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STORMWATER MANAGEMENT PLAN

Tweed Coast Homes Pty Ltd
Lots 1, 2 and 3 DP 29748 & Lot 4 DP 31209
Tweed Coast Road & Cypress Crescent, Cabarita Beach

Prepared by:

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MIXED USE RESIDENTIAL & TOURIST DEVELOPMENT
TWEED COAST ROAD & CYPRESS CRESCENT, CABARITA BEACH
LOTS 1, 2 AND 3 DP 29748 & LOT 4 DP 31209

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1.0 Introduction

1.1 General Introduction

Cozens Regan William Prove Pty Ltd has been commissioned by Tweed Coast Homes Pty Ltd to prepare a Stormwater Management Plan for the Mixed Use Residential & Tourist Development in Cypress Crescent, Cabarita Beach.

The Plan is required to support an application to Tweed Shire Council for the proposed development and to provide documentation for the management of stormwater runoff during the operational phase in order to minimise any adverse downstream impacts created by the development.

Development of the site will involve earthworks and building works**.** The development will alter the present land use and an assessment is required to determine the impact of these proposed changes on the pollutant loads.

This plan is to provide an impact assessment and any amelioration measures required to offset any potential adverse impact.

1.2 Scope of Plan

The development impact on the peak discharge and runoff and details of any measures required to comply with the council's requirements is documented. The determination of the pollutant loads generated from the site will not be calculated in this plan as the provisions of Section D.7.12 will be used to determine the size of the required treatment device. The remedial measures to treat the runoff, to ensure compliance with the provisions within the "Tweed Urban Stormwater Quality Management Plan", specifically annexure D7 –"Stormwater Quality" are also documented.

1.3 Site Description

The subject site is four residential allotments that are described as Lots 1, 2 and 3 DP 29748 & Lot 4 DP 31209, Cypress Crescent, which currently has existing tourist accommodation on each site. It is located on the corner of Tweed Coast Road & Cypress Crescent. Other residential buildings surround the site.

The proposed development comprises of residential units within the proposed building, associated driveway, basement car park and landscaped areas.

2.0 Stormwater Management Plan – D7 Requirements

The following documentation and assumptions has been used in the preparation of the Stormwater Management Plan. Plan A.6.21/SK2 should be read in conjunction with the details contained within this document.

2.1 Adoption of Annexure A

Analysis of the impacts of the proposed development will be determined in accordance with the provisions of Annexure D7 "Stormwater Quality" and this plan should be read in conjunction with the Stormwater Management Plan Drawing A.6.21/SK2. Not with standing these requirements, Annexure A "Code of Practice for Soil and Water Management on Construction Works" has and should be adopted as the minimum requirements. Consideration of this reference material has been used in the preparation of this document.

2.2 Existing Site Drainage and Catchments

Drainage from the site is proposed to be collected in a piped system and directed to the kerb and channel in Cypress Crescent. The legal point of discharge is the kerb and channel in Cypress Crescent.

The existing site grades to the east. No external catchments affect the site.

The final catchment area contributing to the drainage system is 0.2802ha and comprises of impervious roof area, basement carparking, driveway area and landscape areas. The roof area will discharge to the legal point of discharge without treatment. The carparking and driveway area subject to rainfall will require treatment by an oil and grit separator.

2.3 Operation Requirements

During the Operational phase treatment is required to minimise the impact of Suspended Solids, Nutrients (Total Phosphorus and Total Nitrogen), litter and oil and grease. The provisions of Table 5.4 of the "Tweed Urban Stormwater Quality Management Plan" define the discharge criteria to be satisfied for the operational phase of any new development. Calculations for the pollutant generated and the treatment methods and expected results of the treatment are detailed in **Section 3**.

The impact on discharge from the site, due to increased impervious area is also considered in **Section 3**.

3.0 Water Quality

3.1 Water Quality Parameters

Appendix F of the NSW EPA publication "Managing Urban Stormwater: Council Handbook (Draft), December 1997", recommends that the modelling approach for this size development be a Level 1 assessment. Assessment of the average annual storm load is required and the treatment determined.

The buildings, driveways and landscaping areas, will generate pollutants
The base data adopted for this assessment is:

- Average annual rainfall 1719 mm/year
- Runoff coefficient for impervious areas 1.0
- Runoff coefficient for landscaping areas 0.6
- Catchment Area (Driveway & Basement)0.2582ha

3.2 Water Quality Assessment

The drainage system is proposed to discharge to the pipe system. The receiving body of water for this system is ultimately the Pacific Ocean via piped system to the dunal area.

No investigations of the down stream area have been taken to establish a baseline since the design discharge parameters have been given by the "Tweed Urban Stormwater Quality Management Plan".

The primary pollutants of concern as a result of this development are:

- Sediments
- Nutrients
- Oils and grease

The following sections assess pollution generation and detail methods of treatment.

3.2.1 Treatment Goals

The provisions of the "Tweed Urban Stormwater Quality Management Plan" need to be satisfied for the Operational Phase of the project. As such the water quality objectives, <u>for the driveway and basement areas only</u>, as detailed in Table 5.4, equate to the following discharge criteria for an average year. Some consideration must be given to the car park area, which would be subject to periodic cleaning:

- Suspended Solids (SS) 77.46 kg/year
- Total Phosphorus (TP) 0.207 kg/year
- Total Nitrogen (TN) 1.162 kg/year

These water quality goals are to be achieved prior to discharging into the drainage system. Treatment of the runoff collected from the roof drainage is not required.

Using the "deemed to comply" provisions of Section D.7.12 of the "Tweed Urban Stormwater Quality Management Plan" a proprietary device can be determined on size and determination of the treated pollutant loads not required. It therefore is proposed to provide a treatment device, for the removal of suspended solids and nutrients using this method.

3.2.2 Oil and Grit Separator

The potential for sediment generation and oil/grease within the driveways warrant the consideration of primary treatment in the form of an Oil and Grit Separator. This should be located at the collection point prior to discharging into the existing system (Refer to drawing A.6.21/SK2). Oil and Grit Separators have varying efficiencies of pollutant removal dependant on the type unit selected, however the proposed use of a Humes STC 2 Oil & Grit Separator, with a wet well size of **1.30m^3** will satisfy the "deem to comply" requirements of Section D7.12.

The installation of closely spaced grated stormwater inlets should also be considered to assist in the removal of the gross pollutants (rubbish, leaf matter, etc.). Management of these structures will require regular maintenance and details for this are outlined below.

3.3 Water Quality Management

3.3.1 Objectives

The objectives are to provide a stormwater drainage system that reduces the impact of the development compared with the existing pre-development loads. Management practices to assist in the reduction of the reliance on the primary treatment structures will be implemented.

Provision of long-term water quality monitoring for this development is considered impractical and is not proposed.

3.3.2 Maintenance Control Measures

The Contractor/Builder is responsible for the installation and maintenance of the primary control measures during the construction phase and the defects liability period.

Maintenance responsibilities for the operating life of the project revert to the Owner/ business operators once the defects liability period has expired.

Maintenance will require:

a) Regular sweeping and rubbish removal from the driveway and landscape areas, including rubbish removal from the grated stormwater inlets. This should be done visually on a daily basis.
b) Monitoring the oil and grit separator regularly and inspecting at least every three (3) months and after every storm event large enough to produce runoff.
c) Cleaning out the oil and grit separator when the storage capacity has been reduced by 30%.
d) Collect all litter, cuttings and leaf litter for composting or disposal off site.

3.4 Discharge Management

This section deals with the change in characteristics of stormwater runoff as a result of the proposed development. The increase in impervious area will result in an increase in the peak discharge and also the volume of runoff.

3.4.1 Peak Discharge Summary

The catchment area of 0.2802ha will discharge directly to the existing drainage system. The post development phase will result in an increase in the impervious area of land and subsequently will result in an increase in the peak discharge and volume of runoff. It is assumed that the existing system is adequately sized to cater for runoff.

No mitigation of the discharge is proposed.

4.0 Conclusion

The need for mitigation of the peak stormwater discharge is not required. Therefore provision of on site detention is not required. Meeting the water quality objectives, as set out by the Tweed Shire Council is one of the primary objective and all aspects have been considered. The potential impact on the quality of receiving waters for this project is to be mitigated as follows:

a) Provision of an Oil and Grit Separator to improve discharged water quality from the car park hardstand areas during the operational phase.

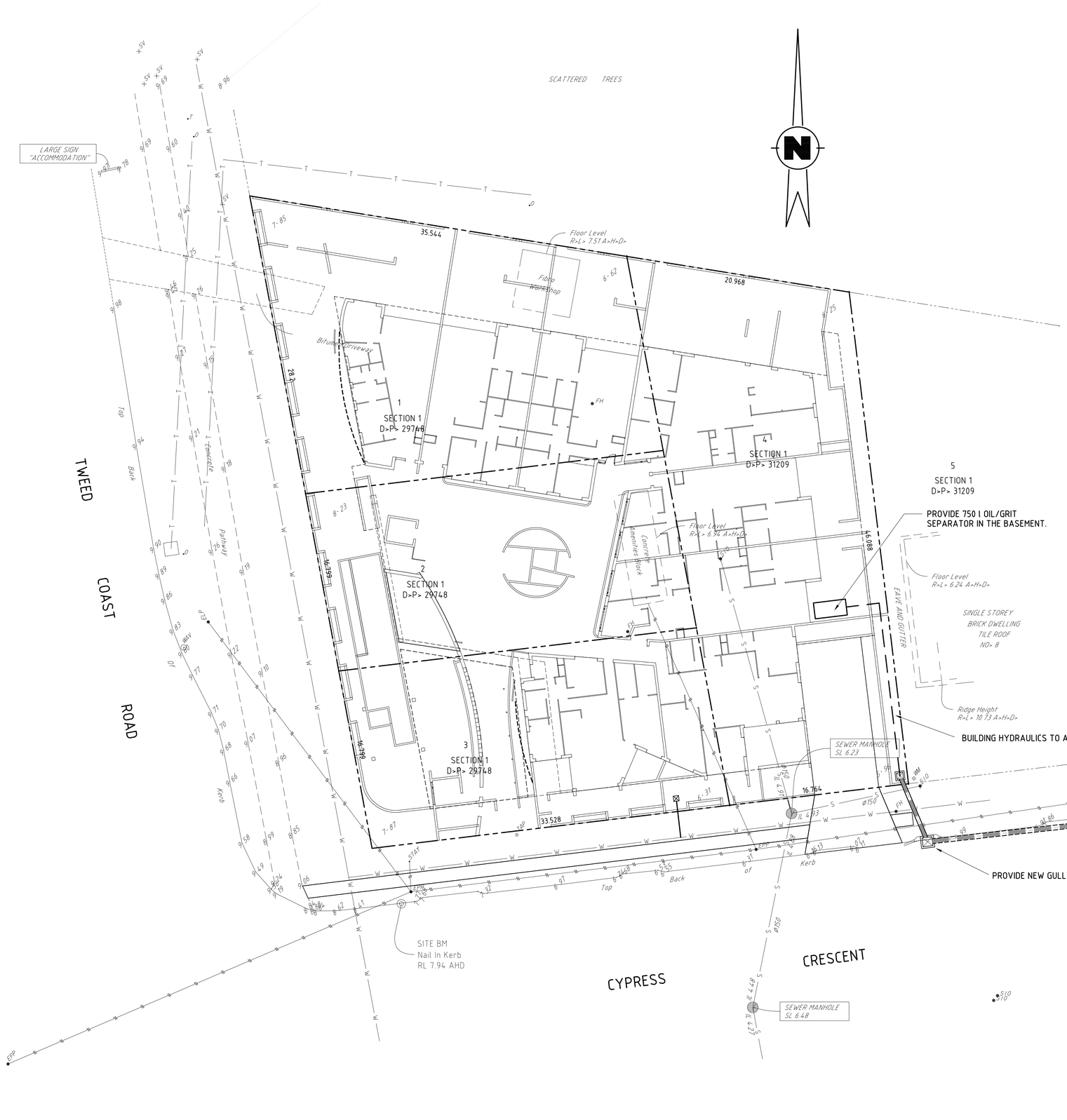
b) Management of operations of the site during the life of the development to minimise the potential pollutant loads.

The implementation of standard industry site practices is considered satisfactory for this development.

References

1. NSW, Environment Protection Authority, 11/97, "*Managing Urban Stormwater: Council Handbook, (Draft)"*.
2. NSW, Environment Protection Authority, 11/97, "Managing Urban Stormwater: Treatment Techniques".
3. The Institution of Engineers, Australia, Queensland Division, December 1996, "Soil Erosion and Sediment Control, Engineering Guidelines for Queensland Construction Sites".
4. NSW Department of Housing, 8/98, "Managing Urban Stormwater: Soils and Construction".
5. Brisbane City Council, Feb 2000, "Sediment Basin Design, Construction and Maintenance".

FIGURES



NOTES

- ALL PIPE WORK TO BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF AS3500 AND THE LOCAL AUTHORITY.
- ALL PIPEWORK TO BE 150 DIA. LAYED AT 1.65% MIN. U.N.O.
- ALL DIMENSIONS MUST BE TAKEN FROM SITE AND / OR VERIFIED BEFORE COMMENCEMENT OF WORK.
- THESE DRAWINGS ARE DIAGRAMMATIC ONLY AND ARE INTENDED TO INDICATE DESIGN IN ACCORDANCE WITH THE RELEVANT REGULATIONS AND REQUIREMENTS OT THE LOCAL AUTHORITY AND DO NOT RELIEVE THE BUILDER FROM ANY RESPONSIBILITY EVEN IF PLANS ARE STAMPED APPROVED.
- PLUMBER IS TO CO-ORDINATE WITH STRUCTURE PRIOR TO ANY CONSTRUCTION.
- PLUMBER IS TO VERIFY ALL INVERT LEVELS AND COVER OVER DRAINAGE LINES ARE CORRECT AND OBTAINABLE BEFORE COMMENCEMENT.

NOTE :
ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF WORKS.

No.	DATE	ISSUE	REVISED	CHECKED
B	03/10	LAYOUT AMENDED	D.P.G.	J.A.W.
A	11/09	ORIGINAL ISSUE	D.P.G.	J.A.W.

IN ASSOCIATION WITH

SCALE A 0 2 4 6 8 10 1 : 200

SCALE B

DATUM AHD

SCALES SHOWN ARE AT A1 SIZE

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(RPEQ No 4536)

CLIENT: TWEED COAST HOMES PTY. LTD.

PROJECT: MIXED USE RESIDENTIAL AND TOURIST DEVELOPMENT
CNR. TWEED COAST ROAD AND CYPRESS CRESCENT, CABARITA
STORMWATER MANAGEMENT PLAN

JOB NO. A.6.21

DRAWING NO. Sk.2

ISSUE A B

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