

PUTNEY HILL

VICTORIA ROAD, RYDE, NSW

Civil Engineering Design Report - Stage 2



Prepared for:
Frasers Putney Pty. Ltd
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- CONTENTS -

1	INTRODUCTION	4
1.1	PURPOSE OF REPORT	4
1.2	THE SITE	4
1.3	PROJECT BACKGROUND	4
1.4	THE DEVELOPMENT	4
1.5	PROPOSED DESIGN	4
1.6	STATUTORY REQUIREMENTS & STANDARDS.....	5
2	PROPOSED DESIGN	6
2.1	EROSION & SEDIMENT CONTROL	6
2.1.1	<i>Erosion prevention.....</i>	6
2.1.2	<i>Sediment control.....</i>	6
2.2	EARTHWORKS	6
2.2.1	<i>Site Drainage.....</i>	7
2.2.2	<i>Pit and Pipe system.....</i>	8
2.2.3	<i>Water treatment.....</i>	8
2.2.4	<i>Major System.....</i>	8
2.3	ROADS.....	8
2.3.1	<i>Geometry.....</i>	8
2.3.2	<i>Pavements.....</i>	9
2.4	UTILITY SERVICES	10
3	REFERENCES	11

1 INTRODUCTION

1.1 Purpose of Report

J Wyndham Prince Pty Ltd have been engaged by Frasers Putney Pty Ltd to undertake the design and documentation of the civil engineering works for the Stage 2 proposed redevelopment at the Frasers Putney, Ryde, NSW.

1.2 The Site

The Royal Rehabilitation Centre Sydney (RRCS) occupied a 17.8 ha site bounded by Morrison Road, Prince's Street, Victoria Road and Charles Street Ryde.

Stage 1 of the development is under construction.

The Stage 2 site falls from a highpoint at the junction of Morrison Road and Prince's Street in the western corner in a north easterly direction to the middle of the site and the park and basin constructed as part of Stage 1 works.

1.3 Project Background

Frasers Putney is located on the former Ryde Rehabilitation Centre Sydney, on Victoria Road Ryde which comprises a site area of approx 17.8 ha. The site has been in operation as a rehabilitation centre since 1899. RRCS have relocated into new premises on a 2 ha facility on the site near Morrison Road.

To date RRCS has undertaken extensive planning and consultation to conceptually plan the site into a residential community with mixed use of medical and community facilities. Concept Plan approval was obtained from the Minister for Planning on 23 March 2006 and the Part 3A approval 16 December 2008.

Frasers Putney Pty. Ltd propose to develop the remainder of the RRCS site which comprises 15.8 ha of proposed residential development consisting of approximately 791 dwellings. The development of 15.8ha will be known as Putney Hill and will include residential buildings and infrastructure works for associated future residential occupancy. Stage 1 of the development is under construction.

1.4 The Development

The proposed Stage 2 development comprises residual land of approx. 5.4 Ha being developed into a residential subdivision for up to 344 dwellings including roads, parkland and infrastructure services.

The residential component will comprise the following:

- Apartment buildings
- Townhouse developments:

It is envisaged the development will be constructed in several sub stages within Stage 2. The Residential development for Stage 2 includes 40 Houses and 304 apartments. The Stage 1 residential development includes 447 dwellings. The central detention basin and water quality treatment pond have already been delivered.

1.5 Proposed Design

Cox Richardson have completed a preliminary layout of the roads, earthworks, footpaths and dwelling footprints to enable spatial planning of the site. Further detail design of these elements will be required in the future to finalise road geometry and levels; earthworks; cut and fill volumes as well as stormwater pipe and pit sizes and levels.

1.6 Statutory Requirements & Standards

The Civil works will be designed in accordance with the following relevant legislation, acts, standards and references:

- AMCORD - A National resource document for residential development, referenced in the Deed of Agreement between RRCS and Ryde Municipal Council
- RTA Road Design Guide, all parts
- AUSTRROADS – Guide to Traffic Engineering Practice
- AUSTRROADS – Design Vehicles and Turning Path Templates
- Australian Standards:
 - AS2890. 1 – Off Street Parking
 - AS2890. 2 – Commercial Vehicle Facilities
 - AS2890. 5 – On-Street Parking
- Australian Rainfall and Runoff (AR&R) 4th Edition.
- Managing Stormwater: Soils and Construction 4th Edition Volume 1, Landcom 2004 (Blue Book)
- Managing Urban Stormwater Guidelines, Department of Housing (2004)
- Ryde Council's Development Control Plan 2010, and Engineering Requirements.

2 PROPOSED DESIGN

2.1 Erosion & Sediment Control

The erosion and sediment controls for the development will be designed in accordance with the following documents - Managing Stormwater: Soils and Construction 4th Edition Volume1, Landcom 2004 (Blue Book) and Ryde City Council's Engineering Requirements.

It is proposed the following erosion and sedimentation facilities will be provided during construction.

2.1.1 Erosion prevention

- Catch/ diversion drains will be provided on the upstream side of the works to divert clean flows around the work site.
- Topsoil stockpile locations will be located away from flow areas and will also be surrounded by sediment fences.
- Batter lengths will be minimised and batter slopes once constructed will be stabilised to reduce erosion potential.
- Existing trees to be retained will be identified and protected.
- Exposed soils will be revegetated.
- Disturbed areas will be revegetated and stabilised according to landscaping details.

2.1.2 Sediment control

- Silt fences will be used to divert and contain sediment generated from the site works.
- A stabilised site access point including a shaker grid will minimise soil loss from vehicles exiting the site.
- Proposed stormwater inlet pits will be protected with inlet filters.
- A large portion of the site will drain to the existing central pond, the limiting of sediments to the pond is a desirable outcome, thus temporary sediment basins in addition to other soil and water measures will be provided during construction.

2.2 Earthworks

The site generally grades towards the centre of the site, near Linley Way and the existing park and pond constructed as part of Stage 1 works.

Bulk earthworks will be undertaken to:

- Remove and reconsolidate uncontrolled fill on site.
- Balance, cut and fill volumes where possible to minimise the export of material
- Regrade the site to ensure all stormwater over land flows are directed to the detention basin and wetlands.
- Regrade the site to provide effective grades for vehicular and pedestrian movements and disabled access.
- Provide batters at maximum slope of 1V in 4H for roadways.
- Regrade the site to provide benched areas for building construction.

It should be noted however that due to the topography of the site, roads will generally be graded to between a maximum of 12% and a minimum of 1% with appropriate vertical and horizontal curvature for transitioning of grades, to ensure appropriate sight distances are provided to drivers for safety. As a result of this site topography and the need to meet certain

road vertical geometry, these design criteria have dictated where cut and fill will be required. Early analysis of the cut and fill of the site indicates that it will be necessary to export fill from the site and this is compounded by the need to excavate for basement car parks.

Detailed plans and sections will be provided with the Construction Certificate documentation, indicating the final cut and fill levels for Stage 2.

2.2.1 Site Drainage

All stormwater drainage infrastructures will be designed in accordance with AS3500.3, City of Ryde Council's specifications, Concrete Pipe Association of Australia guidelines and the Australian Rainfall and Runoff publication (ARR).

The site drainage system will comprise a minor / major system in accordance with ARR. In particular the minor system comprises a pit and pipe system whilst the major system relies on surface overland flows.

The stormwater system for Stage 2 Putney Hill will consist of a piped drainage system through the development with overland flow paths provided over roads, paths and open space areas. The stormwater drainage system will then drain to a constructed Gross Pollutant Trap (GPT') prior to being discharged into the constructed detention basin located in the centre of the site.

The analysis of the on-site detention requirements for the development was undertaken and reported by Cardno in 2007, and revised in 2008. The constructed basin has been designed to cater for the Stage 2 residential development.

2.2.2 Pit and Pipe system

It is proposed the minor system will collect the roof water, surface water from landscaped areas, pavements and roads and convey this to a pit and pipe system which discharges to the central pond.

Pits will comprise concrete inlet and junction pits at all junctions of pipelines. Inlet pits will include a class D (heavy duty) grate and cover in roadway areas and class B (medium duty) in other lightly trafficked areas. Heel safe grates will be provided in areas subject to pedestrian traffic.

The pipe system will be designed for a 20 year ARI and comprises mostly reinforced concrete pipes for pipes larger than 375mm and UPVC pipes for pipe sizes up to 300mm diameter. Pipelines will be designed for a minimum of 1% fall and a minimum cover of 600mm in trafficable areas and 300mm in garden areas.

2.2.3 Water treatment

In order to treat stormwater discharging from site, the piped stormwater flows will be directed to the existing gross pollutant trap located on the southern edge of the pond. The GPT is designed to capture litter, coarse sediments and floating hydrocarbons emanating from site.

In accordance with NSW EPA recommendations GPT size has been designed for the Treatable Flow Rate (TFR) which is defined as the runoff from the peak storm expected to be exceed four times per year (otherwise known as the "3 month return period").

2.2.4 Major System

The major system comprises overland flow paths along roads and pathways and will be designed for storms up to the 100 year ARI. Overland flows will be directed to the central pond and detention basin. The size, depth and characteristics of ponding in the existing basin and wetlands has been constructed in accordance with the modelling and design undertaken by Cardno.

2.3 Roads

2.3.1 Geometry

The roads will be designed as public access roads which will ultimately be owned and maintained by council.

As such all roads within the RRCS development have been designed in accordance with AMCORD, as referenced in the Deed of Agreement between RRCS and Ryde Municipal Council and AUSTRROADS guidelines for a speed limit of up to 40 km/hr. In general the roads will be designed to comprise:

Access Street - Minimum road reserve width	= 12.0m
Access Street - Minimum trafficable lane width	= 2.75m
Access Street - Minimum verge width	= 3.25m
Minor Road - Minimum road reserve width	= 13.0m
Minor Road - Minimum trafficable lane width	= 3.0m
Minor Road - Minimum verge width	= 3.5m
Private Road - Minimum road width	= 5.5m
Minimum parking lane width	= 2.5m
Minimum footpath width	= 1.5m
Minimum grade of roads	= 1.0 %
Maximum grade of roads	= 12.5%

Minimum kerb radii	= 6m
Maximum road cross falls	=3%
Desirable grades in intersections	=3%
Maximum grades in intersections	=9%

It is noted that the road geometry has considered the retention of several significant tree stands on site, which has affected the road and building location layout.

Roads will be designed to accommodate access for garbage trucks and large 12.5 long rigid vehicles (LRVs). Intersections within the development will be designed to enable a 9m single rigid truck to turn within trafficable lanes. The 12.5m long rigid trucks will need to use additional lanes for turning, however, can be accommodated within the kerbs proposed.

Parking has been provided on selected sections of the proposed roads to provide visitor parking. This parking arrangement will be further investigated at the Development Application stage. For the majority of the development, off street visitor parking will be provided on each building site.

2.3.2 Pavements

There are various types of proposed pavements to be constructed on site. These include:

- Kerb and gutter, which will be located throughout the site to direct stormwater flows towards the piped drainage system.
- Asphaltic Concrete (AC) road pavements will be used for all roads to provide access for cars, emergency services and delivery vehicles. Construction of the roads shall be in accordance with City of Ryde specifications for each road category and subject to pavement subgrade testing by a registered National Association Testing Authorities Australia Laboratory
- Concrete footpaths, pram ramps and other pedestrian facilities, which will be constructed throughout the site to provide access for pedestrians and residents to traverse through and around the site.

2.4 Utility Services

Utility services such as potable water, sewerage, electrical reticulation, gas and telecommunications will be provided underground, generally in the road reserves, or easements when on private land, in accordance with the relevant authority's requirements.

The Stage 1 Service Utilities have been constructed and the connection locations for Stage 2 are outlined below:

- Sydney Water (water) – Existing watermains in Stage 1 will be extended to service the Stage 2 development.
- Sydney Water (sewer) – Connection will be made with existing mains adjacent to the Central Parklands and Wetlands
- Endeavour Energy (electricity) – The existing electrical network will be extended to service the Stage 2 development.
- Jemena (gas) – Connection will be made with existing mains at the intersection of Road 5 and Road 2, Stage 1.
- NBN Co. (telecommunications) - NBN co. will deliver and reticulate telecommunications throughout the subdivision and connect to the existing infrastructure located at the intersection of Road 5 and Road 2, Stage 1.

3 REFERENCES

- AMCORD - A National resource document for residential development
- RTA Road Design Guide, all parts
- AUSTROADS – Guide to Traffic Engineering Practice
- AUSTROADS – Design Vehicles and Turning Path Templates
- Australian Standards:
 - AS2890. 1 – Off Street Parking
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- Managing Urban Stormwater Guidelines, Department of Housing (2004)
- Ryde Council's Development Control Plan 2010, and Engineering Requirements.