



Robert
Bird
Group

Stormwater Management Plan Report Westfield Kotara Eastern Expansion

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Prepared For: Scentre Group Design

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Date: 13th May 2016

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1.0 Introduction

1.1 Document Scope

This Stormwater Management Plan (SWMP) has been prepared by Robert Bird Group (RBG) to outline the stormwater concept design proposals for the Westfield Kotara Expansion, at Northcott Drive, Kotara, NSW – the “Site”.

The purpose of this document is to provide details of the stormwater management proposals in order to mitigate any adverse impacts on downstream property.

This report presents the investigation and analyses results for the proposed stormwater management systems for the Site. Civil Design Drawings have been developed to complement this report and are included in Appendix B.

1.2 Project Description

The project consists of a new and refurbished retail space at the existing Westfield Kotara shopping mall. The new build works extend above an existing at-grade car park accessed from Northcott Drive. It is proposed to retain the car park and build the new structure above suspended on columns.

1.1 References and Inputs

Project documentation referenced in preparation of this SWMP includes:

- Australian Rainfall and Runoff – A Guide to Flood Estimation, Volumes 1 and 2 (1987) – The Institution of Engineers, Australia.
- AS/NZS 3500.3.2 National Plumbing and Drainage Part 3.2: Stormwater Drainage – Acceptable Solutions.
- Managing Urban Stormwater – Soils and Construction Volume 1 (4th Edition, March 2004) – NSW Department of Housing.
- Newcastle City Council Technical Manual, Stormwater and Water Efficiency for Development – 2015
- Newcastle City Council Development Control Plan (DCP) – 2012
 - Section 4.01 Flood Management; and
 - Section 7.06 Stormwater
- Kotara Shopping Centre Stormwater Drainage Assessment – Hyder Consulting , December 2005
- Garden City Shopping Centre, Kotara Flood Impact Assessment – Patterson Britton and Partners, June 2002.
- Architectural Plans – Scentre Group Design:
 - 01.5201 Level 1 Proposed Plan
 - 01.5203 Level 2 Proposed Plan
 - 01.5205 Level 3 Proposed Plan



1.3 Existing Site Description and Conditions

Westfield Kotara shopping mall occupies an 8 Ha site in the Newcastle City Council (BCC) local government area and borders Park Avenue to the north, Lexington Parade to the west, Cynthia Street to the southeast and Northcott Drive to the east. The site also borders a short length of public playing fields (Hudson Park) to the southwest. The site location is shown on Figure 1.

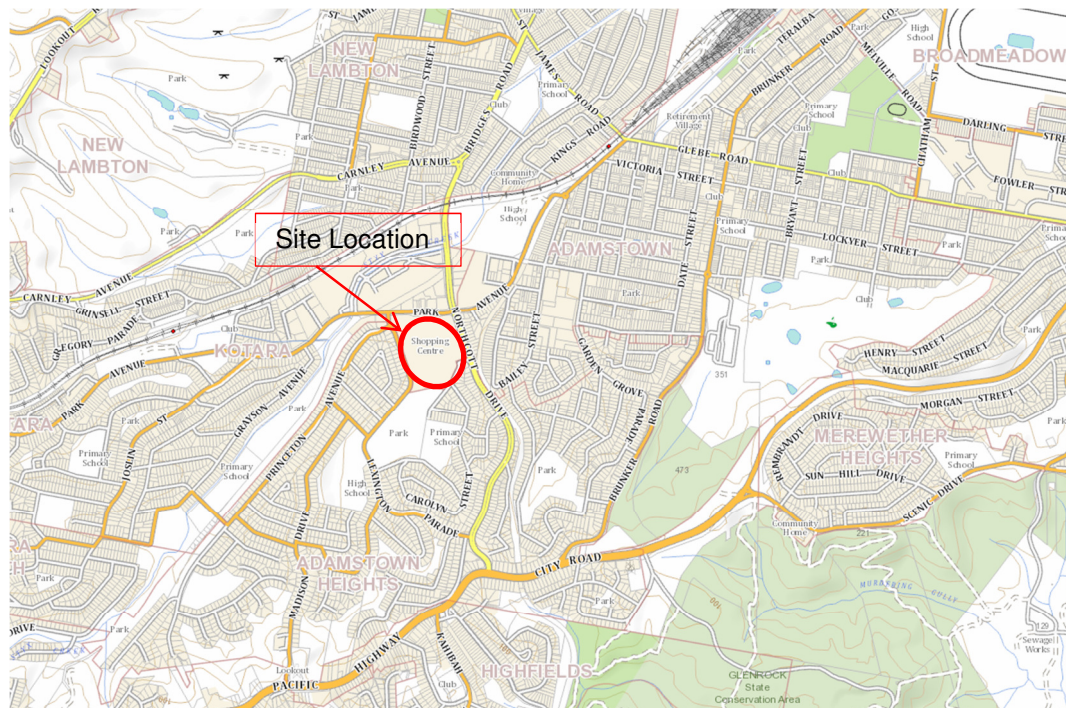


Figure 1 - Site Location Plan

As shown on Figure 2, the site is entirely occupied by buildings other than a small area (approx. 0.45 Ha) on the eastern side of the site which is an open to air, at-grade car park.

The site has vehicle accesses from each of the above named adjacent roads which access loading docks, and car parking areas. The access to the eastern at-grade car park is from Northcott Drive.



Figure 2 - Aerial View of Existing Site

1.4 Drainage

The existing site drainage infrastructure collects runoff from the building roofs and at-grade car park and discharges to twin 1500mm concrete box culverts (Council owned trunk drainage system within an easement) which traverse the site from Hudson Park to Northcott Drive. The trunk drain continues off-site to the north where it discharges to Styx Creek.

1.5 Flooding

The site is within the 100Yr ARI flood zone, as shown on Council flood mapping – refer to Figure 3.

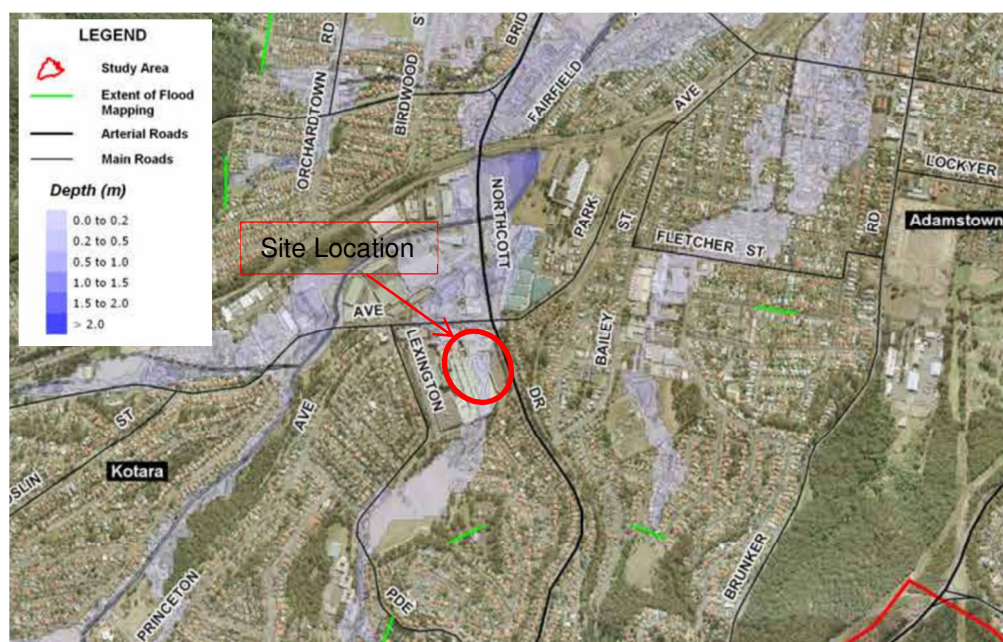


Figure 3 - Extract from Newcastle City Council Flood Study – 100 Year ARI Maximum Flood Depth

As noted in the Patterson Briggs and Partners Flood Impact Assessment (FIA) report, the internal and trunk drainage systems have been modelled and were found to only have capacity to convey the 1 year ARI storm event flows. As such, all rainfall events higher than intensity that this are expected to traverse the site as overland flow. The report, also shows the extent of flooding within the at-grade car park due to trapped overland flows in storm events greater than the 1 Year ARI. The extent of inundation is to a level of approximately 23.8m AHD, at which point the flows are able to pass around kerbs to flow to the north east of the site. The extent of flooding is shown in Figure 4 and includes areas which are covered as well as the open to air part of the car park.

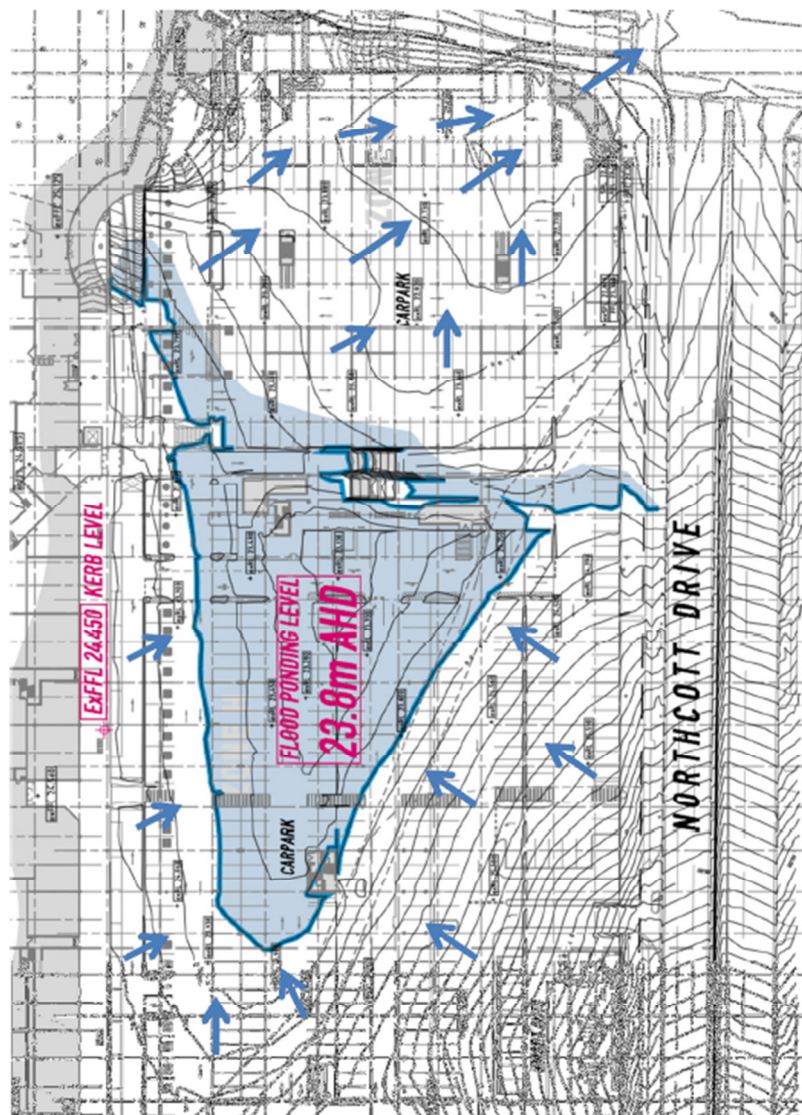


Figure 4 - Extent of Flooding in At-Grade Car Park – Source Paterson, Britton & Partners

The FIA provides analysis that shows that a flow of about 15 m³/s will travel overland through the car park at the peak of the design 100 year recurrence event and identifies areas of potential flood hazard due to the depth of water and / or velocity of the flow which include the at-grade car park area (as shown in Figure 4)

The Newcastle City Council DCP section 4.01 Flood Management gives the following criteria for flood hazards for suitability for areas used for car parking:

- Velocity must be less than 0.5m/sec; and
- Depth must be less than 0.3m

The FIA states that in the case of the at-grade car park, the depth of flooding is up to 800mm, however the velocity of flow would be close to zero. Whilst the depth of water would be likely to result in vehicles floating, it is unlikely that they would be transported at any speed. Based on criteria in the NSW Floodplain Development Manual (2005) the FIA concludes that this area would be classified as a low hazard area.

Upstream of the flooding area, the FIA states that the hydraulic analysis indicates that overland flows discharged along the internal roadway could travel at velocities greater than 4m/s and reach depths of up to 300mm in the design 100 year ARI event and would therefore be classified as a floodway and would be regarded as a high hazard area.

It is noted that the flood hazard is an existing situation which will not be changed by the proposed development.

2.0 Proposed Development

The proposed development consists of refurbishment of parts of the existing shopping centre, and the construction of a suspended structure over the existing open to air at-grade car park – the extents of the new build are shown in Figure 4.

It is noted that the proposed development will not increase the site impermeable area compared with the existing situation.

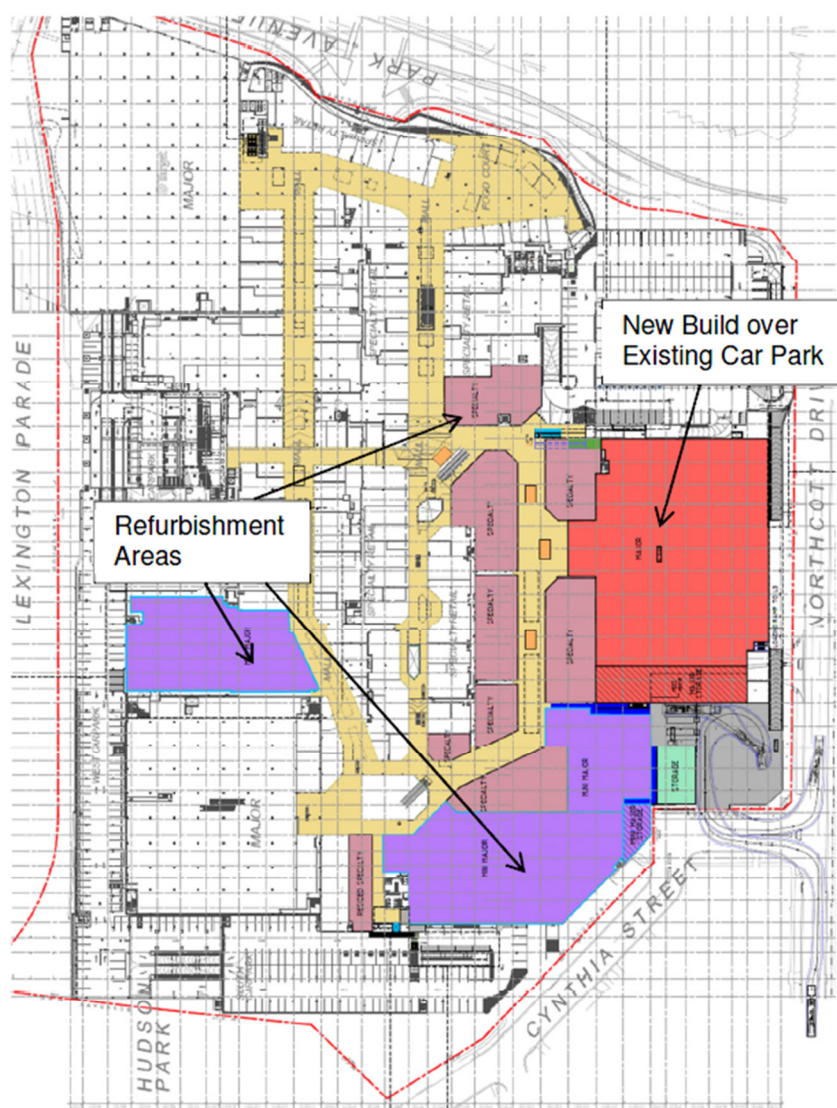


Figure 5 - Proposed Development (Level 2 Plan)

3.0 Stormwater Drainage Design

3.1 Design Criteria

Stormwater management controls have been developed based on having zero net impact on the site runoff quantity or quality, compared with the existing development and are summarised below:

- a. All new structural columns and footings will be placed outside of the easement for the existing trunk drainage culverts. The culverts will remain as existing and will be unaffected by proposals.
- b. Some internal drainage pits and pipe lines within the existing open to air at-grade car park will be affected by column positions and will need to be relocated to suit. The new structure will mean that the car park is no longer open to air which will reduce the quantity of rain water needing to be collected in the car park. The pits will provide connection points for the proposed roof drainage.
- c. A small area of the existing car park will need to be lowered in order to provide the desired overhead structure height. The area affected is in the southeast corner of the car park (corner of Northcott Drive and Cynthia Street). This area is outside of the flood extents shown in Figure 4 and the design levels will be above the flood level to ensure that this area is not impacted.
- d. Overland flow paths through the site will not be altered. Columns may need to be placed within flow paths but these are considered to be of negligible impediment to flow.
- e. The structural design of columns within the overland flow path area where velocity exceeds 0.5m/s or flood depth exceeds 0.3m (ie. having a surface level lower than 23.5) will be required to consider the possibility of impact from moving vehicles during a flooding event.

4.0 Erosion and Sediment Control

The quality of stormwater discharge from the site during the construction stage will be managed using erosion and sediment control and surface water management measures in accordance with the Landcom guidelines – Managing Urban Stormwater Runoff: Soils and Construction (“Blue Book”) and Blacktown City Council’s DCP.

Potential erosion and sediment control measures for the development may include, but not be limited to, the following:

- Settling tanks/basins;
- Surface water collection systems i.e. drains to collect construction site runoff and convey flows to control and treatment systems ;
- Shaker grid and wash down areas at vehicle entry points; and,
- Sediment protection devices on existing and proposed inlet pits.

A concept sediment and erosion control design is included in Appendix A.



Appendix A

Concept Civil Design Drawings





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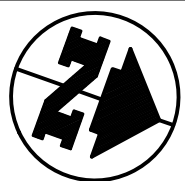
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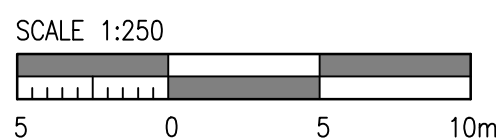
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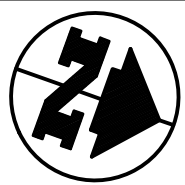
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CONTROL PLAN**

Project
**WESTFIELD KOTARA
EASTERN EXPANSION**

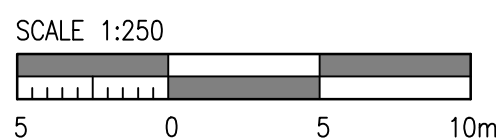
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Owner and Operator of **Westfield** in Australia and New Zealand

Title
GENERAL ARRANGEMENT PLAN

Project
**WESTFIELD KOTARA
EASTERN EXPANSION**

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