RobertBirdGroup

Structural Report

Discovery Point Masterplan

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Report Amendment Register

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1.0 Introduction

This report presents the following:

(a) Description of the site and proposed development at Discovery Point, Wolli Creek
(b) Information relating to excavation, demolition and construction methodology
(c) Scope of proposed basement retention works
(d) Description of building foundations
(e) Derailment protection discussion
(f) Discussion about track monitoring requirements

These items are discussed in response to the Director General's Requirements (DGR), specifically 1L, addressing –

- the requirements of the document, "*Brief for review of geotechnical and structural design for developments adjacent to or above rail corridor for external third party works performed under the NSW State Environmental Planning Policy (Infrastructure) 2007*"

- the requirements of the document, "*Development Near Rail Corridors and Busy Roads – Interim Guideline*" by the NSW Government Department of Planning, in particular the requirements of Section 6 – "*Excavation, earthworks and other construction related issues*".

2.0 Site Description

Overview

The site at Discovery Point, Wolli Creek is bounded by the Cooks River to the north, the Illawarra Line to the west, Magdalene Terrace and Brodie Spark Drive to the south, and the Princes Highway to the east. The site is trapezoidal in plan. The Airport (East Hills) Rail Line runs through the site approximately east-west, and Wolli Creek train station is positioned within the site, roughly in the centre of the development. The eastern half of the development, comprising of the Public Domain, Magdelene Chapel, Tempe House, Greenbank (apartment building), and Verge (apartment building) are completed. Vine (apartment building), roughly in the centre of the site and just south of the Airport Rail Line, is currently under construction.

The undeveloped part of the site currently consists of two general zones, one north of the Airport Rail Line, and one south of the Airport Rail Line. For the purposes of this report, these zones will be referred to as Discovery North and Discovery South. See the aerial photo below for a general overview of the site.

Site Topography

The topography of the undeveloped portion of the Discovery Point site is summarised below –

Discovery South – generally cleared natural ground, ranging in level from RL+5.4 (southern end of the site) to approximately RL+2.0 adjacent to Wolli Creek Train Station. The partially excavated southern basement is located in the eastern part of this precinct, with bulk excavation levels ranging from RL+2.0 to RL-6.0.

Discovery North – generally cleared natural ground, ranging in level from RL+2.8 (southern end of the site adjacent to Wolli Creek Train Station) to approximately RL+0.0 at the bank of Wolli Creek.

The proposed Concept Plan consists of the following general elements or precincts –

Proposed Development - Summary

Please refer to architectural Concept Plan drawings by Bates Smart for a more detailed description of the proposed development. A summary is provided below.

Discovery Point South

- Six buildings, ranging in height up to RL64.40, of predominantly residential usage, but with some retail space at lower levels
- A 2-level podium-style retail and loading dock building incorporated into Building 1b
- A central neighbourhood park
- An integrated Basement Level B0 predominantly used for car parking, at approximately RL+1.8, serving the Discovery South precinct. The basement extends from near the southern site boundary, adjacent to the Illawarra Line boundary to the west, and extends to connect at discrete locations to the Wolli Creek Train Station facilities to the north. To the east, the basement connects into the B0 basement car parking spaces serving Vine (currently under construction) Apartments.
- Basement Level B1 car parking level at approximately RL-1.0, serving the Discovery South precinct. The basement is proposed to be located within the extent of the existing diaphragm wall, originally constructed circa 2003, and which currently forms part of the basement perimeter wall of Greenbank, Verge, and Vine (under construction) Apartments.
- Basement Level B2 car parking level at approximately RL-3.7, serving the Discovery South precinct. The basement is proposed to be located within the extent of the existing diaphragm wall, originally constructed circa 2003, and which currently forms part of the basement perimeter wall of Greenbank, Verge, and Vine (under construction) Apartments.

Discovery Point North

- Eight buildings, ranging in height up to RL79.65, of predominantly residential usage
- 2-level podium-style car parking and residential buildings incorporated into the towers
- Basement Level B0 predominantly used for car parking, plant rooms, and minor residential space to the northern end of the precinct, at approximately RL+4.8. The basement extends approximately 15 metres from the southern boundary of this precinct (Wolli Creek Train Station), approximately 10 metres from the western boundary (Illawarra Rail Line), north to the boundary of the riparian zone of the Cooks River, and east to the boundary of the as-constructed Public Domain precinct.
- An integrated Basement Level B1 car parking level at approximately RL+2.0, serving the Discovery North precinct. The basement extends approximately 15 metres from the southern boundary of this precinct (Wolli Creek Train Station), approximately two metres from the

western boundary (Illawarra Rail Line), north to the boundary of the riparian zone of the Cooks River, and east to the boundary of the as-constructed Public Domain precinct.

Likely Structural Systems

The structure is anticipated to consist of a combination of load-bearing walls and columns on pile or pad foundations. Structural materials will be a combination of steel, concrete, masonry and timber to suit structural loads, BCA requirements, durability requirements, and architectural intents.

Typical floor plates are anticipated to be a combination of reinforced, post tensioned, or composite concrete floor systems. Roof structures will be a mix of concrete and steel to suit architectural and BCA requirements.

Basement perimeter retention systems will be a mix of steel and concrete wall systems specifically selected to suit the geotechnical conditions, groundwater levels, temporary and permanent stability requirements, location of adjacent structures and public infrastructure, and varying depths of basement across the site.

3.0 Geotechnical Conditions

A geotechnical site investigation has been completed by geotechnical consultants, Coffey Geosciences. Please refer to Coffey's reports for information regarding the detailed geotechnical conditions across the site.

In summary, the site geotechnical conditions consist of layers of –

- fill and topsoil, over
- medium to stiff clays, over
- sandstone, increasing in strength with depth.

Rock levels across the site vary, and generally increase in depth towards the Cooks River to the north west of the site.

The water table levels generally reduce as the site approaches the Cooks River. The steady state groundwater levels and their variance across the site are detailed in Coffey's reports. In summary, typical steady state groundwater levels are –

Northern precinct – RL1.15 AHD
Southern precinct – RL1.50 AHD

More detail can be found in Coffey Geosciences reports.

4.0 Excavation, Demolition and Construction Methodology

Demolition of minor existing structures on site will be required. Demolition is expected to be completed using standard construction equipment including excavators. A demolition methodology statement will be written by the contractor who is engaged to build each stage of the new development, prior to issue of the Construction Certificate for each stage.

At Discovery Point South, excavation of up to approximately 4.0 metres in depth will be required outside the line of the existing diaphragm wall, and up to 6.0 metres within the line of the existing diaphragm wall, to form the new lower levels of basement car parking. This will be completed using standard earthmoving equipment, primarily excavators. Excavation method statements will be written by the contractor who is engaged to build each stage of the new development, prior to issue of the Construction Certificate for each stage.

At Discovery Point North, excavation of up to approximately 2.0 metres in depth will be required to form the new lower levels of basement car parking. This will be completed using standard earthmoving equipment, primarily excavators. A new basement retaining wall system will be required to retain soil around the new lower level. Excavation method statements will be written by

the contractor who is engaged to build each stage of the new development, prior to issue of the Construction Certificate for each stage.

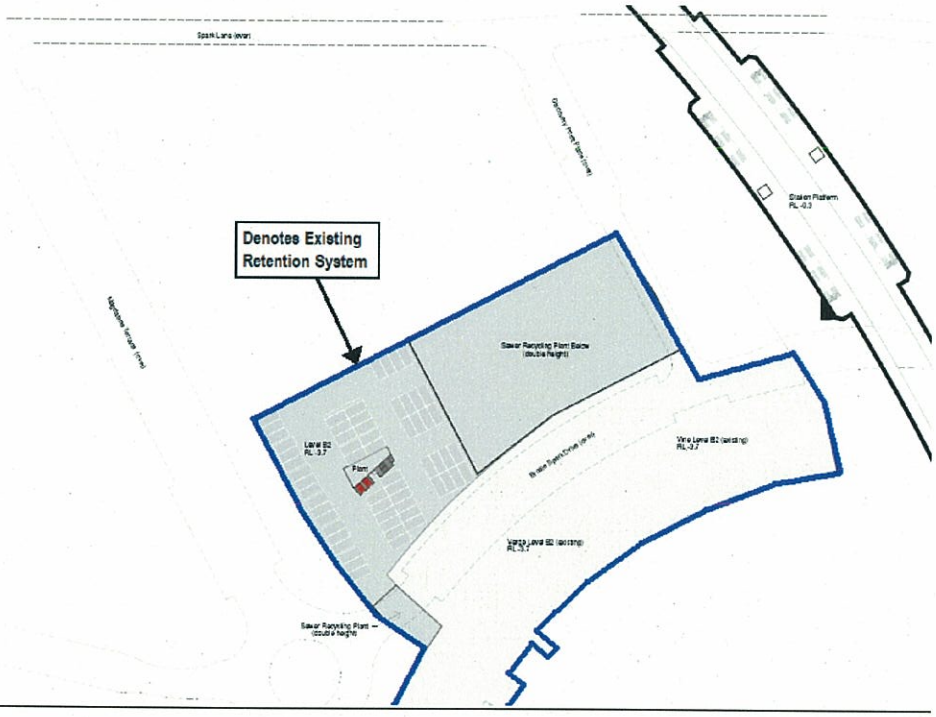
The structure is anticipated to include load-bearing walls and columns sitting on piles. Floor plates will most likely be a combination of reinforced and post tensioned concrete. The roof will probably be structural steel. On this basis construction methodology is expected to adopt generally conventional methods, however construction methodology will be described by the contractor who is engaged to build the development, and will be documented further in the relevant Project Applications on a staged basis.

All relevant documentation will be submitted to Railcorp on a staged basis during the Project Application process.

5.0 Retention System Requirements

Temporary and permanent retention systems for basement excavations will be required at locations as shown in the diagrams below, as part of the proposed development.

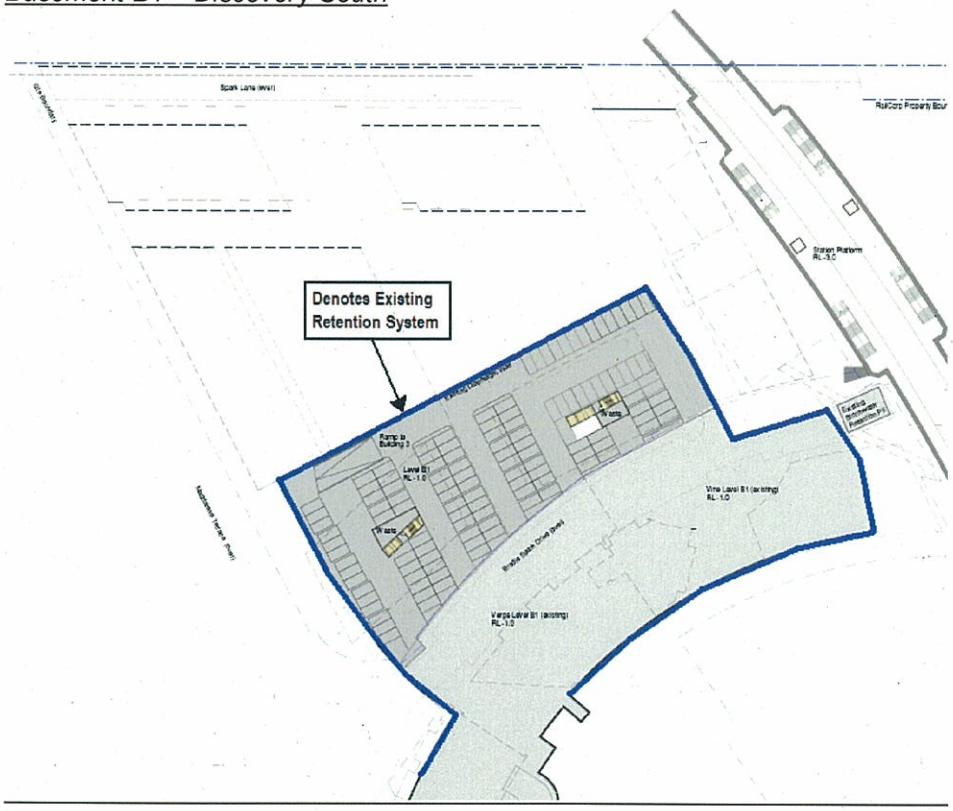
Basement B2 – Discovery South



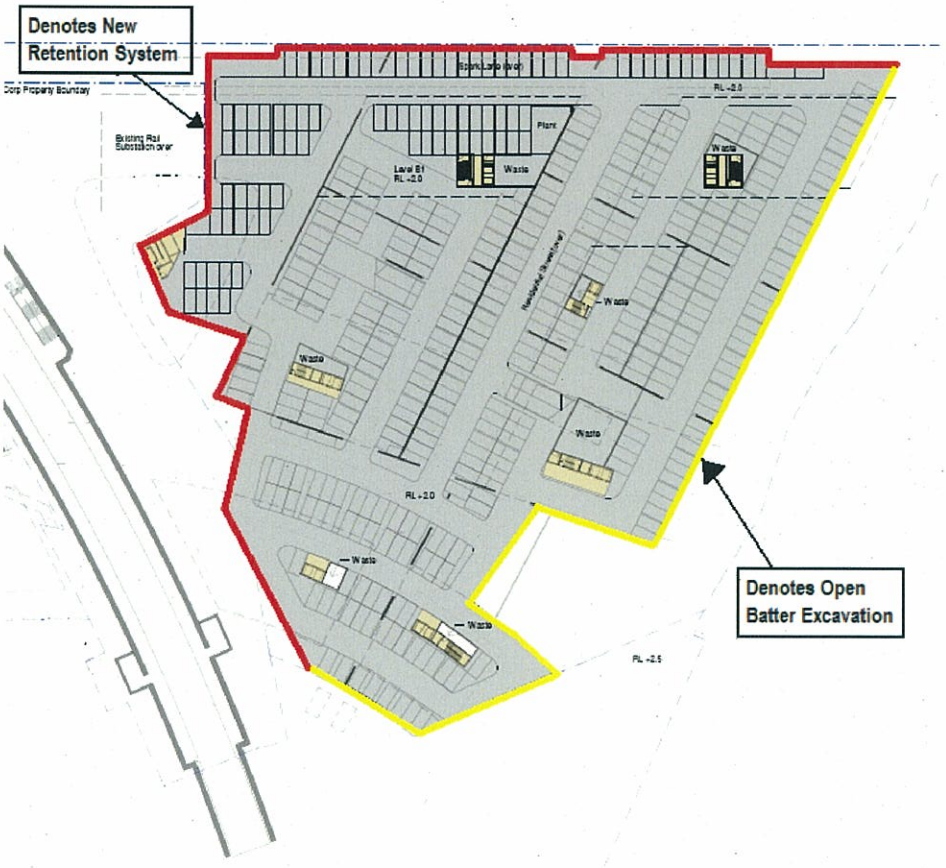
Note:

The existing diaphragm wall retention system shown above currently has authority approval for the installation of temporary anchors, required during completion of excavation of this zone of basement works. The intention of the new Concept Plan is to maintain this component of the design with no changes proposed to the currently approved works.

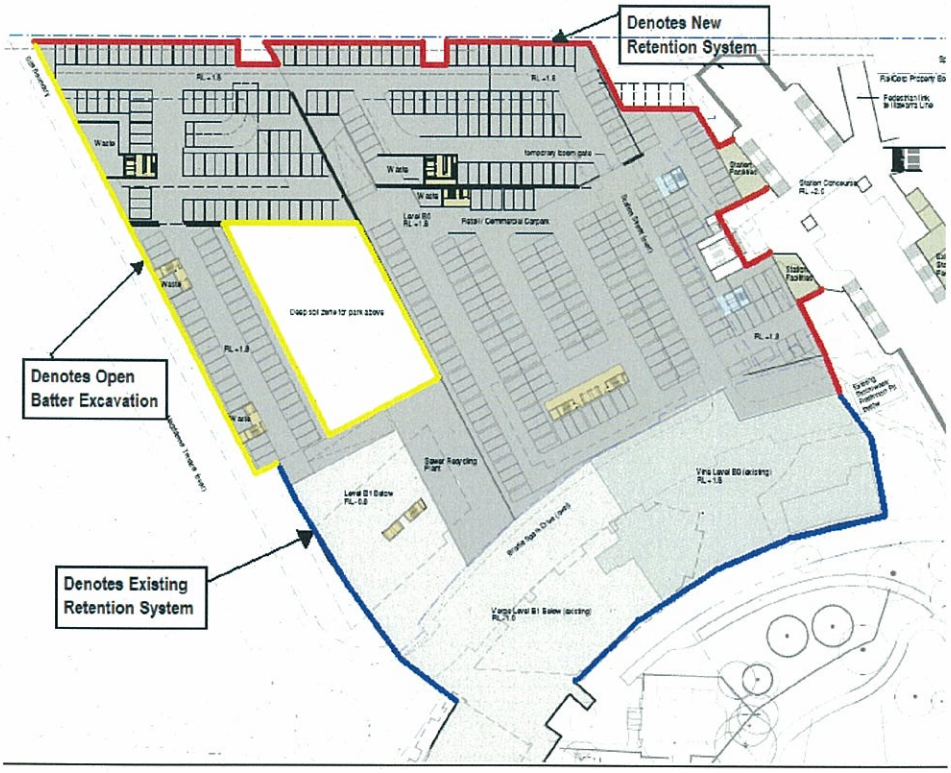
Basement B1 – Discovery South



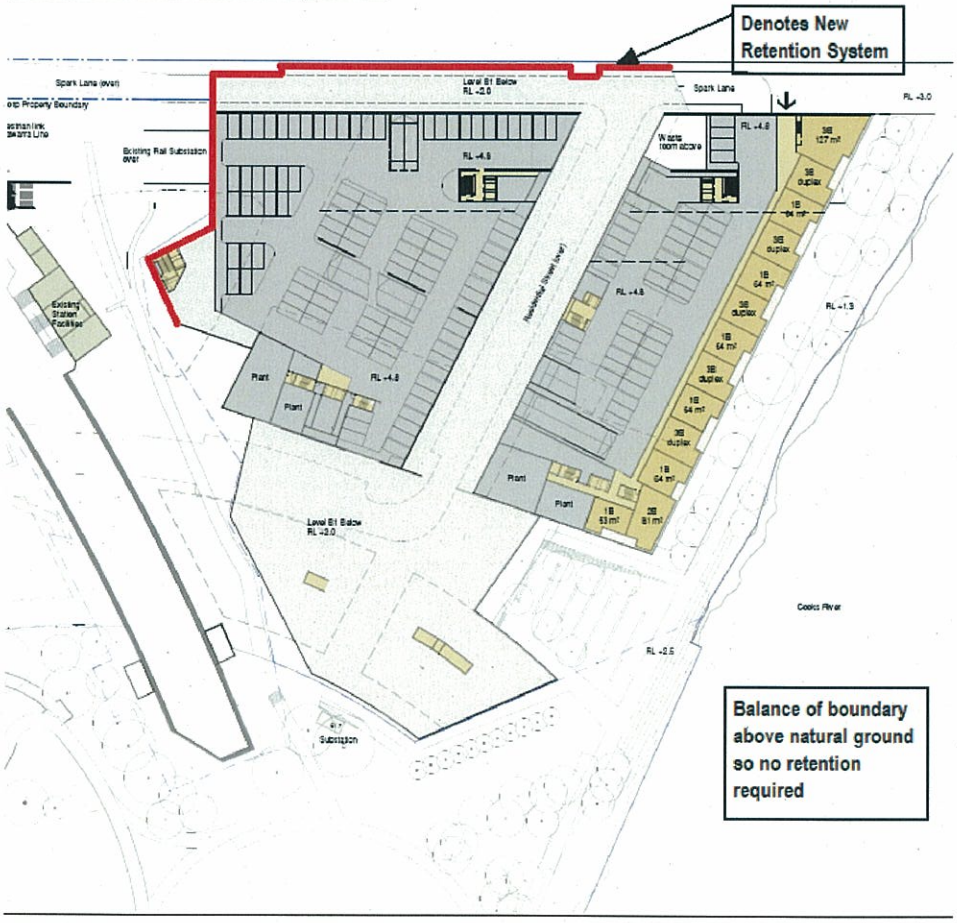
Basement B1 – Discovery North



Basement B0 – Discovery South



Basement B0 – Discovery North



Temporary and permanent retention systems adopted on the project will be designed in accordance with the requirements of the following documents –

- "*Brief for review of geotechnical and structural design for developments adjacent to or above rail corridor for external third party works performed under the NSW State Environmental Planning Policy (Infrastructure) 2007*"
- "*Development Near Rail Corridors and Busy Roads – Interim Guideline*" by the NSW Government Department of Planning, in particular the requirements of Section 6 – "*Excavation, earthworks and other construction related issues*".
- The Building Code of Australia
- relevant Australian Standards and codes

As the design of each stage of the development is submitted for detailed approval, details of the stage-specific retention structures will be provided to demonstrate compliance with the aforementioned guidelines. The overall basement design and excavation has been planned in order to minimise or eliminate the need to install any anchors or similar temporary structures providing excavation stability, within Railcorp easements or across Railcorp boundaries.

6.0 Building Foundations

The buildings are proposed to be supported vertically on a combination of load-bearing walls and columns. These vertical elements will sit on pile caps and piles, with piles extending down to bedrock. On this basis no vertical building load is intended to be transferred to the railway corridor.

All footing systems will be designed in accordance with the Building Code of Australia and all relevant Australian Standards and codes.

For civil engineering design considerations, please refer to the Soil and Water Management Plan by Smart Civil, Ref. C0100170-R1.

7.0 Derailment Protection of Structures

Derailment protection requirements of structures will be assessed, designed and detailed prior to issue of Construction Certificate for each stage of the proposed development, located adjacent to the railway corridor. Any derailment structures that may be required will comply with the requirements of the Railcorp Engineering Standard ESC 380.

The proposed Concept Plan does not locate any parts of any habitable structures within 10 metres of the centreline of any adjacent tracks. On this basis detailed risk assessments for derailment are not expected to be required.

8.0 Track Monitoring Requirements

Track monitoring procedures and methodologies will be developed by the contractor who is engaged to build the development. This information can be submitted to Railcorp as required prior to issue of Construction Certificate for each stage of the proposed development.

9.0 Rail Safety Plan

A rail safety plan will also be developed by the contractor who is engaged to carry out the building works. This will be prepared by the builder as required prior to issue of Construction Certificate for each stage of the proposed development.

10.0 Geotechnical Impact Report and Impact Assessments

Coffey Geotechnics have completed a geotechnical draft summarising the geotechnical impact of proposed excavations adjacent to the rail corridor. Please refer to Coffey Geotechnics report GEOTLCOV24013AA-AB for details, in particular Section 3 of this report.

A detailed, stage-specific geotechnical impact assessment as required by the document "Development Near Rail Corridors and Busy Roads – Interim Guideline" by the NSW Government Department of Planning, Section 6.4, would be completed as part of stage-specific Project Applications for the development.

11.0 Conclusion

This report has examined and presented information appropriate to structural design at the proposed development sites at Discovery Point, Wolli Creek. A number of deliverables for the project have been discussed, and these can be provided to Railcorp and other relevant authorities for review and approval as required, once detailed design for the Project Application phase continues beyond Concept Plan phase, and in all cases prior to works commencing in a staged manner on site.

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