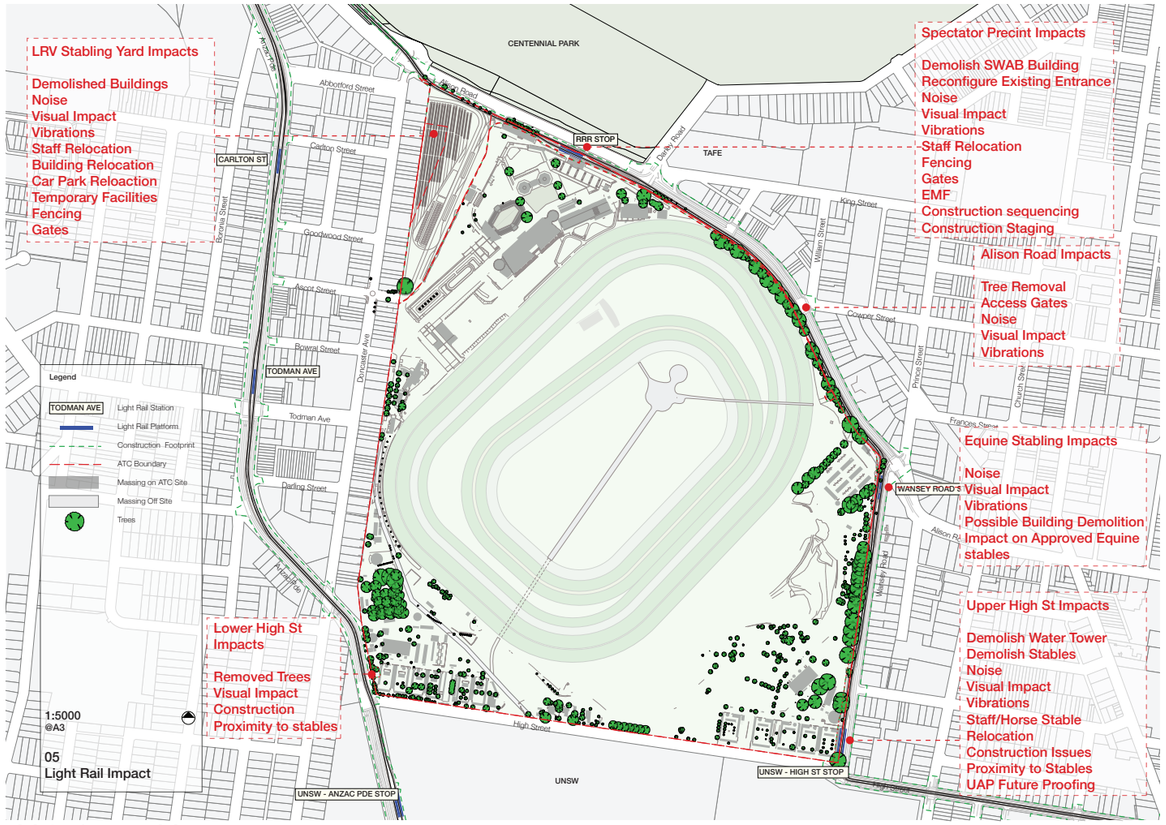
Australian Turf Club and Sydney's Light Rail project:
Urban Impact Summary document- 18.12.2013

Precinct Map



Major Impact Map

Sydney's Lightrail: Impacts Summary Sheet

Australian Turf Club (ATC) has asked Woods Bagot to provide professional services in regards to the Sydney Light Rail Impact on the Randwick Racecourse. The review process exercise undertaken is the following:

1. **'Analysis of the Exhibited Documents'** - Environmental Impact Statement (EIS) for the Light Rail project and the Urban Activation Precinct Master plan to assist ATC in their response the these documents during the exhibition period
2. **A 'Risk and Opportunity Matrix'** reviewing the Rail intervention into the proposed ATC 'Randwick Master plan'.

We have defined the following objective for this study.
To analyse the impact of these two documents on the ATC Master plan, aiming to limit any risks to ATC due to the impact of these two documents, and maximising any opportunities arising for ATC due to these two documents. One of these opportunities may be the development opportunity above the Stabling Yard and the study will work to aid ATC in securing this opportunity.

All EIS documents have been review and aggregated into a series of maps reflecting the impact in a comprehensive way. The 'Risk and Opportunity Matrix' will cover the following aspects:

Impact analysis
Impact on Master plan
Alternate development opportunities
Operational Impacts
Noise and Vibration Issues
Alternate route Options Analysis
Staging Studies

We have established a precinct map to facilitate the review of the the impact by precinct as shown .

1- Lightrail Stabling Review

General elements review

- Facilities – Train storage, maintenance, staff facilities and parking, operations, materials store, wash down/cleaning.
- Operating hours – start up and close down operations.

Implications to ATC:

- Compromise existing ATC operations -Initial demolition of existing facilities – alternatives must be organised prior to removal.
- Reduced access
- Potential noise – start up whistle.
- Visual impact
- Possible security risk increase – critical public infrastructure

2- Stop (station) Review

General elements review:

- Location and layout review – ATC land take impacts
- Gateway public entrance – master plan review/image review
- Other transport mode interactions – buses, taxis, VIP access
- Major event operations – limitations and capacity review
- Suggested improvements to ATC operation
- Suggested branding image improvements

3- Route Review

General elements review:

- Location and layout review – preferred route
- Equine impacts – particularly around horse DA approved stables area (noise and movement)

CENTENNIAL PARK

Anzac Pde

Abbotford Street

Alison Road

Security Building

Administration / Membership Building

RRR STOP

Facilities Management and Heritage Society Buildings

Family Lawn

SWAB building

Darley Road

TAFE

CARLTON ST

Carlton Street

Octagonal Bar

Centennial Lawn

Rose Garden Lawn

Theatre of the Horse

Officials Stand

Oaks Lawn Marquee

King Street

Boronia Street

Spectator Precinct

Goodwood Street

Fig Tree Lawn

Royal Randwick Grandstand

William Street

Raceday stall

Ascot Street

Midfield Precinct

Cowper Street

Equine Centre

Infield Pedestrian Tunnel

Bowral Street

Doncaster Ave

Prince Street

Church Street

TODMAN AVE

Todman Ave

Frances Street

Infield Precinct

Darling Street

WANSEY ROAD STOP

Alison Road

Wansey Road

Anzac Pde

Infield Vehicular Tunnel

Lower High Street Precinct

Upper High Street Precinct

High Street

UNSW

UNSW - HIGH ST STOP

High Street

UNSW - ANZAC PDE STOP

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees

1:5000
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00
Existing with LR Overlay

Zone 01
Stabling Yard

Zone 02
RRR Stop

Zone 03
Alison Rd Boundary

Zone 04
Wansey Rd Stop
Future Equine
Stabling Facility

Zone 05
Upper High St Equine
Existing Stabling

Zone 06
Lower High
Street

CENTENNIAL PARK

TAFE

UNSW

RRR STOP

CARLTON ST

TODMAN AVE

UNSW - ANZAC PDE STOP

UNSW - HIGH ST STOP

WANSEY ROAD STOP

Anzac Pde

Abbotford Street

Carlton Street

Boronia Street

Goodwood Street

Ascot Street

Bowral Street

Doncaster Ave

Todman Ave

Darling Street

Alison Road

Darley Road

King Street

William Street

Cowper Street

Prince Street

Church Street

Frances Street

Wansey Road

High Street

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Zone 01
- Zone 02
- Zone 03
- Zone 04
- Zone 05
- Zone 06

1:5000
@A3

01
Zones

CENTENNIAL PARK

Carpentry Workshop
Plumbing Workshop
Electrical Workshop
Metal workshop
Paint Store
Cleaners store and Amenities
Amenities
Store yard and parking area
Parking
Signage

Security Building
and gates

SWAB building
Fencing gates

Fencing and Gates

Fencing and Gates

Existing Stables

Fencing and Gates

Existing Stables

Existing Water Tower

Anzac Pde
Abbotford Street
Alison Road
Carlton Street
Goodwood Street
Ascot Street
Bowral Street
Todman Ave
Darling Street
Boronia Street
Doncaster Ave
Darley Road
King Street
William Street
Cowper Street
Prince Street
Church Street
Frances Street
Wansey Road
High Street
UNSW

CARLTON ST
TODMAN AVE
RRR STOP
WANSEY ROAD STOP
UNSW - HIGH ST STOP
UNSW - ANZAC PDE STOP

Legend

TODMAN AVE	Light Rail Station
	Light Rail Platform
	Construction Footprint
	ATC Boundary
	Massing on ATC Site
	Massing Off Site
	Trees
	Demolished Building
	Additional buildings ATC believes will be impacted

1:5000
@A3

02
Buildings to be Demolished

CENTENNIAL PARK

TAFE

RRR STOP

CARLTON ST

TODMAN AVE

WANSEY ROAD STOP

UNSW - ANZAC PDE STOP

UNSW - HIGH ST STOP

UNSW

Anzac Pde

Abbotford Street

Carlton Street

Boronia Street

Goodwood Street

Ascot Street

Bowral Street

Doncaster Ave

Todman Ave

Darling Street

Alison Road

Darley Road

King Street

William Street

Cowper Street

Prince Street

Church Street

Frances Street

Wansey Road

High Street

Legend

TODMAN AVE	Light Rail Station
	Light Rail Platform
	Construction Footprint
	ATC Boundary
	Massing on ATC Site
	Massing Off Site
	Trees
	Trees
Existing	
Demolished	
Trimmed	

1:5000
@A3

03
Tree Removal

LRV Stabling Yard
Above site development

Proposed Replacement Deck Car Park
in planning

Overflow Grandstand and Convention Centre
in planning

Proposed Replacement Facilities and Management Building

Centre of Excellence/ Lifestyle facility
15 000 m²
in planning

SWAB Building
Refurbishments and additions.
DA Approved

Hotel
Conference and restaurant.
170 Rooms
Approval expected early 2014

Cowper St Crossing
revised Intersection and Track Crossover.
In planning

Lower High Street UAP

Equine Stable Complex
600 Horse
DA Approved

Upper High Street UAP

CENTENNIAL PARK

CARLTON ST

RRR STOP

TAFE

TODMAN AVE

WANSEY ROAD STOP

UNSW - ANZAC PDE STOP

UNSW - HIGH ST STOP

UNSW

Anzac Pde

Abbotford Street

Alison Road

Carlton Street

Boronia Street

Goodwood Street

Ascot Street

Bowral Street

Todman Ave

Darling Street

Darley Road

William Street

King Street

Cowper Street

Prince Street

Church Street

Frances Street

Wansey Road

High Street

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Future Development

1:5000
@A3

04
Approved and Proposed Opportunities

LRV Stabling Yard Impacts

Demolished Buildings
Noise
Visual Impact
Vibrations
Staff Relocation
Building Relocation
Car Park Reloaction
Temporary Facilities
Fencing
Gates

Spectator Precint Impacts

Demolish SWAB Building
Reconfigure Existing Entrance
Noise
Visual Impact
Vibrations
Staff Relocation
Fencing
Gates
EMF
Construction sequencing
Construction Staging

Alison Road Impacts

Tree Removal
Access Gates
Noise
Visual Impact
Vibrations

Equine Stabling Impacts

Noise
Visual Impact
Vibrations
Possible Building Demolition
Impact on Approved Equine stables

Upper High St Impacts

Demolish Water Tower
Demolish Stables
Noise
Visual Impact
Vibrations
Staff/Horse Stable Relocation
Construction Issues
Proximity to Stables
UAP Future Proofing

Lower High St Impacts

Removed Trees
Visual Impact
Construction
Proximity to stables

CENTENNIAL PARK
TAFE
UNSW

CARLTON ST
TODMAN AVE
RRR STOP
WANSEY ROAD STOP
UNSW - HIGH ST STOP
UNSW - ANZAC PDE STOP

Anzac Pde
Abbotford Street
Alison Road
Carlton Street
Boronia Street
Goodwood Street
Ascot Street
Bowral Street
Doncaster Ave
Todman Ave
Darling Street
Darley Road
King Street
William Street
Cowper Street
Prince Street
Church Street
Frances Street
Wansey Road
High Street

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees

1:5000
@A3

05
Light Rail Impact

CENTENNIAL PARK

RRR STOP

CARLTON ST

TODMAN AVE

TAFE

UNSW

UNSW - ANZAC PDE STOP

UNSW - HIGH ST STOP

WANSEY ROAD STOP

Anzac Pde

Abbotford Street

Alison Road

Darley Road

Carlton Street

Boronia Street

Goodwood Street

Ascot Street

Doncaster Ave

Bowral Street

Todman Ave

Darling Street

King Street

William Street

Cowper Street

Prince Street

Church Street

Frances Street

Wansey Road

High Street

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Building footprint , UAP

1:5000
@A3

URBAN ACTIVATION PLAN

Alison Road

Impact:

Removal of trees reduces the visual screening to the administration building and Alison rd frontage.
Destroys parkland environment unless replaced.
No security building replace-ment Identified
No revised entry gate layout design provided

Impact:

Proximity of track alignment to existing administration building severely reduces amenity inside the building and concern about elements of the building will need to be removed (sun shades, air-conditioning)
EMF, Noise, Visual Amenity

Impact:

Buses required to stop in the traffic/bus lane – a lay-by for stopping buses required
Minimum pedestrian layover path on footpath
Combining bycicle path is dangerous

Impact:

East bound trains can only unload on the north side (single side loading), whereas the north-bound train can load/unload both side.

Impact:

No detailed traffic and transport management plan provided

RRR STOP

Alison Road

Impact:

Heavy vehicle access to the in-field (currently through Gate 1 and Busway) would be severed by the current station layout/design.
No heavy vehicle access to spectator precinct considered.

Impact:

Pedestrians are required to cross the tracks to connect with the foot-path on the south of the station to a footpath on the north located be-tween the tracks and the road. It is potentially a safety risk and forces passers-by to carry out conflicting pedestrian movements with event patrons. Safety with pedestrians being pushed onto Alison and back onto rail lines

Impact:

Level change issue between the platform level and the existing RRR entry concourse not resolved.
Necessitates demolition of SWAB building, replacement of which is not considered.
No Assessment provided on impact to ticket and transitive buildings.
No defined assessment on pedes-trian safety during major events.
No landscape plan provided.

Impact:

Island platform arrangement requires all passengers (east and west) to cross the lines. Side platforms would require only one direction to cross the lines.

Impact:

Hotel application and intersection configuration has not been considered.

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Future Development

1:5000
@A3

Impact Plan 01
Spectactor Precinct

Impact:

Existing access point on Alison Road is removed.
All access points to be maintained unless agreed.

Impact:

Possible Building Demolition.

Impact:

No recognition of the approved stable facilities on the stop location.

Impact:

The retaining wall design will have a significant visual impact within the RRR precinct.

WANSEY ROAD STOP

Impact:

Access to the RRR must be controlled at this location.

Impact:

Existing access point on Wansey road (south of stop) is potentially compromised and limits access to the approved stable facilities.
Heavy vehicle access must be mainained .
Proposed equine stabling intersection should be controlled.

Impact:

Loss of trees will impact visual amenity and acoustic control from RRR.

Impact:

Loss of Fencing and gate replacement.
Detailed design provided to ensure safety, security and aesthetics.

Alison Road

Prince Street

Frances Street

Wansey Road

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Future Development

1:5000
@A3

Impact Plan 02
Wansey Rd Stop

Impact:

Existing stables building north of the stop will be removed.

Impact:

Potential loss of established trees.

Impact:

Track grade is potentially excessive and could cause additional noise impacts.
Stable access lost
No equine management plan provided for construction phase.
Detailed noise mitigation measures not addressed.

Impact:

Existing water tank north of the stop will be demolished, no replacement considered

Impact:

Access to the RRR must be controlled at this location.
No design provided for access to existing stables, no future access to UAP discussed or contemplated.
No heavy vehicle access contemplated.

Impact:

Existing stables facilities adjacent to the stop will be partially demolished.
No temporary or permantent replacement identified.
No details on engineering solutions for structure or services to cater for future development.

Impact:

No discussion on future traffic capacities for UAP

Wansey Road

High Street

UNSW - HIGH ST STOP

Legend

TODMAN AVE Light Rail Station

Light Rail Platform

Construction Footprint

ATC Boundary

Massing on ATC Site

Massing Off Site

Trees

Future Development

1:5000
@A3

Impact Plan 03
Upper High St Precinct

Impact:

Loss of Fencing and gate replacement.
Detailed design provided to ensure safety, security and aesthetics

William Street

Impact:

Tree Removal
Access Gates
Noise
Visual Impact
Vibrations
Proximity to Stables/Horses

Cowper Street

Impact:

Loss of trees will impact visual amenity and acoustic control from RRR

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Future Development

1:5000
@A3

Impact Plan 04
Alison Road

rd Street

eet

Alison Road

Impact:

E.M.F
Construction and Sequencing
Construction Staging
Noise
Visual Impact

Impact:

Demolition of Existing Buildings

RRR STOP

Impact:

Proximity of track alignment to existing administration building severely reduces amenity inside the building and concern about elements of the building will need to be removed (sun shades, air-conditioning)
EMF, Noise, Visual Amenity

Impact:

Pedestrians are required to cross the tracks to connect with the foot-path on the south of the station to a footpath on the north located be-tween the tracks and the road. It is potentially a safety risk and forces passers-by to carry out conflicting pedestrian movements with event patrons. Safety with pedestrians being pushed onto Alison and back onto rail lines

Impact:

Island platform arrangement requires all passengers (east and west) to cross the lines. Side platforms would require only one direction to cross the lines.

Legend

- TODMAN AVE — Light Rail Station
- Light Rail Platform
- Construction Footprint
- ATC Boundary
- Massing on ATC Site
- Massing Off Site
- Trees
- Future Development

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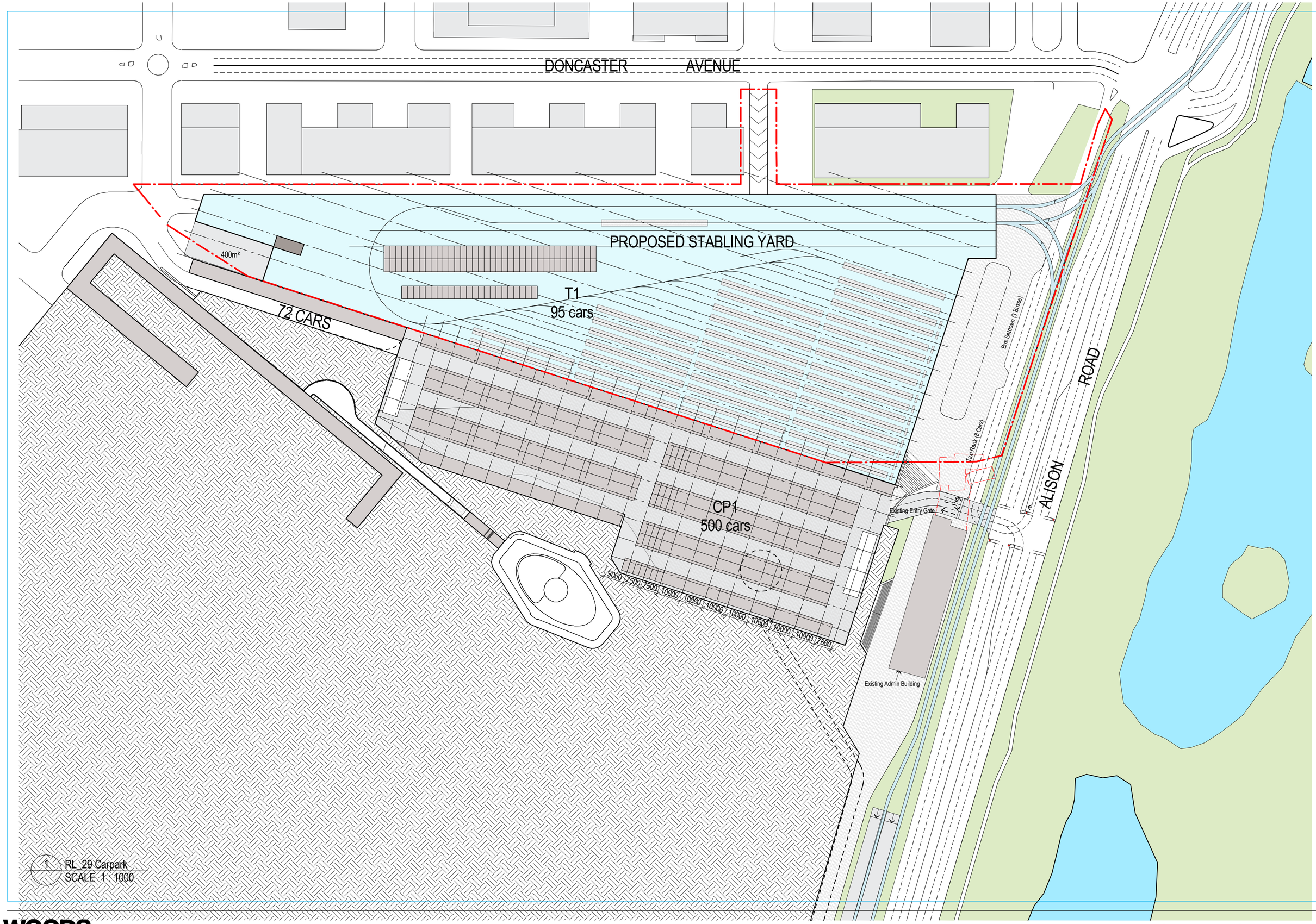
Impact Plan 05
Stabling Yard

Street



1 RL_29 Carpark
SCALE 1 : 1000

WOODS BAGOT

Client Name	Project Name	Sheet Name
Australian Turf Club	Randwick Racecourse Stable Yard Development	FloorPlan RL_29 No Over-Site Development

Project number	Scale
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Drawing number	Revision
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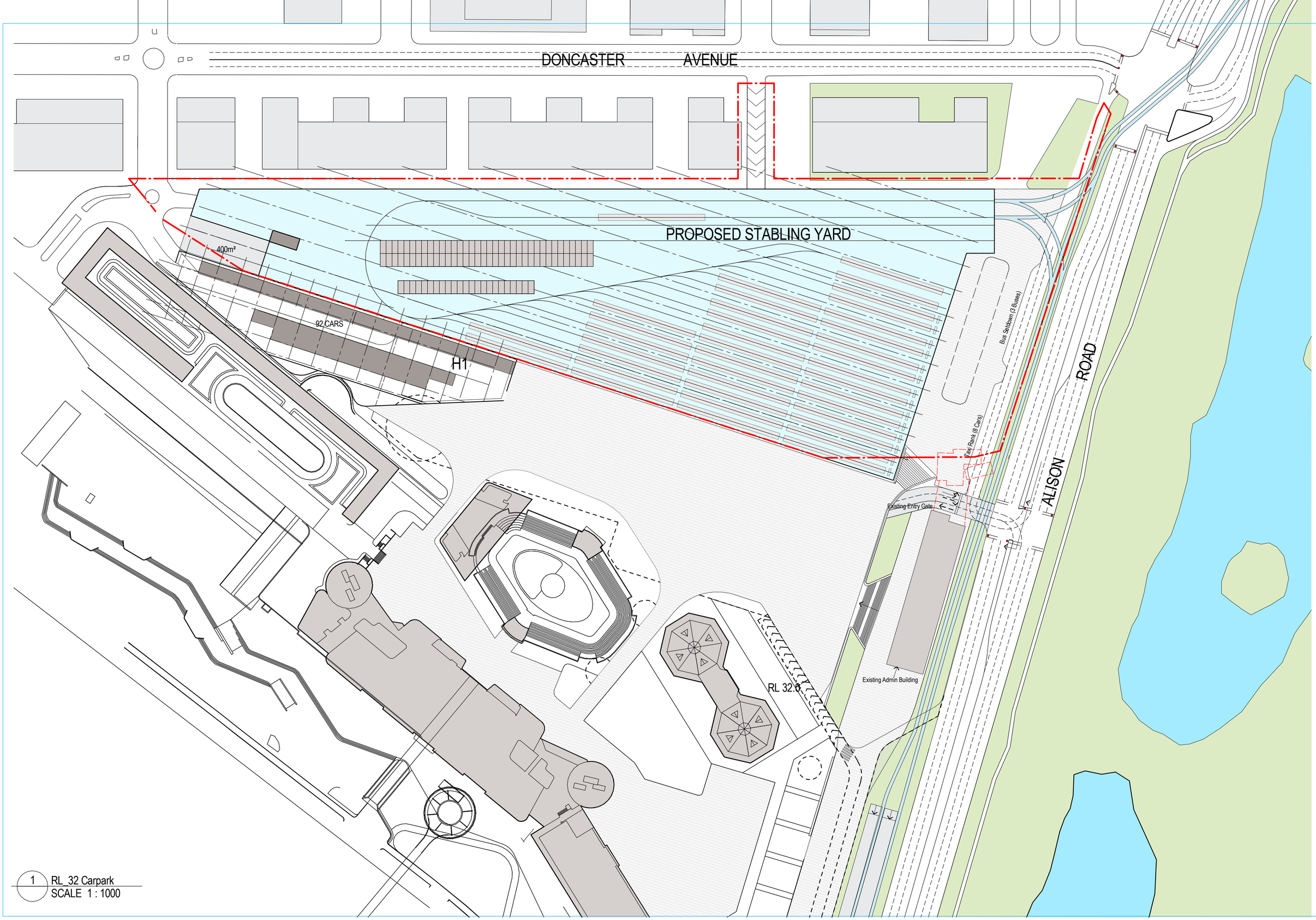

1 RL_32 Carpark
SCALE 1 : 1000

WOODS BAGOT

Client Name
Australian Turf Club

Project Name
Randwick Racecourse Stable Yard Development

Sheet Name
FloorPlan RL_32 No Over-Site Development

Project number
00-00-0000

Scale
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Drawing number
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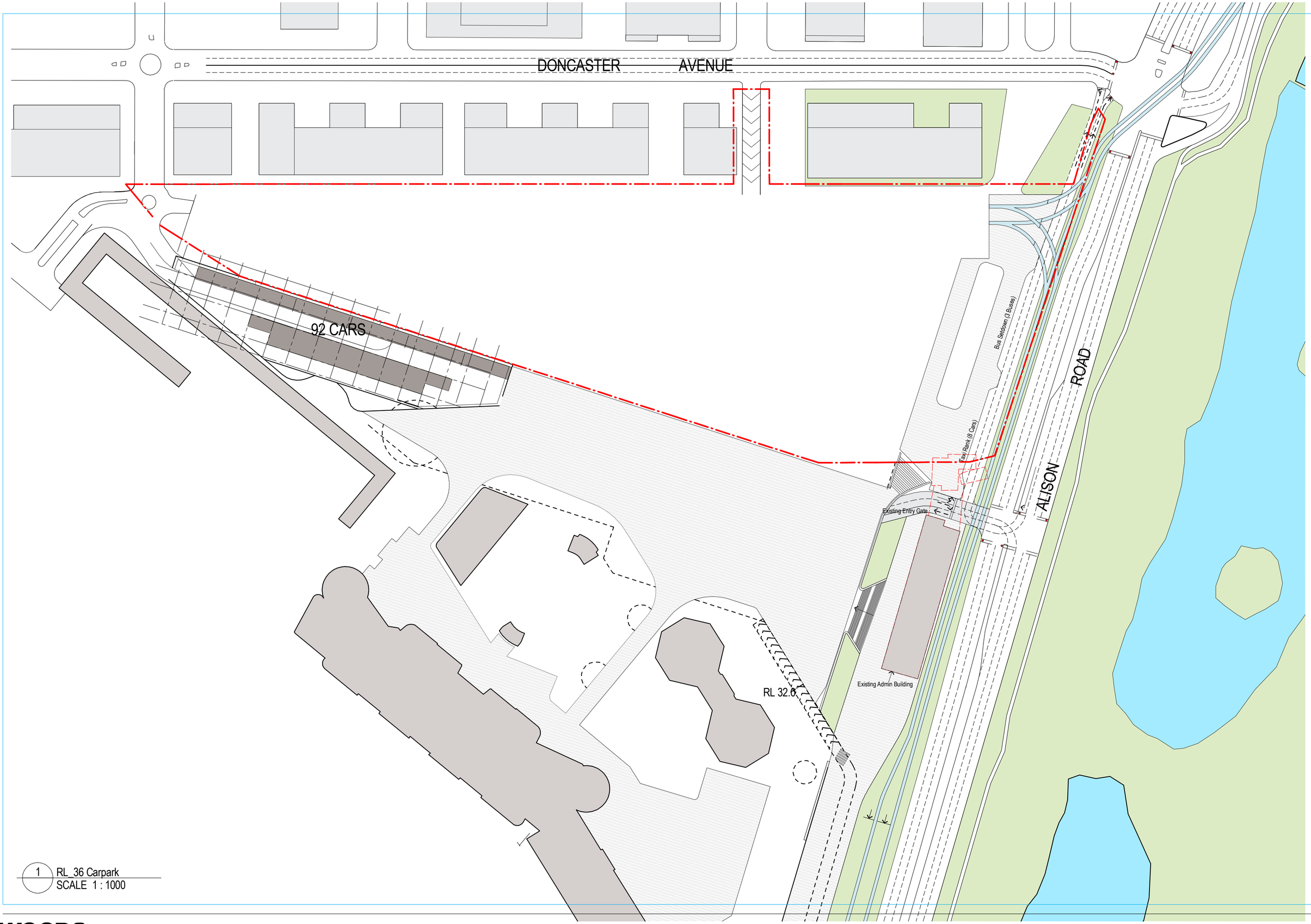

1 RL_36 Carpark
SCALE 1 : 1000

WOODS BAGOT

Client Name
Australian Turf Club

Project Name
Randwick Racecourse Stable Yard Development

Sheet Name
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Project number
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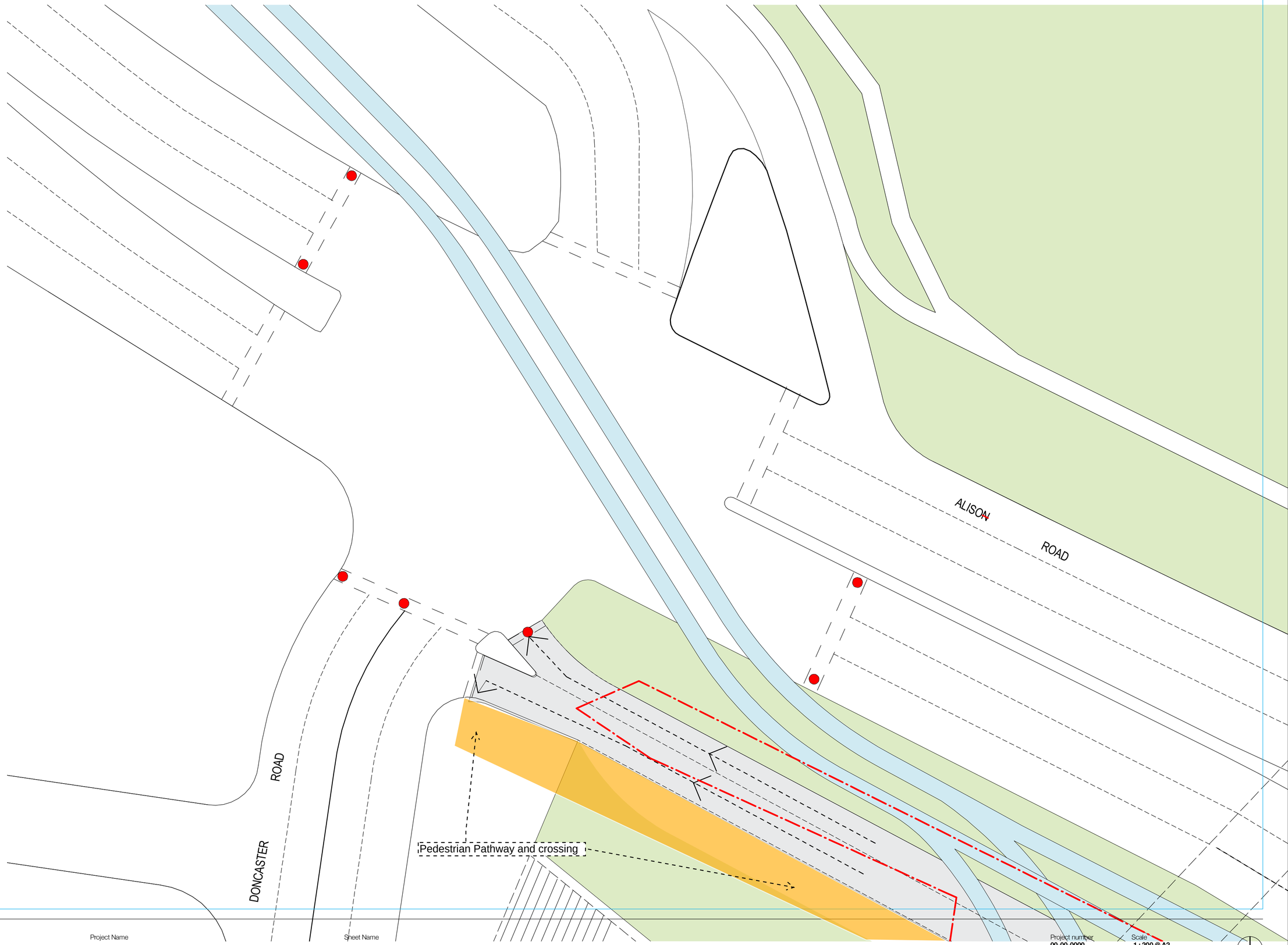

WOODS BAGOT™

Client Name
Australian Turf Club

Project Name
Randwick Racecourse Stable Yard Development

Sheet Name
Intersection Alison Rd and Doncaster Rd

Project number
00-00-0000

Scale
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Drawing number
SK1009

Revision

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WOODS BAGOT™

Client Name
Australian Turf Club

Project Name
Randwick Racecourse Stable Yard Development

Sheet Name
Intersection Alison Rd Bus Taxi Setdown

Project number
00-00-0000

Scale
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Drawing number
SK1010

Revision

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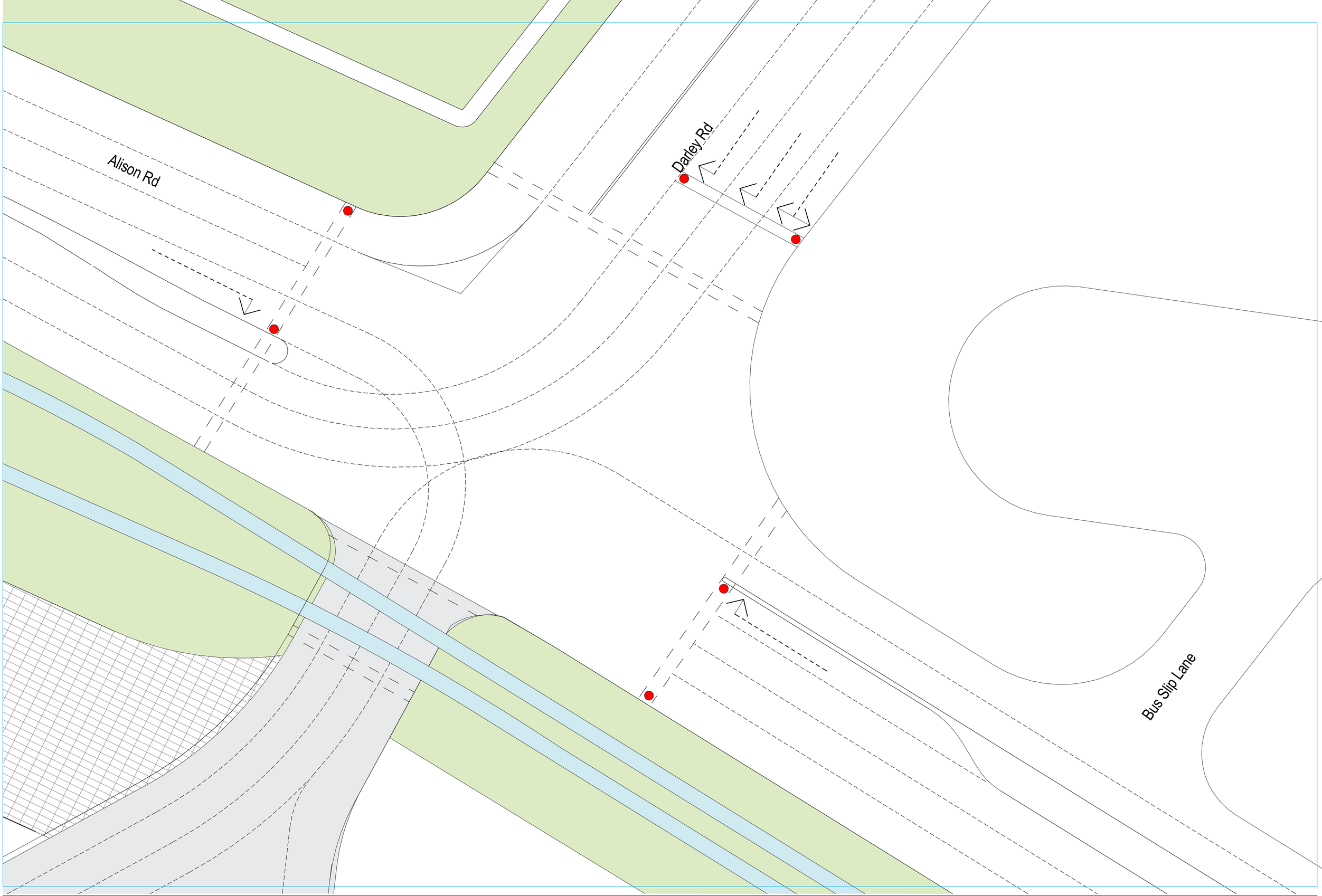

WOODS BAGOT™

Client Name
Australian Turf Club

Project Name
Randwick Racecourse Stable Yard Development

Sheet Name
Intersection Alison Rd and Darley Rd

Project number
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Scale
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Drawing number
SK1011

Revision

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DRAFT - THIS REPORT IS IN DRAFT AND - COMPLETE SAFETY AUDIT AND RISK REVIEW IS ONGOING.

CBD & SOUTH EAST LIGHT RAIL PROJECT

(AUSTRALIAN TURF CLUB – ROYAL RANDWICK PRECINCT)

TECHNICAL REVIEW

(DECEMBER 2013)

Traffix Group Pty Ltd ABN 32 100 481 570

Address: Suite 8, 431 Burke Road, Glen Iris Victoria 3146 **Contact:** Telephone: 03 9822 2888 Facsimile: 03 9822 7444

TABLE OF CONTENTS

APPENDICES

Nil.

Our Reference: G16042R-01A

VERSION HISTORY

Version	Date	Type	Prepared By	Approved By
A	09/12/2013	Draft Report	A. Coyle / N. Green	A. Coyle

1 INTRODUCTION

Traffix Group Pty Ltd has been engaged by the Australian Turf Club (ATC) to provide independent technical advice regarding the proposed CBD & South East Light Rail project.

2 ASSIGNMENT SCOPE

The purpose of this assignment is to provide independent technical advice regarding the proposed CBD & South East Light Rail project to ensure that the project best meets the objectives and vision of the Australian Turf Club (ATC) for the Royal Randwick Precinct.

The plans prepared by Transport for New South Wales have been reviewed and the sites inspected.

In particular, the review focussed on key issues such as:

- Layout - Platform Size, Storage, Swept Paths.
- Access - Crossing Points, Ramps, Illegal Access, Safety, Footpath / Shared Path, Vehicle.
- Intermodal - Sharing of Tracks, Bus Stops, Bus / LRV Transfer, Bus Priority.
- Signal Operation – Overview, LRV Movements, Bus Movements, Pedestrian Movements, Traffic Impacts.

3 CBD & SOUTH EAST LIGHT RAIL PROJECT

The CBD & South East Light Rail Project (the 'Project') is a new light rail line extending 12 kilometres from Circular Quay along George Street to Central Station, then to Kingsford via Anzac Parade and Randwick via Alison Road.

Key features of the project include:[1]

- nine stops between Circular Quay and Central Station.
- seven stops between Kingsford and Central Station, including the University of NSW at Anzac Parade and Moore Park.
- six stops between Central Station and Randwick, serving the Prince of Wales Hospital, University of NSW at Wansey Road, Royal Randwick Precinct and Moore Park.
- interchanges located at major rail stations – Central Station, Town Hall, Wynyard and Circular Quay and bus interchanges at both Randwick and Kingsford.
- pedestrian zone from Bathurst Street to Hunter Street with light rail operating through the centre.
- segregated traffic and light rail lanes between Central Station and Bathurst Street and between Hunter Street and Circular Quay.

Key benefits include:

- Increased capacity:
  - space for 300 commuters on each 45 metre long light rail service – equivalent to five standard length buses.
  - reduced crowding and congestion.
  - buses freed up to service other destinations.
- Faster, simpler, more reliable services:
  - 'turn up and go' services every two to three minutes in peak times.
  - 97 per cent reliability.
  - services that are on time and fast.
  - real time information at all stops and on vehicles, showing route and stop locations.
  - simple to navigate.
  - effective wayfinding at stops and interchanges, to help you transfer to bus, ferry or heavy rail.
- Urban renewal opportunities:
  - pedestrian friendly streets, open spaces and revitalised public areas
  - reduced congestion at the heart of the CBD
  - a more attractive, accessible environment for visitors, businesses and workers
  - improved connections where people live, work and visit.
- Improved amenity:
  - integrated, electronic ticketing available at outlets or on-board
  - light rail stops maximise accessibility, with multiple doors available to alight at your stop
  - smooth, comfortable and quiet services, with air-conditioned vehicles
  - safe, clean, accessible and comfortable environment.

An overview of the project is shown in Figure 1. The study areas for this investigation are highlighted in red.

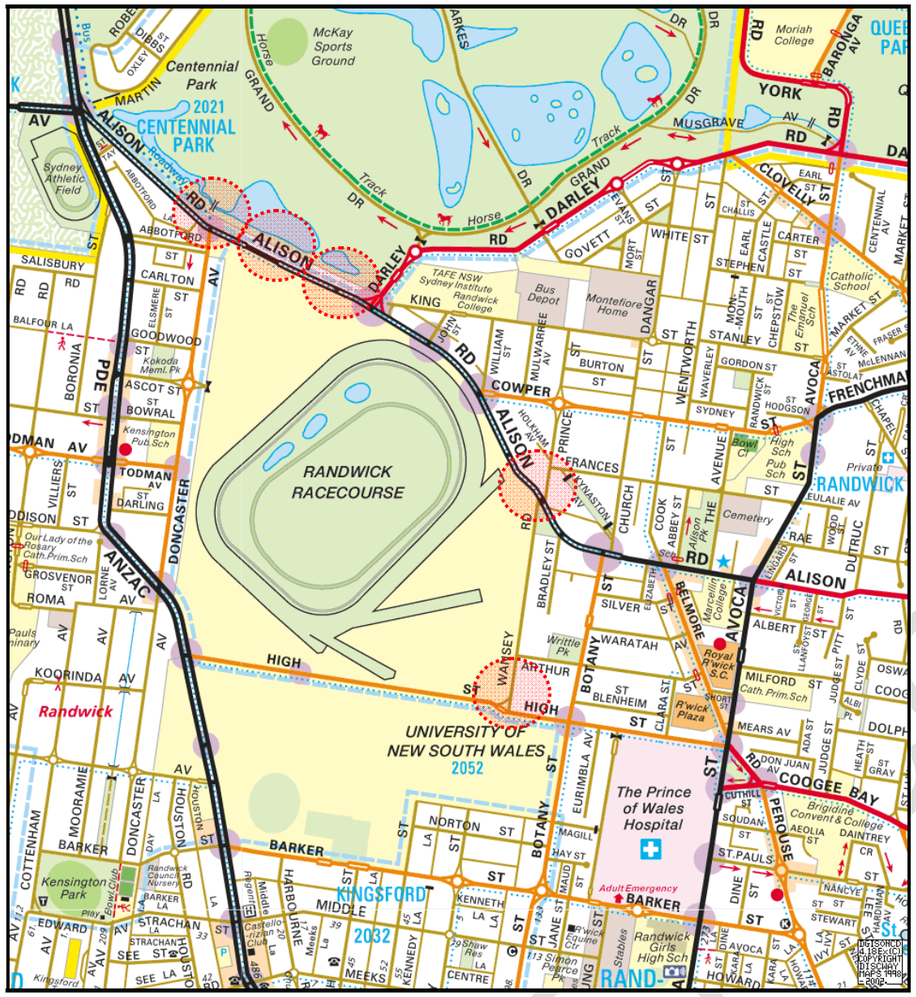
Source: http://www.transport.nsw.gov.au/lightrail-program/cbd-and-south-east-light-rail

Figure 1: Project Overview and Study Areas

[1] Source: http://www.transport.nsw.gov.au/lightrail-program/cbd-and-south-east-light-rail

4 ROYAL RANDWICK PRECINCT

The Royal Randwick Precinct is bounded by Alison Road, Wansey Road, High Street and Doncaster Avenue, as shown below in Figure 2.



Source: Ausway Publishing

Figure 2: Road Network and Study Areas

The proposed City and South East Light Rail Project will involve the construction of light rail tracks along the northern and eastern boundaries of the Royal Randwick Precinct, as shown below in Figure 3.

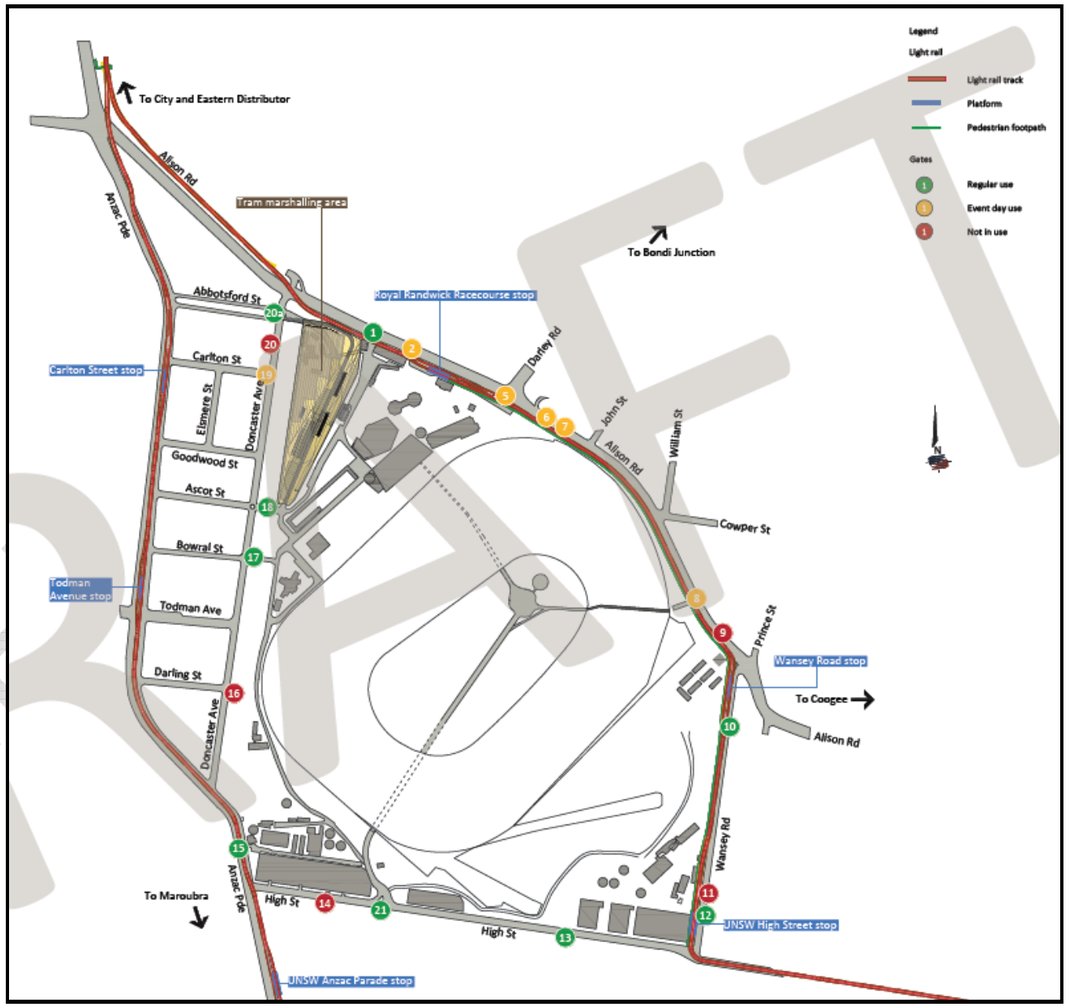


Figure 3: Royal Randwick Precinct – Impacts on Access Locations

In addition, a master plan is in place to further transform Royal Randwick into a world class destination for racing, events and entertainment. The scale of the project includes an approved hotel, stabling complex, convention centre and centre of excellence.

5 REFERENCE DOCUMENTS

The following documents were reviewed during the preparation of this report:

- Transport Operations Report, Final Report, Transport for NSW, 8 October 2013, Sydney.
- CBD and South East Light Rail Engineering, Light Rail Systems and Urban Design Definition Design - Volume 3 - Part 1 - South East Corridor, Final, CSELR-00WP-GN-R-0019, prepared for Transport for NSW, 16 August 2013.
- CBD & South East Light Rail Engineering, Light Rail Systems and Urban Design Definition Design Report - Volume 4 - Urban Design, CSELR-OOWP-GN-R-OO20, Final, prepared for Transport for NSW, 16 August 2013.

6 PASSENGER BOARDING & ALIGHTING VOLUMES

The 'Transport Operations Report, Final Report, Transport for NSW, 8 October 2013, Sydney' provides information regarding predicted passenger boarding and alighting numbers as well as bus transfers and walk ups. A summary of this data is provided in Table 1.

Table 1: Predicted Passenger Boarding & Alighting Volumes

Location	Transport Operations Report Predicted Volumes (AM Peak Hour*)
Alison Road / Royal Randwick Precinct	Precinct Access Plan (Table 7-19) states: 921 boardings & 316 alightings forecast for 2021 (total – 1,237 per hour). 1,029 boardings & 358 alightings forecast for 2036 (total – 1,387 per hour).
Alison Road / Wansey Road	Precinct Access Plan (Table 7-20) states: 691 boardings & 187 alightings forecast for 2021 (total – 878 per hour). 802 boardings & 213 alightings forecast for 2036 (total – 1,015 per hour).
Wansey Road / High Street Stop (UNSW)	Precinct Access Plan (Table 7-21) states: 749 boardings & 2,188 alightings forecast for 2021 (total – 2,937 per hour). 842 boardings & 2,803 alightings forecast for 2036 (total – 3,645 per hour).

* It is noted that it has been assumed that the patronage stated in the tables are from Tables 7-16, 7-17, 7-18 and 7-21 are AM Peak Hourly Volumes although it is not stated in the table.

In addition, the Alison Road / Royal Randwick Precinct stop will be the main access point for passengers during events at the Royal Randwick Precinct.

7 ALISON ROAD / DONCASTER AVENUE

The light rail will transition from the north side of Alison Road to the south side at the Doncaster Avenue intersection.

7.1 EXISTING CONDITIONS

The existing conditions are shown in Figure 4 and Figure 5 and are summarised as follows:

- Signalised cross-intersection with entry/exit to busway on north side of intersection. Pedestrian crosswalsk on west and south legs.
- Bus routes along Alison Road (some of which use busway).
- Shared path along north side of Alison Road.

Source: http://maps.six.nsw.gov.au/

Figure 4: Alison Road / Doncaster Avenue – Existing Conditions

Doncaster Avenue – View North to Alison Road

Alison Road – View East to Doncaster Avenue

Alison Road – View West to Doncaster Avenue

Busway – View South East to Alison Road

Figure 5: Alison Road / Doncaster Avenue – Photographs

7.2 PROPOSED CONDITIONS

It is proposed to construct (as shown in Figure 6):

- new light rail tracks transition from the north-west corner to the south-east corner of the intersection.
- relocated stop lines on Alison Road.

DRAFT

Source: Transport for NSW

Figure 6: Proposed Conditions - Alison Road / Doncaster Avenue

7.3 TECHNICAL REVIEW

The findings from the review of this location are included in Table 2.

Table 2: Alison Road / Doncaster Avenue

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
Consistency	-	-	-	-
Layout	Track Location	Light rail tracks transition from the north-west corner to the south-east corner of the intersection.	Light rail tracks cross the traffic lanes at a 'shallow' angle. Light trail tracks are slippery when wet and pose a significant risk to on-road cyclists due to the shallow angle. However, it is noted that there is an existing shared path along the north side of Alison Road.	Bicycle tyres may be caught in light rail tracks when crossing at angles less than 90 degrees. Light rail tracks are slippery when wet.
	Platform Size	-	-	-
	Storage	-	-	-
	Swept Paths	-	-	-
Access	Crossing Points	Pedestrian crosswalk on Alison Road west of Doncaster Avenue relocated 20m west.	The relocation of the pedestrian crosswalk on Alison Road west of Doncaster Avenue 20m west significantly reduces the visibility of pedestrians by drivers turning left from Doncaster Avenue. In addition, the proposed double left turn increases the risk that the driver from the right hand left turn lane will not see a pedestrian.	Reduced visibility to pedestrians using the pedestrian crosswalk on Alison Road west of Doncaster Avenue by drivers turning left from Doncaster Avenue.
	Ramps	-		
	Illegal Access	-		
	Safety	-	-	-
	Footpath / Shared Path	Existing shared path retained along northern side of Alison Road. LRV tracks cross footpath on southern side of Alison Road.	n/a No details are provided as to how pedestrians using the southern footpath of Alison Road east of Doncaster Avenue will cross the light rail tracks. All other pedestrian movements at this location are signalised.	n/a Pedestrian and LRV conflict on southern side of Alison Road east of Doncaster Avenue.
	Vehicle	Bus movements to and from the busway will be retained.	n/a	n/a
Intermodal	Sharing of Tracks	Buses and LRV will shared existing busway west of Doncaster Road.	Refer comment below regarding bus and LRV conflicts.	n/a
	Bus Stops	No detail provided regarding existing bus stops.	Existing bus stops on Alison Road and on busway in vicinity of intersection.	Location and access to bus stops.
	Bus / LRV Transfer	No light rail stop proposed at this location.	n/a	n/a
	Bus Priority	Bus phase to and from the busway retained.	n/a	n/a
Signal Operation	Overview	Additional light rail phase to be added to intersection.	It is understood that signals operate in a three phase arrangement – Alison Road, Doncaster Avenue and Bus Movements. The intersection will be widened from 25m to 75m along Alison Road. The removal of the median will also decrease delineation along Alison Road.	Wide intersection with minimal delineation for traffic along Alison Road.
	LRV Movements	Separate phase for LRV movements.	There is no detail regarding the management of conflicts between LRV and buses on the northern side of Alison Road. Eastbound LRV waiting at the intersection will block the busway, and westbound LRV will merge with westbound buses on to the busway.	Bus and LRV conflict on the northern side of Alison Road
	Bus Movements	Bus phase to and from the busway retained.	Buses will be required to wait within the middle of the intersection to perform a right turn.	Buses required to wait within middle of wide intersection that has poor delineation. Consider extension of red pavement through intersection to improve delineation and to provide a clear area for buses to wait.
	Pedestrian Movements	All existing movements retained.	n/a	n/a
	Traffic Impacts	Report indicates minimal impacts on traffic.	Impacts on traffic due to additional light rail phase, and wider intersection.	n/a

8 ALISON ROAD / STABLING YARD

The proposed stabling yard will be located on Alison Road at the main 'administration' entrance to Royal Randwick Precinct.

8.1 EXISTING CONDITIONS

The existing conditions are shown in Figure 7 and Figure 8 and are summarised as follows:

- Unsignalised T-intersection (priority along Alison Road) with right turn lane in to driveway.
- Three traffic lanes in each direction along Alison Road with 70km/h speed limit.

Source: http://maps.six.nsw.gov.au/

Figure 7: Alison Road / Stabling Yard – Existing Conditions

Alison Road – View East from Access

Alison Road – View West across Access

Figure 8: Alison Road / Stabling Yard – Photographs

8.2 PROPOSED CONDITIONS

It is proposed to construct (as shown in Figure 9):

- new light rail tracks along southern side of Alison Road.
- new light rail track junction to access stabling facilities on southern side of Alison Road.
- pedestrian walkway between roadway and rail.

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8.3 TECHNICAL REVIEW

The findings from the review of this location are included in Table 3.

Table 3: Alison Road / Stabling Yard

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
Consistency	-	-	-	-
Layout	Track Location	Light rail tracks located on southern side of Alison Road.	n/a	n/a
	Platform Size	-	-	-
	Storage	-	-	-
	Swept Paths	-	-	-
Access	Crossing Points	-	-	-
	Ramps	-	-	-
	Illegal Access	-	-	-
	Safety	-	-	-
	Footpath / Shared Path	Existing shared path retained along northern side of Alison Road. LRV tracks separate footpath on southern side of Alison Road and Royal Randwick Precinct. Pedestrian walkway located between light rail tracks and Alison Road.	n/a No details are provided as to how pedestrians using the southern footpath of Alison Road will cross the light rail tracks (NB: To access Administration Building, etc.). Narrow (approx. 3m) footpath located between eastbound light rail tracks and westbound carriageway of Alison Road. This is a very constrained pedestrian environment with high speed vehicles passing on both sides. No details are provided regarding fencing.	n/a Pedestrians crossing light rail tracks to access Royal Randwick Precinct. Narrow walkway between light trail tracks and Alison Road with high speed vehicles passing both sides.
	Vehicle	No details provided regarding vehicle access.	Existing unsignalised intersection used as main 'non-event' access point to Royal Randwick Precinct. Unsignalised vehicle movements are high risk due to the high speed (70km/h) Alison Road traffic, various light rail movements (eastbound, westbound, left in, left out, right in, right out) and pedestrian movements.	If unsignalised, high risk of collisions between vehicles, light rail vehicles and pedestrians. Consider the siganlisation of the intersection.
Intermodal	Sharing of Tracks	-	-	-
	Bus Stops	-	-	-
	Bus / LRV Transfer	-	-	-
	Bus Priority	-	-	-
Signal Operation	Overview	As indicated above, consider signalisation of intersection.	n/a	n/a
	LRV Movements	-	-	-
	Bus Movements	-	-	-
	Pedestrian Movements	-	-	-
	Traffic Impacts	-	-	-

9 ALISON ROAD / ROYAL RANDWICK PRECINCT STOP

The proposed Wansey Road / High Street stop will service the upper campus of UNSW.

9.1 EXISTING CONDITIONS

The existing conditions are shown in Figure 10 and Figure 11 and are summarised as follows:

- Bus interchange to the west of Darley Road for event operation.
- Three traffic lanes in each direction along Alison Road with 70km/h speed limit.

Source: http://maps.six.nsw.gov.au/

Figure 10: Alison Road / Royal Randwick Precinct – Existing Conditions

Alison Road – View West to Darley Road

Alison Road – View North to Darley Road

Bus Interchange – View West from Darley Road

Bus Interchange – View West from Darley Road

Bus Interchange – View West from Darley Road

Bus Interchange – View West from Darley Road

Figure 11: Alison Road / Royal Randwick Precinct – Photographs

9.2 PROPOSED CONDITIONS

It is proposed to construct (as shown in Figure 12):

- new centre island platform stop (normal operation).
- new side platform (westbound) and pocket track for post-event loading.
- bus and taxi parking areas in kerbside lane along Alison Road.

DRAFT

Source: Transport for NSW

Figure 12: Proposed Conditions – Alison Road / Royal Randwick Precinct

9.3 TECHNICAL REVIEW

The findings from the review of this location are included in Table 4.

Table 4: Alison Road / Royal Randwick Precinct

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
Consistency	-	-	-	-
Layout	Track Location	Light rail tracks located on southern side of Alison Road.	n/a	n/a
	Platform Size	Centre platform – 45.0m x 5.25m Side platform – 45.0m x 3.20m	No details are provided regarding predicted event boarding and alighting numbers so it is difficult to assess the ability of the platforms to cater for the expected patronage. The proposed side platform (for post-event boarding) is supported to minimise the number of crossings of the tracks. If the platforms are not large enough, passengers will queue down the ramps and across the tracks. Any overflow will block access across the tracks for passengers going to and from the walkway between the tracks and Alison Road. It is understood that provision for longer LRV may be required. The proposed layout does not appear to make provision for the longer LRV.	Request additional information regarding event boarding and alighting numbers.
	Storage	Ramps proposed at each end of platforms can provide additional storage area.	n/a	n/a
	Swept Paths	Proposed track cross-over located immediately east of platform stops.	Additional clearance may be required at the eastern end of the stops to allow for the swept paths of LRV.	Clearances of LRV to pedestrian waiting areas.
Access	Crossing Points	Proposed LRV priority pedestrian crossings at both ends of stop.	These types of crossings should work satisfactorily in this environment.	n/a
	Ramps	Ramps proposed at both ends of stops.	In the cross sections, tracks appear to be lowered.	n/a
	Illegal Access	Existing fencing along Alison Road centre median to be retained.	Existing fencing along Alison Road centre median will discourage illegal movements across Alison Road.	n/a
	Safety	-	-	-
	Footpath / Shared Path	Shared path along southern side of Alison Road up to proposed platform stops.	There is an existing shared path on the northern side of Alison Road west of Darley Road. It is proposed to provide a narrow footpath between the light rail tracks and Alison Road between Darley Road and Doncaster Avenue which is unlikely to be suitable as a shared path. It is considered that the benefits of extending the shared path to the platform stops is minimal, and will create conflicts, especially during events.	Shared path between Darley Road and platform stops expected to create conflicts between cyclists and pedestrians, and encourage cyclists to use narrow footpath further west rather than existing shared path on the north side of Alison Road.
	Vehicle	-	-	-
Intermodal	Sharing of Tracks	-	-	-
	Bus Stops	Buses and taxis proposed to stop in kerbside lane during events 'under traffic control conditions'.	Prior to the construction of the bus interchange in 2009, buses and taxis stopped in the kerbside lane. There are only two westbound lanes in Alison Road east of Darley Road. There are three right turn lanes out of Darley Road. The third right turn lane will conflict with the kerbside bus/taxi lane. If traffic control is to be used to manage westbound traffic in Alison Road during events, this creates on ongoing resource requirement for the ATC to provide the required traffic management. The 3.0m wide footpath between the tracks and Alison Road may become very congested at each of the bus stop locations which may make it difficult for other pedestrians to move along the footpath.	Conflicts between buses and taxis with westbound traffic on Alison Road when entering and exiting the kerbside lane. As Alison Road will effectively be reduced to a four lane divided road, consider the removal of the third right turn lane from Darley Road to create an exclusive lane for buses and taxis during events.
	Bus / LRV Transfer	The proposed location of existing bus stops is not shown on the plans.	There is expected to be some transfer between buses and LRV at this location.	Provide safe access between bus stops and light rail stop.
	Bus Priority	-	-	-
Signal Operation	Overview	-	-	-
	LRV Movements	-	-	-

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
	Bus Movements	-	-	-
	Pedestrian Movements	-	-	-
	Traffic Impacts	It is proposed to retain the six traffic lanes in Alison Road west of Darley Road.	n/a	n/a

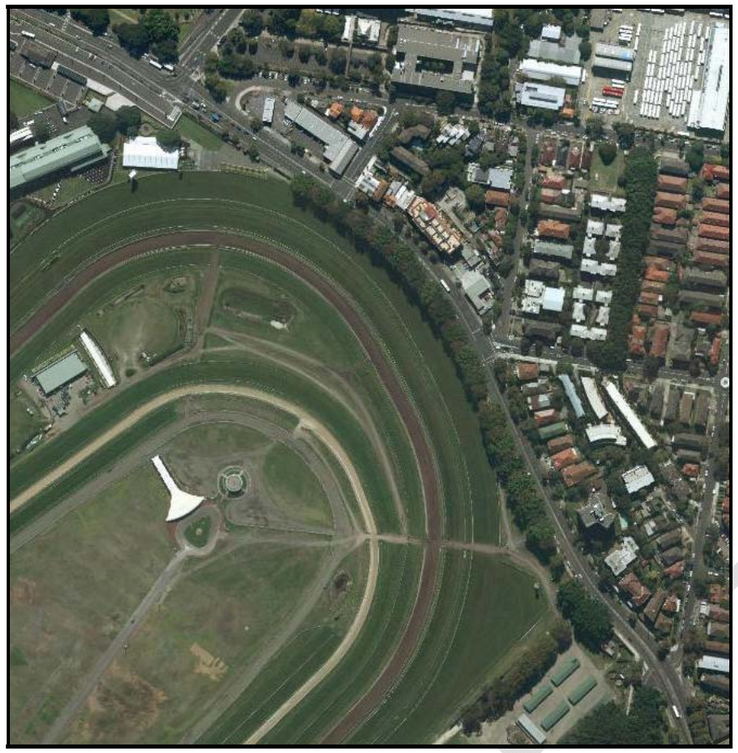
10 ALISON ROAD – DARLEY ROAD TO WANSEY ROAD

Alison Road between Darley Road and Wansey Road will be modified to accommodate the new light rail tracks and shared path along the southern side.

10.1 EXISTING CONDITIONS

The existing conditions are shown in Figure 13 and Figure 14 and are summarised as follows:

- two or three traffic lanes in each direction, with kerbside parking in some locations.
- signalised intersections at Cowper Street, John Street and Darley Road.
- footpaths along both sides.



Source: http://maps.six.nsw.gov.au/

Figure 13: Alison Road - Darley Road to Wansey Road – Existing Conditions

Alison Road – View West from Wansey Road

Alison Road – View West from Wansey Road

Alison Road – View West to Cowper Street

Alison Road – View West to John Street

Alison Road – View West to Darley Road

Alison Road – View East from Darley Road

Figure 14: Alison Road (Darley Road to Wansey Road) – Photographs

10.2 PROPOSED CONDITIONS

It is proposed to construct (as shown in Figure 15):

- new light rail tracks on the southern side of Alison Road.
- new shared path on the southern side of the light rail tracks.
- reduced numbers of traffic lanes to accommodate light rail tracks and shared path.

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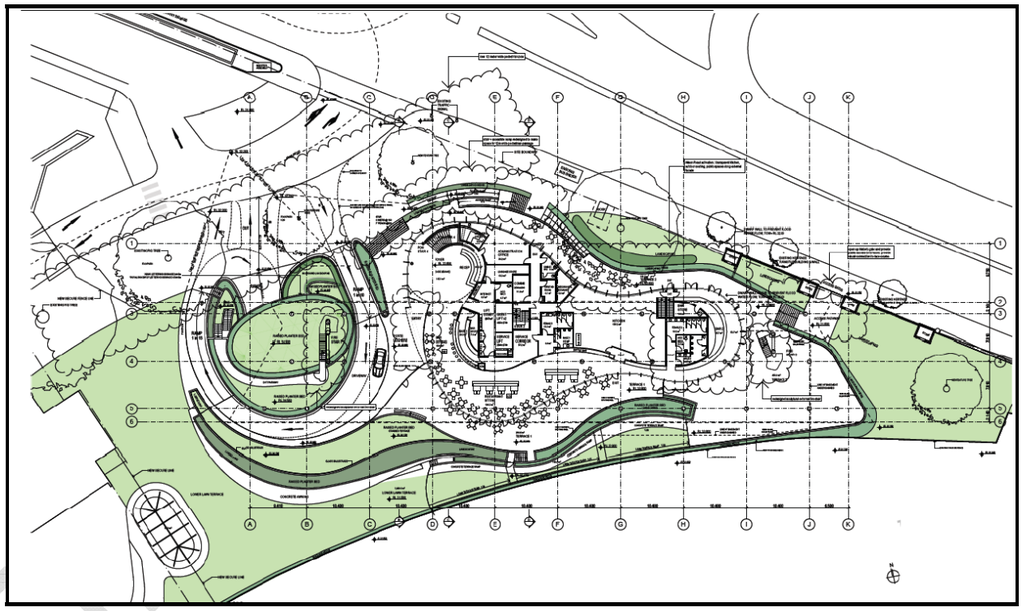
Figure 15: Proposed Conditions – Alison Road (Darley Road to Wansey Road)

There is also a proposed hotel development on the south side of Alison Road at the Darley Road intersection as shown below in Figure 16.



Source: ATC

Figure 16: Proposed Hotel Development

10.3 TECHNICAL REVIEW

The findings from the review of this location are included in Table 5.

Table 5: Alison Road (Darley Road to Wansey Road)

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
Consistency	-	-	-	-
Layout	Track Location	Light rail tracks located on southern side of Alison Road.	n/a	n/a
	Platform Size	-	-	-
	Storage	-	-	-
	Swept Paths	-	-	-
Access	Crossing Points	No details of how pedestrians will cross light rail tracks.	At Darley Road, John Street and Cowper Street, there are no details of how pedestrians will cross the light rail tracks. In addition, there is no storage area between the Alison Road traffic lanes and the light rail tracks, nor between the shared path and the light rail tracks.	No pedestrian storage areas between traffic lanes, light rail tracks and shared path.
	Ramps	-	-	-
	Illegal Access	No indication of any proposed fencing between Alison Road, tracks and shared path.	Existing busway along Alison Road has fencing on both sides with openings at bus stops. Fencing may be required along Alison Road due to high speed LRV passing pedestrians and cyclists in the opposite direction. Openings could be provided at intersections.	Conflicts between high speed LRV and pedestrians and cyclists using shared path.
	Safety	-	-	-
	Footpath / Shared Path	Proposed shared path on south side of tracks.	Separated shared path will provide a high standard facility in terms of safety and operation.	n/a
	Vehicle	There are a number of existing access gates to the Royal Randwick Precinct.	There are no details regarding the retention or removal of these access gates, and if retained, how vehicles will be able to cross the light rail tracks and shared path.	Safe crossings of the light rail tracks and shared path at access gates.
Intermodal	Sharing of Tracks	-	-	-
	Bus Stops	There is an existing bus stop on the south side of Alison Road near Darley Road.	There is no indication if the bus stop will be retained (and there is no room between the tracks and Alison Road).	Location and access to bus stop.
	Bus / LRV Transfer	-	-	-
	Bus Priority	-	-	-
Signal Operation	Overview	-	-	-
	LRV Movements	-	-	-
	Bus Movements	-	-	-
	Pedestrian Movements	-	-	-
	Traffic Impacts	Alison Road reduced from a 6 lane divided road to a 4 lane divded road.	Reduction in the number of traffic lanes, particularly at intersections, will reduce the capacity of Alison Road. Parking will also be removed along both sides of Alison Road which impacts on existing bus and coach parking along the south side on event days.	n/a

11 ALISON ROAD / WANSEY ROAD STOP

The proposed Alison Road / Wansey Road stop will service residential area surrounding the intersection.

11.1 EXISTING CONDITIONS

The existing conditions are shown in Figure 17 and Figure 18 and are summarised as follows:

- Unsignalised Cross-intersection (priority along Alison Road) with skewed approaches.
- Shared path along west side of Wansey Road and south side of Alison Road.
- Residential catchments to north of Alison Road.

Source: http://maps.six.nsw.gov.au/

Figure 17: Alison Road / Wansey Road – Existing Conditions

Wansey Road - View North to Alison Road

Wansey Road - View North to Alison Road

Alison Road - View South from Wansey Road

Wansey Road - View North to Prince Street

Wansey Road - View South from Alison Road

Alison Road - View South across Wansey Road

Figure 18: Alison Road / Wansey Road – Photographs

11.2 PROPOSED CONDITIONS

It is proposed to construct (as shown in Figure 19):

- new light rail tracks on the west and south legs of the intersection.
- centre island tram platform stop on south leg.
- traffic signals.

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Figure 19: Proposed Conditions – Alison Road / Wansey Road

11.3 TECHNICAL REVIEW

The findings from the review of this location are included in Table 6.

Table 6: Alison Road / Wansey Road

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
Consistency	-	-	-	-
Layout	Track Location	Light rail tracks located on southern side of Alison Road and western side of Wansey Road.	n/a	n/a
	Platform Size	Centre island 45.0m x 4.4m		
	Storage			
	Swept Paths	LRV turning corner will swing wider than shown on plan.	LRV will swing 'further out' when turning the corner between Alison Road and Wansey Road. The swept paths of the LRV may encroach in to the shared path and also the pedestrian waiting area between the tracks and the intersection.	Conflict between LRV and pedestrians / cyclists at intersection.
Access	Crossing Points	Crosswalks are proposed on the north, west and south legs of the intersection. LRV priority crossing proposed of tracks.	Proposed crosswalks are supported provided that there is adequate storage area (clear of the swept paths of LRV) between Alison Road and the tracks and on the shared path.	Conflict between pedestrians and LRV between Alison Road and tracks, and between pedestrians, LRV and cyclists on shared path.
	Ramps	Ramp provided at northern end of stop.	n/a	n/a
	Illegal Access	No formal access at southern end of stops.	It is expected that there will be illegal access to / from the northern end of the stop.	Illegal access to / from southern end of the stop.
	Safety	-	-	-
	Footpath / Shared Path	New shared path to be installed (cantilvered due to height differences).	Replacement of existing shared path. High speed northbound cyclists down the Wansey Road hill. If existing fence retained, limited sight distance around corner at the intersection.	Sight distance and speed around curve for northbound cyclists.
	Vehicle	No vehicle access to Royal Randwick Precinct shown on plan.	Existing access driveway to stables not shown on plans. Access will cross tracks and shared path. Existing 'traffic signal' system to warn approaching shared path users when access gate is open.	Vehicles accessing stables crossing tracks and shared path.
Intermodal	Sharing of Tracks	-	-	-
	Bus Stops	-	-	-
	Bus / LRV Transfer	No details provided regarding bus stop locations.	n/a	Location and access to bus stop.
	Bus Priority	-	-	-
Signal Operation	Overview	As tracks are separated from the roads, the LRV's can operate 'outside' of the traffic signals.	n/a	n/a
	LRV Movements	-	-	-
	Bus Movements	-	-	-
	Pedestrian Movements	Pedestrian crosswalks and crossing will provide safe pedestrian access.	n/a	n/a
	Traffic Impacts	The traffic signals will provide safer access to and from the side streets.	There is no separated right turn from Alison Road in to Wansey Road. There is a significant lateral shift for westbound traffic on Alison Road through the intersection.	No right turn lane from Alison Road in to Wansey Road. Westbound lateral shift on Alison Road.

12 WANSEY ROAD / HIGH STREET STOP

The proposed Wansey Road / High Street stop will service the upper campus of UNSW.

12.1 EXISTING CONDITIONS

The existing conditions are shown in Figure 20 and Figure 21 and are summarised as follows:

- Unsignalised T-intersection (priority along High Street). Left turn slip lane on west leg. University vehicle access immediately east of intersection.
- Pedestrian 'zebra crossing' on east leg. Pedestrian refuges on west leg. Existing shared path along west side of Wansey Road.
- Bus routes along High Street. Bus stops located to the east and west of the intersection.
- Pedestrian access to UNSW's upper campus.
- Large numbers of public transport (bus) passenger accessing bus stops on High Street.

Source: http://maps.six.nsw.gov.au/

Figure 20: Wansey Road / High Street – Existing Conditions

View North to Wansey Road

View West along High Street

View East along High Street

View West to High Street Pedestrian Crossing

View South to UNSW Entrance

View North from UNSW Entrance to High Street

Figure 21: Wansey Road / High Street – Photographs

Daily pedestrian movement data (by location and mode at each of the main access points) was provided by UNSW and are presented in Figure 22. This shows the high number of arrivals (11,958) from the existing bus stops in High Street near Wansey Road, with approximately 80% (9,500) by public transport. There is also a high number of departures (9,607) to the existing bus stops in High Street, with approximately 74% (7,100) by public transport.

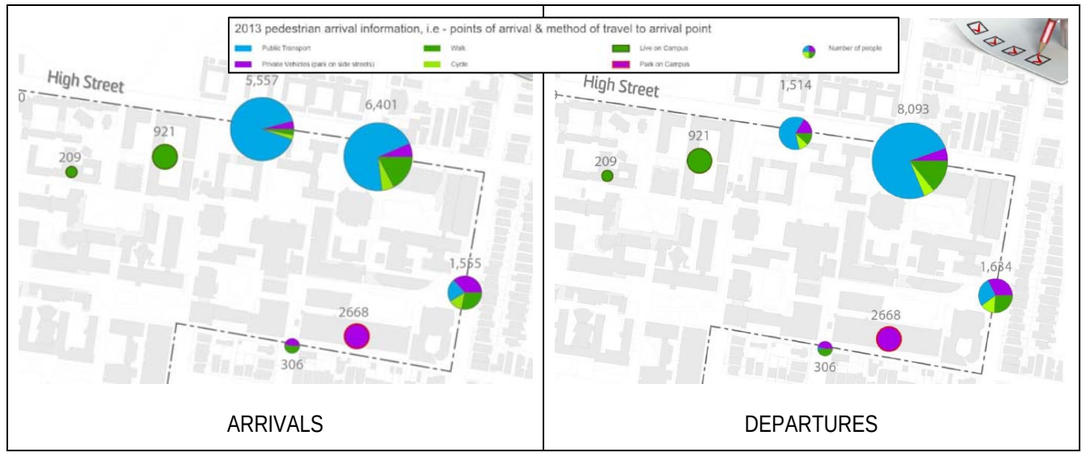

Figure 22: UNSW Daily Pedestrian Movements - by location by mode

Figure 23 presents the breakdown of pedestrian movements in 15 minute intervals.

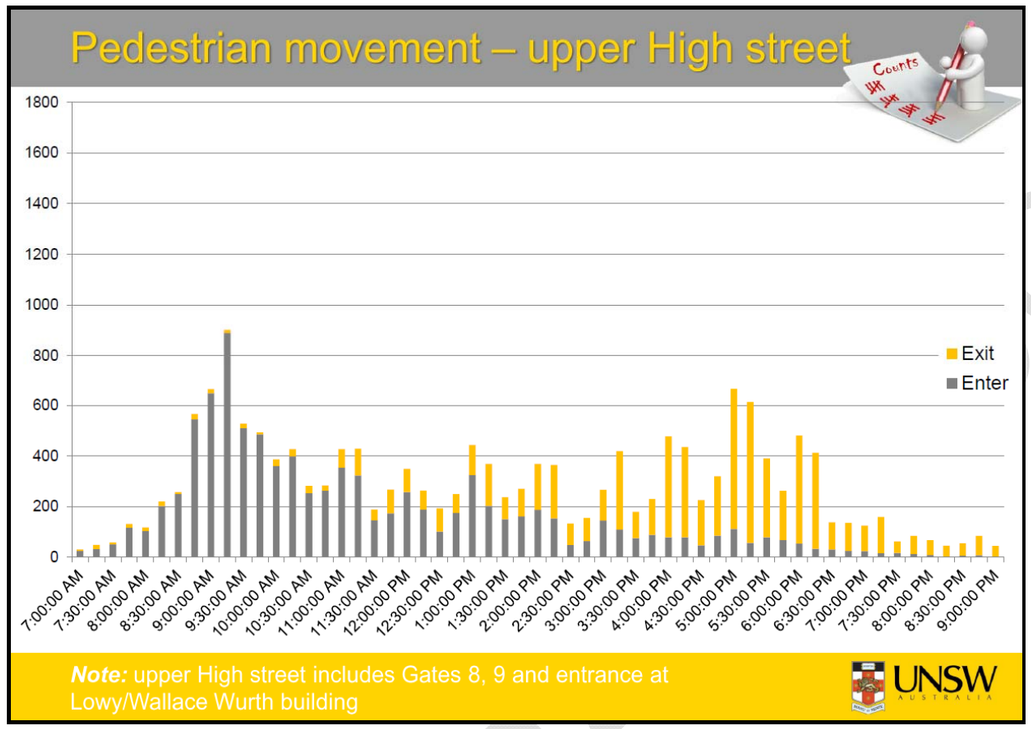

Figure 23: UNSW Pedestrian Movements – 15 minute intervals

12.2 PROPOSED CONDITIONS

It is proposed to construct (as shown in Figure 24):

- new light rail tracks on the north and east legs of the intersection.
- tram platform stops on the north leg.
- traffic signals.

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Figure 24: Proposed Conditions - Wansey Road / High Street

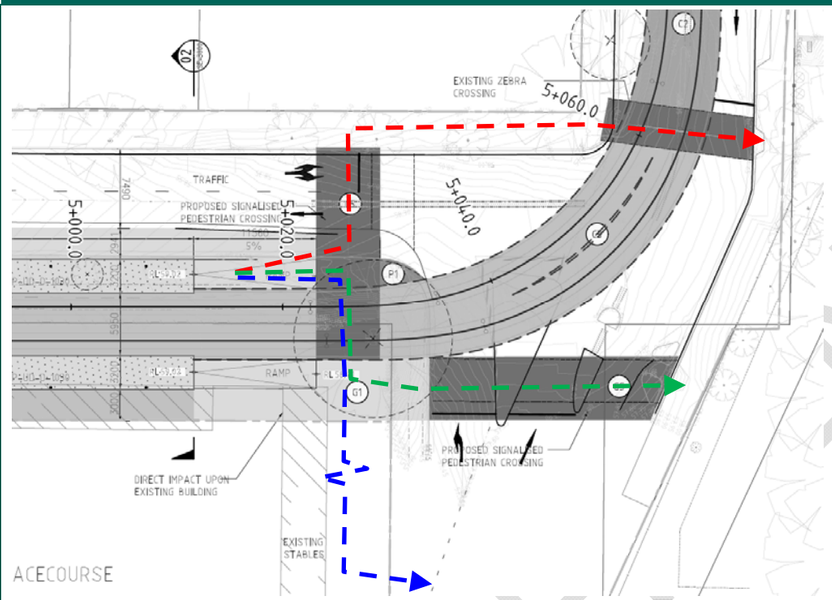
12.3 TECHNICAL REVIEW

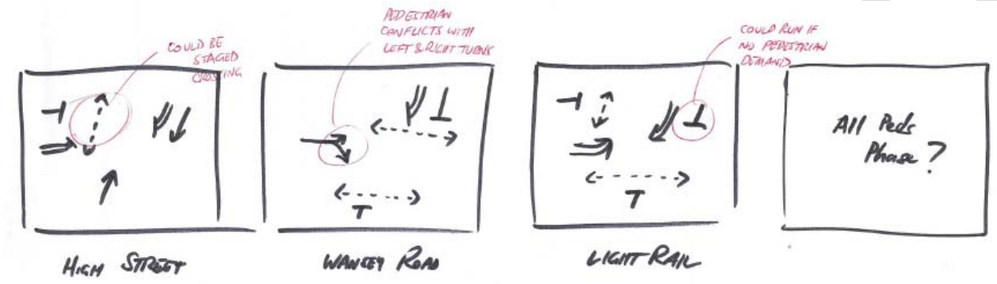
The findings from the review of this location are included in Table 7.

Table 7: Wansey Road / High Street

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
Consistency	-	-	The 'Road Engineering' plans and the 'Stop Plans' show different configurations for the pedestrian crossings. It has been assumed that the Stop Plans are the basis for comment.	Update plans to be consistent.
Location	Surrounding Land Uses	Located at north east corner of UNSW campus, on north side of High Street.	Proposed stop is located adjacent to UNSW campus, a major passenger generator.	Not enough room in High Street to locate tracks, stops and traffic lanes.
	Land Acquisition	Required from Royal Randwick Precinct on west side of Wansey Road.	n/a	n/a
Layout	Track Location	Tracks located on west side of Wansey Rd and centre of High Street.	Track curves require tracks to be located on west side of Wansey Road. Additional land acquisition would be required from residential properties on north east corner of intersection to realign track curves.	n/a
	Platform Size	Both platforms 45.0m x 3.2m = 144.0 sqm.	Assumption: LRV at 2-3 minute frequencies at CBD end will result in LRV at 4-6 minute frequencies at this location. Assume approximately 3 LRV each 15 minute period. Alighting: Assuming a capacity of 300 pax per LRV, should be no more than 300 pax alighting at any one time. Capacity of platforms to cater for peak alighting numbers (approx. 632 pax in 15 minute period). Using the Fruin Level of Service criteria, the ramp (average flow rate of 42 pax per minute) is expected to operate with a Level of Service of A. However, if 211 pax alighted from one LRV, the Level of Service would drop to E. Boarding: Capacity of platforms to cater for peak boarding numbers (approx. 480 pax in 15 minute period). Using the Fruin Level of Service criteria, this platform is expected to operate with a Level of Service of D (129 pax waiting for LRV). The ramp (average flow rate of 26 pax per minute) is expected to operate with a Level of Service of A. However, the signalised crossings will meter the flows of pedestrians.	Alighting: Proposed outbound platform ramp will restrict flow off the stop and will 'meter' pedestrians reaching the crossing points. However, predicted flow rates are expected to be within capacity. Boarding: Proposed citybound platform will be very congested (Level of Service F) with some pax being required to wait on ramp and approaches.
	Storage	Ramps provided at both north and south ends to provide access.	Ramps and approaches will provide additional storage if stops are congested. Road safety risk is if pax cannot clear light rail tracks or roads. As the citybound stop will have the highest boarding numbers, the ramp and large storage area is expected to accommodate all required pax without queuing across the light rail tracks and roads.	n/a
	Swept Paths	The proposed tracks and stops will reduce the width of Wansey Road and High Street.	North to east left turns (from Wansey in to High) – very tight radius, turning vehicles may encroach on to citybound light rail tracks.	Ensure design vehicles able to undertake turn. If cannot undertake turn, stop line on east leg of intersection may need to be set back.
			West to north left turns (from High in to Wansey) – very tight radius, turning vehicles may encroach on to southbound traffic lane or mount footpath, potential conflict with pedestrians if right turners allowed turn at same time as pedestrians.	Ensure design vehicles able to undertake turn. If cannot undertake turn, consider removal of the left turn slip lane and allow left turns from the eastbound 'through' lane. The left

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
				turn slip lane could then be used as a larger pedestrian area and reduce the width of the crossing across the west leg of the intersection. The Wansey Road stop line could then also be moved further south.
			North to east right turns (from Wansey in to High) – very tight radius, turning vehicles may encroach on to waiting areas, may impact on parking along High Street, potential conflict with pedestrians if right turners allowed turn at same time as pedestrians.	Ensure design vehicles able to undertake turn. Review conflict with pedestrians – consider early start for pedestrians on crossing.
			LRV clearances increase around tight radii. Turning LRV may encroach in to pedestrian crosswalks and waiting areas.	Ensure adequate clearances to turning LRV around curves and modify crosswalks and waiting areas to suit.
			Westbound through movements have poor delineation through intersection.	Build out southern side of High Street out to existing kerb outstand.
Access	Crossing Points	The 'Road Engineering' plans and the 'Stop Plans' show different configurations for the pedestrian crossings. Signalised Pedestrian Crossings are proposed at Wansey Rd/High St intersection, across Light rail tracks (at north and south ends) and also across Wansey Rd at north end of stops.	A key design consideration must be the movement of pedestrians to and from the stops. In the AM Peak, there will be a very high movement of pedestrians from the southbound platform, down the ramp, and then across the roads at the signalised access points. Even though these movements are to be controlled by signals, it is expected that pedestrians will cross the tracks and roads against the signals. Therefore, although signalised crossings are required for the road crossings, the crossings of the tracks should be 'LRV priority crossings' which will allow pedestrians to cross as required except for when LRV are present. As the stops are located on the north side of High Street, pedestrians to UNSW will be required to either: ▪ cross Wansey Road and High Street, ▪ cross tracks then High Street, or ▪ cross tracks, walk westbound along High Street then cross at zebra crossing.	Agree that road crossings should be signalised. Recommend that crossings of the tracks should be unsignalised with priority given to LRV. Electronic signs could be used to provide increased warning of an approaching LRV e.g. 'GIVE WAY TO LIGHT RAIL VEHICLE' The removal of the left turn slip lane could increase the storage areas for pedestrians and reduce the crossing width. The southbound shared path ends just north of High Street. Shared path users will need to share this space with large numbers of pedestrians. Provide a surface treatment that clearly delineates the end of the shared path and warns of pedestrians. Consider an alternative access down northern side of High Street to a new pedestrian overpass to provide direct connection in to UNSW campus.

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
			 It is noted that the existing zebra crossing on High Street to the west of the Wansey Road intersection(as shown in Figure 21) is used by a large number of pedestrians (mostly bus passengers) and UNSW has safety concerns regarding its operation. Adjacent to this zebra crossing is a raised walkway into UNSW's grounds. A potential future option is to create a pedestrian overpass (to replace the zebra crossing) that connects directly to the raised walkway within UNSW. This option would mean that a significant number of LRV pax would only have to cross the tracks and no roads.	
	Ramps	DDA compliant ramps provided at both north and south ends to provide access.	The ramps end at the crossing points which may create congestion as pedestrians wait to cross the tracks or Wansey Rd.	Shorten ramps if possible to create larger waiting areas prior to cross points.
	Illegal Access	No fencing has been shown.	The crossing at northern end important to provide access to from residential area and park and ride. Illegal or undesirable crossings are expected to occur between the shared path, track and park and ride footpath (especially during the AM Peak).	Install fence between shared path and tracks (to protect shared path uses from opposing LRV), and between park and ride footpath and tracks (to prevent pedestrians crossing tracks away from formal crossing points.
	Safety	-	Illegal access is the main safety issue as discussed above.	n/a
	Footpath / Shared Path	4.0m shared path on Wansey Road narrows to 3.0m past platform.	Shared path ends at southern end of platform. Shared path users, especially cyclists, will enter an area with significant numbers of pedestrians.	Nil – 3.0m is desirable width for shared path. Ensure path material and signage indicate end of shared path. Consider installation of bicycle lanterns for crossing of High Street to allow cyclists to cross without dismounting.
	Vehicle	No vehicle access proposed.	University access restricted to left in/left out. No vehicle access to Royal Randwick Precinct shown on plan.	Access to Royal Randwick Precinct.
Intermodal	Sharing of Tracks	-	n/a	n/a
	Bus Stops	Westbound bus stops (indented bays) proposed on south side of High Street east of intersection.	Proposed stop will replace a number of existing bus stops in High Street.	n/a
		Eastbound bus stops retained on north side of High Street west of intersection.	Nil.	n/a
	Bus / LRV	-	It is noted that some bus stops will be retained, and passengers may transfer to LRV. These passengers likely to	n/a

Category	Sub-Category	Proposed Conditions	Discussion / Comment	Road Safety Risk/s
	Transfer		cross High Street then Wansey Road.	
	Bus Priority	No bus priority shown on plans.	LRV and pedestrian priority likely to be highest priorities, so unlikely to be able to also provide bus priority. In addition, buses will not be located in separate lanes so additional priority unlikely to be effective.	n/a
Signal Operation	Overview	No details provided.	Separate phases likely to be required for High Street throughs, Wansey Road left/right, and tram movements. Some other movements (vehicle and pedestrian) could run with LRV phases. Some traffic movements conflict with pedestrian movements. 	Review phasing to determine optimal operation for LRV and pedestrians.
	LRV Movements		Signalised left and right turn movements. LRV movements could run separately. May not want green for pedestrians across Wansey Road at same time as LRV movements as pedestrians may observe green walk signal and think it applies to the crossing of the tracks. Need to determine southbound trams 'trigger' signals. The time at stops is variable and only want to provide time to LRV phases when needed. Providing advance detection of east leg will be possible. Advance detection on north leg not possible due to proximity of stop. So when LRV detected, need to be able to 'close' down other phases as quickly as possible. The restriction on closing down phases will be pedestrian crossing clearance times. If pedestrian crossing can be as short as possible, this reduces the time required to 'stop' the pedestrian phase and switch to the LRV phase.	If crossing of Wansey Road is signalised and crossing of tracks is not, stagger the crossings so that pedestrians are required to change direction. Modify intersection to increase distance between light rail stop and crossing point to allow detection of southbound LRV. Modify intersection to reduce length of the pedestrian crossings. Signal operation should be set up to allow LRV phase to run between other phases to reduce delays.
	Bus Movements	Bus movements eastbound and westbound through intersection.	No additional priority.	n/a
	Pedestrian Movements	Pedestrian Operated Signals and LRV Priority Crossings.	Some traffic and tram movements conflict, need to consider how they will be undertaken safely. One option may be to run an all pedestrian phase which allows pedestrians to cross in all directions at one time.	Consider an all pedestrian phase which allows pedestrians to cross in all directions at one time.
	Traffic Impacts	Right turn movement from east to north removed.	Northbound (left turn) and eastbound (through) traffic will share High Street with LRV. Although light rail tracks are separated midblock, right turning vehicles share the tracks.	Consider some form of traffic metering, especially in High Street east of intersection, to hold traffic in Wansey and/or High to reduce congestion for eastbound LRV. Note this may impact on High Street bus services.

PARKING & TRAFFIC
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Client

Australian Turf Club

Project

Proposed Light Rail Project
Assessment of Access and Development Implications

(Ref. No. T2-953)

Date
December 2013

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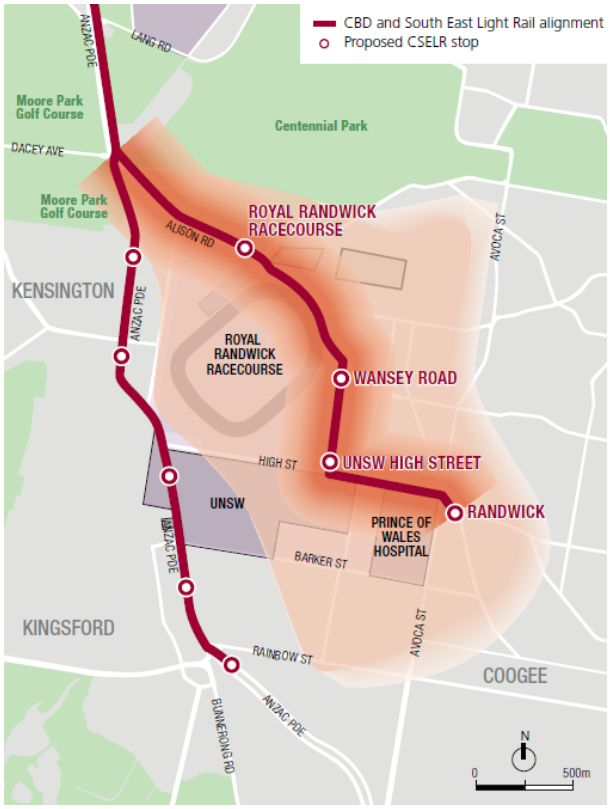
1 Introduction

1.1 Project Summary

Parking and Traffic Consultants (PTC) has been engaged by the Australian Turf Club (ATC) to assess the opportunities and constraints associated with the Royal Randwick Racecourse (the Racecourse), resulting from the NSW Government proposal to construct a Light Rail network connecting between Circular Quay, Randwick and Kingsford. The Light Rail routes affect a number of frontages of the Racecourse as well as the proposal to locate a Light Rail Stabling area within the northern corner of the Racecourse site.



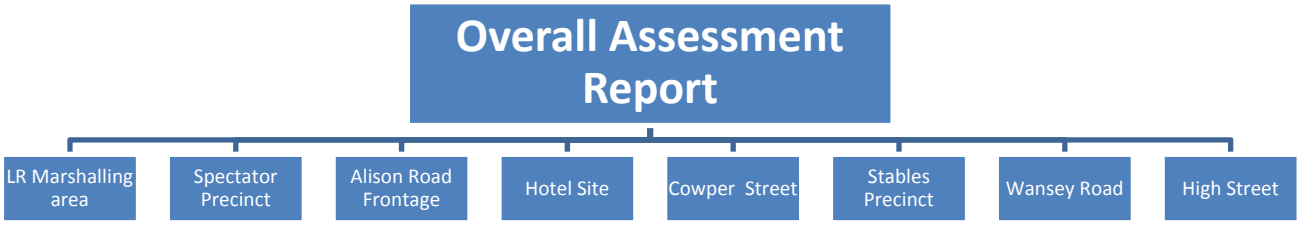
The Light Rail project is currently at the public comment stage, whereby the Environmental Impact Statement (EIS) has been published for comment with a submissions closing date of 16th December.

The proximity of the proposed routes to the Racecourse will no doubt have an impact on the current access arrangements and some of the approved and planned development opportunities within the site.

It is important that the ATC are fully informed of the impacts on access and development potential and also whether the Light Rail proposal will result in any opportunities not previously identified.

1.2 Purpose of this Report

This report has been prepared to present the opportunities and constraints resulting from the Light Rail proposal in relation to the traffic engineering and parking implications. For the purposes of this assessment, the Racecourse has been divided into precincts (refer to drawing PTC03, Attachment 1) as the implications of the Light Rail proposal are very specific to each area of the site. This report is structured to present each area separately, commencing with the Light Rail Stabling Area and dealing with the following precincts in a clockwise order around the Racecourse, as illustrated overleaf.



The implications of the Light Rail on each precinct are site specific, however the general topics covered in each area are:

- vehicular, pedestrian and equine access and egress,
- internal vehicle circulation arrangements,
- the existing parking provision,
- the movement of large crowds within and external to the Racecourse,
- the accommodation of public transport (including taxis),
- the movement of horses within the Racecourse
- the impact on potential development opportunities,

The final section of this report also describes the impact of the construction of the Light Rail project on the operation of the Racecourse. It should be noted that the EIS is light on detail in relation to the construction process; however we have been able to make certain assumptions in terms of the spatial requirements.

1.3 General Impacts of the Light Rail Proposal

The Light Rail route and Stabling area are proposed to be aligned along three frontages of the Racecourse (Doncaster Parade, Alison Road and Wansey Road), and each of these frontages currently provides access to the Racecourse, as well as future opportunities for improved and more formal access arrangements. The proposed Light Rail will have an impact on the accessibility of the Racecourse under the current and future conditions and in order to summarise the impacts, the following table provides a summary of all access gates and proposed access locations affected by the Light Rail. This information is also summarised on Drawings PTC-01 to 03 contained as Attachment 1.

The construction of the Light Rail project will need to be managed to retain access to the Racecourse and to avoid any impact on events that are planned to take place within the Racecourse.

The Racecourse relies on heavy vehicle access to various parts of the site for a variety of needs (servicing, event bump-in / bump-out, equine transport etc) and it is essential that the Light Rail proposal includes the provision to retain the current level of access provision.

During special events, the Racecourse is subject to the movement of large crowds and the Light Rail project must have regard for the safe and effective management of this activity during the construction and operational stages of the project.

The following tables present a summary of the impacts of the Light Rail scheme on the various access locations (gates) serving the Racecourse.

Alison Road					
Gate	Use	Frequency of use	Users	Status (based on EIS information)	Access Requirements
1	Main Gate	Daily	Pedestrians, Cars, Taxis, Heavy vehicles, Emergency vehicles	Redesign by TfNSW required	Essential that existing access movements are maintained
		Event Days	Pedestrians, Cars, Taxis		
2	Bus Egress	Daily	Pedestrians	Removed	An alternative arrangement for management special event buses should be established by TfNSW
		Event Days	Bus egress, Pedestrians		
3	-	-	-		
		-	-		
4	-	-	-		
		-	-		
5	Bus entry, Pedestrian access	Daily	Pedestrians, Emergency vehicles	Redesign by TfNSW required	Must be retained to provide access to the grandstand and proposed Hotel
		Event Days	Bus Entry, Emergency vehicles, Taxis		
6	Pedestrian Egress	Daily	Unused	Removed	Must be retained
		Event Days	Pedestrian Egress		

7	Pedestrian Egress	Daily	Unused	Removed	Must be retained
		Event Days	Pedestrian Egress		
	Proposed Crosstrack	Event Days			
8	Vehicle Access	Daily	Service Vehicles	Removed	Must be retained
		Event Days	Cars, Emergency vehicles		
9	Stable access	Daily	Unused	Removed	Must be retained
		Event days	Pedestrians, Cars		
9a	Dwelling Access	Daily	Dwelling Access	Removed	Must be retained
		Event Days			

Wansey Road

Gate	Use	Frequency of use	Users	Status (based on EIS information)	Access Requirements
10	Stable	Daily	Cars, Service vehicles, Heavy vehicles	Redesign by TfNSW required	Must be retained to provide constant access to the stables precinct
		Event days	Cars, Equine transport, Heavy vehicles		
11	Unused	Daily	Unused	Removed	Must be retained for future access provision
		Event days			
12	Stable access	Daily	Cars, Pedestrians, Heavy vehicles, Equine transport	Removed	Must be replaced by an alternative location (High St)
		Event days			

High Street

Gate	Use	Frequency of use	Users	Status (based on EIS information)	Access Requirements
13	Service access	Daily	Pedestrians, Cars, Heavy vehicles, Equine transport	Retained	Must Be retained

		Event days			
21	High Street access	Daily	Pedestrians, Cars, Heavy vehicles, Equine	Retained	Must Be retained
		Event days			
14	Stable access	Daily	Pedestrians, Cars	Retained	Must Be retained
		Event days	Unused		

Anzac Parade & Doncaster Avenue

Gate	Use	Frequency of use	Users	Status (based on EIS information)	Access Requirements
15	Stable access	Daily	Pedestrians, Cars, Service vehicles	Retained	Must be retained
		Event days			
16	Unused	Daily	Unused	Retained	Must be retained for future access provision
		Event days			
17	Stable access	Daily	Pedestrians, Cars, Equine	Retained	Must be retained
		Event days			
18	Grand Stand, Car park & Stables	Daily	Pedestrians, Cars, Service vehicles	Removed	The associated car park is being removed due to the Stabling Area
		Event days	Pedestrians, Taxis, Equine transport		
19	Grand Stand, Car park & Stables	Daily	Pedestrians, Cars	Removed	The associated car park is being removed due to the Stabling Area
		Event days	Pedestrians, Cars, Taxis		
20a	Restricted car park	Daily	Cars, Service vehicles	Removed	The associated car park is being removed due to the Stabling Area
		Event days			

2 LRV Stabling Yard

The proposed Light Rail project includes the provision of a LRV stabling yard located in the northern corner of the Racecourse site.

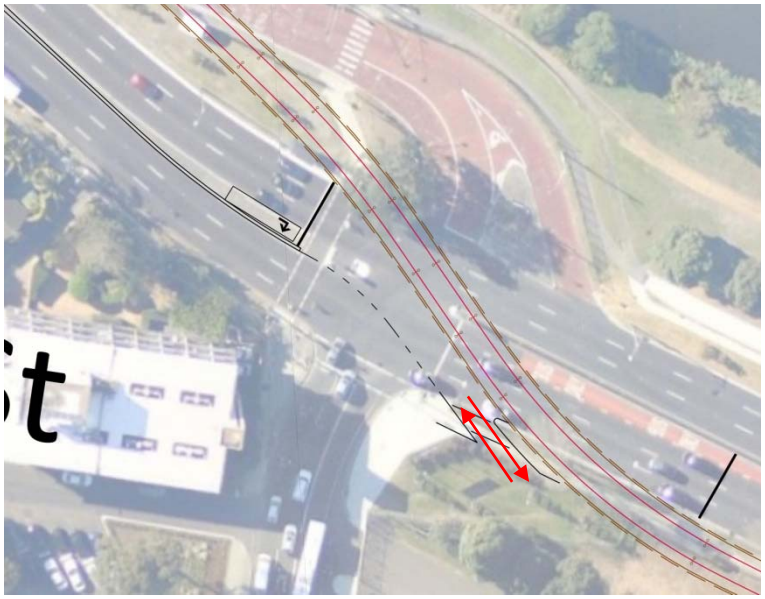
According to information provided by the ATC, the area of the racecourse site intended to accommodate the LR Stabling area currently accommodates approximately 935 parking spaces. A further 150 spaces are located in the area surrounding the boundaries of the LR Stabling yard, access to which may be affected. These spaces must be re-designed and re-constructed in close proximity to the spectator precinct to ensure the success of ATC operations and avoid overflow parking on surrounding roads.

Parking Inventory (subject to site survey)

Parking Area	Parking Location	Estimate Loss of Parking	ATC Leased	LR Stabling Affected	LR Affected
A	Members Car Park (Centennial Park Land)	270	●	●	●
B	Triangle Site and Gate 19 Laneway	230	●	●	●
C	Anson Land	370		●	●
D	ATC Main Drive	65	●	●	●
E	ATC Taxi Way	90			
F	Busway & SWAB	150	●		●
G	Officials Stand	100			
	Total Impact	**1275**		**935**	**1088**
	Estimated parking affected on ATC land	**715**			

Car Park Plan

The proposed Light Rail alignment along and across Alison Road at Doncaster Parade creates the potential to accommodate a right turn phase at the existing traffic signal controlled intersection, which would enable vehicles to access and egress from the northern corner of the Racecourse. This could provide a useful alternative means of access as the busway is being removed as part of the project. This arrangement is illustrated on the following sketch plan.



The connecting access road would need to be accommodated along the northern edge of the stabling area in order to connect with the spectator precinct adjacent to Gate 1.

It is noted that the Light Rail crossing follows a very shallow angle across Alison Road, meaning that the northbound stop line on Alison Road would be located approximately 50 from the intersection, which is highly unusual and results in length clearance times (the all red phase) in relation to the

traffic signals. While this doesn't directly impact on the Racecourse, we are concerned that extensive delays will be caused by this part of the proposal. Our experience of the modelling in relation to the Hotel development indicates that the Alison Road corridor runs well at present, as a result of well coordinated signal operation, however it is subject to delays if this coordination is interrupted, or if Anzac Parade is underperforming.

The drawings provided by TfNSW do not indicate how pedestrians will be accommodated within the new intersection arrangement. This is of concern as employees and patrons of the Racecourse rely on the existing crossing at this location in order to access the footway / cycleway along the northern side of Alison Road.

In relation to the impact on the existing access arrangements, the LRV stabling yard will detach the Racecourse from the northern frontage of Doncaster Parade. In this regard, the following access points will be affected.

Gate 19 is located on Doncaster Parade opposite Carlton Street and provides vehicle and pedestrian access to parking areas within the northern corner of the Racecourse. The parking area and a number of buildings will be removed as a result of the LRV stabling yard, however, the access also connects through to the spectator precinct so its loss will restrict any access for pedestrians and vehicles to the spectator precinct via Gate 1 (main access) and Gate18 (Ascot Street).

Gate 20 is located on Doncaster Parade and provides vehicle and pedestrian access to the northern parking areas; however it is currently not used.

Gate 20a is a formal access gate serving the former Tram area along the western boundary of the Racecourse. The loss will restrict access to the spectator precinct via Gate 1 (main access) and Gate18 (Ascot Street).

The proposed acquisition of land will result in the ATC being unable to access the spectator precinct on racedays (as Alison Road Gates are historically closed for events). TfNSW should provide a solution for new car parking and suitable access to this parking on event and non-event days.

3 Spectator Precinct

The Light Rail route will be aligned along the frontage of the spectator precinct and the area between the Administration building and the footpath along Alison Road. This places the rail alignment hard up against the administration building, while the footpath remains along the kerb of Alison Road.

Gate 1 provides access to the spectator precinct and also the Administration Building, which involves most the general day-to-day traffic activity associated with the Racecourse. In this regard, Gate 1 represents the primary 'front door' of the Racecourse and is in use constantly throughout each day by pedestrians, service vehicles, taxis and visitors to the administration Building.

According to TfNSW all Light Rail crossings will be traffic signal controlled. Given that the Gate 1 access requires movements across the tracks, this will require the CSERL to signalise the existing Gate 1 access intersection. As part of signalisation of this intersection, it is essential that the right turn movement into the Racecourse is retained with an auxiliary right turn lane similar to the existing arrangement. It is noted that the existing right turn lane is substandard in width; therefore a realignment of the Alison Road kerbs may be required. Given the restricted space into which the Light Rail corridor is being placed, this would most likely involve carriageway widening along the northern side of Alison Road. TfNSW should provide a detailed plan of how this intersection will be accommodated. The redesign of the intersection does raise the possibility of gaining the right turn movement from Gate 1, subject to the corridor having sufficient capacity to accommodate the additional traffic signal phase. Given the access constraints being placed on the Racecourse as a result of the Light Rail proposal, right turn egress will be required from the Spectator precinct.

The construction period will likely involve the closure, or severe restriction of access via Gate 1. This is not acceptable to the ATC as this is our primary street address and access point for all heavy vehicle deliveries and non-race day access for pedestrians and vehicles to both the spectator precinct and the infield. The Light Rail passes through the entire width of the access intersection and in order to provide access, a staged construction process will be required and details should be provided by TfNSW. Alternatively TfNSW should identify and nominate an alternative temporary access location, which must provide the same level of accessibility and convenience for the ATC.

It is not clear on which side of the LR the pedestrian pathway will be located, although the alignment is shown hard up against the Admin Building suggesting a footpath along the Alison Road kerb. On this basis it is not clear how pedestrians will safely access the Racecourse via Gate 1. Detailed access plans are required to show clear unimpeded access.

There is an existing pedestrian access gate located on the Alison Road frontage, midway along the frontage of the Administration building. The gate serves the front entrance of the Administration Building, and while this is currently not used, the ATC should highlight the loss of this access in relation to future development opportunities for the building and the impact on the ability for the building to present Alison Road.

4 Alison Road Frontage

Alison Road between Doncaster Parade and Wansey Road represents a key frontage to the Racecourse, providing existing access to the Spectator Precinct and Administration Building, the bus-way access and egress, the potential Hotel access/egress and the future Cowper Street / cross-track access.

Alison Road provides a strategic connection between Randwick and the City and carries significant volumes of vehicles per day (AADT) according to RMS data. This traffic activity is currently accommodated in three lanes in each direction, with an auxiliary right turn lane provided at the Racecourse access.

It is noted that the Section 15 of the EIS describes Alison Road as having a separated busway, "which runs in parallel to Alison Road", however, the busway terminates at Doncaster Parade and does not extend along any part of Alison Road fronting the Racecourse.

The proposed Racecourse station will be situated within the current location of the Racecourse Busway (not to be confused with the busway located along Alison Road and Anzac Parade). The Busway was developed fairly recently in order to manage crowds within the Racecourse site rather than the former situation, whereby buses would dwell within the kerbside lane of Alison Road. This arrangement both places a large number of pedestrians within close proximity to the carriageway and light rail tracks, and relies on the use of a trafficable lane, reducing the capacity of Alison Road during periods where maximum capacity is critical. The proposal to-date is for buses to be accommodated within the kerb side again. While there is an argument to suggest that the Light Rail will essentially replace the existing bus usage, this only applies to service to Central through Surry Hills. In this regard, buses and coaches will continue to play an important role in the public transport provision. All visitors using the bus services will be required to cross the Light Rail tracks at either end of the station. There are several concerning aspects of this arrangement including the safety of pedestrians crossing a live rail track, and also the capacity of the Alison Road footway to accommodate the crowd (between Alison Road and the rail tracks) without having groups of pedestrians on the tracks.

Clearly the management of large crowds will involve staff to guide and assist, which occurs at present, however the introduction of the station brings with it a greater level of complexity. The ATC propose that the proponent needs to consider this aspect of the project in terms of the costs and risks.

The relocation of buses to Lane 1 of Alison Road will severely reduce the capacity of the carriageway, which, with no modelling required, there is no doubt that this will have a detrimental impact on the road network, with a loss of a third of the westbound capacity. Additionally there is an increase in risk to patrons waiting for buses. A bus stopping bay adjacent to Alison Road is required to allow buses to stop without restricting traffic flow on Alison Road whilst providing a buffer between patrons and traffic.

Access for service vehicles entering the spectator precinct loading areas will need to be retained through the operating and construction periods. It is preferable that this provision would occur at Gate 1 and in conjunction with the Hotel development (See Section 5), notwithstanding, the access provision needs to be retained regardless of the hotel development.

The construction period will close the busway and will make pedestrian access to Alison Road (proposed bus area) extremely difficult during major events. The ATC has recently completed the new grandstand and spectator precinct to accommodate increasing crowds and requires clear and unimpeded access. TfNSW should provide details in relation to the staging of construction activity so that pedestrian activity is not compromised. It is recommended that the ATC provide TfNSW with an events calendar for the duration of the construction period so that works and staging can be planned around the events to limit the disruption.

According to the section drawings, the station will be situated at the level of Alison Road, which is up to a metre lower than the current busway level. This will require extensive excavation and the drawings do not indicate how the proposed levels will tie into the existing levels towards the SWAB Building.

This is an important consideration in the context of parking within the Racecourse. The proposed station will remove the existing parking (47 spaces) located within the busway, which is in use for the majority of the time. A further 103 parking spaces is also providing around the SWAB Building as shown in the second image below. With the excavation and levelling works required, it is not clear whether this parking will be replaced.

In this regard the removal of the busway has not been adequately addressed. The current plan to relocate the buses to Lane 1 of Alison Road will be a backward step in terms of the pre-busway arrangement, with the added complication of a busy and active light rail line between the Racecourse and the buses.

5 Hotel Site

Since the use of Gate 10 was stopped in relation to event bump-in/out in agreement with Randwick City Council, a gate located adjacent to Gate 5 has been used for access to the infield. Trucks enter the Racecourse via Gate 1 and travel along the rear of the Administration Building, through the busway and around the outside of the track until reaching the crosstrack access road. The Light Rail will remove the ability for trucks to access the infield via the gate adjacent Gate 5. There are currently no alternative heavy vehicle access opportunities with regard to the infield (refer to Cowper Street access proposal described in Section 6).

The proposed Light Rail route passes through the proposed Hotel / Grandstand access road at the intersection with Alison Road. We understand that TfNSW is preparing alternative intersection layouts and it is essential that the right turn movement being sought as part of the Hotel DA is not prohibited in the process. To the west of Darley Road, Alison Road is shown having three lanes by using existing spare carriageway width at this location. This spare width was relied on to accommodate the right turn lane to the Hotel; therefore the right turn lane would not be accommodated in the currently proposed arrangement.

The levels of the Light Rail should be provided and amended in co-ordination with the ATC and its designers as this may affect the ramp grades / lengths associated with the porte-cochere, disabled access and car park/loading dock.

The existing pedestrian Gates 6 and 7 will be removed as a result of the Light Rail.

Access is required into the spectator precinct currently near Gate 5. Gate 1 is the only heavy vehicle access point and access to the rear of the officials stand is required, currently accessed via the busway.

6 Cowper Street – Proposed Infield Access/Egress

The crosstrack roadway is located in a specific position based on the strict requirements of the race tracks. This means that access is limited to the Alison Road frontage around the eastern side of the race tracks. In previous studies, an access located opposite Cowper Street has been designed to accommodate heavy vehicles (up to a 25m B-Double) associated with events and car traffic associated with the infield car park. The existing crosstrack is currently used as an egress on race days, following the last race and weather permitting. Given the access constraints being placed on the Racecourse as a result of the Light Rail proposal, right turn egress will be required from the infield car park.

The Light Rail potentially impacts on the ability to create the future crosstrack road at the Cowper Street intersection. The previous design studies concluded that the levels in this area are critical as there is a level difference between Alison Road and the racetrack, which would need to be negotiated by Semi-trailers and B-Doubles. We understand that the levels of the Light Rail are critical in relation to flooding and the maximum depth of water for operation.

The alignment of the Light Rail will remove the westbound kerbside lane from Alison Road. The narrowed carriageway width will be approx 15 metres which is insufficient to accommodate 5 lanes, meaning that the right turn lane proposed to serve the crosstrack road will not likely be possible, however this is a significant requirement of the access being at this location. The vast majority (almost all) bump-in/out traffic arrives at the Racecourse from the west, therefore right turn access is essential. Redesign is required to ensure heavy vehicle access is provided to the infield.

The Cowper Street crosstrack access will need to be constructed before the commencement of the Randwick Racecourse stop to ensure heavy vehicles can access the infield.

The existing Gates 8 and 9 will be removed as a result of the Light Rail.

7 Horse Stables Precinct

The Stables precinct is located in the vicinity of the north Wansey Road Light Rail station. The station structure will involve a cantilever over part of the Racecourse, however, according to the EIS documents it appears that Gate 10 can be retained as it is located to the south of the station platforms. According to TfNSW, all crossings over the tracks will be controlled by traffic signals, therefore ATC should be provided with details of how this will be achieved at Gate 10, considering the requirement to allow access to heavy vehicles, equine vehicles, standard vehicles and pedestrians through this gate and the controls required to ensure the safety of all parties. The geometry of the land around Gate 10 and the connected roadway down to the stables precinct is steep and follows a tight alignment, therefore redesign options are limited and made more complicated by the low ground clearance of the articulated horse trucks.

Wansey Road is proposed to become one-way, which will affect the accessibility of the Stables Precinct. Wansey road should remain two-way to cater for the existing and future traffic load due to the approved horse stabling complex, the Urban Activation Plan (UAP) and the standard increase in traffic in the area. Also turning paths will need to be undertaken to ensure that the reduced carriageway width remains sufficient to accommodate semi-trailer (horse truck) access / egress.

The addition of traffic signals at the Alison Road / Wansey Road intersection provides some benefit in that it will improve overall traffic safety at the intersection, however some details are yet to be established such as the lack of pedestrian area between the Light Rail and Alison Road. The crossing across Alison Road will be 35 metres long (including the Light Rail), which will result in a long crossing phase and the potential for slower walkers to not clear the crossing within the clearance time. This is particularly an issue for southbound walkers who are required to cross the Light Rail in the final seconds of the crossing phase. Combined pedestrian and cycle paths and the high volumes generated by an event heighten the likelihood of conflicts, and the presence of light rail adds to this risk.

Gate 8 and 9 are also required for access.

8 Wansey Road

The Light Rail Proposal includes the conversion of Wansey Road to one-way, which will impact on the directional accessibility of the Wansey Road precinct. Other than the Stables Precinct (see Section 7) the conversion of Wansey Road to one-way will not impact on the existing arrangement of the Racetrack in the context that the remaining Gates (Gates 11 and 12) are to be removed due to the proposed station location (see below). However, it is noted that the southern part of the Racecourse site is identified as part of the Randwick Urban Activation Precinct and as such will be reliant on maximum flexibility of access from the region, which will require the use of Wansey Road and High Street. It is of concern that Wansey Road will be converted to one-way in order to retain parking spaces, rather than retaining full directional access.

According to the EIS proposal, gates 11 and 12 will be removed as a result of the Light Rail station. Gate 12 is currently in use 24 hours a day and 7 days a week by horse trucks and heavy vehicles between 7am and 7pm to access the south-east stables and as such forms a critical access. There are opportunities to access the stables from High Street; however this would likely involve extensive reconfiguration of the stables buildings and layout, as each potential access location is aligned with the buildings. The gate 12 access is required to be maintained or relocated within a close proximity to its current position to allow this vital piece of infrastructure to be retained.

According to the Light Rail design drawings, the existing shared footway / cycleway along Wansey Road will be aligned between the Racecourse boundary and the Light Rail corridor. The ATC recommends that Road Safety Audits be undertaken at locations in the vicinity of the Racecourse to identify risks associated with the combined pedestrian and cycle activity, particularly in the context of large events, and the introduction of the light rail project.

9 High Street

The proposed Light Rail corridor runs along High Street to the east of Wansey Road and therefore does not have any direct impact on the High Street Frontage. However, there are a number of indirect impacts and considerations in relation to the future use of this part of the Racecourse.

It is essential that heavy vehicle access is retained along High Street and Wansey Road with all existing turning movements retained. The stables rely on the use of horse floats, which include articulated vehicles up to 19m semitrailers. The current documentation indicates that access for large vehicles will be affected both during the construction and operating stages. It is also important to maintain access for all vehicles types currently able to use Gate 21 (the primary access from High Street), including emergency vehicles, visitor traffic and outdoor broadcast vehicles, which all relay on Gate 21 and/or the infield access tunnel.

Under the proposal to locate the Light Rail stop within Wansey Road, the closure of Gates 11 and 12 will required a new access to the stables precinct, which could be located within the upper High Street frontage, although this would require significant adjustment of existing buildings and infrastructure.

The intersection of High Street and Anzac Parade may require widening work to offset the impact on the capacity of the intersection. This may require some land-take at the south-west corner of the Racecourse, which is land identified for future commercial development.

The southern part of the Racecourse is identified as part of the Urban Activation Precinct, which will involved very different access requirements to that of the existing use. In this regard it is important that assess opportunities are not impacted by the Light Rail proposal.

10 Construction Impacts

The construction of the Light Rail will cause various impacts to the Racecourse access arrangements during different periods of the project. The staging of the works will play a very important part of the planning process to ensure that impacts are minimised. It is also recommended that the ATC provides TfNSW with as much event programming information as possible in order that the Light Rail works can be programmed to avoid major events. The construction programme will likely overlap with a number of large events and it is essential that access to the Racecourse is not impacted by the construction activity, or traffic restrictions being in place.

Detailed planning will be required in relation to Gate 1, the busway and Gate 10 and Gate 12 as the works across each gate are unavoidable, however access must be retained, particularly Gates 1, 10 and 12. TfNSW should nominate how these works are to be undertaken so that the plan is agreed with the ATC and conditioned within the RFP stage.

Where access points are to be closed for any duration, TfNSW should nominate alternative arrangements t be agreed with the ATC, and these arrangements should also be conditioned within the RFP. Detailed Traffic management plans are required to ensure all vehicles currently accessing the racecourse continue to be able to avoid operational issues.

11 Summary

In summary, there is no doubt that he proposed Light Rail project will benefit the Racecourse in relation to public transport connectivity. However, the route selected will impact directly on three critical frontages and indirectly on High Street. In this regard, it is import to assess the impacts associated with the proposal to ensure that the present and future access opportunities for the Racecourse are not detrimentally impacted, or that impacts are managed or mitigated where unavoidable.

The key impacts identified in this study are:

- The Proposed Stabling Area. This will result in the loss of overflow parking within the western part of the Racecourse as well as the associated access gates on Doncaster Parade.
- The Light Rail route will pass through the existing main access to the spectator precinct (Gate 1). In the long run, this may provide a benefit as the intersection will need to be traffic signal controlled, however it is essential that the existing right turn movement is retained along with a dedicated lane capable of accommodating heavy vehicles.
- The proposed station within the busway will involve the complete removal of the busway. This is of great concern as no acceptable alternative solution has been presented by TfNSW. It is concerning that the management of buses will revert back to the previous situation (ie blocking a lane of Alison Road on critical days and managing crowds in close proximity of the active carriageway) with the added complication of active Light Rail tracks running between the Racecourse and the buses.
- The Light Rail route passes through the entry to the busway and grandstand (Gate 5), which will also provide access and egress to the proposed hotel. We have noted the loss of through lanes on Alison Road and the potential loss of the proposed right turn lane serving the hotel site.
- The impact on the track access gate located adjacent to the hotel site will remove any form of heavy vehicle access to the infield. The issue of access should be addressed as a matter of priority, as this would be lost as soon as construction commenced on this section of the Light Rail. This has the potential to impact on events already programmed for 2014/15.
- The Light Rail routes passes through the proposed location of a new cross-track road, which would be located opposite Cowper Street. We do not have sufficient levels and alignment information to determine the exact impact and whether or not the intersection arrangement would still be viable. This is critical to provide heavy vehicle access to the infield following the Light Rail construction.
- The existing and proposed stables facility vehicle access arrangements must be maintained,

- The Urban Activation Precinct must be considered in the planning of the Light Rail to ensure that future access provisions are not compromised or limited in any way compared to existing access availability.

Attachment 1 - Existing Gate Locations

A3

Alison Road

Gate	Use	Frequency of use	Users
1	Main gate	Daily	Pedestrians, Cars, Taxis, Heavy vehicles, Emergency vehicles, Service vehicles, Equine transport
		Event days	Pedestrians, Cars, Taxis
2	Bus egress	Daily	Pedestrians
		Event days	Bus egress, Pedestrians
3	-	-	-
		-	-
4	-	-	-
		-	-
5	Bus entry, Pedestrian access & Proposed Hotel access	Daily	Pedestrians, Emergency vehicles, Heavy vehicles
		Event days	Bus entry, Emergency vehicles, Taxis
6	Pedestrian egress	Daily	Unused
		Event days	Pedestrian egress
7	Pedestrian egress	Daily	Unused
		Event days	Pedestrian egress
8	Vehicle access	Daily	Service vehicles
		Event days	Cars, Emergency vehicles
9	Stable access	Daily	Unused
		Event days	Pedestrians, Cars
9a	Dwelling access	Daily	Dwelling access
		Event days	Dwelling access

Wansey Road

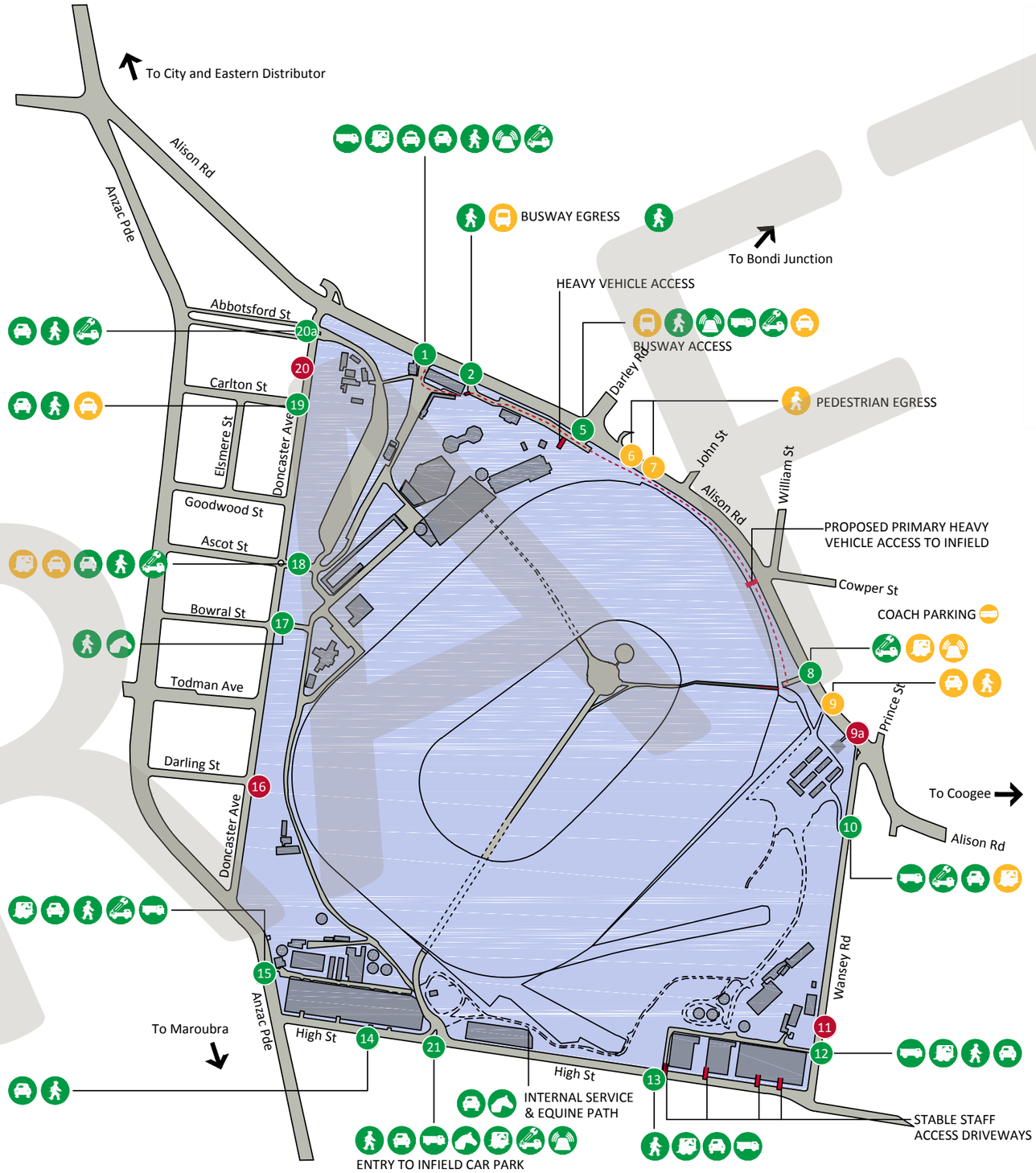
Gate	Use	Frequency of use	Users
10	Stable access	Daily	Cars, Service vehicles, Heavy vehicles
		Event days	Cars, Equine transport, Heavy vehicles
11	Currently not in use	Daily	Unused
		Event days	Unused
12	Stable access	Daily	Cars, Pedestrians, Heavy vehicles, Equine transport
		Event days	Cars, Pedestrians, Heavy vehicles, Equine transport

High Street

Gate	Use	Frequency of use	Users
13	Service access	Daily	Pedestrians, Cars, Heavy vehicles, Equine transport
		Event days	Pedestrians, Cars, Heavy vehicles, Equine transport
21	High Street access	Daily	Pedestrians, Cars, Heavy vehicles, Equine, Equine transport, Service vehicles, Emergency vehicles
		Event days	Pedestrians, Cars, Heavy vehicles, Equine, Equine transport, Service vehicles, Emergency vehicles
14	Stable access	Daily	Pedestrians, Cars
		Event days	Pedestrians, Cars

Anzac Parade & Doncaster Avenue

Gate	Use	Frequency of use	Users
15	Stable access	Daily	Pedestrians, Cars, Service vehicles, Equine transport
		Event days	Pedestrians, Cars, Service vehicles, Equine transport
16	Currently not in use	Daily	Unused
		Event days	Unused
17	Stable access	Daily	Pedestrians, Equine
		Event days	Pedestrians, Equine
18	Grand Stand, Car park & Stables	Daily	Pedestrians, Cars, Service vehicles
		Event days	Pedestrians, Taxis, Equine transport
19	Grand stand, Car park & Stables	Daily	Pedestrians, Cars
		Event days	Pedestrians, Taxis
20a	Restricted car park	Daily	Cars, Service vehicles
		Event days	Cars, Service vehicles



Legend

User / Gate

- Regular use
- Special event use
- Currently not in use

Heavy vehicle route

Users

- Pedestrians
- Cars
- Taxis
- Buses
- Heavy vehicles
- Equine transport
- Horses
- Emergency vehicles
- Service vehicles

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NOTES:
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PROJECT:
ROYAL RANDWICK RACECOURSE
LIGHT RAIL STRATEGY

DRAWING TITLE:
EXISTING ACCESS LOCATIONS AND USE

CLIENT:	AUSTRALIAN TURF CLUB		
DRG. #:	PTC-01		
VERSION #:	DRAFT	SCALE:	NTS
PROJECT #:	T2-953	DATE:	18/12/13

A3

Alison Road

Gate	Use	Frequency of use	Users
1	Main gate	Daily	Pedestrians, Cars, Taxis, Heavy vehicles, Emergency vehicles, Service vehicles, Equine transport
		Event days	Pedestrians, Cars, Taxis
2	Bus egress	Daily	Pedestrians
		Event days	Bus egress, Pedestrians
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		Event days	Cars, Service vehicles

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NOTES:
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PROJECT:
ROYAL RANDWICK RACECOURSE
LIGHT RAIL STRATEGY

DRAWING TITLE:
LIGHT RAIL IMPACT ON ACCESS LOCATIONS

CLIENT:	AUSTRALIAN TURF CLUB		
DRG. #:	PTC-02		
VERSION #:	DRAFT	SCALE:	NTS
PROJECT #:	T2-953	DATE:	18/12/13

A3

Alison Road

Gate	Use	Frequency of use	Users
1	Main gate	Daily	Pedestrians, Cars, Taxis, Heavy vehicles, Emergency vehicles, Service vehicles, Equine transport
		Event days	Pedestrians, Cars, Taxis
2	Bus egress	Daily	Pedestrians
		Event days	Bus egress, Pedestrians
3	-	-	-
		-	-
4	-	-	-
		-	-
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High Street

Gate	Use	Frequency of use	Users
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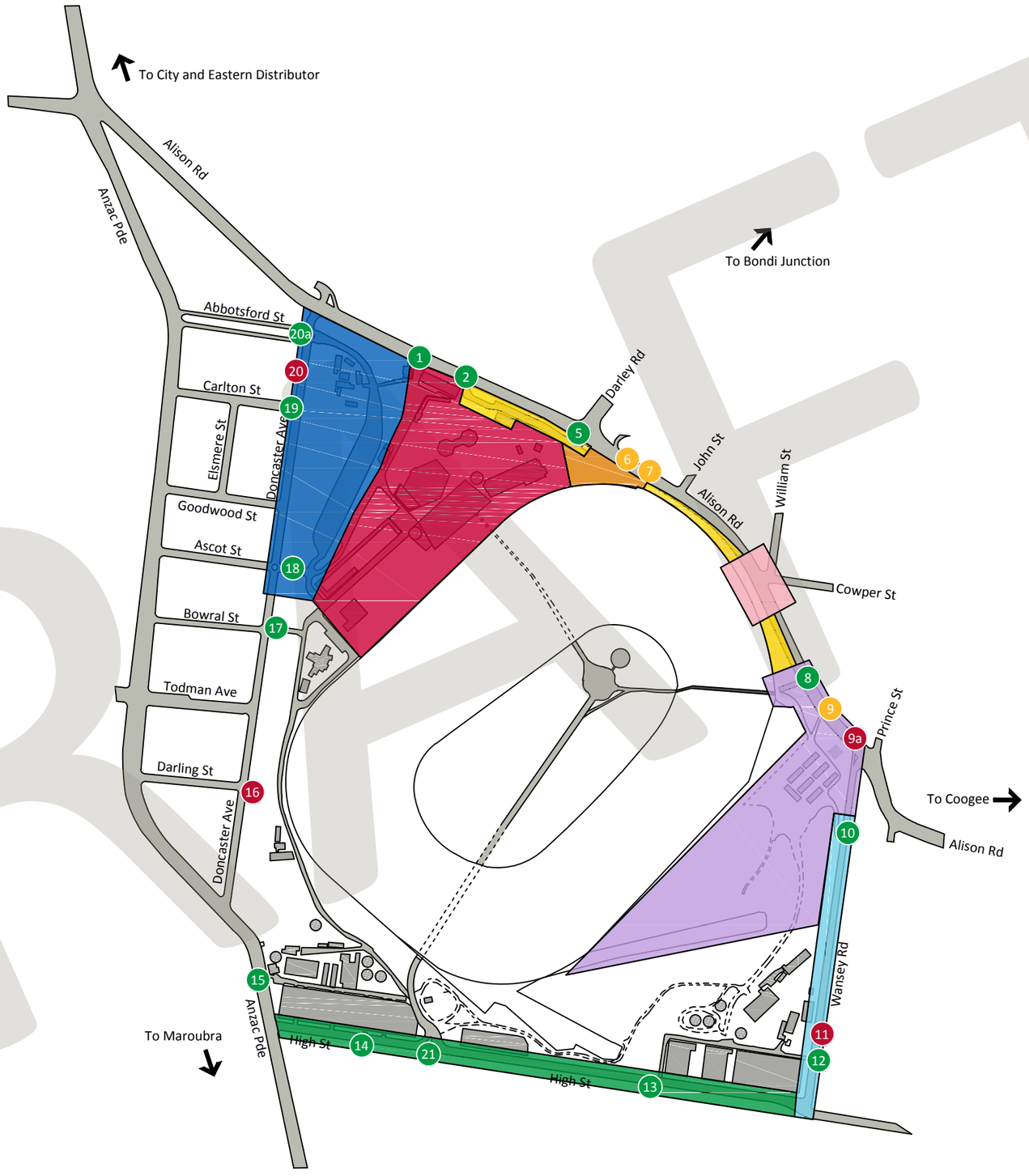

Legend

Precincts

- High Street Precinct
- Proposed Wansey Road Precinct
- Equine Stables Precinct
- Cowper Street Precinct
- Hotel Precinct
- Spectator Precinct
- Alison Road Frontage
- LRV Stabling Area

Gate

- 1 Regular use
- 1 Event day use
- 1 Currently not in use

N

ROYAL RANDWICK

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PROJECT:
ROYAL RANDWICK RACECOURSE
LIGHT RAIL STRATEGY

DRAWING TITLE:
PRECINCT PLAN

CLIENT:	AUSTRALIAN TURF CLUB		
DRG. #:	PTC-03		
VERSION #:	DRAFT	SCALE:	NTS
PROJECT #:	T2-953	DATE:	18/12/13

Royal Randwick Racecourse
Alison Road, Randwick
NSW 2031

16 December 2013

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Attention: **Andrew Steventon**
Project Manager

Re: Review of Light Rail Environmental Impact Assessment
Comments Regarding Flooding

Following a qualitative assessment of the likely impacts, it is probable that construction of the Light Rail will have adverse flooding impacts on either the Royal Randwick Racecourse or the adjoining floodplain users. Alison Road is an overland flowpath conveying peak discharges of up to 8.5 m^3/s along it and 10.4 m^3/s across it between Prince Street and Darley Street in the 100 year ARI event (event commonly used in quantifying impacts). The current underground pipe capacity is in the order of a 1 year ARI event. Thus in larger events, significant runoff will occur along the road network and in places into private property. Mitigation measures to negate any adverse flooding impacts (such as increase in flood levels and extents or diversion of overland flowpaths) proposed in the EIS include:

- Increasing the downstream drainage capacity;
- Diverting upstream flows around or under the track formation;
- Providing stormwater detention under or adjacent to the track formation;
- Diverting the existing drainage; and
- Providing new drainage parallel to the Light Rail alignment.

While construction of these measures will assist in mitigating impacts, they are unlikely to be adequate in keeping them within an acceptable tolerance of +/- 0.01m which has been applied to obtain development approvals at Royal Randwick in the past. Similar issues are likely for the proposed alignment along Wansey Road.

Furthermore, achieving the design criteria of limiting track water depths to 0.015 m or less for whichever event is larger of a 10 year ARI or the design ARI of the adjacent road is improbable if the track levels are in accordance with the proposed design methodology of adopting rail levels similar to existing ground levels. Inundation depths in excess of 0.3 m are predicted along Alison Road in the 10 year ARI event. Similarly, flood depths of 0.3 m are approximated along Wansey Road for the 10 year ARI event. While depths of 0.05 m are tolerable for continued Light Rail operation (albeit at reduced speeds) the significantly larger depths along Alison and Wansey Roads will realistically require a raising of the track relative to the existing road levels. This will however, exacerbate flood risk along Alison and Wansey Roads through a combined loss of

conveyance and loss of flood storage. Flood levels are therefore likely to be higher as a result of the proposed works. This necessitates a detailed flood impact assessment which includes the proposed Light Rail alignment since current flood levels without the Light Rail are inadequate in informing track design levels.

Flood impacts are likely to be exacerbated nearby the proposed Randwick Light Rail Stabling Facility, the Royal Randwick Racecourse stop and the Wansey Road stop locations. Compensatory measures may need to be considered at these locations.

Volume 1A of the EIS Section 10.2.2 suggests that the Anson site ground levels (proposed location of Randwick Light Rail Stabling Facility) will be raised. The site is downstream of the Centennial Parklands from which flows of up to 50 m^3/s are estimated to originate in the 100 year ARI event. This will result in a significant reduction (in the order of 20 m^3/s at the peak) to the current flowpath which will be directed elsewhere and/or exacerbate impacts.

A significant flood storage loss and conveyance loss will occur if any filling is undertaken on the Anson site. Peak depths of 0.77 m are predicted over the Anson site for the 10 year ARI event rising to a peak depth of 1.38 m for the 100 year ARI event. This results in an approximate flood storage loss of 4000 m^3 if the site or entrance to the site is elevated to such a level as to achieve immunity for the 10 year ARI event. This increases to 14,000 m^3 if protection from the 100 year ARI event is desirable. Compensatory floodplain storage might be achieved by diverting flows from Alison Road to the racetrack area which can act as a retarding basin. Based on existing levels of storage in the racetrack of approximately 51, 000 m^3 and 90,000 m^3 for the 10 year and 100 year ARI events, diversion of the lost Anson site flood storage would result in manageable flood level increases over the racetrack of less than 0.1 m.

The proposed location of the Royal Randwick Racecourse stop experiences relatively lower peak flood depths (0.1 m and 0.13 m for the 10 year ARI and 100 year ARI events respectively) due to the elevated levels of the existing busway. However, proposed ground levels for the Royal Randwick Racecourse stop are lower than existing ground levels therefore higher flood depths will occur. Furthermore, the current high ground levels provide flood protection to the grandstand area of the Royal Randwick Racecourse, therefore, potential loss of flood immunity due to the lowering of ground levels needs to be investigated.

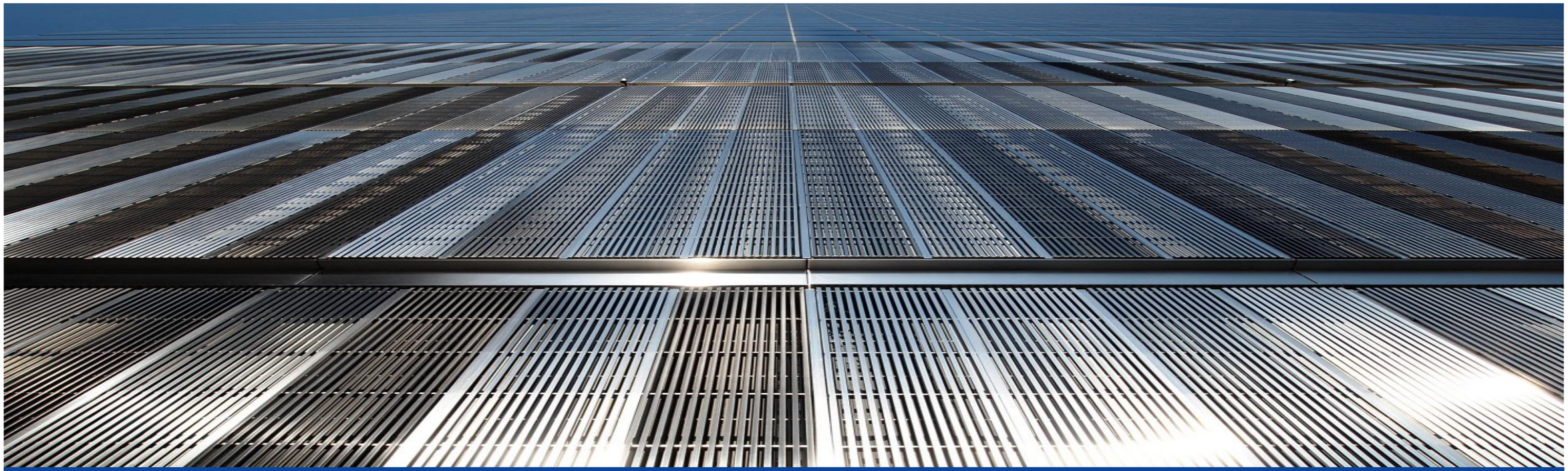
Peak flood depths of 0.87 m and 0.92 m are estimated for the 10 year and 100 year ARI events respectively within the platform area of the Wansey Road stop. This results in approximate flood storage losses of 63 m^3 and 76 m^3 respectively if flood immunity from these events is required for the Wansey Road platform stop.

The proposed site for the High Street Substation is flood affected by the overland flow path along Anzac Parade. Relocation of the substation will be required to prevent an exacerbation of flood risk.

While the Light Rail project is overwhelmingly beneficial the flood risk has not been adequately addressed in the EIS. The high level assessment of the likely impacts of the proposal is insufficient and a detailed assessment is required to satisfy requirements of the Floodplain Development Manual.

Yours Sincerely,
WMAwater

Dr Philip Conway
Water Engineer



LIGHT RAIL SERVICES REVIEW

ROYAL RANDWICK RACECOURSE,

AUSTRALIAN TURF CLUB

Confidential

19/12/2013

UNITED BY OUR DIFFERENCE WSP

Client

Australian Turf Club
Alison Road, Randwick NSW

Consultant

WSP Buildings

Tel: 89070900
Fax: 99574127

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Issue 1 Final Report	Rev 1 Final Report		
Date	16/12/2013	16/12/2013		
Prepared by	JCO KDS	JCO KDS		
Signature				
Checked by	JCO	JCO		
Signature				
Authorised by	JCO	JCO		
Signature				
Project number	SYD1339400	SYD1339400		

Table of Contents

1 Introduction

1.1 General

The proposed new Light Rail project impacts on the Royal Randwick Racecourse in a number of key areas:

- Extensive RRR property and infrastructure will need to be demolished, relocated and re-supplied.
- Extensive relocation of the existing supply authority assets currently serving RRR, whilst ensuring a continuity of supply to the RRR.
- Apparent utilisation of the available local power capacity in the region.
- Restrictions on future reticulation routes imposed by the new rail construction.

1.2 Applicable Documents

The following document should be read in conjunction with this services review.

- Transport for New South Wales Environmental Impact Statement for CBD and South East Light Rail Project (Nov 2013)

1.3 Limitations

The review is based on the available documentation provided by the EIS, the ATC and visual inspections of the site.

1.4 Definitions

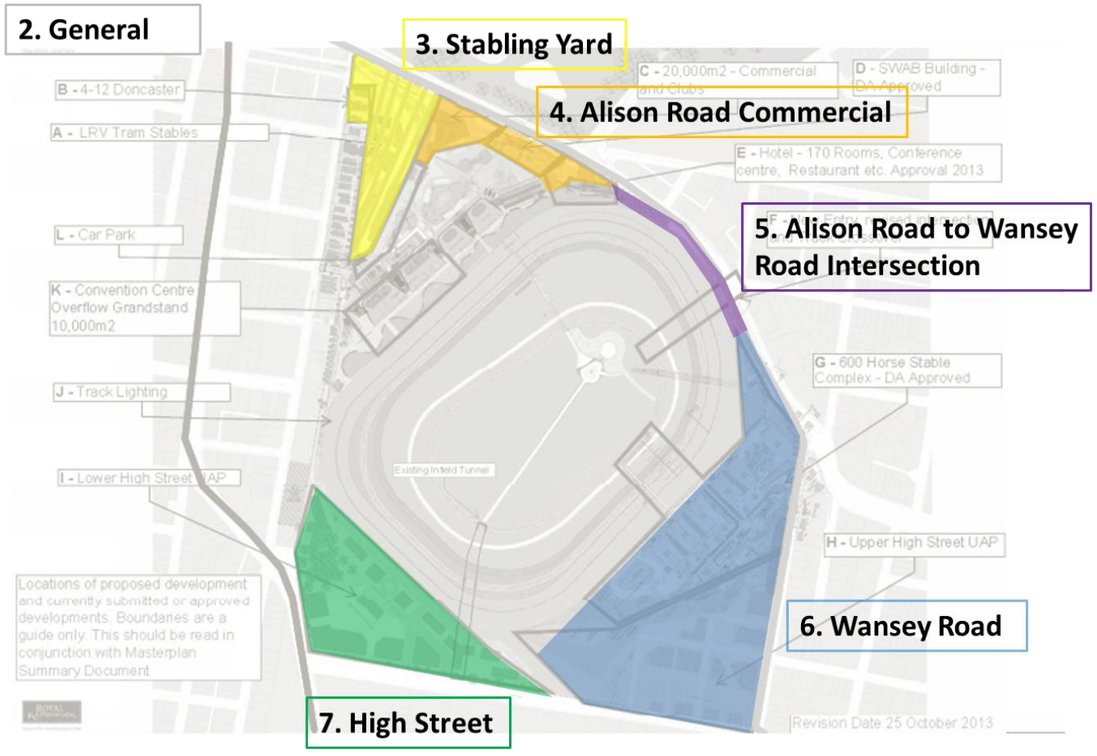
ATC – Australian Turf Club

CSELR – CBD and South East Light Rail

EIS – Environmental Impact Statement

RRR – Royal Randwick Racecourse

TfNSW – Transport for NSW



2 General

2.1 Electrical and Communications

2.1.1 Current Development and Operation

Whilst the EIS identifies some of the possible impacts on the Royal Randwick Racecourse, it does not fully cover the extent of the issues and associated remedial actions.

The principal impacts on the electrical and communications infrastructure can be summarised as follows, with the listed items dealt with in more detail in the subsequent sections:

Site Electrical Capacity – Ausgrid currently assesses the RRR as a "Large Load Customer" that has reached its maximum demand capacity allocation on the local HV network on race or event days. The Australian Turf Club will be expected to fund all or part of the cost of any new HV feeder cables, most likely to be from the Clovelly Zone Substation. A short term policy of offsetting the load of any new development by the provision of permanent standby generators is the ATC's only current alternative.

The CSELR is also identified as a "Large Load Customer", however the 6MVA power requirement for the 3 No Substations located on RRR is obtained from the local HV network, with no new HV feeder required.

Any future RRR additional load requirements (see Appendix 8C) will therefore require a new HV feeder, at an approximate cost of $4M.

RRR's Ausgrid Infrastructure – The CSELR potential impact on the existing RRR Ausgrid infrastructure manifests itself in a number of ways, including:

- Impacts of the new kiosk substations.
- Impacts on the existing kiosk substations on the site.
- Potential impact on RRR's existing HV feeders from the construction.
- Potential damage and supply interruptions during construction.

The EIS states that the full investigation into the Supply Authority infrastructure is yet to be completed and this only increases the uncertainty and increases the risk to RRR.

RRR Comms Infrastructure – The CSELR potential impact on the existing communications infrastructure includes the following:

- Impact on the existing incoming services from the new construction.
- Potential damage and supply interruptions during construction.

The EIS states that the full investigation into the Supply Authority infrastructure is yet to be completed and this only increases the uncertainty of the impact and the risk to RRR.

Direct Impact from CSELR Construction – The following risks are identified in the EIS without any detailed resolutions.

- Stray electrical currents and the subsequent electromagnetic interference.
- Adjacency of the overhead HV cabling to existing RRR structures.
- Spill / nuisance lighting from the rails and Light Rail Vehicle stops themselves.
- Restriction to future incoming electrical and communications incoming services due to the track construction. It is a fundamental requirement for CSELR to provide future utility access to the RRR site.

RRR Internal Infrastructure – The effects of the CSELR construction comprising of LRV stops, rails and LRV LRV Stabling Yard has both direct and indirect implications on RRR's buildings and associated services. Relocations of the following systems will be necessary:

- Existing underground services and reticulation.
- Existing sub main distribution and associated switchgear.
- Existing LV supply feeders.
- Existing external lighting.
- Existing CCTV and Access Control systems, including the head end location.
- Existing communications services and reticulation, including outside broadcasting links..
- Existing electronic gate and access system.
- Existing external signage.
- Existing public address.
- Existing fire alarm systems.
- Satellite Dish relocation.

There is also the indirect impact on the highlighted services due to the relocation of existing ATC assets:

- Existing Heritage and Workshop buildings due to the LRV Stabling Yard LRV stabling yards.
- Reconfigured Horse Stable Blocks and entrances on Wansey St due to the High St LRV stop.

2.1.2 Future Development and Operation

Future Site Electrical Capacity:

RRR's future construction developments and increased frequency of events will necessitate an increased maximum demand for the site, the implications of which are highlighted in Section 2.1.1. The apparent availability of up to 6MVA on the local supply HV network would meet a large proportion of the RRR future development requirements.

Incoming Services Constraints:

The construction of the rail and LRV stops constrict future reticulation paths to the RRR site. Clear services zones, with conduits for future electrical and communications incoming cabling need to be establish and provided to guarantee the site's future operations.

This needs to be established, agreed and provided as part of the CSELR construction.

2.3 Hydraulics and Fire

2.3.1 Current Development and Operation

The general strategy identified within the EIS appears to be for existing services to remain in situ or be lowered. Diversions and relocations will also be required but are not detailed at this stage. Hydrant ring main diversion works may be necessary, but not defined.

Risk of water / drainage services containing asbestos is high.

The deletion of existing water tank utilised for irrigation will impact current operations at the RRR. There is a significant capital cost to demolish the existing facilities, as part of the early works package, and provide new systems in order to achieve continuity of irrigation services.

Existing tanks, bores and associated equipment will require significant modification to support continuity of irrigation services and not limit future development opportunities.

2.3.2 Future Development and Operation

Existing utilities services, including gas, water services; storm water and sewer drainage located under the proposed CSELR alignment requires treatment / redirection as necessary

Risk of contaminants entering the storm water system, detention basin and aquifer from accidental spills, etc,will need to be reviewed as part of the process.

Concrete structures may affect existing storm water overland flow and reduce the amount of rainwater recharging the aquifer, resulting in lowered groundwater levels limiting or affecting existing bore water supply.

Review of current cold water distribution network is required to comply with current standards and codes required.

Review of current Fire Hydrant coverage required to comply with current standards and codes required.

Storm water and sewer drainage diversion network may be necessary.

The construction of the rail and LRV stops constrict future reticulation paths to the RRR site. Clear services zones, with provisioning for future cold water, drainage, gas and hydrant connections need to be established and provided to guarantee the site's future operations.

This needs to be established, agreed and provided as part of the CSELR construction.

2.4 Acoustics

2.4.1 Current Development and Operation

There are a number of issues identified in the following sections. Our primary concern is that the EIS has not provided any meaningful assessment of noise / vibration to address these issues. Further information should be sought from TfNSW with regards to addressing these issues directly.

Whilst the operational noise and vibration issues may be able to be suitably mitigated - our primary concern will remain the Construction noise and vibration to the existing Horse Stables on Upper High Street due to close proximity of the construction works to the stables.

It should be noted that in any discussions and agreement between the Australian Turf Club and TfNSW, the issues surrounding the noise and vibration impacts not only to humans are considered and assessed, but also the horses and the operations of the racecourse, including Stabling, Training and Race day impacts on where horses will be located on the site during various activities.

2.4.2 Future Development and Operation

There are a number of issues identified in the following sections. As a general overview – we would expect that noise and vibration impacts on future developments will be able to be suitably mitigated; however this may impact on the design and cost of these developments (for example, increased glazing specifications to mitigate noise intrusion from LRV stations, etc.).

It should be noted that in any discussions and agreement between the Australian Turf Club and TfNSW, the issues surrounding the noise and vibration impacts not only to humans are considered and assessed, such as the existing Admin Building, but also the horses and the operations of the racecourse, including Stabling, Training and Race day impacts on where horses will be located on the site during various activities. Particular attention is drawn to the LRV Stabling facility and its inherent 24 hour operations.

2.5 Environmental

2.5.1 Current Development and Operation

No comments identified at this stage.

2.5.2 Future Development and Operation

Climate change adaptation measures will need to be incorporated into the CSELR design in further detail i.e. drainage system designs, emergency management plans, etc.

Ongoing climate change assessments would also be required as part of the process.

Further detail is required on monitoring programs to confirm pollution control requirements are being met.

Consider if additional waste and recycling bins are required for Randwick and Wansey Road stops to maintain tidiness.

Water sensitive urban design approaches and flood mitigation measures developed by the PPP will need to be reviewed.

Air quality may be compromised during construction and potentially during operation. A quantitative assessment of air quality impacts needs to be undertaken as part of the CSELR process.

Cycle routes will be re-routed in some cases. Proposed options require review.

Detailed review of potential loss of habitat and ecology is required.

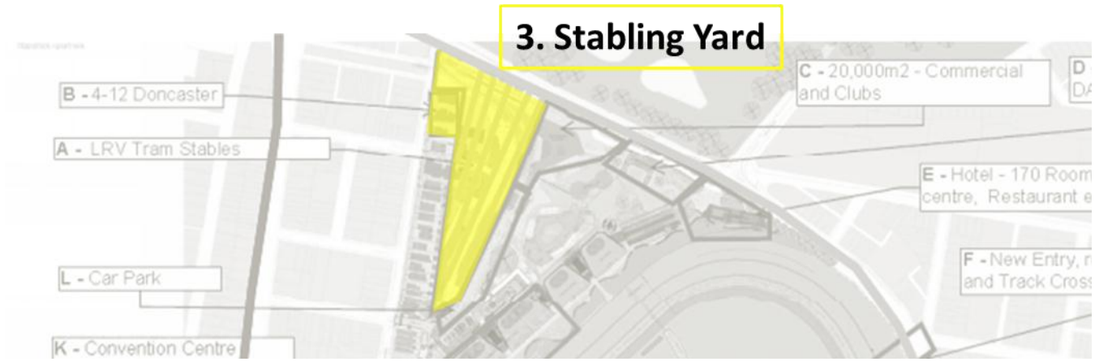
A detailed and thorough hazard and risks assessment would need to be completed as part of the CSELR, as to date only a high level assessment has been undertaken.

Hazards and risks identified will need to be mitigated to ensure the safety of ATC staff, visitors, neighbours and horses during construction.

Soil and water management plan to be reviewed.

Current views will be impacted by the CSELR, and will potentially have a 'high adverse visual impact'. Liaise with TfNSW to understand how views can be maintained/enhanced.

3 Stabling Yard



3.1 Electrical and Communications

3.1.1 Current Development and Operation

Utilities Infrastructure:

- As stated in the EIS, detailed investigations of the existing supply authority infrastructure is yet to be carried out. This represents a potential risk to RRR from damage and potential supply interruptions during the CSELR construction. The existing substation located in Doncaster Avenue will require relocation due to the proposed CSELR LRV Stabling Yard. The implications to RRR are not defined within the EIS.
- HV cabling diversions will be required.
- Telstra fibre and copper runs along Alison Road will need to be relocated or diverted, with continuity of supply to be assured.
- The proposed new CSELR Randwick Depot Substation and its associated HV cabling will need to be co-ordinated with the existing Ausgrid infrastructure to ensure that there is no loss of supply during the construction stage.

RRR Internal Infrastructure:

- The Security Building is the principal centre for the RRR fire alarm, security and electronic gate and access systems. A new location will need to be established for all the associated control panels and head end equipment, services will need to be transferred in a phased sequence of works and reticulation realigned to the new location.
- There is little documentation on existing services within this area. Detailed surveys will need to be undertaken to establish the full scope of works for the underground services.
- External lighting will need to be removed.
- The existing satellite dish will need to be relocated, along with its field cabling.

Direct Impact from Tram Stabling Yard Construction:

- Demolition of the Heritage Office, Work Sheds, Tradesman Amenities, Security Building and amenities, storage areas and car parking for racecourse workers will require isolation and removal of the associated supply services and the building's electrical systems.
- Surveys identifying the existing electrical and communication services within each building will need to be conducted as the impacts are not detailed within the EIS.
- The extensive 750V DC services associated for the track power offers a large potential source for stray earth currents and EMI. No detailed study has been conducted by CSELR and no solutions have been identified to specific areas.

3.1.2 Future Development and Operation

Future Impact of the Tram Stabling Yard:

- The relocation of the demolished buildings will have an impact on the RRR existing infrastructure.
- The 24 hour operation of the site will have increased impacts on RRR, namely:
  - Spill lighting form the yard itself will need to be considered, with suitable measures taken by CSELR.
  - Potential noise from the associated public address.

3.2 Hydraulics and Fire

3.2.1 Current Development and Operation

Due to the demolition of security office and amenities the Fire Indicator Panel (FIP) will need to be relocated along with all associated links to the site's sub panels.

Old buildings / structures - i.e. Heritage Office, Work Sheds, tradesman amenities, security office and amenities, storage areas present a high risk of the hydraulic services containing asbestos.

Existing utility services will need to be identified within the Heritage Office, Work Sheds, tradesman amenities, security office and storage areas to ensure continuity of services (storm water, gas, water, sewer, hydrant services) during early works and light rail construction.

3.2.2 Future Development and Operation

Existing utilities services, including gas, water services, storm water and sewer drainage located under the proposed CSELR alignment requires to be treated / redirected as necessary.

The construction of the rail and LRV Station Yard will constrict future reticulation paths to the RRR site. Clear services zones, with provisioning for future cold water, drainage, gas and hydrant connections need to be established and provided to guarantee the site's future operations.

This needs to be established, agreed and provided as part of the CSELR construction.

3.3 Acoustics

3.3.1 Current Development and Operation

Possible noise impacts from both Construction and Operation of Stabling Yard on:

- Parade Ring – noise and potential vibration impacts on amenity of space (human and horse). Vibration concerns relate to Construction phase only.
- Circulation / Recreation Landscaped Zone – noise impacts on amenity of space (human)

3.3.2 Future Development and Operation

Possible noise impacts from both Construction and Operation of Stabling Yard on:

- Convention Centre and Overflow Grandstand - – noise impacts on amenity of space (human)
- Overland / Residential development above – noise impacts from Stabling Yard to development above and

surrounding areas.

- 20,000m2 ATC Commercial and Clubs Building – noise and potential vibration impacts on amenity of space (human). Depending on phasing of works, vibration from construction of the Light Rail may have structural impacts on this area (if the future development is there prior to the Light Rail)

3.4 Environmental

3.4.1 Current Development and Operation

Existing buildings may have asbestos (and paint may contain lead), therefore a hazardous survey should be carried out to quantify the early works package.

3.4.2 Future Development and Operation

Construction waste will be produced through the demolition of existing buildings and needs to be managed appropriately. Waste management plans will need to be developed.

Accidental spills or leakage from stabling and maintenance activities at the proposed Randwick stabling facility have the potential to contaminate the Botany Sands aquifer and surrounds. A robust management plan needs to ensure contamination is avoided. TfNSW will need to detail risk mitigation plans.

There are a number of trees within the proposed Randwick stabling facility temporary construction compound, including a large Moreton Bay Fig at the Western end of the site.

More detail is provided around how the temporary construction compound will be configured.

4 Alison Road, Commercial

4.1 Electrical and Communications

4.1.1 Current Development and Operation

Utilities Infrastructure:

- The existing Ausgrid HV feeder traverses Alison Rd opposite Darley Rd and enters the Racecourse adjacent to the existing toilet blocks. No current proposal is identified within the EIS for possible relocations of said services or the associated phasing and enabling works necessary.
- The 2 No. Existing kiosk substations located adjacent to the toilet block do not appear to be directly affected by the proposed works; however this needs to be confirmed.
- Existing Telstra fibre and copper network services currently run parallel to the CSELR tracks. There is no specific resolution proposed within the EIS. This represents a significant risk to RRR current operational requirements.
- The proposed new CSELR track and LRV stop installation will need to be co-ordinated to ensure no supply interruptions to either power or comms during the construction phase.

RRR Infrastructure:

- The main server room for the RRR development is located within the main Admin Building on Allison Rd. Site comms services are reticulated from this point. An existing comms conduit network emanates from here serving a number of RRR systems. The run along the Alison Rd frontage will be impacted by the proposed new LRV stop and diversions, relocations and enabling work will be necessary to all ATC services, including:
  - IT and communications.
  - Infield Sign Services.
  - Public Address.
  - MATV
  - Outside Broadcast.
  - Main Entry Gates.

Direct Impact from the CSELR Construction:

- The extensive 750V DC services associated for the track overhead power offers a large potential source for stray earth currents and EMI. No detailed study has been conducted by CSELR and no solutions have been identified for specific areas, and as such is a risk to RRR.

Direct Impact from LRV Tram Stop Construction:

- The proposed new stop will impact on the existing services located in the current main entrance area. The levelling of services will disrupt the existing infrastructure (See 4.1.1).
- The current main public area has extensive services that will need to be relocated to suit the new landscaping for the area. These include:
  - Public area lighting.
  - Public Address system.
  - Extensive CCTV
  - Incoming supplies to the Swab and adjacent buildings.
  - Main Gates

4.1.2 Future Development and Operation

ATC Hotel:

A proposed new hotel development is earmarked, with a load requirement of 700kVA. The development's incoming services and kiosk substation will require provision as part of the CSELR construction. The location of the kiosk and future conduits will need to be provided to ensure future connectivity to the supply authority infrastructure. Conduit, pipework and culverts where required should be coordinated and installed by CSELR for future use.

Future Commercial Development:

A future mixed development of 20,000m^2 has been allocated, requiring a potential 2-3MVA electrical supply and incoming comms services. As above, supply infrastructure and a secured future conduit path will be required as part of the CSELR construction to ensure future connectivity to the relevant supply authority infrastructure. Conduit, pipework and culverts where required should be coordinate and installed by CSELR for future use.

Future Swab Building:

Should the Old SWAB Building be relocated the DA Approved Swab Building will also require a future infrastructure corridor as part of the CSELR construction. Conduit, pipework and culverts where required should be coordinate and installed by CSELR for future use.

4.2 Hydraulics and Fire

4.2.1 Current Development and Operation

Existing utilities services, including gas, water services, storm water and sewer drainage located under the proposed CSELR alignment requires to be treated / redirected as necessary

4.2.2 Future Development and Operation

New Royal Randwick racecourse stop – The current fire hydrant booster location and designated Fire Truck area is impacted.

The reticulation of gas pipework is also impacted in the immediate area. In addition there is a risk in maintaining continuity of service to the site.

Hydrant network requires to be fully traced to ensure redundant hydrants being removed do not limit coverage and be replaced adequately.

The proposed rail route runs approximately one metre away from the Admin Building and will impact on the existing hydraulic services located in the area.

The construction of the rail will constrict future reticulation paths to the RRR site. Clear services zones, with provisioning for future cold water, drainage, gas and hydrant connections need to be established and provided to guarantee the site's future operations.

This needs to be established, agreed and provided as part of the CSELR construction.

4.3 Acoustics

4.3.1 Current Development and Operation

Noise and Vibration Impacts:

- From Construction of railway on Administration Building – Noise and vibration impacts both on amenity of spaces and structural concerns
- From Operation of LRVs passing very close to Administration building – Noise and vibration impacts on amenity of spaces
- Increased noise in Admin building due to removal of current wall between roadway and Admin building – Noise impacts on amenity of spaces

4.3.2 Future Development and Operation

Noise and Vibration Impacts:

- Future Hotel development – Noise and vibration impacts on amenity of spaces. Possible structural concerns from construction in close proximity.
- 20,000m2 Commercial and Clubs – noise and potential vibration impacts on amenity of space. Depending on phasing of works, vibration from construction of the Light Rail may have structural impacts on this area (if the future development is there prior to the Light Rail)
- Proposed SWAB Building – noise and potential vibration impacts on amenity of space. Depending on phasing of works, vibration from construction of the Light Rail may have structural impacts on this area (if the future development is there prior to the Light Rail)

4.4 Environmental

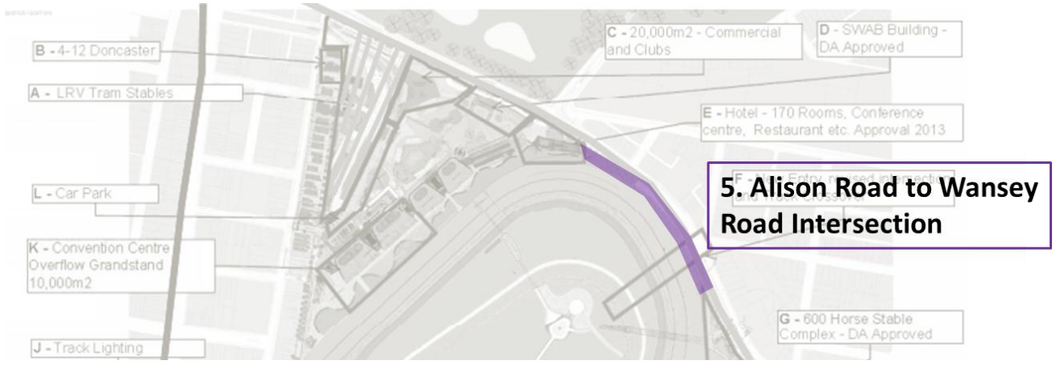
4.4.1 Current Development and Operation

See Chapter 2 General.

4.4.2 Future Development and Operation

See Chapter 2 General.

5 Alison Road to Wansey Road Intersection



5.1 Electrical and Communications

5.1.1 Current Development and Operation

Utilities Infrastructure:

- As stated in the EIS, detailed investigations of the existing supply authority infrastructure is yet to be carried out. This represents a potential risk to RRR from damage and potential supply interruptions during the CSELR construction.

RRR Infrastructure:

- Whilst there are limited implications to the RRR infrastructure from the proposed CSELR track, local electrical services to starting towers and electronic gates will be disrupted.

Direct Impact from CSELR Construction:

- The extensive 750V DC services associated for the track overhead power offers a large potential source for stray earth currents and EMI. No detailed study has been conducted by CSELR and no solutions have been identified for specific areas, and as such is a risk to RRR.

5.1.2 Future Development and Operation

Proposed new Track Crossover:

- The new overhead link to the racecourse will require future reticulation paths for the RRR services such as power, communications and data, gate control, etc.
- A secured future conduit path will be required as part of the CSELR construction to ensure future connectivity to the relevant supply authority infrastructure. Conduit, pipework and culverts where required should be co-ordinate and installed by CSELR for future use.

Track Lighting for Night Racing:

- Future night racing is proposed for the venue, Multiple secured future conduit paths will be required as part of the CSELR construction to ensure future connectivity to the relevant supply authority infrastructure.
- Conduit, pipework and culverts where required should be co-ordinate and installed by CSELR for future use.

5.2 Hydraulics and Fire

5.2.1 Current Development and Operation

Existing utilities services, including gas, water services, and storm water and sewer drainage located under the proposed CSELR alignment requires to be treated / redirected as necessary

5.2.2 Future Development and Operation

Flood Zones in and around Alison Road and Wansey Road will require mitigation and further investigation as part of the CSELR process.

Potential contaminants entering the storm water system during construction may impact the irrigation supplies.

Key plant and equipment will require protection against water damage.

The construction of the rail and LRV Station Yard will constrict future reticulation paths to the RRR site. Clear services zones, with provisioning for future cold water, drainage, gas and hydrant connections need to be established and provided to guarantee the site's future operations.

This needs to be established, agreed and provided as part of the CSELR construction.

5.3 Acoustics

5.3.1 Current Development and Operation

- The projected loss of a high number of existing trees surrounding RRR will have potential impact on neighbouring residents during RRR event days. The CSELR will need to be cognisant of the fact.

5.3.2 Future Development and Operation

- Limited Impact

5.4 Environmental

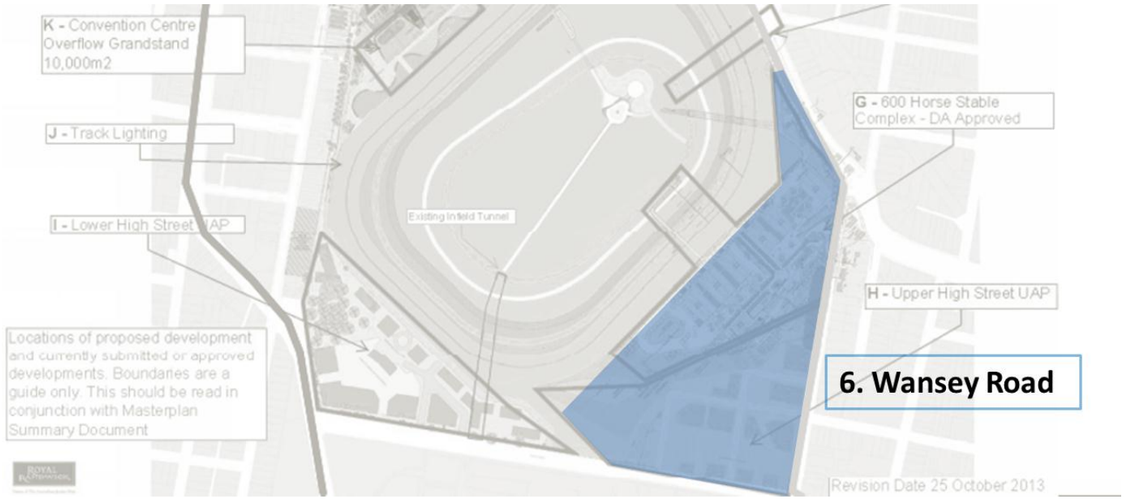
5.4.1 Current Development and Operation

See Chapter 2 General.

5.4.2 Future Development and Operation

See Chapter 2 General.

6 Wansey Road



6.1 Electrical and Communications

6.1.1 Current Development and Operation

Utilities Infrastructure:

- As stated in the EIS, detailed investigations of the existing supply authority infrastructure is yet to be carried out. This represents a potential risk to RRR from damage and potential supply interruptions during the CSELR construction. The existing substation located in Wansey Rd will require relocation due to the proposed CSELR track and LRV stop. The implications to RRR are not defined within the EIS.
- The proposed new CSELR Randwick Racecourse Substation and its associated HV cabling will need to be co-ordinated with the existing Ausgrid infrastructure to ensure that there is no loss of supply during the construction stage and to ensure that there is no impact on the RRR access arrangements.

RRR Infrastructure – Direct Impact from LRV Stop Construction

- Wansey Rd LRV Stop - Whilst there are limited implications to the RRR infrastructure from the proposed CSELR track, local electrical services to the current Stabling Blocks and Main Electronic gates will be disrupted.
- The existing LV service pole located at Gate 10 will need to be relocated and its associated services re-fed.
- High St LRV Stop – The proposed new LRV stop has some major impacts on the current RRR infrastructure for the existing Stable Blocks. Demolition of the Stabling Blocks and the Water Tower will require isolation and removal of the associated supply services and the building's electrical systems.
- Surveys identifying the existing electrical and communication services within each building will need to be conducted as the impacts are not detailed within the EIS. These will include but are not restricted to:
  - Underground electrical, comms and fire alarm incoming services to the Stable Blocks.
  - External lighting.
  - Main Gates.

RRR - Direct Impact from CSELR Construction:

- The construction of an extensive retaining wall arrangement will impact miscellaneous RRR services, including external lighting and the electronic main gates.
- The extensive 750V DC services associated for the track overhead power offers a large potential source for stray earth currents and EMI. No detailed study has been conducted by CSELR and no solutions have been identified for specific areas, and as such is a risk to RRR.

6.1.2 Future Development and Operation

Horse Stabling Complex (DA Approved).

- The proposed new development's incoming services and kiosk substation will require provision as part of the CSELR construction. The location of the kiosk and future conduits will need to be provided to ensure future connectivity to the supply authority infrastructure for electrical and comms services. Conduit, pipework and culverts where required should be coordinate and installed by CSELR for future use.

Upper High St UAP:

- The proposed new development's incoming services and kiosk substation will require provision as part of the CSELR construction. The location of the kiosk and future conduits will need to be provided to ensure future connectivity to the supply authority infrastructure electrical and comms services. Conduit, pipework and culverts where required should be coordinate and installed by CSELR for future use. This will involve extensive co-ordination to ascertain the development protocols.

Future Impact of the LRV Stops:

- The operation of the site will have potential impacts on RRR, namely:
  - Spill lighting form the LRT stop itself will need to be considered, with suitable measures taken by CSELR.
  - Potential noise from the associated public address.

6.2 Hydraulics and Fire

6.2.1 Current Development and Operation

Flood Zones in and around Alison Road and Wansey Road will require mitigation and further investigation as part of the CSELR process.

Potential contaminants entering the storm water system during construction may impact the irrigation supplies.

Key plant and equipment will require protection against water damage.

The deletion of existing water tank utilised for irrigation will impact current operations at the RRR. There is a significant capital cost to demolish the existing facilities, as part of the early works package, and provide new systems in order to achieve continuity of irrigation services.

Major hydraulic and storm water flow paths exist in this location. Any changes or impacts imposed by the CSELR should not exacerbate the current situation (refer to Civil engineering report for detail).

6.2.2 Future Development and Operation

Existing storm water culvert collects storm water from upper Alison Road discharges to the detention basin located to the east of the existing infield tunnel and will require redirecting.

Irrigation water tank being omitted supplies irrigation network for entire site. Conduit, pipework and culverts where required should be coordinate and installed by CSELR for future use.

The construction of the rail and LRV Stop will constrict future reticulation paths to the RRR site. Clear services zones, with provisioning for future cold water, drainage, gas and hydrant connections need to be established and provided to guarantee the site's future operations.

This needs to be established, agreed and provided as part of the CSELR construction.

6.3 Acoustics

6.3.1 Current Development and Operation

Noise and Vibration Impacts:

- Construction and Operation on Barrier Stables – noise and potential vibration impacts on amenity of space (horse). Vibration concerns primarily relate to Construction phases only.
- Construction and Operation on Upper High Street Stables – noise and potential vibration impacts on amenity of space (horse).
- User and Station noise impacting on Upper High Street Stables – noise and potential vibration impacts on amenity of space (horse).

6.3.2 Future Development and Operation

Noise and Vibration Impacts:

- Construction and Operation 600 Horse Stable (likely lower impact than on existing Upper High Street Stable) – noise and potential vibration impacts on amenity of space (horse). Vibration concerns relate to Construction phase only.
- Construction and Operation on Upper High Street UAP – Again, impacts likely less significant than on the existing Stables – noise and potential vibration impacts on amenity of space (human).

6.4 Environmental

6.4.1 Current Development and Operation

A review will be required of pesticides, herbicides, fertilisers, imported fill, solvents for polishing metals, etc. that may affect horse stables and their surrounds.

6.4.2 Future Development and Operation

Large mature fig trees on both sides of Wansey Road may need to be removed prior to the construction of the CSELR.

7 High Street

7.1 Electrical and Communications

7.1.1 Current Development and Operation

Supply Authority Infrastructure:

- The proposed new CSELR High St Substation and its associated HV cabling will need to be co-ordinated with the existing Ausgrid infrastructure to ensure that there is no loss of supply during the construction stage, particularly due to the proposed feed from the existing substation.

7.1.2 Future Development and Operation

Lower High St UAP:

- The proposed new development's incoming services and kiosk substation will require provision as part of the CSELR construction. The location of the kiosk and future conduits will need to be provided to ensure future connectivity to the supply authority infrastructure electrical and comms services.

7.2 Hydraulics and Fire

7.2.1 Current Development and Operation

There is a risk of contaminants entering the storm water system, detention basin and aquifer from accidental spills, etc.

Existing utilities services, including gas, water services, storm water and sewer drainage located under the proposed CSELR alignment requires to be treated / redirected as necessary

7.2.2 Future Development and Operation

Concrete structures may affect existing storm water overland flow and reduce the amount of rainwater recharging the aquifer, resulting in lowered groundwater levels limiting or affecting existing bore water supply.

The bore pump near the maintenance shed to be removed, relocated and re-commissioned. The ATC will need to review irrigation options.

Existing tanks, bores and associated equipment will require significant modification to support continuity of irrigation services and not limit future development opportunities

7.3 Acoustics

7.3.1 Current Development and Operation

Noise and Vibration Impacts:

- Construction and Operation on Lower High Street Stables – noise and potential vibration impacts on amenity of space (horse).

7.3.2 Future Development and Operation

Noise and Vibration Impacts:

- Construction and Operation on Lower High Street UAP, impacts likely less significant than on the existing Stables – noise and potential vibration impacts on amenity of space (human).

7.4 Environmental

7.4.1 Current Development and Operation

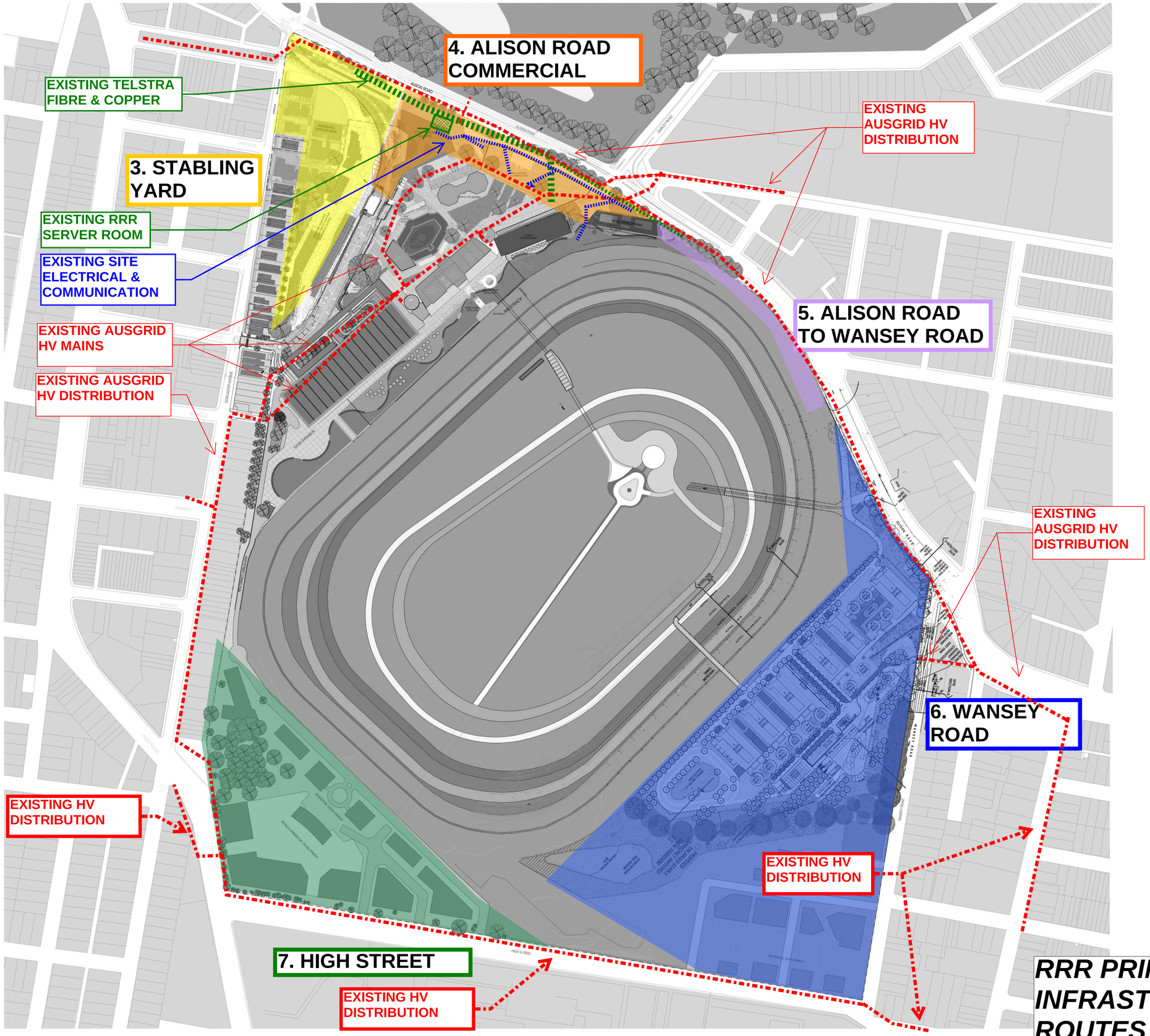
See Chapter 2 General.

7.4.2 Future Development and Operation

See Chapter 2 General.

8 Appendix A – Hydraulic Services Schematic

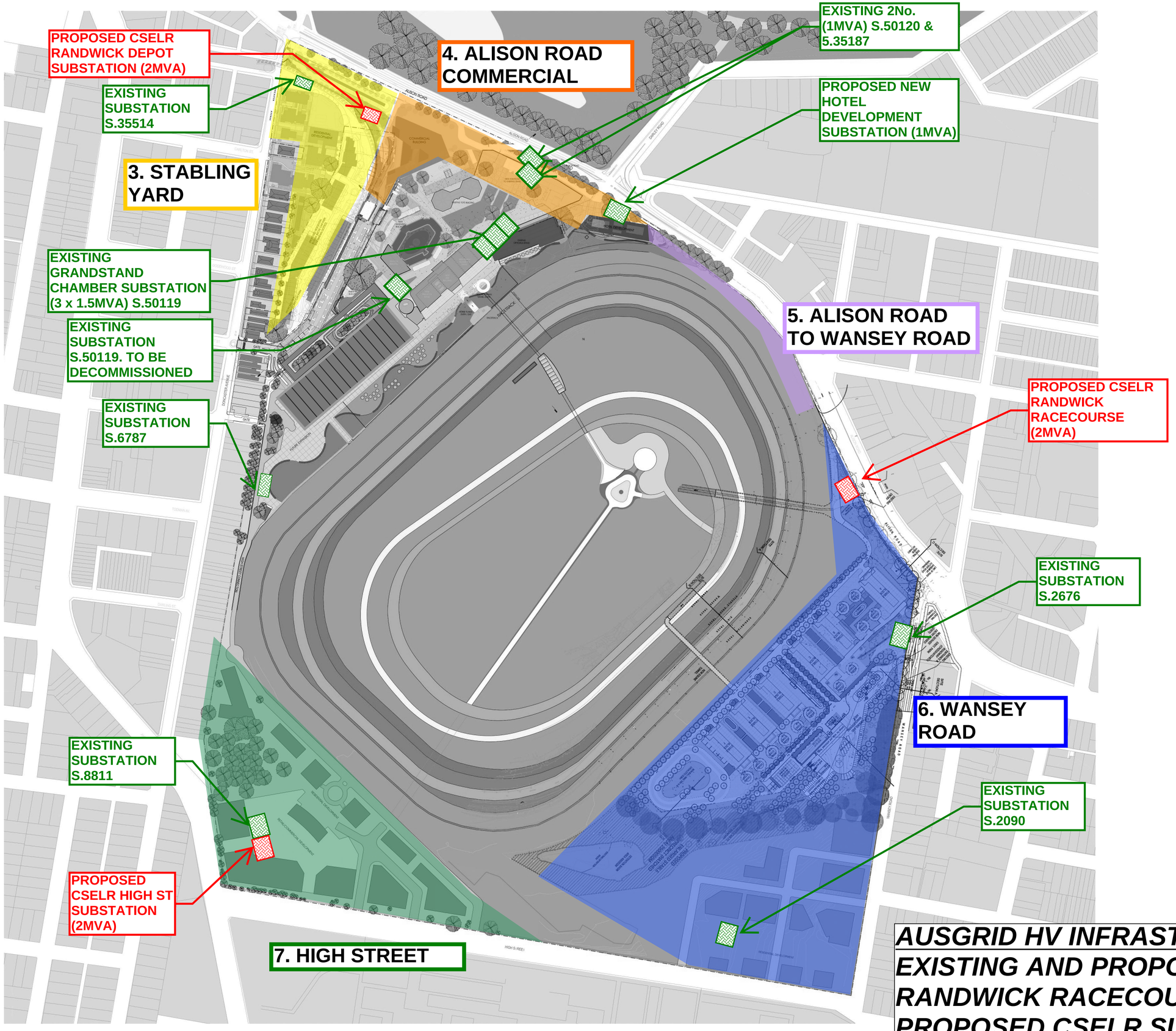
2. GENERAL



RRR PRINCIPAL INFRASTRUCTURE ROUTES

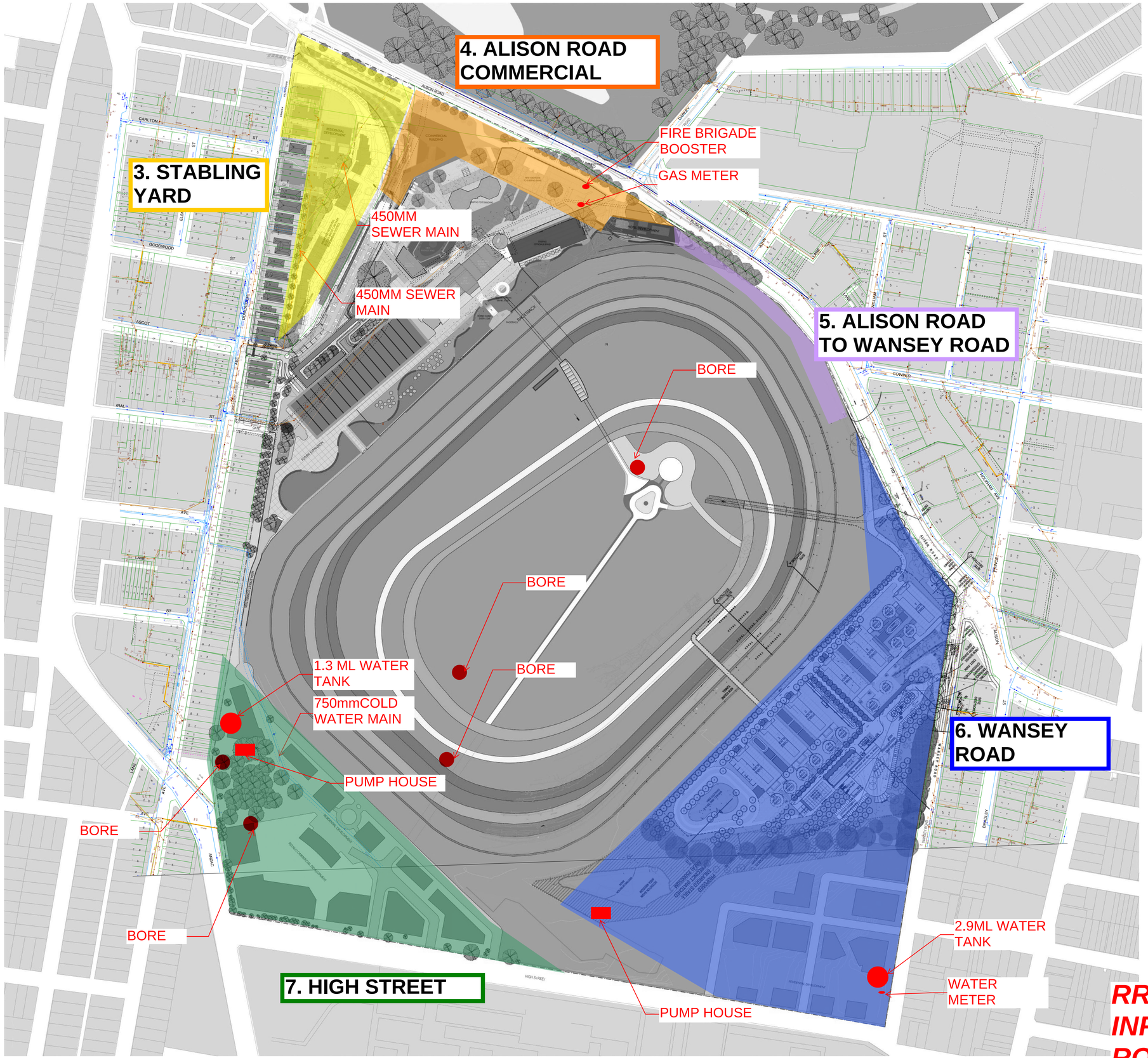
8 Appendix B – Electrical and Comms Principal Infrastructure Layouts

2. GENERAL



AUSGRID HV INFRASTRUCTURE EXISTING AND PROPOSED ROYAL RANDWICK RACECOURSE AND PROPOSED CSELR SUBSTATION LAYOUT

2. GENERAL



RRR PRINCIPAL INFRASTRUCTURE ROUTES LAYOUT

8 Appendix C – Royal Randwick Racecourse Future Loads

ROYAL RANDICK RACECOURSE – FUTURE DEVELOPMENT LOAD REQUIREMENTS				
Stage	**Programme**	**Load Centre**	**Est. Load (VA)**	**Comments**
1	TBC	Adina Randwick Hotel	680	Ausgrid have informed that a new feeder will be required.
2	TBC	Horse Stabling Complex	500	Stabling Complex consisting of 6 barns (1570m^2 each), naturally ventilated, with two small offices and sleeping quarters each.
3	TBC	Track Lighting	4,250	2,279 light fittings on 88 poles for after dark events.
4	TBC	Car Park	200	Decked Car Park
5	TBC	Office Space	1,570	Centre of Excellence (20,000m^2) / Fitness Centre (3,500^2)
6	TBC	Exhibition Space	1,100	Convention / Exhibition centre with over 10,000m^2 of exhibition space.
7	TBC	Upper High St UAP	7,500	Retail / Residential (2,000m^2 / 138,000m^2)
8	TBC	Lower High St UAP	7,500	Commercial / Residential (60,000m^2 / 80,000m^2)
9	TBC	SWAB Building	TBC	
10	TBC	New Entry and Track Crossover	TBC	
11	TBC	Tram Stable Development	TBC	500 Apartments and Car Parking

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CSELR – ATC Randwick

Landscape EIS Review

city making + livability

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Zone 01 - Stabling Yard

1. Description of issues and commentary

a) The Royal Randwick Racecourse (RRR) is both a gateway landmark site and a significant destination for local, national and international guests, noting as critical the site's "landmark presence as a major gateway to Randwick City" (P7 Royal Randwick Racecourse Development Control Plan (RRRDCP 2013)) is retained and upheld. The proposed stabling yards on Alison Road will have an adverse impact on the site's significance and its contribution to the readability of the area, compromising. Proposed works need to be consistent with the categorisation of landmark and gateway.

b) There will be significant loss of plantings to the stabling yard zone (refer Fig 1, site photos of existing Ficus Macrophylla).

c) There will be a significant impact of the Alison Road frontage (approximately 135m in length) which is a key frontage on the approach to the main race course entrance.

d) Loss of plantings will have a high degree of adverse impact on the site's:
   i. Amenity
   ii. Landscape and heritage values
   iii. Visual impact (from all facilities within the Spectator area)
   iv. Habitat
   v. Climatic attributes (sun, shade, shelter etc).

e) Removal of these plantings is in conflict with the proposed "Park" theme of the Anzac Parade and Alison Road section of the proposed track.

f) Trees proposed to be removed within this zone are classified in the Randwick Comprehensive Development Control Plan 2013 as of "exceptional significance". Refer map 4, tree group 12 of the RRRDCP 2013. Also, refer the Royal Randwick Racecourse Conservation Management Plan and the LEP 2012.

g) It is noted within the EIS (see Vol 1B Chap 15.7.5) "The loss of trees of 'exceptional significance' (RRRDCP 2013), would result in a substantial loss of a treed internal streetscape and the visual connection to the landscape of the Racecourse would be lost on this site."

h) "The Randwick stabling facility site would be configured so as to retain the large Moreton Bay Fig at the western end of the site". (Chapter 15 Vol A-P66). However there are numerous large figs within this area and none are shown to be retained in Figure 5.50 Randwick stabling facility - indicative layout (Chapter 5 Vol B-P70)

2. Proposed solution or response

a) Due to the State Significance of the Royal Randwick Racecourse and the importance of both the arrival sequence and experience of its guests or dignitaries, any remedial landscape works must be to the highest quality to reflect the vision and values of both the Royal Randwick Racecourse and that of the Randwick Local Government Area (LGA).
b) Future detailed design works will need to be undertaken to ascertain the extent and scope of work required to mitigate the impact of the stabling yards.
c) Without understanding the full scope of future works, a RRR Landscape Design Guidelines and palette of elements needs to be prepared to guide the replacement or amelioration of affected landscape areas, or which can guide works at the interface or that may require future screening.
d) It is intended that the proposed Design Guidelines including palette of materials will both define a landscape character that is unique to the RRR and at the same time relate strongly to the adjacent Centennial Park and the current proposed material palette defined by Randwick Council.
e) Trees of significance, as outlined in the RRRDCP 2013 (as illustrated in Figure 1), shall be transplanted (to agreed locations) to reuse a valuable asset and create an immediate landscape presence, embracing the parkway theme of this portion of LRT line and retaining the heritage and habitat values, embracing sustainability principles.
f) Any stabling facilities and associated elements such as sub stations must be harmoniously integrated into the future proposed landscape and located outside of primary viewing lines, preferably underground and definitely underground on Alison Road frontage.

Zone 02 - RRR stop

1. Description of issues or comment

a) The proposed RRR stop will have "a high adverse landscape impact" (see Vol 1B 15.7.5) to the RRR main entry, during and post construction.
b) The LRT stop will have a high degree of adverse impact on:
    i. Existing pedestrian accessibility - Re-grading and reconfiguration of paths and ramps will be required (refer DRG No: CSELR-00SE-UD-D-3780)

ii. Pedestrian access from the LRT stops to the RRR facilities (larger number of patrons arriving at once will require wider paths and facilities)
iii. Existing landscape surfaces, finishes, plantings, signage, lighting, fencing, entry gates/walling (noted as having "exceptional significance" RRRDCP 2013, Map 3) and shelters may need to be replaced or reconfigured.

2. Proposed solution or response

c) See proposed solution, Zone 01, points (a)-(d)
d) Any proposed structures, platforms and light rail facilities associated with the RRR stop be designed in a fashion to complement the proposed material palette as nominated in this document.
e) Relocate significant trees from areas to Alison Road frontage.
f) Upgrading and mitigating the impact of landscape elements as described in Zone 02, point (b), items i-iii.

Zone 03 Alison Road Boundary

1. Description of issues and commentary

a) There will be significant loss of plantings to the Alison Road Zone (refer Appendix 1, Fig 3) (Refer chapter 15, Vol A-P63, Figure 15.21a Randwick Precinct (North) – Impacts to planted trees)
b) Chapter 15, Table 15.26 Randwick Precinct – Assessment of landscape impacts states "The perimeter of the racecourse along Alison Road and Wansey Road would be used for construction of the light rail track, necessitating the removal of approximately 85 trees along Alison Road (from Doncaster Avenue to Wansey Road) and a number of trees fronting Wansey Road". This will have a significant impact on RRR and significant future thought, design and planning will be needed to address this impact and to protect the values of the area and site.
c) Loss of plantings will have a high degree of adverse impact on the:
    i. Amenity
    ii. Landscape and heritage values
    iii. Visual impact (from the main grandstand and Alison Road)
    iv. Habitat
    v. Climatic attributes (sun, shade, shelter etc)
    vi. Acoustic
d) Mitigation measures as nominated in section 15.6.3 Mitigation Measures propose a number of species to replace existing trees. In the context of

urban and landscape issues this must be decided in conjunction with the ATC and Randwick Council. Any replacement tree must be approved by the ATC with the intent to select species suitable to its setting and function so as not to interfere with the adjacent race track and to amplify the nature of the setting.

e) Chapter 15, Table 15.24 "Randwick Precinct – Assessment of landscape impacts", nominates that "trees would be replaced in accordance with the Transport for NSW 'Vegetation Offset Guide' (2013d) in nearby suitable locations." This should be based on prior approval from the ATC to ensure compliance with (d).

2. Proposed solution or response

a) See proposed solution, Zone 01, points (a)-(d)
b) Any replacement tree along the Alison Road frontage (as with any on or adjoining the RRR) must be approved by the ATC, with the intent to select a species suitable so as not to interfere with the adjacent race track.
c) Visual, security and acoustic considerations will need to be designed and developed to mitigate the landscape impact to the Alison Road Zone / frontage and to enhance the character and nature of the site.

Zone 04 Wansey Road stop

1. Description of issues and commentary

a) The proposed Wansey Road stop will require "the trees along the western side [would need] to be removed prior to construction" (see Vol 1B Chap 5 p42). Refer Figure 3 of appendix 1.
b) Trees proposed to be removed within this zone are classified in the Randwick Comprehensive Development Control Plan 2013 as of "exceptional significance". Refer map 4, tree group 59 of the RRRDCP 2013. Refer Randwick City councils Register of Significant Trees (2007). Also, refer the Royal Randwick Racecourse Conservation Plan.
c) The removal of the significant trees along the western edge of Wansey Road will significantly impact the site. They currently provide a green backdrop to the Racecourse as viewed from the spectator precinct.
d) "Port Jackson and Morton Bay Figs at Royal Randwick Racecourse on Alison Road, the George Dan Reserve and Wansey Roads, create an avenue of planting which is identified on Randwick City Council's (2007) Register of Significant Trees and is considered to be of regional sensitivity. The Figs contribute to the significance of the Racecourse as a

landscape element and provide amenity to the adjoining streets." (Chapter 15-P68). Removal of these trees will have an adverse impact on the RRR.

e) Loss of significant trees will have a high degree of adverse impact on the:
    i. Amenity
    ii. Landscape and heritage values
    iii. Visual impact (from all facilities within the Spectator area)
    iv. Habitat
    v. Climatic attributes (sun, shade, shelter etc)

f) "During operation there would be open views to the racecourse, but due to width restrictions there would not be any trees provided along Alison Road or Wansey Road reserve to replace those removed" (see Table 15.24 Randwick Precinct – Assessment of landscape impacts 15-71). This conflicts with other statements about replacement trees.

g) The proposed Wansey Road stop cross section as illustrated in Figure 5.29 " (see Vol 1B Chap 15 p42) shows an over-hanging cycle way, supported by a retaining wall, that "would have a maximum height of approximately 4.5 metres, with an average height of approximately 3.5 metres. The retaining wall would span approximately 125 metres". A structure of such size would have a significant visual impact as the backdrop to the race course and would be seen by tens of thousands of guests from the main stand. (see Vol 1B Chap 5 p62). Significant consideration would be required for the structure and its screening to create an acceptable backdrop to this view.

2. Proposed solution or response

a) See proposed solution, Zone 01, points (a)-(e)

b) Property boundary lines are absent from the drawings so it is impossible to ascertain the direct impact on RRR land. These will need to be defined so as to understand the immediate impact.

c) The proposed design (both retaining walls and tree removal) needs significant development in the context of the above comments and the proposed materials palette.

d) TFNSW should consider the planting zone within the new retaining walls to relocate existing Figs.

Zone 05 UNSW High Street stop

1. Description of issues and commentary

a) The UNSW High Street stop will have a high visual and landscape impact. Elevated above the racecourse it will be visible from most areas of the RRR. Furthermore, removal of existing trees will amplify its

impact. As noted in point (f) in the description of issues of zone four – these trees will not be replaced. They MUST BE replaced to mitigate the adverse impacts.

b) See description of issues and commentary, Zone 04 Wansey Road stop, comments b-f.

2. Proposed solution or response

a) See proposed solution, Zone 01, points (a)-(e)

b) See proposed solution, Zone 04, points (c)

Appendix

Appendix 1 - Figures

Figure 1 - Existing Ficus Macrophylla proposed to be removed within stabling yards

Figure 2 - RRR stop loction and RRR entry

Figure 3 - Alison Road Stop. All trees are proposed to be removed to the left (southern side of the Road).
Figure 15.21a Randwick Precinct (North) – Impacts to planted trees

Figure 4 - Wansey Road Stop. All trees are proposed to be removed to the left (western side of the Road).
Refer EIS Figure 15.21b Randwick Precinct (South) – Impacts to planted trees

Figure 5 - Zone 05 UNSW High Street stop - Wansey Road looking north

REALM studios

Royal Randwick Racecourse
Public Realm Materiality & Character Study

Issue B - 17th December 2013

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Contents

EIS IMPACT REVIEW- WOODS BAGOT - 10.12.13

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Zones

Four relevent zones (2-5) are identified by Woods Bagot in their review of the Sydney Light Rail Environmental Impact Statement (EIS) in relation to the Royal Randwick Racecourse managed by the Australian Turf Club (ATC).

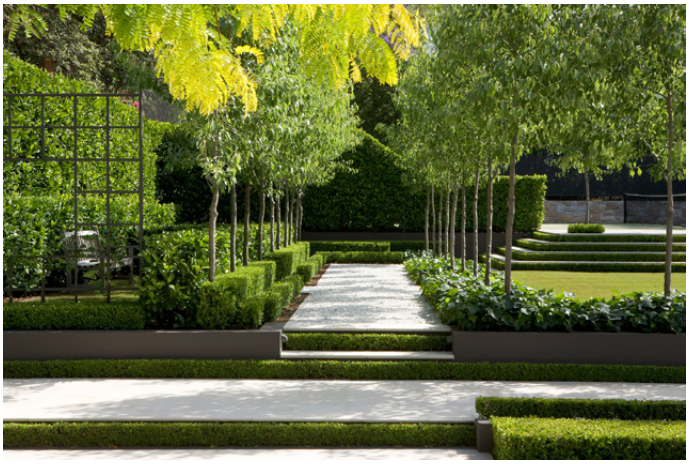
This document explores at a high-level the Design Guidelines for potential public realm character and material treatments (hardscape & softscape) associated with zones impacted upon by the proposed light rail and stations.

Objectives

Of focus is desire for the ATC to achieve:

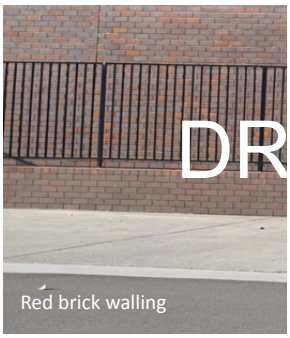
- strengthening of a gateway landmark site
- a consistency of treatment in keeping with the Royal Randwick brand between internal and external areas. The brand can be described as:
    - sophisticated / elegant
    - formal / refined
    - rich / manicured
- a clear heirarchy and way-showing strategy
- control over key views and visual buffering
- replacement of significant plantings removed for the LRT
- reuse of existing trees through transplantation
- retain heritage and habitat values embracing sustainability principles

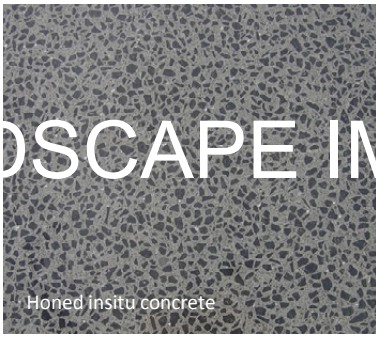

Formally inspired design



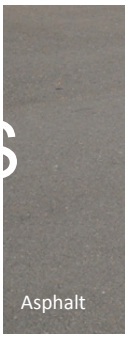
Zone Two: RRR Stop

HARDSCAPE

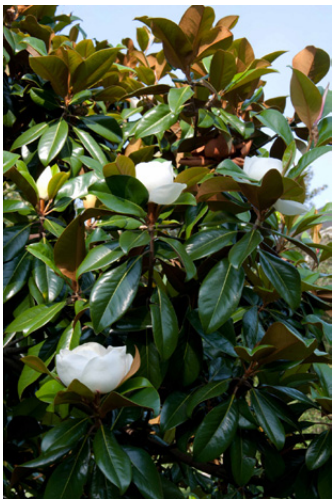

Red brick walling


Honed insitu concrete

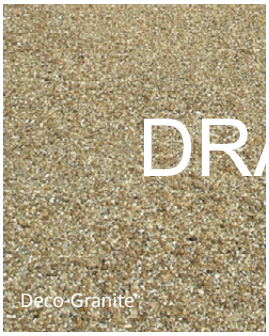

Granite cobbles


Asphalt

SOFTSCAPE



DRAFT HARDSCAPE IMAGES


Deco-Granite


Black steel barrier


Black steel balustrade


Black steel security fencing


















Zone Three: Alison Road Boundary

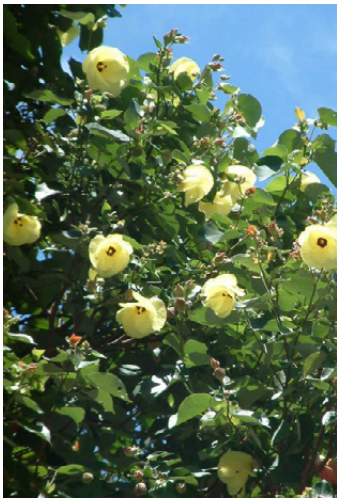
HARDSCAPE


Black steel security fencing


Brushed concrete pavements


Asphalt

SOFTSCAPE



Sandstone Retaining Wall

Zone Four & Five: Wansey Road & UNSW High Street Stops

HARDSCAPE


Black steel security fencing


Sandstone pavements


Asphalt

SOFTSCAPE

Brushed concrete pavements

Sandstone Retaining Wall

RobertBirdGroup

Civil & Structural Engineering Review Report, of

CBD and South East Light Rail (CSELR) Project
Environmental Impact Statement (EIS)

Issue: C

Prepared For: Australian Turf Club

Project No.: 13895

19th December 2013

Document No.: 13895 – RBG – ATC - 001

bsi. ISO 9001 Quality Management

Report Amendment Register

Issue	Section & Page No.	Issue/Amendment	Author/ Initials		Project Engineer	Reviewer/ Initials		Date
A	N/A	Initial Issue	RL		Ross Lucas		CP	06.12.13
B	Section 2.0	2nd Issue	RL		Ross Lucas		CP	12.12.13
C	N/A	3rd Issue	RL		Ross Lucas		CP	19.12.13

ISSUE ACCEPTED BY:

AUTHOR:

.....

Ross Lucas
Signing for and on behalf of
Robert Bird Group Pty Ltd
Date: 19th December 2013

REVIEWER:

.....

Chris Potter
Signing for and on behalf of
Robert Bird Group Pty Ltd
Date: 19th December 2013

Table of Contents

1.0 Introduction

1.1 Report scope

Robert Bird Group Pty Ltd (RBG) have been engaged by Australian Turf Club (ATC) to conduct a civil and structural engineering review of the Environmental Impact Statement (EIS) which was publicly exhibited by Transport NSW for the CBD and South East Light Rail (CSELR) project on 12 December 2013.

This report summarises the RBG civil and structural engineering review of the EIS. The review focuses on impacts, considerations, and opportunities of the CSELR project as it pertains to the ATC Royal Randwick Racecourse (RRR), adjoining ATC property, and associated property, infrastructure, and servicing.

The following report will provide advice in the form of a general review of the proposed light rail scheme, including comments on the civil and structural aspects relevant to, or affecting, ATC property or operations; and

1.2 References

The following documents were referenced in this review:

- CBD and South East Light Rail Project Environmental Impact Statement – Volumes 1-6, dated November 2013;
- Light Rail – ATC Information Briefing.
- Randwick UAP Council Briefing Presentation, Department of Planning.
- RRR plans and surveys as provided by ATC.

1.3 Abbreviations

ATC	Australian Turf Club
CSELR	CBD and South East Light Rail
EIS	Environmental Impact Statement
LRV	Light Rail Vehicle
RBG	Robert Bird Group
RRR	Royal Randwick Racecourse
TfNSW	Transport New South Wales
UAP	Urban Activation Precinct

1.4 CSELR Project Description

The CSELR proposal comprises construction and operation of a light rail service from Circular Quay to Kingsford and Randwick via Surry Hills. A summary of the CSELR project is contained within the EIS.

The CSELR as it relates to the ATC is broadly categorised into the following CSELR elements:

- Randwick Line, including
    - o Alison Road track alignment;
    - o Wansey Road track alignment;
    - o UNSW High Street Stop;
    - o Royal Randwick Racecourse Stop; and,
    - o Wansey Road Stop;
- Randwick LRV stabling facility.

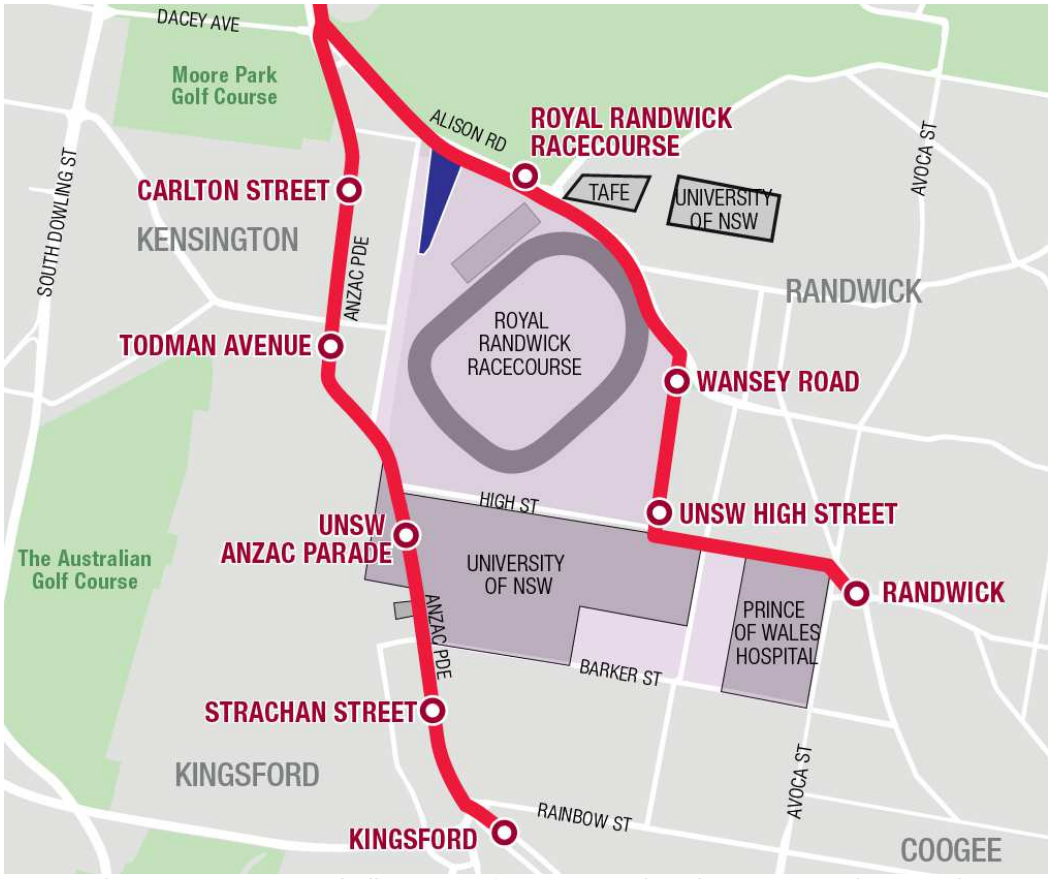


Figure 1.1 - Proposed alignment of CSELR Project (source EIS Figure 1.2)

2.0 Review of CSELR Environmental Impact Statement

2.1 Wansey Road Alignment, Wansey Stop

a) Description of Issue

EIS Section 6.26 notes that gabion or crib walls may be adopted for proposed retaining walls along Alison and Wansey Road. Elsewhere in the EIS (i.e. Table 15.21), the retaining solution is referred to as piled.

Comment

EIS is contradictory on the proposed retaining solution. It is understood that the engineered solution is to be the piled and reinforced concrete retaining wall (as illustrated in Figure 5.48 of the EIS.

Gabions and crib walls typically have greater land-take. Also these retaining structures are not appropriate for suspending a shared path. Final solution to be engineered to allow heavy vehicle crossings for existing and future developments, complete without amendment to the retaining structures. In addition all retaining structures need to be treated with an architectural finish and landscaped solution which requires minimal maintenance by TfNSW.

b) Description of Issue

EIS Section 5.6.2 details a suspended shared path over ATC land. The path is suspended off a new concrete retaining wall founded on piles. Wansey Road existing retaining wall to be replaced. Approximately 125m in length up to 4.5m in height. The retaining wall requires land acquisition from ATC.

Comment

Construction of the retaining wall will likely impact RRR to enable construction of the piled footing (loss of trees and piling rig access), and maintenance of the suspended path will likely require an easement inside RRR for inspection and maintenance access. The easement must not impact current ATC operations and must cater for the proposed UAP development including basement structure to be constructed without interfering with the High Street and Wansey Road stops.

Treatment of the retaining wall to be confirmed, and considered in relation to the amenity of the future stables development.

A fence providing screening of Royal Randwick Racecourse (RRR) is required from the suspended path to horse training and stabling areas.

RRR vehicle clearances from suspended path to be considered. A vehicle exclusion zone is likely to be required to prevent impacts on the structure. This may impact RRR circulation.

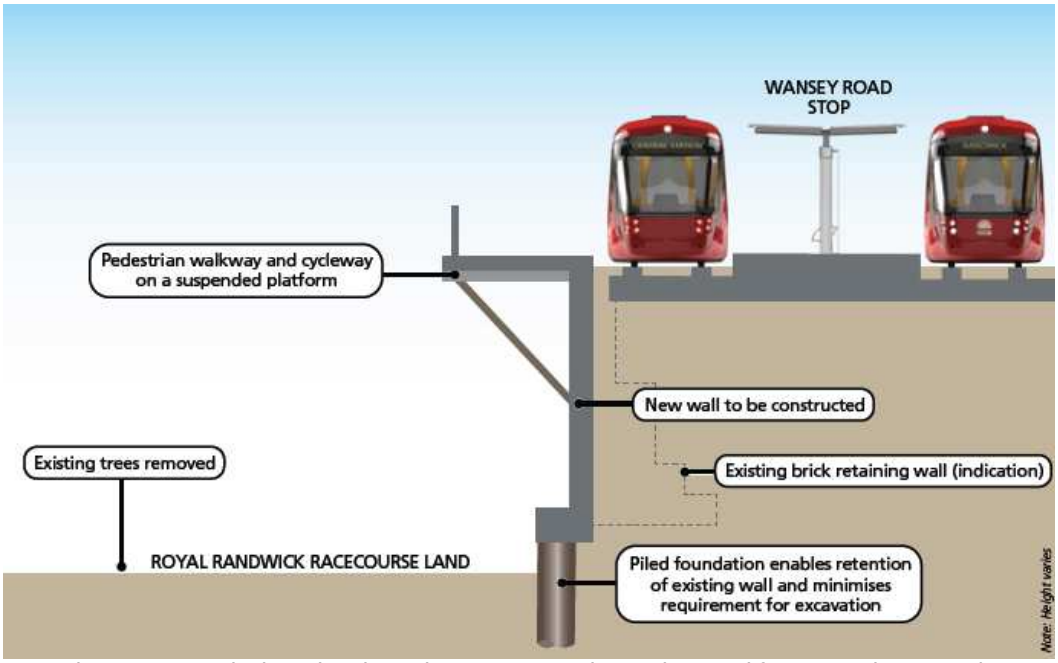


Figure 2.1 - Typical section through Wansey Road Stop (sourced from EIS Figure 10.5).

c) <u>Description of Issue</u>

EIS Appendix J, section O.17 identifies a mitigation measure, proposed to reduce construction impacts at High Cross Park, which is to locate a satellite construction compound in the vicinity of Wansey Road Stop. This may impact ATC access and ATC preparation areas.

Comment

Subject to the compound extents, this may not impact ATC other than as will already be impacted as part of land acquisition; however the compound must not cut off access. It is unclear how the compound would be configured and what ATC areas will be used, TfNSW to clarify nil impact to ATC operations.

d) <u>Description of Issue</u>

EIS Table 6.1. Table describes early works activities, including:

- Demolition Works (where required for Early Works)
- Implementation of road configuration changes identified in the early works package.
- Undertaking long lead time utility relocation and modification works.
- Early light rail works, such as preparation works for the track slab construction.

Early Works activities may include works that impact on RRR, i.e. loss of access, demolition of ATC buildings and reservoir, and construction access for piling rigs along Wansey Road.

Comment

Impacts on ATC as part of Early Works may trigger an early requirement to relocate existing stabling and other facilities (earlier than Main Works activities). Identify extent of Early Works that impact on RRR.

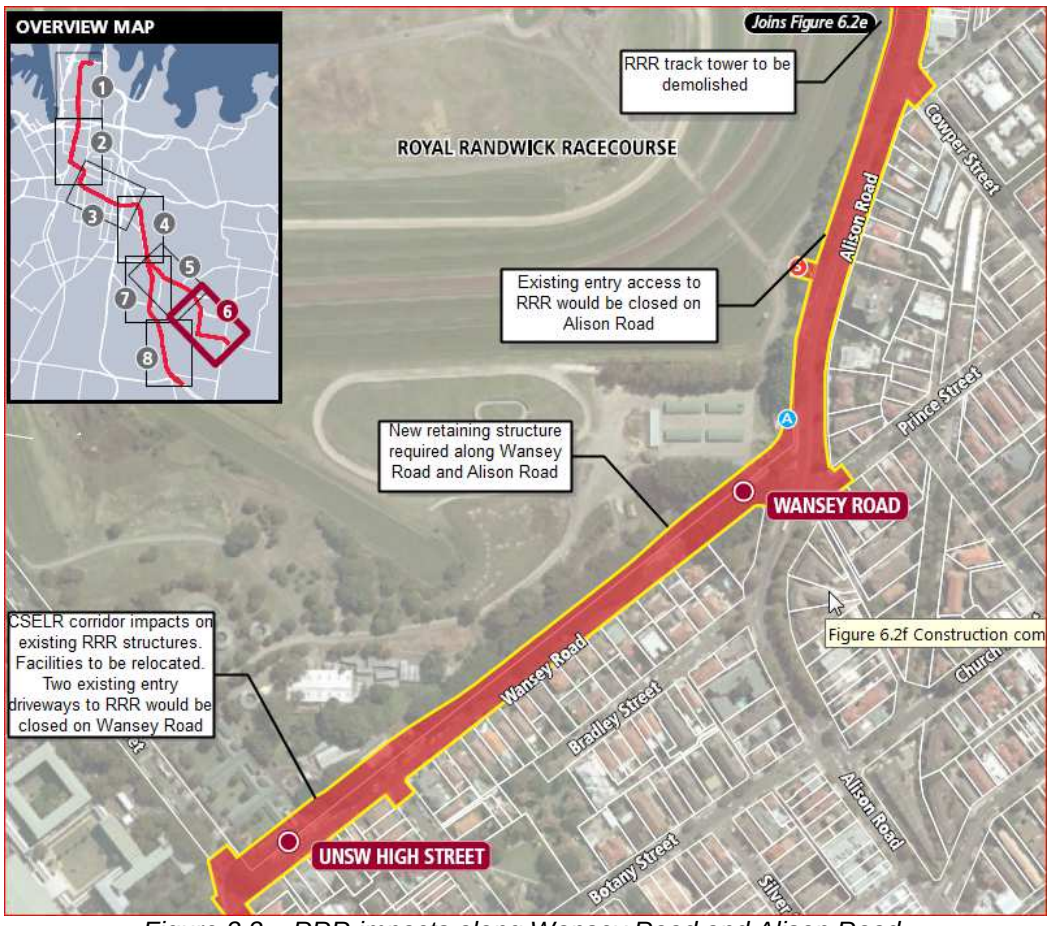


Figure 2.2 – RRR impacts along Wansey Road and Alison Road.

2.2 Alison Road Alignment and Royal Randwick Racecourse Stop

e) Description of Issue

Substation proposed to be sited on ATC lands requiring land acquisition. Development constraints may exist around the substation.

Comment

Confirm with TfNSW the specific development constraints that will exist around substations. There may be constraints that exist outside the land acquisition footprint. These constraints to be reviewed against proposed developments to ensure no impact to ATC.

f) Description of Issue

Alignment will impact a stewards tower adjacent to the track.

Comment

It appears steward's tower will require relocation. This has not been considered as part of current TfNSW documents. Should the steward's tower on ATC land adjacent to Alison road require relocation, detailed assessment with Racing NSW and relevant racing stewards is required.

g) Description of Issue

Existing access to the racecourse along Alison Road will be restricted by CSELR.

Comment

Consider providing new access to RRR at proposed signalised intersection of Alison Road and Wansey Road. Significant grade separation at this point, however this may mitigate access

restriction issues associated with normal racecourse operations, and also enable access for the future stables development (albeit with a redesigned stables Masterplan).
Civil design required for signalised intersection to Alison Road main entry. Redesign of entry gates, footings, walls etc to be designed and reconstructed by TfNSW.

h) Description of Issue

Significant trees lost along Wansey and Alison Road frontages providing screening, potentially providing wind mitigation on to track and surrounding facilities, loss of shade to stabling and training facilities.

Comment

Consider impact of removal of trees to RRR.

i) Description of Issue

The alignment of the CSELR in the vicinity of the RRR Stop passes very close to the existing ATC Administration Building. The proposed alignment requires demolition of the existing brick wall outside the Alison Road frontage of the building, removal of trees, and impacts on an awning and services.

Comment

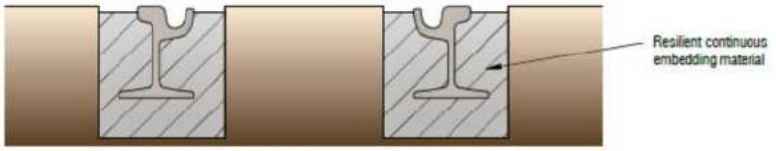
Other than the impacts noted above, with the alignment passing a few metres from the building, consideration should also be given to

- Vibration impacts on the existing structure and occupants.
- Noise impacts on occupants.
- Pedestrian safety for occupants exiting the building with the rail passing close to the front door.

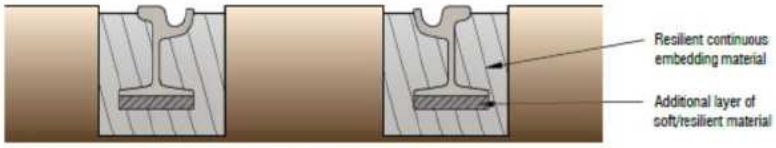
The use of noise/vibration attenuating trackform should be considered in this area and any areas adjacent to buildings or stables should be utilised to minimise impacts.

EIS Technical Paper 11 – Part A, page 18, notes that noise catchment area NCA05.2 as being a minimum distance of 4m to nearest receptor building façade. Preliminary CSELR alignments would indicate that the CSELR is closer than 4m to the ATC administration building.
Technical Paper 11 notes the use of high-resilience trackform to mitigate impacts of ground-bourne noise on sensitive receptors. The extracts below from the EIS nominate the proposed trackform options to reduce noise (and potentially vibration) effects on receptors. The Alison Road alignment, including the ATC administration building frontage, is noted as being Standard Trackform. Consideration has been given to the future hotel within the RRR, however consideration should be given to provided noise and vibration attenuating trackform in front of the ATC administration building, and other potentially sensitive receptor areas on the RRR boundary, including existing and future horse stabling.

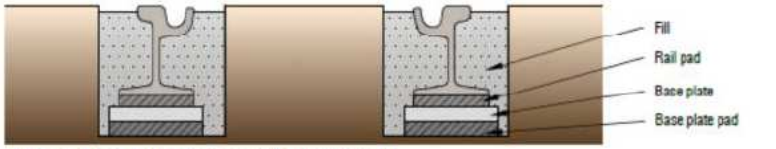
Figure 14 Indicative Embedded Rail Trackforms



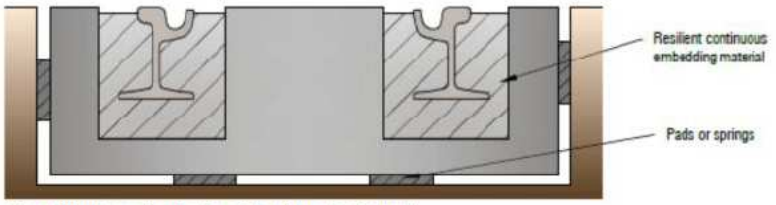
Continuously supported embedded rail



High-resilience continuously supported embedded rail



High-resilience discretely supported embedded rail



Very high attenuation floating slab with embedded rail

Table 21 Trackform Extents

Trackform Type	Locations and Comments
Standard	Standard trackform would be employed at locations where there are no particularly sensitive receptors, and through the majority of the pedestrianised zone along George Street where speeds would be low. Locations for standard trackform are: • Alfred St at Circular Quay • Between Bathurst Street and the Wynyard Stop • Eddy Avenue at Central Station • Moore Park (South Dowling Street to Robertson Road) • Alison Road to Wansey Road Stop, except adjacent to the new hotel proposed at Royal Randwick Racecourse
High-resilience	High-resilience trackform would be required throughout the majority of the proposal area where sensitive receptors line the route. This trackform would control ground-borne noise impacts on receptors where the facade provides a high level of attenuation to airborne noise, meaning ground-borne noise is more likely to be noticeable. The high density of receptors particularly throughout Surry Hills and the City Centre means that while ground-borne noise may be masked in the front rooms of buildings, it may be noticeable in rooms set back from the facades. High-resilience trackform would be used at all locations except those identified for standard trackform above, and possible locations where very high attenuation may be required (subject to detailed design investigations).
Very high attenuation	Very high attenuation track is not likely to be required for ground-borne noise control with the possible exception of locations near theatres or recording studios. Very high attenuation track may be required for vibration attenuation at some locations, for example adjacent to the Randwick hospital precinct (see **Section 0**)

Figure 2.3 – Proposed CSELR trackform type and extents (extract from EIS).

2.3 Randwick Stabling Facility

j) Description of Issue

EIS Chapter 19, Climate Change Risk Assessment item 3b notes that climate change causes increased frequency and severity of storm events. The EIS notes that the Randwick Stabling site is inundated in a 1 in 5 year event up to 200mm, and all events beyond this. EIS notes that 15% should be added to rainfall intensities to account for climate change. However, the capacity of the existing network is insufficient to flood protect the system to CSELR criteria. EIS does not propose a solution to this issue. CSELR stabling yard to be located in flood prone land. Construction of the LRB stables in this flood prone land may exacerbate flooding issues elsewhere. CSELR does not propose a solution to flood protecting the stabling yard. There may be an impact on RRR subject to the proposed solution.

Comment

EIS notes upgrading the downstream drainage network is noted as potential solution. This may be too large and costly solution for TfNSW. Construction of stabling yards, and filling site for flood protection, in what appears to be flood backwaters, may cause flood impacts elsewhere. EIS notes detention as option. This is likely to be a significant volume (to replace lost flood storage volume) and there may be issues getting a hydraulic solution that does not involve pumping.

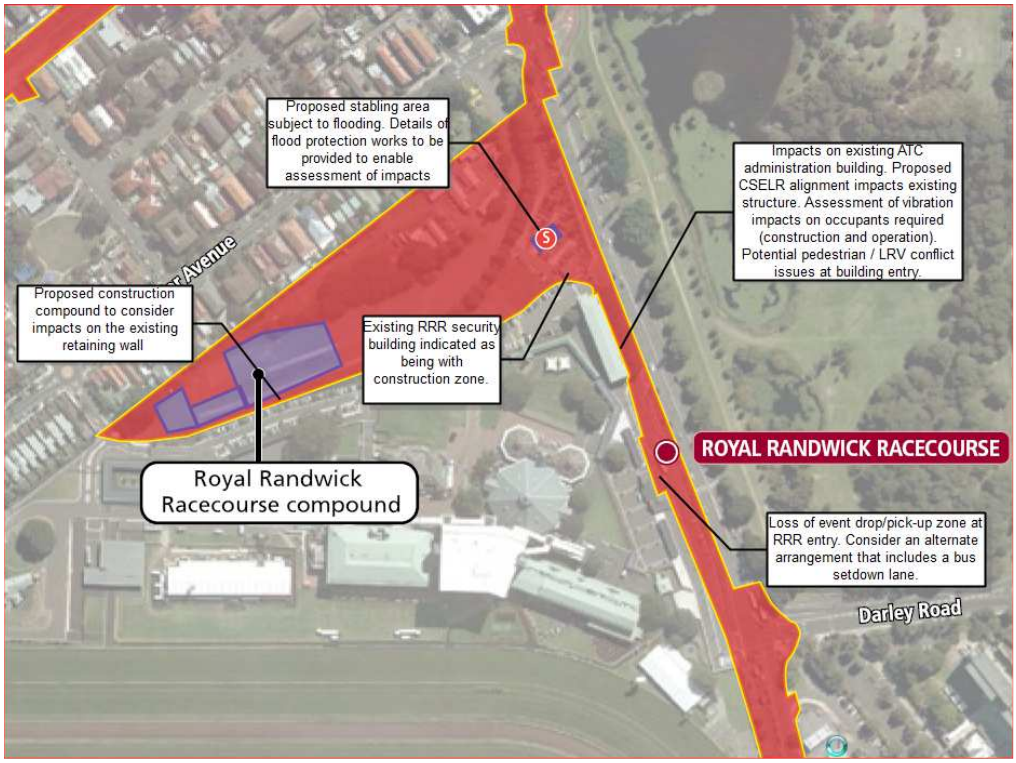


Figure 2.4 – RRR impacts at Stabling Yard and RRR Stop.

k) Description of Issue

The EIS notes that a 6m noise wall will be constructed between the residential properties and the proposed stabling yard. .

Comment

EIS focused on impacts to the existing residential properties. Limited discussion or assessment on impacts to the RRR facilities (i.e. administration building, guard hut, event buildings/facilities).

- Consider visual amenity of a 6m noise wall along the boundary.
- Consider light pollution from flood lighting the stabling facility.

l) Description of Issue

EIS notes high groundwater in proposed Royal Randwick stabling site. Proposes measures to protect aquifer from contamination. Mitigation measures not described within the EIS.

Comment

Consider impact and possible mitigation measures to protect aquifer against contamination during construction. Noting also that site is subject to flooding.

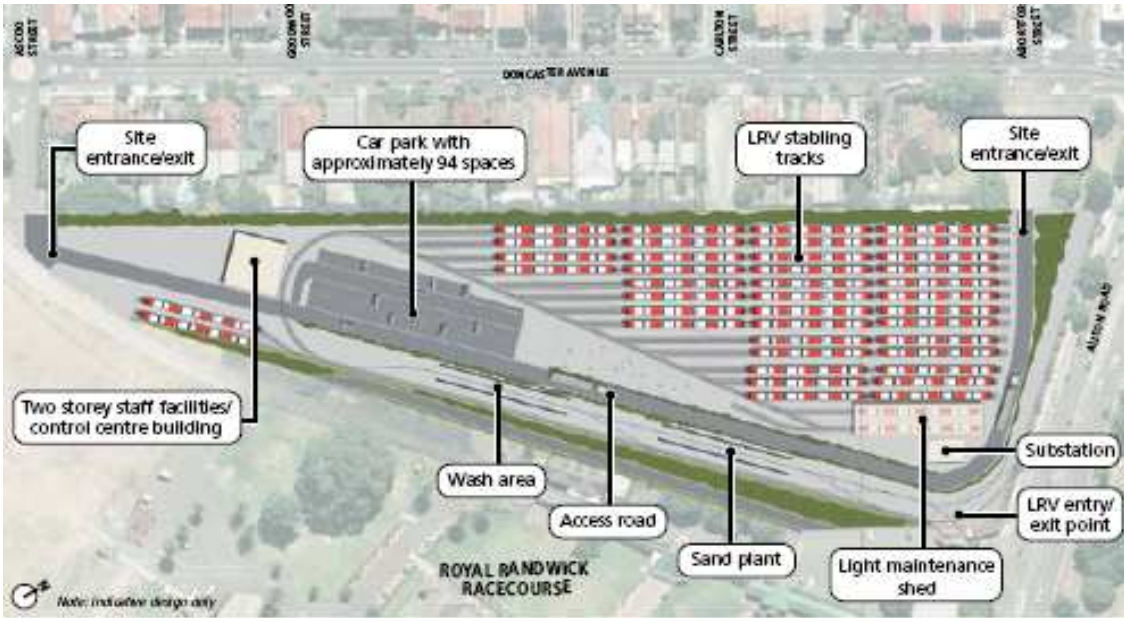


Figure 2.5 – Proposed stabling yard facility with RRR.

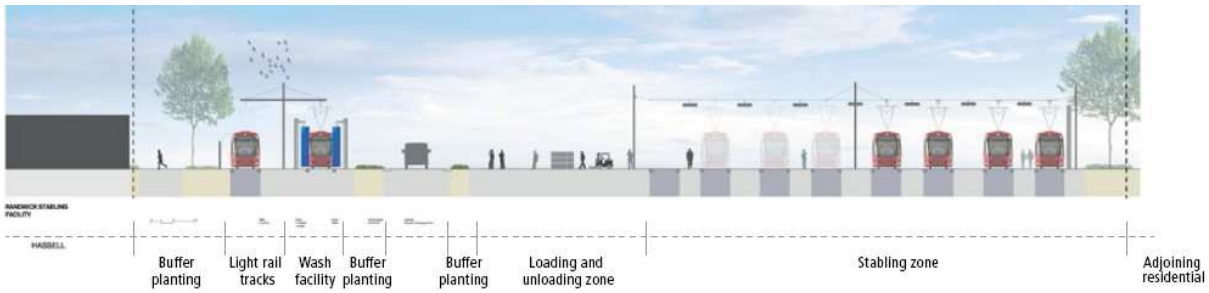


Figure 2.5 – Typical section through proposed stabling yard within RRR.

2.4 General Impacts / Other Issues

m) Description of Issue

The CSELR proposal may constrain access and servicing to future UAP sites within ATC lands and impact development potential. Current UAP built form densities/heights are indicated in Figure 2.7 below.

Comments

- Civil and structural design and construction of the light rail must allow for heavy vehicle crossovers at all existing entrances and exits.
- Civil and structural design and construction of the light rail must allow for heavy vehicle crossovers to approved developments and future urban activation precincts (UAP).
- The engineering of the track and all associated retaining structures must be engineered and co-ordinated with authorities to cater for services penetrations, existing and future provisions.

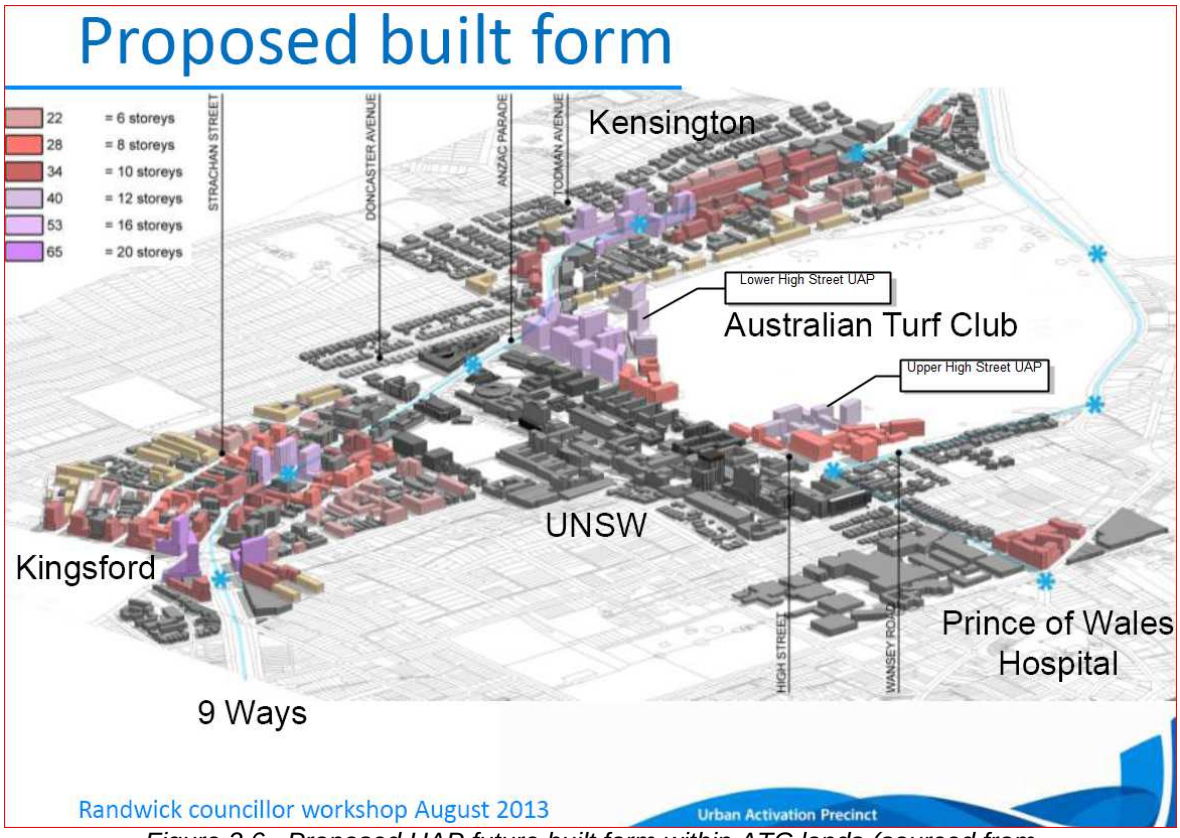


Figure 2.6 –Proposed UAP future built form within ATC lands (sourced from http://www.planning.nsw.gov.au).

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