			A	05/10/1992	-0.92	R		
A	12/10/1992	-0.88	R			A	19/10/1992	-1.00	R			A	26/10/1992	-0.93	R		
A	02/11/1992	-0.90	R			A	09/11/1992	-0.95	R			A	16/11/1992	-0.96	R		
A	23/11/1992	-0.92	R			A	30/11/1992	-0.88	R			A	07/12/1992	-0.97	R		
A	21/12/1992	-0.85	R			A	28/12/1992	-0.85	R			A	04/01/1993	-1.10	R		
A	11/01/1993	-0.16	R			A	18/01/1993	-0.52	R			A	25/01/1993	-0.80	R		
A	01/02/1993	-0.70	R			A	08/02/1993	-0.81	R			A	15/02/1993	-0.80	R		
A	22/02/1993	-0.90	R			A	01/03/1993	-0.83	R			A	08/03/1993	-1.00	R		
A	15/03/1993	-0.87	R			A	22/03/1993	-0.92	R			A	29/03/1993	-0.80	R		
A	05/04/1993	-0.97	R			A	12/04/1993	-0.90	R			A	19/04/1993	-0.90	R		
A	26/04/1993	-0.98	R			A	03/05/1993	-0.99	R			A	10/05/1993	-1.00	R		
A	17/05/1993	-1.00	R			A	24/05/1993	-0.90	R			A	31/05/1993	-0.95	R		
A	07/06/1993	-0.80	R			A	14/06/1993	-0.90	R			A	28/06/1993	-0.90	R		
A	05/07/1993	-1.00	R			A	13/07/1993	-1.12	R			A	19/07/1993	-1.30	R		
A	26/07/1993	-1.10	R			A	02/08/1993	-1.10	R			A	09/08/1993	-1.10	R		
A	16/08/1993	-1.18	R			A	23/08/1993	-1.20	R			A	30/08/1993	-1.26	R		
A	06/09/1993	-1.20	R			A	13/09/1993	-1.20	R			A	20/09/1993	-1.20	R		
A	27/09/1993	-1.20	R			A	11/10/1993	-1.20	R			A	18/10/1993	-1.40	R		
A	25/10/1993	-2.00	R			A	01/11/1993	-1.24	R			A	08/11/1993	-1.27	R		
A	15/11/1993	-1.29	R			A	22/11/1993	-1.50	R			A	29/11/1993	-1.40	R		
A	27/12/1993	-1.40	R			A	03/01/1994	-1.54	R			A	10/01/1994	-1.57	R		
A	17/01/1994	-1.58	R			A	24/01/1994	-1.51	R			A	31/01/1994	-1.40	R		
A	08/02/1994	-1.10	R			A	14/02/1994	-1.18	R			A	21/02/1994	-1.20	R		
A	28/02/1994	-1.20	R			A	07/03/1994	-1.20	R			A	14/03/1994	-1.30	R		
A	21/03/1994	-1.20	R			A	28/03/1994	-1.20	R			A	04/04/1994	-1.10	R		
A	11/04/1994	-1.20	R			A	18/04/1994	-1.20	R			A	25/04/1994	-1.30	R		
A	02/05/1994	-1.20	R			A	09/05/1994	-1.20	R			A	30/05/1994	-1.20	R		
A	06/06/1994	-1.30	R			A	27/06/1994	-1.30	R			A	01/08/1994	-1.30	R		
A	08/08/1994	-1.60	R			A	22/08/1994	-1.70	R			A	29/08/1994	-1.50	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	05/09/1994	-1.50	R			A	12/09/1994	-1.70	R			A	19/09/1994	-1.80	R		
A	26/09/1994	-1.70	R			A	03/10/1994	-1.80	R			A	10/10/1994	-1.70	R		
A	24/10/1994	-1.70	R			A	31/10/1994	-1.60	R			A	28/11/1994	-1.60	R		
A	05/12/1994	-1.65	R			A	12/12/1994	-1.65	R			A	19/12/1994	-1.70	R		
A	01/01/1995	-1.70	R			A	09/01/1995	-1.70	R			A	16/01/1995	-1.60	R		
A	14/02/1995	-1.30	R			A	28/02/1995	-1.40	R			A	14/03/1995	-1.41	R		
A	21/03/1995	-1.38	R			A	28/03/1995	-1.59	R			A	04/04/1995	-1.61	R		
A	11/04/1995	-1.56	R			A	18/04/1995	-1.47	R			A	25/04/1995	-1.50	R		
A	02/05/1995	-1.56	R			A	16/05/1995	-1.43	R			A	23/05/1995	-1.53	R		
A	30/05/1995	-1.46	R			A	06/06/1995	-1.34	R			A	13/06/1995	-1.29	R		
A	20/06/1995	-1.31	R			A	27/06/1995	-1.34	R			A	04/07/1995	-1.39	R		
A	11/07/1995	-1.31	R			A	18/07/1995	-1.28	R			A	25/07/1995	-1.41	R		
A	01/08/1995	-1.63	R			A	08/08/1995	-1.64	R			A	15/08/1995	-1.63	R		
A	22/08/1995	-1.63	R			A	29/08/1995	-1.65	R			A	05/09/1995	-1.70	R		
A	12/09/1995	-1.48	R			A	19/09/1995	-1.48	R			A	26/09/1995	-1.49	R		
A	03/10/1995	-1.48	R			A	10/10/1995	-1.47	R			A	17/10/1995	-1.50	R		
A	24/10/1995	-1.49	R			A	31/10/1995	-1.43	R			A	07/11/1995	-1.44	R		
A	14/11/1995	-1.44	R			A	21/11/1995	-1.53	R			A	28/11/1995	-1.69	R		
A	06/12/1995	-1.54	R			A	12/12/1995	-1.51	R			A	19/12/1995	-1.55	R		
A	26/12/1995	-1.56	R			A	02/01/1996	-1.62	R			A	09/01/1996	-1.22	R		
A	16/01/1996	-1.15	R			A	23/01/1996	-1.14	R			A	30/01/1996	-1.18	R		
A	06/02/1996	-1.28	R			A	13/02/1996	-1.50	R			A	20/02/1996	-1.56	R		
A	27/02/1996	-1.38	R			A	12/03/1996	-1.43	R			A	19/03/1996	-1.47	R		
A	26/03/1996	-1.48	R			A	02/04/1996	-1.53	R			A	09/04/1996	-1.49	R		
A	16/04/1996	-1.49	R			A	23/04/1996	-1.42	R			A	30/04/1996	-1.33	R		
A	07/05/1996	-0.89	R			A	14/05/1996	-0.89	R			A	21/05/1996	-1.07	R		
A	28/05/1996	-1.15	R			A	04/06/1996	-1.15	R			A	11/06/1996	-1.20	R		
A	18/06/1996	-1.11	R			A	25/06/1996	-1.21	R			A	02/07/1996	-1.26	R		
A	09/07/1996	-1.26	R			A	16/07/1996	-1.29	R			A	23/07/1996	-1.34	R		
A	31/07/1996	-1.27	R			A	07/08/1996	-1.29	R			A	15/08/1996	-1.34	R		
A	21/08/1996	-1.36	R			A	28/08/1996	-1.38	R			A	04/09/1996	-1.38	R		
A	12/09/1996	-1.42	R			A	21/09/1996	-1.39	R			A	28/09/1996	-1.32	R		
A	05/10/1996	-1.37	R			A	12/10/1996	-1.39	R			A	19/10/1996	-1.38	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	26/10/1996	-1.39	R			A	17/11/1996	-1.47	R			A	24/11/1996	-1.46	R		
A	01/12/1996	-1.49	R			A	08/12/1996	-1.57	R			A	14/12/1996	-1.41	R		
A	21/12/1996	-1.45	R			A	29/12/1996	-1.48	R			A	04/01/1997	-1.53	R		
A	13/01/1997	-1.70	R			A	19/01/1997	-1.80	R			A	27/01/1997	-1.82	R		
A	02/02/1997	-1.73	R			A	10/02/1997	-1.62	R			A	16/02/1997	-1.64	R		
A	23/02/1997	-1.66	R			A	02/03/1997	-1.62	R			A	09/03/1997	-1.74	R		
A	16/03/1997	-1.60	R			A	23/03/1997	-1.61	R			A	02/04/1997	-1.61	R		
A	06/04/1997	-1.59	R			A	13/04/1997	-1.51	R			A	20/04/1997	-1.61	R		
A	27/04/1997	-1.58	R			A	04/05/1997	-1.57	R			A	11/05/1997	-1.51	R		
A	18/05/1997	-1.39	R			A	25/05/1997	-1.43	R			A	01/06/1997	-1.51	R		
A	08/06/1997	-1.72	R			A	15/06/1997	-1.64	R			A	22/06/1997	-1.67	R		
A	30/06/1997	-1.71	R			A	06/07/1997	-1.64	R			A	13/07/1997	-1.56	R		
A	20/07/1997	-1.57	R			A	27/07/1997	-1.51	R			A	03/08/1997	-1.66	R		
A	10/08/1997	-1.72	R			A	17/08/1997	-1.78	R			A	24/08/1997	-1.72	R		
A	31/08/1997	-1.72	R			A	07/09/1997	-1.42	R			A	14/09/1997	-1.42	R		
A	21/09/1997	-1.26	R			A	28/09/1997	-1.26	R			A	05/10/1997	-1.27	R		
A	12/10/1997	-1.27	R			A	19/10/1997	-1.72	R			A	26/10/1997	-1.76	R		
A	02/11/1997	-1.75	R			A	09/11/1997	-1.78	R			A	16/11/1997	-1.72	R		
A	23/11/1997	-1.69	R			A	30/11/1997	-1.74	R			A	06/12/1997	-1.72	R		
A	14/12/1997	-1.72	R			A	21/12/1997	-1.72	R			A	28/12/1997	-1.72	R		
A	04/01/1998	-1.57	R			A	11/01/1998	-1.72	R			A	18/01/1998	-1.62	R		
A	25/01/1998	-1.66	R			A	01/02/1998	-1.62	R			A	08/02/1998	-1.62	R		
A	15/02/1998	-1.65	R			A	22/02/1998	-1.66	R			A	01/03/1998	-1.62	R		
A	08/03/1998	-1.62	R			A	15/03/1998	-1.79	R			A	22/03/1998	-1.90	R		
A	29/03/1998	-1.92	R			A	07/04/1998	-1.96	R			A	12/04/1998	-1.98	R		
A	19/04/1998	-1.78	R			A	25/04/1998	-1.76	R			A	03/05/1998	-1.61	R		
A	10/05/1998	-1.44	R			A	17/05/1998	-1.51	R			A	24/05/1998	-1.52	R		
A	31/05/1998	-1.52	R			A	07/06/1998	-1.54	R			A	14/06/1998	-2.16	R		
A	21/06/1998	-2.14	R			A	28/06/1998	-2.22	R			A	05/07/1998	-2.24	R		
A	19/07/1998	-2.20	R			A	26/07/1998	-2.30	R			A	02/08/1998	-2.50	R		
A	09/08/1998	-2.45	R			A	16/08/1998	-2.54	R			A	23/08/1998	-2.43	R		
A	30/08/1998	-2.45	R			A	06/09/1998	-2.10	R			A	12/09/1998	-2.02	R		
A	20/09/1998	-2.01	R			A	27/09/1998	-2.01	R			A	04/10/1998	-2.02	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	11/10/1998	-2.26	R			A	19/10/1998	-2.30	R			A	25/10/1998	-2.42	R		
A	01/11/1998	-2.25	R			A	08/11/1998	-2.10	R			A	15/11/1998	-2.13	R		
A	29/11/1998	-2.19	R			A	06/12/1998	-2.15	R			A	13/12/1998	-2.26	R		
A	20/12/1998	-2.38	R			A	03/01/1999	-2.20	R			A	10/01/1999	-2.13	R		
A	17/01/1999	-2.18	R			A	24/01/1999	-2.16	R			A	31/01/1999	-2.20	R		
A	07/02/1999	-2.20	R			A	14/02/1999	-2.25	R			A	21/02/1999	-2.24	R		
A	28/02/1999	-2.23	R			A	07/03/1999	-2.07	R			A	15/03/1999	-2.10	R		
A	21/03/1999	-2.05	R			A	29/03/1999	-1.54	R			A	15/04/1999	-1.58	R		
A	18/04/1999	-2.10	R			A	25/04/1999	-2.17	R			A	02/05/1999	-2.20	R		
A	09/05/1999	-2.20	R			A	16/05/1999	-2.29	R			A	23/05/1999	-2.19	R		
A	30/05/1999	-2.18	R			A	06/06/1999	-2.20	R			A	13/06/1999	-2.22	R		
A	20/06/1999	-2.20	R			A	27/06/1999	-2.24	R			A	04/07/1999	-1.97	R		
A	11/07/1999	-2.06	R			A	18/07/1999	-2.03	R			A	25/07/1999	-2.13	R		
A	01/08/1999	-2.11	R			A	08/08/1999	-2.16	R			A	15/08/1999	-2.10	R		
A	22/08/1999	-2.17	R			A	29/08/1999	-2.16	R			A	05/09/1999	-1.56	R		
A	12/09/1999	-1.53	R			A	19/09/1999	-1.62	R			A	26/09/1999	-1.65	R		
A	03/10/1999	-1.58	R			A	10/10/1999	-1.58	R			A	24/10/1999	-1.66	R		
A	31/10/1999	-1.69	R			A	07/11/1999	-1.66	R			A	14/11/1999	-1.95	R		
A	21/11/1999	-2.17	R			A	28/11/1999	-1.96	R			A	05/12/1999	-1.78	R		
A	12/12/1999	-1.76	R			A	19/12/1999	-1.74	R			A	26/12/1999	-1.68	R		
A	02/01/2000	-1.39	R			A	09/01/2000	-1.44	R			A	16/01/2000	-1.50	R		
A	23/01/2000	-1.64	R			A	30/01/2000	-1.47	R			A	05/02/2000	-1.48	R		
A	12/02/2000	-1.48	R			A	19/02/2000	-1.28	R			A	26/02/2000	-0.51	R		
A	05/03/2000	-1.37	R			A	11/03/2000	-1.42	R			A	19/03/2000	-1.44	R		
A	26/03/2000	-1.49	R			A	02/04/2000	-1.54	R			A	09/04/2000	-1.51	R		
A	23/04/2000	-1.47	R			A	30/04/2000	-1.28	R			A	07/05/2000	-1.20	R		
A	14/05/2000	-1.33	R			A	21/05/2000	-1.42	R			A	28/05/2000	-1.45	R		
A	04/06/2000	-1.46	R			A	11/06/2000	-1.35	R			A	18/06/2000	-1.35	R		
A	25/06/2000	-1.43	R			A	02/07/2000	-1.58	R			A	09/07/2000	-1.67	R		
A	16/07/2000	-1.72	R			A	23/07/2000	-1.72	R			A	30/07/2000	-1.74	R		
A	06/08/2000	-1.65	R			A	13/08/2000	-1.77	R			A	20/08/2000	-1.77	R		
A	27/08/2000	-1.84	R			A	03/09/2000	-1.86	R			A	10/09/2000	-1.88	R		
A	17/09/2000	-1.88	R			A	01/10/2000	-1.94	R			A	08/10/2000	-2.01	R		

REG NUMBER 62679

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	15/10/2000	-1.97	R			A	22/10/2000	-1.80	R			A	29/10/2000	-1.72	R		
A	05/11/2000	-1.36	R			A	12/11/2000	-1.42	R			A	19/11/2000	-1.10	R		
A	26/11/2000	-1.12	R			A	03/12/2000	-1.49	R			A	11/12/2000	-1.55	R		
A	18/12/2000	-1.52	R			A	24/12/2000	-1.56	R			A	31/12/2000	-1.26	R		
A	07/01/2001	-1.56	R			A	14/01/2001	-1.86	R			A	21/01/2001	-1.57	R		
A	28/01/2001	-1.54	R			A	04/02/2001	-1.84	R			A	11/02/2001	-1.68	R		
A	18/02/2001	-1.79	R			A	25/02/2001	-1.86	R			A	04/03/2001	-1.90	R		
A	11/03/2001	-1.84	R			A	18/03/2001	-1.88	R			A	25/03/2001	-1.92	R		
A	01/04/2001	-1.92	R			A	08/04/2001	-1.87	R			A	15/04/2001	-1.86	R		
A	22/04/2001	-1.98	R			A	29/04/2001	-1.99	R			A	06/05/2001	-1.99	R		
A	13/05/2001	-1.96	R			A	20/05/2001	-2.01	R			A	27/05/2001	-1.93	R		
A	03/06/2001	-1.97	R			A	10/06/2001	-1.90	R			A	17/06/2001	-1.90	R		
A	24/06/2001	-1.96	R			A	01/07/2001	-1.99	R			A	08/07/2001	-2.00	R		
A	15/07/2001	-2.05	R			A	22/07/2001	-2.02	R			A	29/07/2001	-2.00	R		
A	05/08/2001	-1.99	R			A	12/08/2001	-1.97	R			A	19/08/2001	-1.90	R		
A	26/08/2001	-1.99	R			A	02/09/2001	-1.92	R			A	09/09/2001	-1.94	R		
A	16/09/2001	-2.22	R			A	23/09/2001	-2.27	R			A	30/09/2001	-1.99	R		
A	07/10/2001	-1.97	R			A	14/10/2001	-1.90	R			A	21/10/2001	-2.30	R		
A	28/10/2001	-2.25	R			A	04/11/2001	-2.26	R			A	11/11/2001	-2.25	R		
A	18/11/2001	-2.25	R			A	25/11/2001	-2.22	R			A	02/12/2001	-2.12	R		
A	09/12/2001	-2.02	R			A	16/12/2001	-2.13	R			A	23/12/2001	-2.15	R		
A	30/12/2001	-2.17	R			A	06/01/2002	-2.16	R			A	13/01/2002	-1.98	R		
A	20/01/2002	-1.95	R			A	27/01/2002	-1.98	R			A	03/02/2002	-1.97	R		
A	10/02/2002	-1.96	R			A	17/02/2002	-1.97	R			A	24/02/2002	-2.06	R		
A	03/03/2002	-2.06	R			A	10/03/2002	-1.98	R			A	17/03/2002	-1.98	R		
A	24/03/2002	-1.99	R			A	31/03/2002	-1.99	R			A	07/04/2002	-1.99	R		
A	14/04/2002	-2.00	R			A	21/04/2002	-2.06	R			A	28/04/2002	-2.08	R		
A	05/05/2002	-2.02	R			A	12/05/2002	-2.02	R			A	19/05/2002	-2.12	R		
A	26/05/2002	-2.17	R			A	02/06/2002	-2.17	R			A	09/06/2002	-1.95	R		
A	16/06/2002	-2.05	R			A	23/06/2002	-2.05	R			A	30/06/2002	-2.05	R		
A	07/07/2002	-1.68	R			A	14/07/2002	-1.72	R								

WIRE LINE LOG DETAILS

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 62679

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 12/09/2000	Y 28/06/1991	Y 12/09/2000	Y 12/09/2000	Y 28/06/1991	Y 28/06/1991	Y 28/06/1991	Y 28/06/1991

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 28/06/1991		Y 28/06/1991		Y 28/06/1991			

GENERAL NOTES

****** NO RECORDS FOUND ******

REG NUMBER 84902

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-11-22	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-54	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	290012	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	31	**NORTHING**	7434013	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2704	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	L31 LN2704	**ACCURACY**	SKET	**PRES EQUIPMENT**	NE
				GPS ACC			
GIS LAT	-23.189578404	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	LONG BCH NO.1 WRC
GIS LNG	150.948399481	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	25/11/1985			**DATA OWNER**	
STATUS	AU	**DRILLERS NAME**	H HENESS			**CONFIDENTIAL**	N
ROLES	SM	**DRILL COMPANY**	QWRC				
	WS	**METHOD OF CONST.**	DRILLER - M HENESS				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	25/11/1985	1	Polyvinyl Chloride	3.100	WT	60	0.00	10.80
A	25/11/1985	2	Perforated or Slotted Casing		AP		9.80	10.80

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	10.80	SAND,FINE GRAINED QUARTZOSE

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00		DUNE SANDS

AQUIFER DETAILS

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 84902

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	4.60	10.80	SAND	25/11/1985	-4.60	N	POTABLE		Y	UC	DUNE SANDS

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

PIPE	DATE	ELEVATION	PRECISION	DATUM	MEASUREMENT POINT	SURVEY SOURCE
A	25/NOV/85	103.78	SVY	ASD	R	LLOYD
X	25/NOV/85	102.12	SVY	ASD	N	LLOYD

WATER ANALYSIS PART1

****** NO RECORDS FOUND ******

WATER ANALYSIS PART 2

****** NO RECORDS FOUND ******

WATER LEVEL DETAILS

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	25/11/1985	-4.20	R			A	04/11/1986	-4.60	R			A	27/02/1989	-8.90	R		
A	06/03/1989	-8.60	R			A	13/03/1989	-9.00	R			A	20/03/1989	-9.00	R		
A	27/03/1989	-9.00	R			A	03/04/1989	-8.06	R			A	10/04/1989	-8.03	R		
A	01/05/1989	-8.00	R			A	15/05/1989	-8.00	R			A	22/05/1989	-7.00	R		
A	29/05/1989	-7.00	R			A	12/06/1989	-7.00	R			A	19/06/1989	-7.50	R		
A	03/07/1989	-7.50	R			A	10/07/1989	-8.00	R			A	31/07/1989	-8.00	R		
A	07/08/1989	-7.80	R			A	14/08/1989	-7.90	R			A	21/08/1989	-7.80	R		

REG NUMBER 84902

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	28/08/1989	-7.73	R			A	04/09/1989	-7.80	R			A	25/09/1989	-7.80	R		
A	02/10/1989	-7.85	R			A	09/10/1989	-8.00	R			A	23/10/1989	-8.00	R		
A	30/10/1989	-8.04	R			A	13/11/1989	-8.04	R			A	20/11/1989	-8.20	R		
A	27/11/1989	-8.04	R			A	11/12/1989	-8.04	R			A	18/12/1989	-8.10	R		
A	25/12/1989	-8.11	R			A	01/01/1990	-8.10	R			A	08/01/1990	-8.25	R		
A	15/01/1990	-8.12	R			A	22/01/1990	-8.13	R			A	29/01/1990	-8.32	R		
A	05/02/1990	-8.36	R			A	12/02/1990	-8.24	R			A	19/02/1990	-8.40	R		
A	26/02/1990	-8.26	R			A	05/03/1990	-8.10	R			A	12/03/1990	-7.92	R		
A	19/03/1990	-8.24	R			A	26/03/1990	-7.98	R			A	02/04/1990	-7.55	R		
A	09/04/1990	-6.98	R			A	16/04/1990	-6.68	R			A	23/04/1990	-6.68	R		
A	30/04/1990	-6.70	R			A	07/05/1990	-7.75	R			A	14/05/1990	-7.78	R		
A	21/05/1990	-7.79	R			A	28/05/1990	-7.74	R			A	04/06/1990	-7.80	R		
A	11/06/1990	-7.54	R			A	18/06/1990	-7.54	R			A	25/06/1990	-7.76	R		
A	02/07/1990	-7.70	R			A	09/07/1990	-7.78	R			A	16/07/1990	-7.80	R		
A	23/07/1990	-7.82	R			A	30/07/1990	-7.83	R			A	06/08/1990	-7.85	R		
A	13/08/1990	-7.85	R			A	20/08/1990	-7.86	R			A	27/08/1990	-7.88	R		
A	03/09/1990	-7.90	R			A	10/09/1990	-7.90	R			A	17/09/1990	-7.92	R		
A	24/09/1990	-7.93	R			A	01/10/1990	-7.94	R			A	08/10/1990	-7.96	R		
A	15/10/1990	-7.96	R			A	22/10/1990	-7.95	R			A	29/10/1990	-8.16	R		
A	05/11/1990	-8.21	R			A	12/11/1990	-8.00	R			A	19/11/1990	-8.00	R		
A	26/11/1990	-8.00	R			A	03/12/1990	-8.00	R			A	10/12/1990	-8.00	R		
A	17/12/1990	-8.12	R			A	24/12/1990	-8.13	R			A	31/12/1990	-7.99	R		
A	07/01/1991	-7.60	R			A	14/01/1991	-7.58	R			A	21/01/1991	-7.65	R		
A	28/01/1991	-7.65	R			A	04/02/1991	-7.69	R			A	11/02/1991	-7.69	R		
A	18/02/1991	-7.91	R			A	25/02/1991	-7.80	R			A	03/03/1991	-7.62	R		
A	11/03/1991	-7.71	R			A	18/03/1991	-7.65	R			A	25/03/1991	-7.75	R		
A	01/04/1991	-7.70	R			A	08/04/1991	-7.90	R			A	15/04/1991	-7.90	R		
A	22/04/1991	-7.70	R			A	29/04/1991	-7.80	R			A	06/05/1991	-7.80	R		
A	13/05/1991	-7.80	R			A	20/05/1991	-7.70	R			A	27/05/1991	-7.85	R		
A	01/06/1991	-7.94	R			A	10/06/1991	-7.97	R			A	17/06/1991	-7.90	R		
A	24/06/1991	-7.95	R			A	01/07/1991	-8.03	R			A	08/07/1991	-8.10	R		
A	15/07/1991	-7.90	R			A	21/07/1991	-7.92	R			A	29/07/1991	-7.92	R		
A	05/08/1991	-7.92	R			A	12/08/1991	-7.90	R			A	19/08/1991	-7.90	R		

REG NUMBER 84902

PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	26/08/1991	-7.90	R			A	02/09/1991	-7.90	R			A	09/09/1991	-7.90	R		
A	16/09/1991	-8.15	R			A	23/09/1991	-8.15	R			A	30/09/1991	-8.15	R		
A	07/10/1991	-8.20	R			A	14/10/1991	-8.26	R			A	21/10/1991	-8.26	R		
A	28/10/1991	-8.27	R			A	11/11/1991	-8.29	R			A	18/11/1991	-8.29	R		
A	25/11/1991	-8.29	R			A	02/12/1991	-8.20	R			A	09/12/1991	-8.00	R		
A	16/12/1991	-8.20	R			A	23/12/1991	-8.20	R			A	30/12/1991	-8.25	R		
A	06/01/1992	-8.26	R			A	13/01/1992	-8.26	R			A	20/01/1992	-8.26	R		
A	27/01/1992	-8.26	R			A	03/02/1992	-8.26	R			A	10/02/1992	-8.24	R		
A	17/02/1992	-8.20	R			A	24/02/1992	-8.16	R			A	02/03/1992	-8.10	R		
A	09/03/1992	-8.00	R			A	17/03/1992	-7.90	R			A	24/03/1992	-7.90	R		
A	30/03/1992	-8.00	R			A	06/04/1992	-7.90	R			A	13/04/1992	-8.00	R		
A	20/04/1992	-8.00	R			A	27/04/1992	-8.12	R			A	04/05/1992	-8.10	R		
A	11/05/1992	-8.10	R			A	18/05/1992	-8.00	R			A	25/05/1992	-8.07	R		
A	01/06/1992	-8.07	R			A	08/06/1992	-8.07	R			A	15/06/1992	-8.09	R		
A	22/06/1992	-8.09	R			A	29/06/1992	-8.10	R			A	06/07/1992	-8.10	R		
A	27/07/1992	-8.10	R			A	03/08/1992	-8.00	R			A	10/08/1992	-8.16	R		
A	17/08/1992	-8.16	R			A	24/08/1992	-8.18	R			A	31/08/1992	-8.06	R		
A	07/09/1992	-8.06	R			A	14/09/1992	-8.06	R			A	21/09/1992	-8.00	R		
A	28/09/1992	-8.00	R			A	05/10/1992	-8.00	R			A	12/10/1992	-8.06	R		
A	19/10/1992	-8.10	R			A	26/10/1992	-8.10	R			A	02/11/1992	-8.10	R		
A	09/11/1992	-8.15	R			A	07/12/1992	-8.15	R			A	14/12/1992	-8.15	R		
A	21/12/1992	-8.15	R			A	04/01/1993	-8.11	R			A	11/01/1993	-8.10	R		
A	18/01/1993	-8.10	R			A	25/01/1993	-8.10	R			A	01/02/1993	-8.10	R		
A	08/02/1993	-8.16	R			A	15/02/1993	-8.10	R			A	22/02/1993	-8.10	R		
A	01/03/1993	-8.18	R			A	08/03/1993	-8.19	R			A	15/03/1993	-8.22	R		
A	22/03/1993	-8.22	R			A	29/03/1993	-8.30	R			A	05/04/1993	-8.30	R		
A	12/04/1993	-8.32	R			A	19/04/1993	-8.32	R			A	26/04/1993	-8.32	R		
A	03/05/1993	-8.32	R			A	10/05/1993	-8.40	R			A	17/05/1993	-8.40	R		
A	24/05/1993	-8.40	R			A	31/05/1993	-8.30	R			A	07/06/1993	-8.20	R		
A	14/06/1993	-8.30	R			A	28/06/1993	-8.40	R			A	05/07/1993	-8.40	R		
A	13/07/1993	-8.42	R			A	19/07/1993	-8.42	R			A	26/07/1993	-8.44	R		
A	02/08/1993	-8.40	R			A	09/08/1993	-8.50	R			A	16/08/1993	-8.60	R		
A	23/08/1993	-8.70	R			A	30/08/1993	-8.70	R			A	06/09/1993	-8.70	R		

REG NUMBER 84902

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	13/09/1993	-8.70	R			A	20/09/1993	-8.70	R			A	27/09/1993	-8.80	R		
A	11/10/1993	-8.80	R			A	18/10/1993	-8.80	R			A	25/10/1993	-8.80	R		
A	01/11/1993	-8.80	R			A	08/11/1993	-8.90	R			A	22/11/1993	-8.60	R		
A	29/11/1993	-8.60	R			A	27/12/1993	-8.60	R			A	03/01/1994	-8.60	R		
A	24/01/1994	-8.60	R			A	31/01/1994	-8.65	R			A	08/02/1994	-8.40	R		
A	14/02/1994	-8.46	R			A	21/02/1994	-8.50	R			A	28/02/1994	-8.40	R		
A	07/03/1994	-8.30	R			A	14/03/1994	-8.30	R			A	21/03/1994	-8.30	R		
A	28/03/1994	-8.30	R			A	04/04/1994	-8.30	R			A	11/04/1994	-8.40	R		
A	18/04/1994	-8.40	R			A	25/04/1994	-8.40	R			A	02/05/1994	-8.30	R		
A	09/05/1994	-8.30	R			A	16/05/1994	-8.40	R			A	23/05/1994	-8.40	R		
A	30/05/1994	-8.40	R			A	06/06/1994	-8.40	R			A	13/06/1994	-8.50	R		
A	27/06/1994	-8.50	R			A	18/07/1994	-8.50	R			A	01/08/1994	-8.60	R		
A	15/08/1994	-8.60	R			A	22/08/1994	-8.70	R			A	29/08/1994	-8.80	R		
A	05/09/1994	-8.80	R			A	26/09/1994	-8.80	R			A	31/10/1994	-8.70	R		
A	07/11/1994	-8.70	R			A	14/11/1994	-8.60	R			A	28/11/1994	-8.60	R		
A	26/12/1994	-8.60	R			A	01/01/1995	-8.60	R			A	09/01/1995	-8.60	R		
A	16/01/1995	-8.60	R			A	23/01/1995	-8.50	R			A	30/01/1995	-8.50	R		
A	06/02/1995	-8.50	R			A	14/02/1995	-8.20	R			A	28/02/1995	-8.06	R		
A	21/03/1995	-8.22	R			A	28/03/1995	-8.21	R			A	04/04/1995	-8.13	R		
A	11/04/1995	-8.41	R			A	18/04/1995	-8.23	R			A	25/04/1995	-8.33	R		
A	02/05/1995	-8.21	R			A	16/05/1995	-8.59	R			A	23/05/1995	-8.38	R		
A	30/05/1995	-8.29	R			A	06/06/1995	-8.29	R			A	13/06/1995	-8.27	R		
A	20/06/1995	-8.28	R			A	27/06/1995	-8.28	R			A	04/07/1995	-8.36	R		
A	11/07/1995	-8.32	R			A	18/07/1995	-8.30	R			A	25/07/1995	-8.46	R		
A	01/08/1995	-8.28	R			A	08/08/1995	-8.31	R			A	15/08/1995	-8.17	R		
A	22/08/1995	-8.22	R			A	29/08/1995	-8.10	R			A	05/09/1995	-8.15	R		
A	12/09/1995	-8.18	R			A	19/09/1995	-8.32	R			A	26/09/1995	-8.35	R		
A	03/10/1995	-8.39	R			A	10/10/1995	-8.32	R			A	17/10/1995	-8.40	R		
A	24/10/1995	-8.36	R			A	31/10/1995	-8.37	R			A	07/11/1995	-8.39	R		
A	14/11/1995	-8.46	R			A	21/11/1995	-8.44	R			A	28/11/1995	-8.34	R		
A	06/12/1995	-8.44	R			A	12/12/1995	-8.32	R			A	19/12/1995	-8.42	R		
A	26/12/1995	-8.31	R			A	02/01/1996	-8.40	R			A	09/01/1996	-8.22	R		
A	16/01/1996	-8.29	R			A	23/01/1996	-8.22	R			A	30/01/1996	-8.34	R		

REG NUMBER 84902

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	06/02/1996	-8.38	R			A	13/02/1996	-8.40	R			A	20/02/1996	-8.22	R		
A	27/02/1996	-8.28	R			A	12/03/1996	-8.27	R			A	19/03/1996	-8.26	R		
A	26/03/1996	-8.29	R			A	02/04/1996	-8.33	R			A	09/04/1996	-8.36	R		
A	16/04/1996	-8.36	R			A	23/04/1996	-8.27	R			A	30/04/1996	-8.28	R		
A	07/05/1996	-7.97	R			A	14/05/1996	-7.89	R			A	21/05/1996	-8.16	R		
A	28/05/1996	-8.25	R			A	04/06/1996	-8.16	R			A	11/06/1996	-8.22	R		
A	18/06/1996	-8.17	R			A	25/06/1996	-8.26	R			A	02/07/1996	-8.33	R		
A	09/07/1996	-8.34	R			A	16/07/1996	-8.31	R			A	23/07/1996	-8.40	R		
A	31/07/1996	-8.44	R			A	07/08/1996	-8.49	R			A	15/08/1996	-8.48	R		
A	21/08/1996	-8.52	R			A	28/08/1996	-8.49	R			A	04/09/1996	-8.50	R		
A	12/09/1996	-8.56	R			A	21/09/1996	-8.62	R			A	28/09/1996	-8.53	R		
A	05/10/1996	-8.51	R			A	12/10/1996	-8.61	R			A	19/10/1996	-8.62	R		
A	26/10/1996	-8.54	R			A	17/11/1996	-8.60	R			A	24/11/1996	-8.56	R		
A	01/12/1996	-8.60	R			A	08/12/1996	-8.66	R			A	14/12/1996	-8.52	R		
A	21/12/1996	-8.56	R			A	29/12/1996	-8.49	R			A	04/01/1997	-8.61	R		
A	13/01/1997	-8.39	R			A	19/01/1997	-8.42	R			A	27/01/1997	-8.37	R		
A	02/02/1997	-8.47	R			A	10/02/1997	-8.35	R			A	16/02/1997	-8.45	R		
A	23/02/1997	-8.43	R			A	02/03/1997	-8.52	R			A	09/03/1997	-8.35	R		
A	16/03/1997	-8.27	R			A	23/03/1997	-8.28	R			A	02/04/1997	-8.33	R		
A	06/04/1997	-8.32	R			A	13/04/1997	-8.27	R			A	20/04/1997	-8.37	R		
A	27/04/1997	-8.35	R			A	04/05/1997	-8.36	R			A	11/05/1997	-8.31	R		
A	18/05/1997	-8.37	R			A	25/05/1997	-8.29	R			A	01/06/1997	-8.39	R		
A	08/06/1997	-8.07	R			A	15/06/1997	-8.35	R			A	22/06/1997	-8.23	R		
A	30/06/1997	-8.28	R			A	06/07/1997	-8.12	R			A	20/07/1997	-8.36	R		
A	27/07/1997	-8.30	R			A	03/08/1997	-8.34	R			A	17/08/1997	-8.37	R		
A	24/08/1997	-8.32	R			A	31/08/1997	-8.30	R			A	07/09/1997	-8.37	R		
A	14/09/1997	-8.46	R			A	21/09/1997	-8.36	R			A	28/09/1997	-8.52	R		
A	05/10/1997	-8.50	R			A	12/10/1997	-8.55	R			A	19/10/1997	-8.46	R		
A	26/10/1997	-8.52	R			A	02/11/1997	-8.52	R			A	09/11/1997	-8.62	R		
A	16/11/1997	-8.52	R			A	23/11/1997	-8.59	R			A	30/11/1997	-8.60	R		
A	06/12/1997	-8.62	R			A	14/12/1997	-8.51	R			A	21/12/1997	-8.52	R		
A	28/12/1997	-8.64	R			A	04/01/1998	-8.44	R			A	11/01/1998	-8.42	R		
A	18/01/1998	-8.42	R			A	25/01/1998	-8.55	R			A	01/02/1998	-8.42	R		

REG NUMBER 84902

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	08/02/1998	-8.52	R			A	15/02/1998	-8.49	R			A	22/02/1998	-8.58	R		
A	01/03/1998	-8.52	R			A	08/03/1998	-8.42	R			A	15/03/1998	-8.32	R		
A	22/03/1998	-8.42	R			A	29/03/1998	-8.30	R			A	07/04/1998	-8.31	R		
A	12/04/1998	-8.32	R			A	19/04/1998	-8.36	R			A	25/04/1998	-8.32	R		
A	03/05/1998	-8.30	R			A	10/05/1998	-8.27	R			A	17/05/1998	-8.29	R		
A	24/05/1998	-8.32	R			A	31/05/1998	-8.25	R			A	07/06/1998	-8.38	R		
A	14/06/1998	-8.16	R			A	21/06/1998	-8.16	R			A	28/06/1998	-8.18	R		
A	05/07/1998	-8.10	R			A	19/07/1998	-8.20	R			A	26/07/1998	-8.12	R		
A	02/08/1998	-8.24	R			A	09/08/1998	-8.16	R			A	10/08/1998	-8.20	R		
A	23/08/1998	-8.11	R			A	30/08/1998	-8.12	R			A	06/09/1998	-8.25	R		
A	12/09/1998	-8.15	R			A	20/09/1998	-8.19	R			A	27/09/1998	-8.23	R		
A	04/10/1998	-8.25	R			A	11/10/1998	-8.15	R			A	19/10/1998	-8.14	R		
A	01/11/1998	-8.16	R			A	08/11/1998	-8.04	R			A	15/11/1998	-8.20	R		
A	29/11/1998	-8.23	R			A	06/12/1998	-8.10	R			A	13/12/1998	-8.13	R		
A	20/12/1998	-8.15	R			A	03/01/1999	-8.14	R			A	10/01/1999	-8.17	R		
A	17/01/1999	-8.18	R			A	24/01/1999	-8.10	R			A	31/01/1999	-8.12	R		
A	07/02/1999	-8.11	R			A	14/02/1999	-8.13	R			A	21/02/1999	-8.14	R		
A	28/02/1999	-8.10	R			A	07/03/1999	-8.10	R			A	15/03/1999	-8.17	R		
A	21/03/1999	-8.07	R			A	29/03/1999	-8.32	R			A	15/04/1999	-8.36	R		
A	18/04/1999	-8.02	R			A	25/04/1999	-8.13	R			A	02/05/1999	-8.13	R		
A	09/05/1999	-8.14	R			A	16/05/1999	-8.09	R			A	23/05/1999	-8.07	R		
A	30/05/1999	-8.09	R			A	06/06/1999	-8.13	R			A	13/06/1999	-8.19	R		
A	20/06/1999	-8.17	R			A	27/06/1999	-8.24	R			A	04/07/1999	-8.15	R		
A	11/07/1999	-8.20	R			A	18/07/1999	-8.13	R			A	25/07/1999	-8.27	R		
A	01/08/1999	-8.19	R			A	08/08/1999	-8.27	R			A	15/08/1999	-8.19	R		
A	22/08/1999	-8.32	R			A	29/08/1999	-8.26	R			A	05/09/1999	-8.53	R		
A	12/09/1999	-8.45	R			A	19/09/1999	-8.59	R			A	26/09/1999	-8.53	R		
A	03/10/1999	-8.54	R			A	10/10/1999	-8.47	R			A	24/10/1999	-8.59	R		
A	31/10/1999	-8.56	R			A	07/11/1999	-8.52	R			A	14/11/1999	-8.58	R		
A	21/11/1999	-8.58	R			A	28/11/1999	-8.44	R			A	05/12/1999	-8.48	R		
A	12/12/1999	-8.49	R			A	19/12/1999	-8.46	R			A	26/12/1999	-8.37	R		
A	02/01/2000	-8.34	R			A	09/01/2000	-8.35	R			A	16/01/2000	-8.39	R		
A	23/01/2000	-8.27	R			A	30/01/2000	-8.28	R			A	05/02/2000	-8.37	R		

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 84902

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	12/02/2000	-8.43	R			A	19/02/2000	-8.34	R			A	26/02/2000	-8.34	R		
A	05/03/2000	-8.37	R			A	11/03/2000	-8.32	R			A	19/03/2000	-8.32	R		
A	26/03/2000	-8.34	R			A	02/04/2000	-8.42	R			A	09/04/2000	-8.31	R		
A	23/04/2000	-8.37	R			A	30/04/2000	-8.34	R			A	07/05/2000	-8.22	R		
A	14/05/2000	-8.25	R			A	21/05/2000	-8.22	R			A	28/05/2000	-8.32	R		
A	04/06/2000	-8.24	R			A	11/06/2000	-8.23	R			A	18/06/2000	-8.21	R		
A	25/06/2000	-8.32	R			A	02/07/2000	-8.27	R			A	09/07/2000	-8.22	R		
A	16/07/2000	-8.29	R			A	23/07/2000	-8.31	R			A	30/07/2000	-8.32	R		
A	06/08/2000	-8.18	R			A	13/08/2000	-8.31	R			A	20/08/2000	-8.24	R		
A	27/08/2000	-8.32	R			A	03/09/2000	-8.24	R			A	10/09/2000	-8.35	R		
A	17/09/2000	-8.27	R			A	01/10/2000	-8.23	R			A	08/10/2000	-8.30	R		
A	15/10/2000	-8.29	R			A	22/10/2000	-8.34	R			A	29/10/2000	-8.25	R		
A	05/11/2000	-8.15	R			A	12/11/2000	-8.14	R			A	19/11/2000	-8.17	R		
A	26/11/2000	-8.14	R			A	03/12/2000	-8.17	R			A	11/12/2000	-8.26	R		
A	18/12/2000	-8.18	R			A	24/12/2000	-8.22	R			A	07/01/2001	-8.21	R		
A	14/01/2001	-8.23	R			A	21/01/2001	-8.22	R			A	28/01/2001	-8.21	R		
A	04/02/2001	-8.29	R			A	11/02/2001	-8.27	R			A	18/02/2001	-8.19	R		
A	25/02/2001	-8.15	R			A	04/03/2001	-8.21	R			A	11/03/2001	-8.20	R		
A	18/03/2001	-8.20	R			A	25/03/2001	-8.20	R			A	01/04/2001	-8.22	R		
A	08/04/2001	-8.21	R			A	15/04/2001	-8.21	R			A	22/04/2001	-8.22	R		
A	29/04/2001	-8.21	R			A	06/05/2001	-8.22	R			A	13/05/2001	-8.42	R		
A	20/05/2001	-8.32	R			A	27/05/2001	-8.23	R			A	03/06/2001	-8.27	R		
A	10/06/2001	-8.20	R			A	17/06/2001	-8.22	R			A	24/06/2001	-8.24	R		
A	01/07/2001	-8.22	R			A	08/07/2001	-8.22	R			A	15/07/2001	-8.22	R		
A	22/07/2001	-8.22	R			A	29/07/2001	-8.22	R			A	05/08/2001	-8.22	R		
A	12/08/2001	-8.22	R			A	19/08/2001	-8.22	R			A	26/08/2001	-8.22	R		
A	02/09/2001	-8.22	R			A	09/09/2001	-8.22	R			A	16/09/2001	-8.22	R		
A	23/09/2001	-8.22	R			A	30/09/2001	-8.22	R			A	07/10/2001	-8.22	R		
A	14/10/2001	-8.22	R			A	21/10/2001	-8.22	R			A	28/10/2001	-8.22	R		
A	04/11/2001	-8.27	R			A	11/11/2001	-8.27	R			A	18/11/2001	-8.27	R		
A	25/11/2001	-8.27	R			A	02/12/2001	-8.27	R			A	09/12/2001	-8.35	R		
A	16/12/2001	-8.27	R			A	23/12/2001	-8.27	R			A	30/12/2001	-8.38	R		
A	06/01/2002	-8.27	R			A	13/01/2002	-8.27	R			A	20/01/2002	-8.28	R		

REG NUMBER 84902

PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE	N/R	RMK	LOG	PIPE	DATE	MEASURE (m)	N/R	RMK	LOG
A	27/01/2002	-8.27	R			A	03/02/2002	-8.27	R			A	10/02/2002	-8.28	R		
A	17/02/2002	-8.29	R			A	24/02/2002	-8.36	R			A	03/03/2002	-8.36	R		
A	10/03/2002	-8.22	R			A	17/03/2002	-8.27	R			A	24/03/2002	-8.28	R		
A	31/03/2002	-8.27	R			A	07/04/2002	-8.28	R			A	14/04/2002	-8.27	R		
A	21/04/2002	-8.26	R			A	28/04/2002	-8.26	R			A	05/05/2002	-8.26	R		
A	12/05/2002	-8.32	R			A	19/05/2002	-8.34	R			A	26/05/2002	-8.34	R		
A	02/06/2002	-8.34	R			A	09/06/2002	-8.17	R			A	16/06/2002	-8.17	R		
A	23/06/2002	-8.17	R			A	30/06/2002	-8.22	R			A	07/07/2002	-8.22	R		
A	14/07/2002	-8.26	R														

WIRE LINE LOG DETAILS

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 10/08/2000	Y 27/02/1992	Y 10/08/2000	Y 10/08/2000	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 27/02/1992		Y 27/02/1992		Y 27/02/1992			

GENERAL NOTES

****** NO RECORDS FOUND ******

REG NUMBER 88366

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-11-05	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-18	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	288960	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	44	**NORTHING**	7434527	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2831	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	P44	**ACCURACY**	SKET	**PRES EQUIPMENT**	SP
				GPS ACC			
GIS LAT	-23.184799967	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	GOLF COURSE BORE-OLO
GIS LNG	150.938192335	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	04/10/1979			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**	BEASLEY J			**CONFIDENTIAL**	
ROLES	WS	**DRILL COMPANY**	HILLGROVE DRILLING				
		METHOD OF CONST.	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	04/10/1979	1	Polyvinyl Chloride	6.300	WT	160	0.00	5.00
A	04/10/1979	2	Screen	0.500	AP	160	5.00	6.00
A	04/10/1979	3	Gravel Pack				0.00	6.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	4.00	FINE WHITE SAND
2	4.00	4.50	FINE SAND SOME SHELL GRIT
3	4.50	5.50	COARSE SAND & GOOD SHELL GRIT
4	5.50	6.00	GOOD SHELL GRIT SOME MUD
5	6.00	6.50	SHELL GRIT & LOTS OF MUD
6	6.50	7.00	YELLOW CLAY

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88366

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	6.50	GT KEPPEL DUNES

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	2.00	6.00	SAND			N			Y	UC	GT KEPPEL DUNES

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

****** NO RECORDS FOUND ******

WATER ANALYSIS PART1

****** NO RECORDS FOUND ******

WATER ANALYSIS PART 2

****** NO RECORDS FOUND ******

WATER LEVEL DETAILS

****** NO RECORDS FOUND ******

WIRE LINE LOG DETAILS

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88366

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 10/08/2000	Y 27/02/1992	Y 10/08/2000	Y 10/08/2000	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 27/02/1992		Y 27/02/1992		Y 27/02/1992			

GENERAL NOTES

****** NO RECORDS FOUND ******

REG NUMBER 88367

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-11-21	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-56	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	290067	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	31	**NORTHING**	7434041	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2704	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	L31 LN2704	**ACCURACY**	SKET	**PRES EQUIPMENT**	CL
				GPS ACC			
GIS LAT	-23.189328102	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	LONG BEACH PS 1
GIS LNG	150.948933873	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	20/09/1987			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**	BEASLEY J			**CONFIDENTIAL**	
ROLES	WS	**DRILL COMPANY**	HILLGROVE DRILLING				
		METHOD OF CONST.	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	20/09/1987	1	Polyvinyl Chloride	5.500	WT	140	0.00	11.40
A	20/09/1987	2	Screen	0.500	AP	140	11.40	13.00
A	20/09/1987	3	Gravel Pack	0.640	GR			

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	10.00	FINE WHITE SAND
2	10.00	11.00	FINE GREY SAND
3	11.00	12.00	FINE YELLOW SAND
4	12.00	14.00	FINE GREY SAND
5	14.00	15.00	FINE YELLOW SAND TRACE OF CLAY
6	15.00	16.00	FINE YELLOW SAND AND CLAY

REG NUMBER 88367

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
902			SWL 2.6 M 20.09.1987
903			YIELD 8.0 L/S PUMP TEST

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	16.00	GT KEPPEL DUNES

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	2.60	15.00	SAND							UC	GT KEPPEL DUNES

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

****** NO RECORDS FOUND ******

WATER ANALYSIS PART1

PIPE	DATE	RD ANALYST	QAN	DEPTH (m)	RMK	SRC	COND (uS/cm)	pH	Si (mg/L)	TOTAL IONS	TOTAL SOLIDS	HARD	ALK	FIG. OF MERIT	SAR	RAH
A	15/01/1988	1 S&B	45099	13.00	PU	GB	340	5.7		197.50	192.93	34	7	0.3	4.4	

WATER ANALYSIS PART 2

REG NUMBER 88367

PIPE	DATE	RD	Na	K	Ca	Mg	Mn	HCO3	Fe	CO3	Cl	F	NO3	SO4	Zn	Al	B	Cu
A	15/01/1988	1	59.0	2.0	2.0	7.0		9.0			104.0		0.5	14.0				

WATER LEVEL DETAILS

****** NO RECORDS FOUND ******

WIRE LINE LOG DETAILS

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 27/02/1992		Y 27/02/1992		Y 27/02/1992			

GENERAL NOTES

****** NO RECORDS FOUND ******

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88368

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-11-20	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-54	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	289998	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	31	**NORTHING**	7434091	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2704	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	L31 LN2704	**ACCURACY**	SKET	**PRES EQUIPMENT**	CL
				GPS ACC			
GIS LAT	-23.188868106	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	LONG BEACH PS2
GIS LNG	150.948271783	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	22/09/1987			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**				**CONFIDENTIAL**	
ROLES	WS	**DRILL COMPANY**					
		METHOD OF CONST.	DRILLER J BEASLEY (ROTARY)				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	22/09/1987	1	Polyvinyl Chloride	5.500	WT	140	0.00	12.40
A	22/09/1987	2	Screen	0.500	AP	140	12.40	14.00
A	22/09/1987	3	Gravel Pack	0.640	GR			

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	6.00	FINE WHITE SAND
2	6.00	11.00	FINE YELLOWISH SAND
3	11.00	14.00	SLIGHTLY COARSER WHITE SAND
4	14.00	15.00	FINE WHITE SAND TRACE OF CLAY
5	15.00	17.00	YELLOW SAND WITH 30% CLAY
6	17.00	25.00	HEAVY GREY CLAY

REG NUMBER 88368

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
7	25.00	26.00	HEAVY GREY CLAY AND QUARTZ STONE
902			SWL 2.7 M....22.09.1987
903			YIELD 8.0 L/S PUMP TEST

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	17.00	GT KEPPEL IS DUNES

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	2.70	15.00	SAND							UC	GT KEPPEL IS DUNES

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

****** NO RECORDS FOUND ******

WATER ANALYSIS PART1

PIPE	DATE	RD ANALYST	QAN	DEPTH (m)	RMK	SRC	COND (uS/cm)	pH	Si (mg/L)	TOTAL IONS	TOTAL SOLIDS	HARD	ALK	FIG. OF MERIT	SAR	RAH
A	15/01/1988	1 S&B	45099	14.00	PU	GB	370	6.0		216.50	209.89	40	11	0.3	4.3	

REG NUMBER 88368

WATER ANALYSIS PART 2

PIPE	DATE	RD	Na	K	Ca	Mg	Mn	HCO3	Fe	CO3	Cl	F	NO3	SO4	Zn	Al	B	Cu
A	15/01/1988	1	63.0	2.0	3.0	8.0		13.0			116.0		0.5	11.0				

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 27/02/1992		Y 27/02/1992		Y 27/02/1992			

GENERAL NOTES

**** NO RECORDS FOUND ****

REG NUMBER 88369

REGISTRATION DETAILS

		BASIN	1290	**LATITUDE**	23-11-19	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	150-56-53	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	289964	**MAP-NO**	9051
D/O FILE NO.	515/030/2488	**LOT**	31	**NORTHING**	7434118	**MAP NAME**	ROCKHAMPTON
R/O FILE NO.	30-2488	**PLAN**	LN2704	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	L31 LN 2704	**ACCURACY**	SKET	**PRES EQUIPMENT**	NE
				GPS ACC			
GIS LAT	-23.188626109	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	LONG BEACH PS 3
GIS LNG	150.947943088	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	24/09/1987			**DATA OWNER**	
STATUS	AD	**DRILLERS NAME**				**CONFIDENTIAL**	
ROLES	WS	**DRILL COMPANY**					
		METHOD OF CONST.	DRILLER J BEASLEY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	24/09/1987	1	Polyvinyl Chloride	5.500	WT	140	0.00	16.40
A	24/09/1987	2	Screen	0.500	AP	140	16.40	18.00
A	24/09/1987	3	Gravel Pack	0.640	GR			

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	6.00	FINE WHITE SAND
2	6.00	8.00	DIRTY GREY SAND
3	8.00	10.00	VERY DIRTY ORGANIC SAND
4	10.00	13.00	FINE GREY SAND
5	13.00	16.00	FINE YELLOW SAND
6	16.00	18.00	FINE WHITE SAND

REG NUMBER 88369

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
7	18.00	19.00	FINE YELLOW SAND
8	19.00	20.00	FINE YELLOW SAND CLAY BOUND
9	20.00	21.00	SANDY CLAY MIXTURE
902			SWL 7.7 (24.09.1987)
903			YIELD 8.0 L/S PUMP TEST

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	20.00	GT KEPPEL IS DUNES

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	7.70	19.00	SAND							UC	GT KEPPEL IS DUNES

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

****** NO RECORDS FOUND ******

WATER ANALYSIS PART1

PIPE	DATE	RD ANALYST	QAN	DEPTH (m)	RMK	SRC	COND (uS/cm)	pH	Si (mg/L)	TOTAL IONS	TOTAL SOLIDS	HARD	ALK	FIG. OF MERIT	SAR	RAH

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88369

PIPE	DATE	RD	ANALYST	QAN	DEPTH (m)	RMK	SRC	COND (uS/cm)	pH	Si (mg/L)	TOTAL IONS	TOTAL SOLIDS	HARD	ALK	FIG. OF MERIT	SAR	RAH
A	15/01/1988		1 S&B	45074	16.00	PU	GB	425	5.8		240.50	235.42	35	8	0.2	5.4	

WATER ANALYSIS PART 2

PIPE	DATE	RD	Na	K	Ca	Mg	Mn	HCO3	Fe	CO3	Cl	F	NO3	SO4	Zn	Al	B	Cu
A	15/01/1988	1	74.0	2.0	1.0	8.0		10.0			130.0		0.5	15.0				

WATER LEVEL DETAILS

****** NO RECORDS FOUND ******

WIRE LINE LOG DETAILS

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 27/02/1992		Y 27/02/1992		Y 27/02/1992			

GENERAL NOTES

****** NO RECORDS FOUND ******

REG NUMBER 88370

REGISTRATION DETAILS

OFFICE	Rockhampton	**BASIN**	1290	**LATITUDE**	23-11-18	**MAP-SCALE**	104
DATE LOG RECD		**SUB-AREA**		**LONGITUDE**	150-56-52	**MAP-SERIES**	M
D/O FILE NO.	515/030/2488	**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	289929	**MAP-NO**	9051
R/O FILE NO.	30-2488	**LOT**	31	**NORTHING**	7434144	**MAP NAME**	ROCKHAMPTON
H/O FILE NO.		**PLAN**	LN2704	**ZONE**	56	**PROG SECTION**	
		ORIGINAL DESCRIPTION	L31 LN2704	**ACCURACY**	SKET	**PRES EQUIPMENT**	JP
				GPS ACC			
GIS LAT	-23.188380311	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	LONG BEACH PS 3A
GIS LNG	150.947602993	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	03/08/1990			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**				**CONFIDENTIAL**	N
ROLES	WS	**DRILL COMPANY**					
		METHOD OF CONST.	DRILLER J BEASLEY (ROTARY)				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	01/08/1990	1	Polyvinyl Chloride	5.500	WT	140	0.00	12.60
A	01/08/1990	2	Screen	0.500	AP	140	12.60	13.60
A	01/08/1990	3	Gravel Pack					

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	4.00	LIGHT BROWN FINE SAND
2	4.00	8.00	RED IRON STAINED FINE SAND
3	8.00	9.00	ORANGE FINE SAND
4	9.00	10.00	YELLOW FINE SAND
5	10.00	12.00	LIGHT BROWN FINE SAND
6	12.00	14.00	WHITE FINE SAND

REG NUMBER 88370

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
7	14.00	15.00	WHITE SAND WITH CLAY BANDS
8	15.00	16.00	WHITE SAND

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1			GT KEPPEL IS DUNES

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	10.00	14.00	SAND							UC	GT KEPPEL IS DUNES

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

****** NO RECORDS FOUND ******

WATER ANALYSIS PART1

****** NO RECORDS FOUND ******

WATER ANALYSIS PART 2

****** NO RECORDS FOUND ******

WATER LEVEL DETAILS

****** NO RECORDS FOUND ******

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88370

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992	Y 27/02/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 27/02/1992		Y 27/02/1992		Y 27/02/1992			

GENERAL NOTES

**** NO RECORDS FOUND ****

REG NUMBER 88696

REGISTRATION DETAILS

OFFICE	Rockhampton	**BASIN**	1290	**LATITUDE**	23-10-52	**MAP-SCALE**	104
DATE LOG RECD		**SUB-AREA**		**LONGITUDE**	150-56-18	**MAP-SERIES**	M
D/O FILE NO.	515/030/2488	**SHIRE**	6360-ROCKHAMPTON RE	**EASTING**	288972	**MAP-NO**	9051
R/O FILE NO.	30-2488	**LOT**	2	**NORTHING**	7434939	**MAP NAME**	ROCKHAMPTON
H/O FILE NO.		**PLAN**	LN2615	**ZONE**	56	**PROG SECTION**	
		ORIGINAL DESCRIPTION	L2 LN2615	**ACCURACY**	SKET	**PRES EQUIPMENT**	CL
				GPS ACC			
GIS LAT	-23.181087077	**PARISH NAME**	2615-KEPPEL			**ORIGINAL BORE NO**	HAVEN BORE (OLO)
GIS LNG	150.938364639	**COUNTY**	LIVINGSTONE			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACED	
FACILITY TYPE	SF	**DATE DRILLED**	01/01/1984			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**				**CONFIDENTIAL**	N
ROLES	WS	**DRILL COMPANY**					
		METHOD OF CONST.					

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM	TOP (m)	BOTTOM (m)
A	01/01/1984	1	Polyvinyl Chloride	4.500	WT	114	0.00	5.00
A	01/01/1984	2	Screen				5.00	6.00
B	01/01/1984	1	Polyvinyl Chloride	4.500	WT	114	0.00	5.00
B	01/01/1984	2	Screen				5.00	6.00
C	01/01/1984	1	Polyvinyl Chloride	4.500	WT	114	0.00	5.00
C	01/01/1984	2	Screen				5.00	6.00
D	01/01/1984	1	Polyvinyl Chloride	4.500	WT	114	0.00	5.00
D	01/01/1984	2	Screen				5.00	6.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	6.00	FINE SAND

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88696

STRATIGRAPHY DETAILS

**** NO RECORDS FOUND ****

AQUIFER DETAILS

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 88696

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 10/02/1999	Y 15/12/1992	Y 15/12/1992	Y 15/12/1992	Y 15/12/1992	Y 15/12/1992	Y 15/12/1992	Y 15/12/1992

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 15/12/1992		Y 15/12/1992		Y 15/12/1992			

GENERAL NOTES

****** NO RECORDS FOUND ******

User Licence for digital data

Permitted use:
- You may use the supplied data for your own purposes (including supply to consultants for a specific consultancy project for you but the consultants must return or destroy the supplied data when the project is finished). You must not sell or distribute the supplied data.
- You must display this copyright notice on any copies of the supplied data however altered, reformatted or redisplayed if you supply to a consultant or copy for back up purposes: "© The State of Queensland (Department Environment and Resource Management) [year]".
- You may create and distribute hardcopy and digital products based on or containing the supplied data, provided all the following conditions are met:
- You must display this acknowledgment on the product(s): "Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) [year]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws."
- You must include metadata with the product(s) and the metadata must incorporate as a minimum the metadata supplied with this data.

1 Obligations:

- You must not use the data for direct marketing or in breach of the privacy laws.
- If you wish to distribute the supplied data you must organise a different licence by contacting the Department (Email: marketing@derm.qld.gov.au).

2 Ownership:

The State of Queensland as represented by the Department of Environment and Resource Management (DERM) is the owner of the intellectual property rights in and to the supplied data or has the right to make this supplied data available under licence arrangements.

3 Disclaimer and indemnity:

You agree to accept all responsibility and risks associated with the use of the supplied data. DERM makes no representations or warranties in relation to the supplied data, and, you agree that, to the extent permitted by law, all warranties relating to accuracy, reliability, completeness, currency or suitability for any particular purpose and all liability for any loss, damage or costs (including consequential damage) incurred in any way (including but not limited to that arising from negligence) in connection with any use of or reliance on the supplied data are excluded or limited. You agree to continually indemnify the State of Queensland and DERM (and their officers and employees) against any loss, cost, expense, damage and liability of any kind (including consequential damage and liability in negligence) arising directly or indirectly from or related to any claim relating to your use of the supplied data or any product made from the data.

**** End of Report ****

Appendix C

Borehole Reports, Groundwater Bores

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

TEST BORE REPORT

BORE No: MB1
DATE: 23/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: SW DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°

AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0	SAND - light yellow/grey fine to medium grained sand with some shell fragments, damp							Concrete
5.5	SHELLS - light grey shells with some fine to medium grained sand and gravel							Bentonite Seal; Class 18 PVC 50mm Casing; Filter Sand Factory slotted screen 3.1 to 7.6m depth
7.7								Bore installed to 7.6m
7.9	SANDY CLAY - dark grey sandy clay TEST BORE DISCONTINUED AT 7.9m							

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** Steel to 2m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: Located 2m from 2 USTs. SWL = 3.88 mBTOC, 3.38 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 23/8

Douglas Partners
Geotechnics • Environment • Groundwater

TEST BORE REPORT

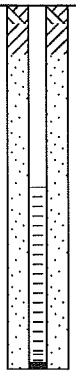
BORE No: MB2
DATE: 23/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: MECURE RESORT, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°

AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.5	SAND - dark brown/grey fine to medium grained sand with some silt							Concrete
1	- light grey/off-white fine to medium grained sand							Bentonite Seal
1.4	- yellow/brown							
2.0	- light grey/yellow							
3								Filter Sand
4								
5							▽	Factory slotted screen 3m to 6m depth
6.0	TEST BORE DISCONTINUED AT 6.0m							Bore installed to 6m depth



RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** Steel to 2m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: 5m from Maintenance Shed UST. SWL = 5.15 mBTOC, 4.60 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB3
DATE: 24/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: NE DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°

AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.5	SAND - brown fine to medium grained sand with some organic matter and shells - light yellow/brown fine to medium grained sand						▽	Concrete Bentonite Seal Class 18 PVC 50mm Casing Filter Sand Factory slotted screen 5.5m to 11.5m depth Bore installed to 11.5m
8.0	SILTY SAND - light yellow/brown mottled grey silty fine grained sand							
10.0	SAND - light yellow/brown fine grained sand							
12.0	SANDY CLAY - grey mottled red/brown sandy clay							
14.0	TEST BORE DISCONTINUED AT 14.0m							

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel (H) to 3m

TYPE OF BORING: Rotary mud to 14m depth

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0291803, 7437609, elevation = 6m. SWL = 5.85 mBTOC, 5.40 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB4
DATE: 24/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: NE DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°

AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0	SAND - light yellow/brown fine to medium grained sand, moist							Concrete
								Bentonite Seal
6							▽	Class 18 PVC 50mm Casing
8.9	- yellow/brown/orange fine grained sand							
9.5	- light yellow/brown/grey fine grained sand							Filter Sand
13.5	- orange/brown							
13.9	- light yellow/brown/grey							Factory slotted screen 11.4m to 17.4m depth
16.5	CLAYEY SAND - orange/red/brown clayey fine grained sand							
18.1	TEST BORE DISCONTINUED AT 18.1m							Bore installed to 17.4m

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud to 18.0m depth

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0292046, 7437632, elevation = 7m. SWL = 6.85 mBTOC, 6.30 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB5
DATE: 25/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: NE DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.5	SAND - light orange/brown fine grained sand							Concrete
	- light grey/brown fine grained sand							Bentonite Seal
7.5	CLAYEY SAND - orange/brown clayey fine grained sand						▽	Class 18 PVC 50mm Casing
8.0	SANDY CLAY - red/brown sandy clay							Factory slotted screen 5.5m to 8.5m depth
								Filter Sand
								Bore installed to 8.5m
14.0	TEST BORE DISCONTINUED AT 14.0m							

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0292144, 7437551, elevation = 2m. SWL = 4.35 mBTOC, 3.85 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB6
DATE: 25/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: NE DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.5	SAND - light orange/brown fine grained sand - lighth yellow/grey fine grained sand						▽	Concrete Bentonite Seal Class 18 PVC 50mm Casing Filter Sand Factory slotted screen 12.5m to 21.5m depth
21.5	TEST BORE DISCONTINUED AT 21.5m							Bore installed to 21.5m

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0292374, 7437393, elevation = 4m. SWL = 4.43 mBTOC, 3.93 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB7
DATE: 26/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: SW DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.3	FILLING - dark brown silty gravelly sand - brown fine grained sand with some silt							Concrete Bentonite Seal
2.5	SAND - orange/brown fine grained sand - light brown fine grained sand							
4.5	INDURATED SAND - dark brown silty fine grained sand (coffee rock)							
4.9	SAND - light brown fine grained sand							Class 18 PVC 50mm casing Filter Sand Factory slotted screen 5.0m to 11.0m depth
9.8	SANDY GRAVEL AND SHELLS - brown mottled white sandy gravel and shells							
11.0	CLAYEY SAND/SANDY CLAY - light orange/brown mottled grey clayey sand/sandy clay							
14.0	TEST BORE DISCONTINUED AT 14.0m							Bore installed to 14.0m depth

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0289101, 7434739, elevation = 10m. SWL = 8.65 mBTOC, 8.15 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB8
DATE: 26/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: SW DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°

AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.0	SAND - orange/brown fine grained sand							Concrete
0.6	- brown fine grained sand							Bentonite Seal
3.5	- light orange/brown fine grained sand							Class 18 PVC 50mm Casing
								Filter Sand
							▽	Factory slotted PVC screen 9.5m to 12.5m depth
12.0	CLAYEY SAND - orange/brown mottled light grey clayey sand							
14.0	TEST BORE DISCONTINUED AT 14.0m							Bore installed to 14.0m

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0289265, 7434613, elevation = 12m. SWL = 12.25 mBTOC, 11.75 mbgL

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB9
DATE: 27/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: SW DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.4	FILLING - orange/brown clayey sand with some gravel							
1.0	SAND - dark brown fine grained sand with some silt							
	- light brown fine grained sand		D	2.5				
				4.0				
6.5	CLAYEY SAND - orange/brown clayey fine grained sand							
8.0	- orange/brown mottled grey clayey sand/sandy clay (weathered sandstone)							
10.0	TEST BORE DISCONTINUED AT 10.0m							

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 289557, 7434414, elevation = 18m. No monitoring bore installed. (approx 100m from end of runway)

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB10
DATE: 27/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: SW DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0.0	SAND - orange/brown fine grained sand							Concrete
1.0	- light yellow/brown fine grained sand							Bentonite Seal
7.5							▽	Class 18 PVC 50mm Casing
7.8	- orange/brown slightly silty fine grained sand / - light yellow brown fine grained sand							Filter Sand
16.0	SANDY CLAY - orange/brown mottled light grey sandy clay/clayey fine grained sand							Factory slotted PVC screen 11.0m to 17.0m depth
17.2	TEST BORE DISCONTINUED AT 17.2m							~~Bore installed to~~ 17.2m

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 0289819, 7434199, elevation = 8m. SWL = 7.78 mBTOC, 7.35 mbgL (approx 60m from Long Beach bores)

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 14/8

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

BORE No: MB11
DATE: 28/07/06
SHEET 1 OF 1

CLIENT: OZTON PTY LTD
PROJECT: GROUNDWATER SUPPLY INVESTIGATION
LOCATION: SW DUNE SAND, GREAT KEPPEL ISLAND

PROJECT No: 33976
SURFACE LEVEL: --
DIP OF HOLE: 90°
AZIMUTH: --

Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Sampling & In Situ Testing: Depth	Sampling & In Situ Testing: Results	Contamination Observations	Water	Well Construction Details
0	SAND - orange/brown fine grained sand							Concrete
1								Bentonite Seal
1.5	- yellow/brown fine grained sand							
6.5	- orange/brown fine grained sand							
6.9	- light yellow/brown fine grained sand							
12								Filter Sand
15								Class 18 PVC 50mm Casing
20								Factory slotted PVC screen 17.0m to 23.0m depth
23								Bore installed to 23m
24.0	TEST BORE DISCONTINUED AT 24.0m							

RIG: Hydropower Scout **DRILLER:** Drillsure **LOGGED:** CD **CASING:** 100mm Steel to 3m

TYPE OF BORING: Rotary mud

WATER OBSERVATIONS: Groundwater observations not possible whilst drilling

REMARKS: GPS = 289685, 7434579, elevation = 22m.

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	PL	Point load strength Is(50) MPa
W	Water sample	S	Standard penetration test
C	Core drilling	U_x	Tube sample (x mm dia.)
pp	Pocket penetrometer (kPa)	PID	Photo Ionisation Detector

CHECKED
Initials: CD
Date: 23/8

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Ozton Pty Ltd
PROJECT: Production Bore Installation and Testing
LOCATION: Long Beach, Great Keppel Island

SURFACE LEVEL: 8.73m
EASTING: 289829
NORTHING: 7434205
DIP/AZIMUTH: 90°/--

BORE No: PB1
PROJECT No: 33976A
DATE: 23.10.2007
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - grey-brown fine to medium grained sand with some silt and organic matter							
	0.5	- dark orange-brown fine grained sand							
	1								
	2								
	2.5	- light orange-brown fine grained sand							
	3								Concrete
	4								
	5								
	6								Bentonite Seal
	7							▼	
	8								
	9								Class 12 PVC 150mm casing

RIG: Mayhew 1000 **DRILLER:** Geoff Bird **LOGGED:** CD **CASING:** Nil

TYPE OF BORING: Rotary mud to 19.5m

WATER OBSERVATIONS: Not possible whilst drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Ozton Pty Ltd
PROJECT: Production Bore Installation and Testing
LOCATION: Long Beach, Great Keppel Island

SURFACE LEVEL: 8.73m
EASTING: 289829
NORTHING: 7434205
DIP/AZIMUTH: 90°/--

BORE No: PB1
PROJECT No: 33976A
DATE: 23.10.2007
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	10.0	SAND - as before							
	11								
	12								
	13								Sand Filter Pack
	14								
	15								
	16								Stainless Steel Screen 150mm
	17								
	17.5	- orange-brown fine grained sand							
	18								
	18.5	SANDY CLAY - orange-brown mottled grey sandy clay							
	19								
	19.5	Bore discontinued at 19.5m							

RIG: Mayhew 1000 **DRILLER:** Geoff Bird **LOGGED:** CD **CASING:** Nil

TYPE OF BORING: Rotary mud to 19.5m

WATER OBSERVATIONS: Not possible whilst drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ⧗ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Ozton Pty Ltd
PROJECT: Production Bore Installation and Testing
LOCATION: Long Beach, Great Keppel Island

SURFACE LEVEL: 12.81m
EASTING: 289776
NORTHING: 7434244
DIP/AZIMUTH: 90°/--

BORE No: PB2
PROJECT No: 33976A
DATE: 24.10.2007
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - light grey-brown fine grained sand with some silt and organic matter							
	0.5	- light yellow-brown fine grained sand							
	4.5	- dark orange-brown and red fine grained sand							
	6.5	- light orange-brown fine grained sand							

Well Construction Details: 3 Concrete; Bentonite; 8 Class 12 PVC Casing

RIG: Mayhew 1000 **DRILLER:** Geoff Bird **LOGGED:** CD **CASING:** Nil

TYPE OF BORING: Rotary mud to 24.0m

WATER OBSERVATIONS: Not possible whilst drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ⧗ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Ozton Pty Ltd
PROJECT: Production Bore Installation and Testing
LOCATION: Long Beach, Great Keppel Island

SURFACE LEVEL: 12.81m
EASTING: 289776
NORTHING: 7434244
DIP/AZIMUTH: 90°/--

BORE No: PB2
PROJECT No: 33976A
DATE: 24.10.2007
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	10.0	- light yellow-brown fine grained sand							
	11							▼	Sand Filter Pack
	12								
	13								
	14								
	15								
	16								
	17								
	18								150mm diameter stainless steel screen
	19								

RIG: Mayhew 1000 **DRILLER:** Geoff Bird **LOGGED:** CD **CASING:** Nil

TYPE OF BORING: Rotary mud to 24.0m

WATER OBSERVATIONS: Not possible whilst drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Ozton Pty Ltd
PROJECT: Production Bore Installation and Testing
LOCATION: Long Beach, Great Keppel Island

SURFACE LEVEL: 12.81m
EASTING: 289776
NORTHING: 7434244
DIP/AZIMUTH: 90°/--

BORE No: PB2
PROJECT No: 33976A
DATE: 24.10.2007
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	20.0	SAND - as before							
	22.5	SANDY CLAY - light grey mottled orange-red sandy clay							
	24.0	Bore discontinued at 24.0m							

RIG: Mayhew 1000 **DRILLER:** Geoff Bird **LOGGED:** CD **CASING:** Nil

TYPE OF BORING: Rotary mud to 24.0m

WATER OBSERVATIONS: Not possible whilst drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ⧗ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 7.49m AHD
EASTING: 290979.2
NORTHING: 7453628.9
DIP/AZIMUTH: 90°/--

BORE No: MB12
PROJECT No: 74586.01
DATE: 12/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - grey, fine to medium grained sand, with trace of silt							Concrete
	1								Drilling Spoil
									50mm PVC Class No. 18 casing
	2								Bentonite Seal
	3	- moist - wet						▼	
	4								
	5								Prepacked 50mm factory slotted in PVC screen 2.8m to 9.0m
	6	- pale brown-orange							
	7								Filter Sand
	8								Piezometer installed to 9.0m depth
	9								
	9.0								
	9.2	SILTY CLAY - estimated 'stiff to firm', orange-brown and grey, silty clay, with a trace of medium to coarse grained quartz gravel, with some fine to medium grained sand							
	10	Bore discontinued at 9.2m due to refusal.							
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: Groundwater observed at 2.9m.

REMARKS: SWL on construction: 1.03m BGL

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics I Environment I Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 7.49m AHD
EASTING: 290979.2
NORTHING: 7435628.9
DIP/AZIMUTH: 90°/--

BORE No: MB12a
PROJECT No: 74586.01
DATE: 10/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.0	SAND - grey and light grey, fine to medium grained sand, with a trace of silt							
		- moist to wet		B	3.5			▼	
					4.0				
		- wet							
		- saturated							
				B	6.0				
					6.5				
		- becoming pale brown-orange							
	8.3	SILTY SAND - pale brown and orange, silty sand, with some clay, wet							
		- becoming light brown							
		- becoming brown-orange							
		- with a trace of quartz fragments and trace of clay							
		- decreasing clay content, saturated		B	12.3				
		- with a trace of clay, wet			12.5				
		- saturated							
		- increasing clay content							
		- pale grey							
	16.8	- increasing clay content		B	16.8				
					17.0				
	17.3	SILTY CLAY - grey, silty clay, with some fine to medium grained sand and medium to coarse quartz gravel, wet							
		Bore discontinued at 17.3m due to refusal.							

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: Groundwater observed at 4.0m.

REMARKS: No well installed due to screen damage and bore collapse. Redilled as MB12b

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics I Environment I Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 7.49m AHD
EASTING: 290979.2
NORTHING: 7435628.9
DIP/AZIMUTH: 90°/--

BORE No: MB12b
PROJECT No: 74586.01
DATE: 11/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - grey, fine to medium grained sand, with trace of silt							
	3	- moist - wet						▼	
	6	- pale brown-orange							
	9.5	SILTY CLAY - estimated 'stiff to firm', orange-brown and grey, silty clay, with trace of medium to coarse grained quartz gravel, with some fine to medium grained sand							
	10.3	Bore discontinued at 10.3m due to refusal.							

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: Groundwater observed at 2.9m.

REMARKS: No well installed due to non-release of auger plug. Redrilled as MB12

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics I Environment I Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 13.3m AHD
EASTING: 291215.1
NORTHING: 7435371.8
DIP/AZIMUTH: 90°/--

BORE No: MB13
PROJECT No: 74586.01
DATE: 13/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - brown, fine to medium grained sand							Concrete
	1								Backfill
									50mm PVC Class No. 18 casing
	2								Bentonite Seal
	2.0	SILTY CLAYEY SAND - brown, silty clayey sand, fine to medium grained sand, with some fine to coarse grained quartz gravel, moist							
	2.8								
	3	SILTY SAND - pale orange-brown, silty sand, fine to medium grained sand, moist to wet		D	3.0			▽	
		- increasing clay content			3.5			▼	Filter Sand
	4	- brown and orange-brown mottled with some clay, some medium to coarse grained quartz gravel, trace of tree roots, moist to wet							
	5								Prepacked 50mm factory slotted in PVC screen 3.0m to 6.10m
	5.0	SILTY CLAYEY SAND - red-brown, silty clayey sand, fine to medium grained sand, moist to wet							
	5.5								
	6	SILTY SANDY CLAY - estimated 'stiff to very stiff', orange-brown and grey mottled, medium plasticity, silty sandy clay, fine to medium grained sand, moist							Piezometer installed to 6.10m depth
		- increasing moisture content							
	7								
	8								
	8.0	CLAYEY SAND - orange-brown, clayey sand, fine to medium grained sand, wet							
	8.5								
	9	SILTY CLAY - very stiff, red-brown, medium to high plasticity, silty clay, with some fine grained sand, some fine to medium grained quartz gravel							
		- increasing gravel content							
	10								
	11	- band of grey silty clayey sand, fine to medium grained sand							
	11.4	Bore discontinued at 11.4m due to refusal.							
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: Groundwater seepage observed at 2.8m BGL and at 8.0m BGL.

REMARKS: SWL on completion: 2.57m BGL

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics I Environment I Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 15.15m AHD
EASTING: 291484.3
NORTHING: 7435428.5
DIP/AZIMUTH: 90°/--

BORE No: MB14
PROJECT No: 74586.01
DATE: 14/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - dark brown/black, sand, mixed with organic matter, with some fine to medium grained sand, with some silt							Concrete
	1	- becoming dark brown and grey, no organic matter - dark grey, no clay, moist - pale grey							Drilling Spoil 50mm PVC Class No. 18 casing
	2			B	2.0 2.5				Bentonite Seal
	3			B	3.0 3.6			▼	
	4	- grey - becoming pale brown, with some clay, moist to wet						▷	Prepacked 50mm factory slotted in PVC screen 3.50m to 6.60m
	5	- pale brown, increasing clay content							Filter Sand
	6	SILTY SANDY CLAY - pale brown, silty sandy clay, fine to medium grained sand, moist							Piezometer installed to 6.60m depth
	6.6	- increasing resistance Bore discontinued at 6.6m due to refusal.							
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								
	16								
	17								
	18								
	19								

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: Groundwater seepage observed at 4.0m.

REMARKS: SWL on completion: 3.12m BGL

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics I Environment I Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 28.28m AHD
EASTING: 291703.9
NORTHING: 7435198.9
DIP/AZIMUTH: 90°/--

BORE No: MB15
PROJECT No: 74586.01
DATE: 14 - 15/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	SAND - brown, fine to medium grained sand, with silt and organic matter							Concrete
		- pale red-brown, fine grained sand, with some silt		B					Drilling Spoil
	1								Bentonite Seal
	2.0	- light red-brown, fine to medium grained sand		B					50mm PVC Class No. 18 casing
	3.0	- red-brown, with a trace of clay		B					
	4.0	- increasing clay content, with a trace of fine to medium gravel		B					Drilling Spoil
	5.0								
	9.0			B					Prepacked 50mm factory slotted in PVC screen 7.80m to 10.90m
	9.4	SANDY CLAY - red-brown, sandy clay, with some medium to coarse gravel, fine to medium grained sand			9.5				Filter Sand
	10	- increasing clay content							Piezometer installed to 10.90m depth
	11.0	Bore discontinued at 11.0m due to refusal.							

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: No free groundwater seepage observed whilst drilling.

REMARKS: Well dry on construction.

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 19.41m AHD
EASTING: 291544.5
NORTHING: 7435361.5
DIP/AZIMUTH: 90°/--

BORE No: MB16
PROJECT No: 74586.01
DATE: 16/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - brown and grey, fine to medium grained sand, with some silt and organic matter							Concrete
		- light grey, fine grained sand		B	0.5				Drilling Spoil
	1	- pale grey, fine to medium grained sand			1.2				50mm PVC Class No. 18 casing
	2								
	3	- pale orange-brown							Bentonite Seal
	4			B	4.0				
		- light orange-brown			4.2				
	5								Drilling Spoil
	6	- pale orange-brown							
								▼	
	7			B	7.0				
		- orange-brown, moist			7.2				
	8								
		- light orange-brown, increasing moisture content							
	9			B	9.0				Prepacked 50mm factory slotted in PVC screen 7.10m to 13.30m
		- moist to wet			9.2			▷	
	10								
	11								Filter Sand
	12								
	13								Piezometer installed to 13.30m depth
		- light grey, moist							
	14			B	13.8				
		- moist to wet			14.0				
	15	- moist							
	16								
		- moist to wet							
	17								
	17.7								
	18	Bore discontinued at 17.7m due to refusal.							
	19								

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: Groundwater seepage observed at 9.3m and 14.0m.

REMARKS: SWL on construction: 6.68m BGL

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics I Environment I Groundwater

BOREHOLE LOG

CLIENT: Tower Holdings Pty Ltd
PROJECT: Additional Groundwater Investigation
LOCATION: Great Keppel Island

SURFACE LEVEL: 36.72m AHD
EASTING: 292260.7
NORTHING: 7435076
DIP/AZIMUTH: 90°/--

BORE No: MB17
PROJECT No: 74586.01
DATE: 15/2/2011
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0	SAND - pale grey and grey, fine to medium grained sand, with some organic matter							
		- pale brown							
				B	0.7				
	1				1.0				1
		- pale orange-brown, with some clay							
	2								2
	2.5			B	2.5				
	2.6	SILTY CLAY - estimated 'stiff to very stiff', orange-brown, silty clay, with some fine to medium grained sand			2.6				
		Bore discontinued at 2.6m due to refusal.							
	3								3
	4								4

RIG: Ezi Probe **DRILLER:** B & G Drilling **LOGGED:** KH **CASING:** Nil

TYPE OF BORING: Hollow flight auger.

WATER OBSERVATIONS: No free groundwater and seepage observed whilst drilling.

REMARKS: No well installed.

SURVEY DATUM: GDA94 Zone 56 K

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater