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25-27 Warriewood Road, Warriewood

Access Performance Solution Report

25-27 Warriewood Road, Warriewood

Access Performance Solution Report

Prepared for:

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Revision History

Doc.	Rev.	Date	Purpose	Prepared by:	Reviewed by:
APS	0	05/10/2020	Stakeholder Review	Hannah Collins	Yik-Xiang Hue
APS	1	17/12/2020	Stakeholder Review (Add. PS3)	Hannah Collins	Yik-Xiang Hue
APS	2	22/12/2020	For Construction	Hannah Collins	Yik-Xiang Hue

Executive Summary

J & G Knowles and Associates Pty Ltd has appointed 3D Access Pty Ltd to undertake an accessibility evaluation for 25-27 Warriewood Road, Warriewood.

This Access Performance Solution Report (APS) evaluates the proposed access provisions against the National Construction Code (NCC), Building Code of Australia (BCA) 2019 Performance Requirements. With the exception of these proposed Performance Solutions, all other aspects of the building in relation to access and mobility are to comply with the BCA Deemed-To-Satisfy (DTS) Provisions or have been granted other dispensations by approval/referral agencies.

The following variations to the DTS Provisions have been identified by the Relevant Building Surveyor (RBS):

Table 1 Proposed Performance Solutions and Reference Criteria

Proposed Performance Solution	Building Code of Australia	
	DTS Provision	Performance Requirement
To provide technical justification for step free access through a secondary pedestrian entrance along Lorikeet Grove Laneway in lieu of through the pedestrian entrance along Lorikeet Grove.	D3.1, Table D3.1	DP1 (a)
To provide technical justification to rationalise the distance of the secondary entrance being greater than 50M.	D3.2 (b) (ii)	DP1 (a)
To provide technical justification to support risers with a 25mm vertical gap where the riser meets the going. Consideration is given that stair goings will contain a depth of 355mm.	D3.3(a)(ii) Inter alia AS 1428.1, Clause 11.1 (d)	DP1 (a)

The proposed Performance Solutions have been evaluated and it is our considered opinion that the building design meets the BCA Performance Requirements with the inclusion of the following specification of required access measures:

Table 2 Specification of Required Access Measures

System	Performance Standard
Construction Requirements	<u>General</u> Access into the building shall be provided via the Lorikeet Grove laneway with the following design additions: ▪ Except for where addressed elsewhere in this report, the stair serving Lorikeet Grove will comply with Clause 11 of AS 1428.1 (Standards Australia, 2010);

System	Performance Standard
	▪ The ramp serving Lorikeet Grove Laneway will comply with Clause 10 of AS 1428.1 (Standards Australia, 2010); <u>Performance Solution 3 – Stair Nosing</u> The stair serving the Lorikeet Grove entry will be provided in accordance with the following: ▪ A 25mm vertical gap will occur where the riser meets the going; ▪ The stair goings will contain a depth of 355mm; and ▪ The stair will comply in all other aspects with Clause 11 and 12 of AS 1428.1 (Standards Australia, 2010).
Management in Use	<u>General</u> ▪ Signage will be provided at the bottom of the stairs on Lorikeet Grove and at the entrance of Lorikeet Grove Laneway, and include the following information: – Raised and visual version of the international symbol of access; – Wayfinding arrow (pointing toward Lorikeet Grove laneway); and – Raised text and braille specifying an accessible path of travel is available via Lorikeet Grove laneway. ▪ All residents will be provided with information about the accessibility arrangements of the building.

Other than the abovementioned requirements and the specifically addressed deviations from the BCA DTS Provisions in this report, it is assumed that all other parts of the building will be provided and maintained as required by the BCA DTS Provisions.

Contents

1 Introduction

1.1 Purpose

J & G Knowles and Associates Pty Ltd has appointed 3D Access Pty Ltd to undertake an accessibility evaluation for 25-27 Warriewood Road, Warriewood.

This Access Performance Solution Report (APS) evaluates the proposed access provisions against the National Construction Code (NCC), Building Code of Australia (BCA) 2019 Performance Requirements. With the exception of these proposed Performance Solutions, all other aspects of the building in relation to access and mobility are to comply with the BCA Deemed-To-Satisfy (DTS) Provisions or have been granted other dispensations by approval/referral agencies.

This report is only to be used for 25-27 Warriewood Road, Warriewood with the design as described in the referenced documentation. The report is not to be used to support any other design scheme as changes to the design may affect the evaluation. 3D Access Ltd takes no responsibility for any issues associated with the misuse of this report.

1.2 Relevant Legislation

The primary legislation applicable to the development is the Building Code of Australia (BCA) 2019 (ABCB, 2019), the Disability Discrimination Act (Australian Goverment, 1992), and the Disability (Access to Premises - Buildings) Standards – the "Premises Standards" (Australian Government, 2010).

The BCA provides a set of Performance Requirements which must be complied with. The prescriptive deemed-to-satisfy (DTS) Provisions are also described in the BCA. A design that complies with the DTS Provisions is deemed to comply with the Performance Requirements. A Performance Solution is a design that does not comply with the DTS Provisions however is shown to comply with the Performance Requirements by way of an evaluation.

The evaluation of a proposed Performance Solution can be undertaken using a variety of methods. These are defined in Clause A2.2(2) of the BCA. One or more, or a combination of these methods are adopted to determine whether the proposed Performance Solution complies with the Performance Requirements of the BCA. The relevant Performance Requirements are determined in accordance with Clause A2.2(3) of the BCA. Compliance with Performance Requirements is undertaken in accordance with A2.2(1) of the BCA.

The objective of the Premises Standards (Australian Government, 2010) is to provide the building and design industry with detailed information about how they can design and construct their buildings in a way that meets their responsibilities under the Disability Discrimination Act (Australian Goverment, 1992).

It is acknowledged that there are limitations to these standards and their use exclusively, will not prevent a claim being made under the DDA. It is noted that the DDA is a complaints-based mechanism, whereby a claim of unlawful discrimination may be taken firstly to the Human Rights Commission and if unsuccessful to the Federal Court of Australia. This report offers a merit-based assessment of those designs and plans against the BCA Performance Requirements and referenced standards with respect to access for people with a disability.

1.3 Reference Documentation

The report is based on information contained in the following documents and drawings:

Table 3 Reference Documentation

Document	Prepared by	Issue
Email To: David Kettle; Adam Buzasi CC: Mark Allan; Adam Pappas Subject: Warriewood - stairs mark up	Janelle Pirone, J & G Knowles and Associates Pty Ltd	Thu 10/09/2020 10:15 AM
Email To: Janelle Pirone CC: Adam Buzasi; Tim Vernon; Leon Rozitis Subject: RE: Warriewood Road, Warriewood - Access Queries	Hannah Collins, 3D Access	Wed 02/12/2020 10:30 AM
Email To: Janelle Pirone; Hannah Collins CC: Adam Buzasi; Leon Rozitis Subject: RE: Warriewood Road, Warriewood - Access Queries	Tim Vernon, CDA Design Group Pty Ltd	Wed 02/12/2020 11:29 AM
Drawing Series Warriewood Residential Development Project Number: 1510121 Drawing DA - 105 *Overall Floor Plan - Basement* Drawing DA - 100 Proposed Apartment Ground Floor Plan / Dwelling Lower Level Floor Plan Drawing DA – 101 Proposed Apartment First Floor Plan / Dwelling Mid Level Floor Plan Drawing DA – 102 Proposed Apartment Second Floor Plan / Dwelling Upper Level Floor Plan	VIA Architects	Received: 17/12/2020
Drawing Series Warriewood Apartments Project Number: 1510121 Drawing L02-T2 *Section C-C*	CDA Design Group	Received: 17/12/2020

1.4 Project Stakeholders

The project stakeholders are listed below:

Table 4 Relevant Stakeholders

Contact	Organisation	Role
Janelle Pirone	J & G Knowles and Associates Pty Ltd	Client
-	V/A Architects	Architect
Elie Ishac	McKenzie Group Consulting Pty Ltd	Building Certifier
Adam Buzasi	3D Access	Access Consultant

1.5 Report Limitations

The following limitations are applicable with respect to the access advice presented in this report:

- 3D Access has prepared this document for the sole use of the client and for the specific purpose expressly stated in the document. No other party should rely on this document without the prior written consent of 3D Access. 3D Access undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document.
- The information contained in this document provides advice in relation to access and mobility only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of access and mobility.
- The report is limited to the assessment of proposed Performance Solutions for the BCA DTS variations identified in this report for compliance with relevant BCA Performance Requirements. With the exception of these proposed Performance Solutions, all other aspects of the building in relation to access and mobility are to comply with the BCA DTS Provisions or have been granted other dispensations.
- Reports marked 'Not for Construction' or 'Draft' may be subject to change and are not released as final reports. 3D Access accepts no liability pending release of the final version of the report.
- In preparing this document 3D Access may have relied upon information provided by the client and other third parties, some of which may not have been verified. 3D Access accepts no responsibility or liability for any errors or omissions which may be incorporated into this document as a result.
- The recommendations, data and methodology documented in this assessment are based on the listed reference documentation. The recommendations apply specifically to the project under consideration, and must not be utilised for any other purpose. Any modifications or changes to the project from that described in the listed reference documentation may invalidate the advice provided in this document, necessitating a revision.
- Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

- Changes in design or construction of the product(s) or building use, non-complying building elements not within the scope of this report, building and product defects, changes or amendments in the Standard(s) which form the basis for documenting compliance with the Performance Requirements, variations and differences in site conditions, building use, product selection, quality and material fatigue and management and staff policies, procedures which contravene the intent and spirit of the DDA may render this report invalid.
- This report does not absolve individuals or corporations from making reasonable adjustments so that a person may access or derive substantial benefit from the service (Equal Opportunity Act 2010).

1.6 Access to Premises Standard Limitations

People who design, build, own, lease, operate or manage premises have a responsibility under the Disability Discrimination Act 1992 (DDA) not to discriminate against people with disabilities. While complying with the Premises Standards and BCA does not absolve discrimination or lodgement of a complaint with the Australian Human Right Commission, it is considered as reasonable defence.

Facility managers, lessees and property owners are advised that the Disability Discrimination Act 1992 (DDA) places duties on employers and service providers to consider barriers – both physical and non-physical – that people may encounter when trying to access a service or employment.

It is recommended that management implement a process of continued quality improvements with respect to maintaining safe and equitable access and to monitor the amenities to identify any unforeseen issues created by the proposed works.

2 Principal Building Characteristics

The building and occupant characteristics described below are informative only. The information is based on referenced documentation and is current at the time of writing this report. It is not intended to restrict or limit the design and is subject to clarification or change as the design develops.

It is the responsibility of the design team, services engineers and building surveyor to ensure compliance with all parts of the BCA DTS Provisions except where described as a proposed Performance Solution in this report or where other dispensations have been granted. A consolidated set of design criteria for design guidance is described in the Executive Summary.

2.1 Building Characteristics

The project comprises a 4 storey building containing apartments and carparking.

Table 5 Building Parameters

BCA Parameter	
Occupancy	Apartments, Carpark
BCA Classification	Class 2, Class 7a
Number of Storeys Contained	4

The building is located at 25-27 Warriewood Road, Warriewood, shown in the following figures.

Figure 1 Overall Floor Plan - Basement

Figure 2 Proposed Apartment Ground Floor Plan / Dwelling Lower-Level Floor Plan

Figure 3 Proposed Apartment First Floor Plan / Dwelling Mid-Level Floor Plan

Figure 4 Proposed Apartment Second Floor Plan / Dwelling Upper-Level Floor Plan

2.2 Occupant Characteristics

Occupants in the publicly accessible spaces may include residents and visitors. Their age and ability will broadly be representative of the general population. As they are expected to frequently move to and from their units, they will be familiar with the building's access routes.

Visitors are also considered to be representative of the general population. They are not expected to be as familiar with access routes however are generally expected to be accompanied by and therefore take direction from residents.

3 Access Evaluation

3.1 Performance Solution 1 – Alternative Pedestrian Entrance

3.1.1 Introduction

The following table briefly describes the proposed Performance Solution, the relevant BCA DTS Clause and Performance Requirements.

Table 6 Proposed Performance Solution and Reference Criteria

Proposed Performance Solution	Building Code of Australia	
	DTS Provision	Performance Requirement
To provide technical justification for step free access through a secondary pedestrian entrance along Lorikeet Grove Laneway in lieu of through the pedestrian entrance along Lorikeet Grove.	D3.1, Table D3.1	DP1 (a)

The proposed Performance Solution is shown in the figure below. A continuous accessible path of travel has not been provided through pedestrian entrance along Lorikeet Grove; instead, access shall be available via the ramp serving Lorikeet Grove laneway.

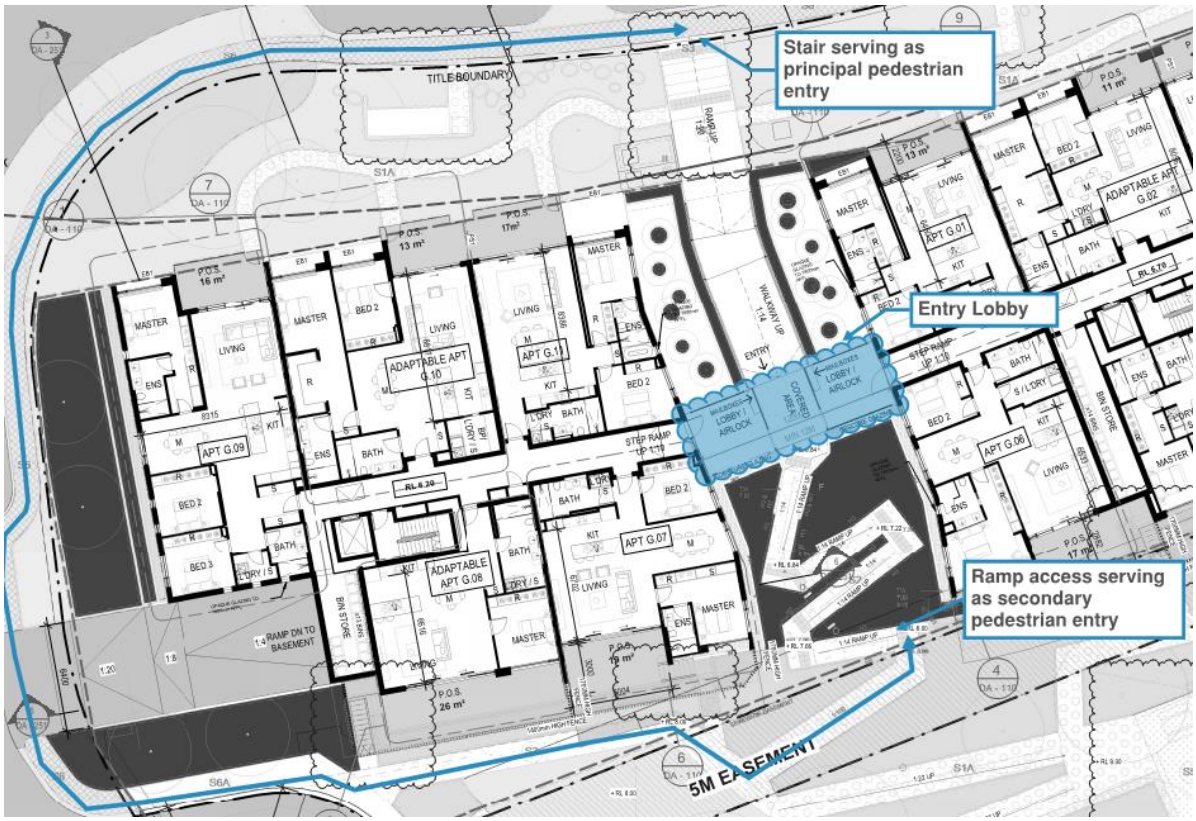


Figure 5 Path of travel to Secondary Entrance

3.1.2 Intent of the BCA and the Access to Premises Standard

Clause D3.1, Table D3.1 (ABCB, 2019) requires that, for Class 2 buildings, common areas shall be accessible, with access provided from a pedestrian entrance (required to be accessible) to at least 1 floor containing SOU's and to the entrance doorway of each SOU located on that level.

It should be noted that neither the BCA (ABCB, 2019) nor Premises Standards (Australian Government, 2010) apply access provisions to the SOUs itself or any areas for the exclusive use by residents i.e. a private pool or garage; this is demonstrated further from neither forms of legislation containing any access requirements for the internal parts of a Class 2 SOU or to any carpark not provided with accessible parking spaces (Table D3.1). It should be recognised that there are no requirements for a Class 2 development to be provided with accessible carparking.

DTS Clause D3.2 (a) (i) states that access shall be provided to a building required to be accessible from the main points of a pedestrian entry at the allotment boundary, with Clause D3.2 (b) (i) requiring access through the principal pedestrian entrance.

The intent of access through the principal pedestrian entrance is to ensure that all occupants have equal opportunity to gain access through the main focal point of the building.

While the BCA identifies the locations of where access needs to be provided, it does not provide criteria on what constitutes a 'principal pedestrian entrance' nor does it provide clarity where a building contains multiple entrances, each being a prominent point of entry.

This is further support within The Guide to the Premises Standards which states:

> *There is no definition in the premises Standards or BCA on what constitutes the 'principal pedestrian entrance' to a building. There will be times where it will be necessary to pick one of several entrance that may have equal status. This has always been building law.*

Considering this it is therefore possible for a single building to contain several entrances that each having a potential to be classified as the 'principal pedestrian entrance'.

3.1.3 Approach

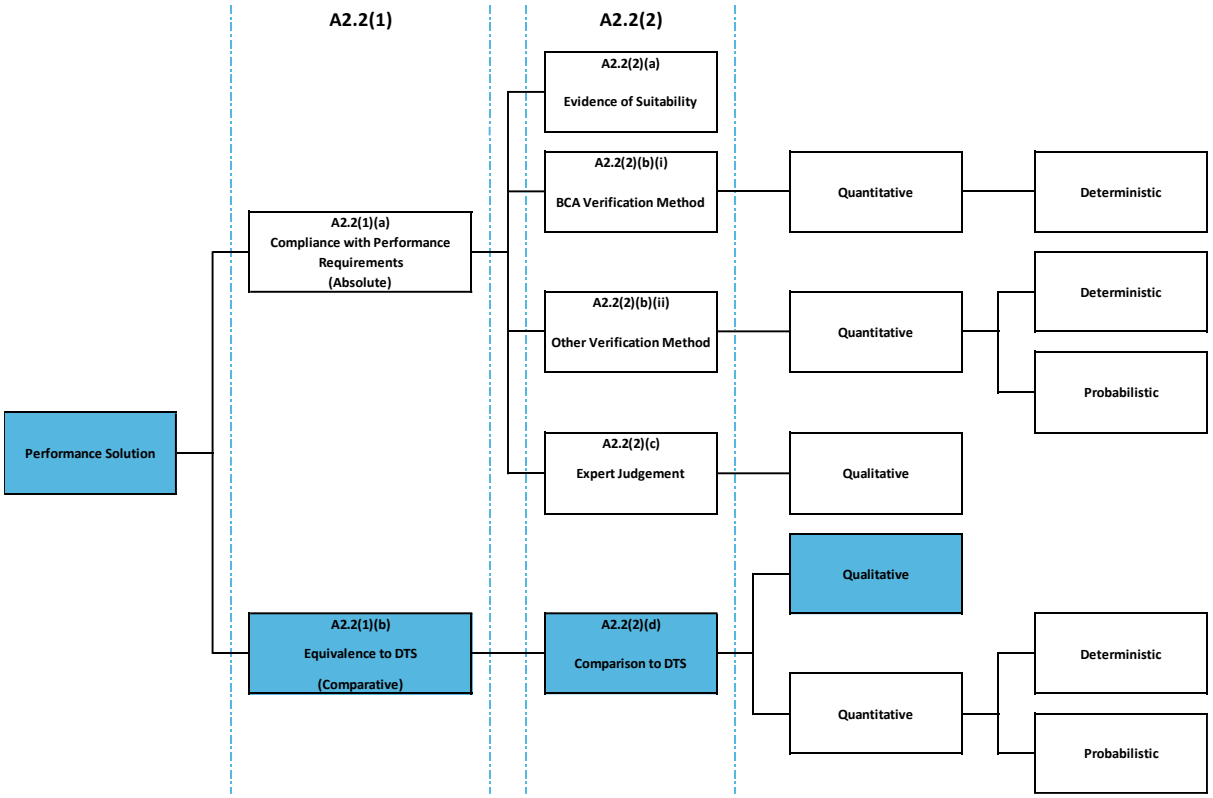


Figure 6 Method of Approach

3.1.4 Design Criteria

Access into the building shall be provided via the Lorikeet Grove laneway with the following design additions:

- Except for where addressed elsewhere in this report, the stair serving Lorikeet Grove will comply with Clause 11 of AS 1428.1 (Standards Australia, 2010);
- The ramp serving Lorikeet Grove Laneway will comply with Clause 10 of AS 1428.1 (Standards Australia, 2010);
- Signage will be provided at the bottom of the stairs on Lorikeet Grove and at the entrance of Lorikeet Grove Laneway, and include the following information:
  - Raised and visual version of the international symbol of access;
  - Wayfinding arrow (pointing toward Lorikeet Grove laneway); and
  - Raised text and braille specifying an accessible path of travel is available via Lorikeet Grove laneway.
- All residents will be provided with information about the accessibility arrangement of the building, and residents will be able to provide direction and assistance to their visitors.

3.1.5 Method of Evaluation

A qualitative and comparative evaluation will be undertaken comparing the risk of a person operating a mobility chair being disadvantaged in the proposed design when compared with a comparable design that fully complies with the BCA DTS Provisions.

3.1.6 Design Scenario

The proposed Performance Solution will be compared with a comparable design that fully complies with the DTS Provisions. The comparable BCA DTS compliant design will be a building with the same class, use, accessibility requirements (i.e. a building "required to be accessible" (ABCB, 2019)), number of levels and population (Population characteristics) as the proposed Performance Solution except:

- Access will be provided through the entrance on Lorikeet Grove.
- The entrance on Lorikeet Grove Laneway will be removed.

3.1.7 Acceptance Criteria

The acceptance criteria is that the risk of a person using a mobility chair being disadvantaged in the proposed design is equal to or lower in the Performance Solution when compared with the comparable design that fully complies with the BCA DTS Provisions.

3.1.8 Evaluation

While the BCA DTS Provisions require access to be provided through the principal pedestrian entrance there is no definition of what constitutes a 'principal pedestrian entrance'. This means that any one of several entrances may be classified as the 'principal pedestrian entrance'. While it is recognised that Lorikeet Grove may be considered the frontage of the site, and it is reasonable to consider this as the 'principal pedestrian entrance', for all intents and purposes the 'principal pedestrian entrance' could also be via the ramp serving Lorikeet Grove laneway.

In the compliant building, an accessible path of travel has been provided through the single entry on Lorikeet Grove. It should be noted that visitor carparking – both standard and accessible – is only available on Lorikeet Grove Laneway, thus visitors arriving at site would be required to travel approximately 160m from their car and to the Lorikeet Grove entry. Furthermore, occupants travelling from the surrounding residential area or public transport via the footpath may travel from either end of Lorikeet Grove. It could be argued that a more centrally located entrance point, such as from the Lorikeet Grove laneway, would cater for a broader number of occupant circumstances.

In the Performance Solution design, the building contains two entries, with the principal pedestrian entry (serving Lorikeet Grove) not being provided with an accessible path of travel. As in the comparable design, visitor carparking (including standard and accessible parking bays) are only provided at Lorikeet Grove Laneway, therefore visitors arriving at site via vehicle are unlikely to be disadvantaged by the non-provision of access through the entry serving Lorikeet Grove (refer to Figure 7 below).

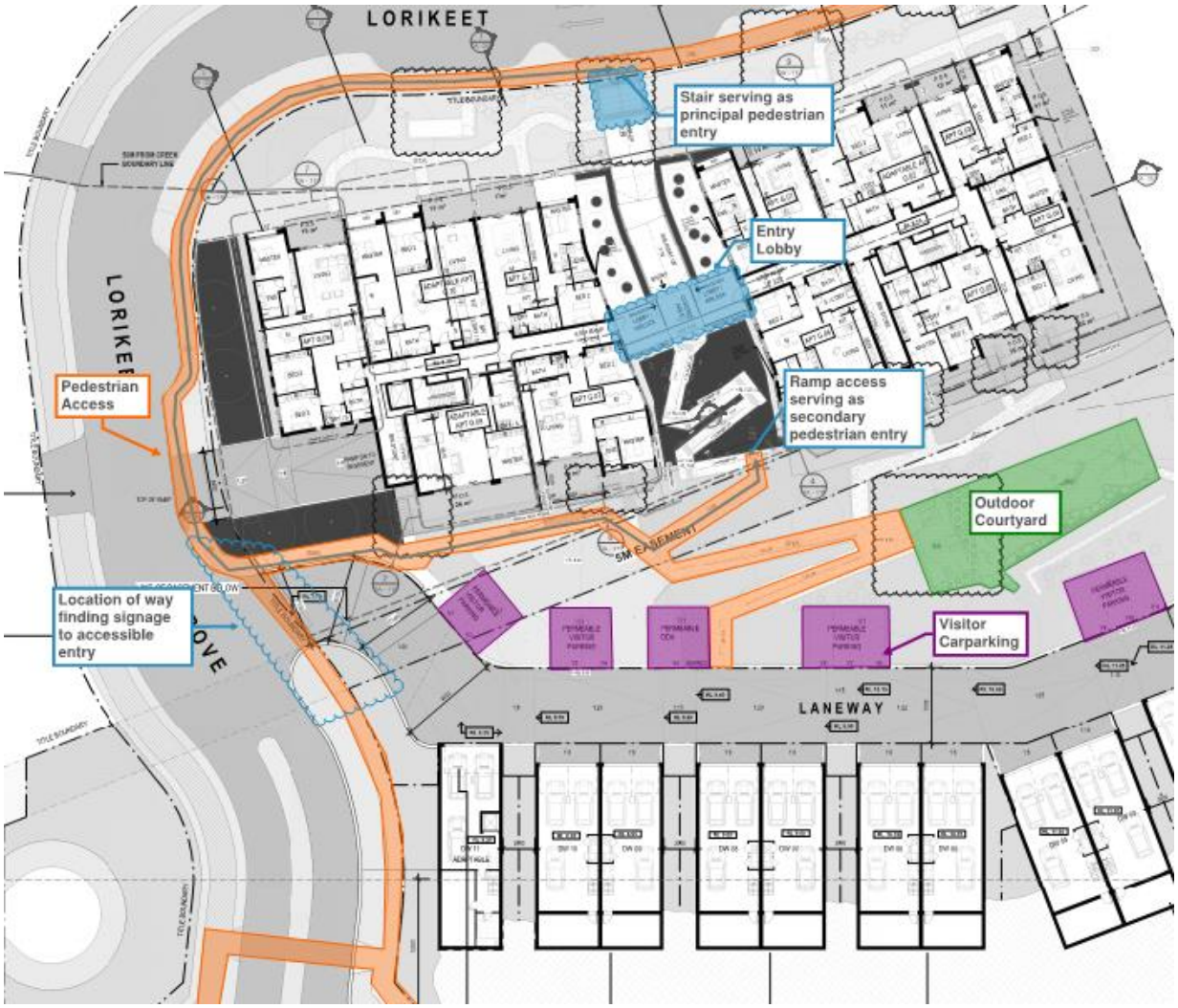


Figure 7 Part Ground Floor Plan, showing visitor carparking and pedestrian access to site

Where occupants travel to site via the footpath it is important to consider where they may be travelling from, i.e. the surrounding residential area and/or closest bus stop. As demonstrated in the figure below, occupants may travel from either end of Lorikeet Grove, thus the provision of a centrally located accessible entrance caters for a broader range of occupant circumstances.

Figure 8 Site Analysis

Furthermore, signage will be provided at the bottom of the stairs serving the entry facing Lorikeet Grove and at the entrance of Lorikeet Grove Laneway, informing visitors that an accessible path of travel is provided through the entry facing Lorikeet Grove Laneway, removing ambiguity and reducing the likelihood of a visitor travelling an undue distance in order to find an accessible entry into the proposed building.

It should also be noted that occupants travelling from the bus stations or surrounding residential areas would be required to negotiate public footpaths that may have steep gradients and uneven surfaces, thus it may be reasonable to expect that occupants with a low degree of mobility would access site via vehicle, and that occupants able to negotiate these paths would not be disadvantaged by the proposed design.

Furthermore, residents have access to a private carpark at Basement Floor, thus can access their apartment floor directly via a lift, and where travelling to site via the pedestrian footpath it is expected they will be aware of the site conditions, offsetting the risk of residents feeling disadvantaged by the proposed design.

Although an accessible path of travel is not provided on Lorikeet Grove (to serve the entry lobby) when considering the way in which occupants access the site and the provision of way finding signage, individuals with mobility impairments are considered no more disadvantaged when compared to a compliant design. The proposed Performance Solution therefore satisfies the acceptance criterion.

3.1.9 Conclusion

The evaluation undertaken above has determined that the risk of a person using a mobility chair being disadvantaged in the proposed design is equal to or lower in the Performance Solution when compared with the comparable design that fully complies with the BCA DTS Provisions. It is our considered opinion that the Performance Solution satisfies Performance Requirement DP1 (a) to the degree necessary.

3.2 Performance Solution 2 – Distance Between Entrances

3.2.1 Introduction

The following table briefly describes the proposed Performance Solution, the relevant BCA DTS Clause and Performance Requirements.

Table 7 Proposed Performance Solutions and Reference Criteria

Proposed Performance Solution	Building Code of Australia	
	DTS Provision	Performance Requirement
To provide technical justification to rationalise the distance of the secondary entrance being greater than 50m.	D3.2 (b) (ii)	DP1 (a)

The proposed Performance Solution is shown in Figure 9 below. The accessible entrance (i.e. the ramp serving Lorikeet Grove Laneway) will be located further than 50m from the non-accessible entrance (i.e. the stairway serving Lorikeet Grove), contrary to BCA Clause D3.2(b)(ii).

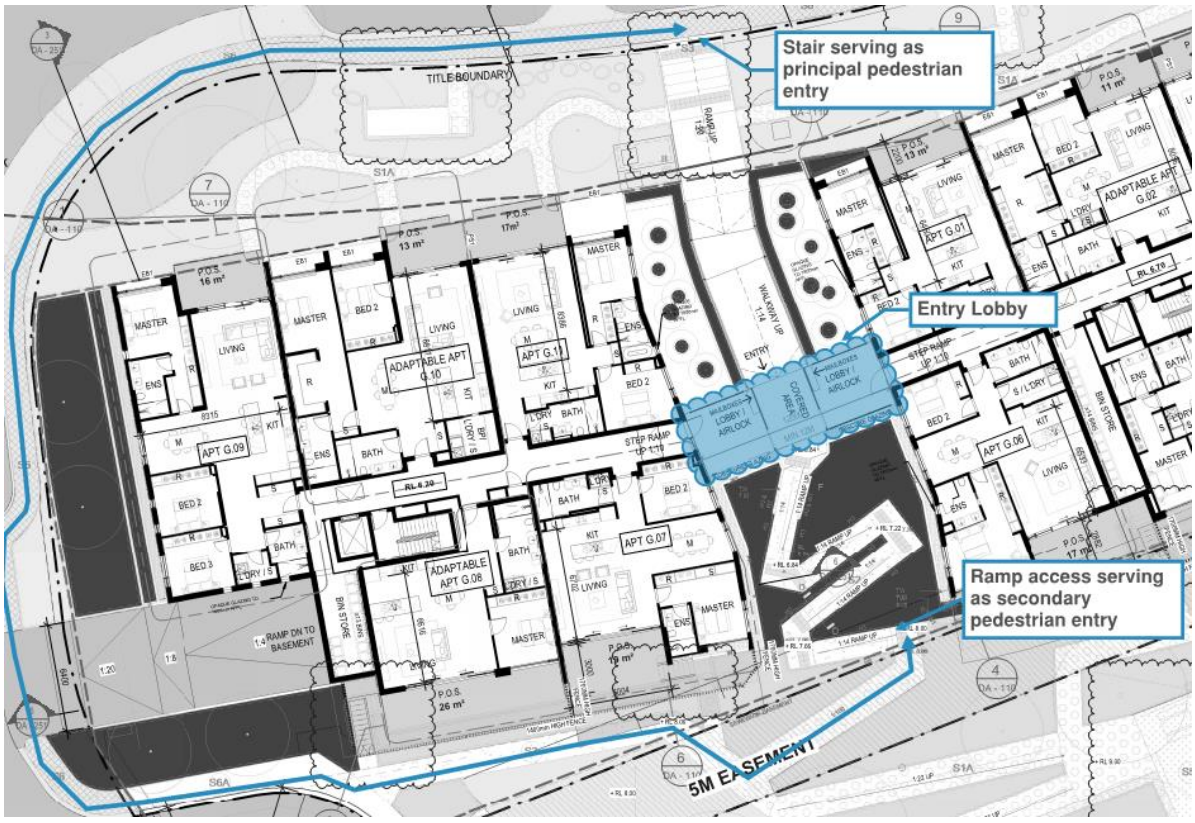


Figure 9 Part Ground Floor Plan, showing path of travel between entry points

3.2.2 Intent of the BCA and the Access to Premises Standard

BCA Clause D3.2(b)(i) stipulates that, in a building required to be accessible, an accessway must be provided through the principal pedestrian entrance and through not less than 50% of all pedestrian entrances (including the principal pedestrian entrance).

BCA Clause D3.2(b)(ii) stipulates than a pedestrian entrance which is not accessible must not be located more than 50m away from an accessible pedestrian entrance.

The Guide to the BCA notes that the intent of the provision is to ensure that situations where people have to travel unreasonable distances is avoided – especially when unaware of the access arrangement of the building. However, the DTS provisions may not necessarily take into account other environmental features, or other factors.

The Performance Requirements specifies that access must be provided to the degree necessary to enable people to access work and public spaces.

3.2.3 Approach

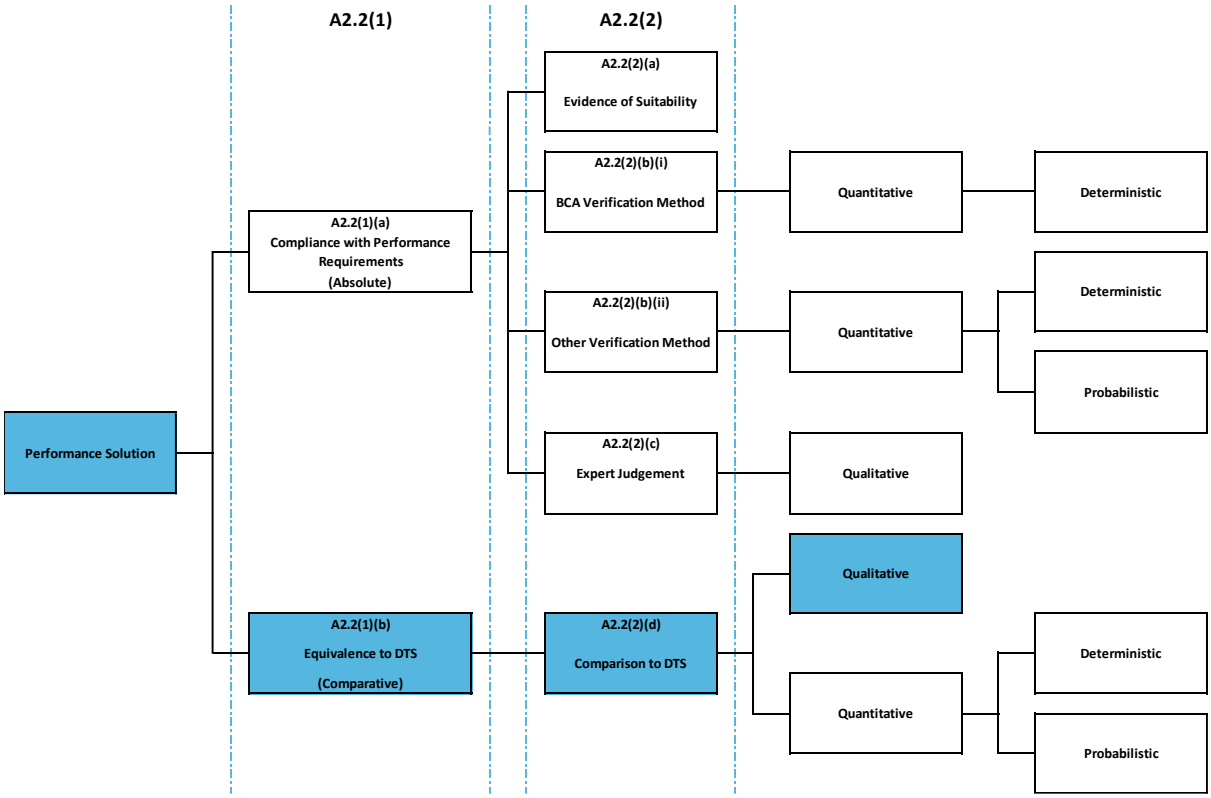


Figure 10 Method of Approach

3.2.4 Design Criteria

Access into the building shall be provided via the Lorikeet Grove laneway with the following design additions:

- The stair serving Lorikeet Grove will comply with Clause 11 of AS 1428.1 (Standards Australia, 2010);
- The ramp serving Lorikeet Grove Laneway will comply with Clause 10 of AS 1428.1 (Standards Australia, 2010);
- Signage will be provided at the bottom of the stairs on Lorikeet Grove and at the entrance of Lorikeet Grove Laneway, and include the following information:
  - Raised and visual version of the international symbol of access;
  - Wayfinding arrow (pointing toward Lorikeet Grove laneway); and
  - Raised text and braille specifying an accessible path of travel is available via Lorikeet Grove laneway.
- All residents will be provided with information about the accessibility arrangement of the building, and residents will be able to provide direction and assistance to their visitors.

3.2.5 Method of Evaluation

A qualitative and comparative evaluation will be undertaken comparing the proposed design with a comparable design that fully complies with the BCA DTS Provisions.

3.2.6 Design Scenario

The proposed Performance Solution will be compared with a comparable design that fully complies with the DTS Provisions. The comparable BCA DTS compliant design will be a building with the same class, use, accessibility requirements (i.e. a building "required to be accessible" (ABCB, 2019)), number of levels and population (Population characteristics) as the proposed Performance Solution except:

- The accessible and non-accessible entrances will be located no more than 50m apart.

3.2.7 Acceptance Criteria

The acceptance criterion is that the risk of individuals with accessibility requirements being disadvantaged in the Performance Solution is equal to or lesser than in the comparable design that fully complies with the BCA DTS Provisions.

3.2.8 Evaluation

The major source of risk for disadvantage for individuals with accessibility requirements is being unaware of inaccessible entrances and needing to travel an unreasonable distance to locate an accessible one.

The functional difference between the comparable and Performance Solution designs will be the distance provided between the accessible and non-accessible building entry points. However, the key factor that affects travel to the building – particularly of individuals with accessibility requirements – are other features of the built environment – particularly features that would limit or influence the directions of approach to the building.

In the comparable design, the accessible and non-accessible entry points will be located no more than 50m apart. Despite the entrances being provided at a compliant distance from each other, as only the accessible entry (on Lorikeet Grove Laneway) has been provided visitor carparking (including an accessible carpark), visitors arriving at site via vehicle are not expected to be disadvantaged by the proposed design. Likewise, residents have access to a private carpark at Basement Floor, thus can access their apartment floor directly via a lift.

Where occupants travel to site via the footpath, it is important to consider where they may be travelling from: i.e. the surrounding residential area or closest public transport points, such as bus stops (shown in the figure below).

Figure 11 Site Analysis

It could be argued that occupants would be more inclined to utilise Bus Stop 1 to access the Lorikeet Grove Laneway entry, as this distance is less than the distance between Bus Stop 2 and the Lorikeet Grove entry. Furthermore, where an individual did have the physical ability to travel between Bus Stop 2 and the Lorikeet Grove entry (approximately 200m), it would be reasonable to expect they could travel a similar distance within the development to reach apartment entries or communal outdoor areas.

In the Performance Solution design, a distance greater than 50m has been provided between the accessible and non-accessible entrances. As in the comparable design, visitor carparking is provided at the accessible entrance only, thus individuals arriving at site via vehicle would not be disadvantaged by the proposed design. Likewise, residents have access to a private carpark at Basement Floor, thus can access their apartment floor directly via a lift. Where occupants utilise public transport to access the site, It could be argued that occupants would be more inclined to utilise Bus Stop 1 to access the Lorikeet Grove Laneway entry, as this distance is significantly less than the distance between Bus Stop 2 and the Lorikeet Grove entry. However, where individuals have the physical ability to travel from Bus Stop 2 (or the surrounding residential area) to the Lorikeet Grove entry, the additional distance between the non-accessible and accessible entry points is unlikely to disadvantage them

It should also be noted that occupants travelling from the bus stations or surrounding residential areas would be required to negotiate public footpaths that may have steep gradients and uneven surfaces; thus it may be reasonable to expect that occupants with a low degree of mobility would access site via vehicle, and that occupants able to negotiate these paths would not be disadvantaged by the proposed design.

It should also be noted that signage will be provided at the bottom of the stairs serving the entry facing Lorikeet Grove and at the entrance of Lorikeet Grove Laneway, informing visitors that an accessible path of travel is provided through the entry facing Lorikeet Grove, removing ambiguity and reducing the likelihood of a visitor travelling an undue distance in order to find an accessible entry into the proposed building.

Although a distance greater than 50m has been provided between the accessible and non-accessible entrances, when considering the site conditions, the way in which occupants access site and the provision of way finding signage, individuals with mobility impairments are considered no more disadvantaged when compared to a compliant design. The proposed Performance Solution therefore satisfies the acceptance criterion.

3.2.9 Conclusion

The evaluation above has determined that [the risk of individuals with accessibility requirements being disadvantaged in the Performance Solution is equal to or lesser than in the comparable design that fully complies with the BCA DTS Provisions. It is our considered opinion that the Performance Solution satisfies Performance Requirements DP1 (a) to the degree necessary.

3.3 Performance Solution 3 – Stair Nosing

3.3.1 Introduction

The following table briefly describes the proposed Performance Solution, the relevant BCA DTS Clause and Performance Requirements.

Table 8 Proposed Performance Solutions and Reference Criteria

Proposed Performance Solution	Building Code of Australia	
	DTS Provision	Performance Requirement
To provide technical justification to support risers with a 25mm vertical gap where the riser meets the going. Consideration is given that stair goings will contain a depth of 355mm.	D3.3(a)(ii) Inter alia AS 1428.1, Clause 11.1 (d)	DP1 (a)

The proposed Performance Solution is shown in the figures below. The stairs serving the Lorikeet Grove entry will be provided with a 25mm vertical gap where the riser meets the going, contrary to Clause 11.1 (d) of AS 1428.1 (Standards Australia, 2010), which is required by BCA DTS Clause D3.3(a)(ii) (ABCB, 2019).

Figure 12 Part Ground Floor, showing non-compliant stair clouded

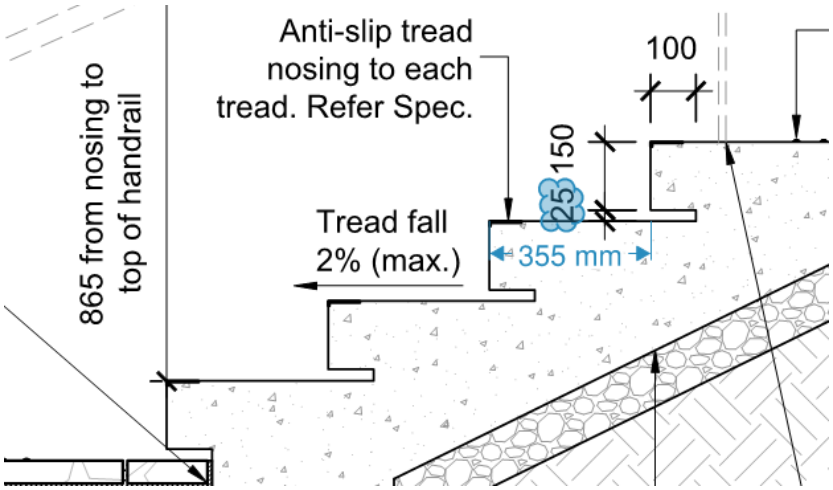
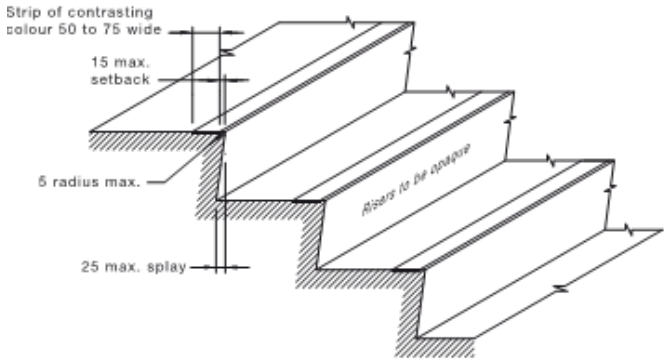


Figure 13 Part Section, showing proposed stair design

3.3.2 Intent of the BCA and the Access to Premises Standard

DTS Clause D3.3 (a)(ii) stipulates that stairways, except for fire-isolated stairways, must comply with clause 11 of AS 1428.1.

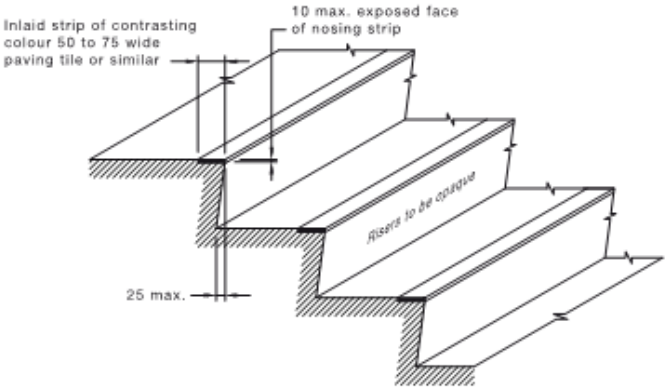
Clause 11.1 (d) of AS 1428.1 specifies that stair nosings shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25mm, as shown in Figures 27(A) and 27(B) (refer to figure below).



NOTE: A chamfered nosing 5 × 5 mm may be used.

DIMENSIONS IN MILLIMETRES

FIGURE 27(A) A TYPICAL STAIR NOSING PROFILE WITH NOSING STRIP



DIMENSIONS IN MILLIMETRES

FIGURE 27(B) A TYPICAL STAIR NOSING PROFILE WITH EXPOSED NOSING STRIP

Figure 14 Figures 27(A) and 27(B) of Clause 11.1(d) (Standards Australia, 2010)

The Whys of Access advises that enclosed stair risers without lips are required to ensure that a person does not catch their toe under the nosing as they ascend the stairs. This can be difficult for people who may have prosthesis in place of their leg, or others with spina bifida or any other ambulant disability, as they may find it difficult and tiring ascending stairs. Should their toe become caught under the lip or the nosing, it may become even more tiring and potentially develop into a high-risk situation. This can result in individuals to fall down the stairs (Access Institute, 2019).

DTS Clause D2.13, Table D2.13, specifies that the minimum stair riser and going dimensions for a public stair are 115mm high by 250mm deep.

3.3.3 Approach

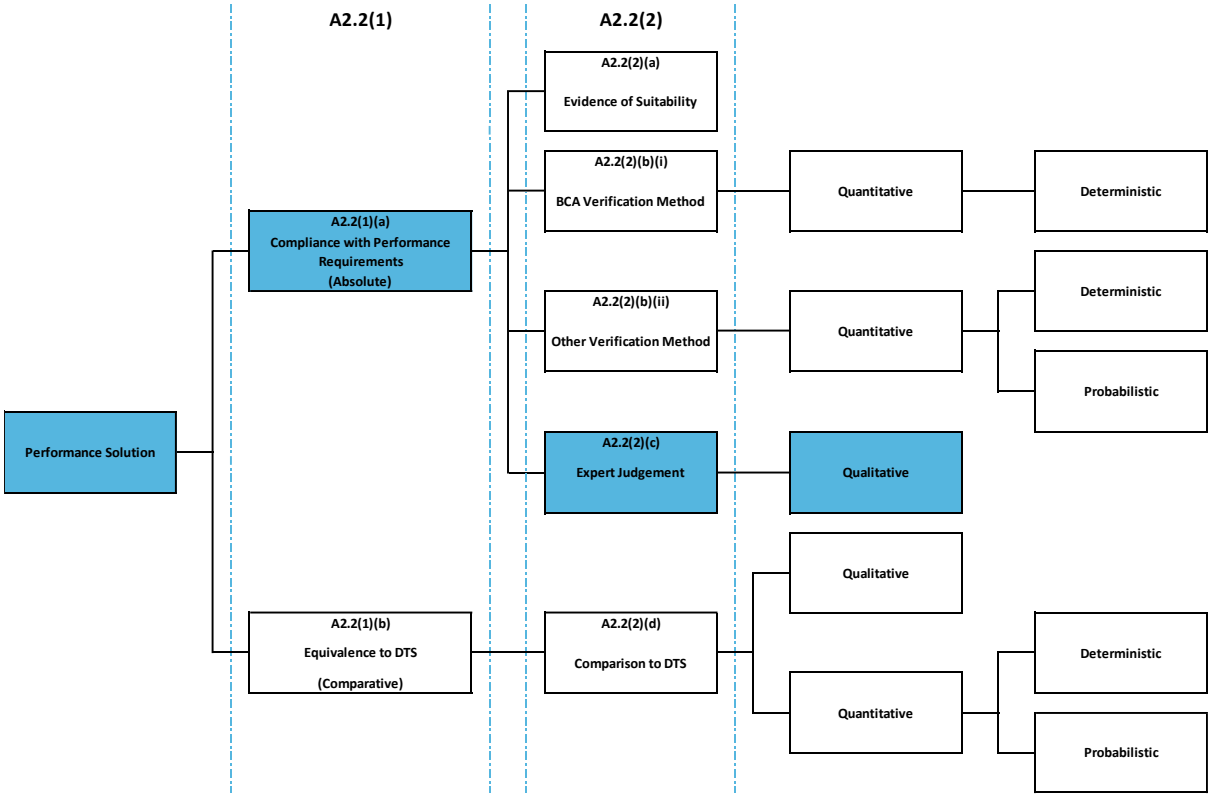


Figure 15 Method of Approach

3.3.4 Design Criteria

The stair serving the Lorikeet Grove entry will be provided in accordance with the following:

- A 25mm vertical gap will occur where the riser meets the going;
- The stair goings will contain a depth of 355mm; and
- The stair will comply in all other aspects with Clause 11 and 12 of AS 1428.1 (Standards Australia, 2010).

3.3.5 Method of Evaluation

Compliance will be demonstrated through Expert Judgement. The Performance Solution will consider:

- Stepping patterns of persons with prosthetic legs; and
- The depth of the stair goings.

3.3.6 Design Scenario

Not applicable.

3.3.7 Acceptance Criteria

The acceptance criterion is that the stair nosing design will still be deemed reasonable for individuals accessing the building via stair serving the Lorikeet Grove entry.

3.3.8 Evaluation

The design of the proposed stair is shown in the Figure 16 below. The stair has been provided with a 25mm vertical gap at the bottom of the riser, contrary to the requirements of Clause 11.1 of AS 1428.1 (Standards Australia, 2010), which specifies that stair nosings shall not project beyond the face of the riser, and that the riser may be vertical or have a splay backwards up to a maximum 25mm.

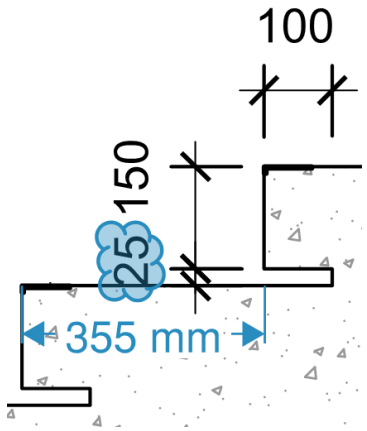


Figure 16 Part Section, showing proposed stair design

3.3.8.1 Stepping Patterns of Persons with Prosthetic Legs

Research undertaken by the International Society for Prosthetic and Orthotics (International Society for Prosthetics and Orthotic, 2013) demonstrates that individuals with and without prosthetic legs (performing the normal reciprocal stepping pattern) ascend the stair in such a way that they do not encounter the lower section of the riser with their feet (as demonstrated within the figure below).

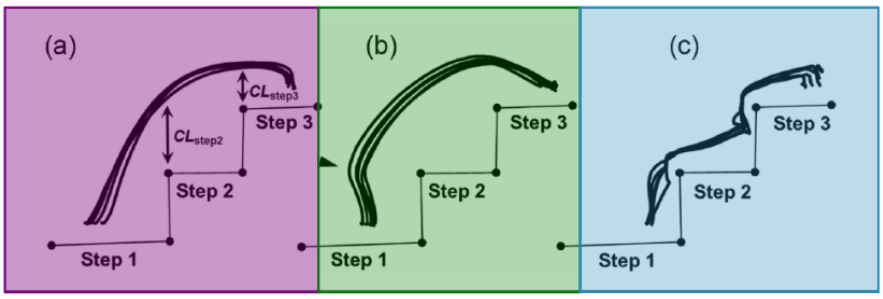


Figure 1. Trajectories of the Mt_1 marker during the swing phase in (a) ABS, (b) TF1, and (c) TF2, respectively. An arrowhead indicates backward movement of the Mt_1 marker in the TF1 during the early swing phase.

Figure 17 Stair Ascent (normal reciprocal stepping pattern) (International Society for Prosthetics and Orthotic, 2013)

The data shows that individuals who ascend two (160mm) risers in a single stride, will only encounter the middle section of the (300mm) goings (as shown in part (a) and (b) of Figure 17 above), and where individuals ascend one riser at a time, they are more likely to intersect the top part of the riser (as shown in part (c) of the figure above). Thus, it can be inferred that the 25mm vertical gap, located at the bottom of the riser, would not impact persons (with or without prosthetic legs), as individuals would bypass this when ascending the stairs.

Further guidance can be taken from The Whys of Access, which advises that people who have prosthetics in place of their leg (or other ambulant disabilities) may find it difficult and tiring ascending stairs; should their toe become caught under the lip or the nosing it becomes even more tiring (Access Institute, 2019). As the 25mm vertical gap is located at the bottom of the riser, individuals performing the common normal reciprocal stepping pattern are unlikely to become caught under gap (as demonstrated within Figure 17).

3.3.8.2 The Depth of The Stair Goings

Additionally, the 355mm depth of each stair going will exceed the minimum depth required under the BCA, to offer a greater area for individuals to place their feet on when ascending a stair. This increased going depth will offset the risks associated with a person catching their toe under the gap as they ascend the stairs. Research undertaken by the Centre of Forensic Science at the University of Western Australia, indicates that the average male and female Australian foot lengths are 274.2mm and 245.8mm respectively (Centre for Forensic Science, 2013). Data collected is shown in the figures below.

	Male	Female
	Left	Left
	Mean	Mean
Foot		
FL	27.42	24.58
FB	10.34	9.27
FHB	6.79	6.01
Footprint		
FPT1L	25.48	23.01
FPT2L	25.46	22.87

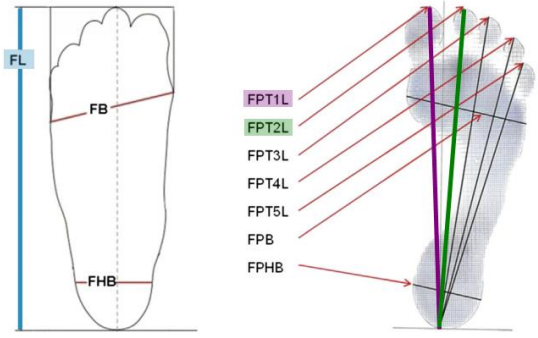


Figure 18 Western Australian Male and Female Average Foot Length (Centre for Forensic Science, 2013)

When considering that the proposed stair will contain goings with depths of 355mm, individuals ascending the stairs would be provided with sufficient clearance (as shown in the figure below). The larger going depth reduces the risk of an individual touching their foot against the riser or catching their toe on the 25mm vertical gap as they ascend the flight.

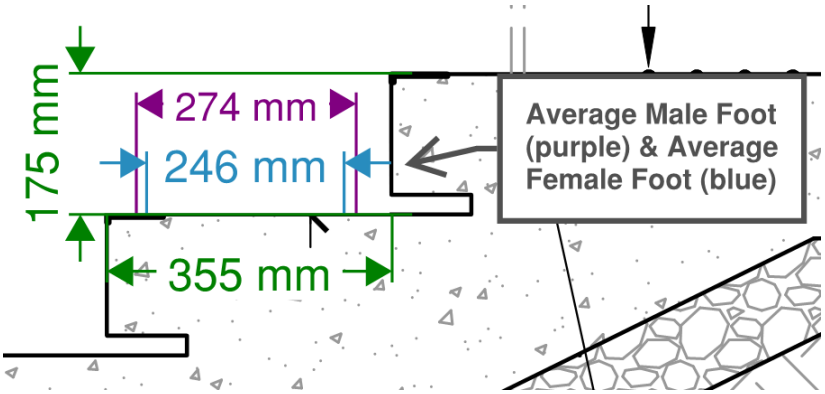


Figure 19 Proposed Performance Solution Design

3.3.8.3 Summary

The provision of a 25mm gap in the riser is not considered to disadvantage individuals with accessibility requirements when considering:

- The stepping patterns of individuals with and without prosthetic legs; and
- The length of the going is large enough to fully accommodate the average foot sizes of pedestrians.

The proposed Performance Solution therefore satisfies the acceptance criterion.

3.3.9 Conclusion

The evaluation above has determined that the stair nosing design will still be deemed reasonable for individuals accessing the building via stair serving the Lorikeet Grove entry. It is our considered opinion that the Performance Solution satisfies Performance Requirements DP1 (a) to the degree necessary.

4 References

ABCB. (2019). *National Construction Code Series Volume 1 - Building Code of Australia 2019.* Canberra: Australian Building Codes Board.

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Australian Goverment. (1992). *Disability Discrimination Act.* Office of Legislative Drafting and Publishing.

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International Society for Prosthetics and Orthotic. (2013). *Foot clearance strategy for step-over-step stair climbing in transfemoral amputees.* Sage.

Standards Australia. (2010). *AS 1428.1 - 2009 Design for Access and Mobility (Part 1: General requirements for access - New building work(Incorporating Amendment No. 1 & 2).*