

# Tallawong Station Precinct South

Response to Submissions: Engineering Items



# Tallawong Station Precinct South

## Response to Submissions: Engineering Items

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## Quality Information

Document Tallawong Station Precinct South


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Prepared by Jeffrey Chan

Reviewed by Daniel Fettell

### Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
001	02-Oct-2018	Draft	Daniel Fettell Principal Engineer	
002	17-Oct-2018	For Issue	Daniel Fettell Principal Engineer	

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## 1.0 Introduction

Tallawong Metro Station (formerly known as ‘Cudgegong Road Station’) is located 48 kilometres north-west of Sydney CBD, parallel to Schofields Road between Cudgegong Road and Tallawong Road. It is the first station on the new Sydney Metro North West line and will service The Ponds, Rouse Hill and surrounding areas.

Tallawong Station, including commuter car park, station plaza and forecourts was approved in September 2012, as part the staged Critical State Significant Infrastructure approval for the Sydney Metro North West Rail Link.

Landcom, on behalf of Sydney Metro, submitted a concept proposal for Tallawong Station Precinct South. A number of submissions were received on this concept proposal that related to engineering items, this report provides responses to those submissions.

Submissions that are addressed within this report are from the following organisations:

- Department of Planning and Environment;
- Blacktown City Council;
- Environmental Protection Agency;
- Government Architect;
- Sydney Water; and
- Endeavour Energy.



## 2.0 Department of Planning and Environment

As part of the Tallawong Station Precinct South (SSD 9063), the Department of Planning and Environment (DPE) requested additional information. The requested information that is covered by the AECOM scope of works and response are summarised below:

### B. Traffic and Parking

*vi. Demonstrate that the proposed 3.0m lane widths are adequate for larger vehicles such as buses, refuse and service vehicles*

As outlined within Section 2.0 of the Civil Design Report (Rev 3, 2018), tracking was undertaken at key intersections using the below design vehicles:

Item	Standard	Adopted	Comment
<b>Horizontal Road Alignment</b>			
Vehicle Design Speed	BCC DCP	50 km/h	Based on operational speed of 50 km/h
Turning Paths	BCC/TfNSW AS 2890.2 – 2002	<u>Design Vehicle:</u> BCC Refuse vehicle: <ul style="list-style-type: none"> <li>Overall length = 11m</li> <li>Width = 2.5m</li> <li>Wall to wall turn radius = 10.5m</li> </ul> Medium Rigid Vehicle (MRV) <ul style="list-style-type: none"> <li>Overall Length = 8.8m</li> <li>Overall Width = 2.5m</li> <li>Kerb to kerb turn radius = 10m</li> </ul>	Access for BCC Garbage Truck and single Medium Rigid Vehicle (MRV) to proposed roads required.
	Austrroads 2008	Emergency response vehicles and service vehicles	L = 19.0m

**Figure 1: Design Vehicles**

The vehicle tracking plans are contained within the Cudgegong Road Station Precinct – Town Centre South State Significant Development Application Civil Package, the drawing numbers are below:

- Drawing 60558549-SHT-CI-0801
- Drawing 60558549-SHT-CI-0802
- Drawing 60558549-SHT-CI-0803
- Drawing 60558549-SHT-CI-0804

Subsequent to the SSDA submission, additional tracking was undertaken at each of the building entrances for larger refuse vehicles and these are contained within Appendix A of the revised Waste Strategy Report (Rev 2, 2018).

These tracking plans demonstrate that the proposed 3.0m lane widths are adequate for larger vehicles such as buses, refuse and service vehicles.

## 3.0 Blacktown City Council

As part of the Tallawong Station Precinct South (SSD 9063), Blacktown City Council (BCC) offered commentary on the proposed design and requested additional information. The requested information that is covered by the AECOM scope of works and response are summarised below:

### 3.1 Planning and Design

7. *Waste Collection arrangements must be wholly contained within the respective sites. All trucks must enter and leave in a forward direction. Basement collection is the preferred configuration for all sites. The proposal indicated ground flood collection for site 1B which is unsightly and undesirable.*

Waste collection arrangements are contained wholly within each development site and trucks enter and leave in a forward direction. Building 1B has been modified and now provides a basement for waste collection and car parking.

Full waste collection arrangements are contained within the revised Waste Strategy Report (Rev 2, 2018). It is noted that this a Concept SSDA for the precinct and the design of each building will detail the specific basement and waste collection arrangements for each individual building.

### 3.2 Recreation Planning and Design

2. *Road verge widths to be minimum 3.5 m*

*All local road footpaths are to be minimum of 1.6 m and this is to include the adjacent SP2 and RE1 area which must be a minimum 3.5 m wide. There is no justification for any reduction in the footpath widths.*

All road verge widths are a minimum 3.5m (when including footpaths) and local road footpaths are a minimum of 1.6 m wide, refer to the following civil drawings:

- 60558549-SHT-CI-0121 TYPICAL SITE SECTION - SHEET 01
- 60558549-SHT-CI-0122 TYPICAL SITE SECTION - SHEET 02
- 60558549-SHT-CI-0123 TYPICAL SITE SECTION - SHEET 03
- 60558549-SHT-CI-0124 TYPICAL SITE SECTION - SHEET 04
- 60558549-SHT-CI-0125 TYPICAL SITE SECTION - SHEET 05

Three of these sections have been submitted post submission of the concept proposal:

- 60558549-SHT-CI-0121 – Section B has been amended to remove the parking reference where the cycle lane is located, footpath has also been correctly shown as 3m width;
- 60558549-SHT-CI-0123 – Section F has been amended to show the correct setback distance of 10m; and
- 60558549-SHT-CI-0123 TYPICAL – In consultation with Blacktown City Council (BCC), the footpath width in Section H has been reduced to 3m to allow a 2m landscaped area.

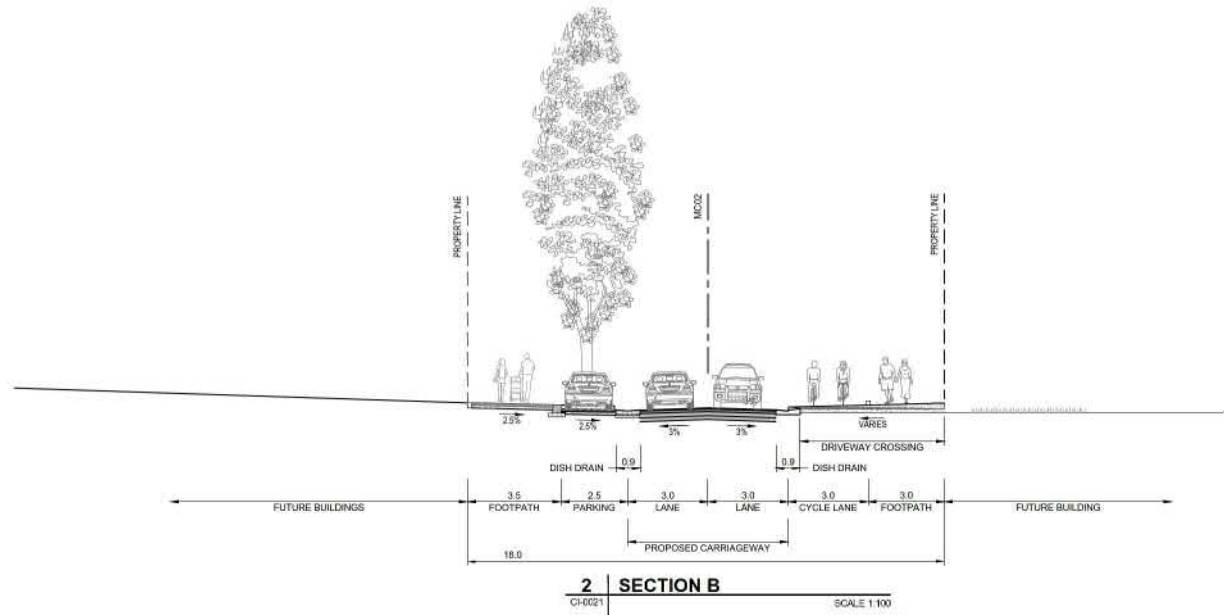
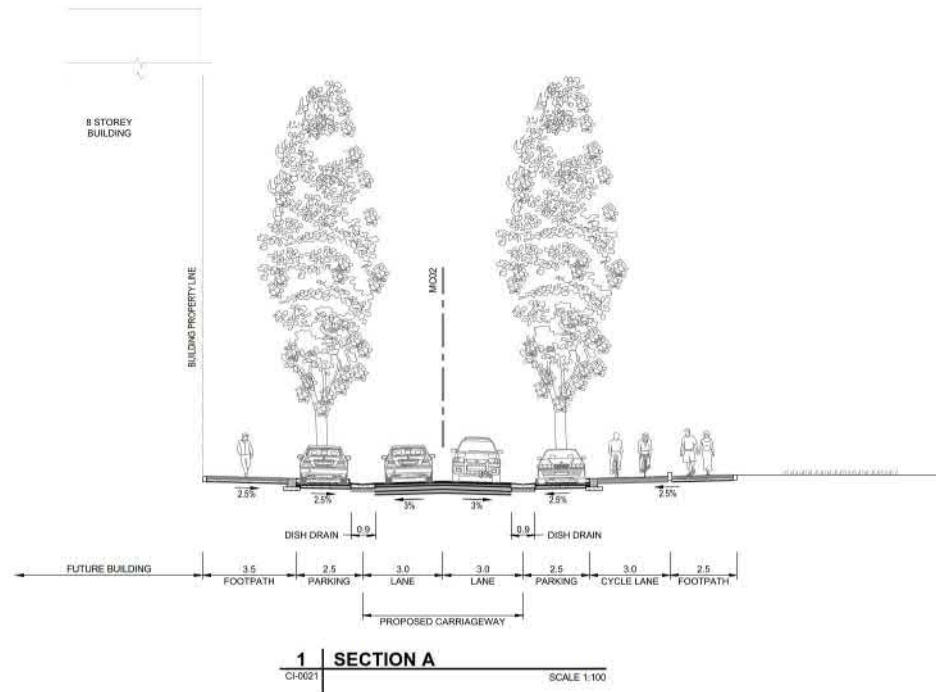
These revised sections are shown in Figure 2, Figure 3 and Figure 4 below.



## NOTES

1. REFER TO SCHEDULE FOR CUDGONG ROAD (AREA 20) PRECINCT DEVELOPMENT CONTROL PLAN AND BLACKTOWN CITY COUNCIL GROWTH CENTER PRECINCT DEVELOPMENT CONTROL PLAN FOR FURTHER DETAILS ON ROAD CROSS SECTIONS.
2. REFER TO BLACKTOWN CITY COUNCIL ENGINEERING GUIDE FOR DEVELOPMENT (2005) FOR FURTHER INFORMATION ON REQUIRED GRADING.

Figure 2: Updated Section B



AECOM

## PROJECT

CUDGONG ROAD  
STATION PRECINCT  
TOWN CENTRE SOUTH  
CIVIL PACKAGE

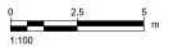
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## SCALE BAR



## PRELIMINARY

## PROJECT MANAGEMENT INITIALS

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DESIGNER	CHECKED	APPROVED

## ISSUE/REVISION

A	18/05/2018	ISSUED FOR PRELIMINARY
IR	DATE	DESCRIPTION

## KEY PLAN

## PROJECT NUMBER

60558549

## SHEET TITLE

TYPICAL SITE SECTION

## SHEET 01

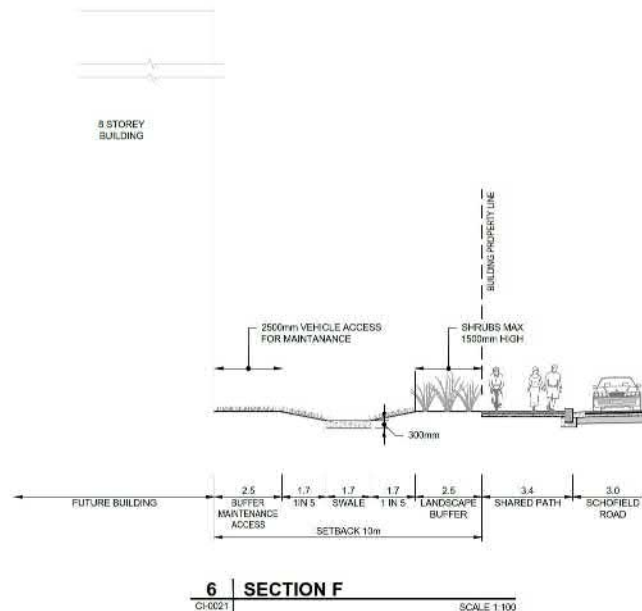
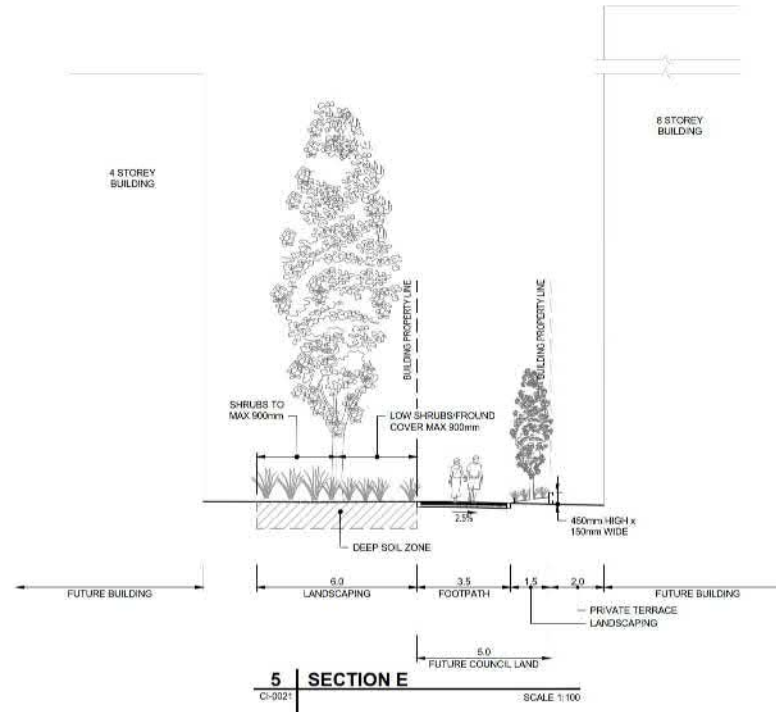
## SHEET NUMBER

60558549-SHT-00-0000-CI-0121

## NOTES

1. REFER TO SCHEDULE FOR CUDGEGONG ROAD (AREA 20) PRECINCT DEVELOPMENT CONTROL PLAN AND BLACKTOWN CITY COUNCIL GROWTH CENTER PRECINCT DEVELOPMENT CONTROL PLAN FOR FURTHER DETAILS ON ROAD CROSS SECTIONS.
2. REFER TO BLACKTOWN CITY COUNCIL ENGINEERING GUIDE FOR DEVELOPMENT (2005) FOR FURTHER INFORMATION ON REQUIRED GRADING.

Figure 3: Updated Section F



# AECOM

## PROJECT

CUDGEGONG ROAD  
STATION PRECINCT  
TOWN CENTRE SOUTH  
CIVIL PACKAGE

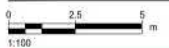
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## PRELIMINARY

### PROJECT MANAGEMENT INITIALS

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DESIGNER	CHECKED	APPROVED

### ISSUE/REVISION

IR	DATE	DESCRIPTION
A	18/05/2018	ISSUED FOR PRELIMINARY

### KEY PLAN

### PROJECT NUMBER

60558549

### SHEET TITLE

TYPICAL SITE SECTION

SHEET 03

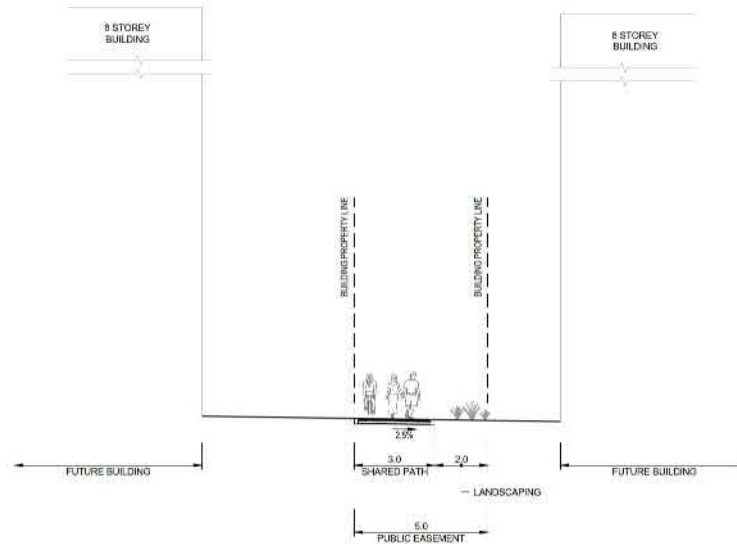
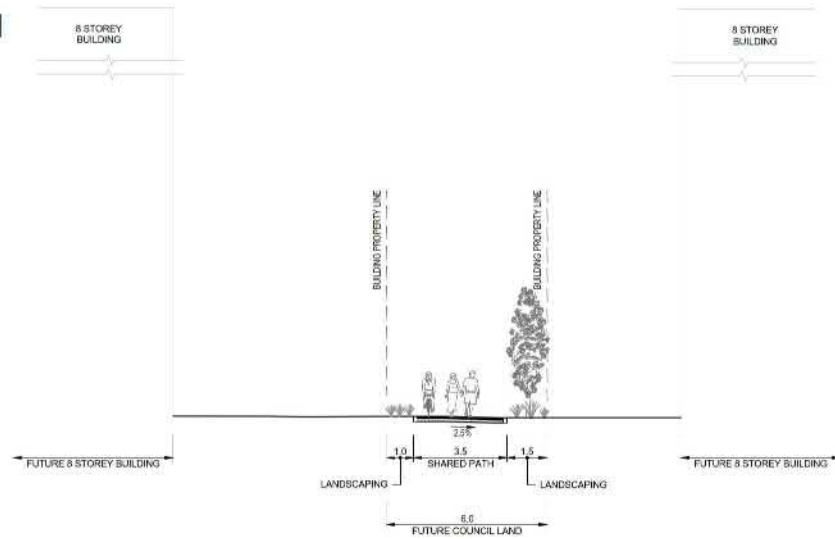
### SHEET NUMBER

60558549-SHT-00-0000-CI-0123

## NOTES

1. REFER TO SCHEDULE FOR CUDGEGONG ROAD (AREA 20) PRECINCT DEVELOPMENT CONTROL PLAN AND BLACKTOWN CITY COUNCIL GROWTH CENTER PRECINCT DEVELOPMENT CONTROL PLAN FOR FURTHER DETAILS ON ROAD CROSS SECTIONS.
2. REFER TO BLACKTOWN CITY COUNCIL ENGINEERING GUIDE FOR DEVELOPMENT (2005) FOR FURTHER INFORMATION ON REQUIRED GRADING.

Figure 4: Updated Section H



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## PROJECT

CUDGEGONG ROAD  
STATION PRECINCT  
TOWN CENTRE SOUTH  
CIVIL PACKAGE

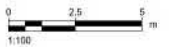
## CLIENT



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## SCALE BAR



## PRELIMINARY

## PROJECT MANAGEMENT INITIALS

J. CHAN	D. FETTELL	D. FETTELL
DESIGNER	CHECKED	APPROVED

## ISSUE/REVISION

IR	DATE	DESCRIPTION
A	18/05/2018	ISSUED FOR PRELIMINARY

## KEY PLAN

## PROJECT NUMBER

60558549

## SHEET TITLE

TYPICAL SITE SECTION

## SHEET 04

## SHEET NUMBER

60558549-SHT-00-0000-CI-0124

### 3.3 Drainage Engineering

*We have significant problems with the proposal and are unable to make a full assessment. We require the following:*

1. *An electronic copy of the DRAINS and MUSIC models for assessment.*

An electronic copy of the DRAINS and MUSIC models were provided to council on the following dates:

- DRAINS Model: Tuesday, 7 August 2018
- MUSIC Model: Friday, 10 August 2018

Final coordination regarding the park layout and any potential stormwater harvesting affected the Water Quality results. A consolidated DRAINS and MUSIC model will be submitted to BCC with this report.

2. *The proposed location of the Vortex GPT as shown on AECOM Drainage Plant Sheet 05 is unacceptable. This is proposed on a very busy corner. This will prevent safe access for maintenance or cleaning and place vehicles and staff at risk. The GPT needs to be relocated to the eastern side of Cudgegong Road where access can be obtained from the old road pavement. Provide details for the pipes across the street and how this can be incorporated into the design of the GPT and ensuring the low flows are directed to the basin. Under the proposed arrangement it appears that some pipes are bypassing the basin itself and other flows are bypassing the GPT prior to discharge to the basin. This is compromising the effectiveness of treatment and may cause premature failure of the bioretention basin. Provide details of any splitters and the size of the proposed GPT.*

Since this submission, AECOM have undertaken further coordination with BCC, please refer to our response in Section 3.4 Design Engineering for the revised drainage strategy. This strategy involves the deletion of the proposed new GPT and instead uses the existing GPT installed as part of the NRT works.

There will however be a need to be a small increase in flow rates to the biofiltration basin of 0.03 m<sup>3</sup>/s from the road associated with Site 2 (south of Conferta Avenue). This flow rate is small and will increase the rate of GPT bypass by 0.4% which is a marginal and small amount. The shortfall in treatment will be compensated by increasing the biofiltration basin surface area.

A total of 20-25m<sup>2</sup> of additional biofiltration area is required, as shown in Figure 5 there is approximately 100m<sup>2</sup> available at the western side of the existing NRT basin.

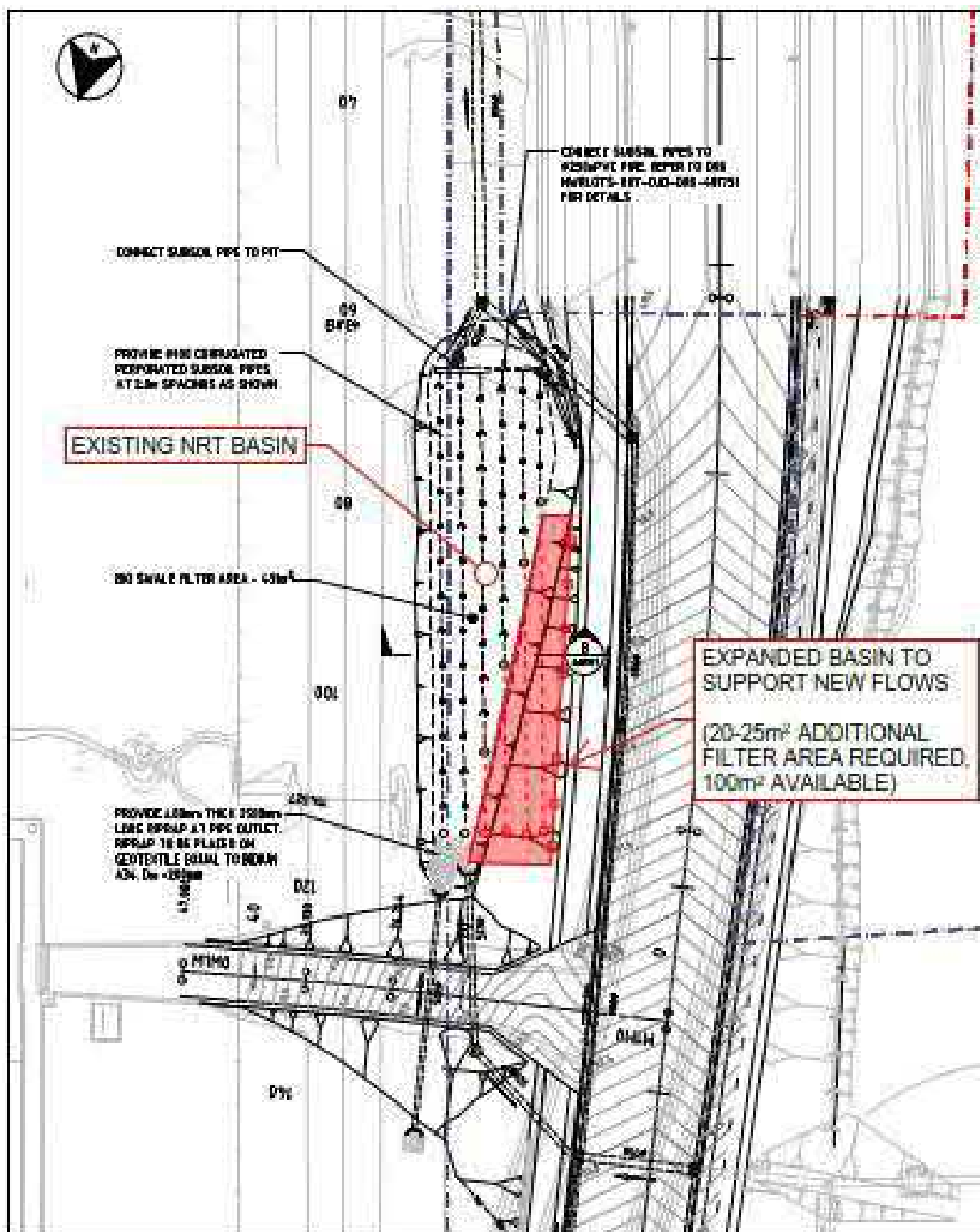
3. *Provide a turning area at the end of the access road to enable educator/maintenance trucks to safely turn around*

Please refer to our response to item 2 above, as the NRT GPT is proposed to be reused, the existing operation and maintenance provision for that GPT remain and a new turning area is not required.

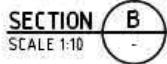
4. *There are substantial contradictions as to the size of the proposed bioretention basin. For the basin, AECOM Drainage Plan Sheet 05 shows a 200 m<sup>2</sup> filter area and 270 mm EDD. Page 20 of the Integrated Water Cycle Management Strategy refers to a 246 m<sup>2</sup> filter area and 300 mm EDD*

As detailed in Section 3.4 Design Engineering, the intention is to re-use and expand the current NRT bio-filtration detail. Details of this proposed expansion and filter media are shown below in Figure 5 and Figure 6.

Please note, we have not been able to verify that the size of the biofiltration basin is actually 431 m<sup>2</sup> in the NRT design drawings as reproduced in Figure 5.



**Figure 5: Proposed Basin Expansion (Plan)**



### Figure 6: Proposed Basin Expansion (Section)



5. *Insufficient detail is provided about the bioretention basin. We require:*

- a. *A section through the basin from Cudgegong Road to the access track to show the relationship and levels between the elements. Note our WHS requirements will not accept a 1V:3H batter slope. Maximum is 1V:4H providing it is heavily vegetated and not turfed.*

Please refer to Figure 5 and Figure 6 above showing a plan and section through the proposed basin extension. It is noted that the existing NRT basin has a 1:3 minimum batter dimension, while a retaining wall is proposed this is only for the north western side of the basin and access is available from the eastern side of the basin.

- b. *Provide a profile with a 400 to 450 mm filter layer, a 350 mm transition layer and 200 mm gravel layer, with saturated zone set 100 mm below the underside of the filter media.*

Based on the revised stormwater strategy the intention would be to extend the existing NRT basin utilising the same details noting that this complies with the above.

- c. *Provide typical 150 mm slotted PVC subsoil pipes laid flat.*

Noted, this is included in the revised stormwater strategy.

- d. *Provide a subsoil collection pit similar to Detail 13 of our WSUD Drawings A(BS)175M*

Noted, this is included in the revised stormwater strategy.

- e. *The minimum invert of the inlet pipe to the bioretention basin is to be set at the filter media level, but preferable to 300mm above. Provide a large sediment pit 400 mm deep at the outlet as part of scour protection.*

As described in our response in Section 3.4 of this report, the proposed stormwater strategy connects to the existing NRT drainage infrastructure. This infrastructure outlets to the bioretention approximately 300mm above the media level and is proposed to remain unchanged.

- f. *Provide details as to how the overflows from the basin will be managed.*

Overflows from the basin will be managed using the current overflow pits provided. Since the increase in catchment area is only likely to increase the incoming flow rate by 30 L/s in a design 6 month storm, it is unlikely that increasing the overflow pit dimensions would be necessary

- 6. *Require the 2 year ARI flood levels in Second Ponds Creek adjacent to the proposed bioretention basin, to assess the effectiveness of the system*

We have modified the WSUD strategy by consolidating the new proposed biofiltration basins into Council's existing biofiltration basin. As such, we are proposing to utilise the existing basin location and outlets, pending detailed hydraulic modelling. We believe the tail water concerns associated with the second basin location are not relevant now that this is the case.

There will however be a need to be a small increase in flow rates to the biofiltration basin of 0.03 m3/s from the road associated with Site 2 (south of Conferta Avenue). This flow rate is small and will increase the rate of GPT bypass by 0.4% which is a marginal and small amount. The shortfall in treatment will be compensated by increasing the biofiltration basin surface area. The best opportunity to do this would provide an additional 20 to 25 square m of biofiltration. There should be adequate space for 102sq.m of biofiltration.

- 7. *Amend the AECOM Drainage Catchment Plan Sheet 01 to include the lower area of Cudgegong Road as well as the catchment of the bioretention basin itself and areas drainage directly to it.*

Catchment and bypass areas have been updated in Section 3.4, it's noted that the lower area of Cudgegong Road is RMS land and forms part of the Schofields Road drainage catchment.

8. Provide a detail for the Biofiltration Street Tree referred to in Section 6.3.3 of the Integrated Water Cycle Management Strategy and design for a minimum of 150 mm of ponding. Allow for 100 mm in the modelling.

This proposed detail is shown below in Figure 7.

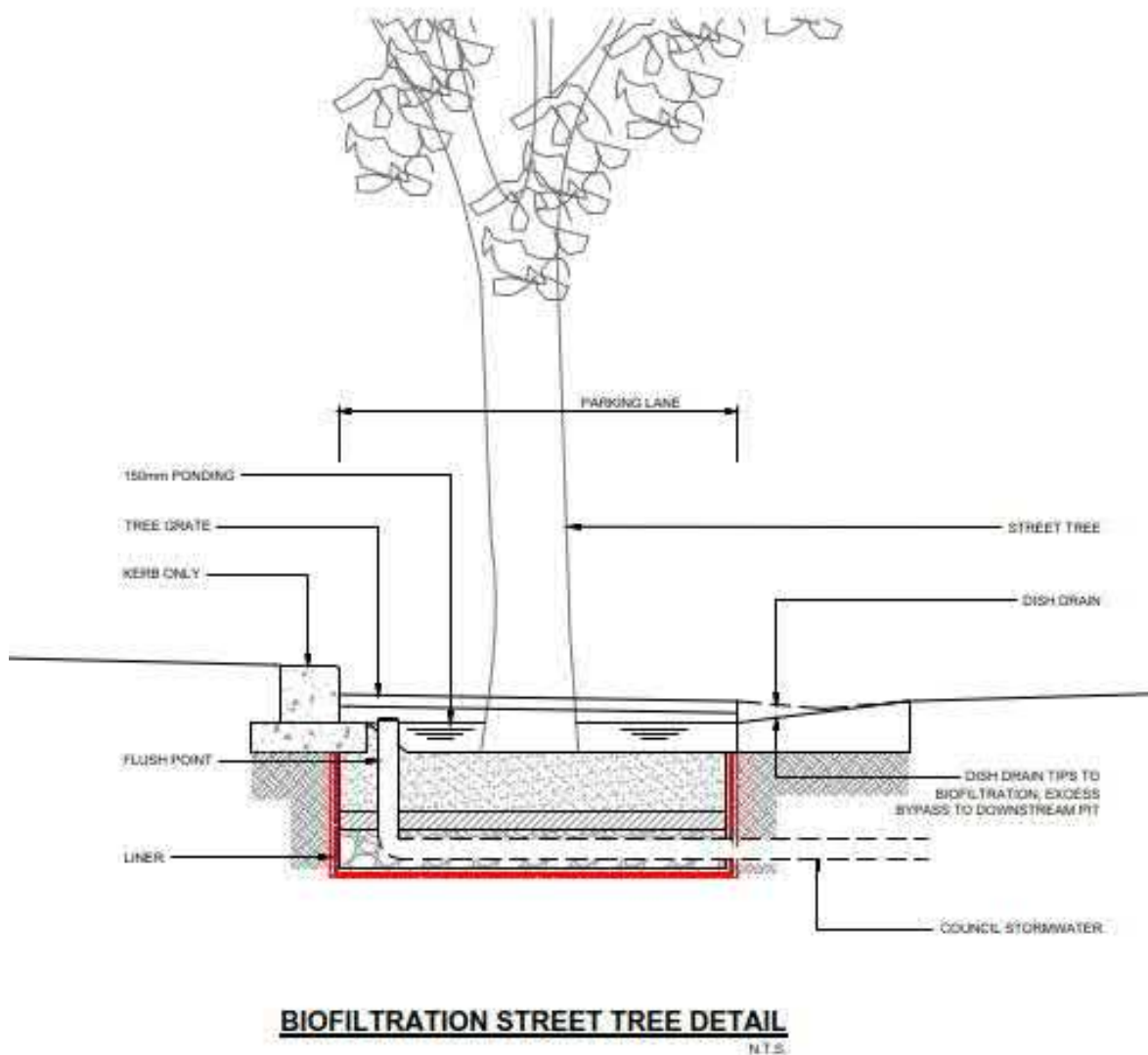


Figure 7: Biofiltration Street Tree Detail

9. Provide confirmation from Sydney Water that recycled water is available for this site as it is not available for other surrounding areas.

The Tallawong Station Precinct South sites adjacent to the boundary of the Parklea North Recycled Water boundary, Options Planning is currently being undertaken by Sydney Water as per their response below in Figure 8.

### Recycled Water

The Tallawong precinct is within Parklea North Recycled Water Supply Zone. There is sufficient trunk capacity to service initial development in the precinct, however we expect amplification will be required over the next five years to support growth in the wider area. Recycled water is being explored as part of the Options Planning works and further updates on this will be available in late 2018.

Figure 8: Sydney Water Recycled Water Network Response

*Note that a wide series of conditions need to be imposed once the amended information is received.*

This is noted.

### 3.4 Design Engineering

*In principle we agree with the additional bioretention on the eastern side of Cudgegong Road to treat the additional road area. However, there is not enough information that the concept will work. The proposed rezoning of the SP2 drainage land cannot be supported until we get proper proof of concept. The long section and hydraulics of the stormwater lines and overland flow paths from the bioretention to Second Ponds Creek are required to be submitted and reviewed by us prior to any consent being granted.*

*It appears that the proposed bioretention on the eastern side of Cudgegong Road is highly constrained as it is very low (3m lower than the existing bioretention and in the order of 1.5m below existing ground levels based on our ALS data). Lifting it and the associated drainage should be investigated. This may avoid the need for street tree bioretention pits.*

*The SEI calculations are wrong as the pre-developed flows should be calculated with the probabilistic rational method. We require more details of the actual calculations.*

We have reviewed the Stormwater Strategy to explore opportunities to direct runoff of public roads into the NRT bioretention basin. With the removal and replacement of a section of NRT drainage pipes it is possible to divert road stormwater into the bioretention via a connection into the NRT DN900 stormwater pipe.

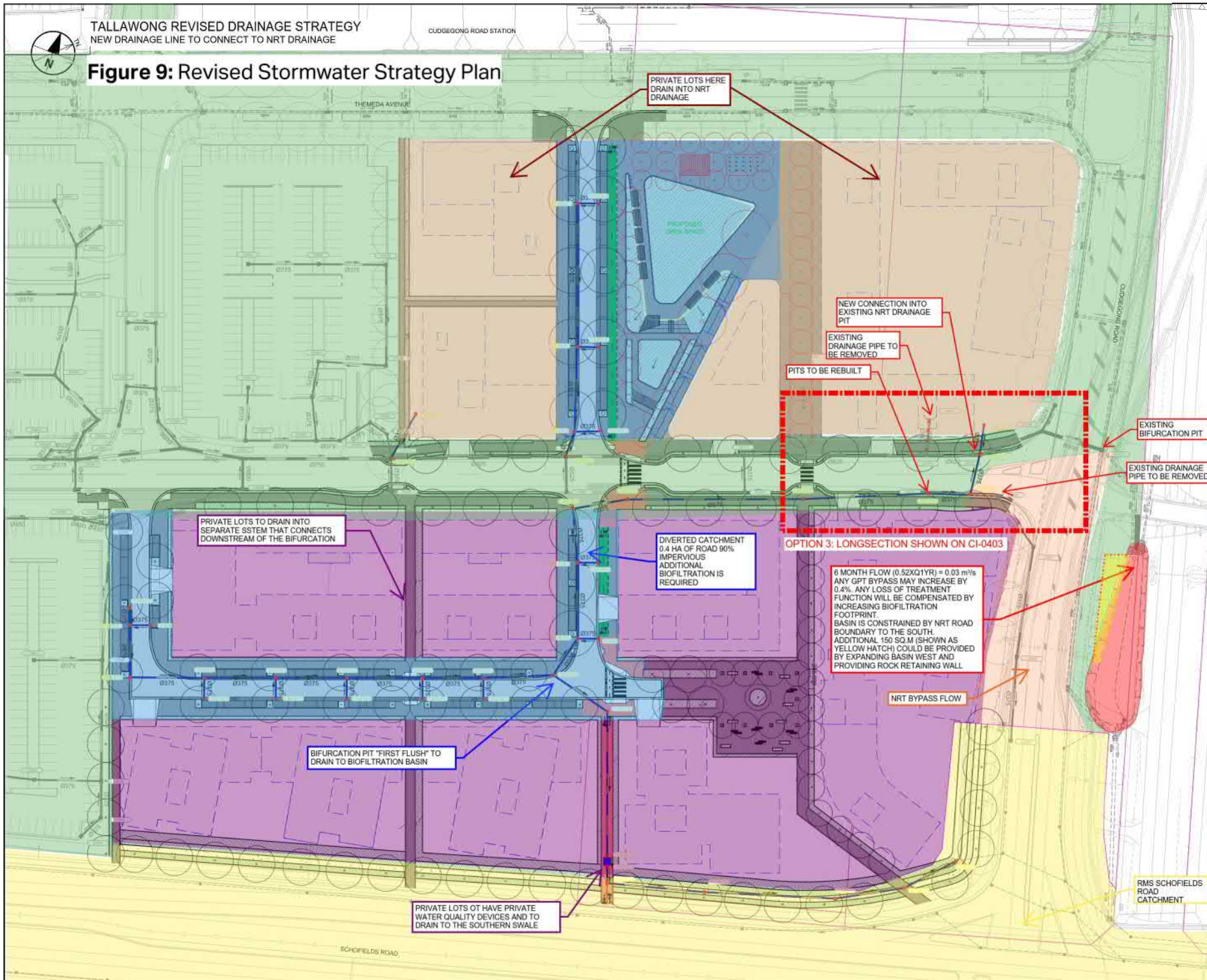
These options are contained below in Figure 9, Figure 10, Figure 11, Figure 12, Figure 13 and Figure 14. It is noted that these options will avoid the construction of new basin outlets to Second Ponds Creek as the current NRT outlets can be utilised.

A desktop utilities check has been undertaken in Figure 10 which shows the viability of the option, during detailed design it is recommended that the Work-As-Executed documents are obtained and if necessary a utility services search to confirm the levels and any required utility interface details.

The SEI calculations have been updated using the probabilistic rational method rather than using a hydrologic model and will be provided to council along with the MUSIC and DRAINS models which reflect the revised park design.

It is also noted that the revised strategy does not require the retention of SP2 local drainage zone adjacent to Schofields Road.





TALLAWONG REVISED DRAINAGE STRATEGY  
NEW DRAINAGE LINE TO CONNECT TO NRT DRAINAGE

CUDGONG ROAD STATION

THEMEDA AVENUE

SCHOFIELDS ROAD

Figure 9: Revised Stormwater Strategy Plan

PRIVATE LOTS HERE  
DRAIN INTO NRT  
DRAINAGE

NEW CONNECTION INTO  
EXISTING NRT DRAINAGE  
PIT

EXISTING  
DRAINAGE PIPE TO  
BE REMOVED

PITS TO BE REBUILT

EXISTING  
BIFURCATION PIT

EXISTING DRAINAGE  
PIPE TO BE REMOVED

PRIVATE LOTS TO DRAIN INTO  
SEPARATE SSTEM THAT CONNECTS  
DOWNSTREAM OF THE BIFURCATION

DIVERTED CATCHMENT  
0.4 HA OF ROAD 90%  
IMPERVIOUS  
ADDITIONAL  
BIOFILTRATION IS  
REQUIRED

OPTION 3: LONGSECTION SHOWN ON CI-0403

6 MONTH FLOW (0.52XQ1YR) = 0.03 m<sup>3</sup>/s  
ANY GPT BYPASS MAY INCREASE BY  
0.4%. ANY LOSS OF TREATMENT  
FUNCTION WILL BE COMPENSATED BY  
INCREASING BIOFILTRATION  
FOOTPRINT.  
BASIN IS CONSTRAINED BY NRT ROAD  
BOUNDARY TO THE SOUTH.  
ADDITIONAL 150 SQ.M (SHOWN AS  
YELLOW HATCH) COULD BE PROVIDED  
BY EXPANDING BASIN WEST AND  
PROVIDING ROCK RETAINING WALL

NRT BYPASS FLOW

BIFURCATION PIT 'FIRST FLUSH' TO  
DRAIN TO BIOFILTRATION BASIN

PRIVATE LOTS OT HAVE PRIVATE  
WATER QUALITY DEVICES AND TO  
DRAIN TO THE SOUTHERN SWALE

RMS SCHOFIELDS  
ROAD  
CATCHMENT

AECOM

PROJECT

CUDGONG ROAD  
STATION PRECINCT  
TOWN CENTRE SOUTH  
CIVIL PACKAGE

CLIENT

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LEGEND

- PROPOSED BUILDING OUTLINE
- PRAM RAMP
- DRIVEWAY CROSSING
- FUTURE BUILDING STRUCTURE
- FOOTPATH PAVEMENT
- BIKE PATH
- COMBINED FOOT & BIKE PATH
- LANDSCAPING
- PARKING BAY
- FLEXIBLE ROAD PAVEMENT
- PROPOSED TREE
- DRAINAGE PITS (REFER  
DRAINAGE DRAWINGS  
FOR DETAILS)
- FUTURE PEDESTRIAN  
CROSSING

SCALE BAR

0 12.5 25  
m  
1:500

PRELIMINARY

PROJECT MANAGEMENT INITIALS

J. CHAN	D. FETTELL	D. FETTELL
DESIGNER	CHECKED	APPROVED

ISSUE/REVISION

NO.	DATE	DESCRIPTION
1	18/05/2018	ISSUED FOR PRELIMINARY

KEY PLAN

PROJECT NUMBER

60558549

SHEET TITLE

GENERAL ARRANGEMENT

SHEET 01

SHEET NUMBER

60558549-SHT-00-0000-CI-0021

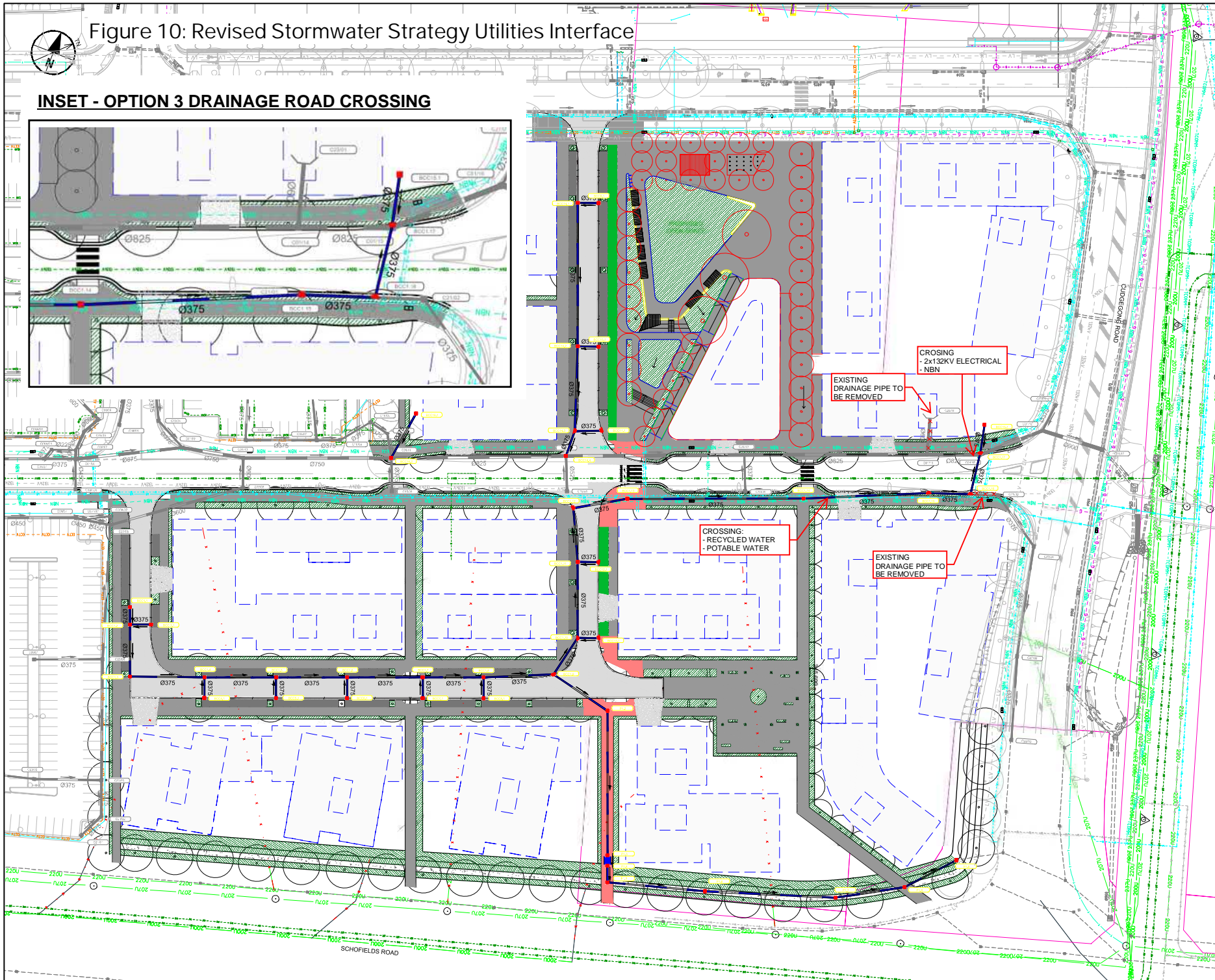
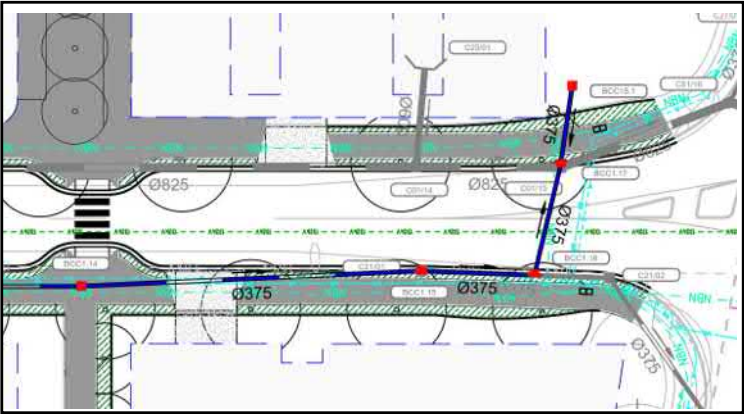


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Figure 10: Revised Stormwater Strategy Utilities Interface

INSET - OPTION 3 DRAINAGE ROAD CROSSING



**AECOM**

PROJECT  
CUDDEGONG ROAD  
STATION PRECINCT  
TOWN CENTRE SOUTH  
CIVIL PACKAGE

CLIENT



CONSULTANT

AECOM Australia Pty Ltd  
A.B.N 20 093 846 925  
www.aecom.com

LEGEND

- PROPOSED BUILDING OUTLINE
- PRAM RAMP
- DRIVEWAY CROSSING
- FUTURE BUILDING STRUCTURE
- FOOTPATH PAVEMENT
- BIKE PATH
- COMBINED FOOT & BIKE PATH
- LANDSCAPING
- PARKING BAY
- FLEXIBLE ROAD PAVEMENT
- PROPOSED TREE
- DRAINAGE PITS (REFER DRAINAGE DRAWINGS FOR DETAILS)
- FUTURE PEDESTRIAN CROSSING

SCALE BAR

0 12.5 25  
1:500  
m

PRELIMINARY

PROJECT MANAGEMENT INITIALS

J. CHAN	D. FETTELL	D. FETTELL
DESIGNER	CHECKED	APPROVED

ISSUE/REVISION

NO.	DATE	DESCRIPTION
A	18/05/2018	ISSUED FOR PRELIMINARY
IR	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60558549

SHEET TITLE

GENERAL ARRANGEMENT

SHEET 01

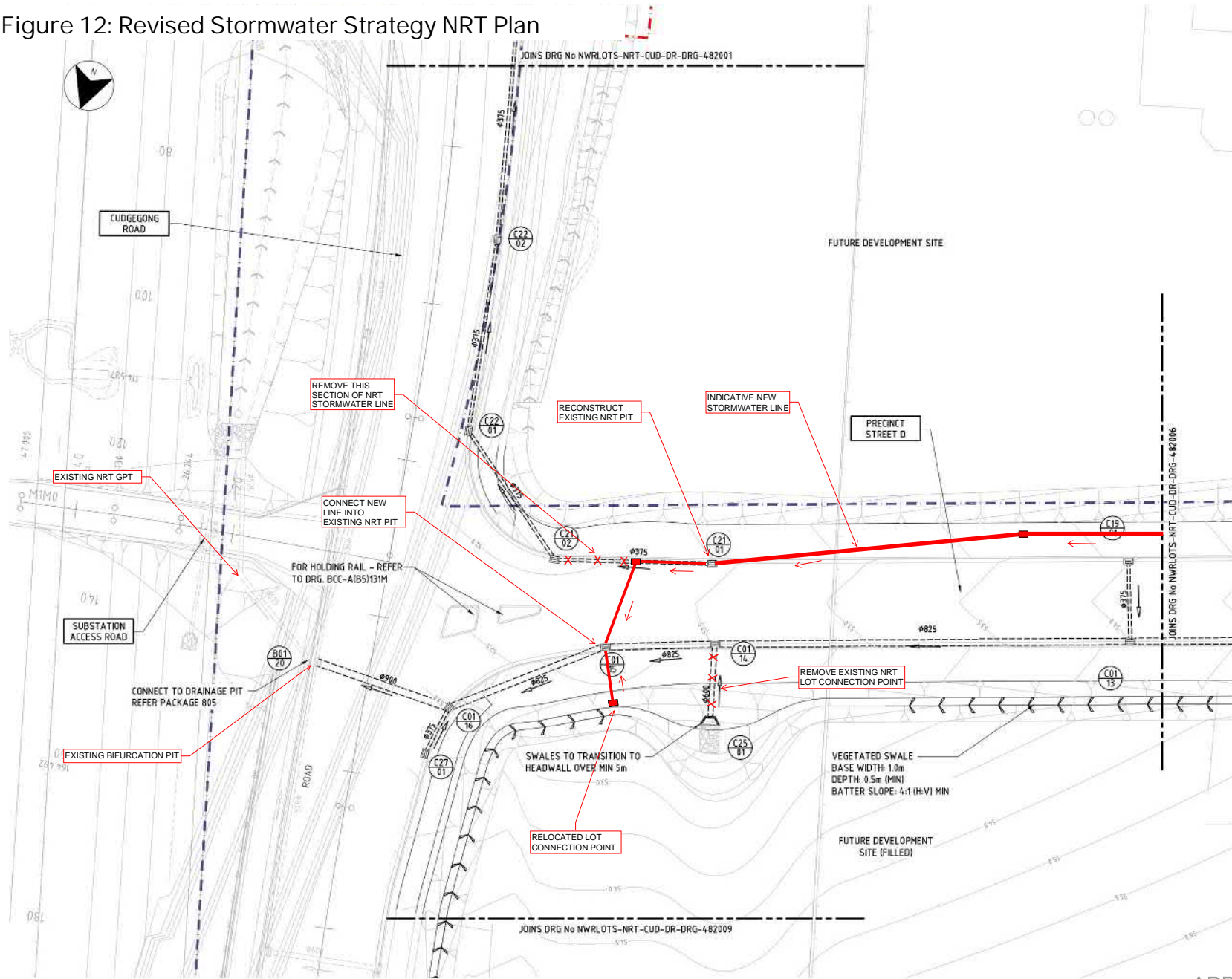
SHEET NUMBER

60558549-SHT-00-0000-CI-0021

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Figure 12: Revised Stormwater Strategy NRT Plan

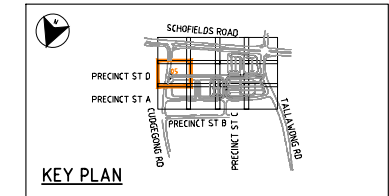


# LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (INDICATIVE ROAD RESERVE)
- RAIL ALIGNMENT
- ROAD CONTROL LINE
- KERB BREAK
- RETAINING WALL
- SOIL NAIL WALL
- RETAINING WALL DRAIN
- TABLE DRAIN
- VEGETATED SWALE
- VEGETATED CATCH DRAIN
- CONCRETE LINED CATCH DRAIN
- SURFACE DEPRESSION IN PARK
- CONCRETE LINED CATCH DRAIN
- SUB SOIL PIPE WITH CLEAN OUT
- EXISTING DRAINAGE LINE WITH PIT
- 805 STORMWATER PIPE AND HEADWALL
- EXISTING DRAINAGE TO BE DECOMMISSIONED
- 805 STORMWATER PIPE AND HEADWALL
- ROOF WATER DOWN PIPE OUTLET
- GRATED TRENCH DRAIN
- CONCRETE BATTER DRAIN
- DRAINAGE PITS
- FORMATION DRAINAGE PIT
- ROOF WATER DOWN PIPE
- WATER QUALITY STRUCTURE
- DRAINAGE PIT TAG
- SCOUR PROTECTION

## NOTES:

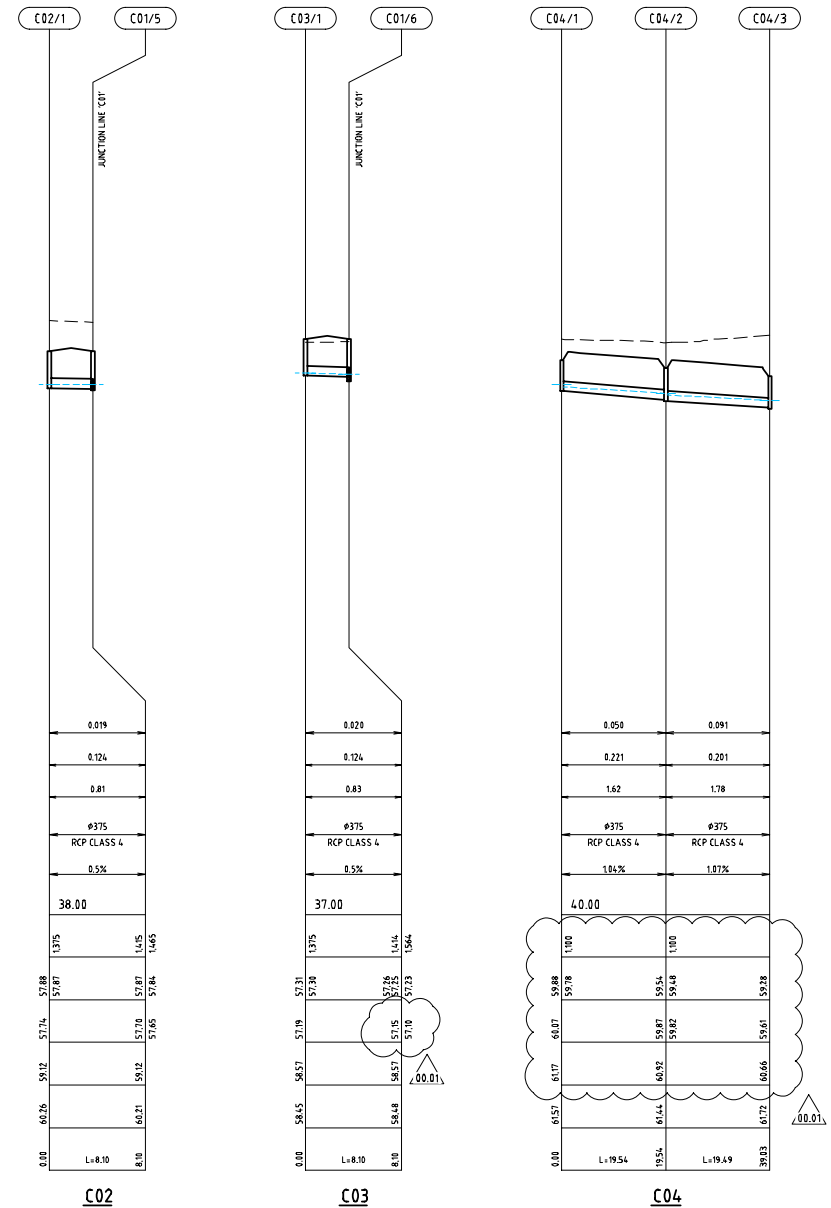
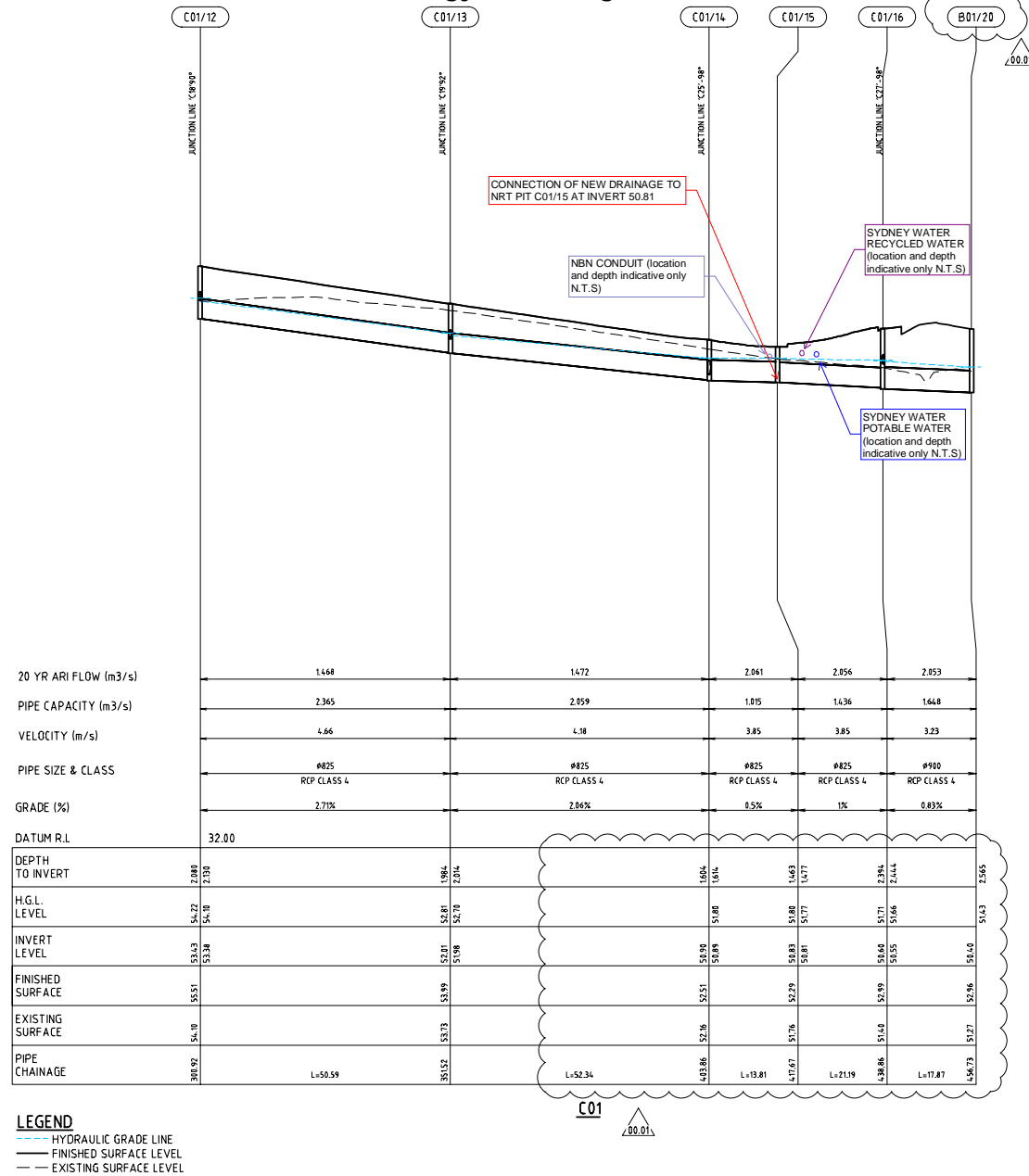
- FOR GENERAL NOTES, REFER TO DRAWING No's NWRL0TS-NRT-CUD-CW-DRG-481331 TO 481335.
- FOR DRAINAGE TYPICAL DETAILS, REFER TO DRG. No's NWRL0TS-NRT-CUD-DR-DRG-482031 TO 482035.
- FOR COMBINED SERVICE ROUTE ALLOCATION REFER TO DESIGN LOT 221, FOR UTILITY INFORMATION REFER TO DRG. No's NWRL0TS-NRT-CUD-UT-DRG-482911 TO 482922.
- DESIGNWORKS AREA SHOWN IN GREY DENOTES WORKS TO BE COMPLETED AS PART OF DESIGN LOT 806.
- FOR COMBINED SERVICE ROUTE ALLOCATION REFER TO DESIGN LOT 221.



APPROVED FOR CONSTRUCTION

					SCALES		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING		CLIENT		The information shown on this drawing is for the purposes of the North West Rail Link (NWRL) Project only. No warranty is given as to its accuracy for any other purpose. The Service Provider accepts no liability arising from the use of this drawing and the information shown thereon. No liability shall be accepted for any loss or damage caused by the use of this drawing.		NORTH WEST RAIL LINK	
													CUDGONG ROAD STATION DRAINAGE ROAD DRAINAGE PLAN SHEET 5	
DO AB 26/09/16 DESIGN LOT 806 - APPROVED FOR CONSTRUCTION CD							INDEPENDENT CERTIFIER CERTIFICATE NWRL0TS-OIC-CUD-CE-CER-000014				DRAWN _____ DESIGNED BY _____ DRG CHECK _____ DESIGN CHECK _____ APPROVED _____		STATUS: FOR CONSTRUCTION SHEET 5 OF 12 DRG No NWRL0TS-NRT-CUD-DR-DRG-482005	
REV BY DATE DESCRIPTION APPD							NO I.e. Use not scale from this drawing.						NWRL REV 00	
A1 Original Co-ordinate System: MGA Zone 56 Height Datum: A.H.D. This sheet may be prepared using colour and may be incomplete if copied														

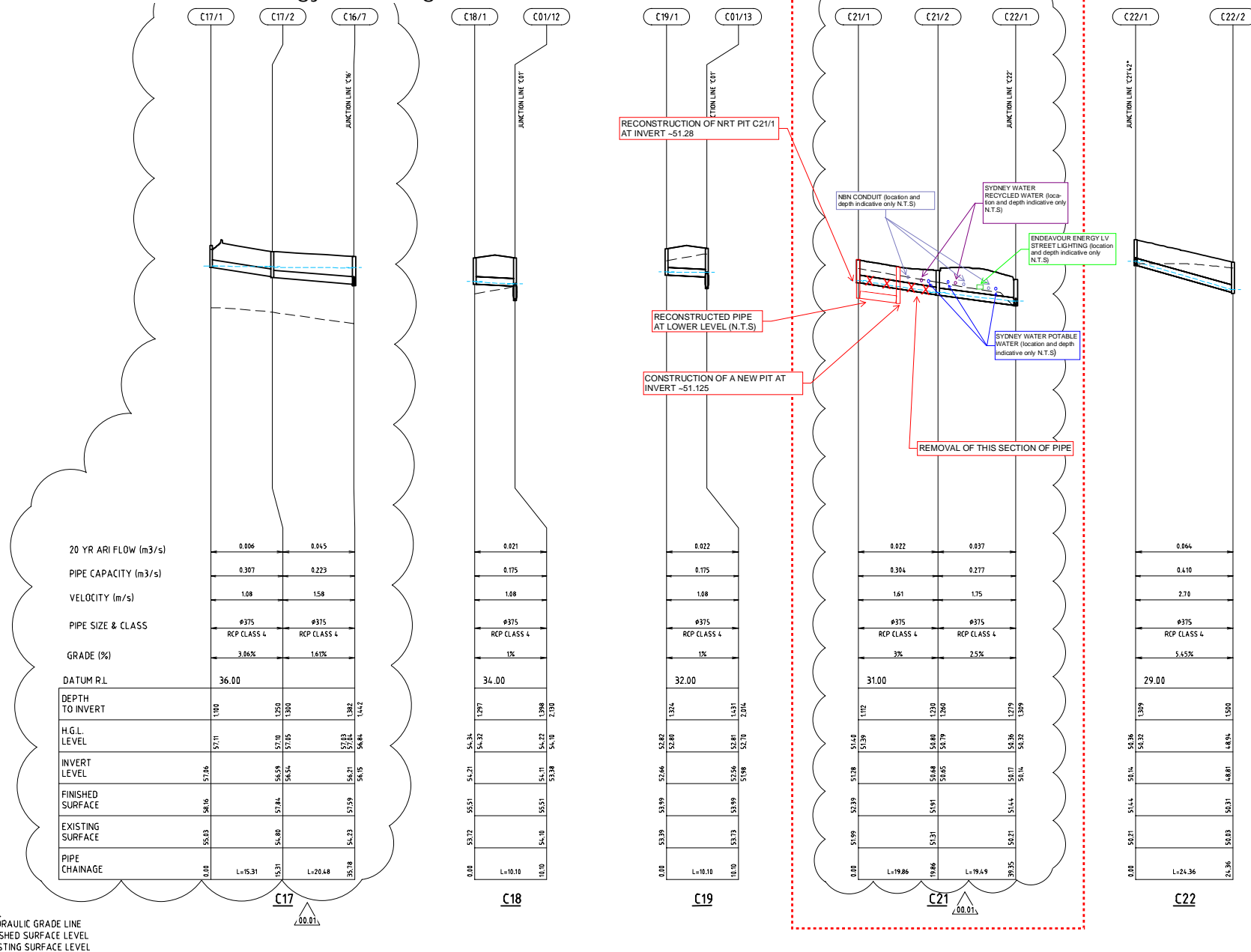
Figure 13: Revised Stormwater Strategy NRT Long Section 1



APPROVED FOR CONSTRUCTION

A1 Original				Co-ordinate System: MGA Zone 56				Height Datum: A.H.D.				This sheet may be prepared using colour and may be incomplete if copied			
NO 1: No not scale from this drawing.				INDEPENDENT CERTIFIER CERTIFICATE				NWRLOTS-01C-CUD-CE-CER-000014				NSW GOVERNMENT			
Transport for NSW				northwest rapid transit				DRAWN: A. BERNARD				DESIGNED: J. VIDANAPATHIRANA			
DRG CHECK: J. VILSON				DESIGN CHECK: G. THOMAS				APPROVED: J. B. B. B.				380208			
STATUS: FOR CONSTRUCTION				SHEET 2 OF 10				DRG No: NWRLOTS-NRT-CUD-DR-DRG-482062				NWRL REV: 00.01			

Figure 14: Revised Stormwater Strategy NRT Long Section 1



APPROVED FOR CONSTRUCTION

					<b>SCALES</b>		<b>DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING</b>		<b>CLIENT</b>		<b>DESIGN PROVIDERS</b>		<b>NORTH WEST RAIL LINK</b>	
													<b>CUDGONG ROAD STATION</b>	
													<b>DRAINAGE</b>	
													<b>ROAD DRAINAGE LONGITUDINAL SECTION</b>	
													<b>SHEET 8</b>	
													<b>STATUS: FOR CONSTRUCTION</b>	
													<b>SHEET 8 OF 10</b>	
													<b>DRG No NWRL0TS-NRT-CUD-DR-DRG-482068</b>	
													<b>NWRL REV 00.01</b>	

### 3.5 Access and Traffic Management

3. *Vehicular access to the site is proposed at the collector roads of Cudgegong Road and Tallawong Road. All access driveways, ramps, circulation aisles and parking arrangements are to be designed in accordance with AS 2890.1, AS 2890.2 and AS 2890.6.*

Access driveways, ramps, circulation aisles and parking arrangements were designed in accordance with AS 2890.1, AS 2890.2 and AS 2890.6 along with guidance from the Blacktown City Council Growth Centre Precincts DCP as described in the Civil Design Report (Rev 3, 2018)

4. *Provision for adequate site distance needs to be made for both pedestrian and vehicular movement at all driveways in accordance with Section 3.2.4 AS 2890.1 and Figure 3.2 of AS 2890.1, to ensure the safety of pedestrians on the footpath system and motor vehicles.*

Site distance calculations for intersections are provided within Section 3.0 of the Civil Design Report (Rev 3, 2018). Site distance checks for the driveways shown in Figure 15 below have been undertaken, this includes the following driveways:

- Building 1A
- Building 1B
- Building 2B
- Building 2C
- Building 2D
- Building 2E

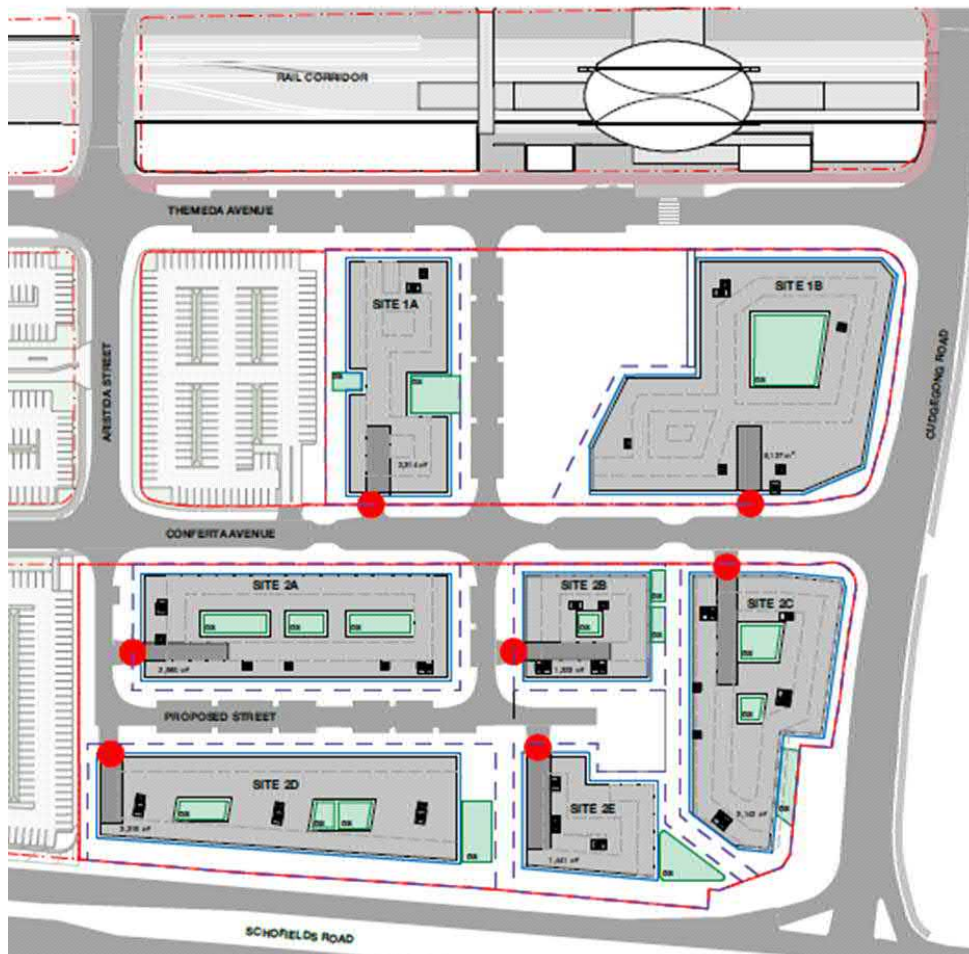


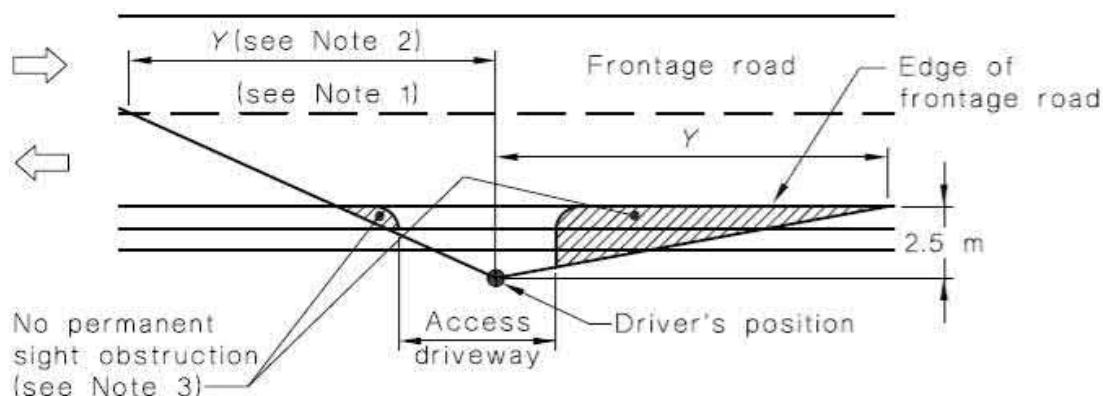
Figure 15: Location of Access Driveways



Source: AECOM, 2018

Sight distance checks were completed to ensure that the proposed access arrangements provide a safe environment. Access driveways need to be located such that adequate entering sight distance to traffic on the frontage road as well as sight distance to pedestrians is provided.

Sight distance requirements at access driveways should be provided as illustrated in Figure 16.



NOTES:

- 1 Centre-line or centre of road (undivided road), or right hand edge of right hand through lane (divided road).
- 2 A check to the left is not required at a divided road where the median is wide enough to shelter a vehicle leaving the driveway.
- 3 Parking on this side of the frontage road may need to be restricted on either side of the driveway so that the sight distance required by the above table to an approaching vehicle is not obstructed.

**Figure 16: Sight Distance Requirements at Access Driveways**

Source: AS/NZS 2890.1:2004 – Parking Facilities: Off-street car parking

The sight distances have been calculated at an assumed speed limit of 50km/hr however, it is noted that there are various traffic calming measures located within the road frontages such as pedestrian crossings and kerb extensions. As such, it is expected that the speed along the frontage roads be less than the assumed speed.

Based on the above, the sight distance was calculated to be **45 metres**. The sight triangles were measured from 2.5 metres back from the kerb as outlined in the standards (AS/NZS 2890.1).

The sight triangles indicate that minor obstructions occur for vehicles exiting all driveways, except for building 2D.1 where a car parking space is located within the sight triangles. However, considering the low speed environment of the frontage road and given kerb extensions are located near the driveway, it is expected that vehicle speeds will be reduced in proximity to the driveway along the frontage road. In addition, vehicles travelling along the frontage road are further required to reduce their speeds in order to turn right. It is therefore expected that vehicles exiting the driveways will be able to nudge forward, gaining adequate sight distances.

It should be noted that sight distances for Building 1B.1 were checked 2.5 metres back from the cycle path and the kerb. Both sight distance checks were adequate.

Based on the above calculations and those contained within the Civil Design Report (Rev 3, 2018) adequate provision for site distances has been made.

### 3.6 Waste Management

*The applicant must:*

- *Provide a Waste Management Plan for the ongoing management for each residential site (1A, 1B, 2A, 2B, 2C, 2D and 2E) and commercial/retail site within the proposed development that details:*
  - *proposed waste management features for the site*

The proposed waste management features are detailed in the revised Waste Strategy Report (Rev 2, 2018).

- *proposed truck size to service the site*

The proposed truck is detailed within the Waste Report Section 2.5.2, Table 8 and Section 2.1 of the Civil Report. For completeness the full dimensions are shown below in Figure 17.

- *number of stages, buildings and number of units in each*

Detailed within Section 2.4.1, Table 1 of the revised Waste Strategy Report.

- *provision of a caged bulky waste storage area for each building (and its size)*

Detailed within Section 2.5.4 and Table 11 of the revised Waste Strategy Report.

- *physical treatment of the loading bays to prevent unauthorised parking*

Detailed within Section 2.5.2, dot point 4 of the revised Waste Strategy Report.

- *waste and recycling generation rates, bin capacities and collection frequencies*

Generation rates are outlined in Table 3 and Table 6 and MGB capacities are outlines in Table 9 and Table 10 of the revised Waste Strategy Report.

Collection frequencies are discussed in Section 2.5.3 Table 9 is based on a once weekly collection for general waste and once fortnightly collection for recycling (Blacktown City Council waste collection schedules). For commercial and retail waste, the number of bins required for the entire development is based on collection of both general waste and recycling seven days per week.

- *collection point and associated access for collection vehicles*

Section 2.5.2 of the revised Waste Strategy Report outlines that the location, size and access requirements of the loading bays and dedicated waste collection zones will be outlined once architectural drawings of the buildings have been developed.

- *provision of chutes on each residential floor and 240L recycling bins adjacent*

Section 2.5.6 of the revised Waste Report outlines the vertical movement of waste and states that all residential buildings should have a single chute system installed on each level for general waste.

- *method to move bins from the chute discharge points to the collection points*

Section 2.5.6 of the revised Waste Report outlines the movement of waste in detail.

- *resident access to waste rooms, bulky items storage and chute discharge points*

Section 2.5.6 of the revised Waste Report outlines the movement of waste in detail.

- *use of a building manager to coordinate ongoing management*

Section 2.5.6 of the revised Waste Report outlines the movement of waste in detail in addition to the responsibilities for each process.

- *Amend Tables 1 and 2 (and update Table 7 accordingly) of the Waste Strategy Report to include:*
  - *residential waste generation rates of:*
    - *240L/unit/week for waste*
    - *80L/unit/week for recycling*



*The proposed Melbourne City rates are not acceptable.*

Rates have been amended in Table 3 of the revised Waste Strategy Report.

- *Amend Tables 3 and 4 (and update Table 8 accordingly) of the Waste Strategy Report to include:*
  - *waste generation rates from the EPA's Better Practice Guide for waste management and recycling in commercial and industrial facilities must be complied with and generation rates based on the 'maximum' calculations*
  - *if specific tenancies cannot be provided, the maximum waste and recycling generation rates for the permissible uses must be applied as follows:*
    - *500L/100 m<sup>2</sup> floor area/day for waste*
    - *220L/100 m<sup>2</sup> floor area/day for recycling*

Rates amended for 'Retail' in Table 6 of the revised Waste Strategy Report to reflect the Better Practice Guide.

- *Demonstrate that the residential bin storage rooms have sufficient space to store all the required bins for the development. Due to the limited architectural information available at this stage, the minimum storage room area requirements in Table 9 of the Waste Strategy Report cannot be verified.*

Number of MGBs and area required for adequate storage have been outlined in Table 9 (residential) and Table 10 (commercial/retail) of the revised Waste Strategy Report.

- *Provide bulky waste storage at a rate of 4 m<sup>2</sup>/40 units and 1 m<sup>2</sup>/20 units (or part thereof) for bulky items like furniture. The storage area must be:*
  - *caged with a minimum 1.5 m wide doorway to aid movement of large furniture items*
  - *suitably line marked and signposted*
  - *managed by an on-site building manager/caretaker in perpetuity for the life of the development*

Section 2.5.4 Bulky Waste and Table 11 Bulky Waste Storage Area requirements have been updated in the revised Waste Strategy Report.

- *Demonstrate the following if bins are to be collected in the basement:*
  - *forward in, forward out movement of trucks*
  - *all truck manoeuvring on-site*
  - *ramp grades do not exceed 15.4%*
  - *loading bay in close proximity to the waste room*
  - *physical treatment of the loading bay to prevent unauthorised parking*
  - *the full length of the truck is contained in the loading bay, not within the driveway*
  - *bin transfer grades not to exceed 1:30*
  - *bin travel distances not to exceed 10 m*
  - *demonstrated 4.5 m headroom allowance*

This information is contained with Section 2.5.2 of the revised Waste Strategy Report.

- *Provide a designated loading bay for collection vehicles that is not hindering basement traffic flow:*
  - *this is required for the residential waste collection points*
  - *the truck must be contained wholly within the loading bay*

- *the truck must be a minimum of 8.8 m long medium rigid vehicle or 12.5 m long articulated vehicle (depending on the part of the site it will service)*

This information is contained with Section 2.5.2 of the revised Waste Strategy Report. For completeness the full dimensions are shown below in Figure 17.

- *Provide truck swept paths for residential sites for an 8.8 m long, medium rigid vehicle with a 22 m turning circle.*

Vehicle tracking undertaken at each of the building entrances for the BCC refuse vehicles and these are contained within Appendix A of the revised Waste Strategy Report.

*Please note that these comments are based on the limited information in the Waste Strategy Report and concept plans, which lack sufficient detail to make comments on the specifics of the proposed waste management of this Stage Significant Development Application. The calculations within the report are based on the total of 1,100 dwellings and 9000 m<sup>2</sup> of retail, commercial and community uses. The architectural design and distribution of these tenancies across the 7 sites is uncertain. Therefore a detailed assessment of each site is not possible at this stage.*

It is noted that this is a concept SSDA for the precinct and the design of each building will detail the specific architectural design, distribution of tenancies, basement designs and waste collection arrangements for each individual building.

Figure 17: 11.0m Blacktown Custom Garbage Truck

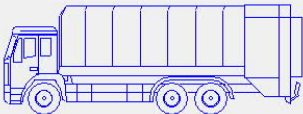
**Edit Vehicle Details**

Displayed Data: ☒ Plan/Profile View Data ☐ Roofline View Data

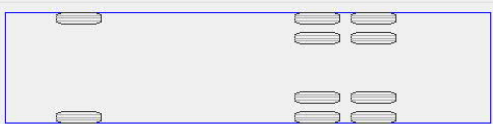
Creation Units: meters

Note: Profile for representation purposes only

Profile



Plan



Overall Vehicle Length: 11.00 m

General Data

Name: 11m HRV

Library: Custom

Region: Local

Country: Global

Profile Type: Vehicle

Vehicle Profile: Heavy Garbage Truck

Class: Refuse Collection

Lock to Lock Time: 6.0 sec.

Steering Lock Angle: 45.8 deg.

Current Part Data

Part Profile: <None>

Tractor: Full

Width: 2.50

Steering: Front Only

Front Axle Group

Axes: 1

Wheels: 2

Track: 2.50 m

Rear Axle Group

Axes: 2

Wheels: 4

Track: 2.50 m

Dimensions: 1.66, 6.05, 0.00

OK Cancel Help

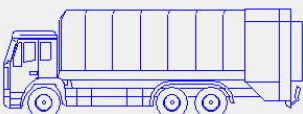
**Edit Vehicle Details**

Displayed Data: ☐ Plan/Profile View Data ☒ Roofline View Data


Creation Units: meters

Note: Profile for representation purposes only

Profile



Roofline



Overall Vehicle Length: 11.00 m

General Data

Name: 11m HRV

Library: Custom

Region: Local

Country: Global

Profile Type: Vehicle

Vehicle Profile: Heavy Garbage Truck

Class: Refuse Collection

Lock to Lock Time: 6.0 sec.

Steering Lock Angle: 45.8 deg.

Current Part Data

Roofline/Outline: Truck - Garbage

Height: 3.05

Ground Clearances

Front: 0.23 Wheelbase: 0.30 Rear: 0.23

OK Cancel Help

### 3.7 Other Matters

1. *The applicant is to comply with Growth Centre Precincts Development Control Plan, including for road design and widths*

The design of roadways including footpaths and shared paths within the Tallawong Station South Precinct comply with the Blacktown City Council (BCC) Growth Centre Precincts DCP.

For the North-South Road located adjacent to the designated park, the design widths are based on the Typical Medium-high density local road classification as outlined in Figure 3-14 of the DCP (refer Figure 18 below).

New road cross sections are also contained in Section 3.2 above.

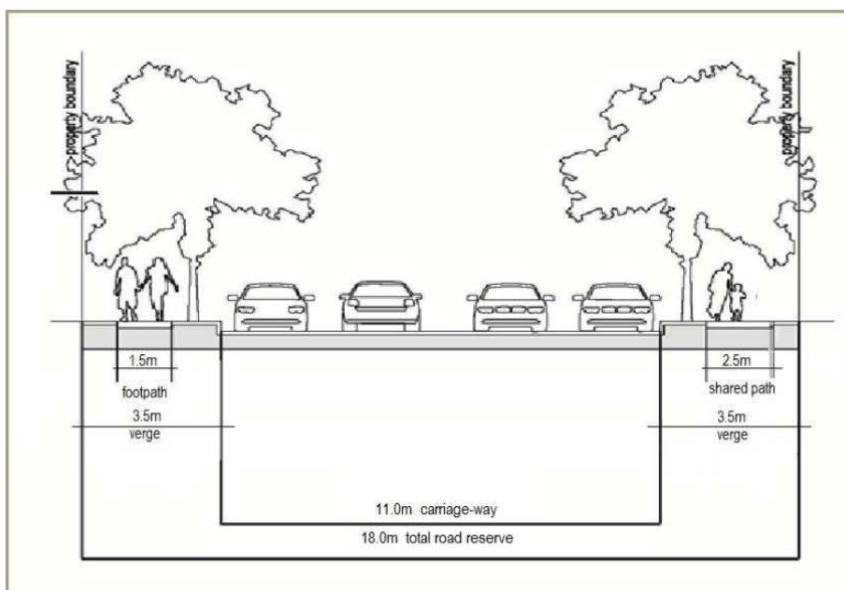


Figure 3-14 Medium-high density local road

Source: BCC Growth Centre Precincts DCP

#### Figure 18: BCC Growth Centre Precincts Road Widths

A comparison of all road widths and where they have been derived is contained in Figure 19.

The total road reserve of the new proposed road west of the park is 18m as shown above in Section A, Figure 2 above, however the typical road arrangements has been altered to include a dedicated cycle path and improve tree amenity. This section was developed in consultation with BCC's landscape design staff to provide an improved tree canopy for the street.

Similarly the typical arrangement in Section B, Figure 2 still maintains a 18m total road reserve but includes a dedicated cycle path on the eastern side of the road at the loss of approximately 2 car spaces.

Figure 19: Road Width Comparison Table

Source	Carriageway Width	Footpath Width <sup>3</sup> (1.5-3.5m)	Shared Path Width	Comments
<b>Typical Road Cross Section (Sections A,B,C,D)</b>				
Adopted Dimension	11.0m <sup>1</sup>	3.5m	n/a	Carriageway comprises 2x3.0m travel lanes and 2.5m parking lanes
BCC Growth Centre Precincts DCP	11.0m	1.5m	2.5m	Based on Typical Medium-high density local road Section as shown in <b>Figure 3-14</b> of DCP
BCC Engineering Guide for Development 2005	11.0m	3.5m	n/a	Based on information provided in <b>Table 3.1: Road Hierarchy and Widths</b> . Road classified as a “residential collector road”
<b>Typical Shared Path (Sections F,G,H)</b>				
Adopted Dimension	n/a	n/a	6.5m for section F 6.0m for sections G and 5.0m for section H	Overall width includes 3.5m paved width for section G and H and 3.4m for section F
BCC Growth Centre Precincts DCP	n/a	n/a	2.5m	Based on Typical Medium-high density local road section as shown in <b>Figure 3-14</b> .
BCC Engineering Guide for Development 2005	n/a	n/a	4-10m	Standard provides overall width only. Provided in <b>Table 3.1: Road and Hierarchy and Widths</b> . Classified as “Pathways”
<b>Typical Foot Path (Sections E,I,J)</b>				
Adopted Dimension	n/a	5.0m for section E 3.0 for section I and J <sup>2</sup> 3m for Section H as requested by Council and agreed at meeting 30/8/18	n/a	For Section E overall width includes 3.5m paved footpath.  For Section I and J overall width includes 1.8m paved footpath width.
BCC Growth Centre Precincts DCP	n/a	3.5m	n/a	Based on Typical Medium-high density local road section as shown in <b>Figure 3-14</b> .
BCC Engineering Guide for Development 2005	n/a	4-10m	n/a	Standard provides overall width only. Provided in <b>Table 3.1: Road and Hierarchy and Widths</b> classified as “Pathways”

**Note:**

1. For Section B carriageway width is reduced to 8.5m as comprises only of a single parking lane.
2. For Section I and J footpath width is reduced to 3.0m.
3. The footpath verge is 3.5m

## 4.0 Environmental Protection Agency

As part of the Tallawong Station Precinct South (SSD 9063), the Environmental Protection Agency (EPA) offered commentary on the proposed design and requested additional information. The requested information that is covered by the AECOM scope of works and response are summarised below:

### 4.1 Air Quality

*The SEARs require consideration of the Development Near Rail Corridors and the Busy Roads interim guideline (DoP 2008). The supporting Air Quality Assessment outlines the air provisions of the guideline, however its only comment on applying the guideline is that the development location is such that there will be no emission impacts from Windsor Road.*

*The EIS traffic study indicates Schofields Road will carry traffic flows of over 2,300 vehicles per hour in 2035, approaching the guideline threshold of 2,500 vehicles per hour for which residential building setbacks of at least 20 metres are recommended. While the traffic flows are only predictions, it would be reasonable to consider the potential impacts from Schofields Road, which is directly adjacent to the development site.*

*For example, the supporting design quality guidelines consider and address a range of environmental considerations but do not explicitly consider air emissions exposure from Schofields Road. While some of the design proposals may reduce exposure incidentally (for example, varied building textures, space between buildings), it is proposed that there will be under 15 metres separation between Schofields Road and residential buildings, with living areas proposed to front the road. Design approaches for housing next to busy roads from the Parramatta Road Corridor Urban Transformation Strategy should be considered. These included:*

- *Using architectural and design approaches that provide separation from major roads and ensuring habitable rooms of future developments are oriented away from busy roads.*
- *Where development includes mechanical ventilation (such as air conditioning), ensuring that the air intakes for the ventilation are situated away from pollution sources.*

*A copy of these measures can be obtained at:*

*<http://www.urbangrowth.nsw.gov.au/assets/Projects/Parramatta-Road/Publications-161109/Strategy-Documents/6.-Implementation-Tool-Kit-Planning-and-Design-Guidelines-November-2106.pdf>*

Although the 2035 modelled traffic flows approach the guideline threshold of 2,500 vehicles per hour, improvements in the composition of the urban vehicle fleet through uptake of hybrid and electric vehicles will result in reduced vehicular air emissions compared with the current vehicle fleet, thus negating the need to apply the guideline setback of at least 20 metres.

The Design Quality Guidelines (DQG) have been updated to include mitigation measures considering those within the Parramatta Road Corridor Urban Transformation Strategy.

Architectural and design considerations including setback distance, habitable room orientation and location of mechanical ventilation intakes for buildings in proximity to Schofields Road can be included in individual building DA design on a case by case basis.



*In relation to carbon emissions and sustainability broadly, the EIS objectives explicitly refer to Landcom targets rather than the Greater Sydney Regional Plan and supporting Western City District Plan. The concept should align with these Plans supporting sustainability priorities/actions and objectives. At 96,900 square metres, this precinct development falls just below the 100,000 square metre threshold for the District Plan action on low carbon precincts, that is,*

*“Encourage the preparation of low-carbon, high efficiency strategies to reduce emissions, optimise the use of water, reduce waste and optimise car parking provision where an increase in total flow area greater than 100,000 square metres is proposed in any contiguous area of 10 or more hectares”.*

*The concept provides an opportunity to investigate strategies with Transport for NSW and Landcom in developing a low carbon precinct. DEP may wish to explore this approach with the proponent in collaboration with GSC and other Government Agencies including EPA and OEH.*

Targets as provided in the Cudgegong Road Station Precinct South (Tallawong) Ecologically Sustainable Development (ESD) Report have been developed to be generally in line with the GSC Regional Plan and Western City District Plan. This includes both minimum and aspirational targets to create low carbon precincts. Options as outlined in the ESD report will require further evaluation for feasibility and adoption at tender and in detailed design but provide the framework for the concept SSDA.

## 4.2 Water Quality

*Based on a review of the supporting information it appears that the proposal has not addressed key sustainability priorities in the Western City District Plan., In particular, Planning Priority W12 Protecting and improving the health and enjoyment of the Districts waterways. it is also supported by action 69 “improve the health of catchments and waterways through a risk-based approach to managing the cumulative impacts of development including coordinated monitoring of outcomes”. In addition, actions 70 “work towards reinstating more natural conditions in highly modified waterways.*

*The NSW Water Quality Objectives (WQO) provide a framework and benchmarks for the community uses and values of waterways and the water quality that is needed to support these. They were developed using the Australian and New Zealand guidelines for fresh and marine water quality (2000) and are the NSW Government’s endorsed environmental values and long-term goals for NSW’s surface waters. Land use changes associated with this new precinct should deliver a sustainable development outcome that not only supports on-going improvement in the health of these catchments and waterways but also allows the WQO to be met over time where they are not currently being achieved.*

The Water Sensitive Urban Design (WSUD) strategy has been developed in coordination with Blacktown City Council and is consistent with the existing WSUD strategy of a regional biofiltration basin for the area and it is noted that post development water quality is an improvement on the rural-residential water quality.

Further to this, it is recommended that a condition be imposed stipulating that the requirements of Blacktown City Council, Sydney Water and the EPA with regard to the on-site detention, healthy waterways (including downstream soil erosion) and water storage must be ascertained and addressed. Details of on-site detention and water storage and evidence of consultation with Blacktown City Council, Sydney Water and the EPA must be submitted with the first detailed development application relating to the site.

*The submitted information does not appear to provide details of expected water quality outcomes. It does state that post-development water quality will comply with the generic per cent load reductions in the Blacktown City Council Growth Centres Precincts Development Control Plan (that is, Gross Pollutants 90 per cent, TSS 85 per cent, TP 65 per cent, TN 45 per cent). In addition, the stream erosion index of less than 3.5.*

*In particular, the EIS states that “the subsoils are highly erodible as they are very low in organic matter, highly dispersible and occasionally sodic”. Sydney Water has been investigating sustainable flow requirements in the catchment of South Creek revealing that a stream erosion index of 1 let along 3.5 would result in stream erosion.*

*It is important that ambient water quality targets for the receiving waters are developed to support WQOs rather than applying generic per cent load reductions that have no reference to receiving water outcomes. Furthermore, these generic targets do not reflect contemporary Water Sensitive Urban Design (WSUD) performance and may not deliver improvements in the health of local waterways being sought by the District Plan. Landcom may also wish to consult with Sydney Water who are investigating flow requirements in the catchment to help inform the South Creek Corridor Project.*

*The development of the Precinct also provides an opportunity to apply the Office of Environment and Heritage and the EPA's 'Risk-based Framework for Considering Waterway Health outcomes in Strategic Land-Use Planning Decisions'. This framework can help assist decisions that maintain, improve or restore water quality in the strategic planning process to help meet the NSW Water Quality and River Flow Objectives. The framework can be used to:*

- Ensure the community's environmental values and uses for our waterways are integrated into strategic land use planning decisions*
- Identify relevant objectives for the waterway that support the community's environmental values and uses, and can be used to set benchmarks for design and best practice*
- Identify areas in the catchment where management responses cost-effectively reduce the impacts of land-use activities on our waterways*
- Support management of land use developments to achieve reasonable environmental performance levels that are sustainable, practical and socially and economically viable.*

*Both the Western City District Plan and Greater Sydney Regional Plan recognises the above framework. It is also currently helping to inform discussions in relation to precinct planning in other parts of the South Creek and Hawkesbury/Nepean Catchment including Wilton and South West Growth Areas. A copy of the framework can be found at: <https://www.epa.nsw.gov.au/your-environment/water/policies-guidelines-and-programs>.*

*The Western City District Plan also recognises the need for prioritising the management of waterways as green infrastructure. This involves:*

- reconceptualising waterways as an infrastructure asset that provide environmental, social and economic benefits to communities*
- integrating approaches to protecting environmentally sensitive waterways within a network of green infrastructure*
- addressing the cumulative impacts of development and land management decisions across catchments to improve water quality and waterway health.*

*It is important that the planning of this precinct is demonstrating that it is contributing to the South Creek Corridor Plan which is recognised as a key initiative in the Greater Sydney Regional Plan and Western City District Plan.*

*The EIS states that the site and surrounding areas are classified as having high salinity probability. It also states that previous assessments of salinity undertaken for the Sydney Metro works concluded there was a negligible potential salinity rating, and aggressivity results had a "non-aggressive" rating. However, a recommendation is stated that a Detailed Site Investigation (including salinity testing) should be conducted for the site to confirm the suitability of the site for the proposed development. It is important that DPE discuss with the proponent opportunities on how such an assessment could be best progressed as it may have significant implications on how development could best proceed at the site in the absence of this information.*

*In relation to Salinity issues in the catchment, DPE may also wish to consult the "Hydrogeological Landscapes for the Hawkesbury-Nepean Catchment Management Authority, Western Sydney Study Area" (Oct 2011).*

As noted in the EPA response, the Water Quality details and outcomes are contained within the Integrated Water Cycle Management report. These comply with both the Blacktown City Council DCP requirements and the Green Star Commitments for the site.

Further to this, it is recommended that a condition be imposed stipulating that the requirements of Blacktown City Council, Sydney Water and the EPA with regard to the on-site detention, healthy waterways (including downstream soil erosion) and water storage must be ascertained and addressed. Details of on-site detention and water storage and evidence of consultation with Blacktown City Council, Sydney Water and the EPA must be submitted with the first detailed development application relating to the site.

This could include increasing storage of roof water for re-use which reduce the downstream Soil Erosion Index (SEI) further. As this is a Concept SSDA, when the buildings themselves are further defined and designed the integration of roof storage into the building design will be explored.

### 4.3 Waste Water Management

*The submitted information states that the site is located within the Rouse Hill wastewater system, with wastewater being treated at the Rouse Hill Recycling plant and transferred via a series of sewer pumping stations. This plant treats wastewater to tertiary standards which then recycles back to customers for non-drinking purposes. The EIS also states that the existing wastewater network is within the vicinity of the precinct. It is unclear from the submitted information if the Precinct will be serviced by a dual pipe system to provide treated wastewater. A key element of the supporting Integrated Water Cycle Management Plan is the recognition of treated waste water reuse. DPE should seek clarification from the proponent as a proposal that maximises waste water reuse will be an important sustainability initiative for the Precinct.*

As described in our response in Section 3.3, Options Planning is currently being undertaken by Sydney Water. It is noted that the Civil Drawings show recycled water pipes to service each development lot, refer drawings 60558549-SHT-CI-0501 to 0505. We recommend this is explored further with Sydney Water during the detailed design of the development.

### 4.4 Waste Management

*In general, the supporting waste management plan is generally a high-level strategy proposing strategies including the use of wheelie bins or bulk bins for the entire development. This would potentially result in hundreds bin lifts per week (unless they use bulk bins which will reduce the number of bin lifts). While the strategy does mention both options it does not recommend one or the other. Neither does it recommend the use of compactors or chute systems. It further states that any options need to be considered in consultation with council. In this regard, there is no clear recommendation on the desired approach to achieve the best outcome for the precinct.*

*Ultimately, the proponents will need to consult with Blacktown City Council to ensure that Council can carry out on-site waste collections and that the dimensions of the building entrance and basement etc allows for Councils waste collection vehicles to enter the site and perform required services. With the outcome being potentially a future development that ends up with a very traditional waste and recycling collection system with very little innovation applied. For example, the opportunity to explore vacuum systems.*

*The EIS states that “the waste management measures outlined in the Waste Management Report will be taken into account during the detailed design and operation of the future stages of the development”. This will provide an opportunity for the future detailed assessment. However, it is recommended that this be expanded to provide a broader piece of work that helps align with the Western City District Plan priorities/actions. This would also help investigate opportunities for more innovative waste solutions for the precinct. The EPA could also be consulted in the developed of this work.*

The waste report has been developed in consultation with BCC and complies with their requirements, more detail will be provided at the detailed DA stage.

The final waste strategy and specific innovations are highly dependent on the eventual building designs, including architectural and structural limits. Once building designs are further developed there is the opportunity to identify stretch targets for the each building and the precinct.

This baseline strategy was requested by Blacktown City Council to outline what a conservative scenario may look like operationally, and to understand the architectural impact of traditional waste management. This ‘traditional scenario’ is used as a foundation to assess the design against operation requirements.

We have included tracking for each basement entrance and have coordinated this with Blacktown City Council. Vacuum Waste Systems are an innovative method for managing waste and it would be the responsibility of the individual developer to work with Council to allow for this if it is commercially feasible for the development. Alternatively, waste compactors and balers have been recommended to reduce the area required for storage rooms, which has been outlined in our strategy.

## 5.0 Government Architect

As part of the Tallawong Station Precinct South (SSD 9063), the Government Architects office offered commentary on the proposed design and requested additional information. The requested information that is covered by the AECOM scope of works and response are summarised below:

*The landscape proposal and green infrastructure in the Public Domain and Landscape Strategy are supported however the opportunity to link green infrastructure more broadly, for example, with other ecosystems such as the water sensitive urban design strategy, has not been fully realised. This concern is also linked to issues discussed in Section 6.2.1 regarding the amenity of the network of public spaces within the development.*

The Water Sensitive Urban Design (WSUD) strategy has been developed in coordination with Blacktown City Council and is consistent with the existing WSUD strategy of a regional biofiltration basin for the area.

However it is the intention for the stormwater and runoff to be used as passive irrigation for landscape items and for WSUD to be incorporated into the proposed street trees, this detail is shown above in Section 3.3 and Figure 7.

## 6.0 Sydney Water

As part of the Tallawong Station Precinct South (SSD 9063), Sydney Water offered commentary on the proposed design and requested additional information. The requested information that is covered by the AECOM scope of works and response are summarised below:

### 6.1 Drinking Water

*The Tallawong Precinct will be supplied with drinking water via the Parklea Water Supply Zone serviced via the Prospect water filtration plant. There is sufficient trunk capacity to service initial development in the precinct, however we expect amplification will be required over the next 5 years to support growth in the wider area.*

*Network extensions or amplifications may be required to service the redevelopment areas. These will be assessed at the section 73 (Sydney Water Act) application stage.*

This is noted and consistent with Concept SSDA Utilities Report, during subsequent design phases a formal Section 73 application will be made.

### 6.2 Wastewater

*The Tallawong Precinct is within the Riverstone wastewater system. There is sufficient capacity to service initial development in the precinct, however we expect amplification will be required over the next five years to support growth in the wider area.*

*Network extensions or amplifications may be required to service the redevelopment areas. These will be assessed at the section 73 (Sydney Water Act) application stage.*

This is noted and consistent with Concept SSDA Utilities Report, during subsequent design phases a formal Section 73 application will be made.

### 6.3 Recycled Water

*The Tallawong precinct is within the Parklea North Recycled Water Supply Zone. There is sufficient truck capacity to service initial development in the precinct, however we expect amplification will be required over the next five years to support growth in the wider area. Recycled water is being explored as part of the Options Planning works and further updates on this will be available in late 2018.*

This is noted and consistent with Concept SSDA Utilities Report, an allowance has been made in the design for a recycled water network connecting to the existing Recycled Water Network and this will be explored further during subsequent design phases where a formal Section 73 application will be made.

### 6.4 Stormwater Management and Flooding

*Sydney Water notes that attention should be given to the appropriate use of land, based on flooding constraints. The relevant controls for stormwater discharges and increased storage of roof water, should be considered in alignment with proposals for healthy waterways.*

This is noted, flood constraints are detailed within the Integrated Water Cycle Management Report. It is recommended that a condition be imposed stipulating that the requirements of Blacktown City Council, Sydney Water and the EPA with regard to the on-site detention, healthy waterways (including downstream soil erosion) and water storage must be ascertained and addressed.

Details of on-site detention and water storage and evidence of consultation with Blacktown City Council, Sydney Water and the EPA must be submitted with the first detailed development application relating to the site.

## 6.5 Development Impact of Existing Assets

*It is noted that there is a potential risk to existing Sydney Water assets in the development of new roads, infrastructure and construction developments. Sydney Water has been working with Sydney Metro in relation to adjusting and protecting our existing assets impacted on by the construction of the Metro North West as well as lay new infrastructure within known precinct layouts.*

*While Sydney Water has worked with Sydney Metro to mitigate the need for further adjustments to our existing assets, future development of the Tallawong Precinct may result in further impacts to Sydney Water's existing infrastructure. Any works required to our existing infrastructure will be considered as part of future development applications and the Section 73 (Sydney Water Act) application stage.*

*There is an opportunity to work with other infrastructure delivery partners to minimise disruption, duplication of, or abortive work and we will continue investigation options for streamlining delivery to coordinate and future-proof works.*

This is noted, the intent is to minimise the impact on existing Sydney Water assets and potential crossings have been shown within the Civil Engineering Drawings. During subsequent design stages any requirements for protection or relocation of existing assets will be discussed formally with Sydney Water.

## 6.6 Partnership Approach

**Partnership Approach:** *Sydney Water is working with Landcom, Sydney Metro and other infrastructure partners on their developments in this area and will continue working in close partnership to develop the most efficient solutions for these developments.*

*Due to accelerated growth and development within Sydney, please be advised that this Servicing Advise is accurate at date of issue only.*

This is noted, as a part of subsequent design phase's ongoing coordination with Sydney Water on the potable water, wastewater and recycled water servicing of the precinct and any impacts on existing assets will be proactively discussed with Sydney Water.



## 7.0 Endeavour Energy

As part of the Tallawong Station Precinct South (SSD 9063), Endeavour Energy offered commentary on the proposed design and requested additional information. The requested information that is covered by the AECOM scope of works and response are summarised below:

### 7.1 Electrical Infrastructure

*As shown in the below site plans from Endeavour Energy's G/Net master facility model there are:*

- *No easements over the site benefitting Endeavour Energy (active easements are indicated by red hatching).*
- *To the Schofields Road road verge / roadway:*
  - *Low voltage underground cables.*
  - *11,000 volt / 11 kV high voltage underground cables to the corner of Cudgegong Road.*
- *To the Cudgegong Road road verge / roadway:*
  - *Low voltage underground cables.*
  - *Low voltage overhead power lines.*
- *Underground earth cables and underground pilot cables (carrying protection signals or communications between substations) to the both Schofields Road and Cudgegong Road.*
- *The Cudgegong Road frontage of the site is opposite Endeavour Energy's Rouse Hill Switching Station at 83 Schofields Road Rouse Hill (Lot 1 DP 1175409) and 132,000 volt / 132 kV overhead Feeder 9JA – Vineyard to Rouse Hill Switching Station.*

*Please note the location, extent and type of any electricity infrastructure, boundaries etc. shown on the plan is indicative only. Generally (depending on the scale and/or features selected), low voltage (normally not exceeding 1,000 volts) is indicated by blue lines and high voltage (normally exceeding 1,000 volts but for Endeavour Energy's network not exceeding 132,000 volts / 132 kV) by red lines (these lines can appear as solid or dashed and where there are multiple lines / cables only the higher voltage may be shown). This plan only shows the Endeavour Energy network and does not show electricity infrastructure belonging to other authorities or customers owned electrical equipment beyond the customer connection point / point of supply to the property. This plan is not a 'Dial Before You Dig' plan under the provisions of Part 5E 'Protection of underground electricity power lines' of the Electricity Supply Act 1995 (NSW).*

This is noted and is consistent with the Utilities Report and Civil Engineering Drawings. As a part of subsequent design phases formal ASP 3 design will commence for each building lot and confirm the exact design and tie-in of electrical infrastructure.

### 7.2 Rouse Hill Switching Station

*As an adjoining or nearby owners and occupiers, the main area of concern which Endeavour Energy has is in relation to the access arrangements to the Rouse Hill Switching Station.*

*Access to the Rouse Hill Switching Station has previously been affected by the road widening and/or realignment of both Schofields Road (the original site access) and Cudgegong Road. As a result of these previous road works the current access to the site is off Cudgegong Road with a crossing over the original road alignment which is shown in the following extracts of Google Maps Street View.*

*Access to Rouse Hill Switching Station needs to be maintained at all times. Endeavour Energy will require reasonable notice if any of the road works will affect the access to the site to ensure arrangements are in place to maintain access ie. particularly in the event of an emergency. For safety and security reasons access to the site is restricted. Should access to the site be required by any consultants or contractors, it can only occur with Endeavour Energy's prior consent and under direct supervision.*

This is noted and is recommended to be included with any future Construction Management Plan (CMP) for the site. The current design limits all works to the eastern side of Cudgegong Road with the exception of the expansion of the existing biofiltration basin.

The current access as constructed by NRT is to remain without alteration as a part of this development.

*As Endeavour Energy's Rouse Hill Switching Station is a non-habitable building / site it is comparatively less impacted by the proposed development of the Precinct. Endeavour Energy is not necessarily opposed to the Development Application but in regards to the appropriate development controls and the impact of the proposed development on adjoining or nearby owners and occupiers, it will leave such determination to the Department / Council.*

*In regards to Endeavour Energy's role as an electricity supply authority, subject to the following recommendations and comments Endeavour Energy has no objection to the Development Application.*

This is noted.

### 7.3 Network Capacity / Connection

*In regards to the availability of electricity supply to sites within the Precinct, the availability of supply to a site is based on a wide range of factors eg. the age and design of the network; other development in the locality utilising previously spare capacity within the local network; the progress of nearby / surrounding sites including electricity infrastructure works eg. a smaller and isolated development that may not of its own accord require a padmount substation may require a padmount substation to facilitate the development and from which the spare capacity is made available to subsequent nearby development. Older / above ground areas of the network utilising pole mounted substations have comparatively limited capacity of 25 kilovolt amperes (kVA) up to a maximum of 400 kVA where as a newer padmount substation can accommodate loads from 315 kVA up to 1,500 kVA (typically 500 kVA) ie. there is a significant variation in the number and type of premises able to be connected to a substation.*

*In due course the applicant for the future proposed development of the sites within the Precinct will need to submit an application for connection of load via Endeavour Energy's Network Connections Branch to carry out the final load assessment and the method of supply will be determined. Depending on the outcome of the assessment, any required padmount or indoor / chamber substation/s will need to be located within the property (in a suitable and accessible location) and be protected (including any associated cabling) by an easement and associated restrictions benefiting and gifted to Endeavour Energy. Please refer to Endeavour Energy's Mains Design Instruction MDI 0044 'Easements and Property Tenure Rights'. Further details are available by contacting Endeavour Energy's Network Connections Branch via Head Office enquiries on telephone: 133 718 or (02) 9853 6666 from 8am - 5:30pm or on Endeavour Energy's website under 'Home > Residential and business > Connecting to our network' via the following link: <http://www.endeavourenergy.com.au/>*

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made. Once the relevant information related to this connection application has been made, the electrical substations will be designed in accordance with Endeavour Energy's Network Standards.

As a part of the individual building designs and development applications, electrical servicing will be further defined (e.g. padmount or chamber substations).

### 7.4 Urban Residential Subdivision

*Urban residential subdivision of a site is subject to Endeavour Energy Underground Residential Distribution (URD) policy. Endeavour Energy's Company Policy 9.2.5 'Network Asset Design', includes the following requirements for electricity connections to new residential subdivisions:*

#### 5.11.1.1 Urban areas

Reticulation of new residential subdivisions will be underground. In non-bushfire prone areas, new lines within existing overhead areas can be overhead, unless underground lines are cost justified or required by local council requirements.

Where underground reticulation is required on a feeder that supplies a mixture of industrial, commercial and/or residential loads, the standard of underground construction will apply to all types of load within that development.

Where ducting is used, adequate spare ducts and easements must be provided at the outset to cover the final load requirements of the entire development plan.

Extensions to the existing overhead 11kV/22kV network must generally be underground. Bare wire will be used for conductor replacements and augmentations except in treed areas where CCT or NMSHVABC must be used.

Extensions to the existing overhead LV network and augmentations must either be underground or ABC. Conductor replacements greater than 100m in route length must utilise aerial bundled cable.

CCT = Covered conductor thick with insulation fully rated for the voltage on the conductor.  
NMSHVABC = Non-metallic Screened High Voltage Aerial Bundled Cable.

**Table 2 – Distribution Network Design Parameters Summary**

Limits	Urban	Industrial and commercial	Non-urban
Default HV reticulation	U/G	U/G	O/H
Default LV reticulation	U/G	U/G	O/H – ABC

#### Non-urban

Any area that is identified as rural land zoning

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made.

## 7.5 Location of Electricity Easements

*The incorporation of electricity easements into privately owned lots eg. for padmount substations and associated underground cables likely to be required to facilitate the proposed development, is generally problematic for both Endeavour Energy and the future landowners and requires additional easement management to ensure no uncontrolled activities / encroachments occur within the easement area. Accordingly Endeavour Energy's recommendation is that whenever reasonably possible, easements be entirely incorporated into public reserves and not burden private lots (except where they are remnant lots or not subject to development). Endeavour Energy's preference is to have continuity of its easements over the most direct and practicable route affecting the least number of lots as possible. Therefore it generally does not support the incorporation of easements into multiple / privately owned lots.*

*The future proposed substation locations on a site will require a detailed assessment to consider the suitability of access, safety clearances, fire ratings, flooding (please refer to the following point 'Flooding and Drainage') impact on adjoining properties etc. For example, to avoid the creation of restrictions on the adjoining site the development shown in the following extract of Google Maps Street View is of a site in Liverpool required the installation of a fire wall next to the padmount substation. Whilst meeting the fire rating requirements etc. from an aesthetics perspective this is not an attractive outcome. Restricted access to the substation by maintenance workers causes delays in power restoration and may have severe consequences in the event of an emergency. Delays to accessing electricity infrastructure due to traffic congestion may also have severe consequences in the event of an emergency.*

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made. As a part of the individual building designs and development applications, electrical servicing will be further defined (e.g. padmount or chamber substations).

## 7.6 Flooding and Drainage

*Endeavour Energy has noted that the Environmental Impact Statement indicates that a Flood Impact Assessment has been undertaken by AECOM which identifies that the site is located outside the 1% and PMF flood extent of Second Ponds Creek to the east with flood modelling of the local overland flow paths has been undertaken to identify the 1% AEP flood level with 50%*

*blockage of stormwater pipe network and a 15% increase in rainfall intensity to reflect possible climate change impacts.*

*Distribution substation should not be subject to flood inundation ie. the padmount substation cubicles are weather proof not flood proof. Endeavour Energy's Mains Construction Instruction MCI 0006 'Underground distribution construction standards manual' Section 7 'Substation and switching stations' provides the following details of the requirements for new padmount substation locations in flood prone land.*

#### **7.1.6 Flooding and drainage**

Substations are to be located such that the risk of flooding or stormwater damage is minimal.

As a minimum the level at the top of the transformer footing, HV and LV switchgear, shall not be lower than the 1:100 year flood level.

All drains within the substation site area or in the vicinity shall be properly maintained to avoid the possibility of water damage to Endeavour Energy's equipment.

In areas where, as determined by the Network Substation Manager, there is a high water table or a heightened risk of flooding, indoor substations will not be permitted.

All materials used in the construction below the substation (ground level) shall be capable of withstanding prolonged immersion in water without swelling or deterioration.

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made.

## **7.7 Bushfire**

*Endeavour Energy has noted that the Environmental Impact Statement indicates that 'Parts of the site are identified as "Category 1 Bushfire Prone Vegetation" and "100 metre wide buffer zone to the Category 1 Bushfire Prone Vegetation" under the Blacktown Bushfire Prone Land Map'. The accompanying Bushfire Protection Assessment assessing the impacts of the proposal against the NSW Rural Fire Service (RFS) publication Planning for Bushfire Protection 2006 providing the following advice (please also refer to the above point 'Urban Residential Subdivision'):*

### **5.3 Bushfire Protection Assessment for the proposed Medium Density Residential Development.**

The performance criteria for the proposed medium density residential [infill] component of the development are:

#### **(5) Water & Utility Services:**

Gas & electricity services are located underground.

*The following is an extract of Endeavour Energy's Company Policy 9.1.1 Bushfire Risk Management:*



### 9.1.1 BUSHFIRE RISK MANAGEMENT

#### 1.0 POLICY STATEMENT

The company is committed to the application of prudent asset management strategies to reduce the risk of bushfires caused by network assets and aerial consumer mains to as low as reasonably practicable (ALARP) level. The company is also committed to mitigating the associated risk to network assets and customer supply reliability during times of bushfire whilst achieving practical safety, reliability, quality of supply, efficient investment and environmental outcomes. The company is committed to compliance with relevant acts, regulations and codes.

*Accordingly the network required to service the proposed development must be fit for purpose and meet the technical specifications, design, construction and commissioning standards based on Endeavour Energy's risk assessment associated with the implementation and use of the network connection / infrastructure for a bushfire prone site. In assessing bushfire risk, Endeavour Energy has traditionally focused on the likelihood of its network starting a bushfire, which is a function of the condition of the network. Risk control has focused on reducing the likelihood of fire ignition by implementing good design and maintenance practices. However safety risks associated with the loss of electricity supply are also considered.*

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made.

## 7.8 Earthing

*The construction of any building or structure (including fencing, signage, flag poles etc.) whether temporary or permanent, that is connected to or in close proximity to Endeavour Energy's electrical network is required to comply with Australian/New Zealand Standard AS/NZS 3000:2007 'Electrical installations' to ensure that there is adequate connection to the earth. Inadequate connection to the earth places persons and the electricity network at risk.*

*Endeavour Energy is committed to ensuring that its activities and assets conform to all relevant International and Australian Standards, Energy Networks Association (ENA) Standards and NSW legislation. Whilst the earthing of the rouse Hill Switching Station has accordingly been designed within the site boundaries, adjoining properties still need to ensure that any building or structure is adequately earthed to prevent electromagnetic induction and transferred voltage hazards.*

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made.

## 7.9 Prudent Avoidance

*The electricity network is operational 24/7/365 ie. all day, every day of the year. The electricity industry has adopted a policy of prudent avoidance by doing what can be done without undue inconvenience and at modest expense to avert the possible risk to health from exposure to emissions from electricity infrastructure such as electric and magnetic fields (EMF) and noise which generally increase the higher the voltage ie. Endeavour Energy's network ranges from low voltage (normally not exceeding 1,000 volts) to high voltage (normally exceeding 1,000 volts but not exceeding 132,000 volts / 132 kV). In practical terms this means that when designing new transmission and distribution facilities, consideration is given to locating them where exposure to the more sensitive uses is reduced and increasing separation distances. These emissions are generally not an issue but with Council's permitting or encouraging development with higher density, reduced setbacks and increased building heights, new development can impact on existing electricity infrastructure. Where development is proposed in the vicinity of electricity infrastructure, Endeavour Energy is not responsible for any amelioration measures for such emissions that may impact on the nearby proposed development. Endeavour Energy believes that likewise Council should also adopt a policy of prudent avoidance by the siting of more sensitive uses away from any electricity infrastructure.*

*Please find attached a copy of ENA's 'Electric & Magnetic Fields – What We Know, January 2014' which can also be accessed via the ENA's website at <http://www.ena.asn.au/> and provides the following advice:*

*Localised EMFs may also be encountered in specific situations such as near substations, underground cables, specialised electrical equipment, or at elevated locations near lines. Note that the strengths of EMFs decrease rapidly with distance from the source.*

*Typical magnetic field measurements associated with Endeavour Energy's activities and assets given the required easement widths, safety clearances etc. and having a maximum voltage of 132,000 volt / 132 kV, will with the observance of these separation distances not exceed the recommended magnetic field public exposure limits.*

*Endeavour Energy has noted that the Environmental Impact Statement does not appear to mention the proximity to Rouse Hill Switching Station or Feeder 9JA. The Urban Design Report as shown in the following extract of the Site Analysis Plan shows 'Endeavour Energy Switch Station' but there appears to be no detail / discussion about a 'complimentary interface' between the Rouse Hill Switching Station / Feeder 9JA and the buildings to the opposite side of Cudgegong Road.*

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made.

It is further noted that Endeavour Energy is not responsible for any amelioration measures for such emissions that may impact on the nearby proposed development and that if it is determined by the ASP 3 design that such amelioration measures are required, these will form part of the precinct and building design by the developer.

## **7.10 Vegetation Management**

*The planting of large trees in the vicinity of electricity infrastructure is not supported by Endeavour Energy. Suitable planting needs to be undertaken in proximity of electricity infrastructure. Only low growing shrubs not exceeding 3.0 metres in height, ground covers and smaller shrubs, with non-invasive root systems are the best plants to use. Larger trees should be planted well away from electricity infrastructure (at least the same distance from overhead power lines as their potential full grown height) and even with underground cables, be installed with a root barrier around the root ball of the plant. Landscaping that interferes with electricity infrastructure may become a potential safety risk, cause of bush fire, restrict access or result in the interruption of supply. Such landscaping may be subject to Endeavour Energy's Vegetation Management program and/or the provisions of the Electricity Supply Act 1995 (NSW) Section 48 'Interference with electricity works by trees' by which under certain circumstances the cost of carrying out such work may be recovered.*

*In regards to the future padmount substations required to facilitate the proposed development please refer to the attached copy of Endeavour Energy's Guide to Fencing, Retaining Walls and Maintenance Around Padmount Substations*

This is noted and the proposed landscape design has taken into account proximity to existing electrical infrastructure at a concept design level.

The requirements of future padmount substations are noted and will be incorporated into the ASP 3 and building / public domain landscape design when a formal application for connection of load will be made.

## **7.11 Dial Before You Dig**

*Before commencing any underground activity the applicant is required to obtain advice from the Dial Before You Dig 1100 service in accordance with the requirements of the Electricity Supply Act 1995 (NSW) and associated Regulations. This should be obtained by the applicant not only to identify the location of any underground electrical or other utility infrastructure across the site, but also to identify them as a hazard and to properly assess the risk.*



A Dial Before You Dig was undertaken as part of the Concept SSDA and was used to develop the combined services plan within the Civil Engineering documentation.

These will also be included in Safety in Design (SiD) documentation during subsequent design phases.

## 7.12 Demolition

*Demolition work is to be carried out in accordance with Australian Standard AS 2601—2001 ‘The demolition of structures’. All electric cables or apparatus which are liable to be a source of danger, other than a cable or apparatus used for the demolition works shall be disconnected ie. the existing customer service lines will need to be isolated and/or removed during demolition. Appropriate care must be taken to not otherwise interfere with any electrical infrastructure on or in the vicinity of the site eg. streetlight columns, power poles, overhead and underground cables etc.*

This is noted and will be incorporated into the ASP 3 design when a formal application for connection of load will be made.

## 7.13 Public Safety

*As the proposed development will involve work near electricity infrastructure, workers run the risk of receiving an electric shock and causing substantial damage to plant and equipment. I have attached Endeavour Energy’s public safety training resources, which were developed to help general public / workers to understand why you may be at risk and what you can do to work safely. The public safety training resources are also available via Endeavour Energy’s website via the following link:*

*<http://www.endeavourenergy.com.au/wps/wcm/connect/ee/nsw/nsw+homepage/communitynav/safety/safety+brochures>*

*If the applicant has any concerns over the proposed works in proximity of the Endeavour Energy’s electricity infrastructure, as part of a public safety initiative Endeavour Energy has set up an email account that is accessible by a range of multiple stakeholders across the company in order to provide more effective lines of communication with the general public who may be undertaking construction activities in proximity of electricity infrastructure such as builders, construction industry workers etc. The email address is [Construction.Works@endeavourenergy.com.au](mailto:Construction.Works@endeavourenergy.com.au)*

This is noted and will be incorporated into the ASP 3 design and any formal Safety in Design (SiD) documentation during subsequent design phases.

## 7.14 Emergency Contact

*In case of an emergency relating to Endeavour Energy’s electrical network, the applicant should note the Emergencies Telephone is 131 003 which can be contacted 24 hours/7 days.*

This is noted and is to be included in future safety documentation and SiD processes.

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