Proposed Parking Facility
1165 Barrenjoey Road, Palm Beach

Stage 3 Design Road Safety Audit Report

Prepared for: Mr John Oliver

September 2019

Report No: PT19058r01_V1

TABLE OF CONTENTS

List of Figures

List of Tables

1. Introduction

This report presents findings of a Stage 3 Final Design Road Safety Audit of design drawings for the proposed parking elevated deck / barrier wall structure to serve the existing residential dwelling at the site known as 1165 Barrenjoey Road, Palm Beach. The detailed design drawings have been prepared by Peter Princi Architects.

The preparation of this report has been based on both a detailed assessment of the final engineering design plans prepared for construction and an on – site inspection. A photographic record of the site inspection is presented in Appendix A of this report.

The need for the Road Safety Audit has been requested by the Roads and Maritime Services in their letter dated 5 September 2019. A copy of this letter is provided in Appendix B of this report.

The aim of the audit is to independently examine the road design drawings and identify potential risks to public safety as a result of the proposed construction and therefore reduce the likelihood of accidents on and around the road precinct. The audit will attempt to identify any associated road safety hazards, for all road users, and offer recommendations for corrective actions.

2. Site Location

The following presents a summary of existing site and a historical review of the immediate road environment.

2.1 Site Location

The existing site includes a single dwelling property which is positioned below the pavement level of Barrenjoey Road. Access to the dwelling is via a number of stairs. The existing site is shown in Figure 1.

Figure 1 - Site Location

Source: Google maps

The site is located on an existing bend in Barrenjoey Road.

2.2 Classification Criteria

It is usual to classify roads according to a road hierarchy in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil and the volume of traffic they should appropriately carry. The RTA has set down the following guidelines for the functional classification of roads.

- Arterial Road – typically a main road carrying over 15,000 vehicles per day and fulfilling a role as a major inter-regional link (over 1,500 vehicles per hour)
- Sub-arterial Road – defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 vehicles per day (500 to 2,000 vehicles per hour)

- Collector Road – provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vehicles per day (250 to 1,000 vehicles per hour). At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably.
- Local Road – provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles per day (250 vehicles per hour).

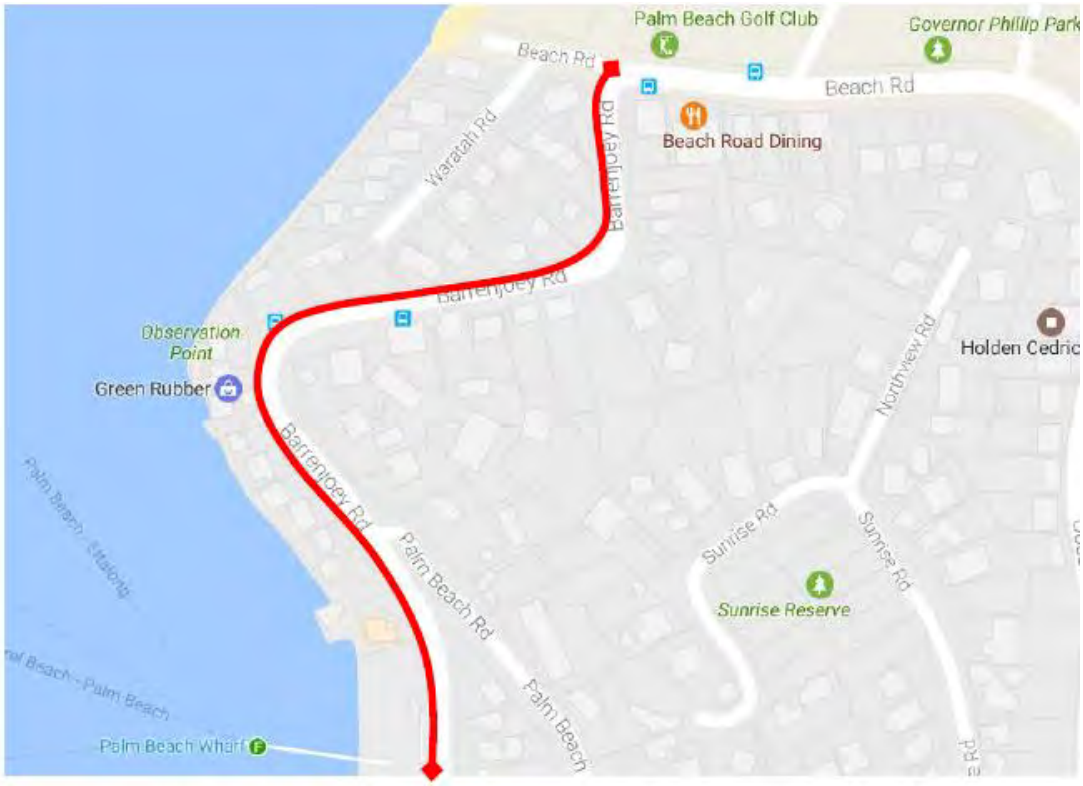
2.3 Existing Road Network

Barrenjoey Road – is only road through the area linking Palm Beach Road in the north with suburbs to the south. In the vicinity of the site the road includes a single travel lane in each direction with on-street parking only available in areas where a shoulder is present. A recently constructed indented northbound bus bay is located some 20m north of the northern boundary of No.1165 Barrenjoey Road.

3. Background Report / Conditions / Proposal Review

3.1 Palm Beach Walkway – Stage 2 Concept Design (Pre-Construction) Road Safety Audit – The Transport Partnership 6 October 2017

The subject site is located directly adjacent to the recently constructed Palm Beach Walkway undertaken by the Northern Beaches Council. This new walkway proposed a pedestrian pathway connection of the Palm Beach Wharf to the existing Palm Beach Walkway in Beach Road. The extents of this project is shown below.



This Stage2 Road Safety Audit report assessed the proposed design for a new pedestrian pathway along the western / northern side of Barrenjoey Road. A copy of this audit is provided in Appendix C of this report.

If note, this RSA report was a second report for the proposal of which the original RSA identified 17 issues which required further investigation in the preparation of the detailed construction drawings for the proposal.

It is noted that the proposed walkway proposed the removal of sections of the existing safety barrier which was located along the western side of Barrenjoey Road around the bend to the north of the subject site.

To confirm the placement of the safety barrier prior to the Palm Beach Walkway works, the following presents the existing location of the barrier on Monday 11 December 2017 prior to works undertaken on the Palm Beach Walkway.

Figure 2 - Safety Barrier / Wall Locations Prior to Palm Beach Walkway Works

Of note from Figure 2 a section of barrier adjacent to No.1163 Barrenjoey Road (dwelling immediate south of the subject site) had been removed to provide an off street parking deck.

Of further note, the previous safety barrier extended across the full frontage of No.1165 and 1167 Barrenjoey Road with partial coverage of No.1169 Barrenjoey Road with a further barrier provided to the north.

There was no formal pedestrian pathway along the western side of Barrenjoey Road with pedestrians required to walk within the small road shoulder. A street view of the previous barrier / shoulder arrangement across the frontage of No.1163 and No.1165 Barrenjoey Road is shown below.

Figure 3 – Street View of Barrier / Shoulder Arrangement Prior to Palm Beach Walkway Works

3.2 Palm Beach Walkway – Stage 4 Finalisation (Post Construction) Road Safety Audit – The Transport Partnership 30 August 2018

At completion of the Palm Beach Walkway works undertaken by the Northern Beaches Council, a post construction Road Safety Audit of the new corridor as a whole was undertaken by The Transport Partnership dated 30th August 2018.

A copy of this Road Safety Audit report is provided in Appendix D of this report.

The resulting safety barrier arrangements of the new pedestrian footpath is shown below in

Figure 4 - Safety Barrier Locations Post to Palm Beach Walkway Works

It is noted that the Palm Beach Walkway works have resulted in the shortening of the existing barrier outside No.1167 and No.1169 to provide direct vehicular access to the respective deck parking structures. A low garden bed has been placed along the kerbline between No.1167 and No.1169 Barrenjoey Road.

3.3 Barrenjoey Road – Recommendation for 40km/hr Speed Limit

It is noted that the Palm Beach Walkway works have been subject to ongoing discussions between the Northern Beaches Council and the RMS on matters relating to the changes to the safety barrier and other access issues following completion of the works.

As advised by the client, it is also understood that these discussions have resulted in the following recommended proposals for both the road and proposed parking access to No.1165 Barrenjoey Road.

The following is confirmed from an email dated 9th June 2019 from a Mr Phillip Devon - Manager Transport Network Northern Beaches Council:

Hi John,
Andrew Johnston passed your details to me to investigate the issues surrounding your parking platform and the median requested by RMS as part of the consent conditions.

I have spoken with RMS and we are looking at potentially removing that requirement in favour of the simple addition of a structural railing to the parking platform given that speed limit on that section of Barrenjoey Road is being reduced to 40km/h in the near future and the parking platform is required to be engineered to the required level anyway.

I will give you a call early next week to discuss the next steps forward with the approvals.
Sincerely,
Phillip Devon
Manager Transport Network
Northern Beaches Council

Thus, it is acknowledged above that a 40km/hr speed limit will be introduced across the frontage of the subject site to slow approaching traffic speeds.

It is also noted that support for vehicle access to No.1165 Barrenjoey Road is provided in principle on the basis that the proposed parking facility includes a safety barrier arrangement to replace the existing barrier where the parking structure is proposed.

4. Project Description

To provide off street parking to the existing dwelling at No.1165 Barrenjoey Road, an elevated parking structure is proposed in the order of 6.0m depth and 9.0m in length. The structure would be of a similar nature to those which currently exist at No.1163, No.1167 and No.1169 Barrenjoey Road.

Whilst the structure is anticipated to only accommodate one vehicle at a time, the design of the structure would accommodate up to two vehicles if necessary.

To replace the existing safety barrier which would be removed to provide vehicle access to the land locked dwelling, a safety barrier would be included around the periphery of the parking deck of suitable quality to accommodate a head on collision of a vehicle as per the requirements of the Australian Standard AS1170.

A copy of the civil design plans of the proposed parking deck are provided in Appendix E of this report.

5. Supporting Information

5.1 Drawings

Drawings provided to conduct the audit are as follows. All drawings were prepared by Peter Princi Architects.

- Drawing No. DA01 Issue A Dated August 2018 – Site Plan
- Drawing No. DA02 Issue A Dated August 2018 – Site Plan
- Drawing No. DA03 Issue A Dated August 2018 – Inclinator
- Drawing No. DA04 Issue A Dated August 2018 – Car Stand Elevations
- Drawing No. DA05 Issue A Dated August 2018 – Car Stand Elevations

The following elements were not reviewed as part of this audit;

- Underground Utility plans and proposals;
- Geotechnical information and pavement specifications;
- Landscaping Design Specifications; and
- Street Lighting.

5.2 Checklists and Reference Materials

The project was audited in accordance with both the Roads and Traffic Authority NSW (RTA) – TD 2003/RS03-V2 - Technical Direction for Road Safety Practitioners - Policy for road safety audits of construction and reconstruction projects (August 2005) and Austroads - GUIDE TO ROAD SAFETY - Part 6: Road Safety Audit (2009). Standard checklists were used as part of the assessment of the project. A copy of the checklist is attached in Appendix F of this report.

The key elements examined as part of the audit process include:

- General intersection and road layout proposed
- Intersection approach and departures
- Road features, including provision for all road users
- Proposed Traffic Control Devices (Signs and Linemarking)

Other specific reference documents, papers, and manuals utilised during the course of the audit are detailed as follows:-

- RTA Road Design Guide - 2002
- RTA TD 2003/RS03-V2 (August 2005) - Technical Direction for Road Safety Practitioners - Policy for road safety audits of construction and reconstruction projects.
- AUSTROADS - Guide To Road Design - Part 3 – Geometric Design
- AUSTROADS - Guide To Road Design - Part 4: Intersections and Crossings – General
- AUSTROADS - Guide To Road Design - Part 6A: Pedestrian and Cyclist Paths
- AUSTROADS - Guide to Road Safety - Part 3: Speed Limits and Speed Management
- Australian Standards AS 1742 (Parts 1 and 2)
- Australian Standards AS 1428

5.3 Road Safety Audit Program

5.3.1 Background

A road safety audit is a series of formal checks of road and traffic works, both existing and future, in relation to their accident potential and safety performance. It is conducted by a team independent to the project to provide an independent and objective safety assessment. The purpose of this audit process is to pro-actively manage road safety by identifying and addressing risks associated with road safety deficiencies.

5.3.2 Audit Stage

This Stage 3 – Detailed Design Stage Audit examined Construction Certificate Engineering Detail Plans Drawing Set Nos. stated in Section 5.1 of this report were prepared by Peter Princi Architects. The audit was undertaken in accordance with both the RTA – TD 2003/RS03-V2 - Technical Direction for Road Safety Practitioners - Policy for road safety audits of construction and reconstruction projects (August 2005) and Austroads – Guide to Road Safety - Part 6: Road Safety Audit (2009).

5.3.3 Audit Program

The audit focuses on a desktop audit of the design. Although the works have yet to be constructed, a site inspection was undertaken to gauge existing traffic conditions and any potential constraints to provide access. The audit was conducted by a Level 3 Accredited Road Safety Auditor, currently listed with the Register of Road Safety Auditors, NSW.

5.4 Audit Objectives

This road safety audit is limited in assessing potential road safety risks i.e. accident potential, for all users of the project, irrespective of the design standards adopted. The Road Safety Audit does not rate a project, check compliances with standards nor substitute for proper design checks. A Road Safety Audit does not specify details of corrective actions required in a design but may make specific recommendations for follow up by the design team.

The objectives of the audit are therefore to:-

- Identify and eliminate potential safety hazards for all road users likely to use the roadway, including traffic, pedestrians and cyclists.
- Ensure that measures to eliminate or reduce future safety problems are fully considered, prior to the roadwork commencing.
- Improve safety risks associated with the project and prevent the development of new accident locations.
- Make recommendations to remove or reduce identified road safety deficiencies.
- Provide a Risk Assessment rating of identified safety deficiencies that is a product of the likelihood of an accident occurring (probability/exposure) and the severity of the outcome should an accident occur.

5.4.1 Risk Assessment

The table below provides specific details of the audit findings and a risk rating as high, medium or low. The risk ratings have been based on the risk matrix presented in Table 4.1, which has been adopted from the standard Austroads Risk Matrix.

Likelihood	Highly Probable	Occasional	Improbable
Severity			
Major	**High**	**High**	**Medium**
Moderate	**High**	**Medium**	**Low**
Minor	**Medium**	**Low**	**Low**

The terms in the table above are described below.

Likelihood:

- Highly probable: It is likely that more than one crash of this type could occur within a five-year period.
- Occasional: It is likely that less than one crash of this type could occur within a five-year period.
- Improbable: Less than one crash of this type could occur within a 10-year period.

Severity:

- Major: The crash is likely to result in a fatality or serious injuries

For example, high/medium speed vehicle collision, high/medium speed collision with a fixed object, pedestrian struck at high speed, and cyclist hit by car.

- Moderate: The crash is likely to result in minor injuries or large scale of property damage

For example, some slow speed vehicle collisions, cyclist falls, and rear end crashes.

- Minor: The crash is likely to result in minor property damage or many near miss crash events

For example, some slow speed collisions, pedestrian walks into object (no head injury), and car reverses into post.

Priority:

- High: Very important, and needs to be addressed urgently.
- Medium: Important, and needs to be addressed as soon as possible.
- Low: Needs to be considered as part of regular maintenance/planning program.

5.5 Audit Process Summary

Audited Project:	Proposed New Parking Deck at the site known as 1165 Barrenjoey Road, Palm Beach
Detail Design Drawings:	Proposed Car Deck Drawing No's DA01 – DA05 Prepared by Peter Princi Architects
Audit For:	Mr John Oliver
Project Manager: Positive Traffic Pty Ltd	Dean Brodie Phone: 0414 462247 Dean@positivetraffic.com.au
Audit Team:	Dean Brodie (Accredited Auditor Level 3) Audit ID: RSA-02-0606
Audit Type:	Stage 3 – Detail Design
Inspection Date:	18 July 2019
Audit Date:	21 September 2019
Completion Date:	28 September 2019

6. Audit Findings & Recommendations

6.1 Deficiency Log

The identified deficiencies have been identified during the site inspection and an assessment of the proposal. These are presented below.

Table 1 - Deficiency Log

No.	Item	Description	Risk	Audit Team Assessment/Comment	Client Representative Comment
1.	Shortened Barrier	Reduction of barrier requires appropriate end treatment	High	Condition of consent	
2.	Sight Lines	Sight lines to southbound traffic around bend	Low	Provision of convex mirror on southern side of parking deck would assist	
3.	Removal of barrier	Removal of existing barrier and replacement with new barrier around parking deck	Low	Marginal increase to pedestrian / vehicle collision risk	
4.	Curve Speed	The existing bend north of the subject site does not include curve speed advisory signage	Med	Approaching traffic to the bend in either direction would benefit from curve speed advisory signage	

7. Design Issues

7.1 Item 1 – Shortened Barrier

Any reduction in length of the existing barrier adjacent to No..1165 and No.1167 should include as a condition of consent appropriate end of barrier arrangements in accordance with RMS standards.

7.2 Item 2 – Sight Lines

Whilst with a single vehicle parked there is an opportunity to enter and leave the parking deck in a forward direction, the parking of more than one vehicle would require a vehicle to reverse into Barrenjoey Road.

The reversing of a vehicle from a single dwelling residential house is expected and is the case for all existing / recently constructed parking decks along Barrenjoey Road.

To maximise available sight lines to reversing vehicles from the parking deck to southbound traffic coming around the bend, a convex mirror or similar type of facility should be considered on the southern boundary of the parking deck. The existing power pole provides an opportunity for installation of such a device without impacting on adjacent properties. This is shown in Photo 1 below.

Photo 1 - Existing Lockable Bollard Access to Grassed Road Reserve

7.3 Item 3 – Shortening of Existing Barrier / Barrier Around Parking Deck

As stated above it is noted that the Northern Beaches Council and the Roads and Maritime Services have proposed the installation of a 40km/hr speed limit past the subject site and around the bend to Palm Beach. Thus this assessment has been undertaken with consideration of the reduction in speed limit.

The purpose of the existing barriers is to provide deflection of impacting vehicles.

An example of the possible paths of travel of an errand vehicle travelling northbound along Barrenjoey Road past the subject site is presented below in Figure 5.

Figure 5 - Potential Path of Travel for Northbound Errand Vehicle

If note, the commencement of the existing barrier near the common boundary of No.1163 / 1165 Barrenjoey Road is somewhat out of the potential paths of vehicles on the basis that the errand vehicle is endeavouring to turn out of the impact.

Of interest, prior to the Palm Beach Walkway works, pedestrians were required to walk in front of the existing barrier within the narrow shoulder as confirmed in Figure 3 above. Thus, previously the barrier offered no protection to pedestrians at the subject site.

A further benefit of the barrier is to provide some additional protection to pedestrians

The resulting Palm Beach Walkway works have now placed pedestrians behind the barrier where the barrier remains and has not been removed.

Overall, on the basis that pedestrians can walk behind a barrier, this would provide additional protection from an errand vehicle compared to that of if only face kerb was present. However, the liklihood of an impact between an errand vehicle in a reduced speed zone and a pedestrians in the precise location of the impact of the kerb would be generally low.

It is also noted that currently in locations where no barrier is present, say the location of existing parking decks on the bend or where the barrier has been removed, there is no protection from an errand vehicle impacting on houses below.

As the proposal includes an impact resistent barrier in accordance with the requirements of the relevant Australian Standard (combined with the possibility of a parked vehicle providing further protection) the proposal would not result in a diminished risk to the greater potential for impact with that being an errand vehicle colliding with dwellings below.

7.4 Item 4 – Curve Speed Advisory Signage

The nature of the bend is such that following the introduction of the 40km/hr speed limit in the location, on the basis that the RMS deemed the existing curve to not be appropriate for travel at 40km/hr, a curve speed advisory sign for both directions should be considered. The speed on the signage would be determined by the RMS. The suggested locations are presented below in

Figure 6 – Northbound Suggested Location for Curve Speed Advisory Sign

Figure 7 – Southbound Suggested Location for Curve Speed Advisory Sign

8. Formal Statement & Sign Off

I, Dean Brodie, declare that I have reviewed the material and data listed in this report, inspected the site and identified the safety and operational deficiencies noted. The team assessing these drawings are all accredited Road Safety Auditors.

I declare that the audit team have had no involvement, nor provided any input into the design or preparation of the plans for a new parking deck structure to serve No.1165 Barrenjoey Road, Palm Beach which includes the following drawing set prepared by Peter Princi Architects:

- Drawing No. DA01 Issue A Dated August 2018 – Site Plan
- Drawing No. DA02 Issue A Dated August 2018 – Site Plan
- Drawing No. DA03 Issue A Dated August 2018 – Inclinator
- Drawing No. DA04 Issue A Dated August 2018 – Car Stand Elevations
- Drawing No. DA05 Issue A Dated August 2018 – Car Stand Elevations

It should be noted that while every effort has been made to identify potential safety hazards, no guarantee can be made that every deficiency has been identified.

I recommend that the issues identified in the Deficiency Log be assessed, signed off and actions implemented, where considered necessary, by the design team prior to finalisation of the design drawings.

Signed:

Dean Brodie
Road Safety Auditor - Level 3
Lead Auditor
RMS Id: RSA-02-0606
September 2019
Positive Traffic Pty Ltd

Client Representative

I have reviewed the material and data in this report, assessed the deficiencies noted, commented and discussed in conjunction with the Design Team. Corrective actions have been taken where required.

Signed:

Date:

9. Appendix A – Site Inspection Photographs

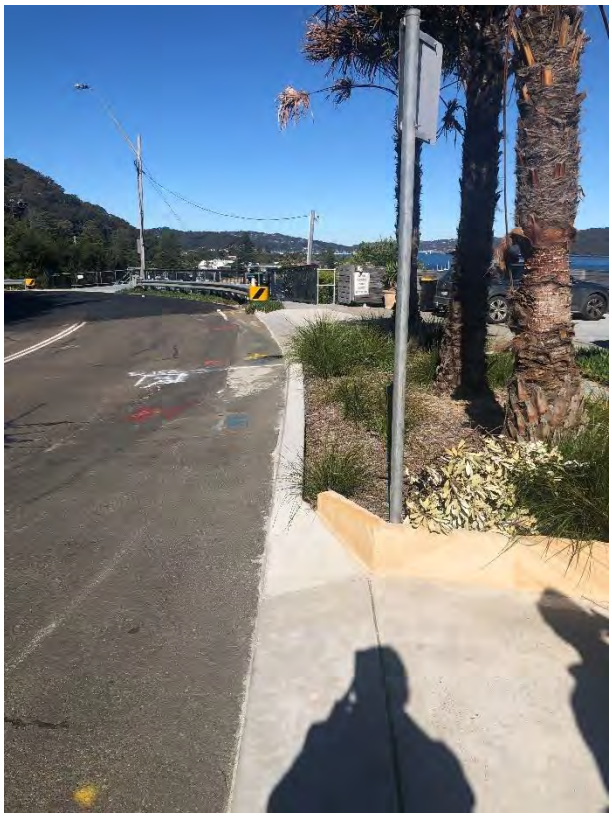
Parking Deck of No.1163 Barrenjoey Rd

Existing Barrier Across No.1165 Barrenjoey Rd

Existing Barrier Across No.1165 Barrenjoey Rd

Shortened Barrier to Provide Parking Access to No.1167 Barrenjoey Road

Location of new garden as replacement of previous safety barrier for reconstructed bus bay

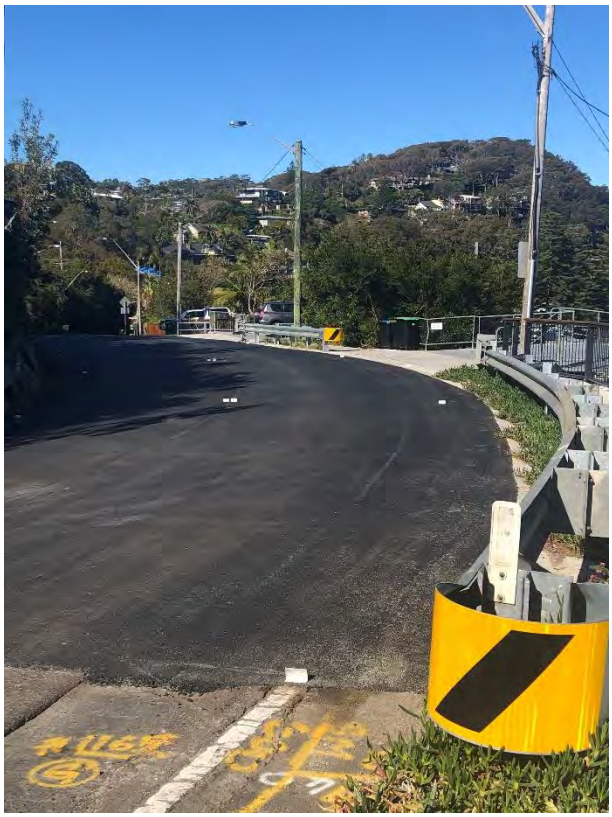


Sandstone seating of reconstructed bus bay

New indented bus bay

Modified barrier to provide access to No.1169 Barrenjoey Road

Modified barrier for driveway works to No.1163 Barrenjoey Road



10. Appendix B – RMS Letter Dated 5 September 2019

5 September 2019

Our Reference: SYD18/01323/04 (A28988273)
Council Reference: DA2018/1342

The General Manager
Northern Beaches Council
Civic Centre, 725 Pittwater Road
DEE WHY NSW 2099

Attention: **David Auster**

Dear Sir/Madam,

PROPOSED CAR STAND AND INCLINATOR – 1165 BARRENJOEY ROAD PALM BEACH

Reference is made to Council's original correspondence dated 21 August 2018 and the additional response received by both Council and the applicant dated 10 January 2019 and also 28 August 2019 regarding the abovementioned Application which was referred to Roads and Maritime Services (Roads and Maritime) for concurrence in accordance with Section 138 of the *Roads Act, 1993.*

Roads and Maritime have previously requested additional information. The information provided is not at a level where Roads and Maritime can review and approve the attached plans. Swept path plans submitted did not clearly show two vehicles using the proposed car stand. A road safety audit has not been submitted to Roads and Maritime as requested in the previous letter dated 10 January 2019.

Roads and Maritime requests that the following information be submitted for further assessment:

- An independent road safety audit that assesses the proposed access in terms of road safety and the impact the alteration would have on the classified road.
- Concept civil design plans for the proposed car stand.
- Swept path plans that provide a clear depiction of how the proposed vehicles will enter and exit the site from both car parking spaces. Roads and Maritime note that the swept path plans submitted where incorrect and cannot be reviewed and approved.

Direct access to the parcel from the Barrenjoey Road is currently not possible due to a safety guard rail being in situ. For access to be achieved alterations would need to be undertaken at the owner's expense with no cost to Roads and Maritime.

The applicant is advised that the above information is required to allow Roads and Maritime to complete the assessment of this Application. Roads and Maritime may also request further information once the assessment is carried out.

Any inquiries in relation to this Application can be directed to Cameron McIntyre on 8849 2787 or development.sydney@rms.nsw.gov.au.

Yours Sincerely,

Pahee Rathan
Senior Land Use Assessment Coordinator
North West Precinct

11. Appendix C – Palm Beach Walkway Stage 2 Pre-Construction Road Safety Audit Report – The Transport Partnership 6 October 2017

Palm Beach Walkway

Stage 2 Concept Design (Pre-Construction) Road Safety Audit

Prepared for:

Lloyd Drilling Constructions

6/10/2017

The Transport Planning Partnership

Palm Beach Walkway

Stage 2 Concept Design (Pre-Construction) Road Safety Audit

Client: Lloyd Drilling Constructions

Version: Draft

Date: 6/10/2017

TTPP Reference: 17295

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
01	06/10/17	Wayne Johnson	Ken Hollyoak	Wayne Johnson	

The Transport Planning Partnership (TTPP) has prepared this report in accordance with the instructions of Lloyd Drilling Constructions for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

Table of Contents

Tables

Figures

APPENDICES

The Transport Planning Partnership (TTPP) has prepared this report in accordance with the instructions of Lloyd Drilling Constructions for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

1 ROAD SAFETY AUDIT SUMMARY

Audited project:	Palm Beach Walkway
Developer:	Lloyd Drilling Constructions
Project Manager:	Lloyd Anglicas
Email address:	Lloyd@lloydconstructions.com.au
Telephone:	0418 232 523
Audit Team:	Wayne Johnson (Level 3 Lead Audit Member) Ken Hollyoak (Level 3 Audit Team Member)
Audit type:	Stage 2 Concept Design (Pre-Construction)
Commencement meeting:	N/A
Audit date:	25 August 2017
Completion meeting:	N/A
Previous audit:	N/A

The objective of this road safety audit is to examine and identify road safety concerns regarding the concept road design for the Palm Beach Walkway along the western side of Barrenjoey Road between Palm Beach Wharf and Palm Beach Golf Course.

The findings of the road safety audit have been detailed in Section 4.3 of this report.

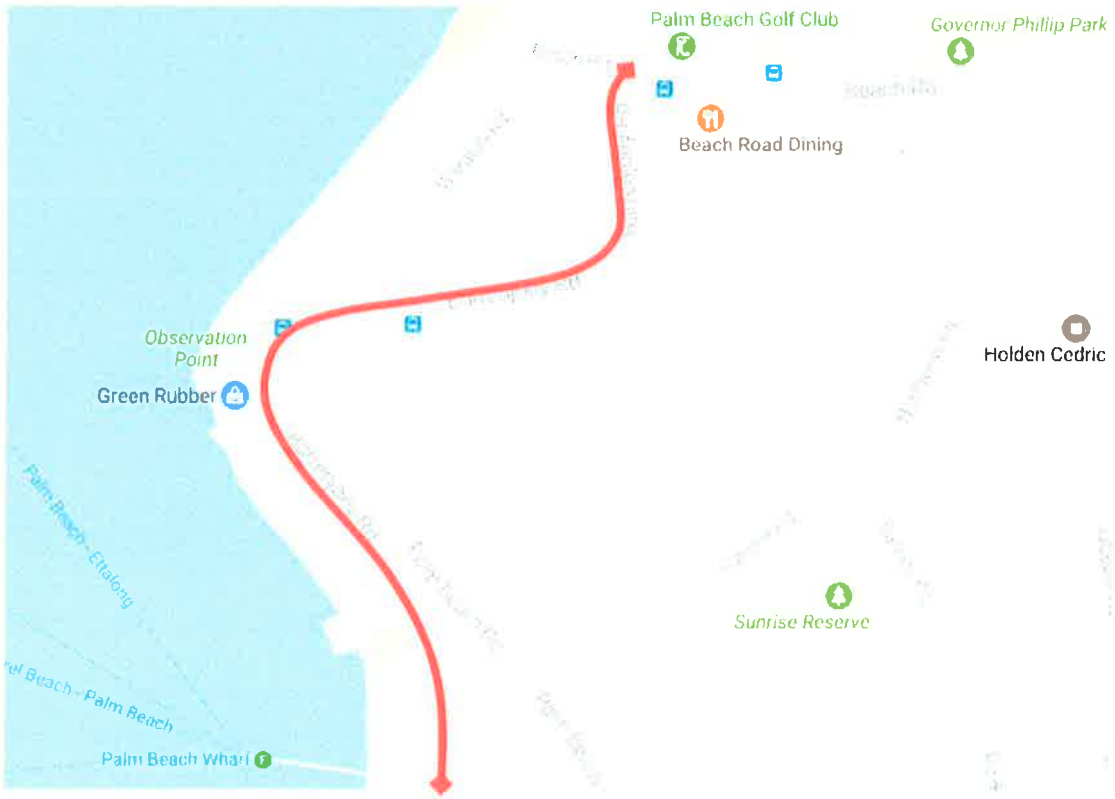
2 INTRODUCTION

2.1 Background and Audit Location

This report has been prepared by The Transport Planning Partnership (TTPP) to present audit findings associated with the proposed design of the Palm Beach Walkway between Palm Beach Wharf and Palm Beach Walkway. In March 2017, an audit was previously conducted and a road safety audit was prepared that outlined 17 road safety problems with the initial design. In September 2017, Lloyd Drilling Constructions Pty Ltd was contracted for the construction of the Palm Beach walkway. TTPP was commissioned to review the latest concept design plans and provide an independent road safety audit.

The length of the scope of works is shown in Figure 2.1.

Figure 2.1: Site Location and its Surrounding Environment



2.2 Audit Objective

The objective of this Audit was to ensure that there are no fundamental flaws in the proposal in relation to road safety that may cause road safety issues and would be costly to address at a later date both in terms of cost and time.

2.3 Design Drawings for the Road Safety Audit

The audit team was provided with the following concept design drawings as listed in Table 2.1 and reviewed as part of this audit.

Table 2.1: Detailed Design Drawings

Drawing Number	Revision	Document Title
2/11	A	WALKWAY PLAN VIEW + SECTIONS_1
3/11	A	WALKWAY PLAN VIEW _2
8/11	A	WALKWAY PLAN VIEW + SECTIONS_4
10/11	A	WALKWAY PLAN VIEW _5
11/11	A	WALKWAY PLAN VIEW + SECTIONS_4
4/11	A	WALKWAY SECTIONS_2
5/11	A	WALKWAY SECTION_3
7/11	A	WALKWAY SECTIONS_4
9/11	A	WALKWAY SECTIONS_5
2016-01-70	D	TYPICAL SECTIONS SHEET 1
2016-01-72	D	1185 BARRENJOEY ROAD
R0220-02	N/A	GULLY PIT – TYPE SA WITHOUT KERB INLET FOR SA KERB AND CHANNEL
R0740-01	N/A	'ELSHOLZ' CONCRETE KERB MEDIAN AND NEARSIDE INSTALLATION SECTIONS/PROFILES
R0300-04	N/A	STANDARD VEHICULAR CHANNEL CROSS USE WITH TYPE SA KERB CHANNEL

2.4 Procedures and Reference Material

The procedures used are these described in the Roads and Maritime Services' 2011 Guidelines for Road Safety Audit Practices. The Austroads Guide to Road Safety: Part 6 Roads Safety Audit checklist was used by the audit team as a reference in this detailed design audit. Key elements examined included:

- design issues
- alignment details
- intersections
- special road users

- lighting, signs and delineation
- physical objects
- environmental constraints
- other matters.

Other specific documents and manuals referred to during the course of this audit were:

- AGRD04A-10 Guide to Road Design - Part 4 Intersections
- RMS Road Design Guide.

2.5 Audit Team

The RSA was carried out by the following team:

- Wayne Johnson – level 3 road safety auditor (lead auditor)
- Ken Hollyoak – level 3 road safety auditor (team member).

3 ROAD SAFETY AUDIT PROGRAM

3.1 Commencement Meeting

Not required.

3.2 Site and Field Audit

Daylight and night time site inspections were carried out on 27th September and 3rd October 2017 in fine weather conditions. A number of photographs and videos were taken.

3.3 Completion Meeting

Not required.

4 ROAD SAFETY AUDIT FINDINGS

4.1 Introduction

The road safety audit findings have been documented in Table 4.2.

Table 4.1 provides specific details of the audit findings and a risk rating as high, medium or low. The risk ratings have been based on the risk matrix presented in Table 4.1, which has been adopted from the standard Austroads Risk Matrix.

Table 4.1: Risk Matrix

Likelihood / Severity	Highly probable	Occasional	Improbable
Major	High	High	Medium
Moderate	High	Medium	Low
Minor	Medium	Low	Low

The terms in Table 4.1 are described below.

Likelihood:

- Highly probable: It is likely that more than one crash of this type could occur within a five-year period.
- Occasional: It is likely that less than one crash of this type could occur within a five-year period.
- Improbable: Less than one crash of this type could occur within a 10-year period.

Severity:

- Major: The crash is likely to result in a fatality or serious injuries

  For example, high/medium speed vehicle collision, high/medium speed collision with a fixed object, pedestrian struck at high speed, and cyclist hit by car.

- Moderate: The crash is likely to result in minor injuries or large scale of property damage

  For example, some slow speed vehicle collisions, cyclist falls, and rear end crashes.

- Minor: The crash is likely to result in minor property damage or many near miss crash events

  For example, some slow speed collisions, pedestrian walks into object (no head injury), and car reverses into post.

Priority:

- High: Very important, and needs to be addressed urgently.
- Medium: Important, and needs to be addressed as soon as possible.
- Low: Needs to be considered as part of regular maintenance/planning program.

4.2 Responding to the Audit Report

As set out in the road safety audit guidelines, the responsibility for the roads rests with the project manager, not with the auditor. The project manager is under no obligation to accept the audit findings. Neither is it the role of the auditor to agree to, or approve the project manager's responses to the audit.

The audit provides the opportunity to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations.

4.3 Road Safety Audit Findings

The audit findings are documented in Table 4.2 which provides:

- specific details of the road safety issues identified during the audit
- a risk level rating for each of the road safety audit findings.

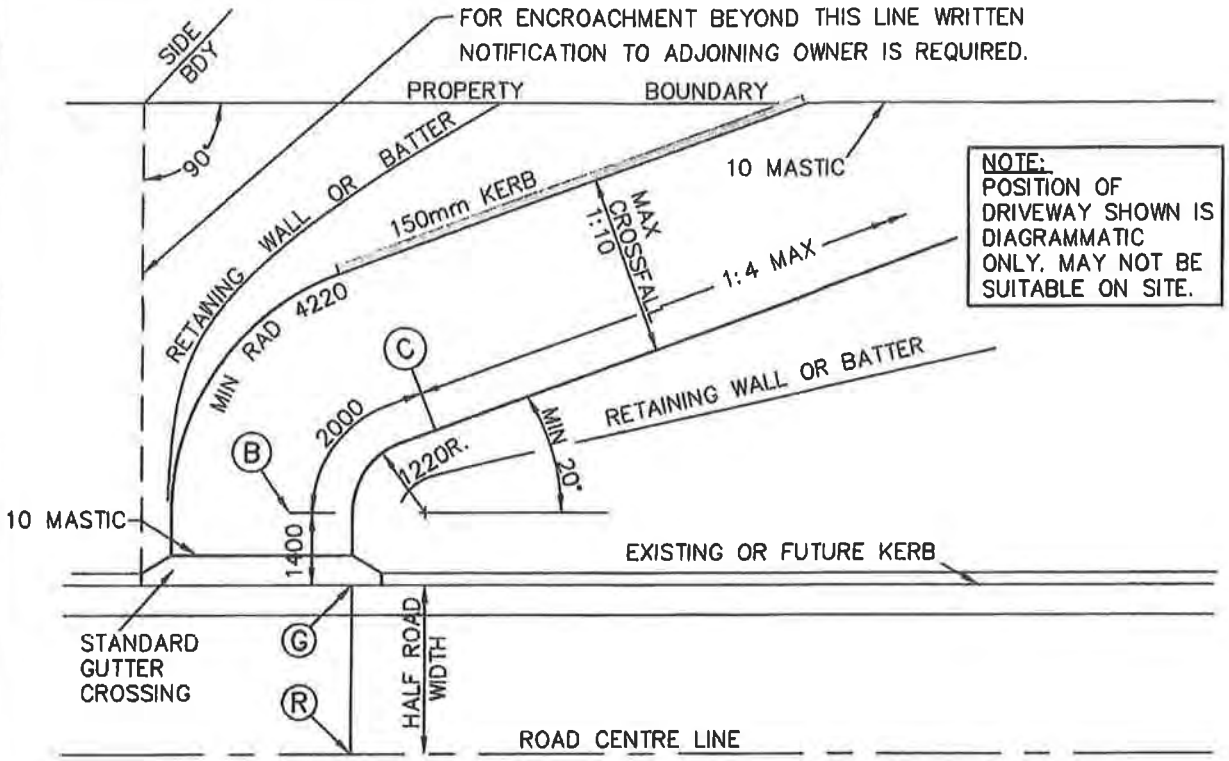
It should be acknowledged that positive attributes of the audited road section have not been discussed. Deficiencies that do not cause a safety problem are also not listed.

In-line with RMS best practice, recommendations have not been included in the road safety audit findings.

Designers are to respond to each road safety audit finding shown in Table 4.2. They can either accept the audit finding by amending the design, or disagree with a justification. This document shall be submitted to the approval authority as part of the design approval process.

PLAN MAY BE MIRROR REVERSED FOR ACCESS FROM OPPOSITE SIDE OF LOT.

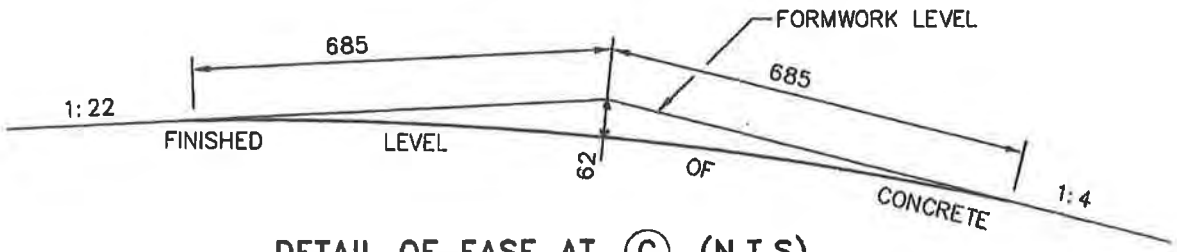
FOR USE ONLY FOR SINGLE DWELLING OR DUAL OCCUPANCIES



NOTE:
POSITION OF DRIVEWAY SHOWN IS DIAGRAMMATIC ONLY. MAY NOT BE SUITABLE ON SITE.

SET OUT

POINT	REMARKS	LEVELS
R	ROAD CENTRELINE	
G	INVERT OF GUTTER	
B	1400 FROM KERB FACE	130 ABOVE "G"
C	3400 FROM KERB FACE	100 ABOVE "G" (FORMWORK LEVEL)



DETAIL OF EASE AT (C) (N.T.S)

NOTES

- To be read in conjunction with Pittwater 21 Development Controls.
- Retaining walls & batter slopes to comply with Geotechnical Risk Management Policy for Pittwater.
- Design levels are calculated along inside edge NOT centreline.

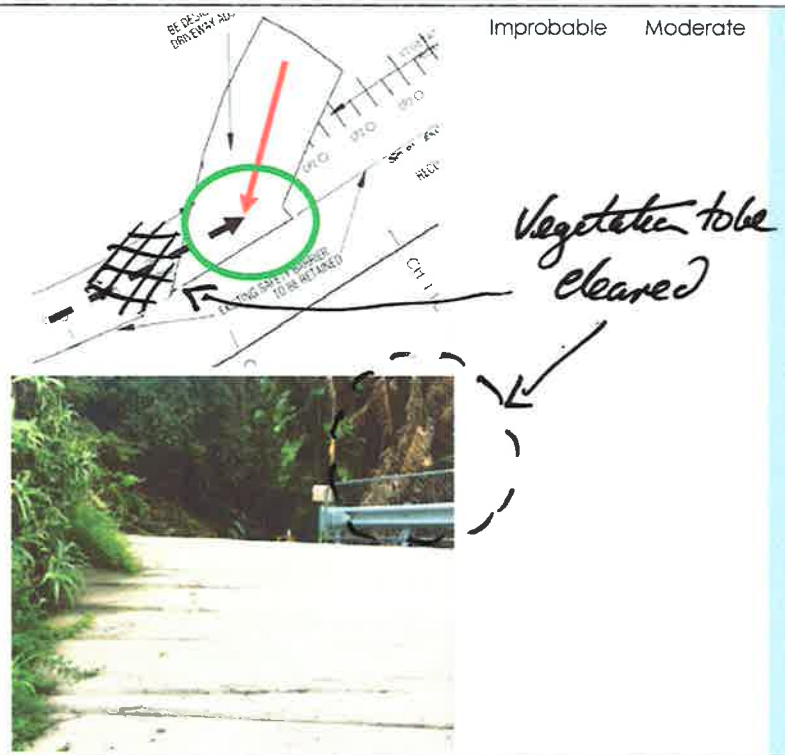
PITTWATER COUNCIL

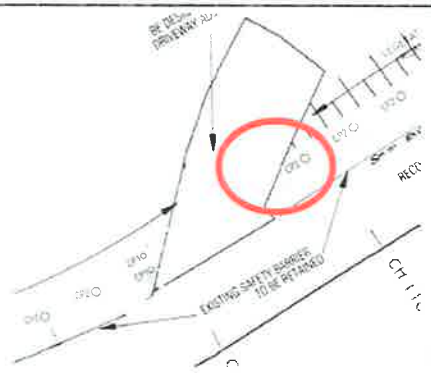
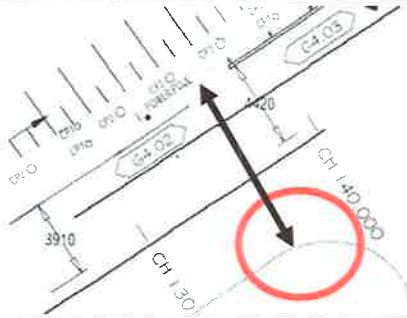
DRIVEWAY PROFILE
LOW LEVEL SKEW

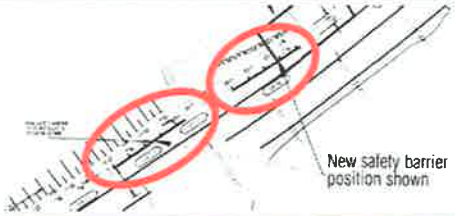
PLAN No.
DP-05

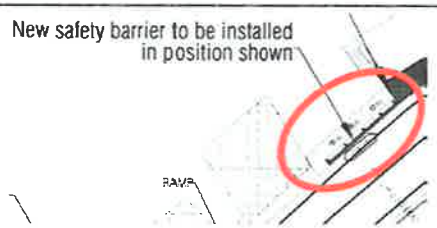
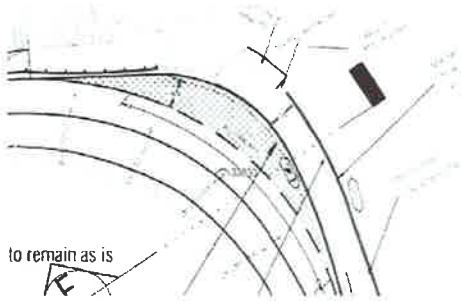
Date:
9/11/2011

Table 4.2: Road Safety Audit Findings

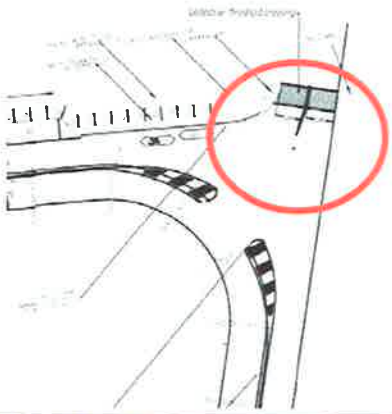
Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
1	Sd1708-008: 3/11	100m	The residential driveway of 1153 Barrenjoey Road slopes steeply down from the proposed Barrenjoey Road walkway. Consequently, residents exiting their property will not have sufficient visibility towards pedestrians on the walkway, particularly towards pedestrians walking northbound.		Improbable	Moderate	Low	Clear vegetation to give pedestrian visibility

Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
2	Sd1708-008: 3/11	100m	The residential driveway of 1153 Barrenjoey Road slopes steeply down from the proposed walkway. The proposed walkway will be flat across the residential driveway. Consequently, there will be a 'step' between the walkway and the driveway. The step between the driveway and the proposed walkway might be addressed by increasing the gradient of the driveway which may be hazardous for pedestrians/ motorists in this section of the proposed walkway.		Improbable	Moderate	Low	Driveway to be reconstructed to plan DP-05 Driveway profile low level skew
3	Sd1708-008: 3/11	135m	A new kerb ramp is proposed at chainage 135m. A kerb ramp is not proposed on the opposite side of Barrenjoey Road and therefore pedestrians will not be able to cross the road safely, particularly pedestrians in wheelchairs, parents with prams and elderly pedestrians.		Improbable	Moderate	Low	Kerb ramp to be constructed on opposite side of Barrenjoey Rd

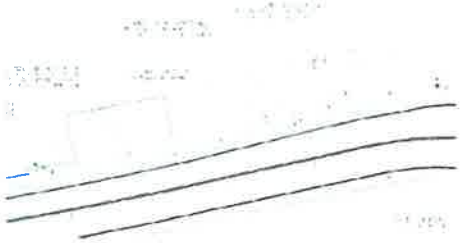
Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
4	Sd1708-008: 8/11	140m and 185m	The length of the new safety barrier appears to be approximately 10m. A 10m long safety barrier may not effectively deflect an errant vehicle back onto the road.		Improbable	Moderate	Low	NIL
5	Sd1708-008: 8/11	155m	The proposed driveway will reduce the length of an existing residential carport. Consequently, vehicles parked in the carport will extend across the proposed walkway which will restrict visibility along the walkway and the effective width of the walkway.		Improbable	Moderate	Low	? small car OK. parallel only.
6	Sd1708-008: 8/11	200m	Residents currently park 'front to kerb' in carports along Barrenjoey Road. Residents will have poor visibility when reversing from the carport across the walkway which may lead to pedestrian/ vehicle conflict. Consideration shall be given to residents parking 'rear to kerb' to ensure motorists have adequate visibility of pedestrians on the walkway when exiting the carport.		Improbable	Moderate	Low	

Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
7	Sd1708-008: 8/11	235m	The end section of this safety barrier does not flare away from the road. The end section of the safety barrier is parallel with the road and therefore will not deflect errant motorists back towards the road if they lose control of their motor vehicle.		Improbable	Moderate	Low	Barrier to be flared
8	Sd1708-008: 8/11	290m	The proposed bus stand area does not appear to have been designed in accordance with the STA bus design guidelines. A bus stopped within the Bus Stand area will prohibit access to a residential property. As a minimum, a swept path of a standard bus entering and exiting the proposed Bus Stand should be undertaken to ensure a bus does not encroach into the northbound travel lane. On a side note, the continuity line marking should extend across the full length of the bus bay.		Improbable	Moderate	Low	VDM Need to check BUS in for option 3

Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
9	Sd1708-008: 8/11	295m	The location of an existing power pole is not shown on the plans. The power should be shown to ensure it is not an obstruction to pedestrians.		Improbable	Minor	Low	Pole added to plans
10	Sd1708-008: 10/11	495m	Inadequate sight visibility is provided from this residential driveway towards the proposed walkway. Overgrown vegetation restricts visibility which may lead to conflict between vehicles and pedestrians. Consideration should be given to providing adequate pedestrian sight visibility from this driveway, and all other driveways in Barrenjoey Road, in accordance with the Australian Standards.		Improbable	Minor	Low	Vegetation to be removed

Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
11	Sd1708-008: 11/11	570m	There is a lack of detail at the intersection of Barrenjoey Road and Beach Road. Consideration should be provided for guidance and Give Way linemarking.		Improbable	Moderate	Low	VDM
12		Various locations	The end terminals on a number of guard rails in Barrenjoey Road do not have any delineation. A lack of delineation on the guard rail end terminal reduces the effectiveness of the guard rail which may increase the severity of an incident.		Improbable	Moderate	Low	End terminals to all have delineation

check locations w/ drawing

Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
								ditto
13	2016-01-22 Sheet 3	170m – 235m	There are large unprotected sections of the walkway that are not protected by a footpath kerb/ elsholtz kerb because of the provision of carports.		Note only.			
14		310m – 390m	The design does not show the transition between the existing and new safety barriers located somewhere between Ch 310m and 390m		Note only.			
15		Entire route	The swept path of a HRV/ STA bus along the route in both directions should be undertaken to ensure a HRV/ STA bus can pass each other simultaneously.	Entire route.	Note only.			?
16		Entire route	A 1.5m wide pedestrian path does not permit two	Entire route.	Note only.			

Item No.	Drawing No.	Location/ Chainage	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
			wheelchairs to pass each other simultaneously. An overtaking bay is provided at chainage 70m but there do not appear to be any other overtaking bays provided along the walkway.					passing every 50 metres to modify drg - passing bay's.

5 CONCLUDING STATEMENT

The findings and opinions in the report are based on the examination of the specific road and environs, and might not address all concerns existing at the time of the audit.

The auditors have endeavoured to identify features of the road that could be modified in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so at their own risk without any liability to the Auditors.

Wayne Johnson
Level 3 Lead Road Safety Auditor
The Transport Planning Partnership

Ken Hollyoak
Level 3 Road Safety Auditor
The Transport Planning Partnership

Appendix A

Audited Design Drawings

The Transport Planning Partnership
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02 8437 7800

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www.tpp.net.au

12. Appendix D - Palm Beach Walkway – Stage 4 Finalisation (Post Construction) Road Safety Audit – The Transport Partnership 30 August 2018

Palm Beach Walkway

Stage 4 Finalisation (Post-Construction) Road Safety Audit

Prepared for:

Lloyd Drilling Constructions

30/08/2018

The Transport Planning Partnership

Palm Beach Walkway

Stage 4 Finalisation (Post-Construction) Road Safety Audit

Client: Lloyd Drilling Constructions

Version: Draft

Date: 30/08/2018

TTPP Reference: 17295

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
01	30/08/18	Wayne Johnson	Ken Hollyoak	Wayne Johnson	

The Transport Planning Partnership (TTPP) has prepared this report in accordance with the instructions of Lloyd Drilling Constructions for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

Table of Contents

Tables

Figures

APPENDICES

The Transport Planning Partnership (TTPP) has prepared this report in accordance with the instructions of Lloyd Drilling Constructions for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

1 ROAD SAFETY AUDIT SUMMARY

Audited project:	Palm Beach Walkway
Developer:	Lloyd Drilling Constructions
Project Manager:	Luke Anglicas
Email address:	Luke@lloydconstructions.com.au
Telephone:	0418 232 523
Audit Team:	Wayne Johnson (Level 3 Lead Audit Member) Ken Hollyoak (Level 3 Audit Team Member)
Audit type:	Stage 4 Finalisation (Post-construction)
Commencement meeting:	N/A
Audit date:	25, 27 and 29 August 2017
Completion meeting:	N/A
Previous audit:	N/A

The objective of this road safety audit is to examine and identify road safety concerns following the construction of the Palm Beach Walkway along the western side of Barrenjoey Road between Palm Beach Wharf and Palm Beach Golf Course.

The findings of the road safety audit have been detailed in Section 4.3 of this report.

2 INTRODUCTION

2.1 Background and Audit Location

This report has been prepared by The Transport Planning Partnership (TTPP) to present audit findings associated with the construction of the Palm Beach Walkway between Palm Beach Wharf and Palm Beach Walkway.

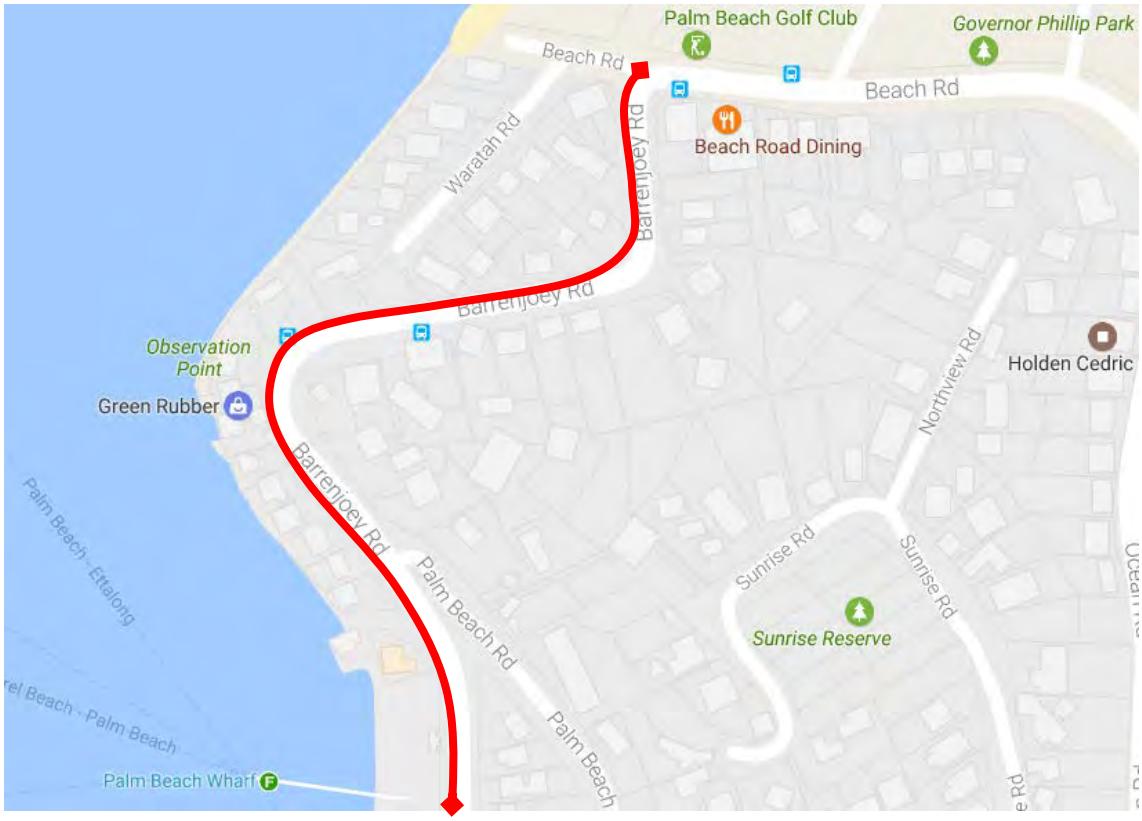
In March 2017, an audit was previously conducted and a road safety audit was prepared that outlined 17 road safety problems with the initial design.

In September 2017, Lloyd Drilling Constructions Pty Ltd was contracted for the construction of the Palm Beach Walkway. TTPP was commissioned to review the concept design plans and provide an independent road safety audit.

In August 2018, Lloyd Drilling Constructions Pty Ltd commissioned TTPP to undertake an audit of the constructed Palm Beach Walkway

The length of the scope of works is shown in Figure 2.1.

Figure 2.1: Site Location and its Surrounding Environment



2.2 Audit Objective

The objective of this Audit was to ensure that there are no fundamental flaws in the proposal in relation to road safety that may cause road safety issues.

2.3 Design Drawings for the Road Safety Audit

The audit team was provided with the following concept design drawings as listed in Table 2.1 and reviewed as part of this audit.

Table 2.1: Detailed Design Drawings

Drawing Number	Revision	Document Title
1/19	D	CONSTRUCTION NOTES
2/19	D	WALKWAY PLAN VIEW + SECTIONS_1
3/19	D	WALKWAY PLAN VIEW _2
4/19	D	WALKWAY SECTIONS_2
5/19	D	WALKWAY SECTION_3
6/19	D	WALKWAY SECTION_4
7/19	D	WALKWAY PLAN VIEW SECTIONS_4
8/19	D	WALKWAY SECTIONS_5
9/19	D	WALKWAY PLAN VIEW _5
10/19	D	WALKWAY PLAN VIEW + SECTIONS_4
11/19	D	BUS STOP PLAN VIEW
12/19	D	DRIVEWAY PLAN VIEW
13/19	D	SECTIONS
14/19	D	SECTIONS
15/19	D	BUS STOP BUS TURNING CYCLES
16/19	D	WALKWAY – BALLUSTRADE SECTIONS_1
17/19	D	WALKWAY – PRIVACY SCREEN SECTIONS_1
18/19	D	WALKWAY – PRIVACY SCREEN SECTIONS_2
19/19	D	WALKWAY – PRIVACY SCREEN PLAN VIEW

2.4 Procedures and Reference Material

The procedures used are these described in the Roads and Maritime Services' 2011 Guidelines for Road Safety Audit Practices. The Austroads Guide to Road Safety: Part 6 Roads Safety Audit checklist was used by the audit team as a reference in this detailed design audit. Key elements examined included:

- design issues
- alignment details
- intersections
- special road users
- lighting, signs and delineation
- physical objects
- environmental constraints
- other matters.

Other specific documents and manuals referred to during the course of this audit were:

- AGRD04A-10 Guide to Road Design - Part 4 Intersections
- RMS Road Design Guide.

2.5 Audit Team

The RSA was carried out by the following team:

- Wayne Johnson – level 3 road safety auditor (lead auditor)
- Ken Hollyoak – level 3 road safety auditor (team member).

3 ROAD SAFETY AUDIT PROGRAM

3.1 Commencement Meeting

Not required.

3.2 Site and Field Audit

Daylight site inspections were carried out on 25th and 27th August 2018 and a night time audit was undertaken on 29th August 2018 in fine weather conditions. A number of photographs and videos were taken.

3.3 Completion Meeting

Not required.

4 ROAD SAFETY AUDIT FINDINGS

4.1 Introduction

The road safety audit findings have been documented in Table 4.2.

Table 4.1 provides specific details of the audit findings and a risk rating as high, medium or low. The risk ratings have been based on the risk matrix presented in Table 4.1, which has been adopted from the standard Austroads Risk Matrix.

Table 4.1: Risk Matrix

Likelihood / Severity	Highly probable	Occasional	Improbable
Major	High	High	Medium
Moderate	High	Medium	Low
Minor	Medium	Low	Low

The terms in Table 4.1 are described below.

Likelihood:

- Highly probable: It is likely that more than one crash of this type could occur within a five-year period.
- Occasional: It is likely that less than one crash of this type could occur within a five-year period.
- Improbable: Less than one crash of this type could occur within a 10-year period.

Severity:

- Major: The crash is likely to result in a fatality or serious injuries

  For example, high/medium speed vehicle collision, high/medium speed collision with a fixed object, pedestrian struck at high speed, and cyclist hit by car.

- Moderate: The crash is likely to result in minor injuries or large scale of property damage

  For example, some slow speed vehicle collisions, cyclist falls, and rear end crashes.

- Minor: The crash is likely to result in minor property damage or many near miss crash events

  For example, some slow speed collisions, pedestrian walks into object (no head injury), and car reverses into post.

Priority:

- High: Very important, and needs to be addressed urgently.
- Medium: Important, and needs to be addressed as soon as possible.
- Low: Needs to be considered as part of regular maintenance/planning program.

4.2 Responding to the Audit Report

As set out in the road safety audit guidelines, the responsibility for the roads rests with the project manager, not with the auditor. The project manager is under no obligation to accept the audit findings. Neither is it the role of the auditor to agree to, or approve the project manager's responses to the audit.

The audit provides the opportunity to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations.

4.3 Road Safety Audit Findings

The audit findings are documented in Table 4.2 which provides:

- specific details of the road safety issues identified during the audit
- a risk level rating for each of the road safety audit findings.

It should be acknowledged that positive attributes of the audited road section have not been discussed. Deficiencies that do not cause a safety problem are also not listed.

In-line with RMS best practice, recommendations have not been included in the road safety audit findings.

Designers are to respond to each road safety audit finding shown in Table 4.2. They can either accept the audit finding by amending the design, or disagree with a justification. This document shall be submitted to the approval authority as part of the design approval process.

Table 4.2: Road Safety Audit Findings

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
1	Signage is not provided at the start and end of the walkway to prohibit cyclists from using the walkway. Given the undulating nature of Barrenjoey Road it is thought that some cyclists may use the walkway which may lead to incidents with pedestrians.		Improbable	Moderate	Low	
2	Garbage bins were located within the intersection of Barrenjoey Road and the access road to the Palm Beach Water Taxi. Garbage bins located within the intersection are likely to present a hazard for trucks undertaking turning movements at the intersection		Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
3	There is a pedestrian desire line from the start of the walkway which leads down to the toilets. The alternative route (i.e. through the car park) involved a diversion through the car park. The desire line is clearly used down a relatively steep embankment and if pedestrians use this shorter route, they could slip and fall.		Improbable	Moderate	Low	
4	No Parking signage is installed along Barrenjoey Road between the Palm Beach Water Taxi access road and Palm Beach Road. No Parking signage permits motorists to park for up to two minutes which would not be safe in this location as there is insufficient road shoulder width. If motorists parked within the No Parking area, following motorists would have to cross double barrier lines to overtake the parked vehicle which is illegal.	 	Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
	Furthermore, there are no parking restrictions in some locations which may result in motorists parking within the narrow road shoulder.					
4	The pedestrian access ramps do not include any pavement decals. Given a high proportion of path users will be tourists, consideration should be given to providing additional delineation. i.e. “Look Left”.	 	Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
						
5	The lane markings and extent of the bus zone are not easily identifiable. This could result in cars entering the bus zone with potential late lane changes when they find it is a bus zone. This could result in side swipe type crashes.		Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
6	Gaps are provided between safety barriers along Barrenjoey Road to permit pedestrian access. However, the pedestrian footpath facilities do not provide any pedestrian access facilities for disabled persons or parents with prams.	 	Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
7	Provision of an indented on-street parking space adjacent 1185 Barrenjoey Road has resulted in a sharp change in the alignment of the walkway. The property boundary fence restricts forward visibility which may lead to incidents with children (up to 16 years of age) legally cycling northbound on the walkway.		Occasional	Moderate	Medium	
8	Provision of an indented on-street parking space adjacent 1185 Barrenjoey Road has resulted in a sharp change in the alignment of the walkway. Children up to 16 years of age are permitted to cycle on the walkway. Northbound cyclists may lose control given the downhill gradient of the walkway on approach to the indented car space.		Occasional	Moderate	Medium	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
9	There were a large number of trip hazards adjacent to the footpath		Improbable	Moderate	Low	
10	Some of the property accesses were not complete at the time of the audit.		Note only			
11	In some places, fences, and barriers extend into the footpath. This could result in pedestrians catching arms etc on the protrusions.		Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
						
12	There were some steep falls located a short distance away from the footpath. This could result in pedestrians falling down the bank as there is no fence to prevent this from happening.		Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
13	The 40m /h road marking may be covered when a large vehicle parks within the parking space.	 	Improbable	Moderate	Low	
14	The alignment of the drop kerb crossing was such that it does not match up with the break in the kerb on the other side.		Improbable	Moderate	Low	

Item No.	Descriptions of Findings	Drawing	Likelihood	Severity	Risk Rating	Designer Response
15	It is unclear why the driveway to 1180 Barrenjoey Road is 6-8m wide. A wide driveway may encourage motorists to undertake turning manoeuvres into/ from the property at speed across the walkway.		Improbable	Moderate	Low	
16	The 50 km/h repeater sign is unnecessarily close to the 40 km/h sign.		Improbable	Moderate	Low	
17	A northbound bus was observed crossing the centre double barrier line on the corner adjacent 1180 Barrenjoey Road. The bus could collide with a vehicle travelling in the opposing direction when a northbound bus (or large truck) crosses the centre line.		Occasional	Moderate	Medium	

5 CONCLUDING STATEMENT

The findings and opinions in the report are based on the examination of the specific road and environs, and might not address all concerns existing at the time of the audit.

The auditors have endeavoured to identify features of the road that could be modified in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so at their own risk without any liability to the Auditors.

_____

Wayne Johnson
Level 3 Lead Road Safety Auditor
The Transport Planning Partnership

_____

Ken Hollyoak
Level 3 Road Safety Auditor
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Appendix A

Audited Design Drawings

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02 8437 7800

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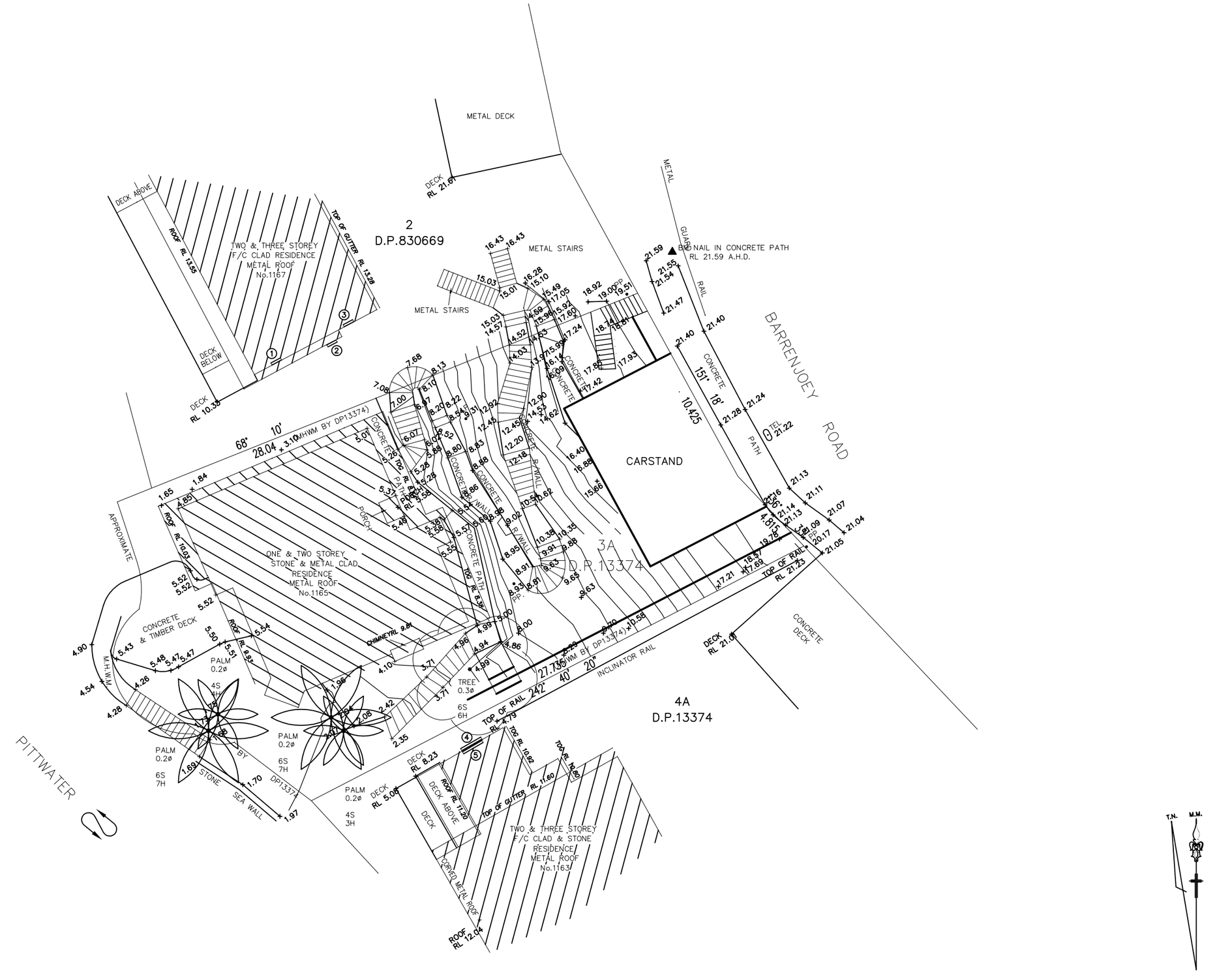
www.ttpp.net.au

13. Appendix E - Construction Certificate Engineering Plans

- Drawing No. DA01 Issue A Dated August 2018 – Site Plan
- Drawing No. DA02 Issue A Dated August 2018 – Site Plan
- Drawing No. DA03 Issue A Dated August 2018 – Inclinator
- Drawing No. DA04 Issue A Dated August 2018 – Car Stand Elevations
- Drawing No. DA05 Issue A Dated August 2018 – Car Stand Elevations



All Dimensions are in millimetres
Written Dimensions preferred to scale
All measurements to be checked on site
All work to BCA and AS
NOT FOR CONSTRUCTION

© Copyright 2018

Client
MR. JOHN OLIVER
1165 BARRENJOEY ROAD
PALM BEACH NSW 2108

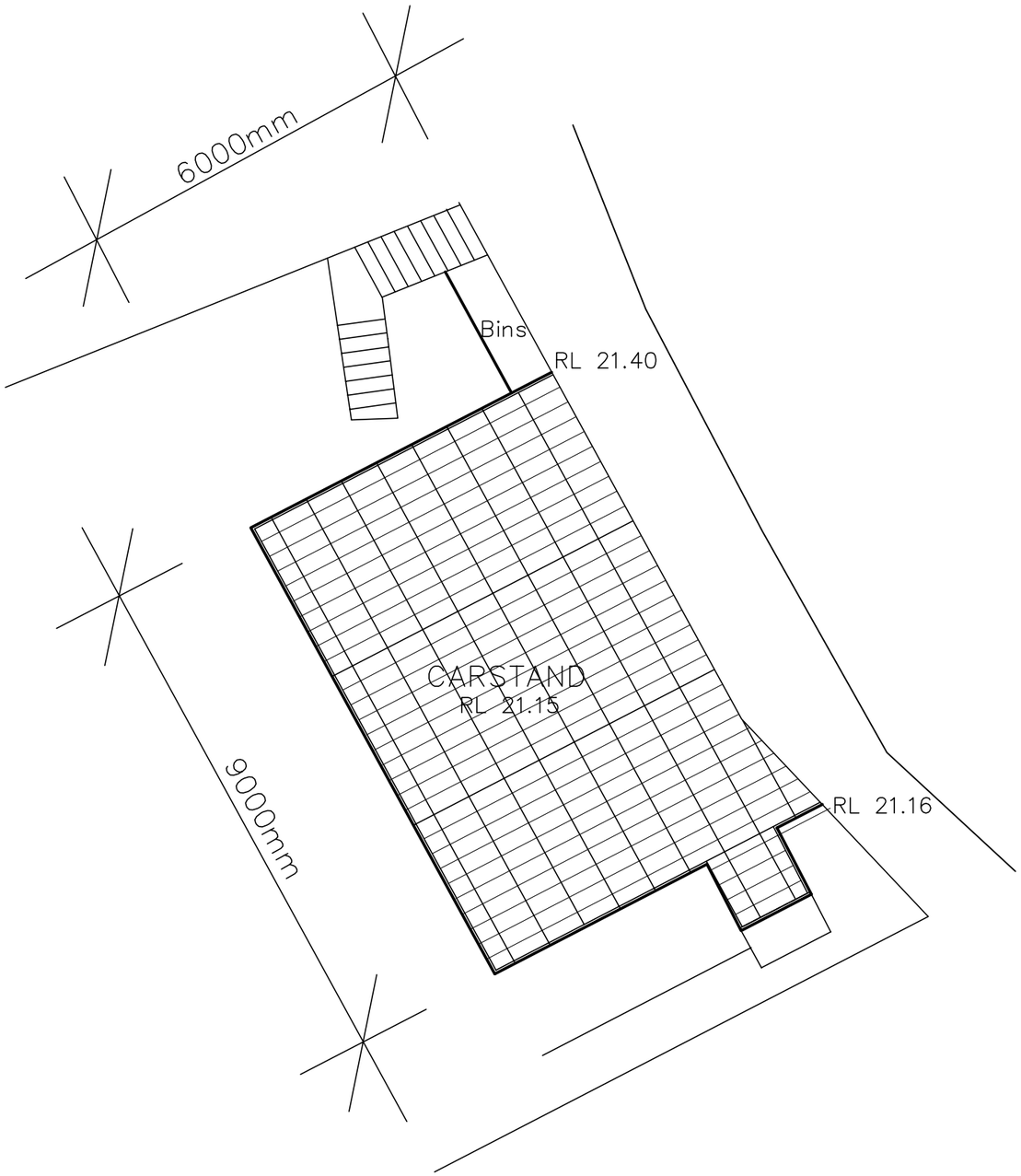
Project
CAR STAND AND INCLINATOR
1165 BARRENJOEY ROAD
PALM BEACH NSW 2108

Drawing
SITE PLAN

PETER PRINCI architects
ABN 34 315 485 678
P.O. Box 615
Frenchs Forest NSW 1640
Email: peter@pparchitects.com.au
Ph: (02) 9452 5661
Fax: (02) 9452 5662
Mobile: 0418 166 002

Drawn	Job No.
PP	
Checked	Date
PP	Aug '18
Scale	Issue
1: 200	A

Drawing No.
DA01



PLAN – CARSTAND

T.N. M.M.

All Dimensions are in millimetres
Written Dimensions preferred to scale
All measurements to be checked on site
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Client
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Project
CAR STAND AND INCLINATOR
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Drawing
SITE PLAN

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Drawn	Job No.
PP	
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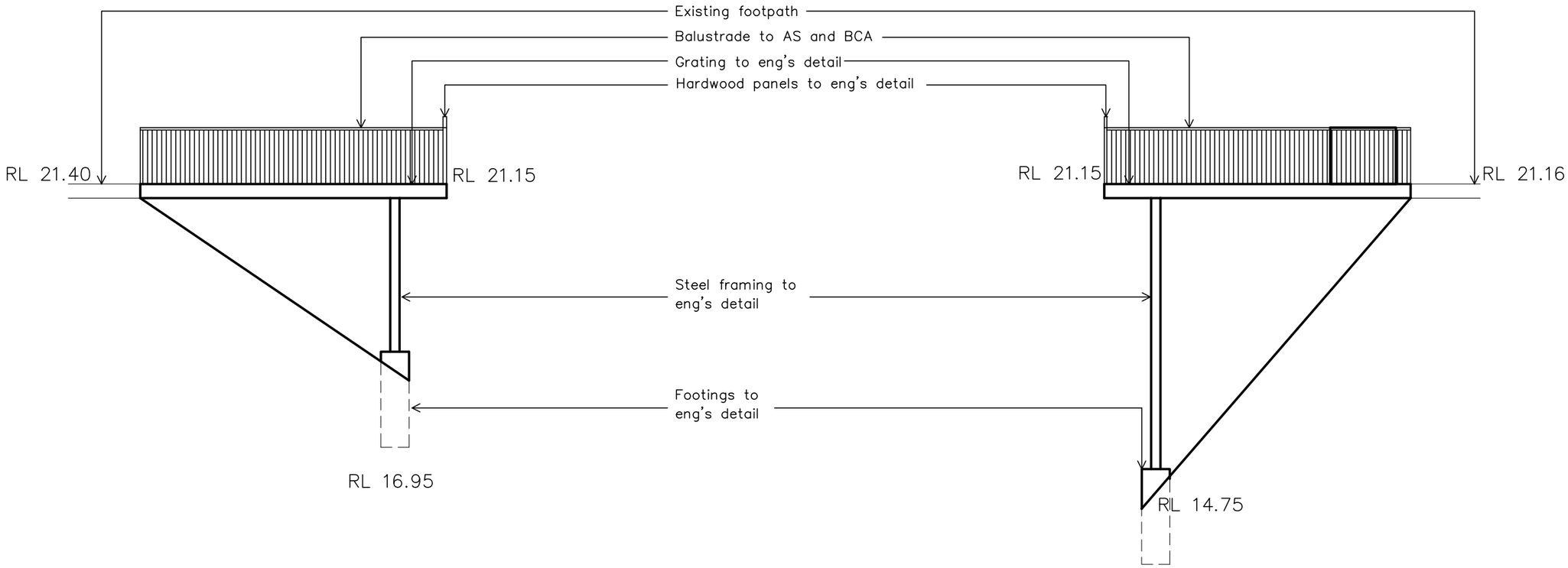
PP	Aug '18
Scale	Issue
1:100	A

Drawing No.
DA02



NORTH ELEVATION

SOUTH ELEVATION

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CARSTAND – ELEVATIONS

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Scale	Issue
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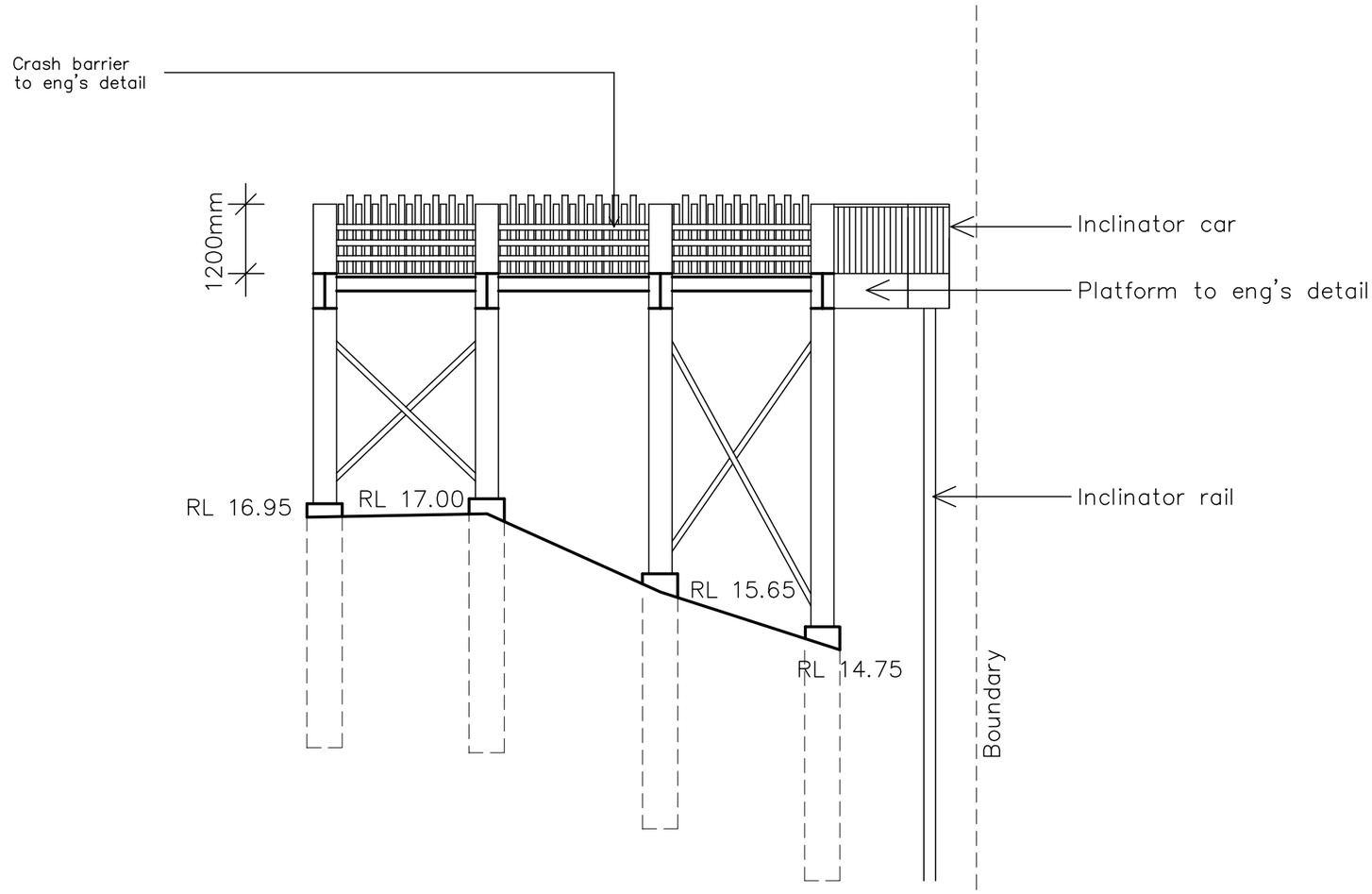
Drawing No.
DA04



WEST ELEVATION

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Drawing
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Scale	Issue
1:100	A

Drawing No.
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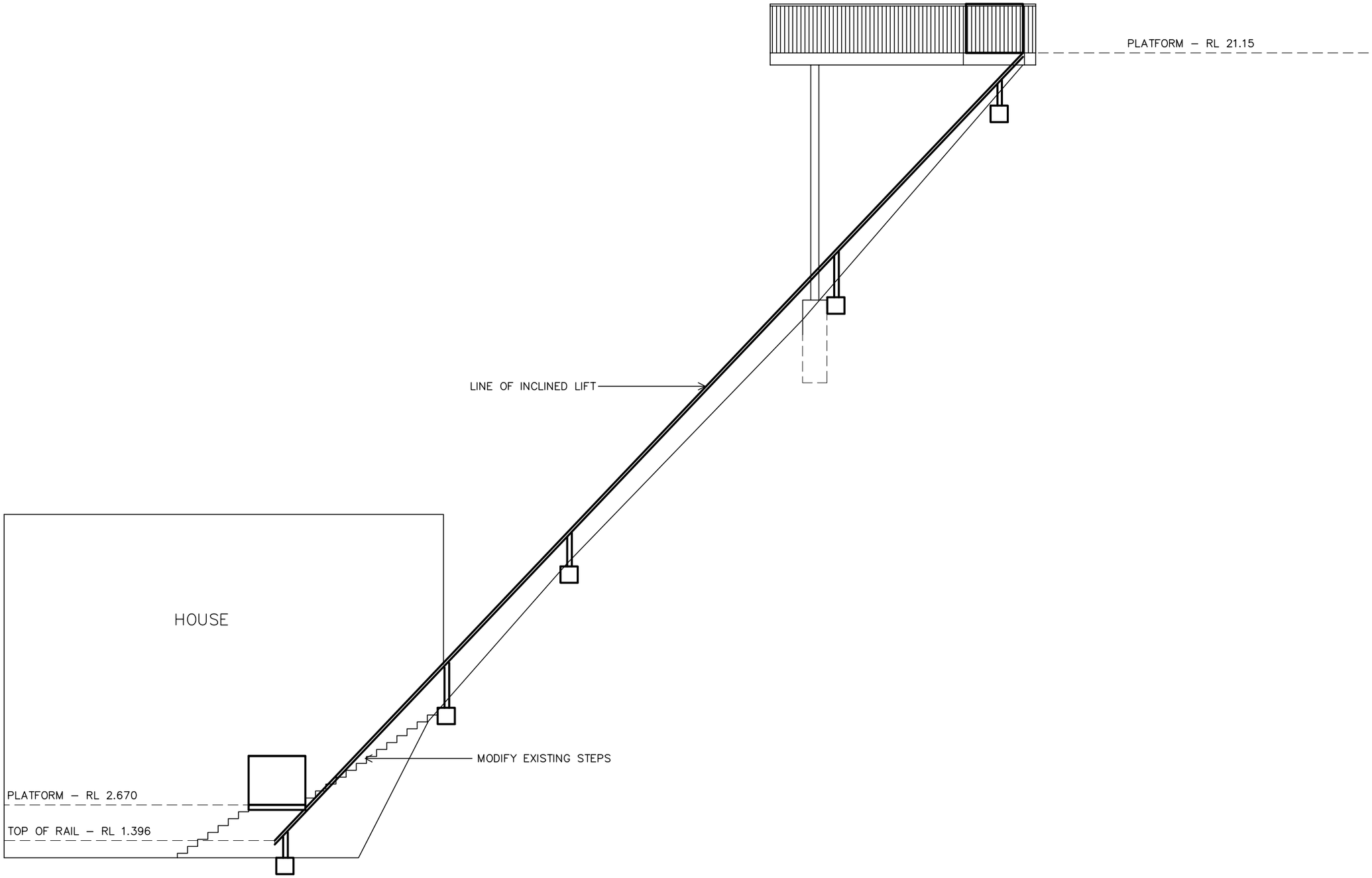

INCLINATOR – SECTIONAL ELAVATION

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Drawn	Job No.
PP	
Checked	Date
PP	Aug '18
Scale	Issue
1:100	A

Drawing No.
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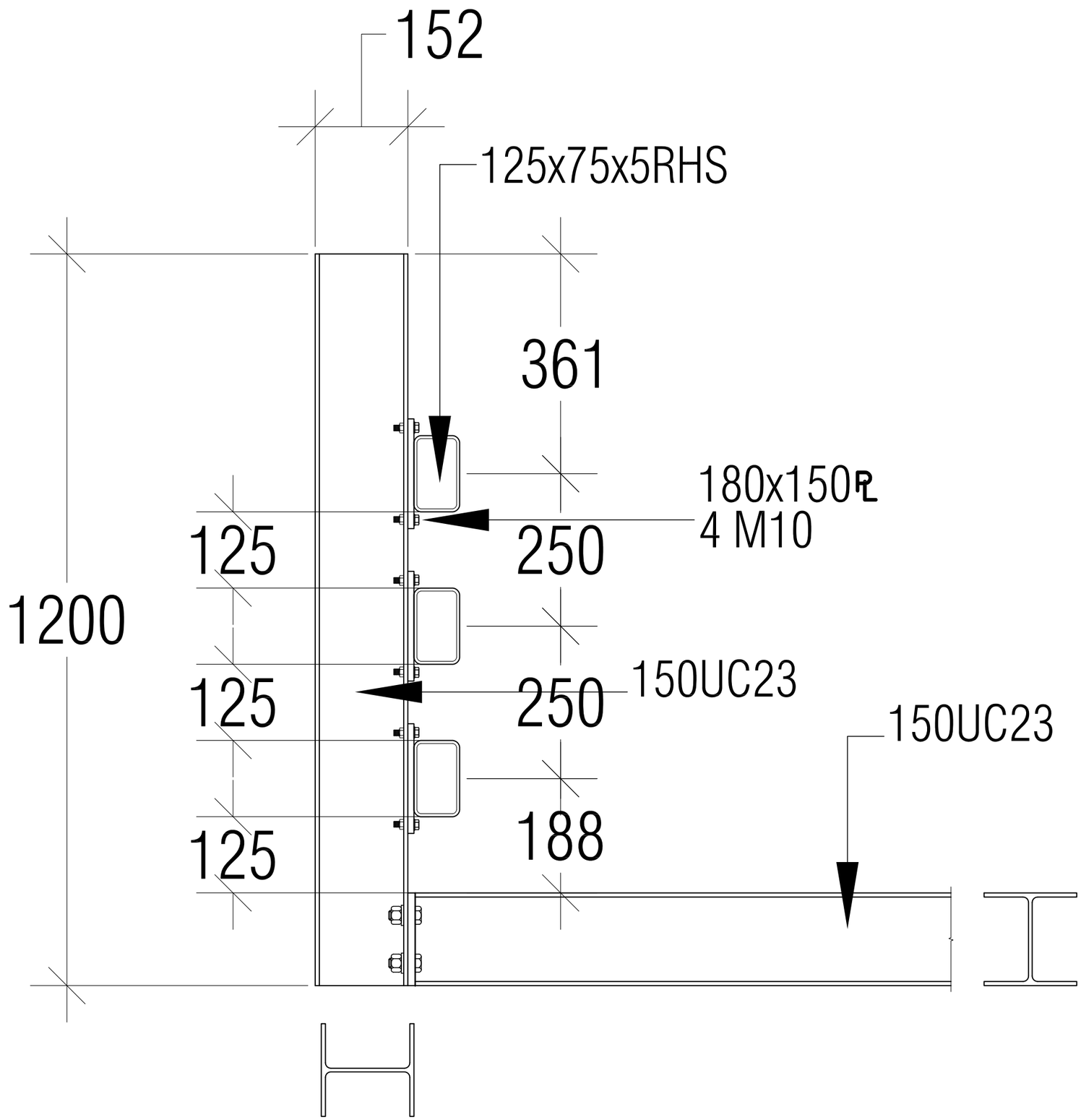

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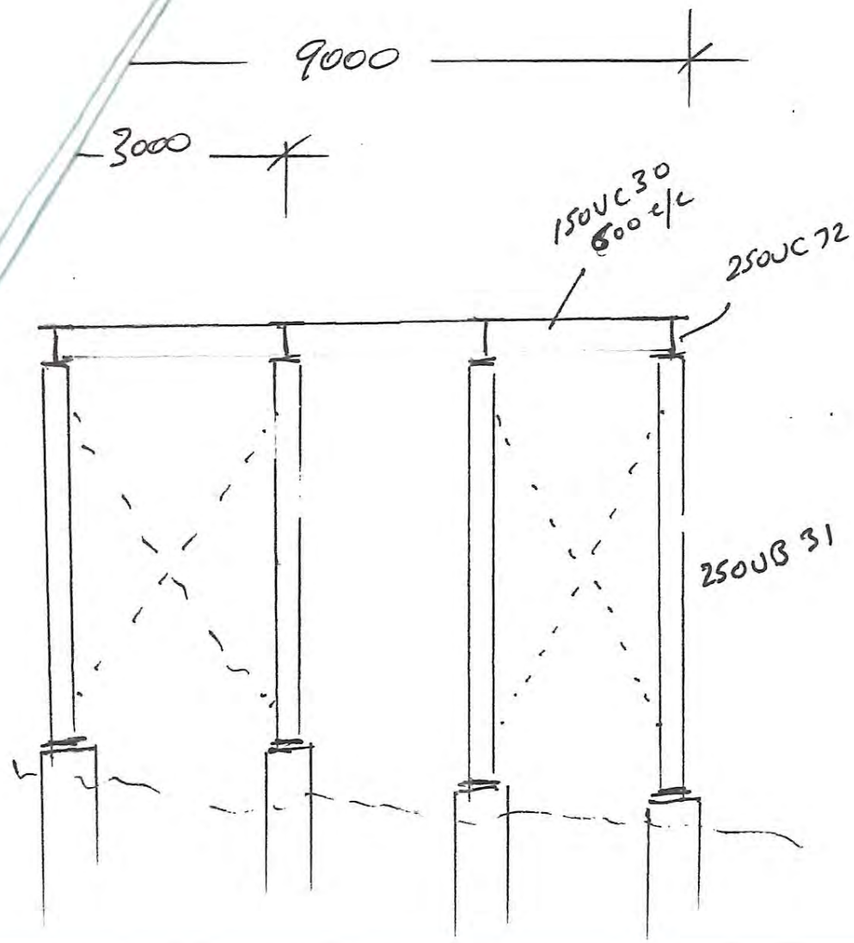

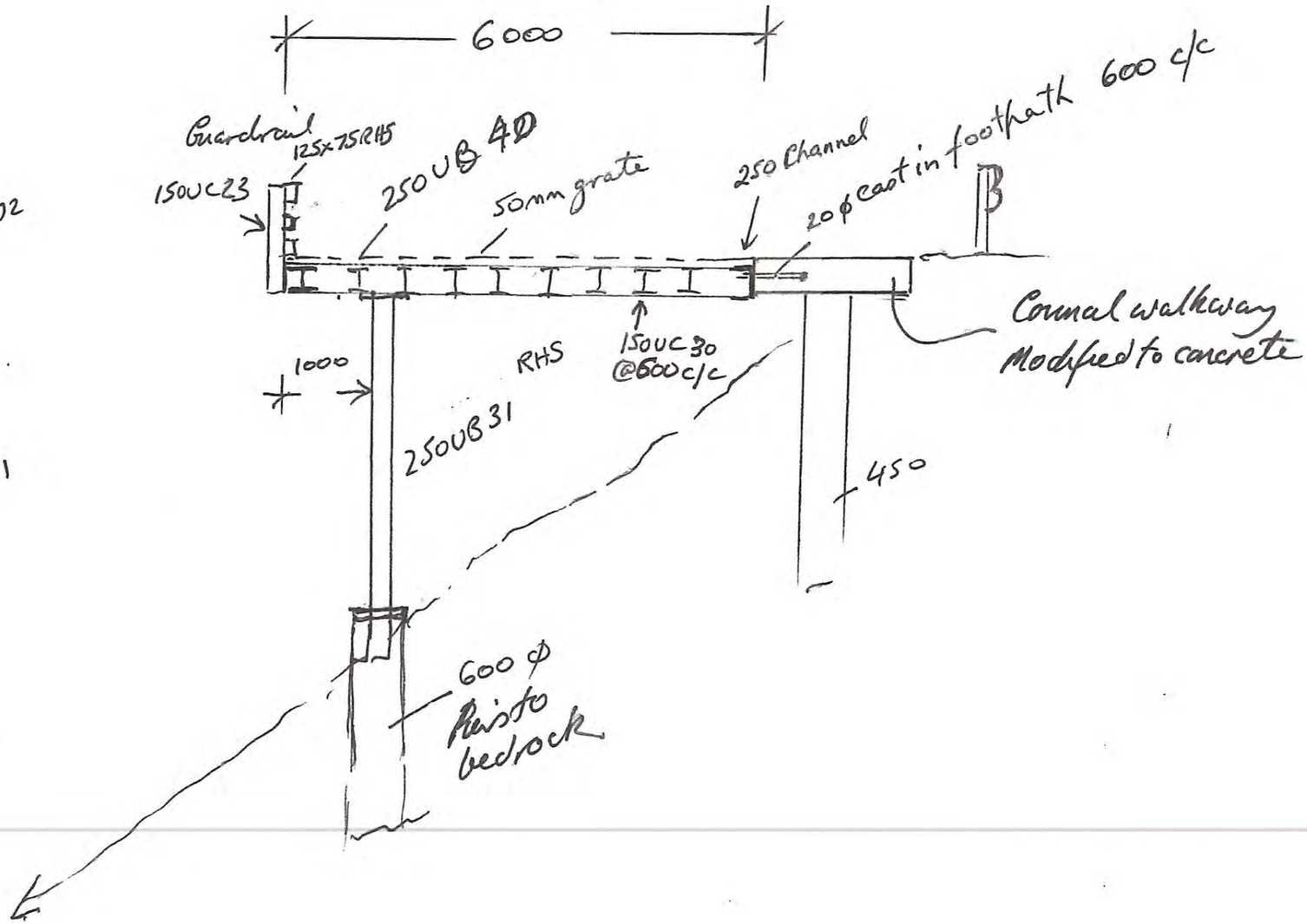

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14. Appendix F – RSA Stage 3 Checklist

Checklist 3: Detailed design stage audit

Issue	Yes	No	Comment
3.1 General topics			
1 Changes since previous audit			
Do the conditions for which the scheme was originally designed still apply? (i.e. no significant changes to the surrounding network or area to be served, or traffic mix.)			N/A
Has the design of the project remained unchanged since previous audit (if any)?			N/A
2 Drainage			
Will the new road drain adequately?			N/A
Are the road grades and crossfalls adequate for satisfactory drainage?			N/A
Are flat spots avoided or adequately dealt with at start/end of superelevation?			N/A
Has the possibility of surface flooding been adequately addressed, including overflow from surrounding or intersecting drains and water courses?			N/A
Is gully pit spacing adequate to limit flooding?			N/A
Is pit grate design safe for pedal cycles? (i.e. gaps not parallel with wheel tracks)			N/A
Will footpaths drain adequately?			N/A
3 Climatic conditions			
Has the design taken into account weather records or local experience which may indicate a particular problem? (for example, snow, ice, wind, fog)			N/A
4 Landscaping			
Will drivers be able to see pedestrians (and vice versa) past or over the landscaping?			N/A
Will intersection sight lines be maintained past or over the landscaping?			N/A
Will safety be adequate with seasonal growth? (for example, no obscuring of signs, shading or light effects, slippery surface, etc.)			N/A
Will roadside safety be adequate when trees or plantings mature (no roadside hazard)?			N/A
Has 'frangible' vegetation been used in possible run-off road areas?			N/A

Issue	Yes	No	Comment
5 Services			
Does the design adequately deal with buried and overhead services? (especially in regard to overhead clearances, etc)			N/A
Has the location of fixed objects/furniture associated with services been checked? (including any loss of visibility, position of poles, and clearance to overhead wires)			N/A
6 Access to property and developments			
Can all accesses be used safely?	Y		
Is the design free of any downstream or upstream effects from accesses, particularly near intersections?	Y		
Do rest areas and truck parking area have adequate sight distance at access points?			N/A
7 Emergencies, breakdowns, emergency and service vehicle access			
Has provision been made for safe access and movements by emergency vehicles?	Y		
Does the design and positioning of medians and vehicle barriers allow emergency vehicles to stop and turn without unnecessarily disrupting traffic?	Y		
Have broken-down vehicles or stopped emergency vehicles been adequately considered?			N/A
Is provision for emergency telephones satisfactory?			N/A
Are median breaks on divided carriageways safely located? (i.e. frequency, visibility)			N/A
8 Future widening and/or realignments			
If the scheme is only a stage towards a wider or dual carriageway is the design adequate to impart this message to drivers? (is the reliance on signs minimal/appropriate, rather than excessive?)			N/A
Is the transition between single and dual carriageway (either way) handled safely?			N/A
9 Staging of the scheme			
If the scheme is to be staged or constructed at different times: - are the construction plans and program arranged to ensure maximum safety? - do the construction plans and program include specific safety measures, signing; adequate			N/A

Issue	Yes	No	Comment
transitional geometry, etc. for any temporary arrangements?			
10 Staging of the work			
If the construction is to be split into several subprojects, is the order safe? (i.e. the stages are not constructed in an order that creates unsafe conditions.)			N/A
11 Adjacent developments			
Does the design handle accesses to major adjacent generators of traffic and developments safely?			N/A
Is drivers' perception of the road ahead free of misleading effects of any lighting or traffic signals on an adjacent road?	Y		
Has the need for screening against glare from lighting of adjacent property been adequately considered?			N/A
12 Stability of cut and fill			
Is the stability of batters satisfactory? (for example, no potential for loose material to affect road users)			N/A
13 Skid resistance			
Has the need for anti-skid surfacing been considered where braking or good road adhesion is most essential? (for example, on gradients, curves, approaches to intersections and signals)			N/A
3.2 Design issues (general) **1 Geometry of horizontal and vertical alignment**			
Does the horizontal and vertical design fit together correctly?	Y		
Is the vertical alignment consistent and appropriate throughout?	Y		
Is the horizontal alignment consistent throughout?	Y		
Is the alignment consistent with the function of the road?	Y		
Is the design free of misleading visual cues? (for example, visual illusions, subliminal delineation like lines of poles)	Y		

Issue	Yes	No	Comment
2 Typical cross-sections			
Are lane widths, shoulders, medians and other cross-section features adequate for the function of the road?			N/A
Is the width of traffic lanes and carriageways suitable in relation to: - alignment? - traffic volume? - vehicle dimensions? - the speed environment? - combinations of speed and traffic volume?			N/A
Are the shoulder widths adequate for stationary vehicles and errant vehicles?			N/A
Are median widths adequate for road furniture?			N/A
Is superelevation consistent with the road environment?			N/A
Are the shoulder crossfalls safe for vehicles to traverse?	Y		
Are batter slopes drivable for cars, trucks?			N/A
Are side slopes under structures appropriate?			N/A
Have adequate facilities been provided for pedestrians and cyclists?			N/A
3 Effect of cross-sectional variation			
Is the design free of undesirable variations in cross-section design?	Y		
Are crossfalls safe? (particularly where sections of existing highway have been used, there have been compromises to accommodate accesses, at narrowings at bridges, etc.)			N/A
Are any curves with adverse crossfall within appropriate limits?			N/A
Is superelevation provided and sufficient at all locations where required?			N/A
4 Roadway layout			
Are all traffic management features designed so as to avoid creating unsafe conditions?	Y		
Is the layout of road markings and reflective materials able to deal satisfactorily with changes in alignment? (particularly where the alignment may be substandard.)			N/A
Is there adequate provision for overtaking?			N/A
Are overtaking lanes provided where required and safely commenced and ended?			N/A
Are overtaking requirements satisfactory?			N/A

Issue	Yes	No	Comment
Is the design free of sunrise/sunset problems?			N/A
Have public transport requirements been adequately catered for?			N/A
5 Shoulders and edge treatment			
Are the shoulders likely to be safe if used by slow moving vehicles or cyclists?			N/A
Are the following safety aspects of shoulder provision satisfactory? - provision of sealed or unsealed shoulders; - width and treatment on embankments; - crossfalls of shoulders.			N/A
6 Effect of departures from standards or guidelines			
Any approved departures from standards or guidelines: is safety maintained?	Y		
Any hitherto undetected departures from standards: is safety maintained?			N/A
7 Visibility and sight distance			
Are horizontal and vertical alignments consistent with visibility requirements?	Y		
Has an appropriate design speed been selected for visibility requirements?	Y		Note Council / RMS proposal for 40km/hr speed limit – suggest curve speed signage on bend
8 Environmental treatments			
Has safety been considered in the location of environmental features? (for example, noise fences)	Y		N/A
3.3 Alignment details **1 Visibility; sight distance**			
Are horizontal and vertical alignments consistent with the visibility requirements?	Y		Convex mirror would assist vehicles exiting if reversing
Is the design free of sight line obstructions due to safety fences or barriers? - boundary fences? - street furniture? - parking facilities? - signs? - landscaping? - bridge abutments? - parked vehicles in laybys or at the kerb? - queued traffic?	Y		Convex mirror would assist vehicles exiting if reversing

Issue	Yes	No	Comment
Are railway crossings, bridges and other hazards all conspicuous?			N/A
Is the design free of any other local features which may affect visibility?	Y		N/A
Is the design free of overhead obstructions (for example, road or rail overpasses, sign gantries, overhanging trees) which may limit sight distance at sag curves?	Y		
Has a clear headroom or a high vehicle detour been provided where necessary?			N/A
Is visibility adequate at: - any pedestrian, bicycle or cattle crossings? - access roads, driveways, on and off ramps, etc.?	Y		
Has the minimum sight triangle been provided at: - entry and exit ramps? - gore areas? - intersections? - roundabouts? - other conflict points?			N/A
2 New/existing road interface			
Have implications for safety at the interface been considered?	Y		
Is the transition from old road to the new scheme satisfactory?			N/A
If the existing road is of a lower standard than the new scheme, is there clear and unambiguous warning of the reduction in standard?			N/A
Have the appropriate provisions for safety been made where sudden changes in speed are required?			N/A
Is access or side friction handled safely?			N/A
Does the interface occur well away from any hazard? (for example, a crest, a bend, a roadside hazard or where poor visibility/distractions may occur.)		N	Reduction in speed limit, convex mirror and curve speed advisory signage would reduce risk
If carriageway standards differ, is the change effected safely?			N/A
Is the transition where the road environment changes (for example, urban to rural; restricted to unrestricted; lit to unlit) done safely?			N/A
Has the need for advance warning been considered?	Y		N/A

Issue	Yes	No	Comment
3 Readability of the alignment by drivers			
Will the general layout, function and broad features be recognised by drivers in sufficient time?	Y		
Will approach speeds be suitable and will drivers correctly track through the scheme?	Y		Reduction in speed limit + curve speed advisory signage would reduce risk
4 Detail of geometric design			
Are the design standards appropriate for all the requirements of the scheme?	Y		
Is consistency of general standards and guidelines, such as lane widths and cross falls, maintained?			N/A
5 Treatment at bridges and culverts			
Is the geometric transition from the standard cross-section to that on the bridge handled safely?			N/A
3.4Intersections			
1 Visibility to and at intersections			
Are horizontal and vertical alignments at the intersection or on the approaches to the intersection consistent with the visibility requirements?			N/A
Is the standard adopted for provision of visibility appropriate for the speed of traffic and for any unusual traffic mix?			N/A
Will the design be free of sight line obstructions due to: - safety fences or barriers? - boundary fences? - street furniture? - parking facilities? - signs? - landscaping? - bridge abutments? - parked vehicles in laybys and at the kerb? - queued traffic?	Y		Reduction in speed limit, convex mirror and curve speed advisory signage would reduce risk
Are railway crossings, bridges and other hazards all conspicuous?			N/A
Is the design free of any other local features which may affect visibility?	Y		
2 Layout			
Are intersections and accesses adequate for all vehicular movements?			N/A

Issue	Yes	No	Comment
Have the appropriate design vehicle and check vehicle been used for turning dimensions?	Y		Turning path analysis undertaken as part of separate submission
Are swept paths accommodated for all likely vehicle types? (has the appropriate design vehicle been used?)	Y		
Are intersections free of any unusual features which could affect road safety?			N/A
Are pedestrian fences provided where needed? (for example, to guide pedestrians or discourage parking.)			N/A
Has pavement anti-skid treatment been provided where needed?			N/A
Have islands and signs been provided where required?			Curve speed advisory signage would reduce risk to general traffic around bend
Vehicles which may park at or close to the intersection: can they do this safely or does this activity need to be relocated?			N/A
Are safety hazards due to parked vehicles avoided?	Y		Provision of double centre line on approach to intersection of Explorers Way for 10m will prevent on-street parking near intersection
3 Readability by drivers			
Will the existence of the intersection and its general layout, function and broad features be perceived correctly and in adequate time?			N/A
Are the approach speeds and likely positions of vehicles tracking through the intersection safe?			N/A
Is the design free of misleading elements?	Y		
Is the design free of sunrise or sunset problems which may create a hazard for motorists?			N/A
4 Detailed geometric design			
Can the layout safely handle unusual traffic mixes or circumstances?			N/A
Does any median or any island safely account for: - vehicle alignments and paths? - future traffic signals? - pedestrian storage space and surface? - turning path clearance? - stopping sight distance to the nose? - mountability by errant vehicles?			N/A

Issue	Yes	No	Comment
Is adequate vertical clearance to structures provided? (for example, powerlines, shop awnings)			N/A
5 Traffic signals			
Is the signal phasing/sequence safe?			N/A
Is adequate time provided for traffic movements and pedestrian movements?			N/A
Will the signal lanterns be visible? (for example, not obstructed by trees, poles, signs or large vehicles.)			N/A
Are lanterns for other approach directions adequately shielded from view?			N/A
Are high-intensity signals and/or target boards provided if likely to be affected by sunrise/sunset?			N/A
Does the alignment (vertical and horizontal) provide satisfactory stopping sight distance to the intersection or back of queue?			N/A
Are pedestrian facilities provided where they are required?			N/A
Will approaching drivers be able to see pedestrians?	Y		N/A
Are partially or fully controlled turning phases provided where required?			N/A
Are signal posts located where they are not an undue hazard?			N/A
Are road markings for turning traffic satisfactory?			N/A
Have adequate pedestrian phases been provided?			N/A
6 Roundabouts			
Is adequate deflection provided to reduce approach speeds?			N/A
If splitter islands are needed, are they adequate for sight distance, length, pedestrian storage, etc.?			N/A
Is the central island prominent?			N/A
Can the appropriate design vehicle and check vehicle be accommodated?			N/A
Are the central island details satisfactory? (delineation, mountability, conspicuousness)			N/A
Can pedestrians be seen by drivers in sufficient time?			N/A

Issue	Yes	No	Comment
Can pedestrians determine whether vehicles are turning? (no obstructions to sight lines)			N/A
Are direction markings in approach lanes provided where required?			N/A
Is the lighting adequate?			N/A
7 Other intersections			
Has the need for kerbed or painted islands and refuges been considered?			N/A
Do intersections have adequate queue length/storage for turning movements (including in the centre of a staggered intersection)?			N/A
3.5 Special road users			
1 Adjacent land			
Are all accesses to and from adjacent land/properties safe?	Y		No change
Have the special needs of agriculture and stock movements been considered?			N/A
2 Pedestrians			
Can pedestrians cross safely at: - intersections? - signalised and pedestrian crossings? - refuges? - kerb extensions? - bridges and culverts? - other locations?			N/A
Is each crossing point satisfactory for: - visibility, for each direction? - use by the disabled? - use by the elderly? - use by children/schools?			N/A
Is pedestrian fencing on reservations and medians provided where required for each crossing?			N/A
Is fencing adequate on freeways?			N/A
Are pedestrians deterred from crossing roads at unsafe locations?		N	Proposal does not alter this existing arrangement
Are pedestrian related signs appropriate and adequate?			N/A
Is width and gradient of pedestrian paths, crossings, etc. satisfactory?	Y		
Is surfacing of pedestrian paths, crossings, etc. satisfactory?	Y		

Issue	Yes	No	Comment
Have dropped kerbs been provided for each crossing?			N/A
Have channels and gullies been avoided at each crossing?			N/A
Is lighting satisfactory for each crossing?			N/A
Are crossings sited to provide maximum use?			N/A
Is avoidance of a crossing unlikely? (for example, by more direct but less safe alternative)	Y		Nature of location is deterrent
3 Cyclists			
Have the needs of cyclists been considered: - at intersections (particularly roundabouts)? - especially on higher speed roads? - on cycle routes and crossings? - at freeway entry and exit ramps?			N/A
Are shared cycleway/footway facilities (including subways and bridges) safe and adequately signed?			N/A
4 Motorcyclists			
Has the location of devices or objects that might destabilise a motorcycle been avoided on the road surface?			N/A
Is the roadside clear of obstructions where motorcyclists may lean into curves?	Y		
Will warning or delineation be adequate for motorcyclists?	Y		
Has barrier kerb been avoided in high-speed areas?			N/A
In areas more likely to have motorcycles run off the road is the roadside forgiving or safely yielded?			N/A
Are all unnecessary poles, posts and devices removed or appropriately shielded?			N/A
Are drainage pits and culverts traversable by motorcycle?			N/A
5 Equestrians and stock			
Have the needs of equestrians been considered, including the use of verges or shoulders and rules regarding the use of the carriageway?			N/A
Can underpass facilities be used by equestrians/stock?			N/A

Issue	Yes	No	Comment
6 Freight			
Have the needs of truck drivers been considered, including turning radii and lane widths?			N/A
Have the needs of freight transport been considered, adequately signed and catered for?			N/A
7 Public transport			
Have the needs for public transport been considered, adequately signed and catered for?			N/A
Have the needs of public transport users been considered?			N/A
Have the manoeuvring needs of public transport vehicles been considered?			N/A
Are bus stops well positioned for safety?			N/A
8 Road maintenance vehicles			
Have the needs of road maintenance vehicles been considered, adequately signed and catered for?			N/A
Can maintenance vehicles be safely located?			N/A
3.6 Lighting, signs and delineation			
1 Lighting			
Has lighting been adequately provided where required?			N/A
Is the design free of features which interrupt illumination? (for example, trees or overbridges)			N/A
Is the design free of lighting poles that would present a fixed roadside hazard?			N/A
Are frangible or slip-base poles to be provided?			N/A
Ambient lighting: if it creates special lighting needs, have these been satisfied?			N/A
Is the lighting scheme free of confusing or misleading effects on signals or signs?			N/A
Does the lighting adequately illuminate crossings, nearby paths, refuges, etc.?			N/A
Are all gore areas adequately illuminated?			N/A
Are all merge areas adequately illuminated?			N/A
Is the scheme free of any lighting black patches?			N/A
If there are locations with accident problems that are known to be amenable to treatment with improved lighting, has this lighting been provided?			N/A

Issue	Yes	No	Comment
2 Signs			
Are signs appropriate for their location?		N	Traffic would benefit from curve speed advisory signage
Are signs located where they can be seen and read in adequate time?			N/A
Will signs be readily understood?			N/A
Are signs appropriate to the driver's needs? (for example, direction signs, advisory speed signs, etc.)		N	Traffic would benefit from curve speed advisory signage
Are signs located so that drivers' sight distance is maintained?			N/A
Are signs located so that visibility is maintained: - to/from accesses and intersecting roads? - to/from pedestrians and important features on the road?			N/A
Have the consequences of vehicles striking signposts been considered?			N/A
Are sign supports out of the clear zone?			N/A
If not, are they: - frangible? - shielded by barriers (e.g. guard fence, crash cushions)?			N/A
Has an over-reliance on signs (in lieu of adequate geometric design) been avoided?			N/A
Are signs on the new scheme consistent with those on the adjoining section of road (or will the previous signs need to be upgraded)?			N/A
3 Marking and delineation			
Are markings (lines, arrows, etc.) consistent with standard markings?			N/A
Have any locations where standard markings might be confusing or misread been identified and treated in a way which considers road users' likely responses?			N/A
Are barrier lines (no overtaking) provided where required?			N/A
Are raised retroreflective pavement markers (RRPMs) provided where necessary?			N/A
Are curve warning signs, advisory speed plates or chevron alignment markers provided where required?		N	Existing issue, traffic would benefit from curve speed advisory signage on bend
Are markings on the new scheme consistent with those on the adjoining section of road (or will the previous markings need to be upgraded)?			N/A

Issue	Yes	No	Comment
Are diagonal markings or chevrons painted where required?			N/A
Will markings and delineation be visible at night-time?			N/A
Will markings and delineation be visible in wet weather?			N/A
Has the need for profiled (audible) line marking been considered?			N/A
Have both high and low-beam cases been considered?			N/A
Are guide posts of the frangible type?			N/A
3.7 Physical objects **1 Median barriers**			
Have median barriers been considered and properly detailed?			N/A
Have all design features that require special attention (for example, end treatments) been considered?			N/A
2 Poles and other obstructions			
Are all poles located well away from moving traffic?			N/A
Have frangible or breakaway poles been included where required?			N/A
Are median widths adequate to accommodate lighting poles or trees?			N/A
Is the position of traffic signal controllers and other service apparatus satisfactory?			N/A
Is the roadside clear of any other obstructions that may create a safety hazard?			N/A
Have all necessary measures been taken to remove, relocate or shield all hazards?			N/A
Can roadside drains and channels be safely traversed by any vehicle that runs off the road?			N/A
3 Crash barriers			
Are crash barriers provided where necessary and properly detailed? (for example, at embankments, structures, trees, poles, drainage channels, bridge piers, gore areas)	Y		Proposal includes crash barrier around perimeter of parking facility

Issue	Yes	No	Comment
Is the crash barrier safe? (i.e. unlikely to create a danger for road users including pedestrians, cyclists, motorcyclists, etc.)	Y		The proposed barrier suitably designed would be an improvement compared to fencing on existing car decks in the location – reduction in speed limit would further reduce risk to pedestrians
Are the end conditions of the crash barrier safe and satisfactory?	Y		Any reduction in length of existing crash barrier is expect to have RMS approved end facilities
Is the guard fence designed according to standards for: - end treatments? - anchorages? - post spacing? - block outs? - post depth? - rail overlap? - stiffening at rigid obstacles?	Y		Any reduction in length of existing crash barrier is expect to have RMS approved end facilities
Is all guard fence necessary? (i.e. what it shields is a greater hazard than the fence)			N/A
Where pedestrians and cyclists travel behind guard fence, is the rear of the fence safe for them?			N/A
4 Bridges, culverts and causeways/floodways			
Are bridge barriers and culvert end walls safe regarding: - visibility? - ease of recognition? - proximity to moving traffic? - the possibility of causing injury or damage? - collapsible or frangible ends? - signs and markings? - connection of crash barriers? - roadside hazard protection?			N/A
Is the bridge railing at the correct level and strong enough?			N/A
Is the shoulder width on the bridge the same as on the adjacent road lengths?			N/A
Is safe provision made for non-vehicular traffic over structures? (for example, pedestrians, pedal cycles, horses/stock, etc).			N/A
Are all culvert end walls (including driveway culverts) drivable or outside the clear zone?			N/A
Have causeways/floodways etc. been given			N/A

Issue	Yes	No	Comment
correct signing and adequate sight distance?			
3.8 Additional questions to be considered for development proposals			
1 Horizontal alignment			
Is visibility adequate for drivers and pedestrians at proposed accesses?	Y		Provision of convex mirror would assist reversing vehicles viewing southbound traffic
Is adequate turning space provided for the volume and speed of traffic?			N/A
Are curve radii and forward visibility satisfactory?			N/A
Are sight and stopping distances adequate?			N/A
2 Vertical alignment			
Are gradients satisfactory?	Y		Generally flat
Are sight and stopping distances adequate?	Y		Traffic aware of parking deck facilities along corridor
3 Parking provision			
Is on-site parking adequate to avoid on-street parking and associated risks?	Y		Facility can accommodate two vehicles
Are parking areas conveniently located?	Y		
Is adequate space provided in parking areas for circulation and intersection sight distance?	Y		
4 Servicing facilities			
Are off-street loading/unloading areas adequate?			N/A
Are turning facilities for large vehicles provided in safe locations?			N/A
Is emergency vehicle access adequate?			N/A
5 Signs and markings			
Have necessary traffic signs and road markings been provided as part of a development?			N/A
Is priority clearly defined at all the intersection points within the car park and access routes?			N/A
Will the signs and markings be clear in all conditions, including day/night, rain, fog, etc.?			N/A
6 Landscaping			
Does landscaping maintain visibility at intersections, bends, accesses and pedestrian locations?			No landscaping proposed

Issue	Yes	No	Comment
Has tree planting been avoided where vehicles are likely to run off the road?			N/A
7 Traffic management			
Have any adverse area-wide effects been addressed?			N/A
Will the design keep travel speeds at a safe level?			N/A
Are the number and location of accesses appropriate?			Existing dwelling has no access or parking and is land locked
Are the facilities for public transport services safely located?			N/A
Are any bicycle facilities safely located in respect of vehicular movements?			N/A
Are pedestrian facilities adequate and safely located?			N/A
8 Other			
Has appropriate street lighting been provided?			N/A
Are all roadside hazards appropriately dealt with?			N/A
Has safe pedestrian access to the development been provided?	Y		Inclinator proposed
3.9 Any other matter **1 Safety aspects not already covered**			
Is the road able to safely handle oversize vehicles, or large vehicles like trucks, buses, emergency vehicles, road maintenance vehicles?			N/A
If required, can the road be closed for special events in a safe manner?			N/A
If applicable, are special requirements of scenic or tourist routes satisfied?			N/A
Have all unusual or hazardous conditions associated with special events been considered?			N/A
Have all other matters which may have a bearing on safety been addressed?	Y		