

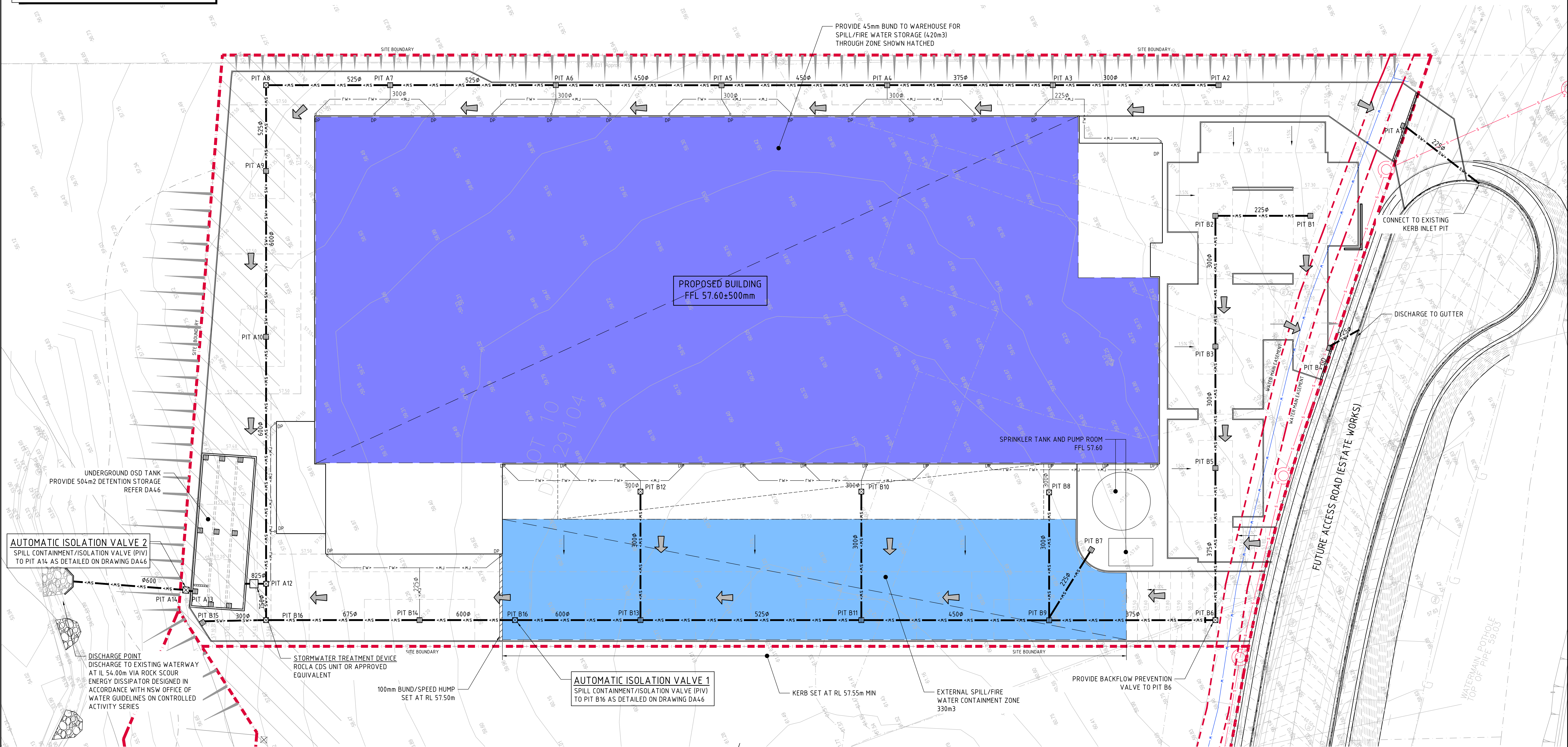
- LEGEND:**  
LEVELS DATUM IS AHD.
- SGGP, SINGLE GRATED GULLY PIT
  - SJP, SEALED JUNCTION PIT
  - DOWNPIPE (INDICATIVE ONLY)
  - GRATED DRAIN
  - DRAINAGE LINE
  - ROOFWATER LINE
  - EXISTING DRAINAGE LINE
  - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
  - FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
  - OVERLAND FLOW ARROWS

PIT SCHEDULE - LINE A

| PIT No. | GRATE RL | TYPE    | SIZE      | COMMENT |
|---------|----------|---------|-----------|---------|
| PIT A1  | 57.00    | S.G.G.P | 900x900   |         |
| PIT A2  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A3  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A4  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A5  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A6  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A7  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A8  | 57.55    | S.G.G.P | 900x900   |         |
| PIT A9  | 57.35    | S.G.G.P | 900x900   |         |
| PIT A10 | 57.40    | S.G.G.P | 900x900   |         |
| PIT A11 | NOT USED |         |           |         |
| PIT A12 | 57.47    | S.J.P   | 1200x1200 |         |
| PIT A13 | 57.25    | S.J.P   | 900x900   |         |
| PIT A14 | 57.00    | P.I.V   | 1200x1200 |         |

PIT SCHEDULE - LINE B

| PIT No. | GRATE RL | TYPE    | SIZE      | COMMENT |
|---------|----------|---------|-----------|---------|
| PIT B1  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B2  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B3  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B4  | 56.70    | S.G.G.P | 900x900   |         |
| PIT B5  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B6  | 58.20    | S.J.P   | 900x900   |         |
| PIT B7  | 57.55    | S.G.G.P | 900x900   |         |
| PIT B8  | 57.55    | S.J.P   | 900x900   |         |
| PIT B9  | 57.20    | S.G.G.P | 900x900   |         |
| PIT B10 | 57.55    | S.J.P   | 900x900   |         |
| PIT B11 | 57.20    | S.G.G.P | 900x900   |         |
| PIT B12 | 57.55    | S.J.P   | 900x900   |         |
| PIT B13 | 57.20    | S.G.G.P | 900x900   |         |
| PIT B14 | 57.20    | S.G.G.P | 900x900   |         |
| PIT B15 | 57.00    | S.G.G.P | 900x900   |         |
| PIT B16 | 57.45    | S.J.P   | 1200x1200 |         |
| PIT B17 | 57.37    | P.I.V   | 1200x1200 |         |



STORMWATER DRAINAGE PLAN  
SCALE 1:250

FOR DEVELOPMENT APPLICATION

2m 0 5 10 15 20 25m  
SCALE 1:250 AT A0 SIZE PLOT

| REVISED PER FIRE WATER REQUIREMENTS | 30.04.18 | D     |
|-------------------------------------|----------|-------|
| ISSUED FOR DEVELOPMENT APPLICATION  | 15.12.17 | C     |
| ISSUED FOR DEVELOPMENT APPLICATION  | 15.12.17 | B     |
| ISSUED FOR INFORMATION              | 24.11.17 | A     |
| AMENDMENTS                          | DATE     | ISSUE |
| AMENDMENTS                          | DATE     | ISSUE |
| AMENDMENTS                          | DATE     | ISSUE |
| AMENDMENTS                          | DATE     | ISSUE |

| ARCHITECT | CLIENT |
|-----------|--------|
|           |        |
|           |        |
|           |        |

| DESIGNED | DRAWN | CHECKED  | DATE | SCALE | AS SHOWN | CAO REF.        |
|----------|-------|----------|------|-------|----------|-----------------|
| M.C.     | 1.0   | 24.11.17 | M.W. | A0    | AS SHOWN | C011994.01-DA41 |

| PROJECT                                                      | CLIENT |
|--------------------------------------------------------------|--------|
| NULON MOTORS<br>LOT8, BRINGELLY ROAD<br>HORNINGSEA PARK, NSW |        |
|                                                              |        |
|                                                              |        |

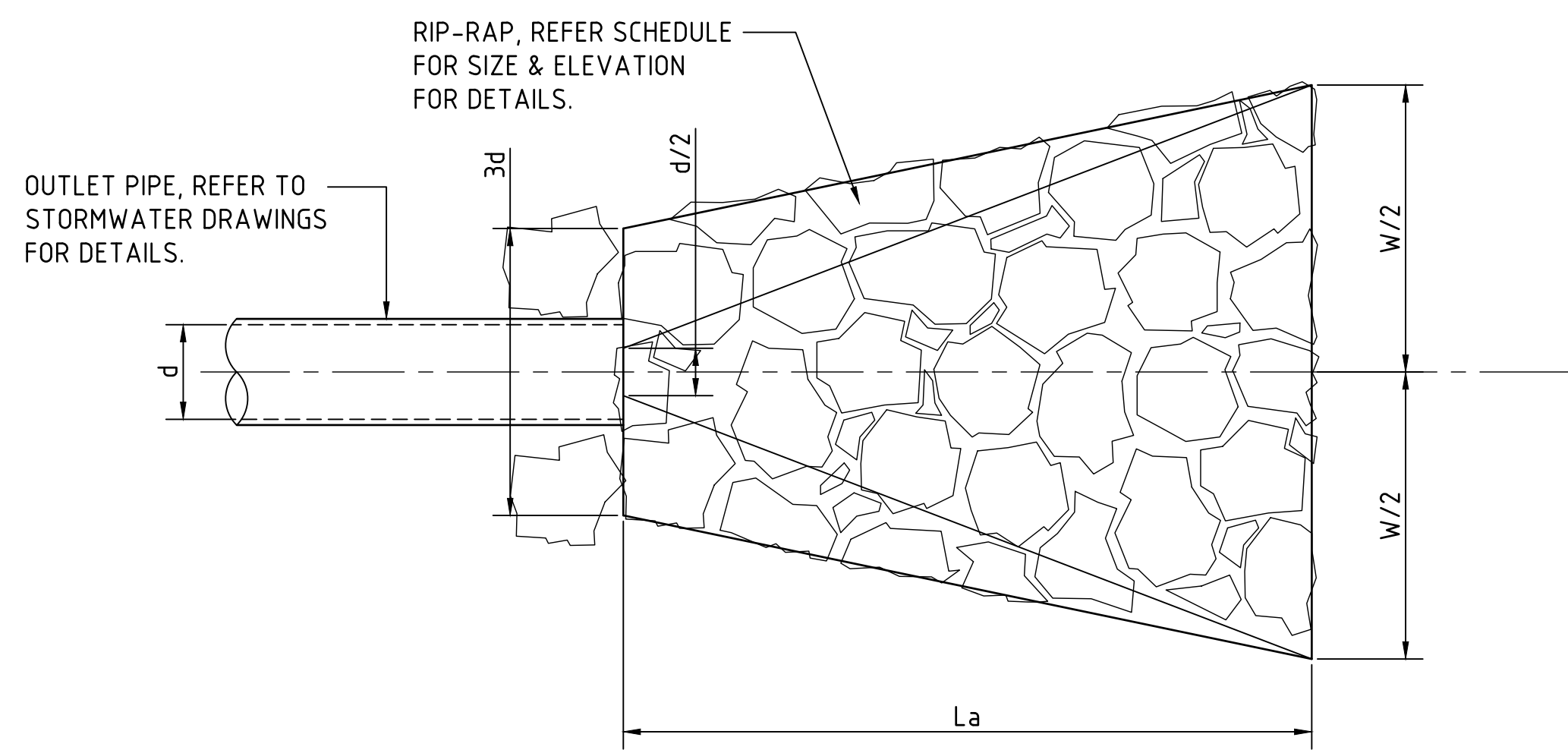
| Costin Roe Consulting Pty Ltd.                                                                                                      | Consulting Engineers |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Level 1, 8 Windmill Street<br>Wahia Bay, Sydney NSW 2000<br>Tel: (02) 9551-7999 Fax: (02) 9551-7921<br>email: mail@costinroe.com.au |                      |
|                                                                                                                                     |                      |
|                                                                                                                                     |                      |

Costin Roe Consulting

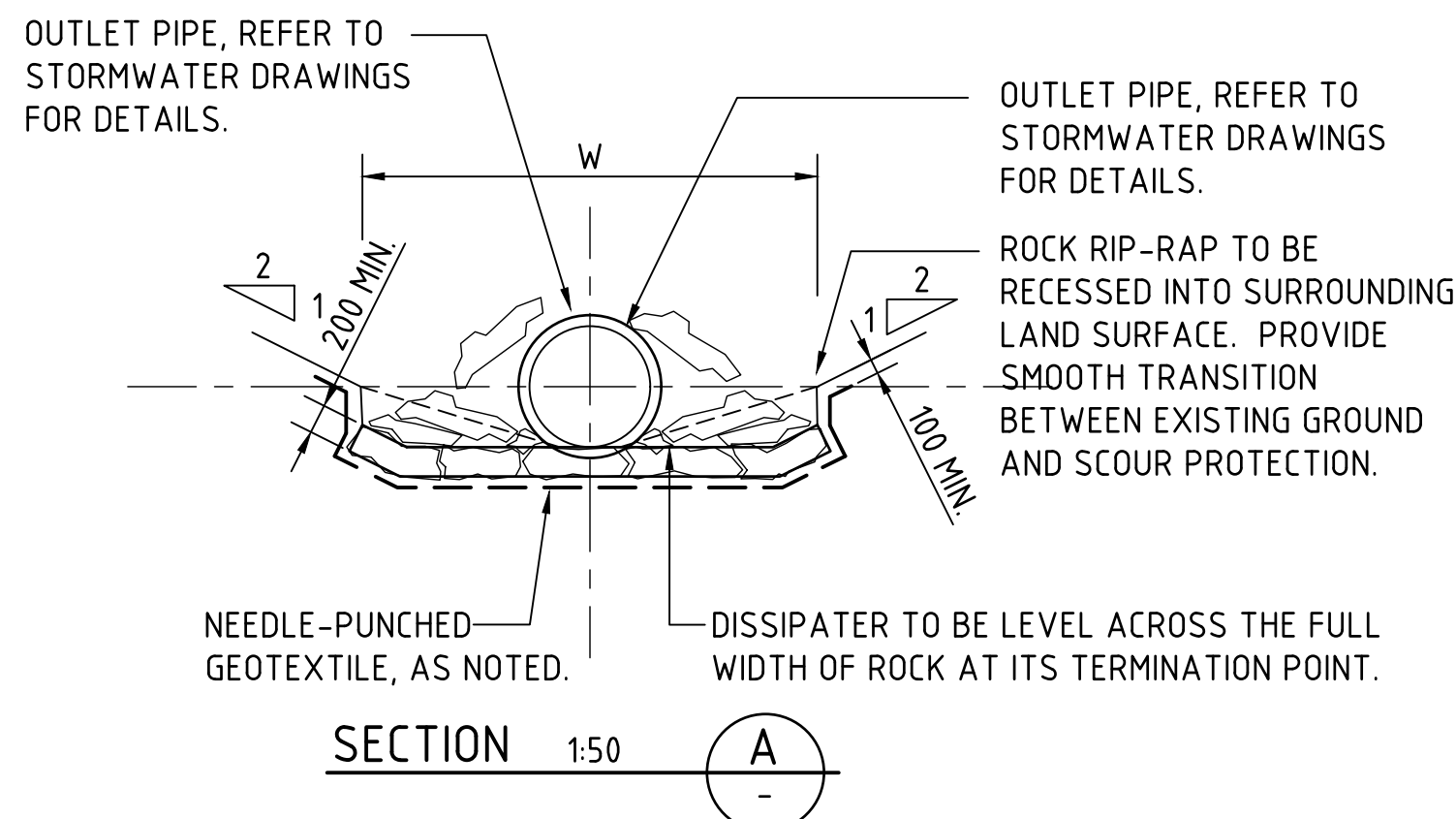
PRECISION | COMMUNICATION | ACCOUNTABILITY

| DRAWING TITLE            | DRAWING No      | ISSUE |
|--------------------------|-----------------|-------|
| STORMWATER DRAINAGE PLAN | C011994.01-DA41 | D     |





PLAN VIEW



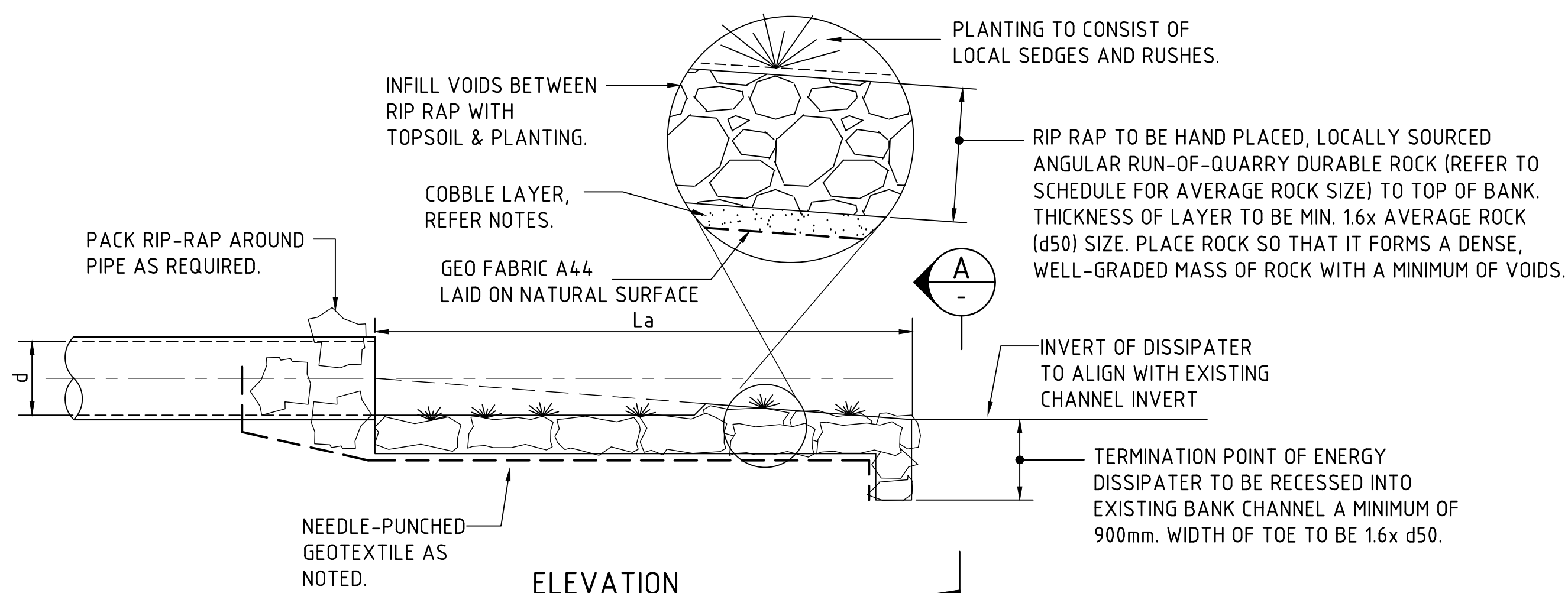
SECTION 1:50 A

DISSIPATER NOTES:

1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50=150mm MINIMUM) AS NOTED IN THE SCHEDULE. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 16x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.

DISSIPATER SCHEDULE

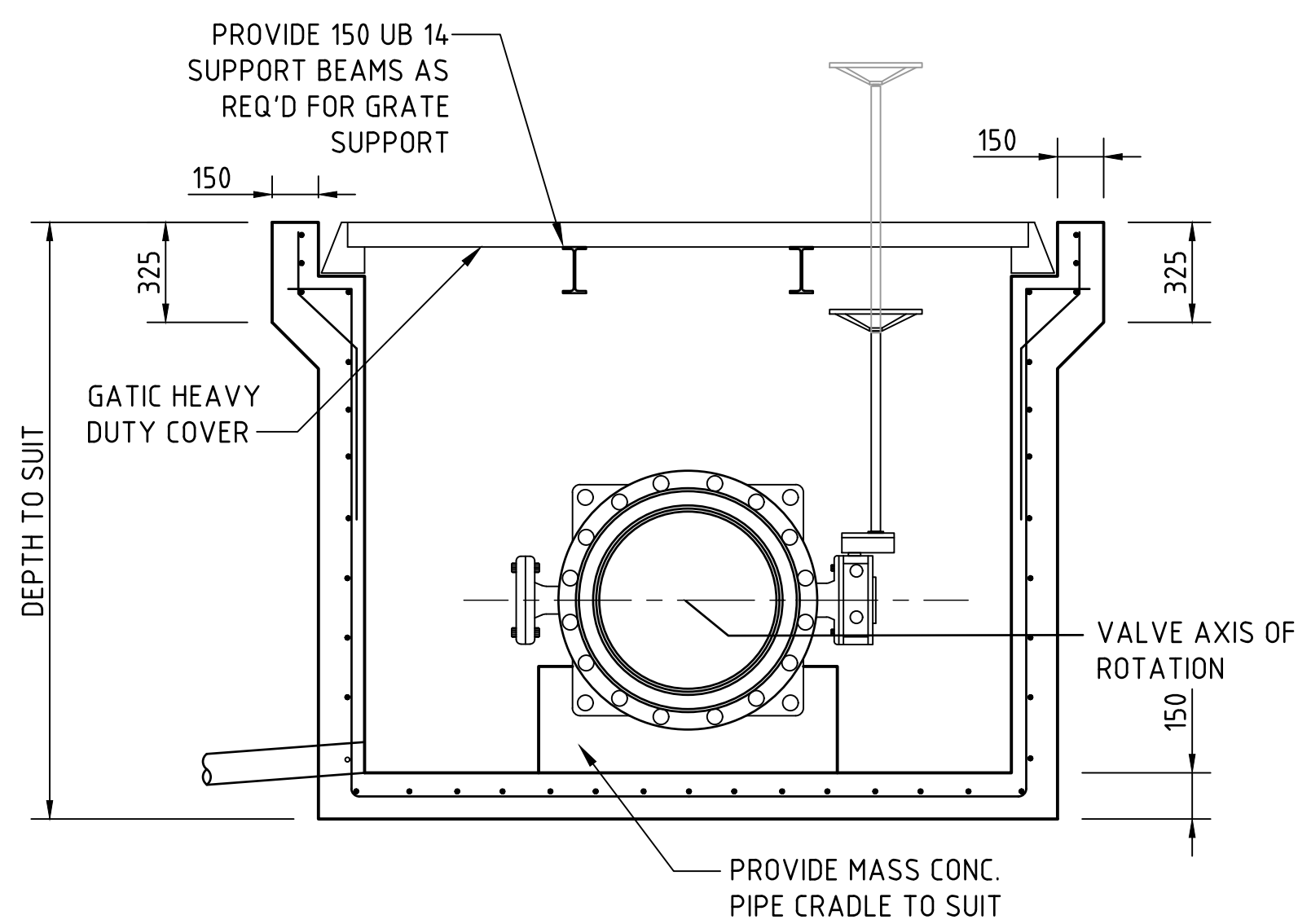
| DISCHARGE POINT | d   | La   | W    | RIP-RAP (d50) |
|-----------------|-----|------|------|---------------|
| OUTLET 1        | 600 | 2500 | 3100 | 250           |



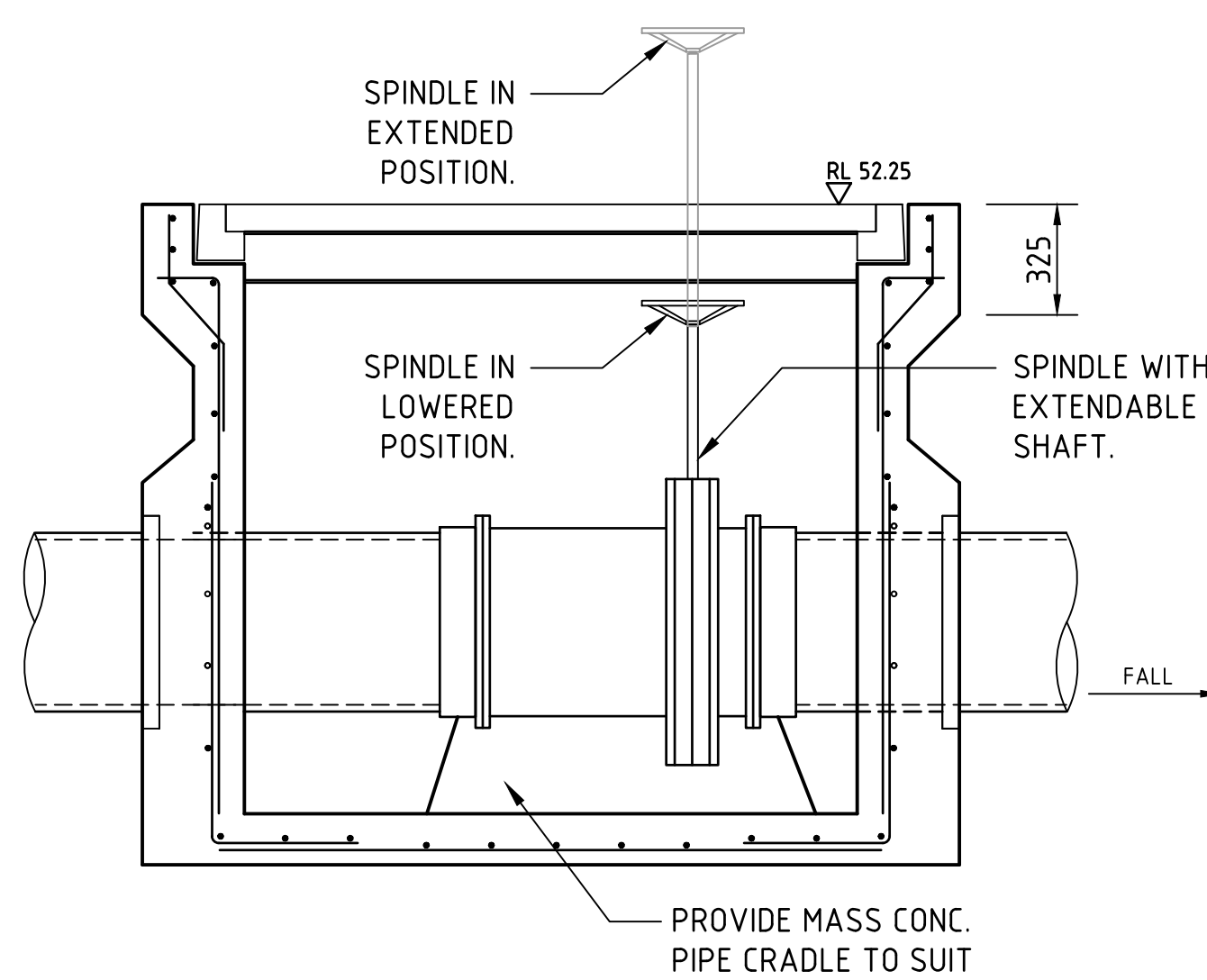
ELEVATION

STORMWATER OUTLET DISSIPATER

SCALE 1:50



CROSS-SECTION



LONG-SECTION

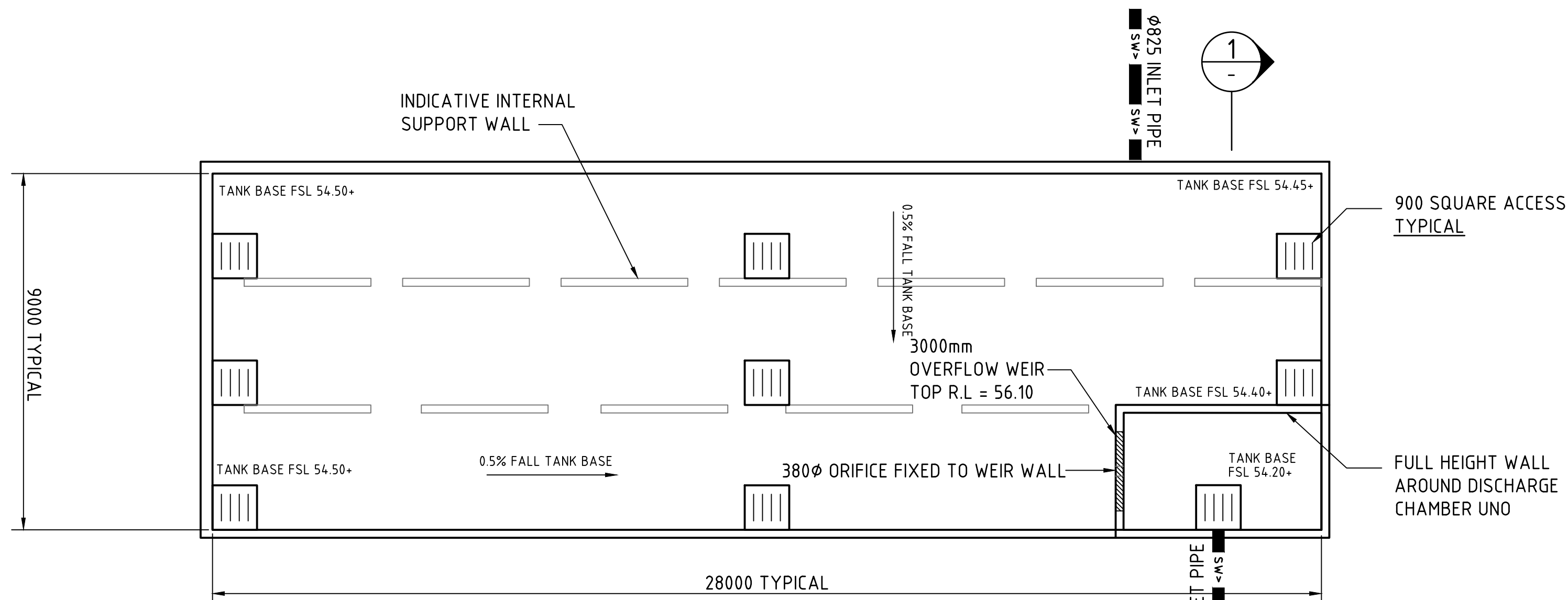
NOTE: ADJACENT RETAINING WALL AND BIO-BASIN NOT SHOWN FOR CLARITY.

AUTOMATIC POLLUTION ISOLATION VALVE (PIV) DETAILS - PIT A14 & PIT B16

SCALE 1:20

NOTE:

- KEYSTONE KNIFE VALVE OR PENSTOCK VALVE ALSO CONSIDERED. SUITABLE FOR SPILL WATER CONTAINMENT.
- VALVE LINKED TO FIRE SYSTEM PLUS SENSORS WITH ABILITY TO DETECT CONTAMINATED WATER.



BELOW GROUND OSD TANK PLAN

SCALE 1:100

OSD TANK DETAILS

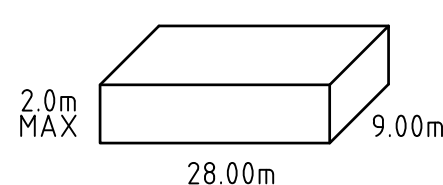
SITE AREA  
TOTAL SITE AREA 21 968m<sup>2</sup>

TOTAL SITE AREA DRAINING TO STORAGE (90% IMPERVIOUS) 21 968m<sup>2</sup>

STORAGE

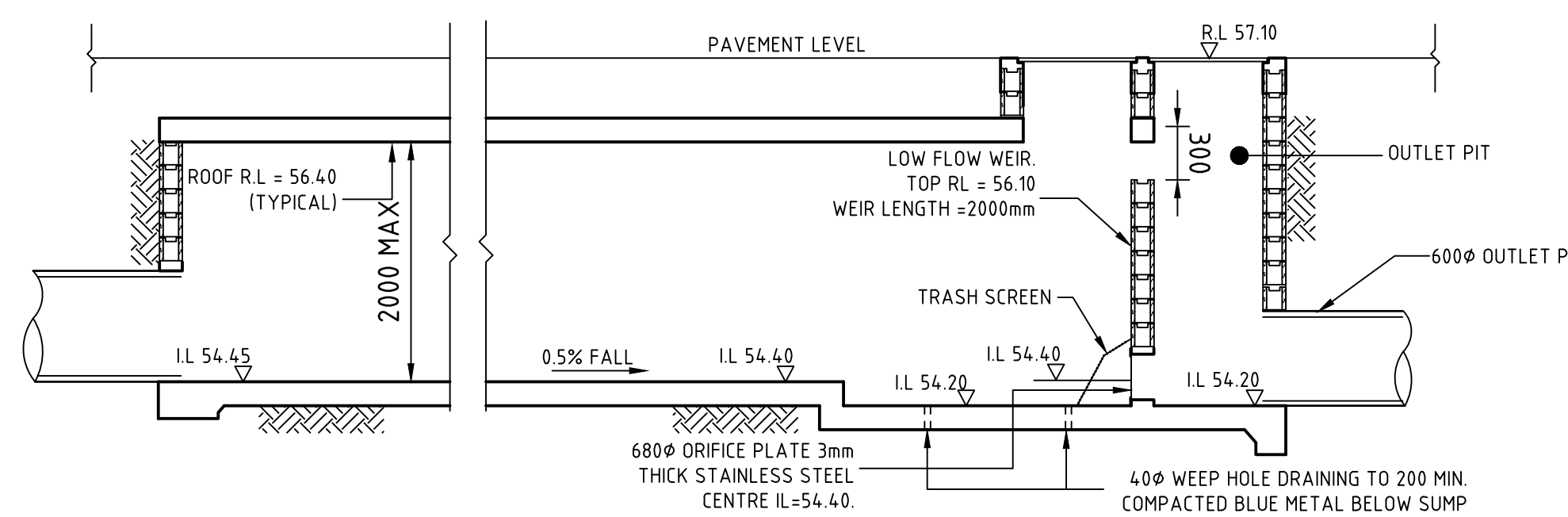
ORIFICE Ø 480mm  
VOLUME PROVIDED 504m<sup>3</sup>

INTERNAL TANK DIMENSIONS (INC. HIGH FLOW CHAMBERS)



OSD HYDRAULIC DETAILS

| STORM A.R.I EVENT | STORM DURATION | PRE-DEVELOPMENT FLOW (m <sup>3</sup> /s) | POST-DEVELOPMENT FLOW (UN-ATTENUATED) (m <sup>3</sup> /s) | POST-DEVELOPMENT FLOW (ATTENUATED) (m <sup>3</sup> /s) | OSD TANK WATER DEPTH (mm) | OSD TANK STORAGE VOLUME (m <sup>3</sup> ) |
|-------------------|----------------|------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|---------------------------|-------------------------------------------|
| 5 YEAR            | 1 HOUR         | 0.555                                    | 0.716                                                     | 0.349                                                  | 1.10                      | 278                                       |
| 20 YEAR           | 1 HOUR         | 0.625                                    | 0.750                                                     | 0.412                                                  | 1.62                      | 4.07                                      |
| 100 YEAR          | 2 HOURS        | 0.930                                    | 1.020                                                     | 0.768                                                  | 1.91                      | 4.79                                      |



SECTION 1:50 1: TYPICAL THRU' TANK



FOR DEVELOPMENT APPLICATION



# **CIVIL ENGINEERING REPORT DEVELOPMENT APPLICATION SSD 8900**

**NULON MOTOR OILS FACILITY  
LOT 8, BRINGELLY ROAD  
HORNINGSEA PARK**

***Prepared For:***

**Commercial & Industrial Property Pty Ltd  
Suite 59, Jones Bay Wharf  
26-32 Pirrama Road  
PYRMONT NSW 2009**

***Prepared by:***

**Costin Roe Consulting  
Level 1, 8 Windmill Street  
WALSH BAY NSW 2000**

**Rev: C**

**DOCUMENT VERIFICATION**

|                       |                                                               |
|-----------------------|---------------------------------------------------------------|
| <b>Project Title</b>  | Nulon Motor Oils, Lot 8 Bringelly Road                        |
| <b>Document Title</b> | Civil Engineering Report – Development Application            |
| <b>Project No.</b>    | Co11994.01                                                    |
| <b>Description</b>    | Civil engineering report for proposed industrial development. |
| <b>Client Contact</b> | Mr Paul Jewiss, Commercial & Industrial Property Pty Ltd      |

|                    |                       |                  |
|--------------------|-----------------------|------------------|
|                    | <b>Name</b>           | <b>Signature</b> |
| <b>Prepared by</b> | Isabella Oke          |                  |
| <b>Checked by</b>  | Mark Wilson           |                  |
| <b>Issued by</b>   | Mark Wilson           |                  |
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| 18 Dec. 2017 | B               | Mr Paul Jewiss, CIP | PDF               |
| 30 Apr. 2018 | C               | Mr Paul Jewiss, CIP | PDF               |
|              |                 |                     |                   |



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## **1 INTRODUCTION**

### **1.1 Introduction**

Commercial & Industrial Property proposes to develop a warehouse and distribution facility for Nulon Motor Oils in Horningsea Park, NSW.

The proposed development over the site is for a single-level warehouse building, office space, truck loading and circulation areas and passenger vehicle parking.

### **1.2 Scope**

Costin Roe Consulting Pty Ltd has been commissioned by CIP to prepare this Engineering Report in support of the proposed Development Application for the site.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Earthworks
- Stormwater Management; and
- Erosion Control.

The engineering objectives for the development are to complete the alternations and additions, based on the proposed architectural layout, and to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design and is consistent with the requirements of council's water quality objectives.

It should be noted that drawings developed for this report are conceptual only, and not a detailed design. Details provided are subject to adjustment as the design is developed to completion.

### **1.3 Authority Jurisdiction**

The development, being part of the Bringelly Road Business Hub, as approved under SSD\_6324, will be assessed by the NSW Department of Planning and Environment. The department issued SEARS specific to this development under SSD\_8900 dated 13 December 2017 (Refer **Appendix C**) and this document considers the requirements of the SEARS and agency responses.

It is noted that as the site is located within the bounds of Liverpool City Council local government area that the requirements of the Liverpool City Council *Development Design Specification D1 through D9* will be considered in the design of facility.

## 2 DEVELOPMENT SITE

### 2.1 Location

The proposed development is located in the suburb of Horningsea Park within the proposed Bringelly Road Business Hub at Lot 8, Bringelly Road as shown in **Figure 2.1**.



**Figure 2.1. Locality Map (Source: SIX Maps 2017)**

### 2.2 Existing Site Description

The Bringelly Road Business Hub Estate is currently located on an undeveloped parcel of land. The proposed Nulon Motors Facility occupies a land area of 2.2 Ha located on Lot 8 at the eastern end of the Bringelly Road Business Hub Estate. The site is bounded by an existing waterway the north, undeveloped land to the east, the Lot 6 of the proposed Bringelly Road Business Hub to the west, and Old Bringelly Road to the south.

The current levels on the site range from 61.30m to 56.50m, with a fall between 2% and 8%. Runoff from the site currently flows from a high point on the western boundary of the site. One half of the property drains to the existing waterway to the north of the site whilst the other half drains towards Bringelly Road.

Access to the site is available along Bringelly Road.

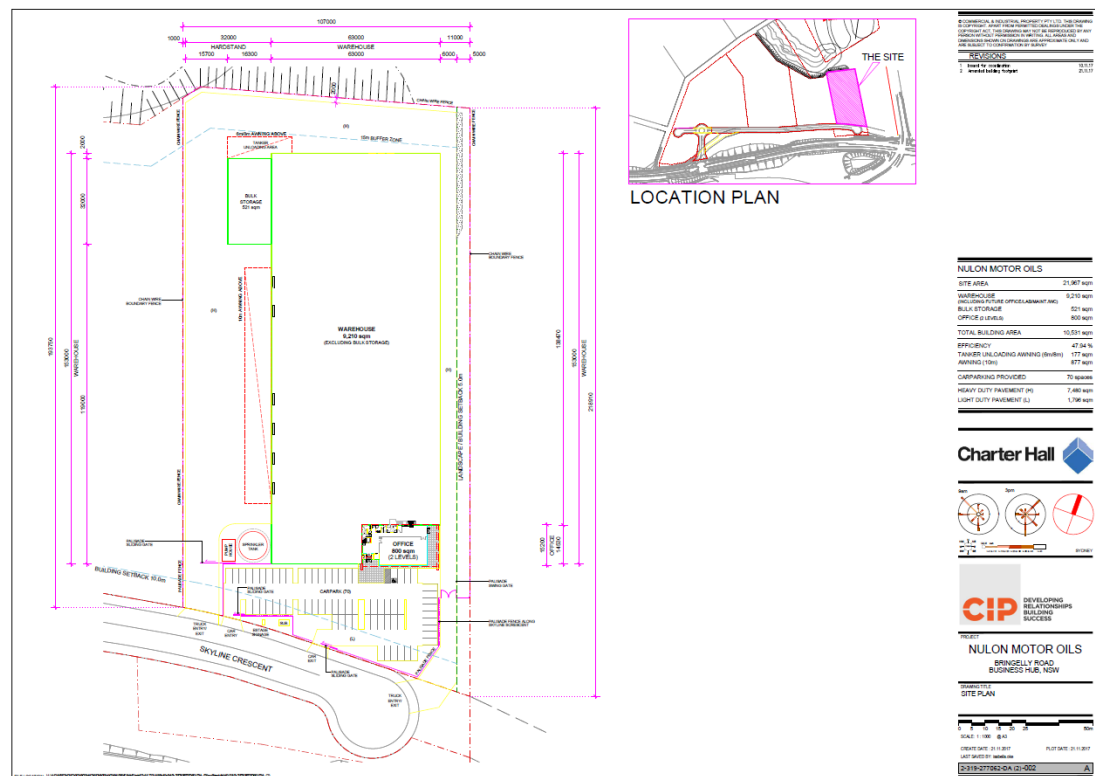


## 2.3 Proposed Development

The proposed development is for the construction of a single level warehouse for Nulon Motor Oils. The indicative layout for the development produced by CIP has been included in **Figure 2.2**.

The proposed warehouse comprises a large single level warehouse building with ancillary office space on the south-east corner of the building. Truck loading areas and circulation hardstand is located on the western side of the building and parking on the south. Fire access has also been provided around the full perimeter of the building.

Civil works will include minor earthworks, stormwater drainage and pavements.



**Figure 2.2. Proposed Development Layout**

### **3 SITE WORKS**

#### **3.1 Earthworks**

Minor earthworks will be required over the site to facilitate the construction of the new warehouse building, following infrastructure works that will be completed as part of the overall estate works being proposed for the Bringelly Road Business Hub Estate. As part of the estate works, a flat pad at RL 57.30m, will be provided for this site.

The final levels over the site will be subject to detailed earthworks modelling and volume assessments.

Soil Erosion and Sediment Control measures including sedimentation basins are to be placed in accordance with submitted drawings and the Soil and Water Management Plan in **Section 7** of this report.

#### **3.2 Embankment Stability**

To assist in maintaining embankment stability, slopes of permanent batters will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 7**.

#### **3.3 Supervision of Earthworks**

All geotechnical testing and inspections performed during the earthworks operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-1996.

#### **3.4 Retaining Walls**

The civil engineering objective is to minimise retaining walls within the constraints of the architectural layout and allowable grading (as per AS2890.1 and AS2890.2) through paved areas and batters in landscaped areas.

Given the existing natural falls and nature of the industrial development, retaining walls will be required. Where possible, landscaped batters are proposed to limit and reduce retaining wall construction. Retaining will be provided as part of infrastructure works at boundary locations. The proposed method of construction will be reinforced concrete masonry, masonry faced reinforced earth retaining, pile and shot-crete, or other concrete or masonry type construction.

Location and indicative heights of retaining walls are shown on drawing **Co11994.01-DA51**.



## **4 STORMWATER MANAGEMENT**

### **4.1 Hydrology**

#### **4.1.1 General Design Principles**

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Liverpool City Council Development Control Plan and accepted engineering practice.

Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.

Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication “Australian Rainfall and Runoff” (1987 Edition), Volumes 1 and 2 (AR&R).

#### **4.1.2 Minor/ Major System Design**

The piped stormwater drainage (minor) system has been designed to accommodate the 20-year ARI storm event (Q20). Overland flow paths (major) which will convey all stormwater runoff up to and including the Q100 event (to the provided OSD tanks) have also been provided which will limit major property damage and any risk to the public in the event of a piped system failure.

#### **4.1.3 Rainfall Data**

Rainfall Intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling for the 5 to 100 year ARI events, was taken from The Bureau of Meteorology Online IFD Tool.

#### **4.1.4 Runoff Models**

The calculation of the runoff from storms of the design ARI will be calculated with the catchment modelling software DRAINS using council nominated IFD data.

The design parameters for the DRAINS model are to be based on typical parameters for the area and are as follows:

| <b>Model</b> | <b>Model for Design and analysis run</b>         | <b>Rational method</b> |    |
|--------------|--------------------------------------------------|------------------------|----|
|              | Rational Method Procedure                        | ARR87                  |    |
|              | Soil Type-Normal                                 | 3.0                    |    |
|              | Paved (Impervious) Area Depression Storage       | 1                      | mm |
|              | Supplementary Area Depression Storage            | 1                      | mm |
|              | Grassed (Pervious) Area Depression Storage       | 5                      | mm |
| AMC          | Antecedent Moisture Condition (ARI=1-5 years)    | 2.5                    |    |
| AMC          | Antecedent Moisture Condition (ARI=10-20 years)  | 3.0                    |    |
| AMC          | Antecedent Moisture Condition (ARI=50-100 years) | 3.5                    |    |
|              | Sag Pit Blocking Factor (Minor Systems)          | 0                      |    |
|              | On Grade Pit Blocking Factor (Minor Systems)     | 0                      |    |
|              | Sag Pit Blocking Factor (Major Systems)          | 0.5                    |    |
|              | On Grade Pit Blocking Factor (Major Systems)     | 0.2                    |    |
|              | Inlet Pit Capacity                               |                        |    |

**Table 3.1: DRAINS Parameters**

## 4.2 Hydraulics

### 4.2.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

### 4.2.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground level, for the peak runoff from the Major System runoff. Where the pipes and junctions are sealed, this freeboard would not be required.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 300mm below the finished floor level of the building.

#### 4.2.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

#### 4.2.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

#### 4.2.5 Overland Flow

The piped system has been designed to convey all storms up to and including the 20-year ARI. Dedicated flow paths have been shown which will convey stormwater from the site to OSD systems and in the event of full system blockage to the existing waterway to the north.

### 4.3 **Site Drainage**

#### 4.3.1 Existing Site Drainage

The property currently comprises undeveloped land with no formal drainage system. Runoff from the site currently flows north-east to the existing natural waterway to the north of the site, and a minor catchment to the south-east towards Bringelly Road.

#### 4.3.2 Proposed Site Drainage

As per general engineering practice and the guidelines of LCC, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. This meets the requirements of LCC and is the minimum recommended capacity for an industrial development.

The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australia Standard Codes of Practice, the standard of LCC and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institute of Engineers, Australia publication “Australian Rainfall and Runoff” (1988 Edition), Volumes 1 and 2 (ARR).



Stormwater Management is required to be provided for water quantity and quality in accordance with the requirements of LCC DCP. Further discussion on the Stormwater Management Strategy is provided in **Section 5** and **6** of this report. Reference to drawings **CO11994.01-DA41** shows the proposed drainage layout. The stormwater management strategy has been completed with consideration to the estate management strategy as defined by Northrop Consulting Engineers as part of SSD\_6324.

#### 4.3.3 Proposed Site Discharge

Discharge from the site is proposed at on the north-western corner of the property boundary, via a 600mm diameter RCP and headwall to the existing Bedwell Park Wetland to the north, as per estate management strategy as defined by Northrop Consulting Engineers as part of SSD\_6324.

Pollution/ firewater containment measures are provided within the site and at the stormwater discharge point. Refer to **Section 6.3** and drawing **Co11994.01-DA41** and **DA46** for details.

## 5 STORMWATER QUANTITY MANAGEMENT

Liverpool City Council requires water quantity management, or stormwater detention, to be provided to limit the runoff discharged from private property into the underground piped drainage system to pre-developed flow and to assist in mitigating the increased stormwater runoff generated by development.

Attenuation of stormwater runoff from the western catchment on the development only is proposed to be managed via a detention tank provided in the north-west of the site. As set out in the estate management strategy as defined by Northrop Consulting Engineers as part of SSD\_6324, the objective for stormwater discharge is to attenuate stormwater flow from the development to pre-developed flows, consistent with Liverpool City Council policy and engineering practice.

Sizing of the basin system has been completed using DRAINS modelling software in accordance with the Liverpool City Council Policy for the 1 in 5 year ARI to 1 in 100 year ARI storms for various durations.

**Table 5.1** provides details for the pre and post development flows and storage for the total detention system. The critical storm duration for the 1 in 5 year, 1 in 20 year and 1 in 100 year ARI storms is 30 minutes and flows and storage information are provided for this storm.

| ARI | Pre-developed Flow (m <sup>3</sup> /s) | Post-developed Flow (m <sup>3</sup> /s) |            |
|-----|----------------------------------------|-----------------------------------------|------------|
|     |                                        | Un-attenuated                           | Attenuated |
| 5   | 0.555                                  | 0.716                                   | 0.349      |
| 20  | 0.625                                  | 0.750                                   | 0.412      |
| 100 | 0.930                                  | 1.020                                   | 0.768      |

**Table 5.1. Site and Detention Hydrology**

The indicative location of the detention tank can be found on Drawing **Co11994.01-DA41**.

Indicative hydrological and storage arrangements are shown below, **Table 5.2**.

| ARI | Post Developed Flow (m³/s) |            |           |        |       | Storage (m³) |
|-----|----------------------------|------------|-----------|--------|-------|--------------|
|     | Un-attenuated              | Attenuated |           |        |       |              |
|     |                            | Low Flow   | High Flow | Bypass | Total |              |
| 5   | 0.555                      | 0.349      | --        | 0      | 0.349 | 260          |
| 20  | 0.625                      | 0.412      | --        | 0      | 0.412 | 370          |
| 100 | 0.930                      | 0.442      | 0.326     | 0      | 0.768 | 480          |

**Table 5.2. OSD Tank Storage and Flow Arrangement**

The modelling has shown that, with the provision of a total storage volume of 480m<sup>3</sup> contained in the modelled system, stormwater flows from the development will be attenuated to pre-development flows. Detention storage will be fully active and will be provided as an OSD tank in the north-west of the property. The proposed detention system meets the policy requirements of Liverpool City Council.

## 6 STORMWATER QUALITY CONTROLS

### 6.1 Regional Parameters

There is a need to provide design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by the Blacktown City Council.

Liverpool City Council have nominated, in *Section 6.4* of their *DCP 2008*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

|                        |     |
|------------------------|-----|
| Gross Pollutants       | 90% |
| Total Suspended Solids | 80% |
| Total Phosphorus       | 65% |
| Total Nitrogen         | 45% |
| Total Hydrocarbons     | 90% |

### 6.2 Proposed Stormwater Treatment System

Stormwater Treatment Measures (STM's) are to be implemented in accordance with the Liverpool Council Policy and the strategy and measures outlined in the Bringelly Road Business Hub Engineering Report by Northrop Engineers (Ref:140089) approved under SSD\_6324. The STM's are to be sized according to the new development area only.

The STM's for the development shall be based on a treatment train approach to ensure that all of the objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment to parking, hardstand & roof areas is to be performed via an appropriately sized Gross Pollutant Trap located on site;
- Tertiary treatment is to be made off-lot, via the Bedwell Park Wetland located to the north of the estate. The Bedwell Park Wetland will provide treatment of nutrients and sediments as set out in the Northrop Report quoted above. Stormwater discharge to the Bedwell Park Wetland is via an existing flow path to the north of the site.

A spill containment system is proposed for fire and spill isolation, refer **Section 6.3** following.

### 6.3 Spill/ Firewater Containment

The requirements for spill and fire water containment are set out in the Preliminary Hazard Assessment by *RiskEng* report No. *Q17-035\_Nulon\_PHA*. The requirements for spill and firewater containment is for a system to be capable of containing a minimum of 612m<sup>3</sup>, being the firewater discharge



(sprinkler and 3 hydrant hoses combined) at 6.8m<sup>3</sup>/ minute over a 90 minute period.

The proposed containment strategy achieves a total on site storage of 1300m<sup>3</sup>. The proposed containment volume is over double the minimum required, hence provides a large contingency volume.

The containment strategy allows for a combination of measures including internal warehouse bunding (45mm), external pavement bunding, and storage within the OSD tank and pit and pipe network. This would enable containment of spills or firewater from the site within a combination of mechanically operated isolation measures (i.e. external bunding, stormwater pits, pipes and detention tank) and non-mechanical measures (i.e. internal warehouse bunding).

Two stormwater isolation/ spill containment valves will be provided for the external containment measures. The first isolation point will be located downstream of the proposed external pavement bund area, and the second at the site discharge point immediately downstream of the on-site detention tank. These valves will have automatic and manual shutoff mechanism, and will be linked to the fire alert system. Further the automatic system will also include sensors with the ability to detect contaminated water. The valves are currently shown as butterfly valves however other similar shutoff valves such as a Keystone Knife Valve or a penstock valve would also be considered appropriate for the spill containment isolation.

The containment volume for each zone is nominated below:

|                                |                          |
|--------------------------------|--------------------------|
| Internal Warehouse Bund (45mm) | 420 m <sup>3</sup>       |
| External Pavement Bund         | 330 m <sup>3</sup>       |
| <u>Drainage System and OSD</u> | <u>550 m<sup>3</sup></u> |
| Total                          | 1300 m <sup>3</sup>      |

Refer **Section 6.3**, and drawings **Co11994.01-DA41 and DA46**.

## 6.4 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater where the flow is from roof areas or stormwater where the flow is from all areas of the development.

For the purposes of this development, we refer to a rainwater harvesting system, where benefits of collected stormwater from roof areas over a stormwater harvesting system can be made as rainwater is generally less polluted than stormwater drainage.

Rainwater harvesting is proposed for the development for re-use of non-potable applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the non-potable water demand for the individual future developments in the range of 50-80%.

In general terms the rainwater harvesting systems will be in-line tanks for the collection and storage of rainwater. At times when the rainwater storage tank is

full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

Rainwater falling on roofs is soft, clear and generally low in microbial and chemical contamination. Any contamination of rainwater generally occurs during collection and storage. The use of simple and cost effective rainwater collection and treatment systems ensures reliable operation and water quality for non-potable use. The proposed rainwater treatment will be a first flush diverter in accordance with council engineering guidelines.

Indoor and outdoor water demand and rainwater tanks sizing will be based on individual site requirements. A nominal tank size is subject to detailed analysis during construction certificate stage by the Hydraulic Engineering Consultant. The tank will be located on site to best suit the development layout and servicing needs.

## **6.5 Maintenance and Monitoring**

It is important that each component of the water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 6.3** below) to assist in the effective operation and maintenance of the various water quality components.

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the below nominated frequency it is recommended that inspections are made following large storm events.

**Table 6.3. Indicative Maintenance Schedule**

| <b>MAINTENANCE ACTION</b>                                                                                                | <b>FREQUENCY</b>                                | <b>RESPONSIBILITY</b>                           | <b>PROCEDURE</b>                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>SWALES/LANDSCAPED AREAS</b>                                                                                           |                                                 |                                                 |                                                                                                                    |
| Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation | Six monthly                                     | Maintenance Contractor                          | Replant and/or fertilise, weed and water in accordance with landscape consultant specifications                    |
| Inspect swale for excessive litter and sediment build up                                                                 | Six monthly                                     | Maintenance Contractor                          | Remove sediment and litter and dispose in accordance with local authorities' requirements.                         |
| Check for any evidence of channelisation and erosion                                                                     | Six monthly/ After Major Storm                  | Maintenance Contractor                          | Reinstate eroded areas so that original, designed swale profile is maintained                                      |
| Weed Infestation                                                                                                         | Three Monthly                                   | Maintenance Contractor                          | Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.     |
| Inspect swale surface for erosion                                                                                        | Six Monthly                                     | Maintenance Contractor                          | Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate. |
| <b>OSD SYSTEM</b>                                                                                                        |                                                 |                                                 |                                                                                                                    |
| Check all items nominated for SWALES/ LANDSCAPED AREAS above                                                             | Refer to SWALES/ LANDSCAPED AREAS section above | Refer to SWALES/ LANDSCAPED AREAS section above | Refer to SWALES/ LANDSCAPED AREAS section above                                                                    |
| Inspect and remove any blockage from orifice                                                                             | Six Monthly                                     | Maintenance Contractor/ Owner                   | Remove grate and screen to inspect orifice.                                                                        |
| Inspect trash screen and clean                                                                                           | Six Monthly                                     | Maintenance Contractor/ Owner                   | Remove grate and screen if required to clean it.                                                                   |
| Inspect flap valve and remove any blockage.                                                                              | Six Monthly                                     | Maintenance Contractor/ Owner                   | Remove grate. Ensure flap valve moves freely and                                                                   |

| MAINTENANCE ACTION                                                                          | FREQUENCY   | RESPONSIBILITY                | PROCEDURE                                                                                                               |
|---------------------------------------------------------------------------------------------|-------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                                                                                             |             |                               | remove any blockages or debris.                                                                                         |
| Inspect pit sump for damage or blockage.                                                    | Six Monthly | Maintenance Contractor/ Owner | Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve is clear.                      |
| Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates. | Six Monthly | Maintenance Contractor/ Owner | Remove debris and floatable materials.                                                                                  |
| Check attachment of orifice plate and screen to wall of pit                                 | Annually    | Maintenance Contractor        | Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.   |
| Check orifice diameter is correct and retains sharp edge.                                   | Five yearly | Maintenance Contractor        | Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.                             |
| Check screen for corrosion                                                                  | Annually    | Maintenance Contractor        | Remove grate and screen and examine for rust or corrosion, especially at corners or welds.                              |
| Inspect overflow weir and remove any blockage                                               | Six monthly | Maintenance Contractor/ Owner | Ensure weir is free of blockage.                                                                                        |
| Inspect walls for cracks or spalling                                                        | Annually    | Maintenance Contractor        | Remove grate to inspect internal walls, repair as necessary.                                                            |
| Check step irons                                                                            | Annually    | Maintenance Contractor        | Ensure fixings are secure and irons are free from corrosion.                                                            |
| <b>INLET &amp; JUNCTION PITS</b>                                                            |             |                               |                                                                                                                         |
| Inside of pits                                                                              | Six Monthly | Maintenance Contractor        | Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter. |



| <b>MAINTENANCE ACTION</b>                                 | <b>FREQUENCY</b>                | <b>RESPONSIBILITY</b>  | <b>PROCEDURE</b>                                                                                      |
|-----------------------------------------------------------|---------------------------------|------------------------|-------------------------------------------------------------------------------------------------------|
| Outside of pits                                           | Four Monthly/ After Major Storm | Maintenance Contractor | Clean grate of collected sediment, debris, litter and vegetation.                                     |
| <b>PROPRIETARY TREATMENT DEVICES (STORMWATER360)</b>      |                                 |                        |                                                                                                       |
| Refer to Manufacturers Operation and Maintenance Manual   | Annually                        | Maintenance Contractor | Refer to Manufacturers Operation and Maintenance Manual                                               |
| <b>STORMWATER SYSTEM</b>                                  |                                 |                        |                                                                                                       |
| General Inspection of complete stormwater drainage system | Bi-annually                     | Maintenance Contractor | Inspect all drainage structures noting any dilapidation in structures and carry out required repairs. |

## 7 EROSION & SEDIMENT CONTROL PLAN

An erosion and sediment control plan (ESCP) is shown on drawings **Co11994.01-DA20 & DA25**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

### 7.1 General Conditions

- The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
- Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Landcom document *Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book* and Liverpool City Council specifications.
- All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

### 7.2 Land Disturbance

Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 7.1**

| Land Use           | Limitation                                                                                                                 | Comments                                                                                                                                                                                                                                                                                                     |
|--------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction areas | Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans. | All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.                                                                                                                           |
| Access areas       | Limited to a maximum width of 5 metres                                                                                     | The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries. |
| Remaining lands    | Entry prohibited except for essential management works                                                                     |                                                                                                                                                                                                                                                                                                              |

**Table 7.1 Limitations to access**

### 7.3 Erosion Control Conditions

- Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
- Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.
- Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
- Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
- Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
- Where practical, foot and vehicular traffic will be kept away from all recently established areas
- Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as low a gradient as practical but not steeper than:

2H:1V where slope length is less than 7 meters

2.5H:1V where slope length is between 7 and 10 meters

3H:1V where slope length is between 10 and 12 meters

4H:1V where slope length is between 12 and 18 meters

5H:1V where slope length is between 18 and 27 meters

6H:1V where slope length is greater than 27 meters

- All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
- During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be left in a cloddy state that resists removal by wind.

### 7.4 Pollution Control Conditions

- Stockpiles will not be located within 5 meters of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways.
- Sediment fences will:
  - Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.

- Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and
- Provide a return of 1 meter upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20 year  $t_c$  discharge.
- Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
- Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
- Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

## **7.5 Waste Management Conditions**

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

## **7.6 Site Inspection and Maintenance**

A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:

- At least weekly.
- Immediately before site closure.
- Immediately following rainfall events in excess of 5mm in any 24 hour period.

The self audit will include:

- Recording the condition of every sediment control device
- Recording maintenance requirements (if any) for each sediment control device
- Recording the volumes of sediment removed from sediment retention systems, where applicable
- Recording the site where sediment is disposed
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report. The responsible person will ensure that:

- The plan is being implemented correctly
- Repairs are undertaken as required
- Essential modifications are made to the plan if and when necessary
- The report shall carry a certificate that works have been carried out in accordance with the plan.

Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.

Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,

No low points exist that can overtop in a large storm event

Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams or installing additional diversion upslope.

Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).

Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.

Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.

Excessive vegetation growth will be controlled through mowing or slashing.

All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:

- Recent works to ensure they have not resulted in diversion of sediment laden water away from them
- Degradable products to ensure they are replaced as required, and
- Sediment removal, to ensure the design capacity or less remains in the settling zone.

Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.

Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised

Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.



## 8 SEARS/ EPA ITEMS

This section of the report covers items relating to the NSW Department of Planning and Environment SEARS letter dated 13 December 2017, reference SSD\_8900, agency response letter from EPA (Doc 17/567051 dated 28 November 2017). Further reference to the EIS prepared on behalf of CIP should be made for confirmation of how the SEAR's have been addressed for non-engineering related items.

It is to be recognized that the engineering design for this Development Application has been completed with consideration to the approved Estate Stormwater Management and Engineering Strategy defined under SSD 6324, as required of the SEAR's General Requirement section.

We also confirm that discussion and correspondence were initiated with the NSW EPA, as noted below and included in **Appendix D**, relating to the proposed erosion and sediment controls and stormwater management during operation of the facilities.

| <b><i>Soils and Water, Groundwater and Licencing</i></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Item 1</i>                                            | <p><i>Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.</i></p> <p><u>Response</u></p> <p>We confirm that no water sharing plans are relevant or proposed as part of the warehouse construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.</p> |
| <i>Item 2</i>                                            | <p><i>Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).</i></p> <p><u>Response</u></p> <p>We confirm that no volumetric licensing requirements are relevant or proposed as part of the warehouse construction.</p>                                                                                                                                                     |
| <i>Item 3</i>                                            | <p><i>The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply.</i></p> <p><u>Response</u></p> <p>We confirm that Sydney Water will perform water supply for the life of the project. Reduction in non-potable demand will be made via rainwater reuse, details of which are nominated in Section 6.3 of this report.</p>          |
| <i>Item 4</i>                                            | <p><i>A detailed and consolidated site water balance.</i></p> <p><u>Response</u></p> <p>We confirm that water usage is consistent with industrial developments typical of the area. Water use will be for toilet flushing, hand washing, employee showers and irrigation with supply being made from Sydney Water. Water demand will be supplemented by rainwater harvesting with</p>                                                                        |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | proposed reduction in non-potable demands as per Liverpool City Council and the NSW Department of Environment and Conservation document <i>Managing Urban Stormwater: Harvesting and Reuse</i> , using a simple water balance analysis to balance the supply and demand.                                                                                                                                                                                                                                                                                           |
| Item 5  | <p><i>A detailed assessment against the NSW Aquifer Interference Policy (2012) using DPI Water's assessment framework.</i></p> <p><u>Response</u></p> <p>We confirm that the development will not affect groundwater and or aquifers. An assessment of the NSW Aquifer policy is not relevant for the warehouse distribution center construction.</p>                                                                                                                                                                                                              |
| Item 6  | <p><i>Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.</i></p> <p><u>Response</u></p> <p>We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction.</p> |
| Item 7  | <p><i>Full technical details and data of all surface and groundwater modelling.</i></p> <p><u>Response</u></p> <p>We confirm the proposed development does not affect surface and groundwater water surface and that groundwater modelling is not relevant for the proposed development. It is not proposed to recharge the groundwater system. Surface storm water runoff is managed and disposed of as described in Sections 4, 5 and 6 of this report.</p>                                                                                                      |
| Item 8  | <p><i>Proposed surface and groundwater monitoring activities and methodologies.</i></p> <p><u>Response</u></p> <p>We confirm the proposed development does not affect surface and groundwater water surface and that groundwater monitoring activities are not relevant for the proposed development.</p>                                                                                                                                                                                                                                                          |
| Item 9  | <p><i>Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.</i></p> <p><u>Response</u></p> <p>The development does not involve any cumulative impacts on water resources.</p>                                                                                                                                                                                                                                                                                                              |
| Item 10 | <i>Consideration of relevant policies and guidelines as contained in attachment 1 of the SEAR document.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                       | <p><u>Response</u></p> <p>Consideration of the relevant policies and guidelines has been made.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Water Management and Key Items</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                       | <p><i>Water Sharing Plans</i></p> <p><u>Response</u></p> <p>We confirm that no water sharing plans are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.</p>                                                                                                                                                                                                                                                                                                                                            |
|                                       | <p><i>Licensing Considerations</i></p> <p><u>Response</u></p> <p>We confirm that no water sharing plans or licensing considerations are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.</p>                                                                                                                                                                                                                                                                                                           |
|                                       | <p><i>Surface Water Assessment</i></p> <p><u>Response</u></p> <p>We confirm that a Stormwater Management Plan has been produced for the proposed development which covers management of stormwater runoff including water quality and quantity. Reference to Sections 4, 5 &amp; 6 of this document should be made for confirmation of how the Water Sensitive Urban Design and management of quality and quantity has been addressed.</p> <p>We also confirm that no utilization of surface water runoff from water courses, rivers or dams is proposed or relevant as part of the warehouse distribution development.</p> |
|                                       | <p><i>Groundwater Assessment</i></p> <p><u>Response</u></p> <p>Earthworks are proposed to facilitate industrial development. Section 5 of this report discusses the expected negligible impact on existing water table and groundwater over the site. We also confirm that no utilization of groundwater is proposed as part of the development.</p> <p>An assessment of groundwater is not relevant or proposed as part of the warehouse distribution project.</p>                                                                                                                                                         |
|                                       | <p><i>Groundwater Dependent Ecosystems</i></p> <p><u>Response</u></p> <p>Earthworks are proposed to facilitate industrial development. Section 4 of this report discusses the expected negligible impact on existing water table and groundwater over the site. We also confirm that no utilization of groundwater is proposed as part of the development.</p>                                                                                                                                                                                                                                                              |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                  | An assessment of groundwater dependent ecosystems is not relevant or proposed as part of the warehouse distribution project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                  | <p><i>Watercourses, Wetlands and Riparian Land</i></p> <p><u>Response</u></p> <p>No defined watercourses, wetlands or riparian land will be affected by the proposed development. Assessments relating to these items are not relevant to the project and are covered in SSD 6324.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                  | <p><i>Flooding</i></p> <p><u>Response</u></p> <p>The site is not flood affected. Flooding relating to the flow path and wetland to the north are covered in SSD 6324.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                  | <p><i>Services and Public Utilities</i></p> <p><u>Response</u></p> <p>Services and provision of services will be made as part of the Bringelly Business Hub infrastructure works. Infrastructure works for the estate will provide service connections for stormwater, sewer, water supply and gas, and are covered in SSD 6324.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>EPA Requirement Key Items</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Item 1</i>                    | <p><u><i>Erosion and Sediment Controls During Construction</i></u></p> <p>Erosion and sediment controls will be provided during construction. All soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Landcom document <i>Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book</i> and Liverpool City Council specifications.</p> <p>The ESC concept is shown on attached drawings DA20 and DA25 in <b>Appendix A</b>. The proposed control measures include:</p> <ol style="list-style-type: none"> <li>1. Silt fences to divert clean water</li> <li>2. Diversion swales</li> <li>3. Construction entry/ truck shaker</li> <li>4. Stockpile management</li> <li>5. Sediment basin</li> <li>6. Dust controls</li> </ol> <p>The proposed measures will be made to reduce impact and risk of sediment laden runoff from the site into surrounding properties or environmental zones.</p> |
| <i>Item 2</i>                    | <p><u><i>Stormwater Management During Operation of the Facility</i></u></p> <p>Stormwater management measures, including water quality treatment and site detention systems are to be implemented in accordance with the Liverpool Council Policy and the strategy and measures approved under SSD_6324 outlined in the <i>Bringelly Road Business Hub Engineering</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |     |                        |     |                  |     |                |     |                    |     |
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|                        | <p><i>Report by Northrop Engineers (Ref:140089).</i></p> <p>The increase in stormwater runoff due to the increase in impervious areas is proposed to be managed by an in-ground tank with a storage volume of 504m<sup>3</sup>. This system will attenuate post development stormwater discharge to pre-development. Refer to drawing Co11994.01-DA41 in <b>Appendix A</b>.</p> <p>Liverpool City Council have nominated, in <i>Section 6.4</i> of their <i>DCP 2008</i>, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:</p> <table> <tr> <td>Gross Pollutants</td><td>90%</td></tr> <tr> <td>Total Suspended Solids</td><td>80%</td></tr> <tr> <td>Total Phosphorus</td><td>65%</td></tr> <tr> <td>Total Nitrogen</td><td>45%</td></tr> <tr> <td>Total Hydrocarbons</td><td>90%</td></tr> </table> <p>Stormwater treatment and treatment measures for the development shall be based on a treatment train approach to ensure that the treatment objectives above are met.</p> <p>Components of the treatment train for the development are as follows:</p> <ul style="list-style-type: none"> <li>• Primary treatment to parking, hardstand &amp; roof areas is to be performed via an appropriately sized Gross Pollutant Trap located on site. The proposed GPT will be a vortech style GPT such as a Rocla CDS system. This will target litter, sediment, oil and grease and some nutrients;</li> <li>• Tertiary treatment is to be made off-lot, via the Bedwell Park Wetland located to the north of the estate. The Bedwell Park Wetland will provide treatment of nutrients and sediments as set out in the Northrop Report and approved SSD_6324 quoted above. Stormwater discharge to the Bedwell Park Wetland is via an existing flow path to the north of the site.</li> </ul> | Gross Pollutants | 90% | Total Suspended Solids | 80% | Total Phosphorus | 65% | Total Nitrogen | 45% | Total Hydrocarbons | 90% |
| Gross Pollutants       | 90%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |     |                        |     |                  |     |                |     |                    |     |
| Total Suspended Solids | 80%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |     |                        |     |                  |     |                |     |                    |     |
| Total Phosphorus       | 65%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |     |                        |     |                  |     |                |     |                    |     |
| Total Nitrogen         | 45%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |     |                        |     |                  |     |                |     |                    |     |
| Total Hydrocarbons     | 90%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |     |                        |     |                  |     |                |     |                    |     |
| <i>Item 3</i>          | <p><u><i>Spill/ Fire Water Containment</i></u></p> <p>The requirements for spill and fire water containment are set out in the Preliminary Hazard Assessment by RiskEng report No. Q17-035_Nulon_PHA. The requirements for spill and firewater containment is for a system to be capable of containing a minimum of 612m<sup>3</sup>, being the firewater discharge (sprinkler and 3 hydrant hoses combined) at 6.8m<sup>3</sup>/minute over a 90 minute period.</p> <p>The proposed containment strategy achieves a total on site storage of 1300m<sup>3</sup>. The proposed containment volume is over double the minimum required.</p> <p>The containment strategy is detailed in Section 6.3 of this report and allows for a combination of measures including internal warehouse bunding, external pavement bunding and storage within the OSD tank and pit and pipe network. Two stormwater isolation valves will be provided</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |     |                        |     |                  |     |                |     |                    |     |

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|  | <p>downstream of the proposed external pavement bund area, and a second at the site discharge point. These valves will have automatic and manual close mechanism, and will be linked to the fire alert system, plus include sensors with the ability to detect contaminated water.</p> <p>Refer <b>Section 6.3</b>, and drawings <b>Co11994.01-DA41 and DA46</b>.</p> |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## 9 CONCLUSION

This Civil Engineering Report has been prepared to support the development application for a proposed warehouse and distribution facility at Lot 8 in Bringelly Road Business Hub on Bringelly Road, Horningsea Park.

A civil engineering strategy for the site has been developed which provides a best fit solution within the constraints of the existing landform, structures and pavements, the proposed architectural layout and the Stormwater Management Strategy as defined by Northrop Consulting Engineers as part of SSD\_6324. The stormwater quality and quantity management strategy has been developed to reduce pollutant loads in stormwater leaving this site in accordance with engineering principles and council policy.

Further, a spill and firewater containment system has been proposed which contains a volume of 1300m<sup>3</sup> on site, more than double the minimum required volume as set out in **Section 6.3** of the report.

It is recommended that the management strategies mentioned in this report be incorporated into the future detailed design. Detailed design may result in changes to the concept however design criteria will be followed.

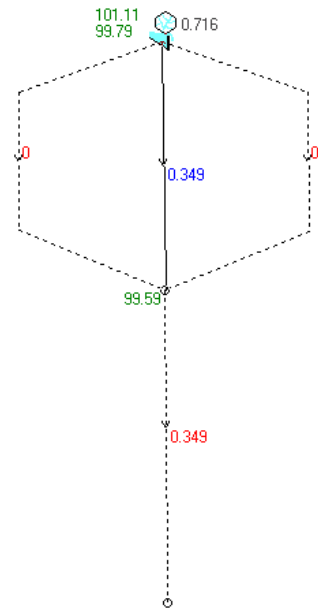
# Appendix A

## **DRAWINGS BY COSTIN ROE CONSULTING**

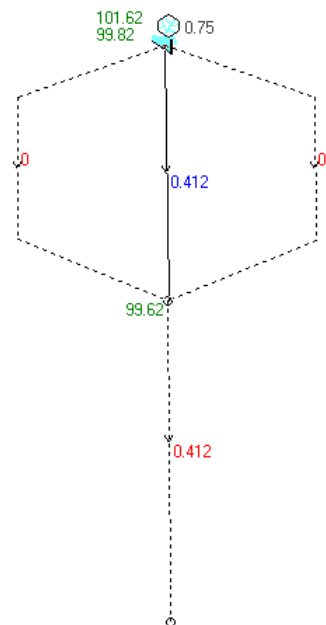
# Appendix B

## DRAINS MODEL

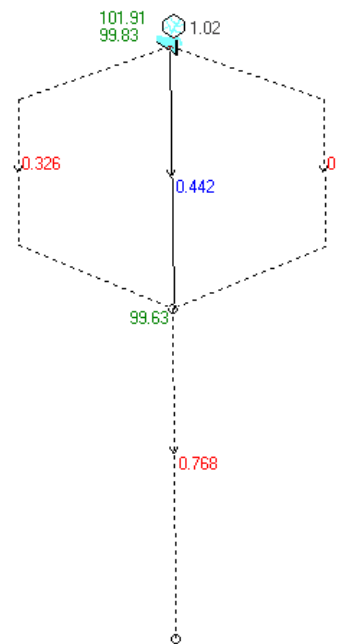
### Q5 MODEL



### Q20 MODEL



# Q100 MODEL



# Appendix C

**NSW Department of Planning & Environment**

**SSD\_8900 SEARS**



Mr Mark Griffiths  
Development Manager  
CIP Constructions (NSW) Pty Ltd  
Suite 59, 26-32 Pirrama Road  
Pyrmont NSW 2009

SSD 8900  
DOC17/595203

Dear Mr Griffiths

**State Significant Development – Secretary's Environmental Assessment Requirements  
Nulon Motor Oils Facility, Bringelly Road Business Hub (SSD 8900)**

Please find attached the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above mentioned development. **Attachment 1** provides guidelines which may assist in the preparation of the EIS.

These SEARs have been prepared in consultation with relevant government agencies (see **Attachment 2**), and are based on the information you have provided to date. Unfortunately, Transport for NSW was unable to respond in time. The Department will provide you with a copy of its requirements as soon as it is received.

Please note the Department may alter these SEARs at any time. You must consult further with the Department if you do not lodge a development application (DA) and EIS for the development within two years of the date of issue of these SEARs.

I wish to emphasise the importance of effective and genuine community consultation and the need for the proposal to proactively respond to the community's concerns. Accordingly, you must undertake a comprehensive, detailed and genuine community consultation and engagement process during the preparation of the EIS. This process must ensure the community is informed of the development and engaged with issues of concern to it. Sufficient information must be provided to the community to enable a good understanding of the development and any potential impacts.

If the proposal is likely to have a significant impact on matters of National Environmental Significance, it may require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, please advise accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary SEARs may need to be issued. This approval would be in addition to any approvals required under NSW legislation and it is your responsibility to contact the Commonwealth Department of the Environment and Energy to determine if an approval under the EPBC Act is required for your proposal.

Please contact the Department at least **two weeks** before you propose to submit the DA and EIS for the development. This will enable the Department to confirm:

- the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*); and
- consultation and public exhibition arrangements including the number of copies (hard-copy and USB) of the DA and EIS that will be required.

If you have any enquiries, please contact Ms Chloe Dunlop on 02 8289 6667 or via email at [chloe.dunlop@planning.nsw.gov.au](mailto:chloe.dunlop@planning.nsw.gov.au).

Yours sincerely

Chris Ritchie  
Director  
Industry Assessments  
*as the Secretary's nominee*

13/12/17.

# Secretary's Environmental Assessment Requirements

## Section 78A(8A) of the *Environmental Planning and Assessment Act 1979*

### State Significant Development

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Application Number</b>   | SSD 8900                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Development</b>          | <p>Construction and operation of a light industrial building within the Bringelly Road Business Hub including ancillary office space, car parking and landscaping. The light industrial building will be for the preparation of automotive industry products and will include the following operations:</p> <ul style="list-style-type: none"><li>– bulk fluid delivery and storage;</li><li>– blending;</li><li>– bottling and packaging;</li><li>– storage;</li><li>– dispatch and distribution; and</li><li>– ancillary office administration.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Location</b>             | Lot 8 within Bringelly Road Business Hub located at Bringelly Road, Leppington (Lot 10 DP 29104), Liverpool local government area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Applicant</b>            | CIP Constructions (NSW) Pty Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Date of Issue</b>        | December 2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>General Requirements</b> | <p>The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i>. In addition, the EIS must include:</p> <ul style="list-style-type: none"><li>• a detailed description of the development, including:<ul style="list-style-type: none"><li>– a description of the proposed operation (with diagrams) incorporating a description of the proposed delivery, storage, blending, bottling, packaging and distribution operations;</li><li>– the need and justification for the proposed development;</li><li>– a description of feasible options within the development which may include a layout options analysis;</li><li>– likely staging of the development;</li><li>– likely interactions between the development and any existing, approved and proposed developments in the vicinity of the site;</li><li>– plans of any proposed works with details of the proposed setbacks, site coverage, car parking, landscaped areas;</li><li>– details of infrastructure upgrades or items required to facilitate the development, and a description of any arrangements to ensure the upgrades will be implemented in a timely manner and maintained;</li></ul></li><li>• consideration of the conditions of the development consent SSD 6324;</li><li>• consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments;</li><li>• a risk assessment of any potential environmental impacts of the development, identifying the issues for further assessment;</li><li>• a detailed assessment, where relevant, of the key issues below, and any other potential significant issues identified in the risk assessment, which must include:<ul style="list-style-type: none"><li>– a description of the existing environment, including sufficient baseline data;</li><li>– an assessment of the potential impacts of the development, including any cumulative impacts due to other development in the vicinity; and</li><li>– a description of the measures that would be implemented to avoid, minimise and if necessary, offset the predicted potential impacts, including strategies for adaptive management and/or contingency plans to manage any significant risks to the environment; and</li></ul></li></ul> |



|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|                   | <ul style="list-style-type: none"> <li>– a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.</li> </ul> <p>The EIS must also be accompanied by a report from a qualified quantity surveyor providing:</p> <ul style="list-style-type: none"> <li>• a detailed calculation of the Capital Investment Value (CIV) (as defined in clause 3 of the <i>Environmental Planning and Assessment Regulation 2000</i>) of the development, including details of all assumptions and components from which the CIV calculation is derived;</li> <li>• an estimate of the jobs that will be created by the development during the construction and operational phases of the development; and</li> <li>• certification that the information provided is accurate at the date of preparation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Key issues</b> | <p>The EIS must include an assessment of the potential impacts of the proposal (including cumulative impacts) and develop appropriate measures to avoid, mitigate, manage and/or offset these impacts. The EIS must address the following specific matters:</p> <ul style="list-style-type: none"> <li>• <b>Strategic Context</b> – including: <ul style="list-style-type: none"> <li>– detailed justification for the proposal having regard to its location and impacts, the suitability of the site and public interest;</li> <li>– demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following documents must be addressed: <ul style="list-style-type: none"> <li>○ <i>State Environmental Planning Policy (Western Sydney Parklands) 2009</i>;</li> <li>○ the <i>Parklands Plan of Management 2020</i>;</li> <li>○ the <i>Parklands Plan of Management 2020 Supplement</i>;</li> <li>○ the <i>Parklands draft Plan of Management 2030</i>; and</li> </ul> </li> <li>– justification for the proposed site layout.</li> </ul> </li> <li>• <b>Traffic and Access</b> – including: <ul style="list-style-type: none"> <li>– a quantitative Traffic Impact Assessment prepared in accordance with the relevant Council, Austroads and Roads and Maritime Services guidelines;</li> <li>– details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation;</li> <li>– details and a justification of access to, from and within the site (vehicular and pedestrian);</li> <li>– impacts on the safety and capacity of the surrounding road network (including intersections along Bringelly Road and Cowpasture Road) and access points, using SIDRA modelling or similar to assess impacts from current traffic counts and cumulative traffic from existing and proposed development;</li> <li>– demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development; and</li> <li>– details of road upgrades, new roads or access points required for the development, if necessary.</li> </ul> </li> <li>• <b>Hazards and Risk</b> – including: <ul style="list-style-type: none"> <li>– a preliminary risk screening completed in accordance with <i>State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33</i> (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is “potentially hazardous” a preliminary hazard analysis (PHA) must be prepared in accordance with <i>Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis</i> (DoP, 2011) and <i>Multi-Level Risk Assessment</i> (DoP, 2011); and</li> <li>– report on consultation with pipeline operator Jemena to ensure that high pressure gas pipelines remain compliant with the relevant Australian</li> </ul> </li> </ul> |

Standards throughout the life of the development and include a Safety Management Study, if necessary.

- **Noise and Vibration** – including:
  - a quantitative noise and vibration impact assessment undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority (EPA) guidelines (including the NSW Noise Policy for Industry 2017) with an assessment of nearby sensitive receivers;
  - cumulative impacts of other developments; and
  - details of proposed mitigation, management and monitoring measures.
- **Urban Design** – including:
  - measures to minimise the potential visual impacts of the development including:
    - a detailed assessment (including photomontages and perspectives) of the proposed facility including height, colour, scale, building materials and finishes, signage and lighting, particularly from nearby residential receivers and significant vantage points in the public domain;
    - detailed plans showing suitable landscaping incorporating endemic species; and
    - justification for any inconsistencies with the Updated Site Design Guidelines prepared by JBA Urban Planning Consultants, dated June 2015 as amended and approved under Condition A8 of the development consent for SSD 6324.
- **Bushfire** – including:
  - a bushfire assessment report which provides an assessment of bushfire hazard, including:
    - details of the storage of flammable materials;
    - an assessment against the requirements of *Planning for Bushfire Protection 2006*, particularly access and provision of water supply for firefighting purposes; and
    - a description of measures to ensure the proposal will not increase the bushfire risk to adjoining lands.
- **Soil and Water** – including:
  - a description of water demands of the development and a breakdown of water supplies;
  - identify any water licensing requirements under the *Water Act 1912* of *Water Management Act 2000*;
  - details of proposed erosion and sediment controls during construction;
  - detailed plans and a description of the surface and stormwater management system, including on-site detention, designed in accordance with Water Sensitive Urban Design principles; and
  - an assessment of potential impacts (including from potential spillage of materials) on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils), related infrastructure, watercourses and riparian land and measures proposed to reduce and mitigate those impacts.
- **Biodiversity** – including:
  - details of the number of trees to be removed and the number of trees to be planted on the site; and
  - an assessment and documentation of biodiversity impacts related to the development in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR) in the form required by section 6.12 of the *Biodiversity Conservation Act 2016*, section 6.8 of the *Biodiversity Conservation Regulation 2017* and the Biodiversity Assessment Method.
- **Heritage** – including:
  - an assessment of European Heritage including potential impacts on the surrounding site and surrounding area, including any built landscape items, conservation areas, views and settings.

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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|                                           | <ul style="list-style-type: none"> <li>• <b>Waste Management</b> – including: <ul style="list-style-type: none"> <li>– details of the quantities and classification of all waste streams to be generated on site in accordance with the EPAs <i>Waste Classification Guidelines</i> (2014);</li> <li>– details of waste storage, handling, transport, and disposal; and</li> <li>– the measures that would be implemented to ensure the development is consistent with the aims, objectives and guidelines in the <i>NSW Waste Avoidance and Resource Recovery Strategy 2014-21</i>.</li> </ul> </li> <li>• <b>Air Quality</b> – including: <ul style="list-style-type: none"> <li>– a description and assessment of all air quality impacts from the proposed operations; and</li> <li>– details of dust control during site preparation and civil works.</li> </ul> </li> </ul>                                                                                                          |
| <b>Plans and Documents</b>                | The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the <i>Environmental Planning and Assessment Regulation 2000</i> . Those documents should be included as part of the EIS rather than as separate documents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Consultation</b>                       | <p>During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners.</p> <p>In particular you must consult with:</p> <ul style="list-style-type: none"> <li>• Western Sydney Parklands Trust</li> <li>• Liverpool City Council;</li> <li>• Roads and Maritime Services;</li> <li>• Transport for New South Wales;</li> <li>• Office of Environment and Heritage;</li> <li>• Environment Protection Authority;</li> <li>• <b>Sydney Water;</b></li> <li>• Water NSW;</li> <li>• Rural Fire Service; and</li> <li>• any other public transport or community service providers.</li> </ul> <p>The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to those issues. Where amendments have not been made to address an issue, a short explanation should be provided.</p> |
| <b>Further consultation after 2 years</b> | If you do not lodge an EIS for the development within 2 years of the issue date of these SEARs, you must consult with the Secretary in relation to the requirements for lodgement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>References</b>                         | The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans. While not exhaustive, <b>Attachment 1</b> contains a list that may be relevant to the assessment of this development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



## **ATTACHMENT 1**

### Technical and Policy Guidelines

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>

<http://www.epa.nsw.gov.au/>

<http://www.environment.nsw.gov.au/>

<http://www.dpi.nsw.gov.au/>

#### **Plans and Documents**

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
  - the location of the land, boundary measurements, area (sq.m) and north point;
  - the existing levels of the land in relation to buildings and roads;
  - location and height of existing structures on the site;
  - location and height of adjacent buildings and private open space; and
  - all levels to be to Australian Height Datum (AHD).
2. A locality/context plan drawn at an appropriate scale indicating:
  - significant local features;
  - the location and uses of existing buildings, shopping and employment areas; and
  - traffic and road patterns, pedestrian routes and public transport nodes.
3. Drawings at an appropriate scale illustrating:
  - draft plan of subdivision prepared by a registered surveyor;
  - detailed earthworks plan;
  - stormwater concept plan;
  - landscape plan; and
  - Construction Management Plan, inclusive of a Construction Traffic Management Plan and construction methodology and staging.

#### **Documents to be Submitted**

Documents to submit include:

- 1 hard copy and 1 electronic copy of all the documents and plans for review prior to exhibition; and
- Additional copies as determined by the Department once the development application is lodged

#### **Policies, Guidelines and Plans**

| Aspect                    | Policy /Methodology                                                                                                                                                             |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Traffic and Access</b> | Guide to Traffic Generating Development (RTA)<br>Planning Guidelines for Walking and Cycling<br>Austroads Guide to Traffic Management – Part 12: Traffic Impacts of Development |

| Policies, Guidelines and Plans |                                                                                                                               |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Aspect                         | Policy /Methodology                                                                                                           |
|                                | Cycling Aspects of Austroads Guides                                                                                           |
|                                | Road Design Guide (RTA)                                                                                                       |
|                                | NSW 2021                                                                                                                      |
|                                | NSW Long Term Transport Master Plan                                                                                           |
|                                | Sydney's Walking Future                                                                                                       |
|                                | Sydney's Cycling Future                                                                                                       |
| Hazards and Risk               |                                                                                                                               |
|                                | State Environmental Planning Policy No. 33 – Hazardous and Offensive Development                                              |
|                                | Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis                                             |
| Noise and Vibration            |                                                                                                                               |
|                                | Interim Construction Noise Guideline (DECC)                                                                                   |
|                                | Assessing Vibration: a technical guide (DEC)                                                                                  |
|                                | NSW Noise Policy for Industry 2017 (EPA)                                                                                      |
|                                | Environmental Criteria for Road Traffic Noise (EPA)                                                                           |
|                                | Noise Guide for Local Government (EPA)                                                                                        |
| Bushfire                       |                                                                                                                               |
|                                | Planning for Bush Fire Protection 2006 (RFS)                                                                                  |
|                                | Draft Planning for Bush Fire Protection 2017 (RFS)                                                                            |
| Soil and Water                 |                                                                                                                               |
| Surface Water                  | National Water Quality Management Strategy: Water quality management - an outline of the policies (ANZECC/ARMCANZ)            |
|                                | National Water Quality Management Strategy: Policies and principles - a reference document (ANZECC/ARMCANZ)                   |
|                                | National Water Quality Management Strategy: Implementation guidelines (ANZECC/ARMCANZ)                                        |
|                                | National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)         |
|                                | National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ) |
|                                | Using the ANZECC Guideline and Water Quality Objectives in NSW (DEC)                                                          |
|                                | State Water Management Outcomes Plan                                                                                          |
|                                | Water Guidelines for Controlled Activities (DPI)                                                                              |
|                                | NSW Government Water Quality and River Flow Environmental Objectives (DECC)                                                   |
|                                | Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC)                                               |
|                                | Managing Urban Stormwater: Soils & Construction (Landcom)                                                                     |
|                                | Managing Urban Stormwater: Treatment Techniques (DECC)                                                                        |
|                                | Managing Urban Stormwater: Source Control (DECC)                                                                              |
|                                | Technical Guidelines: Bunding & Spill Management (DECC)                                                                       |
|                                | Floodplain Development Manual (DIPNR)                                                                                         |
|                                | Floodplain Risk Management Guideline (DECC)                                                                                   |
|                                | A Rehabilitation Manual for Australian Streams (LWRRDC and CRCCH)                                                             |
|                                | Technical Guidelines: Bunding & Spill Management (DECC)                                                                       |
|                                | Council's Stormwater Management Policy 2017                                                                                   |

| Policies, Guidelines and Plans |                                                                                                                |
|--------------------------------|----------------------------------------------------------------------------------------------------------------|
| Aspect                         | Policy /Methodology                                                                                            |
| <i>Erosion and Sediment</i>    | Managing Urban Stormwater: Soils & Construction (Landcom)                                                      |
|                                | Design Manual for Soil Conservation Works - Technical Handbook No. 5 (Soil Conservation Service of NSW)        |
|                                | Soil and Landscape Issues in Environmental Impact Assessment (DLWC)                                            |
|                                | Wind Erosion – 2nd Edition                                                                                     |
| <i>Groundwater</i>             | National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC) |
|                                | NSW State Groundwater Policy Framework Document (DLWC)                                                         |
|                                | NSW State Groundwater Quality Protection Policy (DLWC)                                                         |
|                                | NSW State Groundwater Quantity Management Policy (DLWC) Draft                                                  |
|                                | The NSW State Groundwater Dependent Ecosystem Policy (DLWC)                                                    |
|                                | Guidelines for the Assessment and Management of Groundwater Contamination (DECC) Draft                         |
|                                | NSW Aquifer Interference Policy (NOW)                                                                          |
| <i>Soil</i>                    | Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC) |
|                                | National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)                         |
|                                | State Environmental Planning Policy No. 55 – Remediation of Land                                               |
|                                | Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land (DOP)                          |
|                                |                                                                                                                |
| <b>Biodiversity</b>            |                                                                                                                |
|                                | NSW Biodiversity Assessment Method (OEH, 2017)                                                                 |
|                                | The NSW State Groundwater Dependant Ecosystem Policy (DWLC)                                                    |
| <b>Waste</b>                   |                                                                                                                |
|                                | Waste Avoidance and Resource Recovery Strategy 2014-2021 (EPA 2014)                                            |
|                                | EPA's Waste Classification Guidelines                                                                          |
|                                | Environmental Guidelines: Assessment Classification and Management of Non-Liquid and Liquid Waste (NSW EPA)    |
| <b>Air Quality</b>             |                                                                                                                |
|                                | Protection of the Environment Operations (Clean Air) Regulation 2002                                           |
|                                | Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DEC)                                  |

**ATTACHMENT 2**  
**Public Authority Responses to Request for Key Issues**



## Chloe Dunlop

---

**From:** Nicholas Hon  
**Sent:** Tuesday, 21 November 2017 9:30 AM  
**To:** Chloe Dunlop  
**Subject:** RE: SSD 8900 - Request for input into SEARS - Nulon Motor Oils

Hi Chloe,

The responses from the Applicant on my queries after the meeting is sufficient at this stage.

Following a review of the attached documents, it is recommended that the following SEARs be included:

**Hazards and Risks** – The Environmental Impact Statement (EIS) must include a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should the preliminary risk screening indicate that the development is "potentially hazardous", a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011).

The EIS must also report on the consultation with Jemena (pipeline operator) to ensure that high pressure gas pipelines remain compliant with the relevant Australian Standards throughout the life of the development, and include a Safety Management Study if necessary.

Regards,

**Nicholas Hon**

Technical Specialist (Hazards)  
NSW Department of Planning & Environment  
Level 29, 320 Pitt Street  
Sydney NSW 2000 Australia  
T (02) 9274 6344 E [nicholas.hon@planning.nsw.gov.au](mailto:nicholas.hon@planning.nsw.gov.au)



Planning &  
Environment

**From:** Chloe Dunlop  
**Sent:** Monday, 20 November 2017 4:18 PM  
**To:** Nicholas Hon <[Nicholas.Hon@planning.nsw.gov.au](mailto:Nicholas.Hon@planning.nsw.gov.au)>  
**Subject:** FW: SSD 8900 - Request for input into SEARS - Nulon Motor Oils

Hi Nick,

Please see attached CIP's response to the Department's queries re dangerous goods discussed in the meeting on 7 November 2017 for the proposed Nulon Oils facility. The formal request for SEARs for the EIS is also attached.

I would appreciate if you could advise if you could provide your comments and input into the SEARs.

Many thanks

Regards,

**Chloe Dunlop**



Office of  
Environment  
& Heritage

DOC17/596687

Ms Chloe Dunlop  
Senior Planning Officer – Industry Assessments  
NSW Department of Planning and Environment  
GPO Box 39  
SYDNEY NSW 2001

Dear Ms Dunlop

**SSD 8900 - Request for input into the Secretary's Environmental Assessment Requirements -  
Nulon Motor Oils**

I refer to your email of 16 November 2017 requesting input from the Office of Environment and Heritage (OEH) on the Secretary's Environmental Assessment Requirements (SEARs) for the above.

As requested, please find attached OEH's recommended SEARs in attachment 1.

If you have any queries about this advice, please contact Marnie Stewart on 9995 6868 or by email at [marnie.stewart@environment.nsw.gov.au](mailto:marnie.stewart@environment.nsw.gov.au).

Yours sincerely

7.12.2017

**ALEX GRAHAM**  
**Director Greater Sydney**  
**Regional Operations**

## Attachment 1: OEH recommended SEARs

| Biodiversity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Biodiversity impacts related to the proposal are to be assessed in accordance with the <i>Biodiversity Assessment Method</i> and documented in a Biodiversity Development Assessment Report (BDAR).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2. The BDAR must include information in the form detailed in the <i>Biodiversity Conservation Act 2016</i> (s. 6.12), <i>Biodiversity Conservation Regulation 2017</i> (s. 6.8) and <i>Biodiversity Assessment Method</i> including details of the measures proposed to address the offset obligation as follows: <ul style="list-style-type: none"> <li>• The total number and classes of biodiversity credits required to be retired for the development/project;</li> <li>• The number and classes of like-for-like biodiversity credits proposed to be retired;</li> <li>• The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules;</li> <li>• Any proposal to fund a biodiversity conservation action; and</li> <li>• Any proposal to make a payment to the Biodiversity Conservation Fund.</li> </ul> |
| 3. If requesting the application of the variation rules, the BDAR must contain details of what reasonable steps have been taken to attempt to obtain the required like-for-like biodiversity credits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4. The BDAR must be prepared by a person accredited in accordance with the <i>Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017</i> under s. 6.10 of the <i>Biodiversity Conservation Act 2016</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 5. In accordance with section 9.1 and 9.2 of the BAM the BDAR must assess <i>all</i> direct and indirect impacts of the proposal on native vegetation, threatened ecological communities and threatened species habitat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



Level 6, 10 Valentine Avenue  
Parramatta NSW 2150  
Locked Bag 5020  
Parramatta NSW 2124

Telephone: 61 2 9873 8500  
Facsimile: 61 2 9873 8599  
[heritagemailbox@environment.nsw.gov.au](mailto:heritagemailbox@environment.nsw.gov.au)  
[www.heritage.nsw.gov.au](http://www.heritage.nsw.gov.au)

File No: SF17/53052  
Ref No: DOC17/566150  
Your reference: SSD 8900

Ms Chloe Dunlop  
Senior Planning Officer  
Industry Assessments  
Department of Planning and Environment  
GPO Box 39  
SYDNEY NSW 2001

Sent by email to: [Chloe.Dunlop@planning.nsw.gov.au](mailto:Chloe.Dunlop@planning.nsw.gov.au)

Dear Ms Dunlop

**Request for Secretary's Environmental Assessment Requirements (SEARs) for the proposed construction of a Light Industrial Warehouse Facility with Ancillary Office Space, Liverpool LGA (SSD 8900)**

---

Reference is made to your email received on 16 November 2017 seeking input into the Department of Planning and Environment Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Assessment (EIS) for the above proposal.

On 13 January 2017, the Department of Planning and Environment granted deferred development consent to Staged Development Application SSD 6324 for the Bringelly Road Business. The concept approval also involved bulk earthworks and other works in stage 1 early works. This is very likely to have involved removal and harm to archaeology at the site and was subject to specific conditions to manage this. The current application is unlikely to require SEARs for historical archaeology on that basis.

The DA seeks consent for a light industrial warehouse facility with ancillary office space, accommodating approximately 10,360 m<sup>2</sup> and approximately 70 car parking spaces.

The SEARs Request Report and preliminary Environmental Impact Statement, both prepared by Ethos Urban, outlining the background, the proposal, the planning context and key Environmental Aspects to be assessed, dated 6 and 14 November 2017 respectively, have been reviewed and the following comments are provided:

Heritage is not identified as a key factor for the SEARs. The subject site is in the vicinity the local heritage item the *Bringelly Road Cultural Landscape*. It is noted there is no excavation proposed as part of this application. The following SEARs are recommended to be included to enable an appropriate level of assessment:

- The EIS should be amended to include a Heritage Impact Statement (HIS) to address the extent of impact on the surrounding site and surrounding area, including any built and landscape items, conservation areas, views and settings.

If you have any questions regarding the above matter, please contact James Quoye, Heritage Officer, at the Heritage Division, Office of Environment and Heritage on telephone (02) 9873 8612 or by email: [james.quoye@environment.nsw.gov.au](mailto:james.quoye@environment.nsw.gov.au).

Yours sincerely

A handwritten signature in black ink that reads "Timothy Smith". The signature is written in a cursive style, with the first name "Timothy" and the last name "Smith" clearly legible.

Tim Smith OAM  
Director Heritage Operations  
Heritage Division  
Office of Environment & Heritage  
**As Delegate of the Heritage Council of NSW**  
5 December 2017





4 December 2017

Roads and Maritime Reference: SYD17/01598/01 (A20155059)  
DP&E Reference: SSD 8900

Director  
Department of Planning and Environment  
Industry Assessments  
GPO Box 39  
SYDNEY NSW 2001

Attention: **Chloe Dunlop**

Dear Sir/Madam

**NULON MOTOR OILS – LOT 8 BRINGELLY ROAD BUSINESS HUB, WESTERN SYDNEY  
PARKLANDS**

Reference is made to your correspondence dated 16 November 2017 requesting Roads and Maritime Services (Roads and Maritime) to provide details of key issues and assessment requirements regarding the abovementioned development for inclusion in the Secretary's Environmental Assessment (EA) requirements.

Roads and Maritime require the following issues to be included in the transport and traffic impact assessment of the proposed development:

1. Daily and peak traffic movements likely to be generated by the proposed development including the impact on intersections along the Bringelly Road and Cowpasture Road and the need/associated funding for upgrading or road improvement works (if required).
2. Details of the proposed site access and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle widths, etc).
3. Detailing vehicle circulation, proposed number of car parking spaces and compliance with the appropriate parking codes.
4. Details of light and heavy vehicle movements (including vehicle type and likely arrival and departure times).
5. To ensure that the above requirements are fully addressed, the transport and traffic study must properly ascertain the cumulative study area traffic impacts associated with the development (and any other known proposed developments in the area). This process provides an opportunity to identify a package of traffic and transport infrastructure measures required to

**Roads and Maritime Services**



support future development. Regional and local intersection and road improvements, vehicular access options for adjoining sites, public transport needs, the timing and cost of infrastructure works and the identification of funding responsibilities associated with the development should be identified.

The proponent is advised that Roads and Maritime is currently undertaking road widening works on Bringelly Road and Cowpasture Road. The proponent can contact the Project Manager Roy Surace (Roy.Surace@rms.nsw.gov.au or 02 8874 7076) for further information regarding the Bringelly Road design plan.

Any inquiries in relation to this Application can be directed to Malgy Coman on 8849 2413 or development.sydney@rms.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'RCumming', with a stylized flourish at the end.

Rachel Cumming  
**Senior Land Use Assessment Coordinator**  
**Network and Safety Section**



Our Reference: DOC17/567051  
Your Reference: SSD8900

Ms Chloe Dunlop  
Senior Planning Officer  
NSW Department of Planning and Environment  
by email: [chloe.dunlop@planning.nsw.gov.au](mailto:chloe.dunlop@planning.nsw.gov.au)

Dear Ms Dunlop

**Request for Input into Secretary's Environmental Assessment Requirements  
Nulon Motor Oils SSD 8900**

Reference is made to your request for the Environment Protection Authority's ("EPA") requirements for the preparation of an Environment Impact Statement ("EIS") for the construction of a light industrial warehouse facility to be operated by Nulon Motor Oils. The proposed operations include bulk fluid delivery and storage; blending; bottling and packaging; storage; dispatch and distribution.

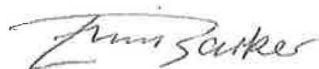
The EPA acknowledges the *Preliminary Environmental Impact Statement*, dated 14 November 2017, prepared by Ethos Urban. The EPA has considered the proposal given the information provided. In summary, the EPA's key information requirements include an adequate description and assessment of:

1. how materials will be stored and handled to prevent spillage and or environmental incidents.
2. expected impacts of the proposed manufacturing activities and what impact this will have on air quality
3. the impacts and quantity of wastewater, stormwater management and discharges from the site.

The EPA's requirements for the preparation of an EIS for the proposed Nulon Motor Oils facility are included in Attachment 1. The EIS should consider relevant guidelines as listed in Attachment 2. Any industry specific codes of practice and best practice management guidelines should also be considered.

Please contact Tenille Lawrence on (02) 9995 6207 if you require any further information regarding this matter.

Yours sincerely

 28/11/2017

**ERIN BARKER**

**Unit Head - Sydney Industry**

**NSW Environment Protection Authority**

Contact officer: TENILLE LAWRENCE  
9995 6207

## ATTACHMENT 1

### 1. Licensing requirements

On the basis of the information submitted to date, it appears the proposal meets the thresholds of scheduled activity *Petroleum products and fuel production* under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.

The EIS should address the requirements of Section 45 of the POEO Act determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate limits for the EPL.

Should project approval be granted, the proponent will need to make a separate application to the EPA for an EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the EPA's Guide to Licensing document.  
<http://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/guide-to-licensing>

### 2. The Proposal and the Premises

The objectives of the proposal should clearly state and refer to:

- the specifics of the operation including its components and activities
- the raw products which will be used onsite and the products which will be produced
- the toxicity of the products involved and the potential impacts on the surrounding environment.

The EIS will need to fully identify all the processes and activities intended for the site over the life of the development including:

- all equipment proposed for use at the site
- chemicals used on site and proposed methods for their transportation, storage use and emergency management
- waste generation and disposal
- methods to mitigate any expected environmental impacts of the development, especially in relations to pollution controls, potential modification or augmentation of these controls to manage increased production and environmental risks at the facility.

### 3. Air issues

The EIS should include a detailed air quality impact assessment (AQIA).

The AQIA should:

- a) include a detailed description of all processes that could result in air emissions must be identified and described. Sufficient detail to accurately communicate the characteristics and quantity of all emissions must be provided
- b) assess the risk associated with potential discharges of fugitive and point source emissions for all stages of the proposal. Assessment of risk relates to environmental harm, risk to human health and amenity

- c) justify the level of assessment undertaken on the basis of risk factors, including but not limited to:
  - proposal location;
  - characteristics of the receiving environment; and
  - type and quantity of pollutants emitted.
- d) describe the receiving environment in detail.
- e) the proposal must be contextualised within the receiving environment (local, regional and inter-regional as appropriate). The description must include but need not be limited to:
  - meteorology and climate;
  - topography;
  - surrounding land-use; receptors; and
  - ambient air quality.
- f) include a consideration of 'worst case' emission scenarios and impacts at proposed emission limits
- g) account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.
- h) include air dispersion modelling where there is a risk of adverse air quality impacts, or where there is sufficient uncertainty to warrant a rigorous numerical impact assessment. Air dispersion modelling must be conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2007)
- i) demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the (POEO) Act (1997) and the POEO (Clean Air) Regulation (2010).
- j) provide an assessment of the project in terms of the priorities and targets adopted under the NSW State Plan 2010 and its implementation plan Action for Air.
- k) detail emission control techniques/practices that will be employed by the proposal.

#### 4. Noise and vibration

In relation to noise, the following matters should be addressed (where relevant) as part of the Environmental Assessment.

- Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009).
- Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the Assessing Vibration: a technical guideline (DEC, 2006).
- Operational noise from all industrial activities to be undertaken on the premises should be assessed using the guidelines contained in the *Noise Policy for Industry* (EPA, 2017).
- Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in NSW Road Noise Policy (EPA, 2011)

## 5. Waste, chemicals and Hazardous Materials

Details of the quantity and type of liquid and/or non-liquid waste(s) generated, handled, processed or disposed of at the premises. Waste must be classified according to EPA's Waste Classification Guidelines 2014.

Details of liquid waste and non-liquid waste management at the facility, including:

- the transportation, assessment and handling of waste arriving at or generated at the site;
- any stockpiling of wastes or recovered materials at the site;
- any waste processing related to the facility, including reuse, recycling, reprocessing or treatment both on- and off-site;
- the method for disposing of all wastes or recovered materials at the facility;
- the emissions arising from the handling, storage, processing and reprocessing of waste at the facility;
- the proposed controls for managing the environmental impacts of these activities.

Details of procedures for the assessment, handling, storage, transport and disposal of all hazardous waste used, stored, processed or disposed of at the site, in addition to the requirements for liquid and non-liquid wastes.

Outline contingency plans for any event that affects operations at the site that may result in environmental harm, including: excessive stockpiling of waste, volume of leachate generated exceeds the storage capacity available on-site etc.

## 6. Water and soils

Describe the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.

Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.

Outline all erosion, sediment and leachate control including measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during works. The EIS should show the location of each measure to be implemented including:

- Sediment traps
- Diversion banks
- Sediment fences
- Bunds (earth, hay, mulch)
- Geofabric liners
- Other control measures as appropriate.



## Attachment 2 – Guidance Material

| Title                                                                                                               | Web address                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Protection of the Environment Operations Act 1997</i>                                                            | <a href="http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N">http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N</a>                                                   |
| <b><u>Licensing</u></b>                                                                                             |                                                                                                                                                                                                                       |
| EPA Guide to Licensing                                                                                              | <a href="http://www.epa.nsw.gov.au/licensing/licenceguide.htm">www.epa.nsw.gov.au/licensing/licenceguide.htm</a>                                                                                                      |
| <b><u>Air Issues</u></b>                                                                                            |                                                                                                                                                                                                                       |
| <b>Air Quality</b>                                                                                                  |                                                                                                                                                                                                                       |
| Approved methods for modelling and assessment of air pollutants in NSW (2005)                                       | <a href="http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf">http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf</a>                                                               |
| POEO (Clean Air) Regulation 2010                                                                                    | <a href="https://www.legislation.nsw.gov.au/#/view/regulation/2010/428/full">https://www.legislation.nsw.gov.au/#/view/regulation/2010/428/full</a>                                                                   |
| <b><u>Noise and Vibration</u></b>                                                                                   |                                                                                                                                                                                                                       |
| Interim Construction Noise Guideline (DECC, 2009)                                                                   | <a href="http://www.epa.nsw.gov.au/resources/noise/09265cng.pdf">www.epa.nsw.gov.au/resources/noise/09265cng.pdf</a>                                                                                                  |
| Assessing Vibration: a technical guideline (DEC, 2006)                                                              | <a href="http://www.epa.nsw.gov.au/noise/vibrationguide.htm">www.epa.nsw.gov.au/noise/vibrationguide.htm</a>                                                                                                          |
| NSW Road Noise Policy                                                                                               | <a href="http://www.epa.nsw.gov.au/publications/noise/2011236-nsw-road-noise-policy">http://www.epa.nsw.gov.au/publications/noise/2011236-nsw-road-noise-policy</a>                                                   |
| Noise Policy for Industry (EPA, 2017)                                                                               | <a href="https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)">https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)</a> |
| <b><u>Waste, Chemicals and Hazardous Materials and Radiation</u></b>                                                |                                                                                                                                                                                                                       |
| <b>Waste</b>                                                                                                        |                                                                                                                                                                                                                       |
| Waste Classification Guidelines (EPA, 2014)                                                                         | <a href="http://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines">http://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines</a>   |
| <b><u>Water and Soils</u></b>                                                                                       |                                                                                                                                                                                                                       |
| <b>Soils – general</b>                                                                                              |                                                                                                                                                                                                                       |
| Managing urban stormwater: soils and construction, vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B | Vol 1 - Available at <a href="http://www.environment.nsw.gov.au/resources/water/BlueBookVol1.pdf">http://www.environment.nsw.gov.au/resources/water/BlueBookVol1.pdf</a>                                              |

27 November 2017

Chloe Dunlop  
Senior Planning Officer  
Industry Assessments  
Department of Planning & Environment  
GPO Box 39, Sydney NSW 2001

Dear Chloe

### **Sydney Water input to SEARs for Nulon Motor Oils**

Thank you for your letter of 16 November 2017 seeking Sydney Water's input on the Secretary's Environmental Assessment Requirements for the abovementioned proposal. We have reviewed the proposal and provide the following comments for your consideration. Sydney Water requests that the Department of Planning and Environment include the following Secretary's Environmental Assessment Requirements relating to the provision of water-related services for the subject site:

#### **Water-related Infrastructure Requirements**

1. The proponent of development should determine service demands following servicing investigations and demonstrate that satisfactory arrangements for drinking water, wastewater, and recycled water (if required) services have been made.
2. The proponent must obtain endorsement and/or approval from Sydney Water to ensure that the proposed development does not adversely impact on any existing water, wastewater or stormwater main, or other Sydney Water asset, including any easement or property. When determining landscaping options, the proponent should take into account that certain tree species can cause cracking or blockage of Sydney Water pipes and therefore should be avoided.
3. Strict requirements for Sydney Water's stormwater assets (for certain types of development) may apply to this site. The proponent should ensure that satisfactory steps/measures been taken to protect existing stormwater assets, such as avoiding building over and/or adjacent to stormwater assets and building bridges over stormwater assets. The proponent should consider taking measures to minimise or eliminate potential flooding, degradation of water quality, and avoid adverse impacts on any heritage items, and create pipeline easements where required.

#### **Integrated Water Cycle Management**

4. The proponent should outline any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and demonstrate water sensitive urban design (principles are used), and any water conservation measures that are likely to be proposed. This will allow Sydney Water to determine the impact of the proposed development on our existing services and required system capacity to service the development.

If you require any further information, please contact Lulu Huang of Growth Planning and Development on 02 8849 4269 or e-mail [lulu.huang@sydneywater.com.au](mailto:lulu.huang@sydneywater.com.au).

Yours sincerely,



Paul Mulley  
**Manager, Growth Planning and Development**

Department of Planning and Environment  
Industry Assessments  
GPO Box 39  
Sydney NSW 2001

By email: [Chloe.Dunlop@planning.nsw.gov.au](mailto:Chloe.Dunlop@planning.nsw.gov.au)

Attention: Chloe Dunlop

**Re: SSD 8900 - Request for input into SEARS - Nulon Motor Oils**

Liverpool City Council was invited to provide a response to a Secretary's Environmental Assessment Requirements (SEARs) request from Ethos Urban, on behalf of CIP Constructions (NSW) Pty Ltd, for the construction of an industrial premises in Lot 8 of the Bringelly Road Business Hub, Horningsea Park.

It is Council's opinion that such a facility will likely pose a serious risk to the community and to the environment. The development consent for certain land in the Western Sydney Parklands (here-in called the Bringelly Road Business Hub) was approved for the uses of 'large format retail premises', 'light industry', 'service station', 'take away food and drink premises', and 'restaurant or café'. Council is not satisfied that the development can be defined as light industry.

Land in the Western Sydney Parklands is not subject to any land-use zoning. Instead, there are a number of low-impact land-uses which are permitted without consent, which are necessary for the operation and maintenance a regional park (such as recreation facilities (outdoor)). All other uses must be consistent with clause 12 of the WSP SEPP, including any approved concept (in this instance SSD 6324). Land in the Western Sydney Parklands is not subject to any Standard Instrument LEP nor SEPP that contains zone objectives, nor a definition of 'Light Industry' (the proposed land-use). It is noted that the approval for the Bringelly Road Business Hub also omits any definition of what constitutes 'light industry'. As such, it is deemed appropriate to assess whether the proposed development is consistent with the objectives of the Bringelly Road Business Hub. This is assisted by utilising the standard instrument definition of light industry being:

***light industry** means a building or place used to carry out an industrial activity that does not interfere with the amenity of the neighbourhood by reason of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, waste water, waste products, grit or oil, or otherwise, and includes any of the following:*

- (a) high technology industry,*
- (b) home industry.*

**Note.**

*Light industries are a type of industry—see the definition of that term in this Dictionary.*

The justification provided for the land-uses in the Bringelly Road Business Hub was provided by JBA on behalf of the trust as part of SSD 6324. Section 6.1 in the document titled '*Preliminary Environmental Investigation Report Request for DGRs State Significant Development*', dated December 2013, stated that the proposed land-uses would facilitate *"the development of large format retail with the potential to provide a variety of local jobs in close proximity to future residential development. The proposed land use will complement the activities proposed for the nearby Leppington Major Centre."* In a revised request for DGRs (letter dated 3 April 2014), light industry and warehousing/logistic land-uses were also sought, as they were deemed to be similar in nature. The Trust's Plan of Management requires that business parks are only considered where the four criteria below are met:

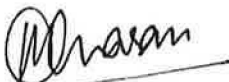
1. *Land uses should not only generate an appropriate commercial return but also add to the amenity of adjacent communities.*
2. *Land uses must generate additional employment and training opportunities for local and regional communities.*
3. *Development must be undertaken in a manner that will minimise the environmental impact of such development.*
4. *The development of business hubs will only be permitted to occur on sites with low environmental and recreational values.*

The proponent's SEPP 33 assessment states that the quantities of dangerous goods stored and vehicle movements associated with the development do not exceed threshold quantities outlined in 'Applying SEPP 33', therefore SEPP 33 does not apply, and therefore it is presumed that the development is not a hazardous or offensive industry. Council does not have the required in-house expertise to either concur or refute these findings. It is Council's opinion that the hazardous nature of the materials handled by this facility may lie outside the scope of SEPP 33 and Australian Standards, and as such international standards and best practice should apply. Council defers comment on the SEPP 33 assessment to a person or company with specialist qualifications and experience in the relevant field. It is strongly advised that the SEPP 33 assessment and the EIS is peer reviewed by an appropriately qualified and experienced party.

It is Council's opinion that the operations of a facility which stores and transforms combustible petrochemicals is generally inconsistent with the definition of light industry (as per the Standard Instrument), and is generally incompatible with the intended use of the land, as per the planning framework above. The risks of fire/explosion and potential ecological damage from spills or failure of equipment could have significant repercussions on the safety of the local community and the natural environment.

If you have any questions please contact Ian Stendara, A/Senior Strategic Planner on 9821 9246.

Yours sincerely



**Masud Hasan**

A / Executive Planner  
Strategic Planning





## NSW RURAL FIRE SERVICE



The Secretary  
Department of Planning and Environment  
GPO Box 39  
SYDNEY NSW 2001

Your reference: SSD 8900  
Our reference: D17/4216

30 November 2017

**Attention: Chloe Dunlop**

Dear Sir/Madam,

### **Request for input into SEARS - Bringelly Road Business Hub- Nulon Motor Oils Warehouse**

Reference is made to correspondence dated 17 November 2017 seeking input regarding the preparation of Secretary's environmental assessment requirements for the above State Significant Development in accordance with the *Environmental Planning and Assessment Act 1979*. On the basis of the information provided the proposed development is for the construction of a light warehouse facility and operations will include the preparation of motor oil products for future retail sale off-site as well as the following:

- Bulk fluid delivery and storage;
- Blending;
- Bottling and packaging;
- Storage;
- Dispatch and distribution; and
- Ancillary office administration.

The New South Wales Rural Fire Service (NSW RFS) has reviewed the information provided and advises that a bush fire assessment report shall be prepared which identifies the extent to which the proposed development conforms with or deviates from the relevant provisions of *Planning for Bush Fire Protection (PBP) 2006*.

As the proposed warehouse facility is proposed to store and process flammable materials on bush fire prone land the following will need to be considered within the submitted bush fire report:

- Information which demonstrates that the development can comply with Section 4.3.6 f) of *PBP 2006* for industrial and warehouse facilities;
- Evidence of how the proposal will not increase "the bush fire risk to adjoining lands" in accordance with Section 4.1.3 of *PBP 2006* for infill development, where additional potential fire hazards are located within the subject sites;

Postal address  
NSW Rural Fire Service  
Records Management  
Locked Bag 17  
GRANVILLE NSW 2141

Street address  
NSW Rural Fire Service  
Planning and Environment Services (East)  
42 Lamb Street  
GLENDENNING NSW 2761

T 1300 NSW RFS  
F (02) 8741 5433  
E [pes@rfs.nsw.gov.au](mailto:pes@rfs.nsw.gov.au)  
[www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au)





- Information which shows how flammable materials will be stored in such a way that their ability to become involved with a potential bush fire will be minimised; and,
- Information which shows that the proposed warehouse will not be in the flame zone, as the proposed development will store, process and package flammable substances.

If you have any queries regarding this advice, please contact Emma Jensen, Development Assessment and Planning Officer, on 1300 NSW RFS.

Yours sincerely,



Nika Fomin  
Manager, Planning and Environment Services (East)

## Appendix D

### CORRESPONDENCE WITH EPA

**From:** Mark Wilson  
**Sent:** Thursday, 14 December 2017 1:02 PM  
**To:** [tenille.lawrence@epa.nsw.gov.au](mailto:tenille.lawrence@epa.nsw.gov.au)  
**Cc:** Paul Jewiss <[pjewiss@ciproperty.com.au](mailto:pjewiss@ciproperty.com.au)>; Mark Griffiths <[mgriffiths@ciproperty.com.au](mailto:mgriffiths@ciproperty.com.au)>  
**Subject:** SSD 8900 Nulon Motors - SEARS/ EPA Items

Tenille,

Thanks for your time on the phone earlier today. As discussed, we are providing civil engineering design for the developers of the site, Commercial and Industrial Property (CIP), for a development application for the Nulon Motors Facility at Bringelly. Refer to the SSD8900 SEARS for the site attached.

We provide the following initial information pertaining to your agency response to the Department of Planning and Environment (Ref: DOC17/567051 dated 28/11/2017) regarding stormwater management during the operational phase of the development, and erosion and sediment controls on the site during construction. Paul Jewiss from CIP will follow up with additional information relating to waste, hazardous material etc in the following days. The measures and items below will be described in more detail in our Engineering Report currently being prepared and will be included in the application submission.

#### Erosion and Sediment Controls During Construction

Erosion and sediment controls will be provided during construction. All soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Landcom document *Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book* and Liverpool City Council specifications.

The ESC concept is shown on attached drawings DA20 and DA25 as attached. The proposed control measures include:

1. Silt fences to divert clean water
2. Diversion swales
3. Construction entry/ truck shaker
4. Stockpile management
5. Sediment basin
6. Dust controls

The proposed measures will be made to reduce impact and risk of sediment laden runoff from the site into surrounding properties or environmental zones.

### Stormwater Management During Operation of the Facility

Stormwater management measures, including water quality treatment and site detention systems are to be implemented in accordance with the Liverpool Council Policy and the strategy and measures approved under SSD\_6324 outlined in the *Bringelly Road Business Hub Engineering Report* by Northrop Engineers (Ref:140089).

The increase in stormwater runoff due to the increase in impervious areas is proposed to be managed by an inground tank with a storage volume of 504m<sup>3</sup>. This system will attenuate post development stormwater discharge to pre-development. Refer to drawing Co11994.01-DA41 attached.

Liverpool City Council have nominated, in *Section 6.4* of their *DCP 2008*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

|                        |     |
|------------------------|-----|
| Gross Pollutants       | 90% |
| Total Suspended Solids | 80% |
| Total Phosphorus       | 65% |
| Total Nitrogen         | 45% |
| Total Hydrocarbons     | 90% |

Stormwater treatment and treatment measures for the development shall be based on a treatment train approach to ensure that the treatment objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment to parking, hardstand & roof areas is to be performed via an appropriately sized Gross Pollutant Trap located on site. The proposed GPT will be a vortech style GPT such as a Rocla CDS system. This will target litter, sediment, oil and grease and some nutrients;
- Tertiary treatment is to be made off-lot, via the Bedwell Park Wetland located to the north of the estate. The Bedwell Park Wetland will provide treatment of nutrients and sediments as set out in the Northrop Report and approved SSD\_6324 quoted above. Stormwater discharge to the Bedwell Park Wetland is via an existing flow path to the north of the site.

### Spill/ Fire Water Containment

The requirements for spill and fire water containment are still under assessment.

The current strategy, subject to review and confirmation, is for a stormwater isolation valve to be provided at the drainage discharge point (Pit A13). Containment volume of 504m<sup>3</sup> plus additional storage within pits and pipes of approximately 50m<sup>3</sup> will be available for containment of firewater and/or spill. Note the isolation valve has not yet been shown on the attached plan but will be introduced to the drawing set for the application documents.

Paul Jewiss will provide further details as to the required containment volumes for firewater.

If you have any questions on the provided information please call me on 0421847808 or Paul on 0428288762.

Best Regards,

**Mark Wilson**  
Director

# NULON MOTORS

## DRAWING LIST

| DRAWING NO.      | DRAWING TITLE                         |
|------------------|---------------------------------------|
| C011944.01-DA 10 | DRAWING LIST & GENERAL NOTES          |
| C011944.01-DA 20 | EROSION AND SEDIMENT CONTROL PLAN     |
| C011944.01-DA 25 | EROSION AND SEDIMENT CONTROL DETAILS  |
| C011944.01-DA 40 | STORMWATER DRAINAGE CATCHMENT PLAN    |
| C011944.01-DA 41 | STORMWATER DRAINAGE PLAN              |
| C011944.01-DA 45 | STORMWATER DRAINAGE DETAILS - SHEET 1 |
| C011944.01-DA 46 | STORMWATER DRAINAGE DETAILS - SHEET 2 |
| C011944.01-DA 51 | FINISHED LEVELS PLAN                  |

GENERAL NOTES:

- G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
- G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE.  
ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.  
ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT.  
REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
- G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED.  
TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
- G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
- G6 ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.
- G7 DRAWING TO BE READ IN CONJUNCTION WITH ENGINEERING REPORT CO1994.01-05.rpt

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS A.H.D.
2. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN
3. THE MAJOR CONTOUR INTERVAL IS 0.5m
4. THE MINOR CONTOUR INTERVAL IS 0.1m.
5. MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
6. MAXIMUM PAVEMENT GRADES ARE TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
7. MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
8. PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES EXCEED 1:20 (5%)
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
12. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500-3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVEL PLANS D&S1.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE UPVC GRADE S80 UNDO.
8. PIPES 400 AND ABOVE ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING M12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm where REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE Laid AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING UNDER AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. WHERE PIPE LINES ENTER PITS, PROVIDE 2mm LENGTH OF STOCKING WRAPPED SLOTTED Ø100 UPVC TO EACH SIDE OF PIPE.
13. ALL SUBSIDIARY DRAINAGE LINES SHALL BE Ø100 SLOTTED UPVC WITH 400mm COVER TO PIPE COVER. BENEATH GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSIDIARY LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSIDIARY LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
14. ALL PIPE GRADES IN 100 MINIMUM UNDO.
15. PROVIDE STEEL IRONS IN PITS DEEPER THAN 1000mm.
16. 400mm COVER TO PIPE COVER. BENEATH GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSIDIARY LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSIDIARY LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
17. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE IN CONTAINER PAVEMENT SHALL BE CLASS G 'HEAVY DUTY', AND THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' UNDO.
18. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
19. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH COVER TO MATCH DP SIZE UNDO. ON PLAN. PROVIDE CLEANING EYE AT GRADE LEVEL.
20. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.



SITE PLAN  
N.T.S

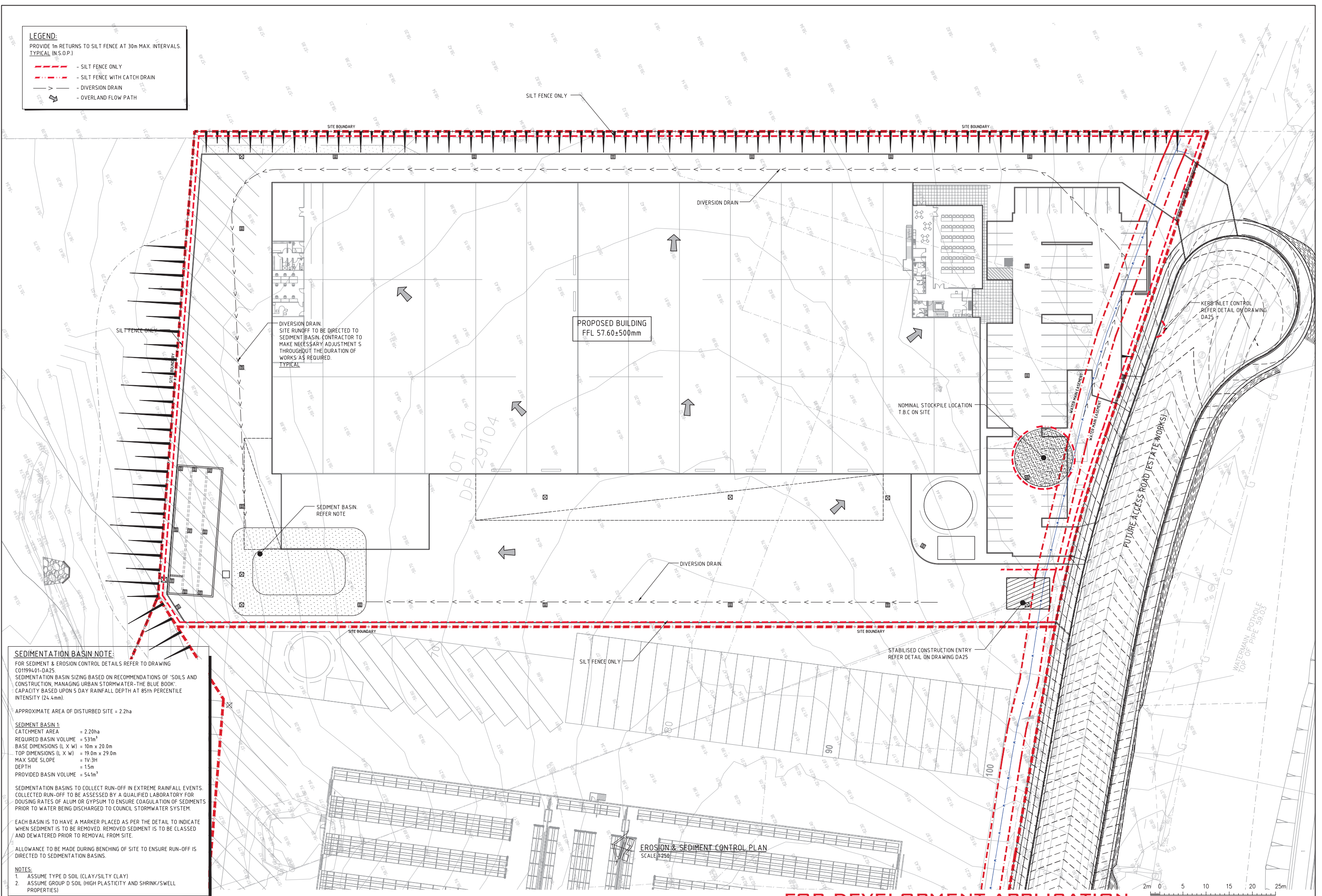
**FOR DEVELOPMENT APPLICATION**

[illegible]



**LEGEND:**  
PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.  
TYPICAL (N.S.O.P.)

- SILT FENCE ONLY
- SILT FENCE WITH CATCH DRAIN
- DIVERSION DRAIN
- OVERLAND FLOW PATH



**SEDIMENTATION BASIN NOTE:**  
FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C011994-01-DA25.  
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.  
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (24.4mm).  
APPROXIMATE AREA OF DISTURBED SITE = 2.2ha

**SEDIMENT BASIN 1:**  
CATCHMENT AREA = 2.20ha  
REQUIRED BASIN VOLUME = 531m³  
BASE DIMENSIONS (L X W) = 10m x 20.0m  
TOP DIMENSIONS (L X W) = 19.0m x 29.0m  
MAX SIDE SLOPE = 1V:3H  
DEPTH = 1.5m  
PROVIDED BASIN VOLUME = 541m³

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

**NOTES:**  
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)  
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

**FOR DEVELOPMENT APPLICATION**

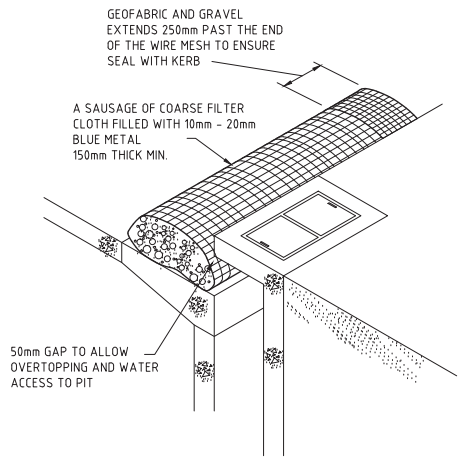
SCALE 1:250 AT A0 SIZE PLOT

|                                    |  |  |  |          |       |            |      |       |            |      |       |
|------------------------------------|--|--|--|----------|-------|------------|------|-------|------------|------|-------|
| ISSUED FOR DEVELOPMENT APPLICATION |  |  |  | 15.12.17 |       |            |      | B     |            |      |       |
| ISSUED FOR INFORMATION             |  |  |  | 24.11.17 |       |            |      | A     |            |      |       |
| AMENDMENTS                         |  |  |  | DATE     | ISSUE | AMENDMENTS | DATE | ISSUE | AMENDMENTS | DATE | ISSUE |

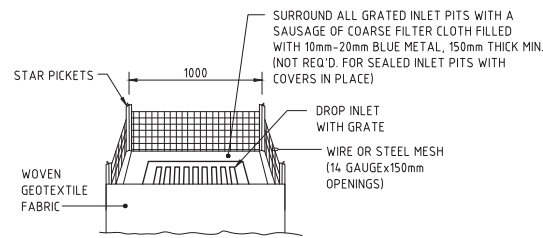
|           |        |                                                              |          |       |          |         |      |          |                |                                                                                                                                                                                               |  |
|-----------|--------|--------------------------------------------------------------|----------|-------|----------|---------|------|----------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| ARCHITECT | CLIENT | PROJECT                                                      | DESIGNED | DRAWN | DATE     | CHECKED | SIZE | SCALE    | CAD REF.       | Costin Roe Consulting Pty Ltd.<br>Consulting Engineers<br>Level 1, 4 Windmill Street<br>Wahia Bay, Sydney NSW 2000<br>Tel: (02) 9251-7889 Fax: (02) 9251-7721<br>email: mail@costinroe.com.au |  |
|           |        | NULON MOTORS<br>LOT8, BRINGELLY ROAD<br>HORNINGSEA PARK, NSW | M.C.     | I.O.  | 24.11.17 | M.W.    | A0   | AS SHOWN | C01994-01-DA20 | PRECISION   COMMUNICATION   ACCOUNTABILITY                                                                                                                                                    |  |

|               |  |                                 |  |
|---------------|--|---------------------------------|--|
| DRAWING TITLE |  | EROSION & SEDIMENT CONTROL PLAN |  |
| DRAWING NO.   |  | C011994-01-DA20                 |  |
| ISSUE         |  | B                               |  |



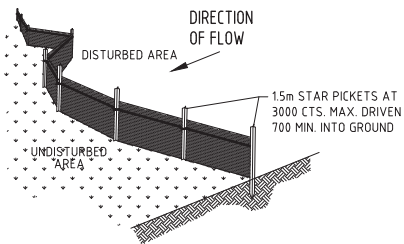


KERB INLET CONTROL  
N.T.S.

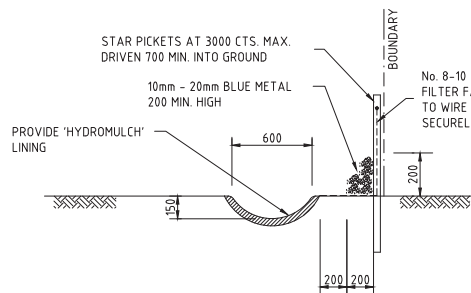


GRADED INLET PIT FILTER DETAIL  
N.T.S.

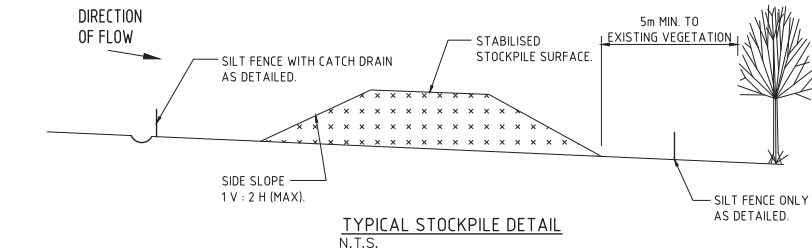
NOTE: ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.



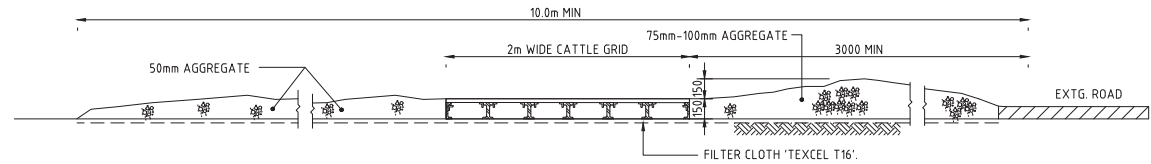
TYPICAL SILT FENCE DETAIL  
N.T.S.  
PROVIDE 1m RETURNS AT 30m INTERVALS.  
TYPICAL



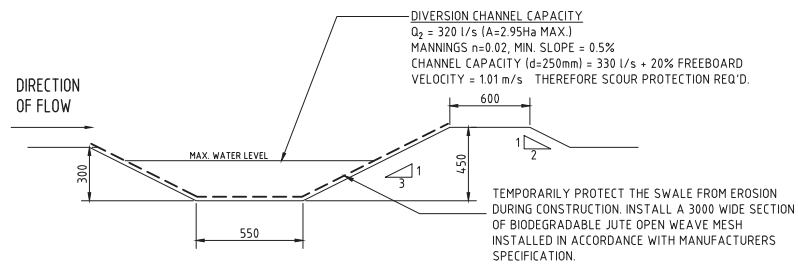
TYPICAL OPEN DRAIN & SILT FENCE  
SCALE 1:20



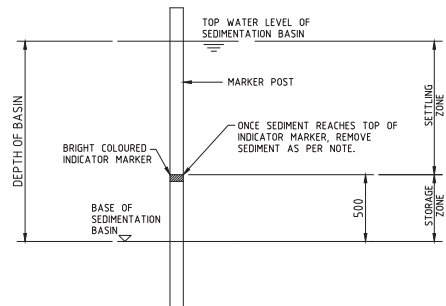
- STOCKPILE NOTES**
1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
  2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
  3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
  4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
  5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



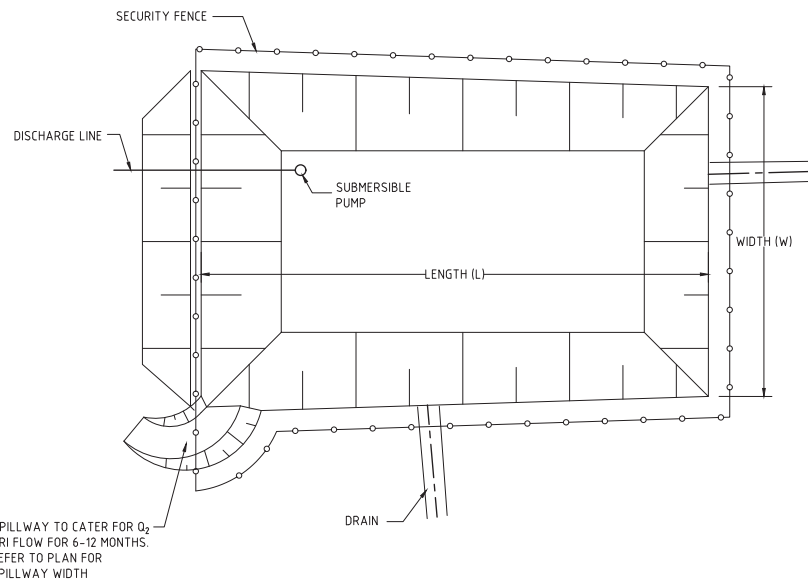
SECTION 1:20 : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



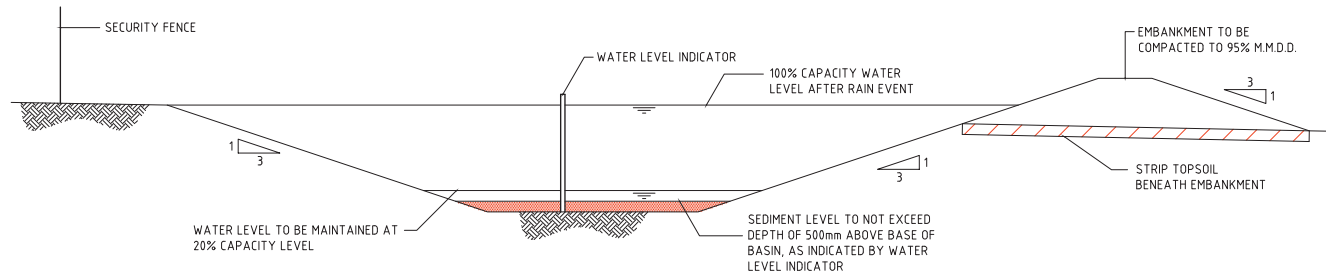
DIVERSION DRAIN SECTION  
SCALE 1:20



SEDIMENT STORAGE MARKER  
SCALE 1:20



TYPICAL SEDIMENT CONTROL POND PLAN  
SCALE 1:250



TYPICAL SEDIMENT CONTROL BASIN SECTION  
SCALE 1:50

- NOTES:**
- ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.
  - MINIMISE DISTURBED AREAS.
  - ROADS & FOOTPATHS TO BE SWEEP DAILY.
  - 12m TURF TO BE PLACED BEHIND KERBS.
  - DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

2m 0 5 10 15 20 25m  
SCALE 1:250 AT A0 SHEET SIZE

500mm 0 1 2 3 4 5m  
SCALE 1:50 AT A0 SHEET SIZE

200mm 0 500 1000 1500 2000mm  
SCALE 1:20 AT A0 SHEET SIZE

FOR DEVELOPMENT APPLICATION

|                                    |  |          |       |            |  |        |  |              |  |                                |  |                            |  |
|------------------------------------|--|----------|-------|------------|--|--------|--|--------------|--|--------------------------------|--|----------------------------|--|
| ISSUED FOR DEVELOPMENT APPLICATION |  | 15.12.17 | B     | ARCHITECT  |  | CLIENT |  | PROJECT      |  | COSTIN ROE CONSULTING PTY LTD. |  | DRAWING TITLE              |  |
| ISSUED FOR INFORMATION             |  | 24.11.17 | A     |            |  |        |  | NULON MOTORS |  | Consulting Engineers           |  | EROSION & SEDIMENT CONTROL |  |
| AMENDMENTS                         |  | DATE     | ISSUE | AMENDMENTS |  | DATE   |  | DESIGNED     |  | DRAWN                          |  | DRAWING No                 |  |
|                                    |  |          |       |            |  |        |  | M.C.         |  | I.O.                           |  | C011994-01-DA25            |  |
|                                    |  |          |       |            |  |        |  | DATE         |  | CHECKED                        |  | B                          |  |
|                                    |  |          |       |            |  |        |  | 24.11.17     |  | M.W.                           |  |                            |  |
|                                    |  |          |       |            |  |        |  | SCALE        |  | AS SHOWN                       |  |                            |  |
|                                    |  |          |       |            |  |        |  | CAD REF.     |  | C01994-01-DA25                 |  |                            |  |

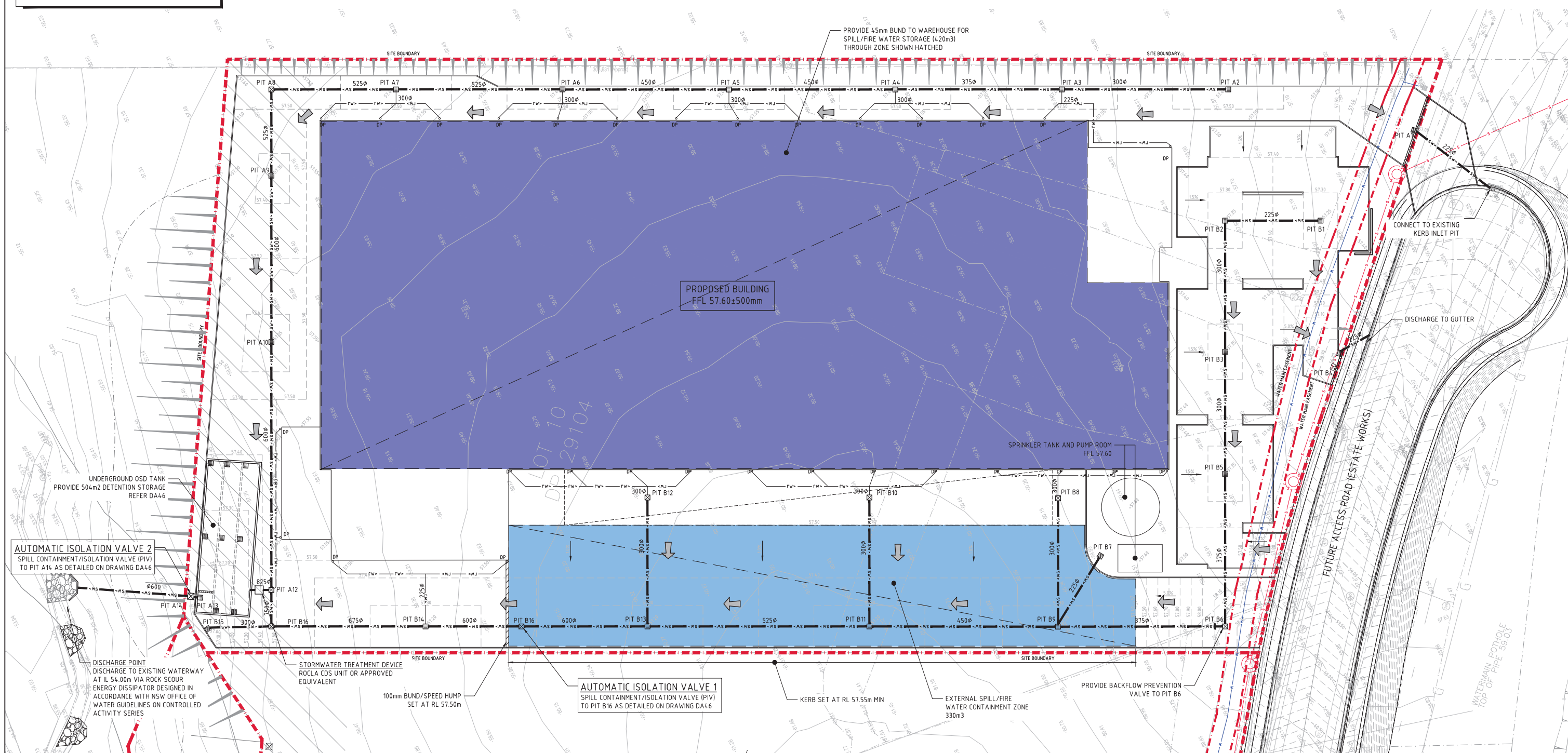


LEVELS DATUM IS AHD.

-  - SGGP, SINGLE GRATED GULLY PIT
-  - SJP, SEALED JUNCTION PIT
-  - DOWNPIPE (INDICATIVE ONLY)
-  - GRATED DRAIN
-  - DRAINAGE LINE
-  - ROOFWATER LINE
-  - EXISTING DRAINAGE LINE
-  - FINISHED PAVEMENT CONTOUR (M)  
0.5m INTERVALS
-  - FINISHED PAVEMENT CONTOUR (M)  
0.1m INTERVALS
-  - OVERLAND FLOW ARROWS

| PIT No. | GRATE RL | TYPE    | SIZE      | COMMENT |
|---------|----------|---------|-----------|---------|
| PIT A1  | 57.00    | S.G.G.P | 900x900   |         |
| PIT A2  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A3  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A4  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A5  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A6  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A7  | 57.40    | S.G.G.P | 900x900   |         |
| PIT A8  | 57.55    | S.G.G.P | 900x900   |         |
| PIT A9  | 57.35    | S.G.G.P | 900x900   |         |
| PIT A10 | 57.40    | S.G.G.P | 900x900   |         |
| PIT A11 | NOT USED |         |           |         |
| PIT A12 | 57.47    | S.J.P   | 1200x1200 |         |
| PIT A13 | 57.25    | S.J.P   | 900x900   |         |
| PIT A14 | 57.00    | P.I.V   | 1200x1200 |         |

| PIT No. | GRATE RL | TYPE    | SIZE      | COMMENT |
|---------|----------|---------|-----------|---------|
| PIT B1  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B2  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B3  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B4  | 56.70    | S.G.G.P | 900x900   |         |
| PIT B5  | 57.25    | S.G.G.P | 900x900   |         |
| PIT B6  | 58.20    | S.J.P   | 900x900   |         |
| PIT B7  | 57.55    | S.G.G.P | 900x900   |         |
| PIT B8  | 57.55    | S.J.P   | 900x900   |         |
| PIT B9  | 57.20    | S.G.G.P | 900x900   |         |
| PIT B10 | 57.55    | S.J.P   | 900x900   |         |
| PIT B11 | 57.20    | S.G.G.P | 900x900   |         |
| PIT B12 | 57.55    | S.J.P   | 900x900   |         |
| PIT B13 | 57.20    | S.G.G.P | 900x900   |         |
| PIT B14 | 57.20    | S.G.G.P | 900x900   |         |
| PIT B15 | 57.00    | S.G.G.P | 900x900   |         |
| PIT B15 | 57.45    | S.J.P   | 1200x1200 |         |
| PIT B16 | 57.37    | P.I.V   | 1200x1200 |         |

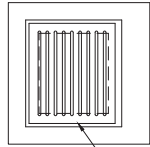


STORMWATER DRAINAGE PLAN  
SCALE 1:250

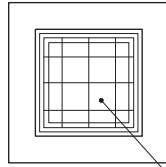
**FOR DEVELOPMENT APPLICATION**

[illegible]

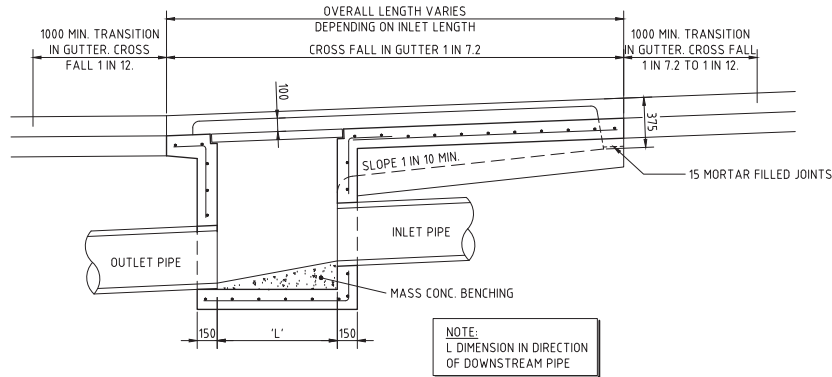




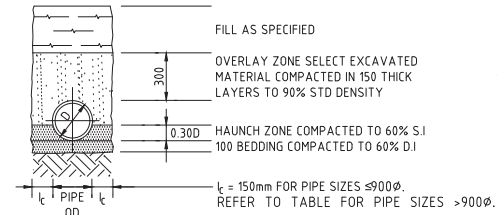
PLAN  
SCALE 1:20



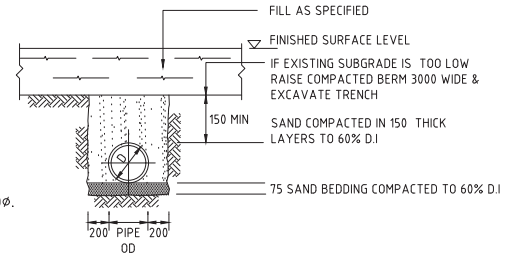
PLAN  
1:20



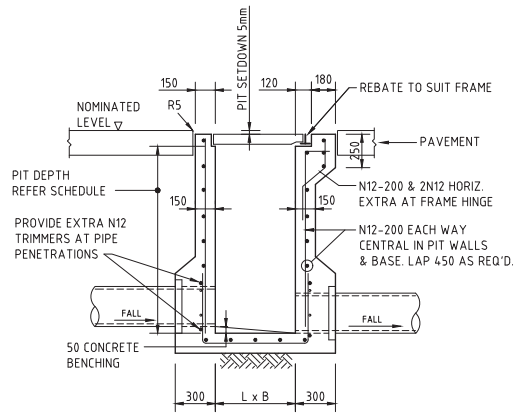
LONG SECTION  
SCALE 1:20



TYPE H1 SUPPORT TO  
CONCRETE PIPES AT  
LANDSCAPED AREAS

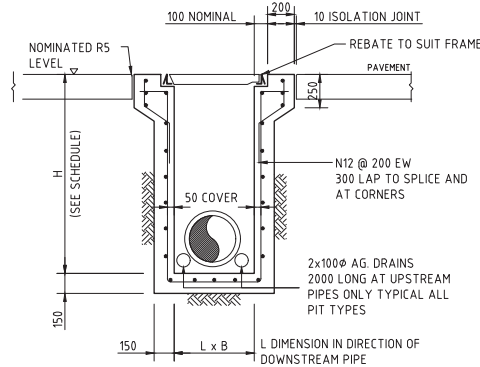


SUPPORT TO uPVC PIPES

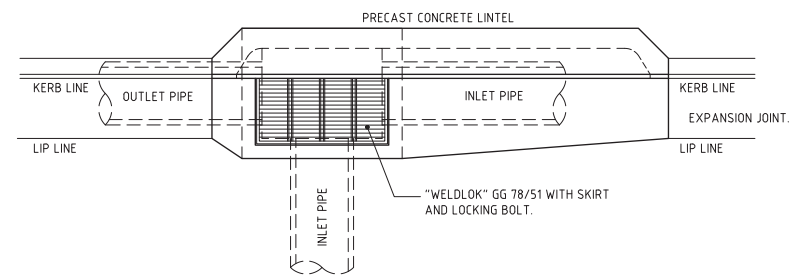


SEE SCHEDULE  
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

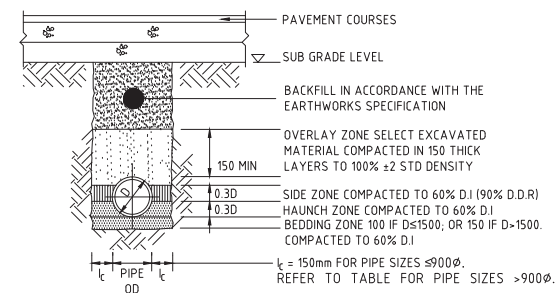
SECTION  
SCALE 1:20



SECTION  
SCALE 1:20

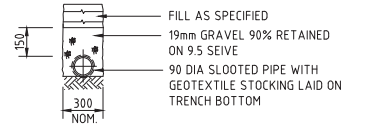


PLAN  
SCALE 1:20



TYPE HS2 SUPPORT TO  
CONCRETE PIPES  
UNDER PAVEMENT

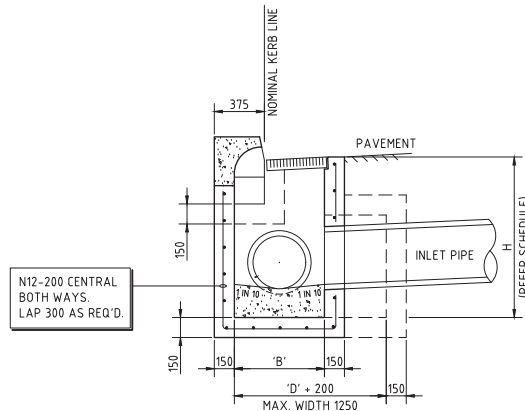
D ≤ 1350, MAX FILL = 4.0m  
D > 1350, MAX FILL = 3.0m



SUPPORT TO AG. DRAIN

## SINGLE GRATED GULLY PIT - SGGP

## SEALED PIT - SP



CROSS SECTION  
SCALE 1:20

## KERB INLET PIT - KIP

| CONCRETE QUALITY |       |                       |             |           |                      |
|------------------|-------|-----------------------|-------------|-----------|----------------------|
| ELEMENT          | SLUMP | AGGREGATE (MAX. SIZE) | CEMENT TYPE | ADMIXTURE | F <sub>c</sub> (MPa) |
| PIT              | 80    | 20                    | GP          | NIL       | 25                   |

### NOTES:

- WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
- SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
- ALL REINFORCING TO HAVE 30 MIN. CLAR CONCRETE COVER.
- FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.

| BEDDING & HAUNCH MATERIAL GRADING |                   |
|-----------------------------------|-------------------|
| SIEVE SIZE                        | WEIGHT PASSING(%) |
| 19                                | 100               |
| 2.36                              | 100 TO 50         |
| 0.60                              | 90 TO 20          |
| 0.30                              | 60 TO 10          |
| 0.15                              | 25 TO 0           |
| 0.075                             | 10 TO 0           |

| SIDE ZONE MATERIAL GRADING |                   |
|----------------------------|-------------------|
| SIEVE SIZE                 | WEIGHT PASSING(%) |
| 75                         | 100               |
| 9.5                        | 100 TO 50         |
| 2.36                       | 100 TO 30         |
| 0.60                       | 50 TO 15          |
| 0.075                      | 25 TO 0           |

SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

| SIDE ZONE WIDTH |                     |
|-----------------|---------------------|
| PIPE SIZE       | L <sub>t</sub> (mm) |
| ≤900Ø           | 150                 |
| 1050Ø           | 175                 |
| 1200Ø           | 200                 |
| 1350Ø           | 225                 |
| 1500Ø           | 250                 |
| 1650Ø           | 275                 |
| 1800Ø           | 300                 |

REFER TO ENGINEER FOR TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Ø

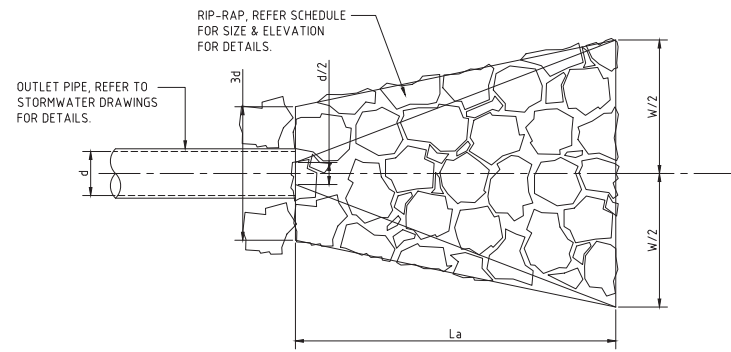
## PIPE LAYING DETAILS

SCALE 1:20 AT A0 SHEET SIZE

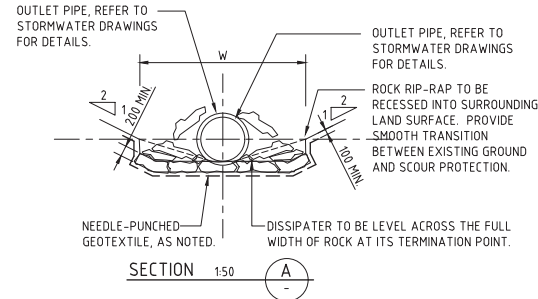
FOR DEVELOPMENT APPLICATION

200mm 0 500 1000 1500 2000mm  
SCALE 1:20 AT A0 SHEET SIZE

|                                    |  |  |                      |       |            |                                            |       |            |
|------------------------------------|--|--|----------------------|-------|------------|--------------------------------------------|-------|------------|
| ISSUED FOR DEVELOPMENT APPLICATION |  |  | 15.12.17             |       |            | B                                          |       |            |
| ISSUED FOR INFORMATION             |  |  | 24.11.17             |       |            | A                                          |       |            |
| AMENDMENTS                         |  |  | DATE                 | ISSUE | AMENDMENTS | DATE                                       | ISSUE | AMENDMENTS |
| ARCHITECT                          |  |  | CLIENT               |       |            | PROJECT                                    |       |            |
| NULON MOTORS                       |  |  | NULON MOTORS         |       |            | LOT 8, BRINGELLY ROAD                      |       |            |
| HORNINGSEA PARK, NSW               |  |  | HORNINGSEA PARK, NSW |       |            | DRAWING TITLE                              |       |            |
| STORMWATER DRAINAGE DETAILS        |  |  | SHEET 1              |       |            | DRAWING NO.                                |       |            |
| C011994-01-DA45                    |  |  | B                    |       |            | PRECISION   COMMUNICATION   ACCOUNTABILITY |       |            |



PLAN VIEW

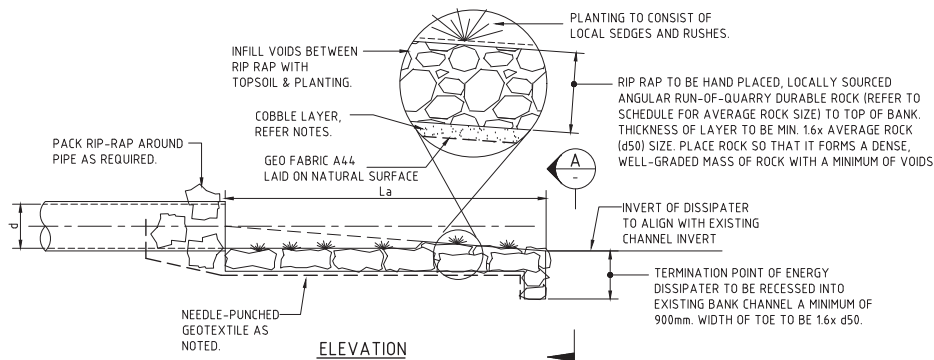


DISSIPATER NOTES:

1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50=150mm MINIMUM) AS NOTED IN THE SCHEDULE. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 16x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.

DISSIPATER SCHEDULE

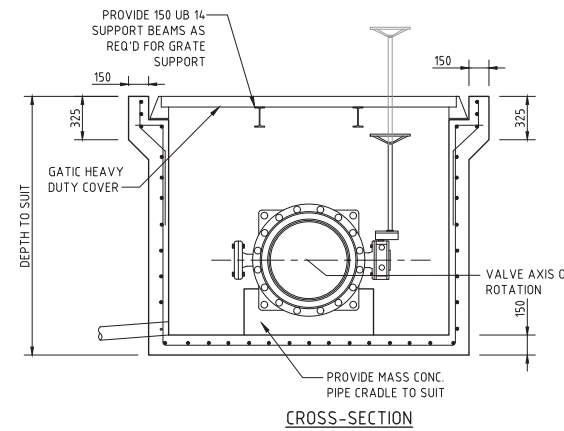
| DISCHARGE POINT | d   | La   | W    | RIP-RAP (d50) |
|-----------------|-----|------|------|---------------|
| OUTLET 1        | 600 | 2500 | 3100 | 250           |



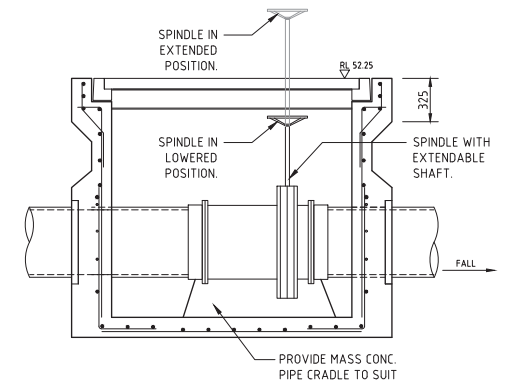
ELEVATION

STORMWATER OUTLET DISSIPATER

SCALE 1:50



CROSS-SECTION



LONG-SECTION

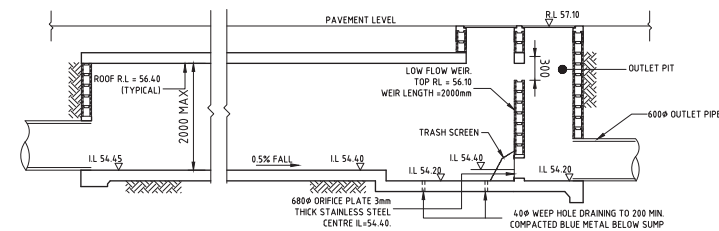
NOTE: ADJACENT RETAINING WALL AND BIO-BASIN NOT SHOWN FOR CLARITY.

AUTOMATIC POLLUTION ISOLATION VALVE (PIV) DETAILS - PIT A14 & PIT B16

SCALE 1:20

NOTE:

- KEYSTONE KNIFE VALVE OR PENSTOCK VALVE ALSO CONSIDERED. SUITABLE FOR SPILL WATER CONTAINMENT.
- VALVE LINKED TO FIRE SYSTEM PLUS SENSORS WITH ABILITY TO DETECT CONTAMINATED WATER.



SECTION 1-1: TYPICAL THRU' TANK

OSD TANK DETAILS

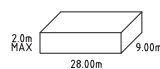
SITE AREA  
TOTAL SITE AREA 21 968m<sup>2</sup>

TOTAL SITE AREA DRAINING TO STORAGE (90% IMPERVIOUS) 21 968m<sup>2</sup>

STORAGE

ORIFICE Ø 480mm  
VOLUME PROVIDED 504m<sup>3</sup>

INTERNAL TANK DIMENSIONS (INC. HIGH FLOW CHAMBERS)



OSD HYDRAULIC DETAILS

| STORM A.R.I EVENT | STORM DURATION | PRE-DEVELOPMENT FLOW (m <sup>3</sup> /s) | POST-DEVELOPMENT FLOW (UN-ATTENUATED) (m <sup>3</sup> /s) | POST-DEVELOPMENT FLOW (ATTENUATED) (m <sup>3</sup> /s) | OSD TANK WATER DEPTH (mm) | OSD TANK STORAGE VOLUME (m <sup>3</sup> ) |
|-------------------|----------------|------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|---------------------------|-------------------------------------------|
| 5 YEAR            | 1 HOUR         | 0.555                                    | 0.716                                                     | 0.349                                                  | 1.10                      | 278                                       |
| 20 YEAR           | 1 HOUR         | 0.625                                    | 0.750                                                     | 0.412                                                  | 1.62                      | 4.07                                      |
| 100 YEAR          | 2 HOURS        | 0.930                                    | 1.020                                                     | 0.768                                                  | 1.91                      | 4.79                                      |

FOR DEVELOPMENT APPLICATION

CIP

PROJECT  
NULON MOTORS  
LOT8, BRINGELLY ROAD  
HORNINGSEA PARK, NSW



Costin Roe Consulting Pty Ltd.  
Consulting Engineers  
Level 1, 4 Windmill Street  
Wahia Bay, Sydney NSW 2000  
Tel: (02) 9251-7899 Fax: (02) 9251-0721  
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE  
STORMWATER DRAINAGE DETAILS  
SHEET 2

DRAWING No C011994-01-DA46

ISSUE

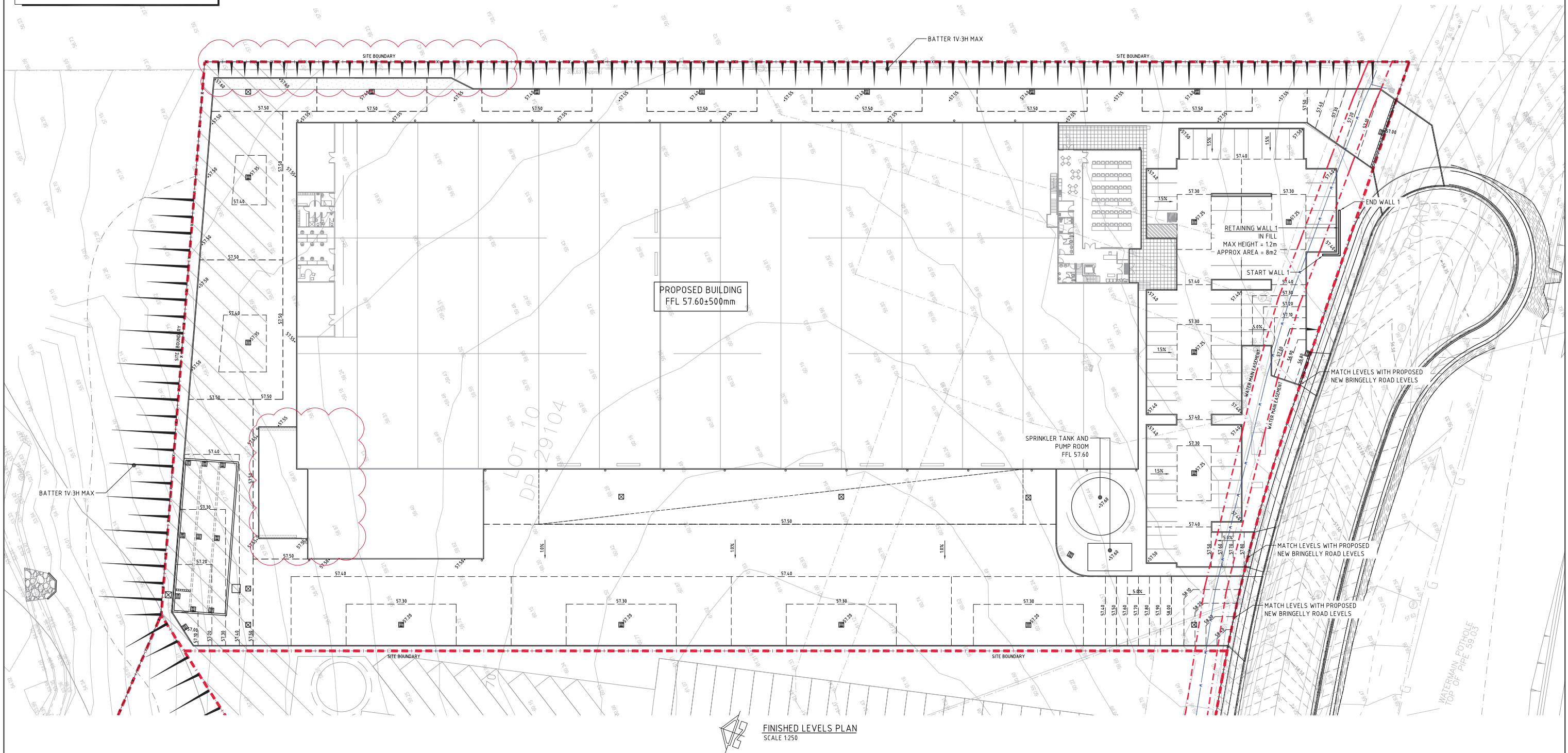
| AMENDMENTS                          | DATE     | ISSUE | AMENDMENTS | DATE | ISSUE |
|-------------------------------------|----------|-------|------------|------|-------|
| REVISOR FOR FIRE WATER REQUIREMENTS | 30.04.18 | C     |            |      |       |
| ISSUED FOR DEVELOPMENT APPLICATION  | 15.12.17 | B     |            |      |       |
| ISSUED FOR INFORMATION              | 24.11.17 | A     |            |      |       |

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GRATED DRAIN
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS



FINISHED LEVELS PLAN  
SCALE 1:250

FOR DEVELOPMENT APPLICATION

2m 0 5 10 15 20 25m  
SCALE 1:250 AT A0 SIZE PLOT

|                                    |  |  |          |       |            |  |  |                                           |  |  |                                         |  |  |                                            |  |  |                      |  |  |
|------------------------------------|--|--|----------|-------|------------|--|--|-------------------------------------------|--|--|-----------------------------------------|--|--|--------------------------------------------|--|--|----------------------|--|--|
| ISSUED FOR DEVELOPMENT APPLICATION |  |  | 15.12.17 | C     | ARCHITECT  |  |  | CLIENT                                    |  |  | PROJECT                                 |  |  | COSTIN ROE CONSULTING PTY LTD.             |  |  | DRAWING TITLE        |  |  |
| ISSUED FOR DEVELOPMENT APPLICATION |  |  | 15.12.17 | B     |            |  |  | NULON MOTORS                              |  |  | Consulting Engineers                    |  |  | PRECISION   COMMUNICATION   ACCOUNTABILITY |  |  | FINISHED LEVELS PLAN |  |  |
| ISSUED FOR INFORMATION             |  |  | 24.11.17 | A     |            |  |  | LOT 8, BRINGELLY ROAD                     |  |  | Level 1, 8 Windmill Street              |  |  | DRAWING No                                 |  |  | C011994.01-DA51      |  |  |
| AMENDMENTS                         |  |  | DATE     | ISSUE | AMENDMENTS |  |  | HORNINGSEA PARK, NSW                      |  |  | Tel: (02) 8551-7899 Fax: (02) 8541-3721 |  |  | ISSUE                                      |  |  | C                    |  |  |
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|                                    |  |  | DATE     | ISSUE |            |  |  | DEVELOPING RELATIONSHIPS BUILDING SUCCESS |  |  | Level 1, 8 Windmill Street              |  |  |                                            |  |  |                      |  |  |
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