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Hillview Heights Pty Ltd

Lot 66, DP 551005, Pacific Highway, Moonee Beach

Report on Engineering Infrastructure

December 2004

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

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Appendices

1. Introduction

1.1 GHD Role and Scope

GHD have been engaged to undertake preliminary investigations for the geotechnical and service requirements for the proposed subdivision. The scope of services investigated includes water and sewerage infrastructure, electrical and telecommunications services.

In compiling this report, GHD considered the list of publications in Attachment 3 of the Director General's Requirements provided in the Department of Planning letter to Hillview Heights Estates Pty Ltd (Ref MP05_0064).

1.2 Client

The land developer is Hillview Heights Pty Ltd.

1.3 Site Location and Description

The proposed residential subdivision is located approximately 800m to the south of Moonee Beach Road, between the villages of Sapphire and Moonee Beach, and some 10km north of Coffs Harbour.

The site is approximately 102 hectares in area and is identified as Lot 66, DP 551005.

1.4 Proposed Development

The proposed development is a residential subdivision containing a diverse mix of housing types. The development will yield approximately 300 dwellings. The dwellings will comprise approximately:

166 dwellings in the northern precinct

134 dwellings in the southern precinct

For the purposes of our investigation we have also assumed an eco-resort development will occur in the south-east corner of the site. For the purposes of our calculations we have assumed the eco-resort produces a loading on services of 50 Equivalent Tenements.

2. Geotechnical Assessment

2.1 Topography Description

The site is situated on the eastern side of the Pacific Highway and approximately 800m south of Moonee Beach Road. It is bounded by the village of Moonee Beach to the north, and there exists cleared land to the south, which is planned to be developed for similar residential uses by others in the future.

The site topography can be described as moderately undulating with slopes grading from flat areas to 5 to 10 % or more. In the vicinity of the natural drainage gullies covering the site, the gradients become steeper over short lengths.

Reduced levels across the site range from RL 1.5 AHD in the drainage paths to RL 15.0 AHD on the hills. The majority of development is proposed to occur on land that lies between RL 5.0 AHD and RL 10.0 AHD. The hills and their gentle side slope provide excellent opportunity for allotments that are well drained, and generally without the requirement of extensive site earthworks.

The land retains its natural treed vegetation.

2.2 Soil Conditions

2.2.1 Geotechnical issues

The Dorrigo / Coffs Harbour 1:250,000 geological map indicates that the site is on the boundary of the Coramba Beds comprising of mudstone, siltstone and greywacke with minor volcanic intervals and Quaternary Alluvium comprising of sands and clays.

In brief the site comprises Residual sandy clay soils, clay soils and extremely weathered rock, and alluvial sandy soils in the low areas.

Soil strengths (CBR values) have been undertaken at test locations throughout the site. CBR tests indicated that the site soils have a soaked CBR of between 2%(low strength) and 6%(moderate strength). It is recommended for preliminary pavement designs that a CBR of 2% be assumed for design of flexible pavements. However, upon final detailed design, it is recommended that further CBR tests be undertaken at the proposed location of the road pavements to provide a more detailed pavement design.

Guidelines for site works, trenching and excavation, and construction of road pavements on low CBR subgrade materials have also been provided.

Refer Appendix B for the detailed assessments.

2.2.2 Site Contamination Issues

A search of Council's register of banana cultivation areas revealed that Council has no history of banana cultivations occurring within the site. Given the natural state of the site, it is considered unlikely that soils within the site have been contaminated.

GHD considers that there is no need for further investigation of the site. However, the possible presence of deeper areas of contamination should be considered during any works on the site. During development of the site, if soils appear to be significantly different to those described in this report or appear to be visually contaminated, it is recommended that an experienced environmental consultant be engaged to assess, validate and remediate (if necessary) suspected impacted soils.

2.2.3 Acid Sulfate Soils

Reference to the Moonee Beach Acid Sulfate Soils Risk Map published by the Department of Land and Water Conservation indicates that the proposed subdivision development is located partly in an area which has no known occurrence of acid sulfate soils and partly in an area which has a low probability of the occurrence of acid sulfate soils between 1m and 3m below the ground surface.

Samples from test pits were screened for the presence of actual and potential Acid Sulfate Soils. On the basis of the screening results, it is considered that the soils to 3m depth are not actual acid sulfate soils, but may be potential acid sulfate soils.

On the basis of the preliminary assessment, it is recommended that further assessment of acid sulfate soils be carried out prior to excavation of site soils once the location and depth of excavations are known in more detail. The assessment should target alluvial soil areas below about RL5m AHD.

Refer to Appendix B for the detailed assessments.

2.3 Bulk Earthworks

It is considered that the proposed development will generally conform to the natural contours of the site, and that bulk earthworks will be generally limited to the proposed road reserves.

All bulk earthworks will be undertaken in accordance with an approved Soil and Water Management Plan. Any fill imported to the site will be approved by an engineer prior to the import of the fill to the site, and shall be of a sound clean material, reasonable standard, and free from large rocks, stumps, organic matter and other debris. Where ever possible, material having similar properties to the in-situ site material shall be sourced.

3. Water Supply

3.1 Existing Water Infrastructure

The development site is not serviced by Council's existing water infrastructure.

Council have advised that a new water trunk main will be required to service the potable water requirements for the proposed development.

3.1.1 Reuse Watermain and Irrigation

A reuse water main used for irrigation purposes is currently aligned along the service road corridor and is sourced from the WWTP near Moonee Beach. Council use this main generally for their own irrigation purposes, and there are no plans at this time to bring this service onto the development site.

Council have advised that the quality of effluent from the reuse main is not suitable for domestic purposes.

Council may determine to extend a service from the existing main if the public open space areas planned for the site are to be irrigated and maintained by Council.

Refer to drawing SK-03 for location details of the reuse main.

3.2 Planned Water Infrastructure

3.2.1 Trunk Service

Council have advised that the new trunk water main should connect into an existing 300 dia main located adjacent to the Moonee Beach Tavern to the north. This will require extension of the new trunk main approximately 800m to the development site. The alignment will be along the service road corridor to the east of, and running generally parallel to the Pacific Highway.

Hydraulic modelling, carried out using the Pipes++ software for the full development including the possible eco-resort, showed that:

- Further to the proposed DN300 trunk main connecting to the existing water supply adjacent to the Moonee Beach Tavern, for the current water supply system to service the proposed development, another DN250 would then need to extend back to the Moonee reservoir (another 300m) to augment the existing DN200 pipeline.

Council have advised that a second water reservoir adjacent to the Moonee Reservoir is planned for construction in 2007. The final route selection will depend upon Council's requirements, and Council's future program for the augmentation of the Moonee Reservoir and ancillary trunk services.

Under the Coffs Harbour Moonee Development Control Plan the developer will be liable for the costs of this main, however there will be available reimbursement to the developer if further analysis shows that other developments can make use of this main for their own requirements.

The trunk water system layout and the proposed reticulation system is shown in drawing SK-02.

3.2.2 Internal Infrastructure

A preliminary water reticulation system to service the proposed development has been prepared, and analysed by the Pipes++ software, to determine that the proposed development can be provided a suitable water supply system.

The layout provides water service to all allotments and is looped for security of supply and optimisation of flows and pressure. The internal mains are linked to the trunk main at numerous locations as shown on the plan.

Fire hydrants will be located at appropriate intervals in accordance with Council requirements.

Control valving will be planned to enable main shutdown of discrete areas with minimum impact on adjacent areas. Scour valves (or hydrants) will be placed at the end point of any dead end legs and at the low points of the mains, to maintain clean water supply conditions. A particularly long dead end main may occur to service the possible eco-resort.

Final sizing of the internal watermain network and trunk main will be undertaken during the detailed design for each stage and after confirmation from Council as to their preferred connection point to the reticulation system, and details of their proposed augmentation of the existing reticulation system. Pressure and flow calculations for domestic and fire fighting purposes will be undertaken across the site, in order to determine pipe sizing.

4. Sewerage Reticulation

4.1 Existing Sewer Infrastructure

The development site is not serviced by Council's existing sewerage infrastructure.

Coffs Harbour City Council has advised that sewer is to be directed to an existing gravity sewer main located within the property of the Moonee Beach Tavern.

4.2 Planned Sewer Infrastructure

4.2.1 Trunk Service

Due to the undulating nature of the site, and the low lying watercourses within the site, a number of sewer pump stations will be required to service the full development.

Preliminary analysis reveals that a maximum of six sewer pump stations may be required. However, this number may be reduced upon final detailed design of the sewer network, and depending upon the final designed surface levels of the development.

A sewer rising main will be required from the development site to the Council connection point, a length of approximately 300m.

4.2.2 Internal Services and Staged Development

The ultimate development has four distinct sewerage zones as dictated by the undulating topography, plus the possible eco-resort site. For this reason, there will be required a system of gravity collection mains, sewer pump stations and rising mains to be connected either in series or delivering into a common trunk rising main to be constructed to the existing gravity sewer infrastructure 300m to the north of the site.

Some of the main technical issues involved with piping the sewage to the north via a pressurised main are:

- The location of pump stations above the 100 year flood event;
- The size of the pump wells for emergency storage;
- The detention time of the effluent in the rising main due to the relatively small amount of effluent generated requiring transfer over a relatively long distance; and
- The availability of sewage pumps for the duties required.

A preliminary design of the proposed sewer network is shown on drawing SK-01.

4.3 Load Calculations and System Design

Confirmation of the designed pipe sizing, plan layout, manhole locations, rising main design and pump station details will be undertaken during the final detailed design phase. These works will be undertaken to the requirements and standards as established by the Council.

5. Electrical and Telecommunications Infrastructure

5.1 Electrical Infrastructure

There currently exists an 11kV overhead electricity supply line within the power easement adjacent to the eastern boundary of the site.

Country Energy is also planning the construction of an overhead 66kV supply line adjacent to the existing supply line.

The electrical services to be constructed as part of the development works will comprise electrical transformers, distribution pillars and underground cabling in conduits.

Electrical substations throughout the site will be located, wherever possible, in parklands and reserves to minimise the visual impact.

The detailed design, and construction timing will be required to be co-ordinated as the development evolves.

The location of the existing 11kV supply line and associated easement is shown on the drawing SK-03.

5.2 Telecommunications Infrastructure

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

The main Sydney to Brisbane optic fibre cable traverses the site, generally adjacent to the site's western boundary. A second traditional main line is also located at the western edge of the site. Drawing SK-03 indicates the location of the telecommunication lines.

Prior to any works on the site a Dial Before You Dig search will be undertaken to determine the current extent and location of services on the site. During construction works, care will be taken to ensure that these lines are not disturbed.

All headworks including conduits, cabling, pits and distribution pillars will be supplied and installed by Telstra at their cost, during the construction of the civil works.

The design and construction timing will be required to be co-ordinated as the development plans evolve.