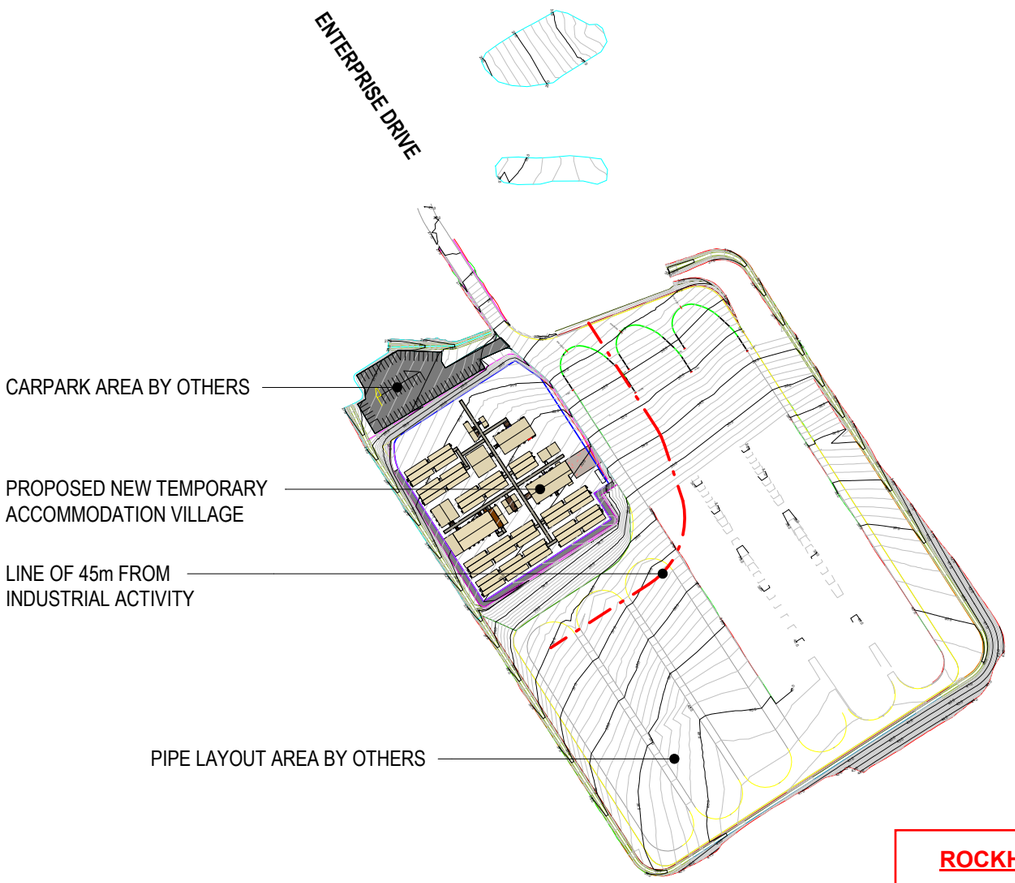
NORTH



SITE INFO

LOT 51 ON SP273020		
TOTAL SITE AREA	115,900 m²	
ROOF BUILDING TOTAL AREA	3,326 m²	2.86 %
STAGE 2 AREA OR WORKS	561 m²	0.48 %
COVERED PATH AREA	328 m²	0.28 %

NOTE: EARTHWORKS PAD BY OTHERS MAX 2% CROSSFALL

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

13 December 2023

DATE

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/74-2023

Dated: 25 August 2023

NOT FOR CONSTRUCTION

2.0 1.0 0 1.0 2.0 3.0 4.0 5.0

1:100 @ A3
1:200 @ A4

CP-SITE AREA PLAN

1 : 3500@A3

NOTE:
- VERIFY ALL DIMENSIONS ON SITE
- NOTED DIMENSIONS TAKE PRESIDENT OVER SCALED DIMENSIONS

PROJECT : PROPOSED NEW TEMPORARY ACCOMMODATION VILLAGE
CLIENT : QCV
LOCATION: 51 Enterprise Drv, Gracemere, QLD 4702

QCV

ANDRE MELVILLE BUILDING DESIGN
& DRAFTING SERVICES
P.O BOX 8, LABRADOR, QLD 4814
Ph: 0498 001 535
E-MAIL: admin@ambd.com.au
www.ambd.com.au
QBCC No. 1222804
ABN No. 37 155 932 675
building designers' association of queensland inc.
ENDORSED Sustainable Building Designer
Townsville - Brisbane - **Goldcoast**

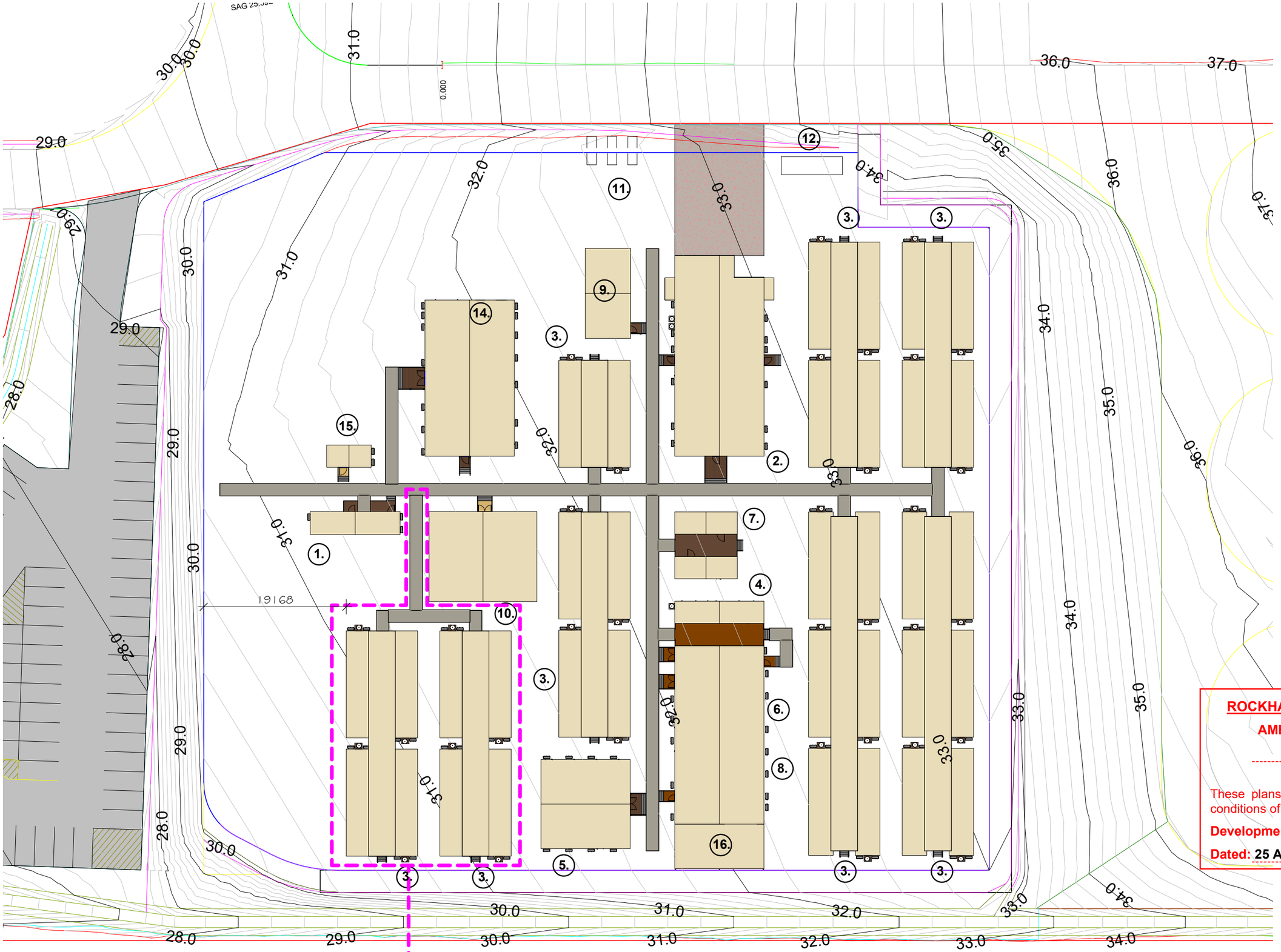
No.	Description	Date
4	REVISED BA ISSUE REVISED - REVISED OFFICE LAYOUT	14/11/23
5	REVISED BA ISSUE REVISED - Stage 1 and Stage 2 additional rooms shown	22/11/23
6	REVISED BA ISSUE REVISED - Stage 2 additional rooms relocated	22/11/23

DESIGNED	AM
DRAWN	AM
DATE	JULY 2023
SCALE A3	As indicated
ISSUED	22/11/23

SITE OVER ALL PLAN

14-1061H - WD-02 - 6

22/11/2023 1:05:57 PM



CP-SITE PLAN -MAIN AREA

1 : 500@A3

NOTE:
- VERIFY ALL DIMENSIONS ON SITE
- NOTED DIMENSIONS TAKE PRESIDENT OVER SCALED DIMENSIONS

PROJECT : PROPOSED NEW TEMPORARY ACCOMMODATION VILLAGE
CLIENT : QCV
LOCATION: 51 Enterprise Drv, Gracemere, QLD 4702

QCV

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DESIGNED	AM
DRAWN	AM
DATE	JULY 2023
SCALE A3	As indicated
ISSUED	22/11/23

SITE PLAN MAIN AREA

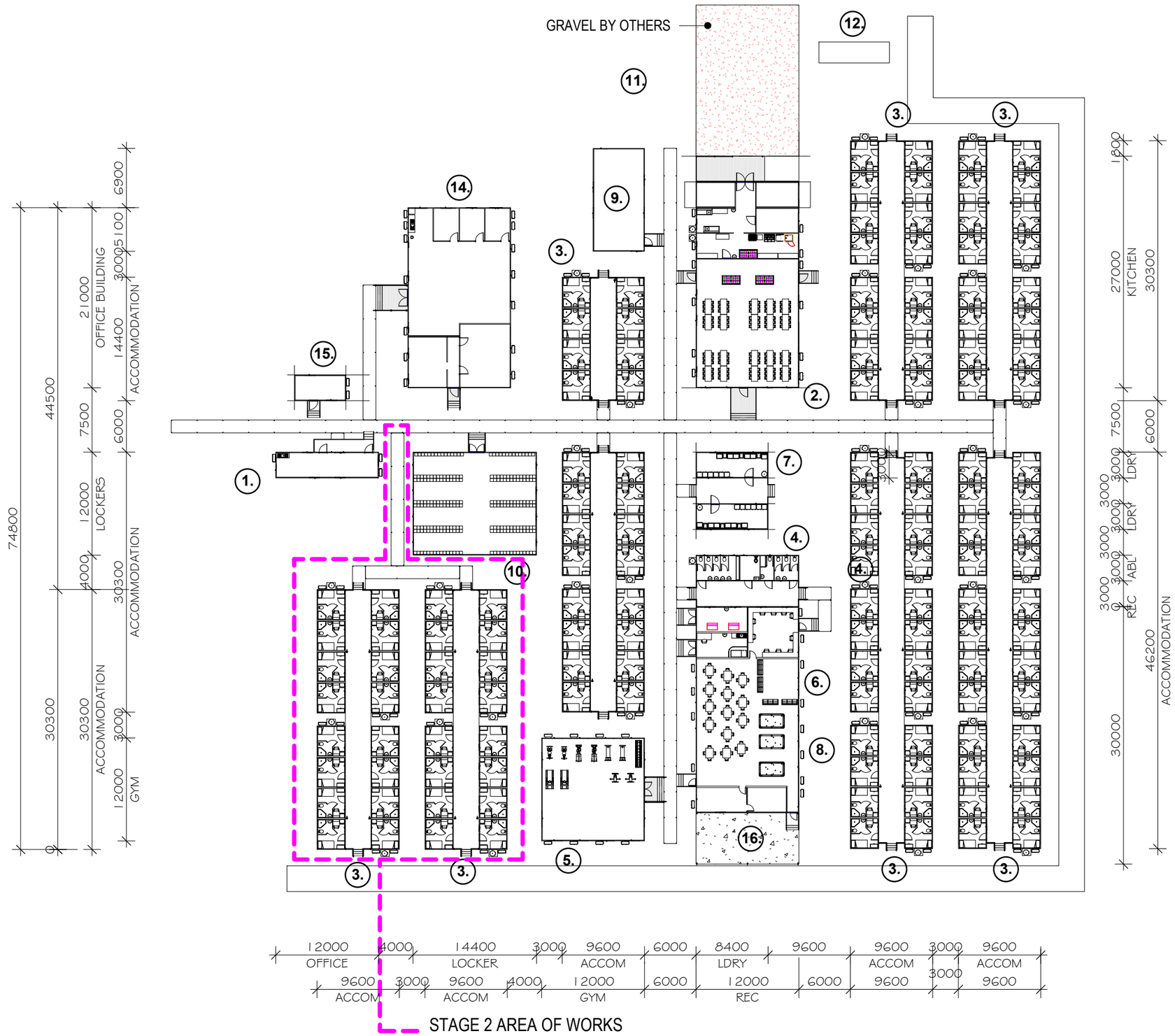
14-1061H - WD-03 - 6

22/11/2023 1:06:03 PM

BUILDING LEGEND

1. RECEPTION/ OFFICE
2. KITCHEN/ DINING
3. ACCOMMODATION
4. ABLUTIONS BUILDING
5. GYM
6. RECREATION
7. LAUNDRY
8. FIRST AID
9. LINEN
10. LOCKERS
11. GENERATORS
12. REFUSE STORAGE
13. COVERED WALKWAY
14. CLIENT OFFICE BUILDING
15. COMMS BUILDING
16. BBQ AREA

NORTH



ROCKHAMPTON REGIONAL COUNCIL

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DATE

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Development Permit No.: D/74-2023

Dated: 25 August 2023

COVERED PATH LENGTHS	
Mark	Length of Path ways
	252.85 m
	252.85 m

NOT FOR CONSTRUCTION

10 5 0 5 10 15 20 25

1:500 @ A3
1:1000 @ A4

NOTE:
- VERIFY ALL DIMENSIONS ON SITE
- NOTED DIMENSIONS TAKE PRESIDENT OVER SCALED DIMENSIONS

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DESIGNED	AM
DRAWN	AM
DATE	JULY 2023
SCALE	A3 As indicated
ISSUED	22/11/23

OVERALL SITE GROUND FLOOR

14-1061H - WD-04 - 6

22/11/2023 1:06:17 PM

LEGEND

- REINFORCED CONCRETE PAVEMENT
- PLANT LAYDOWN 150mm TYPE 2.5 ROADBASE DECOMPOSED GRANITE OR SIMILAR
- INTERNAL ROAD PAVEMENT (200mm TYPE 2.5 ROADBASE)
- LV CARPARK PAVEMENT (200mm TYPE 2.3 ROADBASE)
- BUILDINGS
- 20mm SCREENINGS ON GEOFABRIC
- BED LEVEL CROSSING
- GRASSED AREAS

LOT 1
RP613519

LOT 1
RP612154

LOT 2
RP612154

LOT 12
SP167033

LOT 10
RP618976

LOT 11
RP618976

LOT 1
RP848788

LOT 2
SP259555

LOT 50
SP270249

LOT 51
SP273020

LOT 106
SP273020

DRAIN NORTH

DRAIN NORTH WEST

DRAIN WEST

CONTAINERS

CONTAINERS

DOMES / WORKSHOP

PLANT LAYDOWN

CONTAINERS

WASH BAY

FUEL

BASIN 2

BASIN 1

FLOODWAY CROSSING FOR FULL PROPOSED DEVELOPMENT GENERALLY IN ACCORDANCE WITH STANDARD DWG. CMDG-R-095. REFER TO DWG. C004 FOR DETAILS

ENTERPRISE DRIVE

BED LEVEL CROSSING FOR PIPE LAYDOWN ONLY. REFER TO DWGS. C004,C200 AND C203 FOR DETAILS

LINEN

LOCKER ROOM

RECREATION ROOM

ABLUTIONS

GYM

MEDICAL

ACCOMMODATION OFFICE

KITCHEN

CAMP

MAIN CARPARK (66 BAYS)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/74-2023

Dated: 25 August 2023

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
07/07/2023	D	FOR OPERATIONAL WORKS APPROVAL	AB	CWS
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

Premise

ROCKHAMPTON OFFICE
21 EAST STREET
PO BOX 264
ROCKHAMPTON, QLD, 4700
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE
0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT TEMPORARY CAMP & ASSOCIATED INFRASTRUCTURE
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE GROUND FINISH SURFACES

JOB CODE MIS-1080
SHEET NUMBER C005
REV D

McConnell Dowell Constructors (Aust) Pty Ltd and B.M.D. Constructions Pty Ltd Joint Venture (MBJV)

Waste Management Report

Doc No: PRJ-ENV-PLN014-GEN-1151
Client: Rockhampton Regional Council
Project: Fitzroy to Gladstone Pipeline Project
Location: Rockhampton to Gladstone, QLD
Project No: 1151

MMS ID: HSEQ-HS-TEM017-GEN-1151

Commercial-in-Confidence

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/74-2023
Dated: 25 August 2023

Revision History

Rev	Date	Details	Author	Reviewer	Approver
A	26 June 23	Draft for the Rockhampton Regional Council	B. Hooper		M. Barrows

Contents

1. Introduction

The Waste Management Report (WMR) is one component of the MCD BMD Joint Venture's (MBJV) Operational Works Planning application for the Gladstone-Fitzroy Pipeline Camp and Laydown Area.

The WMR describes how camp waste will be managed and any potential impacts minimised during construction.

1.1. Plan Purpose

The purpose of this WMP is to:

- Describe how MBJV will manage, and control waste risks associated within the Project Camp.
- in accordance with the Rockhampton Regional Council Waste Management Planning Scheme Policy.

2. Context

2.1. Existing Environmental Conditions

Wastes represent lost or degraded material and energy resources. Improper waste management can impact on a range of environmental values including land, air quality, surface water and groundwater. Improper waste management can also cause a range of public health hazards.

2.2. Construction Aspects and Impacts

The potential impacts generated by construction activities are outlined below in Table 1 including the preferred waste strategy. Waste classifications will be recorded on the live waste monitoring register in accordance with the new risk-based classification framework prescribed in the Environmental Protection (Regulated Waste) Amendment Regulation 2018.

Table 1 - Potential Impacts

Activity	Potential Environmental Impact	Preferred Waste Measure	Number of Receptacles	Frequency of Servicing
Packaging waste	Lost resource. Visual impact. Source of litter. Plastics may entrap native animals.	Stored in dedicated skip bins. Disposal of any non-recyclable elements, otherwise recycle (e.g. pallets).	2 x 3m3 receptacles	Weekly as required
Waste concrete and concrete wash out waste	Localised increases in pH. Lost resource. Visual impact.	Stored in situ sump. Recycle as blocks for site use. Dispose of liquid waste as regulated waste.	1 x 12m3 skip	As required
Scrap metal	Loss of resource. Visual impact. Fauna entanglement (e.g. wiring).	Store in dedicated skip bin. Recycle as required.	1 x 12m3 skip	As required
Waste oil and hydrocarbon contaminated wastes	Contamination of soils, surface water and groundwater. Toxicity to plants and animals. Degradation of water resources.	Storage in accordance with AS1940. Recycle if feasible. Reuse separated water for dust suppression. Dispose as required.	1 x 1000L Bunded Pod	As required

Activity	Potential Environmental Impact	Preferred Waste Measure	Number of Receptacles	Frequency of Servicing
	Loss of resource.			
Waste solvents and paints	Contamination of soils, surface water and groundwater. Toxicity to plants and animals. Degradation of water resources. Loss of resource.	Storage in accordance with SDS. Dispose as required with licenced waste contractor.	2 x HazChem Storage Containers	As required
Office wastes, recyclables, electrical waste	Litter. Loss of resource.	Store in dedicated bins. Recycle recyclables. Dispose as required.	2 x 3m3 receptacles	Weekly
Food wastes	May attract vermin. Odour. Disease, particularly through bacterial infection.	Store in dedicated bins. Dispose to licenced landfill facility.	3 x 3m3 receptacles	2 or 3 times weekly
Other domestic wastes	Loss of resource. Litter. Plastics may entrap animals.	Store in dedicated bins. Dispose as required.	As above	As above
Wastewater (toilets, showers, kitchen, laundry) **Sewage and water treatment plant sludge** **Clinical waste**	Contamination of land, surface, and groundwater. Degradation of water resources. Inhibition of native plant growth. Increased nutrient levels in aquatic ecosystems, causing eutrophication and algal outbreaks. Spread of disease. Odour.	Store in septic rated tanks. Store in designated waste containers. Dispose as required.	1 x 10000L Tank	Bi-weekly for setup phase then tap into local sewerage system
Tyres	Fire hazard. Toxic smoke if fire occurs. Visual impact. Loss of resource. Collect water which may harbour mosquitoes and other biting insects.	Store in dedicated stockpiles. Dispose as required.	As required	As required
Batteries	Loss of resource. Release of acidic and/or metallic contaminants to land, surface water and groundwater. Toxicity to plants and animals.	Store on pallets in bunded area. Recycle if feasible. Dispose as required.	As required	As required

Activity	Potential Environmental Impact	Preferred Waste Measure	Number of Receptacles	Frequency of Servicing
	Degradation of water resources. Inhibition of native plant growth.			

3. Roles, Responsibilities and Authorities

All site personnel are responsible to ensure that they minimise environmental nuisance or harm by adherence to all Project Management Plans and other documentation. Site personnel are also responsible for ensuring they do not act in contravention of any Environmental Approval or the Contract.

Field Supervisors are responsible for implementation and maintenance of mitigation measures outlined in the WMR for all activities or work areas under their control.

The Environmental Manager is responsible for routine surveillance and monitoring, communication of requirements of this plan, coordination of visual monitoring, and all other responsibilities
related to waste and recycling identified within this Sub-plan and overall CEMP. Importantly the Environmental Manager is responsible for the immediate notification of State and/or Commonwealth government authorities of impacts that have mandatory reporting requirements

4. Implementation Strategy

4.1. Mitigation and Management Actions

4.1.1. Environmental Mitigation and Management Measures

The Table below outlines the mitigation and management measures to be carried out to ensure the Project meets all necessary requirements as outlined in Section **Error! Reference s ource not found.**.

Table 2 – Waste and Recycling Mitigation and Management Actions

Reference	Mitigation and Management Actions	Timeframe/s	Responsibility
01	The waste minimisation hierarchy of principles shall be integrated into all construction activities: • Avoid; • Reduce; • Reuse; • Recycle; and • Dispose.	Design and during construction	Project Manager Environment Manager Superintendent
02	Requirements relating to this plan to be revisited frequently through Toolbox and Prestart meetings	During construction	Supervisor Environment Manager
03	Waste and recycling facilities will be established on site to facilitate and promote minimal waste disposal. The following waste streams will be managed as specified: • General and office waste: To be collected on-site using bins with appropriate lids, which will be emptied as required and transported to an approved landfill site by approved waste transporter. These bins will be located at the camp area and laydown area. • Co-mingled waste: Co-mingled recycling bins will be provided at the camp. • Hazardous waste: To be appropriately contained and stored on-site in approved hazardous waste bins. Hazardous waste to be removed from site by accredited transporter to approved disposal facility. • Construction waste: Waste concrete, reinforcement steel, formwork off-cuts, and general industrial waste will be collected and contained in large skip-style bins. Skips will be removed and replaced on an as-needed basis, by an accredited waste transporter.	During construction	Superintendent Supervisor Environment Manager

Reference	Mitigation and Management Actions	Timeframe/s	Responsibility
	• Steel Waste: Steel recycling bins will be located at those areas that generate waste steel. Steel skip bins will be in the site facility/ laydown areas closest to the work sites.		
04	All waste concrete, bituminous products and green waste generated will be thoroughly investigated for opportunities to reuse or recycle.	During construction	Environment Manager
05	Concrete orders will be as precise as possible to limit excess. All waste concrete will be removed from site on a regular basis – no waste concrete to be disposed of anywhere on site. Excess concrete will be placed into an appropriate bunded concrete washout area or placed into a sealed container/skip for removal by a licenced contractor for recycling or to be disposed of under appropriate End of Waste: Recycled Aggregates codes if applicable.	During construction	Project Engineer
06	Housekeeping at the Camp and Laydown Area will be regularly undertaken to ensure no waste materials cause littering.	During construction	Superintendent Supervisor
07	Waste and recycling materials shall be transported to appropriately licenced facilities for disposal or reuse.	During construction	Superintendent Project Engineer Environment Manager
08	On-going visual checks will be carried out to ensure correct waste disposal is occurring. Additionally, the site shall be monitored for good housekeeping practices and littering. Weekly inspections will be performed by project staff and documented in MBJV Weekly Safety and Environmental Checklist.	During construction	Supervisor Environment Manager
09	Waste and recycling materials shall be recorded in the Waste and Recycling Register in the project's SharePoint site.	During construction	Environment Manager
10	All putrescible waste receptacles will be covered to prevent water infiltration and wind from causing litter.	Prior to construction	Environment Manager
11	All containers will be secured to prevent movement during a flood event.	During construction	Environment Manager
12	Upon completion of the project in each area along the corridor, all wastes and signage will be removed and disposed of at a licensed waste management facility.	Post Construction	Environment Manager

5. Performance Evaluation

5.1. Monitoring

The Table below sets out the minimum monitoring requirements.

Monitoring Action	Record	Frequency	Responsibility
Environmental inspection	Weekly Environmental Inspection Form	Weekly	Environmental Manager
Routine daily visual observance by all personnel during construction to monitor the site for litter or other waste issues.	Daily Supervisor Reports	Daily	Site Supervisor
Recording the amount of waste being re-used, recycled, and disposed	Monthly Report and Waste Contractor Monthly Report	Monthly	Waste contractor and Environmental Manager
ISC Waste Auditing to Final Destination	6-Monthly audit including verification of waste destination	6-Monthly	Sustainability Team Member

6. Review and Improvement

6.1. Reporting

The Environmental Weekly Inspection Checklist, monthly reporting and annual independent audits undertaken throughout the construction phase of the project will be documented and kept on record by the Environmental Manager or their delegate for the duration of the Project.

Documentation will be kept and include:

- Monitoring registers
- Complaints
- Non-conformances
- Environmental inspections
- Waste volumes and type
- Audits

6.2. Document Updates

The Site Environmental Management Representative will amend, update, and continue to develop and improve this WMR on an ongoing as the construction program progresses and continual improvement opportunities are identified.

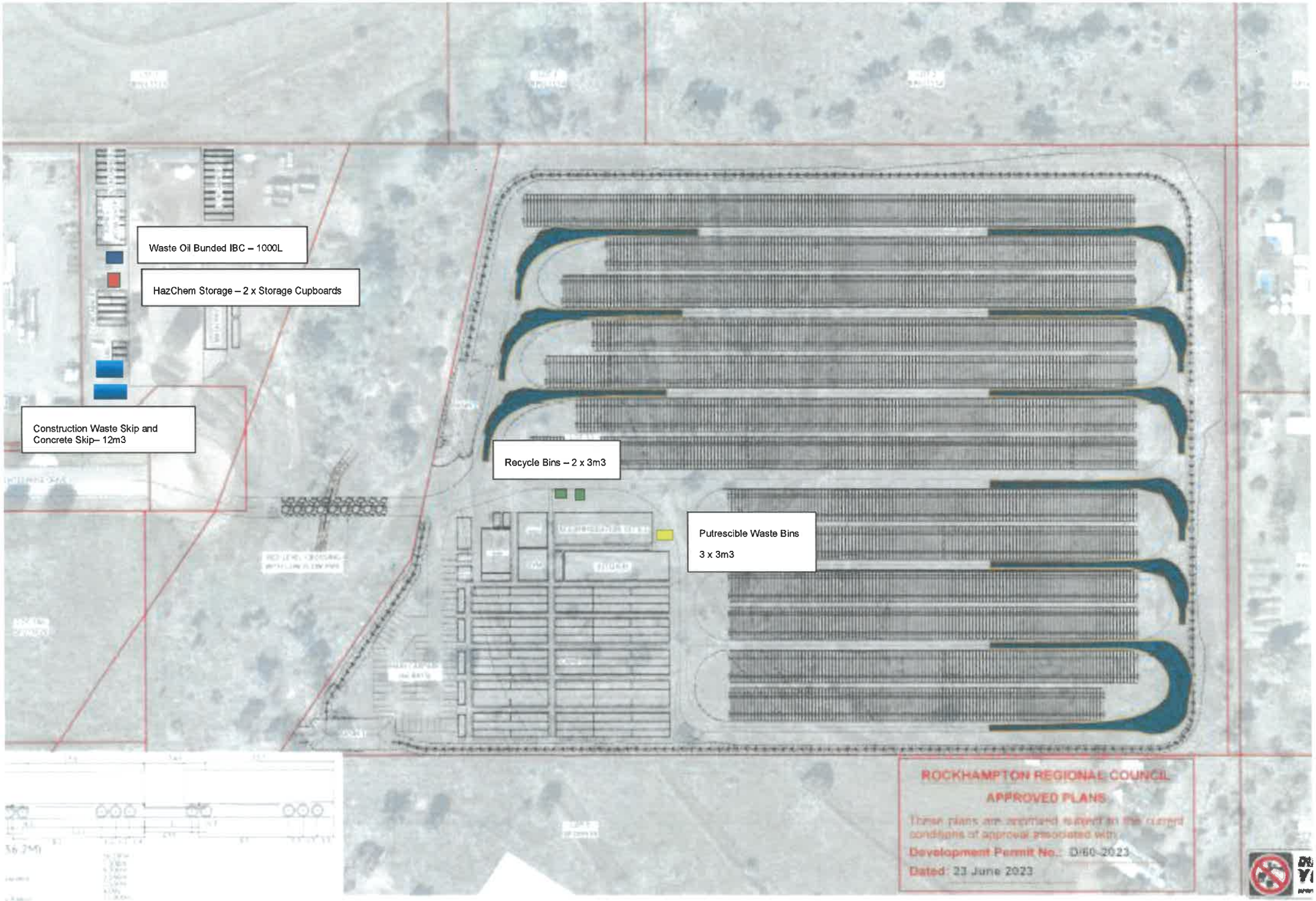

Waste Oil Bunded IBC – 1000L
HazChem Storage – 2 x Storage Cupboards
Construction Waste Skip and Concrete Skip– 12m3
Recycle Bins – 2 x 3m3
Putrescible Waste Bins
3 x 3m3
ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/60-2023
Dated: 23 June 2023

Figure 1 - A-Double Vehicle Swept Paths – Somerset Rd / Enterprise Drive. Screen shot provided by Premise.

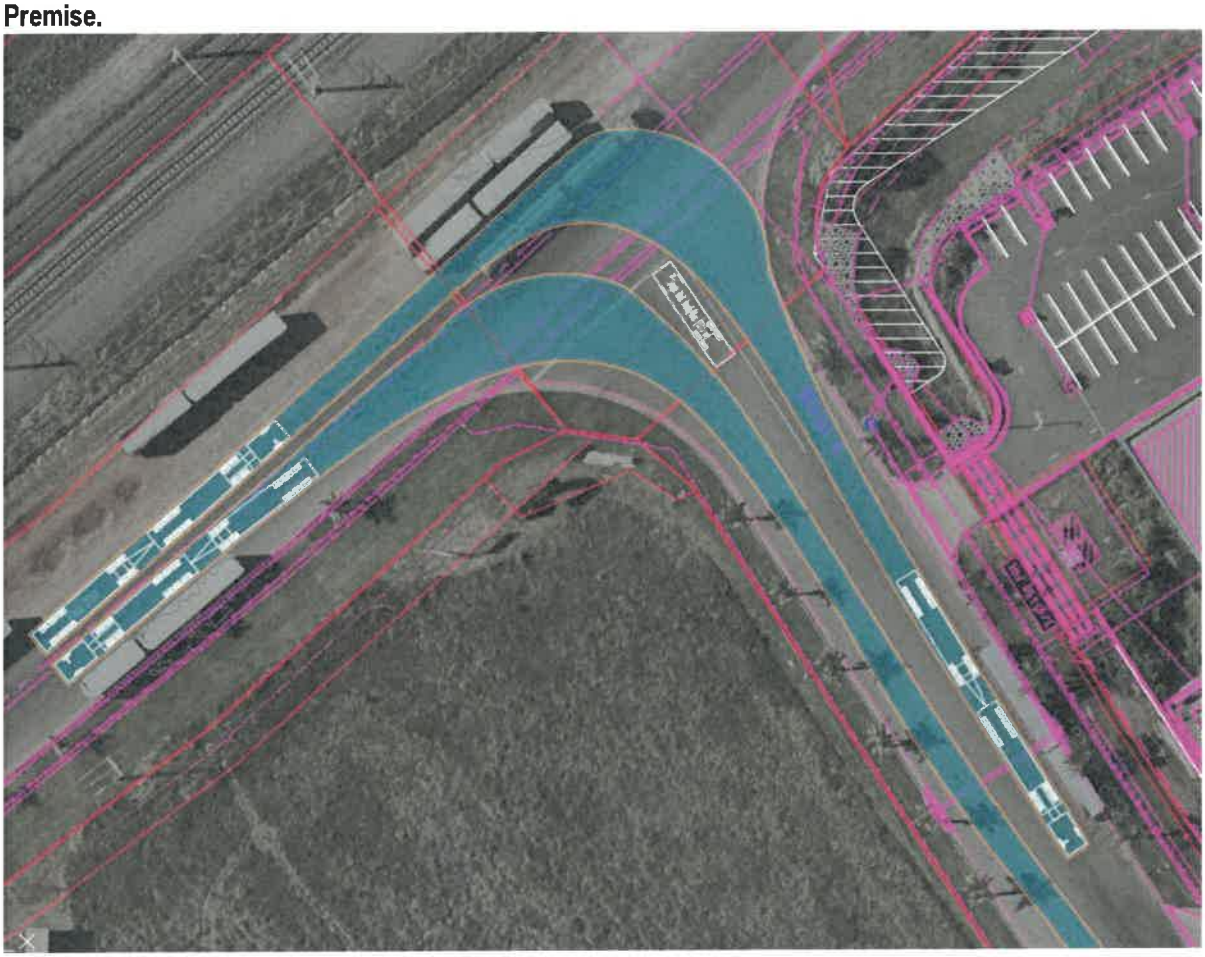
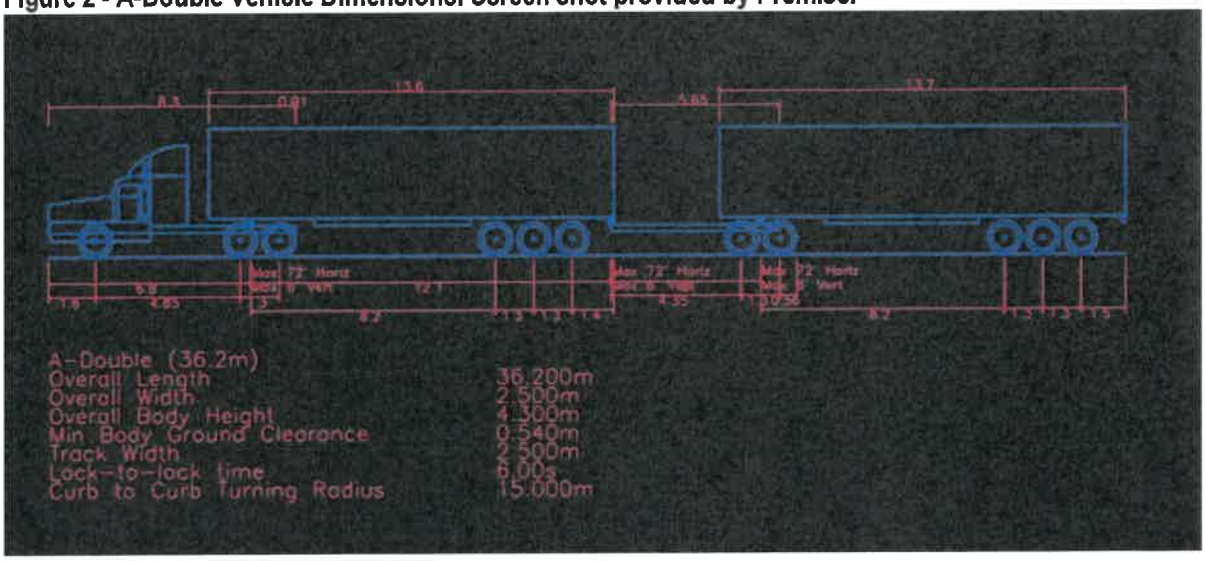


Figure 2 - A-Double Vehicle Dimensions. Screen shot provided by Premise.



ROCKHAMPTON REGIONAL COUNCIL

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Development Permit No.: D/74-2023

Dated: 25 August 2023

Premise

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
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BMD CONSTRUCTIONS PTY LTD AND MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD

Temporary Camp and Laydown at Lot 51 Enterprise Drive, Gracemere.

TRAFFIC IMPACT ASSESSMENT

Report No: MIS-1080/R01
Rev: A
8 June 2023

DOCUMENT AUTHORISATION					
Revision	**Revision Date**	**Report Details**			
A	08/06/23	For MCU Approval			
Prepared By		**Reviewed By**		**Authorised By**	
Lawrence Mills	LM	Bradley Jones	BJ	Chris Shields	

CONTENTS

FIGURES

TABLES

APPENDICES

1. INTRODUCTION

Premise Australia Pty Ltd (Premise) has been engaged by the McConnell Dowell Constructors (Aust) Pty Ltd and BMD Constructions Pty Ltd joint venture ('MBJV') to undertake a Traffic Impact Assessment ('TIA') for the proposed temporary workers camp and laydown area at 51 Enterprise Drive (Lot 51 on SP27302), Gracemere in accordance with the Department of Transport and Main Roads' (TMR's) "Guide to Traffic Impact Assessment" (GTIA).

1.1 Background

Premise understands that MBJV are delivering the Fitzroy to Gladstone Pipeline (FGP) Project. MBJV has proposed to utilise Lot 51 on SP27302 known as Lot 51 Enterprise Street, Gracemere, to implement a temporary workers accommodation camp and pipe laydown area. The proposed development site is anticipated to operate for two (2) years from mid-2023 to mid-2025.

1.2 Scope and Study Area

Figure 1 shows the impact assessment area which consists of the proposed development site and the existing priority-controlled Somerset Road / Enterprise Drive intersection.

Figure 1 – Impact assessment area

Construction is expected to proceed in two (2) stages and will consist of the following timeframes:

- Access to construct the pipe laydown area – ideally operating from mid-June 2023;
- Camp construction – commencing early July 2023 with the first half of the Camp ready for mid-August 2023, and second half soon thereafter.

2. EXISTING CONDITIONS

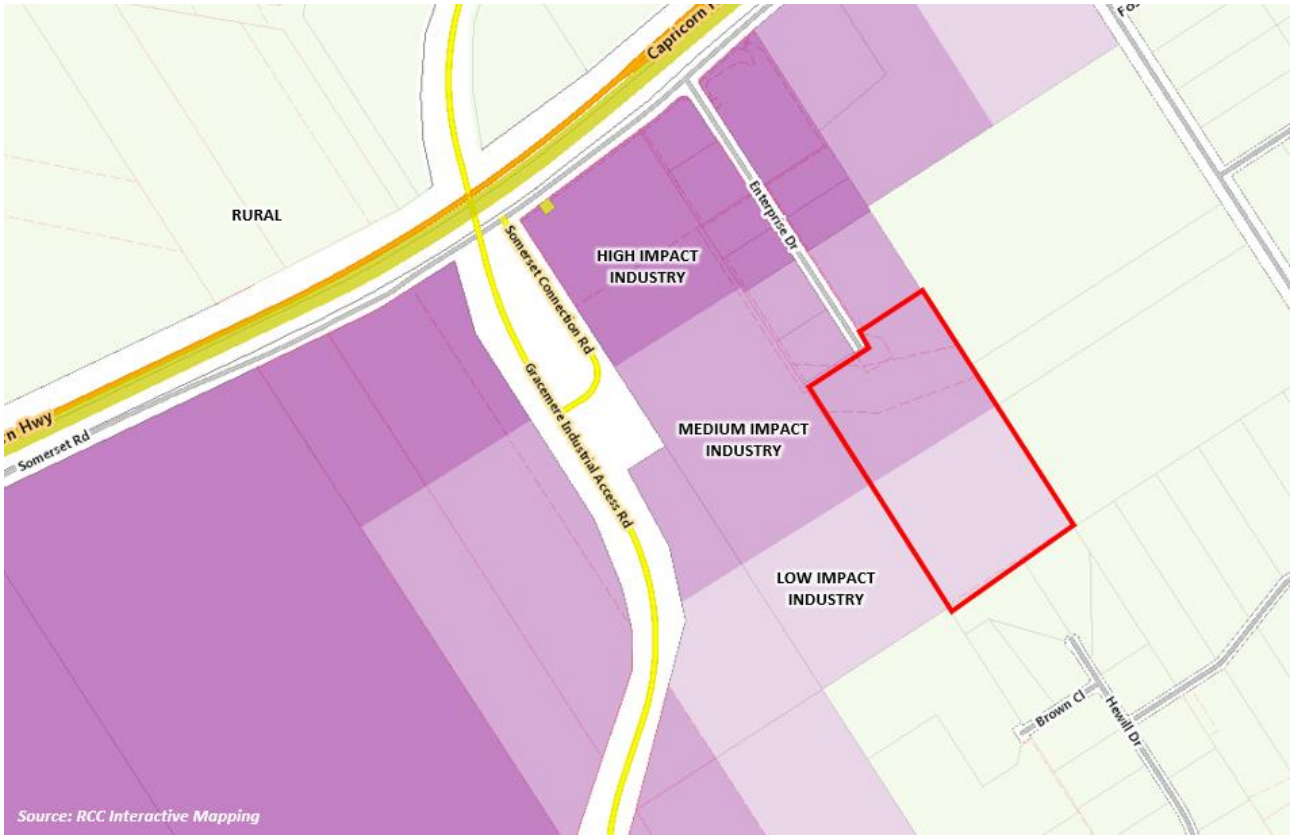
2.1 Land Use and Zoning

The subject site is currently zoned low and medium impact industry in the Rockhampton Regional Council (RRC) Planning Scheme and is unoccupied.

2.2 Adjacent Land Uses / Approval

Land use surrounding the subject site is shown in Figure 2. Land use to the northeast is low to medium impact industry and land use to the southwest, southeast and northeast is Rural.

Figure 2 – Surrounding area land use



2.3 Surrounding Road Network Details

The surrounding road network is shown by Figure 1.

2.3.1 FRONTAGE ROADS

The subject site is accessed from the end of Enterprise Drive which connects to Somerset Road.

2.3.1.1 Enterprise Drive

Enterprise Drive is an industrial access road under the governing authority of RRC. The road is approximately 530 m in length featuring a single lane in each direction. For the purposes of this report, the road is described as being aligned from southeast to northwest, from the cul-de-sac where the site entrance is

located to the intersection with Somerset Road. The carriageway width varies from approximately 15 m wide at the Somerset Road intersection to approximately 12 m wide near the site entrance.

2.3.1.2 Somerset Road

Somerset Road is classified as an Industrial Collector under the RRC planning scheme. The road runs parallel to the Capricorn Highway from Wiseman Street to the west to Capricorn Street to the east, featuring a single lane in each direction. The carriageway width ranges from 10 to 12 m between the intersection with Enterprise Drive and the intersection with Somerset Connection Road.

2.3.2 INTERSECTION

This assessment will investigate the priority controlled (give way) intersection between Enterprise Drive and Somerset Road, as shown in Figure 3. The subject intersection is described as a T-intersection with Somerset Drive aligned southwest to northeast, having priority over Enterprise Drive. Each intersection leg features single lane approaches and departures.

Figure 3 – Somerset Drive / Enterprise Drive Priority Controlled T-intersection.

2.4 Traffic Volumes

RRC supplied traffic count data for Somerset Road which was collected between 25th February 2022 and 18th March 2022 (refer Appendix A). The data obtained from this survey included:

- The Average Daily Traffic (ADT) reported for this period was 607 vehicles per day with 53% heavy vehicles (%HV).
- The morning peak hour is reported as 8-9 AM with 39 vehicles per hour.
- The afternoon peak hour is reported as 3-4 PM with 43 vehicles per hour.

Additionally, Premise undertook traffic counts at the Somerset Road / Enterprise Drive intersection on 4th May 2023 from 2:30 PM to 4:30 PM and 5th May 2023 from 7:30 AM to 9:30 AM (refer Appendix B). These time periods were selected as extending half an hour each side of the weekday peak hours reported by RRC for the 2022 traffic data. The observed morning and evening peak hour traffic volumes are shown in Figure 4 and Figure 5.

The observed morning peak hour was observed to be consistent with the traffic count data supplied by RRC, whilst the afternoon traffic count occurred between 2:45 PM to 3:45 PM.

Figure 4 – Observed (2023) Morning Peak Hour Traffic Volumes

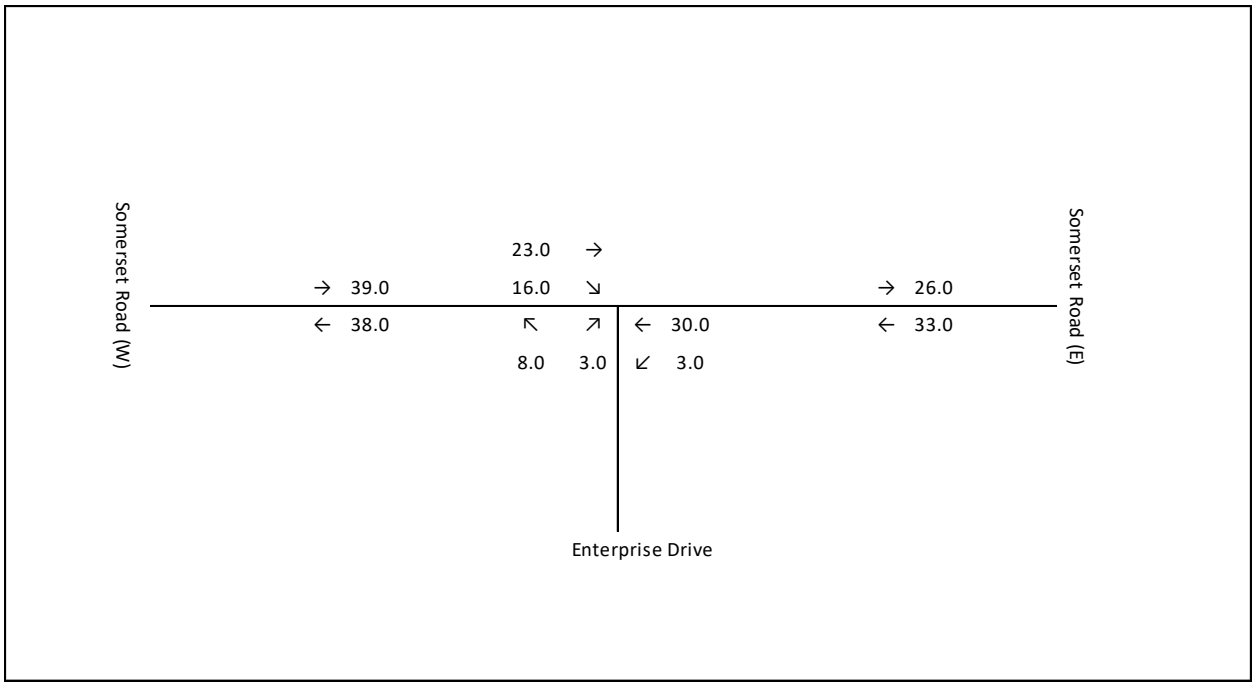
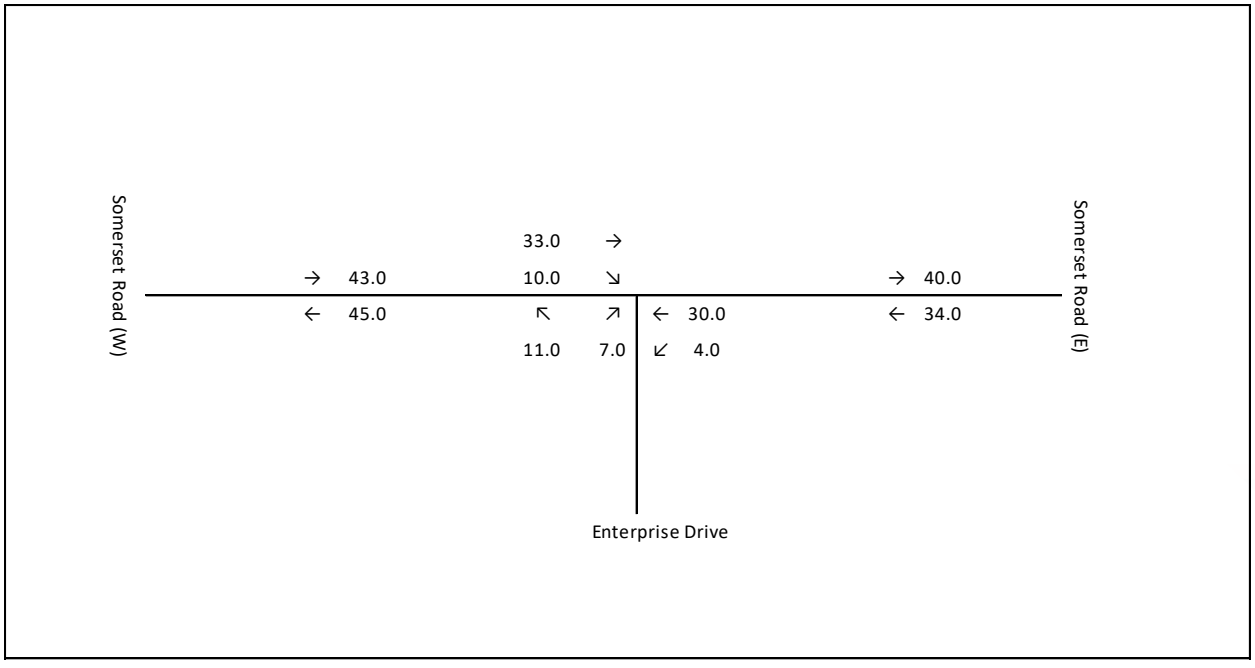


Figure 5 – Observed (2023) Evening Peak Hour Traffic Volumes



2.5 Intersection and Network Performance

The 2009 edition of Austroads "Guide to Traffic Management Part 3: Traffic Studies and Analysis" (AGTM03-09) states that "at unsignalised intersections with minor roads where there are relatively low volumes of cross and turning traffic, capacity considerations are usually not significant, and capacity analysis is unnecessary." Table 1 reproduced from AGTM03-09 sets out details of intersection volumes below which capacity analysis is unnecessary.

Table 1 – Intersection Volumes Below Which Capacity Analysis is Unnecessary (AGTM03-09)

Type of road	Light cross and turning volumes maximum design hour volumes vehicles per hour (two way)		
Two-lane major road	400	500	650
Cross road	250	200	100
Four-lane major road	1000	1500	2000
Cross road	100	50	25

As Somerset Road is a two-lane major road, and both Somerset Road and Enterprise Drive currently carry less than 100 vph as indicated in Section 2.4, the Somerset Road / Enterprise Drive intersection does not require analysis.

2.6 Road Safety Issues

To identify existing road safety issues in the study area road crash location data reported in Queensland Globe was reviewed. No road crashes are reported on Somerset Road or Enterprise Drive. The closest crashes to the development site reported in Queensland Globe occurred was a collision with a train in 2010 which occurred at a level crossing approximately 330 m to the northeast of the site. Based on historic Google Earth imagery, the level crossing was closed and replaced by the Gracemere Industrial Access Road overpass of the Blackwater rail system and Capricorn Highway between 2011 and 2013.

2.7 Site Access

The development site currently has access via the cul-de-sac terminating Enterprise Drive.

2.8 Construction Phase Parking

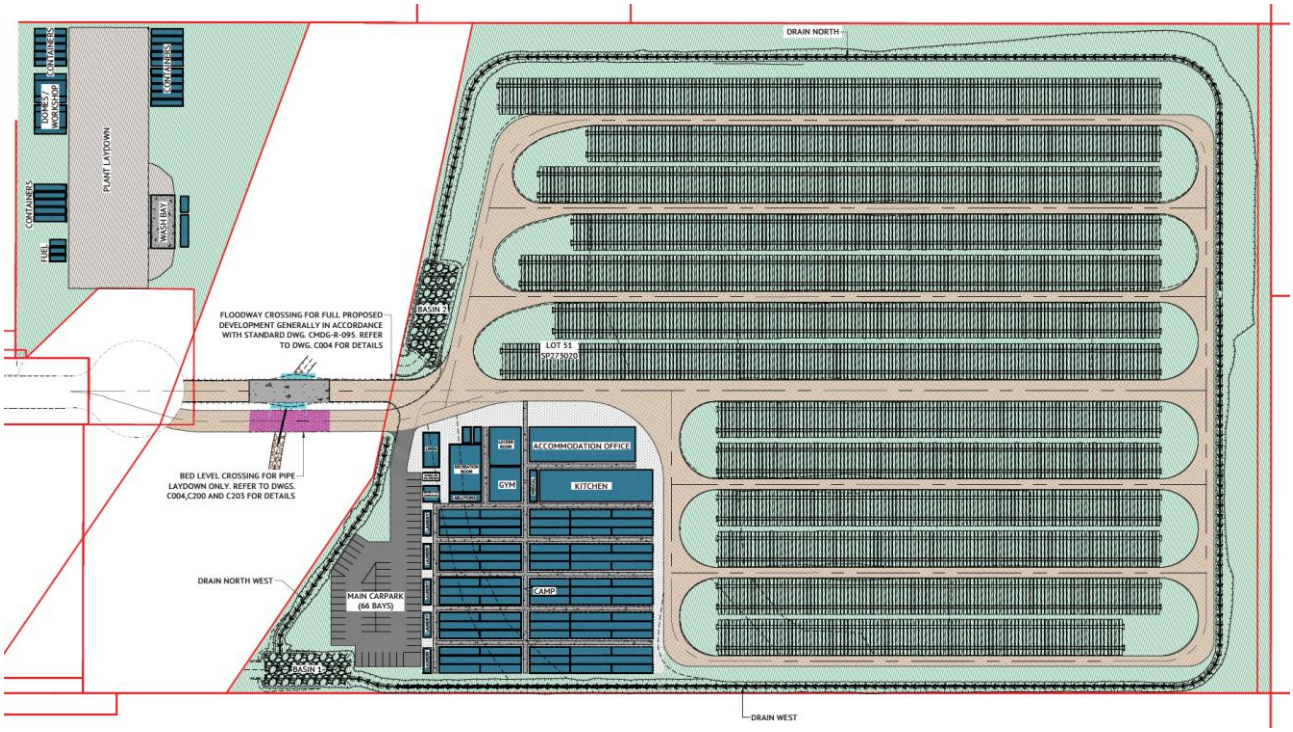
There is a section near the north-east site corner which has been cleared of vegetation and may therefore be temporarily utilized for on-site parking whilst construction is under way.

3. PROPOSED DEVELOPMENT DETAILS

3.1 Development Site Plan

The proposed development site plan as designed by Premise for MBJV is shown in Appendix C and reproduced in Figure 6.

Figure 6 – Proposed Development Layout



3.2 Operational Details

MBJV have advised that construction of the pipeline is expected to commence in in August 2023 with a target completion for August 2025. The pipe laydown area is anticipated to be active from mid-June 2023 and the remainder of the workers camp will be in operation by mid-August 2023.

An average of 160 pipes per week will be delivered to the pipe laydown area via A-double trucks, at an average rate of 4-6 loads per day. During the initial phase deliveries will take place from Monday to Saturday between the hours of 6:30am to 6:30pm. Delivery times will later be altered to 6:30am to 6:30pm seven (7) days a week, subject to RRC approval of MCU application D/70-2023. Transport of pipes from the laydown area to the Right of Way Corridor will be undertaken using prime movers / semi-trailers.

Workers will operate via three (3) crews on a two (2) week on and one (1) week off basis, with a one (1) crew being rotated every Tuesday. The majority of workers will be transported to the site by bus.

3.3 Proposed Internal Access and Parking

The temporary workers camp will be accessed from Enterprise Drive. The required number of designated light vehicle car parking spots has been assessed in accordance with Section 9.3.1 "*Access, Parking and Transport Code*" of the RRC planning scheme (2015). According to Table 9.3.1.3.2 in the RRC planning scheme, a facility providing non-resident workforce accommodation requires one (1) space for every three (3)

bedrooms. With a total of 200 bedrooms, a minimum of 66 parking spaces are required for light vehicles. As shown in the development site plan (refer Appendix C), The camp will consist of a designated parking area containing 66 parking bays, meeting the minimum required by RRC planning scheme.

4. DEVELOPMENT TRAFFIC

4.1 Traffic Generation

Development traffic is expected to consist of light and heavy vehicles pertaining to delivery of camp supplies, site maintenance, transportation of pipes from laydown area, and the rotation of workers from accommodation. MBJV have advised on expected vehicle generation for site personnel utilising the camp facility and for pipe transportation. The expected 'worst case' hourly and daily traffic generation has been estimated as shown in Table 2. It is understood that the development site will produce traffic throughout all stages in the lifespan of the camp, including mobilisation, operational works and demobilisation. Based off the supplied information, it has been determined that the highest traffic volume to occur at any one time will be during the operational phase. This expected worst case scenario is assumed to occur during the roster changes, in which 12-seater buses will transport workers to and from the accommodation. The traffic profile shown in Table 2 does not consider mobilisation and demobilisation as the overall volumes during these times is expected to be much lower.

Table 2 – Generated Traffic Data – Worst Case Day.

Traffic Consideration	Vehicle Type	Daily Traffic	Peak Hourly Traffic
Personnel – Pipe Laydown Area			
Utes with Management	Ute	28	14
Utes with Supervisor	Ute	40	10
Utes with Crews	Ute	26	13
Worker transportation	12-Seater Bus	6	3
Personnel – Camp Facility			
Utes with Management	Ute	20	10
Utes with Supervisor	Ute	40	10
Utes with Crews	Ute	26	13
Worker transportation	12-Seater Bus	20	10
Heavy Vehicle Movements			
Pipe Deliveries	Road Trains / A-Doubles	12	1.2
Mobilisation Plant	Prime Mover / Semi trailer	16	1.6

Pipe Stringing	Prime Mover / Semi trailer	16	1.6
General Plant Movements.	Prime Mover / Semi trailer	4	0.4
Waste, Food and Laundry deliveries	Prime Mover / Semi trailer	4	0.4
Total Traffic		**258**	**89**

4.2 Trip Distribution

Based off the most practical route to access the site from the Capricorn Highway, it is expected that all development traffic enter and exit Enterprise Drive from the west approach. Furthermore, a 70:30 directional split between the peak and counter peak directions has been assumed with the outbound direction being the peak direction during the morning and the inbound direction being peak direction in the evening.

4.3 Development Traffic Volumes on the Network

The overall estimated development traffic volumes for the morning and evening peak hours are shown in Figure 7 and Figure 8.

Figure 7 – Morning Peak Hour Development Traffic Volumes.

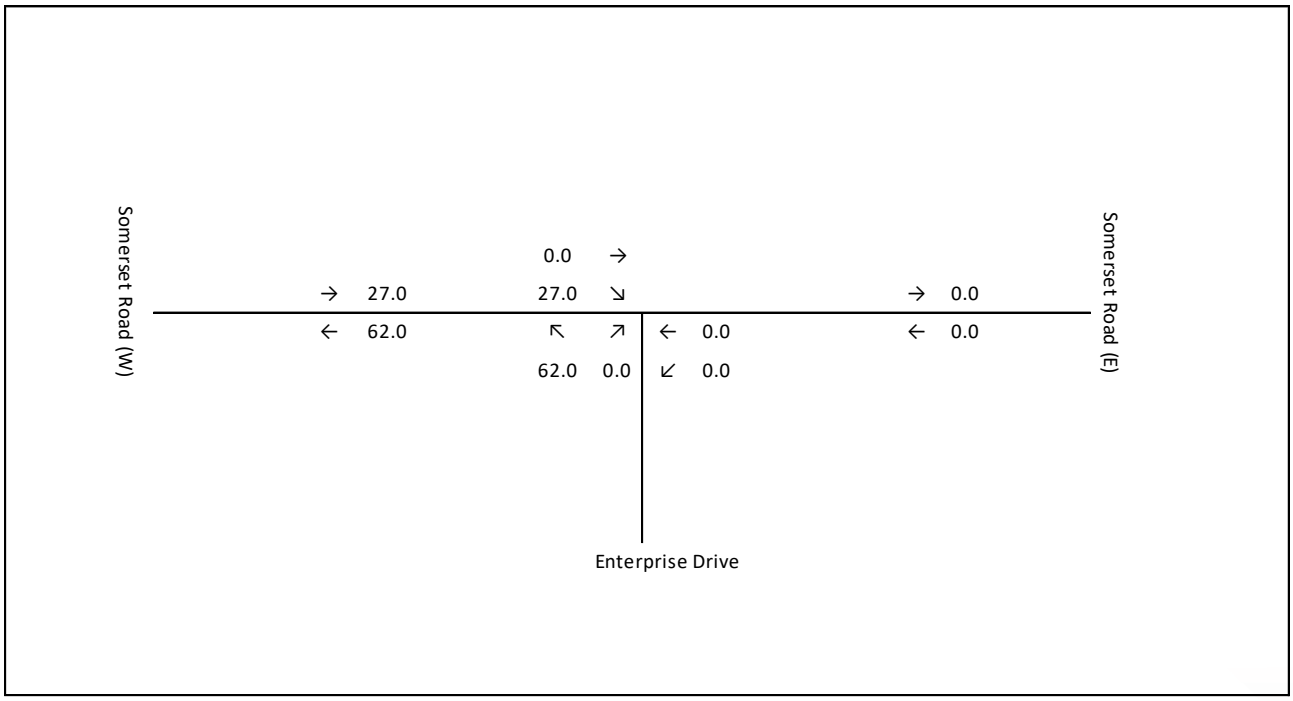
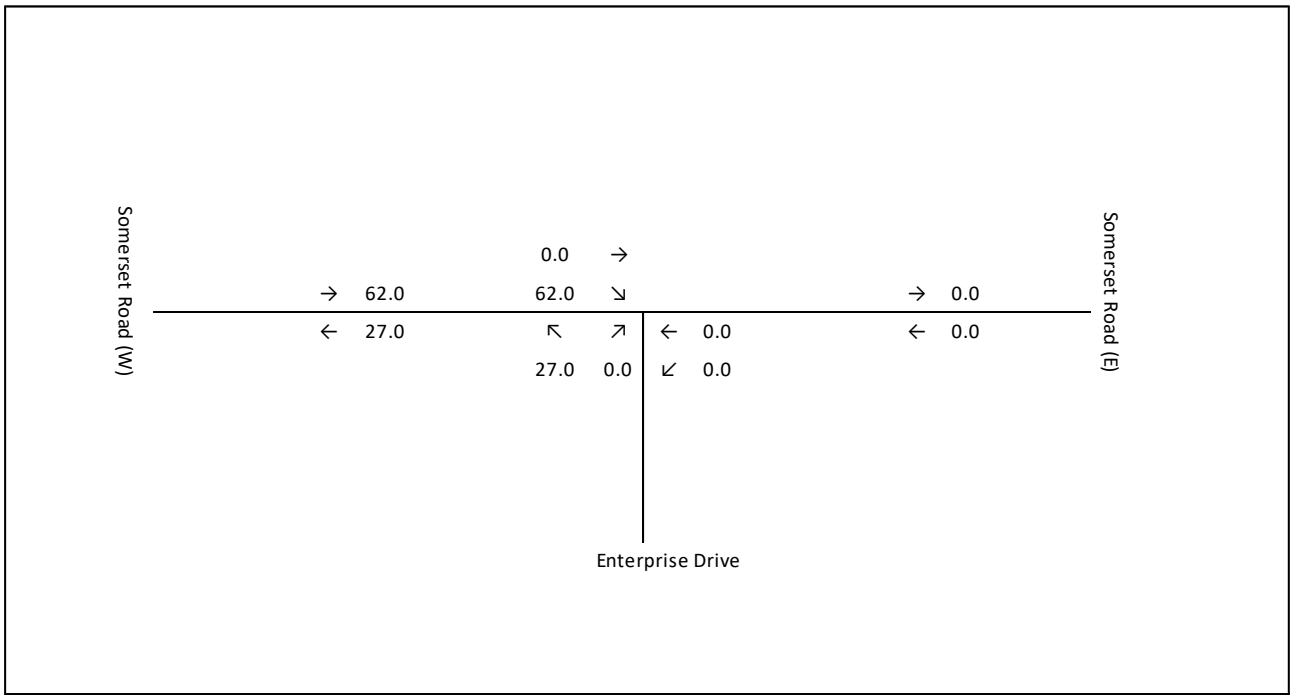


Figure 8 – Evening Peak Hour Development Traffic Volumes.



5. IMPACT ASSESSMENT AND MITIGATION

5.1 With and Without Development Traffic Volumes

Existing traffic volumes shown in Figure 4 and Figure 5, have been adopted as the opening year 2023 'without development' traffic volumes. The 'with development' traffic volumes have been estimated by adding the 'without development' traffic volumes to the estimated development traffic volumes shown in Figure 7 and Figure 8. The overall 'with development' traffic volumes are shown in Figure 9 and Figure 10.

Figure 9 – 'Opening Year' 'With Development' Morning Peak Hour Traffic Volumes.

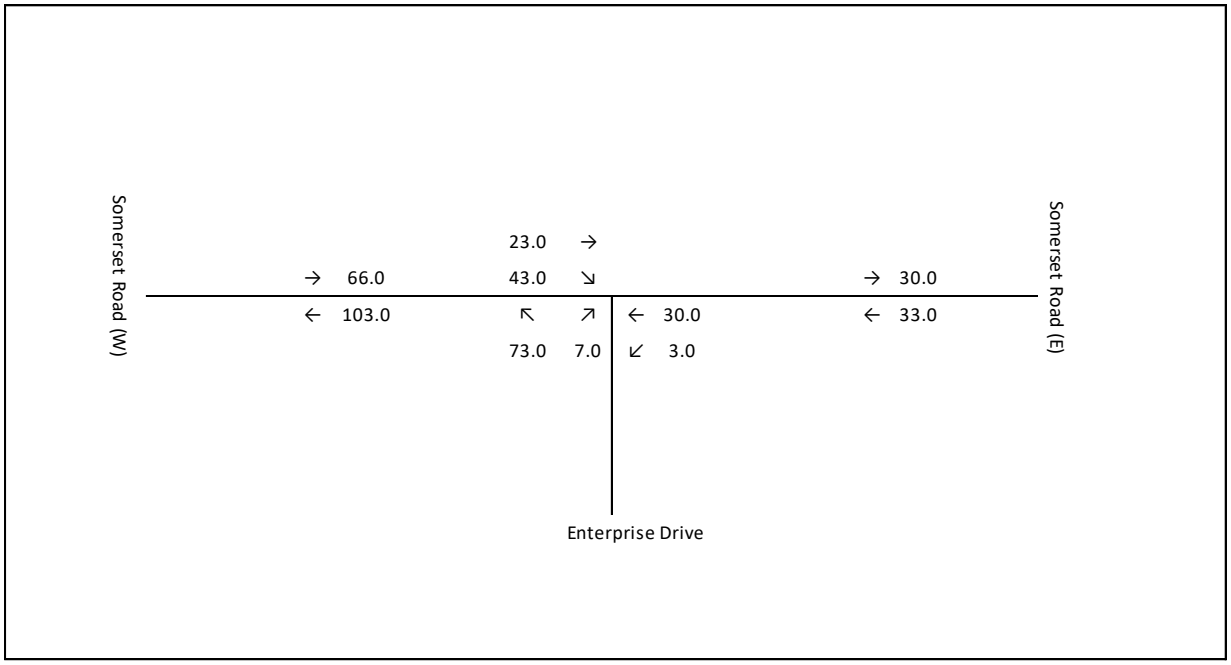
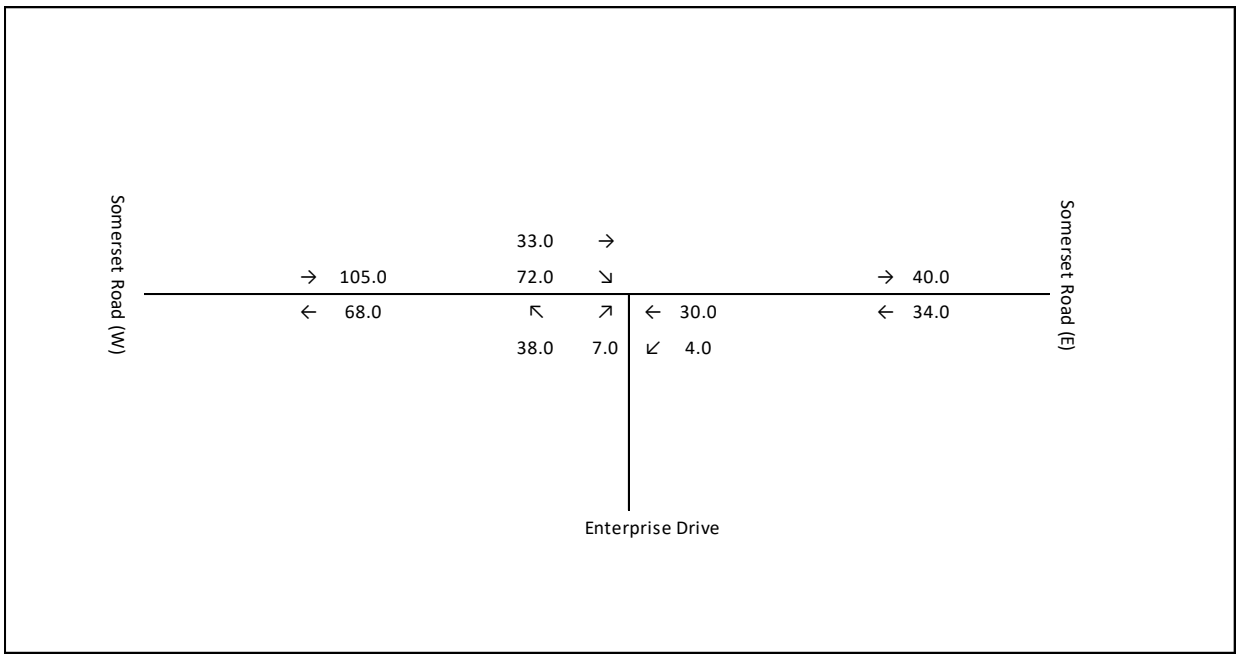


Figure 10 -'Opening Year' 'With Development' Evening Peak Hour Traffic Volumes.



5.2 Construction Traffic Impact Assessment

As noted in Section 4.1 traffic generation during mobilisation and demobilisation will be less than operations traffic. Therefore the following assessment of operations traffic provides a conservative assessment of construction traffic impacts.

5.3 Road Safety Impact Assessment and Mitigation

The GTIA specifies the following two (2) stage process for assessment of road safety impacts:

1. Risk Assessment to determine the change in risk profile associated with existing road safety issues as a result of the development; and
2. Safety Assessment to determine if changes to infrastructure require either a road safety audit by an accredited road safety auditor (RSA) or a road safety assessment by either an RSA or a registered professional engineer of Queensland (RPEQ).

5.3.1 RISK ASSESSMENT

A road safety risk assessment was conducted in accordance with the risk assessment process specified by the GTIA, the risk assessment process involves the following steps for each risk item:

- Evaluate potential consequences based on accident severity from 1, property damage only, to 5, fatality;
- Evaluate potential likelihood from 1, rare, to 5, almost certain; and
- Sum the potential consequence and likelihood values to determine the risk score with scores up to and including 4 considered low risk, 5 to 7 medium risk, and 8 or greater high risk.

As mentioned in Section 2.6, no crashes were identified on Somerset Road within 100 m of the Enterprise Drive Intersection. The complete absence of crashes recorded in Queensland Globe for the study area suggests that the potential likelihood and / or potential consequences of any existing risk items results in a low overall risk score. Therefore, the increase in traffic resulting from the proposed development over its two (2) year life is not expected to result in any existing risk items increasing to a level which requires mitigation

5.3.2 ROAD ENVIRONMENT SAFETY ASSESSMENT

In accordance with the GTIA, both Somerset Road and Enterprise Drive are assessed as having a low road environment risk rating based on having a posted speed limit of 60 km/h and an AADT of less than 8,000vpd.

As the risk level of the road environment is low, changes to the road environment (such as construction of a new property access) do not require a road safety audit but should be subject to a road safety assessment. A road safety assessment may be conducted by either an accredited RSA or an RPEQ. This requirement would be satisfied by safety reports prepared in accordance with Section 295 of the Work Health and Safety Regulation 2011 as part of the design process.

5.4 Access and Frontage Impact Assessment and Mitigation

Section 3.4 of "Australian / New Zealand Standard Parking Facilities Part 1: Off-street Car Parking" (AS/NZS 2890.1) states "the queuing area to be provided between the vehicular control point and the property boundary shall be sufficient to allow influx of traffic without impacting traffic or pedestrian flows on the subject road". Table 3 reproduced from AS/NZS 2890.1 shows the minimum size of queuing area required for a car park with control points located at site entry.

Table 3 – Minimum Queuing Length at a Car Park with Control Points at Entrances (AS/NZS 2890.1)

Capacity of Car Park (Note 1)	Peak hourly in-flow of traffic	
	Up to 75% of Capacity (Note 2)	More than 75% of capacity (Note 3)
Not more than 100 cars	The greater of a minimum of 2 cars or 3% of capacity.	The greater of a minimum of 2 cars or 4% of capacity.
More than 100 cars	1st 100 cars: 3% of capacity	1st 100 cars: 4% of capacity
	2nd 100 cars: 2% of capacity	2nd 100 cars: 2% of capacity
	Additional cars: 1% of capacity	Additional cars: 1.5% of capacity
	A minimum queuing length of 3 cars/lane	A minimum queuing length of 3 cars/lane

Note 1: Equal to the total number of parking spaces served by the entrance (proportioned where several entrances service a common parking area).

Note 2: Generally casual (short-staying) and mixed patronage.

Note 3: Tidal traffic typical of car parking for a special event.

According to the Development Plan shown in Appendix C and reproduced in Figure 6, there are a total of 66 car parking spaces throughout the main car parking area. The peak hourly development traffic inbound to the site is 62 vph (refer Figure 5) which is greater than 75% of the capacity. Therefore, the minimum queuing length required is 3.1 cars which equates to a length of 19m (6.0 m per vehicle). On-site traffic management should allow inbound traffic to have priority over outgoing traffic to avoid queuing on Enterprise Drive.

5.4.1 TURN WARRANT ASSESSMENT

A Turn warrant assessment has been undertaken for the Somerset Road / Enterprise Drive intersection based on warrants contained in Austroads' "Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings" (AGTM06-20). The assessment is based on a design speed of 70 km/h, being 10km/h above the posted speed limit, and estimated 'with development' traffic volumes (refer Section 5.1). Figure 11 shows the major road turn treatment warrants in the normal design domain for a design speed of 70 km/h. As indicated in Figure 11 and Table 4, Basic Left / Basic Right turn treatments are warranted. These turn treatments are already present on Somerset Road at the Enterprise Drive intersection. Therefore, no upgrades are required to the existing turn treatments, as part of the development.

Figure 11 – Major Road Turn Warrants – Somerset Road / Elements Boulevard Intersection.

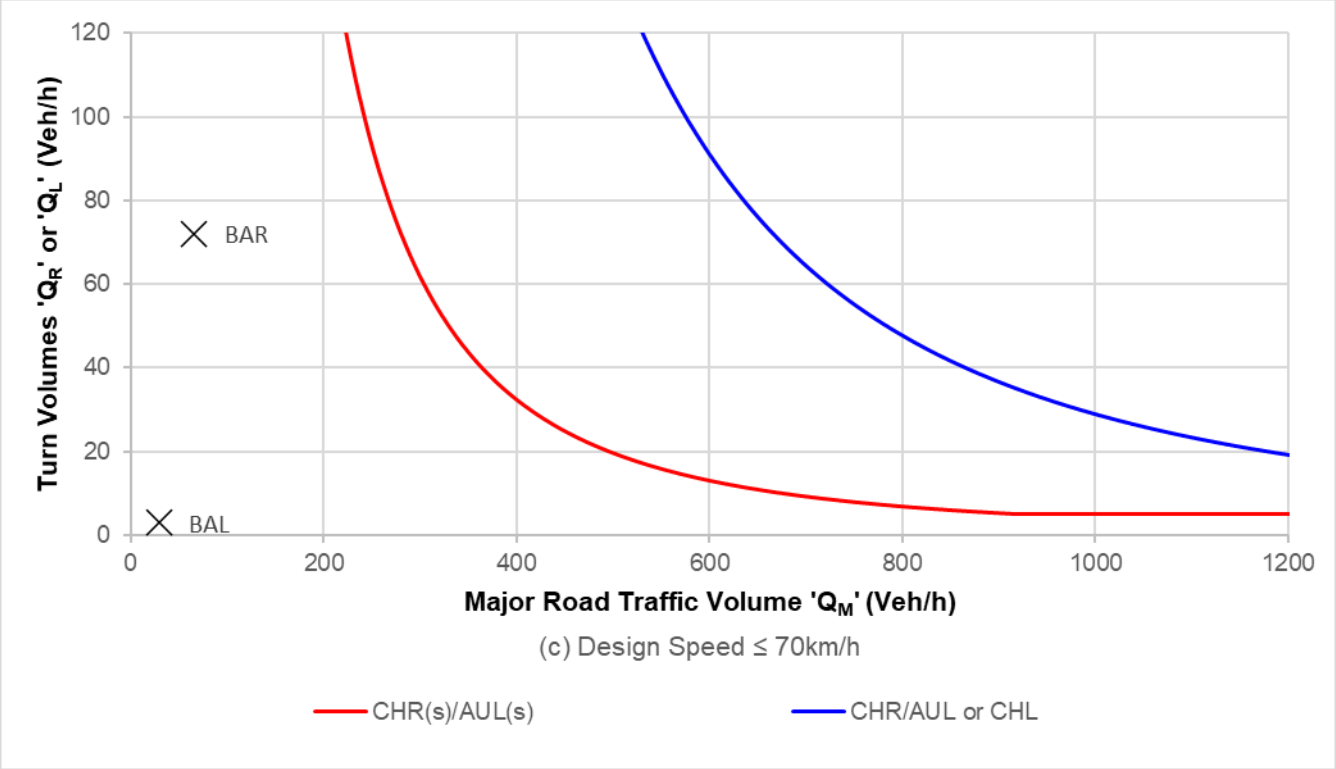


Table 4 – Opening Year 'With Development' Warranted Turn Treatments

Intersection Movements	AM Peak Hour Traffic			PM Peak Hour Traffic		
	Q_M (vph)	Q_L / Q_R (vph)	Treatment	Q_M (vph)	Q_L / Q_R (vph)	Treatment
Somerset Road / Enterprise Drive						
Right Turn	56	43	BAR	66	72	BAR
Left Turn	30	3	BAL	30	3	BAL

5.4.2 SIGHT DISTANCES

The GTIA specifies minimum sight distance requirements for intersections as:

- Approach Sight Distance (ASD) required to the road surface at all intersections and accesses;
- Safe Intersection Sight Distance (SISD) desirable between a vehicle using a public road intersection and a vehicle approaching on the major road; and
- Minimum Gap Sight Distance (MGSD) acceptable between a vehicle using a public road intersection and a vehicle approaching on the major road.

ASD, SISD and MGSD are defined in Austroads "Guide to Road Design Part 4A: Unsignalised and Signalised Intersections" (AGRD04A-17). Austroads also provides formulas for calculating the acceptable minimum sight

distances. Because the proposed access to the site is via the end of a cul-de-sac and not an intersection, SISD and MGSD are not required for this sight distance assessment.

ASD is the distance at which a driver can see any line marking on the road surface at the intersection. ASD should be sufficient to allow a driver to react to the intersection and, if necessary, come to a complete stop before entering the intersection. Minimum ASD is calculated using the formula:

$$ASD = \frac{R_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where:

- R_T = reaction time
  = 2.0 sec alert driving conditions (high expectancy of stopping due to traffic signals);
- V = design speed
  =70 km/h (10 km/h above posted speed limit)
- d = coefficient of acceleration
  = 0.36 (desirable value for most urban and rural road types); and
- a = longitudinal grade.
  = 0 %.

Based off the above parameters the required ASD is 92 m. A site inspection was undertaken on 19th April 2023 to determine visibility at the existing site access. Figure 12 shows that the site entry point has visibility covering the full length of Enterprise Drive to the intersection with Somerset Road, traversing a distance of approximately 520 m. Therefore, the site entrance has sufficient ASD.

Figure 12 – Enterprise Drive looking northwest from the proposed site access

5.5 Intersection Delay Impact Assessment and Mitigation

As described in Section 2.5, unsignalized intersections with minor roads containing relatively low traffic volumes do not require capacity analysis. As indicated by Figure 9 and Figure 10, forecast traffic on Enterprise Drive is expected to remain less than 100 vph, whilst the maximum hourly traffic on Somerset Road is expected to be 173 vph. As the major road volume is less than 500 vph and the crossroad volume is less than 200 vph, capacity analysis is not required in accordance with Table 1, Section 2.5 inAGTM03-09

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Impacts and Mitigation Measures

This TIA was undertaken to address the impacts of development traffic associated with the proposed temporary workers camp and laydown area for MBJV. The TIA includes road safety, access and frontage and intersection delay impact assessments and did not identify any impacts requiring mitigation. Changes to the road environment such as construction of a new property access should be subject to road safety assessment in accordance with normal design processes, but the low risk level of the road environment does not warrant a road safety audit.

6.2 Certification Statement and Authorisation

This report was prepared by Lawrence Mills under the direct supervision of Bradley Jones (RPEQ 19986).

The Traffic Impact Assessment Certification in accordance with the GTIA is attached in Appendix D.

APPENDIX A

RRC TRAFFIC COUNT DATA – GRACEMERE INDUSTRIAL ACCESS ROAD, SOMERSET CONNECTION ROAD AND SOMERSET ROAD.

Street	Link Start	Link End	Location Description	Start Date	End Date	AADT	% Heavy Vehicles	PM PEAK TIME/VEHICLES	AM PEAK TIME/ VEHICLES
Gracemere Industrial Access I	Somerset Connec	Malchi Nine Mile Rd	On overpass	21/08/2020	04/09/2020	1274	42	8-9AM, 100	3-4PM, 105
Somerset Connection Rd	Somerset Rd	Overpass Access Rd	150m S of Somerset Rd	06/05/2016	20/05/2016	907	45	8-9AM, 70	3-4PM, 38
Somerset Rd	Stewart St	Macquarie St	Somerset Rd Opp 165	25/02/2022	18/03/2022	607	52.7	8-9AM, 39	3-4PM, 43

APPENDIX B

FIELD TRAFFIC COUNT DATA – 4TH & 5TH MAY 2023

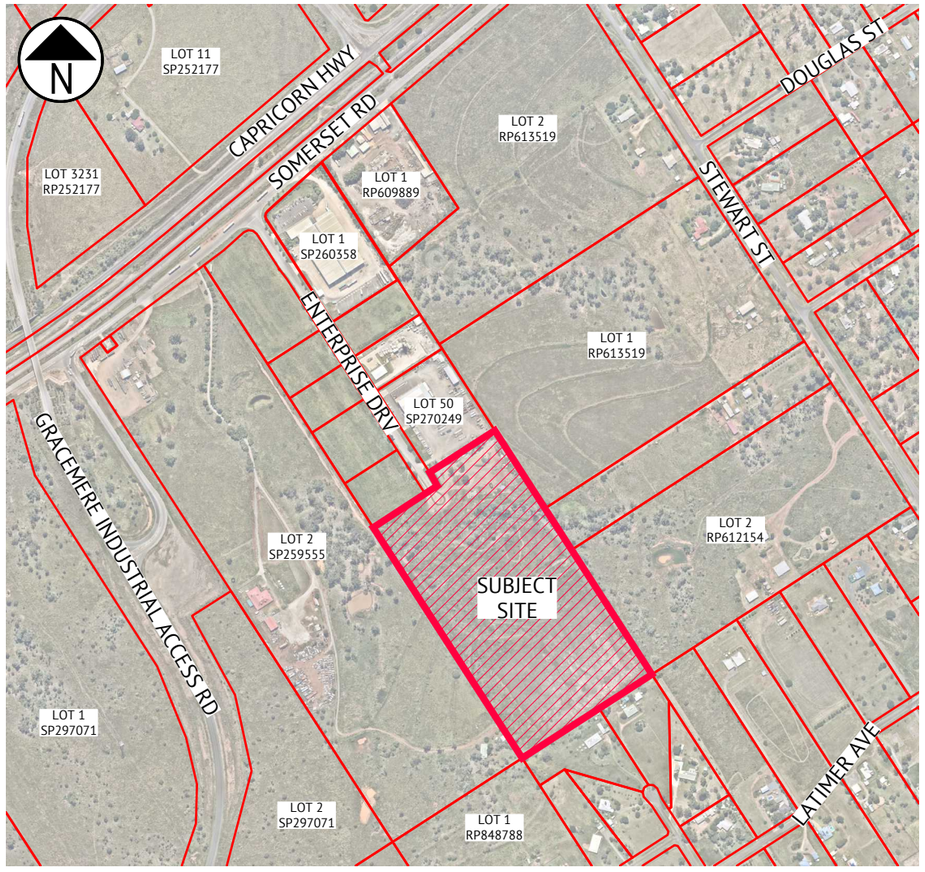
	Somerset Road (W)		Somerset Road (E)		Enterprise Drive	
	Through	**Right**	**Through**	**Left**	**Left**	**Right**
7:30 AM	4	2	4	1		
7:45 AM	1	4	5	2		
8:00 AM	4	5	7		2	1
8:15 AM	7	5	9	1		
8:30 AM	10	4	8	1	1	
8:45 AM	2	2	9	1	5	2
9:00 AM	5	3	5	1	1	
9:15 AM	7	1	7	1	4	2
Peak Hour	**8:00 am to 9:00 am**					
Peak Hour Traffic Volume	**23**	**16**	**33**	**3**	**8**	**3**

	Somerset Road (W)		Somerset Road (E)		Enterprise Drive	
	Through	**Right**	**Through**	**Left**	**Left**	**Right**
2:30 PM	6	3	2	1	5	2
2:45 PM	6	3	10		4	2
3:00 PM	8	3	7		6	2
3:15 PM	12		9	2	1	1
3:30 PM	7	4	4	2		2
3:45 PM	6	4	4		3	
4:00 PM	0	0	7		5	2
4:15 PM	0	0	7	1	2	4
Peak Hour	**2:45 PM to 3:45 PM**					
Peak Hour Traffic Volume	**33**	**10**	**30**	**4**	**11**	**7**

APPENDIX C

DEVELOPMENT SITE PLAN

GRACEMERE TEMPORARY CAMP, PIPE & PLANT LAYDOWN AREA FOR McCONNELL DOWELL BMD JOINT VENTURE (MBJV)



LOCALITY PLAN

LOT 51 ON SP273020

DRAWING SCHEDULE	
DRAWING NO.	DRAWING TITLE
C001	COVER SHEET, LOCALITY PLAN & DRAWING SCHEDULE
C002	SAFETY IN DESIGN REPORT
C003	GENERAL NOTES AND TYPICAL DETAILS
C004	BED LEVEL CROSSING DETAILS
C005	GROUND FINISH SURFACES
C100	EARTHWORKS PLAN
C101	EARTHWORKS SITE SECTIONS
C200	ROAD GEOMETRY PLAN
C201	GENERAL ARRANGEMENT PLAN
C202	VEHICLE SWEPT PATH PLAN
C203	CL1 LONGITUDINAL SECTION
C204	CL2 LONGITUDINAL SECTION - SHEET 1 OF 2
C205	CL2 LONGITUDINAL SECTION - SHEET 2 OF 2
C300	DIVERSION DRAIN SETOUT PLAN
C301	DIVERSION DRAIN NORTH LONGITUDINAL SECTION
C302	DIVERSION DRAIN WEST LONGITUDINAL SECTION
C303	DIVERSION DRAIN NORTH WEST LONGITUDINAL SECTION
C400	SEDIMENT BASIN 1 LAYOUT & SECTIONS
C401	SEDIMENT BASIN 2 LAYOUT & SECTIONS
C500	SOIL EROSION & SEDIMENT CONTROL PLAN
C501	SOIL EROSION & SEDIMENT CONTROL DETAILS

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

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DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
0 100 200 300m
SCALE 1:5000 (A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE COVER SHEET, LOCALITY PLAN & DRAWING SCHEDULE

JOB CODE MIS-1080
SHEET NUMBER C001
REV C

DESIGN HAZARD SCHEDULE

ITEM	DESIGN HAZARD	POTENTIAL HAZARD	RISK	ELIMINATION / MINIMISATION OF HAZARD / RISK	RESIDUAL RISK
D1	ROAD DESIGN HAZARD - PIPE LAYDOWN	INTERNAL ROADS, INTERSECTIONS AND PIPE LAYDOWN AREA DESIGNED TO SUIT A TYPE 1 CLASS 2 ≤ 36.5m ROAD TRAIN A-DOUBLE AND A 49T EXCAVATOR WITH VACUUM LIFT FOR UNLOADING PIPE	MODERATE	ALL INTERNAL ROADS, INTERSECTIONS AND PIPE LAYDOWN AREAS HAVE BEEN DESIGNED TO ACCOMMODATE TURNING MOVEMENTS FOR THE CLIENT-NOMINATED VEHICLES. DELINEATION IS TO BE PROVIDED TO APPROPRIATELY MANAGE VEHICLES. LIGHT VEHICLES, SERVICE VEHICLES AND BUSES WILL BE SPERATED FROM PIPE LOADING AND UNLOADING MOVEMENTS.	LOW
D2	TRAFFIC HAZARD - EXTERNAL	EXTERNAL TRAFFIC ON ENTERPRISE DRIVE CUL-DE-SAC HEAD	MODERATE	EXISTING CUL-DE-SAC TO BE MAINTAINED TO ALLOW VEHICLES IN ENTERPRISE DRIVE TO TURN AROUND. APPROPRIATE SIGNAGE TO BE INSTALLED AT END OF CUL-DE-SAC.	LOW
D3	SITE DRAINAGE HAZARD - EXTERNAL	SITE MUST DRAIN EFFECTIVELY AND EFFICIENTLY IN BOTH MINOR AND MAJOR FLOODING SCENARIOS, ENSURING THAT NEIGHBOURING PROPERTIES AND CATCHMENTS ARE NOT NEGATIVELY IMPACTED	HIGH	BED LEVEL CROSSING MINIMISES ALTERATIONS TO EPHEMERAL OVERLAND FLOW PATH. NO AFFLUX IS CAUSED ON ADJACENT PROPERTIES BY THE PROPOSED WORKS. ALL STORMWATER FLOWS ARE DIRECTED TO DISCHARGE INTO THE OVERLAND FLOW PATH WHICH DISCHARGES TO THE EXISTING LPD AT THE NORTH-WESTERN CORNER OF THE SITE.	LOW
D4	SITE DRAINAGE HAZARD - INTERNAL	ACCESS ACROSS EPHEMERAL OVERLAND FLOW PATH	HIGH	BED LEVEL CROSSING IS PROPOSED TO BE TRAFFICABLE UP TO AND INCLUDING 63% AEP EVENT - STABILITY CHECKED V ≤ 2 m/s, d ≤ 0.3 m, and Vd product ≤ 0.4 m^2/s. FLOW DEPTH GAUGE TO BE PROVIDED FOR CROSSING.	MODERATE
D5	EXISTING UNDERGROUND / OVERHEAD SERVICES HAZARD	EXISTING UNDERGROUND AND/OR OVERHEAD SERVICES EXIST ON SITE	MODERATE	EXCAVATION WORKS ARE MINIMISED. WORKS ARE MAINLY FOCUSSED ON RESHAPING EXISTING STOCKPILE AND BUNDS. ALL EXISTING SERVICES MUST BE LOCATED, POTHOLED AND CONFIRMED IF LIVE OR REDUNDANT.	LOW
D6	GEOTECHNICAL TESTING HAZARD	LIMITED GEOTECHNICAL TESTING HAS BEEN CARRIED OUT FOR SITE	MODERATE	PAVEMENT DESIGNS HAVE BEEN NOTED AS PROVISIONAL ONLY SUBJECT TO ASSUMED SUBGRADE CONDITIONS BEING MET. CLIENT HAS BEEN ADVISED THAT ADDITIONAL GEOTECHNICAL TESTING MAY BE REQUIRED DURING CONSTRUCTION PHASE.	LOW
D7	SURVEY HAZARD	NIL PHYSICAL SURVEY HAS BEEN CARRIED OUT FOR SITE	MODERATE	CLIENT HAS BEEN ADVISED THAT ADDITIONAL SURVEY MAY BE REQUIRED ONCE SITE STRIPPING IS COMPLETE TO CONFIRMS LEVELS AND GRADES.	LOW

CONSTRUCTION HAZARD SCHEDULE

ITEM	POTENTIAL HAZARD	POSSIBLE PREVENTATIVE ACTION
C1	BED LEVEL CROSSING	WORK WITHIN OR ADJACENT TO EPHEMERAL OVERLAND FLOW PATH, MUST NOT OCCUR WHEN SIGNIFICANT INNUDATION IS LIKELY TO OCCUR. CROSSING NOT BE USED WHEN FLOW DEPTH GAUGE INDICATES DEPTH > 0.25 m
C2	OVERHEAD POWER HAZARD	WARNING SIGNS AND MARKERS SHALL BE ERECTED ADVISING OF THE PRESENCE OF LIVE OVERHEAD CABLES. A REPRESENTATIVE OF THE SUPPLY AUTHORITY SHALL REMAIN ON SITE DURING EARTHWORKS AND ANY OTHER HIGH-RISK WORKS, IF REQUIRED.
C3	UNDERGROUND ELECTRICAL, TELECOMMUNICATION, GAS AND WATER MAIN HAZARD	WARNING SIGNS AND MARKERS SHALL BE ERECTED ADVISING OF THE PRESENCE OF THE EXISTING SERVICE. THE SERVICE SHALL BE IDENTIFIED AND MARKED BY THE SUPPLY AUTHORITY PRIOR TO THE COMMENCEMENT OF EXCAVATION. A REPRESENTATIVE OF THE SUPPLY AUTHORITY SHALL REMAIN ON SITE DURING THE EXCAVATION WORK IF REQUIRED.
C4	WORKS NEAR RAIL, AIRPORTS AND ROADS HAZARD	ALL REQUIRED PERMITS, APPROVALS AND SAFETY REQUIREMENTS FROM THE RELEVANT AUTHORITY SHOULD BE OBTAINED PRIOR TO COMMENCING WORK. A REPRESENTATIVE OF THE RELEVANT AUTHORITY SHALL REMAIN ON SITE DURING CONSTRUCTION WHILE THE HAZARD REMAINS.
C5	PEDESTRIAN ACCESS HAZARD	WORK WITHIN OR ADJACENT TO AREAS WHICH THE PUBLIC REQUIRES PEDESTRIAN ACCESS MUST HAVE APPROPRIATE BARRICADES AND SIGNAGE ERECTED AT ALL TIMES.
C6	POTENTIAL VEHICLE HAZARD	SITE PERSONNEL SHALL BE ADVISED OF THE POTENTIAL HAZARDS AND THE APPROPRIATE PROCEDURES FOR WORKING ADJACENT TO OPERATING PUBLIC ROADS. APPROPRIATE SAFETY CLOTHING SHALL BE WORN AND THE REQUIRED SIGNAGE SHALL BE ERECTED. THE WORKS SHALL BE UNDERTAKEN IN A MANNER WHICH DOES NOT COMPROMISE THE SAFETY OF THE VEHICLE OCCUPANTS OR THE SITE PERSONNEL.
C7	DEMOLITION AND CLEARING HAZARD	SUITABLE QUALIFIED AND EXPERIENCED PERSONNEL SHALL BE RESPONSIBLE FOR THE DEMOLITION AND CLEARING WORKS FOR THE PROJECT AT ALL TIMES. THE MANAGING CONTRACTORS WORK METHOD STATEMENT SHALL ALSO GIVE CONSIDERATION TO FALLING DEBRIS, COLLAPSE AND DANGEROUS AIRBORNE AGENTS.
C8	TRAFFIC MANAGEMENT HAZARD	SUITABLE QUALIFIED AND EXPERIENCED PERSONNEL SHALL BE RESPONSIBLE FOR THE SAFE AND ORDERLY PASSAGE OF VEHICULAR AND PEDESTRIAN TRAFFIC THROUGH THE PROJECT AT ALL TIMES.THE MANAGING CONTRACTOR SHALL DEVELOP AND MAINTAIN A TRAFFIC MANAGEMENT PLAN (TMP) FOR THE PROJECT TO ESTABLISH APPROPRIATE CONTROLS IN ACCORDANCE WITH THE MANUAL FOR UNIFORM TRAFFIC CONTROL.
C8	ASBESTOS HAZARD - EXISTING SERVICES	ALL PERSONNEL SHOULD BE ADVISED OF THE POTENTIAL PRESENCE OF ASBESTOS AND AN IDENTIFICATION AND ACTION PLAN SHALL BE PUT IN PLACE. SAMPLING AND IDENTIFICATION IS TO BE UNDERTAKEN IN ACCORDANCE WITH WORKPLACE HEALTH AND SAFETY REGULATIONS. IF SAMPLING CONFIRMS THE PRESENCE OF ASBESTOS, THEN AN ACTION PLAN IS TO BE IMPLEMENTED TO REMEDIATE THE SITE.

DESIGN HAZARD NOTES:

1. PREMISE AUSTRALIA PTY LTD (PREMISE), HAVING BEEN COMMISSIONED TO CARRY OUT DETAILED DESIGN AND DOCUMENTATION OF THESE WORKS, CONFIRM THAT THE PREMISE DRAWING SET HAS BEEN INTERNALLY REVIEWED FOR DESIGN SAFETY IN ACCORDANCE WITH SECTION 22 OF THE WORK HEALTH AND SAFETY ACT 2011 QLD.
2. THIS REPORT SUMMARISES AN INTERNAL REVIEW OF THE PREMISE DETAILED DESIGN DRAWINGS FOR DESIGN SAFETY.
3. THIS REPORT IN NO WAY RELIEVES THE PRINCIPAL, CONTRACTOR OR ANY OTHER PARTY OF THEIR OWN OBLIGATIONS AND RESPONSIBILITIES UNDER THE WORK HEALTH AND SAFETY ACT 2011 QLD, INCLUDING (BUT NOT LIMITED TO) CONSULTATION WITH THE DESIGNER UNDER SECTION 294 OF THE ACT, THE PREPARATION OF SATISFACTORY SAFE WORK METHOD STATEMENTS AND DUTIES OF CARE.
4. IT IS A REQUIREMENT UNDER SECTION 296 OF THE WORK HEALTH AND SAFETY ACT 2011 QLD, THAT A COPY OF THIS REPORT BE PROVIDED TO THE CONTRACTOR BY THE ENTITY COMMISSIONING THE WORK SHOWN ON THE PREMISE DRAWINGS.
5. AS PER THE DEPARTMENT OF JUSTICE AND THE ATTORNEY-GENERAL- WORKPLACE HEALTH AND SAFETY QUEENSLAND, A WRITTEN REPORT IS NOT REQUIRED FOR DESIGNS THAT HAVE TYPICAL FEATURES.

CONSTRUCTION HAZARD NOTES:

1. UNDER THE QUEENSLAND WORK HEALTH AND SAFETY ACT 2011, THE WORK HEALTH AND SAFETY REGULATION 2011 AND OTHER LEGISLATION AND GUIDELINES, THE PRINCIPAL CONTRACTOR HAS SPECIFIC OBLIGATIONS IN RELATION TO THE SAFE OPERATION OF THE SITE AND OF THE WORKS.
   TO ASSIST THE PRINCIPAL CONTRACTOR IN COMPLYING WITH THESE OBLIGATIONS THE PROJECT DESIGNERS HAVE IDENTIFIED BY DRAWING NOTES, AREAS WHERE POTENTIAL HAZARDS MAY ARISE. THESE NOTES OR ADVICE, SHALL NOT NECESSARILY BE CONSIDERED COMPLETE AND ARE BASED UPON THE DESIGNERS' UNDERSTANDING OF THE SAFETY RISKS ASSOCIATED WITH THE WORKS.
   THESE NOTES OR ADVICE SHALL NOT RELIEVE THE PRINCIPAL CONTRACTOR OF ANY OBLIGATION UNDER THE RELEVANT LEGISLATION OR GUIDELINE. THE PRINCIPAL CONTRACTOR SHALL REMAIN RESPONSIBLE FOR THE PREPARATION OF AN APPROPRIATE WORK HEALTH SAFETY MANAGEMENT PLAN AND SAFE WORK METHOD STATEMENTS FOR THE SITE.
2. PURSUANT TO THE WORK HEALTH AND SAFETY ACT 2011 WE HEREBY ADVISE THAT OUR DESIGN SAFETY REVIEW HAS IDENTIFIED UNUSUAL OR ATYPICAL DESIGN FEATURES THAT MAY PRESENT ADDITIONAL HAZARDS OR RISKS DURING THE CONSTRUCTION PHASE AND THESE ARE LISTED IN THE CONSTRUCTION HAZARD SCHEDULE.

CONSEQUENCE TABLE

LEVEL	CONSEQUENCE	COST/TIME
5 - CATASTROPHIC	FATALITY OR MULTIPLE PERSONS ONSITE WITH LIFE THREATENING HEALTH EFFECTS OR INABILITY TO CONTINUE	HUGE FINANCIAL OR TIME LOSS
4 - MAJOR	EXTENSIVE INJURIES, OR ONSET OF SEVERE OR LIFE THREATENING HEALTH EFFECTS TO SINGLE PERSON ONSITE. MULTIPLE PERSONS WITH ONSET OF IRREVERSIBLE HEALTH EFFECTS. PERMANENT INJURY TO PERSON ONSITE.	MAJOR FINANCIAL OR TIME LOSS
3 - MODERATE	MEDICAL TREATMENT REQUIRED. IRREVERSIBLE HEALTH EFFECT TO A SINGLE PERSON. MULTIPLE PERSONS ONSITE WITH REVERSIBLE HEALTH EFFECTS.	HIGH FINANCIAL OR TIME LOSS
2 - MINOR	FIRST AID, SINGLE OR MULTIPLE INJURIES AMONGST PERSONS ONSITE. SINGLE PERSON ONSITE WITH MODERATE SHORT TERM REVERSIBLE HEALTH EFFECTS.	MEDIUM FINANCIAL OR TIME LOSS
1 - INSIGNIFICANT	NO INJURIES. OVER EXPOSURE TO A SINGLE PERSON ONSITE, BUT NO REPORTED HEALTH EFFECTS.	LOW FINANCIAL OR TIME LOSS

LIKELIHOOD TABLE

LEVEL	DESCRIPTION	QUANTIFICATION GUIDE
A - ALMOST CERTAIN	THE EVENT IS EXPECTED TO OCCUR IN MOST CERTAIN CIRCUMSTANCES	MORE THAN ONCE PER YEAR
B - LIKELY	THE EVENT WILL PROBABLY OCCUR IN MOST CIRCUMSTANCES	AT LEAST ONCE IN 5 YEARS
C - POSSIBLE	THE EVENT SHOULD OCCUR AT SOME TIME	AT LEAST ONCE IN 10 YEARS
D - UNLIKELY	THE EVENT COULD OCCUR AT SOME TIME	AT LEAST ONCE IN 30 YEARS
E - RARE	THE EVENT MAY OCCUR IN EXCEPTIONAL CIRCUMSTANCES	LESS THAN ONCE IN 30 YEARS

RISK ANALYSIS MATRIX

LIKELIHOOD	CONSEQUENCE: 1 - INSIGNIFICANT	2 - MINOR	3 - MODERATE	4 - MAJOR	5 - CATASTROPHIC
A - ALMOST CERTAIN	MODERATE	HIGH	EXTREME	EXTREME	EXTREME
B - LIKELY	MODERATE	HIGH	HIGH	EXTREME	EXTREME
C - POSSIBLE	LOW	MODERATE	HIGH	EXTREME	EXTREME
D - UNLIKELY	LOW	LOW	MODERATE	HIGH	EXTREME
E - RARE	LOW	LOW	MODERATE	HIGH	HIGH

RISK EVALUATION TABLE

RISK LEVEL	ACTION REQUIRED
EXTREME	UNACCEPTABLE RISK. RE-DESIGN REQUIRED. DO NOT PROCEED WITHOUT ADDITIONAL CONTROLS.
HIGH	UNACCEPTABLE RISK. ADDITIONAL CONTROLS NEEDED. CONSIDER FURTHER REVIEW AND CONSIDER RE-DESIGN
MODERATE	RISK MAY BE ACCEPTABLE. MANAGEMENT TO DETERMINE ACTIONS REQUIRED
LOW	ACCEPTABLE. MANAGE RISK THROUGH ROUTINE PROCEDURES AND OTHER ADMINISTRATIVE CONTROLS

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

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DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347
SCALE
ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: SAFETY IN DESIGN REPORT

JOB CODE: MIS-1080
SHEET NUMBER: C002
REV: C

GENERAL

1.0 EXISTING SERVICES
THE CONTRACTOR SHALL ESTABLISH THE EXTENT AND LOCATION OF ALL EXISTING SERVICES WITHIN THE WORKS AREA. ALL SERVICES SHALL BE PROTECTED AGAINST ACCIDENTAL DAMAGE DURING THE CONSTRUCTION OF THE WORKS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS INCURRED DUE TO DAMAGE TO EXISTING SERVICES.

2.0 INSPECTIONS
A MINIMUM OF 24 HOURS NOTICE OF ALL REQUIRED INSPECTIONS SHALL BE GIVEN BY THE CONTRACTOR TO THE CLIENT/SUPERINTENDENT / ENGINEER. THE ENGINEER REQUIRES INSPECTIONS AT THE FOLLOWING STAGES OF CONSTRUCTION.

a. TOPSOIL STRIPPING
b. COMPLETION OF EARTHWORKS

CHECK LEVELS AND TESTING RESULTS WILL BE REQUIRED PRIOR TO INSPECTIONS WHERE APPLICABLE.

EARTHWORKS AND ROADWORKS

1.0 EARTHWORKS

1.1 TOPSOIL
THE CONTRACTOR SHALL STRIP TOPSOIL FROM THE WHOLE OF THE WORKS AREA IN PRIVATE PROPERTY TO A DEPTH OF 200mm OR AS DIRECTED BY THE SUPERINTENDENT / ENGINEER AND STOCKPILE IT IN THE NOMINATED STOCKPILE AREA PRIOR TO COMMENCING BULK EARTHWORKS. THE CONTRACTOR SHALL BE REQUIRED TO CARRY OUT TEMPORARY STABILISING MEASURES TO MINIMISE THE TRANSPORTATION OF AIRBORNE MATERIAL THAT MAY CAUSE NUISANCE TO NEIGHBOURING PROPERTIES.

1.2 BULK FILLING

1.3.1 ROADS
PRIOR TO ANY FILLING THE AREA TO BE FILLED SHALL BE PROOF ROLLED BY FOUR PASSES OF A 10 TONNE MINIMUM STATIC MASS ROLLER / LOADED WATER TRUCK. THE FINAL PASS SHALL BE TREATED AS TEST ROLLING IN ACCORDANCE WITH TESTING CLAUSE 5.4 OF AS 3798 WITH INSPECTION CARRIED OUT BY THE APPROVED GEOTECHNICAL TESTING AUTHORITY OR THE SUPERINTENDENT / ENGINEER. THE COST OF PROOF AND TEST ROLLING SHALL BE DEEMED TO BE INCLUDED IN THE CONTRACT LUMP SUM. FILLING SHALL BE PLACED IN LAYERS OF NOT MORE THAN 200mm LOOSE THICKNESS AND COMPACTED TO A MINIMUM STANDARD MAXIMUM DRY DENSITY AS DETERMINED BY AS 1289, E1.1 AND SPECIFIED IN THIS SPECIFICATION. TEST FREQUENCY SHALL BE AS STATED IN THE QUALITY ASSURANCE TESTING TABLE A. AT ALL TIMES DURING BULK EARTHWORKS THE CONTRACTOR SHALL ENSURE THAT THE WORKS ARE KEPT IN A STATE SO AS NOT TO ALLOW PONDING ON THE WORKS OR EROSION FROM THE WORKS IN THE EVENT OF RAIN. THE MOISTURE CONTENT OF THE FILL SHALL BE MAINTAINED AS CLOSE AS IS PRACTICAL TO OPTIMUM MOISTURE CONTENT DURING THE COMPACTION OF THE FILL.

1.3.2 SELECT FILL
SELECT FILL MATERIAL SHALL BE IN ACCORDANCE WITH THE BELOW SPECIFICATION TO ENSURE MOISTURE INGRESS UNDER THE SLAB IS MINIMISED.
GRADING COEFFICIENT SHALL BE BETWEEN 16 AND 34, WHEREBY GRADING COEFFICIENT IS:

((%PASSING 26.5MM SIEVE-%PASSING 2.0MM SIEVE) X (%PASSING 4.75MM SIEVE)/100).

SHRINKAGE PRODUCT SHALL BE BETWEEN THE RANGE OF 100 TO 300, WHEREBY THE SHRINKAGE PRODUCT IS:
(LINEAR SHRINKAGE X %PASSING 0.425MM SIEVE).

SOIL TESTING CONFIRMING MATERIAL COMPLIANCE IS TO BE PROVIDED BY THE CONTRACTOR.

ALL EARTHWORKS FILL ON LOTS IS TO BE LEVEL 1 CERTIFIED IN ACCORDANCE WITH AS3798-1996 WITH EXTENTS SHOWN ON EARTHWORKS PLAN. CERTIFICATION SHALL STATE THAT FILL IS SIMILAR TO THAT DEFINED IN SECTION 6.1.2 OF AS2870.1-1996 AND CAN THUS BE CLASSIFIED AS "CONTROLLED FILL".

1.4 DUST CONTROL
THE CONTRACTOR SHALL ENSURE THAT DUST RESULTING FROM THE EARTHWORKS OPERATIONS IS KEPT TO A MINIMUM BY THE APPLICATION OF WATER TO THE WORKS AREA OR BY OTHER APPROVED METHODS AS DIRECTED BY THE ENGINEER/SUPERINTENDENT DURING ALL PERIODS OF CONSTRUCTION.

1.5 WATER FOR CONSTRUCTION PURPOSES
THE PRINCIPAL SHALL NOT SUPPLY WATER FOR USE IN CONSTRUCTION OF THE WORKS. THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR OBTAINING WATER FOR THESE PURPOSES. WATER CAN BE PURCHASED FROM COUNCIL WITH PRIOR CONSENT.

1.6 REPLACEMENT OF UNSOUND MATERIAL
IF DURING PROOF ROLLING OF THE FILL/PAVEMENT AREAS OR IN THE CONSTRUCTION OF CUTS, UNSOUND OR UNSUITABLE MATERIAL IS ENCOUNTERED WHICH IN THE OPINION OF THE ENGINEER IS NOT SUITABLE FOR INCLUSION IN THE FILL, THE CONTRACTOR SHALL EXCAVATE AND REMOVE TO SPOIL AS DIRECTED ON SITE SUCH UNSUITABLE MATERIAL. THE CONTRACTOR SHALL THEN REPLACE THE UNSOUND MATERIAL WITH SUITABLE MATERIAL DRAWN FROM THE CUTTING OPERATION ON SITE (IF AVAILABLE), OR FROM A SUITABLE SUPPLIER.

1.7 REPLACEMENT OF TOPSOIL
AT THE COMPLETION OF THE BULK EARTHWORKS AND FOLLOWING APPROVAL OF THE FINISHED SURFACE. THE CONTRACTOR SHALL LIGHTLY TINE UP THE BATTERS AND OPEN DRAINS AND REPLACE THE STOCKPILED TOPSOIL IN THE AREAS NOMINATED BY THE SUPERINTENDENT.
THE FINISHED SURFACE OF THE TOPSOIL SHALL BE LIGHTLY STATIC ROLLED AND WATERED TO PRODUCE AN EVEN SURFACE SUITABLE FOR SEEDING AND FERTILISING.

1.8
THE TOLERANCE REQUIREMENTS ON THE FINISHED SURFACE LEVEL OF EARTHWORKS SHALL BE AS FOLLOWS:

a. HORIZONTAL ALIGNMENT ±50MM
b. VERTICAL/GEOMETRIC TOLERANCE
c. PRIMARY TOLERANCE ±10MM
d. CROSSFALL ±0.2%
e. RATE OF CHANGE OF CROSSFALL ±0.02% PER METRE.

SOIL EROSION & SEDIMENT CONTROL NOTES

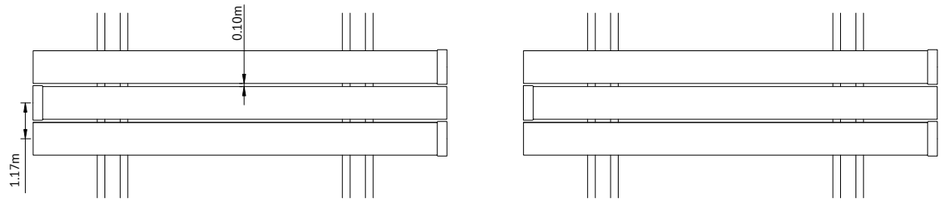
1. FOR NOTES AND DETAILS REFER TO SOIL EROSION AND SEDIMENT CONTROL DETAILS PLAN.
2. STOCKPILE LOCATIONS TO BE DESIGNATED BY THE CONTRACTOR ON SITE DURING CONSTRUCTION AND CONFIRMED WITH THE SUPERINTENDENT.
3. EARTHWORKS TO BE STAGED SUCH THAT CUT TO FILL INCLUDING COMPACTION & TOPSOILING IS COMPLETED WITHIN 2 WEEKS OF STRIPPING OF TOPSOIL.
4. ALL MEASURES FOR EROSION AND SEDIMENTATION CONTROL SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT CONSTRUCTION AND THE MAINTENANCE PERIOD.
5. ALL MEASURES FOR EROSION AND SEDIMENTATION CONTROL SHALL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR IN SUCH A MANNER SO AS NOT TO PRESENT POTENTIAL HAZARD TO ANY PERSON OR PROPERTY.
6. THE SUPERINTENDENT OR CONTRACTOR WILL MONITOR AND APPROVE FURTHER MITIGATION MEASURES NOT LIMITED TO:
   - PREVENT DUST LEAVING THE SITE BY PROACTIVE USE OF WATER TRUCK PRIOR TO AND DURING ANY EXCAVATION, BACK FILLING, GRADING AND SHAPING OF EARTH.
   - INCREASE FREQUENCY OF WATER TRUCK USAGE WHILE EXCAVATIONS AND GROUND WORKS ARE IN PROGRESS TO THE POINT DUST IS NOT AN ISSUE.
10. HYDROMULCH SEED MIX MUST CONTAIN INDIAN BLUE COUCH (BOTHRIOCHLOA PERTUSA) SOWN AT A RATE OF 10-20KG/HA. REVEGETATED AREAS MUST BE ESTABLISHED SUCH THAT 95% OF THE AREA HAS A TOTAL GRASS COVER OF 80%, AND THE INDIAN BLUE COUCH COVER IS A MINIMUM OF 60%.
11. EARTHWORKS AREAS TO BE SPRAYED WITH HYDROSEED IMMEDIATELY UPON COMPLETION AND WATERED UNTIL VEGETATION IS ESTABLISHED.

AS-CONSTRUCTED INFORMATION

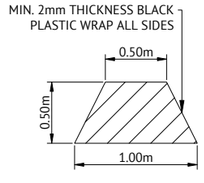
THE BUILDER SHALL PROVIDE LEVELS AND DIMENSION INFORMATION SUITABLE TO CONFIRM TO THE SATISFACTION OF THE SUPERINTENDENT THAT THE WORKS HAVE BEEN CONSTRUCTED TO THE LEVELS AND DIMENSIONS SHOWN ON THE DRAWING. THE BUILDER SHALL PROVIDE ALL AS-CONSTRUCTED INFORMATION NECESSARY FOR THE PREPARATION OF THE AS-CONSTRUCTED PLANS TO COUNCIL REQUIREMENTS. THE MINIMUM INFORMATION REQUIREMENTS ARE AS FOLLOWS:

a. EARTHWORKS AND DRAINAGE EXTENTS;
b. ALL DIMENSIONS SHALL BE PROVIDED IN METRES CORRECT TO 2 DECIMAL PLACES. ALL LEVELS SHALL BE ON AUSTRALIAN HEIGHT DATUM (AHD) AND THE AS CONSTRUCTED SURVEY ON GDA2020 COORDINATE SYSTEM IN METRES CORRECT TO 3 DECIMAL PLACES;
c. THE "AS CONSTRUCTED" INFORMATION FOR EARTHWORKS AND DRAINAGE SHALL BE PROVIDED WITHIN FOURTEEN (14) DAYS ON COMPLETION OF THE WORKS.

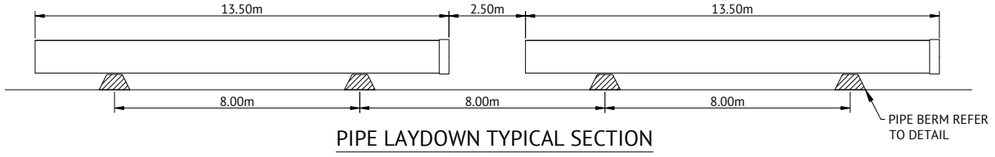
NOTE: ALL WORKS ARE TO BE IN ACCORDANCE WITH THE CMDG GUIDELINES AND AUSTRALIAN STANDARDS UNLESS OTHERWISE APPROVED.



PIPE LAYDOWN TYPICAL ARRANGEMENT
SCALE: 1:100 (A1)



PIPE BERM TYPICAL DETAIL
SCALE: 1:25 (A1)



PIPE LAYDOWN TYPICAL SECTION
SCALE: 1:100 (A1)

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

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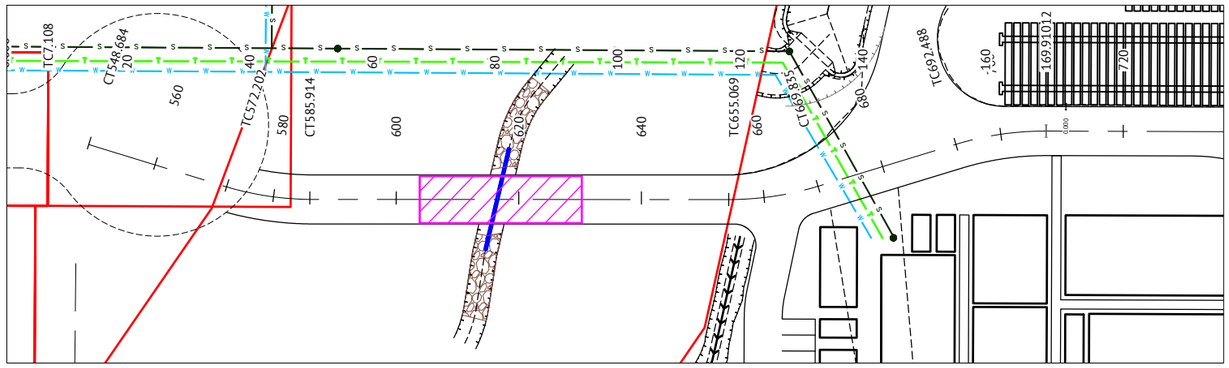
DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347
SCALE
ORIGINAL SHEET SIZE A1

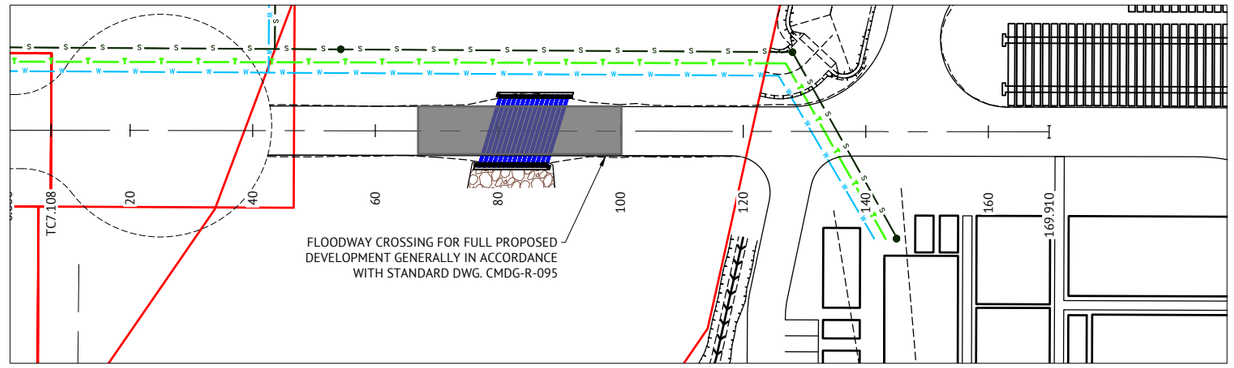
CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: GENERAL NOTES AND TYPICAL DETAILS

JOB CODE: MIS-1080
SHEET NUMBER: C003
REV: C



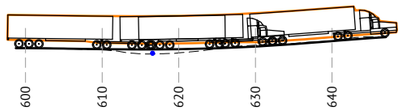
TEMPORARY BED LEVEL CROSSING PLAN

SCALE 1:500 (A1)



ULTIMATE FLOODWAY CROSSING PLAN

SCALE 1:500 (A1)



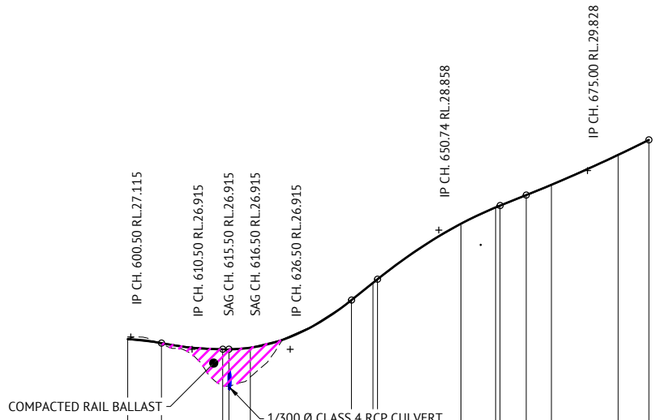
DESIGN VEHICLE VERTICAL CLEARANCE

N.T.S

15/375 RCP (75/2.44) (CLASS 4, BUTT JOINT) (12.06 OUTSIDE OF WALLS)
84.166 SKEW ANGLE 17.1° SKEW NUMBER 107.1 (12.20 OVERALL LENGTH)

ULTIMATE FLOODWAY CULVERT LONGITUDINAL SECTION

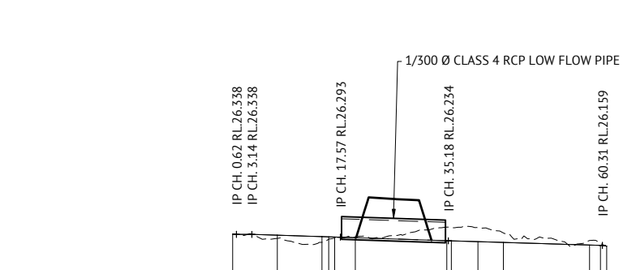
N.T.S



DATUM R.L.23.0																							
CUT (-)/FILL DEPTH	-0.009	0.018	0.592	0.598	0.476	-0.104	-0.052	-0.075	0.048	0.071	0.022	0.051	-0.029	0.231	0.046	0.002							
DESIGN SURFACE	27.080	27.015	26.915	26.915	26.940	27.716	27.997	28.056	28.961	29.228	29.258	29.428	29.597	30.084	30.328	30.710							
NATURAL SURFACE	27.089	26.997	26.323	26.317	26.463	27.821	28.049	28.131	28.913	29.157	29.235	29.397	29.626	29.854	30.282	30.707							
CHAINAGE	600.00	605.50	615.50	616.50	620.00	636.50	640.00	640.74	654.35	660.00	660.74	665.00	669.12	680.00	685.00	692.63							

TEMPORARY BED LEVEL CROSSING LONGITUDINAL SECTION

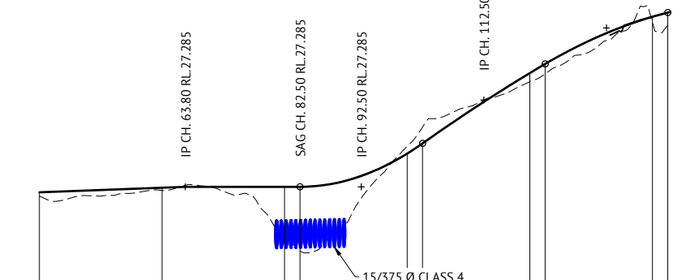
SCALE
HORZ- 1:500 (A1)
VERT- 1:50 (A1)



DATUM R.L.23.0																							
CUT (-)/FILL DEPTH	0.000	0.052	0.093	0.039	0.013	-0.014	-0.221	-0.217	-0.228	-0.155	-0.074	-0.033	0.007										
DESIGN SURFACE	26.343	26.325	26.302	26.299	26.296	26.285	26.235	26.233	26.220	26.207	26.165	26.160	26.148										
NATURAL SURFACE	26.343	26.273	26.209	26.260	26.283	26.299	26.456	26.449	26.447	26.362	26.239	26.193	26.141										
CHAINAGE	0.00	7.28	14.57	15.66	16.63	20.00	34.93	35.67	40.00	44.17	58.21	60.00	61.00										

BED LEVEL CROSSING LOW FLOW PIPE LONGITUDINAL SECTION

SCALE
HORZ- 1:500 (A1)
VERT- 1:50 (A1)



DATUM R.L.23.0																							
CUT (-)/FILL DEPTH	0.061	0.045	0.809	1.043	-0.121	-0.265	0.140	0.163	0.090	0.211													
DESIGN SURFACE	27.195	27.270	27.285	27.285	27.827	27.992	29.139	29.288	30.058	30.126													
NATURAL SURFACE	27.134	27.226	26.476	26.242	27.948	28.258	28.999	29.125	29.967	29.915													
CHAINAGE	40.00	60.00	80.00	82.50	100.00	102.50	120.00	122.50	140.00	142.50													

ULTIMATE FLOODWAY CROSSING LONGITUDINAL SECTION

SCALE
HORZ- 1:500 (A1)
VERT- 1:50 (A1)

FOR APPROVAL

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PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: BED LEVEL CROSSING DETAILS

JOB CODE: MIS-1080
SHEET NUMBER: C004
REV: C

LEGEND

- CONCRETE PAVEMENT
- 150mm SELECT FILL (DECOMPOSED GRANITE)
- INTERNAL ROAD PAVEMENT (150mm TYPE 2.5 ROADBASE)
- LV CARPARK PAVEMENT (150mm TYPE 2.5 ROADBASE)
- BUILDINGS
- 20mm SCREENINGS
- BED LEVEL CROSSING
- GRASSED AREAS

LOT 1 RP613519

LOT 1 RP612154

LOT 2 RP612154

LOT 12 SP167033

LOT 10 RP618976

LOT 11 RP618976

LOT 50 SP270249

LOT 106 SP273020

LOT 51 SP273020

LOT 2 SP259555

LOT 1 RP848788

DRAIN NORTH

CONTAINERS

CONTAINERS

DOMES / WORKSHOP

PLANT LAYDOWN

CONTAINERS

WASH BAY

FUEL

FLOODWAY CROSSING FOR FULL PROPOSED DEVELOPMENT GENERALLY IN ACCORDANCE WITH STANDARD DWG. CMDG-R-095. REFER TO DWG. C004 FOR DETAILS

BASIN 2

ENTERPRISE DRIVE

BED LEVEL CROSSING FOR PIPE LAYDOWN ONLY. REFER TO DWGS. C004,C200 AND C203 FOR DETAILS

LINEN

LOCKER ROOM

ACCOMMODATION OFFICE

RECREATION ROOM

GYM

MEDICAL

KITCHEN

ABLUTIONS

LAUNDRY

LOCKER

LOCKER

LOCKER

LOCKER

LOCKER

DRAIN NORTH WEST

MAIN CARPARK (66 BAYS)

CAMP

BASIN 1

DRAIN WEST

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

Premise

ROCKHAMPTON OFFICE
21 EAST STREET
PO BOX 264
ROCKHAMPTON, QLD, 4700
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE 0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE GROUND FINISH SURFACES

JOB CODE MIS-1080
SHEET NUMBER C005
REV C

LOT 1
RP613519

LOT 1
RP612154

LOT 2
RP612154

LOT 12
SP167033

SITE SECTION 2
REFER DWG. C101

LOCALISED CUT BATTER AND
DIVERSION DRAIN (MAX 1:3)

LOT 50
SP270249

LOT 10
RP618976

TILT DOMES / WORKSHOP 1 (L)

CONTAINERS

CONTAINERS

CONTAINERS

PLANT LAYDOWN

WASH BAY

FUEL

BASIN 2

LOT 51
SP273020

ENTERPRISE DRIVE

SITE SECTION 1
REFER DWG. C101

LOCKER ROOM

ACCOMMODATION OFFICE

RECREATION ROOM

GYM

MEDICAL

KITCHEN

LAUNDRY

LAUNDRY

LAUNDRY

LAUNDRY

LAUNDRY

CAMP

EXISTING CUT-OFF DRAIN

MAIN CARPARK
(66 BAYS)

BASIN 1

LOT 11
RP618976

LOT 1
RP848788

CUT TO FILL = 1,600m3
CUT TO STOCKPILE = 18,502m3
ALL VOLUMES ARE COMPACTED VOLUMES

APPROX. EXTENT OF PLANNING
AREA 1 AND 2 AS MAPPED BY R.R.C

LOT 2
SP259555

EARTHWORKS LEGEND

	FROM	TO	COLOUR
CUT DEPTH	-5.00	-4.80	
	-4.80	-4.60	
	-4.60	-4.40	
	-4.40	-4.20	
	-4.20	-4.00	
	-4.00	-3.80	
	-3.80	-3.60	
	-3.60	-3.40	
	-3.40	-3.20	
	-3.20	-3.00	
	-3.00	-2.80	
	-2.80	-2.60	
	-2.60	-2.40	
	-2.40	-2.20	
	-2.20	-2.00	
	-2.00	-1.80	
	-1.80	-1.60	
	-1.60	-1.40	
	-1.40	-1.20	
	-1.20	-1.00	
	-1.00	-0.80	
	-0.80	-0.60	
	-0.60	-0.40	
	-0.40	-0.20	
	-0.20	0.00	
FILL DEPTH	0.00	0.20	
	0.20	0.40	
	0.40	0.60	
	0.60	0.80	
	0.80	1.00	
	1.00	1.20	
	1.20	1.40	
	1.40	1.60	
	1.60	1.80	
	1.80	2.00	

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FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

Premise

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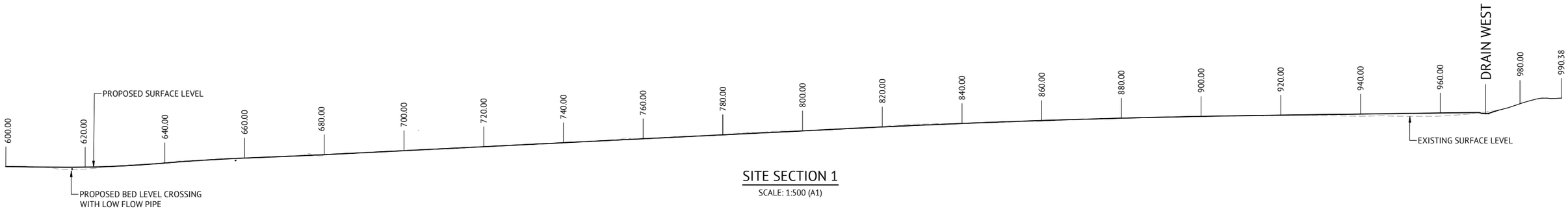
21 EAST STREET
PO BOX 264
ROCKHAMPTON, QLD, 4700
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED: A.BURGGRAAFF
CHECKED: C.SHIELDS
PROJECT MANAGER: C.SHIELDS
ENGINEERING CERTIFICATION: C.SHIELDS RPEQ 9347

SCALE
0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

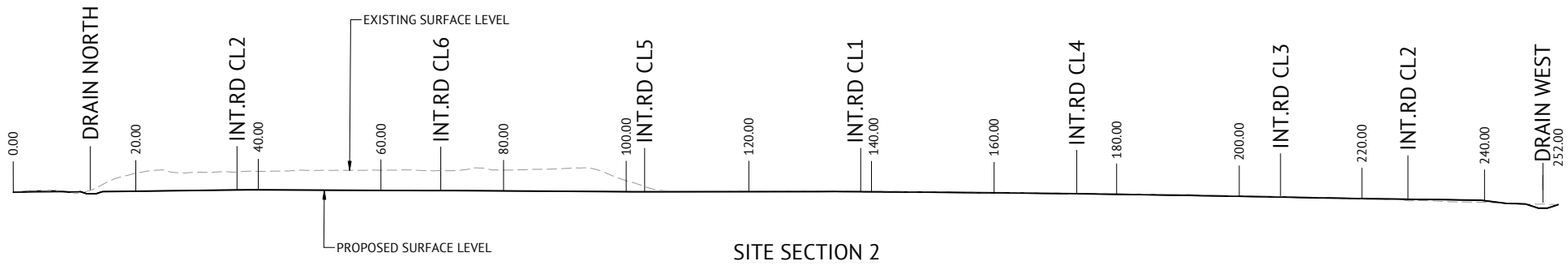
CLIENT	BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT	GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION	LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE	EARTHWORKS PLAN

JOB CODE: MIS-1080
SHEET NUMBER: C100
REV: C



SITE SECTION 1

SCALE: 1:500 (A1)



SITE SECTION 2

SCALE: 1:500 (A1)

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
0 10 20 30m
SCALE 1:500 (A1)
ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: EARTHWORKS SITE SECTIONS

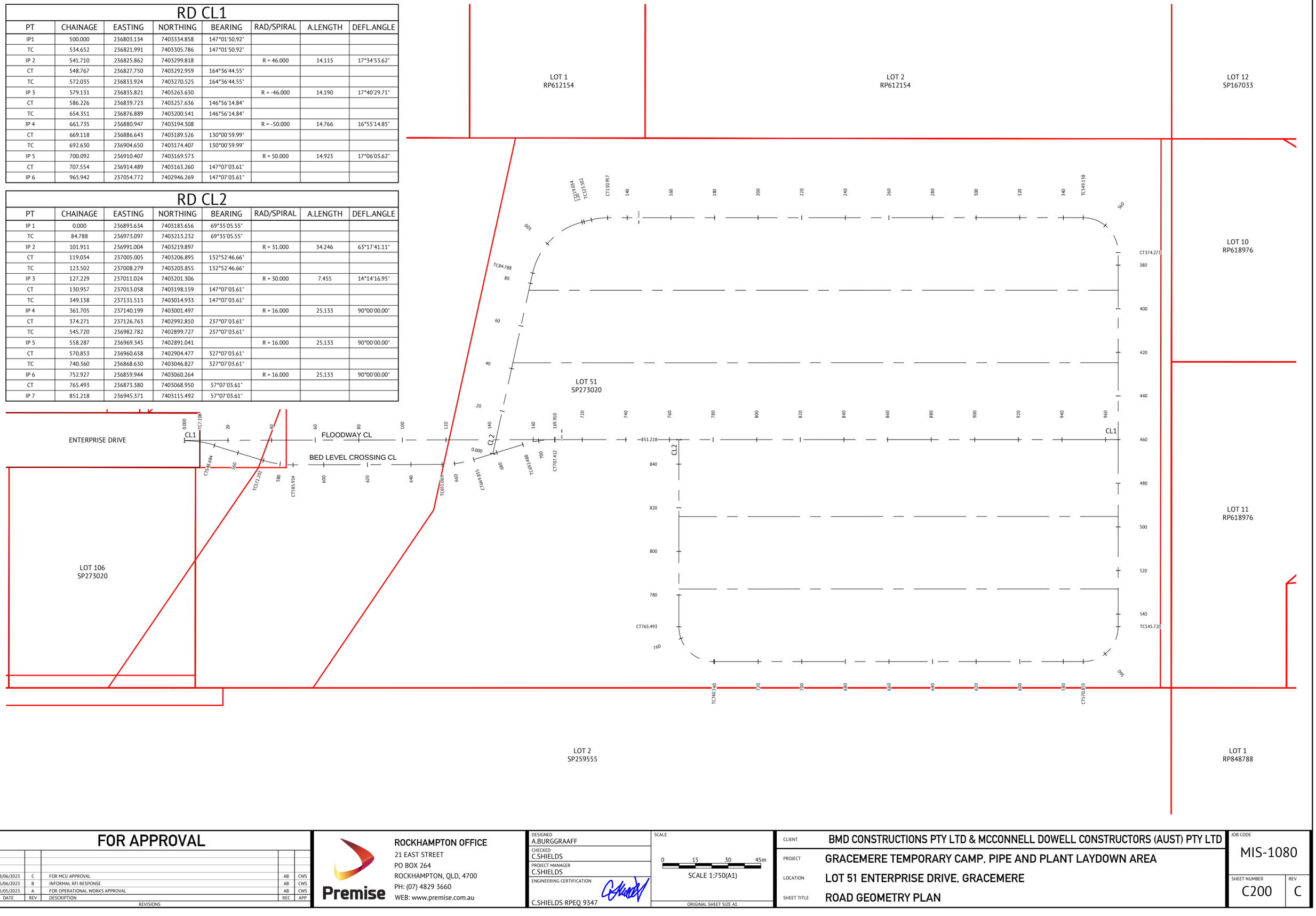
JOB CODE: MIS-1080
SHEET NUMBER: C101
REV: C

RD CL1

PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP1	500.000	236803.134	7403334.858	147°01'50.92"			
TC	534.652	236821.991	7403305.786	147°01'50.92"			
IP 2	541.710	236825.862	7403299.818		R = 46.000	14.115	17°34'53.62"
CT	548.767	236827.750	7403292.959	164°36'44.55"			
TC	572.035	236833.924	7403270.525	164°36'44.55"			
IP 3	579.131	236835.821	7403263.630		R = -46.000	14.190	17°40'29.71"
CT	586.226	236839.723	7403257.636	146°56'14.84"			
TC	654.351	236876.889	7403200.541	146°56'14.84"			
IP 4	661.735	236880.947	7403194.308		R = -50.000	14.766	16°55'14.85"
CT	669.118	236886.643	7403189.526	130°00'59.99"			
TC	692.630	236904.650	7403174.407	130°00'59.99"			
IP 5	700.092	236910.407	7403169.573		R = 50.000	14.923	17°06'03.62"
CT	707.554	236914.489	7403163.260	147°07'03.61"			
IP 6	965.942	237054.772	7402946.269	147°07'03.61"			

RD CL2

PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	236893.634	7403183.656	69°35'05.55"			
TC	84.788	236973.097	7403213.232	69°35'05.55"			
IP 2	101.911	236991.004	7403219.897		R = 31.000	34.246	63°17'41.11"
CT	119.034	237005.005	7403206.895	132°52'46.66"			
TC	123.502	237008.279	7403203.855	132°52'46.66"			
IP 3	127.229	237011.024	7403201.306		R = 30.000	7.455	14°14'16.95"
CT	130.957	237013.058	7403198.159	147°07'03.61"			
TC	349.138	237131.513	7403014.933	147°07'03.61"			
IP 4	361.705	237140.199	7403001.497		R = 16.000	25.133	90°00'00.00"
CT	374.271	237126.763	7402992.810	237°07'03.61"			
TC	545.720	236982.782	7402899.727	237°07'03.61"			
IP 5	558.287	236969.345	7402891.041		R = 16.000	25.133	90°00'00.00"
CT	570.853	236960.658	7402904.477	327°07'03.61"			
TC	740.360	236868.630	7403046.827	327°07'03.61"			
IP 6	752.927	236859.944	7403060.264		R = 16.000	25.133	90°00'00.00"
CT	765.493	236873.380	7403068.950	57°07'03.61"			
IP 7	851.218	236945.371	7403115.492	57°07'03.61"			



FOR APPROVAL				
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS
DATE	REV	DESCRIPTION	REC	APP
REVISIONS				

Premise

ROCKHAMPTON OFFICE
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WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE 0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE ROAD GEOMETRY PLAN

JOB CODE MIS-1080
SHEET NUMBER C200
REV C

LEGEND

- PROPERTY BOUNDARY
- EXISTING SEWER
- EXISTING TELECOMMUNICATIONS/ELECTRICAL
- EXISTING WATER
- PROPOSED 150Ø SEWER
- PROPOSED TELECOMMUNICATIONS/ELECTRICAL
- PROPOSED 100Ø WATER
- CHANNEL FLOW DIRECTION
- R.R.C PLANNING AREA 1 AND 2 FLOOD EXTENTS

ALL CONNECTIONS TO LIVE SERVICES IN ENTERPRISE DRV SHALL BE AT THE DEVELOPER'S EXPENSE AND WITH APPROVAL FROM THE RELEVANT AUTHORITY

LOT 1 RP613519

LOT 1 RP612154

LOT 2 RP612154

LOT 12 SP167033

LOT 10 RP618976

LOT 11 RP618976

LOT 1 RP848788

LOT 50 SP270249

LOT 51 SP273020

LOT 106 SP273020

LOT 2 SP259555

DRAIN NORTH

DRAIN WEST

DRAIN NORTH WEST

EXISTING CUT-OFF DRAIN

CONTAINERS

DOMES / WORKSHOP

PLANT LAYDOWN

WASH BAY

FUEL

CONTAINERS

FLOODWAY CROSSING FOR FULL PROPOSED DEVELOPMENT GENERALLY IN ACCORDANCE WITH STANDARD DWG. CMDG-R-095. REFER TO DWG. C004 FOR DETAILS

CONNECT SEWER TO EXISTING MH

CONNECT ELECTRICAL AND TELECOMMUNICATIONS TO EXISTING PITS

CONNECT WATER MAIN TO EXISTING MAIN WITH REDUCER

ENTERPRISE DRIVE

BED LEVEL CROSSING FOR PIPE LAYDOWN ONLY. REFER TO DWGS. C004,C200 AND C203 FOR DETAILS

BASIN 2

BASIN 1

LINEN

LOCKER ROOM

RECREATION ROOM

CELLER STORAGE

GENERATOR COMPOUND

ABLUTIONS

GYM

MEDICAL

ACCOMMODATION OFFICE

KITCHEN

LAUNDRY

LAUNDRY

LAUNDRY

LAUNDRY

LAUNDRY

CAMP

MAIN CARPARK (66 BAYS)

APPROX. EXTENT OF PLANNING AREA 1 AND 2 AS MAPPED BY R.R.C

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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ROCKHAMPTON, QLD, 4700
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF

CHECKED C.SHIELDS

PROJECT MANAGER C.SHIELDS

ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE 0 15 30 45m

SCALE 1:750(A1)

ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD

PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA

LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE

SHEET TITLE: GENERAL ARRANGEMENT PLAN

JOB CODE: MIS-1080

SHEET NUMBER: C201

REV: C

LOT 1
RP613519

LOT 1
RP612154

LOT 2
RP612154

LOT 12
SP167033

LOT 50
SP270249

CONTAINERS

DOMES / WORKSHOP

CONTAINERS

CONTAINERS

PLANT LAYDOWN

WASH BAY

FUEL

LOT 10
RP618976

FLOODWAY CROSSING FOR FULL PROPOSED DEVELOPMENT GENERALLY IN ACCORDANCE WITH STANDARD DWG. CMDG-R-095. REFER TO DWG. C004 FOR DETAILS

BASIN 2

LOT 51
SP273020

To

ENTERPRISE DRIVE

BED LEVEL CROSSING FOR PIPE LAYDOWN ONLY. REFER TO DWGS. C004,C200 AND C203 FOR DETAILS

LINEN

LOCKER ROOM

ACCOMMODATION OFFICE

RECREATION ROOM

GYM

KITCHEN

ABLUTIONS

LAUNDRY

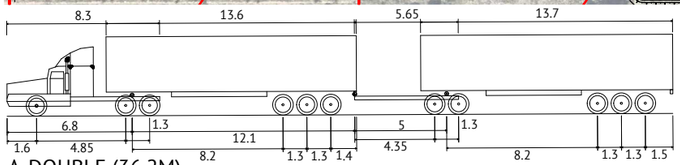
LOT 11
RP618976

LOT 106
SP273020

MAIN CARPARK
(66 BAYS)

CAMP

BASIN 1



A-DOUBLE (36.2M)

Overall Length	36.200m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	15.000m

LOT 2
SP259555

LOT 1
RP848788

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FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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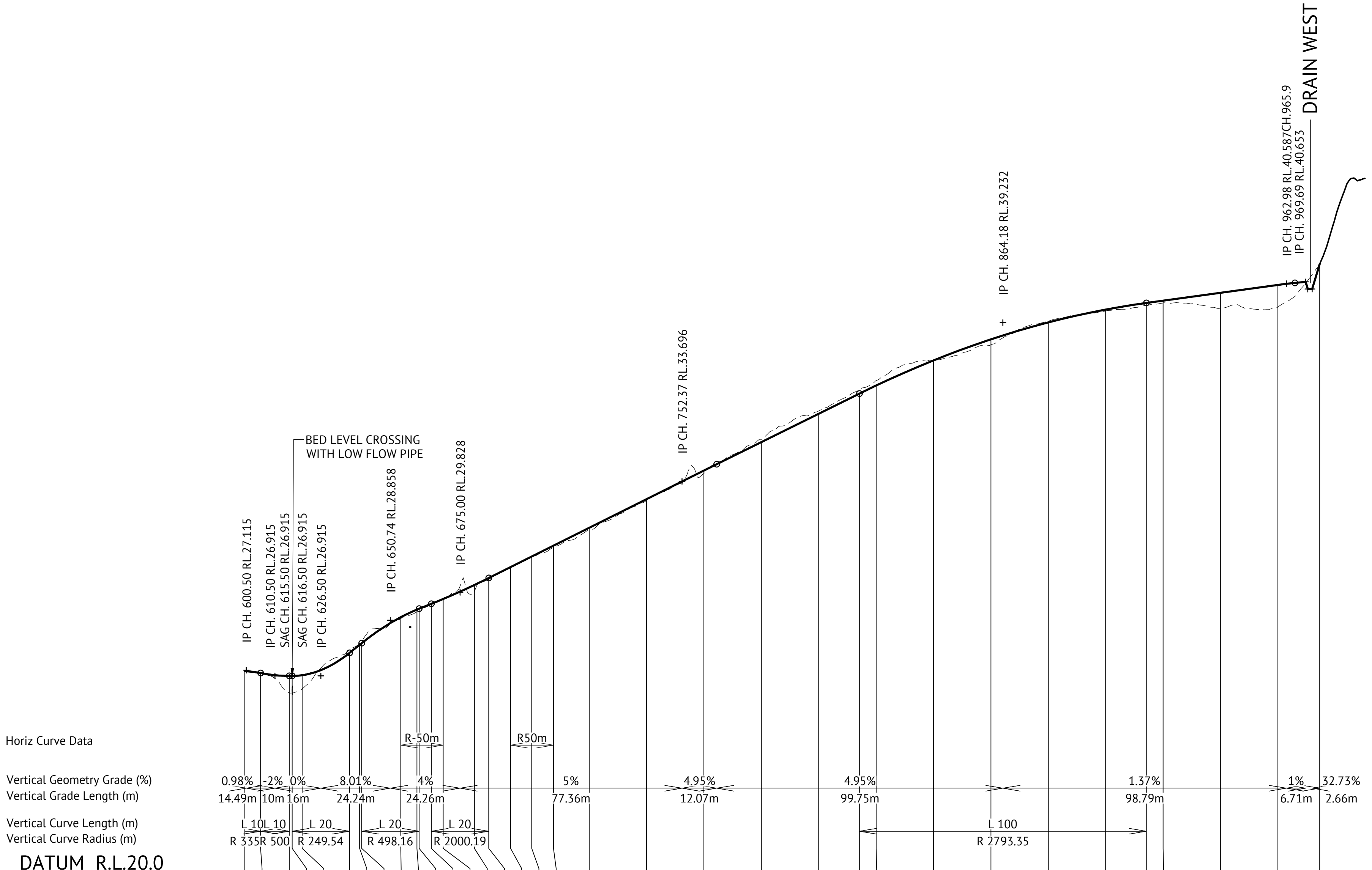
DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE VEHICLE SWEPT PATH PLAN

JOB CODE MIS-1080
SHEET NUMBER C202
REV C



DATUM R.L.20.0

CUT (-)/FILL DEPTH	-0.009	0.018	0.592	0.598	0.476	-0.104	-0.052	-0.075	0.048	0.071	0.022
DESIGN SURFACE	27.080	27.015	26.915	26.915	26.940	27.716	27.997	28.056	28.961	29.228	29.258
NATURAL SURFACE	27.089	26.997	26.323	26.317	26.463	27.821	28.049	28.131	28.913	29.157	29.235
CHAINAGE	600.00	605.50	615.50	616.50	620.00	636.50	640.00	640.74	654.35	660.00	660.74

CUT (-)/FILL DEPTH	0.031	-0.029	0.231	0.046	0.002	-0.012	0.064	0.070	0.049	0.098	-0.100	-0.098
DESIGN SURFACE	29.428	29.597	30.084	30.328	30.710	31.078	31.456	32.078	33.078	34.074	35.065	36.055
NATURAL SURFACE	29.397	29.626	29.854	30.282	30.707	31.090	31.392	32.008	33.029	33.976	35.165	36.152
CHAINAGE	665.00	669.12	680.00	685.00	692.63	700.00	707.55	720.00	740.00	760.00	780.00	800.00

CUT (-)/FILL DEPTH	-0.135	-0.169	-0.026	0.189	-0.057	0.045	0.074	0.079	0.554	0.767		
DESIGN SURFACE	36.757	37.039	37.916	38.649	39.240	39.687	39.918	39.997	40.272	40.546		
NATURAL SURFACE	36.892	37.208	37.942	38.461	39.297	39.642	39.843	39.918	39.718	39.779	42.894	44.258
CHAINAGE	814.18	820.00	840.00	860.00	880.00	900.00	914.18	920.00	940.00	960.00	980.00	990.38

RD CL1 LONGITUDINAL SECTION

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
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05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

Premise
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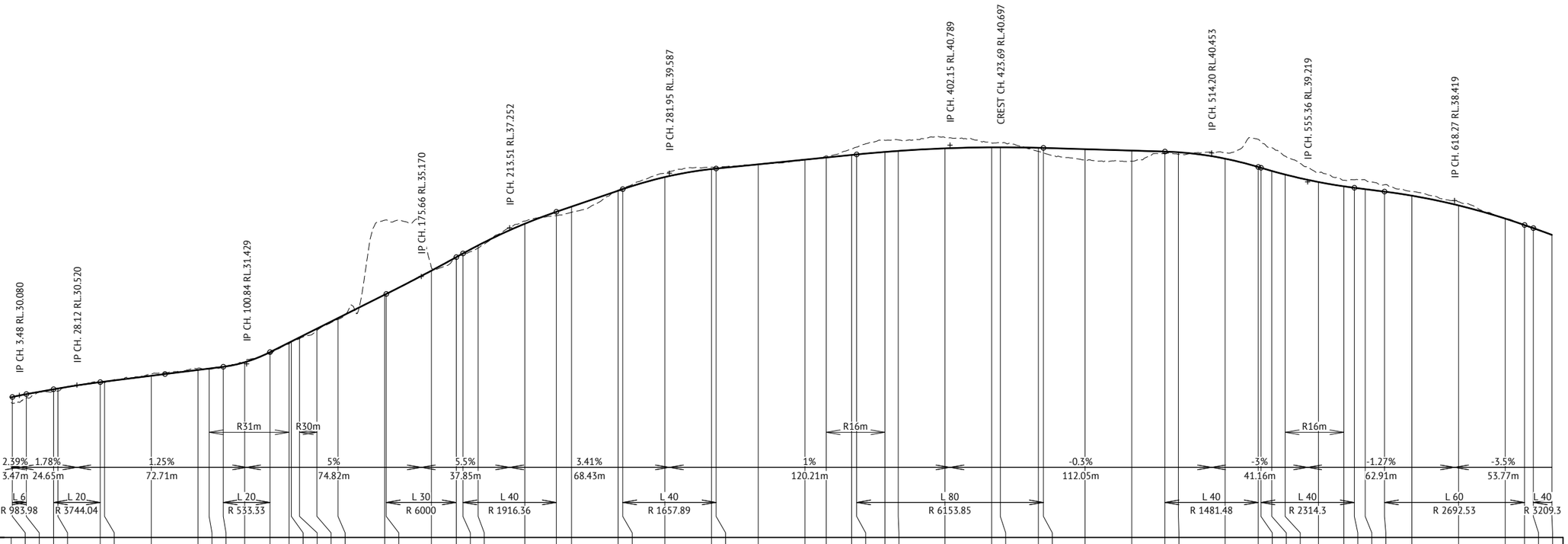
DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE
SCALE 1:1000 (A1) 0 20 40 60m
0 2 4 6m SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE CL1 LONGITUDINAL SECTION

JOB CODE MIS-1080
SHEET NUMBER C203
REV C



Horiz Curve Data

Vertical Geometry Grade (%)

Vertical Grade Length (m)

Vertical Curve Length (m)

Vertical Curve Radius (m)

DATUM R.L.24.0

CHAINAGE	DESIGN SURFACE	NATURAL SURFACE	CUT (-)/FILL DEPTH
0.00	30.008	29.773	0.267
0.48	29.958	29.742	0.175
6.48	30.243	30.134	0.098
18.12	30.265	30.342	0.110
20.00	30.626	30.375	0.019
38.12	30.630	30.645	0.039
40.00	30.999	30.668	-0.080
60.00	31.239	30.918	-0.071
80.00	31.209	31.168	0.019
84.79	31.300	31.228	0.004
90.84	31.512	31.304	-0.015
100.00	31.875	31.497	0.054
110.84	32.289	31.929	0.050
119.03	32.362	32.339	0.025
120.00	32.508	32.387	0.054
123.50	32.866	32.562	0.069
130.96	33.338	32.935	0.049
140.00	37.579	33.387	-3.192
160.00	37.586	34.387	-3.166
160.66	35.555	34.420	-0.137
180.00	36.007	35.418	-0.012
190.66	36.130	35.995	0.022
193.51	36.385	36.152	0.113
200.00	37.540	36.498	-0.114
220.00	37.769	37.426	0.165
233.51	37.914	37.935	0.242
240.00	38.867	38.156	-0.028
260.00	38.949	38.838	-0.044
261.95	39.591	38.905	-0.168
280.00	39.848	39.423	-0.081
300.00	39.827	39.767	-0.039
301.95	39.957	39.787	0.011
320.00	40.172	39.968	-0.004
340.00	40.334	40.168	-0.075
349.14	40.632	40.259	-0.264
360.00	40.707	40.368	-0.318
362.15	40.998	40.389	-0.499
374.27	41.015	40.499	-0.473
380.00	41.114	40.542	-0.463
400.00	40.884	40.652	-0.188
420.00	40.897	40.696	-0.200
423.69	40.524	40.697	0.152
440.00	40.454	40.676	0.216
442.15	40.146	40.669	0.470
460.00	40.100	40.616	0.456
480.00	40.451	40.556	0.062
494.20	40.394	40.513	0.090
500.00	40.476	40.485	-0.265
520.00	41.038	40.211	-1.185
534.20	40.909	39.853	-1.091
535.36	40.685	39.819	-1.001
540.00	40.317	39.684	-0.786
545.72	39.610	39.531	-0.399
560.00	39.285	39.211	-0.259
570.85	39.308	39.026	-0.344
575.36	39.302	38.964	-0.396
580.00	39.095	38.905	-0.294
588.27	38.800	38.800	-0.174
600.00	38.364	38.625	-0.154
620.00	37.664	38.210	-0.018
640.00	37.349	37.645	0.020
648.27	37.259	37.369	-0.022
652.04	36.926	37.237	0.022
660.00		36.948	

RD CL2 LONGITUDINAL SECTION

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

Premise
ROCKHAMPTON OFFICE
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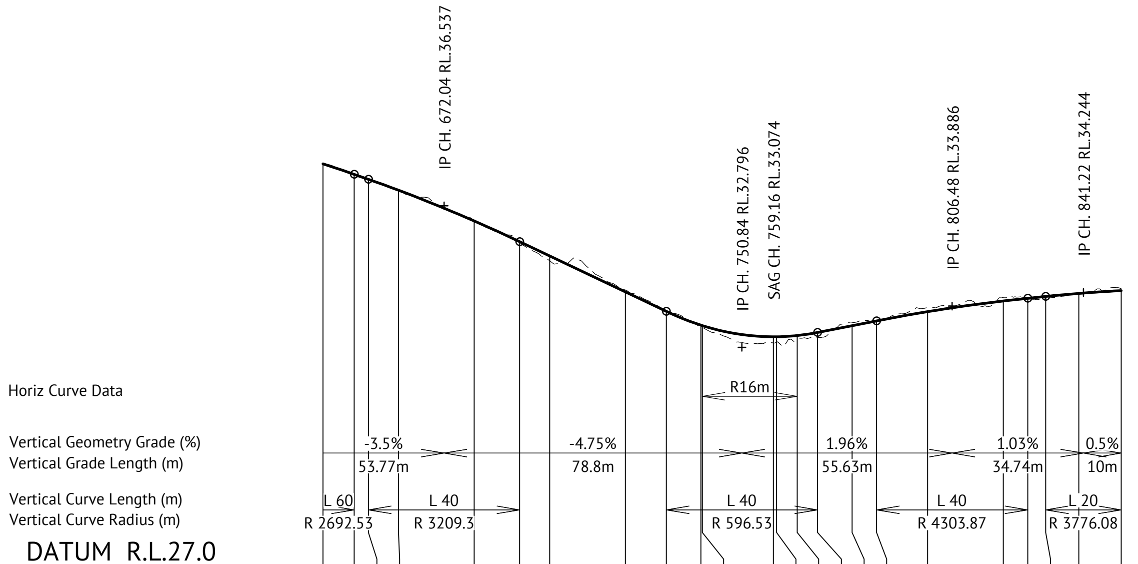
ROCKHAMPTON, QLD, 4700
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
0 0.4 0.8 1.2m
SCALE 1:20 (A1)
0 20 40 60m
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE CL2 LONGITUDINAL SECTION - SHEET 1 OF 2

JOB CODE MIS-1080
SHEET NUMBER C204
REV C



CUT (-)/FILL DEPTH	-0.018	0.020	-0.022	0.022	-0.008	0.004	0.129	-0.051	-0.022	0.052	0.052	0.167	0.148	0.096	0.135	-0.090	-0.005	-0.102	-0.090	-0.008	0.061	0.010	-0.052
DESIGN SURFACE	37.645	37.369	37.237	36.948	36.136	35.587	35.210	34.260	33.746	33.381	33.370	33.074	33.074	33.107	33.188	33.368	33.494	33.738	34.021	34.092	34.141	34.221	34.294
NATURAL SURFACE	37.664	37.349	37.259	36.926	36.145	35.584	35.081	34.311	33.768	33.330	33.318	32.907	32.926	33.011	33.053	33.458	33.499	33.840	34.111	34.100	34.080	34.211	34.346
CHAINAGE	640.00	648.27	652.04	660.00	680.00	692.04	700.00	720.00	730.84	740.00	740.36	759.16	760.00	765.49	770.84	780.00	786.48	800.00	820.00	826.48	831.22	840.00	851.22

RD CL2 LONGITUDINAL SECTION

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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ROCKHAMPTON, QLD, 4700
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WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
0 0.4 0.8 1.2m
SCALE 1:20 (A1)
0 20 40 60m
SCALE 1:1000 (A1)
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: CL2 LONGITUDINAL SECTION - SHEET 2 OF 2

JOB CODE: MIS-1080
SHEET NUMBER: C205
REV: C

DRAIN WEST

PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	236788.564	7403158.446	147°09'08.15"			
TC	1.921	236789.606	7403156.832	147°09'08.15"			
IP 2	3.620	236790.537	7403155.390		R = 10.000	3.400	19°28'45.31"
CT	5.320	236790.934	7403153.720	166°37'53.46"			
TC	8.869	236791.754	7403150.268	166°37'53.46"			
IP 3	12.274	236792.549	7403146.922		R = -20.000	6.810	19°30'37.78"
CT	15.679	236794.416	7403144.035	147°07'15.68"			
TC	312.352	236955.469	7402894.884	147°07'15.68"			
IP 4	324.918	236964.155	7402881.446		R = -16.000	25.133	90°00'01.00"
CT	337.484	236977.592	7402890.132	57°07'14.69"			
IP 5	532.643	237141.490	7402996.078	57°07'14.69"			

DRAIN NORTH

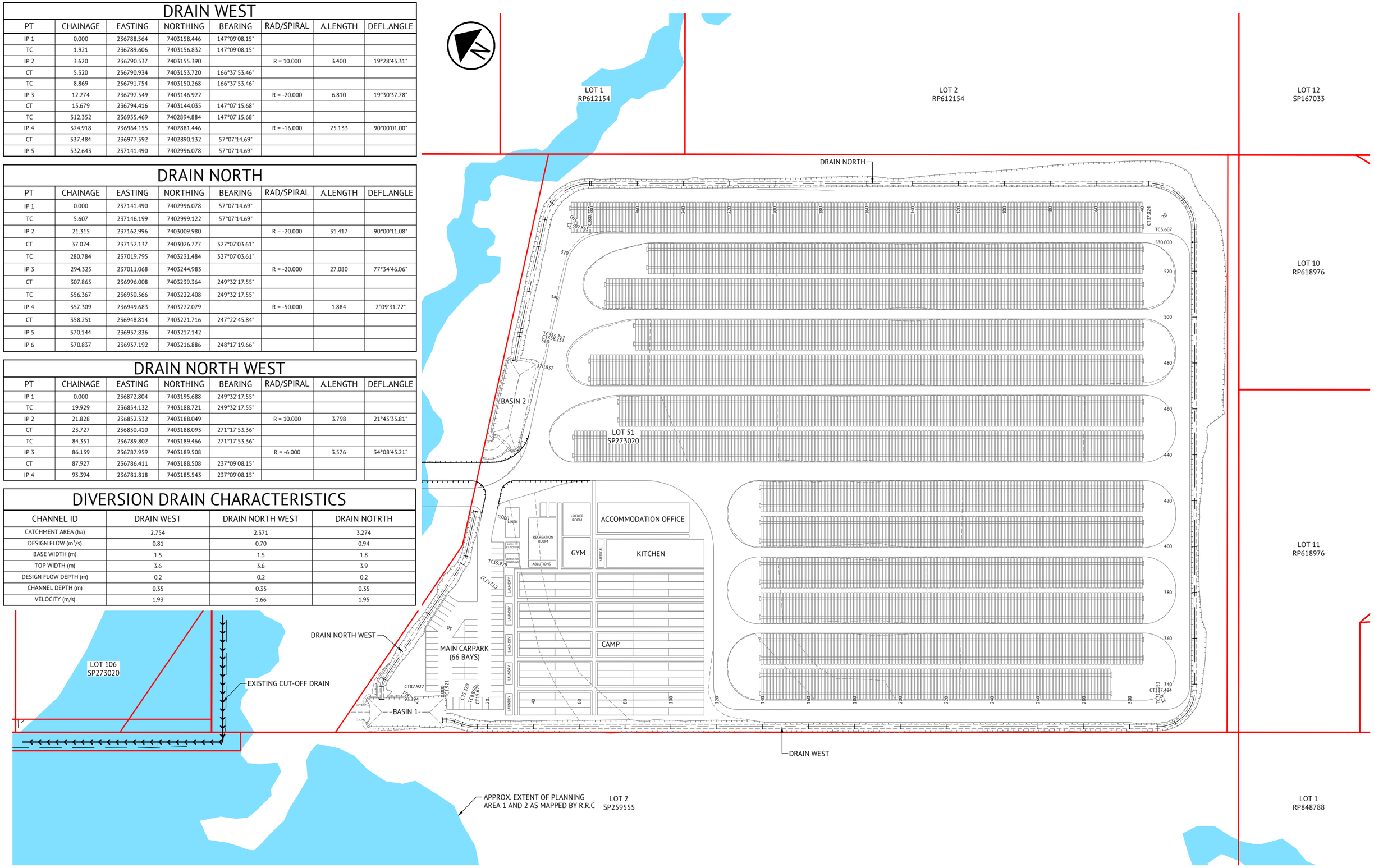
PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	237141.490	7402996.078	57°07'14.69"			
TC	5.607	237146.199	7402999.122	57°07'14.69"			
IP 2	21.315	237162.996	7403009.980		R = -20.000	31.417	90°00'11.08"
CT	37.024	237152.137	7403026.777	327°07'03.61"			
TC	280.784	237019.795	7403231.484	327°07'03.61"			
IP 3	294.325	237011.068	7403244.983		R = -20.000	27.080	77°34'46.06"
CT	307.865	236996.008	7403239.364	249°32'17.55"			
TC	356.367	236950.566	7403222.408	249°32'17.55"			
IP 4	357.309	236949.683	7403222.079		R = -50.000	1.884	2°09'31.72"
CT	358.251	236948.814	7403221.716	247°22'45.84"			
IP 5	370.144	236937.836	7403217.142				
IP 6	370.837	236937.192	7403216.886	248°17'19.66"			

DRAIN NORTH WEST

PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	236872.804	7403195.688	249°32'17.55"			
TC	19.929	236854.132	7403188.721	249°32'17.55"			
IP 2	21.828	236852.332	7403188.049		R = 10.000	3.798	21°45'35.81"
CT	23.727	236850.410	7403188.093	271°17'53.36"			
TC	84.351	236789.802	7403189.466	271°17'53.36"			
IP 3	86.139	236787.959	7403189.508		R = -6.000	3.576	34°08'45.21"
CT	87.927	236786.411	7403188.508	237°09'08.15"			
IP 4	93.394	236781.818	7403185.543	237°09'08.15"			

DIVERSION DRAIN CHARACTERISTICS

CHANNEL ID	DRAIN WEST	DRAIN NORTH WEST	DRAIN NOTRTH
CATCHMENT AREA (ha)	2.754	2.371	3.274
DESIGN FLOW (m^3/s)	0.81	0.70	0.94
BASE WIDTH (m)	1.5	1.5	1.8
TOP WIDTH (m)	3.6	3.6	3.9
DESIGN FLOW DEPTH (m)	0.2	0.2	0.2
CHANNEL DEPTH (m)	0.35	0.35	0.35
VELOCITY (m/s)	1.93	1.66	1.95



FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

Premise

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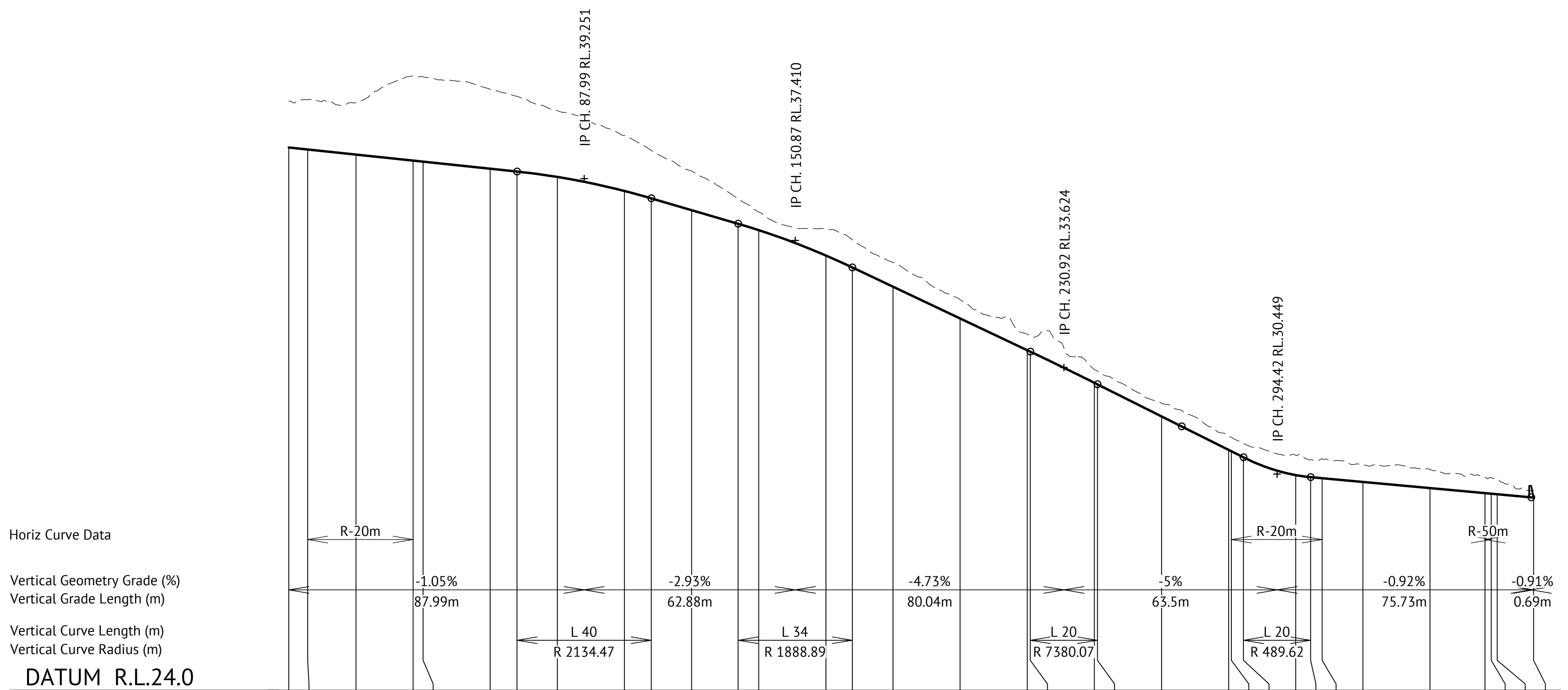
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE
0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE DIVERSION DRAIN SETOUT PLAN

JOB CODE MIS-1080
SHEET NUMBER C300
REV C



DATUM R.L.24.0

CUT (-)/FILL DEPTH	-1.377	-1.484	-1.549	-2.520	-2.530	-2.369	-2.241	-1.973	-1.648	-1.427	-1.164	-0.747
DESIGN SURFACE	40.180	40.121	39.969	39.789	39.758	39.547	39.462	39.302	38.885	38.666	38.314	37.907
NATURAL SURFACE	41.556	41.605	41.517	42.309	42.287	41.916	41.703	41.275	40.533	40.093	39.478	38.654
CHAINAGE	0.00	5.61	20.00	37.02	40.00	60.00	67.99	80.00	100.00	107.99	120.00	133.87

CUT (-)/FILL DEPTH	-0.543	-0.780	-0.826	-0.724	-0.560	-0.475	-0.465	-0.397	-0.394	-0.391	-0.415	-0.411
DESIGN SURFACE	37.718	36.962	36.606	36.032	35.086	34.141	34.097	33.170	33.124	32.170	31.170	31.131
NATURAL SURFACE	38.261	37.742	37.432	36.756	35.647	34.616	34.562	33.567	33.519	32.561	31.585	31.542
CHAINAGE	140.00	160.00	167.87	180.00	200.00	220.00	220.92	240.00	240.92	260.00	280.00	280.78

CUT (-)/FILL DEPTH	-0.417	-0.591	-0.516	-0.576	-0.504	-0.552	-0.484	-0.477	-0.456	-0.210
DESIGN SURFACE	30.949	30.418	30.358	30.326	30.215	30.032	29.882	29.865	29.849	29.750
NATURAL SURFACE	31.367	31.009	30.874	30.903	30.719	30.584	30.367	30.343	30.305	29.960
CHAINAGE	284.42	300.00	304.42	307.86	320.00	340.00	356.37	358.25	360.00	370.84

DRAIN NORTH LONGITUDINAL SECTION

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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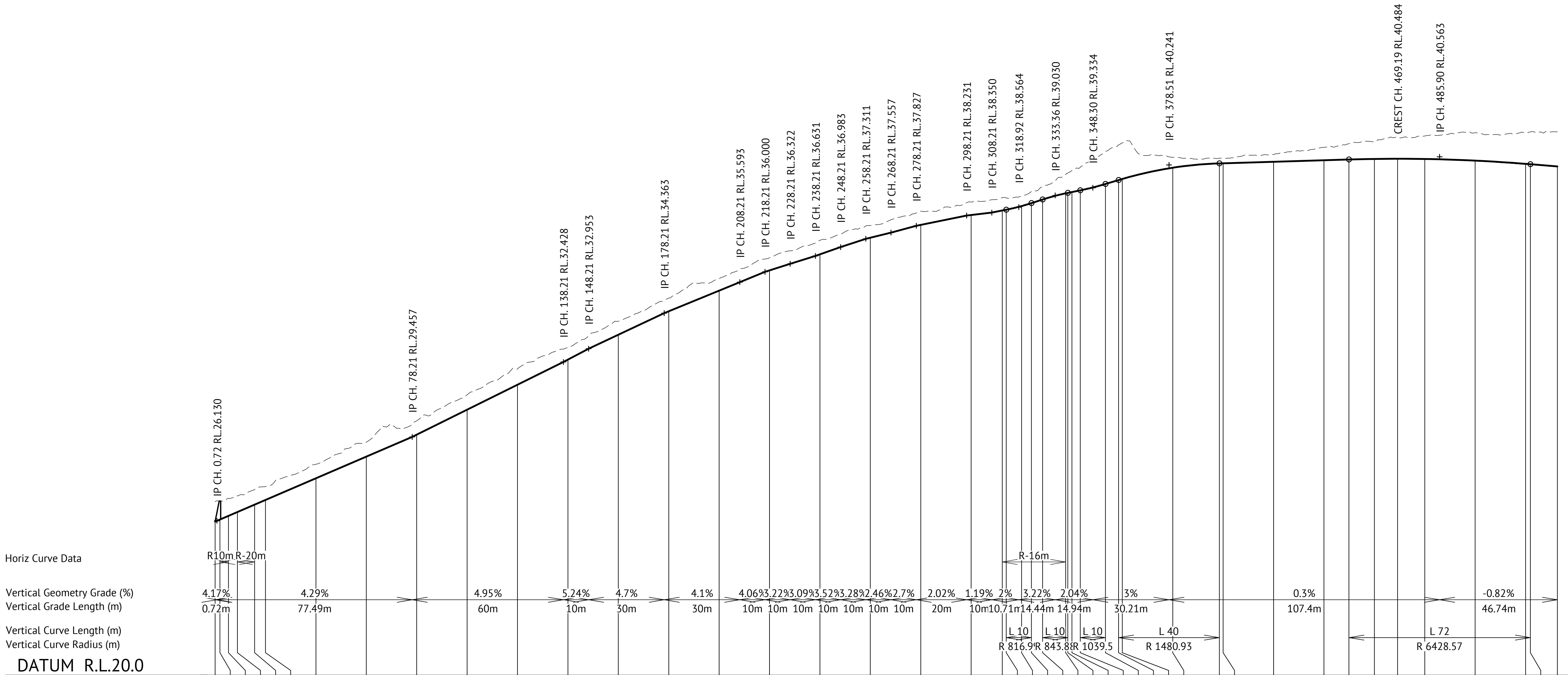
ROCKHAMPTON, QLD, 4700
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE
HORIZONTAL 1:1000 (A1) 0 20 40 60m
VERTICAL 1:100 (A1) 0 2 4 6m
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE DIVERSION DRAIN NORTH LONGITUDINAL SECTION

JOB CODE MIS-1080
SHEET NUMBER C301
REV C



CUT (-)/FILL DEPTH	-0.791	-0.733	-0.692	-0.636	-0.595	-0.529	-0.556	-0.573	-0.551	-0.590	-0.627	-0.472	-0.534	-0.527	-0.482
DESIGN SURFACE	26.100	26.182	26.328	26.480	26.772	26.958	27.816	28.675	29.545	30.536	31.526	32.522	33.507	34.437	35.257
NATURAL SURFACE	26.891	26.915	27.020	27.116	27.367	27.487	28.372	29.248	30.096	31.126	32.153	32.994	34.041	34.964	35.739
CHAINAGE	0.00	1.92	5.32	8.87	15.68	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00

CUT (-)/FILL DEPTH	-0.503	-0.557	-0.484	-0.542	-0.518	-0.512	-0.470	-0.391	-0.455	-0.497	-0.750	-0.787	-0.854	-0.914	-1.282
DESIGN SURFACE	36.057	36.694	37.355	37.863	38.252	38.433	38.464	38.608	38.725	38.868	39.113	39.132	39.165	39.232	39.484
NATURAL SURFACE	36.560	37.251	37.839	38.405	38.770	38.945	38.934	38.999	39.181	39.365	39.863	39.918	40.019	40.147	40.766
CHAINAGE	220.00	240.00	260.00	280.00	300.00	312.35	313.92	320.00	323.92	328.36	337.48	338.36	340.00	343.30	353.30

CUT (-)/FILL DEPTH	-1.393	-1.428	-0.413	-0.210	-0.186	-0.285	-0.511	-0.627	-0.685	-0.854	-0.912	-1.107	-1.220	-1.282	-1.377
DESIGN SURFACE	39.641	39.685	40.130	40.301	40.305	40.365	40.425	40.455	40.477	40.484	40.475	40.410	40.283	40.268	40.180
NATURAL SURFACE	41.033	41.113	40.543	40.511	40.491	40.650	40.936	41.082	41.162	41.338	41.387	41.517	41.503	41.550	41.556
CHAINAGE	358.51	360.00	380.00	398.51	400.00	420.00	440.00	449.90	460.00	469.19	480.00	500.00	520.00	521.90	532.64

DRAIN WEST LONGITUDINAL SECTION

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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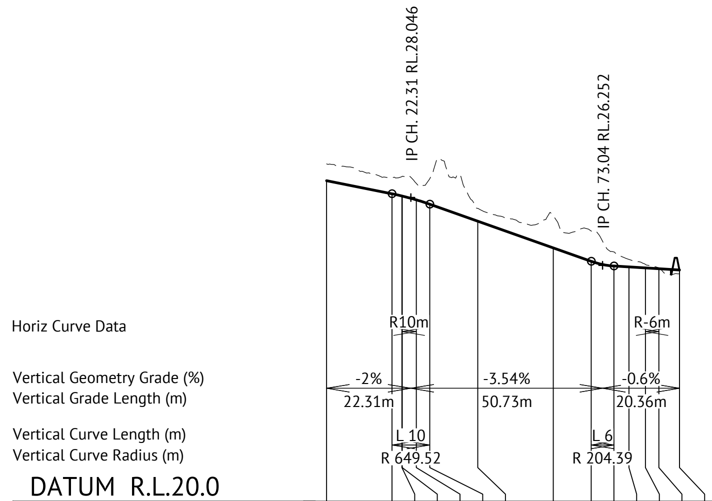
PH: (07) 4829 3660
WEB: www.premise.com.au

DESIGNED A.BURGGRAAFF
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
HORIZONTAL 1:1000 (A1) 0 20 40 60m
VERTICAL 1:100 (A1) 0 2 4 6m
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE DIVERSION DRAIN WEST LONGITUDINAL SECTION

JOB CODE MIS-1080
SHEET NUMBER C302
REV C



DATUM R.L.20.0

CUT (-)/FILL DEPTH	-0.444	-0.433	-0.513	-0.519	-0.436	-0.673	-0.338	-0.862	-0.803	-0.374	-0.201	-0.093	-0.020	0.101
DESIGN SURFACE	28.491	28.145	28.088	28.086	27.985	27.869	27.420	26.713	26.358	26.234	26.210	26.184	26.163	26.130
NATURAL SURFACE	28.935	28.579	28.600	28.605	28.422	28.542	27.758	27.575	27.161	26.608	26.411	26.277	26.183	26.029
CHAINAGE	0.00	17.31	19.93	20.00	23.73	27.31	40.00	60.00	70.04	76.04	80.00	84.35	87.93	93.39

DRAIN NORTH WEST LONGITUDINAL SECTION

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

REVISIONS

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CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION C.SHIELDS RPEQ 9347

SCALE
HORIZONTAL 1:1000 (A1) 0 20 40 60m
VERTICAL 1:100 (A1) 0 2 4 6m
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE DIVERSION DRAIN NORTH WEST LONGITUDINAL SECTION

JOB CODE MIS-1080
SHEET NUMBER C303
REV C

BASIN 1

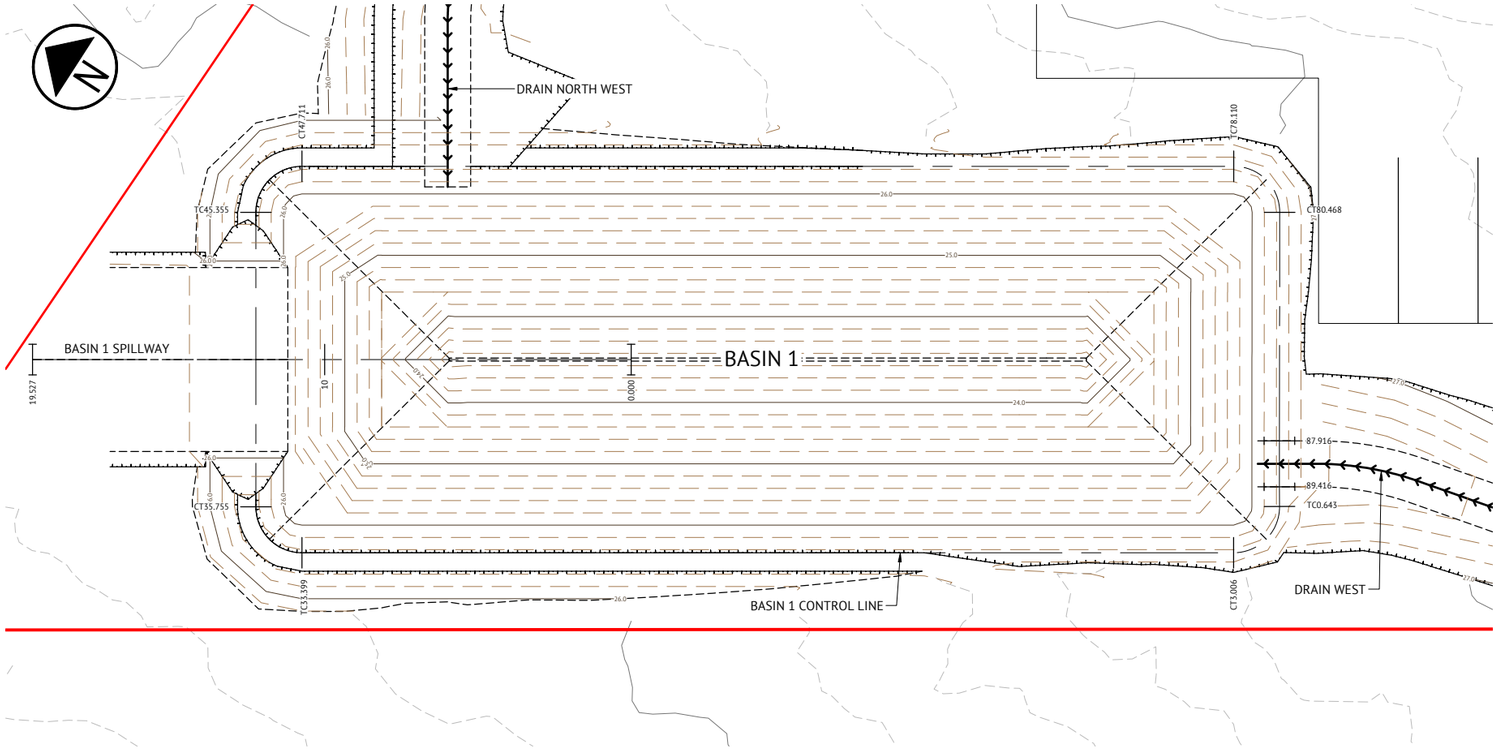
PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	236788.318	7403157.443				
TC	0.643	236787.780	7403157.092	236°53'04.96"			
IP 2	1.825	236786.517	7403156.268		R = 1.500	2.363	90°16'03.20"
CT	3.006	236785.700	7403157.535	327°09'08.15"			
TC	33.399	236769.215	7403183.068	327°09'08.15"			
IP 3	34.577	236768.401	7403184.328		R = 1.500	2.356	90°00'00.00"
CT	35.755	236769.661	7403185.142	57°09'08.15"			
TC	45.355	236777.726	7403190.349	57°09'08.15"			
IP 4	46.533	236778.986	7403191.163		R = 1.500	2.356	90°00'00.00"
CT	47.711	236779.800	7403189.903	147°09'08.15"			
TC	78.110	236796.288	7403164.364	147°09'08.15"			
IP 5	79.289	236797.103	7403163.103		R = 1.500	2.358	90°03'51.37"
CT	80.468	236795.840	7403162.290	237°12'59.53"			
IP 6	87.916	236789.578	7403158.257				

BASIN 1 SPILLWAY

PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING
IP 1	0.000	236780.333	7403177.462	23.300	327°09'10.27"
IP 2	19.527	236769.742	7403193.867	25.750	327°09'10.27"

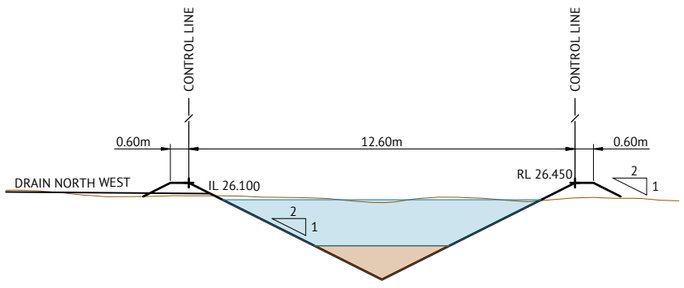
SEDIMENT BASIN CHARACTERISTICS SUMMARY

BASIN PARAMETER	VALUE
VOLUME OF SETTLING ZONE (m^3)	297
SEDIMENT STORAGE (m^3)	149
SEDIMENT STORAGE ZONE DEPTH (m)	1.1
SETTLING ZONE DEPTH (m)	1.5
FREEBOARD (m)	0.3
DEPTH TO SPILLWAY (m)	2.6
SPILLWAY WIDTH (m)	7m (BASE) 10.31m (TOP)



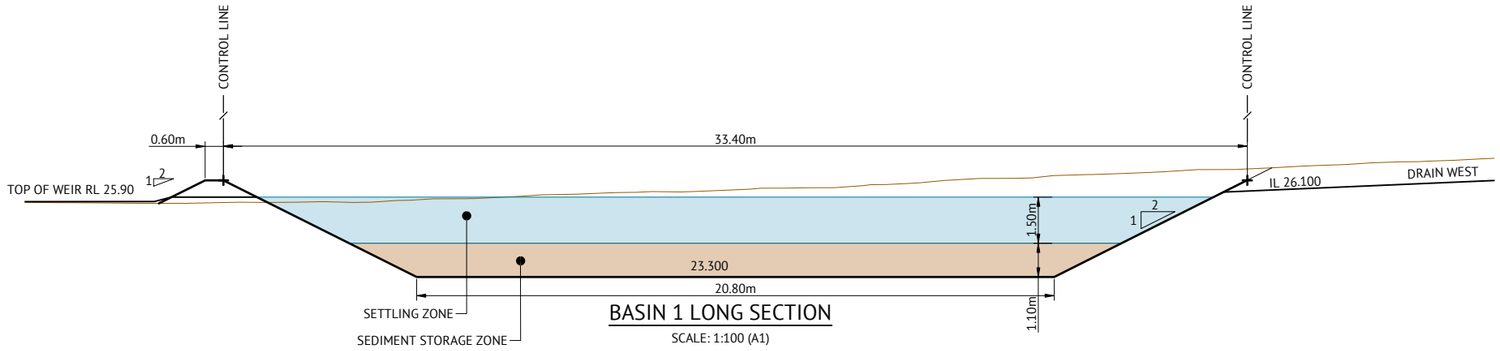
BASIN 1 LAYOUT

SCALE: 1:100 (A1)



BASIN 1 CROSS SECTION

SCALE: 1:100 (A1)



BASIN 1 LONG SECTION

SCALE: 1:100 (A1)

FOR APPROVAL

DATE	REV	DESCRIPTION		
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS
			REC	APP

REVISIONS

Premise

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WEB: www.premise.com.au

DESIGNED: A.BURGGRAAFF
CHECKED: C.SHIELDS
PROJECT MANAGER: C.SHIELDS
ENGINEERING CERTIFICATION: C.SHIELDS RPEQ 9347

SCALE: 0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: SEDIMENT BASIN 1 LAYOUT & SECTIONS

JOB CODE: MIS-1080
SHEET NUMBER: C400
REV: C

BASIN 2

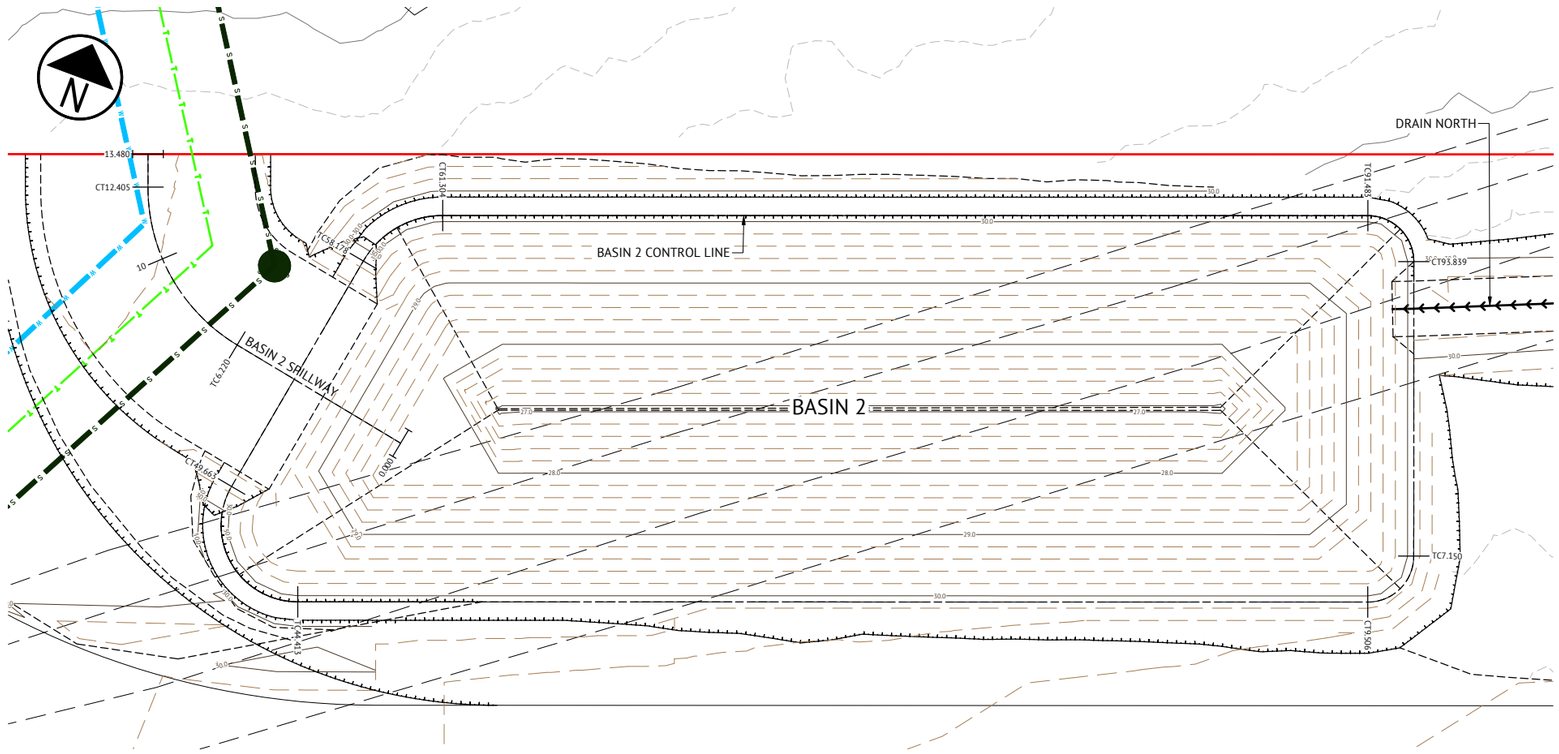
PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	236938.159	7403216.284				
TC	7.150	236940.658	7403209.586	159°32'17.55"			
IP 2	8.328	236941.183	7403208.180		R = 1.500	2.356	90°00'00.00"
CT	9.506	236939.777	7403207.656	249°32'17.55"			
TC	44.413	236907.073	7403195.453	249°32'17.55"			
IP 3	45.726	236905.716	7403194.947		R = 2.500	2.625	60°09'06.37"
CT	47.038	236904.602	7403195.871	309°41'23.92"			
IP 4	48.350	236903.488	7403196.796		R = 2.500	2.625	60°09'06.37"
CT	49.663	236903.736	7403198.222	9°50'30.29"			
TC	58.178	236905.191	7403206.613	9°50'30.29"			
IP 5	59.741	236905.485	7403208.309		R = 3.000	3.126	59°41'47.27"
CT	61.304	236907.098	7403208.911	69°32'17.55"			
TC	91.483	236935.373	7403219.461	69°32'17.55"			
IP 6	92.661	236936.778	7403219.985		R = 1.500	2.356	90°00'00.00"
CT	93.839	236937.302	7403218.580	159°32'17.55"			

BASIN 2 SPILLWAY

PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	236908.408	7403201.474	280°30'58.48"			
TC	6.220	236902.293	7403202.609	280°30'58.48"			
IP 2	9.312	236898.951	7403203.230		R = 6.000	6.186	59°04'09.56"
CT	12.405	236897.765	7403206.416	339°35'08.04"			
IP 3	13.480	236897.390	7403207.423	339°35'08.04"			

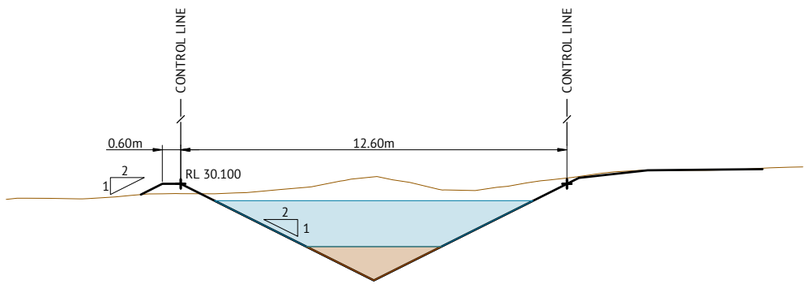
SEDIMENT BASIN CHARACTERISTICS SUMMARY

BASIN PARAMETER	VALUE
VOLUME OF SETTLING ZONE (m^3)	297
SEDIMENT STORAGE (m^3)	149
SEDIMENT STORAGE ZONE DEPTH (m)	1.1
SETTLING ZONE DEPTH (m)	1.5
FREEBOARD (m)	0.3
DEPTH TO SPILLWAY (m)	2.6
SPILLWAY WIDTH (m)	7m (BASE) 10.31m (TOP)



BASIN 2 LAYOUT

SCALE: 1:100 (A1)



BASIN 2 CROSS SECTION

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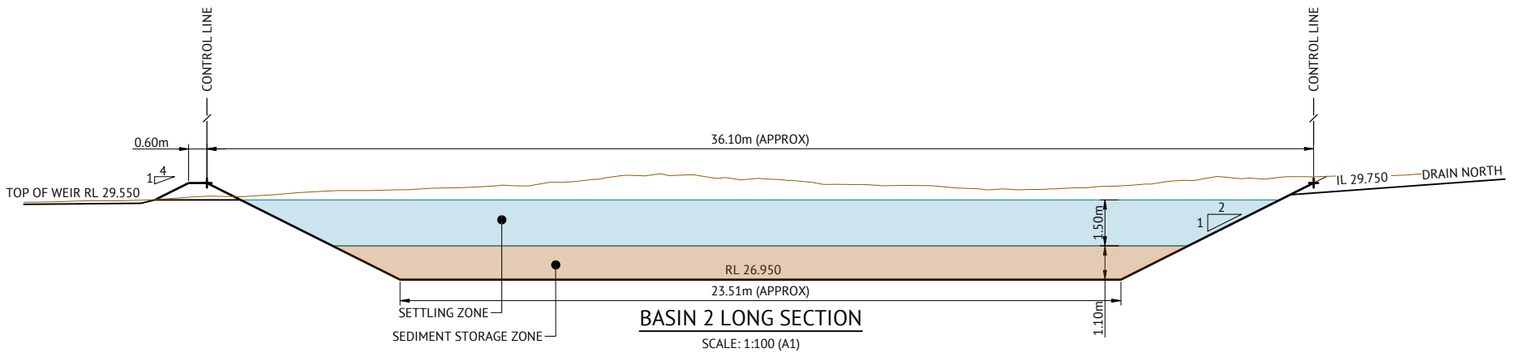

BASIN 2 LONG SECTION

SCALE: 1:100 (A1)

FOR APPROVAL

DATE	REV	DESCRIPTION	REC	APP
08/06/2023	C	FOR MCU APPROVAL	AB	CWS
05/06/2023	B	INFORMAL RFI RESPONSE	AB	CWS
05/05/2023	A	FOR OPERATIONAL WORKS APPROVAL	AB	CWS

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DESIGNED: A.BURGGRAAFF
CHECKED: C.SHIELDS
PROJECT MANAGER: C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

SCALE
0 2 4 6m
SCALE 1:100 (A1)
ORIGINAL SHEET SIZE A1

CLIENT: BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT: GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION: LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE: SEDIMENT BASIN 2 LAYOUT & SECTIONS

JOB CODE: MIS-1080
SHEET NUMBER: C401
REV: C

SOIL EROSION AND SEDIMENT CONTROL LEGEND

- EXTENTS OF SITE
- (SF) SEDIMENT FENCE
- ENTRY/EXIT
- DUMPED ROCK/CHECK DAM

LOT 1 RP613519
LOT 1 RP612154
LOT 2 RP612154
LOT 12 SP167033
LOT 10 RP618976
LOT 11 RP618976
LOT 1 RP848788
LOT 2 SP259555
LOT 50 SP270249
LOT 51 SP273020
LOT 106 SP273020

CONTAINERS
CONTAINERS
CONTAINERS
DOMES / WORKSHOP
PLANT LAYDOWN
CONTAINERS
WASH BAY
FUEL

DRAIN NORTH
BASIN 2
FLOODWAY CROSSING FOR FULL PROPOSED DEVELOPMENT GENERALLY IN ACCORDANCE WITH STANDARD DWG. CMDG-R-095. REFER TO DWG. C004 FOR DETAILS
ENTERPRISE DRIVE
BED LEVEL CROSSING FOR PIPE LAYDOWN ONLY. REFER TO DWGS. C004,C200 AND C203 FOR DETAILS

LINEN
LOCKER ROOM
RECREATION ROOM
ACCOMMODATION OFFICE
GYM
KITCHEN
LAUNDRY
LAUNDRY
LAUNDRY
LAUNDRY
LAUNDRY
CAMP

DRAIN NORTH WEST
EXISTING CUT-OFF DRAIN
MAIN CARPARK (66 BAYS)
BASIN 1
DRAIN WEST

DIAL BEFORE YOU DIG www.1100.com.au

FOR APPROVAL

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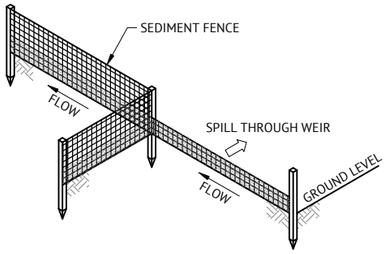
CHECKED C.SHIELDS
PROJECT MANAGER C.SHIELDS
ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347

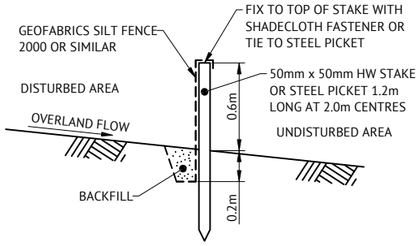
SCALE
0 15 30 45m
SCALE 1:750(A1)
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE SOIL EROSION & SEDIMENT CONTROL PLAN

JOB CODE MIS-1080
SHEET NUMBER C500
REV C



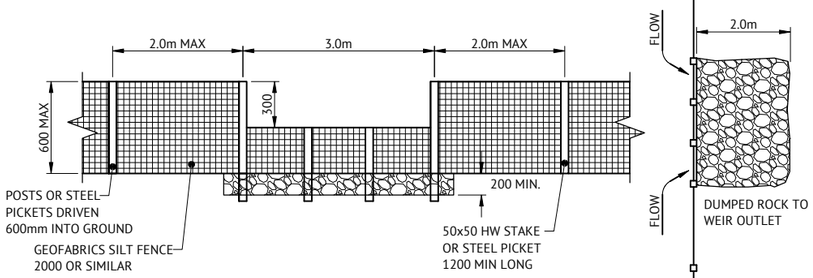
SEDIMENT FENCE RETURN



TYPICAL SECTION

SEDIMENT FENCE DETAIL

NTS

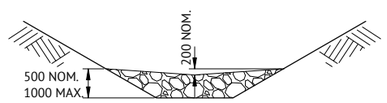


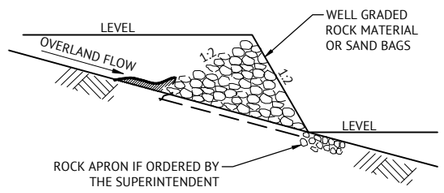
TYPICAL ELEVATION

PLAN

SPILL THROUGH WEIR

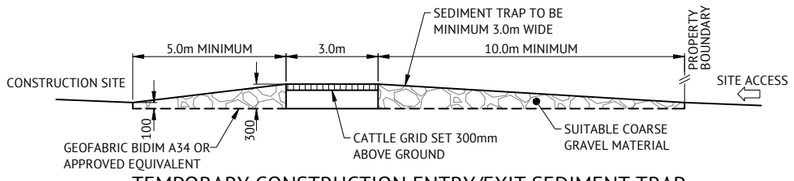
NTS





ROCK CHECK DAM

NTS



TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP

LOCATION TO BE DETERMINED ON SITE
ALTERNATE: 75mm ROCK RUMBLE PAD 20x3m
NTS

SEQUENCE OF ACTIONS TO BE UNDERTAKEN BY CONTRACTOR

1. NOTIFICATION	- THE SUPERINTENDENT IS TO BE GIVEN NOTIFICATION FOR EACH OF THE FOLLOWING POINTS: - AFTER THE AREA TO BE CLEARED HAS BEEN NOMINATED ON SITE. - ONCE THE LOCATION OF THE DIVERSION DRAINS HAVE BEEN DETERMINED ON SITE. - AFTER THE EROSION CONTROL OUTLET STRUCTURES HAVE BEEN INSTALLED.
2. SITE POSSESSION	- ERECTION OF BARRIER FENCING TO BUFFER AREAS AND DRAINAGE RESERVES AS DIRECTED BY SUPERINTENDENT. - INSTALLATION OF CONSTRUCTION EXIT. - CONSTRUCT TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SUCH AS SILT FENCING AND DIVERSION BANKS. - CONSTRUCT SEDIMENT BASIN TO DIMENSIONS NOMINATED BY SUPERINTENDENT, IF REQUIRED, INSTALL DIVERSION BANKS TO DIRECT WATER FROM DISTURBED AREAS TO BE BASIN.
3. CONSTRUCTION	- TOPSOIL TO BE STRIPPED AND STOCKPILED IN LOCATIONS AGREED WITH THE SUPERINTENDENT. A SEDIMENT FENCE IS TO BE CONSTRUCTED ON THE DOWNHILL SIDE OF THE STOCKPILE TO TRAP SEDIMENT. A DIVERSION DRAIN IS TO BE INSTALLED UPSTREAM OF THE STOCKPILE. - AT ALL TIMES THE CONTRACTOR SHALL ENSURE THAT DUST RESULTING FROM THE PROPOSED WORKS, INCLUDING EXCAVATION, BACKFILLING, GRADING AND STOCKPILES IS KEPT TO AN ABSOLUTE MINIMUM. - SEDIMENT CONTROL DEVICES REQUIRED TO BE REMOVED TO ALLOW CONSTRUCTION ACCESS ARE TO BE REINSTATED AT THE COMPLETION OF EACH WORKDAY. - MOVEMENT OF CONSTRUCTION EQUIPMENT SHALL BE LIMITED TO THE AREA OF WORK AND EXISTING ROADS. - DISTURBED AREAS ARE TO BE GRASSED FOLLOWING FINAL TRIMMING IN ACCORDANCE WITH THE DRAWINGS. AREAS ARE TO BE DISTURBED AND RESTORED PROGRESSIVELY. - TURF STRIPS (1000mm WIDE) SHALL BE LAID TO THE BASE OF ALL DOWNSTREAM EARTHWORKS BATTERS STEEPER THAN 1 IN 4. BATTERS SHALL BE TOPSOILED AND GRASS SEEDED IMMEDIATELY UPON COMPLETION OF EARTHWORKS. - KERB SEDIMENT TRAPS ARE TO BE PROVIDED AT EACH DRAINAGE PIT ADJACENT TO DISTURBED AREAS.
4. MAINTENANCE	- CHECK INTEGRITY OF EROSION AND SEDIMENT CONTROL DEVICES: DAILY DURING THE MONTHS OF NOVEMBER TO MARCH, AND FOLLOWING EACH RAINFALL EVENT, AND WEEKLY AT OTHER TIMES OF THE YEAR, AND PRIOR TO IMPENDING RAINFALL EVENTS.
5. GENERAL	- THE CONTRACTOR WILL BE RESPONSIBLE FOR THE MAINTENANCE OF EROSION AND SEDIMENT CONTROL DEVICES FROM THE POSSESSION OF THE SITE UNTIL THE SITE IS ACCEPTED BY THE LOCAL AUTHORITY "OFF MAINTENANCE" OR UNTIL STABILISATION HAS OCCURRED TO THE SATISFACTION OF THE SUPERINTENDENT. - ADDITIONAL CONTROL DEVICES MAY BE REQUIRED BY THE SUPERINTENDENT. - ALTERNATIVE DESIGNS ARE TO BE APPROVED BY THE SUPERINTENDENT PRIOR TO CONSTRUCTION.

DEVICE	CONSTRUCTION REQUIREMENTS	MAINTENANCE REQUIREMENTS
CONSTRUCTION EXITS - USED TO PREVENT THE TRACKING OF DEBRIS FROM TYRES OF VEHICLES ONTO PUBLIC ROAD.	1. REFER TO DETAIL ON THIS PLAN 2. SURFACE WATER FLOWING TO THE CONSTRUCTION EXIT SEDIMENT TRAP MUST BE PIPED UNDER THE TRAP OR A PERIMETER BANK SHOULD BE CONSTRUCTED TO DIRECT SURFACE FLOW AWAY FROM THE TRAP. 3. WASH-OFF TO BE DIRECTED TO A SEDIMENT TRAP OR BUFFER ZONE. 4. ONLY PROVIDE ONE CONSTRUCTION EXIT FOR THE SITE UNLESS SITE ACCESS OR TOPOGRAPHY REQUIRE MORE. 5. ENSURE THAT CONTAMINATED VEHICLES CANNOT BYPASS IT WHEN EXITING THE SITE.	1. REMOVAL OF SEDIMENT AND/OR ADDING EXTRA AGGREGATE. 2. REMOVE SEDIMENT TRANSPORTED ONTO ROADWAYS AND APPLY CORRECTIVE MEASURE TO ENSURE NO RE-OCCURENCE. 3. EXTEND THE LENGTH OF THE GRAVEL PAD IF EXCESSIVE SEDIMENT IS STILL BEING TRANSPORTED OFF THE SITE.
ROCK CHECK DAMS - USED TO INTERCEPT CONCENTRATED FLOW.	1. REFER TO DETAIL ON THIS PLAN 2. PROVIDE DOWNSTREAM OF ALL OUTLETS AND AT 50m MAX. ALONG OPEN CHANNELS AND AROUND FIELD INLETS. 3. SHOULD BE EMBEDDED AT LEAST 200mm INTO THE SOIL TO PREVENT WATER FUNNELING BENEATH THEM. 4. ACCESS WILL BE REQUIRED FOR MAINTENANCE.	1. EXCESSIVE SEDIMENT SHOULD BE REMOVED FROM UPSTREAM OF THE DAMS. 2. THE UPSTREAM GRAVEL FILTER LAYER SHOULD BE REESTABLISHED WHEN SEDIMENT BEGINS TO FLOW THROUGH THE STRUCTURE OR WHEN PERMEABILITY IS EXCESSIVELY REDUCED.
SEDIMENT FENCES - USED TO TEMPORARILY REDUCE THE VELOCITY OF CONTAMINATED SHEET FLOW AND TO INDUCE GRAVITATIONAL SETTLEMENT OF THE ENTRAINED SEDIMENT.	1. REFER TO DETAIL ON THIS PLAN 2. ALL SEDIMENT FENCES TO BE INSTALLED PARALLEL TO CONTOURS. 3. REGULAR TURN-BACKS AND A FIRM WIRE MESH BACKING ARE REQUIRED TO PREVENT THE FURTHER CONCENTRATION OF FLOW. 4. THE FENCE SHOULD BE SEGMENTED INTO A SERIES OF L SHAPED FENCES TO AVOID THE CONCENTRATION OF FLOW ALONG THE FENCE. 5. SEDIMENT FENCE RETURNS AT 20m INTERVALS MAX.	1. REGULAR INSPECTIONS AND MAINTENANCE ARE REQUIRED TO REPAIR DAMAGE CAUSED BY ON-SITE VEHICLES OR THE MOVEMENT OF STOCKPILE MATERIAL. 2. INSPECT AFTER EACH STORM EVENT THAT RESULTS IN RUN-OFF. 3. REMOVE EXCESSIVE SEDIMENT DEPOSITS. 4. INVESTIGATE THE SOURCE OF EXCESSIVE SEDIMENT AND APPLY REMEDIAL ACTIONS IMMEDIATELY. 5. IF THE FENCE IS REGULARLY DAMAGED, INSTALL A SECOND FENCE AT LEAST 1 METRE DOWNSLOPE OF THE EXISTING FENCE.
DIVERSION DRAIN/PERIMETER BANKS - USED TO DIVERT FLOW AROUND DISTURBED AREAS OR USED WITHIN DISTURBED AREAS TO DIRECT CONTAINMENT FLOW TO SEDIMENT TRAP.	1. REFER TO DETAIL ON THIS PLAN 2. CHANNELS MUST HAVE A STABLE OUTLET. 3. DRAINS AND BANKS SHOULD BE SEEDED AND MULCHED IF THEIR WORKING LIFE IS EXPECTED TO EXCEED 30 DAYS.	1. REGULARLY INSPECT BANKS AND REPAIR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. 2. SEDIMENT SHOULD BE REMOVED TO AVOID PONDING.

FOR APPROVAL

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ENGINEERING CERTIFICATION
C.SHIELDS RPEQ 9347
SCALE
ORIGINAL SHEET SIZE A1

CLIENT BMD CONSTRUCTIONS PTY LTD & MCCONNELL DOWELL CONSTRUCTORS (AUST) PTY LTD
PROJECT GRACEMERE TEMPORARY CAMP, PIPE AND PLANT LAYDOWN AREA
LOCATION LOT 51 ENTERPRISE DRIVE, GRACEMERE
SHEET TITLE SOIL EROSION & SEDIMENT CONTROL DETAILS

JOB CODE MIS-1080
SHEET NUMBER C501
REV C

APPENDIX D

TRAFFIC IMPACT ASSESSMENT CERTIFICATION

CERTIFICATION OF TRAFFIC IMPACT ASSESSMENT REPORT

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND

FOR

Project Title	**Temporary Camp & Laydown Area, 51 Enterprise Drive, Gracemere: Traffic Impact Assessment**

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the Professional Engineers Act 2002 as competent in my areas of nominated expertise, I understand and recognise:

- The significant role of engineering as a profession; and that
- The community has a legitimate expectation that my certification affixed to this engineering work can be trusted; and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

i) I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles; and

ii) Where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment; and that

iii) The outcomes of this traffic impact assessment are a true reflection of results of assessment; and that

iv) I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

Name	Bradley Jones
RPEQ No.	19986
RPEQ Competencies	Civil
Email	bradley.jones@premise.com.au
Postal Address	PO Box 1110, Townsville QLD, 4810
Signature & Date	B. Jones 8/6/23

Traffic impact assessment components to which this certification applies	☒
1. Introduction	
Background	☒
Scope and study area	☒
Pre-lodgement meeting notes	☐
2. *Existing Conditions*	
Land use and zoning	☒
Adjacent land uses / approvals	☒
Surrounding road network details	☒
Traffic volumes	☒
Intersection and network performance	☒
Road safety issues	☒
Site access	☒
Public transport (if applicable)	☐
Active transport (if applicable)	☐
Parking (if applicable)	☒
Pavement (if applicable)	☐
Transport infrastructure (if applicable)	☐
3. *Proposed Development Details*	
Development site plan	☒
Operational details (including year of opening each stage and any relevant catchment / market analysis)	☒
Proposed access and parking	☒
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	☒
Trip distribution	☒
Development traffic volumes on the network	☒
5. Impact Assessment and Mitigation	
With and without development traffic volumes	☒
Construction traffic impact assessment and mitigation (if applicable)	☒
Road safety impact assessment and mitigation	☒
Access and frontage impact assessment and mitigation	☒
Intersection delay impact assessment and mitigation	☒
Road link capacity assessment and mitigation	☐
Pavement impact assessment and mitigation	☐
Transport infrastructure impact assessment and mitigation	☐
Other impacts assessment relevant to the specific development type / location (if applicable)	☐
6. *Conclusions and Recommendations*	
Summary of impacts and mitigation measures proposed	☒
Certification statement and authorisation	☒

Humes

Strength. Performance. Passion.

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/74-2023

Dated: 25 August 2023

HumeCeptor® system Technical manual

Issue 5

Contents

enviro DEVELOPMENT™ PROFESSIONAL

HumeCeptor® system

The HumeCeptor® system is a patented hydrodynamic separator, specifically designed to remove hydrocarbons and suspended solids from stormwater runoff, preventing oil spills and minimising non-point source pollution entering downstream waterways.

The HumeCeptor® system is an underground, precast concrete stormwater treatment solution that utilises hydrodynamic and gravitational separation to efficiently remove Total Suspended Solids (TSS) and entrained hydrocarbons from runoff. First designed as an 'at source' solution for constrained, commercial and industrial sites it has been improved and expanded to service large catchments, mine and quarry sites, inundated drainage systems, and capture large volume emergency spill events. The system is ideal for hardstands/wash bays, car parks, shopping centres, industrial/commercial warehouses, petrol stations, airports, major road infrastructure applications, quarries, mine sites and production facilities.

Independently tested, and installed in over 30,000 projects worldwide, the HumeCeptor® system provides effective, and reliable secondary treatment of stormwater for constrained sites.

- **The system reliably removes a high level of TSS and hydrocarbons**
  The HumeCeptor® system was developed specifically to remove fine suspended solids and hydrocarbons from stormwater, and has been certified to achieve high pollutant removal efficiencies for TSS (>80%) and Total Nutrients (TN) (>30%) on an annual basis.
- **It captures and retains hydrocarbons and TSS down to 10 microns**
  Each system is specifically designed to maintain low treatment chamber velocities to capture and retain TSS down to 10 microns. It also removes up to 98% of free oils from stormwater.
- **Each device is sized to achieve the necessary Water Quality Objectives (WQO) on an annual basis**
  Utilising the latest build-up and wash-off algorithms, PCSWMM software for the HumeCeptor® system ensures that the device chosen achieves the desired WQO (e.g. 80% TSS removal) on an annual basis.
- **Its performance has been independently verified**
  The HumeCeptor® system's technology has been assessed by independent verification authorities including the New Jersey Department of Environmental Protection (NJDEP), The Washington Department of Environment (USA), and by the Canadian Environmental Technology Verification program (ETV).

Right:
The bypass chamber of a HumeCeptor® system

- **The system is proven**
  The HumeCeptor® system was one of the first stormwater treatment devices introduced to Australia, and now after 30,000 installations worldwide, its popularity is testament to its performance, quality and value for money.
- **High flows won't scour captured sediment**
  The unique design of HumeCeptor® units ensures that as flows increase and exceed the treatment flow, the velocity in the storage chamber decreases.
- **Nutrients are captured along with the sediment**
  The effective capture of TSS results in the capture of particulate nutrients shown to be >30% of TN and Total Phosphorous (TP).
- **Fully trafficable to suit land use up to class G**
  The HumeCeptor® system is a fully trafficable solution, it can be installed under pavements and hardstands to maximise above ground land use (loading up to class D as standard).
- **Custom designs allow for emergency oil spill storage, directional change, multiple pipes, tidal inundation and class G traffic loads**
  A range of HumeCeptor® systems are available, built specifically to manage emergency spills (50,000 L storage), change of pipe directions, the joining of multiple pipes, high tail water levels as a result of tides or downstream water bodies, and high levels of hydrocarbons with auxiliary storage tanks.
- **We are experienced in the provision of world class treatment solutions**
  Humes has a team of water specialists dedicated to the advancement of economical sustainable solutions, and the provision of expert advice and support.

System operation

The HumeCeptor® stormwater treatment system slows incoming stormwater to create a non-turbulent treatment environment, allowing free oils and debris to rise and sediment to settle. Each HumeCeptor® system maintains continuous positive treatment of TSS, regardless of flow rate, treating a wide range of particle sizes, as well as free oils, heavy metals and nutrients that attach to fine sediment.

The HumeCeptor® system's patented scour prevention technology ensures pollutants are captured and contained during all rainfall events.

Bypass chamber

1. Stormwater flows into the inlet (weir) area of the bypass chamber.
2. Design flows are diverted into the offline treatment chamber by a weir, orifice and drop pipe arrangement (refer to Figure 1).
3. The weir and orifice have been developed to create a vortex that sucks floating oils and sediment down into the treatment chamber.
4. During high flow conditions, stormwater in the bypass chamber overflows the weir and is conveyed to the stormwater outlet directly (refer to Figure 2).
5. Water which overflows the weir stabilises the head between the inlet drop pipe and outlet decant pipe ensuring that excessive flow is not forced into the treatment chamber, protecting against scour or re-suspension of settled material. The bypass is an integral part of the HumeCeptor® unit since other oil/grit separators have been found to scour during high flow conditions (Schueler and Shepp, 1993).

Figure 1 – HumeCeptor® system operation during design flow conditions

Figure 2 – HumeCeptor® system operation during high flow conditions

Treatment chamber

1. Once diverted into the treatment chamber through the weir and orifice, the drop pipe beneath the orifice is configured to discharge water tangentially around the treatment chamber wall.
2. Water flows through the treatment chamber to the decant pipe which is submerged similar to the drop pipe.
3. Hydrocarbons and other entrained substances with a specific gravity less than water will rise in the treatment chamber and become trapped beneath the fibreglass insert since the decant pipe is submerged.
4. Sediment will settle to the bottom of the chamber by gravity forces. The large volume of the treatment chamber assists in preventing high velocities and promoting settling.
5. Water flows up through the decant pipe based on the head differential at the inlet weir, and is discharged back into the bypass chamber downstream of the weir.

Independent verification testing

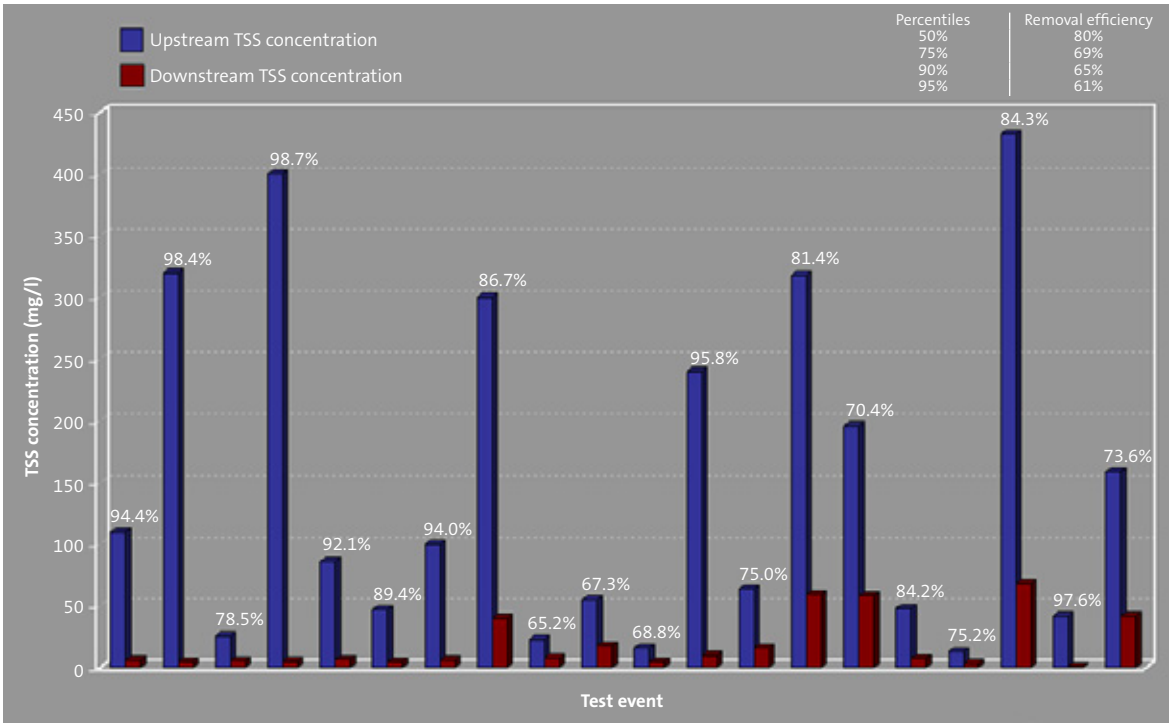
HumeCeptor® systems have been extensively researched by more than 15 independent authorities to validate its performance; it has now gained Environmental Technology Verification (ETV) certificates from ETV Canada, New Jersey Department of Environmental Protection (NJDEP) and Washington Department of Environment (WDOE).

A number of agencies have conducted independent studies; their results from these studies (over 100 test events) have been summarised in Table 1 below.

Table 1 – HumeCeptor® system performance summary

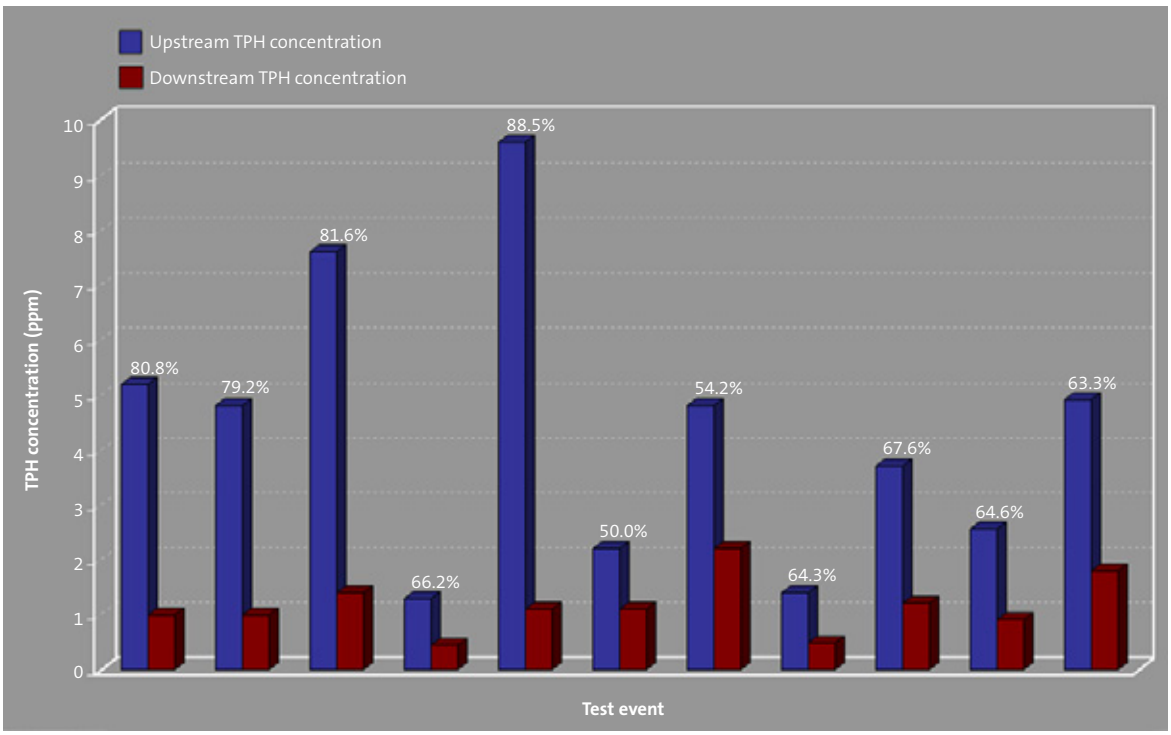
Pollutant	Average removal efficiency	Details
TSS	80%	Laboratory and field results, stable, hardstand, roads, commercial and industrial sites
TN	37%	Field results
TP	53%	Field results
Chromium	44%	Field results
Copper	29%	Field results
TPH	65%	<10 ppm inflow concentration
	95%	10 ppm - 50 ppm inflow concentration (typical stormwater)
	99%	>500 ppm inflow concentration (emergency spills)

Figure 3 – HumeCeptor® system field performance results for Total Suspended Solids (TSS) removal



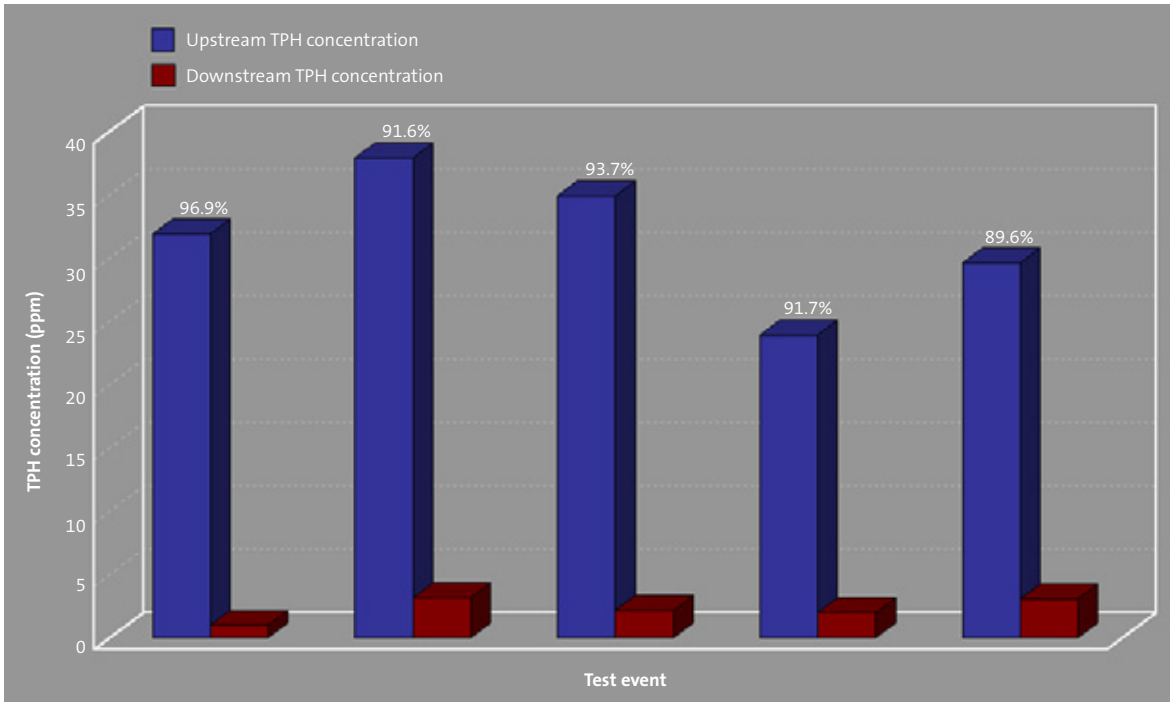
Note: Percentage values represent removal efficiencies

Figure 4 – HumeCeptor® system field performance for Total Petroleum Hydrocarbon (TPH) removal (influent concentration <10 ppm)



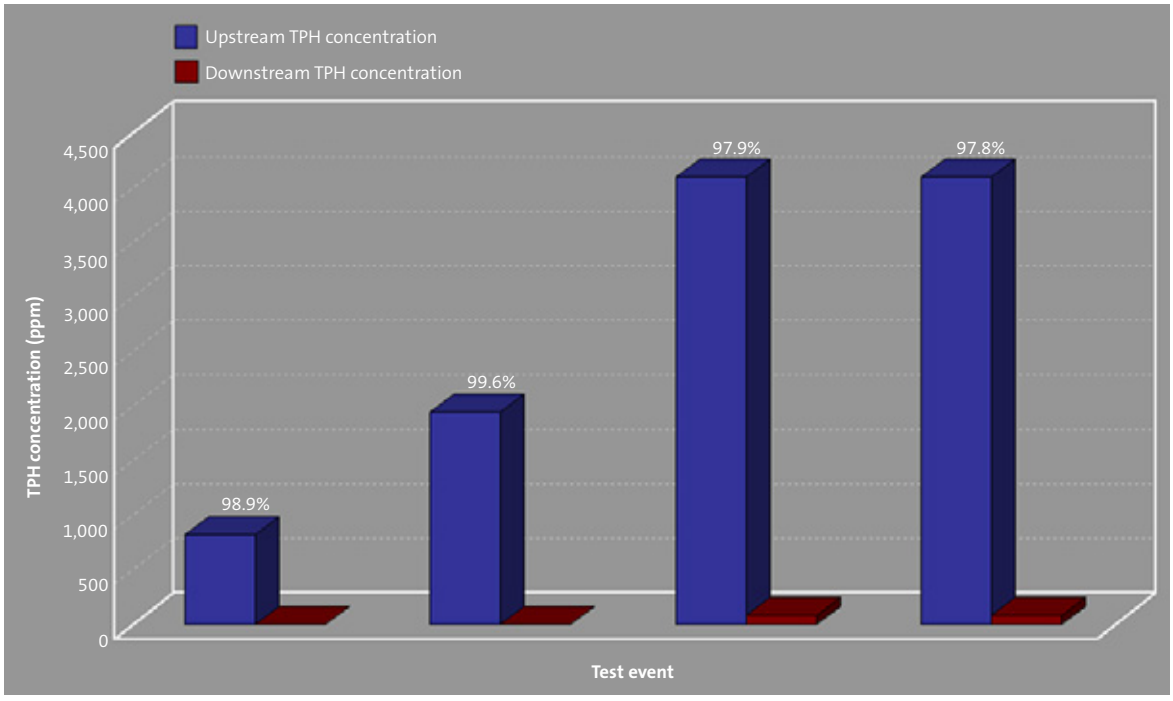
Note: Percentage values represent removal efficiencies

Figure 5 – HumeCeptor® system field performance for Total Petroleum Hydrocarbon (TPH) removal (influent concentration >10 ppm)



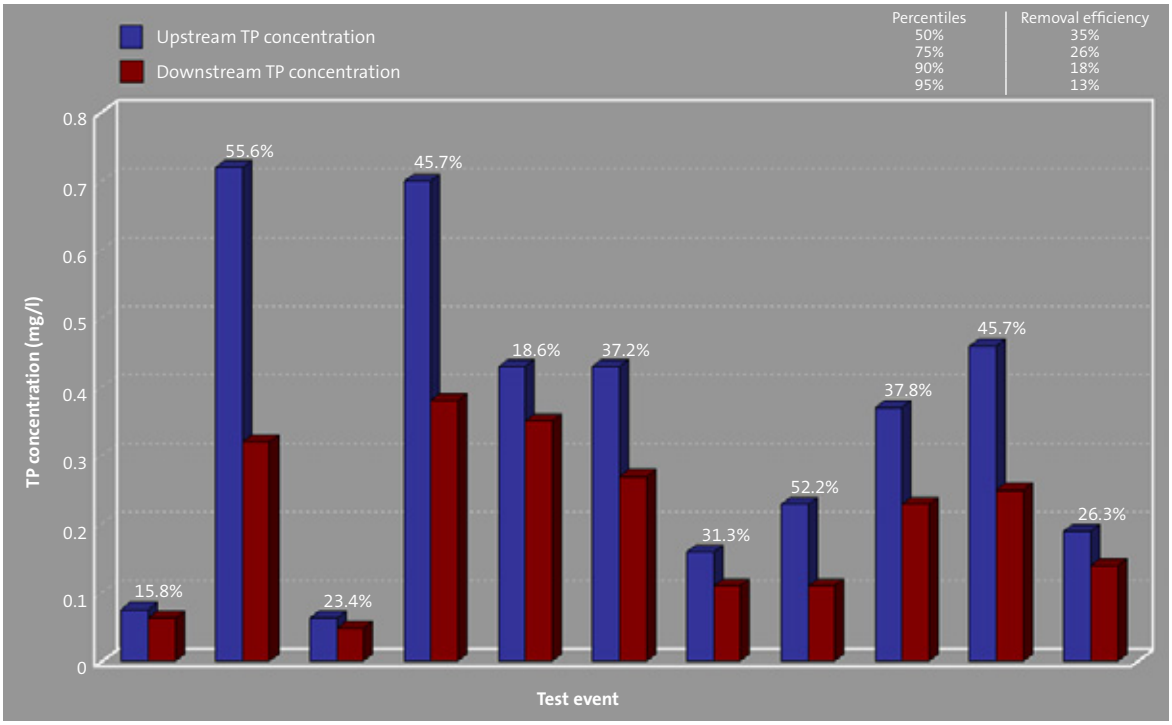
Note: Percentage values represent removal efficiencies

Figure 6 – HumeCeptor® system field performance for Total Petroleum Hydrocarbon (TPH) removal (influent concentration >1,000 ppm)



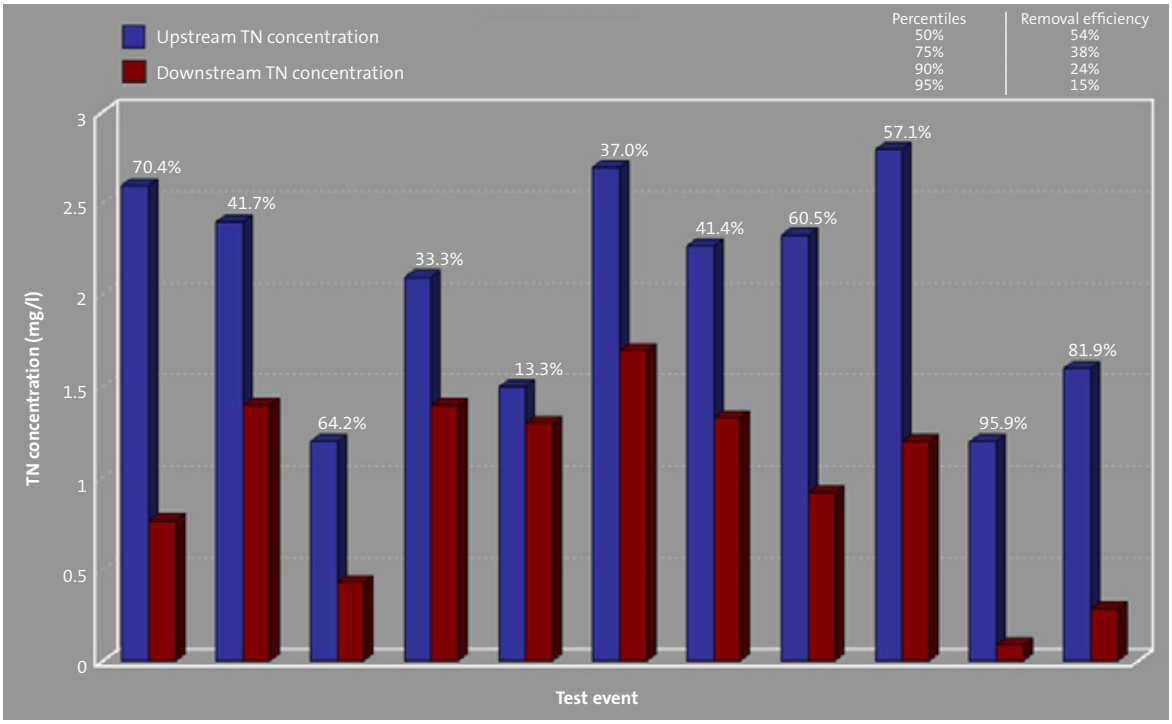
Note: Percentage values represent removal efficiencies

Figure 7 – HumeCeptor® system field performance for Total Phosphorous (TP) removal



Note: Percentage values represent removal efficiencies

Figure 8 – HumeCeptor® system field performance for Total Nitrogen (TN) removal



Note: Percentage values represent removal efficiencies

System options

There are a number of HumeCeptor® systems available to meet the requirements of various WQO for maintaining catchments and local hydrology. The standard range is detailed in Table 2 below.

Table 2 – HumeCeptor® model range and details

HumeCeptor® model	Pipe diameter (mm)	Device diameter (mm)	Depth from pipe invert* (m)	Sediment capacity (m^3)	Oil capacity (l)	Total storage capacity (l)
STC 2 (inlet)	100 - 600	1,200	1.7	1	350	1,740
STC 3	100 - 1,350	1,800	1.68	2	1,020	3,410
STC 5			2.13	3		4,550
STC 7			3.03	5		6,820
STC 9		2,440	2.69	6	1,900	9,090
STC 14			3.69	10	2,980	13,640
STC 18		3,060	3.44	14		18,180
STC 23			4.04	18		22,730
STC 27		3,600	3.84	20	4,290	27,270

Note:
*Depths are approximate.

Variants

Continual improvement over the last 14 years of HumeCeptor® system installations has provided a number of enhancements to address specific treatment and design requirements.

- **HumeCeptor® STC 2 (inlet) model**
  This model features a grated inlet to directly capture runoff from hardstand areas, replacing the need for a stormwater pit (refer to Figure 9).

Figure 9 – HumeCeptor® STC 2 (inlet) model

- **AquaCeptor™ model**

  This model has been designed with a weir extension to increase the level at which flows bypass the treatment chamber, and accommodate downstream tail water levels or periodic inundation (e.g. tidal situations). This weir extension is provided in standard heights of 100 mm intervals, up to a maximum of 500 mm.

  To maintain the hydrocarbon capture capabilities, an additional “high level” inlet pipe is also fitted. This facilitates the formation of the surface vortex from the bypass chamber into the treatment chamber and draws floating hydrocarbons into the unit.

  The selection of the appropriate weir extension height is undertaken in conjunction with the downstream engineering design and/or tidal range charts for the specific location. The AquaCeptor™ model is available in the same sizes as the standard HumeCeptor® units (refer Table 2 on the previous page).

Figure 10 – AquaCeptor™ model

- **MultiCeptor™ model**

  The MultiCeptor™ model (refer to Figure 11) was developed to facilitate the replacement of junction pits while still providing the treatment abilities of the original HumeCeptor® system and reducing time and costs during installation. These units reverse the weir structure to allow for:

  - change of pipe direction
  - multiple inlet pipes
  - differing invert levels of multiple inlet pipes
  - grated inlets.

  The MultiCeptor™ model is available in the same sizes as the standard HumeCeptor® units (refer to Table 3 below) and a 2,440 mm diameter MultiCeptor™ unit is also available to accommodate drainage pipes up to 1,800 mm diameter.

  The larger insert diameter allows for larger pipe connections that are more common where pipes are laid on very flat grades.

Figure 11 – MultiCeptor™ model

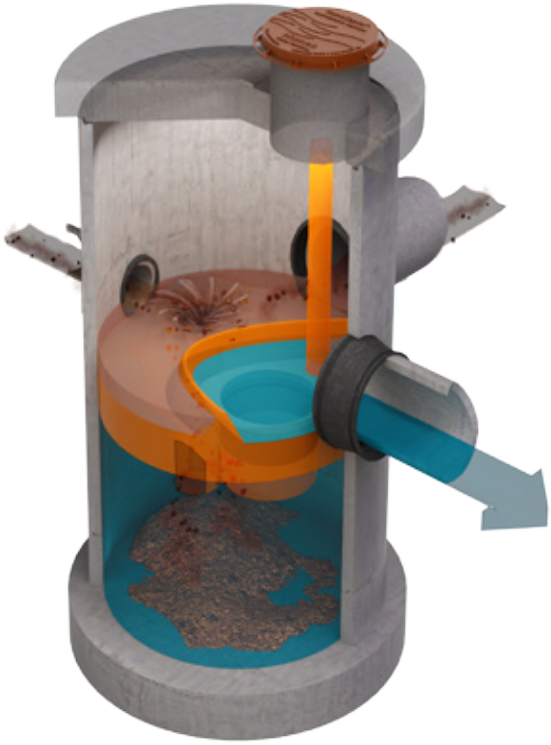


Table 3 – MultiCeptor™ model range and details

HumeCeptor® model	Pipe diameter (mm)	Device diameter (mm)	Depth from pipe invert (m)	Sediment capacity (m^3)	Oil capacity (l)	Total storage capacity (l)
MI3	100 - 1,350	1,800	1.68	2	1,020	3,410
MI5			2.13	3		4,550
MI7			3.03	5		6,820
MI9		2,440	2.69	6	1,900	9,090
MI14			3.69	10	2,980	13,640
MI18		3,060	3.44	14		18,180
MI23			4.04	18		22,730
MI27		3,600	3.84	20	4,290	27,270
MI9 - MI27 (2,440)	100 - 1,800	2,440 top up to 3,600 base	2.69 - 3.84	6 - 20	1,900 - 4,290	9,090 - 27,270

- **DuoCeptor™ model**

  The DuoCeptor™ model has been developed to treat larger catchments (2 Ha - 6 Ha) because some constrained developments can only accommodate a single, large device instead of several smaller devices.

  The unit operates by splitting the flow and treating half of the design flow through the first chamber. The untreated half of the design flow bypassed from the first chamber then passes through the split connection pipe into the second chamber for treatment. Treated flow from the first chamber exits and flows through the other side of the split connection pipe, and bypasses the second chamber to join the treated flow from the second chamber at the outlet of the DuoCeptor™ model.

  Figure 12 displays the DuoCeptor™ model and Table 4 details the range of capacities available.

Figure 12 – DuoCeptor™ model

Table 4 – DuoCeptor™ model range and details

DuoCeptor™ model	Pipe diameter (mm)	Device footprint (L x W)	Depth from pipe invert (m)	Sediment capacity (m^3)	Oil capacity (l)	Total storage capacity (l)
STC 40	600 - 1,500	7,750 x 3,500	3.41	27	10,585	42,370
STC 50			4.01	35	10,585	50,525
STC 60		9,150 x 4,200	3.89	42	11,560	60,255

- **HumeCeptor® MAX model**

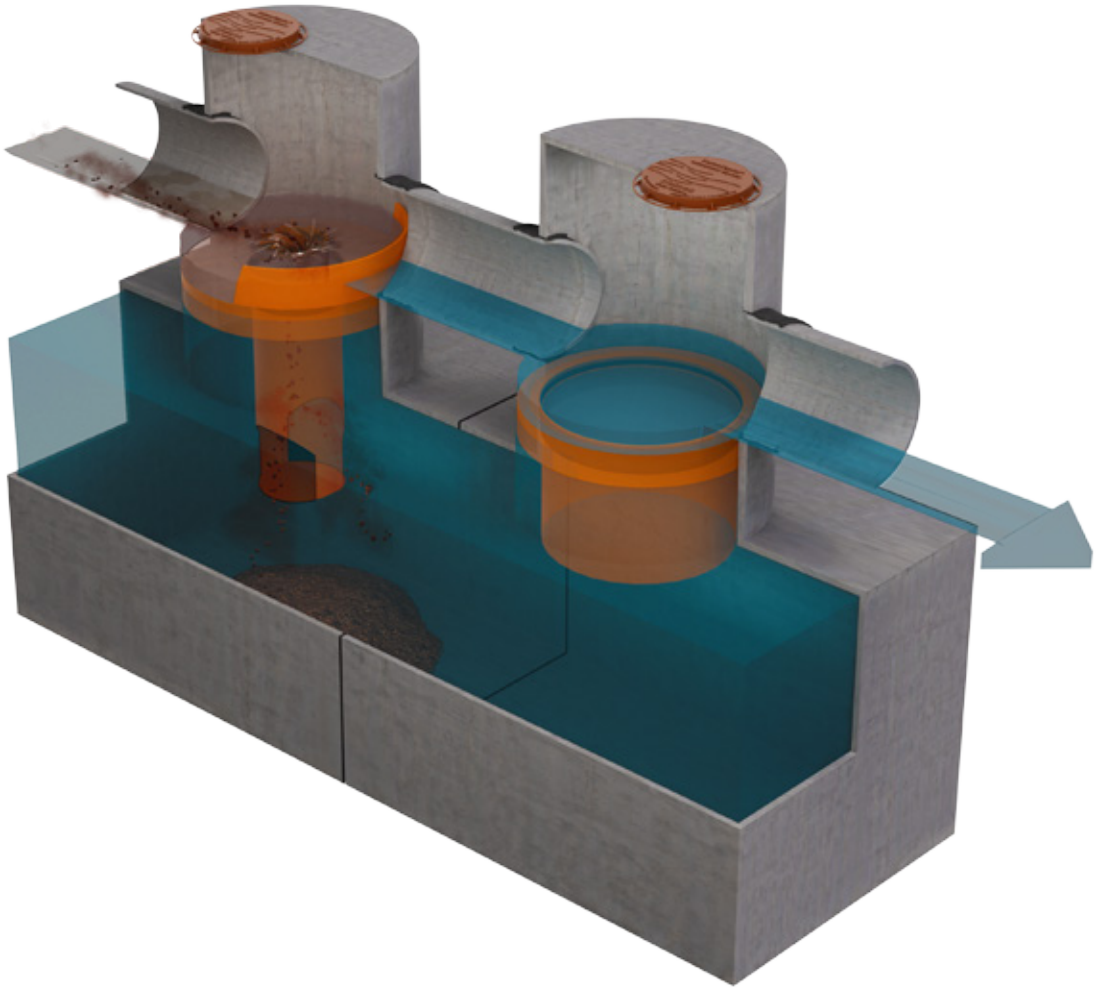
  The HumeCeptor® MAX model (refer to Figure 13) was developed to meet the market need for a single, large, end-of-pipe solution for TSS and hydrocarbon removal. Utilising the HumeCeptor® system's proven capture and scour prevention technology, it is ideal for very large commercial and industrial sites (>6 Ha) (eg. quarries, mine sites and stockpile areas) that need to achieve at least 50% TSS removal and hydrocarbon capture. The HumeCeptor® MAX model can be expanded to almost any capacity required.

  As the HumeCeptor® MAX model uses two 2,400 mm diameter inserts, sizing must be calculated separately from the PCSWMM software for the HumeCeptor® system. Contact Humes Water Solutions for assistance.

- **HumeCeptor® EOS model**

  The HumeCeptor® EOS (Emergency Oil Spill) system provides you with the maximum protection against hydrocarbon spills at petrol stations, highway interchanges and intersections. It combines the passive, always-operating functions of the HumeCeptor® system, with additional emergency storage to capture the volume of spill required by your road authority. Standard designs include 30,000 litres and 50,000 litres of total hydrocarbon storage but these can be modified to suit any specified volume.

Figure 13 – HumeCeptor® MAX model



Design information

To design a system suitable for your project it is necessary to review the configuration of the stormwater system, the location and purpose of other stormwater management (WSUD) controls, traffic loading, and the catchment area and hydrology.

Configuration of the stormwater system

As a cylindrical system, HumeCeptor® hydrodynamic separators are much more flexible for accommodating inlet and outlet pipes on angles than rectangular systems.

Location in the stormwater system

Specifically designed for capturing fine sediment and hydrocarbons, the HumeCeptor® system is best suited to "at source" applications. Therefore, it should be located immediately downstream of the catchment area to be treated, e.g. car parks, loading bays, refuelling stations, wash bays.

Catchment area

As a general rule, larger catchment areas require larger HumeCeptor® units. If the catchment area is unstable (e.g. exposed soil) or contributes unusually high pollutant loads (e.g. landscape supply yards), larger units are more appropriate. This can be modelled in PCSWMM software using the "Power Wash-off" or "Event Mean Concentration" TSS loading function.

Sizing HumeCeptor® systems

PCSWMM software for the HumeCeptor® system is the decision support tool used for identifying the appropriate model. A lite version of PCSWMM software is available to identify the HumeCeptor® system which best meets treatment criteria for conventional urban stormwater quality applications (commercial, industrial, residential etc).

Conventional sites typically have stable land cover, paved surfaces, or landscaped areas that do not easily erode during rainfall events. Please contact Humes for further assistance and modeling for unique or unconventional sites. Examples of unconventional sites are as follows:

1. Sites that exhibit unstable wash-off characteristics such as construction sites and sites with material storage. For example, council works depots, landscape supply yards, gravel surfaces etc.
2. Sites with specific suspended solids characteristics such as coal manufacturing facilities, cement manufacturers (sites with a particle size finer or coarser than what is identified in the program).
3. Sites with altered post-development annual hydrology. Alterations to the annual hydrology result from the implementation of stormwater detention upstream of the proposed HumeCeptor® system. Infiltration or detention of small storms (< 1 year) result in alterations to the annual hydrology. Sites with flood control (2 to 100 year detention facilities) will not significantly alter the annual hydrology since detention occurs infrequently. Upstream flood control facilities do not preclude the use of the software for water quality design.

The software calculates continuous runoff from rainfall and simulates sediment accumulation and sediment transport for the design area. Annual TSS removal rates are estimated from the particle size distribution with settling rates calculated using Stoke's Law, corrected for drag. Assumptions for slope, depression storage, evaporation rates, build-up and wash-off parameters as well as the particle size distribution and settling rates are given in the description of the model calculations.

Users of the software should become familiar with these calculations and parameter values to ensure that they understand the software application. For sites that differ from the assumptions made in the software, please contact your local Humes Water Solutions representative for assistance.

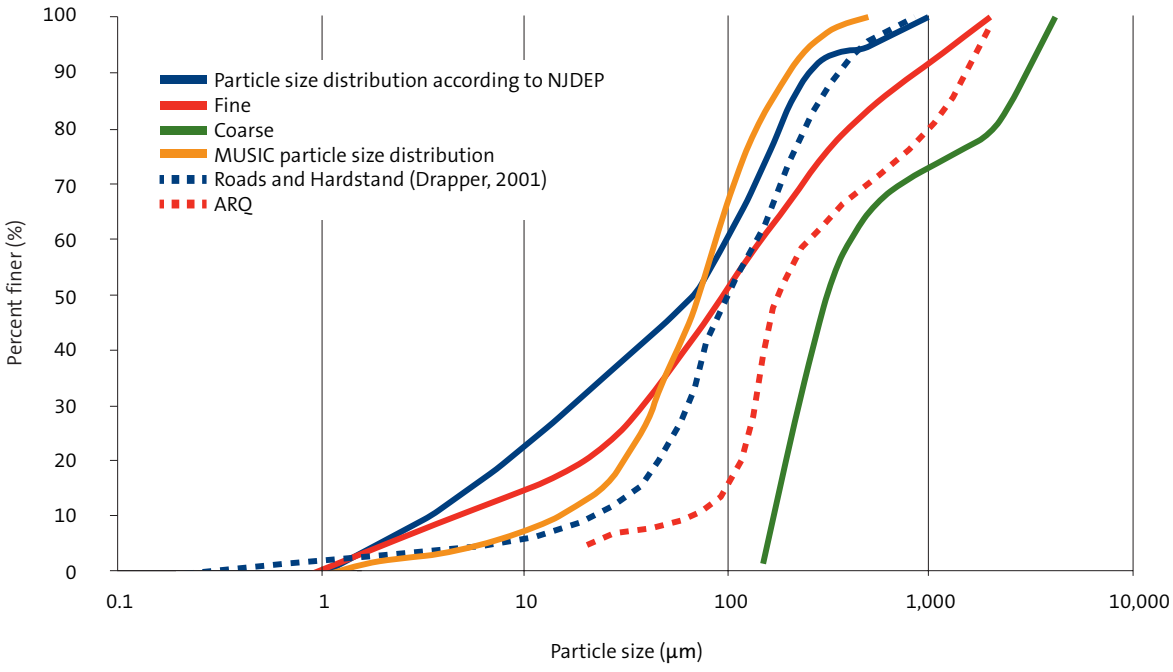
In order to size a unit using the lite version of PCSWMM software, the following six design steps should be followed.

- **Step 1 – Project details and WQOs**
  Enter the project details in the appropriate cells, clearly identifying the water quality objectives (WQO) for the development. It is recommended that a level of annual sediment (TSS) removal be identified and defined by a Particle Size Distribution (PSD). In most Australian situations, this WQO is for 80% TSS removal, but a PSD is not defined. This can be determined from relevant research data or from site monitoring.
- **Step 2 – Site details**
  Identify the site development by the drainage area and the level of imperviousness. It is recommended that imperviousness be calculated based on the actual area of paved surfaces, sidewalks and rooftops.
- **Step 3 – Upstream detention/retention**
  HumeCeptor® systems are designed as a water quality device and is sometimes used in conjunction with on site water quantity control such as ponds or underground detention systems. Where possible, it is more beneficial to install a HumeCeptor® unit upstream of a detention system, as the sediment load is reduced and the maintenance interval between cleaning is maximised.

  Where the HumeCeptor® system is installed downstream of a detention system it will alter the hydrology of the catchment and will influence the size of the unit selected by the software. For those projects, enter the footprint area and flow characteristics into the model.
- **Step 4 – Particle Size Distribution (PSD)**
  It is critical that the PSD is defined as part of the WQO. The design of the treatment system relies on a Stoke's Law settling (and floating) process, and selection of the target PSD influences the model outcomes.

  If the objective is for long term removal of 80% of TSS on a given site, the PSD should be representative of the expected sediment on the site. For example, a system designed to remove 80% of coarse particles (>150 microns) only provides relatively poor removal efficiency of finer particles (<75 microns) that may be naturally present in site runoff. PCSWMM software allows the user to enter their own PSD or select from a range of options in the program (refer to Figure 14 below).

Figure 14 – PCSWMM for HumeCeptor® system - PSD



- **Step 5 – Rainfall records**
  The rainfall data provided with PCSWMM software provides an accurate storm hydrology estimation by modelling actual historical storm events including duration, intensities and peaks. Local historical rainfall has been acquired from the Bureau of Meteorology. Select the nearest rainfall station from the list.
- **Step 6 – Summary**
  At this point, the software is able to predict the level of TSS removal from the site. Once the simulation has been completed, a table is generated identifying the TSS removal of each unit. Based on the WQO identified in Step 1, the recommended HumeCeptor® system unit will be highlighted.

MUSIC/pollutant export model inputs

Many local authorities utilise MUSIC or other pollutant export models to assist in stormwater treatment train selection, and recommend generic inputs for GPTs and hydrodynamic separators.

Considering these against the independent research results in Table 1 on page 4, and PCSWMM modelling used to size a HumeCeptor® unit, the conservative removal efficiencies in Table 5 below are recommended on an annual basis (i.e. no bypass). Humes Water Solutions can optimise the values to suit your specific site.

Table 5 – MUSIC inputs for HumeCeptor® system

Pollutant	Removal efficiency
TSS	80%
TN	30%
TP	30%

System installation

Top:
Installation of the base section (step 3)

Middle:
Installation of the bypass chamber (step 6)

Bottom:
System ready for connection of the inlet and outlet pipes (step 8)

The installation of HumeCeptor® units should conform in general to local authority's specifications for stormwater pit construction. Detailed installation instructions are dispatched with each unit.

The HumeCeptor® system is installed as follows:

1. Excavate and stabilise the site.
2. Prepare the geotextile and aggregate base.
3. Install the treatment chamber base section.
4. Install the treatment chamber section/s (if required).
5. Prepare the transition slab (if required).
6. Install the bypass chamber section.
7. Fit the inlet drop pipe and decant pipe (if required).
8. Connect inlet and outlet pipes as required.
9. Backfill to transition slab level.
10. Install the maintenance access chamber section (if required).
11. Install the frame and access cover/grate.
12. Backfill to finished surface/base course level and complete surface pavement.

System maintenance

The design of the HumeCeptor® system means that maintenance is conducted with a vacuum truck which avoids entry into the unit.

If the HumeCeptor® unit is sized using the PCSWMM guidelines, a maximum interval of annual maintenance is recommended.

A typical maintenance procedure includes:

1. Open the access cover.
2. Insert the vacuum hose into the top of the treatment chamber via the decant (outlet) pipe.
3. Remove the oily water until the level is just below the lower edge of the decant pipe.
4. Lower a sluice gate into the nearest upstream junction pit and decant the water from the treatment chamber into the upstream pit until the sediment layer is exposed.
5. Remove the sediment layer into the vacuum truck for disposal.
6. Raise the upstream sluice gate and allow water to return into the HumeCeptor® unit.
7. Replace the access cover.

FAQs

- **Will it capture litter?**
  The HumeCeptor® system is primarily designed for hydrocarbon and fine sediment removal, so if litter is expected from the catchment an upstream GPT is recommended. However, items such as cigarette butts, plastic bags and smaller gross pollutants will be captured by the system.
- **Do I need to model a bypass flow for the HumeCeptor® system in MUSIC?**
  No, PCSWMM software for the HumeCeptor® system analyses all flows from the catchment to determine 80% TSS removal on an annual basis. Therefore, the output efficiency of PCSWMM for the selected model can be incorporated into a MUSIC treatment node without a bypass flow.
- **How often do I need to undertake maintenance?**
  A maximum interval of 12 months is recommended, with 3 months ideal, however, these systems are designed with a factor of safety, so it will continue to retain sediment until it is completely full.
- **What if the PSD from my site is different to those in the software?**
  Humes Water Solutions has the ability to model a user-defined PSD in PCSWMM software for the HumeCeptor® system. If you have PSD results contact us for assistance.
- **Do I have to use the model that PCSWMM software highlights?**
  No, in most stormwater treatment trains, there are other measures upstream and/or downstream. Select the unit size that you need to achieve your desired removal efficiency in the context of your overall concept. Remember that selecting a model that removes less TSS will also remove less TN and TP.
- **Is it possible to change the hydrology model defaults in PCSWMM?**
  Yes, Humes Water Solutions has the ability to vary these inputs. Please contact us for further assistance.
- **Will the HumeCeptor® system's treatment chamber release nutrients?**
  Over time, captured organic material will break down and release nutrients in all treatment measures whether natural or manufactured. As part of a treatment train, downstream natural measures can remove the small portion of nutrients released during dry weather flows. A regular maintenance program will reduce the amount of break down occurring (Ball and Powell, 2006).

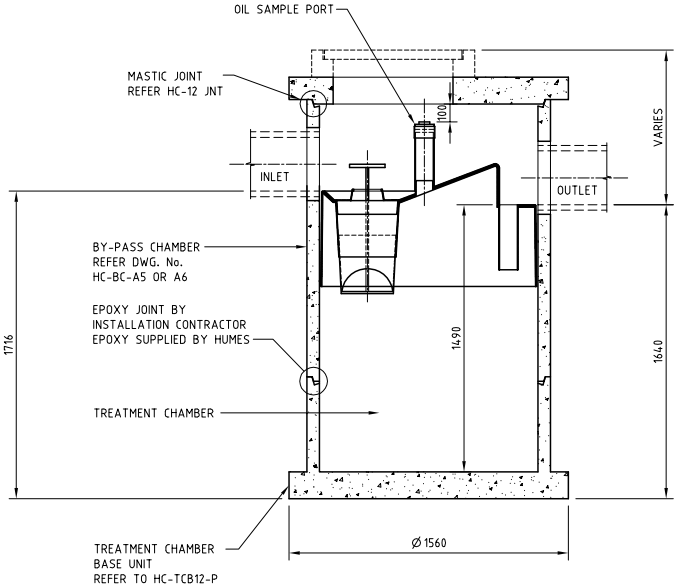
- **Why is the HumeCeptor® system not sized on flow rate?**
  The HumeCeptor® system is sized using actual historical rainfall and an algorithm based on research (Novotny and Chesters 1981, Charbeneau and Barrett, 1988, Ball and Abustan 1995, Sartor and Boyd 1972) showing that pollutants build up and wash off a catchment which is influenced by time, Particle Size Distribution (PSD), rainfall volume and intensity. These form a pollutograph that the software uses to calculate the HumeCeptor® system performance for all flows in every event over the rainfall period. The software then recommends the model that will remove a user selected removal target (usually set to 80%) of TSS load from all of these events.
- **How is the HumeCeptor® system different to a GPT?**
  The HumeCeptor® system is specifically designed to target fine sediment and hydrocarbons. Therefore, it is designed to maintain velocities through the treatment chamber <0.02 m/s. A GPT is designed to capture gross pollutants (>1 mm). For a GPT to function in an equivalent way to a HumeCeptor® system, the treatment chamber velocity must be <0.02 m/s.
- **Why would I use a HumeCeptor® system upstream of a biofilter?**
  Using a HumeCeptor® system upstream of a biofilter acts as a non- scouring sediment forebay, containing sediment to a confined location for easy removal. This protects the biofilter and lengthens its lifespan.

References

- Novotny, V and Chesters, G (1981) "Handbook of Non-Point Pollution Sources and Management", John Wiley and Sons, New York.
- Charbeneau ,RJ and Barrett, M.E (1998) "Evaluation of Methods for Estimating Stormwater Pollutant Loads", Water environment research 70 (7): 1,295 - 1,302.
- Ball, J and Abustan, I (1995) "An Investigation of the Particle Size Distribution During Storm Events on an Urban Catchment", Prol. the 2nd Int. Symposium on Urban Stormwater Management 1995 pp 531 - 535, IEAUST, Melbourne, Nat. Conf. Pub. 95/3.
- Sartor, J.D and Boyd, G.B (1972) "Water Pollutant Aspects of Street Surface Contaminants", US EPA (EPA - R2 - 72 - 081) Washington, DC.
- Ball, J and Powell, M (2006) "Influence of Anaerobic Breakdown on the Selection of Appropriate Urban Stormwater Management Measures", SIA Annual Conference.
- Schueler, Tom and David Shepp (1993) "The Quality of Trapped Sediments and Pool Water Within Oil Grit Separators in Suburban Maryland", Metropolitan Council of Governments.

Appendix

HumeCeptor® system technical drawings



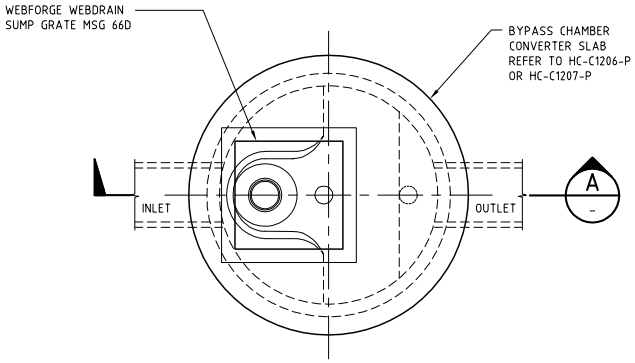
NOTE: STANDARD DROP INLET TO OUTLET IS 76mm

SECTION A – SCALE 1:20

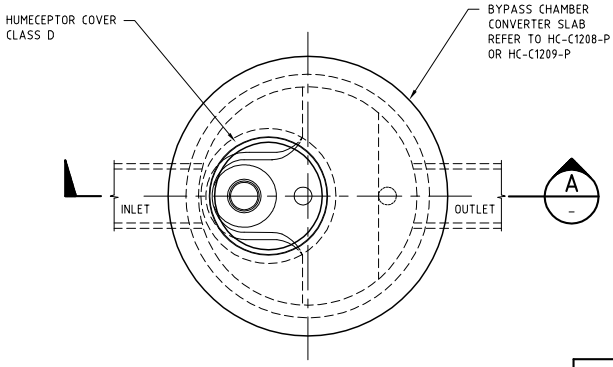
ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	ISSUED FOR MANUFACTURE	RGE	15.05.02	SO'C
1	UPDATED AND REISSUED FOR MANUFACTURE	M.Z.	23-01-03	DFW
2	GENERAL UPGRADE	RM	07-08-03	DFW

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 1740 LITRES
   OIL STORAGE VOLUME = 350 LITRES
   SEDIMENT STORAGE VOLUME = 1.34m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 1130 kg
   BYPASS CHAMBER = VARIES
   BYPASS CHAMBER CONVERTER SLAB = 575 kg
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. FOR OUTLET PIPE CONNECTION DETAILS
   REFER HC-BC-A5 OR A6 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
7. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWING)
8. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.



PLAN - SQUARE OPENING (PREFERRED) – SCALE 1:20



PLAN - CIRCULAR OPENING (ALTERNATIVE) – SCALE 1:20

Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

Readymix Holdings Pty Limited ABN 87 099 732 297

DSN.	SO'C	23-04-02
DWN.	RGE	23-04-02
CKD.	SO'C	23-04-02
APP.	DFW	23-04-02

SUPERSEDES

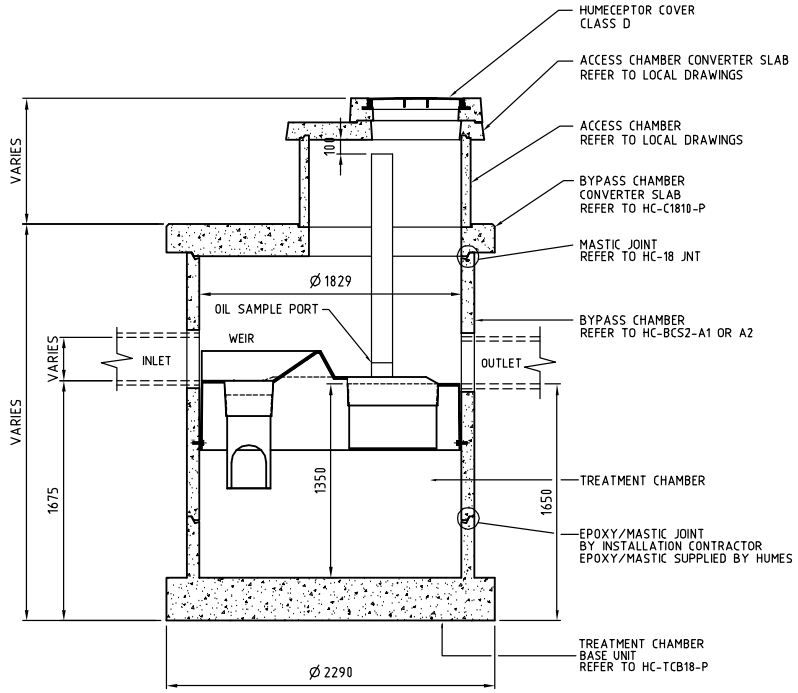
HUMECEPTOR™ STANDARD DRAWING

STC-2 HUMECEPTOR™ c/w INLET AND OUTLET PIPES

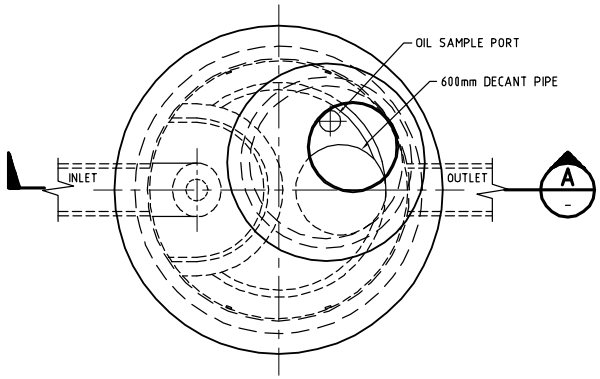
ASSEMBLY DRAWING

PLOT SCALE	SIZE	DRG. NO.	ISSUE
1:20	A2	HC-STC2-B	2

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	UPDATED AND ISSUED FOR MANUFACTURE	M.Z.	07-08-03	DFW
1	STORAGE VOLUMES REVISED	M.Z.	03-09-03	DFW



SECTION A
SCALE 1:25



PLAN
SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 3540 LITRES (1)
   OIL STORAGE VOLUME = 1020 LITRES
   SEDIMENT STORAGE VOLUME = 2.20m3 (1)
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 3.9 TONNE
   BYPASS CHAMBER = VARIES
   BYPASS CHAMBER CONVERTER SLAB = 1.9 TONNE
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWING)
9. NOTE MARKINGS - INLET & OUTLET OVER EACH
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	07-08-03
APP.	DFW	07-08-03

HUMECEPTOR™
STANDARD DRAWING
STC-3 HUMECEPTOR
ASSEMBLY DRAWING

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:25	A2	HC-STC3-A	1

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
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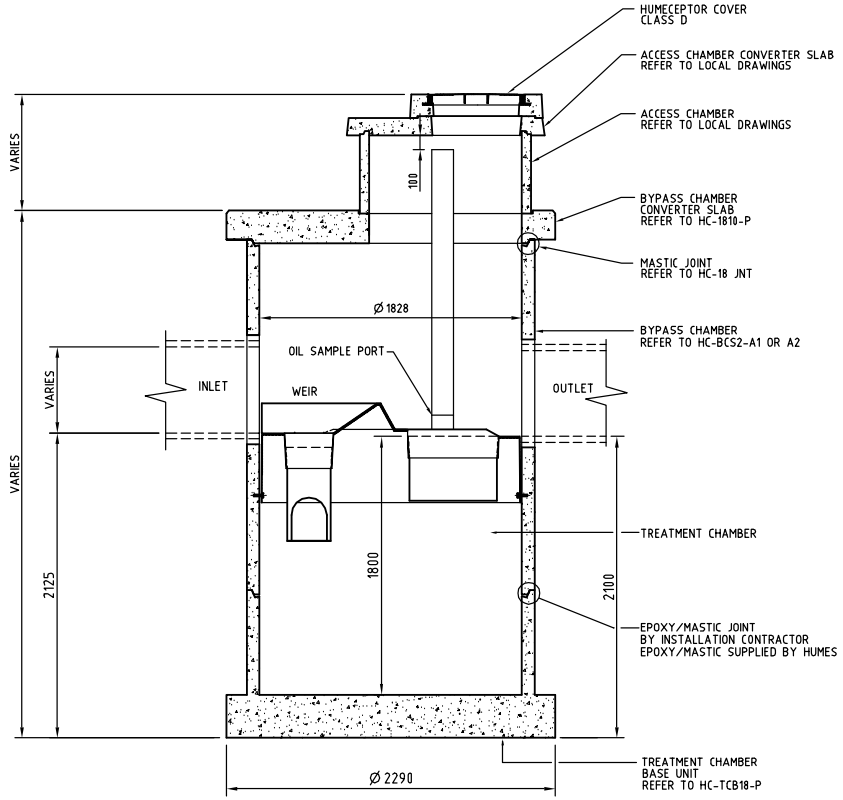
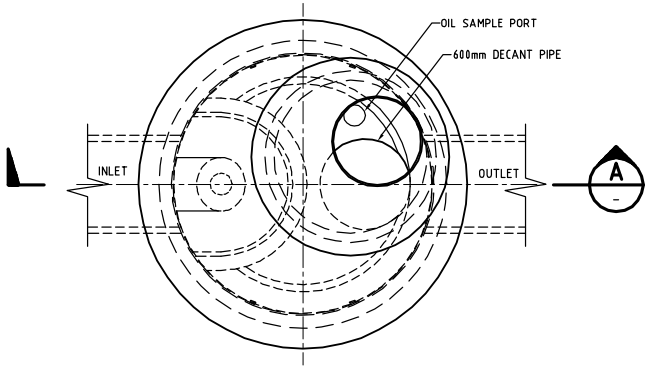


SECTION A – SCALE 1:25



PLAN SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 4720 LITRES
   OIL STORAGE VOLUME = 1020 LITRES
   SEDIMENT STORAGE VOLUME = 3.38m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 4.4 TONNE
   BYPASS CHAMBER = VARIES
   BYPASS CHAMBER CONVERTER SLAB = 1.9 TONNE
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWING)
9. NOTE MARKINGS - INLET & OUTLET OVER EACH
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

Humes

TECHNICAL (DESIGN) SERVICES
BRISBANE, QUEENSLAND

DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	03-09-03
APP.	DFW	03-09-03

HUMECEPTOR™

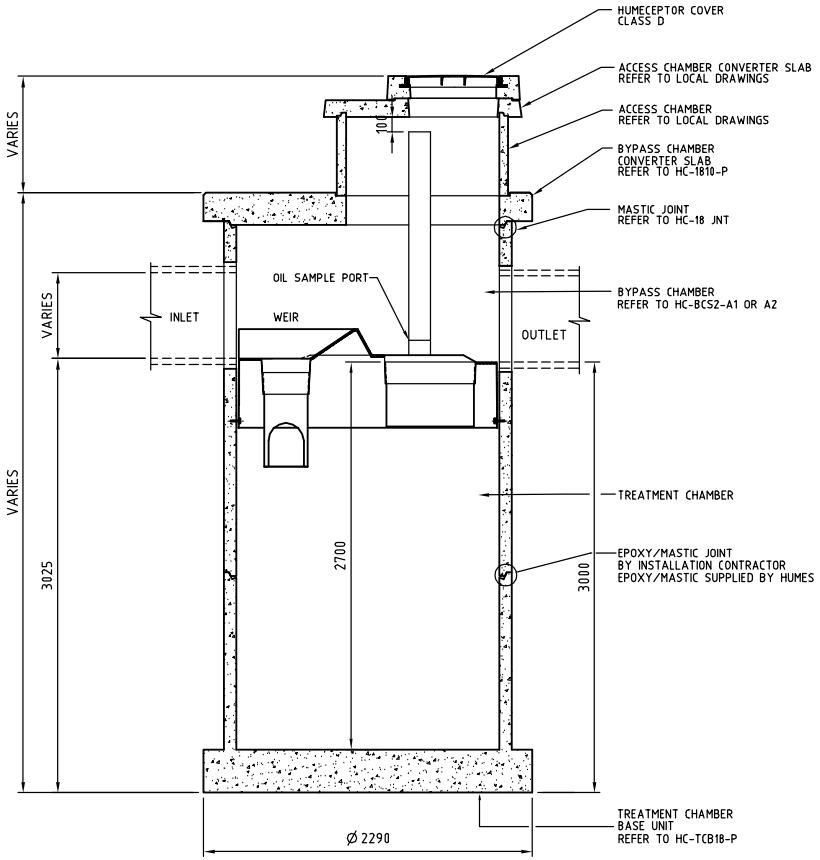
STANDARD DRAWING

STC-5 HUMECEPTOR

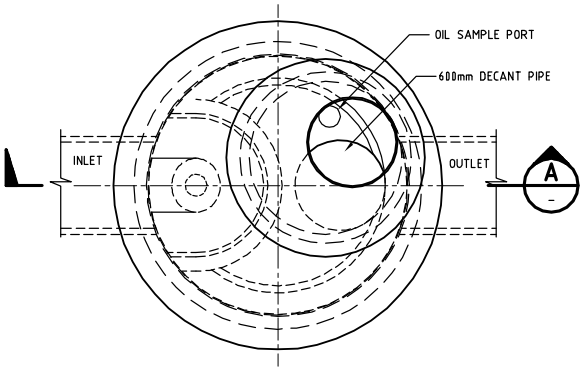
ASSEMBLY DRAWING

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:25	A2	HC-STC5-A	0

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	UPDATED AND ISSUED FOR MANUFACTURE	M.Z.	03-09-03	DFW



SECTION A
SCALE 1:25



PLAN
SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 7080 LITRES
   OIL STORAGE VOLUME = 1020 LITRES
   SEDIMENT STORAGE VOLUME = 5.74m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 5.1 TONNE
   BYPASS CHAMBER = VARIES
   BYPASS CHAMBER CONVERTER SLAB = 1.9 TONNE
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWING)
9. NOTE MARKINGS - INLET & OUTLET OVER EACH
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

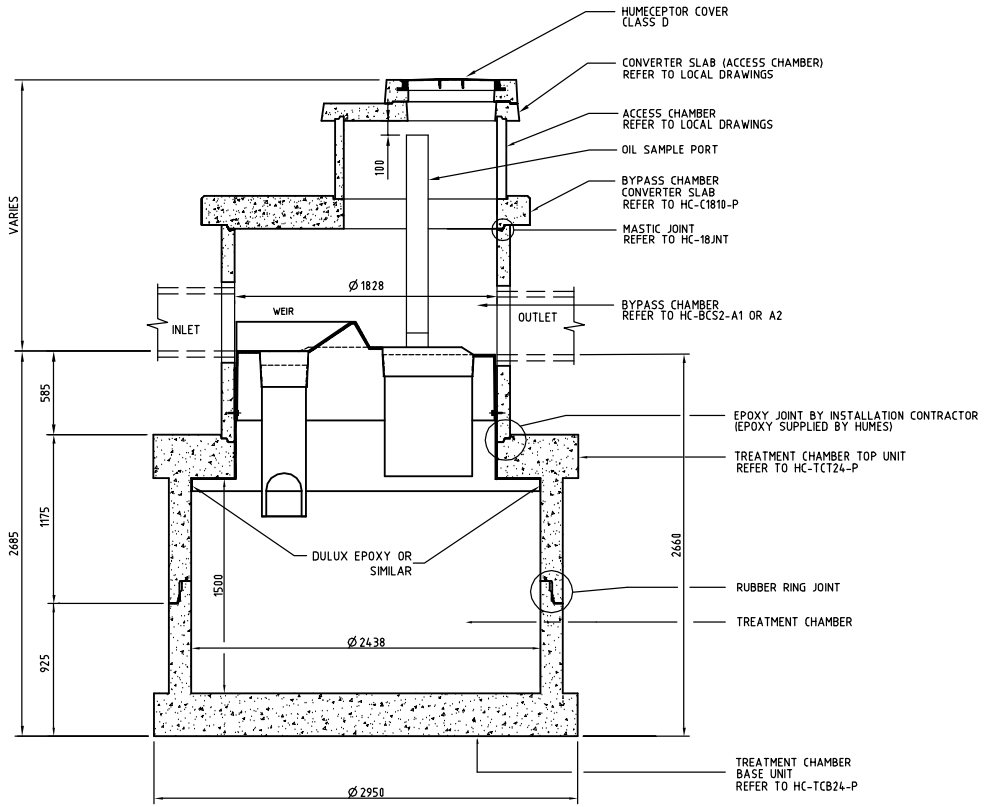
Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	03-09-03
APP.	DFW	03-09-03

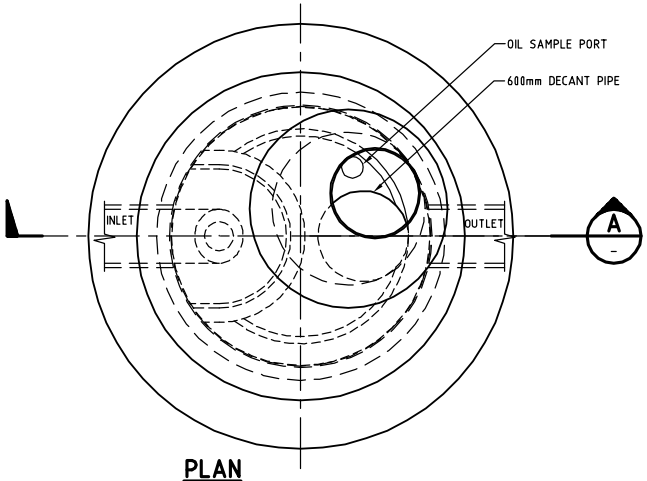
SUPERSEDES

HUMECEPTOR™
STANDARD DRAWING
STC-7 HUMECEPTOR
ASSEMBLY DRAWING

PLOT SCALE	SIZE	DRG. NO.	ISSUE
1:25	A2	HC-STC7-A	0



SECTION A – A
SCALE 1:25



PLAN
SCALE 1:10

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	UPDATED AND ISSUED FOR MANUFACTURE	M.Z.	03-09-03	DFW

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 9260 LITRES
   OIL STORAGE VOLUME = 1900 LITRES
   OIL SEDIMENT STORAGE VOLUME = 6.81 m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 7.7 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB + SHAFT) = 6.0 TONNE
   BYPASS CHAMBER = VARIES
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 or A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS.
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS. (REFER PRODUCT DRAWING)
9. NOTE MARKINGS - INLET AND OUTLET OVER EACH.
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

RUBBER RING JOINT SPECIFICATION

MATERIAL	: NITRILE
HARDNESS:	: 43 ± 3 IRHD (AS 1646)
PROFILE	: L25 (REFER Dwg. J1001-01)
ID	: 2225 ± 16mm

Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	03-09-03
APP.	DFW	03-09-03

HUMECEPTOR™
STANDARD DRAWING
STC-9 HUMECEPTOR
ASSEMBLY DRAWING

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:25	A2	HC-STC-9-A	0

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
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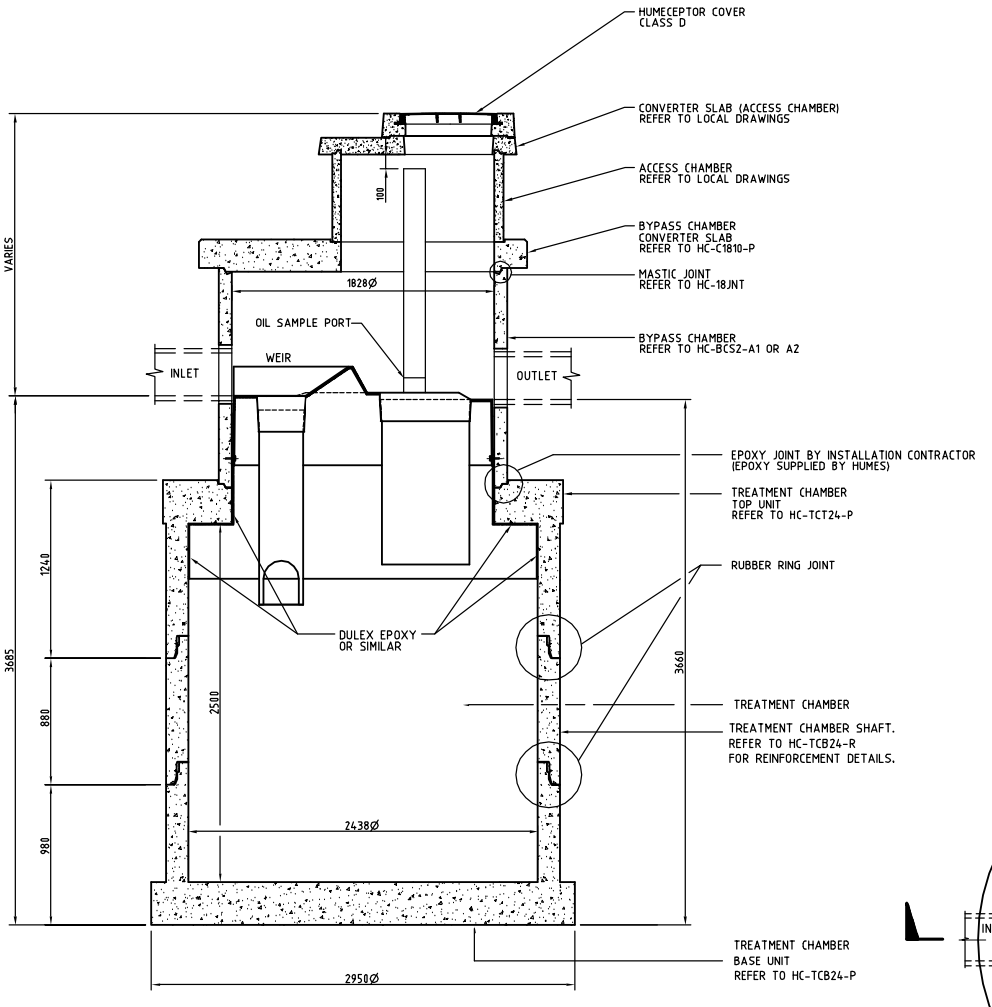
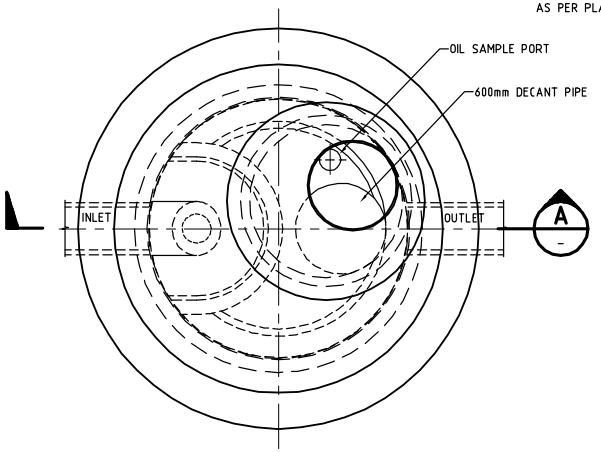


SECTION A
SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 13920 LITRES
   OIL STORAGE VOLUME = 2980 LITRES
   SEDIMENT STORAGE VOLUME = 10.27 m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 7.9 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB + SHAFT) = 6.1 TONNE
   BYPASS CHAMBER = VARIES
   TREATMENT CHAMBER SHAFT = 2.8 TONNE
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWINGS)
9. NOTE MARKINGS - INLET AND OUTLET OVER EACH.
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.



PLAN
SCALE 1:25

RUBBER RING JOINT SPECIFICATION

MATERIAL : NITRILE
HARDNESS : 43 ± 3 IRHD (AS1646)
PROFILE : L25 (REFER Dwg. J1001-01)
ID : 2225 ± 16mm

Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

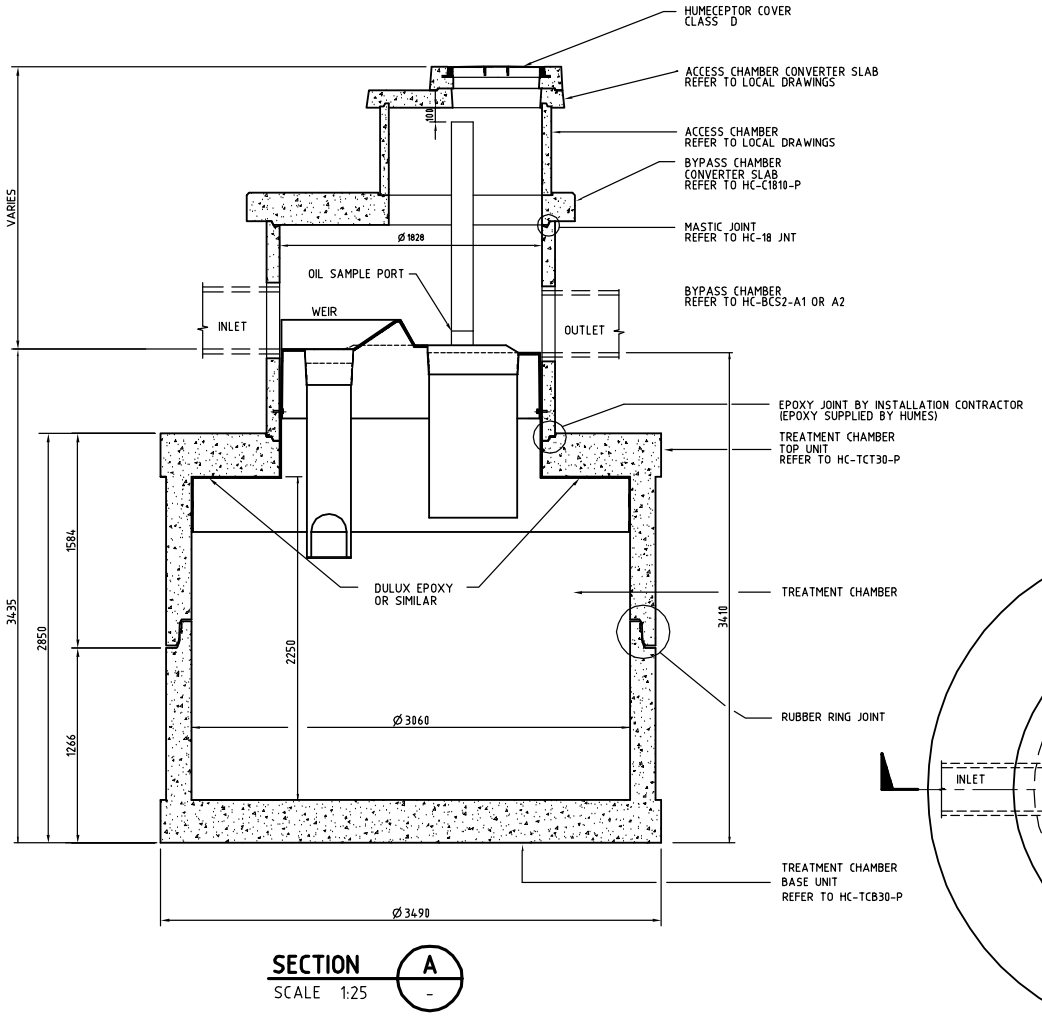
DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	03-09-03
APP.	DFW	03-09-03

HUMECEPTOR™
STANDARD DRAWING
STC-14 HUMECEPTOR
ASSEMBLY DRAWING

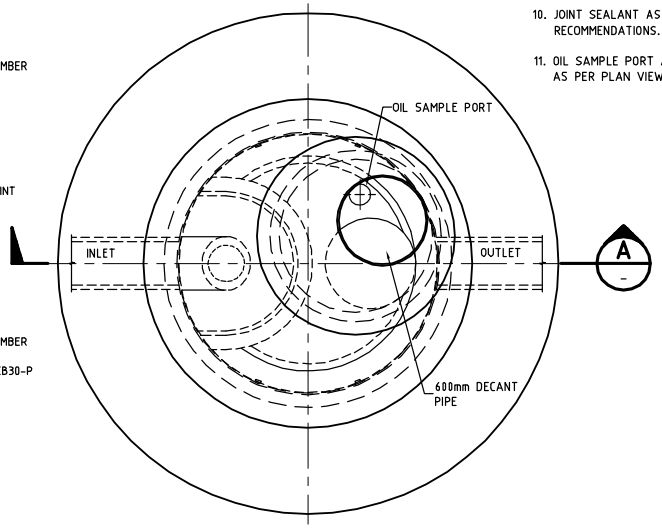
SUPERSEDES

PLOT SCALE	SIZE	DRG. NO.	ISSUE
1:25	A2	HC-STC14-A	0

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	UPDATED AND ISSUED FOR MANUFACTURE	M.Z.	03-09-03	DFW



SECTION A
SCALE 1:25



PLAN
SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 18790 LITRES
   OIL STORAGE VOLUME = 2980 LITRES
   SEDIMENT STORAGE VOLUME = 14.04 m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL.SHAFT) = 12.1 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB + SHAFT) = 11.2 TONNE
   BYPASS CHAMBER = VARIES
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWINGS)
9. NOTE MARKINGS - INLET AND OUTLET OVER EACH.
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

RUBBER RING SPECIFICATION

MATERIAL	:	NITRILE
HARDNESS	:	43 ± 3 IRHD (AS1646)
PROFILE	:	L25 (REFER Dwg. J1001-01)
ID	:	2775 ± 16mm

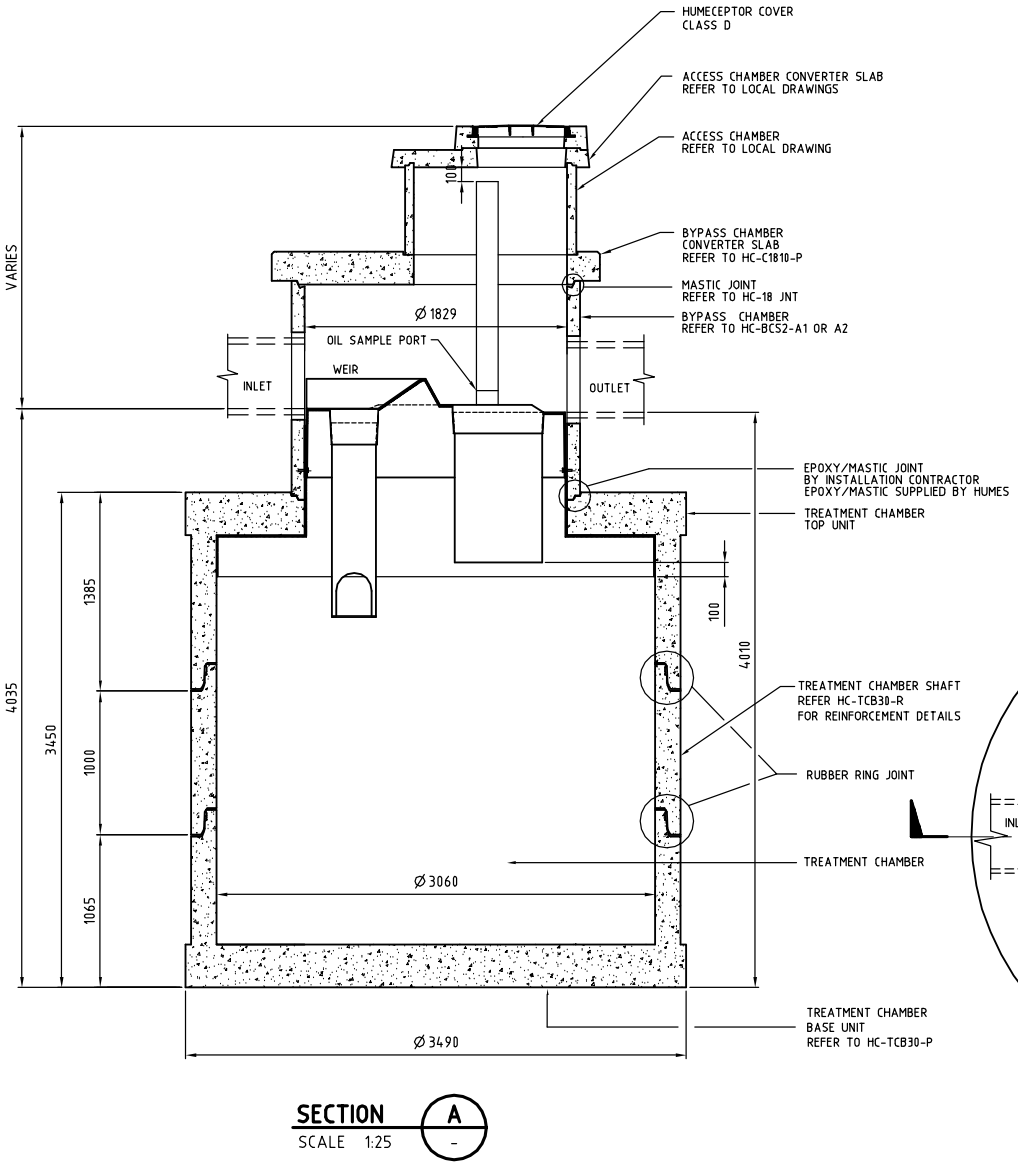
Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	03-09-03
APP.	DFW	03-09-03

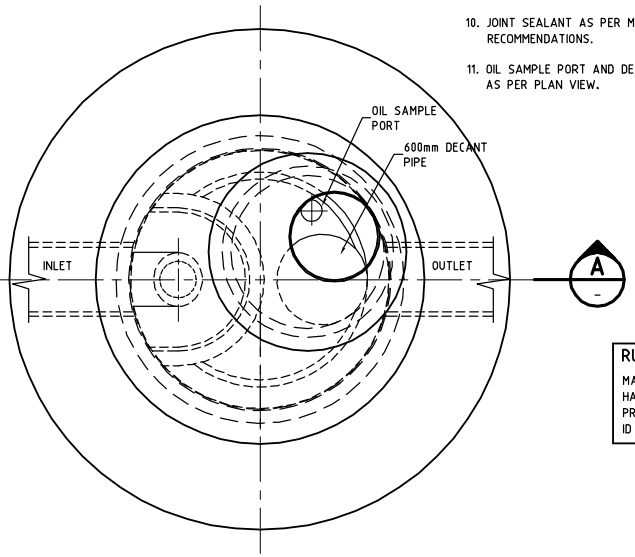
HUMECEPTOR™
STANDARD DRAWING
STC-18 HUMECEPTOR
ASSEMBLY DRAWING

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:25	A2	HC-STC18-A	0

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	UPDATED AND ISSUED FOR MANUFACTURE	M.Z.	03-09-03	DFW



SECTION A
SCALE 1:25



PLAN
SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS
2. DIMENSIONS INCLUDED ARE STANDARD
3. STORAGE VOLUMES
   TOTAL = 23200 LITRES
   OIL STORAGE VOLUME = 2980 LITRES
   SEDIMENT STORAGE VOLUME = 18.45 m3
4. COMPONENT MASSES
   TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 11.2 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB + SHAFT) = 10.1 TONNE
   BYPASS CHAMBER = VARIES
   TREATMENT CHAMBER SHAFT = 4.6 TONNES
5. REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR-N-SEAL INSTALLATION INSTRUCTIONS.
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWINGS)
9. NOTE MARKINGS - INLET AND OUTLET OVER EACH.
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. OIL SAMPLE PORT AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

RUBBER RING SPECIFICATION

MATERIAL	:	NITRILE
HARDNESS	:	43 ± 3 IRHD (AS1646)
PROFILE	:	L25
ID	:	2775 ± 16mm

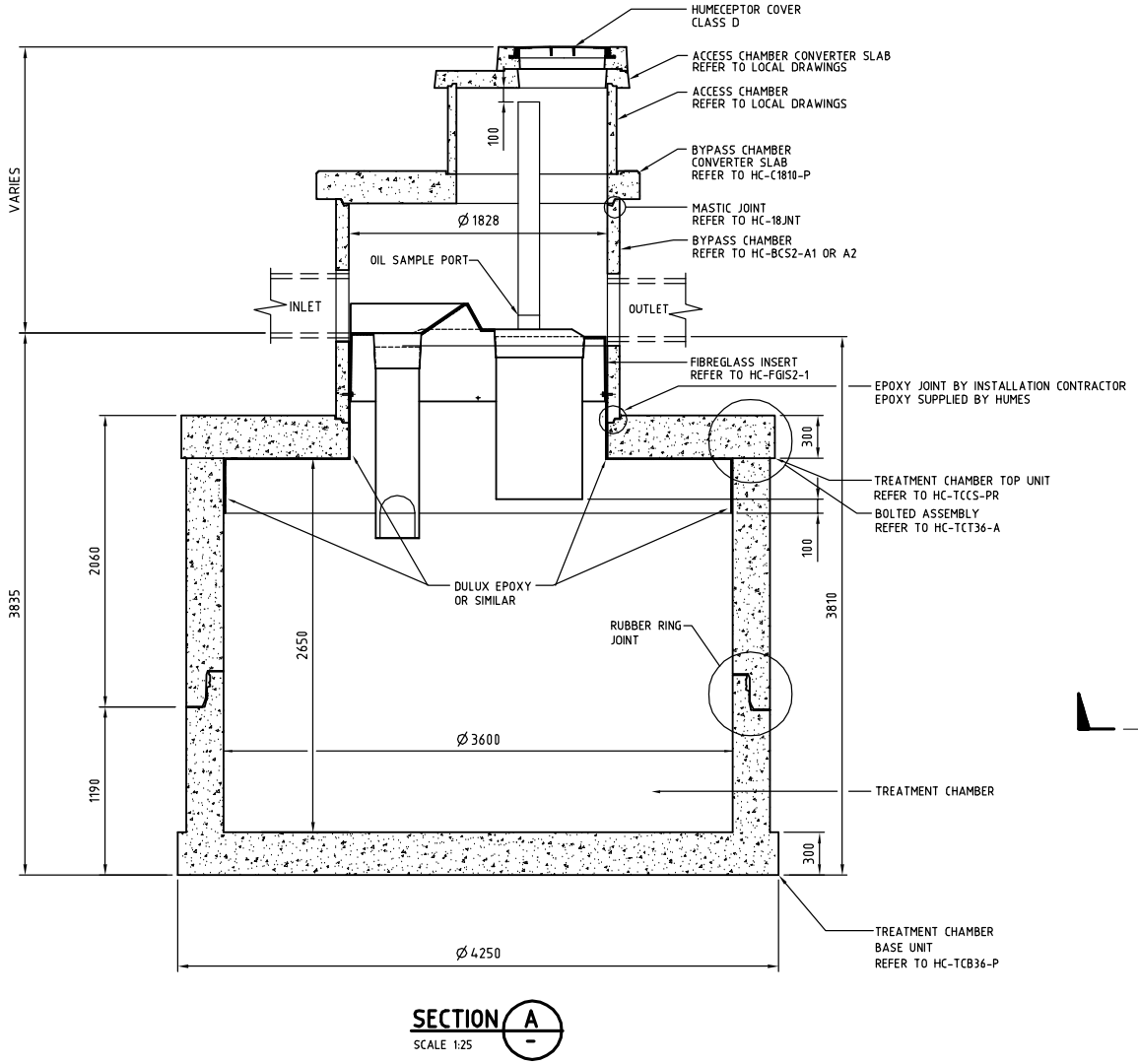
Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

DSN.	DFW	28-01-03
DWN.	M.Z.	28-01-03
CKD.	DFW	03-09-03
APP.	DFW	03-09-03

HUMECEPTOR™
STANDARD DRAWINGS
STC-23 HUMECEPTOR
ASSEMBLY DRAWING

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:25	A2	HC-STC23-A	0

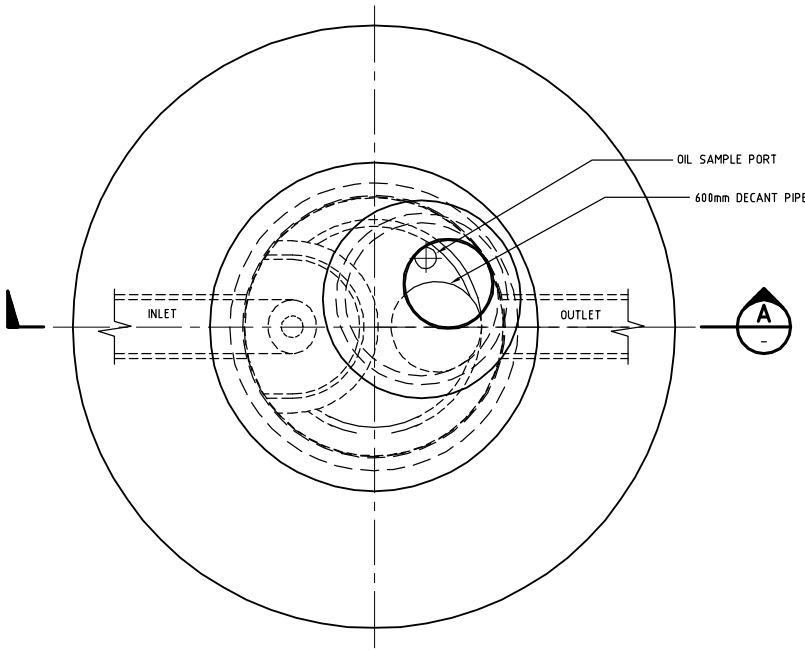
ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	UPDATED AND REISSUED FOR MANUFACTURE	RM	22-04-04	DFW



SECTION A-A
SCALE 1:25

NOTES:

1. TYPICAL ASSEMBLY DETAIL ONLY - REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS.
2. DIMENSIONS INCLUDED ARE STANDARD.
3. STORAGE VOLUMES TOTAL = 29220 LITRES OIL
   STORAGE VOLUME = 4290 LITRES
   SEDIMENT STORAGE VOLUME = 23.50 m3
4. COMPONENT MASSES TREATMENT CHAMBER BASE UNIT (INCL. SHAFT) = 18.3 t
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB + SHAFT) = 23.2 t
5. BYPASS CHAMBER = VARIES REFER TO BYPASS CHAMBER ASSEMBLY DRAWING FOR FIXING DETAILS FOR FIBREGLASS INSERT.
6. BYPASS CHAMBER CONVERTER SLAB TO SUIT LOCAL ACCESS CHAMBER UNITS.
7. FOR INLET AND OUTLET PIPE CONNECTION DETAILS REFER HC-BCS2-A1 OR A2 AND KOR- N-SEAL INSTALLATION INSTRUCTIONS.
8. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS (REFER PRODUCT DRAWINGS)
9. NOTE MARKINGS - INLET AND OUTLET OVER EACH.
10. JOINT SEALANT AS PER MANUFACTURERS RECOMMENDATIONS.
11. VENT PIPE AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.



PLAN
SCALE 1:25

Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

IMPORTANT INSTALLATION INFORMATION

1. FOUNDATION REQUIREMENTS - MIN. ALLOWABLE BEARING CAPACITY REQUIRED 200 kPa
2. UNIT TO BE PLACED ON 150mm THICK BED ZONE MATERIAL IN ACCORDANCE WITH AS3725 REQUIREMENTS
3. TREATMENT CHAMBER SHOULD BE FILLED WITH WATER TO 2/3 DEPTH IMMEDIATELY AFTER INSTALLATION (UNIT MAY FLOAT PRIOR TO BACKFILLING)

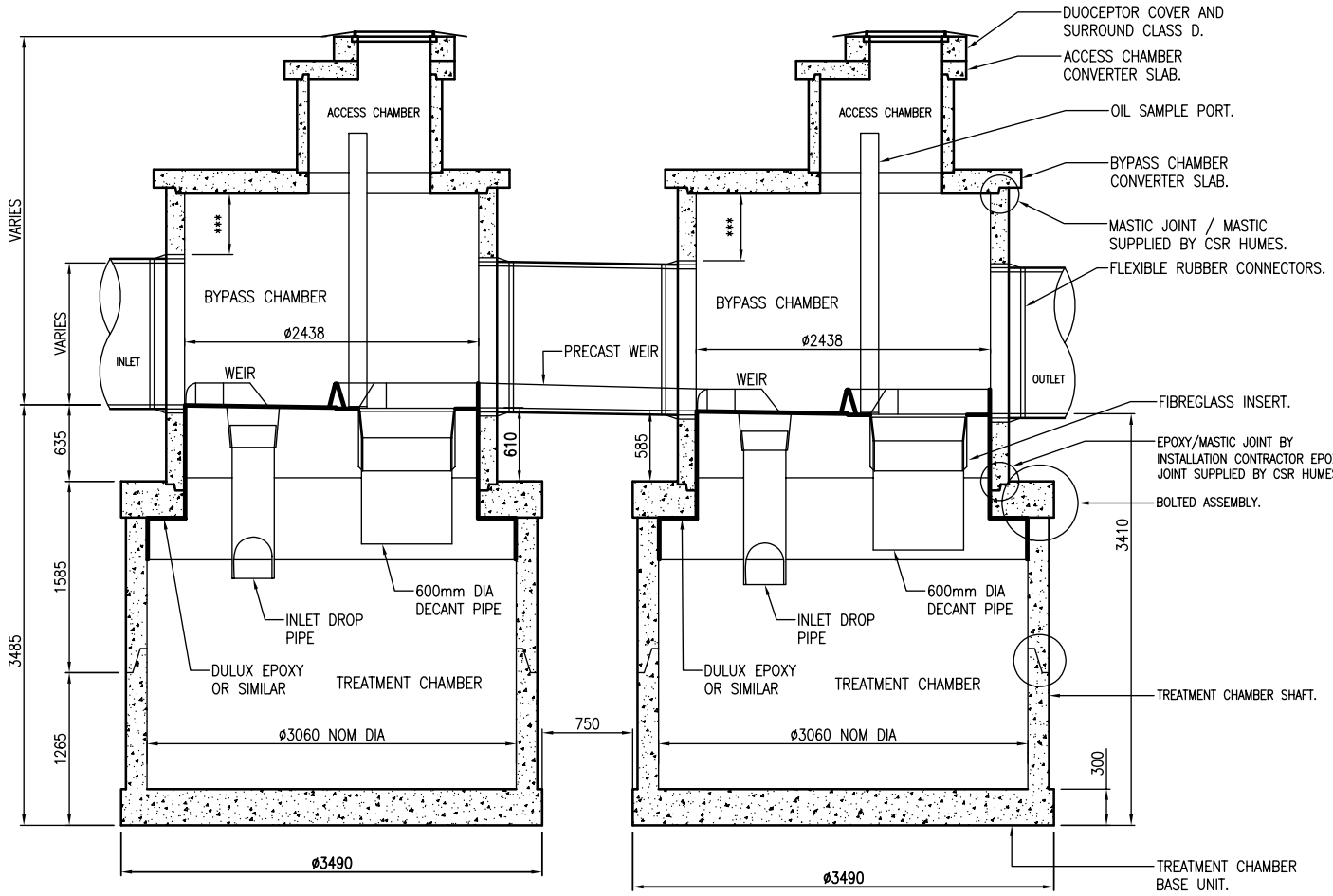
RUBBER RING JOINT SPECIFICATION

MATERIAL	: NITRILE
HARDNESS	: 43 (± 3) IRHD (AS1646)
PROFILE	: L 38 (REFER Dwg. J1002-01)
ID	: 3400 ± 16mm

DSN.	DFW	19-04-04
DWN.	RM	19-04-04
CKD.	DFW	19-04-04
APP.	DFW	19-04-04

HUMECEPTOR™
STANDARD DRAWING
STC-27 HUMECEPTOR
ASSEMBLY DRAWING

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:25	A2	HC-STC27-A	0



FOR INFORMATION

*150 MIN FOR INLET /OUTLET PIPE < 675 DIA
*300 MIN FOR INLET /OUTLET PIPE > 750 DIA

1. TYPICAL ASSEMBLY DETAIL ONLY – REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS.

2. DIMENSIONS INCLUDED ARE STANDARD.

3. STORAGE VOLUMES
   TOTAL = 42,370 LITRES
   OIL STORAGE VOLUME = 10,585 LITRES
   SEDIMENT STORAGE VOLUME = 27 m3

4. COMPONENT MASSES
   TREATMENT CHAMBER BASS UNIT (INC. SHAFT) = 11.92 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB AND SHAFT) = 8.95 TONNE
   BYPASS CHAMBER = 9.74 TONNE

5. REFER TO INSTALLATION GUIDE FOR RECOMMENDED INSTALLATION PROCEDURE.

6. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS THE FOLLOWING SWIFTLIFT KNUCKLES WILL BE REQUIRED:
   6 x 1.3 TONNES
   8 x 2.5 TONNES
   8 x 10.0 TONNES

7. OIL SAMPLE PORT, STEP IRONS AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

8. THE ABOVE WEIGHTS ARE ONLY APPROXIMATIONS OF THE ACTUAL FINAL WEIGHTS OF COMPONENTS AND ARE NOT TO BE USED.

NOT FOR CONSTRUCTION

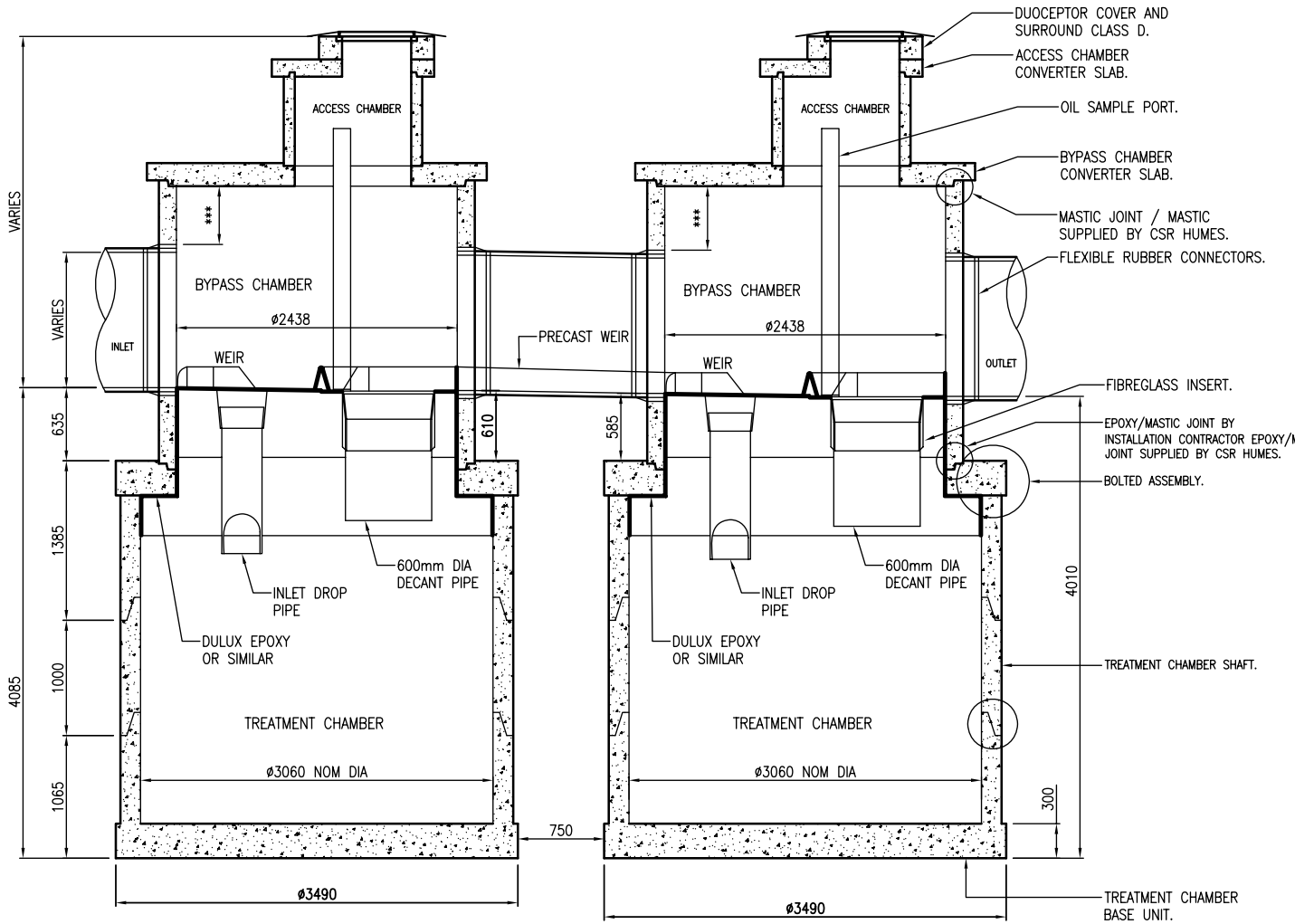
Humes

CLIENT: N/A
CLIENT NAME:

ISSUE	REVISION	INITIAL	DATE
A	ISSUE FOR CLIENT INFORMATION	JCM	25/10/07

JOB NAME: DUOCEPTOR STC40
JOB NO. N/A

DRAWING TITTLE:	GENERAL ARRANGEMENT			
DRAWING NO.	BIS-DUO-003			
DESIGNED BY:	–		MODEL:	STC60
DRAWN BY:	JCM	25/10/07	SCALE:	1:40
CHECKED BY:	CK	25/10/07	SIZE: A3	REV. A



FOR INFORMATION

*150 MIN FOR INLET /OUTLET PIPE < 675 DIA
*300 MIN FOR INLET /OUTLET PIPE > 750 DIA

1. TYPICAL ASSEMBLY DETAIL ONLY – REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS.

2. DIMENSIONS INCLUDED ARE STANDARD.

3. STORAGE VOLUMES
   TOTAL = 50,525 LITRES
   OIL STORAGE VOLUME = 10,585 LITRES
   SEDIMENT STORAGE VOLUME = 35 m3

4. COMPONENT MASSES
   TREATMENT CHAMBER BASS UNIT (INC. SHAFT) = 11.02 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB AND SHAFT) = 12.50 TONNE
   BYPASS CHAMBER = 9.74 TONNE

5. REFER TO INSTALLATION GUIDE FOR RECOMMENDED INSTALLATION PROCEDURE.

6. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS THE FOLLOWING SWIFTLIFT KNUCKLES WILL BE REQUIRED:
   6 x 1.3 TONNES
   8 x 2.5 TONNES
   8 x 10.0 TONNES

7. OIL SAMPLE PORT, STEP IRONS AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

8. THE ABOVE WEIGHTS ARE ONLY APPROXIMATIONS OF THE ACTUAL FINAL WEIGHTS OF COMPONENTS AND ARE NOT TO BE USED.

NOT FOR CONSTRUCTION

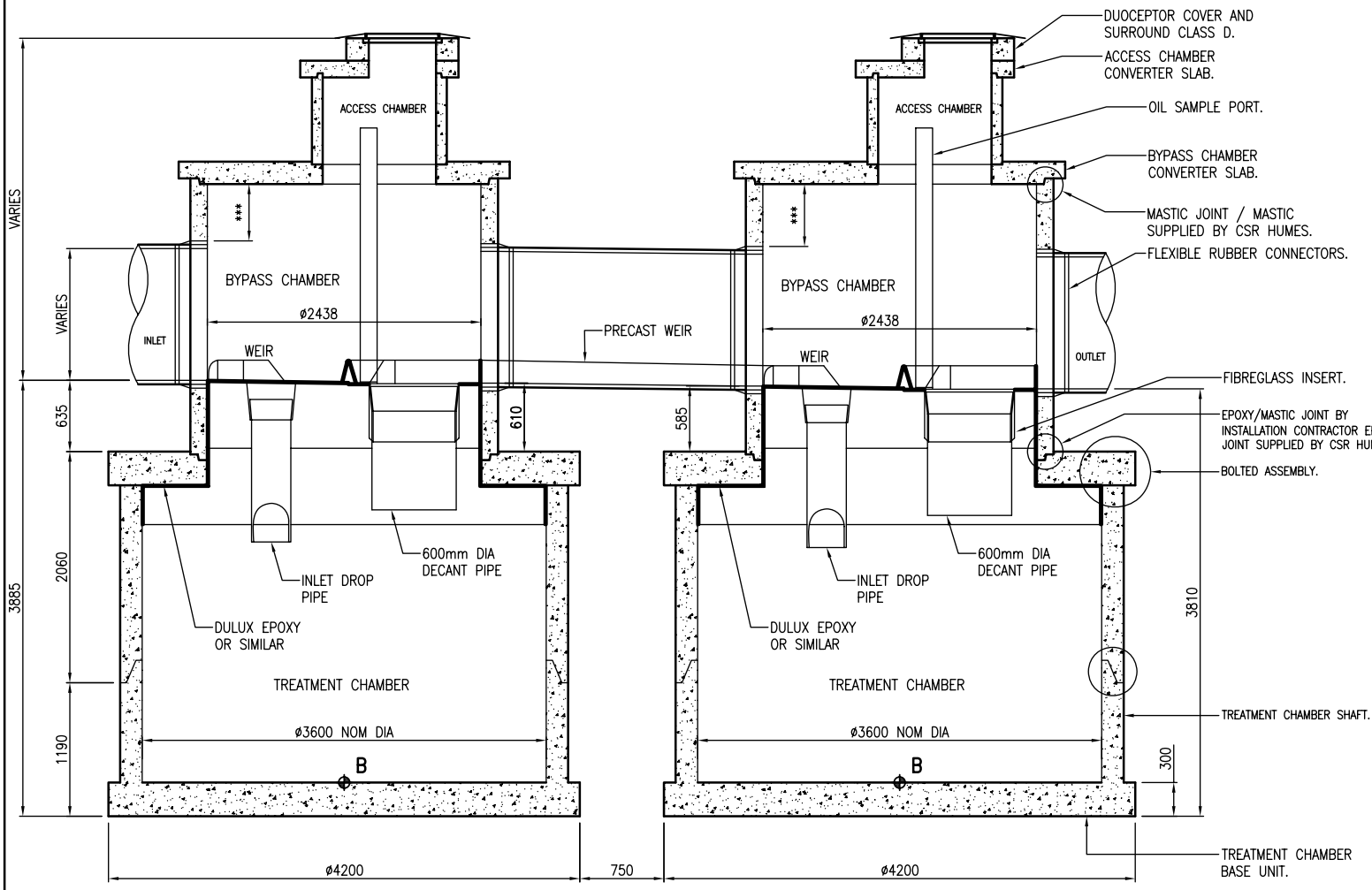
Humes

CLIENT: N/A
CLIENT NAME:

ISSUE	REVISION	INITIAL	DATE
A	ISSUE FOR CLIENT INFORMATION	JCM	25/10/07

JOB NAME: DUOCEPTOR STC50
JOB NO. N/A

DRAWING TITTLE:	GENERAL ARRANGEMENT		
DRAWING NO.	BIS-DUO-002		
DESIGNED BY:	–	MODEL:	STC60
DRAWN BY:	JCM 25/10/07	SCALE:	1:40
CHECKED BY:	CK 25/10/07	SIZE: A3	REV. A



FOR INFORMATION

*150 MIN FOR INLET /OUTLET PIPE < 675 DIA
*300 MIN FOR INLET /OUTLET PIPE > 750 DIA

1. TYPICAL ASSEMBLY DETAIL ONLY – REFER TO PROJECT DRAWING FOR ACTUAL REQUIREMENTS.

2. DIMENSIONS INCLUDED ARE STANDARD.

3. STORAGE VOLUMES
   TOTAL = 60,255 LITRES
   OIL STORAGE VOLUME = 11,560 LITRES
   SEDIMENT STORAGE VOLUME = 42 m3

4. COMPONENT MASSES
   TREATMENT CHAMBER BASS UNIT (INC. SHAFT) = 16.20 TONNE
   TREATMENT CHAMBER TOP UNIT (CONV. SLAB AND SHAFT) = 12.46 TONNE
   BYPASS CHAMBER = 9.74 TONNE

5. REFER TO INSTALLATION GUIDE FOR RECOMMENDED INSTALLATION PROCEDURE.

6. SWIFTLIFT LIFTING ANCHORS PROVIDED FOR LIFTING ALL COMPONENTS THE FOLLOWING SWIFTLIFT KNUCKLES WILL BE REQUIRED:
   6 x 1.3 TONNES
   8 x 2.5 TONNES
   8 x 10.0 TONNES

7. OIL SAMPLE PORT, STEP IRONS AND DECANT PIPE TO BE VISIBLE AS PER PLAN VIEW.

8. THE ABOVE WEIGHTS ARE ONLY APPROXIMATIONS OF THE ACTUAL FINAL WEIGHTS OF COMPONENTS AND ARE NOT TO BE USED.

NOT FOR CONSTRUCTION

Humes

CLIENT: N/A
CLIENT NAME:

ISSUE	REVISION	INITIAL	DATE
A	ISSUE FOR CLIENT INFORMATION	JCM	25/10/07

JOB NAME: DOUCEPTOR STC60
JOB NO. N/A

DRAWING TITTLE:	GENERAL ARRANGEMENT		
DRAWING NO.	BIS-DUO-001		
DESIGNED BY:	–	MODEL:	STC60
DRAWN BY:	JCM 25/10/07	SCALE:	1:40
CHECKED BY:	CK 25/10/07	SIZE: A3	REV. A

Precast solutions

Top:
StormTrap® system

Middle:
RainVault® system

Bottom:
Segmental shaft

Stormwater

Stormwater treatment

Primary treatment

- HumeGard® Gross Pollutant Trap

Secondary treatment

- HumeCeptor® hydrodynamic separator

Detention and infiltration

StormTrap® system

Soakwells

Harvesting and reuse

RainVault® system

ReserVault® system

RainVault® Mini system

Precast concrete cubes

Segmental shafts

Stormwater drainage

Steel reinforced concrete pipes – trench

Steel reinforced concrete pipes – salt water cover

Steel reinforced concrete pipes – jacking

Box culverts

Uniculvert® modules

Headwalls

Stormwater pits

Access chambers/Manholes

Kerb inlet systems

Floodgates

Geosynthetics

Sewage transfer and storage

Bridge and platform

Tunnel and shaft

Walling

Potable water supply

Irrigation and rural

Traffic management

Cable and power management

Rail

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