
August 2006
Volume 2
Sapphire
Environmental Assessment
Report
SGS
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PTW Planning

Sapphire

Prepared for
Sapphire Beach Development Pty Ltd

Environmental Assessment Report

August 2006

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CERTIFICATION

This Environmental Assessment Report has been prepared by PTW Planning on behalf of Sapphire Beach Development Pty Ltd as trustee for Sapphire Beach Development Unit Trust.

The Environmental Assessment Report has been prepared in accordance with the Environmental Assessment Requirements issued by the Director General of the Department of Planning under Part 3A of the Environmental Planning and Assessment Act.

In accordance with the Environmental Assessment Requirements issued by the Director General it is certified that the information contained in this environmental assessment is neither false nor misleading.

Janet Thomson
PTW Planning

22 August 2006.

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Sapphire Beach Development P/L

Proposed Redevelopment of Pelican Beach Resort, Sapphire Beach

Coastal Hazards and Water Management

August 2006

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Executive Summary

An integrated water cycle management and coastal hazards assessment was conducted for the proposed redevelopment of Pelican Beach Resort, near Coffs Harbour. Under existing conditions it was found that for small and frequent storm events stormwater run-off was contained on site and infiltrated into the soil. However, in large and infrequent storm events, stormwater would discharge across the northern boundary into neighbouring properties.

The proposed redevelopment of the Pelican Beach Resort will create an upmarket lifestyle resort catering for a mix of both permanent residents and tourists. At completion, it is expected that the development will comprises 117 dwellings and 234 car parks. The dwellings will consist of a mixture of apartments, town houses and houses. There will also be extensive areas of open space and retained vegetation on the site.

The development is planned to include measures and structures in line with water sensitive urban design principles to sustainably manage water within the development. Some of the features include the installation of rainwater tanks and water efficient appliances and landscaping. Furthermore, a detention basin will be constructed as part of the development, with stormwater run-off from the development being directed to the basin. This water will either infiltrate into the surrounding soil or discharge via an existing stormwater pit and pipe located on an adjacent property to the south. A gross pollutant trap will also be installed to remove litter from discharge through the existing pipe system.

With these measures in place and the use of water sensitive urban design principles for the development, it was determined that:

- Stormwater run-off would be managed in a sustainable manner;
- Stormwater would not discharge to adjacent properties over the northern boundary;
- There would be no additional impacts on the adjacent Solitary Islands Marine National Park.

A coastal hazards assessment was also undertaken. This assessment found that all proposed dwellings were landward of the 100 year hazard line and that the detention basin is situated beyond the immediate coastal hazard line.

Building floor levels were recommended to be at least 7.5 m AHD. This level included the Coffs Harbour City Council freeboard above the determined coastal inundation level.

1. Introduction

Sapphire Beach Development Pty Ltd is proposing to redevelop Pelican Beach Resort near Coffs Harbour.

1.1 Lands Affected by the Proposal

The specific lots involved in the redevelopment are Lot 2 DP 800836 and Lots 100 and 101 DP 629555, Coffs Harbour.

1.2 Overview of the Proposed Development

The proposed redevelopment of the Pelican Beach Resort will create an upmarket lifestyle resort catering for a mix of both permanent residents and tourists. The redevelopment will be undertaken in stages with the lower coastal section of the site. This will be followed by developing the central and then more elevated areas.

At completion, it is expected that the development will comprises 117 dwellings and 234 car parks. The dwellings will consist of a mixture of apartments, town houses and houses. There will also be extensive areas of open space and retained vegetation on the site. The layout of the site is provided in Figure 1.

The houses will be located along the beachfront and consist of premium 2 storey, 3 bedroom structures. To the west of the houses, a series of 2-3 bedroom town houses and/or apartments will be developed and the central and elevated areas will be comprised of 4 storey apartment buildings. The apartments at the northwest corner at the site will also contain recreational/community facilities.

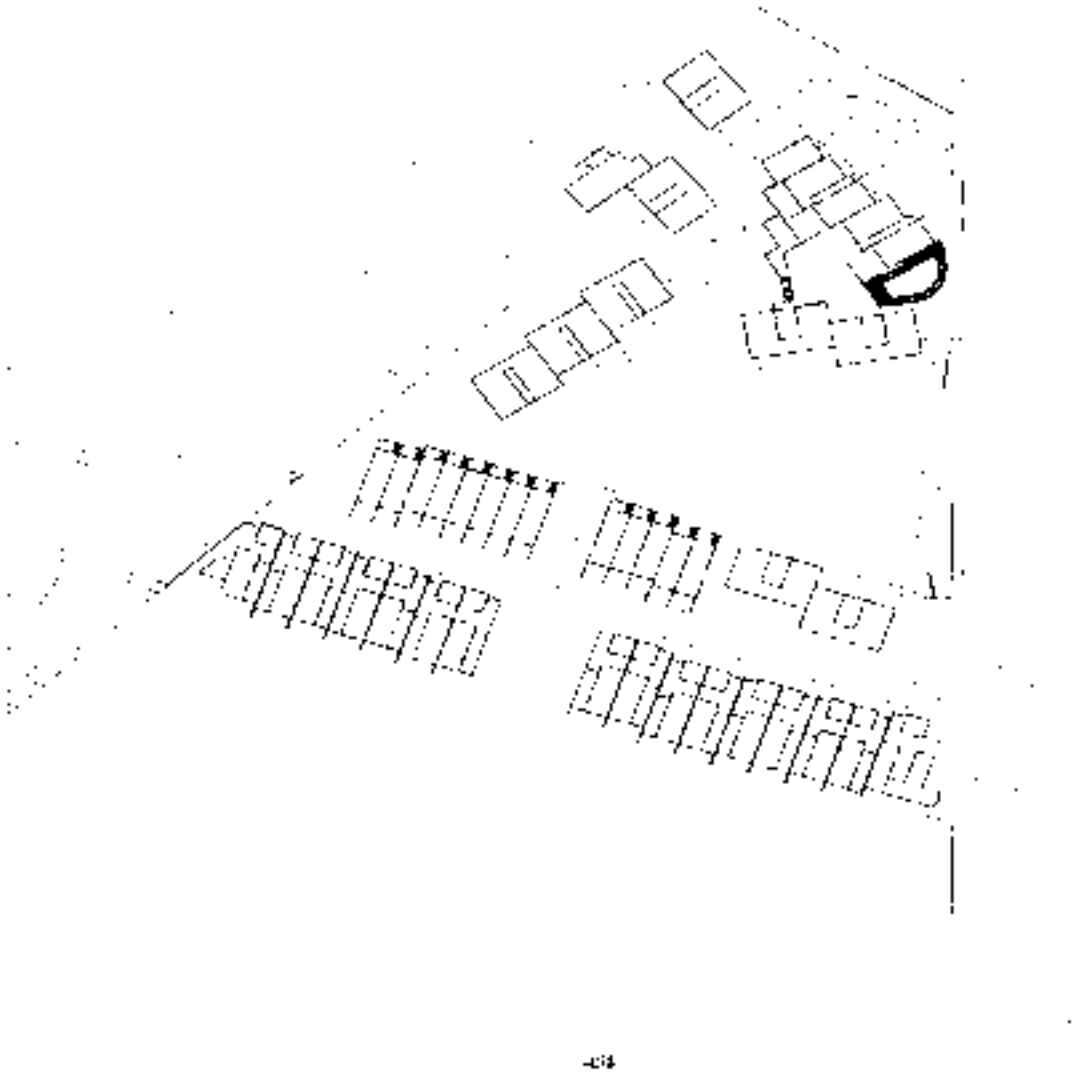

Figure 1 Site Layout

1.3 Purpose of the Report

The purpose of this report is to assess the hydrological and coastal hazard processes and issues associated with the development.

Preliminary discussions/liaison in regards to the proposed development, have been undertaken with:

- Coffs Harbour City Council;
- NSW Marine Parks Authority; and
- NSW Department of Natural Resources.

These discussions have indicated the issues that would be required to be addressed by the development proposal.

1.4 Structure of the Report

This report is structured so that:

- Section 2 gives a description of existing site conditions;
- Section 3 summarises the advice received in respect of potential impacts;
- Section 4 discusses the Integrated Water Cycle Assessment; and
- Section 5 provides a review of Coastal Processes.

2. Existing Site Conditions

2.1 Topography

The site consists of three distinct areas:

- A relatively flat, low lying area that occupies the eastern portion of the site – adjacent to Campbells Beach;
- A steep section that occupies the central part of the site towards the northern property boundary; and
- An elevated area on the western part of the site adjacent to the Pacific Highway. This elevated section is approximately 10-12 metres higher than the lower, eastern portion.

An analysis of the 2 m contours provided by Coffs Harbour City Council showed that the catchment for the site includes elevated areas immediately beyond the western portion of the southern property boundary. Hence, the site will receive some run-off from areas beyond the site boundary. Run-off from the Pacific Highway is captured through the existing stormwater system, and therefore does not enter the site.

2.2 Existing Land Use

The existing site has an area of approximately 4.15 hectares and includes the existing resort, a disused restaurant, an area of remnant rainforest and a grassed foreshore area behind the beach.

2.3 Adjacent Land Uses

To the east of the site is Campbells Beach and the Solitary Islands Marine Park. Development to the south and north consists of low and medium density residential developments respectively. Further north is the Nautilus Resort, which is similar to the current Pelican Beach Resort development. The Pacific Highway provides access and bounds the site to the west.

2.4 Description of Existing Hydrological and Drainage Conditions

A diagram of the existing layout of the site is presented in Figure 2.

Figure 2 shows that large portions of the site are pervious with extensive gardens, trees and lawns. Impervious areas, such as buildings, tennis courts, a pool and car parking are located on the southern portion of the site.

The site drains from west to east with run-off collecting in the depression formed by the sand dune along the eastern boundary. Discharge of water from the depression occurs through one of two mechanisms. Either:

- Infiltration and then groundwater movement towards the ocean; or

- Flow across the northern boundary of the site onto the adjacent property when the depth of the ponded water exceeds approximately 1 metre or 5.5 m AHD. This would only occur in large rainfall events such as a 100-year ARI storm event of 24 hours duration.

An existing 750 mm diameter stormwater pipe that discharges to the ocean has been located on the adjacent southern property. This pipe is currently being utilised for site drainage.

A bore is located on the property and is currently used by the Pelican Beach Resort for the watering of the gardens.

2.5 Foreshore Description

The section of Campbells Beach fronting the site is characterised by a relatively narrow and steep beach berm consisting of coarse sands. A low dune backs the beach, becoming more prominent towards the north of the site, rising in height from approximately 5 m AHD to over 6 m AHD. Dune vegetation is generally limited to grasses in the southern half of the site, while the northern section is heavily vegetated with a mixture of grasses, shrubs and woody plants. Evidence of dune erosion is limited to some minor scarps up to 0.5 metres in height. These scarps are discontinuous in extent and are more exposed in the central, less vegetated section of the dune. Landward, the dune grades down to a swale, with a lower elevation of approximately 4.5 m AHD.

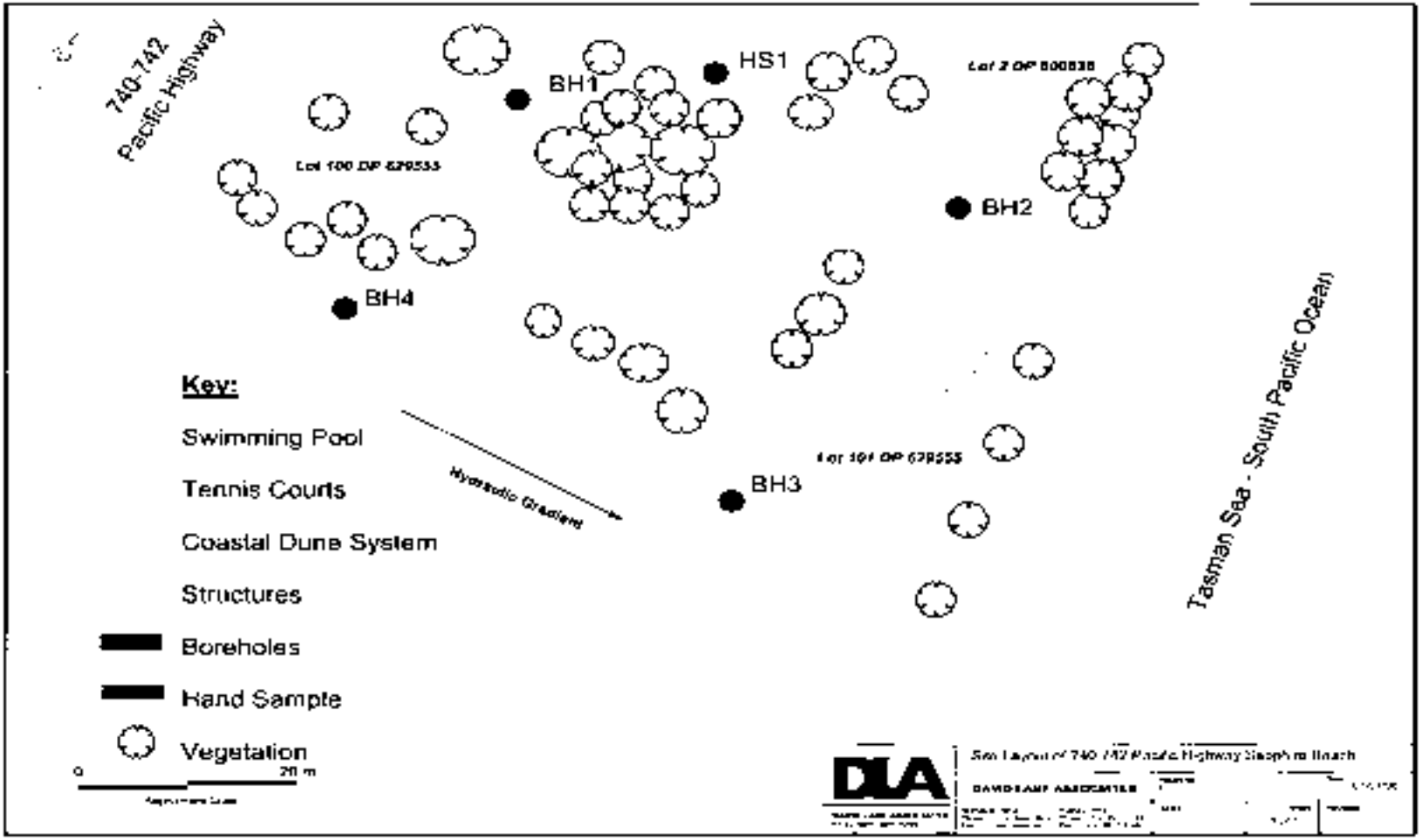

Figure 2 Existing Site Layout

3. Advice Received in Respect of Potential Impacts

Advice has been received from the NSW Marine Parks Authority in relation to the proposed development. This advice was sought due to the proximity of the proposed development to the Solitary Islands Marine Park and the possibility that development may impact on the Marine Park. The advice received was that:

- A permit is not required provided the development is outside the mean high water mark. Hence, for this development a permit from the Marine Parks Authority is not required;
- No new stormwater discharge points to the Marine Park could be constructed. However, existing stormwater outlets may be utilised;
- The NSW Marine Parks Authority will make comment on the application as part of the due process.

Under Section 20 of the Marine Parks Act 1997, a determining authority (i.e. Coffs Harbour City Council in this case) cannot approve a development if it is of the opinion (after consulting with the Marine Parks Authority) that the development is likely to impact on a Marine Park. Therefore, in order to proceed, the development needs to minimise any impact on the adjacent Marine Park.

Advice was also sought from the NSW Department of Natural Resources (DNR) and Coffs Harbour City Council (CHCC) in relation to coastal processes at the site. The advice received was that the development would be assessed on its merits.

4. Integrated Water Cycle Management

Integrated Water Cycle Management (IWCM) utilises principles of water sensitive urban design (WSUD) within a holistic framework to reduce the impacts of development on all parts of the water cycle. Water Sensitive Urban Design and Integrated Water Cycle Management are critical components in an overall strategy for sustainable development. The major aspects of the water cycle that are typically considered within an IWCM strategy include:

- Stormwater;
- Groundwater;
- Potable Water Demand (from the Coffs Harbour reticulated supply);
- Wastewater generation;
- Water Conservation; and
- Water Quality.

4.1 Analysis Process

An initial hydrologic assessment was completed to determine stormwater run-off rates and volumes under existing and developed conditions. The assessment utilised 45 years of daily rainfall data for Coffs Harbour between January 1960 and August 2005 events well as design storms as determined from Australian Rainfall and Runoff. A comparison between the highest recorded rainfall data, April 1963, and the design storm events indicated that this event equated to a 100-year storm with a duration of between 24 and 48 hours.

Further to establishing the applied rainfall for the generation of runoff, the soil characteristics of the site were examined. The geotechnical report (Network Geotechnics 2006) contained in the Phase 1 Site Environmental Investigation (Lane 2006) was the basis for determining the infiltration capacity of the soils. The geotechnical information showed that the soils ranged from silty to sandy clays throughout the site with medium to coarse-grained sand and gravel adjacent to the dune area.

Based on this soil profile, it is assumed that infiltrated water would move towards the dune system and discharge to the ocean.

4.2 Existing Conditions

Utilising both the daily rainfall data and assumed infiltration rate of the soil, the regularity and volume of runoff was established. From this it was found that run-off was generated on about 4,800 days (29%) of the 45-year assessment period. A further assessment of runoff was then undertaken for the 100-year design storm event. The peak volume of 15,500m^3 was generated for the storm duration of 24 hours. This runoff would be contained in the natural depression to the west of the dune system.

It has been estimated that the natural depression area has a storage capacity of 4,500m^3. In addition to this above ground storage, there is a corresponding soil store capacity. Based on the surface area and soil profile depth, this storage volume has been estimated as 5,400m^3. The total storage capacity of the existing system is therefore estimated at 9,900m^3.

Consideration was then given to the volume of this runoff and the corresponding depth of ponding. It was determined that surface ponding of runoff in the depression would occur on approximately 300 days (2%) of the 45 year assessment period. The average depth of ponding was 0.13m with a maximum depth of 1.25m assuming no discharge to the adjacent northern properties. However, if this maximum depth were achieved, discharge would occur over the northern boundary to the adjacent property.

Given the above total storage volume available on the site, a potential discharge to the adjacent property of 5,600m^3 could occur. This issue will need to be addressed by the development proposal.

4.3 Developed Conditions

4.3.1 Water Sensitive Urban Design

The development is planned to include measures and structures in line with water sensitive urban design principles to sustainably manage water within the development. The Water Sensitive Urban Design (WSUD) initiatives planned for use on the site include:

- Adoption of water conservation measures including dual flush toilets and low flow shower heads to reduce potable water demands;
- Use of water efficient appliances;
- Use of water sensitive landscaping and appropriate species;
- Harvesting of roofwater into rainwater tanks with the use of this water for non potable uses (e.g. toilet flushing and garden watering) to reduce the demand on the potable water supply;
- The rainwater tanks will have their supply replenished, as necessary, from the potable water reticulation to ensure there is always one day's demand available in the tanks;
- The overflow from the rainwater tank will be directed onto the soil surface to encourage water infiltration into the soil;
- The use of groundwater for irrigation of landscaping when necessary to reduce the demand on the potable water supply;
- Where practical, direction of surface flows over natural grassed and rock surfaces, blended into the landscape form, to maximise opportunities for water infiltration;
- Minimising paved areas to maximise opportunities for water to infiltrate; and

- Use of detention basins that are designed to infiltrate as much stormwater as practical to achieve the dual aims of reducing the stormwater discharge direct to the ocean through the existing stormwater pipe and to recreate the historical groundwater regime.

The use of these design elements, integrated into the built form, will encourage a water conservation and sustainability strategy at the site.

The development is also required to reduce potable water consumption in line with BASIX and rainwater tanks would provide the most efficient means to satisfy this target. It is assumed that rainwater tanks on individual structures with a capacity of approximately 2,500L for houses and 12,000L approximately for apartment buildings (provided through a proprietary tank) will satisfy the BASIX requirements and provide a reduction in stormwater runoff volumes from the site. The final size would be refined in the detailed design stage.

4.3.2 Post Development Run-off

As previously discussed, this development will be comprised of 117 dwellings, car parking, additional roads and landscaped areas. This will increase the impervious areas and decrease the percentage pervious from the existing conditions. The result of these changes will be an increase in stormwater runoff. For the 100 year 24 hour storm, this increase is approximately 1,300m^3 or 9%. It is anticipated that this increase will be offset through the inclusion of WSUD features nominated in Section 4.3.1.

The total runoff volume for the post development conditions of 16,800m^3 will be catered for by:

- Capturing approximately 400 m^3 in rainwater tanks on buildings;
- Infiltrating about 7,800 m^3 into the soil beneath the detention basin; and
- Detaining about 8,600m^3 in the above ground storage.

Of the 8,600m^3, it is estimated that a portion will be discharged directly into the existing stormwater pipe on the southern boundary. As indicated in design drawings provided by Coffs Harbour City Council (Newham Karl & Partners 1998a, 1998b), this pipe is 750mm diameter and has an expected capacity of 1m^3/s. This estimated capacity is considered high and a more conservative capacity of 0.5m^3/s has been adopted.

Adopting this flow rate for a one hour period gives a discharge capacity of 1,800m^3. Applying a further assumption that this pipe would operate at flow full for the first 4 hours of the 24 hour design storm event, approximately 7,200m^3 of the 8,600m^3 would be discharged. Therefore, the volume required to be stored in the detention area is reduced to 1,400m^3.

A further examination was undertaken of the estimated volumes of ponding likely to occur on the site for the 100-year ARI design rainfall events for standard durations between 15 minutes and 48 hrs. Short duration rainfalls (less than 2 hours) have a high peak flow rate but a modest volume. The surface runoff rate for these events exceeds the capacity of the pipe on the adjacent property, which will result in ponding upstream

of the pipe inlet. Due to the soil conditions of the site the amount of ponding will be limited as there will be significant infiltration.

Storm events of 24 and 48 hours duration have a reduced peak flow rate and hence reduced ponding as much of the run-off would be able to discharge into the pipe on the adjacent property and also infiltrate into the soil. The greatest amounts of ponding are expected to occur for design rainfalls that are toward the middle of the design durations examined.

Based on the available soil information and an adopted capacity of the existing pipe on the adjacent property of 0.5 m^3/s, the maximum predicted ponding volume would be in the order of 2,000 m^3.

An analysis of stormwater run-off volumes for the developed site was also undertaken using the recorded daily rainfall data. This analysis found the drainage system was able to successfully detain, infiltrate and convey stormwater run-off from the development

4.3.3 Minimum Floor Level

Minimum habitable floor levels for the development have been determined considering coastal hazards and 100-year flood events as well as a minimum freeboard of 0.5 m as determined by Coffs Harbour City Council. Geomarine (1998) recommended a minimum inundation level of 7.0 m AHD. This is higher than the estimated flood level for the site. Hence, all buildings within the existing relatively low lying area behind the dune will have a minimum floor level of 7.5 m AHD.

4.3.4 Proposed Detention Layout

A number of constraints were placed on the detention/infiltration system including:

- Minimum 10 m setback from the top of the dune to ensure the detention/infiltration basins are situated outside the immediate coastal hazard line and beyond the area affected by storm bite;
- Minimum 5 m setback from all dwellings; and
- Maximum batter slopes of 1 in 4 in general – which is subject to refinement in the landscaping detail.

Figure 3 shows the proposed development layout and the nominated location for the detention area. This area would have a storage capacity of 3,400m^3 and therefore storage depth of between 0.6 and 0.7m would be required to contain the 2,000m^3 of stormwater runoff. Allowing for 0.5m of freeboard from the top water level to the nominated floor level, the total basin depth would be in the order of 1.2m below floor level. This will require reshaping of the area to the west of the dune system, the final configuration of which would be determined during detail design.

Utilising both design storm events and 45 years of recorded daily rainfall data, the initial hydrologic assessment has shown that the proposed stormwater treatment systems will be able to contain the additional stormwater run-off generated by the development.

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ATTENTUS PROJECTS AND PROPERTIES
PELICAN BEACH RESORT
DETENTION BASIN
LOCATION

job no. | 22-12787
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Figure 03

2/115 West High Street Coffs Harbour NSW 2450 Australia T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com.au W www.ghd.com.au

Plot Date: 14 August, 2006 - 10:20 AM Cad File No: G:\22\12787\CAD\FIG 1 DETENTION BASIN.dwg

4.4 Water Quality

As previously indicated, a number of water sensitive urban design measures will be included in the development. These techniques will act as water quality treatment devices to assist in the removal of pollutants through the treatment of low, or regular, flows. It is these low flows that contain the higher concentrations of nutrient loads.

4.4.1 Rainwater Tanks

Rainwater tanks will be used to harvest roof runoff to minimize the volume of stormwater that needs treatment, as well as reducing the potable water demand, prior to discharge to the detention basins or off site.

Rainwater tanks, together with discharges onto vegetated areas, provide a highly effective means for the removal of pollutants in these smaller storm events. For the treatment of roof water, the first flush flows are directed to the first flush tank. This tank will have the ability to drain to the surrounding soil structure and hence the pollutant removal process is undertaken as the water infiltrates into the soil. Once the first flush storage has reached its capacity, the excess roof runoff is directed to the rainwater storage tank where it can be used to fill the partially depleted storage caused by the household non potable water demands. In the event that this tank is full, the overflows are directed to the proposed detention areas.

4.4.2 Buffers

Impervious surfaces such as car parking, roads and paving will allowed to discharge freely over open vegetated areas often referred to as a buffer. These buffers treat surface flows by reducing the travel time of runoff, reducing the flow velocity and hence reducing the erosion potential and effectively allowing water ponding within the vegetation. This encourages the stormwater to infiltrate into the surrounding soil structure and also improves the opportunity for vegetation to ‘take up’ the nutrients from the runoff hence reducing the nutrient export load to the downstream system.

4.4.3 Detention Basin

The overflows from the above treatment devices will be directed to the proposed detention basins that are each expected to contain both an inlet area, for any concentrated inflow, and a main detention area. The inlet area will allow runoff from point sources to pond for a short period of time, sufficient to remove the medium to course sediment, and then the water will spill into the main storage area. The configuration of this inlet area would be designed to blend with the landscaping and to ensure ease of access so that the sediment build up could be removed as required and would reduce the likelihood of blockages within the larger detention area.

The detention pond has been sized to cater for the storage of runoff in excess of the capacity of the existing 750mm diameter pipe from the adjacent property, ensuring that the stormwater discharge from the development does not exceed the current site stormwater discharge. In addition to detaining the stormwater runoff, the ponded water will be able to infiltrate into the existing soil structure removing any residual nutrients.

Some stormwater runoff from the site will be directed to the existing stormwater discharge pipe located to the south of the subject property. This runoff will be from the more elevated areas of the site and will pass through the gross pollutant trap prior to discharge into the pipeline.

4.4.4 Gross Pollutant Trap

While the above treatment devices will remove nutrients in the stormwater runoff, they will not effectively remove any gross pollutants generated on the site. Consequently, it is proposed that a gross pollutant trap will be constructed as part of the outlet system from the detention basin to the existing pipe discharge located in the adjoining property to the south.

This will allow for the removal of gross pollutants from the runoff prior to connection into the existing stormwater drainage system.

4.4.5 Runoff From Other Areas

In undertaking the analysis on water quality, it has been assumed that any runoff from a catchment area outside of the subject property will receive appropriate water quality treatment before entering onto the subject site.

4.4.6 Summary

The incorporation of the above treatment devices will ensure that there is no increase in pollutant export from the site to the Solitary Islands Marine Park as a result of the proposed development. Details on the size and configuration of the devices will be determined as part of the detail design process and will require detailed water quality modeling.

5. Coastal Hazards

This assessment of coastal hazards is based on the following:

- A preliminary site assessment;
- Campbells Beach Coastal Processes and Hazard Definition Study (Geomarine, 1988);
- Campbells Beach Hazard Lines Map 1 (Willings and Partners, 1999); and
- Discussions with relevant representatives of DNR and CHCC.

5.1 Storm Bite and Coastal Recession

Geomarine (1998) have recommended the following hazard lines as drawn by Willing and Partners (1999) be adopted for Campbells Beach:

- Immediate Hazard Line: 10 metre setback from the dune escarpment;
- 50 year Hazard Line: 29.5 metres setback from the dune escarpment; and
- 100 year Hazard Line: 50 metre setback from the dune escarpment.

These hazard lines are considered conservative estimates and include:

- Long term recession of the dune (0.3 m/yr) based on the historical aerial photography record;
- Sea level rise due to climate change (extra 4.5 m and 10 m recession over 50 and 100 years respectively); and
- Estimated design storm bite of 10 m.

The Geomarine report indicates that the southern part of Campbells Beach (where the site is located) has seen the greatest amount of recession with a loss of sand in the order of 0.2 m^3/m/yr over the period of record assessed (1942 – 1996). Geomarine attributed this loss of sand to a net decrease in the northward littoral drift of sand along the coast from the construction of the breakwalls at Coffs Harbour to the south.

5.2 Coastal Inundation

Geomarine (1998) has recommended that a coastal inundation level of 7.0 m AHD be adopted for Campbells Beach. As the dune crest along this area is between 5.0 and 6.0 m AHD it is expected that the lower lying area of the subject site (down to 4.5 m AHD) could be inundated during large storm events.

5.3 Coffs Harbour City Council Coastal Hazard Policy

Under the Subdivisions and Contracts - Associated Policies, the CHCC Coastal Hazard Policy states:

- A Coastal Hazards Assessment is required for developments that may be affected by Coastal Processes;
- A notation be placed on all properties within the City that are identified within the 100 year Coastal Hazard Zone; and
- The notation to state that any development on the lot will need to take into account the effect of coastal processes over an appropriate planning period. The notation shall also state that, as a general rule, Council requires residential developments to be free from the effects of coastal processes for a period of 100 years and for commercial/tourism development, 50 years. The planning period for other developments, such as extensions, to be assessed on the merits of each case.

5.4 Incorporation of Coastal Hazard Planning Considerations into the Proposed Redevelopment

Figure 4 displays the proposed development overlaying a scanned section of the Willings and Partners (1999) drawing of the Campbells Beach Hazard Lines. This indicates that all building development is proposed to be sited landward of the 100 year Hazard Line.

The proposed detention/infiltration basin has been sited such that it will be at least 10 metres landward of the dune escarpment. Hence, it is outside the Immediate Hazard Line.

To address coastal inundation, all buildings within the existing relatively low-lying area behind the dune will have a minimum floor level of 7.5 m AHD. This will provide a 0.5 metre freeboard above the 7.0 m AHD inundation level recommended by Geomarine (1998). This will be achieved by partially filling the low-lying area to a height of 6.5 m AHD where buildings are to be sited.

A dune revegetation program is also proposed. This will improve the dunes resilience to recession and erosion during storm events.

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Map Projection: Universal Transverse Mercator
Horizontal Datum: Geodetic Datum of Australia 1994
Grid: Map Grid of Australia, Zone 56

Proposed Development Roof Tops (yellow) in relation to Coastal Hazard Lines as drawn by Willing and Partners (1999)

09 08 2006

6. References

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Document Status

Rev No	Author	Reviewer		Approved for Issue		
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Sapphire Beach Development P/L

Proposed Redevelopment of Pelican Beach Resort, Sapphire Beach

Assessment of Services

August 2006

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Appendices

1. Introduction

GHD Pty Ltd (GHD) was engaged by Sapphire Beach Developments Pty Ltd (SBD) to prepare the engineering input into the concept plan for the proposed redevelopment of the Pelican Beach Resort at Lot 2 DP 800836 and Lots 100 and 101 DP 629555, Coffs Harbour.

GHD understands that in reviewing the concept plan for this development, the Department of Planning NSW will require that there are adequate infrastructure services to support the proposed development. GHD has undertaken a desktop review of the available services with the scope of works including:

- Consulting Coffs Harbour City Council (CHCC) in regards to the water and sewer services;
- Obtaining confirmation from Country Energy that capacity exists within the local network to support the proposed development; and
- Gaining conformation from Telstra that telecommunications will be available to the site.

1.1 Site Description

This site currently includes the existing 114 suite resort, a disused restaurant, an area of remnant rainforest, and a grassed foreshore area behind the beach. The site is bounded to the west and accessed from the Pacific Highway and has existing residential development to its north and south. To the east is Campbells Beach which the site overlooks.

1.2 Description of Proposal

The proposed development is for the redevelopment of the Pelican Beach Resort to create an upmarket lifestyle resort catering for a mix of both permanent residents and tourists. The redevelopment of the site will be done in stages with the early stages being built on the lower coastal section of the site. This will be followed by developing up the hill to the flat section adjacent to the Pacific Highway.

At completion, it is expected that the development will comprises 117 dwellings and 234 car parks. The dwellings will consist of a mixture of 88 apartments, 13 town houses and 16 houses. There will also be extensive areas of open space and retained vegetation on the site. The layout of the site is provided in Figure 1, below.

The houses will be located along the beachfront and consist of premium 2 storey, 3 bedroom structures. To the west of the houses a series of 2-3 bedroom town houses will be developed and up the hill to the flat section will be groups of 2 and 3 storey apartment complexes. The large complex of apartments at the northwest corner of the site will also contain recreational and communal facilities.

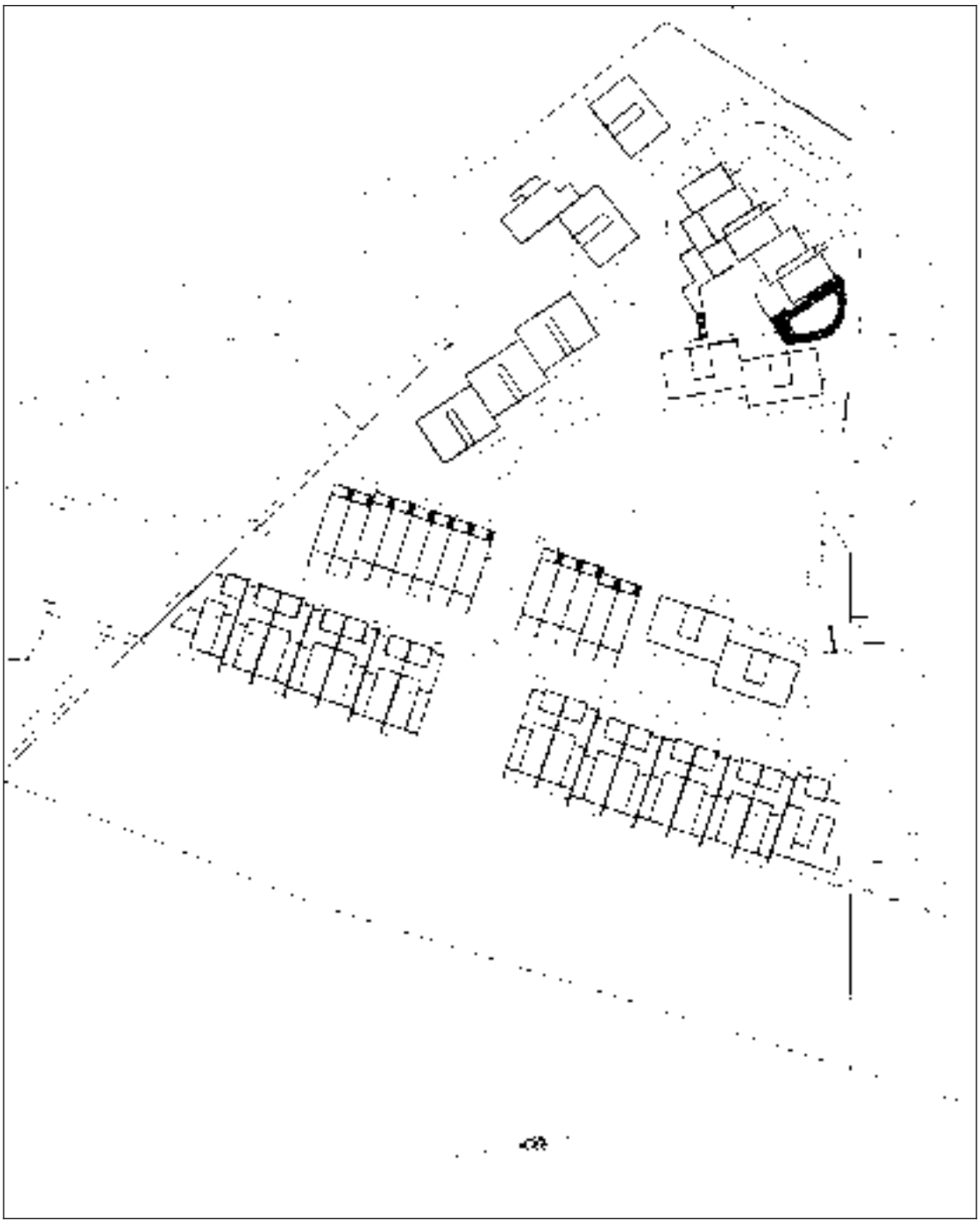

Figure 1: Site Layout

2. Infrastructure and Services

The subject site and adjoining lots are currently serviced by water, sewer, electrical, and telecommunications infrastructure.

The existing infrastructure adequately services the existing 114 suite resort. Given that the proposed development consists of 117 residential/tourist apartments, the future loads on the infrastructure are not expected to be significantly greater than those imposed by the existing resort.

2.1 Water Supply

Council trunk water supply mains are located along the western frontage of the site, adjacent to the Pacific Highway. The existing resort is satisfactorily serviced by this 200mm dia water main.

Given that the proposed development consists of 117 tenements, only 3 more than the 114 tenements currently serviced, the total water supply requirements of the future development will be similar to those already being serviced. CHCC were consulted in regards to the adequacy of the existing water supply system and their preliminary modelling indicates that the existing system will be able to satisfactorily service the proposed development. A copy of CHCC response is provided in Appendix A.

2.2 Sewer System

The current development discharges it's effluent to CHCC's Sewer Pump Station (SPS) 67 immediately north of the subject site. From SPS 67 the effluent is conveyed through a series of sewer pump stations, rising mains, and gravity sewer systems to the Coffs Harbour Sewage Treatment Works.

From the 'Coffs Harbour and Sawtell Sewerage Augmentation Options Report' prepared by Sinclair Knight Merz, December 1998, the sewer pump stations that convey the sewer from the subject site to the Sewage Treatment Works are, in order, SPS67, SPS66, SPS62, SPS61, SPS7, SPS14A.

The abovementioned report also states in 'Appendix D – Collection System Improvements', that four of the above six sewer pump stations are currently under-capacity.

Given that the proposed development of 117 residential/tourist units will have a similar sewer loading as the existing 114 suite development, the nett effect of the proposed development will have negligible effect on the existing sewerage infrastructure.

2.3 Power Supply

Country Energy has been contacted in regards to the provisioning of electricity supply to the proposed development. Country Energy has advised that if the loading of the proposed development is the same or less than the existing development, no upgrade of the existing electrical infrastructure will be required.

Given that the total number of tenements will increase from 114 to 117, Country Energy has advised that the existing electrical infrastructure is likely to satisfy the proposed development loads. Detailed load information will need to be submitted to Country Energy during the detailed design stage to confirm the existing power supply is able to service the proposed development.

2.4 Telecommunications

Contact has been made with the telecommunications authority, Telstra, with respect to this development. Telstra have provided plans of their existing infrastructure in the area.

A major optic fibre cable is located along the western boundary of the site. Local reticulation cable is located within the site servicing the current development.

GHD has received notification of Telstra's intent to pre-provide telecommunications network infrastructure to the proposed development, as provided in Appendix B.

Alterations to the existing telecommunications infrastructure will be required to service the proposed development. The design and construction timing will be required to be co-ordinated as the development plans evolve.

3. Conclusion

GHD Pty Ltd (GHD) was engaged by Sapphire Beach Developments Pty Ltd (SBD) to prepare the engineering input into the concept plan for the proposed redevelopment of the Pelican Beach Resort at Lot 2 DP 800836 and Lots 100 and 101 DP 629555, Coffs Harbour.

The desktop review indicates that the proposed development will not result in a significant increase in the load on any of the infrastructure services compared to the existing development. It is therefore considered that the site has adequate water, sewer, electricity and telecommunications to support the proposed development.

Appendix A

CHCC Response

Wayne Cooper/CoffsHarbour/GHD/AU

22/08/2006 08:23 AM

To Ben Luffman/CoffsHarbour/GHD/AU@GHD

cc

bcc

Subject Fw: Pelican Beach Development and new water loading.

Wayne Cooper
Senior Civil Engineer

GHD | CLIENTS | PEOPLE | PERFORMANCE

T 61 2 6650 5600 | M 0428 426 292 | F 61 2 6652 6021 | wayne.cooper@ghd.com.au
2/115 West High Street Coffs Harbour NSW 2450 Australia| www.ghd.com.au

GHD serves the global markets of: Infrastructure | Mining & Industry | Defence | Property & Buildings | Environment

----- Forwarded by Wayne Cooper/CoffsHarbour/GHD/AU on 22/08/2006 08:24 AM -----

"Michael Herraman" <michael.herraman@chcc.nsw.gov.au>

21/08/2006 05:44 PM

To <wayne.cooper@ghd.com.au>

cc

Subject Pelican Beach Development and new water loading.

Hello Wayne,

Thankyou for your call regarding the Pelican Beach Development.

The model data is indicative only, and if precise data is required then a full site study and report should be carried out.

I have run the computer water modelling software and made the following assumptions:

* 112 Suites will be removed from Pelican Beach Resort.
* 83 Apartments, 13 Terrace Houses and 16 Villas will be built at Pelican Beach Resort.
* Highest new dwelling will be at 25 metres head.
* 150mm PVC Pipe used from highway connection point to Resort.
* PVC Pipe from highway to Pelican Beach Resort 40 metres long.
* Loading has been given by GHD.
* System may change in the future as loading and supply is altered.

Model Run 1:

This model was run for 1 day and 6 hours (extended duration), using peak daily flows, starting at 0500 Hours, using Model file "Coffs pd 2004Pelican Beach GHD.ppp"

Results:

At Pelican Beach node point SAP43 there was 34.3 Metres Head, at .33 Litres a second. The model did not report any undue occurrences.

Model Run 2:

This model was run in Single Balance Mode, starting at 1500 Hours, using Model File "Coffs pd 2004Pelican Beach GHD.ppp"

Results:

There was 34.1 Metres of Head at 1.63 Litres a second. The model did not report any undue occurrences.

Model Run 3:

This model was run in Single Balance Mode, and modelled to achieve zero head at the highway connection point and achieve maximum possible flow for fire fighting purposes. The model starting time was 1500 Hours, using Model "Coffs pd 2004 Pelican Beach GHDfire.ppp"

Results:

At zero metres of head, max. flow was 67 Litres a second.

Please feel free to ring or contact me if you have any questions or require further information.

Kind Regards,
Michael.

Michael Herraman
Water Designer
Coffs Harbour City Council
Ph: 0266484451
Fax: 0266484477
Mob: 0438 470 950
E-mail: michael.herraman@chcc.nsw.gov.au
www.coffsharbour.nsw.gov.au

Appendix B

Confirmation of Telecommunications Supply from Telstra

GHD
2/115 west High St
Coffs Harbour NSW 2450

Phone: 0266505600
Email/Facsimile: 0266526021

Attention: Gaven Harris

Downer Engineering
PO Box 266 Ashmore
QLD 4214

Phone: 1800 600 182
Facsimile: (07) 5556 9410
E-mail: Completions.nmc@downerengineering.com

Our ref: 3415/md
Your ref:

8 June 2006

Dear Sir/Madam

TELECOMMUNICATIONS PROPOSED NETWORK INFRASTRUCTURE NOTIFICATION

Telstra Corporation Limited confirms that notification has been received from regarding Telstra's **intent to pre-provide** telecommunications network infrastructure to the following proposed development:

LOTS NUMBERED	PLAN NUMBER

LOCATION
Lot 2 DP800836 Pacific Hwy Coffs harbour NSW 2452

This notification of **intent to pre-provide** telecommunications infrastructure is issued for this proposed development only and is issued and given solely on the basis of the information provided by the customer to Telstra Corporation Limited as at the date of this notification.

Once telecommunications network infrastructure is provisioned to the proposed development, a Telecommunications Infrastructure Provisioning Confirmation letter will be issued if requested.

Additional works may still be required in order for telecommunications services to be provided to customers in the development and these works will be carried out at Telstra's sole discretion.

Telstra Corporation Limited is not responsible to, a recipient of this notification or anyone else for any loss suffered in connection with this notification or any of the content and excludes, to the maximum extent permitted by law, any liability which may arise as a result of the issue of this notification or its content.

If you have any enquiries or require any further information please contact me on the above address.

Sincerely,

Daniel Wakeford
Downer Engineering,
on behalf of Telstra Corporation Limited

GHD
2/115 west High St
Coffs Harbour NSW 2450

Phone: 0266505600
Email/Facsimile: 0266526021

Attention: Gaven Harris

Downer Engineering
PO Box 266 Ashmore
QLD 4214

Phone: 1800 600 182
Facsimile: (07) 5556 9410
E-mail: Completions.nsw@downerengineering.com

Our ref: 3414/md
Your ref:

8 June 2006

Dear Sir/Madam

TELECOMMUNICATIONS PROPOSED NETWORK INFRASTRUCTURE NOTIFICATION

Telstra Corporation Limited confirms that notification has been received from regarding Telstra's **intent to pre-provide** telecommunications network infrastructure to the following proposed development:

LOTS NUMBERED	PLAN NUMBER

LOCATION
Lot 101 DP629555 Pacific Hwy Coffs harbour NSW 2451

This notification of **intent to pre-provide** telecommunications infrastructure is issued for this proposed development only and is issued and given solely on the basis of the information provided by the customer to Telstra Corporation Limited as at the date of this notification.

Once telecommunications network infrastructure is provisioned to the proposed development, a Telecommunications Infrastructure Provisioning Confirmation letter will be issued if requested.

Additional works may still be required in order for telecommunications services to be provided to customers in the development and these works will be carried out at Telstra's sole discretion.

Telstra Corporation Limited is not responsible to, a recipient of this notification or anyone else for any loss suffered in connection with this notification or any of the content and excludes, to the maximum extent permitted by law, any liability which may arise as a result of the issue of this notification or its content.

If you have any enquiries or require any further information please contact me on the above address.

Sincerely,

Daniel Wakeford
Downer Engineering,
on behalf of Telstra Corporation Limited

GHD
2/115 west High St
Coffs Harbour NSW 2450

Phone: 0266505600
Email/Facsimile: 0266526021

Attention: Gaven Harris

Downer Engineering
PO Box 266 Ashmore
QLD 4214

Phone: 1800 600 182
Facsimile: (07) 5556 9410
E-mail: Completions.nsw@downerengineering.com

Our ref: 3413/md
Your ref:

8 June 2006

Dear Sir/Madam

TELECOMMUNICATIONS PROPOSED NETWORK INFRASTRUCTURE NOTIFICATION

Telstra Corporation Limited confirms that notification has been received from regarding Telstra's **intent to pre-provide** telecommunications network infrastructure to the following proposed development:

LOTS NUMBERED	PLAN NUMBER

LOCATION
Lot 100 DP629555 Pacific Hwy Coffs harbour NSW 2450

This notification of **intent to pre-provide** telecommunications infrastructure is issued for this proposed development only and is issued and given solely on the basis of the information provided by the customer to Telstra Corporation Limited as at the date of this notification.

Once telecommunications network infrastructure is provisioned to the proposed development, a Telecommunications Infrastructure Provisioning Confirmation letter will be issued if requested.

Additional works may still be required in order for telecommunications services to be provided to customers in the development and these works will be carried out at Telstra's sole discretion.

Telstra Corporation Limited is not responsible to, a recipient of this notification or anyone else for any loss suffered in connection with this notification or any of the content and excludes, to the maximum extent permitted by law, any liability which may arise as a result of the issue of this notification or its content.

If you have any enquiries or require any further information please contact me on the above address.

Sincerely,

Daniel Wakeford
Downer Engineering,
on behalf of Telstra Corporation Limited

JOB No.
ENTERED TO DATABASE
INITIAL DATE 19-06-06
19 JUN 2006 REF. No.
NAME INIT DATE ACTION
VJ 19/6/06
W.C.