

## **ANNEXURE 10**

**Stormwater Management Plan**

**prepared by**

**Allen Price & Associates**

## DRAINAGE REPORT



Allen Price & Scarratts Pty Ltd  
Land & Development Consultants  
75 Plunkett Street  
NOWRA NSW 2541

Client: Manildra  
Project: Stormwater Concept – Proposed Beverage Grade Ethanol Plant  
Project No: N26855  
SCC Ref: N/A  
Date: 22 November 2016

# **PROPOSED DEVELOPMENT DRAINAGE DESIGN REPORT at**

# **160 BOLONG ROAD, BOMADERRY**

This report has been prepared to support a development application in accordance with Shoalhaven City Council's DCP2014 and Subdivision Engineering Specification D5 for events from the 10% AEP to 1% AEP.

Calculations have been prepared by a qualified practicing engineer using Colebrook-White Method and Rational Methods.

The proposed development includes construction of multiple facilities including Cooling Towers, Evaporator and an electrical substation. In addition it is proposed to construct a large pad area for ISO Tank container storage as well as the serving access road. The majority of the existing site is an unbound pavement surface that is so compacted and consolidated by heavy vehicle movements that it is considered to be completely impermeable. The site grades at approximately 4% uniformly towards the existing table drain in the Bolong Rd road reserve. Before entering the road reserve there is an approx 3-5m wide strip of grass and vegetation that acts as an informal filter for the site overflow (to be maintained in post development). There is a strip of grassed area within the site to be reconfigured as part of the access road, however it is considered to have very low permeability due to the minimal vegetation cover and consolidation achieved due to heavy scrap material storage in the area.

As there is no overall change in impervious area for the development, the total discharge pre and post development is determined to be equal and as such no additional detention is required. Excluded from this assessment are the cooling towers and evaporators which will be bunded and have their drainage pumped to the existing first flush system which provides OSD for these areas.

As the existing site drainage is by overland flow it is also considered that there will be no net change to water quality for discharge from the site.

The substation building is recommended to discharge to the ground surface by the T-junction spreaders detailed in Appendix E. This will assist to prevent scouring and will sheet the captured roofwater overland to as best as possible mimic the existing condition.

In compliance with Shoalhaven City Council's DCP2014 and Subdivision Engineering Specification D5 the Major and Minor drainage systems have been designed and summarised as follows:

Minor Drainage (10% AEP):

- Piped flows from substation roof are to be discharged via spreaders to ground surface.
- Based upon the site being 83% paved, the permissible discharge of the site is  $0.388\text{m}^3/\text{s}$  for 10% AEP (See Appendix A).
- Post development the total discharge from the proposed allotment is  $0.388\text{m}^3/\text{s}$  for 10% AEP (See Appendix A).
- The post-development peak flow rates from the site do not exceed the pre-development peak flow rates.
- Cooling towers to be bunded and pumped at rate of  $0.024\text{m}^3/\text{s}$
- Evaporators to be bunded and pumped at rate of  $0.029\text{m}^3/\text{s}$
- Appendix E indicates the location for possible pipe work and future design requirements.

Major Drainage (1% AEP):

- All major drainage flows are to discharge from the site overland as sheet flows. No stormwater is proposed to discharge into adjoining private properties in a concentrated manner.
- Based upon the site being 83% paved, the permissible discharge of the site is  $0.537\text{m}^3/\text{s}$  for 1% AEP.
- Post development the total discharge from the proposed allotment is  $0.537\text{m}^3/\text{s}$  for 1% AEP.
- The post-development peak flow rate from the site does not exceed the pre-development peak flow rate.

Appendix A to E show the calculations verifying that the discharge from the site for design events up to and including the 100 year average recurrence interval does not exceed the pre-developed conditions.

## APPENDIX A – DRAINS LEGEND

### LEGEND OF TYPICAL DRAINS SYMBOLS:

CATCHMENTS SHOWN THUS:



CatA1

PITS SHOWN THUS:



PitA1



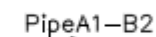
N-EXISTING

NODES SHOWN THUS:



Basin1

DETENTION BASINS SHOWN THUS:



PipeA1-B2

PIPES SHOWN THUS:



OFA1

OVERLAND FLOW PATHS SHOWN THUS:



Chnl1

OPEN CHANNELS SHOWN THUS:

0.057

FLOW (m<sup>3</sup>/s) IN PIPES AND OPEN  
CHANNELS SHOWN THUS:

0.006

FLOW (m<sup>3</sup>/s) IN OVERLAND FLOW PATH  
SHOWN THUS:

0.057

FLOW (m<sup>3</sup>/s) FROM CATCHMENTS SHOWN  
THUS:

3.65

TOP WATER LEVEL IN PITS AND OPEN  
CHANNELS SHOWN THUS:

3.95  
3.95

UPSTREAM AND DOWNSTREAM HYDRAULIC  
GRADE LEVEL IN PITS AND PIPES SHOWN  
THUS:





LEGEND FOR THE OUTPUT FROM  
THE DRAINS PROGRAM



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RATIO DATE OCT 2015 REF: DRAINS

APPENDIX B – DRAINS DATA

 Pre-Development  
 Bolong Road

 Post-Development  
 Bolong Road Post

 Cooling Towers  
 Pump Out 1

 Evaporators  
 Pump Out 2

## APPENDIX C – DRAINS 1:10YR (10% AEP) EVENT

 0.388  
○

 0.388  
○

 0.024  
○

 0.029  
○

1 in 10 year (10% AEP) Summary:

Pre development flows for 10% AEP = 0.388m<sup>3</sup>/s (Excluding Bunded Areas)

Post development flows for 10% AEP = 0.388m<sup>3</sup>/s (Excluding Bunded Areas)

## APPENDIX D – DRAINS 1:100YR (1% AEP) EVENT

 0.537

 0.537

 0.034

 0.040

1 in 100 year (1% AEP) Summary:

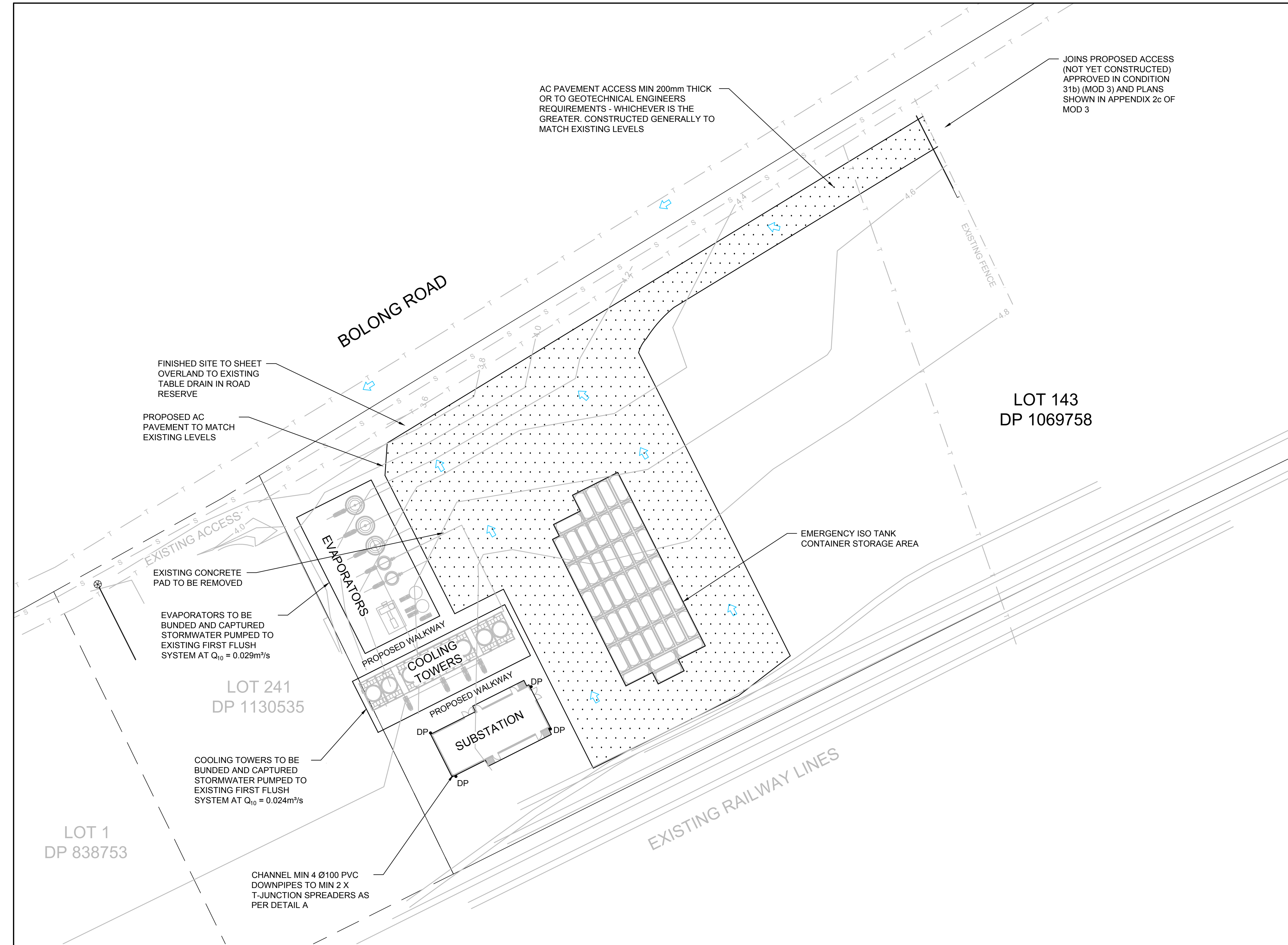
Pre development flows for 1% AEP = 0.537m<sup>3</sup>/s (Excluding Bunded Areas)

Post development flows for 1% AEP = 0.537m<sup>3</sup>/s (Excluding Bunded Areas)



APPENDIX E: ENGINEERING DRAWINGS

N26855-401 – Concept Stormwater Drainage Plan



LAYOUT PLAN  
SCALE 1:500

## LEGEND

- DP • POSSIBLE DOWNPIPE LOCATION MIN Ø100
- PROPOSED UNBOUND PAVEMENT
- OVERLAND FLOW LINES

## PRE-DEVELOPMENT

NOTE: BUNDED AREAS EXCLUDED FROM ASSESSMENT AS PUMPING TO FIRST FLUSH SYSTEM PROVIDES REQUIRED OSD

SUPPLEMENTARY PAVED AREA FROM SITE OVERLAND (INCLUDING HEAVILY CONSOLIDATED UNOAVED STRIP) = 6412m<sup>2</sup> (83%)  
TOTAL PAVED AREAS = 6412m<sup>2</sup> (83%)

PERVIOUS AREA FROM SITE OVERLAND = 1313m<sup>2</sup> (17%)  
TOTAL PAVED AREAS = 1313m<sup>2</sup> (17%)

TOTAL SITE AREA = 7725m<sup>2</sup> (100%)

TOTAL SITE DISCHARGE:  
FOR 1:10YR EVENT = 0.388m<sup>3</sup>/s  
FOR 1:100YR EVENT = 0.537m<sup>3</sup>/s

## POST-DEVELOPMENT

PIPED DISCHARGE TO DIFFUSER FROM SUBSTATION = 266m<sup>2</sup> (3%)  
TOTAL PIPED AREAS = 266m<sup>2</sup> (3%)

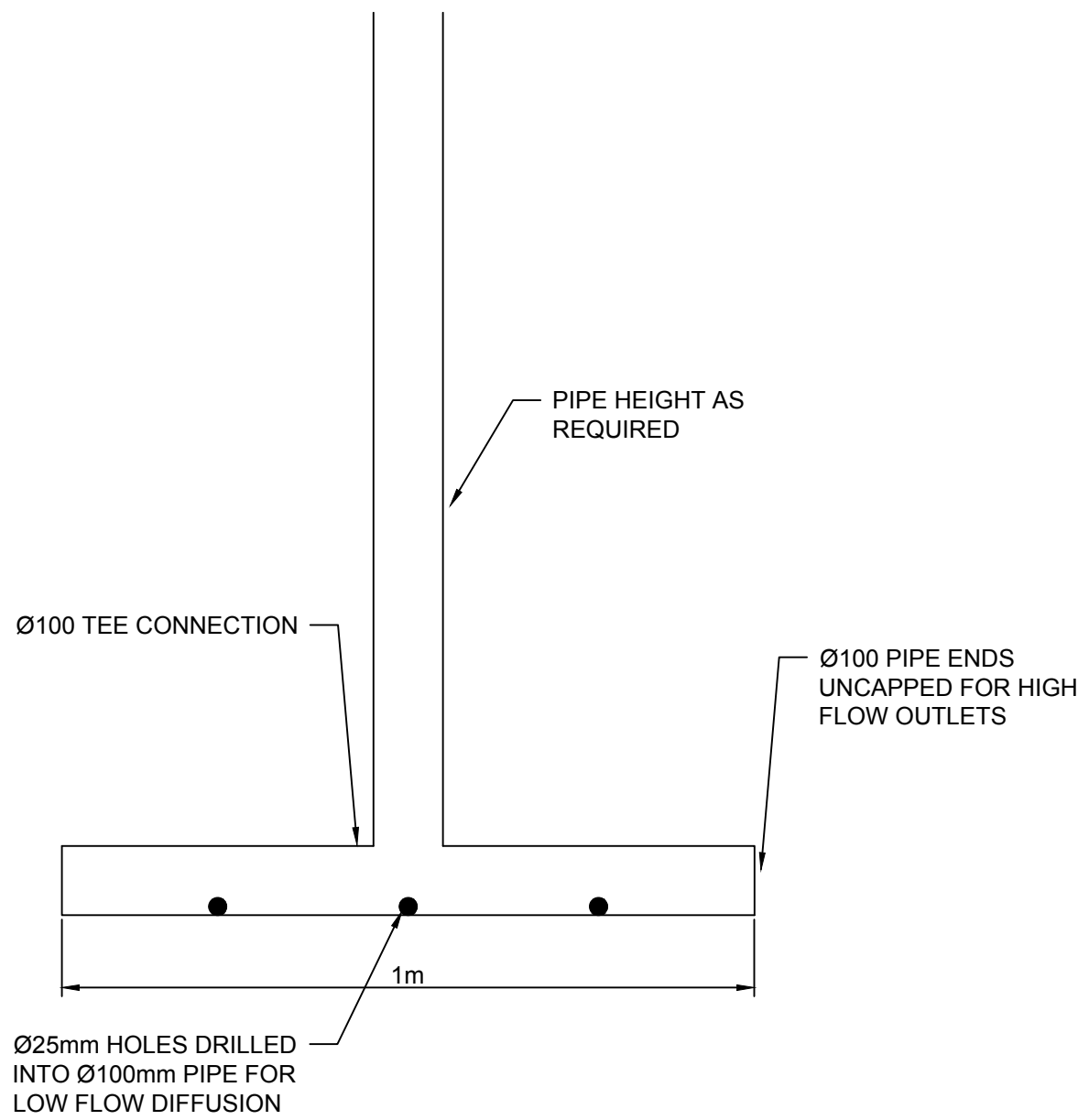
SUPPLEMENTARY PAVED AREA FROM SITE OVERLAND = 6146m<sup>2</sup> (80%)  
TOTAL PAVED AREAS = 6146m<sup>2</sup> (80%)

PERVIOUS AREA FROM SITE OVERLAND = 1313m<sup>2</sup> (17%)  
TOTAL PAVED AREAS = 1313m<sup>2</sup> (17%)

TOTAL SITE AREA = 7725m<sup>2</sup> (100%)


TOTAL SITE DISCHARGE WITH DETENTION 1:10YR EVENT = 0.388m<sup>3</sup>/s  
TOTAL SITE DISCHARGE WITH DETENTION 1:100YR EVENT = 0.537m<sup>3</sup>/s

NOTE:  
DOWNPIPE LOCATIONS ARE INDICATIVE ONLY.



DETAIL A  
SCALE 1:10

M:\Projects\20000\26000\N26855\Drawings\N26855-401.dwg

BEWARE!			
THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE, AT THE CONTRACTOR'S EXPENSE, FOR ANY REPAIRS TO DAMAGE CAUSED DURING CONSTRUCTION.			
RATIO:  1:500 (AT A1 ORIGINAL)	DATUM: AUSTRALIAN HEIGHT DATUM ORIGIN: PM 127396 RL 4.00 DATE OF PLAN: NOVEMBER 2016	SURVEY DESIGN DRAWN CHECK'D	MAK RMH RMH MAK

REV	DESCRIPTION	BY	DATE
0	ISSUED FOR CONCEPT APPROVAL	RMH	22/11/16

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CONCEPT STORMWATER DRAINAGE PLAN FOR  
PROPOSED BEVERAGE GRADE ETHANOL PLANT  
OVER LOT 143 DP 1069758  
160 BOLONG ROAD BOMADERRY  
FOR MANILDRA

DRAWING STATUS FOR CONCEPT APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES	DRAWING NUMBER N26855-401	SHEET 01 OF 01	REVISION 0
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0 5 10 15 20 25  
SCALE:- 1:500

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