

**APPENDIX 3- GEOTECHNICAL  
REPORT PREPARED BY VAN  
LEEUWEN & STODDARD,  
CONSULTING ENGINEERS**

# **GEOTECHNICAL SITE INVESTIGATION REPORT**

**(as per AS1726-1993)**

## **Project Details**

**PROJECT** **Proposed Tathra Hotel and Motel Development**

## **Client and Site Details**

**CLIENT** **Mr. Barry Frost**

**SITE ADDRESS** **Tathra Hotel and Motel  
Snowy Mountains Highway  
Tathra NSW**

**DATE** **27<sup>th</sup> SEPTEMBER 2004**

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### **1.0 Investigation Objectives**

It is required that an assessment be undertaken for Site Development in respect of Geotechnical Conditions and to establish the following data;

- a) Sub surface Conditions
- b) Strength and Stability of Foundation Strata
- c) Estimates of deformation and settlement (where applicable)
- d) Level, quantity and quality of groundwater
- e) Effect of works on adjoining land
- f) Footing recommendations
- g) Excavation conditions, ground support or underpinning
- h) Properties of borrow materials
- i) Failure Mechanisms

Comment - Sites are considered in the larger context of surrounding general area including topography, geology and drainage and comments are offered regarding any affects that adjacent lands may have on the development at hand however this geotechnical report does not include an assessment of stability of adjacent or neighbouring land and merely establishes a risk if any to be further identified or addressed in structural and civil design.

### **2.0 Structural Aims**

The strength of the soil is to be checked for likely response to settlements, bearing pressures and soil slope stability. The methods used for this assessment include ;

- a) Soil Classification by profile logging and reference to geological maps
- b) Assessment of bearing capacity by classification and penetrometer Testing
- c) Assessment of Soil reactivity to moisture(shrink and swell) by classification and sample assessment
- d) Risk assessment of site soil instability (land slip) by site investigation

### **3.0 Project Description**

The above property was inspected for the purposes of design and construction of hotel renovations and the construction of a new motel extension. The existing hotel is being renovated and a new motel block proposed to be constructed along with improvements to access and augmentation of public parking. The area where the motel is being built is located towards the rear of the land and is at a lower elevation than the Snowy Mountains Highway and the hotel. The floor levels of the new motel are at the same approximate ground level of the surrounding landscape. A Geotechnical assessment of the site and soil conditions is required to address the limitations if any for the design and construction of the motel and the hotel additions especially in respect of its foundations and overall site stability.

### **4.0 Site Description**

#### **4.1 Site Access**

Access to the proposed motel site is achievable from the Snowy Mountains Highway via the carpark between the existing hotel bottle shop and motel units. The carpark driveway is sealed with asphaltic concrete. The Snowy Mountains Highway directly outside the Tahtra Hotel Motel is constructed with kerb and gutter but does not appear to be serviced by stormwater pipe systems.

#### **4.2 Climate and Aspect**

The climate in the region is temperate with an average annual rainfall in the order of 900mm. The property is located on a small headland which gives the site 270 degree views and orientation towards the North, South and East.

#### **4.3 Topography**

*Slope of Site*

*The site slopes 10% to 15% southwards which is the lower lying land area within the property.*

*Nature of soil and rock mantle*

*Soils within the entire property may generally be described as about 200mm to 300mm dark brown to grey upper silty loam topsoils underlain by 1000mm to 1500mm of red brown streaky orange silty sandy clay over highly weathered sandstone and weathered sedimentary rock deposits. The rock base is expected to be irregular and rough.*

*Old Fills, Sinkholes ,*

*There are no cracks, holes or mounds on site indicating*

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	<i>Previous land slips</i>	<i>previous landslips or site instabilities. The carpark at the rear of the hotel has been built up by deposition of fill in an old minor gully. In this area the depth of fill is in the order of 3 metres.</i>
	<i>Buildings or structures on site</i>	<i>The existing hotel is a combination of stud frame walls construction to solid masonry walls construction. The roof is metal and floors vary from concrete slabs on ground to suspended concrete slabs on columns and suspended timber floors. There are no significant signs of distress (such as cracks or out of alignment or plumb) due to footing failure or soil instability.</i>
		<i>Subsurface Pipes, Water? Sewer? Waste Water Disposal?</i>
	<i>Development Density</i>	<i>Previous site developments (ie, old footings) The site coverage is significant but still less than 50% for buildings. With sealed car parking the coverage may be as high as 75%. There will be significant runoff generation and appropriate collection and disposal is essential. There are adequate areas available for capture of stormwater, treatment and disposal without risk of pollution or causing local instabilities.</i>
4.4	<i>Vegetation</i>	
	<i>Vegetation on site</i>	<i>There are a few significant pine trees on site ~10 to 20 metres in height and 300mm to 900mm trunk diameter. The trees are well foliated, reasonably plumb and appear to be thriving. The root systems would be extensive. The remainder of the site not covered by buildings or pavement is grassed. There are no areas of exposed soil and non vegetation.</i>
4.5	<i>Drainage</i>	
	<i>Surface Drainage</i>	<i>There are no watercourses on the site. Any construction proposed would not restrict the flow of water from the site. Drainage collected from the buildings and pavement via a series of grated pits and spoon drains however will direct stormwater to a common point creating a flow concentration and it would be required that the collected drainage first be treated and then dispersed via an energy dissipating structure for sheet flow release over the rocky foreshore.</i>
	<i>Groundwater</i>	<i>There was no ground water encountered in test pit excavations</i>
	<i>Flood Levels</i>	<i>The site is not flood prone. Heavy seas from the south however have been recorded to build up and create significant flows down the Tathra wharf road. The hotel and motel site is well elevated above this road and this occurrence is rare.</i>
	<i>Water Logged Ground Drainage Structures</i>	<i>There are no springs or water logged areas on the site. The site is serviced by a sewerage reticulation system and has minimal drainage structures on the site other than a couple of spoon drains and grated pits.</i>
4.6	<i>Geology</i>	
	<i>Soil Sampling and Classification</i>	<i>Visual</i>
	<i>Geological Maps to be used</i>	<i>Underlying soils are Orange to Red brown in colour and are best described as a gravelly sand clay overlying undifferentiated sedimentary rock.</i>
	<i>Colour description</i>	<i>Ranges from fine grained with some coarse grained pockets</i>
	<i>Texture Description</i>	<i>Cohesive (clays), slightly plastic, not friable but tends to be lumpy</i>
	<i>Physical Properties</i>	<i>Cohesive soils – Upper clays Firm to lower underlying Stiff and hard gravelly clays</i>
	<i>Density description</i>	<i>Geological Description - highly weathered residuals of undifferentiated sedimentary shale, siltstone, sandstone and mudstone deposits near boundary of volcanics and minor lavas</i>
	<i>Rock Bed</i>	
4.7	<i>Works Layout</i>	
	<i>Effect of works on site</i>	<i>The effect of a motel construction will have little effect on</i>

	Previous land slips	previous landslips or site instabilities. The carpark at the rear of the hotel has been built up by deposition of fill in an old minor gully. In this area the depth of fill is in the order of 3 metres.
	Buildings or structures on site	The existing hotel is a combination of stud frame walls construction to solid masonry walls construction. The roof is metal and floors vary from concrete slabs on ground to suspended concrete slabs on columns and suspended timber floors. There are no significant signs of distress (such as cracks or out of alignment or plumb) due to footing failure or soil instability. Subsurface Pipes, Water? Sewer? Waste Water Disposal? Previous site developments (ie, old footings)
	Development Density	The site coverage is significant but still less than 50% for buildings. With sealed car parking the coverage may be as high as 75%. There will be significant runoff generation and appropriate collection and disposal is essential. There are adequate areas available for capture of stormwater, treatment and disposal without risk of pollution or causing local instabilities.
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	Effect of works on site	The effect of a motel construction will have little effect on

*the existing drainage regime. The quantity of stormwater generated will increase but properly collected, treated and disposed will ensure that the layout of works as planned will negatively impact the site. All stormwater drainage can drain to the same location as it currently does, a gully south of the main hotel. There is a council sewerage pumping station in this gully but this can easily be accommodated by a reasonable stormwater design and treatment.*

Site Foundation Assessment

Stability

**Negative Stability factors**

Rear Carpark Slope

The fill placed to provide rear car parking has resulted in a significantly sloped batter. With increased runoff and without stormwater treatment this area may be susceptible to instability in severe conditions.(very wet weather) The batter should be extensively planted and the car park stabilized with a surface seal and stormwater collection system built.

Development Density

development density is increased over that currently on site and in collection of stormwater and groundwater flows will be discharged as a concentrated flow therefore some treatment and flow dispersal initiatives are required.

Climate

soil saturation in high rainfall events common along the east coast of Australia may increase soils susceptibility to slow downhill creep but with sufficient stabilization and stormwater collection and discharge control there should be no problem

**Positive Stability factors**

Drainage

the site and its soils are naturally well draining and with adequate provisions for prevention of ground water level build up in high rainfall events and other severe climatic conditions site stability should be maintained.

Rock Mantle

an irregular bedrock base is expected offering more friction against slip in overlying soils

Vegetation

a good coverage of trees and grasses exist effectively reinforcing the soil

Building Condition

the building shows no signs of distress from soil instability or footing settlement

Soil Types

granular well drained soils in when they become saturated may creep or slip downhill

Rock Fragments

There are few isolated boulders and stones that indicate wearing, erosion and collapse down slopes

Previous instability

There is no record of recent soil failures in the area

**Stability Assessment**

It is recognised that that a risk of instability exists due to many factors such as slope of building sites, the climate, high rainfall and availability of surface and subsurface water from sources and density of development. The site is considered to present a low risk of instability to any proposed development provided footings are located appropriately into hard natural ground (below topsoil) and that soils are adequately drained and stabilised.

Foundation Soil Classification

Strength Assessments

All foundations and retaining walls must be designed by an experienced engineer. Uniform bearing material is achievable on this site and bearing pressures in excess of 100KPa are achievable by excavation to about 1 metre. If excavations continue beyond 1 metre depth down to soft rock allowable bearing pressures will be in the order of 300KPa to 500 KPa.

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Soil Classification

Foundation soils may be classified as Class "S" as per AS2870.1-1996 (Slightly Reactive) as the depth of clay soils under the footings is expected to shallow (<600mm). Foundations may include conventional strip footings or raft slabs. Even bearing is expected to be achieved on this site but where soft areas are encountered during excavations 450mm mass concrete piers may be installed at no more than 2000mm spacings. Piers must extend into harder underlying soils or to rock.

This report has been prepared by :

Will Van Leeuwen  
(Chartered Professional Engineer, C.P.Eng. M.I.E.Aust.)  
(Bach.Civ.Eng., Municipal.Eng., Geomech Soc.)

signature .....

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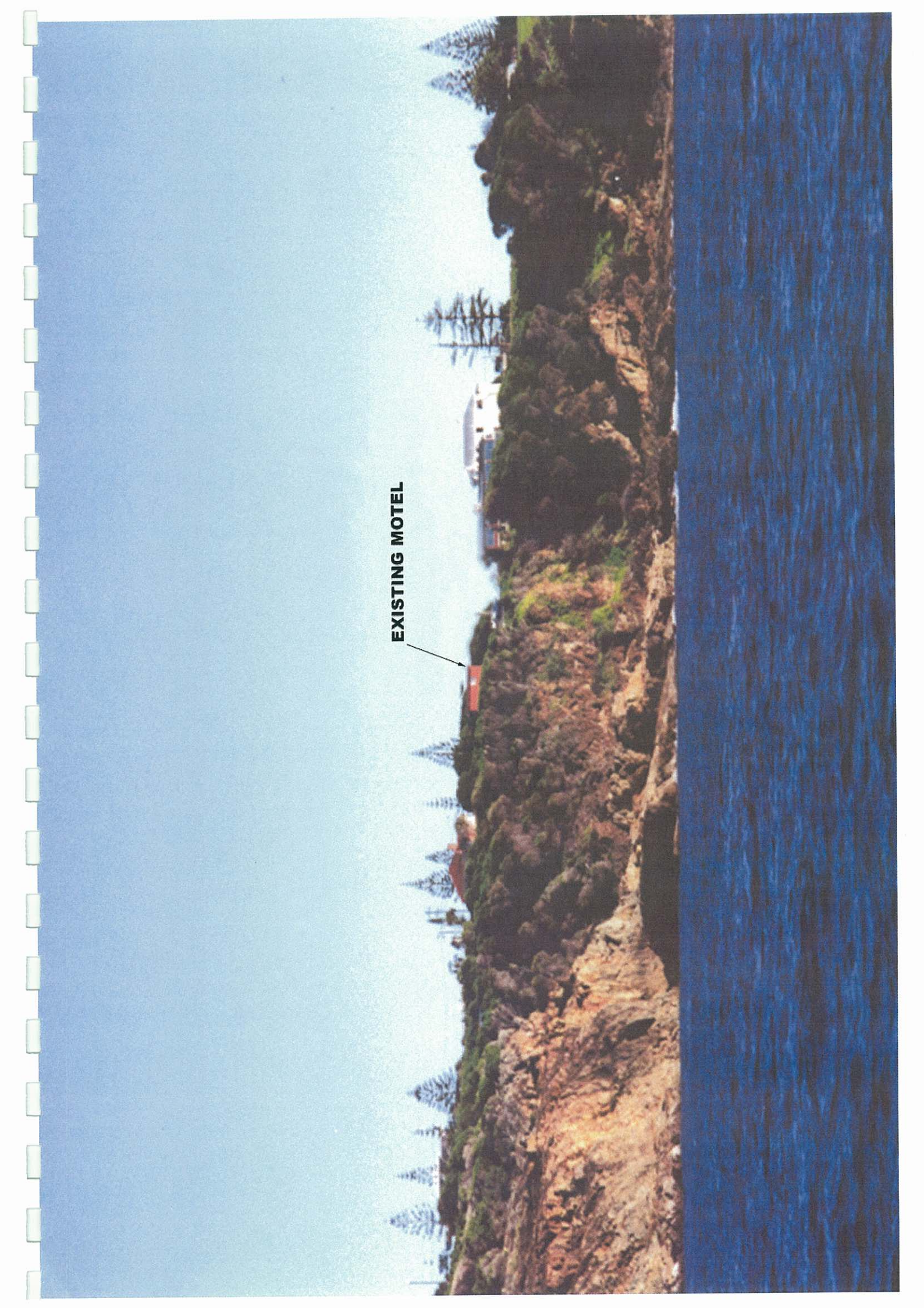
Will Van Leeuwen  
(Chartered Professional Engineer, C.P.Eng. M.I.E.Aust.)  
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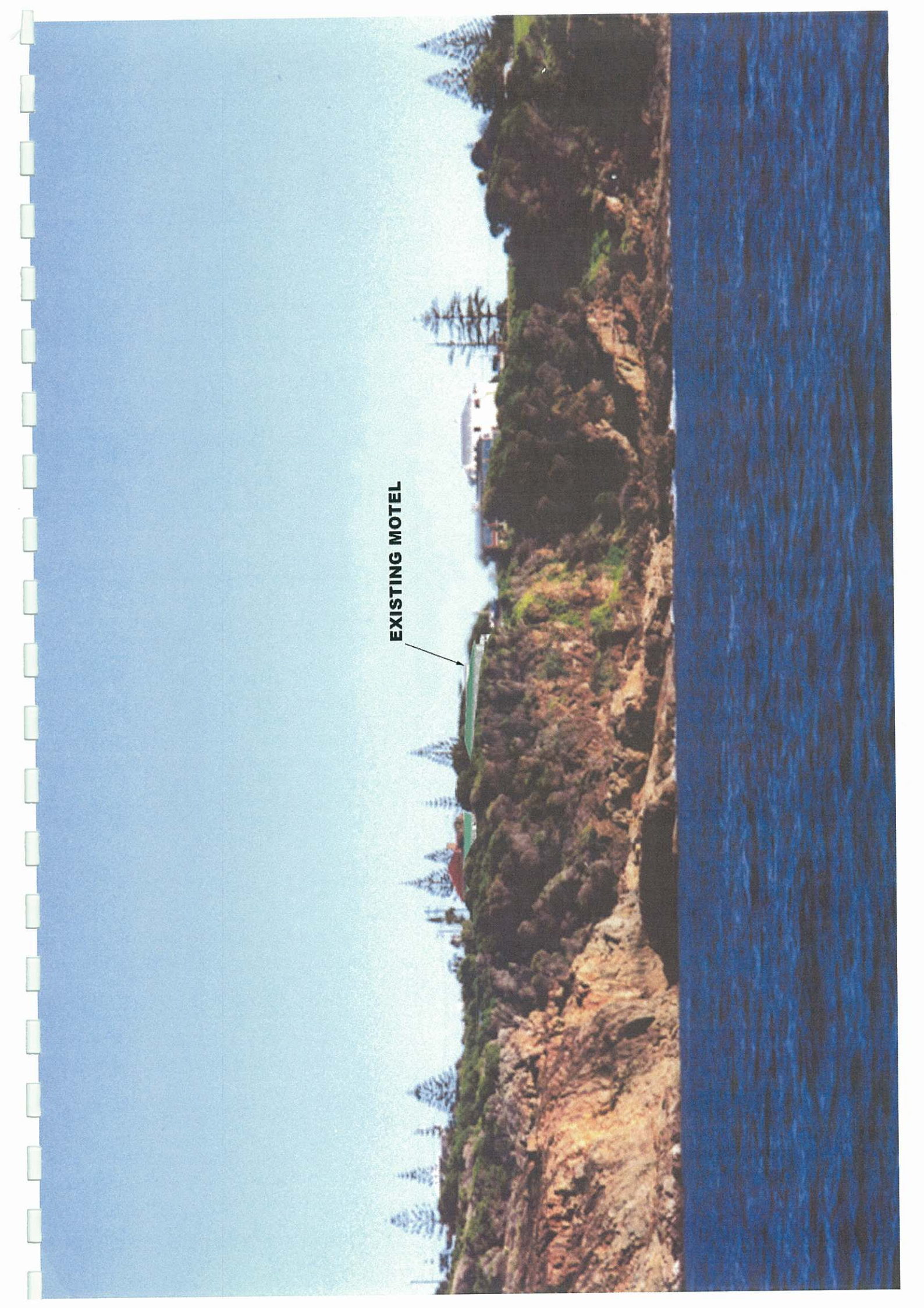


PHOTO FROM 054

**EXISTING MOTEL**



**EXISTING MOTEL**



**EXISTING MOTEL**

**PHOTO FROM 049**





PHOTO FROM 051



PHOTO FROM 054