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CIVIL ENGINEERING REPORT
INCORPORATING
WATER CYCLE MANAGEMENT STRATEGY

SSD 9522

MAMRE ROAD & SOUTHERN LINK RD. KEMPS CREEK NSW

Prepared For:
Frasers Property Australia & Altis Property Partners
Level 2, Building C
1 Homebush Bay Drive
RHODES NSW 2138

Prepared by:
Costin Roe Consulting
Level 1, 8 Windmill Street
WALSH BAY NSW 2000

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	Name	**Signature**
Prepared by	Mitchell Cross	
Checked by	Mark Wilson	
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TABLE OF CONTENTS

1 INTRODUCTION & SCOPE 4

2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT 5

2.1 Site Description 5

2.2 Proposed Development & Staging 6

3 EARTHWORKS & FOUNDATIONS 8

3.1 Soil Profile and Geotechnical Considerations 8

3.2 Earthworks 8

3.3 Embankment Stability 9

3.4 Supervision of Earthworks 9

4 ESTATE ROADS & ACCESS 11

4.1 Introduction 11

4.2 Internal Roads 11

4.3 General Requirements 13

4.4 Intersections 13

6 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY 17

6.1 Key Areas and Objectives 17

6.2 Existing Drainage System & Overland Flows 20

6.3 Proposed Estate Drainage System 21

7 WATER QUANTITY MANAGEMENT 26

7.1 General Design Principles 26

7.2 Methodology 26

7.3 Proposed Stormwater Quantity Management 26

7.4 Basin Maintenance 28

7.5 Climate Change 22

8 STORMWATER QUALITY CONTROLS 30

8.1 Regional Parameters 30

8.2 Proposed Stormwater Treatment System 30

8.3 Stormwater Quality Modelling 31
8.3.1 Introduction 31
8.3.2 Rainfall Data 32
8.3.3 Rainfall Runoff Parameters 32
8.3.4 Pollutant Concentrations& Source Nodes 32
8.3.5 Treatment Nodes 33
8.3.6 Results 33
8.3.7 Modelling Discussion 34

8.4 Stormwater Harvesting 35

8.5 Maintenance and Monitoring 35

9 FLOODING 40

10 EROSION & SEDIMENT CONTROL PLAN 41

10.1 General Conditions 41

10.2 Land Disturbance 41

10.3 Erosion & Sediment Control Conditions 42

10.4 Pollution Control Conditions 43

10.5 Waste Management Conditions 43

10.6 Site Inspection and Maintenance 43

11 SEAR'S & AGENCY RESPONSE ITEMS 46

12 CONCLUSION 55

13 REFERENCES 56

1 INTRODUCTION & SCOPE

Costin Roe Consulting Pty Ltd has been commissioned by Frasers Property Australia & Altis Property Partners JV to undertake a *Civil Engineering Report & Water Cycle Management Strategy* (WCMS) to facilitate accompany a State Significant Development (SSD) with the NSW Department of Planning and Environment (DP&E) for the future industrial development of the land. This report presents a civil engineering assessment of a property bounded by WaterNSW Supply Pipes, Lot 23 DP258414, South Creek and Mamre Road, Erskine Park. The development will be referred to The Mamre South Estate (MSE) in this report.

The assessment provides an assessment of the civil engineering characteristics of the development site and technical considerations of the following aspects:

- Earthworks & geotechnical considerations;
- Roads and Access;
- Water Cycle Management Strategy (WCMS).

The WCMS comprises several key areas of stormwater and water management which are provided below. These key areas have been established with the aim to reduce impacts from the MSE development on the surrounding environment and neighbouring properties including the adjacent South Creek and South Creek corridor. The water cycle management strategy identifies the management measures required to meet the targets set. The key water cycle management areas assessed in this report are:

- Storm Water Quantity;
- Storm Water Quality;
- Water Supply and Reuse;
- Flooding; and
- Erosion and Sediment Control

This engineering analysis is based on development for industrial warehouse and logistic facilities consistent with industrial estates in the surrounding areas and indicative Masterplan provided by Frasers Property and Altis.

A request for SEAR's has been completed by Willowtree Planning. Reference to **Appendix B** should be made for SSD_9522 SEAR's dated 14 September 2018, and **Section 11** of this report for specific responses to civil engineering and water management related items included in the SEAR's.

Revision C of this report includes additional information to address key queries as included a *Request for Additional Information* from the NSW DPE in their letter dated 21 November 2018 and associated *Appendix 1 – Adequacy Review*. A detailed response letter (Ref: Co13362.09.ltr, dated 6 December 2018) has been prepared by Costin Roe Consulting in addition to the updated information contained in this report.

2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 Site Description

The development is located on a parcel of land on the west of Mamre Road, and to the north and south of Bakers Lane in the suburb of Kemps Creek as shown in **Figure 1.1**.

The land comprises a combined area of approximately 118 Ha. The current land-use is predominately rural and rural-residential.

The highest elevation on the land is RL 45m AHD at the intersection of Bakers Lane and Mamre Road. The lowest levels range between RL 30m to RL 34.5m along the western boundary of the site adjacent to South Creek in the South Creek Flood plain.

Grades over the land vary from 0.5% to 2.5% with the grades becoming flatter as you move to the west, away from Mamre Road and toward the South Creek floodplain. South Creek is located on the western boundary of the site.

A major WaterNSW Supply Pipeline is located between on northern property boundary of the study area and the Altis First Estate industrial subdivision is located immediately to the north of the Sydney Water pipe.

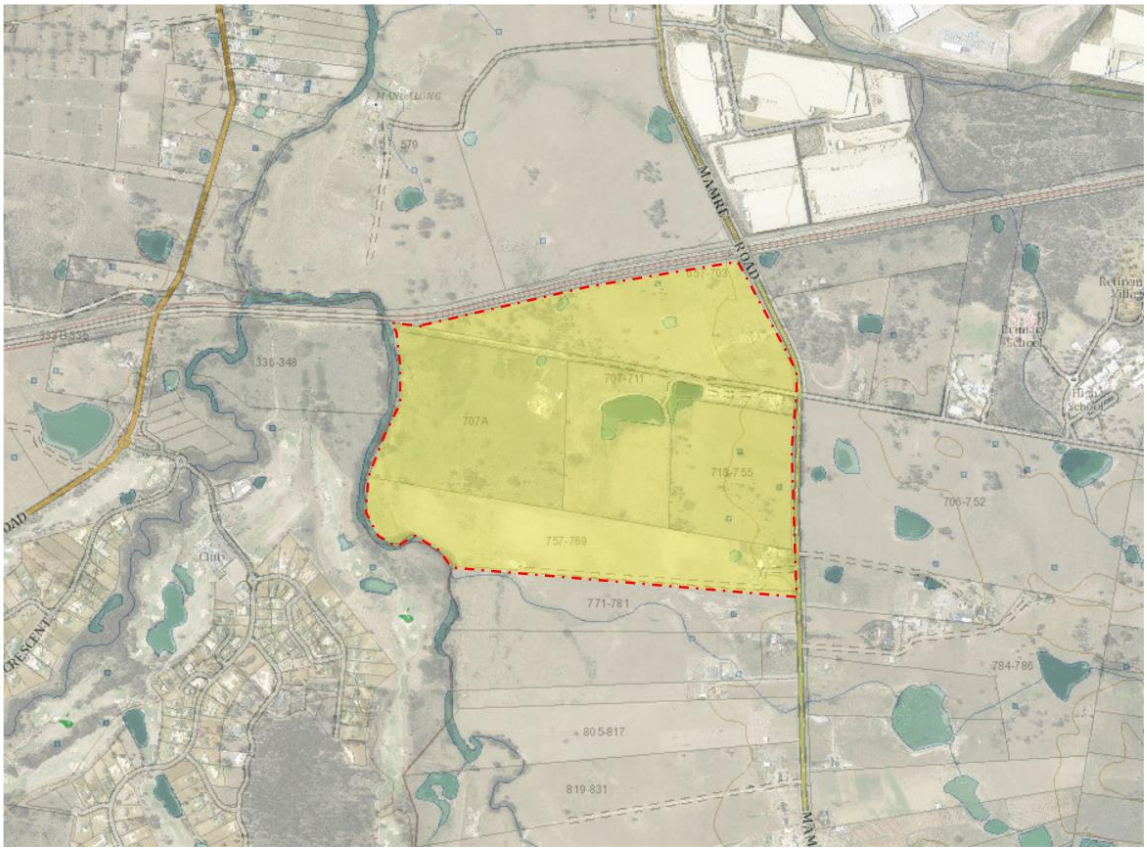

Figure 1.1 Locality Plan

The site is located within the bounds of Penrith City Council (PCC), therefore the engineering requirements of the PCC *Development Control Plan 2014* require consideration in the design.

2.2 Proposed Development & Staging

The proposed development is for an industrial estate, earthworks and infrastructure for future industrial development. An indicative lot layout is shown in **Figures 1.2** with the proposed staging of the works shown in **Figure 1.3**. Infrastructure works will include bulk earthworks, provision of services, road & intersection construction, and stormwater management and has completed in accordance with the Development Masterplan.

The preliminary masterplan layout provided by Frasers Property shows development lots will vary between 1 Ha and 3 Ha in size. Siting of the development lots will be sympathetic to the topography of the land, access and flood planning requirements. The sites adjacent to South Creek will need to allow for the minimum 500mm freeboard to the 1% AEP flood level of South Creek.

Access to all lots would be made via the new Southern Link Road, Bakers Lane and via a new estate access road from Mamre Road. The new access road and associated intersection will be constructed to Penrith City Council requirements and ownership transferred to Penrith City Council.

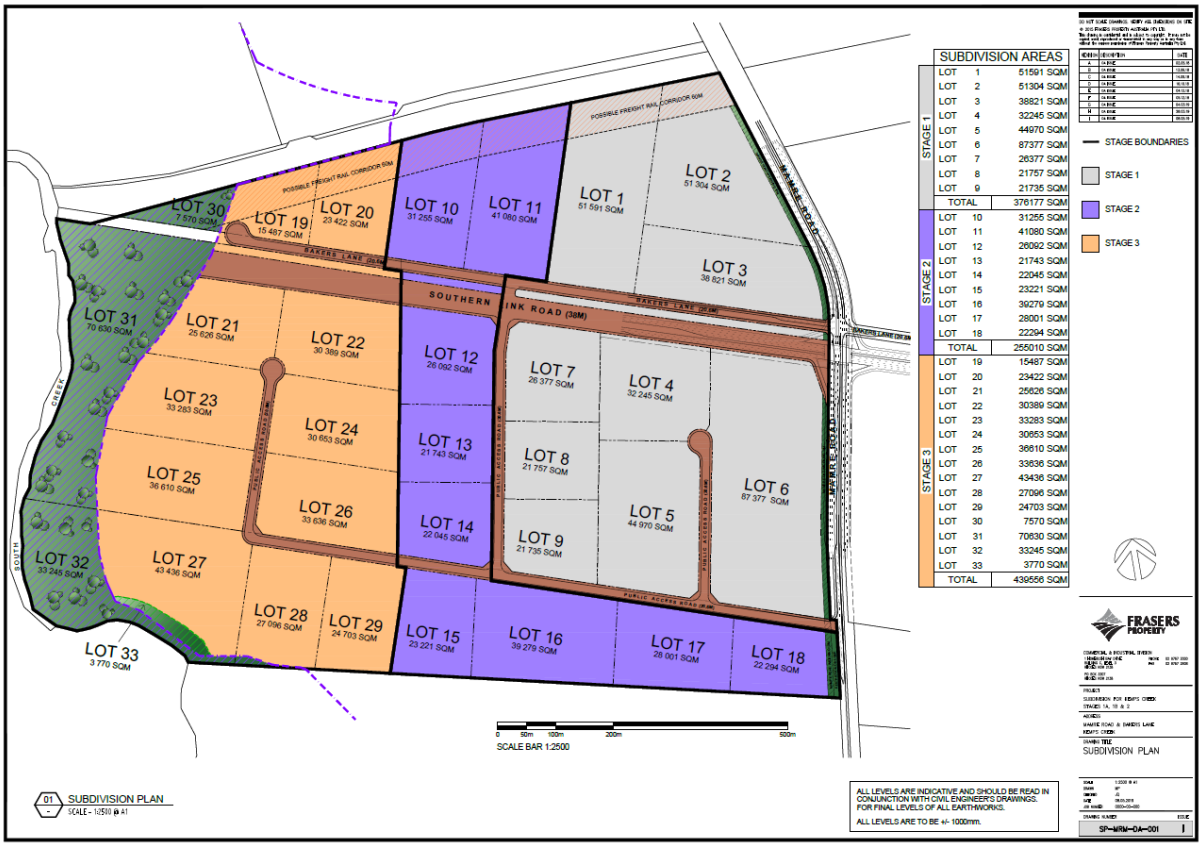

Figure 1.2. Indicative Lot & Building Development Masterplan

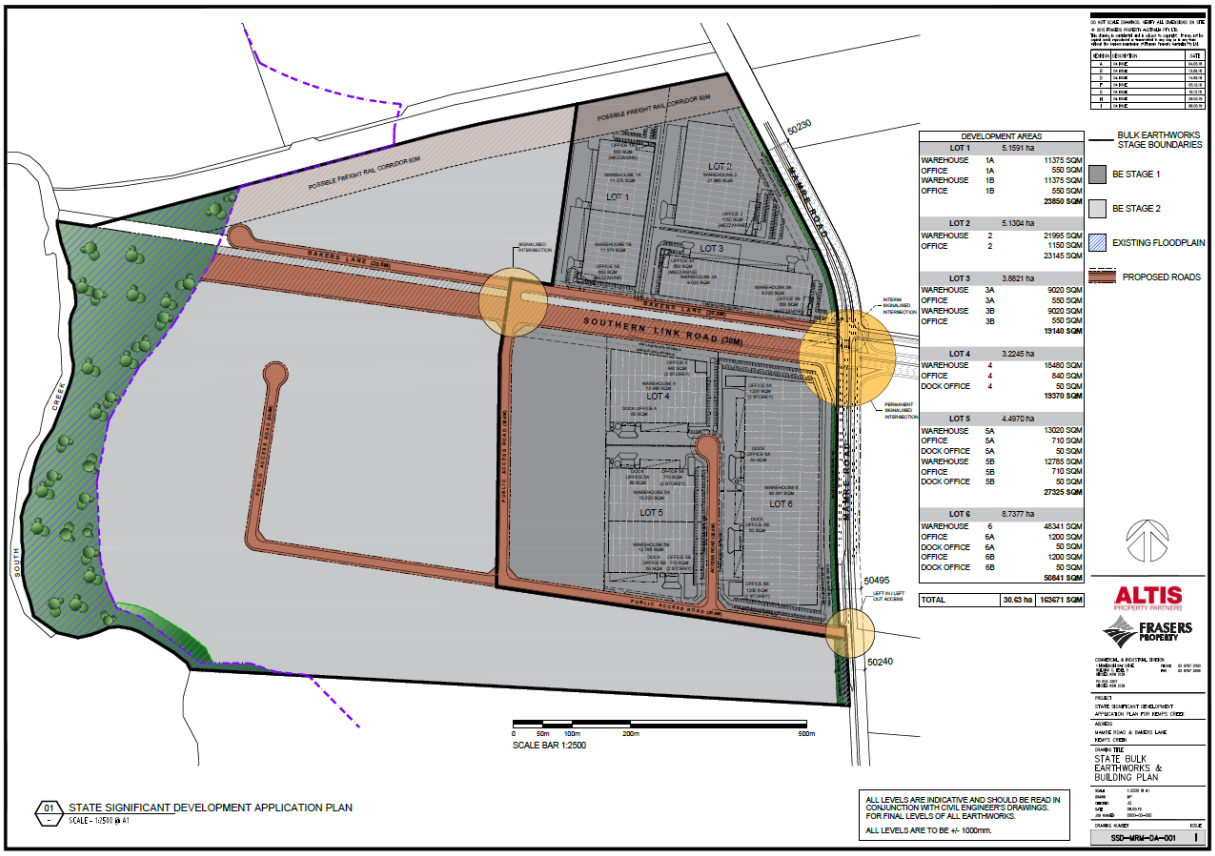

Figure 1.3. Proposed Development

3 EARTHWORKS & FOUNDATIONS

3.1 Soil Profile and Geotechnical Considerations

A geotechnical report has been provided by Pells Sullivan Meynink dated 9 April 2017.

Based on our knowledge of the area, the site is expected to exhibit characteristics consistent with Bringelly Shale Landscapes.

Geotechnical investigations of surrounding sites reference the Penrith 1:100,000 Geological Series Sheet and the areas to the west of Mamre Road are expected to be underlain by Quaternary fluvial sediments and the eastern half by Bringelly Shale of the Wianamatta Group. Alluvial sediments in and around the South Creek flood plain are described as fine-grained sand, silt and clay. The Bringelly Shale is described as shale, claystone, laminate and lithic sandstone.

Engineering properties of the residual clay soils are that they will be moderately reactive, highly plastic subsoils with poor drainage.

Topsoil depths are expected to average 200mm. Given, however, the long-standing rural use topsoil with depths of 300-400mm in depth can be expected locally. Topsoil will overly natural soils comprising alluvium and/or residual soils. Given the large site area the overall topsoil volume will comprise a significant portion of the overall earthwork's component. Consideration to provide bury pits within undevelopable land.

3.2 Earthworks

Bulk earthworks will be required to facilitate the development of the estate for industrial use. The earthworks will be undertaken to provide large flat building pads, facilitate site access from Mamre Road and proposed estate roads, to drain the site stormwater via gravity, and to keep building levels above the 1 in 100-year ARI flood level with a minimum freeboard of 500mm.

High level earthworks and volume estimates have been completed and are shown on drawing **Co13362.00-DA30** of **Appendix A**. The earthworks volume estimates are based on a lot layout with flat building pads. The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate. The primary drivers for the proposed earthworks levels are access and draining the site via gravity. This results in large amounts of fill import being required for the site.

The earthworks volume estimates are as follows:

Cut	- 126,300 m^3
Fill	+2,514,200 m^3
Detailed Excavation ($1250m^3$/Ha)	-135,000 m^3
Balance	+2,252,900 m^3 *(import required.)*

The volume estimate is based on a 214,000m^3 topsoil strip (200mm over the site area) to be either removed from the site, blended or placed and used within non-developable vegetation zones. Given the large volume and associated cost this would impose to dispose the topsoil, geotechnical advice is recommended to confirm options for borrow pit arrangement or blending non-organic topsoil component with site won fill material, so disposal of topsoil is not required. Consideration to the short- and long-term performance of the blended fill, including effect on settlement, soil modulus, CBR and bearing capacity should be made in any geotechnical advice. If high-bay or other settlement sensitive uses are proposed on the site, then topsoil blending should not be adopted.

An import of earthworks has been shown in the concept analysis to enable buildings to be sited above the 1% AEP event with 500mm of freeboard and to enable drainage of sites by gravity. Consideration to bulking of cut materials including rock and clay materials should be allowed for. Bulking of clay would normally be expected to be 4% of the removed volume and rock bulking can be expected in the range of 8-12%.

The site earthworks are to be staged as defined in **Figure 1.3** of this report. Detailed assessment and breakdown of volumes for the individual stages will be provided during construction certificate/detail design phase of the project.

Soil erosion and sediment control measures including sedimentation basins will also be provided for the development – please refer to the Soil and Water Management Plan in **Section 10** of this report. All Soil and Sediment Control measures will be performed in accordance with Penrith City Council requirements and *Landcom Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book.*

Cut earthworks over the site will be minor, and no major changes or impacts to groundwater is expected because of these works.

3.3 Embankment Stability

To assist in maintaining embankment stability, permanent batter slopes will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical. This is in accordance with the recommended maximum batter slopes for residual clays and shale which are present in the area.

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

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in Section 5.

3.4 Supervision of Earthworks

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

3.5 Groundwater

The geotechnical investigations undertaken by PSM Geotechnical did not encounter groundwater in any of the test locations. It could be expected that groundwater may be experienced at depth or around the normal dry weather water level of South Creek, and that this level would have some seasonal variation and variation associated with periods of high rainfall. In any event, groundwater if present would be at depth below the proposed filled pad levels and interaction with existing groundwater paths would be negligable

We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction.

Surface water management, including conveyance of surface runoff, management of water quantity (through on-site detention) and water quantity (through on-site and estate wide management systems using WSUD principles and best practice pollution reduction objectives) has been proposed in the design.

In relation to groundwater affectation, this is expected to be negligible. The geotechnical investigations undertaken by PSM did no encounter groundwater in any of the test locations. Further, the majority of the site and site earthworks involve filling, hence any interaction with existing groundwater or groundwater flow paths would negligible and hence not be impacted.

3.6 Acid Sulphate Soils

An assessment of the potential for acid sulphate soils has been requested as part of the SEAR's requirements.

Reference to the *NSW Land & Water Conservation Acid Sulphate Soils Map 92_Liverpool* shows the subject land clear of any known occurrence of acid sulphate soils.

An environmental assessment has been undertaken by JBS&G for the development – ref 54963/120704 – as included in the EIS. This report includes assessment of acid sulfate soils (refer Section 2.7 of the JBS&G report).

The JBS&G report showed that the risk of acid sulphate soils were low and this site is not subject to any policies relating to acid sulfate soils. As such no specific requirements relating to management of these soils are considered necessary. Refer to the JBS&G report for more detail on this.

4 ESTATE ROADS & ACCESS

4.1 Introduction

Integration with the broader transport strategy for the area will be required including the proposed Southern Link Road. This includes the provision of signalised intersections with Mamre Road which will be required to be designed and constructed to the requirements of NSW Road and Maritime Services.

The current posted speed limit for Mamre Road is 80kM/hr and Bakers Lane is 60kM/hr. The corresponding design speeds for the two roads are 90kM/hr and 70kM/hr. An existing signalised intersection is present at the intersection of Mamre Road and Bakers Lane.

The proposed road alignments will need to be designed to meet Council requirements. The proposed road layout will incorporate best practice for both horizontal and vertical alignments with empathy to the landform.

4.2 Internal Roads

The estate road will need to be designed and constructed as an industrial road consistent with Penrith City Council Development Control Plan 2014, Part C10 Transport, Access and Parking. The road cross section as defined in council DCP is shown in **Table 4.1** and **Figure 4.1**. The access road carriageway arrangement agreed for the First Estate is also included in **Figure 4.2**.

It is noted that during the adjoining First Estate SSD assessment, Council requested a 2.5m shared path (4.8m verge) & 1.5m footpath (3.8m verge) which required a slightly large overall road reserve width of 21.6m. The final agreed arrangement for the First Estate, as shown in **Figure 4.2**, included a 2.5m Shared path (4.1m verge) & 1.2m footpath (3.5m verge). The agreed arrangement per First Estate is proposed to be adopted for this development.

The arrangement of the roads and intersections should be confirmed by the traffic engineering consultant. We understand that Bakers Lane is proposed for upgrade to run parallel to the Southern Link Road incorporating a transit way and multilane carriageway with separation medians. The typical cross section arrangement completed by Aecom is shown in **Figure 4.3**.

Road Type & Traffic Volume	Parking Lane Provision	Dedicated Travel Lanes	Verge Width (Footpath Pedestrian)	Total Road Reserve	Number of lanes	Concrete Footpath 1.5m wide
Industrial	6.0m (2 x 3.0m)	7.0m (2 x 3.5m)	3.0m (2x 3.8m)	20.6m	2 travel/ 2 parking lane	Both sides

Table 4.1. Estate Road Cross Section per PCC DCP2014

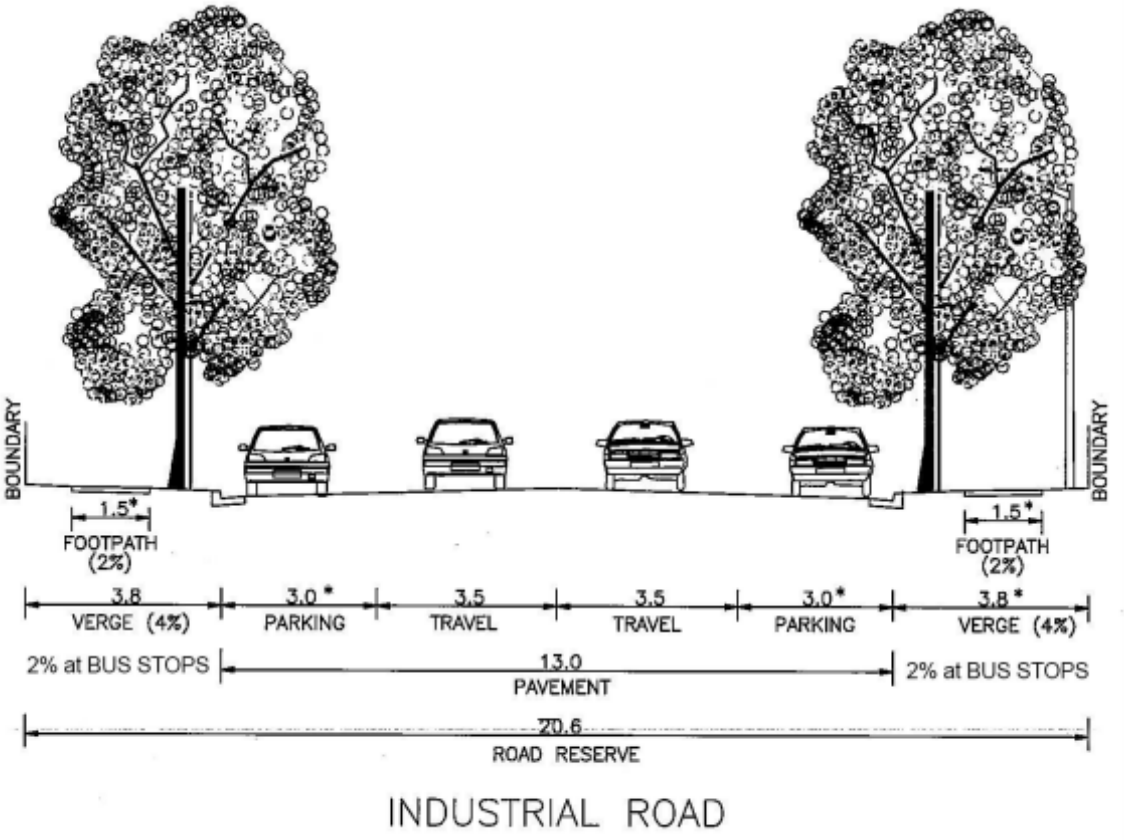

Figure 4.1. DCP Estate Road Cross Section (source: PCC DCP2014 Part C10)

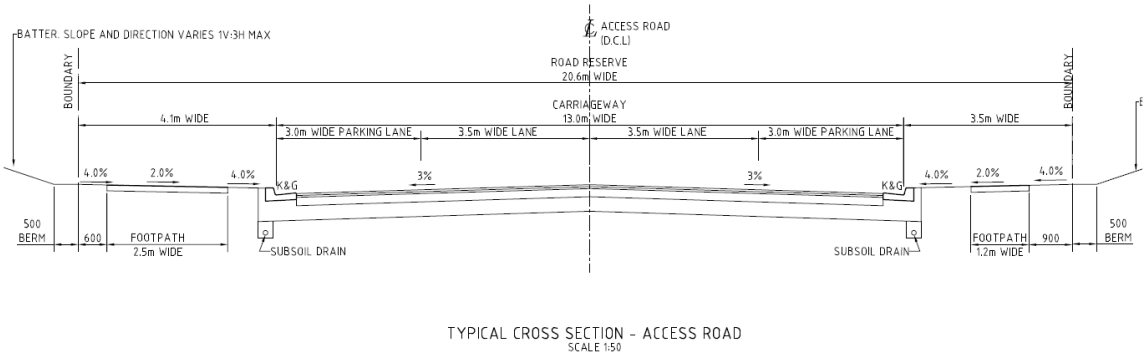

Figure 4.2. Estate Road – Typical Cross Section (as adopted)

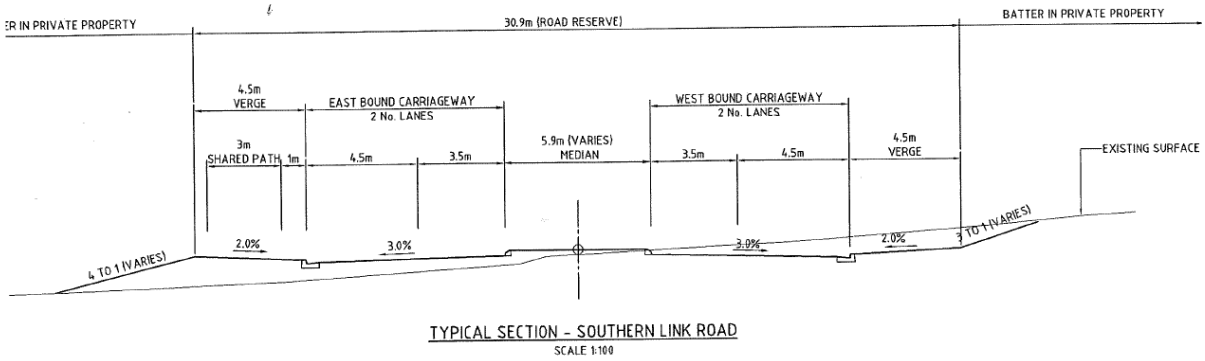

Figure 4.3. Southern Link Road Typical Section (source: Broader Western Sydney Employment Area Southern Link Road Network 60301100-00-FIG-TS-0002)

4.3 General Requirements

All roads will have concrete kerb and gutter and carriageway surface finished with asphaltic concrete as per the requirements of Penrith City Council.

The design for the proposed pavement for internal roads is to be based on *Austroads Pavement Design – A Guide to the Structural Design of Road Pavements.* Council DCP requires the pavement design to be based on a traffic loading of $1x10^7$ ESA. This loading is typical of an industrial road and would meet the needs of the estate.

We recommend that further review of the proposed pavement construction specification and design loading allowance be undertaken for the internal roads when this becomes available.

In accordance with the estate master plan and council requirements, a 1.5m pedestrian path will need to be located on both verges of the road cross section.

4.4 Intersections

Two intersections will be required to Mamre Road. The first will align with Bakers Lane and the future Southern Link Road. The second is proposed mid-way along the Mamre Road property boundary.

Reference to the Traffic Report by Ason Group provides details on performance of the intersections both pre and post development, and general arrangement for the intersections.

Functional layouts of the intersections based on the general arrangement defined in the Traffic Report have been prepared by our office as shown below and included in **Appendix A**.

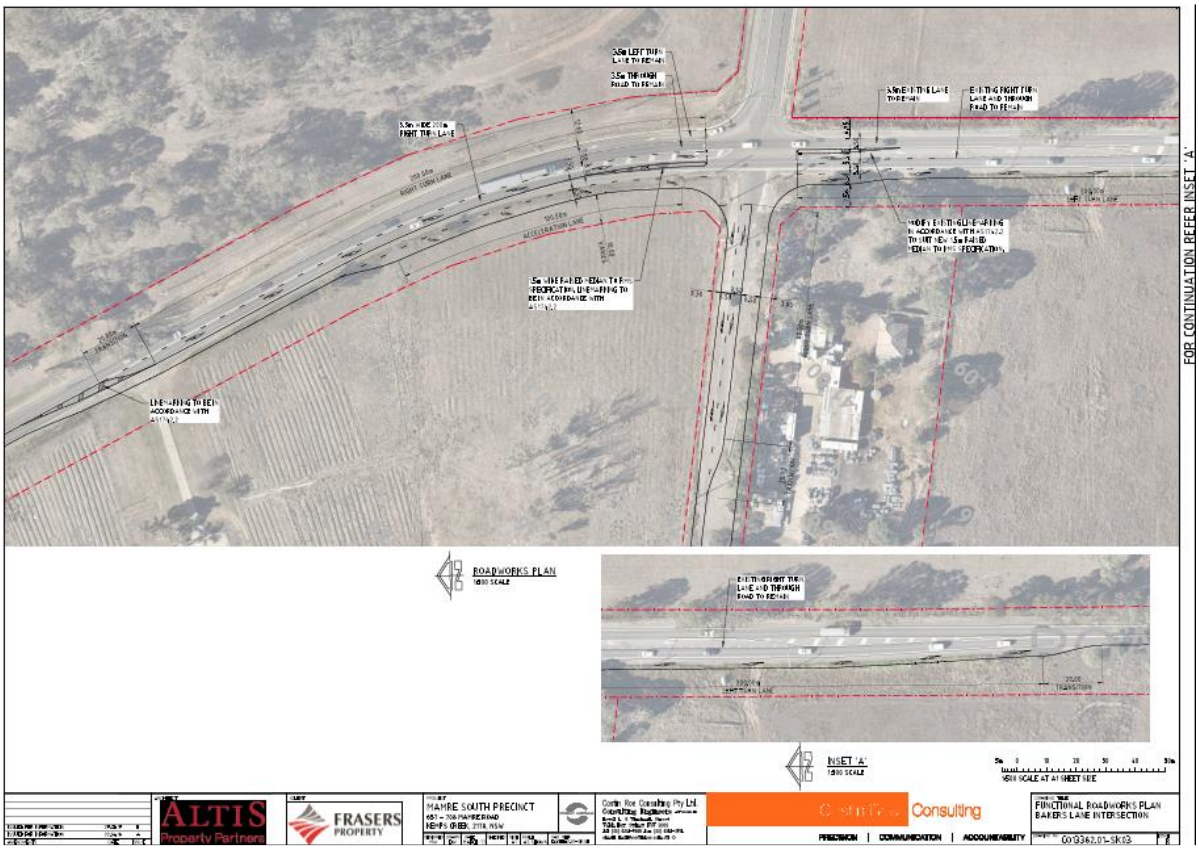

Figure 4.5. Bakers Lane Intersection (initial)

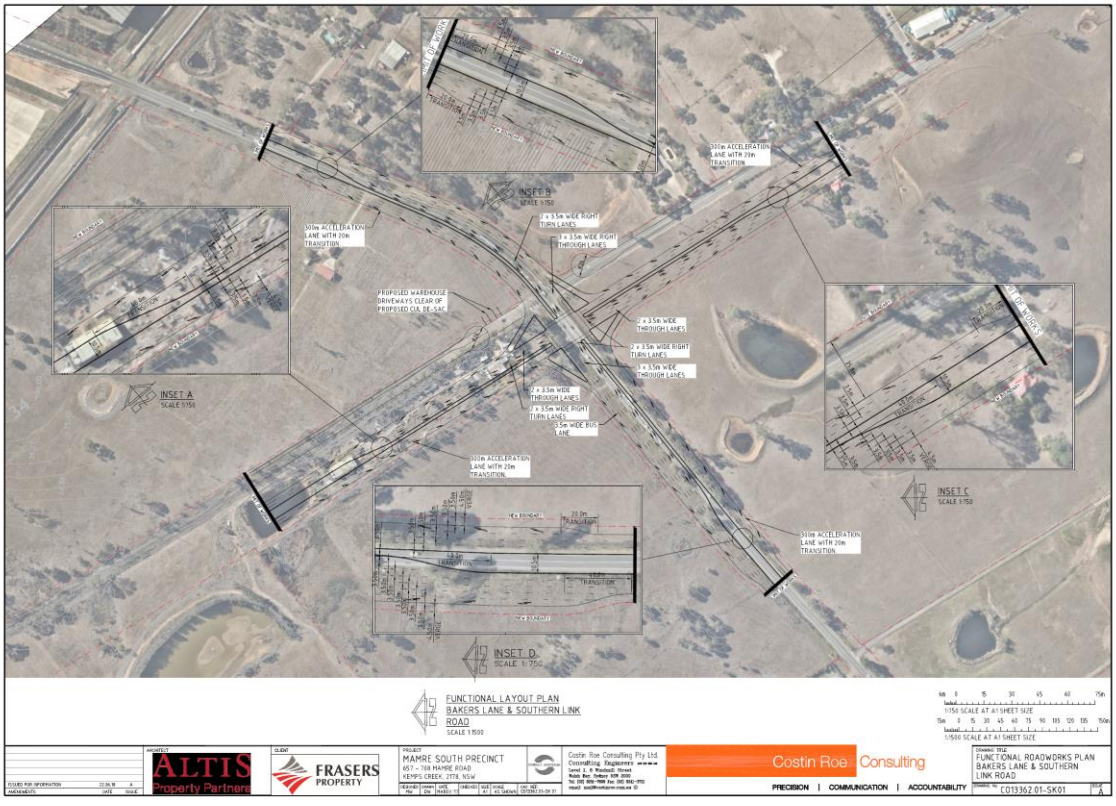

Figure 4.6. Bakers Lane Intersection (with Southern Link Road)

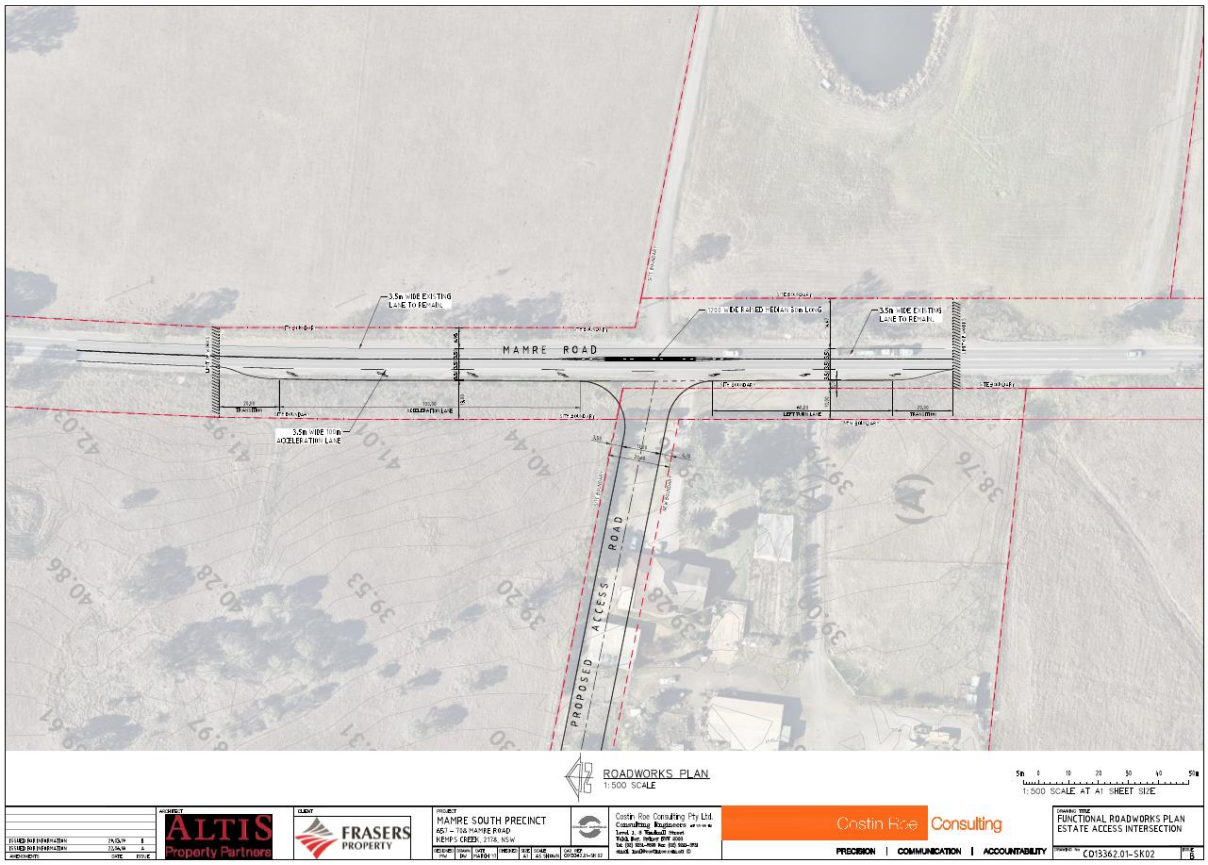

Figure 4.6. Estate Road Intersection

4.5 Southern Link Road Alignment

An indicative alignment of the proposed future Southern Link Road (SLR) has been included in the estate masterplan layout. The adopted alignment has been shown generally in accordance with the alignment concepts included in the Mamre Road Upgrade Study document produced for the NSW RMS and SLR concept designs completed by AECOM which have been placed on exhibition on the DPE website. The SLR has been aligned for the Western extension with the Eastern Extension, per Ason Report and the SSD application across the site.

The alignment of this road remains flexible and can be adjusted in future plans should DPE or NSW RMS decide on an alternate alignment. Beyond the first stage buildings there is flexibility to change the alignment, not impacting any built form.

Noting however, that in our opinion, that of the Traffic Engineers (ASON Group) and in the opinion of the proponent, the currently shown alignment is considered to be the most appropriate. The alignment provided within the application co-locates three major infrastructure corridors without major fragmentation of land. There would only be one bridge structure proposed over South Creek, with the alignment proposed. The eastern end of the proposed SLR through the land, aligns with the DoP&E AECOM road alignment, currently concept design by RMS.

A concept options review has been undertaken to demonstrate potential alternate alignments and South Creek crossing positions (refer drawing **Co13362.01-DA700**) and the constraints and opportunities noted. This simplified plan shows potential geometry of the SLR, matching 3 key locations being the Mamre Rd intersection, across our Stage 1 frontage and the Twin creeks estate a barrier to alignment locations.

It is further noted that the application, being Stage 1 on the eastern portion of the site could accommodate a change to the alignment to suit DP&E's alignment once resolved. This could take similar form to one of the three alignments as shown on our drawing DA700.

6 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY

6.1 Key Areas and Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

Developing a WCMS at the SSD stage of the land development process provides guidance on urban water management issues to be addressed for the estate and development as a whole. This assists urban rezoning and estate infrastructure planning for the industrial development proposed on the land.

This WCMS has been prepared to inform the DP&E and Penrith Council that the development is able to provide and integrate WCM measures into the stormwater management strategy for estate. It presents guiding principles for WCM across the precinct which includes establishing water management targets and identifying management measures required for future building developments to meet these targets.

Several WCM measures have been included in the WCMS and engineering design, which are set out in this report and the attached drawings. The key WCM elements and targets which have been adopted in the design are included in **Table 6.1** following.

Element	Target	Reference
Water Quantity	Maintaining or improving the volume of stormwater flows to South Creek from this site. "*it will be necessary to demonstrate that there will be no increase in runoff from the site as a result of the development for all storms up to and including the 100-year Average Recurrence Interval (ARI) event for all storm durations*".	DPI Penrith Council - *Stormwater Management Policy, Section 3.3.3*
Water Quality	Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 60% Total Nitrogen 45% Total Hydrocarbons 90%	Penrith Council DCP Part C3
Flooding	Buildings and road set 500mm above 1% AEP. No affectation to upstream downstream or adjoining properties as a result of development	Penrith Council DCP Part C3. NSW Floodplain Development Manual. Penrith Council DCP Part C3
Water Supply	Reduce Demand on non-potable water uses. Provide minimum 100,000kL rainwater tanks per development.	Penrith Council DCP Part C3
Erosion and Sediment Control	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to South Creek.	Landcom Blue Book Penrith City Council DPI

Table 6.1. WCM Targets

A summary of the how each of the WCM objectives will be achieved are described below. Reference to the relevant sections of the report should be made for further and technical details relating to the WCM measures:

- *Stormwater Quantity Management (Refer **Section 7**)*

  The intent of this criterion is to reduce the impact of urban development on existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

  Attenuation of stormwater runoff from the development is proposed to be managed via a series of measures including on-lot systems and estate level basins. The

intention is for Stage 1 to provide on-lot systems and Stages 2 and 3 to be managed by estate level systems. This will mean that Stage 1 can be assessed, approved and constructed without the need for estate level basins which need to be located at the downstream end of the property in proximity to the South Creek corridor.

An assessment of detention and attenuation requirements has been made for Stage 1 and the overall estate as a holistic approach. As part of the approach the site storage rate and site discharge rate has been defined for development lots within Stage 1. This will enable future development lot approvals to have a definitive detention and discharge requirement which will assist in council or the DP&E to quickly and efficiently review and confirm stormwater quantity requirements have been addressed as each development lot is designed and submitted for approval.

Detention systems for the Stage 2 and 3 of the development are proposed to be constructed as estate level basins. These basins are to be located within the undevelopable land between the development footprint and South Creek. The detention systems will operate during local storms ensuring attenuation of site runoff in localised storms when South Creek is not in flood. When South Creek is in flood, in the 1% AEP event, the basins are noted to be inundated. This however will not affect flooding or flow rates within South Creek as site runoff, being susceptible to short duration intense storms, would have finished prior to the regional flood which requires longer duration storms over a larger area. Further discussion on the positioning and operation of the estate basin has been included in **Section 7.4** of this report.

Sizing of the basin systems has been completed using DRAINS modelling software in accordance with the Penrith City Council Policy for the 50% AEP to the 1% AEP storm for various durations. The modelling accounts for the drainage system provided for the adjacent sites and conveyance of upstream catchments around the site.

Refer to **Section 7** of the document for detailed sizing of detention systems.

- *Stormwater Quality Management (Refer **Section 8**)*

  There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters.

  The required pollutant reductions are included in **Table 6.1** of this document and MUSIC modelling has been completed to confirm the reduction objectives can be met for the development.

  A series of Stormwater quality improvement devises (SQID's) have been incorporated in the design of the estate. The proposed management strategy will include the following measures:

  - Development sites within Stage 1 will require full on lot treatment. Individual lots in Stage 1 will need to design and model stormwater treatment measures (which meet objectives per Table 6.1). individual measures will be defined as part of future development applications and could include treatment trains of gross pollutant traps (GPT's), filtration devices, pit inserts, buffers, raingardens/ bio-retention or other suitable proprietary devices.

- Development site within stage 2 will require individual lots to have primary treatment devices. These devices will need to target suspended solids, litter, gross pollutants and hydrocarbons.
- Tertiary treatment of Stage 2 lots, and roads will be made via estate level bio-retention basins.

Reference to **Section 8** of this document should be made for detailed Stormwater Quality modelling and measures.

- *Flood Management (refer **Section 9**)*

  The proposed development considered flooding and large rainfall events, both from the adjacent South Creek, and from site generated runoff and upstream properties.

  The following measures have been incorporated in the design:

  - All buildings are sited 500mm above the 1% AEP design flood level of South Creek.
  - Flood storage compensation has been provided where filling in localised pre-developed flood affected areas occurs;
  - Requirements of Penrith City Council DCP Part C3 have been met regarding works in and around flooding areas;
  - Stormwater detention measures have been included to manage pre and post development runoff as discussed above and in **Section 8**; and
  - Overland flow paths to manage runoff in large storm events have been made including achieving at least 500mm freeboard to building levels from the flow paths.
- *Water Demand Reduction/ Rainwater Reuse*

  Rainwater reuse measures will be provided as part of future building development designs. Rainwater reuse will be required to provide a minimum 100,000 L tank and to reduce demand on non-potable uses by at least 35%, with a target of 50%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. **Refer Section 8.4**.

6.2 Existing Drainage System & Overland Flows

The site is currently undeveloped rural land with undulating topography which has been described in **Section 1.2**. There is no formal drainage currently on the site however several local depressions and natural gullies are present. There are also several dams which are used for the currently rural farming operations on the land which lie in relation to the natural gullies.

The site is affected by overland flow from minor upstream catchments to the east of the site. A catchment of approximately 30 Ha is conveyed around the site via existing infrastructure in Mamre Road, diverting along the southern boundary of the site to South Creek.

Two smaller catchments are required to be conveyed through the site. Existing 450mm RCP's are located on Mamre Road as shown on drawing **Co13362.00-DA46**. Conveyance of these flows has been included in the estate infrastructure stormwater

design. The proposed method of conveyance (i.e. in-ground piped Q20 ARI and overland flow to the Q100 ARI event) of the upstream catchment through the site is shown on drawing **Co13362.00-DA400**. The 1.08m^3/s Q100 flow from the upstream catchment will be designed to bypass all site on-site detention (OSD) measures and water quality treatment systems and be conveyed through the future Southern Link Road corridor. Runoff from a second 450mm RCP (being located in front of Lot 2) will be conveyed in an open swale then as part of inground drainage as shown in drawings **Co13362.00-DA416** and **DA419**. An allowance to convey 1.46m^3/s flow from the 1% AEP runoff.

Management of stormwater over the site has been shown on concept drawings **Co13362.00-DA411 to DA419**.

6.3 Proposed Estate Drainage System

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

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of PCC and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1988 Edition), Volumes 1 and 2 (AR&R).

Water quality and re-use are to be considered in the design to ensure that any increase in the detrimental effects of pollution are mitigated, PCC Water Quality Objectives are met and that the demand on potable water resources is reduced.

The proposed drainage system will be required to convey the overland flow from upstream catchments east of the property through the site.

The legal point of discharge is a point specified by Council where stormwater from a property can be discharged. The legal point of discharge is usually Council's stormwater infrastructure (where available), the street kerb and channel for smaller developments or downstream receiving waters like an existing stream or gully, lake, pond or waterbody.

Legal discharge for the entire development land is South Creek on the western side of the development site. The design and construction of the proposed outlet structure to South Creek will be assessed in accordance with the NSW Office of Water document *Controlled Activities: Guidelines for Outlet Structures.*

The stormwater outlets to South Creek will need to consist of a reinforced concrete pipe and 'natural' energy dissipater. The outlet is to be aligned with the creek to remove the potential for bank scour and shall include rip rap energy dissipaters constructed in accordance with the Outlet Structures Guidelines as published by the Department of Water & Energy and The Blue Book. This is shown figuratively below in **Figure 6.1** below.

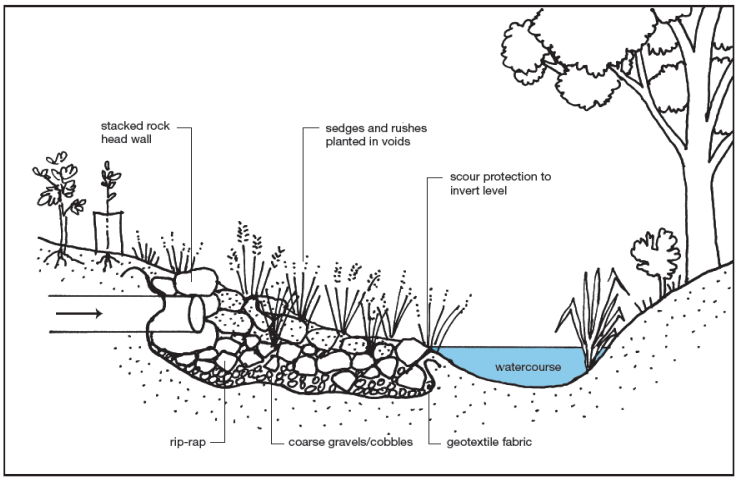

Figure 6.1. Typical Natural Outlet Structure Components

6.4 Climate Change

An assessment has been undertaken for the effect of climate change on the development. The assessment takes into consideration potential effect from increased rainfall intensity and sea level rise.

The effect on development has been assessed for a 10% increase in rainfall intensity. This increase is considered representative of potential climate change impacts for the Western Sydney area (being consistent with projected rainfall increases in accordance with the New South Wales Department of Environment and Climate Change (DECC) 'Floodplain Risk Management Guideline Practical Consideration of Climate Change' (Table 1, October 2007).

This assessment shows that the proposed stormwater drainage system and stormwater management systems (including the proposed detention system) would have sufficient capacity to manage the increased peak flows and water volume with minor increase in hydraulic grade line and peak water level within the basins. We confirm the increase in rainfall intensities will achieve the required minimum 0.5m freeboard to the proposed building pad levels in relation to local overland flow paths in and around the estate as nominated on the design drawings.

In relation to impact on the development from the adjacent South Creek. A conservative estimate of the effect from an increase in rainfall intensity of 10% and a

consistent flow rate increase would result in the 1% AEP flows increasing from 1020m^3/s to approximately 1120m^3/s. This increased flow rate would be less than the current 0.5% AEP flow rate of 1180m^3/s hence the increase in flow rate would result in a flood surface which is less than the current 0.5% AEP event. Based on the modelling completed in our Overland Flow Assessment for the 0.5% AEP, the effect from climate change would result in an increase of 0.15m from the current 1% AEP to the reach 1% AEP + 10% flood level. Overall, flood immunity of the extreme western development sites would be slightly reduced (from 0.5m to 0.35m) however these sites would still achieve flood freeboards greater than those adopted by many local councils (including Blacktown) and nominated in the NSW Floodplain Manual. Further noting that the majority of lots in this development will continue to achieve freeboards greater than 0.5m.

The site is situated well upstream from any tidally influenced receiving waters including expected potential sea level rise of 0.3m. We confirm the development will not affect or be affected by potential sea level rise due to the distance from the Hawksbury River and Pacific Ocean.

An assessment on the stormwater on-site detention basin confirms that the current basin design has sufficient capacity to cater for a rainfall intensity increase of 10% from current rainfall intensities.

6.5 Water Supply

A detailed Service Infrastructure Assessment has been completed by Landpartners Built Environment Consultants and is contained in their report SY073930.000. Reference to this document, included in the EIS should be made for detailed information pertaining to water demands. We provide a summary of the key items relating to potable water supply and demand, as contained in the *Executive Summary* of the Landpartners report for ease of reading as follows.

- *A 200mm water main is laid in Mamre Road adjacent to the frontage of the site. The 200mm continues through an unformed road within the site to serve the Twin Creeks residential development.*
- *The site is within the Cecil Hills reservoir supply zone.*
- *Based on the GHD analysis of the Cecil Hills reservoir zone undertaken for the Oakdale Local Area Service Plan (L.A.S.P) for Water supply the existing Cecil Hills reservoir (and associated pumping station WP 0184B) has sufficient capacity to serve the entire Cecil Hills reservoir zone based on expected 2020 demands.*
- *However, as the subject development is at the extent of the Cecil Hills reservoir zone a pressure and flow enquiry has revealed that flows from the existing 200mm water main adjacent to the site are inadequate to serve the development.*
- *Ultimate servicing of the Priority Growth Area (employment zone) will require substantial amplification of Sydney Water assets. These assets would be:*
    - *Trunk supply water main constructed from the Prospect Water Filtration Plant to the Cecil Hills reservoirs site.*
    - *Construction of a new reservoir at Cecil Hills with the associated supporting infrastructure required for a reservoir.*

- *Construction of "lead out" water mains from the amplified Cecil Hills reservoir to service the Priority Growth Area employment lands and the northern precincts of the S.W Growth Centre.*

- *However, supply could be achieved by extension of existing 200mm water mains constructed in Mamre Road north of the Sydney Catchment Authority water supply pipes. This 200mm main is served from the Erskine Park reservoir zone. This would involve a rezoning of part of the Cecil Hills supply zone by insertion of a dividing valve (D.V) south of the existing 200mm main in Mamre Road and extension of the 200mm Erskine Park supply main to the subject site.*
- *Sydney Water in their correspondence to the proponent of the development dated 8/11/2018 have identified that the preferred servicing strategy is to supply potable water to the site from the Erskine Park Elevated System (refer to Appendix A). Further options planning as outlined in Sydney Waters' correspondence will identify existing and proposed demand as a component of the Initial Precincts for the area identified as "Western Sydney Aerotropolis".*

6.6 Waste Water

A detailed Service Infrastructure Assessment has been completed by Landpartners Built Environment Consultants and is contained in their report SY073930.000. Reference to this document, included in the EIS should be made for detailed information pertaining to waste water. We provide a summary of the key items relating to potable water supply and demand, as contained in the *Executive Summary* of the Landpartners report for ease of reading as follows.

- *No Sydney Water waste water assets currently supply the subject site.*
- *Sydney Water have commenced studies for the preparation of an integrated servicing strategy for the Priority Growth Areas, particularly driven by the need to provide a waste water treatment solution to service the Western Sydney Airport.*
- *Meetings with Sydney Water planning staff have identified that a new Waste Water Treatment Plant (WWTP) is likely to be constructed and operational by late 2025 – early 2026. The preferred location of the new WWTP is along South Creek, north of Elizabeth Drive and south of the M12 corridor.*
- *However due to topographic issues the preferred waste water treatment strategy for the subject site is to direct waste water flows to the St Marys WWTP (see Appendix A – Sydney Water Detailed Planning – Requirements Package).*
- *Sydney Water have identified that the St Marys WWTP has sufficient capacity to treat flows from the subject site.*
- *Service options for the development site could include:*
  - *a) Initial pumpout solution through a Sec 68 approval process from Council.*
  - *b) Pressure sewer system to connect to the Mamre Road Carrier Sec 4 to the north of the site.*
  - *c) Installation of Sewer Pump Station and rising main to discharge to Mamre Road Carrier Sec 4.*
- *Sydney Water in their letter of 21 June 2018 indicate that the St Marys Waste Water Treatment Plant (WWTP) has adequate capacity to cater for flows from the proposed development and in their correspondence of 8/11/18 note their endorsed strategy is to transfer flows to St Marys WWTP. Therefore, the ultimate strategy for service for this site would be the construction of a Sewer Pump Station (SPS) to the*

Mamre Rd, sewer carrier for discharge to St Marys WWTP or extension of a low pressure sewer system to the Mamre Rd carrier.

- *Alternative treatment of waste water is available from private companies operating under the Water Industry Competition Act (WICA).Alternative treatment of waste water is available from private companies operating under the Water Industry Competition Act (WICA).*

7 WATER QUANTITY MANAGEMENT

7.1 General Design Principles

Penrith City Council adopts the principles of water quantity management, also known as "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental effect on the existing stormwater infrastructure and watercourses located within their LGA downstream from the site.

Section 3.3.3 of Councils stormwater management policy requires that "*it will be necessary to demonstrate that there will be no increase in runoff from the site as a result of the development for all storms up to and including the 100-year Average Recurrence Interval (ARI) event for all storm durations*".

7.2 Methodology

A hydrological analysis was undertaken to estimate the impact of the development of the site on peak flows at the downstream extent of the site. Modelling of stormwater runoff quantity was considered for the pre-existing case and for the operational phase of the development.

As the site is greater than 5000m^2, the simplified PSD/SSR method contained in Section 3.3 of the Penrith Council Document *Stormwater Drainage for Building Developments* has not been used in calculating the storage and discharge relationship for the site. Councils preferred modelling software, DRAINs has been used to assess the site detention discharge and storage relationship.

In order to assess the existing and operational phase peak discharges from the development site, a DRAINS hydrological model was used to estimate peak flows from catchments on the site for various storm durations for Q2 year ARI to Q100 year ARI events.

7.3 Proposed Stormwater Quantity Management

Attenuation of stormwater runoff from the development is proposed to be managed through either individual OSD systems on development lots within the Stage 1 portion of the development sites or via an above ground, estate level, detention basin for Stages 2 and 3 of the estate. The estate basin will be located on the north-western corner of the development area. The basin will attenuate stormwater from the Stage 2 and 3 developable portions of the development.

Sizing of the detention systems for individual development sites in the Stage 1 area will be confirmed for the specific facility as part of separate future development applications. These future basins are to be sized based on the outcomes and provided storage rates and permissible site discharge rates provided in this report (refer **Table 7.4**). This method ensures that the overall catchment pre and post development flow rates are addressed and individual site OSD systems will account for the unattenuated road catchments.

Sizing of the on-lot detention and estate systems basin has been completed using DRAINS modelling software in accordance with the Penrith City Council Policy for the 1 in 2-year ARI to 1 in 100-year ARI storm for various durations. We have included rates for site storage and permissible site discharge to be adopted for future development sites within Stage 1.

Table 7.1 shows the overall hydrology for the estate, whilst **Tables 7.2 & 7.3** provides details for the pre and post development flows and storage for the detention systems for Stages 1, and Stages 2/3. The critical storm duration for the 1in 2 year, 1in 20 year and 1 in 100-year ARI storms is 2 year and flows and storages are provided for this storm.

ARI	**Design Storm Duration**	**Peak Flow (m^3/s)**		
		Undeveloped	**Developed**	
		Site	Site (no atten.)	**Site (+ atten.)**
2	30	4.57	13.26	**2.73**
	60	6.60	14.36	**3.96**
	120	6.75	13.58	**4.33**
20	30	14.59	22.72	**14.56**
	60	17.38	24.10	**15.69**
	120	17.92	23.27	**15.74**
100	30	21.80	29.40	**17.13**
	60	24.50	30.50	**18.84**
	120	24.80	29.20	**18.91**

Table 7.1. Overall Estate Hydrology

ARI	**Pre-developed Flow (m^3/s)**	**Post Developed Flow (m^3/s)**				**Storage (m^3)**	**Depth (mm)**
		Un-attenuated	**Attenuated**				
			Low Flow	**High Flow**	**Total**		
2	3.28	6.38	2.12	0	2.12	9000	600
20	8.82	10.90	7.83	0	7.29	18000	1190
100	11.80	13.60	9.08	0	8.40	21800	1430

Table 7.2. Detention System Hydraulics (Stage 1)

ARI	Pre-developed Flow (m^3/s)	Post Developed Flow (m^3/s)				Storage (m^3)	Depth (mm)
		Un-attenuated	Attenuated				
			Low Flow	High Flow	Total		
2	3.54	7.30	2.29	0	2.29	14000	620
20	9.30	12.50	8.07	0	8.07	30000	1230
100	13.00	15.60	9.28	0.553	9.83	37000	1500

Table 7.3. Detention System Hydraulics (Stages 2/3)

The modelling has shown that, with the provision of a storage volume of 13 000m^3 for Stage 1, that stormwater flows from the development will be attenuated to predevelopment flows. **Table 7.4** below shows the site storage rates (SSR) and permissible site discharge (PSD) rates for individual development lots within Stage 1 to achieve the required attenuation as set in **Table 7.1** and **7.2**.

	20% AEP (1 in 2-yr ARI)	5% AEP (1 in 20-yr ARI)	1% AEP (1 in 100-yr ARI)
SSR (m^3/Ha)	210	420	505
PSD (m^3/s/Ha)	0.07	0.205	0.275

Table 7.4. Stage 1 Development Lots - SSR/ PSD Rates

Table 7.3 shows the required storage for the Stage 2/3 detention system. A total active storage of 37,000m^3 is required to achieve the required attenuation.

Detention storage will be fully active and will be provided as above ground basins in open space and conservation areas. The proposed detention basin meets the policy requirements of Penrith City Council.

7.4 Estate Basin Location and Maintenance

The proposed location of the Stage 2/3 detention basin and details can be found on drawing **Co13362.00-DA414.**

The location of the basin has been positioned on the western flank of the development adjacent to South Creek. The basin is positioned below the 1% AEP water level however above the 5% AEP water level as required of Penrith City Council policy. It is further noted that the basin has been positioned such that the majority of the system is located within the flood fringe and flood storage zones of the South Creek flood extent, with only a minor portion (around 10% on the north-west corner) within the defined floodway.

The basin is noted to be effective and to manage the local storms and site runoff from the development area. This ensures that not only frequent flows entering South Creek are managed but also water quality and quantity requirements are met for a large range of storms. During regional flood events, it is expected that the majority of site runoff

has passed, and the combined hydrographs would result in peak flows being managed within South Creek.

Discussions with Penrith City Council regarding the location and effectiveness of the basin in the South Creek floodway have been made during consultation. It was discussed and agreed that, due to timing differences between the local catchments (short time 1-2 hours) and flooding relating to South Creek (long time 20-24hours), the basin would be effective in meeting the intention of the council water quantity management requirements for localised storms, and during large regional floods due to timing effects the proposed development would not impact flooding within the creek.

Maintenance of specific components of the basin are to be performed in accordance with the recommendations contained in **Table 8.5** of this report.

The maintenance obligations relating to the basin were also discussed and agreed with Penrith Council. The intention is for the basin to be owned and maintained by the proponent or estate lot owners and for the maintenance to be governed through a community or neighbourhood plan (or similar acceptable method). This arrangement was approved and adopted in the now constructed detention system on the First Estate under SSD7173.

Potential damage which may occur as a result of by mainstream flooding from South Creek would form part of the maintenance program for the basin. We have estimated (using the TUFLOW model of South Creek) that the inundation of the proposed basin would occur during mainstream flooding events from ARI storms in the range of the 1 in 5-year ARI storm or greater. We have been informed from property owners that overbank flooding has not occurred in the last 30-35 years. Further it is noted that the basin has been positioned generally clear of high hazard or high velocity flows, confirming that velocities of less than 1m/s can be expected across the basin footprint during a regional 1% AEP flood event.

Based on the model assessment and reported flooding, additional regular maintenance (to that which would normally be expected for a basin of this size) surrounding flooding from South Creek are considered to be minimal. Maintenance following a major storm and South Creek Flooding would need to be considered on a case by case basis using the recommended maintenance procedures listed in **Table 8.5** as the minimum level of maintenance to be performed.

It is also noted that the basin design and construction will have no detrimental effect on the mainstream flooding of South Creek. The design has been completed such that the basin will be excavated into the natural surface, ensuring that the hydraulic characteristics of the flood plain remain consistent with or result in an improvement to the current conditions. The design of the basin and landform around the basin has been completed in accordance with the *Overland Flow/ Flooding Assessments* completed by Costin Roe Consulting Pty Ltd for Frasers and Altis Property as included in this SSDA – refer to report **Co13362.00-05.rpt**.

8 STORMWATER QUALITY CONTROLS

8.1 Regional Parameters

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

PCC have nominated, in Section C3 of their *DCP 2014*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%
Total Hydrocarbons	90%
Free Oil and Grease	90%

8.2 Proposed Stormwater Treatment System

Developed impervious areas of the estate, including roof, hardstand, car parking, roads and other extensive impervious areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the whole catchment area of the development. The STM's for the estate are based on a treatment train approach at the estate level to ensure that all the objectives above are met.

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

Stage 1 Development Area

- All development lots within Stage 1 will require on-lot treatment measures which meet the load-based percentage requirements noted in **Section 8.2**.
- Roads will have limited treatment for the interim period between Stage 1 and Stages 2/3. Treatment will be provided through sediment measures, and vegetated swales in the interim period between construction within Stage 1 and construction of future stages.

Stage 2/3 Development Area

- Primary treatment for development lots will be made on lot via the provision of a proprietary GPT. The intention is for development lots to have primary treatment of suspended solids, gross pollutants, hydrocarbons and some nutrients. Pre-treatment of stormwater will assist in mitigating the potential for early onset sedimentation of the bio-retention system;

- Tertiary treatment of lots and roads is to be performed via a 4500 m^2 bio-retention system. The proposed bio-retention system is to be provided within a combined bio-retention and detention basin and will form an overall estate level treatment system;
- It is noted that stormwater from the upstream catchments will bypass treatment systems and are not included in the modelling. Undeveloped areas of the overall property within flood plains or the Southern Link Road corridor are also excluded from the models; and
- A portion of the future building roofs will also provide a level of treatment via rainwater reuse and settlement within the rainwater tank. Given however that building layouts are subject to change during detail design, allowance for rainwater tank within the MUSIC model has not been made.

We confirm that the design of the combined bio-retention and stormwater detention basin has been completed in accordance with Penrith Council WSUD Guidelines and the Water By Design Bio-retention Technical Guidelines for South East Queensland. The maximum depth of water in the Basin has been designed with consideration to Section 3.3.9 of the Water by Design Technical Guidelines based on a maximum depth of ponding during a 1 in 20 year ARI of 1.2m. This was further discussed and agreed with Penrith Council Engineer, Mr Tim Gowing, that the maximum storage depth of 1.2m would be adopted for the larger 1 in 100-year ARI event.

The maintenance of the water quality measures (bio-retention and gross pollutant traps) will be made by the estate at no cost or burden to council. Further discussion on maintenance and the effectiveness of the basin as it relates to the effects of flooding from South Creek are contained in **Section 7** of this document.

8.3 Stormwater Quality Modelling

8.3.1 Introduction

The MUSIC model was chosen to model water quality. This model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC (the Model for Urban Stormwater Improvement Conceptualisation) is suitable for simulating catchment areas of up to 100 km^2 and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set out in Part R of BCC's DCP2006and nominated in Section 5.1 of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*13362.00_MamreSouth_Rev1.sqz*" was set up to examine the effectiveness of the water quality treatment train and to predict if council requirements have been achieved. The layout of the MUSIC model is presented in **Appendix B**.

8.3.2 Rainfall Data

Six-minute pluviographic data which has been sourced from the Bureau of Meteorology (BOM) as nominated below. Evapo-transpiration data for the period was sourced from the Penrith Monthly Areal PET data set supplied with the MUSIC software.

Input	**Data Used**
Rainfall Station	67113 Penrith Lakes
Rainfall Period	1 Jan. 1999 – 31 Dec. 2008 (10 years)
Mean Annual Rainfall (mm)	712
Evapotranspiration	Penrith Monthly Areal PET
Model Timestep	6 minutes

8.3.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold (mm)	1.40
Soil Storage Capacity (mm)	105
Initial Storage (% capacity)	30
Field Capacity (mm)	70
Infiltration Capacity Coefficient a	150
Infiltration Capacity exponent b	3.5
Initial Depth (mm)	10
Daily Recharge Rate (%)	25
Daily Baseflow Rate (%)	10
Daily Seepage Rate (%)	0

8.3.4 Pollutant Concentrations& Source Nodes

Pollutant concentrations for source nodes are not available from Penrith City Council. The source nodes used are based on the land use parameters defined by the nearby Blacktown City Council and are shown as per the **Table 8.1**:

Flow Type	Surface Type	TSS (log_{10} values)		TP (log_{10} values)		TN (log_{10} values)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Baseflow	Roof	*	*	*	*	*	*
	Roads	*	*	*	*	*	*
	Landscaping	1.2	0.17	-0.85	0.19	0.11	0.12
Stormflow	Roof	1.30	0.32	-0.89	0.25	0.30	0.19
	Roads	2.43	0.32	-0.30	0.25	0.34	0.19
	Landscaping	2.15	0.32	-0.6	0.25	0.30	0.19

*Base flows are only generated from pervious areas; therefore these parameters are not relevant to impervious areas.

Table 8.1. Pollutant Concentrations

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 8.1** above and the catchments shown on drawing **Co13362.00-DA400** in **Appendix A**.

8.3.5 Treatment Nodes

Bio-retention and Gross Pollutant Trap treatment nodes have been used in the modelling of the development.

There is one proposed bio-retention basin which will be provided in accordance with industry best practice and the guidelines of the Monash University Facility for Advancing Water Bio-filtration with the following parameters:

Bio-retention system

Parameter	**Value**	
Storage Properties		
Extended Detention Depth	300	mm
Storage Surface Area	4500	m^2 (minimum)
Filter and Media Properties		
Filtration Area	4500**	m^2
Saturated Hydraulic Conductivity	100	mm/hr
Filter Depth	500	mm

** Nominated filtration area excludes all pits, scour protection and other structures which may be present in bio-retention basins.

Gross Pollutant Trap

Parameter		**Value**	
Treatable Flow	xx	m^3/s (approx. 6-month ARI flow)	
Pollutant Reductions			
TSS		70	%
TP	30	%	
TN		0	%
GP's		98	%

8.3.6 Results

Table 8.3 shows the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

	Source	Residual Load	% Reduction	Target Met
Total Suspended Solids (kg/yr)	122000	16100	86.8	Y
Total Phosphorus (kg/yr)	205	57.9	71.7	Y
Total Nitrogen (kg/yr)	841	461	45.1	Y
Gross Pollutants (kg/yr)	9540	0	100	Y

Table 8.3. MUSIC analysis results

The model results indicate that, through the use of the STM's in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the requirements of Part 1 of Section C3 of their *DCP 2014* on an overall catchment basis.

8.3.7 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements of Section C3 of their *DCP 2014* have been met.

The MUSIC modelling has shown that the proposed treatment train of STM's will provide stormwater treatment which will meet council requirements in an effective and economical manner.

Hydrocarbon removal cannot easily be modelled with MUSIC software. The proposed distribution/ storage facility would be expected to produce low source loadings of hydrocarbons. Potential sources of hydrocarbons would be limited to leaking engine sumps or for accidental fuel spills/leaks and leaching of bituminous pavements (car parking only). The potential for hydrocarbon pollution is low and published data from the CSIRO indicates that average concentrations from Industrial sites are in the order of 10mg/L and we would expect source loading from this site to be near to or below this concentration. Hydrocarbon pollution would also be limited to surface areas which will be treated via bio-retention swales which are predicted to achieve a 90% reduction of this pollutant.

Given the expected low source loadings of hydrocarbons and removal efficiencies of the treatment devices we consider that the requirements of the Penrith City Council have been met.

8.4 Stormwater Harvesting

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

Rainwater harvesting will be provided for this development with re-use for non-potable applications as part of future individual building development applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the water demand for the development and to satisfy the requirements of PCC DCP2014.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

Rainwater tanks are to be sized with reference to the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand, based on the base water demands.

The final sizing of rainwater harvesting tanks will need to be assessed once the development layout and reuse demands for the facility are known in accordance with the NSW Department of environment and Conservation document Managing Urban Stormwater: Harvesting and Reuse.

8.5 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. To achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 8.5** below) to assist in the effective operation and maintenance of the various water quality components.

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

Table 8.5. Indicative Maintenance Schedule

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
BIO-RETENTION BASIN			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above
Check for sediment accumulation at inflow points	Six monthly/ After Major Storm	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements.
Check for erosion at inlet or other key structures.	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed profile is maintained

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Check for evidence of dumping (litter, building waste or other).	Six monthly	Maintenance Contractor	Remove waste and litter and dispose in accordance with local authorities' requirements.
Check condition of vegetation is satisfactory (density, weeds, watering, replating, mowing/ slashing etc)	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Check for evidence of prolonged ponding, surface clogging or clogging of drainage structures	Six monthly/ After Major Storm 10-15 years	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements. Replace filter media & planting – refer to appropriately qualified engineer or stormwater specialist
Check stormwater pipes and pits	Six monthly/ After Major Storm	Maintenance Contractor	Refer to INLET/ JUNCTION PIT section below.
OSD BASIN			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above
Inspect and remove any blockage from orifice	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen to inspect orifice.
Inspect trash screen and clean	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen if required to clean it.
Inspect flap valve and remove any blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate. Ensure flap valve moves freely and remove any blockages or debris.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Inspect pit sump for damage or blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve is clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly	Maintenance Contractor/ Owner	Remove debris and floatable materials.
Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and retains sharp edge.	Five yearly	Maintenance Contractor	Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.
Check screen for corrosion	Annually	Maintenance Contractor	Remove grate and screen and examine for rust or corrosion, especially at corners or welds.
Inspect overflow weir and remove any blockage	Six monthly	Maintenance Contractor/ Owner	Ensure weir is free of blockage.
Inspect walls for cracks or spalling	Annually	Maintenance Contractor	Remove grate to inspect internal walls, repair as necessary.
Check step irons	Annually	Maintenance Contractor	Ensure fixings are secure and irons are free from corrosion.
RAINWATER TANK			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet - leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant
INLET & JUNCTION PITS			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.

9 FLOODING

Consideration to flooding is required due to the proximity to South Creek. Reference to the *Updated South Creek Flood Study (rp6033rg_crt150128-Updated South Creek Flood Study (FINAL – Volume 1))*, shows flood levels and flood extent associated with overland flow associated with the adjacent South Creek. This report will be referred to as the *South Creek Study* from hereon.

As required by the SEAR's, a comprehensive flood assessment is required for the development. This assessment has been completed by Costin Roe Consulting and presented in a separate report, refer **Co13362.00-05a.rpt**, and included as part of the EIS and SSDA submission documents.

As part of the assessment, the requirements of *Section 3.5 of PCC C3 Water Management DCP2014* (defines the requirements for flood liable land and relevant policy documents) have been considered. The requirements for development in flood liable land are based on the NSW Government *Floodplain Development Manual (2005)* document are also considered in the assessment.

The *South Creek Study* shows the property is within the zone of the 1% AEP event. The flood surface extent and level for the 1% AEP storm event, presented at the peak flow per the *South Creek Flood Study*, at the upstream boundary of the property can be seen to be 35.0m and 33.5m at the downstream boundary. Allowing for the council required freeboard of 500mm, the corresponding flood planning level for the development varies between RL 35.5m to 34.0m AHD.

The assessment by our office confirms the South Creek study levels and utilises a localised study area to confirm the effect of flooding on the development (ensuring planning levels are accounted), and also the effect of the development on flooding. The intention being to meet Councils DCP Part C3 requirements and to ensure no offsite affectation to upstream, downstream or adjoining properties.

Refer separate report, **Co13362.00-05a.rpt**, for comprehensive flood assessment and commentary.

10 EROSION & SEDIMENT CONTROL PLAN

An erosion and sediment control plan (ESCP) is included in drawings **Co13362.00-DA200, DA210 and DA250**. These plans show the works can proceed without polluting receiving waters. A detailed plan will be prepared after development consent is granted and before works commence.

10.1 General Conditions

1. The ESCP is to be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued by the site manager, council inspector or other authorised representative in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this report and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and Penrith City Council's specifications.
3. All subcontractors will be informed by the site manager of their responsibilities in minimising the potential for sedimentation and soil erosion.

10.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 10.1**.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Temporary construction access	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. All site workers will comply with these restrictions.
Remaining lands	Entry prohibited except for essential management works	

Table 10.1. Limitations to access

10.3 Erosion & Sediment Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on drawing **Co13362.00-DA200 & DA210** and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils (landscaped areas only) remain on the surface at the completion of works.
3. The construction program should be scheduled so that the period of time from starting land disturbance to stabilisation is minimised.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 metres
    - 2.5H:1V where slope length is between 7 and 10 metres
    - 3H:1V where slope length is between 10 and 12 metres
    - 4H:1V where slope length is between 12 and 18 metres
    - 5H:1V where slope length is between 18 and 27 metres
    - 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event of 1 in 2-year ARI (Q2).
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in enough quantities, soil binders and/or dust retardants will be used, or the surface will be left in a cloddy state that resists removal by wind.

10.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways.
2. Sediment fences will:
   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.
   b) Have a catchment area not exceeding 720 square metres, a storage depth (including both settling and settled zones) of at least 0.6 metres, and internal dimensions that provide maximum surface area for settling, and
   c) Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.
3. Sediment removed from any trapping device will be disposed of in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are fully stabilised.

10.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance services are to be provided by the respective contractors at least weekly.

10.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a check sheet (refer **Appendix D**). A site inspection using the check sheet will be made by the site manager:
   - At least weekly;
   - Immediately before site closure; and
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

The self-audit will include:

- Recording the condition of every sediment control device;
- Recording maintenance requirements (if any) for each sediment control device;

- Recording the volumes of sediment removed from sediment retention systems, where applicable;
- Recording the site where sediment is disposed; and
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their recording.

2. In addition, the site manager will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report to the superintendent. The responsible person will ensure that:
   - The plan is being implemented correctly;
   - Repairs are undertaken as required; and
   - Essential modifications are made to the plan if and when necessary.

   The report shall include a certificate that works have been carried out in accordance with the plan.
3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end, drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that:
   - No low points exist that can fill and overtop in a large storm event;
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams and installing additional diversion upslope; and
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
5. Sand/soil/spoil materials placed closer than 2 metres from hazard areas will be removed. Such hazard areas include areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good working condition. In particular, attention will be given to:
   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them;
   b) Degradable products to ensure they are replaced as required; and
   c) Sediment removal, to ensure the design capacity remains in the settling zone.
9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site fully stabilised.
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

11 SEAR's & AGENCY RESPONSE ITEMS

This section of the report covers items relating to the NSW Department of Planning and Environment SEARS letter dated 14 September 2018, reference SSD_9522, agency response letters from Penrith City Council (10 September 2018), NSW Department of Primary Industries (DPI) and NSW Office of Environment & Heritage (OEH).

Further reference to the EIS prepared by Willowtree Planning should be made for confirmation of how the SEAR's have been addressed for non-civil engineering or WCM related items.

SEARS - Flooding *A detailed hydrological and hydraulic assessment which includes the following:*	
Item 1.1	*A comprehensive assessment of the impact of flooding on the development for the full range of flood events to the probable maximum flood. This assessment should address the relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-05a.rpt**, for comprehensive flood assessment which includes potential effects of climate change, sea level rise and increased rainfall runoff. The assessment includes a 10% increase in rainfall intensity. This increase is considered representative of potential climate change impacts for the Sydney metropolitan area (being consistent with projected rainfall increases in accordance with the New South Wales Department of Environment and Climate Change (DECC) 'Floodplain Risk Management Guideline Practical Consideration of Climate Change' (Table 1, October 2007).
Item 1.2	*Consideration of current flood behavior and impacts, including on the flood detention areas, how flood behavior and impacts will change due to the proposal and how these changes will be mitigated.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-05a.rpt**, for comprehensive flood assessment which includes the above items.
Item 1.3	*Assessments of the impact of the development on flood behavior (i.e. levels, velocities and duration of flooding) and on adjacent, downstream and upstream areas.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-05a.rpt**, for comprehensive flood assessment which includes the above items.
Item 1.4	*Detail proposed floor levels for all proposed habitable structures on the*

	site having considered the full range of flood events up to the probable maximum flood. Response Flood planning level of the site has been based on normal, social and industry accepted freeboard allowances for industrial development. A minimum level of 1% AEP plus 500mm freeboard has been adopted. The adopted flood planning level is consistent with nearby industrial estates and council adopted policy. Refer earthworks drawings which confirm FPL's for the development.
Item 1.5	*Detail an emergency flood response plan for the site which includes consideration of a flood-free access to or from the development site in extreme flood events.* Response Refer separate report by Costin Roe Consulting, **Co13362.00-05a.rpt**, for comprehensive flood assessment which includes flood response. It is noted that parts of the site are clear of the PMF event and on-site refuge is available.

SEARS - Soil and Water	
Item 2.1	*A description of how the proposal takes into consideration the South Creek Corridor Strategy and the land use vision for the South Creek Precinct in consultation with Infrastructure NSW and the Greater Sydney Commission.* Response Refer to EIS by Willowtree Planning for comprehensive discussion in relation to the South Creek Corridor Strategy and land vision for the South Creek Precinct.
Item 2.2	*Measures to protect the Warragamba Pipelines corridor from any works or activities associated with the development.* Response All works are proposed to be clear of the Warragamba Pipeline corridor. Perimeter fencing, and sediment controls will be placed along the common boundary of the development and pipeline corridor during construction. Any proposed level differences in the development will employ safe and stable batters, based on recommended slopes from a geotechnical investigation, or via retaining structure. No retaining is currently proposed for the development however future walls may be necessary for individual development sites. These would form part of future designs and development applications. All structures would be within development site

	and would not affect support or structures within the pipeline corridor. A 60m wide corridor has been included south of the water pipeline as provision for a future freight rail line, with no disturbance in this zone effectively providing a 60m buffer between the development and the water pipeline
Item 2.3	*Details of how access to the Warragamba Pipelines corridor would be maintained, on consultation with Water NSW* Response Access to the pipeline corridor from Mamre Road would be maintained per existing conditions. No change to current access arrangements will occur due to the development.
Item 2.4	*A description of water demands and a breakdown of water supplies, including a detailed site water balance.* Response Refer **Section 4**, and subsequent **Sections 5** and **6**, for a comprehensive WCMP which confirms water supplies and reuse requirements. Note the water balance has been performed in respect to the proposed industrial development. A detailed Service Infrastructure Assessment has been completed by *Landpartners Built Environment Consultants* and is contained in their report SY073930.000. Reference to this document, included in the EIS should be made for detailed information pertaining to potable water demands and waste water management. Further water balance information is included in Section 8.4 in relation to proposed re-use of rainwater for non-potable demands. It is noted that detailed site water balance, such as those required for mining sites which involve items not relevant to this project like groundwater flows in mining voids, construction water, dust suppression, vehicle washdowns, material wash downs, ground water reuse or harvesting etc, is not relevant for this development. Noted demands for this site are use for potable/ drinking water for facility occupants, non-potable reuse (from rainwater) for irrigation and toilet flushing which will reduce demand on non-potable uses in the range of 50%. The requirements for water balance assessment are considered to have been addressed in the submitted documents. Refer Sections 6.5, 6.6 and 8.4 of our updated *Engineering and Water Cycle Management Report.*
Item 2.5	*Identification of any water licensing requirements under the Water Act 2012 or Water Management Act 2000.* Response

	We confirm that no water sharing plans or licensing considerations are relevant or proposed as part of the warehouse distribution estate development. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
Item 2.6	*Details of proposed erosion and sediment controls during construction.* Response Refer **Section 10** of this report and associated drawings **Co13362.00-DA200, DA210 and DA250** for details of erosion and sediment control during construction.
Item 2.7	*A description of the surface and stormwater management system designed in accordance with Penrith City Councils WSUD Policy, including drainage design, on-site detention, and measures to treat or reuse water.* Response Refer **Section 6** of this report and associated drawings **Co13362.00-DA400 to DA419** for details of stormwater management and WSUD/WCM measures proposed for the operational phase of the development.
Item 2.8	*Characterisation of the nature and extent of any contamination on the site and surrounding area.* Response Refer to contamination assessment.
Item 2.9	*An assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils (, related infrastructure, watercourse and riparian land and proposed mitigation, management and monitoring measures.* Response We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution estate development. Reference to JBS&G Environmental investigation should be made in relation to salinity and acid sulfate soils. The report shows that low potential for these soils will be encountered on site.

We also provide the following confirmation of other typical SEAR's request items.

Soils and Water, Groundwater and Licensing	
Item 1	*Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.* Response We confirm that no water sharing plans are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
Item 2	*Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).* Response We confirm that no volumetric licensing requirements are relevant or proposed as part of the warehouse distribution center construction.
Item 3	*The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply.* Response We confirm that Sydney Water will perform water supply for the life of the project. Reduction in non-potable demand will be made via rainwater reuse, details of which are nominated in **Section 8.4** of this report.
Item 4	*A detailed and consolidated site water balance.* Response We confirm that water usage is consistent with industrial developments typical of the area. Water use will be for toilet flushing, hand washing, employee showers and irrigation with supply being made from Sydney Water. Water demand will be supplemented by rainwater harvesting with proposed reduction in non-potable demands, Penrith City Council and the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand.
Item 5	*A detailed assessment against the NSW Aquifer Interference Policy (2012) using DPI Water's assessment framework.* Response We confirm that the development will not affect groundwater and or aquifers. An assessment of the NSW Aquifer policy is not relevant for the warehouse distribution center construction.

Item 6	*Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.* Response We confirm that the development does not propose to utilise surface or groundwater water sources. An assessment of the impact on these items is not relevant for the warehouse distribution center construction. Surface water management, including conveyance of surface runoff, management of water quantity (through on-site detention) and water quantity (through on-site and estate wide management systems using WSUD principles and best practice pollution reduction objectives) has been proposed in the design. In relation to groundwater affectation, this is expected to be negligible. The geotechnical investigations undertaken by PSM did no encounter groundwater in any of the test locations. Further, the majority of the site and site earthworks involve filling, hence any interaction with existing groundwater or groundwater flow paths would negligible and hence not be impacted.
Item 7	*Full technical details and data of all surface and groundwater modelling.* Response We confirm the proposed development does not affect surface and groundwater water surface, as described in Item 6 above. We consider that groundwater modelling is not relevant for the proposed development. As there are no requirements to utilise groundwater sources, it is also not proposed or required to recharge the groundwater system. Surface storm water runoff is managed and disposed of as described in **Sections 6, 7 and 8** of this report.
Item 8	*Proposed surface and groundwater monitoring activities and methodologies.* Response We confirm the proposed development does not affect surface and groundwater water surface and that groundwater monitoring activities are not relevant for the proposed development.
Item 9	*Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.* Response The development does not involve any cumulative impacts on water

	resources.
Item 10	*Consideration of relevant policies and guidelines as contained in attachment 1 of the SEAR document.* Response Consideration of the relevant policies and guidelines has been made. These are listed in the EIS by Willowtree Planning and Engineering Policies listed in **Section 13** of this report.

Water Management and Key Items	
	Key Relevant Legislative Instruments Response Consideration of the relevant policies and guidelines has been made. These are listed in the EIS by Willowtree Planning and Engineering Policies listed in **Section 13** of this report.
	Water Sharing Plans Response We confirm that no water sharing plans are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
	Licensing Considerations Response We confirm that no water sharing plans or licensing considerations are relevant or proposed as part of the warehouse distribution center construction. Groundwater and/ or surface water will not be sourced as part of water sharing plans.
	Dam Safety Response No dams are proposed by the development. Several detention systems are proposed which have been designed based on Penrith City Council On-site Detention Policy. The design takes due consideration to design for the 1 in 100-year ARI and operation for events of greater magnitude with redundancy of 100% of the provided 1 in 100-year capacity for all downstream drainage systems and discharge structures.
	Surface Water Assessment

	Response We confirm that a Stormwater Management Plan has been produced for the proposed development which covers management of stormwater runoff including water quality and quantity. Reference to Sections 6, 7 & 8 of this document should be made for confirmation of how the Water Sensitive Urban Design and management of quality and quantity has been addressed. We also confirm that no utilization of surface water runoff from water courses, rivers or dams is proposed or relevant as part of the warehouse distribution development.
	Groundwater Assessment Response Earthworks are proposed to facilitate industrial development. Section 5 of this report discusses the expected negligible impact on existing water table and groundwater over the site. We also confirm that no utilization of groundwater is proposed as part of the development. An assessment of groundwater is not relevant or proposed as part of the warehouse distribution project.
	Groundwater Dependent Ecosystems Response Earthworks are proposed to facilitate industrial development. Section 5 of this report discusses the expected negligible impact on existing water table and groundwater over the site. We also confirm that no utilization of groundwater is proposed as part of the development. An assessment of groundwater dependent ecosystems is not relevant or proposed as part of the warehouse distribution project.
	Watercourses, Wetlands and Riparian Land Response All basins are proposed to be located clear of 40m of South Creek. Works to the riparian land will be required for re-shaping and flood compensation storage. The disturbed areas are to be re-vegetated and ecology restored.
	Transport and Access Response A traffic assessment has been completed by ASON Group. A functional layout of the proposed intersection has been prepared based on the findings of the traffic study and included in the engineering drawing set completed for the application. Refer to **Appendix A** and **Section 4** of this report for the functional layout

	of the intersections.
	Services and Public Utilities Response An assessment of existing public utilities and their ability to service the development has been made. Please refer Landpartners report for the assessment.

12 CONCLUSION

This Civil Engineering Report has been prepared to assist with decision making and development approval regarding the development of land surrounding the proposed Southern Link Road, existing Bakers Lane and Mamre Road, Erskine Park.

An overview of Penrith City Council requirements for stormwater and access has been provided to assist in the SSDA submission. Specific mention has been made to on-site detention and water quality requirements as required as part of the Water Cycle Management Plan for the estate.

A strategy for the management of stormwater for the property has been provided based on the management measures to be provided at both individual lots and at an estate level. This option is in the form of a series of combined detention and water quality basins located at site discharge locations.

The development is located in the vicinity and within the predicted 1% AEP South Creek flood extent. The floor levels of proposed buildings near South Creek will be set at the 1% AEP flood level plus 500mm freeboard in accordance with the requirements of Penrith City Council and the NSW Floodplain Development Manual. Development & filling potential will require TUFLOW flood modelling and discussions and approval with council during the planning approval stage and supplementary report and modelling will be provided to the application. Reference to separate flood report and assessment by Costin Roe Consulting should be made in relation to flooding (refer report **Co13362.00-06c.rpt**)

13 REFERENCES

Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);

Managing Urban Stormwater: Source Control – 1998 (NSW EPA);

Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);

Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);

Penrith City Council – DCP 2010 (Part C3); and

Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

Appendix A
Costin Roe Consulting Pty Ltd
SSDA Drawings

Appendix B
SSD 9522 SEAR's
Dated 14/9/18

NSW GOVERNMENT | Planning & Environment

Planning Services
Industry Assessments
Contact: Bianca Thornton
Phone: 02 8217 2040
Email: bianca.thornton@planning.nsw.gov.au

Our Ref: SSD 9522

Mr Andrew Cowan
Director, Willowtree Planning
Suite 4, Level 7, 100 Walker Street
NORTH SYDNEY NSW 2060

Email: acowan@willowtp.com.au

Dear Mr Cowan

State Significant Development – Planning Secretary's Environmental Assessment Requirements
Kemps Creek Warehouse and Logistics Hub (SSD 9522)

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

The attached SEARs have been prepared in consultation with the relevant government agencies and Penrith City Council (see **Attachment 2**). The SEARs are based on the scoping report prepared by Willowtree Planning, dated 15 August 2018.

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

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

If the proposal is likely to have a significant impact on matters of National Environmental Significance, it may require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). If an EPBC Act approval is required, please advise accordingly, as the Commonwealth approval process may be integrated into the NSW approval process, and supplementary SEARs may need to be issued.

Please contact the Department at least **two weeks** before you lodge the EIS and any associated documentation for the development. This will enable the Department to confirm:

- the applicable fee (see Division 1AA, Part 15 of the *Environmental Planning and Assessment Regulation 2000*)
- consultation and public exhibition arrangements.

If you have any enquiries, please contact Bianca Thornton on the details above.

Yours sincerely

C. Ritchie

Chris Ritchie 14/9/18
Director
Industry Assessments
as the delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD 9522
Project Name	Kemps Creek Warehouse and Logistics Hub
Development	Establishment of a warehouse and logistics hub, comprising: • site-wide earthworks, infrastructure and internal road network • construction and operation of 11 warehouses comprising 165,186 square metres (m^2) of floor space (152,485 m^2 warehouse and 7,700 m^2 office) • 816 parking spaces • subdivision.
Location	657-769 Mamre Road, Kemps Creek in the Penrith Local Government Area (Lot 34 DP1118173, Lot X DP421633, Lot 1 DP1018318, Lot Y DP421633 and Lot 22 DP258414)
Applicant	Frasers Property Industrial Construction Pty Ltd and Altis Property Partners Pty Ltd
Date of Issue	14 September 2018
General Requirements	The environmental impact statement (EIS) must be prepared in accordance with, and meet the minimum requirements of, clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation). In addition, the EIS must include: • a detailed description of the development, including: – the need for the proposed development – justification for the proposed development – likely staging of the development – likely interactions between the development and existing, approved and proposed operations in the vicinity of the site – plans of any proposed building works • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments • a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment • a detailed assessment of the key issues specified below, and any other significant issues identified in this risk assessment, which includes: – a description of the existing environment, using sufficient baseline data – an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes – a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/ or contingency plans to manage significant risks to the environment • a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and

	prepared on company letterhead and indicate applicable GST component of the CIV • an estimate of jobs that will be created during the construction and operational phases of the proposed development • certification that the information provided is accurate at the date of preparation.
Key issues	The EIS must address the following specific matters: • **Statutory and Strategic Context** – including: – detailed justification that the proposed land use is permissible, taking into consideration the State Environmental Planning Policy (Western Sydney Employment Area) 2009 – details of any proposed consolidation or subdivision of land – demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following must be addressed: o State Environmental Planning Policy (Western Sydney Employment Area) 2009 o A Metropolis of Three Cities o Western City District Plan o Western Sydney Aerotropolis – Land Use and Infrastructure Implementation Plan – Stage 1: Initial Precincts o Western Sydney Freight Line corridor. • **Planning Agreement/Development Contributions** – demonstration that satisfactory arrangements have been or would be made to provide, or contribute to the provision of, necessary local and regional infrastructure required to support the development. • **Suitability of the Site** – including: – an analysis of site constraints, such as flooding impacts and future road and road corridors – a detailed justification that the site is suitable for the scale of the proposal and any constraints identified, having regard to the site's surrounds and the potential visual impact of the development. • **Community and Stakeholder Engagement** – including: – a detailed community and stakeholder participation strategy which identifies who in the community has been consulted and a justification for their selection, other stakeholders consulted and the form(s) of consultation, including a justification for this approach – a report on the results of the implementation of the strategy including issues raised by the community and surrounding land owners and occupiers that may be impacted by the proposal – details of how issues raised during community and stakeholder consultation have been addressed and whether they have resulted in changes to the proposal – details of the proposed approach to future community and stakeholder engagement based on the results of consultation. • **Urban Design and Visual** – including: – a visual impact assessment (including photomontages and perspectives) of the development layout and design (buildings and storage areas), including height, colour, scale, building materials and finishes, signage and lighting, having regard to surrounding residential receivers and clause 23 of the State Environmental Planning Policy (Western Sydney Employment Area) 2009, particularly in terms of potential impacts on: o nearby public and private receivers o significant vantage points in the broader public domain including Mamre Road – consideration of the layout and design of the development having regard to the surrounding vehicular, pedestrian and cycling networks

- detailed plans showing suitable landscaping which incorporates endemic species
- a design report that establishes design guidelines and development parameters, and includes diagrams, illustrations and drawings to clarify the design intent of the proposal and which clearly demonstrates how design quality will be achieved in accordance with Clause 31 Design Principles of the State Environmental Planning Policy (Western Sydney Employment Area) 2009

- **Traffic and Transport** – including:
  - a quantitative Traffic Impact Assessment prepared in accordance with relevant Penrith City Council, Austroads and Roads and Maritime Services guidelines
  - details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation
  - impacts on the safety and capacity of the surrounding road network and access points, using SIDRA or similar modelling, to assess impacts from current traffic counts and cumulative traffic from existing and proposed development
  - demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development
  - details and a justification of access to, from and within the site (vehicular and pedestrian)
  - details of road upgrades, new roads or access points required for the development, if necessary
  - consideration of the western connection of the Southern Link Road and road widening requirements for Mamre Road, in consultation with RMS
  - consideration of the proposed Western Sydney Freight Line, including the width of the corridor and how this will be considered in the layout of the proposal, in consultation with TfNSW
  - details of how the proposal would allow connection to future land uses to the south of the site.
- **Flooding** – a detailed hydrological and hydraulic assessment which includes the following:
  - a comprehensive assessment of the impact of flooding on the development for the full range of flood events up to the probable maximum flood. This assessment should address any relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity
  - consideration of current flooding behaviour and impacts, including on flood detention areas, how flood behaviour and impacts will change due to the proposal and how these changes will be mitigated
  - assessment of the impact of the development on flood behaviour (i.e., levels, velocities and duration of flooding) and on adjacent, downstream and upstream areas
  - detail proposed floor levels for all proposed habitable structures on the site having considered the full range of flood events up to the probable maximum flood
  - detail an emergency response plan for the site, which includes consideration of a flood-free access to or from the development site in extreme flood events.
- **Soils and Water** – including:
  - a description of how the proposal takes into consideration the South Creek corridor strategy and the land use vision for the South Creek Precinct, in consultation with Infrastructure NSW and the Greater Sydney Commission
  - measures to protect the Warragamba Pipelines corridor from any works or activities associated with the development

	– details of how access to the Warragamba Piplines corridor would be maintained, in consultation with WaterNSW – a description of the water demands and a breakdown of water supplies, including a detailed site water balance – identification of any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000* – details of proposed erosion and sediment controls during construction – a description of the surface and stormwater management system designed in accordance with Penrith City Council's Water Sensitive Urban Design Policy, including drainage design, on site detention, and measures to treat or re-use water – characterisation of the nature and extent of any contamination on the site and surrounding area – an assessment of potential impacts on surface and groundwater resources, drainage patterns, soil (stability, salinity and acid sulfate soils), related infrastructure, watercourses and riparian land and proposed mitigation, management and monitoring measures. • **Biodiversity** – including: – an assessment of the proposal's biodiversity impacts in accordance with the *Biodiversity Conservation Act 2016*, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted – describe how impacts upon critical vegetation and endangered species on site will be avoided and minimised. • **Infrastructure Requirements** – including: – a detailed written and/or geographical description of infrastructure required on the site – identification of any infrastructure upgrades required off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained – an infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in place prior to the commencement of construction – an assessment of the impacts of the development (construction and operation) on existing infrastructure surrounding the site. • **Heritage** – including: – an Aboriginal Cultural Heritage Assessment Report prepared in consultation with Aboriginal people and in accordance with Office of Environment and Heritage guidelines – an assessment of European Heritage including potential impacts on the surrounding site and surrounding area, including any built landscape items, conservation areas, views and settings. • **Noise and Vibration**– including: – a quantitative noise and vibration impact assessment undertaken by a suitably qualified person in accordance with the relevant Environment Protection Authority guidelines and including an assessment of nearby sensitive receivers – cumulative impacts of other developments – details of proposed mitigation, management and monitoring measures. • **Hazards and Risk** – including: – a preliminary risk screening completed in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* and *Applying SEPP 33* (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory

	Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). • **Bushfire** – including: – details of the storage of any flammable materials – an assessment against the requirements of *Planning for Bushfire Protection 2006*, particularly access and provision of water supply for firefighting purposes – a description of measures to ensure the proposal will not increase the bushfire risk to adjoining lands. • **Waste** – including: – details of the quantities and classification of all waste streams to be generated on site during construction and operation – details of waste storage, handling and disposal during construction and operation – details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-2021. • **Air Quality** – including: – an assessment of the air quality impacts (including dust) during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines – details of proposed mitigation, management and monitoring measures. • **Social** – including the preparation of a social impact assessment, which: – identifies and analyses the potential social impacts of the development, from the points of view of the affected community/ies and other relevant stakeholders, i.e. how they expect to experience the project – considers how potential environmental changes in the locality may affect people's: way of life; community; access to and use of infrastructure, services, and facilities; culture; health and wellbeing; surroundings; personal and property rights; decision-making systems; and fears and aspirations, as relevant and considering how different groups may be disproportionately affected – assesses the significance of positive, negative, and cumulative social impacts considering likelihood, extent, duration, severity/scale, sensitivity/importance, and level of concern/interest – includes mitigation measures for likely negative social impacts, and any proposed enhancement measures – details how social impacts will be adaptively monitored and managed over time.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. You should provide these as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Penrith City Council • Greater Sydney Commission • Roads and Maritime Services • Transport for NSW • Office of Environment and Heritage • Environment Protection Authority • Fire and Rescue NSW • Rural Fire Service • Department of Industry – Crown Lands and Water • Sydney Water

	• WaterNSW • surrounding local residents and stakeholders • any other public transport or community service providers. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1
Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.shop.nsw.gov.au/index.jsp
http://www.australia.gov.au/publications
http://www.epa.nsw.gov.au/
http://www.environment.nsw.gov.au/
http://www.dpi.nsw.gov.au/

Policies, Guidelines & Plans

Aspect	Policy / Methodology
Visual	
	Control of Obtrusive Effects of Outdoor Lighting (Standards Australia, AS 2482)
	State Environmental Planning Policy No 64 - Advertising and Signage
Traffic, Transport and Access	
	Roads Act 1993
	State Environmental Planning Policy (Infrastructure) 2007
	Guide to Traffic Generating Development (Roads and Maritime Services)
	Road Design Guide (Roads and Maritime Services)
	Austroads Guide to Traffic Management – Pt 12: Traffic Impacts of Development
	Austroads Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas
	NSW Long Term Transport Master Plan
Soils and Water	
Soil	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)
	National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)
	State Environmental Planning Policy No. 55 – Remediation of Land
	Managing Land Contamination - Planning Guidelines SEPP 55 – Remediation of Land (DUAP and EPA)
Acid Sulfate Soils	Acid Sulfate Soil Manual (ASSMAC)
Erosion and Sediment	Managing Urban Stormwater: Soils & Construction (Landcom)
	Design Manual for Soil Conservation Works - Technical Handbook No. 5 (Soil Conservation Service of NSW)
	Soil and Landscape Issues in Environmental Impact Assessment (DLWC)
	Wind Erosion – 2nd Edition
Groundwater	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC)
	NSW State Groundwater Policy Framework Document (DLWC)
	NSW State Groundwater Quality Protection Policy (DLWC)
	NSW State Groundwater Quantity Management Policy (DLWC) Draft
	The NSW State Groundwater Dependent Ecosystem Policy (DLWC)
	NSW Aquifer Interference Policy (NOW)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (NOW) 2011
	Bunding and Spill Management (EPA)
Stormwater	Managing Urban Stormwater: Strategic Framework. Draft (EPA)
	Managing Urban Stormwater: Council Handbook. Draft (EPA)
	Managing Urban Stormwater: Treatment Techniques (EPA)
	Managing Urban Stormwater: Source Control. Draft (EPA)
	Managing Urban Stormwater: Harvesting and Reuse (DEC)
Wastewater	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Effluent Management (ARMCANZ/ANZECC)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems - Use of Reclaimed Water (ARMCANZ/ANZECC)
	National Water Quality Management Strategy - Guidelines For Water Recycling: Managing Health And Environmental Risks (Phase1) (EPHC, NRMMC & AHMC)
Biodiversity	
	The Biodiversity Assessment Method (OEH, 2017)
Heritage	
	Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)
	Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)
	Draft Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (Department of Planning 2005)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010)
	Heritage Act 1977
Noise and Vibration	
	Assessing Vibration: A Technical Guide (DEC, 2006)
	Noise Policy for Industry (EPA, 2017)
	Environmental Criteria for Road Traffic Noise (EPA, 1999)
	Noise Guide for Local Government (EPA, 2013)
	Interim Construction Noise Guideline (DECC, 2009)
Hazards and Risk	
	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
	Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DUAP)
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
	Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning (DoP 2011)
Bushfire	
	Planning for Bushfire Protection (Rural Fire Service, 2006)
Waste	
	Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA)
Air Quality	
	Protection of the Environment Operations (Clean Air) Regulation 2002
Air Quality	Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016)
Greenhouse Gas	AGO Factors and Methods Workbook (AGO)

Policies, Guidelines & Plans

Aspect	Policy / Methodology
	Guidelines for Energy Savings Action Plans (DEUS, 2005)
Social	
	Social Impact Assessment Guideline (Department of Planning and Environment)

ATTACHMENT 2
Government Authority Responses to Request for Key Issues

Our reference: ECM 8346214
Contact: Gemma Bennett
Telephone: 4732 8285

10 September 2018

Department of Planning & Environment
Attn: Bianca Thornton
Planning Officer
Industry Assessments
GPO Box 39
SYDNEY NSW 2001

Via email: Bianca.thornton@planning.nsw.gov.au

Dear Ms Thornton,

Notification of SEARs – Kemps Creek Warehouse and Logistics Hub (SSD 9522) at 657-759 Mamre Road, Kemps Creek

I refer to your email regarding the Notice of SEARs – Kemps Creek Warehouse and Logistics Hub (SSD 9522) dated 21 August 2018.

The following comments are provided for your reference:

1. Strategic Planning, Permissibility and Orderly Development

- The applicant appears to be reliant on clause 12 of State Environmental Planning Policy (Western Sydney Employment Area) 2009 to provide permissibility for the land use. However, clause 12 does not include provisions for permissibility for any land uses in unzoned land. Under the Policy -it states that (1) consent is required for development, and (2) the consent authority must consider adjoining land before granting consent. The surrounding land is predominantly zoned RU2 Rural Landscape under Penrith Local Environmental Plan 2010 and the proposed land use is currently expressly prohibited in the RU2 zone and is incompatible with the applicable zone objectives. As a result, it is therefore considered that, under the provisions of the SEPP, the proposal is currently not permissible or suitable for the reasons outlined below.

- While discussions between Council and the proponent in relation to rezoning of the land under SEPP (WSEA) 2009 were held earlier in 2018, it is understood that to date no Planning Proposals has been lodged.

- As the property is identified within the Mamre Road Precinct of the Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan (LUIIP) Stage 1: Initial Precincts (Department of Planning and Environment, August 2018), any large-scale proposal that alters development capability and permissible land uses should be approached with caution until the LUIIP Stage 2: Structure Plan and associated land use directions under the LUIIP are established. Approval of the proposal ahead of this direction has the potential to adversely impact the master planning of this area and the orderly development of the locality.

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NSW 2751 Australia
T 4732 7777
F 4732 7958
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2. Internal Road Design and Infrastructure

- The design and alignment of the Link Road is expected to continue to the west of the site over South Creek. The design of the Link Road should take into consideration the following constraints:
  - Future alignment and levels of the Link Road and bridge works over South Creek and the flooding impacts;
  - Impacts of the future Western Sydney Freight line between the Link Road and Water NSW pipe lines;
  - Temporary cul-de-sac at the western end of the Link Road for manoeuvring shall be provided for the largest vehicle access the site.

- The proposal needs to accommodate the future Western Sydney Freight (railway) line along the southern side of the Water NSW pipeline and may need to provide access for railway future maintenance work. This is yet to be resolved by RMS.

- The parallel road of Bakers lane and the Southern Link Road shall be reviewed. The need for a separate Bakers Lane road carriageway is not considered necessary and access to the proposed lots adjacent to the pipeline could be off a new cul-de-sac with a controlled intersection with the new link road.

- The proposed north/south Local Road should continue to the property boundary to set up access to future development to the south. The road should be upgraded to an industrial local collector road width and standard which would not isolate this development from future development to the south and minimise future access to Mamre Road. This would also remove the requirement for the proposed left in/left out onto Mamre Road. Consultation with RMS and Council will be required to determine the most appropriate road network strategy for the site with connectivity to future development to the south.

- Proposed development and subdivision works adjacent to the Warragamba Pipelines corridor shall conform to the Water NSW requirements as per Part C13 Infrastructure and Services of Penrith Development Control Plan 2014.

- The section of Reserved Road 20.115 under DP 1118173 (also known as Bakers Lane) on the submitted plans is currently an unformed/sealed access track and may be classified as a Crown Road reserve. The developer is to seek confirmation from Crown Lands.

- Splay corners within the corner lots shall be provided at road intersections.

- Typical road types/cross-sections, footpath, cycleway, lighting have not been provided as part of this assessment.

3. Traffic Management

- Suitable provision is made to accommodate and service the development in terms of traffic and transport. On-site car parking is proposed to support the use of the site, so as to not adversely affect the surrounding road network, and maintain all traffic flow within the RMS Environmental Amenity Standards.

- It is noted that signalised intersections and left in/left out arrangements to Mamre road are sought, which are supported in principle.

- Council is yet to resolve with RMS the critical issue being the Southern Link Road alignment, intersection with Mamre Road and the extension alignment of the Southern Link Road to the west of Mamre Road. Council is lobbying for the

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F 4732 7958
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Southern Link Road and roads to the east of the site to be State classified roads due to their position in the road hierarchy.

4. Stormwater and Flooding

- The provision of basins and associated infrastructure within the floodway is not supported. Whilst some infrastructure may be suitable below the 1% AEP development within the floodway will not be supported.

- The applicant shall consider water quality and quantity measures within each individual development. Water quality and quantity measures for stormwater runoff for the public roads shall also be considered and maintained by the registered proprietor and/or community estate – not Council.

- The development site consists of several lots located within South Creek floodplain. The proposed development will impact on flooding as filling (and constructing buildings) is proposed.

- The flood map attached shows the floodway (red), flood storage (green), flood fringe (yellow), the PMF (light green) and the Flood Planning Area limits. As the proposed filling is well within the flood storage areas a detailed flood impact assessment report is required at planning stage that references adopted South Creek Flood Study and recognises areas that are not developable due to flood constraints. The majority of lots within the planning proposal are coded as FA lots and as such detail is required how water traverses through the site. The cumulative loss of flood storage across the South Creek catchment shall be addressed.

- The flood impact assessment must also assess the flood impacts to adjacent properties. When off-site flood impacts are assessed it should be considered a minimum of 2km upstream and 2km downstream to avoid effects at the boundaries of flood modelling. The assessment shall also take into consideration the recent land development under SSD 7173 –Mamre West Land north of the pipe lines.

- A peer review of the flood modelling and flood impact assessment should be undertaken by an independent flood modelling consultant to ensure the flood modelling undertaken is appropriate to the site.

- An overland flow analysis of the catchment upstream of Mamre Road shall be considered in the overall stormwater management of the site.

- We understand (without detail) that the Department of Planning are commissioning a study of the South Creek catchment to determine water quality and quantity targets including environmental impacts, development areas and constraints. Until Council have further detail of this study the Department should be consulted regarding development of this kind along the corridor.

5. Water Sensitive Urban Design

- An overarching Water Sensitive Urban Design (WSUD) Strategy is to be prepared that details the WSUD objectives and how stormwater quality control measures will be implemented to meet pollutant retention targets. The WSUD Strategy must include details of all proposed stormwater treatment measures (approximate size and location, type, configuration etc), and indicate whether the treatment measures will remain in private ownership. As discussed it is preferable that these treatment measures remain in private/community title ownership as per the approach taken for Erskine Business Park.

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NSW 2751 Australia
T 4732 7777
F 4732 7958
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- Any proposed stormwater treatment strategy will need to be informed by high level stormwater quantity and quality modelling using MUSIC. The modelling must use the parameters included in Section 4 of the WSUD Technical Guidelines, as developed for Penrith. A copy of the electronic MUSIC model (i.e.*sqz file) will need to be provided with the design meeting the following pollution retention criteria:
  - - 90% Gross Pollutants;
  - - 85% Total Suspended Solids (TSS);
  - - 60% Phosphorous (TP);
  - - 45% Nitrogen (TN).

- The WSUD Strategy for the site will need to document how potable water conservation targets will be met as per the WSUD Policy requirements. Details on how stormwater harvesting and reuse will be incorporated into the development should be provided. The development provides significant opportunities for stormwater harvesting and at least 80% of non-potable demand should be provided for by rainwater tanks.

- Any changes to the flow rate and flow duration within receiving watercourses as a result of the development shall be limited as far as practicable. Evidence should be provided to show that natural flow paths, discharge points and runoff volumes from the site are retained and maintained as far as possible.

- The subdivision plans for the site should include indicative areas set aside for drainage/WSUD measures, to ensure adequate site area is allocated for these functions early in the layout planning.

- With regards to the riparian corridor, any changes to the existing drainage line will need to be in accordance with the requirements of the NSW Department of Industry – Natural Resources Access Regulator (NRAR). Further to this, a vegetation management plan which meets the Department's guidelines should be prepared which provides detailed guidance on the management requirements for this area.

- Any impacts to South Creek should be minimised and the preference should be to restore the riparian corridor to the standards recommended by the NSW NRAR. Controlled activity approvals for all works within 40m of the creek will also need to be obtained.

6. Environmental Management

- The Environmental Impact Statement (EIS) prepared to support the SSD application should provide a detailed and comprehensive description of the proposal. All environmental impacts of the proposal will need to be identified in the EIS and supported by technical assessment reports prepared by appropriately qualified persons and in accordance with applicable legislation, guidelines and standards.

- It is noted that the document submitted commits to a range of investigations and assessments (contamination, air quality, etc.), however it does not confirm that a formal acoustic assessment will be carried out. Given the proximity to residential receivers (Twin Creeks), and other sensitive receivers (aged care facility and nearby schools), an Acoustic Report should be required to be prepared, with consideration given to construction and operational noise impacts, including those associated with traffic movements and the use of plant and equipment.

- In relation to land contamination, it is important to note that all remediation works in the Penrith local government area require development consent at present, in

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T 4732 7777
F 4732 7958
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line with the requirements of SREP 20 and SEPP 55. Should any site investigations identify contaminated land, consent for remediation works should be sought as a part of this application.

- Appropriate consideration also needs to be given to the potential impacts to flora and fauna. As the site is bordered by South Creek to the west and is mapped as containing Cumberland Plain Woodland, the various state and federal requirements for assessment need to be met. The document has confirmed that investigations are already underway to address this aspect.

As a result of the above permissibility and orderly development concerns, a position from the Department on the provisions of State Environmental Planning Policy (Western Sydney Employment Area) 2009 with respect to permissibility is requested, as this will impact upon the assessment and review of any application pursued.

Should you require any further information or would like to discuss this matter further, please no not hesitate to contact Gemma Bennett on (02) 4732 8285.

Yours faithfully

Gavin Cherry
Development Assessment Coordinator

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

NSW GOVERNMENT | Office of Environment & Heritage

DOC18/604121
SSD 9522

Bianca Thornton
Planning Officer – Industry Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Request for SEARs - Warehouse and logistics hub 657-769 Mamre Road, Kemps Creek (SSD 9522)

Dear Ms Thornton

I refer to your e-mail dated 21 August 2018 requesting input from the Office of Environment and Heritage (OEH) on the Secretary's Environment Assessment Requirements for the above State Significant development.

Please find attached OEH's environmental assessment requirements in Attachment 1.

Aboriginal Cultural Heritage
OEH records indicate that a number of Aboriginal Cultural Heritage items are located on this site and the requirements attached must be addressed.

Biodiversity
The *Biodiversity Conservation Act 2016 (BC Act)* provides a framework and tools to avoid, minimise and offset impacts on biodiversity. Cumberland Plain Woodland (CPW) Critically Endangered Ecological Community (CEEC) exists on the site and is proposed to be cleared across the site. The total area of CPW patches comprises approximately 5ha whereas the total area of the site is 112ha. OEH considers that through better site planning that these areas of CPW can be protected and retained, rather than cleared. The development proposed currently fails to address the BC Act objectives of avoiding and minimising impacts.

South Creek is located along the sites western boundary. The State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA) Land Application Map shows that the subject site is not yet zoned nor is it located within an Industrial Release Area pursuant to Clause 29. The SEPP aims to protect and enhance land to which this Policy applies through appropriate environmental conservation zones, environmentally sensitive development and rehabilitation of remnant vegetation and areas with biodiversity value.

The following SEPP aims are relevant to this proposal and must be addressed in the siting and design of the proposal:
(c) to rezone land for employment or environmental conservation purposes

PO Box 644 Parramatta NSW 2124
Level 6, 10 Valentine Ave Parramatta NSW 2150
Tel: (02) 9995 5000 Fax: (02) 9995 6900
ABN 30 841 387 271
www.environment.nsw.gov.au

(e) to ensure that development occurs in a logical, environmentally sensitive and cost-effective manner and only after a development control plan (including specific development controls) has been prepared for the land concerned
(f) to conserve and rehabilitate areas that have a high biodiversity or heritage or cultural value, in particular areas of remnant vegetation.

Given the above SEPP aims, OEH recommends that the South Creek Corridor should be protected and conserved. It is noted that the existing zoning under this SEPP for nearby creeks such as Ropes Creek and its tributaries is E2 Environmental Conservation. Impacts to significant vegetation should be avoided with areas identified as high biodiversity and conservation value, including the riparian corridor along South Creek on the site and 40m from the top of the bank, protected through a suitable conservation zoning and shown as reserved for future E2 Environmental Conservation Zone on the development proposal plans.

Further, this would be consistent with the SEPP's aims and the following strategies and planning priorities that are directly relevant to this proposal in the Western City District Plan:

- **Planning Priority W13:** Creating a Parkland City urban structure and identity, with South Creek as a defining spatial element

This gives effect to the regional plan A *Metropolis of Three Cities* Objective 26: A cool and green parkland city in the South Creek corridor. A *Metropolis of Three Cities'* vision for South Creek Corridor is to transform its water management, while using the creek corridor to form the spine of the Western Parkland City. This conceptualises a green corridor that provides sites for parks, walking and cycling trails, community facilities, and ecological services including nutrient capture, urban cooling, and local habitat. Innovative approaches will be needed to incorporate specific landscape and waterway features into the design of new urban communities.

The district plan also notes that in recently established neighbourhoods, **environment zones** have been used along major waterways, making a step towards a green parkland city.

The South Creek Urban Design Principles (figure 21 of the Western City District Plan) require that for new business and industrial areas, the plan encourages creek facing employment hubs and recreation spaces for workers. For this site, OEH encourages retention of the CPW and that the area be protected and incorporated into the design of the development. This would also be consistent with the District Plans following two priorities:

- **Planning Priority W14:** Protecting and enhancing bushland and biodiversity
- **Planning Priority W15:** Increasing urban tree canopy cover and delivering Green Grid connections

The district plan states that South Creek is a priority Corridor on the green grid and it is intended to create a continuous open space corridor along the entirety of South Creek that provides ecological protection and enhancement, better stormwater treatment and a regionally significant corridor for recreation uses.

Flooding
The flood requirements outlined in the table attached must be included in the SEARs.

Sustainability
OEH also recommends that the NSW and ACT Governments Regional Climate Modelling (NARCliM) climate change projections developed for the Sydney Metropolitan area are used to inform the building design and asset life of the project. These include over 100 climate variables, including temperature, rainfall, hot days and cold nights, severe Forest Fire Danger Index (FFDI) and are publicly available online and at fine resolution (10km and hourly intervals) for 20-year time periods: 2020–2039 near future and long-term 2060–2079. Further, sustainable design measures such as green roofs should be incorporated into the project design to maximise the long-term Ecologically Sustainable Development outcomes of the proposal.

In this regard, under the heading Ecologically Sustainable Development of the draft SEARs, OEH recommends the following items are added.

- The development incorporates green walls, green roof and/or a cool roof into the design
- The climate change projections developed for the Sydney Metropolitan area are used to inform the building design and asset life of the project

→ Relevant Data and Guidelines:

- NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections are used to inform the building design
- OEH (2015) Urban Green Cover in NSW Technical Guidelines.

A separate response may be provided on heritage matters by the Heritage Division of OEH as delegate of the Heritage Council of NSW. If you have any queries about this advice, please contact Svetlana Kotevska on 8837 6040 or by email at Svetlana.kotevska@environment.nsw.gov.au.

Yours sincerely

S. Harrison 06/09/18

SUSAN HARRISON
Senior Team Leader - Planning
Greater Sydney
Communities and Greater Sydney Delivery Division

Attachment 1: OEH Recommended Environmental Assessment Requirements – Request for SEARs - Warehouse and logistics hub 657-769 Mamre Road, Kemps Creek (SSD 9522)

Biodiversity
1. Biodiversity impacts related to the proposed development are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 using the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and the Biodiversity Assessment Method.
2. The BDAR must document the application of the avoid, minimise and offset hierarchy including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
3. The BDAR must include details of the measures proposed to address the offset obligation as follows; a. The total number and classes of biodiversity credits required to be retired for the development/project; b. The number and classes of like-for-like biodiversity credits proposed to be retired; c. The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; d. Any proposal to fund a biodiversity conservation action; e. Any proposal to conduct ecological rehabilitation (if a mining project); f. Any proposal to make a payment to the Biodiversity Conservation Fund. g. If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.
4. The BDAR must be submitted with all digital spatial data associated with the survey and assessment as per Appendix 11 of the BAM.
5. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016.*

Aboriginal cultural heritage
6. The EIS must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values must be conducted in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH 2010), and guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and consultation with OEH regional branch officers. Note that Due Diligence is not designed for the assessment of a SSD and not a substitute for an ACHAR.
7. Consultation with Aboriginal people must be undertaken and documented in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DEWCC). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.
8. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.
9. The assessment of cultural heritage values must include a surface survey undertaken by a qualified archaeologist in areas with potential for subsurface Aboriginal deposits. The result of the surface survey is to inform the need for targeted test excavation to better assess the integrity, extent, distribution, nature and overall significance of the archaeological record. The results of surface surveys and test excavations are to be documented in the ACHAR.
10. The ACHAR must outline procedures to be followed in the event Aboriginal burials or skeletal material is uncovered during construction to formulate appropriate measures to manage the impacts to this material.
Flooding hazards
11. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including: a. Flood prone land. b. Flood planning area, the area below the flood planning level. c. Hydraulic categorisation (floodways and flood storage areas). d. Flood hazard
12. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.
13. The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios: a. Current flood behaviour for a range of design events as identified in 14 above. This includes the 0.5% and 0.2% AEP year flood events as proxies for assessing

sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

14. Modelling in the EIS must consider and document:
    a. Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.
    b. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood.
    c. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
    d. Relevant provisions of the NSW Floodplain Development Manual 2005.

15. The EIS must assess the impacts on the proposed development on flood behaviour, including:
    a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
    b. Consistency with Council floodplain risk management plans.
    c. Consistency with any Rural Floodplain Management Plans.
    d. Compatibility with the flood hazard of the land.
    e. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
    f. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
    g. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
    h. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.
    i. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
    j. Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
    k. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

Water and Soils

16. The EIS must map the following features relevant to water and soils including:
    a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).

b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
c. Wetlands as described in s4.2 of the Biodiversity Assessment Method.
d. Groundwater.
e. Groundwater dependent ecosystems.
f. Proposed intake and discharge locations.

17. The EIS must describe background conditions for any water resource likely to be affected by the development, including:
a. Existing surface and groundwater.
b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.
c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.
d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.
e. Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning

18. The EIS must assess the impacts of the development on water quality, including:
a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
b. Identification of proposed monitoring of water quality.
c. Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan)

19. The EIS must assess the impact of the development on hydrology, including:
a. Water balance including quantity, quality and source.
b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow,

aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).

e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.

f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.

g. Identification of proposed monitoring of hydrological attributes.

11 September 2018

Our Reference: SYD18/01322 (A23972195)
Dept Ref: SSD 9522

Planning Officer
Industry Assessments
Department of Planning & Environment
GPO Box 39 SYDNEY NSW 2001

Attention: Bianca Thornton

Dear Sir/Madam,

SEARS REQUEST FOR WAREHOUSE & LOGISTICS HUB
657-769 MAMRE ROAD, KEMPS CREEK, PENRITH LGA

Reference is made to your email dated 21 August 2018 requesting Roads and Maritime Services (Roads and Maritime) to provide details of key issues and assessment requirements regarding the abovementioned development for inclusion in the Secretary's Environmental Assessment Requirements (SEARs).

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

1. It is noted per the submission that there is multiple access points proposed on Mamre Road. Roads and Maritime reiterates that the Australian Guidelines "Planning for Road Safety" is based on the widely accepted principle of conflict reduction by separating the traffic movement and land access functions as much as possible. The number of access points should be minimised. Therefore the proposed development should have all its access from the Southern Link Road connection.

2. Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required).

   The key intersections to be examined / modelled include:

   - Site Access Road / Mamre Road

3. Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle widths, etc).

4. Proposed number of car parking spaces and compliance with the appropriate parking codes.

5. Details of light and heavy vehicle movements (including vehicle type and likely arrival and departure times).

6. To ensure that the above requirements are fully addressed, the transport and traffic study must properly ascertain the cumulative study area traffic impacts associated with the development (and any other known proposed developments in the area). This process provides an opportunity to identify a package of traffic and transport infrastructure measures required to support future development. Regional and local intersection and road improvements, vehicular access options for adjoining sites, public transport needs, the timing and cost of infrastructure works and the identification of funding responsibilities associated with the development should be identified.

7. Roads and Maritime requires the Environmental Assessment report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location-specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.

8. Roads and Maritime requires an assessment of the likely toxicity levels of loads transported on arterial and local roads to / from the site and, consequently, the preparation of an incident management strategy for crashes involving such loads, if relevant.

Should you have any further inquiries in relation to this matter, please do not hesitate to contact Hans Pilly Mootanah on telephone 8849 2076 or by email at development.sydney@rms.nsw.gov.au

Yours sincerely,

Pahee Rathan
A/Senior Land Use Assessment Coordinator
North West Precinct

Transport for NSW

Ms. Nikki Matthews
Planning Officer
Industry Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms. Matthews

Request for Secretary's Environmental Assessment Requirements (SEARs) – SSD 9522 Warehouse and Logistics Hub - 657-769 Mamre Road, Kemps Creek

Thank you for your email dated 21 August 2018 requesting Transport for NSW (TfNSW) provide input to the Secretary's Environmental Assessment Requirements (SEARs) for the above State Significant Development (SSD).

Transport and Accessibility (Construction and Operation)

TfNSW advises that the Environmental Impact Statement (EIS) for the subject development should include a Traffic and Transport Impact Assessment that provides, but is not limited to, the following:

- details all daily and peak traffic and transport movements likely to be generated (light and heavy vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development;
- details of the current daily and peak hour vehicle, public transport, pedestrian and bicycle movements and existing traffic and transport facilities provided on the road network located adjacent to the proposed development;
- an assessment of the operation of existing and future transport networks including public transport, pedestrian and bicycle provisions and their ability to accommodate the forecast number of trips to and from the development;
- details the type of heavy vehicles likely to be used (e.g. B-doubles) during the operation of the development and the impacts of heavy vehicles on nearby intersections;
- details of access to, from and within the site from the road network including intersection location, design and sight distance (i.e. turning lanes, swept paths, sight distance requirements);
- impact of the proposed development on existing and future public transport and walking and cycling infrastructure within and surrounding the site;
- an assessment of the existing and future performance of key intersections providing access to the site (Mamre Road and the First Estate Access Road), and any upgrades (road/ intersections) required as a result of the development;
- an assessment of predicted impacts on road safety and the capacity of the road network to accommodate the development;
- demonstrate the measures to be implemented to encourage employees of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing;

- appropriate provision, design and location of on-site bicycle parking, and how bicycle provision will be integrated with the existing bicycle network;
- details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on the site;
- details of access and parking arrangements for emergency vehicles;
- detailed plans of the proposed layout of the internal road network and parking provision on-site in accordance with the relevant Australian Standards;
- details of any likely dangerous goods to be transported on arterial and local roads to/from the site, if any, and the preparation of an incident management strategy, if necessary;
- the existing and proposed pedestrian and bicycle routes and end of trip facilities within the vicinity of and surrounding the site and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles; and
- preparation of a draft Construction Traffic Management Plan which includes:
    - details of vehicle routes, number of trucks, hours of operation, access management and traffic control measures for all stages of construction;
    - assessment of cumulative impacts associated with other construction activities;
    - an assessment of road safety at key intersections;
    - details of anticipated peak hour and daily truck movements to and from the site;
    - details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements;
    - details of temporary cycling and pedestrian access during constructions;
    - an assessment of traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrians, cyclists and public transport operations.

Consultation

During the preparation of the EIS, the applicant should consult with:

- Penrith City Council
- Roads and Maritime Services.

Proposed Western Sydney Freight Line

The public exhibition and the Statement of Environmental Effects for the Western Sydney Freight Line (WSFL) state the corridor in the vicinity of the proposed SSD to be 60-80m. The Preliminary Environmental Assessment identifies the future WSFL as a 40m corridor. Gazettal of the WSFL corridor is expected to be completed in the near future, and the proponent should continue to consult with TfNSW to ensure design of the proposal has accounted for the gazetted corridor width.

If the proposed SSD requires ground penetration and/or excavation to be done to a depth greater than 2m within a 25 metre proximity of the proposed Western Sydney Freight Line, TfNSW will require geotechnical, construction and survey documentation to be prepared and submitted. While, concurrence does not apply to this development application TfNSW advises that the proposal will be assessed in accordance with the requirements of clause 86(4) of the SEPP (Infrastructure) 2007.

If you require further information regarding the above, please don't hesitate to contact Lee Farrell, Transport Planner, via email at lee.farrell@transport.nsw.gov.au.

Yours sincerely

6/9/2018

Mark Ozinga
Principal Manager, Land Use Planning & Development
Freight, Strategy and Planning

CD18/07631

PO Box 398, Parramatta NSW 2124
Level 14, 169 Macquarie Street
Parramatta NSW 2150
www.waternsw.com.au
ABN 21 147 934 787

10 September 2018

Contact: *Alison Kniha*
Telephone: *02 9865 2505*
Our ref: *D2018/96427*

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

Dear Ms Thornton

Input on SEARs – Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Thank you for your email dated 21 August 2018 requesting WaterNSW's input for the SEARs associated with the State Significant Development 9522 at Kemps Creek.

The subject site is immediately south of the Warragamba Pipelines, which are critical water supply infrastructure transporting raw water from Warragamba Dam to the Prospect water filtration plant. The infrastructure and corridor in which it is located are owned and managed by WaterNSW. The corridor is also a 'controlled area' under the *Water NSW Act 2014*, and entry is prohibited without the written consent of WaterNSW.

WaterNSW has reviewed the Preliminary Environmental Assessment (PEA) and associated documentation, and provides the following comments and requirements:

- The WaterNSW publication 'Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines' should inform the preparation of the environmental impact statement (EIS) for the development. The Guidelines are available on WaterNSW's website.
- The PEA (15 August 2018; s3.5) states that consultation is occurring with WaterNSW. To date, WaterNSW has no record of consultation.
- Bulk earthworks, civil infrastructure works and construction have the potential to damage the Pipelines corridor and the infrastructure. Care must be exercised when undertaking development works in proximity to the corridor, and a dilapidation survey and vibration monitoring may be required. The EIS should demonstrate how the works will be undertaken in a manner that will protect WaterNSW land and infrastructure, including details and plans of any retaining walls or supporting batters, stockpiling locations, and management measures to address sediment and erosion control and potentially contaminated water discharge from the dam dewatering process. All controls should be consistent with Landcom's 'Managing Urban Stormwater: Soils and Construction (Vol 1 4th ed., 2004).
- Stormwater from the site currently flows north and west either into South Creek or directly across the Pipelines corridor. A number of large dams on the site also capture stormwater. It is important bulk earthworks and final levels and design of the proposal do not result in an increase in flows across the Pipeline corridor (including in South Creek) of either quantity or quality. The EIS should identify how stormwater management systems for the development will be designed, operated and maintained to ensure post-development flows do not exceed pre-development flows into and through the Pipelines corridor. Dam dewatering methodology should also be designed and undertaken to ensure no flows are above the normal levels

entering the Pipelines corridor. All stormwater management infrastructure must be accommodated within the development site and not encroach on WaterNSW land.

- The EIS must address security and fencing requirements along the boundary with the Pipelines corridor. Temporary construction fencing will be required while works are being undertaken, to be replaced by permanent security fencing to WaterNSW standards.
- Access to the Pipelines corridor is prohibited without the written access consent of WaterNSW. Information on obtaining access consents is available on the WaterNSW website and takes a minimum of 28 days to process.
- WaterNSW staff and contractors require 24-hour access into and out of the Pipelines corridor through the gates on Mamre Road. This access must be maintained unimpeded for security, operational and maintenance purposes.
- WaterNSW operates scour valves at South Creek on the western edge of the development site for the purposes of dewatering the Pipelines during shut down periods. The water is discharged directly into South Creek but can be discharged at a controlled rate to prevent flooding. There are also two air valves located on the Pipelines between South Creek and Mamre Road, and a cross connection and valves adjacent to Mamre Road.

WaterNSW requests that we are consulted on the EIS for this development, and that the Department continue to consult with us regarding proposals with the potential to impact our operational land and water supply infrastructure. Please email all correspondence to Environmental.Assessments@waternsw.com.au.

If you have any questions regarding this letter, please contact Alison Kniha at alison.kniha@waternsw.com.au.

Yours sincerely

MALCOLM HUGHES
Manager Catchment Protection

Bianca Thornton

From: Fire Safety <FireSafety@fire.nsw.gov.au>
Sent: Friday, 24 August 2018 8:47 AM
To: Bianca Thornton
Cc: Fire Safety
Subject: HPE CM: RE: Invitation to PFM & Request for SEARs - Proposed Kemps Creek Warehouse and Logistics Hub (SSD 9522)

Good morning Ms Thornton

Fire & rescue NSW (FRNSW) have reviewed aspects of the documentation submitted. Based upon our review we advise that we did not identify any unique fire hazards associated with the proposed development. Consequently, FRNSW does not have any specific requirements or comment in regard to the PEA.

It is our experience however that large developments such as these usually incorporate a number of alternative solutions to address compliance with the National Construction Code (NCC). Clause 144 of the Environmental Planning and Assessment Regulation 2000 requires certifying authorities to consult with FRNSW in specific circumstances – we envisage that any typical compliance matters, pertaining to fire and life safety, can be satisfactorily addressed within the C.144 and fire engineering brief processes.

Regards

STATION OFFICER MARK CASTELLI
TEAM LEADER – SPECIAL HAZARDS
INFRASTRUCTURE LIAISON UNIT

T: (02) 9742 7430 M: 0438 601 582
E: mark.castelli@fire.nsw.gov.au
1 Amarina Ave, Greenacre, NSW 2190
www.fire.nsw.gov.au

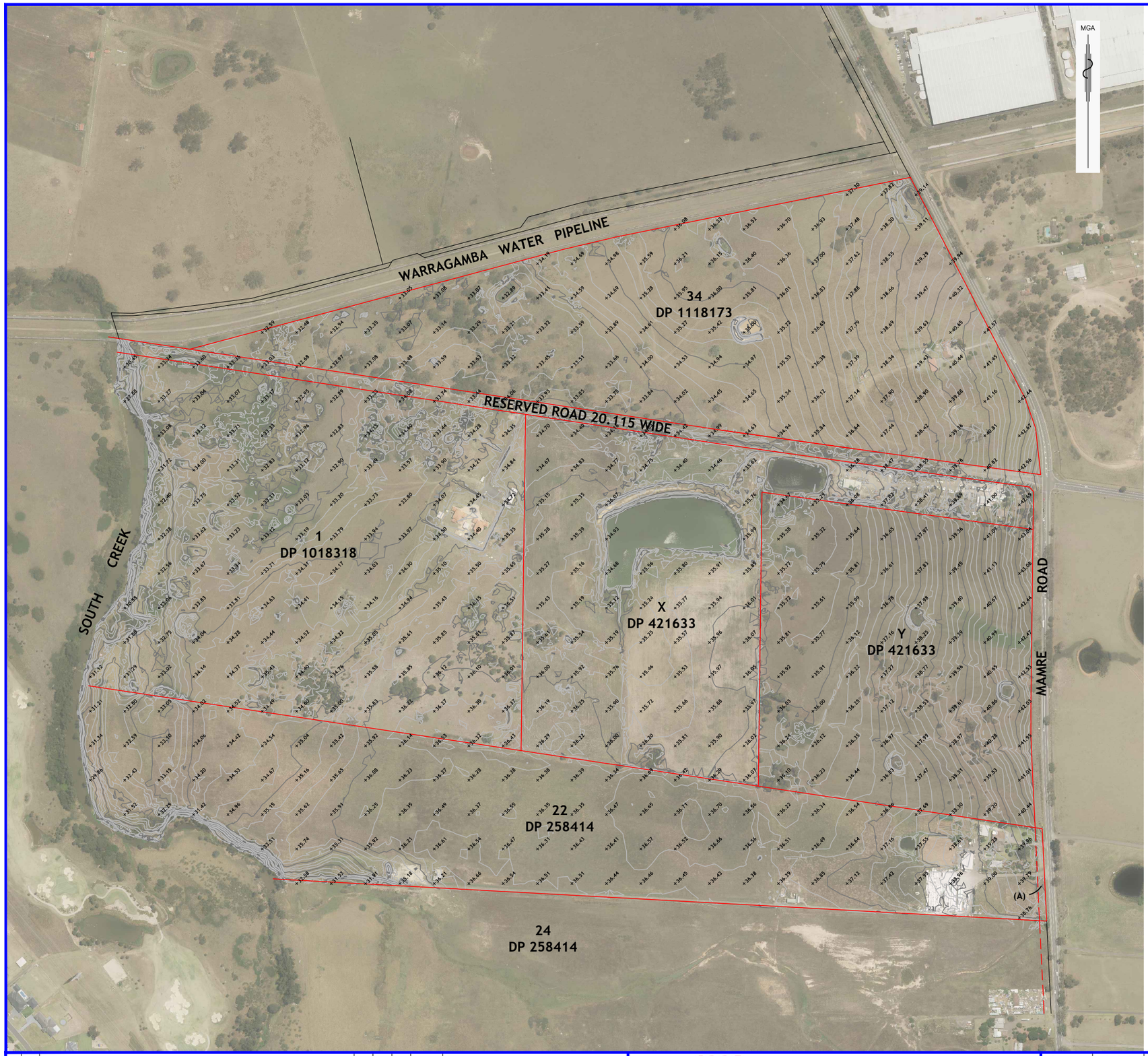
Bianca Thornton

From: Mohammed Rahman <mohammed.rahman@crownland.nsw.gov.au>
Sent: Wednesday, 5 September 2018 8:53 AM
To: Lands Ministerials; Bianca Thornton; Mohammed Rahman
Cc: Paul Layt
Subject: HPE CM: Fwd: FW: Invitation to PFM & Request for SEARs - Proposed Kemps Creek Warehouse and Logistics Hub (SSD 9522)
Attachments: Kemps Creek PEA - SSD 9522.pdf; Appendix 2_ QS Cost Estimate Letter.pdf; Appendix 3_ Preliminary Site Plan.pdf; Appenedix 3_ Draft Subdivision Plan.pdf; Appendix 2_ Capital Investment Value Summary.pdf; 10129-002-POBDY.PDF

Hi,
A Land status investigation on Proposed Kemps Creek Warehouse and Logistics Hub (SSD 9522) shows that there is no Crown land features exist. Therefore, no comments.
thank you.
Regards,

Mohammed H Rahman | Natural Resources Management Officer Sydney Regional Services
Department of Industry, Lands and Water Division
PO Box 2185 DANGAR NSW 2309
T: 02 9842 8331 | F: 02 8836 5365 | E: mohammed.rahman@crownland.nsw.gov.au
W: www.crownland.nsw.gov.au

Appendix C
Site Survey



www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

IMPORTANT NOTES

1. INDEPENDENT INQUIRIES FOR UP TO DATE SERVICE LOCATIONS THROUGH THE RELEVANT AUTHORITIES MUST BE UNDERTAKEN PRIOR TO COMMENCEMENT OF ANY WORKS/EXCAVATION. EXACT SERVICE POSITIONS SHOULD BE ESTABLISHED BY APPROPRIATE MEANS. WE RECOMMEND PROFESSIONAL SERVICE LOCATORS.
2. THE BOUNDARIES SHOWN ON THIS PLAN HAVE BEEN COMPILED FROM SURVEY PLANS, DP421633, DP1018318, DP1118173, DP258414, DP1153854, DP229770, DP154739 AND DP67335 ON PUBLIC RECORD. NO FIELD SURVEY HAS BEEN UNDERTAKEN TO DETERMINE THE ACCURACY OF THE BOUNDARIES AS SHOWN. AS SUCH THESE DIMENSIONS COULD BE OUT OF DATE AND INCORRECT BY MODERN STANDARDS. THIS PLAN SHOULD NOT BE USED FOR BUILDING WORKS CLOSE TO OR ON THE BOUNDARY, OR TO PROSCRIBED SET-BACKS WITHOUT FURTHER SURVEY INVESTIGATION.
3. CONTOURS SHOWN DEPICT THE TOPOGRAPHY. CONTOURS DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT, EXCEPT AT SPOT LEVELS SHOWN.
4. SPOT HEIGHTS AND CONTOURS HAVE BEEN DERIVED FROM MKP (MODEL KEY POINTS) LIDAR DATA SET OBTAINED FROM NSW LPI, CAPTURED BETWEEN 25/02/2011 AND 23/03/2011. STATED VERTICAL ACCURACY OF LIDAR POINTS ±0.3m. STATED HORIZONTAL ACCURACY OF LIDAR POINTS ±0.8m
5. LIMITED FIELD VALIDATION OF LIDAR DATA OCCURRED ON 17/03/2017 ALONG MAMRE ROAD, BAKERS LANE AND WITHIN LOT Y DP421633, USING RTK GNSS DATA (VRS)
6. THIS PLAN MUST REMAIN UNALTERED AS ISSUED BY MONTEATH AND POWYS. ALTERING ANY PART OF THIS PLAN DESTROYS THE INTEGRITY OF THE PLAN. ANY REVISIONS REQUESTED MUST BE ISSUED BY MONTEATH AND POWYS.
7. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN. REPRODUCTION OF THIS PLAN OR OF ANY PART OF THIS PLAN WITHOUT THESE NOTES BEING INCLUDED IN FULL WILL RENDER THE INFORMATION SHOWN ON SUCH REPRODUCTION INVALID AND NOT SUITABLE FOR USE.

SURVEY INFORMATION

1. THE SURVEY IS ON GRID MAP GRID OF AUSTRALIA (MGA). BASED ON PM 33569 – E294164.376 N6255436.559
2. ALL REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (A.H.D)
3. ORIGIN OF LEVELS PM 33569 RL35.732 (A.H.D)
4. CONTOUR INTERVAL IS 0.25m.

(A) – RESTRICTION ON USER (H107598)

REVISIONS						
No	REVISION	SVY	DFT	CHK	DATE	
.	.	.	.	.	.	

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Monteath & Powys Pty Ltd
ACN 000 861 110
SURVEYING PLANNING ENGINEERING DESIGN PROJECT MANAGEMENT
125 Bull Street Newcastle NSW 2300 PO Box 2270 Dangar NSW 2309 T 61 2 4926 1388 F 61 2 4929 3475
Level 11, 205 Pacific Highway St Leonards NSW 2065 T 61 2 94364210
88 Marquis St Gunnedah NSW 2380 PO Box 328 Gunnedah NSW 2380 T 61 2 6742 0166
E survey@monteathpowys.com.au W www.monteathpowys.com.au

Surveyed	Drafted	Checked
PS	AJM	PS

REGISTERED SURVEYOR

Scale @A1 : 1:3000 @A3 : 1:6000 — Original Size A1

DO NOT SCALE

Client: HBB PROPERTY

Title: AERIAL PHOTOGRAPHY AND LIDAR CONTOURS KEMPS CREEK

CAD File: 170115A_01 | Ref No: 17/0115 | Date: 20/03/2017

Sheet No. 1/1

Revision 1

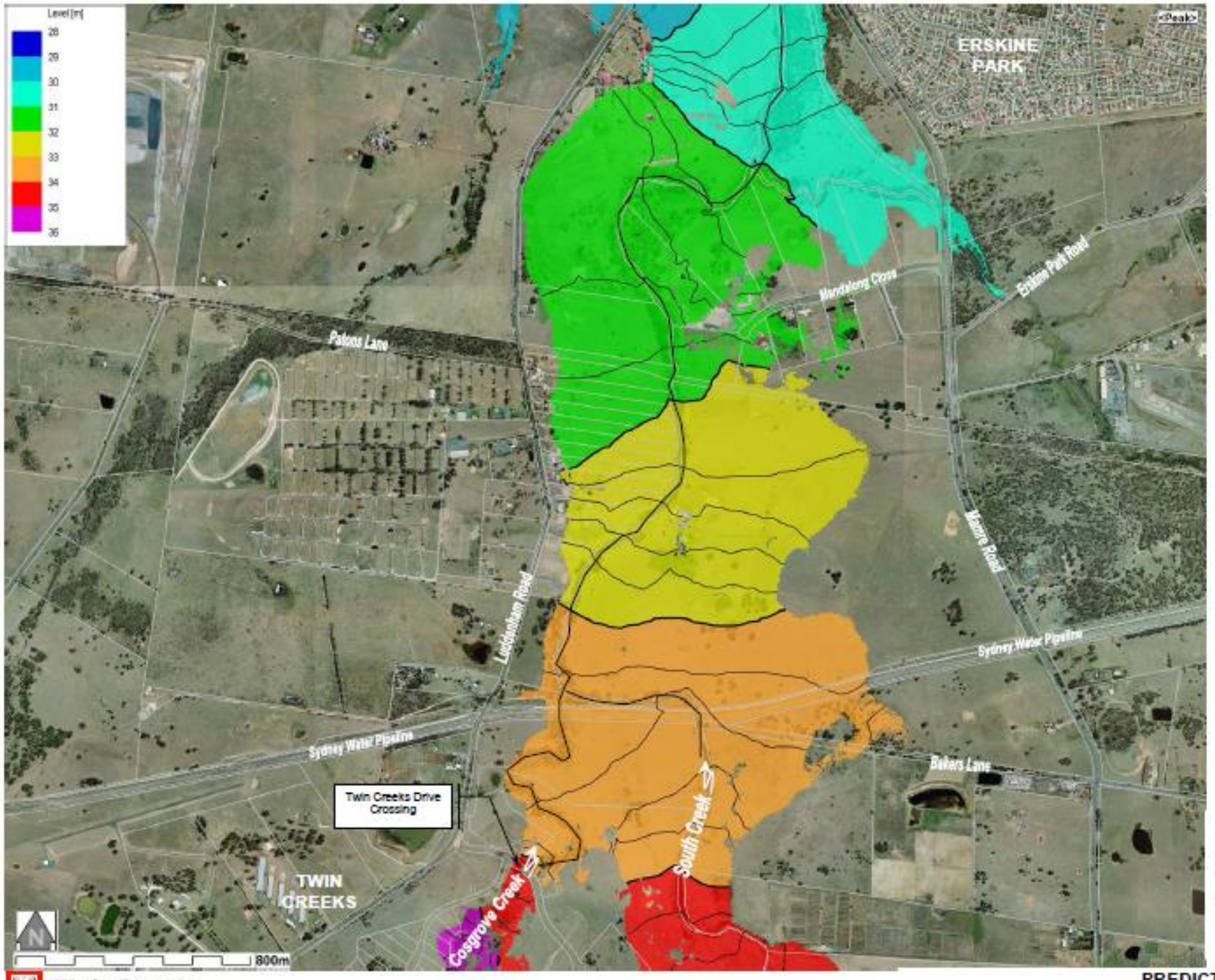
Appendix D

Flood Information Sourced from:

Updated South Creek Flood Study (rp6033rg_crt150128-Updated South Creek Flood Study (FINAL – Volume 1)

Worley Parsons, 2014

FIGURE 6.26



LEGEND:

Flood Level Contour at 1 metre interval

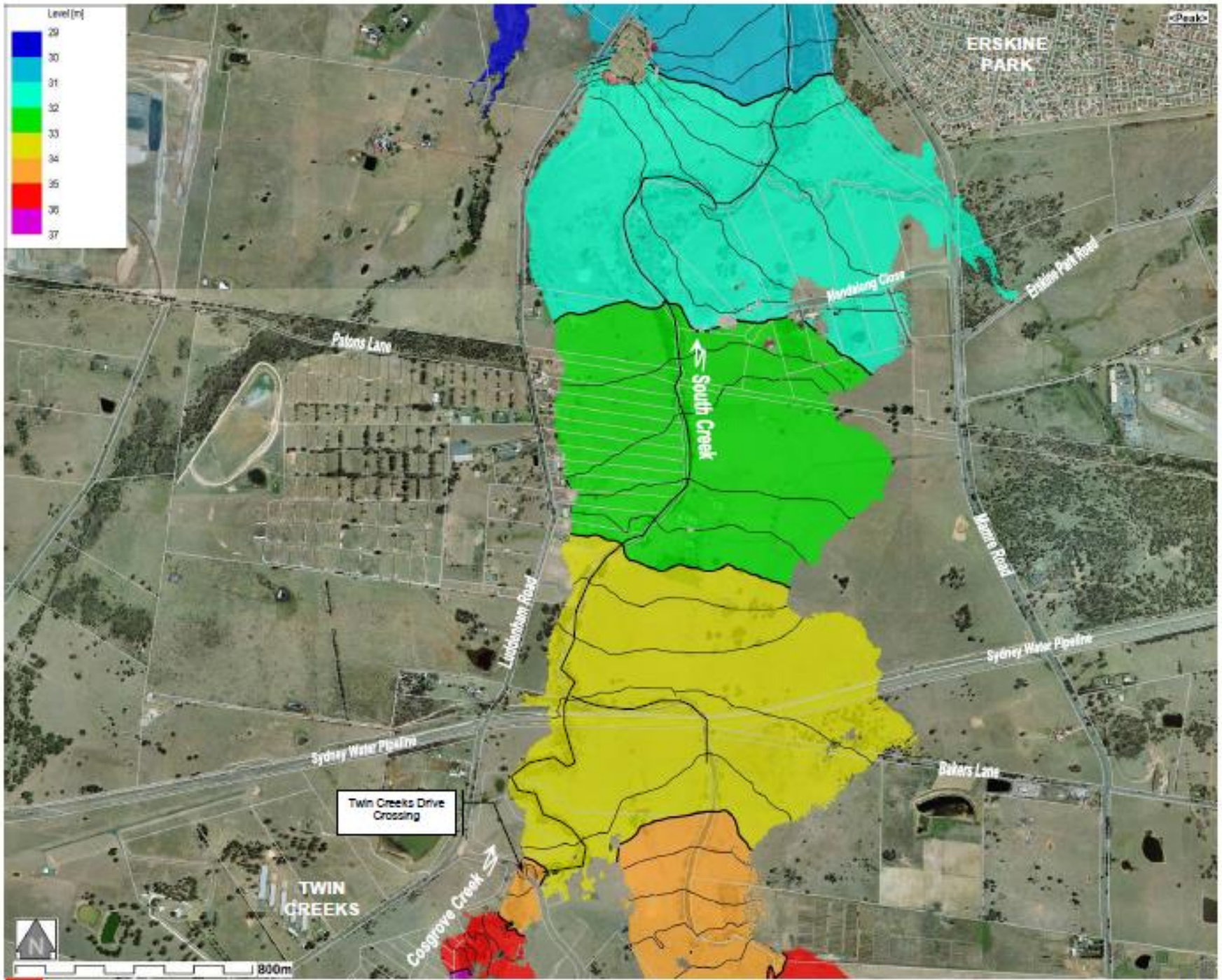
Flood Level Contour at 0.2 metre interval

WorleyParsons
resources & energy

Rp8033- South Creek Flood Study
fg8033rg150113-Fig 6.26-Peak 20yr ARI Levels (5 of 17).doc

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 20 YEAR RECURRENCE FLOOD [EXTENT 5 OF 17]

FIGURE 6.43



LEGEND:

Flood Level Contour at 1 metre Interval

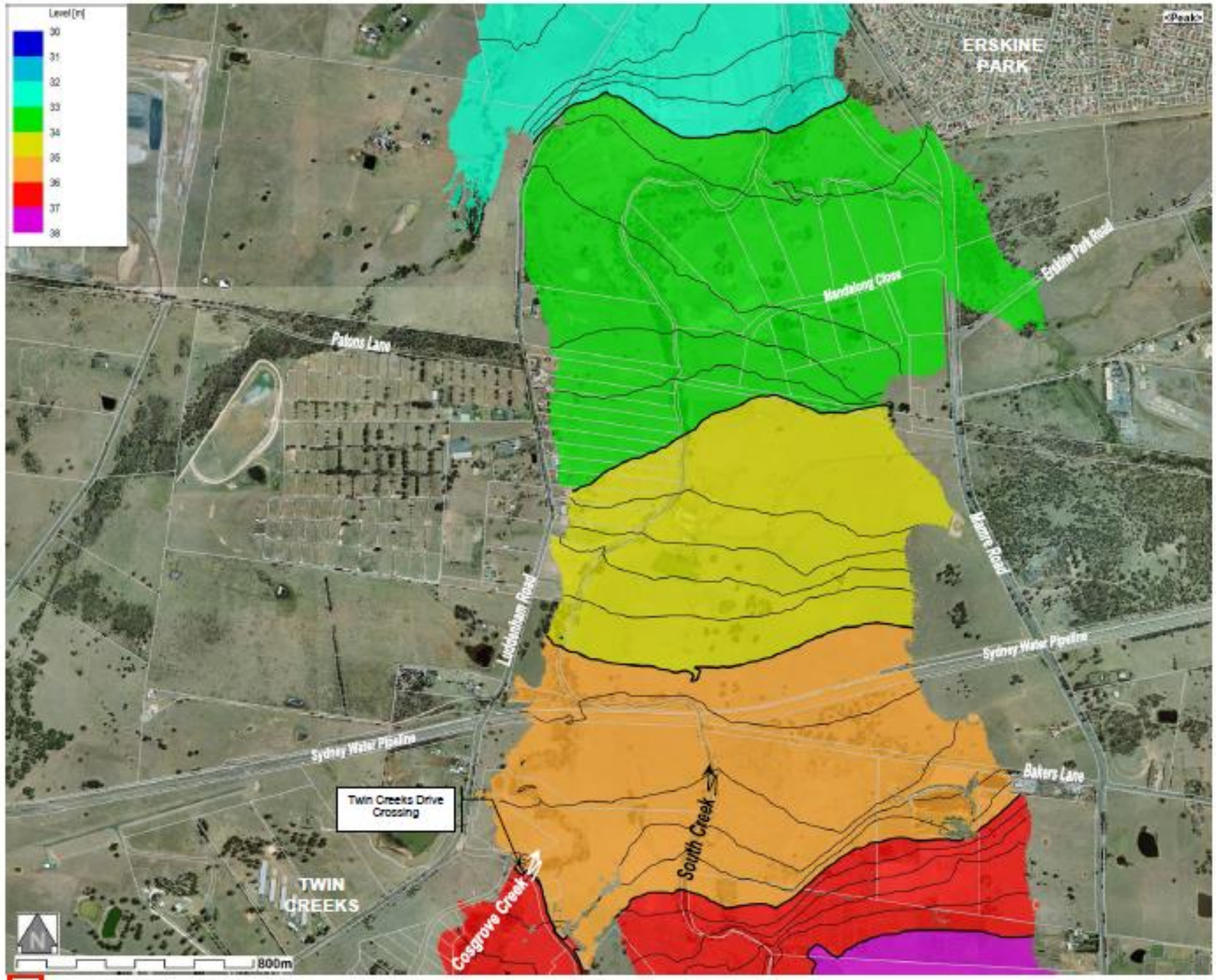
Flood Level Contour at 0.2 metre Interval

WorleyParsons
resources & energy

Rp8033- South Creek Flood Study
tg8033rg150113-Fig 6.43-Peak 100yr ARI Levels (5 of 17).doc

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 100 YEAR RECURRENCE FLOOD [EXTENT 5 OF 17]

FIGURE 6.77



LEGEND:

Flood Level Contour at 1 metre Interval

Flood Level Contour at 0.2 metre Interval

WorleyParsons
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Rp8033- South Creek Flood Study
fg8033rg150113-Fig 6.77-Peak PMF Levels (5 of 17).doc

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PROBABLE MAXIMUM FLOOD [EXTENT 5 OF 17]