

**T2D** TORRENS TO  
DARLINGTON

# Tunnel Protection Overlay Code Amendment

**River Torrens to Darlington Tunnels, South Road**

*Department for Infrastructure and Transport*

*Discussion Paper for Consultation*

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## 1. HAVE YOUR SAY

This Code Amendment is on consultation from 31 August 2023 to 26 October 2023.

During this time, you are welcome to lodge a written submission about any of the changes proposed in this Code Amendment.

Feedback can be provided via:

- Online: PlanSA submission form and survey at [plan.sa.gov.au/have\\_your\\_say/code-amendments/on-consultation](https://plan.sa.gov.au/have_your_say/code-amendments/on-consultation)
- Email: [T2D@sa.gov.au](mailto:T2D@sa.gov.au) with subject 'Submission – Tunnel Protection Overlay Code Amendment'
- Post: Code Amendment, T2D Engagement Team, Department for Infrastructure and Transport, GPO Box 1533, Adelaide SA 5001
- In person: Register to attend a drop-in community information session

Information about community information sessions to be held during the consultation period are available on the PlanSA website.

For more information, contact the T2D Engagement Team, Department for Infrastructure and Transport, on 1300 951 145 or at [T2D@sa.gov.au](mailto:T2D@sa.gov.au).

## 2. WHAT IS THE PLANNING AND DESIGN CODE?

The Planning and Design Code (the Code) sets out the rules that determine what landowners can do on their land.

For instance, if you want to build a house, the Code rules will tell you how high you can build and how far back from the front of your land your house will need to be positioned. The Code will also tell you if any additional rules apply to the area where your land is located. For example, you might be in a high bushfire risk area or an area with specific rules about protecting native vegetation.

### 2.1 Planning and Design Code Framework

The Code is based on a framework that contains various elements called overlays, zones, sub zones and general development policies. Together these elements provide all the rules that apply to a particular parcel of land. An outline of the Code Framework is available on the [PlanSA Portal](#).

### 2.2 Overlays

Overlays contain policies and maps that show the location and extent of special land features or sensitivities, such as heritage places or areas of high bushfire risk.

They may apply across one or more zones. Overlays are intended to be applied in conjunction with the relevant zone. However, where policy in a zone conflicts with the policy in an overlay, the overlay policy trumps the zone policy.

### 2.3 Zones

Zones are areas that share common land uses and in which specific types of development are permitted. Zones are the main element of the Code and will be applied consistently across the state.

For example, a township zone for Andamooka can be expected to apply to similar townships like Carrieton. Each zone includes information (called classification tables) that describes the types of development that are permitted in that zone and how they will be assessed.

### 2.4 Sub zones

Sub zones enable variation to policy within a zone, which may reflect local characteristics. An example is Port Adelaide centre, which has many different characteristics to typical shopping centres due to its maritime activities and uses.

### 2.5 General Development Policies

General development policies outline functional requirements for development, such as the need for car parking or wastewater management. While zones determine what development can occur in an area, general development policies provide guidance on how development should occur.

## 2.6 Amending the Planning and Design Code

The *Planning, Development and Infrastructure Act 2016* (the Act) provides the legislative framework for undertaking amendments to the Code, as illustrated in Figure 1.

With approval of the Minister for Planning (the Minister) a Council, Joint Planning Board, Government Agency or private proponent may initiate an amendment to the Code and undertake a Code Amendment process.

The Department for Infrastructure and Transport (the Department) is undertaking this Code Amendment in its capacity as a Government Agency and in accordance with section 73(4)(a) of the Act.

The Minister approved a Proposal to Initiate this Code Amendment in January 2022. The approved Proposal to Initiate defined the scope of the amendment and prescribed the investigations which must occur to enable an assessment of whether the Code Amendment should take place and in what form. The Minister for Planning also provided conditions in approving the Proposal.

The State Planning Commission (the Commission) is responsible under the Act for ensuring the Code is maintained, reflects contemporary values relevant to planning, and readily responds to emerging trends and issues.

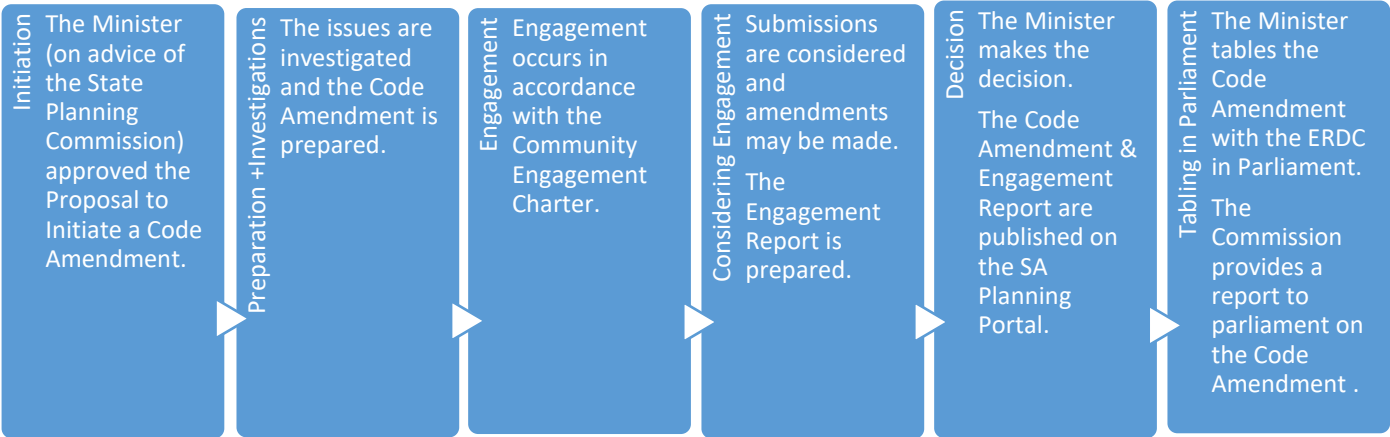


Figure 1: Legislated Code Amendment Process

The Commission provided independent advice to the Minister on the Proposal to Initiate this Code Amendment. The Commission will also provide a report on the Code Amendment (including compliance with the Community Engagement Charter) at the final stage of the Code Amendment process.

### **3. WHAT IS PROPOSED IN THIS CODE AMENDMENT?**

#### **3.1 Need for the amendment**

##### **3.1.1 Protecting the Proposed River Torrens to Darlington Tunnels**

The River Torrens to Darlington (T2D) Project is the final 10.5 kilometre (km) section of the North-South Corridor. Once completed, the T2D Project will deliver a 78 km non-stop traffic light-free motorway between Gawler and Old Noarlunga.

The T2D section extends along South Road from the River Torrens (Karrawirra Pari) in the north to Darlington in the south and is the most complex and highly urbanised part of the North-South Corridor.

World-leading urban design and construction methods are being applied to minimise impacts on local communities, commuters and the environment. When complete, more than 50 per cent of the T2D Project will be tunnels.

One of the keys to project success is ensuring the T2D corridor and tunnels are protected from future development activity that pose a risk of adversely impacting on their design, construction and ongoing operation.

Several mechanisms are being put in place to provide the necessary protections, including:

- land acquisition;
- amendments to the Code's Future Road Widening Overlay, which seeks to prevent development in proximity to arterial roads identified for future widening;
- introduction of the new "Ministerial Building Standard: additional requirements for designated Tunnel Protection Areas"; and
- initiation of this Code Amendment to introduce a Tunnel Protection Overlay.

### 3.1.2 Introducing Tunnel Protections to the Code

The use of planning provisions to protect major underground transport tunnels is international best practice and a feature of interstate planning systems.

This approach has been used for all large-scale transport tunnel projects in Australia, including the Cross City Tunnel in Sydney, the Melbourne Metro, North East Link and Suburban Rail Loop projects in Melbourne, and the Airport Link in Brisbane.

With the forthcoming construction of South Australia's first major transport tunnels through the T2D Project, there is a need to introduce similar provisions into the Code.

Tunnel protection planning policies centre on managing development activities that would compromise the construction of the tunnel, and once built, the ongoing structural integrity of the tunnels. That is, activities that could cause the tunnels to crack or reduce their operation life.

Specifically, the planning policies aim to:

- preserve the area immediately around the tunnels (Tunnel Exclusion Area) from intrusion from structures, such as pilings or basements, or works such as excavation; and
- ensure development activities do not create a change in the loading (or weight or stress) on the tunnels that is beyond what has been factored into the engineering structural design limits.

The loading on the tunnels can be affected by:

- an excessive increase in weight above the tunnel, such as a new 4-level building or warehouse constructed of heavy materials or building up of the surface level by more than 1 metre; or
- removal of excessive weight, such as through excavation and removal of soil greater than 2.5 metres.

The effect of such development activity on loading on the tunnels can generally be managed through measures such as alternative design of footings or construction materials.

This Code Amendment seeks to introduce clear criteria to guide the design and construction methods used in the vicinity of the tunnels while preserving the envisaged land uses for the Affected Areas.

### 3.1.3 Tunnel Protection Overlays

The appropriate Code element to achieve these aims is an overlay. This is because the T2D tunnels traverse multiple zones and individual zone policy amendments would not be efficient in achieving the protections required.

Current overlays that relate to protection of transport infrastructure and operations include the Airport Building Heights, Future Road Widening and Traffic Generating Development overlays.

A review of the overlays found there is no clear benefit in amending them to achieve protection for underground tunnels and that amending the overlays may undermine their specific intent and effectiveness.

Accordingly, the Department has initiated this Code Amendment to introduce a Tunnel Protection Overlay and associated policies to provide the immediate and long-term protections necessary to support the delivery and ongoing operation of the T2D tunnels.

The new Tunnel Protection Overlay will:

- be geographically aligned to the future T2D tunnels;
- consistently apply protections over multiple zones and subzones, including potential changes to zones and subzones through future Code Amendments;
- specify the development activities and thresholds that may compromise the structural integrity or ongoing operation of the tunnels; and
- identify triggers for development applications to be referred to the Commissioner of Highways for technical assessment and direction by specialist tunnel engineers on the design of the proposed development to prevent adverse impacts on the tunnels (supported by amendment to Schedule 9 of the Planning, Development and Infrastructure (General) Regulations 2017 (PDI Regulations)).

The introduction of the overlay will also align the Code with planning systems interstate to protect underground transport assets of State and national significance.

The Tunnel Protection Overlay is complemented by amendments to PDI Regulations to ensure activities posing a high risk of impacting adversely on tunnels are included in the definition of development, including certain essential infrastructure and State agency activities.



### 3.2 Affected Areas

The Affected Areas are those pieces of land determined to be located within the Tunnel Protection Area.

The proposed Tunnel Protection Overlay will be applied to the Affected Areas, which for ease of reference are described as the Southern Affected Area (T2D southern tunnels) and Northern Affected Area (T2D northern tunnels).

- **Southern Affected Area** - extends approximately 4.5 km along South Road from Celtic Avenue, Clovelly Park in the south to Nottingham Crescent, Glandore.
- **Northern Affected Area** - extends approximately 2.2 km along South Road from Davenport Terrace, Hilton in the south to Ashwin Parade, Torrensville in the north.

The width of the Affected Areas has been based on:

- engineering specifications of the tunnel and the geological conditions of the surrounding soils, and relate to the depth of the tunnels;
- a review of the area above the tunnels in which future development poses the greatest risk of causing a change in loading beyond the design limits of the tunnels; and
- a measurement determined by drawing a line that extends from the centreline, and five metres horizontally from the outer edge, of the tunnels at an angle of 45 degrees to where it intersects with the regulated surface level, as illustrated in Figure 2 below. Based on this approach, the Affected Area narrows as the tunnel depth decreases.

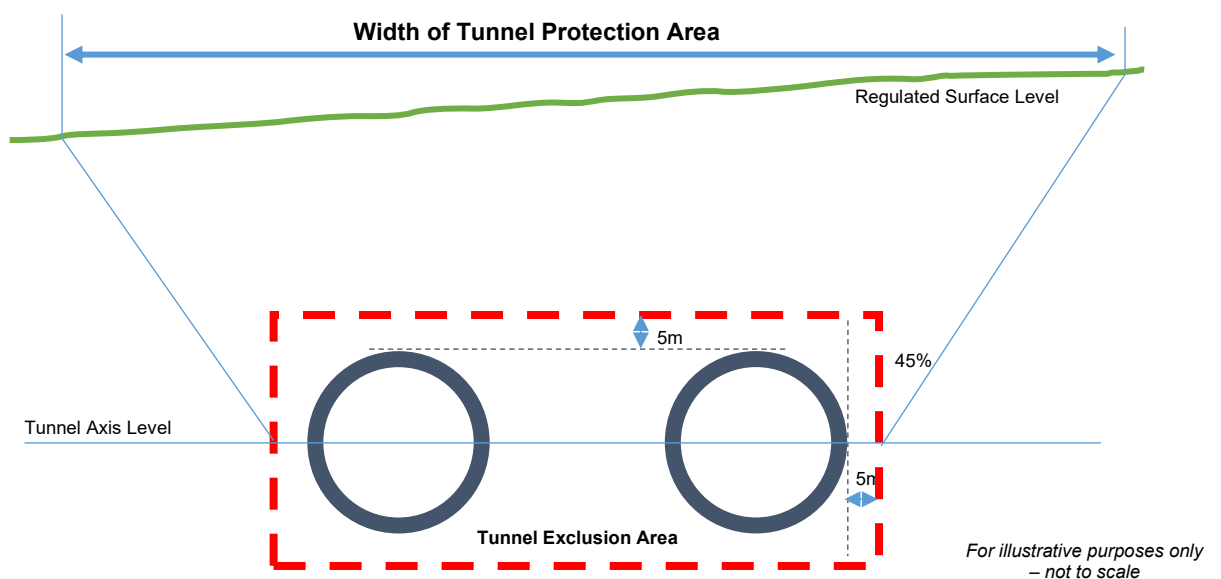


Figure 2: Width of Affected Areas is determined by the depth of the tunnels and engineering standards

For the most part, the Tunnel Protection Area will comprise land located directly above the tunnels and up to approximately 50 metres either side of the Tunnel Exclusion Area.

The exception to this is the Northern Affected Area which extends a minimum of 80 metres to the west of the Tunnel Exclusion Area. This additional offset is required to provide for a potential change to the alignment of the northern tunnels from the Reference Design alignment between their northern and southern portals.

The Affected Areas are based on the design for the T2D Project released in December 2022. The areas will be refined following detailed design in 2024-25, at which time the exact tunnel alignment and depth will be known.

Indicative maps of the Affected Areas are shown in Figure 3 and Figure 4, with detailed maps provided in the Code Amendment and on the South Australian Property and Planning Atlas (SAPPA).



Figure 3: Southern Affected Area

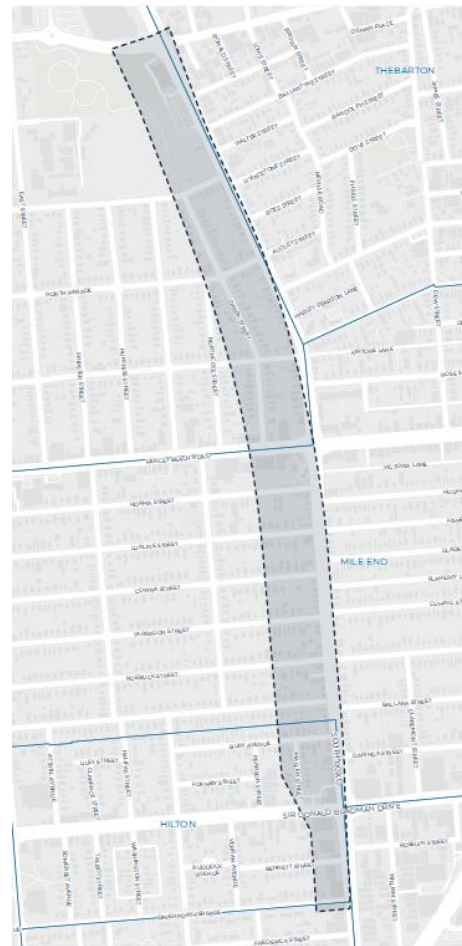


Figure 4: Northern Affected Area

### **3.2.1 Southern Affected Area**

The Southern Affected Area is highly urbanised with predominately light industry, commercial and retail land uses fronting onto South Road south of Cross Road, and residential neighbourhoods around Glandore, Clarence Gardens and Clovelly Park. The Affected Area is located within the City of Marion and City of Mitcham.

### **3.2.2 Northern Affected Area**

The Northern Affected Area is a highly urbanised area characterised by established residential neighbourhoods with retail and commercial clusters at Henley Beach Road and Sir Donald Bradman Drive. The Affected Area is located wholly within the City of West Torrens.

### 3.3 Summary of proposed policy changes

#### 3.3.1 Current Code Policy

The Affected Areas are located in metropolitan Adelaide in the vicinity of the two proposed T2D tunnels as described in [2.2](#) and covers multiple zones as shown in the Code Amendment and outlined below.

##### Southern Affected Area

Zones - the current zones in the Southern Affected Area are set out in Table 1.

Subzone - no sub zones are within the Southern Affected Area.

Overlays - a range of Overlays apply to the area, none of which will be impacted by this Code Amendment.

##### Northern Affected Area

Zones - the current zones in the Northern Affected Area are set out in Table 1.

Subzone - no sub zones are within the Northern Affected Area.

Overlays - a range of Overlays apply to the area, none of which will be impacted by this Code Amendment.

Current Zone	Proportion of Southern Affected Area	Proportion of Northern Affected Area
Employment	35.0%	13.3%
Established Neighbourhood	10.3%	60.5%
General Neighbourhood	6.6%	13.3%
Housing Diversity Neighbourhood	0%	0.8%
Local Activity Centre	0%	0.2%
Recreation	3.4%	9.9%
Strategic Employment	32.4%	1.5%
Suburban Activity Centre	7.9%	0.5%
Suburban Neighbourhood	2.7%	0%
Urban Corridor (Main Street)	0%	10.1%
Urban Neighbourhood	1.6%	0%
<b>Total All Zones</b>	<b>100%</b>	<b>100%</b>

Table 1: Current Zoning – Southern & Northern Affected Areas

### 3.3.2 Proposed Code Policy

The Code Amendment proposes to facilitate protection of the underground tunnels during their design, construction, and ongoing operation.

Specifically, the Amendment introduces planning policies which aim to:

- preserve the area immediately around the tunnels (Tunnel Exclusion Area) from intrusion from structures, such as pilings or anchors, or works such as excavation; and
- ensure development activities do not create a change in the loading (or weight or stress) on the tunnels that is beyond their engineering structural design limits.

The loading on the tunnels can be affected by an excessive increase in weight above the tunnel, such as a new 4-level building or storage of heavy materials, or removal of excessive weight, such as through excavation greater than 2.5 metres. The effect of such development activity on loading on the tunnels can generally be managed through measures such as alternative design of footings and construction materials.

The Code Amendment seeks to introduce clear criteria to guide the design and construction methods used in the vicinity of the tunnels, while preserving the envisaged land uses for the Affected Areas.

The Code Amendment comprises the following:

- introduction of a Tunnel Protection Overlay to the Code;
- addition of a new definition for 'regulated surface level' in Table 8 Administrative Terms and Definitions of the Code;
- spatial application of the Tunnel Protection Overlay to the Affected Areas as described in 3.2 and illustrated in the Code Amendment;
- amendment of the Accepted Development Classification table (Table 1) for zones within the Affected Areas to:
  - introduce additional Classes of Development that have the potential to impact on the T2D tunnels; and
  - add Classification Criteria to assist with determining the potential to impact on the T2D tunnels;
- amendment of the Deemed-to-Satisfy Development Classification table (Table 2) for zones within the Affected Areas to:
  - add relevant Tunnel Protection Overlay policy to be considered in the assessment of certain Classes of Development; and
- amendment of the Applicable Policies for Performance Assessed Development in Table 3 for zones within the Affected Areas to:
  - add relevant Tunnel Protection Overlay policy to be considered in the assessment of certain Classes of Development.

The proposed changes to the classification tables are discussed in more detail in 5.3.2.

In addition, amendments have been made to the PDI Regulations to enable the Code Amendment to come into effect and a new Ministerial Building Standard has been introduced to ensure consistency in assessment at the planning and buildings consent stages. A Fact Sheet providing further information on the Ministerial Building Standard is available on the South Australian Planning Portal.

### **New Tunnel Protection Overlay**

The new overlay establishes protection for underground tunnels by introducing new design criteria for those development activities that pose the greatest potential risk of compromising construction of the tunnels and once built, the ongoing operational and structural integrity of the tunnels and associated underground infrastructure (such as digital systems, cross passages).

The use of an overlay ensures that the protections apply consistently to multiple zones and subzones, including zone changes through future Code Amendments over time.

Developments that exceed specified design thresholds will trigger a referral to the Commissioner of Highways for technical assessment and direction. The technical assessment will be undertaken by specialist tunnel engineers on behalf of the Commissioner. The tunnel engineers will assess the potential impact on the tunnels and, where necessary, provide direction on design changes to mitigate impacts.

Under the new overlay, the following types of development activities will meet the threshold for referral to the Commissioner of Highways:

- a new building (or alteration of or extension to an existing building) or temporary structure exceeding 3 building levels;
- involving excavation or ground intrusion at a depth exceeding 2.5 metres, such as footings, underground car parks, cellars, pipes or drains;
- fill or earthworks that build up the ground level by more than one metre; or
- storage of material or equipment or temporary stockpiling over a designated stockpiling or storage area exceeding 100 square metres.

A copy of the Tunnel Protection Overlay is provided on the PlanSA Portal.

### **Amendments to Current Zones in the Affected Areas**

The overlay will not change what can be built in accordance with the current zone. For example, development in a General Neighbourhood zone will continue to be residential and a Suburban Activity Centre zone will continue to support neighbourhood-scale commercial facilities.

However, to achieve the desired protections for the underground tunnels, design criteria will be introduced to the Assessment Provisions (AP) Tables, 1, 2 and 3 of the zones currently applicable to the Affected Areas, as listed at **3.3.1** above. The amendments will align the zone criteria for accepted development, deemed-to-satisfy development and performance assessed development classifications with the new Tunnel Protection Overlay policies.

In most circumstances, the amendments will not change the development assessment pathway. However, additional checks will be required by proponents and in some

instances, new forms of development will be introduced in line with associated amendments to the PDI Regulations.

The scope of this Code Amendment is limited to current zones in the Affected Areas. If additional zones are introduced to the Affected Area in the future, the Designated Entity introducing those zones will be required to ensure the zones are amended to give the Tunnel Protection Overlay effect.

The proposed policy changes for each zone are shown in the Code Amendment.

## 4. WHAT ARE THE NEXT STEPS FOR THIS CODE AMENDMENT?

### 4.1 Early Commencement

This Code Amendment will commence operation early, on an interim basis on 31 August 2023 under section 78 of the Act. As a result, the policies being proposed in this Code Amendment will apply until they are adopted (or otherwise) by the Minister.

This process is used when the Minister considers that the immediate application of the policy changes is necessary in the interests of orderly and proper development, and to counter applications for inappropriate development ahead of the outcome of consideration of this Code Amendment by the Minister.

For the T2D tunnels, protection of the future tunnels from changes in loadings beyond their engineering design limits or intrusion to the Tunnel Exclusion Area is essential prior to their construction, as well as post-construction.

### 4.2 Engagement

Engagement on the Code Amendment must occur in accordance with the Community Engagement Charter principles, which require that:

- engagement is genuine
- engagement is inclusive and respectful
- engagement is fit for purpose
- engagement is informed and transparent
- engagement processes are reviewed and improved.

An Engagement Plan has been prepared for this Code Amendment to ensure that engagement will be conducted and measured against the principles of the Charter. For more information on the Community Engagement Charter go to the PlanSA portal at

([plan.sa.gov.au/resources/planning/community\\_engagement\\_charter](http://plan.sa.gov.au/resources/planning/community_engagement_charter)).

A summary of the engagement that is occurring for this Code Amendment is as follows:

- A written notice to the following parties inviting them to review and comment on the draft policy and attend information sessions:
  - affected councils and councils in the T2D Project area – City of Marion, City of West Torrens, City of Mitcham, City of Unley, City of Charles Sturt;
  - State Members of Parliament with electorates in which the proposed Code Amendment applies;
  - owners and occupiers of land affected by the Tunnel Protection Overlay and adjacent land;
  - utility providers; and
  - development and planning industry groups, e.g. Property Council, Urban Development Institute of Australia, Planning Institute of Australia (SA)
- community information sessions



- a copy of the draft Code Amendment placed on the SA Planning Portal ([www.plan.sa.gov.au](http://www.plan.sa.gov.au))
- information on the Department's T2D Project website with a link to the SA Planning Portal.
- Fact Sheet outlining what the Code Amendment is about, the proposed policy amendments, how interested persons can comment.

### 4.3 How can I have my say on the Code Amendment?

There are several ways in which you can provide feedback on the Code Amendment.

Feedback can be provided via:

- Online: PlanSA submission form at [plan.sa.gov.au/have\\_your\\_say/code-amendments/on-consultation](http://plan.sa.gov.au/have_your_say/code-amendments/on-consultation)
- Email: [T2D@sa.gov.au](mailto:T2D@sa.gov.au) with subject 'Submission – Tunnel Protection Overlay Code Amendment'
- Post: Code Amendment, T2D Engagement Team, Department for Infrastructure and Transport, GPO Box 1533, Adelaide SA 5001
- In person: Register to attend a drop-in community information session

Information about community information sessions to be held during the consultation period are available on the SA Planning Portal.

### 4.4 What changes to the Code Amendment can my feedback influence?

Aspects of the Code Amendment which stakeholders and the community can influence are:

- Providing information on the potential impact of the proposed new planning policies on current and future property owners and developers.
- Providing feedback as to whether applicants have sufficient information to understand what is required when developing near tunnels.

Aspects of the Code Amendment which stakeholders and the community cannot influence are:

- The initiation of a Code Amendment which seeks to introduce a Tunnel Protection Overlay into the Planning and Design Code and apply it to the proposed Torrens to Darlington tunnels.
- The extent of the subject land that forms the basis of the Code Amendment.
- The engineering principles underpinning the triggers for referral to the Commissioner of Highways.

#### **4.5 What will happen with my feedback?**

The Department is committed to undertaking consultation in accordance with the principles of the Community Engagement Charter and is genuinely open to considering the issues raised by people in the community.

All formal submissions will be considered by the Department when determining whether the proposed Amendment is suitable and whether any changes should be made.

Each submission will be entered into a register and you will receive an email acknowledging receipt of your submission. Your submission will be published on the PlanSA Portal. Personal addresses, email and phone numbers will not be published, however company details will be.

The Department will consider the feedback received in finalising the Code Amendment and will prepare an Engagement Report which will outline what was heard during consultation and how the proposed Code Amendment was changed in response to submissions.

The Engagement Report will be forwarded to the Minister, and then published on the PlanSA Portal.

#### **4.6 Decision on the Code Amendment**

Once the Engagement Report is provided to the Minister, the Commission may provide further advice to the Minister at the Minister's request, if the Code Amendment is considered significant.

The Minister will then either adopt the Code Amendment (with or without changes) or determine that the Code Amendment should not proceed. The Minister's decision will then be published on the PlanSA Portal.

If adopted, the Code Amendment will be referred to the Environment Resources and Development Committee of Parliament (ERDC) for their review. The Commission will also provide the Committee with a report on the Code Amendment, including the engagement undertaken on the Code Amendment and its compliance with the Community Engagement Charter.

## 5. ANALYSIS

### 5.1 Strategic Planning Outcomes

#### 5.1.1 Summary of Strategic Planning Outcomes

The proposed introduction of a Tunnel Protection Overlay to the Code, and application of the overlay to the Affected Areas in the vicinity of the proposed T2D tunnels, will provide the protections necessary for the Department to finalise designs, construct and operate the T2D tunnels.

These protections complement other measures being implemented, including land acquisition, to secure the corridor required for construction of the final 10.5 km section of the North-South Corridor – the State’s preeminent strategic transport corridor through Greater Adelaide.

The use of an overlay to affect the tunnel protection will ensure there will be no requirement to change existing land uses and that new development can proceed as envisaged by the current zoning in the Affected Areas.

A review of the approximately 500 development proposals in proximity of the proposed T2D tunnels lodged over the five-year period 2017-18 to 2021-22 found that only two proposals, or 0.4% of all proposals, would have triggered a referral under the proposed overlay policies. A referral to the Department would require the applicant to demonstrate design solutions to meet the engineering criteria required in the vicinity of the tunnels, such as depth of footings and foundations.

The overlay approach also enables future rezoning and intensification of development in the vicinity of the tunnels to support directions for residential, employment and community lands and linkages set out in the 30 Year Plan for Greater Adelaide and relevant plans of affected Councils.

During the final design and construction phases of the T2D Project, the Department will work with Councils in the vicinity of the T2D corridor to identify opportunities for urban renewal, uplift and public realm improvements arising from shifting large volumes of traffic underground.

#### **Interface between Different Land Uses**

The spatial width of the proposed overlay is formed by the engineering specifications of the tunnel and the geological conditions of the surrounding soils, and the depth of the tunnels. The width does not align with lot configuration and the boundaries of land use zoning at ground level. The proposed overlay incorporates multiple land use zones (described in [Section 3.3.1](#)) and many allotments, including road reserves.

Notwithstanding the diversity of lot types and land uses at ground level, the proposed overlay will not generate interface issues with different land uses as the overlay does not seek to alter land use itself. Rather, development envisaged within these zones may need to demonstrate how engineering criteria are managed considering proximity to the T2D tunnels.

### 5.1.2 Consistency with the State Planning Policies

State Planning Policies define South Australia's planning priorities, goals and interests. They are the overarching umbrella policies that define the state's interests in land use. There are 16 State Planning Policies.

These policies are given effect through the Code, with referral powers assigned to relevant Government Agencies (for example, the Environmental Protection Agency for contaminated land). The Code (including any Code Amendments) must comply with any principle prescribed by a State Planning Policy.

This Code Amendment is considered to be consistent with the State Planning Policies as shown in [Attachment A](#), particularly the following policies:

- **Policy 1.5** Protect land corridors for expansion or augmentation of infrastructure.
- **Policy 11.6** Allow for the future expansion and intensification of strategic transport infrastructure and service provision (corridors and nodes) for passenger and freight movements.
- **Policy 11.7** Identify and protect the operations of key transport infrastructure, corridors, and nodes (passenger and freight).

### 5.1.3 Consistency with the Regional Plan

The directions set out in Regional Plans provide the long-term vision and set the spatial patterns for future development within a region. This can include land use integration, transport infrastructure and the public realm.

The Commission has identified that the existing volumes of the South Australian Planning Strategy, prepared under the *Development Act 1993*, will apply until such time as the new Regional Plans are prepared and adopted. Refer to the SA Planning Portal for more information on the Commission's program for implementing Regional Plans throughout South Australia. Where there is conflict between a Regional Plan and the State Planning Policies, the State Planning Policies will prevail.

*The 30-Year Plan for Greater Adelaide (2017)* is the relevant Regional Plan applicable to this Code Amendment.

This Code Amendment is considered to be consistent with the 30-Year Plan as shown in [Attachment A](#).

### 5.1.4 Consistency with other strategic policy documents

This Code Amendment aligns with other key policy documents as shown in [Attachment A](#).

## 5.2 Infrastructure planning

Provision of infrastructure to the Affected Area is not relevant to this Code Amendment.

## 5.3 Investigations

### 5.3.1 Investigations undertaken

The extent of investigations that have been undertaken as part of the Code Amendment process have been agreed by the Minister in the Proposal to Initiate. The Commission has also specified certain investigations to be undertaken to support the Code Amendment.

The following investigations have been undertaken to inform this Code Amendment:

Investigation	Summary of Scope of Investigations	Summary of Outcome of Recommendations
T2D Design, December 2022	<p>The T2D Design process involved a range of environmental, economic, social and engineering investigations pertinent to the construction and operation of the T2D infrastructure.</p> <p>The T2D Design provides sufficient detail to consider construction impacts, possible issues, constraints and benefits of design options, and provide the basis for future detailed construction design.</p>	<p>The T2D Design establishes the road alignment, tunnel layouts and motorway access points.</p> <p>The T2D Design sets out the indicative alignment, depth and design parameters of the tunnels having regard to surface development, existing ground conditions and development cost.</p> <p>The T2D Design has informed the technical parameters of the proposed overlay.</p>
Interstate Policy Precedents and Practices	<p>The Department has reviewed how similar infrastructure is recognised and protected in the planning systems of other jurisdictions. This includes Cross City Tunnel (NSW), Suburban Rail Loop (VIC), and North East Link (VIC).</p>	<p>The investigations provided precedent and context from other jurisdictions, highlighting a need for protection of the tunnel assets in the planning system and various approaches to achieving this outcome.</p>
Technical Parameters	<p>Identification of specific conditions needed to protect the tunnel asset, including depth of ground intrusion / excavation and limits on changes in loading above the tunnel, having regard to the Reference Design and the policy framework of the zones in the Code.</p>	<p>The investigations provided the intent and basis of the overlay policies, thresholds for referrals and identification of amendments to the PDI Regulations required to implement the overlay.</p>
Impact Assessment	<p>An assessment of the impacts of the proposed overlay may have on the development potential of current zones, and the implications for future proponents of development that will trigger the overlay.</p>	<p>The investigations assessed:</p> <ul style="list-style-type: none"> <li>• impacts on the intent of the underlying zones, including the envisaged land uses;</li> <li>• potential changes to assessment pathways for the development types captured by the overlay; and</li> </ul>

Investigation	Summary of Scope of Investigations	Summary of Outcome of Recommendations
		<ul style="list-style-type: none"> <li>the development types which are within the overlay area that would maintain an Accepted or Deemed-to-Satisfy assessment pathway which can be reflected in the Overlay policy.</li> </ul>

Further details on investigations undertaken in support of the Code Amendment are included in [Attachment B](#).

### 5.3.2 Recommended policy changes

Following is a list of the recommended policy changes which are proposed in response to the investigations undertaken in support of this Code Amendment:

#### **Drafting a Tunnel Protection Overlay and introducing a referral to the Commissioner of Highways**

The Tunnel Protection Overlay has been informed by approaches to planning policy adopted by other jurisdictions and the technical parameters of the T2D tunnels prepared as part of the Reference Design for the project.

Drafting of the overlay also considered:

- minimising adverse impacts on landowners by preserving the intent of the underlying zones and minimising changes to assessment pathways;
- minimising the administrative burden on applicants and assessment bodies, including the volume of referrals to the Department; and
- aligning the wording of the overlay with Code drafting principles and ensuring the assessment criteria are easy to understand and apply.

The intention of the Deemed to Satisfy (DTS) Criteria and Designated Performance Feature (DPF) of the overlay is to specify the design parameters necessary to mitigate risks to underground tunnels and, by doing so, provide certainty for proponents on matters to be considered during the design and construction of multi-level developments, excavation and underground structures in proximity of the T2D tunnel corridor.

In drafting the DTS/DPF, attention was given to the provisions of section 57 of the Act which set out the rules for the development of statutory instruments, including the Code. Specifically, section 57 requires that rules relating to building matters should not be included in the Code, such as footing details and loading metrics, and addressed through building rules.

As a result, the Department has used common development terms in the overlay, such as building levels or depth of excavation, that meet loading change parameters rather than using technical engineering criteria, such as a 45kPa load limit and footing clearance calculations. These technical criteria have been addressed in a new Ministerial Building Standard which includes diagrams and methodologies to simplify interpretation.

This approach also aims to ensure that most developments do not require detailed technical engineering assessment at the planning consent stage. Professional engineers engaged to design the types of affected developments would be familiar with loading metrics and methodologies used in the Ministerial Building Standard.

In addition, definitions for 'regulated surface level' are proposed to be included in Table 8 Administrative Terms and Definitions of the Code to enable calculation of clearances and ease of use of the overlay. As with all defined terms in the Code, each time 'regulated surface level' appears in the Code it will be underlined to alert users that there is a definition available to assist with interpretation.

The investigations also identified a need for developments exceeding specified thresholds, and at greatest risk of compromising the tunnels, to be referred to the Commissioner of Highways for technical assessment and direction by the Department's nominated professional tunnel engineer. The PDI Regulations have been amended in parallel to preparation of this Code Amendment to introduce the new referral to the Commissioner of Highways and enable Early Commencement.

The proposed Tunnel Protection Overlay and definition for 'regulated surface level' is provided in the Code Amendment.

### **Applying the Overlay to the T2D tunnels**

The application of the overlay to land in the vicinity of the T2D tunnel corridor has been based on the criteria set out in [3.2 'Affected Areas'](#) and reflects the technical parameters of the T2D tunnels prepared as part of the Reference Design for the project as discussed in [Attachment B](#).

### **Changes to Development Classification Tables in the Affected Areas**

The investigations found that a number of activities at risk of compromising the tunnels were not included as classes of development in a number of affected zones.

This Code Amendment proposes changes to the following zone policies to ensure all types of development considered by the overlay are recognised in the affected zones.

These changes are supported by amendments to the PDI Regulations to introduce these activities into the definition of development and remove exemptions for these activities when undertaken in association with essential infrastructure and Council and State agency development. Further information on the removal of exemptions for certain essential infrastructure, Council and State agency development is provided a Fact Sheet available on the South Australian Planning Portal.

The following classes of development are proposed to be added to the Accepted Classification table (Table 1) for each of the affected zones together with the criteria that needs to be met to avoid a performance assessment against the Tunnel Protection Overlay:

- Construction, alteration of, or addition to a building – if it does not exceed 3 building levels above the regulated surface level;
- Excavation or ground intruding activity – if it does not involve excavation or ground intruding activity exceeding 2.5 metres below the regulated surface level and/or

involve an underground drain, pipe, conduit, tunnel, underground passageway or adit.

- Filling of land – if it does not involve filling of land exceeding 1 metre above the regulated surface level;
- Storage of material or equipment or temporary stockpiling – if it does not include storage of material or equipment or temporary stockpiling over a designated storage or stockpiling area exceeding 100 square metres; and

In addition to the above, further amendments are proposed to Table 1 for each relevant zone to introduce additional Accepted Development Classification Criteria regarding fill, excavation and/or ground intruding activity for the following classes of development undertaken within the Tunnel Protection Overlay:

- Building work on railway land
- Carport
- Educational establishment
- Outbuilding
- Private bushfire shelter
- Shade sails
- Swimming pool or spa pool
- Temporary public service depot
- Verandah
- Water tank (above ground)
- Water tank (underground)

Amendments are proposed to Table 2 in each zone to add DTS/DPF 1.1 and DTS/DPF 2.1 from the Tunnel Protection Overlay to the Deemed to Satisfy Development Classification Criteria for relevant development types.

Amendments are also proposed to Table 3 in each zone to add Performance Objective (PO) 1.1 and PO 2.1 to the Applicable Policies for Performance Assessed Development.

The specific amendments for each zone are included in the Code Amendment.

### 5.3.3 Impact of Recommended Policy Changes

The Code Amendment does not seek to restrict development from occurring in accordance with the existing zone policy that applies to the Affected Area. Rather, the proposed overlay will introduce a referral to the Commissioner of Highways and design criteria for excavation, ground intruding activities and multi-story developments to provide assurance that such developments are designed to meet the load allowances of the structural design of the tunnels and do not intrude into the tunnel alignment.

Similarly, the Amendment will not preclude future rezoning opportunities in the Affected Areas over the life of the tunnel assets. The Tunnel Protection Overlay will simply alert proponents of any future Code Amendments of the need to take into consideration the requirements for development within a Tunnel Protection Area; and prompt a requirement to consult with the Commissioner of Highways as part of the Code Amendment consultation process.

As a result of rezonings and intensification of development, over coming decades the number of applications for developments that will trigger a referral under the proposed overlay are anticipated to increase. However, the airport height limits covering most of the affected areas mean that this is likely to be limited to localised areas and developments involving underground structures in proximity to the tunnel portals.



## Assessment pathway

The Amendment will result in some changes to the assessment pathway for certain developments in the affected zones. For example, certain works that would not typically require a planning consent, such as a shade sail, would require a performance assessment against the Code if the subject land is covered by the Tunnel Protection Overlay and installation of the shade sail would involve filling of land more than 1m above the regulated surface level or excavation 2.5 metres below the regulated surface level. Similarly, a Deemed-to-Satisfy application for semi-detached dwellings in the General Neighbourhood Zone may default to the Performance Assessed pathway if the affected land is covered by the Tunnel Protection Overlay and the footings for the dwellings will involve ground intruding activity more than 2.5m below the regulated surface level.

For the most part however, the classes of development that are more likely to be affected by the tunnel protection criteria are those that are already subject to a Performance Assessed pathway. For example, an application for a 4-level residential flat building in the Urban Neighbourhood Zone would currently be subject to the Performance Assessed pathway. The addition of the Tunnel Protection Overlay would not change this pathway; it will trigger a referral to the Commissioner of Highways on the basis that the development exceeds 3 levels in height.

## Referrals to the Commissioner of Highways

The triggers for referral to the Commissioner of Highways have been designed to avoid unnecessary burden to applicants of proposed developments by filtering off common building/structure construction and earthworks from the need for referral.

The intent of the referral is to:

- ensure the T2D Project Team is aware of potential developments in proximity to the tunnels during the design and construction phase;
- enable a technical review by professional engineers to ensure proposed development is designed so that it will not intrude into the tunnel corridor nor compromise its structural integrity and performance; and
- provide direction to applicants on design measures to mitigate impacts on the tunnels and associated infrastructure.

## Engineering requirements

The Commissioner of Highways may seek preliminary engineering information with the application for planning consent and/or building consent. This could be confirmed in discussions with the Commissioner of Highways and/or relevant authority and would most likely only be required for developments where the Commissioner has determined that the effects on tunnels assets are not clearly within the tunnel design allowances. The extent of engineering work, and the expertise required would depend upon the scale of the development and its proximity to the tunnels.

In most cases, technical engineering information would not be required until the building consent stage and may be a condition of planning consent. Generally, the additional information would involve preliminary design of the structural form with estimates of loads and foundation requirements. This would usually be within the capability of a structural engineer who would typically be used by a developer (say for a 3-6 storey building

apartment building, e.g. a small consulting engineering firm). In more critical cases, more rigorous building analyses, with specialist advice on foundation designs and assessments of load distribution through the ground could be required. These might be where a larger building is founded on piles that carry loads closer to the tunnels than near surface spread footings.

Such engineering work would be required during the progress of the design of the development in any case, but a potential effect of the policy is that the work might be required earlier to address planning and/or building application requirements.

### **Assessment timeframes**

The proposed timeframe for referrals will be 20 business days, which is consistent with the timeframe for other referrals to the Commissioner of Highways. The Department will have ongoing services of a professional tunnel engineer, either employed by the Department or through contractual arrangements, available to undertake the necessary assessments within the regulated timeframe.

A number of other overlays requiring referral to the Commissioner of Highways apply to much of the affected areas due to the proximity to South Road, including the Major Urban Transport Routes Overlay. Hence, the introduction of an additional referral will not impact on assessment timeframes.

To avoid the potential for delays associated with a request for information from the applicant following lodgment, Schedule 8 of the PDI Regulations have been amended to include details of additional plans to be provided at the time of lodgment in relation to the Tunnel Protection Overlay. These plans will only be required if the proposed development is likely to meet the criteria for referral to the Commissioner.

Introduction of the Tunnel Protection Overlay will be supported by training for Council planners and key Department personnel to mitigate potential for unnecessary referrals to the Commissioner. The use of common development terms in the overlay, such as building levels and depth of excavation, rather than using technical engineering criteria, such as a 45kPa load limit, seeks to simplify the referral triggers to avoid ambiguity.

Developers also have the option to make an application to the Department for a preliminary agreement under section 123 of the Act, which will fast track the assessment timeframe and identify early on what additional information might be required by the Commissioner to assess the application.

The Code Amendment will not change existing public notification requirements.

### **Additional activities requiring a development application**

Introduction of the Tunnel Protection Overlay to the Code will see a limited number of new activities requiring development applications that previously were not considered to constitute development, as detailed in 5.3.2. The impact of this is difficult to quantify and has been sought to be minimised by introducing Accepted Development Classification criteria for common activities where risk can be managed.

The Code Amendment is considered to take a measured and proportionate approach to the protection of the T2D tunnels while ensuring development can occur at the surface.

## **Essential infrastructure, Council works and development by State Agencies**

Some services, utilities and infrastructure works undertaken by essential infrastructure providers (such as SA Power Networks), Councils or State agencies that have the potential to impact on the tunnels will require a development application where previously one was not required.

This includes the installation and construction of new services, and the augmentation of existing services which involve:

- excavation or intrusion of the ground exceeding 2.5 metres below ground level, including underground drains, pipes, conduits, tunnels, underground passageway or adit.
- structures of greater than 3 levels in height or have a loading at the foundation exceeding 45 kPa;
- fill or earthworks more than 1 metre above ground level or have a loading at the surface exceeding 25 kPa; or
- temporary stockpiling over an area exceeding 100 square metres.

The Department will work with affected councils, agencies and service providers to raise awareness of the provisions of the overlay. Early engagement with the Department will be encouraged to determine how services and infrastructure can best be delivered while mitigating impacts on the tunnels. Establishing preliminary agreements under section 123 of the Act will further support fast tracking of the assessment timeframe.

## **Assessment pathway for multi-storey developments**

Impact assessments undertaken to inform this Code Amendment indicate that the proposed overlay will not change what can be built in accordance with the current zones nor will it change the assessment pathway for multi-storey developments.

The majority (99%) of properties in the Northern Affected Area and Southern Affected Area have maximum building height levels of between 1 level and 3 levels.

The exceptions being:

### **Southern Affected Area**

- 21 properties located within the following zones that allow for a maximum building height of 4 levels or 16.5 metres:
  - Suburban Activity Centre zones at Edwardstown (Castle Plaza) and Clovelly Park
  - Urban Neighbourhood zone at Edwardstown (former Hills Site and environs)

New buildings within these zones are currently assessed via the Performance Assessed pathway.

- The majority of the Southern Affected Area is within the Airport Building Heights (Regulated) Overlay – Structures Greater than 15 Metres Overlay.

Proposed developments greater than 3 levels or 15 metres in this zone are assessed via the Performance Assessed pathway and referred to the relevant airport authority for direction to mitigate impacts on aviation safety.

#### Northern Affected Area

- 7 properties located within the following zones that allow for a maximum building height of is 4 levels or 16.5 metres:
  - Urban Corridor (Main Street) Zone at Henley Beach Road

New buildings exceeding 4 levels or 16.5 metres within this zone are assessed via the Performance Assessment pathway

- 100% of the Northern Affected Area is within the Airport Building Heights (Regulated) Overlay – Structures Greater than 15 Metres Overlay.

Proposed developments greater than 3 levels or 15 metres in this zone are assessed via the Performance Assessed pathway and referred to the relevant airport authority for direction to mitigate impacts on aviation safety.

The Performance Assessed pathway will continue to apply to proposed developments greater than 3 levels in the above zones, however as a result of the Code Amendment, a new referral will be introduced for the Commissioner of Highways to undertake a technical review and provide for direction on design measures to mitigate impacts on the tunnels.

The new Ministerial Building Standard provides technical guidance for developers and construction engineers to inform detailed design to meet loading requirements in a Tunnel Protection Overlay area.

#### **Assessment pathway for excavation, filling and ground intruding activities**

Excavation of more than 2.5 metres is generally undertaken in association with other development activities that are subject to the Performance Assessed Pathway, such as construction of a building, structure or underground utilities. Hence the overlay will not impact on the assessment pathway. Similarly, filling is usually incidental to other development activities.

Excavation and filling undertaken as standalone activities are not currently considered to constitute development unless undertaken in certain zones and where the excavating or fill will exceed 9m<sup>3</sup> or is undertaken in specific areas subject to inundation. As part of the Code Amendment, excavation and fill are proposed to be added as classes of development in their own right in zones within the affected areas to ensure that any standalone excavation exceeding a depth of 2.5 metres and any filling of land that exceeds 1 metre above the regulated surface level, triggers a performance assessment.

Ground intruding activities, such as metal ground reinforcing elements and underground pipes or conduits, pose a significant risk of intruding into the T2D tunnel underground corridor or changing the loadings near the tunnels. These forms of work are currently generally exempt from the need to obtain development approval given their minor impacts in normal situations.

However, given the risk to T2D there is a need to ensure these activities are regulated and referred to the Commissioner of Highways for direction, particularly during the design and construction phases when the final alignment of the tunnel is subject to change.

The locations with the greatest risk of intrusions into the Tunnel Exclusion Area or insufficient clearance of footings and foundations is where the tunnel is closest to the surface. To minimise impacts, the Department is acquiring all properties above the area to be constructed by 'cut and cover' method. This is near the tunnel entry and exit points. This method involves excavation to the depth required to construct the tunnels and supporting infrastructure assets, and once constructed the tunnels are covered with fill to ground level.

Within 100 to 200 metres of the 'cut and cover' sections of the tunnel (depending on the design of the tunnels) the tunnels may be less than 10 metres deep. Substantial developments within these locations may require mitigation measures, such as changes to footing designs or limitations on number or extent of basements, to reduce effects on the tunnels.

## 6. REFERENCES

Department for Infrastructure and Transport, 2022, Torrens to Darlington (T2D) Project website [t2d.sa.gov.au](https://t2d.sa.gov.au)

Department of Planning, Transport and Infrastructure, 2013, [A Functional Hierarchy for South Australia's Land Transport Network](#)

Department of Planning, Transport and Infrastructure, 2017, [The 30-Year Plan for Greater Adelaide](#)

Infrastructure SA, 2020, [20-Year State Infrastructure Plan](#)

State Planning Commission, 2019, [State Planning Policies for South Australia – 23 May 2019](#)

# ATTACHMENT A – STRATEGIC PLANNING OUTCOMES

## 1. State Planning Policies

The State Planning Policies (SPPs) require that the Principles of Good Planning are considered in the preparation of any designated instrument, including a Code Amendment.

### SPP Key Principles

There are 16 SPPs that include Objectives, Policies and Principles for Statutory Instruments (including the Planning and Design Code). The most critical SPPs in the context of this Code Amendment are:

State Planning Policy (SPP)	Code Amendment Alignment with SPPs
<p><b>State Planning Policy 1: Integrated Planning</b> To apply the principles of integrated planning to shape cities and regions in a way that enhances our liveability, economic prosperity, and sustainable future.</p>	
<p>1.5 Protect land corridors for expansion or augmentation of infrastructure.</p>	<p>The North-South Corridor is Adelaide’s preeminent strategic transport corridor. When the final T2D section is completed, the corridor will provide non-stop, reliable and efficient access through Adelaide, providing critical links to key transport gateways (Outer Harbor, Adelaide Airport) and the national road network.</p> <p>In the short-term, the overlay policies aim to manage development activities that would compromise the detailed design and construction of the T2D tunnels. Once built, the overlay will provide ongoing protection to the operation and structural integrity of the tunnels over their 100-year design life.</p>
<p><b>State Planning Policy 6: Housing Supply and Diversity</b> To promote the development of a well-serviced and sustainable housing and land choices where and when required.</p>	
<p>6.5 Locate higher density residential and mixed-use development in strategic centres and transport corridor catchments to achieve the densities required to support the economic viability of these locations and the public transport services.</p>	<p>The Southern Affected Area covers a segment of the high frequency mass transit corridor along South Road and Strategic Activity Centre and/or Urban Neighbourhood zones at Edwardstown (Castle Plaza) and Clovelly Park, while the Northern Affected Area covers a portion of the priority mass transit corridor and Urban Corridor (Main Street) zone at Henley Beach Road (<a href="#">A Functional Hierarchy for South Australia’s Land Transport Network, 2013</a>).</p> <p>The engineering structural design limits of the T2D tunnels and the design criteria introduced in the overlay provides for the scale and density of development in these locations as envisaged in current zoning, as well as for increased densities if required in the future.</p> <p>The design and construction methods for multi-level developments, excavation and underground structures will need to consider the proximity to the T2D tunnels and risk mitigation measures introduced through the overlay.</p>

State Planning Policy (SPP)	Code Amendment Alignment with SPPs
<p><b>State Planning Policy 9: Employment Lands</b> To provide sufficient land supply for employment generating uses that supports economic growth and productivity.</p>	
<p>9.2 Enable opportunities for employment and encourage development of underutilised lands connected to, and integrated with, housing, infrastructure, transport and essential services.</p> <p>9.4 Adaptable policies that allow commercial and industrial-focused employment lands to support local economies and evolve in response to changing business and community needs</p>	<p>The structural design limits of the T2D tunnels and the design criteria introduced in the overlay provides for the scale and density of development for employment uses as envisaged in current zoning, such as at Edwardstown, Melrose Park and Mile End, as well as for increased density and scale in the future.</p> <p>The design and construction methods for multi-level developments, excavation and underground structures will need to consider the proximity to the T2D tunnels and risk mitigation measures introduced through the overlay.</p>
<p><b>State Planning Policy 11: Strategic Transport Infrastructure</b> To integrate land use policies with existing and future transport infrastructure, services and functions to preserve and enhance safe, efficient and reliable connectivity for people and business.</p>	
<p>11.6 Allow for the future expansion and intensification of strategic transport infrastructure and service provision (corridors and nodes) for passenger and freight movements.</p> <p>11.7 Identify and protect the operations of key transport infrastructure, corridors, and nodes (passenger and freight).</p>	<p>The proposed overlay supports the expansion of the strategically significant North-South Corridor by protecting the location of the proposed T2D tunnels to enable their detailed design, construction and ongoing operation.</p>



## 2. Regional Plans

### The 30-Year Plan for Greater Adelaide

The investigations undertaken to date and outlined in this Code Amendment will ensure that the proposed overlay is largely consistent with the key policies and targets of the *30-Year Plan for Greater Adelaide (2017 Update)*, which are the most relevant to this Code Amendment, as described below.

30-Year Plan for Greater Adelaide Identified Priorities or Targets	Code Amendment Alignment with 30-Year Plan for Greater Adelaide
<p>Transit corridors, growth areas and activity centres</p> <p>Policy 4: Ensure that the bulk of new residential development in Greater Adelaide is low to medium rise with high rise limited to the CBD, parts of the Park Lands frame, significant urban boulevards, and other strategic locations where the interface with lower rise areas can be managed.</p> <p>Policy 5: Encourage medium rise development along key transport corridors, within activity centres and in urban renewal areas that support public transport use.</p> <p>Policy 6: Promote urban renewal opportunities and maximise the use of government-owned land to achieve higher densities along transit corridors.</p> <p><b>Housing mix, affordability and competitiveness</b></p> <p>Policy 36: Increase housing supply near jobs, services and public transport to improve affordability and provide opportunities for people to reduce their transport costs.</p> <p><b>The economy and jobs</b></p> <p>Policy 55: Promote certainty to undertake development while at the same time providing scope for innovation.</p>	<p>The design criteria introduced through the overlay supports the scale and density of development envisaged in the Regional Plan, including:</p> <ul style="list-style-type: none"> <li>• the urban renewal areas and strategic activity centres at Edwardstown and Clovelly Park</li> <li>• commercial activity along Henley Beach Road mass transit corridor / urban boulevard; and</li> <li>• strategic employment uses at Edwardstown and Melrose Park.</li> </ul> <p>The overlay policies also provide for potential future rezoning to enable medium rise development in other locations in the Affected Areas should urban renewal opportunities emerge.</p> <p>The overlay specifies the design criteria necessary to mitigate risks to underground tunnels and is being introduced early in the design phase of the T2D project. In doing so, the overlay promotes long term certainty for developers on matters to be considered during the design and construction of multi-level developments, excavation and underground structures in proximity to the T2D tunnels.</p>
<p><b>Transport</b></p> <p>Policy 74: Ensure development does not adversely impact the transport function of freight and/or major traffic routes and maintains access to markets.</p> <p>Policy 81: Protect current and future road and rail for strategic requirements, such as ensuring adequate access to ports and other major facilities.</p>	<p>The North-South Corridor is Adelaide's preeminent strategic transport corridor. When the final T2D section is completed, the corridor will provide non-stop, reliable and efficient access through Adelaide, providing critical links to key transport gateways (Outer Harbor, Adelaide Airport) and the national road network.</p> <p>The proposed overlay supports the expansion of the strategically significant North-South Corridor by protecting the location of the proposed T2D</p>

30-Year Plan for Greater Adelaide Identified Priorities or Targets	Code Amendment Alignment with 30-Year Plan for Greater Adelaide
	tunnels to enable their detailed design, construction and ongoing operation.
<p>Infrastructure</p> <p>Policy 83: Define and protect strategic infrastructure sites and corridors from inappropriate development to ensure the continued functionality of the services they provide.</p>	<p>In the short-term, the overlay policies aim to manage development activities that would compromise the detailed design and construction of the T2D tunnels. Once built, the overlay will provide ongoing protection to the operation and structural integrity of the tunnels over their 100-year design life.</p>

### 3. Other Strategic Plans

In supporting the design, construction, and operation of the tunnel elements of the North-South Corridor, the overlay supports the following directions and priorities of:

[South Australia's 20-Year State Infrastructure Strategy, 2020](#)

Infrastructure SA's *20-Year State Infrastructure Strategy* (the Infrastructure Strategy) sets the long-term strategic direction and initial priorities for infrastructure development in South Australia to achieve the following objectives:

- sustained economic and job growth
- planned population growth
- connected and productive regions
- a vibrant, global Adelaide
- enviable liveability.

The Infrastructure Strategy acknowledges that Adelaide's grid-like road network has many intersections that are approaching or exceeding capacity, acting as choke points, which cause delays and variability in travel times. Further, the 2019 Australian Infrastructure Audit estimates congestion costs in Adelaide at \$1.44 billion in 2016 and predicts this to rise to \$2.6 billion in 2031.

In consideration of this, the Infrastructure Strategy identified that the duration and costs of traffic congestion will likely increase without a more efficient transport network that includes free flowing motorways and greater share of demand serviced by public transport.

The North-South Corridor was identified as one of Adelaide's most important transport corridors. The Torrens to Darlington (T2D) Project will provide North-South Corridor road users with improved access to key travel gateways and reduced traffic congestion by taking 130,000 weekday vehicle movements into underground tunnels upon its completion.

The Torrens to Darlington (T2D) Project is the final stage of the 78 km upgrade to deliver an uninterrupted corridor from Gawler to Old Noarlunga and is identified as an investment priority for the State.

Once the T2D Project is completed, the North-South Corridor will provide greater certainty to business and industry in moving goods and freight across the city and improved landside access to international gateways at Outer Harbor and Adelaide Airport.

World-leading urban design and construction methods will be applied to minimise impacts of the T2D Project on local communities, commuters and the environment – with about 60 per cent of the project being underground tunnels.

The T2D tunnels will also move large volumes of traffic underground, providing opportunities for redevelopment and uplift and public realm improvements to support public transport and more active travel through improved walking and cycling connections.

## ATTACHMENT B – INVESTIGATIONS

### 1. T2D Design, December 2022

The T2D Design is a high-level design which establishes key project elements such as the road alignment, tunnel layouts and motorway access points. It is a critical step following the concept (early) design and informed by a range of environmental, economic, technical and social investigations.

The T2D Design provides sufficient detail to consider construction impacts, possible issues, constraints and benefits of design options, and provide the basis for future detailed design to guide construction.

The T2D Design has identified the optimum alignment, depth and design parameters of the tunnels having regard to existing land uses and envisaged surface development, existing ground conditions and development cost.

The T2D Design has informed the technical parameters of the proposed overlay.

In terms of structural design parameters for the tunnels, additional load allowances have been applied to the base case for existing conditions, that is existing land uses and developments. The additional load allowances provide reserve capacity in the tunnel structures to allow for changes in applied loads that might occur from future developments in the vicinity of the tunnels.

The T2D Design is available on the [project website](#).

## 2. Interstate Policy Precedents and Practices

The Department has reviewed how major road and rail tunnels are recognised and protected in the planning systems of other Australian jurisdictions, including Queensland, New South Wales and Victoria.

While the development of a tunnelled motorway is unprecedented in South Australia, many examples of large-scale tunnel projects exist across Australia, including the Clem Jones Tunnel (QLD), Cross City Tunnel (NSW), Melbourne Metro (VIC), Suburban Rail Loop (VIC) and North East Link (VIC).

Accordingly, the planning systems within these locations include policy provisions intended to achieve asset protection and control development within proximity of these assets.

A summary of relevant interstate examples is provided below:

### Queensland

In Queensland, the [Brisbane City Plan](#) contains a ‘Regional Infrastructure Corridors and Substations Overlay Code’ and map, with performance outcomes and acceptable outcomes in relation to tunnel planning considerations. These provisions relate to a broader range of infrastructure, with a category for sub-surface transport infrastructure. The structure of the City Plan, incorporating performance outcomes and acceptable outcomes, provides the best alignment with the structure of South Australia’s Code.

The extracts below from Section 8.2.17 of the City Plan highlights the policy approach to protecting sub-surface transport infrastructure. The policy approach provides for policy criteria on loading from development and fill, as well as from excavation. The approach notes the need for submission of engineering information at the time of application.

Performance outcomes	Acceptable outcomes
Section E—If in the Major sub-surface transport infrastructure category	
<p>PO6</p> <p>Development does not adversely impact the structural integrity or ongoing operation and maintenance of major sub-surface transport infrastructure that is an existing or proposed tunnel.</p> <p>Note—This can be demonstrated by submitting a geotechnical assessment and structural engineering assessment prepared by a suitably qualified engineer (RPEQ).</p>	<p>AO6</p> <p>Development does not exceed the design constraints of major sub-surface transport infrastructure set out in Table 8.2.17.4 in accordance with the written confirmation of the infrastructure owner.</p>
<p>PO7</p> <p>Filling, excavation and construction does not adversely impact the structural integrity, on-going operation and maintenance of a Council-controlled transport tunnel or a future Council-controlled transport tunnel.</p> <p>Note—This can be demonstrated by submitting a geotechnical assessment, groundwater assessment and structural engineering assessment prepared by a suitably qualified engineer (RPEQ).</p>	<p>AO7.1</p> <p>Filling and excavation does not undermine, cause subsidence of, or groundwater seepage into a Council-controlled transport tunnel or a future Council-controlled transport tunnel in accordance with the written confirmation of the infrastructure owner.</p> <p>AO7.2</p> <p>Development involving excavation for basement levels or structural piling does not result in vibration impacts during construction which would compromise the safety and operational</p>

	<p>integrity of a Council-controlled transport tunnel or a future Council-controlled transport tunnel.</p> <p>Note—This can be demonstrated by submitting a geotechnical assessment prepared by a suitably qualified engineer (RPEQ).</p> <p>Editor's note—Development may require an REPO certified vibration monitoring plan for the construction phase of development.</p>
Additional loading	Load relaxation due to excavations
<p>Loading above and adjacent to driven tunnel</p> <ul style="list-style-type: none"> <li>• up to 50kPa (working load) acting at a level of 1m above the crown of the Council-controlled transport tunnel applied in uniform and patterned arrangements (including symmetrical and asymmetrical) which give the most unfavourable loading condition on the Council-controlled transport tunnel;</li> <li>• a build up of surface level with a minimum of 1m of fill equivalent to 20kPa.</li> </ul> <p>Note—The additional loadings (a) and (b) above are to be applied both together and separately.</p>	<p>Continuous excavations</p> <ul style="list-style-type: none"> <li>• up to 7m below natural surface (except up to 14m below natural surface between Baildon Street, Kangaroo Point and St Pauls Terrace, Fortitude Valley for the Clem Jones tunnel);</li> <li>• with a minimum of 7m residual ground cover above the crown of the Council-controlled transport tunnel crown;</li> <li>• with a minimum 7m pillar width between the side wall of the Council-controlled transport tunnel and any adjacent building basement excavation.</li> </ul> <p>Note—The load relaxations in (a), (b) and (c) are to be applied in arrangements which give the most unfavourable loading condition on the Council-controlled transport tunnel.</p>
<p>Loading above and adjacent to cut and cover tunnel</p> <ul style="list-style-type: none"> <li>• up to 25kPa (working load) with a load factor of 1.5 acting at the level of the top of the Council-controlled transport tunnel roof.</li> </ul>	<p>No relaxation applies.</p>

## New South Wales

In New South Wales, [State Environmental Planning Policy \(Infrastructure\) 2007](#) (ISEPP) provides provisions for 'development in or adjacent to road corridors and road reservations'. The ISEPP policy framework specifies a numeric excavation depth, referral triggers and refers to external guidelines gazetted by the Secretary of Transport for NSW to inform the assessment and management of works proposed by external parties that impact the configuration or performance of Transport Assets.

The most provisions most relevant to tunnel protection are those relating to excavation in or immediately adjacent to corridors (Clause 103), as detailed below.

Provision	Clause
103 Excavation in or immediately adjacent to corridors	<p>(1) This clause applies to development that involves the penetration of ground to a depth of at least 3m below ground level (existing) on land that is the road corridor of any of the following roads or road projects (as described in Schedule 2)</p> <ul style="list-style-type: none"> <li>• the Cross City Tunnel,</li> <li>• the Lane Cove Tunnel, [continues list of roads]</li> </ul>

	<p>(2) Before determining a development application (or an application for modification of a consent) for development to which this clause applies, the consent authority must—</p> <ul style="list-style-type: none"> <li>(a) give written notice of the application to TfNSW within 7 days after the application is made, and</li> <li>(b) take into consideration— <ul style="list-style-type: none"> <li>(i) any response to the notice that is received within 21 days after the notice is given, and</li> <li>(ii) any guidelines that are issued by the Secretary for the purposes of this clause and published in the Gazette, and</li> <li>(iii) any implications of the ground penetration for the structural integrity of the road or project, and</li> <li>(iv) any cost implications for the road or project of the ground penetration.</li> </ul> </li> </ul> <p>(3) The consent authority must provide TfNSW with a copy of the determination of the application within 7 days after the determination is made.</p>
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## Victoria

In Victoria, recent amendments to local planning schemes facilitated a new Design and Development Overlay (DDO) for the North East Link Project, as detailed in the table below.

DDOs are also in place for other tunnel projects, including the Metro Rail Tunnel and West Gate Road Tunnel. For the North East Link Project, the DDO provides similar provisions as those in the NSW ISEPP; however it is structured in a way that specifies development that would not trigger a referral.

This method may achieve better alignment with South Australia’s Code and its deemed-to-satisfy provisions. Further, the DDO provides ‘design objectives’ which capture the overarching intent of the controls. Design objectives are similar to ‘performance outcomes’ under the Code.

The approach in Victoria provides specific quantitative criteria for building heights, depth of footings, excavation and fill to protect the North East Link tunnels, which are yet to commence construction.

Similar provisions have been adopted for the proposed Melbourne Metro tunnels (currently under construction) and the proposed for the Suburban Rail Loop project. In the case of these passenger rail projects, Rail Projects Victoria is referred applications that exceed the specified criteria.

Design and Development Overlay Provision
<p><b>Design objectives</b></p> <p>To avoid direct contact with and to provide a safe working clearance around the North East Link Infrastructure.</p> <p>To ensure development does not adversely affect or put at risk the construction, integrity or operation of the Project or North East Link Infrastructure.</p> <p>To avoid Loading onto North East Link Infrastructure, or excavations or other unloading of the ground, that could lead to structural damage or impact, reduced structural capacity, damage detrimental to the serviceability of the structures, or displacement of North East Link Infrastructure to the detriment of freeway operations.</p>

To prevent development and construction methods that could generate unacceptable levels of vibration in North East Link Infrastructure.

To ensure that development of land does not rely upon direct structural support from North East Link Infrastructure unless specifically envisaged in the North East Link design.

To ensure that the potential effects of future developments (including cumulative effects) on the North East Link Infrastructure, and the consequences of those effects on the wider Melbourne transport network are appropriately managed or mitigated.

### **Building Works**

A permit is not required for:

A new building (or extension to an existing building) five or less storeys in height without a basement provided any footing is founded no more than 2.5 metres below Surface Level.

A temporary structure of no more than five storeys.

Excavation works (including for swimming pools) where the depth of excavation is not more than 2.5 metres below Surface Level.

A pole, sign or retaining wall provided any footing is founded no more than 2.5 metres below Surface Level.

An underground utility provided any trench is no more than 2.5 metres below Surface Level.

Fill or earthworks that do not build up the ground level by more than three metres above Surface Level.

Buildings and works associated with the construction, operation, maintenance or repair of North East Link Infrastructure.



### 3. Technical Parameters

## Tunnel Protection – Technical Parameters Investigation Report, August 2022

### Introduction

This report outlines the basis for the recommended technical parameters to be applied through planning and building controls to ensure development activity does not compromise the detailed design, construction and ongoing operation and structural integrity of the River Torrens to Darlington (T2D) tunnels.

It draws upon the experience of other Australian jurisdictions in protecting major road and rail tunnels and is based on advice from the Master Advisory Service for the project (Aurecon Mott Macdonald Joint Venture (AMJV)), the project Reference Designer (North-South Complete JV) and the Department's NSC PDO Engineering Directorate.

### Background

The T2D Project involves converting the remaining 10.5 kilometres (km) of South Road into a non-stop motorway, completing the total 78 km North-South Corridor from Old Noarlunga to Gawler. The T2D section extends along South Road from just north of the River Torrens (Karrawirra Parri) to Darlington in the south. It is the most complex section due to its ground conditions, highly urbanised built form and heritage and character.

The Department for Infrastructure and Transport (the Department) is leading delivery of the T2D Project and is progressing refinement of a reference design for the project.

In parallel, delivery aspects of the T2D Project are being progressed in response to the reference design. This includes mechanisms to protect the T2D corridor and assets from future development activity that would compromise their detailed design, construction, operation and structural integrity.

Measures being put in place to provide the necessary protections, include:

- land acquisition (at surface and below surface (sub-stratum)) to secure land required to enable construction and on which T2D assets will be located;
- amendments to the Planning and Design Code's Future Road Widening and Non-Stop Corridor Overlays, which seek to control development in proximity to arterial roads;
- the inclusion of reserve loading allowances in the design of underground assets (tunnels and cross passages) to provide a certain level of capacity to accommodate future developments; and
- introduction of planning and building controls, via Regulation changes and Planning & Design Code Amendments, to manage development in proximity of the T2D tunnels, which cannot be managed through the above measures.

## Tunnel Protection

Aligned with accepted practice throughout Australia in relation to major road and rail tunnels, the following three elements need to be defined as the basis for technical parameters underpinning protections for the T2D tunnels:

1. The **exclusion area around the tunnels** – sub stratum (below ground) land to be reserved for construction of the tunnel and a no-go area for any development activity or intrusions.
2. The **limitation on loadings and load allowances for future developments applied in the T2D tunnel structural design requirements**, which includes reserve capacity to allow for changes in applied loads from future developments in proximity to the tunnels.
3. The **distance from the tunnels within which future developments could load and/or unload the underground structures beyond their design limits**.

## Assumptions

As the T2D Project is in the reference design phase and there is still some uncertainty around the final alignment of the tunnels, the recommendations in this report are based on the following assumptions:

- That the horizontal alignment of the reference design will be adopted with potentially minor refinement; major changes of the tunnel alignment have not been considered.
- Protection of the corridor prior to tunnel detailed design and construction should focus on ensuring no obstruction to the proposed tunnel alignment is constructed (e.g. boreholes, building piles, deep basements near tunnel portals) and that no excessive vertical loading or unloading is created.
- Further amendments to the controls are anticipated when the detailed design is finalised and to provide long term protection of the tunnel assets after completion when the exact alignment is known.
- Application of reasonably conservative engineering principles without restricting / controlling future developments in proximity to the tunnels unnecessarily.

## Sub Stratum Tunnel Exclusion Area

The **Tunnel Exclusion Area** is an envelope around the tunnels and associated infrastructure (e.g. cross passages, drainage sumps) within which all intrusions of structures such as piles, anchors, cellars and undercroft car parking and works such as drilling and excavations must be precluded.

The sizing of the area is based on the principle of providing sufficient margin of safety around the tunnels against obstructions from future development.

The T2D Tunnel Exclusion Area adopts a block with 5 metre margins from the outside of the tunnel structures from both tubes, as shown in [Figure 1](#). The 5 metre buffer provides sufficient room for minor refinement of the diameter and alignment of the tunnels from the Reference Design during the detailed design and construction phases of the T2D Project.

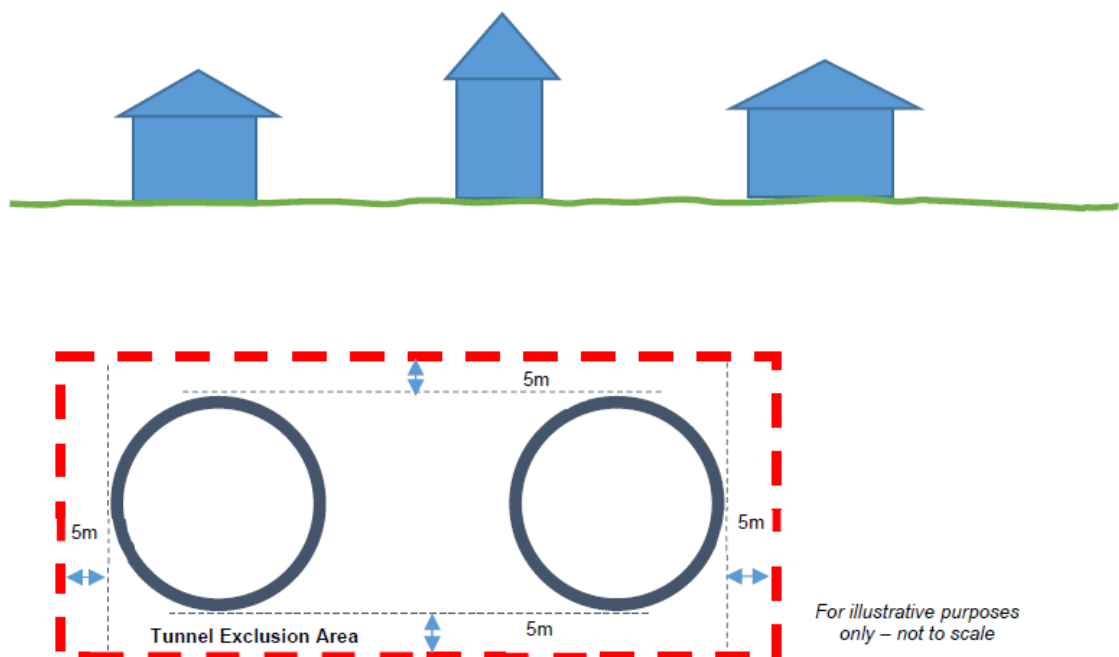
The first line mechanism typically adopted to preclude development activity from the Tunnel Exclusion Area is via ownership through land acquisition, or equivalent, in

accordance with relevant legislation and the land title system applicable to the jurisdiction.

In addition, planning systems are used throughout Australia as a second line mechanism to preclude intrusions into the Tunnel Exclusion Area.

For example, the New South Wales State Environmental Planning Policy (Infrastructure) 2007 features provisions for excavation in or immediately adjacent to road corridors, including the Cross City Tunnel and Lane Cove Tunnel. The planning policies specify numeric depth of excavation or penetration of the ground below ground level that would require referral to the asset owner/road authority.

Similar provisions feature in Victoria's and Queensland's planning systems and apply to tunnel projects including Melbourne's North-East Link, Metro Rail Tunnel and West Gate



Road Tunnel and Brisbane's Clem Jones Tunnel.

**Figure 1: T2D Tunnel Exclusion Area**

### Tunnel Design Load Allowances for Future Development

A second component of the protection of underground road or rail tunnels is imposing limitation on loadings and inclusion of additional loading (or vertical stress) capacity in the tunnel structural design to allow for changes in loads that may occur from future development in proximity of the tunnels.

The loading allowances applied for the T2D tunnels are consistent with typical allowances used in recent tunnelling projects in Australia and New Zealand for similar tunnels. The loadings of many typical buildings can be estimated from the number of levels and the expected structural materials using AS1170.1:2002.

The T2D tunnels comprise two components each of which have different loading allowances:

- 'Bored tunnels' which are constructed in situ using a tunnel boring machine, without removing the ground above; this construction method will be used for the majority of the tunnel length; and
- 'Cut and cover tunnels' which are constructed in a shallow trench and then covered over; this construction method will be used at the beginning/end of each of the tunnels where they return to surface (tunnel portals).

The Department intends to acquire properties directly above the cut and cover sections to enable construction and to manage future development which could compromise the structural integrity of the tunnels.

### **Limitation for Loadings:**

The following conditions are acceptable to the T2D tunnel structural design:

- A building or structure without a basement\* having no more than 45 kilopascal (kPa) total loading over the footprint imposed at the foundation level (equivalent to three or fewer levels); \*excluding a semi basement or cellar of less than 2.5m depth; and
- A surcharge loading of up to 20 kPa as applied at the regulated surface.

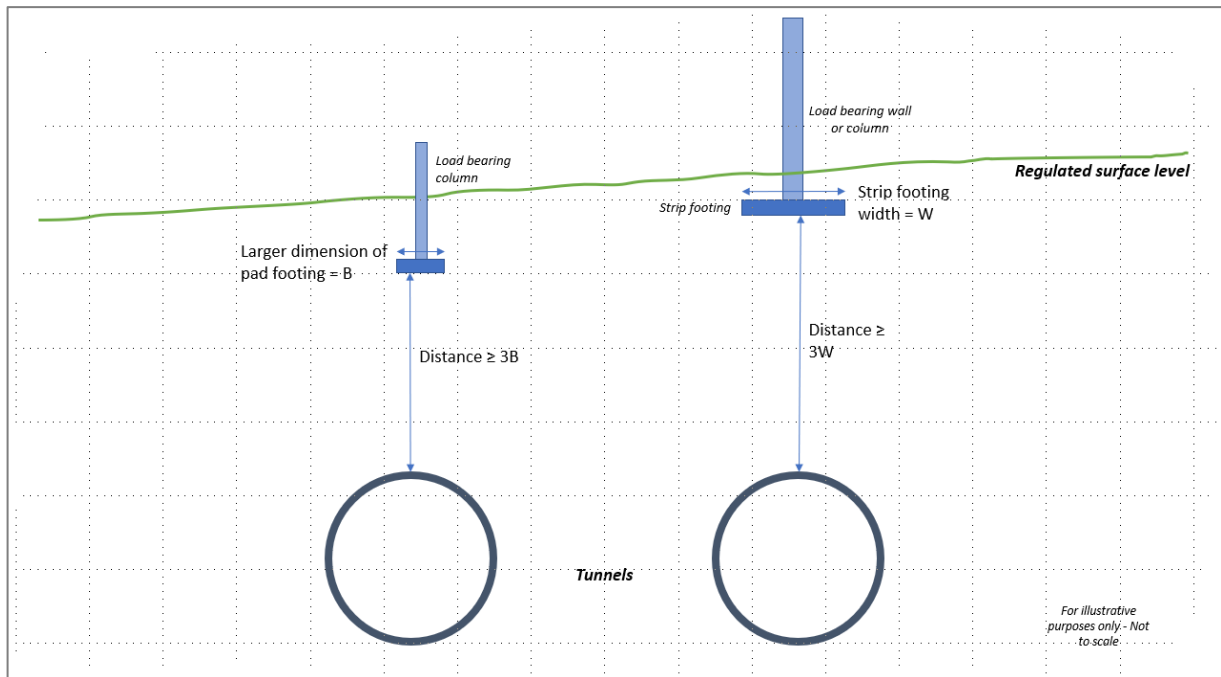
A kilopascal (kPa) is the weight of the load divided by its area. 45 kPa is approximately 4.6 tonnes per square metre or the equivalent of a 3 level building. The surcharge loading of 20 kPa is approximately 2 tonnes per square metre and relates to loads (permanent or temporary) at ground surface, such as fill, heavy equipment or storage of goods or materials on site.

### **Depth of Foundations and Footings:**

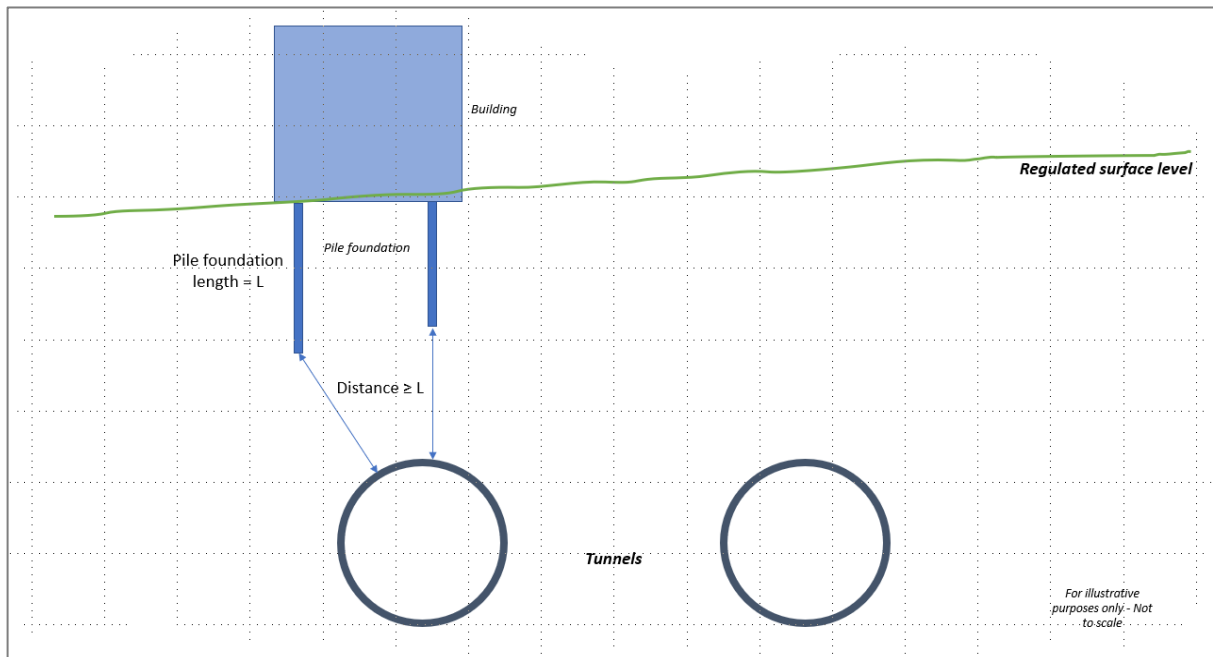
The total loading is based on the loading over the footprint imposed at the foundation level. Where footings or a pile foundation are used, the following provisions apply to serve as triggers for referral on the T2D tunnels:

- Pad footings are at least 3B away from the outside of the tunnel structure (extrados); where B = the largest dimension for individual (pad) footing and strip footings are at least 3W from the outside of the tunnel structure (extrados); where W = the width of continuous (strip) footing, as show in Figure 2
- Pile tip is at least 1L away from the outside of the tunnel structure (extrados); where L = the longest pile length beneath the building/structure, as shown in Figure 3.

**Figure 2: Load Management - Depth of Footings**



**Figure 3: Load Management - Depth of Pile Foundations**



## Excavation:

The T2D tunnels will also be designed for additional unloading due to excavation above or adjacent to the tunnel structure. The following provisions apply to serve as triggers for referral.

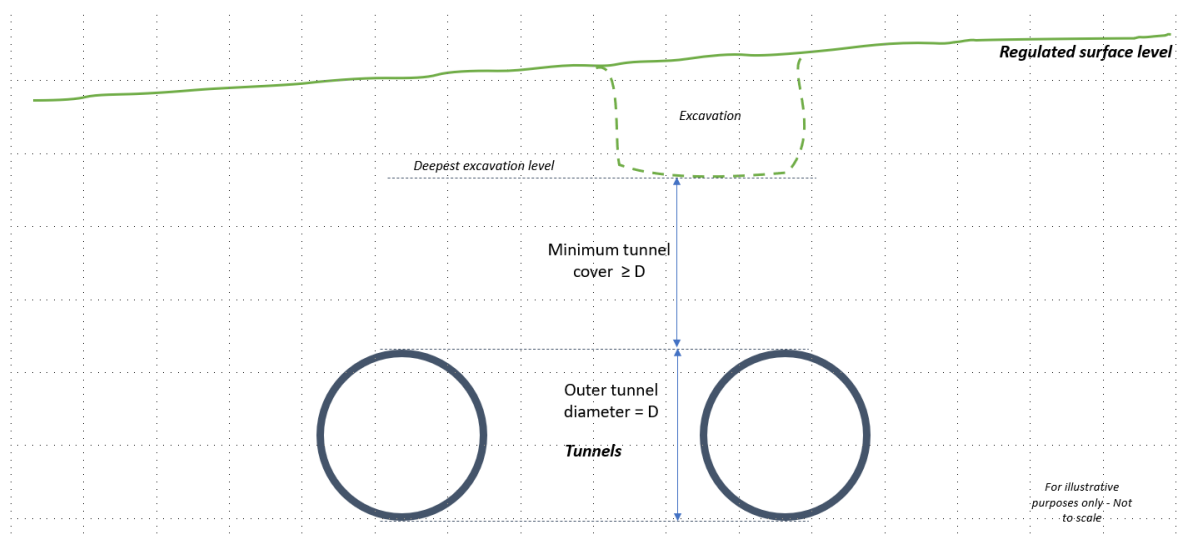
There are two important considerations for the amount of ground above tunnels (also known as overburden) to be left undisturbed. Firstly, the overburden is one of the protections against flotation of the tunnel linings that might otherwise be created by the effects of the water table above the tunnels. Secondly, particularly in rock, the surface and ground loadings arch over the tunnels and disturbance of the ground forming this arch would modify the way that loads are applied to the structural lining.

The general parameters to be applied to prevent excessive unloading in the vicinity of the T2D tunnels is that any excavation of the ground from the surface (other than locally as would be the case for a piled foundation) must maintain an overburden of at least one tunnel diameter (of bored tunnel) or one tunnel box height (of cut and cover tunnel section) between the deepest excavation level and the outside of the tunnel structure as illustrated in Figure 4.

In addition, based on the Reference Design depth of the tunnels, during the design and construction phases the depth of excavation should not exceed 2.5 metres below the existing ground without being reviewed by the T2D Engineering Team for direction. The rationale for adopting 2.5 metres as the limit for excavation before triggering a review is that it is considered not deep enough to cause significant unloading yet sufficient for the purposes of swimming pools and most utilities such as drains, pipes or underground cables.

By comparison, in Victoria there is a one metre limit for earthworks or excavation near tunnels and a 2 metre limit for an underground utility, pole, sign or retaining wall.

**Figure 4: General Parameters for Depth of Excavation**



## Extent of the Tunnel Protection Area

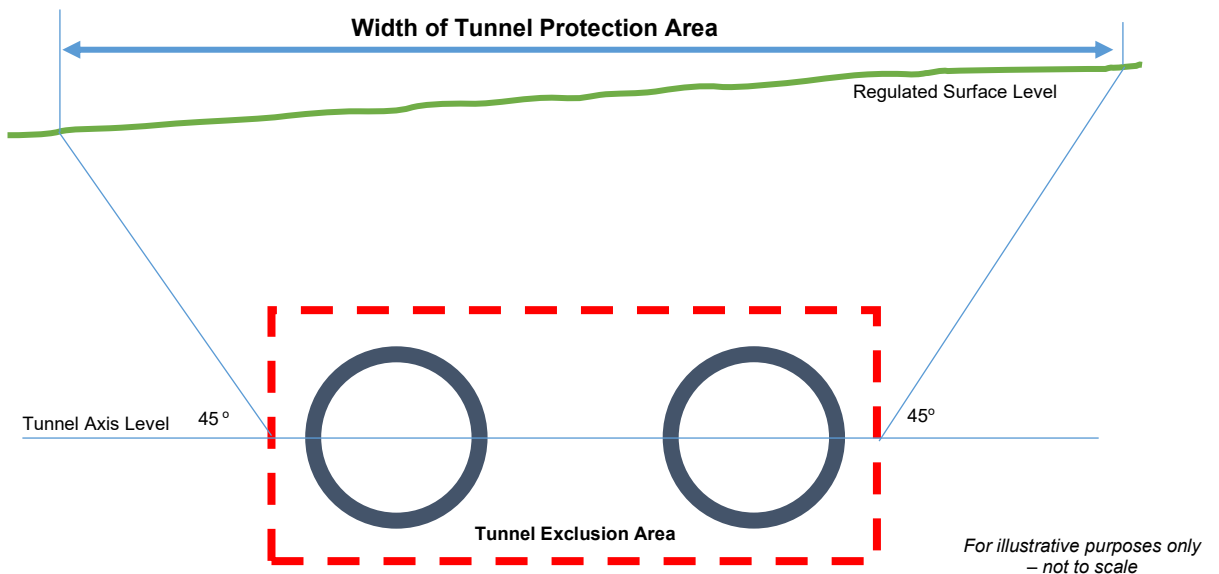
The final component of protecting the T2D tunnels is to determine the area in proximity to the tunnels within which future developments are at greatest risk of causing a change in loading beyond the design limits of the tunnels (Tunnel Protection Area).

This area is based on a range of factors including engineering specifications of the tunnel, the geological conditions of the surrounding soils and the depth of the tunnels.

The Tunnel Protection Area will extend the full length of the T2D tunnels covering both the bored and cut and cover sections. As illustrated in Figure 5, the width of the Tunnel Protection Area is determined by drawing a line at a 45 degree angle from where the centreline/axis of the Reference Design tunnels and the edge of the Tunnel Exclusion Zone intersect, to where the 45 degree line intersects with the regulated surface level. This approach will see the Tunnel Protection Area narrow as the tunnel depth decreases.

For the T2D northern tunnel (Torrensville to Hilton), the Tunnel Protection Area will need to extend a minimum of 80 metres to the west of the Reference Design tunnel alignment to provide flexibility during the design and construction phases given local ground conditions and potential for change to the final tunnel alignment.

**Figure 5: Width of the Tunnel Protection Area**



## Intent and Triggers for Referrals

The triggers for referral to the Commissioner of Highways are necessary to ensure development activity at the greatest risk of compromising the construction and ongoing structural integrity of the proposed T2D tunnels are assessed for potential impact.

The intent of the referral is so that during the detailed design and construction phase, T2D engineers are aware of development in proximity to the tunnel so they can be factored into the design and/or technical advice can be provided to the developer to mitigate risks to T2D. The introduction of referral triggers in proximity to the tunnels will not change existing zoning nor restrict future development.

The triggers have been designed to avoid unnecessary burden to applicants of proposed developments by filtering off common building/structure construction and earthworks from the need for referral. Deviation from the stated thresholds is allowable subject to referral/technical review and approval by the Department.

Based on the technical parameters discussed in this report, the following types of development activities will meet the threshold for referral to the Commissioner of Highways for technical review and direction:

- a new building (or extension to an existing building) or temporary structure exceeding 3 levels or has an increase in total loading exceeding 45kPa at the foundation level;
- development involving excavation at a depth exceeding 2.5 metres or results in significant removal of material (or overburden) above the tunnels, such as underground carpark, major water mains;
- footings and foundations that do not meet design criteria in relation to proximity to the tunnels (i.e. as shown in Figures 2 and 3);
- ground intruding activities (such as drilling, bores, anchors) at a depth exceeding 2.5 metres (to prevent potential intrusions into the Tunnel Exclusion Area during the design & construction phases; once the final alignment/depth of the tunnel is known this will be refined to reflect the actual Tunnel Exclusion Area);
- fill or earthworks that build up the ground level by more than one metre above the regulated surface level (or equivalent to surcharge loading exceeding 20kPa); or
- temporary stockpiling or storage of material or equipment over an area greater than 100 square metres (or equivalent to surcharge loading exceeding 20kPa).

Guidance to assessment bodies regarding the calculation of loadings is provided in AS1170.1. Further guidance could be provided through a technical guideline or clarification from the T2D Engineering Team.

## Definitions

**kPa** means kilopascal and is a unit of pressure measurement defined as one kilonewton per square metre.

**Surcharge loading** means any load such as fill, machinery or storage of goods or materials on a site that exerts a vertical pressure on the ground, defined as the weight of the load divided by its area and is expressed in kPa.



**Total loading** means the total load applied by a building in the form of vertical pressure at the foundation level, defined as its overall weight divided by its footprint area, and is expressed in kPa.