



Concept Stormwater Management and  
Infrastructure Servicing Assessment  
*for*  
Trinity Point Mixed Use Development  
*for* Johnson Property Group

# REPORT DOCUMENT CONTROL

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# 1. Background

## 1.1 Project Overview

Northrop Consulting Engineers have been engaged by Johnson Property Group (The Proponent) to prepare a Concept Design Report for the proposed Mixed-Use Tourist, Hospitality and Residential Development located at 81-85 Trinity Point Drive, Morisset Park NSW 2264, being Lots 101 and 102 DP 1256630 (the site).

The Proponent is seeking to construct a mixed-use tourist, hospitality and residential development consisting of the following:

- Building A & B: Hotels with a combined 218 hotel rooms, 6 serviced apartments, two 300 seat restaurants, a 300 m<sup>2</sup> wellness centre, a 215 m<sup>2</sup> business centre, 535 m<sup>2</sup> retail centre and associated parking and amenities;
- Building C, D, E and F: Four residential apartment buildings with a combined 180 residential apartments, associated landscaping and parking.

Concept approval is sought for the following:

- Building envelopes for a mixed-use tourist, hospitality and residential development including six buildings incorporating sculptural rolling roofs and facades covered in greenery;
- A maximum Ground Floor Area (GFA) of 42,675m<sup>2</sup>;
- 611 basement parking spaces; and
- Proposed staging of the development:
  - Stage 1: Residential buildings C, D and E and portion of basement carpark with 309 car spaces;
  - Stage 2: Hotel Building B, including extension of Stage 1 basement carparking to the north providing an additional 196 car spaces;
  - Stage 3: Hotel building A and residential building F, including extension of basement carpark to the north and south providing an additional 106 car spaces.

Current land use zoning of the development site is SP3 Tourist with the adjoining Council-owned land designated RE1 Public Recreation (Lake Macquarie Local Environmental Plan 2014). The development is to be assessed as a State Significant Development under Part 4 Division 4 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*. As such an Environmental Impact Assessment (EIA) is required to be submitted for committee consideration and authority assessment. This Concept Servicing Report is intended to form part of the EIA for the project.

## 1.2 Scope of Works

This Concept Stormwater Management and Infrastructure Servicing Assessment addresses the following requirements detailed in the Secretary's Environment Assessment Requirements (SEARS):

- Item 10 Stormwater Drainage: Proposed stormwater management measures to be implemented as part of the proposed development;
- Item 11 Water Quality (excluding groundwater impacts): An assessment of stormwater runoff quality from the proposed development and proposed water sensitive urban design measures to be implemented. Assessment of receiving water and groundwater impacts, including establishment of baseline conditions has been undertaken by others; and,
- Item 24 Infrastructure and Utilities (excluding electrical): An assessment of external critical infrastructure capacity and utility servicing requirements to support the proposed development covering potable water, wastewater, communications and gas.

The extent of the proposed development footprint is illustrated in **Figure 1**.





Figure 1: Site Location.

### 1.3 Relevant Guidelines

This report and associated drawings have been prepared in accordance with the following standards and guidelines:

- Lake Macquarie Development Control Plan (DCP) 2014
- Lake Macquarie City Council Water Cycle Management Guidelines 2013
- Lake Macquarie City Council Engineering Design Guidelines 2016
- Lake Macquarie City Council Handbook on Drainage Design Guidelines 2013
- NSW Floodplain Development Manual 2005
- NSW MUSIC Modelling Guidelines 2015
- Soils and Construction Volume 1 2004 ('Blue Book')
- Australian Rainfall and Runoff 2019

## 2. Existing and Planned Infrastructure

### 2.1 General Site Description

The site is situated on Bluff Point on the western shore of Lake Macquarie within the suburb of Morisset Park. The site has a frontage to Trinity Point Drive to the west with the remainder surrounded by waterfront public reserve owned and managed by Lake Macquarie Council (LMCC). The site slopes at grades of 3% to 6% from south to north, with the southern edge of the site bounded by vertical rock faces and the northern end relatively low lying. The total area of Lots 101 and 102 is approximately 3.66 hectares.

The site has previously been largely cleared of vegetation with some scattered mature trees throughout, along with a consistent row of mature trees within adjoining Council land along the Lake edge and some salt marsh communities in the unnamed bay to the north-west.

#### 2.1.1 Geotechnical Constraints and Groundwater

A preliminary geotechnical investigation has been prepared by EP Risk (reference EP2397.001, 12<sup>th</sup> January 2022). Subsurface conditions consist of a mix of predominately clay estuarine deposits and clay residual soils overlying weathered sandstone of varying strength.

The site is identified as being within a Class 2 acid sulphate classification for the northern portion of the site and Class 5 to the south. The Lake area surrounding the site is denoted as Class 1. Excavation and dewatering works on or within such land are an environmental risk and will require preparation of a suitable acid sulphate management plan.

At time of investigation, shallow groundwater was encountered in all boreholes at depths ranging from 1.0-1.5 metres. It is understood further monitoring of groundwater is currently being undertaken however due to the shallow groundwater, basement construction will require extensive dewatering. It is understood the basement is intended to be tanked construction so long-term management of significant groundwater ingress should not be required.

### 2.2 Existing Development on the Site

The north of site currently contains a marina, restaurant and associated infrastructure constructed in 2018, along with an adjoining sealed carpark and access road extending to Trinity Point Drive. To the west of the site is an existing residential subdivision. The remainder of the site is currently undeveloped.

### 2.3 Existing Infrastructure

The following summarises the existing infrastructure in the vicinity of the site.

#### 2.3.1 Roads and Site Access

The site has a frontage to Trinity Point Drive to the west which has an 11.0 metre carriageway within a 16.0 metre road reserve. Parking lanes are provided on both sides of the carriageway. The eastern verge adjacent to the site boundary is currently 1.5 metres wide and a 2.0 metre widening of the road corridor will be undertaken as part of the final subdivision of the site.

A two-way private access road extending to the marina carpark extends from a roundabout at the northern end of Trinity Point Drive.

#### 2.3.2 Stormwater Drainage

Existing stormwater drainage within the site consists of pit and pipe network within the existing marina carpark as well as along the marina access road. It is understood the carpark and access road currently drain to a small retention basin adjacent to the carpark, before discharging to the Lake via a drainage

easement through Council land. Elsewhere, existing stormwater drainage within Trinity Point Drive which discharges to a Council maintained stormwater basin to the north.

It is currently intended to retain the existing carpark and access road stormwater network as part of the proposed development.

### **2.3.3 Water Reticulation**

Preliminary servicing advice has been requested from Hunter Water. Existing water infrastructure near the development consists of the following:

- 100mm PVC-O water main running along the western side of Trinity Point Drive, servicing the existing residential lots. There is an existing tee and valve that crosses Trinity Point Drive near the southern boundary of the site, as well as an existing property service of unknown size extending into Lot 102 near the intersection of Trinity Point Drive and Celestial Drive.
- 150mm PVC-O water main along the eastern side of Trinity Point Drive adjacent to the roundabout. This main extends along the marina access road into Lot 101 within a Hunter Water easement where the main terminates at a stop valve and hydrant.

### **2.3.4 Sewer Reticulation**

Sewer connection points were provided for Lot 101 and 102 under the previous subdivision works. The following sewer infrastructure exists within the vicinity of the development site:

- The Morisset Park 4 Wastewater Pumping Station is located approximately 100 metres to the west of the site along Trinity Point Drive.
- 150mm UPVC-SN8 gravity sewer stub extending from maintenance hole K4884 within Lot 101. This main discharges to a 225mm UPVC-SN8 sewer main extending under the existing roundabout. Based on information provided by Hunter Water the depth to invert is approximately 3.19 metres.
- 150mm UPVC-SN8 gravity sewer main terminating at maintenance chamber MC2388. It is understood this chamber is the connection point for the existing marina and temporary restaurant. Depth to invert at the maintenance chamber is approximately 2.40 metres.
- 150mm UPVC-SN8 dead end sewer branch extending from maintenance hole K0559 into Lot 102. The depth to this connection point is approximately 1.8 metres.

### **2.3.5 Communications**

Dial Before You Dig (DBYD) information indicates existing communication infrastructure exists within Trinity Point Drive with connection points provided for each site.

### **2.3.6 Gas**

DBYD information indicates the following gas infrastructure exists near the development site:

- 110mm 300 kPa network main extending along Trinity Point Drive to the west of the roundabout.
- 32mm 300 kPa network main running north-south within the western verge of Trinity Point Drive along the site frontage. A tee off this main extends to the eastern side of Trinity Point Drive (site frontage) near Celestial Drive.

Northrop is not aware of any existing gas infrastructure within the development site that would require relocation or removal.

## **2.4 Planned Infrastructure**

Northrop is not aware of any additional infrastructure planned in the vicinity of the development.

## 3. Demand Analysis

### 3.1 Flooding

The site is impacted by Lake flooding. A review of flood controls applicable to the site has been undertaken by Molino Stewart and summarised in a letter dated 28<sup>th</sup> October 2021.

### 3.2 Roads and Site Access

As noted previously, a portion of the site will be dedicated to LMCC to affect a 2.0 metre road widening on Trinity Point Drive. The existing carriageway width will remain unchanged. A 1.5 metre footpath is proposed to be constructed in the widened verge. A typical road profile of Trinity Point Drive is included in Appendix B.

It is understood the existing marina access road is to be retained as part of the development and serve as an access to proposed basement parking for the hotels. The residential basement will be accessed from Trinity Point Drive.

### 3.3 Bulk Earthworks

Extensive excavation will be required due to the extent and depth of basement construction. Based on the preliminary site layout it is estimated that approximately 80,000 m<sup>3</sup> of material will be excavated during basement construction. It is estimated approximately 5,000 m<sup>3</sup> can be reused on site, with the remainder requiring disposal or use off site.

### 3.4 Stormwater Management

#### 3.4.1 Management Targets

LMCC's Water Cycle Management Guidelines require the provision of stormwater quality controls to manage the environment impact of runoff on receiving water. This is achieved through the adoption of stormwater quality improvement measures within the proposed development's drainage network. These targets are shown in Table 1 below:

Table 1: LMCC Pollutant Reduction Targets

Pollutant	Treatment Target (When compared to the unmitigated developed scenario)
Total Suspended Solids (TSS)	80% yearly reduction
Total Phosphorus (TP)	45% yearly reduction
Total Nitrogen (TN)	45% yearly reduction

No stormwater detention measures are proposed as the site will discharge directly to Lake Macquarie.

#### 3.4.2 Treatment Train Setup

Stormwater quality modelling was undertaken using the MUSIC software package Version 6.3. Modelling parameters were adopted based on LMCC's MusicLink data where applicable, with all remaining parameters taken from the NSW Music Modelling Guidelines (BMT, 2015).

Site-specific model input parameters are described in the MUSIC Link report in Appendix A, with remaining parameters adopted from NSW MUSIC Modelling Guidelines (2015). The site area was broken down into sub catchments based on the following surface types:

- Roof areas (100% impervious);
- Road and Paved areas – including vehicular pavements and other hardstand areas draining directly to the stormwater system (100% impervious);



- Landscaped areas – including mass planting, turfed areas and paved areas not draining directly to the stormwater system (5% impervious).

Stormwater quality treatment measures proposed to be incorporated into the development are outlined in Table 2.

Table 2: Summary of Stormwater Quality Improvement Measures.

Proposed Measure	Description
Rainwater Harvesting Tanks	<p>Rainwater harvesting tanks are proposed to be provided for each building for a total of 6 tanks. The stored volume is proposed to be reused for toilet flushing within Building A and B as well as landscape irrigation. It was assumed that runoff from the proposed green roof and balcony roofs would be captured for reuse, which was approximately 75% of the plan area of each building.</p> <p>Reuse demands have been estimated as follows:</p> <ul style="list-style-type: none"> <li>• <u>Toilet flushing (Building A and B only)</u> Non-potable water is proposed to be reticulated to ground floor toilets. Ground floor amenities include the proposed restaurants, lobby and function centre. Toilet flushing demands for each building have been estimated based on the total estimated sewer loading for the ground floor area using Hunter Water's sewer estimation methods (WSA02-2011 Hunter Water Edition). Toilet flushing was then estimated based on 30% of the total sewer loading which resulted in an estimate toilet flushing demand of 1 kL/day per building.</li> <li>• <u>Landscape Irrigation</u> Irrigation rates vary significantly dependent on species selection, soil type and climatic conditions. For the purposes of MUSIC modelling, it was assumed that an average irrigation rate of 7 mm/week would apply to all proposed mass planting and turfed areas during warm dry periods (October to March) and 2 mm/week for the remainder of the year, resulting in an assumed average annual irrigation rate of 4.5 mm/week. It is noted these values are intended to be conservative for the purposes of assessing stormwater treatment potential and will be further refined as the development proposal progresses.</li> </ul> <p>At time of writing the total area of mass planting was approximately 10,460 m<sup>2</sup> which results in a yearly irrigation volume across the site of 2,450 kL/year. This was apportioned equally to each reuse tank.</p> <p>All rainwater tanks are currently proposed to be located below ground, outside the basement footprint. Overflows from the rainwater tanks are proposed to discharge directly to the biofiltration basins. Based on the above it is proposed to provide 300 kL of total reuse storage across the site, or 50kL per building. This sizing has primarily been driven to provide sufficient volume for landscape irrigation purposes based on preliminary feedback from the landscape designer.</p>
Sediment Capture Devices (HumeCeptor or approved equivalent)	2 HumeCeptor sediment traps are proposed to provide secondary treatment to stormwater runoff from the larger impervious areas prior to discharge into biofiltration basins.
Biofiltration Basins	<p>4 biofiltration basins will be integrated into landscaping along the eastern boundary of the site. The majority of site stormwater will discharge into these basins prior to discharging to the Lake.</p> <p>Each basin will have a minimum media depth of 400mm and an extended detention depth of 250mm. The base of each basin will be lined to preclude</p>

infiltration. High flows from each basin will discharge via an overflow pit to a pit and pipe network discharging to the Lake.

MUSIC modelling results have been presented against treatment targets in Table 3.

Table 3: MUSIC Model Results

Pollutant	Treatment Target	Source Loading (kg/year)	Residual Loading (kg/year)	Percentage Reduction
Total Suspended Solids (TSS)	80% total reduction	1990.0	391.0	80.5%
Total Phosphorus (TP)	45% total reduction	5.1	2.1	59.2%
Total Nitrogen (TN)	45% total reduction	50.3	20.6	59.2%
Gross Pollutants (GP)	-	531.0	16.3	96.9%

The proposed treatment train will be sufficient to meet or exceed the pollutant removal targets outlined in LMCC's Water Cycle Management Guidelines. It is noted that pollutant generation at the site is likely to be reduced through the following additional measures that were not considered in this modelling:

- An overall reduction in total pavement area directly connected to the stormwater system through passive irrigation of adjoining landscaped areas and other measures including permeable paving;
- Reduction in pollutant generation potential of roof areas through implementation of green roof technology;
- Addition of filter baskets and strainers within surface inlets;
- General maintenance and preventative measures to promote environmentally responsible behaviours such as provision of garbage bins on site as well as appropriate storage and collection of waste materials.

### 3.4.3 Stormwater Discharge

Piped stormwater flows from both sites are proposed to discharge via a single outlet to Lake Macquarie. The point of discharge will be within the existing unused drainage easement to minimise impacts to existing vegetation. An outlet size of DN525 has been estimated.

The majority of site runoff is intended to discharge towards the lake, via the proposed stormwater quality treatment measures. A small portion of runoff from the site frontage will be collected in the pit and pipe network on Trinity Point Drive. An allowance for this bypass of onsite treatment has been made in the site water quality model. It is not expected this small catchment will exceed the capacity of the downstream network.

### 3.4.4 Sediment and Erosion Control

Significant site disturbance is expected during the construction phase of the development. A concept Sediment and Erosion Control Plan has been prepared to minimise impacts to the adjoining waterways. The plan has been prepared in accordance with Managing Urban Stormwater Volume 1 – Blue Book (Landcom, 2004). The following principles have been applied:

- Minimising the amount of disturbance;
- Installation of upslope 'clean water' diversions where possible to divert runoff around the proposed disturbance areas, minimising the generation of sediment laden water; and,

- Treatment of sediment laden runoff from disturbance areas via installation of downslope treatment controls. These include:
  - Sediment capture basins;
  - Silt fencing located downslope of stockpiles and around any existing stormwater surface inlets;
  - Floating sediment booms at all piped and overland flow discharge locations.

### 3.5 Water Reticulation

Preliminary servicing advice has been received from Hunter Water (reference 2022-128, dated 8/3/2022). HWC have advised that there is sufficient capacity within the existing water network to service the proposed development.

It is noted that Table 3.1 of the Water Supply Code of Australia Hunter Water Edition requires a minimum pipe size of DN200 for multiple developments of high density residential greater than or equal to 8 storeys. At present the development has a frontage to a DN150 watermain on Trinity Point Drive. It is expected that an additional DN200 watermain will be required to be constructed along Trinity Point Drive between the existing DN150 dead end tee near Celestial Drive and an existing DN100 main near the southern end of the site.

In accordance with the approved Trinity Point Water Servicing Strategy, 4 watermain interconnections were identified for security of supply. At time of writing, one of these connections has yet to be completed. HWC have advised that all interconnections will be required to be operational as a condition of the Section 50.

The approved Trinity Point Water Servicing Strategy for the development (ADW Johnson, dated 16/7/2014) included allowance for the original tourist development masterplan dated May 2014. This arrangement included allowance for 230 units across 8 buildings, 60 room hotel, an 80-seat café, 400 seat function centre and the proposed marina. A fire flow allowance of 20 L/s was assumed. Confirmation of firefighting coverage will be required to be submitted to Hunter Water as part of the hydraulic application.

It is noted that concurrent development elsewhere may reduce or absorb any additional capacity. Correspondence received from Hunter Water is contained in Appendix C.

### 3.6 Sewer Reticulation

Preliminary servicing advice has been received from Hunter Water (reference 2022-128, dated 8/3/2022). HWC have advised that there is currently insufficient capacity within the Morisset Park 4 WWPS to service the proposed development.

Northrop have undertaken an independent sewer demand calculation based on the preliminary development layout and Hunter Water's demand estimation guidelines (Water Supply Code of Australia Hunter Water Edition Appendix HW N). Sewer demands are summarised in Table 4.

*Table 4: Estimated Sewer Demands.*

Land Use Classification	Connection Point	Equivalent Tenement (ET)	Peak Wet Weather Flow
<b>Site 1</b> 2 x Hotels 2 x Restaurants	Existing DN150 sewer stub at MH K4884	173	6.14 L/s
<b>Site 2</b> 4 x residential buildings Total 180 units	Proposed DN150 sewer branch from MH K0559	120	4.75 L/s

The original wastewater servicing strategy prepared for the broader Trinity Point development (Patterson Britton & Partners, dated 17/7/2007) included an allowance of 149 ET for the development site, inclusive of the marina development.

HWC have advised that the development will require upgrades to Morisset Park 4 WWPS, along with downstream Windermere Park 2 WWPS. Due to the increased loading, HWC will require the proponent to prepare a new wastewater servicing strategy for the development to confirm the extent of upgrades required within each WWPS catchment. The strategy will include as a minimum a review of other planned development in each catchment, assessment of available capacity in respective gravity sewer networks, WWPS upgrade requirements and emergency storage requirements.

It is noted that any concurrent development within the local or downstream wastewater network may further absorb available wastewater capacity. Dependent on development timeframes, further upgrades to the existing downstream sewer network may be required. Correspondence received from Hunter Water is contained in Appendix C.

It is noted MH K4884 will require relocation clear of the proposed building C basement footprint. In addition, a sewer extension from the relocated MH into the residential portion of the development will also be required, due to restrictive depth of the existing DN150 sewer branch within Lot 102. It is expected that these works would occur concurrently as part of a Hunter Water Major Works deed.

### **3.7 Gas**

It is expected that each lot will be serviced by an internal ring main with staged connection of each building undertaken as the development progresses. Further liaison with Jemena will be required to determine detailed connection requirements at detailed design stage once appliance loadings and internal reticulation requirements are known.

## 4. Conclusion

A summary of the findings of this report are as follows:

### 4.1 Flooding

The site is impacted by Lake flooding. Reference is made to flood investigation prepared by Molino Stewart dated 28<sup>th</sup> October 2021.

### 4.2 Roads and Site Access

The existing Trinity Point Drive corridor is proposed to be widened by 2.0 metres as part of the development through dedication of additional road verge. A 1.5 metre footpath is proposed to be constructed within the widened verge. At present there are no further external roadworks proposed a part of the development.

### 4.3 Stormwater Drainage

The stormwater management strategy for the development can be summarised as follows:

- Roof areas will be captured and directed to a 50kL rainwater tank provided for each building. The stored volume will be used internally within Buildings A and B through toilet connections and externally for landscape irrigation across the entirety of the site;
- Runoff from landscaped and paved areas will be collected in a pit and pipe network and directed to 4 biofiltration basins located throughout the site;
- Stormwater collected from the proposed entry roadway and central paved area between Buildings A and B will be directed through two sediment capture devices intended to provide further pre-treatment prior to discharging into the biofiltration basins.

Stormwater will discharge to Lake Macquarie via an existing drainage easement in the north-east corner of the site. No onsite detention is currently proposed.

### 4.4 Water Reticulation

Hunter Water have advised that there is currently sufficient capacity within the existing water infrastructure to service the proposed development. Confirmation of firefighting arrangements will be required at detailed design stage. Due to the development being 8 storeys, it is anticipated that an additional DN200 watermain will be required along the site frontage on Trinity Point Drive.

### 4.5 Sewer

The site is within the Morisset Park 4 WWPS catchment and both Lot 101 and 102 contain existing DN150 sewer connections. Hunter Water have advised that there is currently insufficient capacity within the existing local sewer network and upgrades to Morisset Park 4 WWPS and Windermere 2 WWPS will be required to support the development. An updated Wastewater Servicing Strategy for the development will be required to confirm the required extent of upgrades.

### 4.6 Communications

Existing communications infrastructure exists within Trinity Point Drive. It is expected the existing infrastructure will be sufficient to support the development, however detailed connection information will be provided by NBNCo as part of the detailed design of the site.

### 4.7 Gas

Existing gas infrastructure existing within Trinity Point Drive. Advice from Jemena is pending regarding the capacity of the system to cater for the proposed development. Detailed connection information will be provided by Jemena as part of the detailed design of the site.





## Appendix A – MUSIC Link Report

## MUSIC-*link* Report

Project Details		Company Details	
<b>Project:</b>	Trinity Point Mixed Use Development	<b>Company:</b>	Northrop
<b>Report Export Date:</b>	11/03/2022	<b>Contact:</b>	Andrew Killen
<b>Catchment Name:</b>	NL140397_DA_Rev9_AT	<b>Address:</b>	215 Pacific Highway Charlestown 2290
<b>Catchment Area:</b>	3.42ha	<b>Phone:</b>	0249431777
<b>Impervious Area*:</b>	60.66%	<b>Email:</b>	akillen@northrop.com.au
<b>Rainfall Station:</b>			
<b>Modelling Time-step:</b>	6 Minutes		
<b>Modelling Period:</b>	1/01/1999 - 31/12/2008 11:54:00 PM		
<b>Mean Annual Rainfall:</b>	1015mm		
<b>Evapotranspiration:</b>	1425mm		
<b>MUSIC Version:</b>	6.3.0		
<b>MUSIC-link data Version:</b>	6.34		
<b>Study Area:</b>	South Region		
<b>Scenario:</b>	South Region		

\* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	Reduction	Node Type	Number	Node Type	Number
Flow	15.1%	Rain Water Tank Node	6	Urban Source Node	26
TSS	80.5%	Bio Retention Node	4		
TP	59.2%	Buffer Node	1		
TN	59.2%	GPT Node	2		
GP	96.9%				

### Comments

N/A

### Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Biofiltration 1	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Biofiltration 1	PET Scaling Factor	2.1	2.1	2.1
Bio	Biofiltration 2	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Biofiltration 2	PET Scaling Factor	2.1	2.1	2.1
Bio	Biofiltration 3	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Biofiltration 3	PET Scaling Factor	2.1	2.1	2.1
Bio	Biofiltration 4	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Biofiltration 4	PET Scaling Factor	2.1	2.1	2.1
Buffer	Buffer	Proportion of upstream impervious area treated	None	None	0.25
GPT	Humeceptor (north)	Hi-flow bypass rate (cum/sec)	None	None	100
GPT	Humeceptor (south)	Hi-flow bypass rate (cum/sec)	None	None	100
Rain	RWT B	% Reuse Demand Met	80	None	83.24
Rain	RWT C	% Reuse Demand Met	80	None	95.16
Rain	RWT D	% Reuse Demand Met	80	None	95.0395
Rain	RWT E	% Reuse Demand Met	80	None	96.9426
Rain	RWT F	% Reuse Demand Met	80	None	93.2993
Receiving	Receiving Node	% Load Reduction	None	None	15.1
Receiving	Receiving Node	GP % Load Reduction	70	None	96.9
Receiving	Receiving Node	TN % Load Reduction	45	None	59.2
Receiving	Receiving Node	TP % Load Reduction	45	None	59.2
Receiving	Receiving Node	TSS % Load Reduction	80	None	80.5
Urban	Building A - Remainder	Area Impervious (ha)	None	None	0.061
Urban	Building A - Remainder	Area Pervious (ha)	None	None	0
Urban	Building A - Remainder	Total Area (ha)	None	None	0.061
Urban	Building A - Roof	Area Impervious (ha)	None	None	0.183
Urban	Building A - Roof	Area Pervious (ha)	None	None	0
Urban	Building A - Roof	Total Area (ha)	None	None	0.183
Urban	Building B - Remainder	Area Impervious (ha)	None	None	0.062
Urban	Building B - Remainder	Area Pervious (ha)	None	None	0
Urban	Building B - Remainder	Total Area (ha)	None	None	0.062
Urban	Building B - Roof	Area Impervious (ha)	None	None	0.186
Urban	Building B - Roof	Area Pervious (ha)	None	None	0
Urban	Building B - Roof	Total Area (ha)	None	None	0.186
Urban	Building C - Remainder	Area Impervious (ha)	None	None	0.062
Urban	Building C - Remainder	Area Pervious (ha)	None	None	0
Urban	Building C - Remainder	Total Area (ha)	None	None	0.062
Urban	Building C - Roof	Area Impervious (ha)	None	None	0.185
Urban	Building C - Roof	Area Pervious (ha)	None	None	0
Urban	Building C - Roof	Total Area (ha)	None	None	0.185
Urban	Building D - Remainder	Area Impervious (ha)	None	None	0.06

Only certain parameters are reported when they pass validation

NOTE: A successful self-validation check of your model does not constitute an approved model by Lake Macquarie City Council

MUSIC-*link* now in MUSIC by eWater – leading software for modelling stormwater solutions

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Building D - Remainder	Area Pervious (ha)	None	None	0
Urban	Building D - Remainder	Total Area (ha)	None	None	0.06
Urban	Building D - Roof	Area ImperVIOUS (ha)	None	None	0.179
Urban	Building D - Roof	Area Pervious (ha)	None	None	0
Urban	Building D - Roof	Total Area (ha)	None	None	0.179
Urban	Building E - Remainder	Area ImperVIOUS (ha)	None	None	0.058
Urban	Building E - Remainder	Area Pervious (ha)	None	None	0
Urban	Building E - Remainder	Total Area (ha)	None	None	0.058
Urban	Building E - Roof	Area ImperVIOUS (ha)	None	None	0.173
Urban	Building E - Roof	Area Pervious (ha)	None	None	0
Urban	Building E - Roof	Total Area (ha)	None	None	0.173
Urban	Building F - Remainder	Area ImperVIOUS (ha)	None	None	0.043
Urban	Building F - Remainder	Area Pervious (ha)	None	None	0
Urban	Building F - Remainder	Total Area (ha)	None	None	0.043
Urban	Building F - Roof	Area ImperVIOUS (ha)	None	None	0.13
Urban	Building F - Roof	Area Pervious (ha)	None	None	0
Urban	Building F - Roof	Total Area (ha)	None	None	0.13
Urban	Paved Landscaped Areas	Area ImperVIOUS (ha)	None	None	0.088
Urban	Paved Landscaped Areas	Area ImperVIOUS (ha)	None	None	0.14
Urban	Paved Landscaped Areas	Area ImperVIOUS (ha)	None	None	0.061
Urban	Paved Landscaped Areas	Area Pervious (ha)	None	None	0
Urban	Paved Landscaped Areas	Area Pervious (ha)	None	None	0
Urban	Paved Landscaped Areas	Area Pervious (ha)	None	None	0
Urban	Paved Landscaped Areas	Total Area (ha)	None	None	0.088
Urban	Paved Landscaped Areas	Total Area (ha)	None	None	0.14
Urban	Paved Landscaped Areas	Total Area (ha)	None	None	0.061
Urban	Paved Landscaped areas GTP2	Area ImperVIOUS (ha)	None	None	0.232
Urban	Paved Landscaped areas GTP2	Area Pervious (ha)	None	None	0
Urban	Paved Landscaped areas GTP2	Total Area (ha)	None	None	0.232
Urban	Pervious landscaped areas	Area ImperVIOUS (ha)	None	None	0.008
Urban	Pervious landscaped areas	Area Pervious (ha)	None	None	0.165
Urban	Pervious landscaped areas	Total Area (ha)	None	None	0.174
Urban	Pervious Landscaped Areas GTP1	Area ImperVIOUS (ha)	None	None	0.004
Urban	Pervious Landscaped Areas GTP1	Area Pervious (ha)	None	None	0.097
Urban	Pervious Landscaped Areas GTP1	Total Area (ha)	None	None	0.102
Urban	Pervious Landscaped Areas GTP2	Area ImperVIOUS (ha)	None	None	0.017
Urban	Pervious Landscaped Areas GTP2	Area ImperVIOUS (ha)	None	None	0.006
Urban	Pervious Landscaped Areas GTP2	Area Pervious (ha)	None	None	0.319
Urban	Pervious Landscaped Areas GTP2	Area Pervious (ha)	None	None	0.117
Urban	Pervious Landscaped Areas GTP2	Total Area (ha)	None	None	0.337

Only certain parameters are reported when they pass validation



Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Pervious Landscaped Areas GTP2	Total Area (ha)	None	None	0.124
Urban	Remaining Landscaped Areas GTP2	Area Impervious (ha)	None	None	0.033
Urban	Remaining Landscaped Areas GTP2	Area Pervious (ha)	None	None	0.645
Urban	Remaining Landscaped Areas GTP2	Total Area (ha)	None	None	0.679
Urban	Remaining Roads Areas (To Pits)	Area Impervious (ha)	None	None	0.015
Urban	Remaining Roads Areas (To Pits)	Area Pervious (ha)	None	None	0
Urban	Remaining Roads Areas (To Pits)	Total Area (ha)	None	None	0.015
Urban	Road areas (To Pits) GTP1	Area Impervious (ha)	None	None	0.034
Urban	Road areas (To Pits) GTP1	Area Pervious (ha)	None	None	0
Urban	Road areas (To Pits) GTP1	Total Area (ha)	None	None	0.034
Urban	Road areas (To Pits) GTP2	Area Impervious (ha)	None	None	0.012
Urban	Road areas (To Pits) GTP2	Area Pervious (ha)	None	None	0
Urban	Road areas (To Pits) GTP2	Total Area (ha)	None	None	0.012
Urban	Road areas GTP2	Area Impervious (ha)	None	None	0.029
Urban	Road areas GTP2	Area Pervious (ha)	None	None	0
Urban	Road areas GTP2	Total Area (ha)	None	None	0.029
Urban	Road areass (To Pits)	Area Impervious (ha)	None	None	0.011
Urban	Road areass (To Pits)	Area Pervious (ha)	None	None	0
Urban	Road areass (To Pits)	Total Area (ha)	None	None	0.011

Only certain parameters are reported when they pass validation

#### Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	RWT A	% Reuse Demand Met	80	None	79.9434

Only certain parameters are reported when they pass validation

## Appendix B – Engineering Drawings



# TRINITY POINT MIXED USE DEVELOPMENT

TRINITY POINT DRIVE, MORISSET PARK NSW 2264  
CONCEPT STORMWATER MANAGEMENT AND INFRASTRUCTURE SERVICING PLAN



LOCALITY PLAN


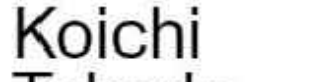

IMAGE SOURCE : NEARMAPS

### DRAWING LIST

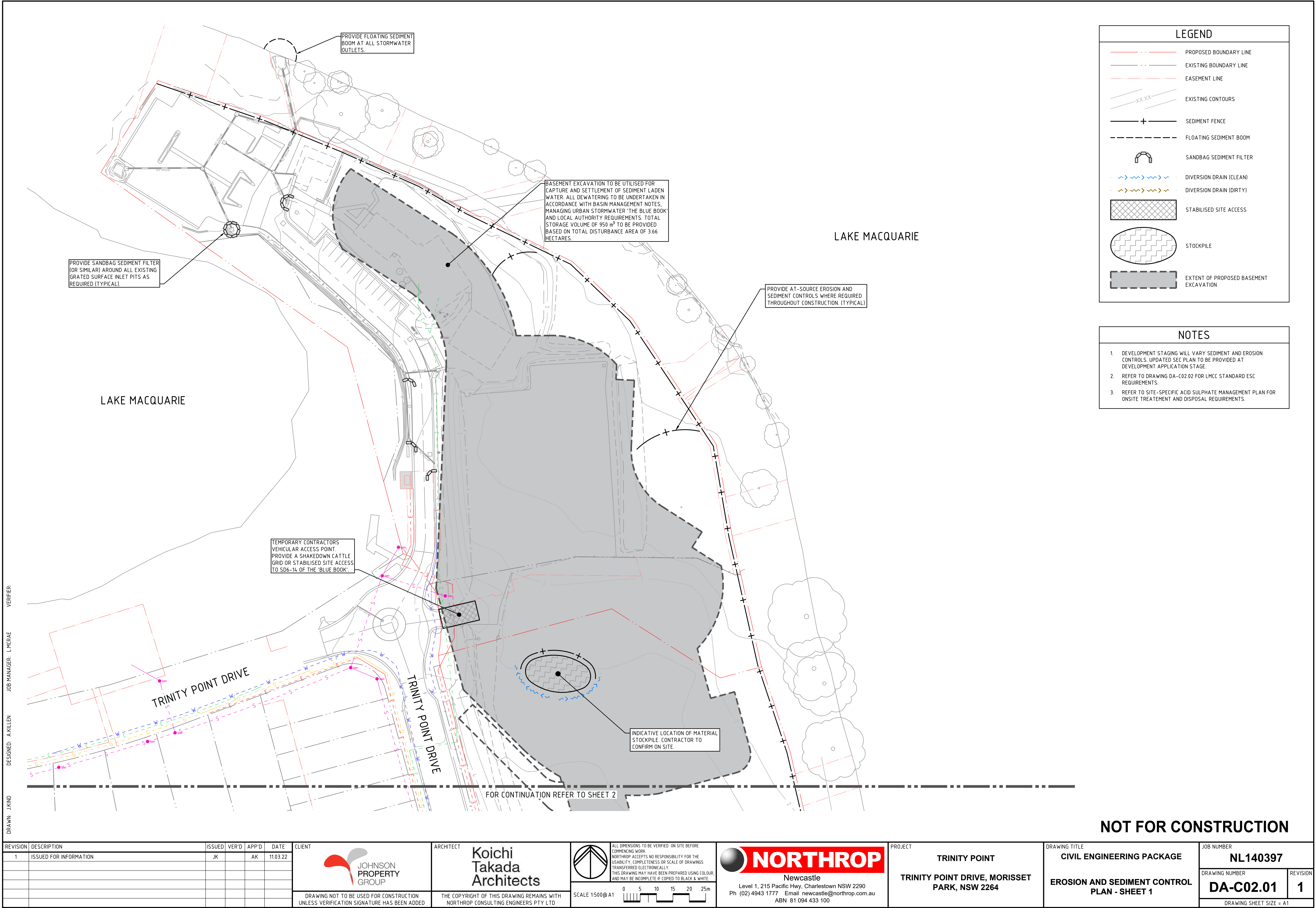
DWG No.	DRAWING TITLE
DA-C01.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
DA-C02.01	EROSION AND SEDIMENT CONTROL PLAN - SHEET 1
DA-C02.02	EROSION AND SEDIMENT CONTROL PLAN - SHEET 2
DA-C02.11	EROSION AND SEDIMENT CONTROL NOTES
DA-C02.12	EROSION AND SEDIMENT CONTROL DETAILS
DA-C04.01	CONCEPT STORMWATER MANAGEMENT PLAN - GROUND LEVEL - SHEET 1
DA-C04.02	CONCEPT STORMWATER MANAGEMENT PLAN - GROUND LEVEL - SHEET 2
DA-C04.21	EXISTING AND PROPOSED INFRASTRUCTURE PLAN - SHEET 1
DA-C04.22	EXISTING AND PROPOSED INFRASTRUCTURE PLAN - SHEET 2
DA-C04.31	ROAD WIDENING PLAN
DA-C05.01	CIVIL DETAILS

NOT FOR CONSTRUCTION

VERIFIER: L MCRAE  
JOB MANAGER: L MCRAE  
DESIGNED: A KILLEN  
DRAWN: J KIND

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT	PROJECT	DRAWING TITLE	JOB NUMBER						
1	ISSUED FOR INFORMATION	JK		AK	11.03.22	 JOHNSON PROPERTY GROUP	 Koichi Takada Architects	 <b>NORTHROP</b> Newcastle Level 1, 215 Pacific Hwy, Charlestown NSW 2290 Ph (02) 4943 1777 Email newcastle@northrop.com.au ABN 81 094 433 100	TRINITY POINT  TRINITY POINT DRIVE, MORISSET PARK, NSW 2264	CIVIL ENGINEERING PACKAGE  COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN	NL140397  DRAWING NUMBER <b>DA-C01.01</b>  REVISION <b>1</b>  DRAWING SHEET SIZE = A1					
						DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED	THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD									





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PROPERTY  
GROUP

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ARCHITECT

Koichi  
Takada  
Architects

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**NORTHROP**

Newcastle

Level 1, 215 Pacific Hwy, Charlestown NSW 2290  
Ph (02) 4943 1777 Email newcastle@northrop.com.au  
ABN 81 094 433 100

PROJECT

TRINITY POINT

TRINITY POINT DRIVE, MORISSET  
PARK, NSW 2264

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

EROSION AND SEDIMENT CONTROL  
PLAN - SHEET 1

JOB NUMBER

NL140397

DRAWING NUMBER

DA-C02.01

REVISION

1

DRAWING SHEET SIZE = A1











DRAWN: J.KIND  
DESIGNED: A.KILLEN  
JOB MANAGER: L.MCRAE  
VERIFIER:

EROSION AND SEDIMENT CONTROL NOTES						
THE FOLLOWING NOTES MAY NOT BE RELEVANT TO EACH DEVELOPMENT.						
<b>General</b>						
1. ESCP refers to Erosion and Sediment Control Plan or a Soil and Water Management Plan (SWMP).						
2. ESC refers to erosion and sediment control.						
3. Sediment, includes, but is not limited to, clay, silt, sand, gravel, soil, mud, cement, and ceramic waste.						
4. Any reference to the Blue Book refers to Managing Urban Stormwater – Soils and Construction, Landcom, 2004.						
5. Any reference to the IECA White Books (2008) refers to IECA 2008, Best Practice Erosion and Sediment Control, Books 1-6, International Erosion Control Association (Australasia), Picton NSW.						
6. Any material deposited in any conservation area from works associated with the development shall be removed immediately by measures involving minimal ground and/or vegetation disturbance and no machinery, or following directions by Council and/or within a timeframe advised by Council.						
<b>The ESCP</b>						
7. The ESCP and its associated ESC measures shall be constantly monitored, reviewed, and modified as required to correct deficiencies. Council has the right to direct changes if, in its opinion, the measures that are proposed or have been installed are inadequate to prevent pollution.						
8. Prior to any activities onsite, the responsible person(s) is to be nominated. The responsible person(s) shall be responsible for the ESC measures onsite. The name, address and 24 hour contact details of the person(s) shall be provided to Council in writing. Council shall be advised within 48 hours of any changes to the responsible person(s), or their contact details, in writing.						
9. At least 14 days before the natural surface is disturbed in any new stage, the contractor shall submit to the Certifier, a plan showing ESC measures for that Stage. The degree of design detail shall be based on the disturbed area.						
10. At any time, the ESC measures onsite shall be appropriate for the area of disturbance and its characteristics including soils (in accordance with those required for the site as per DCP).						
11. The implementation of the ESCP shall be supervised by personnel with appropriate qualifications and/or experience in ESC on construction sites.						
12. The approved ESCP shall be available on-site for inspection by Council officers while work activities are occurring.						
13. The approved ESCP shall be up to date and show a timeline of installation, maintenance and removal of ESC measures.						
14. All ESC measures shall be appropriate for the Sediment Type(s) of the soils onsite, in accordance with the Blue Book, IECA White Books or other current recognised industry standard for ESC for Australian conditions.						
15. Adequate site data, including soil data from a NATA approved Laboratory, shall be obtained to allow the preparation of an appropriate ESCP, and allow the selection, design and specification of required ESC measures.						
16. All works shall be carried out in accordance with the approved ESCP (as amended from time to time) unless circumstances arise where:						
a) compliance with the ESCP would increase the potential for environmental harm; or						
b) circumstances change during construction and those circumstances could not have been foreseen; or						
c) Council determines that unacceptable off-site sedimentation is occurring as a result of a land-disturbing activity. In either case, the person(s) responsible may be required to take additional, or alternative protective action, and/or undertake reasonable restoration works within the timeframe specified by the Council.						
17. Additional ESC measures shall be implemented, and a revised ESCP submitted for approval to the certifier (within five business days of any such amendments) in the event that:						
a) there is a high probability that serious or material environmental harm may occur as a result of sediment leaving the site; or						
b) the implemented works fail to achieve Council's water quality objectives specified in these conditions; or						
c) site conditions significantly change; or						
d) site inspections indicate that the implemented works are failing to achieve the "objective" of the ESCP.						
18. A copy of any amended ESCP shall be forwarded to an appropriate Council Officer, within five business days of any such amendments.						
<b>Site establishment including clearing and mulching</b>						
19. No land clearing shall be undertaken unless preceded by the installation of adequate drainage and sediment control measures, unless such clearing is required for the purpose of installing such measures, in which case, only the minimum clearing required to install such measures shall occur.						
20. Bulk tree clearing and grubbing of the site shall be immediately followed by specified temporary erosion control measures (e.g. temporary grassing or mulching) prior to commencement of each stage of construction works.						
21. Trees and vegetation cleared from the site shall be mulched onsite within 7 days of clearing.						
22. Appropriate measures shall be undertaken to control any dust originating due to the mulching of vegetation onsite.						
23. All office facilities and operational activities shall be located such that any effluent, including wash-down water, can be totally contained and treated within the site.						
24. All reasonable and practicable measures shall be taken to ensure stormwater runoff from access roads and stabilised entry/exit systems, drains to an appropriate sediment control device.						
25. Site exit points shall be appropriately managed to minimise the risk of sediment being tracked onto sealed, public roadways.						
26. Stormwater runoff from access roads and stabilised entry/exit points shall drain to an appropriate sediment control device.						
27. The Applicant shall ensure an adequate supply of ESC, and appropriate pollution clean-up materials are available on-site at all times.						
28. All temporary earth banks, flow diversion systems, and diversion basin embankments shall be machine-compacted, seeded and mulched within ten (10) days of formation for the purpose of establishing a vegetative cover, or lined appropriately.						
29. Sediment deposited off site as a result of on-site activities shall be collected and the area cleaned/rehabilitated as soon as reasonable and practicable.						
30. Concrete waste and chemical products, including petroleum and oil-based products, shall be prevented from entering any internal or external water body, or any external drainage system, excluding those on-site water bodies specifically designed to contain and/or treat such material. Appropriate measures shall be installed to trap these materials onsite.						
31. Brick, tile or masonry cutting shall be carried out on a pervious surface (e.g. grass or open soil) and in such a manner that any resulting sediment-laden runoff is prevented from discharging into a gutter, drain or water. Appropriate measures shall be installed to trap these materials onsite.						
32. Newly sealed hard-stand areas (e.g. roads, driveways and car parks) shall be swept thoroughly as soon as practicable after sealing/surfacing to minimise the risk of components of the surfacing compound entering stormwater drains.						
33. Stockpiles of erodible material shall be provided with an appropriate protective cover (synthetic or organic) if the materials are likely to be stockpiled for more than 10 days.						
34. Stockpiles, temporary or permanent, shall not be located in areas identified as no-go zones (including, but not limited to, restricted access areas, buffer zones, or areas of non-disturbance) on the ESCP.						
35. No more than 150m of a stormwater, sewer line or other service trench shall to be open at any one time.						
36. Site spoil shall be lawfully disposed of in a manner that does not result in ongoing soil erosion or environmental harm.						
37. Wherever reasonable and practicable, stormwater runoff entering the site from external areas, and non-sediment laden (clean) stormwater runoff entering a work area or area of soil disturbance, shall be diverted around or through that area in a manner that minimises soil erosion and the contamination of that water for all discharges up to the specified design storm discharge.						

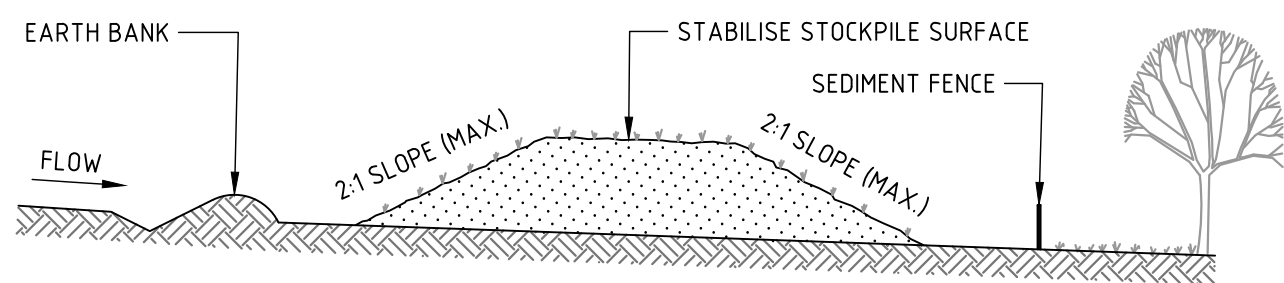
EROSION AND SEDIMENT CONTROL NOTES (cont)						
<b>Site Management including Dust</b>						
38. Priority shall be given to the prevention, or at least the minimisation, of soil erosion, rather than the trapping of displaced sediment. Such a clause shall not reduce the responsibility to apply and maintain, at all times, all necessary ESC measures.						
39. Measures used to control wind erosion shall be appropriate for the location and prevent soil erosion at all times, including working hours, out of hours, weekends, public holidays, and during any other shutdown periods.						
40. The application of liquid or chemical-based dust suppression measures shall ensure that sediment-laden runoff resulting from such measures does not create a traffic or environmental hazard.						
41. All cut and fill earth batters less than 3m in elevation shall be topsoiled, and grass seeded/hydr mulched within 10 days of completion of grading in consultation with Council.						
42. Once cut/fill operations have been finalised in a section, all disturbed areas that are not being worked on shall be stabilised in accordance with time lines in the Blue Book.						
43. All reasonable and practicable measures shall be taken to prevent, or at least minimise, the release of sediment from the site.						
44. Suitable all-weather maintenance access shall be provided to all sediment control devices.						
45. Sediment control devices, other than sediment basins, shall be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event, whether natural or artificial, if the device's sediment retention capacity falls below 75% of its design retention capacity.						
46. All erosion and sediment control measures, including drainage control measures, shall be maintained in proper working order at all times during their operational lives.						
47. Washing/flushing of sealed roadways shall only occur where sweeping has failed to remove sufficient sediment and there is a compelling need to remove the remaining sediment (e.g. for safety reasons). In such circumstances, all reasonable and practicable sediment control measures shall be used to prevent, or at least minimise, the release of sediment into receiving waters. Only those measures that will not cause safety and property flooding issues shall be employed. Sediment removed from roadways shall be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm.						
48. Sediment removed from sediment traps and places of sediment deposition shall be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm.						
<b>Sediment Basins – installation, maintenance and removal including sediment traps</b>						
49. As-Constructed plans shall be prepared for all constructed Sediment Basins and associated emergency spillways. Such plans shall verify the basin's dimensions, levels and volumes comply with the approved design drawings. These plans may be requested by the Certifier or Council.						
50. Sediment basins shall be constructed and fully operational prior to any other soil disturbance in their catchment.						
51. Install an internal gated valve, or similar, in any outlet pipe once pipes installed, or install a sacrificial pipe from basin through wall to external outlet point. The valve shall be connected to a riser made from slopped pipe in the basin. The valve may be opened once captured water meets water quality requirements. The final setup for temporary internal outlet structures to be confirmed prior to construction with Council. This setup will enable discharge of treated water from site without need for pumping.						
52. A sediment storage level marker post shall be with a cross member set just below the top of the sediment storage zone (as specified on the approved ESCP). At least a 75mm wide post shall be firmly set into the basin floor.						
53. The Site Manager shall obtain the relevant approvals from the relevant organisations to discharge treated water from any existing basins. Organisations may include, but not be limited to, Hunter Water, and Council.						
54. Where more than one stage is to be developed at one time, or before the preceding stage is complete, the sediment basin(s) for these stages shall have sufficient capacity to cater for all area directed to the basin(s).						
55. Prior to any forecast weather event likely to result in runoff, any basins/traps shall be dewatered to provide sufficient capacity to capture sediment laden water from the site.						
56. Sufficient quantities of chemicals/agents to treat captured water shall be placed such that water entering the basin mixes with the chemical/agents and is carried into the basin to speed up clarification.						
57. Any basin shall be dewatered within the X-day rainfall depth used to calculate the capacity of the basin, after a rainfall event.						
58. Sufficient quantities of chemicals/agents to treat turbid water shall be securely stored on-site to provide for at least three complete treatments of all basins requiring chemical treatment onsite.						
59. Prior to the controlled discharge (e.g. de-watering activities) from site including excavations and/or sediment basins, the following water quality objectives shall be achieved:						
a) Total Suspended Solids (TSS) to a maximum 50 milligrams/L;						
b) water pH between 6.5 and 8.5, unless otherwise required by the Council;						
c) Turbidity (measured in NTUs) to a maximum of 60 NTU; and						
d) EC levels no greater than background levels.						
60. The Development Approval may require testing of additional water quality elements prior to discharge. E.g. metals, organic substances, chemicals or bacteriological indicators.						
61. A sample of the released treated water shall be kept onsite in a clear container with the sample date recorded on it.						
62. Water quality samples shall be taken at a depth no less than 200mm below the water surface of the basin.						
63. No Aluminium based products may be used treat captured water onsite without the prior written permission from an appropriate Council Officer. The applicant shall have a demonstrated ability to use such products correctly and without environmental harm prior to any approval.						
64. The chemical/agent used in Type D and Type F basins to treat captured water captured in the basin shall be applied in concentrations sufficient to achieve Council's water quality objectives within the X-day rainfall depth used to calculate the capacity of the basin, after a rainfall event.						
65. All Manufacturers' Instructions shall be followed for any chemicals/agents used onsite, except where approved by the Responsible Person or an appropriate Council Officer.						
66. The Applicant shall ensure that on each occasion a Type F or Type D basin was not de-watered prior to being surcharged by a following rainfall event, a report is presented to an appropriate Council officer within 5 days identifying the circumstances and proposed amendments, if any, to the basin's operating procedures.						
67. Settled sediment shall be removed as soon as reasonable and practicable from any sediment basin if:						
a) it is anticipated that the next storm event is likely to cause sediment to settle above the basin's sediment storage zone; or						
b) the elevation of settled sediment is above the top of the basin's sediment storage zone; or						
c) the elevation of settled sediment is above the basins sediment marker line.						
68. Scour protection measures placed on sediment basin emergency spillways shall appropriately protect the spillway chute and its side batters from scour, and shall extend a minimum of 3m beyond the downstream toe of the basin's embankment.						
69. Suitable all-weather maintenance access shall be provided to all sediment control devices.						
70. Materials, whether liquid or solid, removed from any ESC measure or excavation during maintenance or decommissioning, shall be disposed of in a manner that does not cause ongoing soil erosion, water pollution or environmental harm.						
71. All sediment basins shall remain fully operational at all times until the basin's design catchment achieves 70% ground cover or surface stabilisation acceptable to Council.						
72. The ESC measures installed during the decommissioning and rehabilitation of a sediment basin shall comply with same standards specified for the normal construction works.						
73. A sediment basin shall not be decommissioned until all up-slope site stabilisation measures have been implemented and are appropriately working to control soil erosion and sediment runoff.						
74. Immediately prior to the construction of the permanent stormwater treatment device, appropriate flow bypass conditions shall be established to prevent sediment-laden water entering the device.						

EROSION AND SEDIMENT CONTROL NOTES (cont)						
<b>Revegetation/Stabilisation</b>						
75. Temporary Stabilisation may be attained using vegetation, non rewettable soil polymers, or pneumatically applied erosion controls.						
76. All cut and fill earth batters less than 3m in elevation shall be topsoiled, and grass seeded/hydr mulched within 10 days of completion of grading in consultation with Council.						
77. Once cut/fill operations have been finalised in a section, all disturbed areas that are not being worked on shall be stabilised in accordance with time lines in the Blue Book.						
78. The LMCC Seed mix shall be used unless stated on the ESCP/SWMP.						
79. The pH level of topsoil shall be appropriate to enable establishment and growth of specified vegetation prior to initiating the establishment of vegetation.						
80. Non rewettable binder shall be used in all hydr mulch/hydroseed/polymer mixes on slopes or works adjacent to a water course.						
81. Soil ameliorants shall be added to the soil in accordance with an approved Landscape Plan, Vegetation Management Plan, and/or soil analysis.						
82. Surface soil density, compaction and surface roughness shall be adjusted prior to seeding/planting in accordance with an approved Landscape Plan, Vegetation Management Plan, and/or soil analysis.						
83. Procedures for initiating a site shutdown, whether programmed or un-programmed, shall incorporate revegetation of all soil disturbances unless otherwise approved by Council. The stabilisation works shall not rely upon the longevity of non-vegetated erosion control blankets, or temporary soil binders.						
<b>Site Monitoring and Maintenance</b>						
84. The Applicant shall ensure that appropriate procedures and suitably qualified personnel are engaged to plan and conduct site inspections and water quality monitoring throughout the construction and maintenance phase.						
85. All ESC measures shall be inspected and any maintenance undertaken immediately:						
a) at least daily (when work is occurring on-site); and						
b) at least weekly (when work is not occurring on-site); and						
c) within 24hrs of expected rainfall; and						
d) within 18hrs of a rainfall event that causes runoff on the site.						
86. Written records shall be kept onsite of ESC monitoring and maintenance activities conducted during the construction and maintenance periods, and be available to Council officers on request.						
87. All environmentally relevant incidents shall be recorded in a field log that shall remain accessible to all relevant regulatory authorities.						
88. All water quality data, including dates of rainfall, dates of testing, testing results and dates of water release, shall be kept in an on-site register. The register is to be maintained up to date for the duration of the approved works and be available on-site for inspection by [insert name of regulatory authority] on request.						
89. At nominated instream water monitoring sites, a minimum of 3 water samples shall be taken and analysed, and the average result used to determine quality.						
<b>Instream Works</b>						
90. All instream works (including in or adjacent to watercourses natural or manmade, flowing or not) shall be carried out in accordance with the IECA White Books.						

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										REVISION 1			

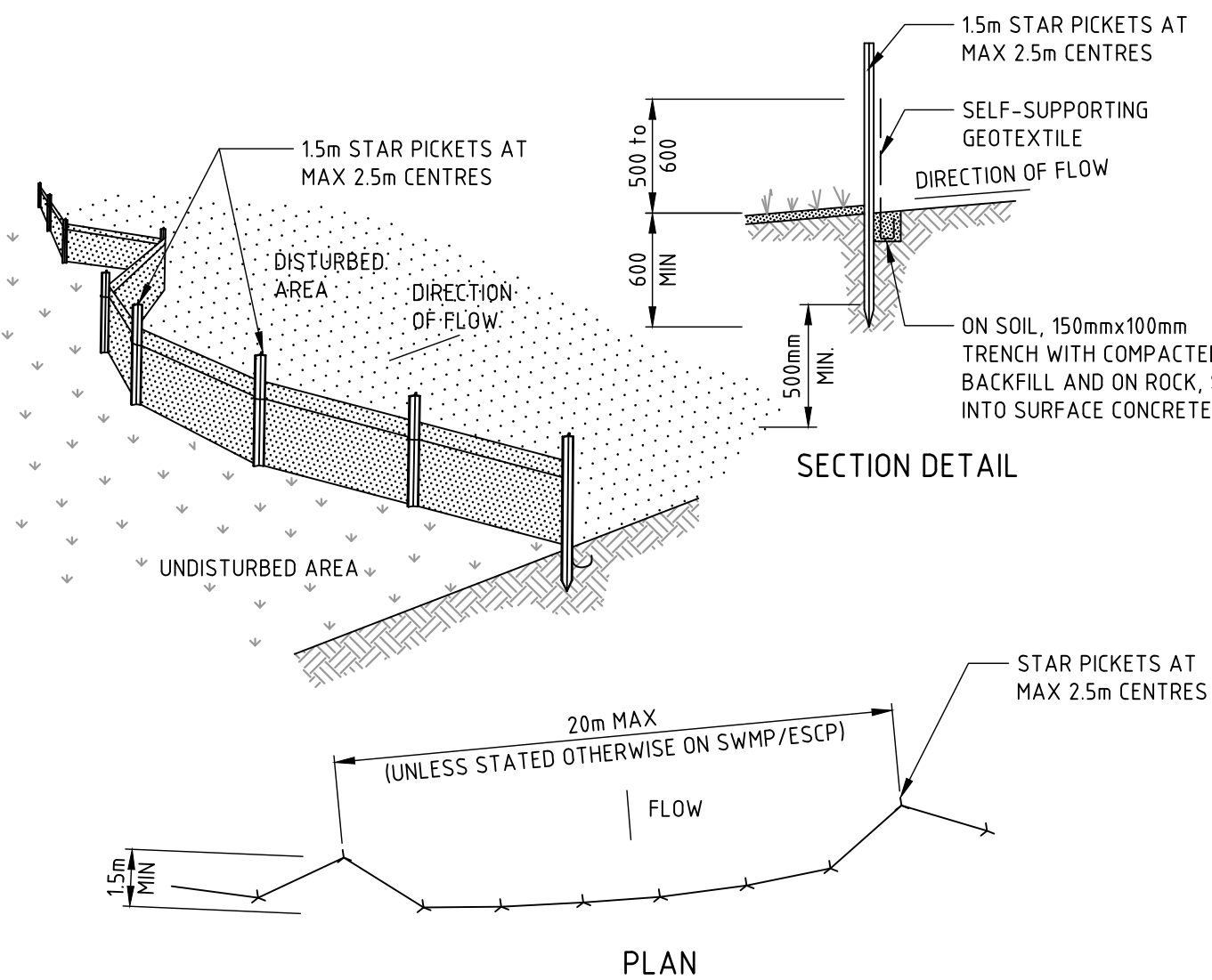




### CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-9) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

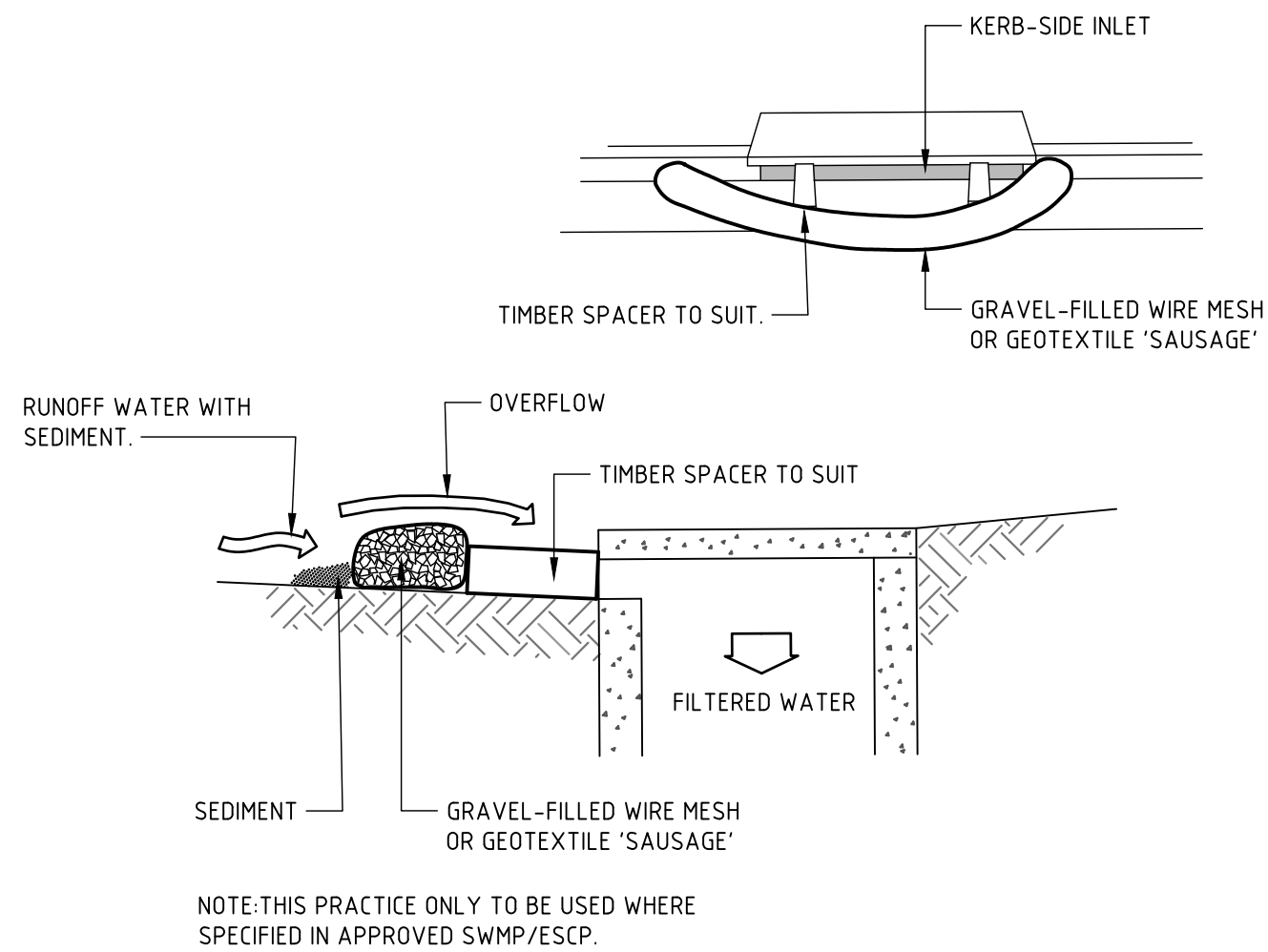
## STOCKPILES (SD 4-1)



## CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 15 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

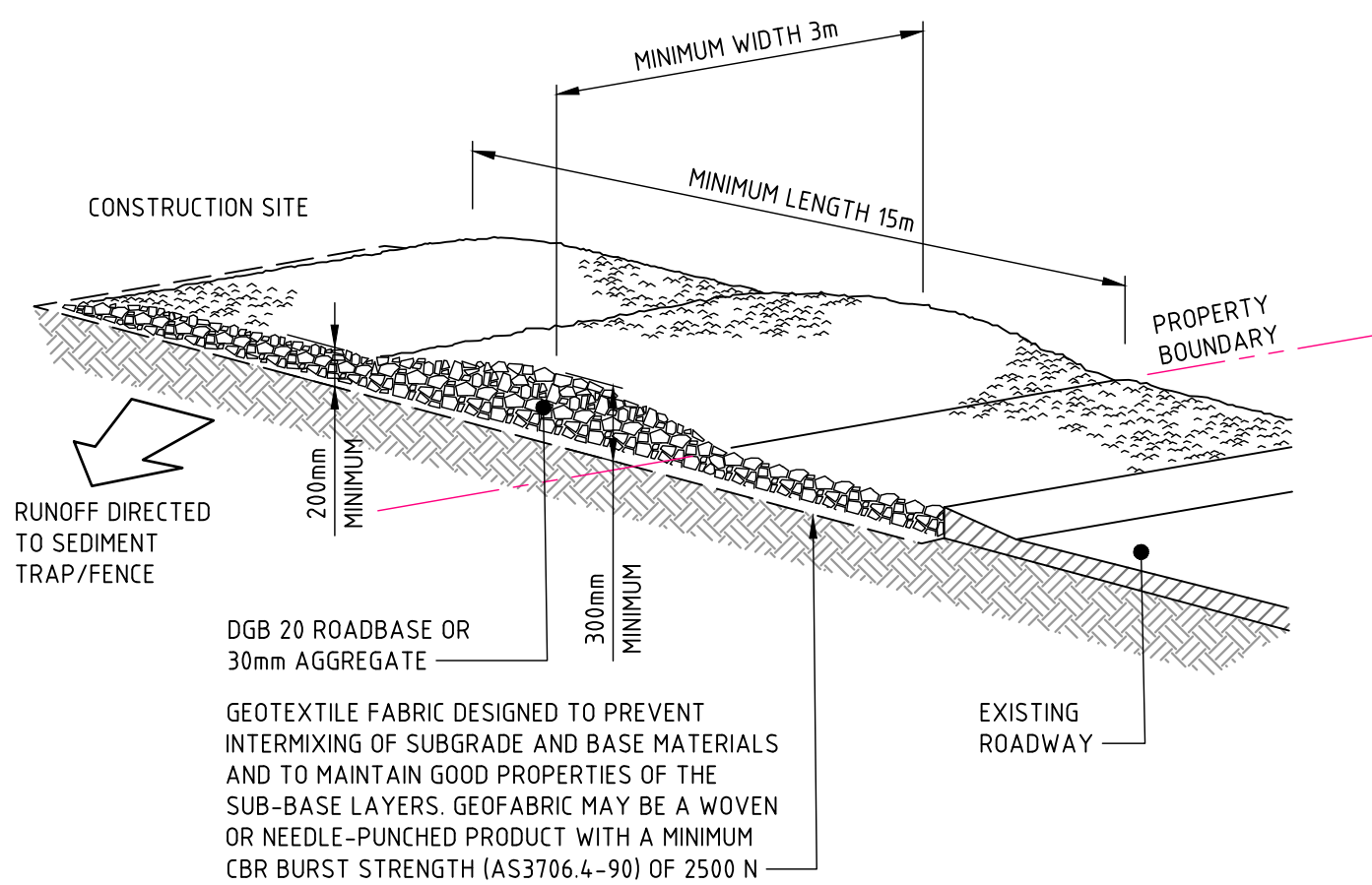
SEDIMENT FENCE (SD 6-8)



### CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER NET AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET.
5. MAINTAIN THE OPENING WITH SPACER BLOCKS.
6. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
7. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.





### MESH AND GRAVEL INLET FILTER (SD 6-11)



## CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

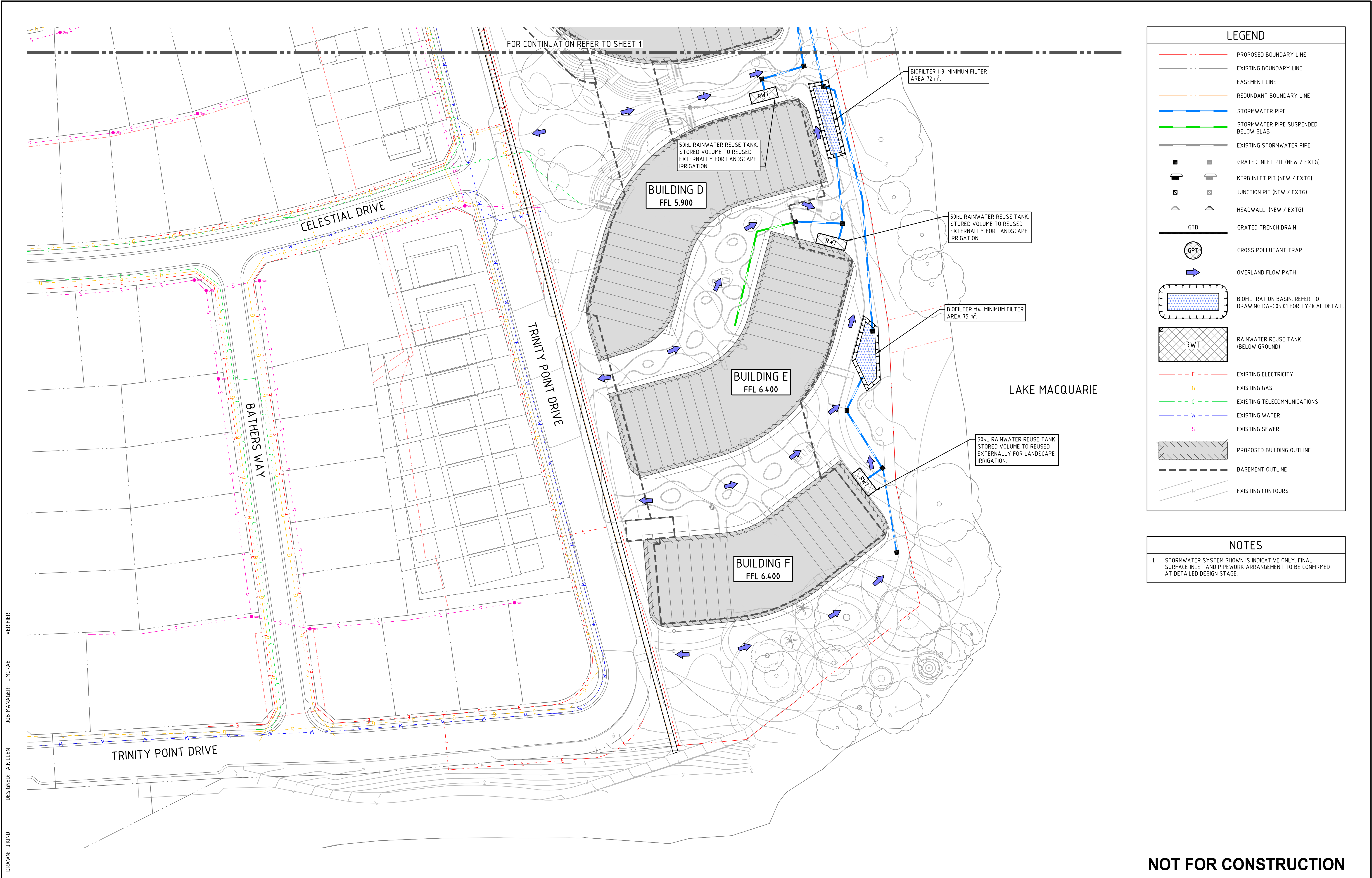
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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT	ARCHITECT		PROJECT	DRAWING TITLE	JOB NUMBER	
1	ISSUED FOR INFORMATION	JK		AK	11.03.22	 JOHNSON PROPERTY GROUP	 Koichi Takada Architects	 Newcastle Level 1, 215 Pacific Hwy, Charlestown NSW 2290 Ph (02) 4943 1777 Email newcastle@northrop.com.au ABN 81 094 433 100	TRINITY POINT  TRINITY POINT DRIVE, MORISSET PARK, NSW 2264	CIVIL ENGINEERING PACKAGE  EROSION AND SEDIMENT CONTROL DETAILS	NL140397	
											DRAWING NUMBER	REVISION
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JOB MANAGER: L.MCRAE  
DESIGNED: A.KILLEN  
DRAWN: J.KIND

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ARCHITECT

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Takada  
Architects

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0 5 10 15 20 25m

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ABN 81 094 433 100

PROJECT

TRINITY POINT

TRINITY POINT DRIVE, MORISSET  
PARK, NSW 2264

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

CONCEPT STORMWATER  
MANAGEMENT PLAN - GROUND  
LEVEL - SHEET 2

JOB NUMBER

NL140397

DRAWING NUMBER

DA-C04.02

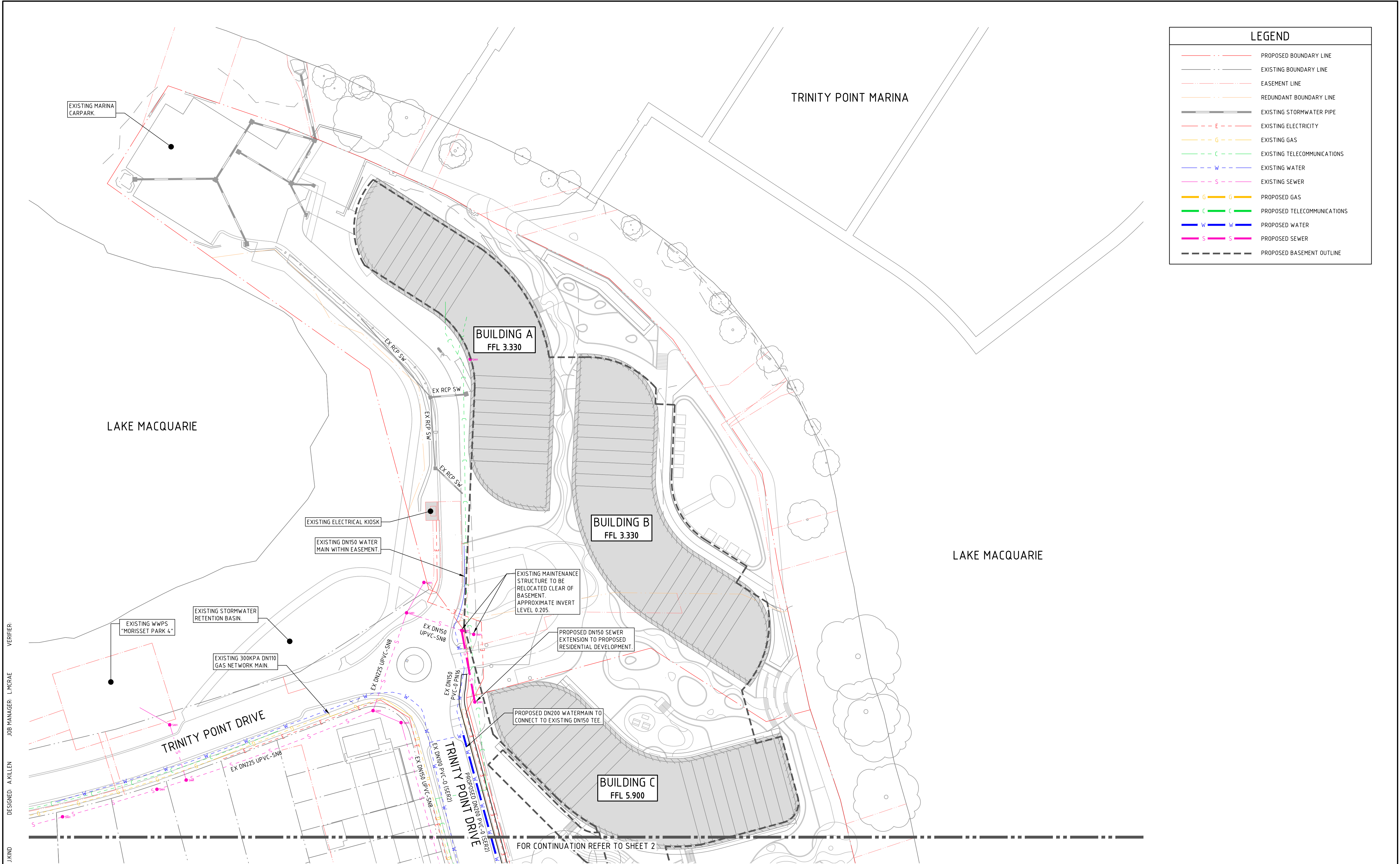
REVISION

2

DRAWING SHEET SIZE = A1

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LEGEND	
	PROPOSED BOUNDARY LINE
	EXISTING BOUNDARY LINE
	EASEMENT LINE
	REDUNDANT BOUNDARY LINE
	EXISTING STORMWATER PIPE
	EXISTING ELECTRICITY
	EXISTING GAS
	EXISTING TELECOMMUNICATIONS
	EXISTING WATER
	EXISTING SEWER
	PROPOSED GAS
	PROPOSED TELECOMMUNICATIONS
	PROPOSED WATER
	PROPOSED SEWER
	PROPOSED BASEMENT OUTLINE

VERIFIER: LMCRAE  
JOB MANAGER: LMCRAE  
DESIGNED: AKILLEN  
DRAWN: JKIND

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SCALE 1:500@A1

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PROJECT

TRINITY POINT

TRINITY POINT DRIVE, MORISSET  
PARK, NSW 2264

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

EXISTING AND PROPOSED  
INFRASTRUCTURE PLAN - SHEET 1

JOB NUMBER

NL140397

DRAWING NUMBER

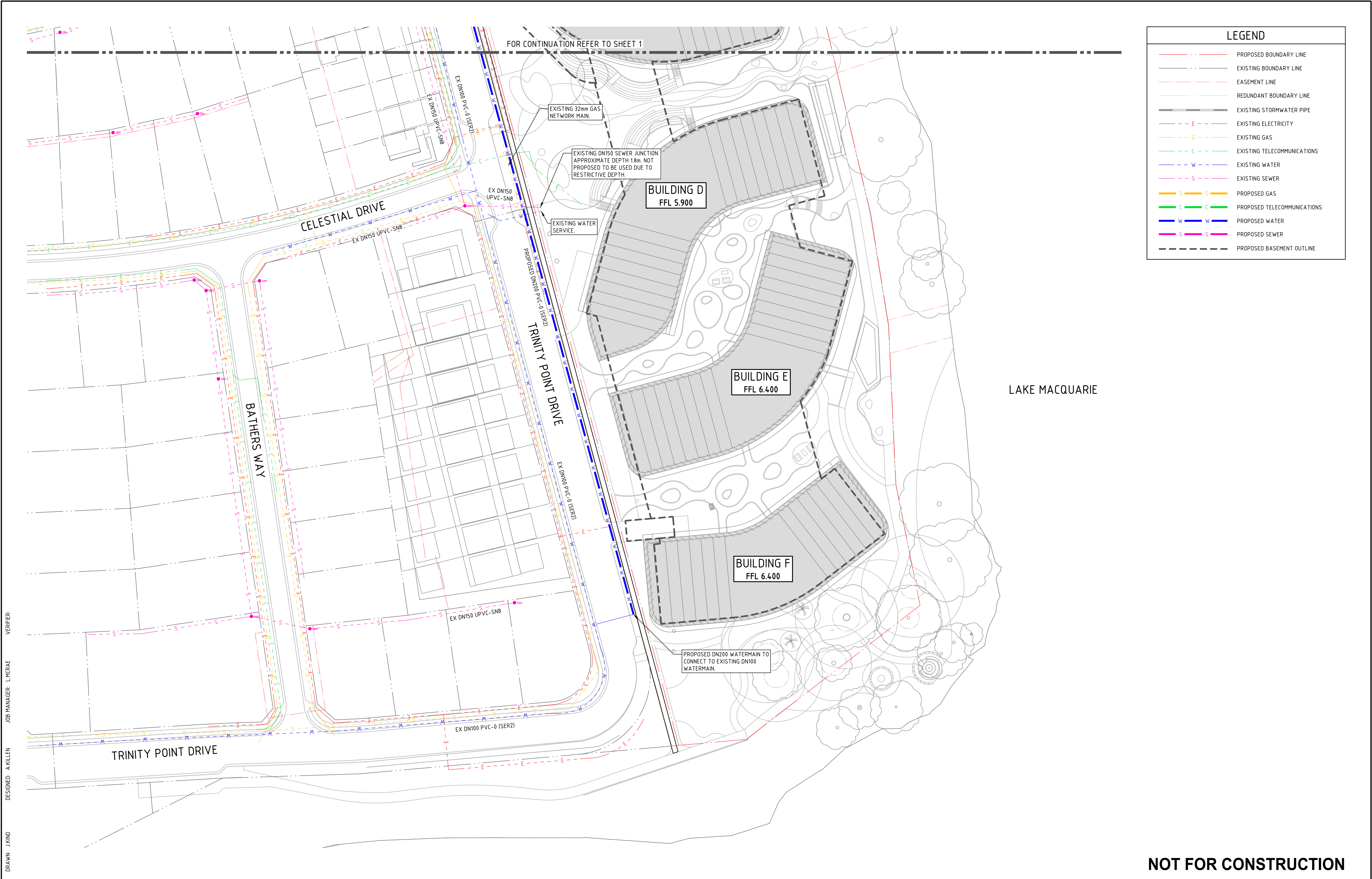
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1

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JOB MANAGER: L MCRAE  
DESIGNED: A KILLEN  
DRAWN: J KIND

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PROPERTY  
GROUP

CLIENT

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ARCHITECT

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Takada  
Architects**

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Newcastle

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ABN 81 094 433 100

PROJECT

**TRINITY POINT**  
**TRINITY POINT DRIVE, MORISSET  
PARK, NSW 2264**

DRAWING TITLE

**CIVIL ENGINEERING PACKAGE**  
**EXISTING AND PROPOSED  
INFRASTRUCTURE PLAN - SHEET 2**

JOB NUMBER

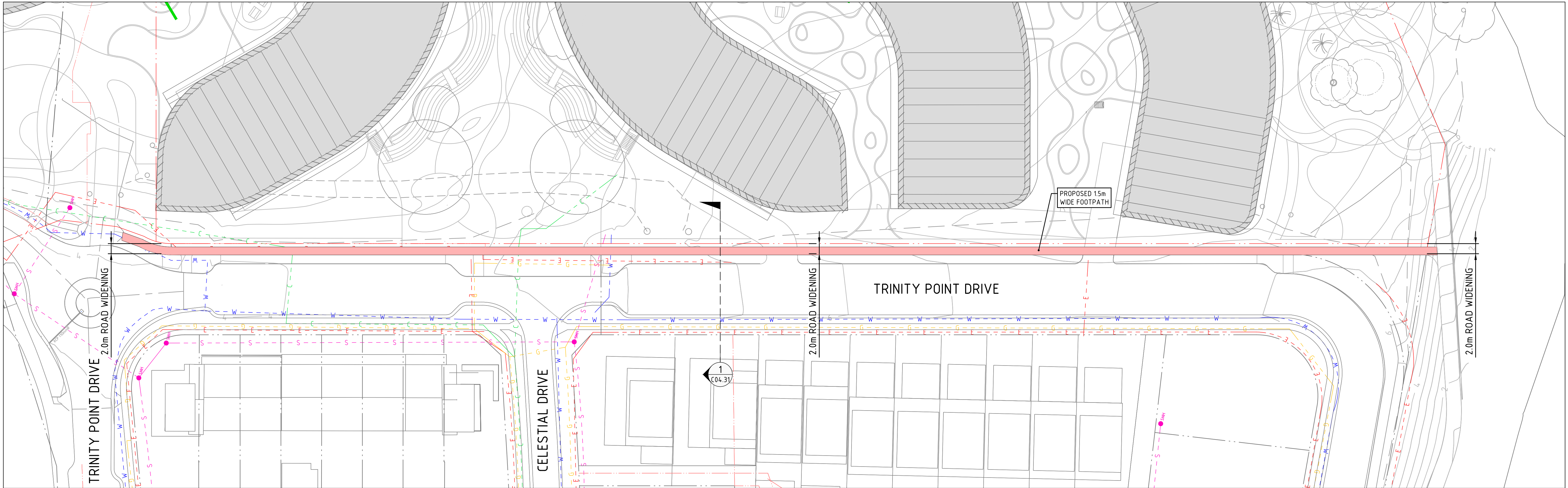
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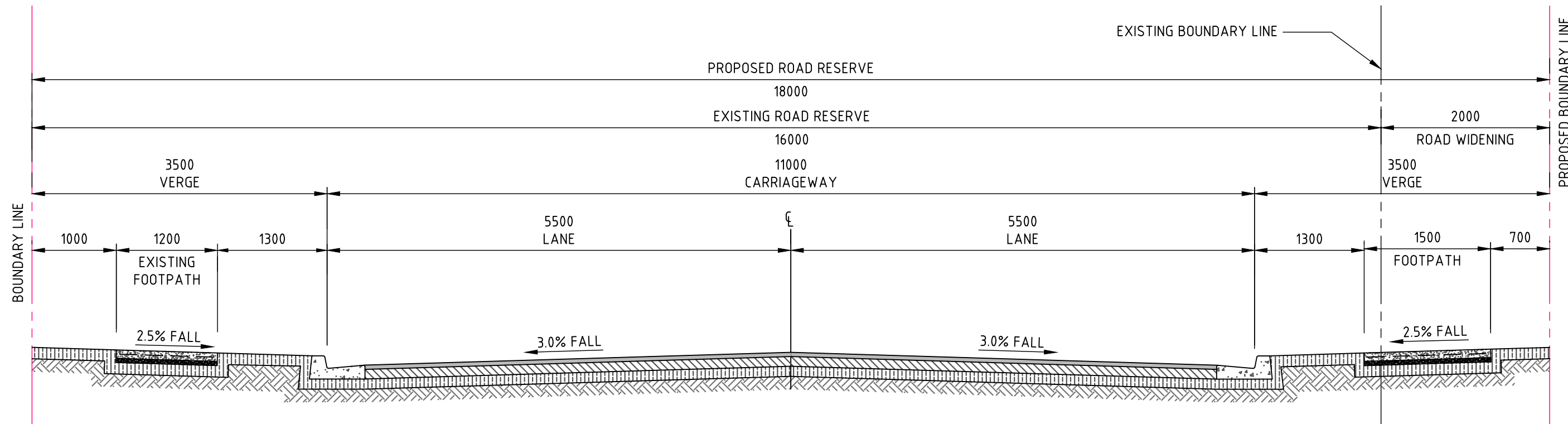
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JOB MANAGER: L MCRAE  
DESIGNED: A KILLEN  
DRAWN: J KIND



LEGEND	
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	REDUNDANT BOUNDARY LINE
	EXISTING BOUNDARY LINE
	EASEMENT LINE
	PROPOSED FOOTPATH PAVEMENT IN ACCORDANCE WITH LMCC STANDARD DRAWING EGS0-301.



TRINITY POINT DRIVE ROAD WIDENING TYPICAL SECTION

SECTION 1  
C04.31

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SCALE 1:50 @ A1  
SCALE 1:400 @ A1

0.0 0.5 1.0 1.5 2.0 2.5m  
0 4 8 12 16 20m

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Newcastle

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Ph (02) 4943 1777 Email [newcastle@northrop.com.au](mailto:newcastle@northrop.com.au)  
ABN 81 094 433 100

PROJECT

**TRINITY POINT**

**TRINITY POINT DRIVE, MORISSET  
PARK, NSW 2264**

DRAWING TITLE

**CIVIL ENGINEERING PACKAGE**

**ROAD WIDENING PLAN**

DRAWING NUMBER

**DA-C04.31**

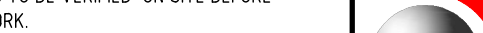


REVISION

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1	ISSUED FOR INFORMATION	JK		AK	11.03.22	 <b>JOHNSON PROPERTY GROUP</b>	 <b>Koichi Takada Architects</b>	 <b>NORTHROP</b> Newcastle Level 1, 215 Pacific Hwy, Charlestown NSW 2290 Ph (02) 4943 1777 Email newcastle@northrop.com.au ABN 81 094 433 100	TRINITY POINT	CIVIL ENGINEERING PACKAGE	NL140397		
										TRINITY POINT DRIVE, MORISSET PARK, NSW 2264	CIVIL DETAILS	DRAWING NUMBER	REVISION
												DA-C05.01	1
DRAWING SHEET SIZE = A1													

## Appendix C – Authority Correspondence





Hunter Water Corporation  
ABN 46 228 513 446

PO Box 5171  
HRMC NSW 2310  
36 Honeysuckle Drive  
NEWCASTLE NSW 2300  
1300 657 657  
enquiries@hunterwater.com.au  
hunterwater.com.au

8 March 2022

TRINITY POINT HOLDINGS PTY LIMITED  
C/- Northrop Consulting Engineers Pty Ltd  
LEVEL 1 215 PACIFIC HIGHWAY  
CHARLESTOWN NSW 2290

### PRELIMINARY SERVICING ADVICE APPLICATION

Property Address:	81-85 TRINITY POINT DRIVE, MORISSET PARK NSW 2264
Lot & Plan number:	Lot 101 DP 1256630, Lot 102 DP 1256630
Development Description:	Preliminary Servicing Application for Stratum Title Subdivision of 2 lots into 2 lots and Development of Residential Units, Hotel, Function Centre, Restaurant and Marina Berths
Hunter Water Reference:	2022-128

Hunter Water offers the following preliminary servicing advice for the provision of water and sewerage facilities for the development detailed above.

General information on water and sewer issues relevant to the proposal are included in this correspondence. This information is indicative only and based on Hunter Water's knowledge of its system performance and other potential developments in the area at the present time. This advice may change substantially due to a range of factors and a detailed analysis of available capacity will be undertaken upon lodgement of a [Development Application](#) to Hunter Water.

When you have development approval, you may submit this Development Application to determine the formal requirements for the development. Hunter Water will then issue a Requirements Letter including an offer for network capacity. You will need to comply with each of the requirements in this Letter for the issue of a [Section 50 Compliance Certificate](#) for the development.

### Financial Requirements

A reimbursement contribution may be required towards the cost of any water and sewer infrastructure that is constructed by a third-party developer and utilised to serve this development. Reimbursements include GST and cannot be determined until the connection points are defined and a Development Application is submitted.

### Water Supply

The proposed development has existing frontage to a DN150 PVC-O PN16 watermain in Trinity Point Drive. There is sufficient capacity in this watermain to service the proposed development, however, you will be required to confirm fire fighting coverage as part of the hydraulic application.



Security of supply is required for the development site in accordance with the previously approved Trinity Point Water Servicing Strategy. However, one of the four watermain interconnections identified in the servicing strategy for security of supply has yet to be completed. The delivery of this remaining watermain interconnection will therefore be a Section 50 requirement for future development on the site.

Hunter Water advises that there are high water pressures in the service area and that the water reticulation will need to be designed accordingly.

### **Wastewater Treatment**

The proposed development is within the Dora Creek Waste Water Treatment Works (WWTW) and there is currently sufficient capacity to service the proposed development.

### **Wastewater Transportation**

The proposed development has existing frontage to a DN150 UPVC-SN8 sewer main in Trinity Point Drive, and there is currently insufficient capacity in the local sewer network to cater for the proposed development. The nearest manhole to service this property is MH K4884, which is within the Morisset Park 4 Wastewater Pump Station (WWPS) catchment, and it appears flows from the development may gravitate to this point.

According to the Morisset Park 4 WWPS design report, a design load of 149 ET was anticipated from the subject site (*Morisset Park 4 Wastewater Pumping Station (SSMOP446), Rising Main and Gravity Main Final Detail Design Report - Johnson Property Group, 2008*).

The proposed development load now exceeds this original design intent and therefore there is currently insufficient capacity in the Morisset 4 WWPS to cater for the proposed development.

Furthermore, Morisset Park 4 WWPS rising main discharges into Windermere Park 2 WWPS (previously referred to as Morisset Park 1 WWPS) catchment. This WWPS has also been identified as requiring additional upgrades to cater for the proposed development.

All required upgrades are to be confirmed as part of a revised sewer servicing strategy.

### **Wastewater Servicing Strategy**

Due to the location and size of the proposed development, a developer funded local wastewater [servicing strategy](#) is required to confirm available network capacity and determine the optimal servicing arrangement for the development. Furthermore, the approval of the *Trinity Point Wastewater Servicing Strategy - Johnson Property Group, 2007* and the associated Strategy Addendum approved in July 2014 has now expired and no longer aligns with the proposed developments loads.

As a minimum the strategy should include an assessment of:

- Available capacity in the existing network.
- Existing loads and future potential development in each catchment.
- Connection points to the existing system.
- Wastewater network augmentations.
- Capacity and upgrades of Morisset Park 4 WWPS.
- Capacity and upgrades of Windermere Park 2 WWPS.
- Emergency storage requirements in the sewer network, including at Morisset Park 4 WWPS to cater for the proposed development loading.
- Staging and interim servicing options for the development.
- Least community cost option.

You will need to engage the services of an [Accredited Design Consultant](#) to prepare the local sewer strategy with reference to the WSAA Hunter Water Design Guidelines.

The servicing strategy would need to be submitted to Hunter Water for review and approval and assets should then be designed and constructed in accordance with the approved documents. Please contact Hunter Water to arrange an inception meeting to discuss and confirm the strategy scope of work prior to commencement.

A review fee will be required to be paid for each servicing report or strategy that is submitted.

### **Delivery of Developer Works**

Developer works will need to be delivered under [Developer Works Deeds](#) executed by the Developer and Hunter Water. All developer works are to be designed by an [Accredited Design Consultant](#) and constructed by an [Accredited Contractor](#).

### **Environmental Requirements**

Hunter Water may require a [Review of Environmental Factors](#) (REF) to be submitted in accordance with the provisions of Environmental Planning and Assessment Act 1979 for the delivery of developer works. Hunter Water will assess the REF as a determining authority under provisions of Part 5 of the Act.

### **Entry Requirements**

The proposed investigation works may require entry to another property. You will need to arrange for entry and have evidence of consent by way of a signed [Entry Permit](#) with the affected landowner.

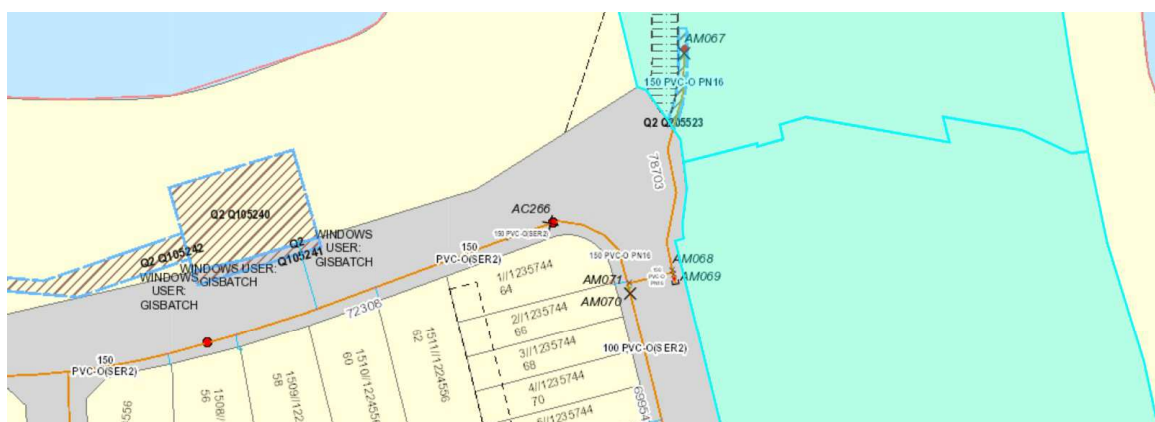
*These preliminary requirements are not commitments by Hunter Water and maybe subject to significant change prior to this development proceeding.*

*If you have any enquiries, please contact your designated assessment officer below.*

<p>Greg McHarg – Account Manager Major Development - Development Services T: 02 4979 9545 E: <a href="mailto:greg.mcharg@hunterwater.com.au">greg.mcharg@hunterwater.com.au</a></p>
---



**Figure 1 – Water servicing infrastructure in the vicinity of the proposed development site**



**Figure 2 – Water servicing infrastructure adjacent to the proposed development site**





**Figure 3 – Wastewater transportation infrastructure in the vicinity of the proposed development site**



**Figure 4 – Wastewater transportation infrastructure adjacent to the proposed development site**