

# Erskine Park Industrial Site Development Application

Engineering Assessment DA No.2

Prepared for Fitzpatrick Investments  
Pty Ltd  
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## Document Information

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# Transmittal

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## Contents

1	Introduction .....	5
2	Related Reports and Documents .....	2
3	The Development .....	4
3.1	Proposed Development Works .....	4
3.2	Existing Site Conditions .....	4
4	Erosion and Sediment Control .....	5
4.1	Sediment Basin .....	5
4.2	Sediment and Erosion Control Measures .....	5
5	Bulk Earthworks .....	6
5.1	Cut and Fill Operations .....	6
6	Stormwater Management Strategy .....	6
6.1	Objectives and Controls .....	6
6.2	Proposed Stormwater Management Strategy .....	6
6.3	Existing Catchments and External Conveyance .....	7
6.4	Post Development Catchments .....	8
6.5	Stormwater Connection .....	8
6.6	Stormwater Quantity .....	9
6.6.1	Stormwater Quantity Objectives .....	9
6.6.2	Stormwater Quantity Management Strategy .....	9
6.7	Stormwater Quality .....	9
6.7.1	Water Quality Objectives (Water Sensitive Urban Design) .....	9
6.7.2	Stormwater Quality Management Strategy .....	9
7	Flooding .....	10
8	Siteworks .....	10
8.1	General .....	10
8.2	Road Pavements .....	11
8.3	Parking and Signage .....	11
8.4	Vertical and Horizontal Geometry .....	11
8.5	Design Vehicles .....	11
8.6	Retaining Walls .....	12
9	Utilities .....	12
10	Conclusion .....	13

## List of Tables

Table 1 – Enspire Drawing Reference .....	2
Table 2 – Typical Roads and Pavements .....	11



## List of Figures

Figure 1 – Site Locality Plan .....	2
Figure 2 – Existing Sitewide Catchment.....	7
Figure 3 – Overall Post Developed Catchment .....	8
Figure 4 – Flood Extents .....	10
Figure 5 –Retaining Walls Constructed under Separate Approval .....	12



## 1 Introduction

Enspire Solutions (**Enspire**) has been engaged by Fitzpatrick Investments Pty Ltd to prepare the Civil Engineering and stormwater management design and documentation in support of a Development Application (**DA**) submission to Penrith City Council for the proposed construction of carparking, loading dock aprons and stormwater drainage infrastructure associated with Lots 2, 3, 4 and 5 within the Erskine Park Industrial Estate, Lockwood Road, Erskine Park (**the subject site**) as shown in **Figure 1** – Site Locality Plan.

This package (Development Application No.2) must be read in conjunction with Development Application No.1 under separate approval. Development Application No.1 focussed on early works and development of Lot 1 and included the following scope of work:

1. Implementation of erosion and sediment controls;
2. Bulk earthworks;
3. Trunk stormwater drainage pit and pipe system;
4. Local stormwater drainage to service Lot 1;
5. Gross pollutant traps;
6. Retaining walls;
7. Internal private road construction; and
8. Utilities servicing, internal circulation roads, hardstands and parking associated with Lot 1.

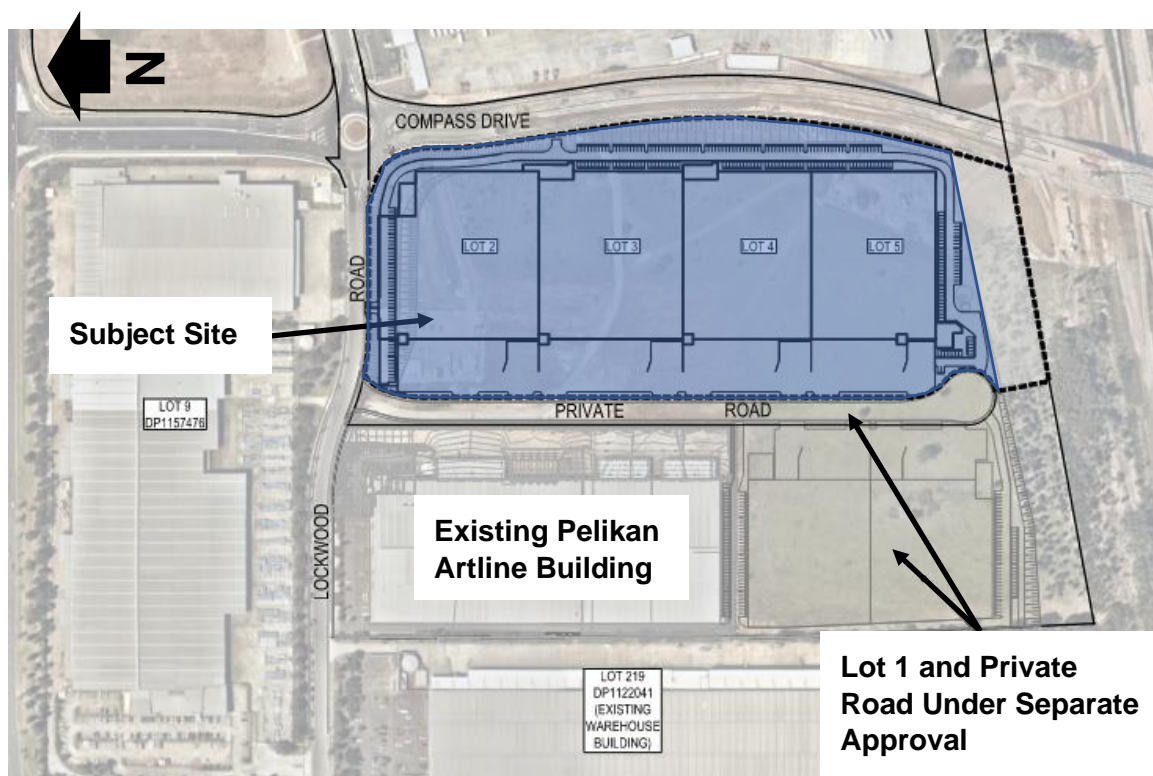
Works associated with this application (Development Application No.2) include:

1. Retention and maintenance of erosion and sediment controls established under DA No.1;
2. Local stormwater drainage to service Lots 2, 3, 4 and 5; and
3. Utilities servicing, internal circulation roads, hardstands and parking associated with Lots 2, 3, 4 and 5.

This report intends to inform Council of the parameters and assumptions adopted in the design and documentation of the following civil engineering elements:

- Sediment and Erosion Control;
- Bulk Earthworks;
- Stormwater Quantity;
- Stormwater Quality;
- Carparking and internal access road geometry;
- Pavements;
- Retaining walls; and
- Utilities.

It should be noted that the Pelikan Artline building shown in **Figure 1** was constructed under a separate approval, however it is located within the same property boundary as the subject site.



**Figure 1 – Site Locality Plan**

Extract from Nearmaps.

## 2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

- 1) Development Application Documentation prepared by Enspire:

**Table 1 – Enspire Drawing Reference**

Drawing Number	Drawing Title
190050-05-DA2-C01.01	COVER SHEET AND DRAWING SCHEDULE
190050-05-DA2-C01.21	GENERAL NOTES
190050-05-DA2-C01.41	GENERAL ARRANGEMENT PLAN
190050-05-DA2-C05.01	SITWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01
190050-05-DA2-C05.02	SITWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02
190050-05-DA2-C11.01	PAVEMENT, SIGNAGE AND LINE MARKING PLAN - SHEET 01
190050-05-DA2-C11.02	PAVEMENT, SIGNAGE AND LINE MARKING PLAN - SHEET 02
190050-05-DA2-C14.01	SITWORKS DETAILS
190050-05-DA2-C20.01	PRE-DEVELOPMENT STORMWATER CATCHMENT PLAN
190050-05-DA2-C20.21	POST-DEVELOPMENT STORMWATER CATCHMENT PLAN
190050-05-DA2-C22.01	TURNING PATH PLAN - SHEET 01
190050-05-DA2-C23.01	SAFETY IN DESIGN

- 2) Stormwater Management Report – Stage C Bioretention/Detention Basin, prepared by Cardno, July 2017;



- 3) Stormwater Management Report, prepared by Cardno, May 2009;
- 4) Penrith City Council Stormwater Drainage Specification for Building Developments 2018;
- 5) Penrith City Council Design Guidelines for Engineering Works for Subdivisions and Developments 2013;
- 6) Penrith City Council Engineering Construction Specification for Civil Works 2017;
- 7) Penrith City Council Development Control Plan 2014; and
- 8) Engineering Assessment - Development Application No. 1, prepared by Enspire Solutions, October 2021.



## 3 The Development

### 3.1 Proposed Development Works

The overall development site is located within the Penrith City Council Local Government Area (LGA) and occupies a total area of approximately 11.9ha. Development application No.2 consisting of Lots 2, 3, 4 and 5 occupies a total area of approximately 8.4ha.

The development is generally bounded by the following;

- Industrial sites to the west;
- Lockwood Road to the north;
- Compass Drive to the east; and
- Conservation area and above-ground trunk watermain to the south.

The development, subject to this development application involves construction of:

- Internal roads, carparking, hardstand apron areas and stormwater drainage associated with four (4) industrial lots, and
- Connection to essential utilities.

### 3.2 Existing Site Conditions

The land to which this application applies was regraded through sitewide bulk earthworks carried out under separate approval (Development Application No.1). This included the construction of additional retaining walls.

Erosion and Sedimentation controls were implemented as part of the bulk earthworks and included a sediment basin towards the northern end of the site.





## 4 Erosion and Sediment Control

The objectives of the erosion and sediment control for the development site are to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with Penrith City Council requirements.

As part of the works, the erosion and sedimentation control will continue to be operated and maintained in accordance with Council requirements and the NSW Landcom Manual, "Managing Urban Stormwater Soil & Construction" 2004 (Blue Book) prior to stabilisation of the site surface.

### 4.1 Sediment Basin

A single sediment basin was constructed during the bulk earthworks (under separate approval as Development Application No.1) and will be operated and maintained until the development site is stabilised. The sediment basin is located at the lowpoint in the site, near the proposed private road intersection with Lockwood Road.

As per Appendix C of the Blue Book, the expected soil texture group for the proposed development is Type D. The sediment basin was designed and sized to represent this soil texture classification.

To ensure the sediment basin is working effectively it will be maintained throughout the construction works. Maintenance includes ensuring adequate settlement times or flocculation and pumping of clean water to reach the minimum storage volume at the lower level of the settling zone. The settling zone was identified by pegs to clearly show the level at which design storage capacity is available.

The pumped water from the sediment basin can be reused for dust control during construction.

An overflow weir was provided to control overflows for rainfall events in excess of the design criteria.

### 4.2 Sediment and Erosion Control Measures

The measures shown on the Development Application No.1 drawings are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction programme, sequencing and techniques, as well as the weather conditions at the time. These measures will include:

- A temporary site security/safety fence constructed around the site;
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles;
- Dust control measures including covering stockpiles, installing fence hessian and watering exposed areas;
- Placement of hay bales or mesh and gravel inlet filters around and along the proposed catch drains and around stormwater inlet pits;
- The construction of a temporary sediment basin; and
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, will be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be



installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations will be stabilised by hydroseeding or hydro mulching on formation.

## 5 Bulk Earthworks

### 5.1 Cut and Fill Operations

Bulk earthworks on the site generally consisting of cut and fill operations to establish proposed road formations and site levels were carried out under separate approval as Development Application No.1. The levels were designed to maintain a consistent warehouse floor level across all lots and provide an optimal interface with the northern and southern properties.

Works under this approval are limited to detailed earthworks, utility service trenching and surface trimming to in preparation for internal road pavements, carparking, hardstand aprons and warehouse flooring.

## 6 Stormwater Management Strategy

### 6.1 Objectives and Controls

The stormwater strategy was developed under separate approval as Development Application No.1. in accordance with the Penrith City Council Development Control Plan 2014 (DCP) and Design Guidelines for Engineering Works for Subdivisions and Developments (2013) guidelines.

The strategy seeks to:

- Prevent damage by stormwater to the built and natural environment;
- Ensure that post development flows from the total site do not generate stormwater discharges that exceed the existing pre-development flows;
- Ensure that an adequate and environmentally acceptable method of removing surface water and stormwater is implemented;
- Minimise nuisance flows of stormwater from one property to adjoining properties;
- Provide a stormwater system which can be maintained economically;
- Provide a stormwater system which utilises open space in a manner compatible with other uses;
- Control flooding and enable access to allotments, stabilise the landform and control erosion; and
- Minimise urban runoff pollutants to watercourses.

### 6.2 Proposed Stormwater Management Strategy

The stormwater management strategy has been designed to ensure site stormwater runoff is managed in the following key areas:

- Site catchments (internal and external);
- Stormwater Quantity; and
- Stormwater Quality.

The proposed civil engineering development package documents site levels, grading, minor and major stormwater drainage components and catchments for the site. The stormwater management strategy considers external upstream catchments as well as downstream external conditions.



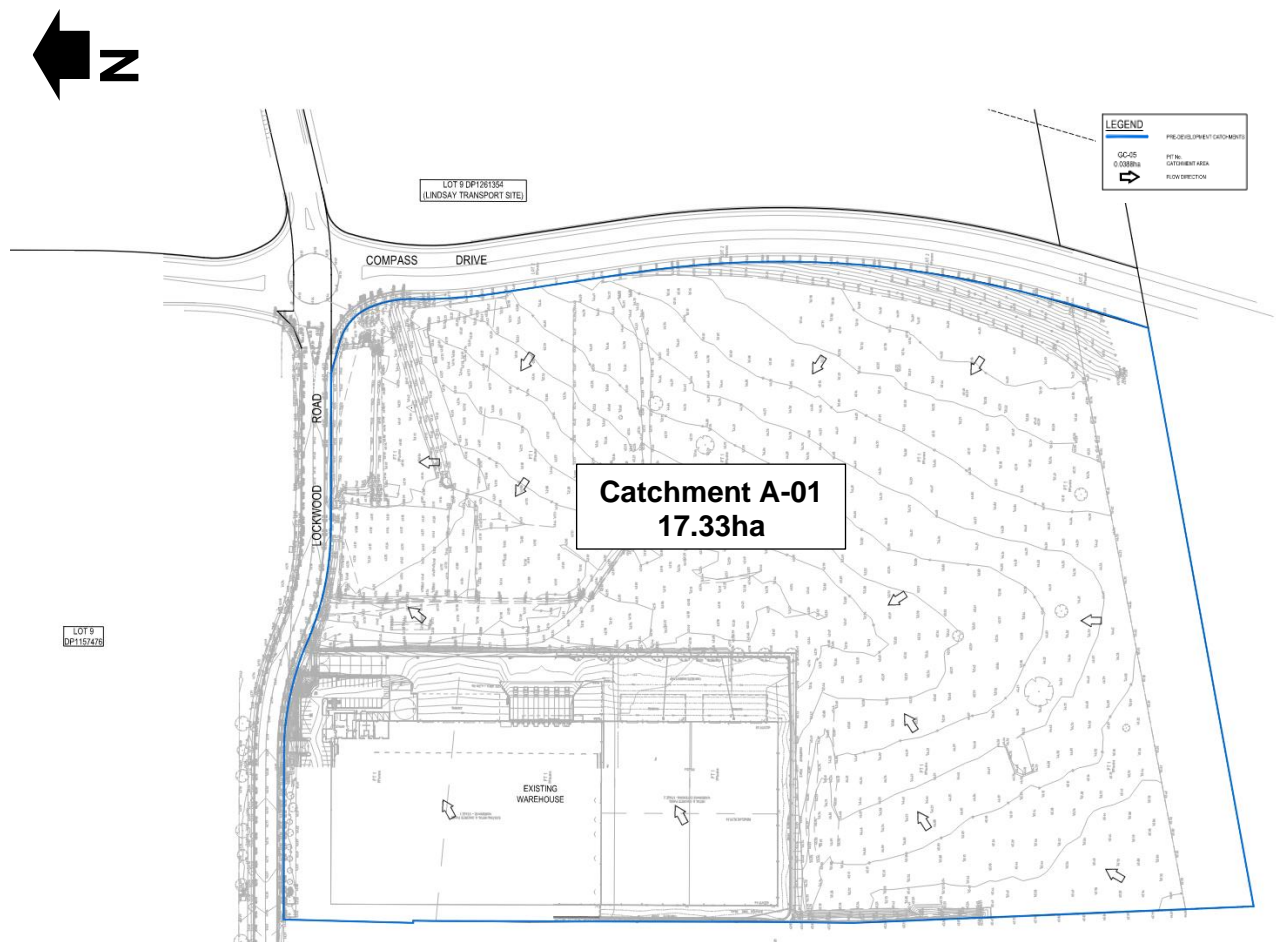
### 6.3 Existing Catchments and External Conveyance

As part of the proposed stormwater management strategy the following items were assessed holistically for the entire site, including the pre-existing Pelikan Artline Building, as well as Lot 1 and the Private Road, constructed under separate approval:

- Pre-developed catchments extents;
- External catchments upstream of the site; and
- Existing overland flow routes.

Under existing conditions, the catchments and impervious areas have been determined based on aerial photography, aerial laser and ground survey of the site. Refer to **Figure 2 – Existing Sitewide Catchment** for the existing catchment plan.

The site is subject to negligible external catchments, given the topographical ridgeline that is located within the conservation area immediately to the south of the development.



**Figure 2 – Existing Sitewide Catchment**

Extract from Enspire Drawing 190050-05-DA-C20.01.

Prior to development, the Erskine Park Industrial Estate was divided into two sub-catchments separated by a ridgeline orientated north-south and roughly parallel to Ropes Creek. The subject



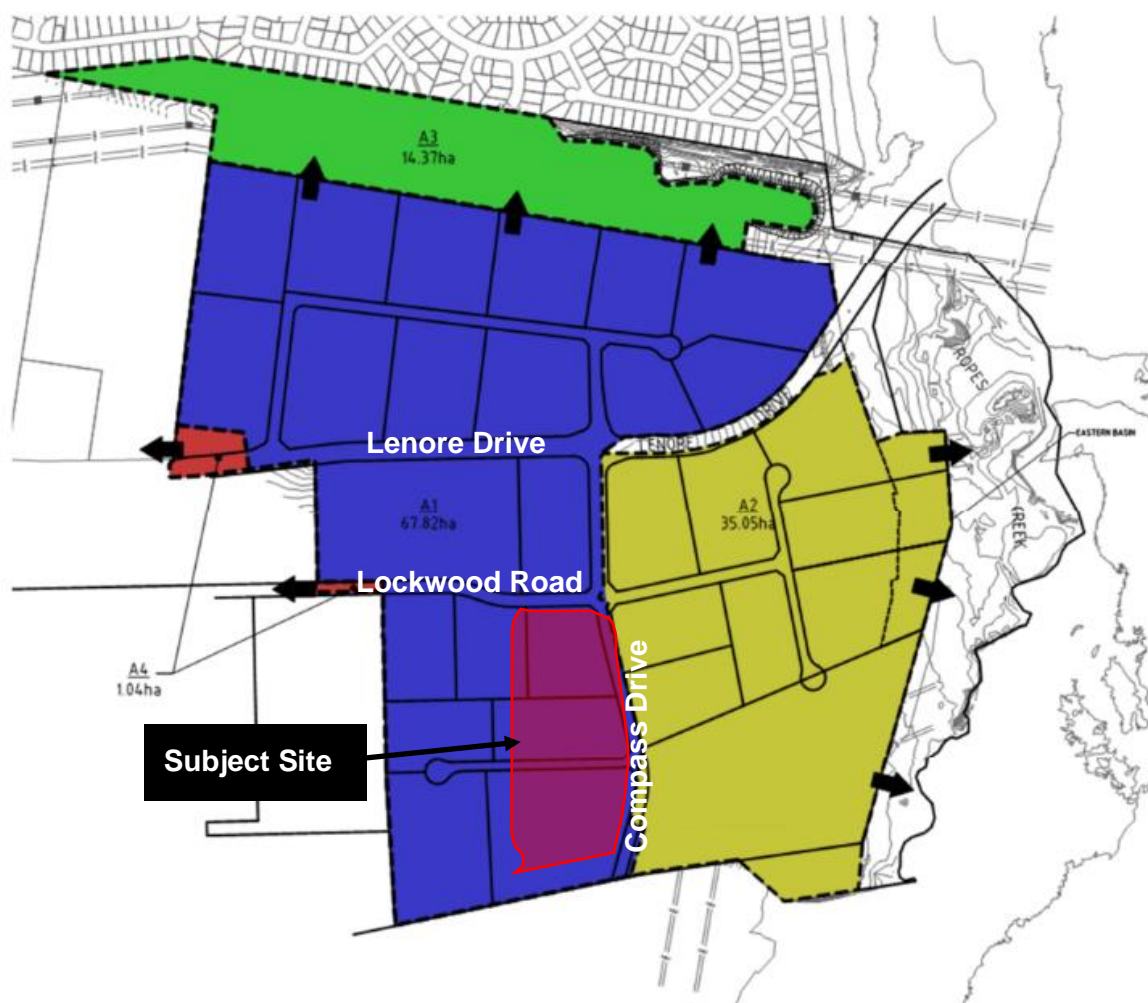
site is located within the catchment that drains northwards towards the electrical easement (along the northern boundary of the Industrial Estate), and then eastwards towards Ropes Creek.

## 6.4 Post Development Catchments

The proposed post-development catchments are generally consistent with the pre-developed catchments as discussed in **Section 6.3**.

**Figure 3** shows the subject site within the context of the overall Industrial Park stormwater drainage catchments.

The subject site is thus consistent with the Industrial Estate stormwater management strategy established by Cardno (2009 and 2017).



**Figure 3 – Overall Post Developed Catchment**

*Quote for Figure or table comment/reference.*

## 6.5 Stormwater Connection

The subject site is serviced by an internal trunk drainage pit and pipe network constructed under separate approval as Development Application No.1, which discharges to a pre-existing 1500mm diameter pipe in Compass Drive. The site will connect to various stubs off the internal trunk drainage.





## 6.6 Stormwater Quantity

### 6.6.1 Stormwater Quantity Objectives

Penrith City Council requires that there will be no increase in runoff from the site as a result of the development under all durations for all the storms up to and including the 1% AEP event.

### 6.6.2 Stormwater Quantity Management Strategy

On-site Stormwater Detention (OSD) for the subject site has been allowed for in the existing regional on-site detention basin constructed within the electrical easement along the northern boundary of the Industrial Estate (Cardno, 2009 and 2017).

## 6.7 Stormwater Quality

### 6.7.1 Water Quality Objectives (Water Sensitive Urban Design)

The main objective of the Penrith DCP 2014 is to safeguard the environment by improving the quality of stormwater run-off entering receiving waters. The following performance criteria are used as a basis:

#### Performance Criteria

- Pollution load reductions:
  - 90% reduction in the post development mean annual load total gross pollutant (greater than 5mm);
  - 85% reduction in the post development mean annual load of Total Suspended Solids (TSS);
  - 60% reduction in the post development mean annual load of Total Phosphorus (TP);
  - 45% reduction in the post development mean annual load of Total Nitrogen (TN);
  - 90% Free Oils and Grease with no visible discharge.
- Modelling for the determination of the mean annual loads of land uses must be undertaken in MUSIC in the detailed design stage and in accordance with the associated WSUD Technical Guidelines.
- Any changes to the flow rate and flow duration within the receiving watercourses as a result of the development shall be limited as far as practicable. Natural flow paths, discharge point and runoff volumes from the site should also be retained and maintained as far as practicable.
- Impervious areas directly connected to the stormwater system shall be minimised. Runoff from impervious areas such as roofs, driveways and rainwater tank overflows shall be directed onto grass and other landscaped areas designed to accept such flows.

### 6.7.2 Stormwater Quality Management Strategy

#### Gross Pollutant Trap

Gross pollutant traps (GPTs) are primary stormwater treatment measures, typically applied as the first measure in a stormwater treatment train. GPTs come in varying forms from simple trash racks through to more complex devices with continuous deflection screens and hydrodynamic separation.

GPTs were installed immediately upstream of the site stormwater outlet connection point under separate approval as Development Application No.1.

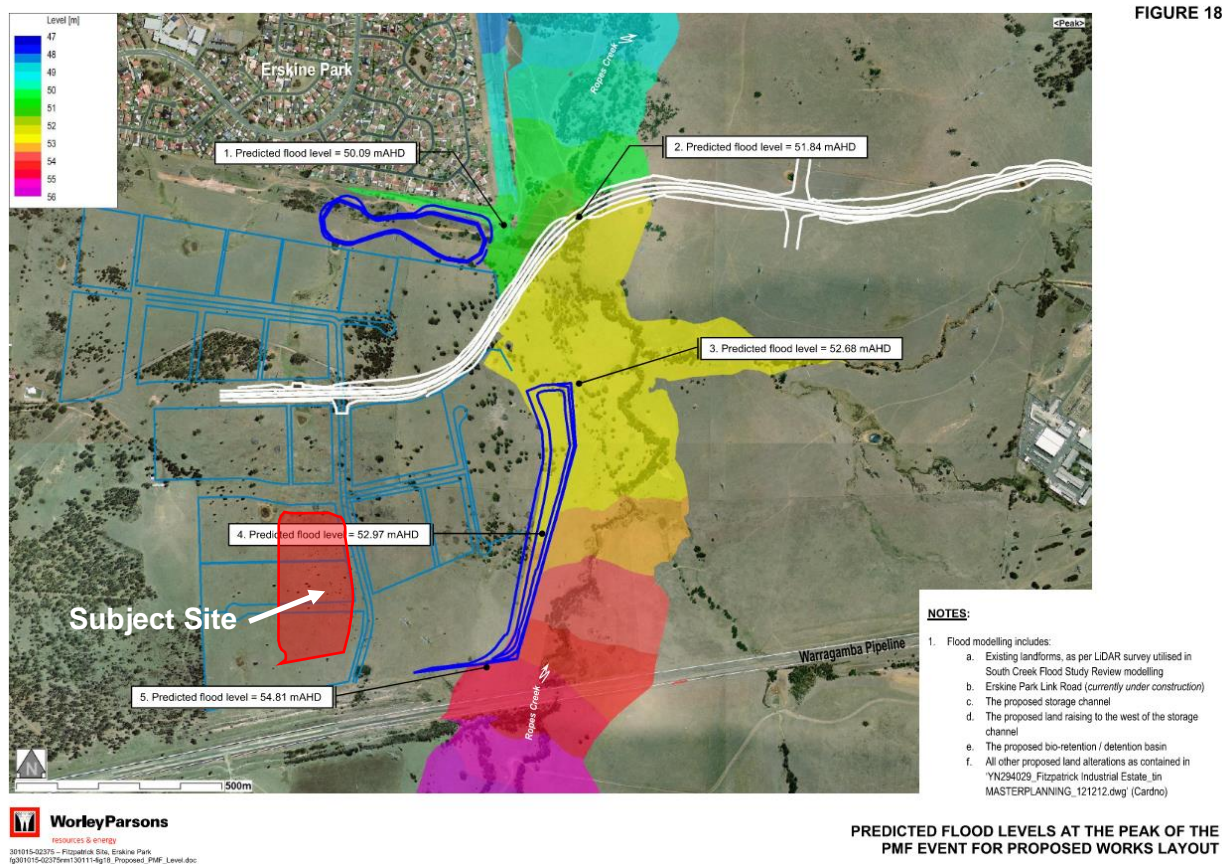
### Bio-retention Areas

Water Sensitive Urban Design (WSUD) for the subject site has been allowed for in the existing regional bioretention basin constructed within the electrical easement along the northern boundary of the Industrial Estate (Cardno, 2009 and 2017).

## 7 Flooding

The subject site is not flood affected.

**Figure 4** show the subject site location relative to the Ropes Creek predicted flood levels at the peak of the PMF event for the proposed works layout (Worley Parsons, 2013).



### Figure 4 – Flood Extents

*Extract from Worley parsons Flood Impact Assessment.*

## 8 Siteworks

## 8.1 General

The proposed development will include a new internal carpark network consisting of a series of a circulation roadways to connect service areas and carparks.

Access from Lockwood Road is proposed to service the undercroft carpark to the northern extent of Lot 2 along with providing circulation to the eastern on-grade carpark.



## 8.2 Road Pavements

It is proposed that internal roads and hardstands will be designed as follows:

**Table 2 – Typical Roads and Pavements**

Road Type	Road Profile	Comments
Carparks and circulation roads	Varies according to AS2890.1	Flexible Pavement 5x10 <sup>5</sup> ESA
Hardstands	Varies according to AS2890.2	Rigid Pavement 1x10 <sup>7</sup> ESA

Please refer to the Enspire drawing package for details of proposed pavements.

## 8.3 Parking and Signage

Signage and line marking will be designed to provide appropriate warning and guidance to drivers.

Please refer to the Enspire drawing package for details of proposed signage and linemarking.

## 8.4 Vertical and Horizontal Geometry

The internal circulation road geometry will be designed in accordance with Penrith City Council Design Guidelines and generally in accordance with AUSTRROADS Guide to Road Design Part 3. The vertical and horizontal geometry has considered sight distance in accordance with AUSTRROADS Guide to Road Design Part 3.

Carpark and hardstand geometry will be designed in accordance with AS2890.1 and AS2890.2.

## 8.5 Design Vehicles

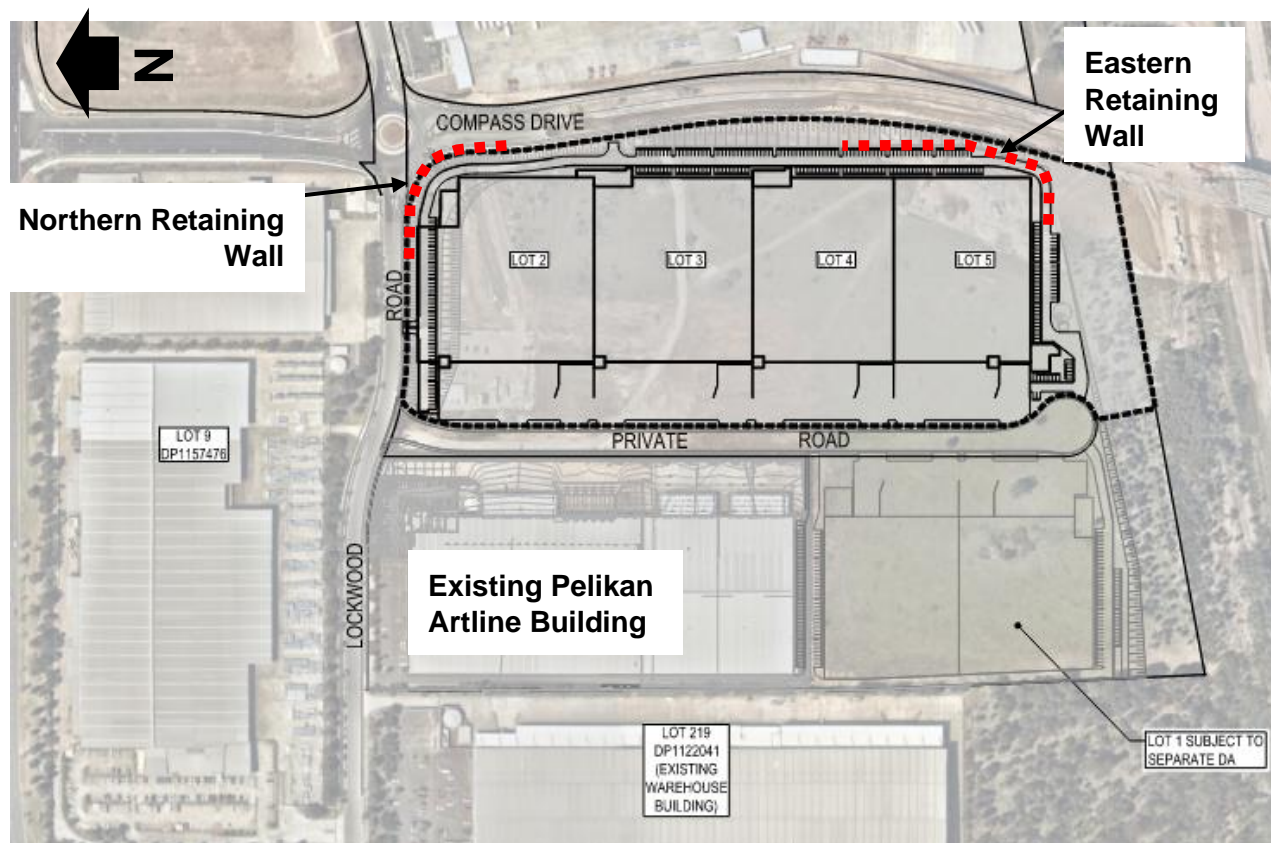
Design vehicles for the development include a 5.2m passenger car and the 26m B-Double articulated vehicle. The 35.4m B-Triple articulated vehicle has been assessed as the check vehicle. Swept path analysis has been completed using AutoTURN software and in accordance with AUSTRROADS and Council's Guidelines.

Please refer to the Enspire drawing package for swept paths at critical locations.



## 8.6 Retaining Walls

Major retaining walls external to the building footprint were constructed under separate approval as Development Application No.1. These include the Northern and Eastern Retaining Walls within the subject site as presented in **Figure 5**.



**Figure 5 –Retaining Walls Constructed under Separate Approval**

## 9 Utilities

Extensive existing utility infrastructure has been provided in the adjacent streets as part of the previous development.

The following services are available to the subject site;

1. Potable Water;
2. Sewer;
3. Telecommunications;
4. High and low voltage electrical services, including street lighting; and
5. Natural Gas.





## **10 Conclusion**

This Civil Engineering and Stormwater Management Report has been prepared to provide an understanding of the design assumptions, inputs and guide to the stormwater quantity and quality management techniques for the proposed development, Erskine Park.

This report demonstrates that the stormwater drainage objectives as outlined in the Penrith City Council Stormwater Drainage Specification for Building Developments and DCP 2014 are met.

The included stormwater drainage, quantity (OSD) and quality (WSUD) provided by the existing trunk drainage system with site connection point discharging to an existing detention/bioretention basin within the electrical easement to the north have been designed to accommodate for the stormwater flows of proposed development.