



**National  
Construction  
Code**

Case Study



# Accessible entrance

Performance Solution Process



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Enquiries about this publication can be sent to:

Australian Building Codes Board  
GPO Box 2013  
CANBERRA ACT 2601  
Phone: 1300 134 631  
Email: [ncc@abcb.gov.au](mailto:ncc@abcb.gov.au)  
Web: [abcb.gov.au](http://abcb.gov.au)

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## Version history

Original

Publish date: May 2021

Print version: 1.0

# Contents

<b>Purpose and limitations</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>4</b>
The Design .....	4
<b>The Process</b> .....	<b>5</b>
Step 1 Prepare a performance-based design brief .....	5
Step 2 Carry out analysis.....	18
Step 3 Evaluate results.....	19
Step 4 Prepare a final report.....	19
<b>References</b> .....	<b>23</b>

## REMINDER

This case study is not mandatory or regulatory in nature and compliance with it will not necessarily discharge a user's legal obligations. The case study should only be read and used subject to, and in conjunction with, the general disclaimer at page i.

The case study should be read in conjunction with the relevant legislation of the appropriate state or territory. It is not intended that the case study will counteract or conflict with the legislative requirements, any references in legal documents, or other documents issued by the Administration or any directives by the appropriate authority.

## Purpose and limitations

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This case study has been prepared to accompany the Australian Building Codes Board (ABCB) Performance Solution Process Handbook, and illustrate the intent and application of the process (see A2.2(4) of the National Construction Code (NCC)). It aims to demonstrate a practical application of the NCC Performance Solution process. Clause A2.2(4) describes the process for developing Performance Solutions:

1. Prepare a brief
2. Carry out analysis
3. Evaluate results
4. Prepare a final report.

The Performance Solution process handbook explains the steps in the process. The process is also summarised in the ABCB Guidance Document – Performance Solution Process, both available from the ABCB website ([abcb.gov.au](http://abcb.gov.au)).

This case study assists NCC users in understanding and developing Performance Solutions. It will be of interest to all parties who are involved in selecting or assessing elements of buildings that must comply with the NCC.

The guidance in this case study is limited to the Performance Solution process (A2.2(4)), using an accessibility issue to explore this provision. While a realistic scenario has been attempted to be recreated in this case study, the technical content within is purely demonstrative for the purposes of explaining how to use the Performance Solution process within the NCC and therefore does not demonstrate full NCC compliance with the NCC Performance Requirements.

Users of this case study are encouraged to check for any State and Territory NCC Variations and Additions that may apply in their jurisdiction. Furthermore, users should be aware of any applicable legislation within their jurisdiction.

The term ‘appropriate authority’ is used in this case study. It is an NCC defined term meaning the relevant authority with the statutory responsibility to determine the particular matter. In general, this will be a building surveyor in respect to the Building Code of Australia (BCA), or may be a government entity with authority.

## Introduction

In this accessibility case study we step through the Performance Solution process for a design looking to provide an accessible entrance for a retail fitout.

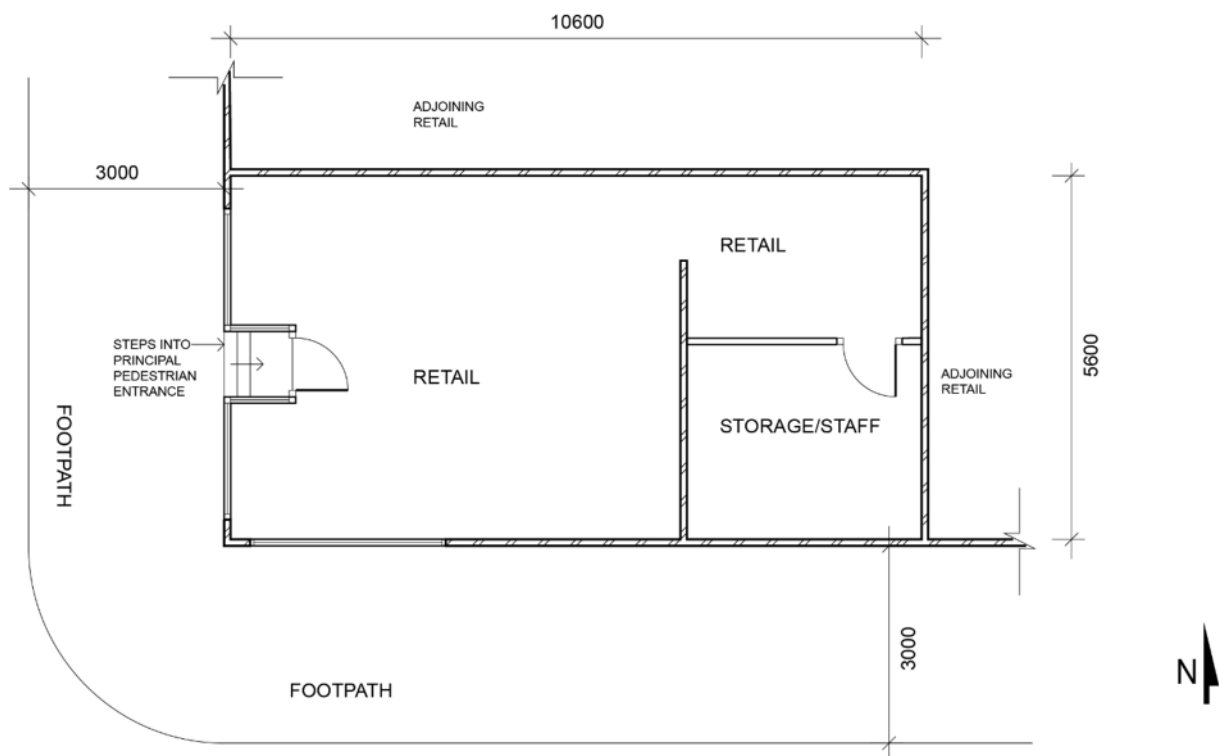
For any parts of the design using a Performance Solution, the Performance Solution process must be used.

## The Design

The client has engaged an architect to develop the designs and documentation for a retail fitout to an existing Class 6 building, including provision of an alternative accessible entrance. Early in the design, it is proposed to use a combination of Performance and Deemed-to-Satisfy (DTS) Solutions for the design of the accessible entrance.

The case study design is representative of a ground floor retail fitout, see Figure 1.

**Figure 1 Existing retail unit with no accessible entrance.**



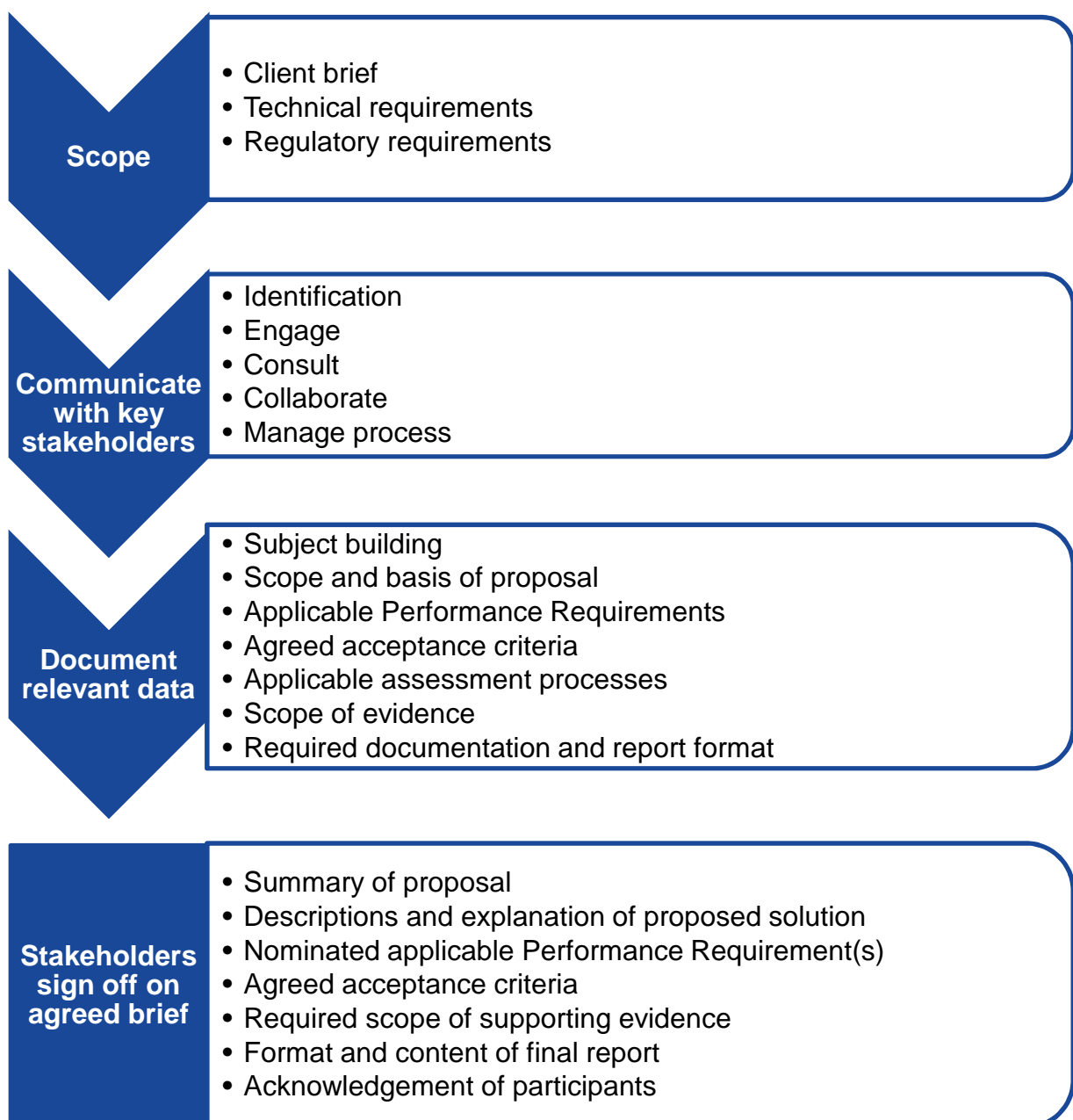
# The Process

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## Step 1 Prepare a performance-based design brief

The purpose of the performance-based design brief (PBDB) is to record the fundamental activities and outcomes of the process, as agreed by stakeholders. Typically the brief process is initiated by the designer. Figure 2 illustrates each component in developing the brief.

Figure 2 Process of developing a performance-based design brief



## Scope

Preparation of a PBDB starts with determining the scope for the building or parts of building that will be subject to a Performance Solution.

In this case study, the project comprises a retail fitout (no change of use) to a 60 m<sup>2</sup> ground floor tenancy within an existing building. The principal (and only) entrance has a stepped access from the footpath. An alternative accessible entrance is proposed as part of the works. The design needs to address the constraints of the building and comply with the relevant NCC requirements. A ramp based on a DTS Solution would impact significantly on the internal layout of this small retail unit, as it would require an intermediate landing. As an alternative, the designer has suggested a single length of ramp could be achieved if the ramp started close to the allotment boundary and ran alongside an existing masonry partition. This would impact the set back of 900 mm (in the DTS Provisions) as well providing a landing within the allotment boundary (see Figure 3). The focus of the solution is to provide an accessible entrance for the retail building using a combination of Performance and DTS Solutions.

Figure 3 and Figure 4 demonstrate the options to address the 285 mm level difference, requiring a 3990 mm long ramp at 1:14 grade. Figure 3 illustrates a possible option satisfying the DTS Provisions, whereas Figure 4 provides a Performance Solutions option that minimises impact on the retail area while still providing ramp accessibility to the retail tenancy.

Figure 3 DTS Solution - recessed ramp requiring intermediate landing

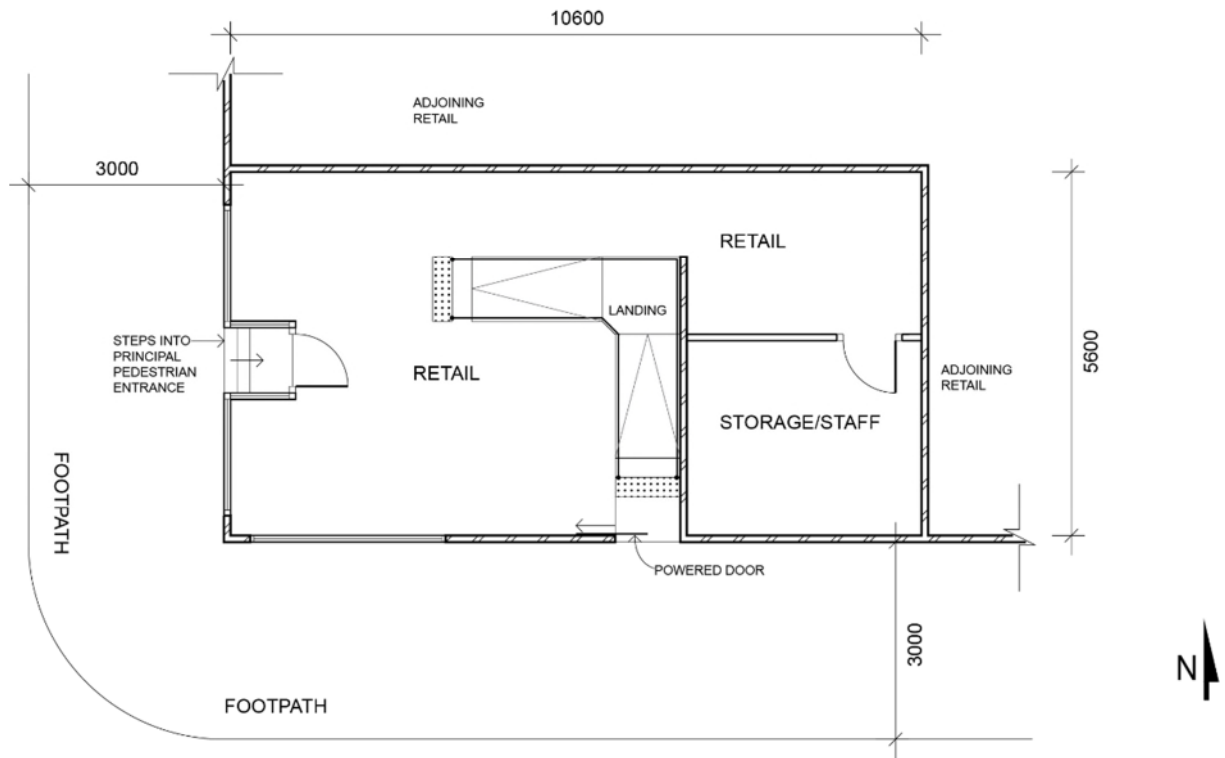
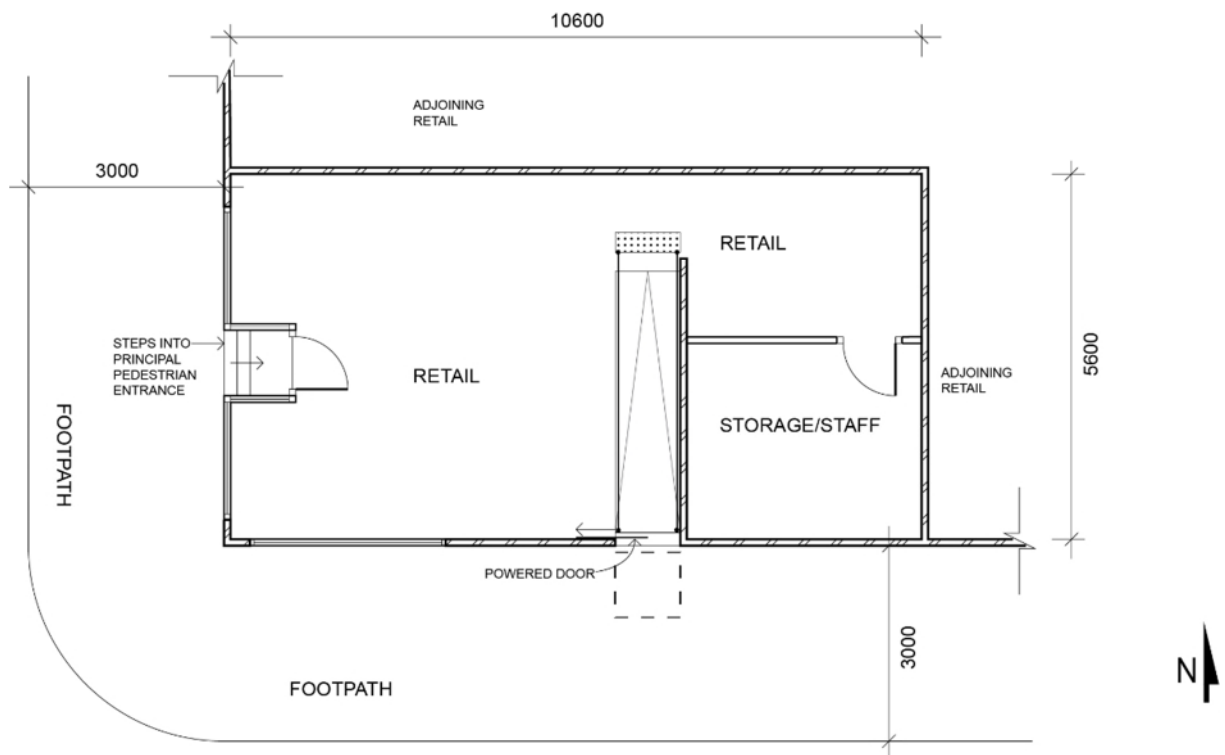


Figure 4 Proposed Performance Solution - ramp utilising footpath as landing





## Stakeholders

Consultation and active engagement with stakeholders is a fundamental component in the process of formulating an appropriate scope of work. Identification and engagement of the relevant stakeholders will often happen in conjunction with scoping the proposed solution including advice on appropriate acceptance criteria, NCC Assessment Methods, potential risks and mitigation strategies.

Table 1 shows the initial stakeholders and their respective roles. The stakeholders are engaged to provide advice on the technical feasibility of developing NCC compliant designs given the constraints of the existing building, and in line with its proposed occupancy and use characteristics. The stakeholder group agreed by email that the architect will manage the development of the design including the PBDB.

**Table 1 Initial stakeholders and their roles**

Stakeholder	Role
<b>Client (tenant)</b>	Retail lease holder
<b>Property owner</b>	Authorises lessee works
<b>Architect</b>	Lead design consultant
<b>Appropriate authority (building surveyor)</b>	Statutory assessment role
<b>Access consultant</b>	Advise on universal and accessible design

### ***Alert:***

It is crucial that the appropriate authority is not asked to provide design advice. It is a conflict of interest for those with regulatory responsibility to assess aspects of a design that they have contributed to the development of.

## Document relevant data

The inputs and negotiations of stakeholders should document relevant data. This is where all the agreements made through the briefing process are set out, in addition to any known limitations or assumptions that underpin the agreements made. The specific acceptance criteria including compliance benchmarks that were agreed and the methods of demonstrating conformity with them must be clearly documented.

Documenting relevant data is a process that brings together information on:

- Subject building (described earlier in “The Scope” section)
- Scope and basis of proposal
- Applicable Performance Requirements
- Agreed acceptance criteria
- Applicable assessment processes
- Scope of evidence
- Required documentation and report format.

Note this is usually not a linear process, with concurrent documentation determined from activities, decisions, reviews and updates to designs. Further, the documentation identified and outlined in the PBDB will form the basis for the final Performance Solution report.

### ***Scope and basis of proposal***

Following an initial review, the access consultant collaborates with the architect and determines that it is technically possible to form an alternative accessible entrance, including a ramp, and that it requires to be addressed through a combination of DTS and Performance Solutions. In particular, aspects of design requiring a Performance Solution are:

1. Landing of adequate size cannot be provided at base of ramp within the allotment boundary.
2. Ramp cannot be set back at a minimum of 900 mm preventing:
  - (a) Placement of tactile ground surface indicators (TGSIs); and
  - (b) Extension of handrails.

The occupancy and use characteristics of the proposed retail unit are agreed to be persons reflective of the general population, including people with disabilities, and conscious and active (not sleeping or otherwise infirm) participants in a retail setting.

### ***Determining applicable Performance Requirements***

In this case study, the proposed approach is to demonstrate compliance with a combination of DTS and Performance Solutions. A2.4(3) requires that the relevant DTS Provisions are identified together with their relevant Performance Requirement

and any other affected Performance Requirements. Table 2 maps these NCC requirements to the identified technical issues.

**Table 2 Mapping NCC requirements to identified technical issues**

Technical issue	Applicable DTS Provision/s	Relevant Performance Requirement <sup>1</sup>	Other relevant Performance Requirements
1. Landing of sufficient size cannot be provided at base of ramp within the allotment boundary	D3.3(a)(i) Does not comply with AS 1428.1 Clause 10	DP1 Access for people with a disability	NA
2(a) Ramp cannot be set back preventing placement of TGSIs	D3.3(a)(i) Does not comply with AS 1428.1 Clause 10 and D3.8(a)(iv) and (b) Does not comply with AS 1428.4.1 Clauses 1 or 2	DP1 Access for people with a disability DP2 Safe movement to and within a building	NA
2(b) Ramp cannot be set back preventing extension of handrails	D3.3(a)(i) Not comply with AS 1428.1 Clause 10	DP1 Access for people with a disability DP2 Safe movement to and within a building	NA

Note:

1. For applicable DTS Provision/s

The next step is to determine acceptance criteria for the Performance Solution.

### ***Acceptance criteria***

Acceptance criteria are the cornerstone of developing a Performance Solution. They need to be established to ensure the relevant Performance Requirements are met for the particular project given the occupancy and use characteristics of the building.

Establishing the acceptance criteria requires teasing apart the technical issue, the intent or purpose of the relevant Performance Requirements and DTS Solutions, and how the proposed design impacts on the occupancy and safe use of the building.

This is necessary to pinpoint the technical matters to be addressed. Once the specific technical matters have been identified, the design response can be considered, including relevant acceptance criteria.

This process started with the mapping of the NCC requirements in Table 2, but needs to be examined in more detail. In this case study, the two relevant Performance Requirements are:

- DP1 Access for people with a disability
- DP2 Safe movement to and within a building

In the context of this case study, DP1 has the qualifier 'to the degree necessary'. However, the proposed new entrance will be the only accessible route into the building. This means the proposed solution needs to ensure an appropriate level of accessibility. DP2 Safe movement to and within a building, has the qualifier 'must'. Features related to DP2 are a 'must' and evidence and justifications to support a proposed solution need to be robust.

### ***DP1 Access for people with a disability***

Access must be provided, to the degree necessary, to enable—

- (a) people to—
  - (i) approach the building from the road boundary and from any *accessible* carparking spaces associated with the building; and
  - (ii) approach the building from any *accessible* associated building; and
  - (iii) access work and public spaces, accommodation and facilities for personal hygiene; and
- (b) identification of *accessways* at appropriate locations which are easy to find.

### **Limitation**

DP1 does not apply to a Class 4 part of a building.

***DP2 Safe movement to and within a building***

So that people can move safely to and within a building, it must have—

- (a) walking surfaces with safe gradients; and
- (b) any doors installed to avoid the risk of occupants—
  - (i) having their egress impeded; or
  - (ii) being trapped in the building; and
- (c) any stairways and ramps with—
  - (i) slip-resistant walking surfaces on—
    - (A) ramps; and
    - (B) stairway treads or near the edge of the nosing; and
  - (ii) suitable handrails where necessary to assist and provide stability to people using the stairway or ramp; and
  - (iii) suitable landings to avoid undue fatigue; and
  - (iv) landings where a door opens from or onto the stairway or ramp so that the door does not create an obstruction; and
  - (v) in the case of a stairway, suitable safe passage in relation to the nature, volume and frequency of likely usage.

Holistically, these Performance Requirements may be considered to require:

- a continuous accessible path of travel
- continuous movement
- safe movement
- provision of information
- protection from hazards.

For the purposes of this case study, the approach used to derive the acceptance criteria is a ‘what, where, who, how, why, and when’ approach. By asking *what, where, who, how, why, and when*, the detailed technical matters to be addressed in the Performance Solution can be teased out, as well as the context for the solution.

**Issue 1 - Ramp landing**

- **What is affected and where?**

The landing at the base of the ramp serving the accessible entrance. This is located on the ground floor, as part of the continuous accessible path of travel to the accessible entrance. This is the only accessible path of travel to the retail unit.

- **How and why is the building, part of building, facility, component, material, etc. affected?**

The space for a landing at the base of the ramp is inadequate and cannot be provided within the allotment boundary.

Purpose of landing is to provide a safe transition to/from a ramped surface. The lack of an adequate landing may be detrimental to safe use of the ramp.

- **Who is affected, how and why?**

The occupancy and use of the building is identified as persons reflective of the general population, including people with disabilities.

The ramp may be used by all building users and is of particular importance for people using wheeled devices, such as prams, people with a mobility impairment including users of wheelchairs, walking aids etc., as well as people with a vision impairment.

These building users are potentially affected because the landing provides a safe transition to/from a ramped surface.

For a person using a mobility aid, or wheeled device, the landing provides a space to align correctly with the ramp to make a safe ascent/descent. For a person with a visual impairment, the landing provides an important transition point to orientate and address the change in level, which might otherwise be a hazard.

- **When is the specific issue important?**

At all times the building is in use.

## **Issue 2 - Ramp cannot be set back at a minimum of 900 mm, or sufficiently, to ground floor, alternative accessible entrance**

- **What is affected and where?**

There is inadequate setback for the ramp from the allotment boundary affecting (a) the placement of TGSIs, and (b) the provision of handrail extensions.

The ramp serves the accessible entrance to the ground floor retail unit, as part of the continuous accessible path of travel. This is the only accessible path of travel to the retail unit.

- **How and why is the building, part of building, facility, component, material, etc. affected?**

(a) TGSIs placement – is required at the top and bottom of a ramp. The lack of a setback means that TGSIs cannot be provided to the bottom landing.

(b) Extension of handrails is required beyond the top and bottom of a ramp surface. The lack of a setback and adequate space means that handrail extensions cannot be provided to the bottom landing.

- **Who is affected, how and why?**

- (a) The purpose of TGSIs is to provide information and warn users of hazards, especially people with a vision impairment. TGSIs also provide predictability in the environment which improves safety and allows for continuous movement.
- (b) Handrails provide all users with stability to allow for safe use of a ramp. This includes people with mobility, ambulant and visual impairments. Handrails provide important information for people with a vision impairment to allow continuous, predictable and safe use of a ramp.

- **When is the specific issue important?**

At all times the building is in use.

Having worked through the detail of the issues to be resolved and considering the context that they occur, the design response and acceptance criteria can be developed. These are summarised in Table 3a and Table 3b. Limitations and assumptions are also stated here.

**Table 3a Summary of technical matters, the proposed design response and acceptance criteria for Issue 1 - Ramp landing**

Matters to be addressed	Design response	Acceptance criteria
Provision of alternative design features for safe use of ramp, to consider needs of people with mobility and vision impairments – landing space and entrance	<ul style="list-style-type: none"> <li>• Consider the use of the footpath as providing adequate space to provide a landing.</li> <li>• Assess available footpath space, crossfalls and transitions, against the minimum space in the DTS Provisions.</li> <li>• Consider safe egress where no landing.</li> </ul>	<ul style="list-style-type: none"> <li>• To achieve circulation space for a 90% wheelchair footprint.</li> <li>• To achieve a crossfall gradient no steeper than 1:40 (1:33 if bitumen).</li> <li>• To achieve a transition of not more than <math>\pm 5</math> mm, for bevelled edges.</li> <li>• Provide sensor activated powered entrance doors for safe egress</li> </ul>
Provision of alternative design features for safe use of ramp, to consider needs of people with mobility and vision impairments – hazard recognition	<ul style="list-style-type: none"> <li>• To improve hazard recognition for people with a vision impairment (and others), provide ramped surface with contrasting colour to surrounding walls/surfaces and landing area outside allotment boundary.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimum luminance contrast of 30% to be achieved and verified upon completion of construction works.</li> <li>• Further input required from lighting consultant. Acceptance criteria to be agreed.</li> </ul>

Matters to be addressed	Design response	Acceptance criteria
	<ul style="list-style-type: none"> <li>Review lighting design to ensure minimum levels of illumination and to minimise impact of glare and shadowing.</li> </ul>	

### Limitations/Assumptions

- Footpath outside control of tenant.
- Footpath finish may change affecting luminance contrast.
- Footpath may fall into disrepair affecting transition across surfaces.
- Relies on expert judgment from access consultant that the proposed design responses are adequate to meet the Performance Requirements.
- Further input required from lighting consultant.

**Table 3b Summary of technical matters, the proposed design response and acceptance criteria for Issue 2: Ramp setback**

Matters to be addressed	Design response	Acceptance criteria
Provision of alternative design features for safe use of ramp, to consider needs of people with mobility and vision impairments.	Provide design features for safe use of ramp: <ul style="list-style-type: none"> <li>Hazard recognition for people with a vision impairment (and others), to be improved by providing ramped surface with contrasting colour to surrounding walls/surfaces and landing area outside allotment boundary (see above).</li> <li>Review lighting design to ensure minimum levels of illumination and to minimise impact of glare and shadowing.</li> <li>TGSIs within the retail unit are to be provided to warn of the ramp hazard, even though there will not be corresponding TGSIs at street end of the ramp.</li> </ul>	<ul style="list-style-type: none"> <li>Minimum luminance contrast of 30% to be achieved and verified upon completion of construction works.</li> <li>Further input required from lighting consultant.</li> <li>Hazard TGSIs to be provided to AS 1428.4.1.</li> <li>A dome button is to be incorporated the end of each handrail</li> </ul>



Matters to be addressed	Design response	Acceptance criteria
	<ul style="list-style-type: none"> <li>Warn users of the end of the handrail where stopped short.</li> </ul>	

### Limitations/Assumptions

- Relies on expert judgment from access consultant that the proposed design responses are adequate to meet the Performance Requirements.
- Further input from lighting consultant.

As we can see, further input is required from a lighting consultant to advise on appropriate lighting design and light levels. The lighting consultant would be an additional stakeholder. Further advice from the lighting consultant added additional acceptance criteria of minimum illumination of 100 lux and fittings specified with placement to minimise glare and shadowing.

Fundamental to the success of the Performance Solution process is that there is general agreement amongst the stakeholders on the acceptance criteria for the proposal. It is essential to have the agreement of the appropriate authority for the project. Without their agreement at this stage the completed design documentation, including the performance proposal, may not be accepted.

### *Assessment processes*

In this case study, the appropriate authority notes that A2.2 and A2.3 in the NCC sets out Assessment Methods that can be used for Performance and DTS Solutions (respectively). It was agreed by the stakeholders that the following NCC Assessment Methods are likely relevant:

- Evidence of suitability
- Expert Judgement
- Comparison with the DTS Provisions.

The appropriate authority will need to be satisfied that relevant acceptance criteria are established and that the NCC Assessment Methods and other information to be provided with the design documents, will be adequate to determine NCC compliance is achieved.

## ***Scope of evidence***

The evidence required to support the components of a Performance Solution is determined by determined by the NCC Assessment Methods. The PBDB notes that certain stakeholders are stakeholders are responsible for providing the evidence (see Table 4a and

Table 4b).

**Table 4a Summary of technical issue, NCC Assessment Method/s, evidence and person/entity responsible to provide evidence for Issue 1 – Ramp landing**

Summary design response and acceptance criteria	NCC Assessment Method	Evidence (Provided by)
<p>Use footpath as landing:</p> <ul style="list-style-type: none"> <li>To achieve circulation space for a 90% wheelchair footprint.</li> <li>To achieve a crossfall gradient no steeper than 1:40 (1:33 if bitumen).</li> <li>To achieve a transition of not more than ±5 mm, for bevelled edges.</li> <li>Provide sensor activated powered entrance doors for safe egress.</li> </ul>	<p>Comparison with DTS Provisions</p>	<p>Accurate drawings showing the proposed building works and the arrangement of the footpath, ramp and entrance (Design practitioner)</p> <p>Report from an appropriately qualified person on efficacy of design responses (Access consultant)</p>
<p>Safe use of ramp:</p> <ul style="list-style-type: none"> <li>Minimum luminance contrast of 30% to be achieved between ramp surface and surrounding walls, landing and footpath; to be verified upon completion of construction works.</li> <li>Minimum 100 lux on ramp. Light fittings and placement to minimise glare and shadowing.</li> </ul>	<p>Expert judgement</p> <p>Evidence of suitability</p> <p>Comparison with DTS Provisions</p>	<p>Accurate drawings and specifications detailing the proposed finishes (Design practitioner)</p> <p>Report from appropriately qualified person on efficacy of design responses (Access consultant)</p> <p>Report from NATA accredited laboratory on LRVs for proposed materials (NATA laboratory)</p> <p>Report confirming onsite testing results of luminance contrast upon completion of works (Appropriately qualified person for onsite testing)</p> <p>Lighting design, specification and onsite testing (Lighting consultant)</p>

**Table 4b Summary of technical issue, NCC Assessment Methods, evidence and person/entity responsible to provide evidence for Issue 2 – Ramp setback, TGSi placement and handrail extensions**

Summary design response and acceptance criteria	NCC Assessment Method	Evidence (Provided by)
<p>Safe use of ramp:</p> <ul style="list-style-type: none"> <li>• Minimum luminance contrast of 30% to be achieved between ramp surface and surrounding walls, landing and footpath; to be verified upon completion of construction works (as above).</li> <li>• Minimum 100 lux on ramp. Light fittings and placement to minimise glare and shadowing.</li> <li>• Hazard TGSIs to be provided to top ramp landing to AS 1428.4.1.</li> <li>• Provide dome button to specification in AS 1428.4.1, where handrails stopped short.</li> </ul>	<p>Expert judgement</p> <p>Evidence of suitability</p> <p>Comparison with DTS Provisions</p>	<p>Accurate drawings and specifications detailing the proposed finishes (Design practitioner)</p> <p>Report from appropriately qualified person on efficacy of design responses (Access consultant)</p> <p>Lighting design, specification and onsite testing (Lighting specialist)</p>

## Step 2 Carry out analysis

Analysis, assessment and verification are different activities within the Performance Solution process. It is important to ensure that adequate analysis has been carried out prior to making an assessment and prior to verifying NCC compliance.

In this case study, the following analyses are undertaken:

- Quantitative analysis to measure the illumination and luminance contrast.
- Qualitative analysis to confirm the equivalence, or better, of proposed designs to adequately address the NCC Performance Requirements.
- Comparative approach with other DTS Solutions, including with NCC referenced standards, for measurement of landing spaces, transitions and crossfalls and for handrail design, including use of a dome button.

***Alert:***

Ultimately, agreed analytical processes may need to be reviewed if initial outcomes do not meet the agreed acceptance criteria.

If for this case study, the review of the footpath revealed that it has crossfalls steeper than 1:40, the stakeholders would need to review the information and consider whether the proposed design is still acceptable. As this is the only accessible entrance, failure to not meet this acceptance criteria may require a different design solution.

Similarly, if the required luminance contrast cannot be achieved with the proposed finishes, different finishes will need to be specified.

### **Step 3 Evaluate results**

During the process of analysis, design scenarios may have been considered and analysed. The evidence and design documents need to verify that the chosen design approach satisfies the agreed acceptance criteria, and in turn, meets the NCC Performance Requirements. The evaluation of results is therefore a critical component of the Performance Solution process.

Evaluating each of the acceptance criteria in this way assists verifying compliance. It also can assist the design team if there are any 'failures', as these can be put into context more easily. In this case study, not achieving an acceptable cross fall for the ramp landing would likely require a significant redesign of the ramp. Whereas, not achieving the required luminance contrast would only require an adjustment to the choice of finishes.

Note, that the evaluation may also not be a linear process, and evaluation of the analysis and results may occur iteratively throughout the process.

### **Step 4 Prepare a final report**

The final report is sometimes referred to as a Performance Solution report. Its prime purpose is to provide the means of verifying compliance with the NCC Performance

Requirements. The appropriate authority will use the Performance Solution report for compliance assessment purposes.

The final report also shows how the construction conforms with the approved design and relevant regulatory, technical, and client specified requirements.

A summary of the Performance Solutions are outlined in Table 5a and Table 5b. Note the final report format is really just an extension of the PBDB document.

The Performance Solution process may have considered a range of non-NCC matters, but the final report only needs to demonstrate that compliance with the NCC Performance Requirements outlined in the brief has been achieved. The content of a typical final report must comply with A2.2(4)(d) and for this case study may include:

- An overview of the brief, including:
  - Scope of the project
  - Stakeholders
  - Applicable NCC Performance Requirements and DTS Provisions
  - Acceptance criteria agreed to by stakeholders
  - Approaches to methods of analysis
  - NCC Assessment Method/s used
  - Any assumptions that were made
  - Limitations
- Overview and outline of the analysis, modelling and/or testing carried out
  - Method of analysis used
  - The results obtained and relevance to the brief
- Evaluation of results including:
  - Comparison of results with acceptance criteria
  - Any expert judgement applied and its justification
- Conclusion
  - Specifications of the final design that are deemed to be acceptable
  - Confirmation that the NCC Performance Requirements/s were met
  - All limitations to the design and any conditions of use.

The conclusion of the final report must include key design decisions, assumptions and limitations that may affect future decisions for the building.

Table 5a Summary of Performance Solution for Issue 1 – Ramp landing not within allotment boundary

NCC Requirements (Applicable DTS, PR, Other PRs)	Summary design response and acceptance criteria	NCC Assessment Method	Evidence (Provided by)
<p><b>DTS</b></p> <p>D3.3 (a)(i) Does not comply with AS 1428.1 Clause 10</p> <p><b>Performance Requirement</b></p> <p>DP1 Access for people with a disability</p> <p><b>Other PRs</b></p> <p>NA</p>	<p>Use footpath as landing:</p> <ul style="list-style-type: none"> <li>• To achieve circulation space for a 90% wheelchair footprint.</li> <li>• To achieve a crossfall gradient no steeper than 1:40 (1:33 if bitumen).</li> <li>• To achieve a transition of not more than <math>\pm 5</math> mm, for bevelled edges.</li> <li>• Provide sensor activated powered entrance doors for safe egress.</li> </ul> <p>Safe use of ramp:</p> <ul style="list-style-type: none"> <li>• Minimum luminance contrast of 30% to be achieved between ramp surface and surrounding walls, landing and footpath; to be verified upon completion of construction works.</li> <li>• Minimum 100 lux on ramp. Light fittings and placement to minimise glare and shadowing.</li> </ul>	<p>Comparison with DTS Provisions</p> <p>Expert judgement</p> <p>Evidence of suitability</p>	<p>Accurate drawings showing the proposed building works and the arrangement of the footpath, ramp and entrance and the proposed finishes (Design practitioner)</p> <p>Report from appropriately qualified person on efficacy of design responses (Access consultant)</p> <p>Report from NATA accredited laboratory on LRVs for proposed materials (NATA laboratory)</p> <p>Report confirming onsite testing results of luminance contrast (Appropriately qualified person for onsite testing)</p> <p>Lighting design, specification and onsite testing (Lighting consultant)</p>

Note:

PR = Performance Requirement

Table 5b Summary of Performance Solution for Issue 2 – Ramp setback, TGSi placement and handrail extensions

NCC Requirements (Applicable DTS, PR, Other PRs)	Summary design response and acceptance criteria	NCC Assessment Methods	Evidence (Provided by)
<p><b>Issue 2a TGSIs</b></p> <p><b>DTS</b></p> <p>D3.3 (a)(i) Does not comply with AS 1428.1 Clause 10</p> <p>D3.8(a)(iv) and (b) Does not comply with AS 1428.4.1 Clauses 1 or 2</p> <p><b>Performance Requirement(s)</b></p> <p>DP1 Access for people with a disability DP2 Safe movement to and within a building</p> <p><b>Other PRs</b> NA</p>	<p>Safe use of ramp</p> <ul style="list-style-type: none"> <li>• Minimum luminance contrast of 30% to be achieved between ramp surface and surrounding walls, landing and footpath; to be verified upon completion of construction works. (As above).</li> <li>• Minimum 100 lux on ramp. Fittings and placement to minimise glare and shadowing.</li> <li>• Hazard TGSIs to be provided to top ramp landing to AS 1428.4.1.</li> </ul>	<p>Expert judgement</p> <p>Evidence of suitability</p> <p>Comparison with DTS Provisions</p>	<p>Accurate drawings and specifications detailing the proposed finishes (Design practitioner)</p> <p>Report from appropriately qualified person on efficacy of design responses (Access consultant)</p> <p>Lighting design, specification and onsite testing (Lighting specialist)</p>
<p><b>Issue 2b Handrail extensions</b></p> <p><b>DTS</b></p> <p>D3.3 (a)(i) Does not comply with AS1428.1 Clause 10</p> <p><b>Performance Requirement(s)</b></p> <p>DP1 Access for people with a disability DP2 Safe movement to and within a building</p> <p><b>Other PRs</b> NA</p>	<p>Safe use of ramp:</p> <ul style="list-style-type: none"> <li>• Provide dome button to specification in AS 1428.4.1, where handrails stopped short.</li> </ul>	<p>Comparison with DTS Provisions</p>	<p>Accurate drawings and specifications detailing the proposed handrail (Design practitioner)</p> <p>Report from appropriately qualified person on efficacy of design responses (Access consultant)</p>

Note:

PR = Performance Requirement



## References

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ABCB (Australian Building Codes Board) (2019) [National Construction Code \(NCC\) Amendment 1 Complete Series](#), ABCB, accessed Jan 2021.

ABCB (Australian Building Codes Board) (2021) [Performance Solution process Handbook](#), ABCB, accessed April 2021.

Standards Australia, AS 1428.1 Design for access and mobility, Part 1: General requirements for access – New building work. Standards Australia, accessed Jan 2021.

Standards Australia, AS 1428.4.1 Design for access and mobility, Part 4.1: Means to assist the orientation of people with vision impairment – Tactile Ground Surface Indicators. Standards Australia, accessed Jan 2021.