# **Appendix F** – Stormwater Engineering Report (Northrop)







CIVIL ENGINEERING REPORT

## Fairmont Hotels and Resort Port Douglas

71-85 Port Douglas Road, Port Douglas QLD 4877

PREPARED FOR Chiodo Corporation Operations Pty Ltd 704/434 St. Kilda Road Melbourne VIC 3004

Ref: SY200372-CR01 Rev: 3 Date: 23.02.21

Tel: (03) 9078 8784



#### Civil Engineering Report: Civil Engineering Report

#### **Revision Schedule**

Date	Revision	Issue	Prepared By	Approved By
31.08.20	1	For Development Application	A. Rivett	S. McClelland
15.12.20	2	Revised Stormwater Section with OSD	A. Rivett	S. McClelland
23.02.21	3	Reissued for Development Application	A. Rivett	-

#### Northrop Consulting Engineers Pty Ltd

ACN 064 775 088 | ABN 81 094 433 100

Level 11, 345 George Street, Sydney NSW 2000

02 9241 4188 | sydney@northrop.com.au | www.northrop.com.au

 $\ensuremath{\textcircled{\sc c}}$  2021 Northrop Consulting Engineers Pty Ltd. All rights reserved.

This document has been prepared on behalf of and for the exclusive use of Pure Projects Pty Ltd and is subject to and issued in accordance with the agreement between Pure Projects Pty Ltd and Northrop Consulting Engineers. Northrop Consulting Engineers accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this document by any third party. Copying this document without the permission of Pure Projects Pty Ltd or Northrop Consulting Engineers is not permitted.



#### Table of Contents

1.	Gene	əral3
	1.1	Introduction
	.2	Related Reports and Documents
	1.3	The Development
2.	Floo	ding and Building Levels6
2	2.1	Flooding
	2.2	Building Immunity Requirements7
3.	Site	Grading and Bulk Earthworks8
3	3.1	Site Grading
3	3.2	Bulk Earthworks
4.	Road	dworks10
4	4.1	Pavements
4	1.2	Parking10
5.	Storr	nwater Management11
Į	5.1	Existing Drainage
Ę	5.2	Proposed Drainage
6.	Cond	clusion17



#### 1. General

#### 1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged to prepare the Civil Engineering design and documentation in support of a Development Application submission to Douglas Shire Council for the proposed Fairmont Hotels development at 71-85 Port Douglas Road, Port Douglas QLD 4877.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Flooding Consideration/Building Levels;
- Site Grading and Bulk Earthworks;
- Roadworks and Pavements; and
- Stormwater Management.

#### 1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

- 1. Development Application Civil Drawings prepared by Northrop:
  - 200372-DA-C01.01: Cover Sheet, Drawing List and Locality Plan
  - 200372-DA-C01.11: Civil Specification Notes
  - 200372-DA-C01.21: General Arrangement Plan
  - 200372-DA-C02.01: Concept Sediment and Erosion Management Control Plan
  - 200372-DA-C02.11: Sediment Erosion Management Control Details
  - 200372-DA-C03.01: Earthworks Cut Fill Plan
  - 200372-DA-C03.11: Earthworks Cut Fill Sections
  - 200372-DA-C04.01: Siteworks and Stormwater Management Plan Sheet 01
  - 200372-DA-C04.02: Siteworks and Stormwater Management Plan Sheet 02
  - 200372-DA-C04.03: Siteworks and Stormwater Management Plan Sheet 03
  - 200372-DA-C04.04: Siteworks and Stormwater Management Plan Sheet 04
  - 200372-DA-C04.11: Driveway Longitudinal Sections
  - 200372-DA-C05.01: Concept OSD Plan
  - 200372-DA-C05.11: Trunk Drainage Longitudinal Section
  - 200372-DA-C08.01: Concept Catchment Plan
- 2. Development Application Architectural Documentation prepared by Buchan Group;
- 3. Development Application Landscape Documentation prepared by Durie Design;
- 4. Catchment Flooding and Storm Tide Study by BMT (ref: R.B24360.001);
- 5. Douglas Shire Council's Infrastructure Works Code;
- 6. Far North Queensland Development Manual; and
- 7. Queensland Urban Drainage Manual Version 4



#### 1.3 The Development

#### 1.3.1 Existing Site

The site is located within the town of Port Douglas in the Douglas Shire Council (Council) Local Government Area (LGA) approximately 2km south of the village centre.

The proposed Fairmont Hotels and Resort Port Douglas is located at 71-85 Port Douglas Road, Port Douglas and is formally known as Lot 1 in SP 150468. The site is approximately 2.1 hectares, bound by Mirage Country Club to the west and north, the Bally Hooley Tramway and Port Douglas Road to the east, and Oaks Resort to the South (refer Figure 1).



Figure 1 – Site location

The existing site is elevated above the adjacent floodplain with most of the site at elevations above 3.5 mAHD compared to floodplain levels of around 1.0 mAHD. The site generally grades to the west to a lagoon located within the adjacent golf course. An existing Ø600 pipe drains the external Port Douglas Road catchment though the site to the lagoon. The golf course is located within the Packers Creek floodplain, draining to the Coral Sea at Dickson Inlet located to the north of the site.

Current site access is provided by an access road from Port Douglas Road. The basement of an abandoned building project occupies approximately one third of the existing site.



#### 1.3.2 Proposed Development

The proposed development is a multi-storey five-star resort with open space around the building incorporating active and passive leisure areas such as pools and a barbecue area. The building consists of a basement carpark, five storeys, and a rooftop leisure area.

Site access is proposed via two access roads from Port Douglas Road, one to access the reception and basement carpark, and the other to access the proposed loading dock. The existing access from Port Douglas Road is not utilised by the development and is to be removed.

A perspective view of the proposed development is shown in Figure 2.

Figure 2 – Perspective of proposed development Source: Buchan Group

Refer to the architectural drawings prepared by Buchan Group in support of the Development Application for full details of the development.



#### 2. Flooding and Building Levels

#### 2.1 Flooding

A catchment flooding and storm tide study was undertaken by BMT (ref: R.B24360.001) to establish the 1% Annual Exceedance Probability (AEP) Defined Flood Level (DFL) for the development site. From this study the 1% AEP DFL estimates are:

- 2.70 mAHD for the 2100 storm tide combination;
- 2.46 mAHD for the 2070 storm tide combination; and
- 2.45 mAHD for the local flooding event.

The flood extents for the 1% AEP regional (2100 storm tide combination) and local flooding events determined by BMT are presented in Figures 3 and 4.



Figure 3 – 1% AEP regional (2100 storm tide combination) flood extents Source: BMT





Figure 4 – 1% AEP local flood extents Source: BMT

#### 2.2 Building Immunity Requirements

In accordance with Council's *Flood and Storm Tide Overlay Code*, the proposed floor level must provide immunity to the 1% AEP DFL plus 300mm freeboard. The adopted lower ground finished floor level of 3.01 mAHD provides 301mm freeboard to the 2100 storm tide combination.



#### 3. Site Grading and Bulk Earthworks

#### 3.1 Site Grading

The adopted lower ground floor level of 3.01 mAHD sits approximately 1-1.5m lower than the adjoining property to the south and generally 1-2m lower than the adjoining property to the north. Retaining walls, to be designed during the detailed design stage, are proposed along the boundary line to account for the level difference. During the detailed design phase, it is proposed to further investigate how the height of retaining walls may be reduced through landscaping treatments between the building and boundaries.

Grading of the site generally directs runoff away from the building towards the stormwater network proposed along the northern and southern boundaries (refer Section 5). Refer civil engineering drawings C04.01-C04.04 for details of concept site grading.

#### 3.2 Bulk Earthworks

With the lowering over most of the site and the excavation of the proposed basement there is an excess of material to be exported from site. Preliminary earthworks volumes are as follows:

- Total Cut: 51,260 m<sup>3</sup>
- Total Fill: 3,445 m<sup>3</sup>
- Excess material (export): 47,815 m<sup>3</sup>

The above indicative volumes are based on the following assumptions:

- Existing surface stripped 150mm over whole site; and
- Finished surface (including basement) set 300mm below finished surface level over whole site.

Indicative areas of cut (red) and fill (green) are shown in Figure 5. Refer civil engineering drawings C03.01 and C03.11 for additional information.





Figure 5 – Indicative areas of cut (red) and fill (green)

A more detailed assessment of the required earthworks volumes will be undertaken during the detailed design phase.



#### 4. Roadworks

Two new property accesses are proposed from Port Douglas Road into the development. The concept design of the new accesses is presented on the civil engineering drawings, with additional design to be undertaken in accordance with Department of Transport and Main Roads (TMR) requirements during the detailed design phase.

The proposed roadworks generally consists of:

- Provision of northbound left-in slip lane to the main site entry with shared bicycle lane;
- Provision of southbound right turn lane into the main site entry;
- Road widening to the western and eastern shoulders to facilitate the additional turn lanes;
- Construction of two new property access roads;
- Removal of the existing disused property access; and
- Adjustment works to the existing shared path, tramway and table drain west of Port Douglas Road as required.

Refer civil engineering drawings C04.02 and C04.04 for additional details of the proposed property accesses and road widening.

#### 4.1 Pavements

Road pavement design will be undertaken during the detailed design phase in accordance with normal engineering practice and TMR requirements where applicable.

#### 4.2 Parking

All onsite parking is located within the basement carpark and is outside the scope of the civil engineering works.



#### 5. Stormwater Management

#### 5.1 Existing Drainage

The site falls generally from east to west towards the golf course located to the rear of the development. A lagoon located within the golf course site immediately west of the property boundary is the receiving waters for the existing runoff and the proposed point of discharge for the development.

An external catchment of approximately 1.72 hectares to the east of the site drains to an existing headwall in the road reserve near the south eastern corner of the site. A Ø600 pipe conveys the runoff from the external catchment through the site to the golf course.

The existing drainage regime is illustrated in Figure 6.



Figure 6 – Existing drainage regime



Under existing conditions runoff from the subject site is predominantly sheets flow crossing directly into the lagoon over the western boundary. The current site configuration is 25% impervious, resulting in the estimated peak site discharges to the golf course shown in Table 1. These figures include runoff generated from the upstream Port Douglas Road catchment.

Event	Peak Site Discharge (L/s)
10% AEP	860
1% AEP	1350

#### 5.2 Proposed Drainage

The vertical and horizontal alignment of the existing Ø600 pipe running along the southern boundary is not compatible with the proposed site layout and levels. Furthermore, the pipe does not have capacity to convey 1% AEP flows to the lagoon. Under existing conditions, flows in excess of the Ø600 pipe's capacity pond south along Port Douglas Road before making their way west to the golf course. It is proposed to provide capacity for the 1% AEP flows from Port Douglas Road in the piped drainage through the site to minimise the impacts of overland flow on this and adjoining developments.

To convey external flows through the site to the golf course it is proposed to provide the following:

- Local regrading of the table drain to a low point adjacent to the property boundary;
- An 1800x900 grated inlet pit (subject to confirmation at detailed design stage) located in the low point of the table drain to capture 1% AEP flows;
- A 1200x600 reinforced concrete box culvert (RCBC) along the southern boundary of the site to convey 1% AEP flows to the lagoon.

There is no reasonable legal point of discharge for the development as the site drains to the west and the runoff from Port Douglas Road passes through the site. As the golf course lagoon is the logical point of discharge for the development, owner's consent has been sought and obtained to discharge to this location.

To gain owner's consent it was required to demonstrate that the post-development discharge from the site does not meaningfully exceed pre-developed conditions. To achieve this, two on-site detention systems are proposed: one in the north-western corner of the site, and another in the south-eastern corner of the site. Each tank consists of a concrete tank below the lower ground level. Refer drawing C05.01 for the concept OSD arrangement.

The site catchments is split between the two OSDs with approximately 50% of the roof area assumed to be directly connected to each OSD. These assumptions are to be confirmed at the detailed design stage. Discharge for the north-western OSD is directly to the golf course lagoon (within the development boundary) and the south-eastern OSD connects to the trunk RCBC which also discharges to the golf course lagoon.

The indicative catchment plan is shown in Figure 7 – refer drawing C08.01 for more details.





Figure 7 – Indicative catchment plan

The points of discharge to the golf course lagoon are generally matched to existing conditions, with connections at the north-western and south-western corners of the site.

The performance of the on-site detention systems has been assessed for the 10% AEP minor event (recommended design AEP for commercial development in QUDM) and 1% AEP major event as summarised in Table 2.

Event	Pre-Development Peak Site Discharge (m³/s)	Post-Development Peak Site Discharge (m³/s)	% Increase
10% AEP	0.86	0.83	Nil
1% AEP	1.35	1.44	7%

Energy dissipators consisting of dumped rock scour protection are proposed to sit wholly within the subject site to prevent adverse impacts on the receiving waters from the increased runoff.

#### 5.2.1 Drainage Design

Preliminary drainage design has been undertaken in DRAINS software using ILSAX hydrology with ARR 2019 rainfall and procedures to size the RCBC and the inlet pit conveying external flows through the site, and to provide preliminary sizing of on-site detention. At the detailed design stage, the same methodology is proposed to design all internal site drainage and optimize the on-site detention.



The piped site drainage is proposed to be designed for the major (1% AEP) storm event due to limited space around the building to accommodate overland flow. In each case, the secondary flow paths are generally designed to carry excess flow overland to the outlets at the northwestern and southwestern corners of the site. Due to the limited fall from east to west, the overland flow paths have been designed as a series of sags and crests, with crest levels set sufficiently below the lower ground FFL to avoid inundation. It is anticipated that the site grading will be further optimized during the detailed design phase.

The design methodology for overland is summarised in Figure 8.



Figure 8 – Overland flow concept

The trunk drainage along the southern boundary of the site has been designed to convey the 1% AEP flow below ground. As with site runoff, there is insufficient space external to the building to accommodate significant overland flows. It is noted that a piped system for the major design event without a secondary overland flow path is undesirable, however if the inlet in Port Douglas Road becomes blocked the inlet will spill to the south within the road reserve and not into the subject site. Not only is this consistent with the pre-developed flow characteristics, the proposed drainage system provides additional capacity over the existing Ø600 pipe. In accordance with QUDM the proposed inlet structure has been design with a blockage factor of 50%. If significant blockage of the inlet



structure is a concern provision of an oversized inlet can be considered during the detailed design stage.

#### 5.2.1.1 Drainage Easements

A three-metre-wide drainage easement is proposed over the trunk drainage along the southern boundary of the site which conveys runoff from the upstream Port Douglas Road catchment through the site. It is noted that the existing Ø600 pipe performing the same purpose does not appear to have an easement registered over it.

#### 5.2.1.2 Flood Storage

Approximately 487 m<sup>3</sup> of storage below the 1% AEP flood level (RL 2.7m) is contained within the site under pre-developed conditions. During detailed design, it is proposed to design the pool area located in the south western corner below the regional flood level to provide compensatory flood storage commensurate with the existing conditions.

The area to be considered for compensatory flood storage is illustrated in Figure 9.



Figure 9 – Approximate zone of for compensatory flood storage subject to detailed design



#### 5.2.1.3 Severe Impact Assessment

For blockage in excess of 50% in the major event, or events exceeding the major event, there is limited risk to the development. As outlined above flows bypassing the inlet structure in Port Douglas Road do not enter the site, instead ponding south within the table drain and draining west through the adjoining site.

During detailed design the civil and landscaping designs will be optimized to minimise the impacts from site runoff in the event of blockages. It is anticipated that minor flooding of the lower ground floor may occur in such events. Also during detailed design the OSD designs will be finalised to ensure that, in the event of blockage, the tank are able to spill outside of and away from the proposed building.

#### 5.2.1.4 Detailed Design

As with the preliminary design for development application, all detailed design of site and trunk drainage will be undertaken in accordance with the Far North Queensland Regional Development Manual, the Queensland Urban Drainage Manual, and Council's requirements.



#### 6. Conclusion

The proposed development at 71-85 Port Douglas Road, Port Douglas consists of a multi-storey resort building with surrounding open space. The floor level for the lower ground floor has been set to 3.01 mAHD, providing 301mm freeboard to the 1% AEP 2100 storm tide combination.

The adopted floor level sits in the order of 1-2m below the adjoining properties to the north and south, with retaining walls proposed to facilitate the level difference. The walls will be designed at the detailed design stage with landscaping solutions to be investigated to reduce the height and extent of walls as much as possible. Bulk excavation of the site will require around 50,000 m<sup>3</sup> of soil to be exported from the site, to be confirmed at the detailed design stage.

Two new property accesses are proposed from Port Douglas Road, with the existing access to be removed. Widening of Port Douglas Road is required to provide left- and right-turn lanes into the main site access.

A 1200x600 RCBC is proposed to replace the existing Ø600 pipe along the southern boundary of the site to convey 1% AEP flows from Port Douglas Road to the golf course lagoon, with a 3m wide easement to be registered over the culvert. Internal site drainage is proposed to connect to the culvert, up to the capacity of the system, with the remaining site area connecting to a second outlet located in the north eastern corner. Two on-site detention systems are proposed in the north-western and south-eastern corners of the site to ensure that the peak flows leaving the site do not meaningfully exceed pre-developed conditions. This has been provided to obtain owner's consent to discharge into the adjoining lagoon and provides compensatory storage for regional flood events.

The impacts of severe rainfall events are minimal given that the runoff arriving at the Port Douglas Road inlet structure do not overflow through the site in the event of blockage or exceedance of capacity. This is consistent with the existing flow regime.

Design of the internal drainage system will be undertaken at the detailed design stage using ILSAX hydrology and ARR 2019 rainfall and procedures in the DRAINS software. The design will be undertaken in accordance with the Far North Queensland Regional Development Manual, the Queensland Urban Drainage Manual, and Council's requirements.

In summary, this report and the accompanying civil engineering drawings determine that:

- Access to the site is available via two new property accesses constructed from Port Douglas Road;
- The required flood immunity is provided to the lower ground floor through the provision of 301mm freeboard to the 1% AEP flood level (2100 storm tide combinate); and
- A drainage regime has been identified and can be further designed at the detailed design stage to meet the relevant requirements.

We trust the information provided is sufficient to support the development application. If you have any queries, please feel free to contact the undersigned to discuss.

Yours faithfully,

Andrew Rivett Civil Engineer (BE Civil, Hons1) Northrop Consulting Engineers Pty Ltd

# FAIRMONT HOTELS AND RESORTS, PORT DOUGLAS

# **CIVIL ENGINEERING PACKAGE DEVELOPMENT APPLICATION**



	CLIENT	DATE	APP'D	VER'D	ISSUED	DESCRIPTION	EVISION
	ا الباه	31.08.20	AR		DC	ISSUED FOR DEVELOPMENT APPLICATION	01
ODO		24.02.21	AR		AP	ISSUED FOR DEVELOPMENT APPLICATION	02
1-1-1-	-1						
corporation							
	VERIFICATION SIGNATURE HAS BEEN ADDED						

DRAWING SCHEDULE						
DRG No.	DRAWING TITLE					
200372-DA-C01.01	COVER SHEET, LOCALITY PLAN AND DRAWING LIST					
200372-DA-C01.11	CIVIL SPECIFICATION NOTES					
200372-DA-C01.21	GENERAL ARRANGEMENT PLAN					
200372-DA-C02.01	CONCEPT SEDIMENT EROSION MANAGEMENT CONTROL PLAN					
200372-DA-C02.11	SEDIMENT EROSION MANAGEMENT CONTROL DETAILS					
200372-DA-C03.01	EARTHWORKS CUT FILL PLAN					
200372-DA-C03.11	EARTHWORKS CUT FILL SECTIONS					
200372-DA-C04.01	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 01					
200372-DA-C04.02	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 02					
200372-DA-C04.03	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 03					
200372-DA-C04.04	SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 04					
200372-DA-C04.11	DRIVEWAY LONGITUDINAL SECTIONS					
200372-DA-C05.01	CONCEPT OSD PLAN					
200372-DA-C05.11	TRUNK DRAINAGE LONGITUDINAL SECTION					
200372-DA-C08.01	CONCEPT CATCHMENT PLAN					



#### NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH DOUGLAS SHIRE COUNCIL DEVELOPMENT GUIDELINES. THE AFOREMENTIONED GUIDELINES INCLUSIVE OF ALL SPEC

### ACCESS AND SAFETY

- THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING TRAFFIC CONTROL.
- THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS OR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED <u>PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY.</u> WORK IS NOT TO COMMENCE ON SITE PRIOR TO APPROVAL OF TRAFFIC MANAGEMENT SCHEME.
- THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES ACCESS TO BUILDINGS ADJACENT THE WORKS IS NOT DISRUPTED.
- WHERE NECESSARY THE CONTRACTOR SHALL PROVIDE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS THROUGH OR BY THE
- THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS REQUIREMENTS.

#### TREE PROTECTION

- REFER TO LANDSCAPE / ARCHITECTS PLAN FOR TREES TO BE RETAINED AND PROTECTED.
- ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY; 2.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR
- MATERIALS INSTALLED OUTSIDE THE DRIP LINE. ENSURING THAT NOTHING IS NAILED TO ANY PART OF THE TREE. 2.2.
- CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY. COUNCILS 2.3. AND/OR INDEPENDENT ARBORISTS TO BE CONSULTED WHERE TREE ROOTS ARE TO BE REMOVED AND/OR CUT.

#### SEDIMENT AND SOIL EROSION

- THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS DESIGN, OTHER REGULATORY AUTHORITY REQUIREMENTS AND MAKE GOOD PAYMENT OF ALL FEES.
- THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
- THE SITE SUPERINTENDENT SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.
- THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
- WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE; 5.1. CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF
- SHAKE DOWN / WASH PAD. 5.2.INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT ENCE CAN BE INCORPORATED INTO THE BARRIER FENCE. 5.3.INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE <u>APPROVED PLANS.</u>
- 6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
- 7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS
- ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
- WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
- 10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
- 11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
- 12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
- 13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
- 14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO COUNCILS STORMWATER SYSTEM . ENSURE WHOLE SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

#### EXISTING SERVICES

- 1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS
- 2. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS AREA TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
- THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF THE PROPOSED WORKS. ANY AND ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AT THE CONTRACTORS EXPENSE.
- THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS.
- THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT.
- 6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED AND MAINTAINED.
- PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF THE PROGRAM FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY.
- 8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

#### EARTHWORKS

- 1. AT THE COMMENCEMENT OF FILLING OPERATIONS FOR BULK EARTHWORKS <u>A GEOTECHNICAL ENGINEER IS TO VISIT THE SITE</u> & CONFIRM THE SUITABILITY OF THE METHODOLOGY OF ACHIEVING THE REQUIRED COMPACTION REQUIREMENTS.
- STRIP TOPSOIL, VEGETABLE MATTER AND RUBBLE TO EXPOSE NATURALLY OCCURRING MATERIAL AND STOCKPILE ON SITE AS DIRECTED BY THE SUPERINTENDENT.
- WHERE FILLING IS REQUIRED TO ACHIEVE DESIGN SUBGRADE, PROOF ROLL EXPOSED NATURAL SURFACE WITH A MINIMUM OF TEN PASSES OF A VIBRATING ROLLER (MINIMUM STATIC WEIGHT OF 10 TONNES) IN THE PRESENCE OF THE SUPERINTENDENT.
- 4. THE CONTRACTOR IS TO ALLOW FOR A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO PROVIDE ADVICE AND CERTIFICATION OF ANY WORKS ASSOCIATED WITH TREATING OR MANAGING UNSUITABLE GROUND CONDITIONS THROUGHOUT THE CONTRACT (e.g. STABILITY OF EXCAVATIONS, POOR SUBGRADE, etc).
- ALL SOFT, WET OR UNSUITABLE MATERIAL IS TO BE REMOVED AS DIRECTED BY THE SUPERINTENDENT AND REPLACED WITH APPROVED MATERIAL SATISFYING THE REQUIREMENTS BELOW.
- PROVIDE CERTIFICATES VERIFYING THE QUALITY OF IMPORTED MATERIAL FOR THE SUPERINTENDENTS APPROVAL.
- ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 200mm THICK LAYERS (LOOSE) AND COMPACTED AT OPTIMUM MOISTURE CONTENT <u>+ OR – 2%) TO ACHIEVE A DRY DENSITY DETERMINED IN</u> ACCORDANCE WITH AS1289.2.1.1, AS1289.5.7.1 AND AS1289.5.8.8 OF IOT LESS THAN THE FOLLOWING STANDARD MINIMUM DRY DENSITY
- OCATION LANDSCAPED AREAS

ROADS

- COMPACTION REQUIREMENT 98% SMDD
- COUNCIL SPECIFICATIONS)
- PAVED AREAS COUNCIL SPECIFICATIONS)
- 100% SMDD (IN ACCORDANCE WITH
- 100% SMDD (IN ACCORDANCE WITH
- 8. TESTING OF THE SUBGRADE FOR BUILDINGS SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY.
- ALLOW THE FOLLOWING COMPACTION TESTING BY N.A.T.A. REGISTERED LABORATORY FOR PLATFORMS AND FILL LAYERS IN CORDANCE WITH THE LATEST VERSION OF AS3798. (MINIMUM ) TS PER LAYER) OR 1 TEST PER MATERIAL TYPE PER 2500sq.m OR
- 10. WHERE TEST RESULTS ARE BELOW THE SPECIFIED COMPACTION, RECOMPACT AND RETEST UNTIL SPECIFIED COMPACTION STANDARDS ARE ACHIEVED, OTHERWISE SUBGRADE REPLACEMENT IS REQUIRED IF COMPACTION STANDARDS ARE NOT ACHIEVED.
- 11. ALLOW FOR EXCAVATION IN ALL MATERIALS AS FOUND U.N.O. NO ADDITIONAL PAYMENTS WILL BE MADE FOR EXCAVATION IN WET OR HARD GROUND.
- 12. WHERE THERE IS INSUFFICIENT EXCAVATED MATERIAL SUITABLE FOR FILLING OR SUBGRADE REPLACEMENT, THE CONTRACTOR IS TO ALLOW TO IMPORT FILL. IMPORTED FILL SHALL COMPLY WITH THE
- FOLLOWING 12.1. BE OF VIRGIN EXCAVATED NATURAL MATERIAL OR
- 12.2. CONTRACTOR TO PROVIDE EVIDENCE IMPORT IS SUITABLE USE 12.3. PLASTICITY INDEX BETWEEN 2-15% AND CBR > 8
- 12.4. FREE FROM ORGANIC AND PERISHABLE MATTER
- 12.5. MAXIMUM SIZE 50mm, PASSING 75 MICRON SIEVE (<25%)

	CLIENT	DATE	APP'D	VER'D	ISSUED	DESCRIPTION	DESCRIPTION	ISION
أ ا ا	ابلباه	31.08.20	AR		DC	ISSUED FOR DEVELOPMENT APPLICATION	ISSUED FOR DEVELOPMENT APPLICATI	)1
ODO	CHI	24.02.21	AR		AP	ISSUED FOR DEVELOPMENT APPLICATION	ISSUED FOR DEVELOPMENT APPLICATI	2
1-1-1-	-1.1.1							
corporation								
5 THE COPYRIGH	DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS							
NORTHROP (	VERIFICATION SIGNATURE HAS BEEN ADDED							

#### EARTHWORKS (cont)

13. THE CONTRACTOR SHALL PROGRAM THE EARTHWORKS OPERATION SO THAT THE WORKING AREAS ARE ADEQUATELY DRAINED DURING THE PERIOD OF CONSTRUCTION. THE SURFACE SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS, ROLLERS MARKS AND SIMILAR WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM THE CONTRACTOR NOT OBSERVING THESE REQUIREMENTS SHALL BE RECTIFIED AT THEIR COST.

14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE AND MAINTAIN THE INTEGRITY OF ALL SERVICES, CONDUITS AND PIPES DURING CONSTRUCTION, SPECIFICALLY DURING THE BACKFILLING AND COMPACTION PROCEDURE. ANY AND ALL DAMAGE TO NEW OR EXISTING SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST.

15. TESTING OF THE SUBGRADE SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY AT THE CONTRACTORS EXPENSE.

DEEP EXCAVATIONS

- PRIOR TO THE COMMENCEMENT OF EXCAVATION WORKS GREATER THAN 1.5m IN DEPTH, THE CONTRACTOR SHALL OBTAIN THE SERVICES OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO DETERMINE THE STABILITY OF A NATURAL MATERIAL AND BENCHING <u>REQUIREMENTS.</u>
- 17. THE CONTRACTOR MUST PROVIDE THE SUPERINTENDENT AND OR THE DESIGN ENGINEER WITH A COPY OF THE GEOTECHNICAL ENGINEERS
- 18. THE CONTRACTOR IS TO PROVIDE SAFETY BARRIERS / FENCING IN ACCORDANCE WITH OH&S AND REGULATORY AUTHORITY REQUIREMENTS.
- SERVICE TRENCHES
- 19. SAWCUT EXISTING SURFACES PRIOR TO EXCAVATION. BACKFILL ALL TRENCHES UNDER EXISTING ROADS, PAVEMENTS AND PATHS WITH STABILISED SAND 5% CEMENT OR DGS40 MATERIAL (5% CEMENT) COMPACTED IN 200mm THICK LAYERS TO 98% MMDD TO UNDERSIDE OF PAVEMENT.
- 20. BACKFILL ALL TRENCHES NOT UNDER ROADS, PAVEMENTS, PATHS AND BUILDINGS WITH APPROVED EXCAVATED OR IMPORTED MATERIAL COMPACTED TO 95% SMDD.

#### SITEWORKS

- ALL WORKS TO BE IN ACCORDANCE WITH RELEVANT LOCAL COUNCIL / REGULATORY AUTHORITIES REQUIREMENTS, ALL SPECIFICATIONS AND AUSTRALIAN STANDARDS. <u>CONFLICTS BETWEEN SAID</u> DOCUMENTS SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION
- THE CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES DURING CONSTRUCTION IN ACCORDANCE WITH ALL REGULATORY AUTHORITIES, INCLUSIVE OF LOCAL COUNCIL REGULATIONS AND REQUIREMENTS.
- THE CONTRACTOR IS TO OBTAIN ALL AUTHORITY APPROVALS AS REQUIRED PRIOR TO COMMENCEMENT OF WORKS.
- RESTORE ALL PAVED, COVERED, GRASSED AND LANDSCAPED AREAS TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT ON COMPLETION OF WORKS. WHERE PLANTING OF NEW GRASS IS NECESSARY REFER TO LANDSCAPE ARCHITECT AND / OR ARCHITECT DOCUMENTATION.
- ON COMPLETION OF ANY TRENCHING WORKS, ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR AS DIRECTED BY THE SITE SUPERINTENDENT, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL, GRASSED AREAS AND ROAD PAVEMENTS.
- 6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF WORKS.
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING LEVELS ONSITE PRIOR TO LODGMENT OF TENDER AND ONSITE WORKS. THE PRICE AS TENDERED SHALL BE INCLUSIVE OF ALL WORKS SHOWN ON THE TENDER PROJECT DRAWINGS. ADDITIONAL PAYMENTS FOR WORKS SHOWN ON THE TENDER PROJECT DRAWINGS WILL NOT BE APPROVED
- 8. DO NOT OBTAIN DIMENSIONS BY SCALING DRAWINGS.
- 9. IN CASE OF DOUBT OR DISCREPANCY REFER TO SUPERINTENDENT FOR CLARIFICATION OR CONFIRMATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
- 10. WHERE NEW WORKS ABUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED. MAKE SMOOTH TRANSITION TO EXISTING FEATURES AND MAKE GOOD WHERE JOINED.
- 11. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
- 12. ALL CIVIL ENGINEERING DESIGN HAS BEEN DOCUMENTED UNDER THE ASSUMPTION THAT ALL NECESSARY SITE CONTAMINATION REMEDIATION WORKS HAVE BEEN SATISFACTORILY COMPLETED (IF APPLICABLE) AND THAT THE SITE IS NOT AFFECTED BY ANY SOIL STRATA OR GROUNDWATER TABLE CONTAMINATION.

#### STORMWATER DRAINAGE

- ALL PIPES SHALL BE CLASS 2 RUBBER-RING JOINTED RCP U.N.O. WHERE UPVC PIPES HAVE BEEN SPECIFIED, THE FOLLOWING CLASS PIPEWORK IS TO BE ADOPTED U.N.O. Ø100mm OR LESS TO BE CLASS 'SN10' AND ABOVE Ø100mm TO BE CLASS 'SN8'.
- uPVC STORMWATER LINES PASSING UNDER FLOOR SLABS TO BE CONCRETE ENCASED.
- FRC PIPES EQUAL TO THAT OF THE STEEL REINFORCED CONCRETE PIPE CLASS SPECIFIED ON THE DRAWINGS MAY BE USED SUBJECT TO APPROVAL FROM THE SUPERINTENDENT.
- 4. ALL PIPE ARE TO BE LAID AT 1.0% MIN GRADE U.N.O.
- 5.1. USE HOT DIPPED GALVANISED COVERS AND GRATES COMPLYING WITH RELEVANT COUNCIL AND AUSTRALIAN STANDARDS.
- 5.2. ALL COVERS AND GRATES TO BE POSITION IN A FRAME AND MANUFACTURED AS A UNIT 5.3. ALL COVERS AND GRATES TO BE FITTING WITH POSITIVE COVER
- LIFTING KEYS 5.4. OBTAIN SUPERINTENDENTS APPROVAL FOR THE USE OF CAST IRON SOLID COVERS AND GRATES. CAST IRON SOLID COVERS (IF APPROVED) TO CONSIST OF CROSS-WEBBED, CELLULAR CONSTRUCTION WITH THE RIBS UPPERMOST TO ALLOW INFILLING
- WITH CONCRETE. INSTALL POSITIVE COVER LIFTING KEYS AND PLASTIC PLUGS. 5.5. UNLESS DETAILED OR SPECIFIED OTHERWISE, COVERS AND GRATES TO BE CLASS 'D' IN VEHICULAR PAVEMENTS AND CLASS 'B'
- ELSEWHERE 5.6. ALL GRATED TRENCH DRAINS SHOULD BE 'CLASS D' CAST IRON WITHIN VEHICULAR PAVEMENTS AND CLASS 'B' HEEL SAFE WITHIN
- PEDESTRIAN PAVEMENTS. 6. ALL PIPE BENDS, JUNCTIONS, ETC ARE TO BE PROVIDED USING
- PURPOSE MADE FITTINGS OR STORMWATER PITS.
- ALL CONNECTIONS TO EXISTING DRAINAGE STRUCTURES SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
- 8. STORMWATER PIPEWORK TO FINISH FLUSH WITH INTERNAL PIT WALLS AND MUST NOT PROTRUDE. CONNECTION TO BE NEATLY RENDER AND MADE NEAT.
- THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
- 10. U.N.O. MATERIAL USED FOR BEDDING OF PIPES SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED AND FREE OF ORGANIC AND CLAY MATERIAL.
- WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN 50mm CONCRETE BED (OR 75mm THICK BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK.
- 12. BEDDING SHALL BE U.N.O TYPE HS2 UNDER ROADS AND H2 UNDER GENERAL AREAS IN ACCORDANCE WITH CURRENT RELEVANT INDUSTRY STANDARDS AND GUIDELINES
- 13. THE CONTRACTOR SHALL ENSURE AND PROTECT THE INTEGRITY OF ALL STORMWATER PIPES DURING CONSTRUCTION. ANY AND ALL DAMAGE TO THESE PIPES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AND AT NO EXTRA COST.
- 14. NOTE THAT THE PIT COVER LEVEL NOMINATED IN GUTTERS ARE TO THE INVERT OF THE GUTTER WHICH ARE 40mm LOWER THAN THE PAVEMENT LEVEL AT LIP OF GUTTER. REFER KERB DETAILS FOR CONFIRMATION.
- SUBSOIL DRAINAGE
- 15. Ø100mm SUBSOIL DRAINAGE LINES WITH NON-WOVEN GEOTEXTILE FILTER SOCK SURROUND SHALL BE CONNECTED TO A STORMWATER DRAINAGE PIT (AT MIN 1% LONGITUDINAL GRADE) AND PROVIDED IN THE FOLLOWING LOCATIONS
- 15.1. THE HIGH SIDE OF PROPOSED TRAFFICKED PAVEMENT AREAS. 15.2. ALL PLANTER AND TREE BEDS PROPOSED ADJACENT TO PAVEMENT
- AREAS. 15.3. BEHIND RETAINING WALLS (IN ACCORDANCE WITH RETAINING WALL DETAILS).
- 15.4. ALL OTHER AREAS SHOWN ON DRAWINGS.
- 15.5. CONTRACTOR IS TO MAKE ALLOWANCE IN BOTH TENDER AND CONSTRUCTION COSTING TO ALLOW FOR SUBSURFACE DRAINAGE BEHIND ALL RETAINING WALLS / ABOVE LOCATIONS AND TO MAKE CONNECTION TO STORMWATER SYSTEM.
- 16. WHERE SUBSOIL DRAINAGE PASSES BENEATH BUILDINGS / PAVED AREAS AND/OR PAVEMENTS. CONTRACTOR TO ENSURE Ø100mm CLASS 'SN10' uPVC DRAINAGE LINE IS USED AND THAT PROPRIETARY FITTINGS ARE USED TO RECONNECT SUBSOIL DRAINAGE LINE.
- 17. THE CONTRACTOR SHALL INSTALL INSPECTION OPENINGS / CLEAROUTS TO ALL SUBSOIL DRAINAGE LINES AND DOWNPIPE LINES AS SPECIFIED ON DRAWINGS AND IN ACCORDANCE WITH COUNCIL SPECIFICATIONS AT MAXIMUM 30m CENTRE AND AT ALL UPSTREAM ENDPOINTS
- 18. PROVIDE 3.0m LENGTH OF Ø100 SUBSOIL DRAINAGE LINE WRAPPED IN NON-WOVEN GEOTEXTILE FILTER FABRIC TO THE UPSTREAM SIDE OF STORMWATER PITS, LAID IN STORMWATER PIPE TRENCHES AND CONNECTED TO DRAINAGE PIT.
- 19. IN AREAS WHERE DUMPED / HAND PLACED ROCK IS USED AS A MEANS OF SCOUR PROTECTION, CONTRACTOR IS TO EXCAVATE A MINIMUM OF 100mm FROM PROPOSED SURFACE, LEVEL AND COMPACT SUBGRADE AS SPECIFIED. ROCK TO THEN BE PLACED ON GEOTEXTILE FILTER FABRIC.

## PRECAST STORMWAT

- THE USE OF PRE-CAST STORMWATER DRAINA ACCEPTED WITHOUT CONFIRMATION BETWEEN AND THE CONTRACTOR REGARDING QUALITY CERTIFICATION OF FINISHES.
- REFER MANUFACTURERS SPECIFICATIONS FOR GUIDELINES.
- PRECAST PIT TO BE PLACED ON MINIMUM 150 AND BED MINIMUM 50mm WHILST CONCRETE IS
- ENSURE PENETRATION IS CORED THROUGH PIT CONNECTION.
- ENSURE A SMOOTH SEALED FINISH AT PIPE CO APPLYING CONCRETE AROUND THE PIPE ON T THE PIT TO FILL IN ANY VOIDS CREATED WHE THE PIPE WAS CORED.
- ENSURE A SEALED FINISH AT PIPE CONNECTIO MINIMUM 150mm THICK CONCRETE AROUND PIP FACE OF THE PIT. ENSURE CONCRETE DOES NO INTEGRITY OF THE SUBSOIL DRAINAGE CONNE
- ENSURE PIPEWORK DOES NOT PROTRUDE INTO WALL, PIPEWORK IS TO FINISH FLUSH WITH IN OTHERWISE NOTED OR DETAILED).
- 8. ENSURE THE OUTLET PIPE IS CONNECTED AT THE PIT TO DRAIN. ALTERNATIVELY FILL THE MASS CONCRETE (MIN 50mm THICK) OR APPRO COMPOUND (LESS THAN 50mm THICK) TO DRA
- 9. PROVIDE CONCRETE BENCHING TO SIDES OF PI DIAMETER. HEIGHT TO MATCH MINIMUM 1/3 PIP

#### SIGNAGE AND LINEM

- ALL SIGNAGE TO BE INSTALLED IN ACCORDANCI STANDARDS 1742 / RMS STANDARDS AND SPE
- LINE MARKING AND PAINT SHALL BE IN ACCORD AND RMS STANDARDS.
- 3. PAINT SHALL BE TYPE 3 CLASS 'A' AND THE CO AND NOT SUBJECT TO DISCOLOURATION BY BIT SURFACE. ALL PAINT TO BE APPLIED BY MECHA
- 4. LINE MARKING SHALL BE SPOTTED OUT AND AF SPRAYING.
- 5. PAINT SHALL BE APPLIED AT A WET THICKNES AND 0.40mm.
- 6. CARPARK LINEMARKING TO BE 80mm WIDE.

#### LANDSCAPIN

- REFER TO DRAWINGS BY OTHERS FOR DETAILS LANDSCAPING TREATMENT.
- . ALL DISTURBED SURFACE TO BE TEMPORARILY HYDROMULCH UPON COMPLETION OF WORKS. A (CT2 COUCH) IS TO BE PLACED BEHIND ALL NEW ROLL KERB.

LL DIMENSIONS TO BE VERIFIED ON SITE BEFORE ommencing work NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE JSABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR. AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE

T OF THIS DRAWING REMAINS WITH CONSULTING ENGINEERS PTY LTD

NOT TO SCALE

Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100

NORTHROP

ROJECT TITLE **CIVIL ENGINEERING** DEVELOPMENT AP FAIRMONT HOTELS A PORT DOUG DRAWING SHEET S

R PITS	PAVEMENTS
PITS IS NOT RTHROP ENGINEERS TROL AND	1. ALL PAVEMENT MATERIALS SHALL COMPLY WITH CURRENT RMS SPECIFICATIONS. PROVIDE MECHANICAL ANALYSIS FOR EACH BATCH OF PAVEMENT MATERIAL TO ENSURE CONFORMITY.
TALLATION	2. <u>COMPACTION STANDARDS</u> BASE 98% MODIFIED MAXIMUM DRY DENSITY SUBBASE 98% MODIFIED MAXIMUM DRY DENSITY SUBGRADE 100% STANDARD MAXIMUM DRY DENSITY
HICK CONCRETE PAD LL PARTIALLY WET. CE TO ALLOW	3. <u>THE CONTRACTOR SHALL CONFIRM THE DESIGN CBR WITH A MINIMUM</u> OF 3 TESTS TAKEN AT SUBGRADE LEVEL. WHERE DISCREPANCY IS FOUND, CONTACT THE DESIGN ENGINEER.
ECTIONS BY HAND NTERNAL FACE OF ENETRATION FOR	<ul> <li>4. ALLOW FOR COMPACTION TESTING BY A N.A.T.A. REGISTERED LABORATORY FOR BASE LAYER, SUBBASE LAYER AND SUBGRADE LAYER IN ACCORDANCE WITH THE LATEST VERSION OF AS3798 FOR PAVEMENTS (MINIMUM 2 TESTS PER LAYER). ALLOW FOR AT LEAST TWO SUCCESSED COMPACTION TESTS IN FACH LAYER</li> </ul>
BY HAND-APPLYING T THE EXTERNAL AFFECT THE TO TO THE PIT	<ol> <li>MATCH NEW PAVEMENTS NEATLY AND FLUSH WITH EXISTING</li> <li>AFTER BASE IS APPROVED, SWEEP CLEAN AND PRIME AT NOMINAL RATE OF 101 PER 10 sam</li> </ol>
HE BEYOND THE RNAL WALL (UNLESS	7. <u>PAVEMENT HOLD POINTS</u> 7.1. SUB-GRADE PROOF ROLL PRIOR TO SET-UP AND FORM FOR CONCRETE POUR
INVERT LEVEL OF SE OF THE PIT WITH 9 GROUTING	<ul> <li>7.2. INSPECTION OF FORMWORK / STEEL PRIOR TO CONCRETE POUR.</li> <li>7.3. SUBMISSION OF SUB-GRADE AND BASE DENSITY TESTS.</li> </ul>
) SUIT PIPE IAMETER.	ASPHALTIC CONCRETE
	1. <u>GENERAL</u> 1.1. ALL ASPHALTIC CONCRETE (AC) WORK TO BE PREPARED AND
KING	CARRIED OUT IN ACCORDANCE WITH GOOD ASPHALTIC PAVING PRACTICE AS DESCRIBED IN AS2150-2005 "ASPHALT (HOT-MIXED) PAVING – GUIDE TO GOOD PRACTICE" AND CURRENT RMS SPECIFICATIONS.
TH AUSTRALIAN CATIONS.	2. PAVEMENT PREPARATION
E WITH AS1742.3	2.1. THE FINISHED PAVEMENT SURFACE TO BE SEALED SHALL BE WITHIN +/- 2% OF THE OPTIMUM AND BROOMED BEFORE COMMENCEMENT OF WORK TO ENSURE COMPLETE REMOVAL OF ALL SUPERFICIAL FOREIGN MATTER.
JR SHALL BE WHITE N FROM ROAD AL SPRAYER.	<ul> <li>2.2. PRIME ALL SURFACES TO BE SEALED. ALLOW PRIME TO SETTLE FOR A MINIMUM OF 3 DAYS BEFORE APPLYING TACK COAT AND ASPHALT.</li> <li>2.3. SWEEP PRIMED SURFACES BEFORE APPLYING TACK COAT.</li> </ul>
VED PRIOR TO	2.4. ALL DEPRESSIONS OR UNEVEN AREAS ARE TO BE TACK-COATED AND BROUGHT UP TO GENERAL LEVEL OF PAVEMENT WITH
BETWEEN 0.35mm	ASPHALTIC CONCRETE BEFORE LAYING OF MAIN COURSE. 2.5. ALL DEFECTS IN THE BASE COURSE INCLUDING CRACKS, SURFACE DEFORMATION AND THE LIKE SHALL BE REPAIRED AS DIRECTED BY THE SUPERINTENDENT PRIOR TO PLACEMENT OF TACK COAT AND/OR AC COURSES.
	3. <u>PLACEMENTS</u> 3.1. ALL ASPHALT SHALL BE PLACED UTILISING APPROVED MECHANICAL PAVING MACHINES. DO NOT HAND PLACE ASPHALT WITHOUT PRIOR APPROVAL FROM ENGINEER
	4. JOINTS
PROPOSED ABILISED WITH	<ul> <li>4.1. THE NUMBER OF JOINTS BOTH LONGITUDINAL AND TRANSVERSE SHALL BE KEPT TO A MINIMUM.</li> <li>4.2. THE DENSITY AND SURFACE FINISH AT JOINTS SHALL BE SIMILAR TO THOSE OF THE REMAINDER OF THE LAYER.</li> </ul>
Omm STRIP OF TURF RB AND GUTTER /	5. <u>COMPACTION</u> 5.1. ALL COMPACTION SHALL BE UNDERTAKEN USING SELF PROPELLED ROLLERS.
	5.2. INITIAL ROLLING SHALL BE COMPLETED BEFORE THE MIX TEMPERATURE FALLS BELOW 105°C USING A STEEL DRUM ROLLER HAVING A MINIMUM WEIGHT OF 8 TONNES AND A MAXIMUM UNIT LOAD ON THE REAR DRUM EQUIVALENT TO
	55kN/m WIDTH OF DRUM. 5.3. SECONDARY ROLLING SHALL BE COMPLETED BEFORE THE MIX TEMPERATURE FALLS BELOW 80°C USING A PNEUMATIC TYRED ROLLER OF AT LEAST 10 TONNES MASS. A MINIMUM TYRE PRESSURE OF 550LPA AND A MINIMUM TOTAL LOAD OF 1 TONNE
	0N EACH TYRE. 5.4. <u>ROLLED SURFACES SHALL BE SMOOTH AND FREE OF</u> <u>UNDULATIONS. BONY AND/OR UNEVEN SURFACES WILL BE</u> REJECTED
	5.5. PROVIDE 2 No. MINIMUM COMPACTION TESTS.
	<ul> <li>6. <u>FINISHED SURFACE PROPERTIES</u></li> <li>6.1. FINISHED SURFACES SHALL BE SMOOTH, DENSE AND TRUE OF SHAPE AND SHALL NOT VARY MORE THAN;</li> <li>6.1.1. 3mm FROM THE SPECIFIED PLAN LEVEL AT ANY POINT.</li> <li>6.1.2. 3mm FROM THE BOTTOM OF A STRAIGHT EDGE LAID TRANSVERSELY.</li> </ul>
	<ul> <li>6.1.3. 5mm FROM THE BOTTOM OF A STRAIGHT EDGE LAID LONGITUDINALLY.</li> <li>6.1.4. MINUS 0 TO PLUS 2mm ADJACENT TO OTHER ELEMENTS SUCH AS KERBS AND THE LIKE TO AVOID POOLING OF SURFACE WATER.</li> <li>6.1.5. MINUS 0 FROM THE SPECIFIED THICKNESS.</li> </ul>
	<ol> <li>DO NOT STORE PLANT EQUIPMENT OR TRAFFIC NEWLY LAID ASPHALTIC CONCRETE PAVEMENTS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.</li> </ol>
	8. DO NOT APPLY MARKING PAINTS UNTIL ASPHALT HAS CURED IN ACCORDANCE WITH PAINT MANUFACTURERS SPECIFICATIONS

## NOT FOR CONSTRUCTION

	DRAWING TITLE	JOB NUMBER	
G PACKAGE PLICATION	CIVIL SPECIFICATION NOTES	2003	72
ND RESORTS,	DRAWING NUMBER		REVISION
GLAS	200372-DA-C01.1 <sup>4</sup>	1	02
ZE = A1		•	





## REFER TO ARCHITECTURAL DA DRAWINGS PREPARED BY BUCHAN GROUP. REFER TO LANDSCAPE DA DRAWINGS PREPARED BY DURIE DESIGN. DETAILS OF EASEMENT TO DRAIN STORMWATER FROM PORT DOUGLAS ROAD TO BE CONFIRMED AT DETAILED DESIGN STAGE.

# NOT FOR CONSTRUCTION

DRAWING TITLEJOB NUMBERDEAWING TITLEDEAWING TITLEDOB NUMBERDEAWING NUMBE

					VIDE SECURITY FENCE AROUND PERIMETER OF THE SITE. SEDIMENT BASIN IN ACCORDANCE WITH DOUGLAS SHIRE COUNCIL AND DEPARTMENT OF ENVIRONMENT AND HERITAGE PROTECTION REQUIREMENTS TO BE SIZED AT
		132 SP1604.77 Golf Course Lagoon			DETAILED DESIGN STAGE
GNED: B. FIELD JOB MANAGER: A. RIVETT VERIFIER:	INSTALL DIVERSION LOW SIDE OF SIT TEMPORARY SEDIM	CHANNEL AT TE, DIRECT TO TENT BASINS. —		Golf Course Lagoon	
DRAWN: D. CHAPMAN BRAWN: D. CHAPMAN 01 02 03	DESCRIPTION ISSUED FOR DEVELOPMENT APPLICATION REISSUED FOR DEVELOPMENT APPLICATION – OSD ADDED ISSUED FOR DEVELOPMENT APPLICATION	ISSUED VER'D DC AR AP I I I I I I I I I I I I I I I I I I	APP'D AR AR AR	DATE 31.08.20 15.12.20 24.02.21	CLIENT CLIENT





	CLIENT	DATE	APP'D	VER'D	ISSUED	DESCRIPTION	REVISION
ا ا <u>م</u> ا م	ابابياه	31.08.20	AR		DC	ISSUED FOR DEVELOPMENT APPLICATION	01
IODO	CHI	24.02.21	AR		AP	ISSUED FOR DEVELOPMENT APPLICATION	02
-1-1-1-	-1-1-1						
corporation							
	DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS						
NORTHROP (	VERIFICATION SIGNATURE HAS BEEN ADDED						





 $\langle \ \rangle \rangle \rangle$ 

NOTE: THIS PRACTICE ONLY TO BE USED WHERE

SPECIFIED IN APPROVED SWMP/ESCP.

3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.

GRAVEL-FILLED WIRE MESH

OR GEOTEXTILE 'SAUSAGE'





6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE

MAINTAIN THE OPENING WITH SPACER BLOCKS. 5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.

2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT

4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET.

PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

# TO BYPASS IT

- THE DRAWING.
- STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
- FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
- CONSTRUCTION NOTES





# STOCKPILES (SD 4-1)

– OVERFLOW

- TIMBER SPACER TO SUIT

r e tartet er ta ert

 $\checkmark$ 

FILTERED WATER

— KERB-SIDE INLET

GRAVEL-FILLED WIRE MESH

OR GEOTEXTILE 'SAUSAGE'

- OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10. 5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.
- WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT. 4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP
- 2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.

TIMBER SPACER TO SUIT.

RUNOFF WATER WITH

CONSTRUCTION NOTES

SEDIMENT -

INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.

AND FILL IT WITH 25mm TO 50mm GRAVEL.

SEDIMENT. -

CONSTRUCTION NOTES 1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.

- 5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE. 6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.
- 4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
- 3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
- CONSTRUCTION NOTES 1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT. 2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.







LL DIMENSIONS TO BE VERIFIED ON SITE BEFORE



ROJECT TITLE **CIVIL ENGINEERING PACKAGE** DEVELOPMENT APPLICATION FAIRMONT HOTELS AND RESORTS, PORT DOUGLAS

## GEOTEXTILE INLET FILTER (SD 6-12)

4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS

2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE 3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN

#### FOR DROP INLETS AT NON-SAG POINTS. SANDBAGS, EARTH BANK OR EXCAVATION USED TO CREATE ARTIFICIAL SAG POINT



#### WIRE OR STEEL MESH (14 GAUGE x 150mm OPENINGS) WHERE

GEOTEXTILE IS NOT

SELF-SUPPORTING

WOVEN GEOTEXTILE

- DROP INLET WITH GRATE

EARTH BANK – LOW FLOW (SD 5–5)

## NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.



#### (APPLIES TO 'TYPE C' SOILS ONLY) EARTH BASIN – DRY (SD 6–3)

7. INSTALL THE PIPE OUTLET WITH SEEPAGE COLLARS AS SPECIFIED IN THE SWMP AND STANDARD DRAWING 6-3B.

8. FORM BATTER GRADES AT 2(H):1(V) UPSTREAM AND 3(H):1(V) DOWNSTREAM OR AS SPECIFIED IN THE SWMP.

2. FORM A CUT OFF TRENCH UNDER THE CENTRELINE OF THE EMBANKMENT 600mm DEEP AND 1200mm WIDE, EXTENDING TO A

3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP

4. SELECT FILL ACCORDING TO THE SWMP THAT IS FREE FROM ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL

5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND THE COMPACTED FILL TO

6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.

POINT ON THE WATERCOURSE WALL ABOVE THE RISER SILL LEVEL.

TO 95 PER CENT STANDARD PROCTOR DENSITY.

THE EXISTING SUBSTRATE.





BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION.

THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO



LE	GEND							
	SITE BOUNDARY LINE							
	ADJACENT BOUNDARY LINE							
	EASEMENT LINE							
	EXISTING TRAM LINE							
BEXX.XX	BULK EARTHWORKS PAD LEVEL							
XX XX	CONTOURS							
	SHORING							
<u>DEPTH OF CUT</u>								
	– 999m TO – 15.0m							
	– 15.0m TO – 10.0m							
	– 10.0m TO – 5.0m							
	-5.0m TO -2.0m							
	- 2.0m TO - 1.0m							
	– 1.0m TO – 0.5m							
	-0.5m TO -0.25m							
	- 0.25m TO - 0.0m							
DEPTH OF FILL								
	0.0m TO 0.25m							
	0.25m TO 0.5m							
	0.5m TO 1.0m							
	1.0m TO 2.0m							
	2.0m TO 5.0m							
	5.0m TO 10.0m							
	10.0m TO 15.0m							
	15.0m TO 999m							

#### LEGEND

- 1. REFER SPECIFICATIONS NOTES FOR EARTHWORKS GENERAL
- REQUIREMENTS. 2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH
- AUSTRALIAN STANDARDS.
- 3. CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES.
- 4. NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
- 5. NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS; ie SERVICE TRENCHING, DETAILED
- EXCAVATION, FOOTINGS AND RETAINING WALLS.
- 6. THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
- APPROXIMATE BULK EARTHWORK VALUES AS FOLLOWS;
   VOLUMES FROM 150mm STRIPPED SURVEY TO BULK EARTHWORKS SURFACE CUT -51,260 m<sup>3</sup>

LUI	-51,260 m <sup>-</sup>
FILL	+3,445 m³
BALANCE	-47,815 m³

# NOT FOR CONSTRUCTION

 PACKAGE<br/>LICATION
 DRAWING TITLE<br/>EARTHWORKS CUT FILL PLAN
 JOB NUMBER<br/>200372

 DRESORTS,<br/>AS
 DRAWING NUMBER<br/>200372-DA-C03.01
 REVISION<br/>02

	CLIENT	DATE	APP'D	VER'D	ISSUED	DESCRIPTION	REVISION
ا د ا د ا		31.08.20	AR		DC	ISSUED FOR DEVELOPMENT APPLICATION	01
HIOD	CH	24.02.21	AR		AP	ISSUED FOR DEVELOPMENT APPLICATION	02
1 [. ] ~ [ - ]	-11						
corpor							
ADDED NORT	VERIFICATION SIGNATURE HAS BEEN ADDED						

ADJACENT LAGOON		4	BUILDING EXTENTS				ROAD RESERVE		
RETAINING WALL 1.7 m HIGH MAX FINISHED S	SURFACE —		BASEMEN				BALLY HOOLEY TRAMWAY	PORT DOUGLAS ROAD	
DATUM RL -3.0 BULK EARTHWORKS SURFACE	~ ~ ~ ~	6 6 0	6 6		6 6			4	
	2.46	-0.4				-0.4		60.9	
EXISTING SURFACE	3.385	3.767 3.695 3.695	3.808	1.327	2.018	1.8 4.186	4 .819 4 .289 4 .289	6.343	5.359 5.629
CHAINAGE	20	30 70 70	60 61	8 08 05	1100	120 130	14.0	170	190 197.512









HORIZONTAL SCALE 1:500@A1 VERTICAL SCALE 1:100@A1





# **NOT FOR CONSTRUCTION**

		•		ate	
AS	200372-DA-C03-11				
ID RESORTS,	DRAWING NUMBER		REVISION	2020	
PACKAGE LICATION	EARTHWORKS CUT FILL SECTIONS	20037	72	12:15 PM	
	DRAWING TITLE	JOB NUMBER			





NORTHROP CO

		ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR	NORTHROP	PROJECT TITLE CIVIL ENGINEERING DEVELOPMENT AP
OF THIS DRAWING REMAINS WITH	AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE 0 2 4 6 8 10m SCALE 1:200@ A1		Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324	FAIRMONT HOTELS A PORT DOUG
DNSULTING ENGINEERS PTY LTD			Email sydney@northrop.com.au ABN 81 094 433 100	DRAWING SHEET SI



NUIES	
-------	--

- 1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND
- DETAILS. 2. REFER TO SPECIFICATION NOTES DRAWINGS FOR DETAILED
- NOTES. 3. REFER TO ARCHITECTURAL DA DRAWINGS PREPARED BY
- BUCHAN GROUP.
- 4. REFER TO LANDSCAPE DA DRAWINGS PREPARED BY DURIE DESIGN. 5. INTERNAL SITE DRAINAGE INCLUDING SIZE AND LOCATION OF
- DOWNPIPE CONNECTIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE. 6. DETAILS OF EASEMENT TO DRAIN STORMWATER FROM PORT
- DOUGLAS ROAD TO BE CONFIRMED AT DETAILED DESIGN STAGE.









NOTE	S
------	---

- 1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND
- DETAILS. 2. REFER TO SPECIFICATION NOTES DRAWINGS FOR DETAILED
- NOTES. 3. REFER TO ARCHITECTURAL DA DRAWINGS PREPARED BY
- BUCHAN GROUP.
- 4. REFER TO LANDSCAPE DA DRAWINGS PREPARED BY DURIE DESIGN. 5. INTERNAL SITE DRAINAGE INCLUDING SIZE AND LOCATION OF
- DOWNPIPE CONNECTIONS TO BE CONFIRMED AT DETAILED DESIGN STAGE. 6. DETAILS OF EASEMENT TO DRAIN STORMWATER FROM PORT
- DOUGLAS ROAD TO BE CONFIRMED AT DETAILED DESIGN STAGE.

## **NOT FOR CONSTRUCTION** DRAWING TITLE

SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 04 DRAWING NUMBER

JOB NUMBER

200372

REVISION





#### LONGITUDINAL SECTION ALONG DR01 HORIZONTAL SCALE 1:500@A1

VERTICAL SCALE 1:100@A1

REVISION		ISSUED	VER'D	APP'D	DATE	CLIENT	
01	ISSUED FOR DEVELOPMENT APPLICATION	AP		AR	24.02.21	C H i C	DDO
							corporation
						DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGH NORTHROP C



#### LONGITUDINAL SECTION ALONG DR02 HORIZONTAL SCALE 1:500@A1

VERTICAL SCALE 1:100@A1



rts,	DRAWING NUMBER		REVISION	8.2020
E N	DRAWING TITLE JOB NUMBER DRIVEWAY LONGITUDINAL SECTIONS JOB NUMBER			12:15 PM

NOT FOR CONSTRUCTION









		AI					
							F
		7					<u>-</u>
	PIPE GRADE (%)				G=0.3%		
	PIPE SIZE (mm)		<		1200×600 RCBC	>	V
ER	Vf – FULL PIPE VELOCITY (m∕s) Q – PIPE FLOW (L∕s)		<		Vf=0.86m∕s Q=616L∕s		<
VERIFI	DRAINAGE LINE		<			A1	
11	DATUM RI		- 12 0				
R: A. RIV	1% A.E.P. H.G.L.	2.794	2.650			2.595 2.596	2.552
JB MANAGE	EINISHED SUDEACE	3.473				2.830	
		473				152	
ELD	NATURAL SURFACE	. E					
ined: B. F	PIPE INVERT LEVEL		1.91			1.645	1.645
DESIG	DEPTH TO INVERT		1.562			1.185	1.185
IAPMAN	CHAINAGE	0.000				88.611	
AWN: D. CF				1			
음 REVISION	DESCRIPTION	ISSUED	VER'D APP'D	DATE	CLIENT	1 22 20 I	
01	ISSUED FOR DEVELOPMENT APPLICATION	AP	AR	24.02.21	<b>с</b>  н і С	0 D	
					DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	CORPORATION THE COPYRIGHT OF THIS DI NORTHROP CONSULTING	RA FN



	ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE SCALE VARIES	NORTHROP	PROJECT TITLE CIVIL ENGINEERING DEVELOPMENT APP	
WING REMAINS WITH		Sydney	FAIRMONT HOTELS AN	
		Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324	PORT DOUGL	
		Email sydney@northrop.com.au ABN 81 094 433 100	DRAWING SHEET SIZE	
			DIAWING SHEET SIZE	

# NOT FOR CONSTRUCTION

	DRAWING TITLE	JOB NUMBER		
PACKAGE	TRUNK DRAINAGE LONGITUDINAL SECTION	2003	72	12:15 PM
ND RESORTS,	DRAWING NUMBER		REVISION	.2020
LAS E = A1	200372-DA-C05.11	1	01	ate :07.08



NOT	FOR	CONS	STRU	ON

PACKAGE LICATION	
D RESORTS, AS	
= A1	