

# VicTrack Rail Development Interface Guidelines

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# Introduction

The purpose of this document is to provide guidance on how to establish an appropriate development interface with railway land.

This will ensure development respects the strategic importance of the railway land and does not adversely affect existing and future transport operations.

## Who are these guidelines for?

These guidelines are for:

- anyone planning to do works or develop land adjacent to the rail corridor
- other agencies and decision makers needing a reference or guidance.

## Policy basis

The policy basis for these guidelines derive from the *Planning and Environment Act 1987*, the *Transport Integration Act 2010* and the Victorian Planning Provisions.

The objectives of the *Planning and Environment Act 1987* seek to secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria; and to protect public utilities and other assets and enable the orderly provision and co-ordination of public utilities and other facilities for the benefit of the community.<sup>1</sup>

Section 11 of the *Transport Integration Act 2010* includes the objective to provide for the effective integration of transport and land use and facilitate access to social and economic opportunities.

The objectives also seek to:

- improve accessibility and transport efficiency with a focus on planning and developing the transport system more effectively and;
- ensure the transport system and land use are aligned, complementary and supportive and ensure that land use decisions are made having regard for the current and future development and operation of the transport system.<sup>2</sup>

Clause 18.01-1S (Land use and transport planning) of the Planning Policy Framework included in all Victorian planning schemes seeks:

*"To create a safe and sustainable transport system by integrating land use and transport" and;*

Clause 18.012S (Transport system) seeks to:

*"Plan or regulate new uses or development of land near an existing or proposed transport route to avoid detriment to and where possible enhance, the service, safety and amenity desirable for that transport route in the short and long terms."*

## The importance of protecting railway land

The rail corridor comprises land and its associated rail infrastructure. It accommodates metropolitan and regional passengers, freight and national freight lines as well as an array of overhead and underground assets including government communications, electricity distribution and transmission lines, water and sewer pipes and pipelines carrying flammable products.

It is a critical state asset, essential to the economic wellbeing and function of Victoria. It is never static, continually evolving and adapting to meet the needs of Victoria's growing population. It has to do this largely within the confines of its existing boundaries.

Most importantly, the rail corridors carry an intergenerational responsibility to provide for the transport requirements of the future.

It is on this basis that the rail corridor must be protected.

### Pre-application meeting

There is no "one size fits all" approach in determining setbacks adjacent to rail. For this reason, we encourage development proponents to have early discussions with VicTrack about relevant rail interface issues.

This enables clarification of both the planning issues and the relevant engineering standards that are referenced in these guidelines.



<sup>1</sup> Planning and Environment Act 1987 – Section 4 (1) c and e,

<sup>2</sup> Transport Integration Act 2010 Section 11, 1 and 3

# Roles and responsibilities

On behalf of the Victorian Government, VicTrack is the owner of all railway land, assets and rolling stock. We work alongside the Department of Transport (DoT) and other agencies including V/Line, Metro Trains Melbourne (MTM), Yarra Trams, the Australian Rail Track Corporation (ARTC) and Rail Projects Victoria (RPV).

Transport assets are primarily leased via DoT to Victoria's rail and tram operators. A series of franchise agreements determine the allocation of our assets to the operators including MTM, V/Line and Yarra Trams, who are in turn responsible for the delivery of public transport services and ongoing management of the assets. All assets not in use for transport remain under the strategic management of VicTrack.

## VicTrack

VicTrack's purpose is set out at section 120 of the *Transport Integration Act 2010* and amongst other responsibilities, VicTrack must hold land reserved for transport purposes and act as custodian and asset manager of non-operational transport related land, infrastructure and assets.

As a landowner, VicTrack is:

- the public land manager of land within the Public Use Zone (Transport – PUZ4) of the Victorian Planning Provisions
- responsible for protecting and enhancing VicTrack's property rights
- responsible for responding to Council notices issued under section 52 of the *Planning and Environment Act 1987*. In forming a response, VicTrack will consult our transport partners MTM, V/Line, ARTC, Yarra Trams and DoT.

## Accredited Rail Operators

The Accredited Rail Operators (AROS) are responsible for operating the rail corridors and maintaining the highest level of safety. Each rail operator will have tailored specifications and requirements that will need to be adhered to.

## The Department of Transport

DoT plans, manages and coordinates Victoria's transport system both now and for the future. When the proposed development in a permit application meets the threshold categories of development set out in Clause 66.02-11 Integrated Public Transport Planning of the Victorian Planning Provisions, the Head, Transport for Victoria is the determining referral authority.<sup>3</sup> It therefore has a statutory obligation to respond to Council notices under s55 of the *Planning and Environment Act 1987*.

In doing so, DoT coordinates advice from its agencies and VicTrack. In these instances, VicTrack provides comments to DoT to incorporate in its response so as to avoid duplication.

VicTrack, DoT and the AROS can also be responsible for reviewing information required under permit conditions and confirming its satisfaction to the responsible authority.

<sup>3</sup> The Head, Transport For Victoria is the referral authority nominated under Clause 66.02-11 Integrated Public Transport Planning in Victorian planning schemes. However, due to organisational change, Transport for Victoria is now known as the Department of Transport. This guideline and the description of the transport agencies will be updated in 2019 following clarification of Department of Transport reforms.





# Railway land

Railway land is a critical state asset, essential to the economic wellbeing and function of Victoria.

As Melbourne and the rest of Victorian grows and expands, the transport system must change to respond to growth. Planning for transport therefore must incorporate a long term view to provide for future transport needs. Rail land that is currently vacant may play an important role in accommodating future transport infrastructure. Similarly, existing development on rail land may be upgraded or redeveloped. It is therefore important to recognise that the use and development of rail land may change over time.

Some of the types of changes that can occur in the rail corridor include (but are not limited to):

- duplication and quadruplication of tracks
- level crossing removal
- elevated rail projects
- new station development
- station upgrades and extensions to platforms
- integrated transport developments
- substations
- strategic cycling corridors and shared user paths
- pedestrian bridges
- crossing loops
- stabling yards, sidings and access
- signalling and communications infrastructure
- rail maintenance facilities and depots.

The rail corridor often extends beyond visible infrastructure, as indicated below. It includes the air space above the rail corridor and may include shared user paths, buildings, equipment and infrastructure and landscaped areas. The boundaries of the rail corridor are not always visible and can be checked with a survey plan.

This diagram details some of the different types of infrastructure that can be found in the rail corridor. VicTrack considers the impact of development adjacent to the rail corridor on this infrastructure.

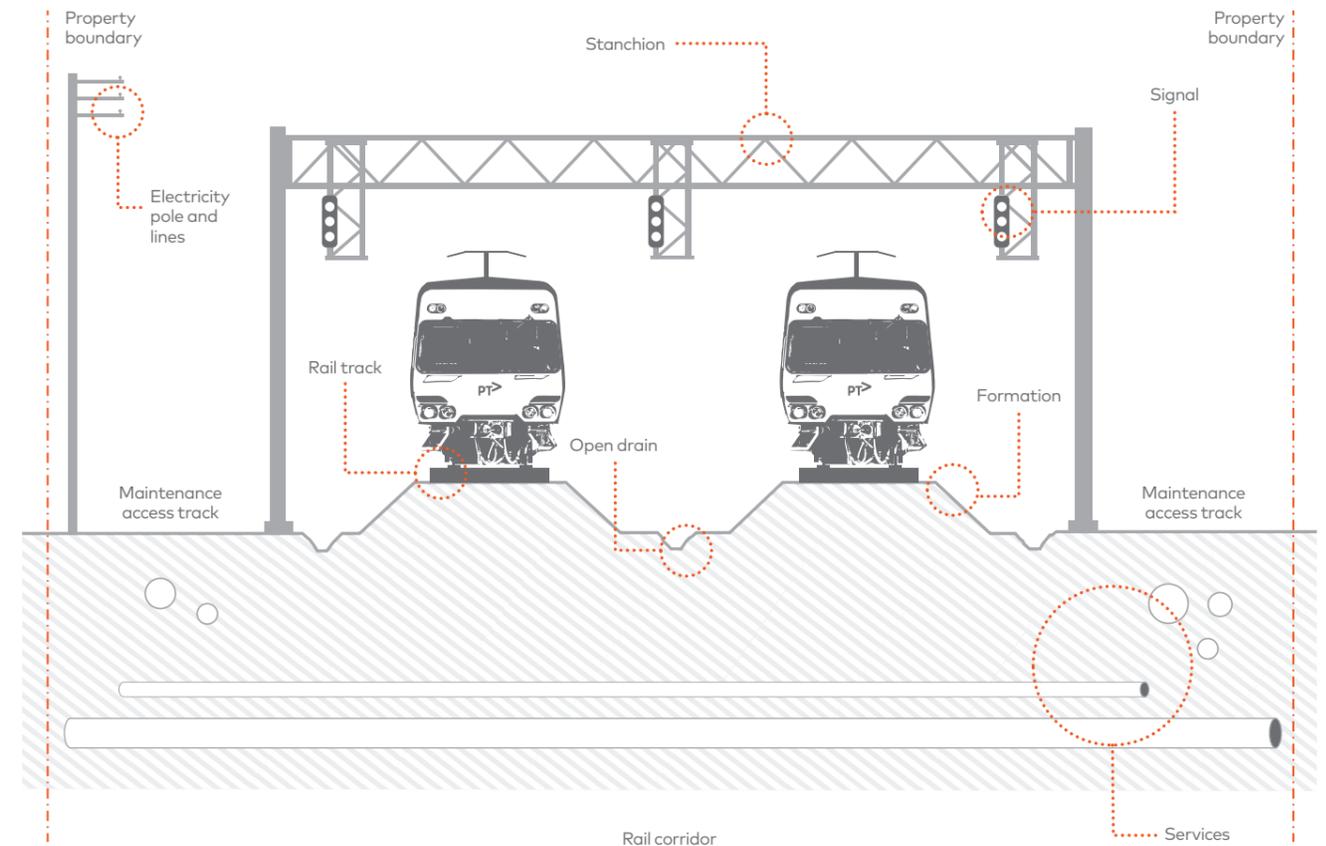


Figure 1

# Rail interface considerations



## Safety first

The rail corridor is a high risk environment. The movement of trains at speed requires lengthy stopping distances. Critical safety and signalling systems control the movement of trains, and the presence of high voltage cables and underground and overhead wiring for electrified trains are all contributing factors.

In this environment, trespass into railway land can pose a significant hazard to individuals and the safe movement of trains and their passengers.

Conversely, abutting development can pose hazards and risks to the safe operation of the rail services by interfering with the rail corridor and overhead powerlines or by introducing driver distraction.

The first principle that should be adopted is that rail safety is a shared responsibility between us all<sup>4</sup>.

There are strict safety standards and procedures that must be met to ensure that any works do not threaten the safety, operational capacity or efficiency of the rail network. Design should ensure that risks to property are eliminated or minimised.

The starting point to maintaining safety of the rail corridor is understanding the existing conditions and, where possible, future transport requirements. When a development is proposed adjacent to the rail corridor a feature and level survey should be carried out, by a qualified land surveyor, to produce a detailed plan showing the location of the site in relation to existing and (where possible) proposed rail infrastructure. The survey should include:

- the boundaries of the development site in relation to the adjacent rail corridor
- any easements and encumbrances on the application site
- location of rail infrastructure including the nearest tracks and signals, overhead transmission lines, and known underground pipes and services
- rights of way or rights to access or cross the rail corridor
- the location of rail tunnels
- the location of services to ensure that the proposal meets protection and clearance requirements for these services
- the location of any nearby substations.

<sup>4</sup> s13 Rail Safety (Local Operations) Act 2006.

# Subdivision

If not planned appropriately, subdivision can impact on the existing and future operation of the rail corridor.

When planning the subdivision of land adjacent to the rail corridor, consider the following:

- Precinct structure plans should aim to create a buffer between sensitive uses and the rail corridor. A buffer may include a road or commercial and community uses parallel with the rail corridor. If a buffer cannot be provided, other techniques to ameliorate the impacts of the rail corridor must be considered, such as acoustic attenuation.
- Shared user paths (SUPs) to be located outside of the rail corridor on private land.
- Direct all surface runoff to a legal point of discharge. Do not use the rail corridor as a drainage reserve.
- It is state planning policy under Clause 18.02-3S to "Provide for grade separation at railway crossings except with the approval of the Minister for Transport". Subdivisions therefore must not create new crossings (including pedestrian and cycle crossings) unless grade separated.

- All new crossings must be fully accessible in accordance with the *Disability Discrimination Act 1992*.
- Where development and subdivision will add additional population and traffic movements adjacent to uncontrolled rail crossings, the developer may be required to upgrade the crossing to a standard road or standard protected crossing to ensure safety. To determine crossing needs, the developer may be required to:
  - consider rail issues in the transport impact assessment report
  - undertake an independent Australian Level Crossing Assessment Model Report (ALCAM) and a risk assessment.
 The cost of upgrade to the crossing will not be borne by VicTrack or the rail operator.
- All land (including land set aside for recreational purposes) abutting the rail corridor must be fenced prior to the release of a statement of compliance.
- All new subdivisions must be fenced at no cost to VicTrack or the ARO. Fencing should be to the ARO's requirements which is generally a 1.8m high black cyclone mesh fence located within the landowner's property.

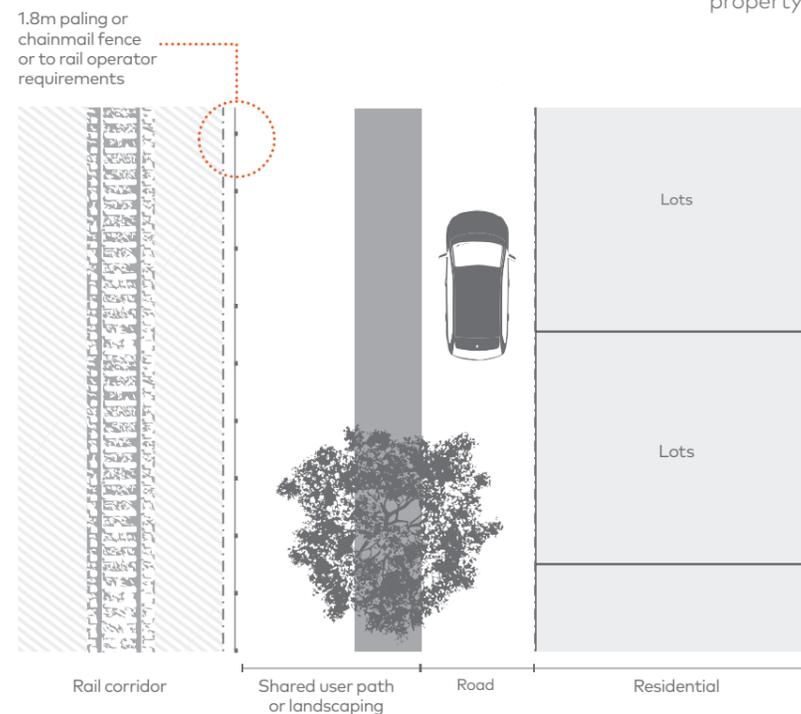


Figure 2

## Shared user paths

VicTrack will only accept SUP applications from Councils, not individual developers. An application can be made on VicTrack's website.

In new subdivisions, SUPs must be located outside the rail corridor, within private land.

SUPs must be located a safe distance from operational rail corridors and must be fenced at no cost to VicTrack or the rail operator.

The design must meet VicTrack's and the ARO standards.

New openings to existing SUPs in the rail corridor are discouraged due to the potential for pedestrian and cyclist conflict.

The design of new buildings and landscaping treatments involving SUPs in the rail corridor should include strategies to ensure safe access to stations and platforms and to avoid cyclist and pedestrian collision.

These strategies may include:

- a setback, splay or glazing to enhance visibility and sightlines at SUP intersections and entrance points
- colour, pattern and tactile elements to alert pedestrians and cyclists to SUP intersections. SUPs within the rail corridor must include paving which is to the satisfaction of the ARO
- landscaping to maintain sightlines for pedestrians and cyclists, which should not overhang the rail corridor
- hard landscaping design to consider cyclist safety and ease of access.

The ARO will be responsible for new design treatments that are proposed for SUPs in the rail corridor. Accordingly, design treatments should be simple and easy to maintain.



Figure 3

# Building setbacks

A primary objective of these guidelines is to ensure new development does not adversely impact on current and future transport operations.

The rail corridor is a three-dimensional space which must be protected to enable new improvements such as stanchions, additional services and tracks, viaducts, substations and communications infrastructure.

Building setbacks are an important strategy to protect the rail corridor and its capacity to accommodate future transport needs.

Appropriate separation between new development and the rail corridor must be provided. Whether a setback is required will vary depending on the context. However, physical separation offers the best way to protect the rail corridor's operations.

New development must observe the principle of independently providing for light, air and outlook within its own property boundaries. This means the building must be able to meet the Building Code of Australia without relying on VicTrack land to do so.

New windows, openings and balconies on the boundary or within one metre of the boundary will not be supported. This is to ensure that private development adjacent to the rail corridor does not constrain the current or future use and development of the rail corridor.

It is important that the owners of developments adjacent to the rail corridor are able to maintain their building and remove graffiti on the rail side without entering the rail corridor. This may require a setback from the rail boundary.

The required setback will be partly dependant on the infrastructure that exists in the particular context. The appropriate building setback will be determined by a combination of the following requirements and considerations.

At a minimum, a building:

- must be set back a minimum of 6m from the centre line of the closest railway track<sup>5</sup>
- within 20m of the centre line must comply with the rail collision loads from rail traffic in accordance with AS5100<sup>6</sup>

- must be set back 4.6m to the side or 6.4m under an electrical conductor<sup>7</sup>
- must not rely on the rail corridor to maintain internal amenity in terms of access to light, air and fire protection<sup>8</sup>
- should not rely on accessing the rail corridor to provide maintenance to the building. The applicant may be required to prepare a plan of how future maintenance of the development is to be undertaken
- must be sited so that it supports its own retention without installing permanent or temporary soil anchors on railway land
- must have sufficient setbacks and design measures to prevent objects being dropped or thrown onto the rail corridor.

Greater building setbacks may be required in high risk locations such as adjacent to station platforms and shared user paths.

VicTrack and DoT may request that applicants demonstrate that any or all of these requirements can be met.

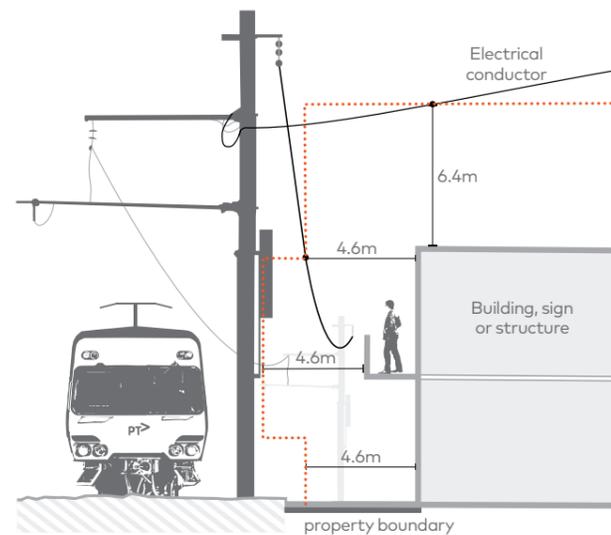


Figure 4



Figure 5 - The new elevated rail between Caulfield and Dandenong shows how the rail corridor can change due to transport improvements and projects

<sup>5</sup> Transport for Victoria/Public Transport Victoria - Network Technical Standard-Structure Gauge Envelopes - Minimum Clearances for Infrastructure Adjacent to the Railway no. DoT-NTS-001:2018

<sup>6</sup> Refer to Australian Standard AS5100.2 2017 Clause 11.4 (note: AS5100 was last updated 31 March 2017).

<sup>7</sup> Refer to the sag and sway in 'Building Design Near Overhead Powerlines' (Energy Safe Victoria).

<sup>8</sup> Refer to Building Code of Australia Clauses CP2 (C3.2) to permit non-fire rated opening on the title boundary, FP4.1 (F4.2) to permit openings located on the title boundary to provide natural light to habitable rooms of the residential parts of the building, and FP4.3 (F4.6) to permit openings located on the title boundary to provide natural ventilation to habitable rooms of the residential parts of the building.



# Noise mitigation

Rail operations, both passenger and freight, generate noise and vibration. The impact of noise and vibration from rail infrastructure can vary considerably depending on site characteristics and layout, as well as geography and land use.

Train and tram operators are exempt from liability from environmental controls and claims of nuisance under legislation\*.

When new development is proposed near rail, the responsibility lies with the development to protect itself from railway noise.

Building design can have a significant impact on how noise is experienced by future residents.

These guidelines and the relevant planning scheme recommend the minimum standard that should be achieved. It may be necessary to provide an increased level of noise attenuation in certain locations near rail to provide good amenity for future residents. It is best to test noise levels and consider noise and vibration early so adequate attenuation can be designed.

Architects and designers should consider a range of strategies to address noise impacts from rail.

The following techniques can limit the impact of noise for future occupants:

- A setback from the rail corridor is an effective method to reduce noise impacts.
- Where possible, locate bedrooms and living rooms away from the rail corridor, on the street interface side.
- Locate bathrooms, laundries, corridors and stairwells on the rail corridor side.
- In mixed use developments, locate commercial and non-sensitive uses immediately adjacent to rail.
- In multi-level developments, a car park adjacent to rail can offer a buffer to noise.
- Maximise solid building mass adjacent to rail.
- Consider the type of materials used adjacent to the rail corridor. Lightweight construction can have poor acoustic performance compared to masonry.
- Minimise the use of windows adjacent to rail to limit the impacts of noise on future residents.
- The layout of buildings can be configured to reduce the impact of noise.

The introduction of Clause 58 into the Victorian Planning Provisions<sup>9</sup> provides a useful guide for considering noise amenity and the noise levels to be achieved in developments near rail. It is recommended that this framework be adopted for all forms of residential housing adjacent to the rail corridor and not just apartments.

Buildings within a noise influence area specified in the table should be designed and constructed to achieve the following noise levels:

- not greater than 35dB(A) for bedrooms, assessed as an LAeq,8h from 10pm to 6am
- not greater than 40dB(A) for living areas, assessed LAeq,16h from 6am to 10pm.

Railways as a noise source	Noise influence area
Railways servicing passengers in Victoria	80m from the centre of the nearest track
Railways servicing freight outside metropolitan Melbourne	80m from the centre of the nearest track
Railway servicing freight in metropolitan Melbourne	135m from the centre of the nearest track

Note: The noise influence should be measured from the closet part of the building to the noise source. Noise levels should be assessed in unfurnished rooms with a finished floor and windows closed.

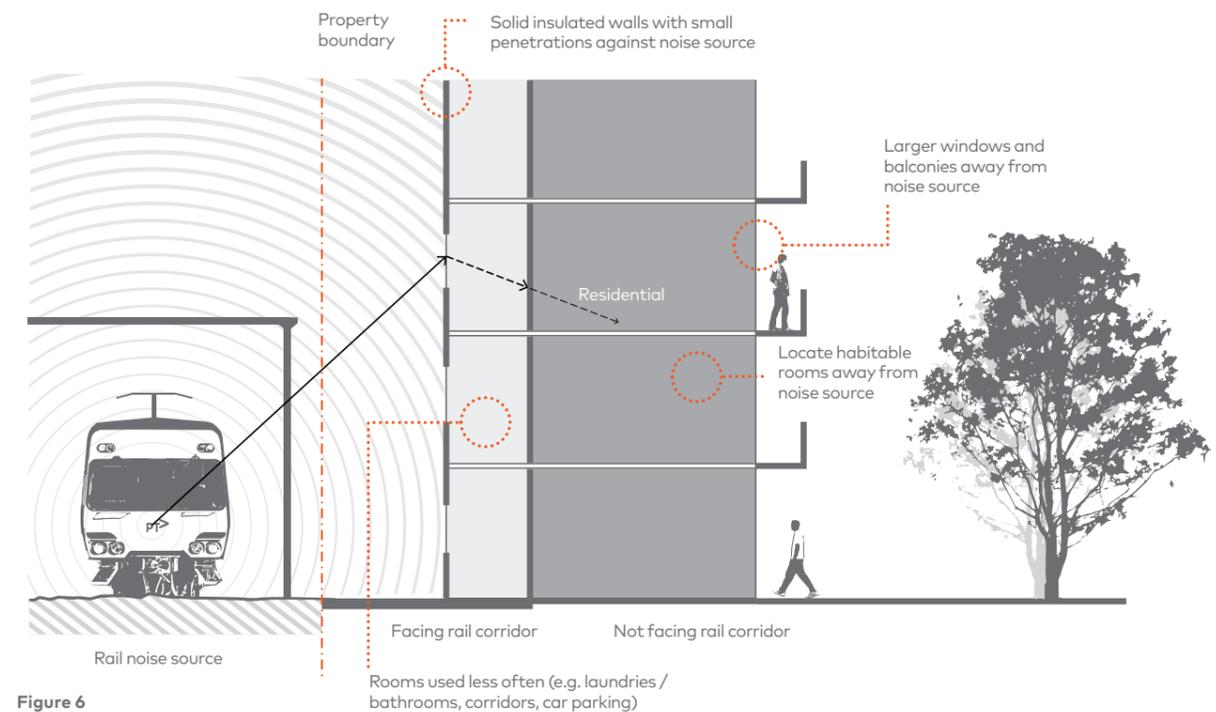


Figure 6

<sup>9</sup> Clause 58.04-3 of all planning schemes.

\* Section 251B Transport (Compliance and Miscellaneous) Act 1983

# Stormwater and drainage

The discharge of stormwater from a development, during and after construction, can impact on rail land and infrastructure. Similarly, a new building may affect existing water courses and drainage infrastructure and change runoff behaviour.

New development will not be permitted to direct stormwater drainage or sewage into the rail corridor.

Excess stormwater and sewage, if directed onto the rail corridor, can dislodge track and other infrastructure.

Flooding must be prevented in order to ensure rail safety. Rail drainage infrastructure is for transport purposes only. Development adjacent to the rail corridor must be self sufficient in relation to drainage and should not plan to connect into existing rail drainage infrastructure.

It is therefore a requirement under the *Rail Safety Act 2006 (221Z1)* that "A person must not cause or permit drainage or sewage to flow or empty from any premises occupied by the person onto land or premises the property of Rail Track".

For development adjacent to the rail corridor, applications received by VicTrack will be referred internally to the utilities and services unit which will consider the following:

- The stormwater management system must be designed to divert stormwater runoff from the entire property subject to development (including all pervious and impervious areas) away from the rail corridor.
- Where the natural slope of the land is towards the rail corridor and the above condition cannot be satisfied:
  - The site is to be landscaped such that stormwater is redirected away from the rail corridor.
  - In some instances, a backup pump drainage system is to be implemented to ensure the post-development discharge into the rail corridor does not exceed the pre-development level in the case of the internal drainage network being blocked and surcharging. The pump would only be needed when the internal drainage network is blocked during a heavy storm, or if the storm event exceeds the capacity of the drainage network installed and pits, trench grates, gutters begin to overflow.

- Stormwater overland flow paths must not be directed into the railway corridor. Where an existing overland flow path currently flows through the subject site into the rail corridor, the discharge is not to increase post development. Check with the ARO for any further comments if this is the case.
- The railway corridor must not be used as a discharge point for stormwater (unless approved by VicTrack and the ARO). One potential exception may be if the legal point of discharge is an existing council drain or Melbourne Water drain running through VicTrack land, in which case the discharge point technically is "within the rail corridor".
- In some instances VicTrack will seek confirmation that stormwater runoff from the site is to be managed during construction, so that the discharge from the site into the rail corridor during construction does not exceed the pre-development discharge.
- Please note that VicTrack and/or the ARO may impose additional requirements if:
  - The subject site has previous history concerned with flooding issues (for example, if the pre-development site discharge from the subject site into the rail corridor is already excessive and causing concerns to rail operation or rail safety, the post-development discharge may have to be much lower than the pre-development level). Consultation may be required with the ARO especially when an overland flow path already flows through the rail corridor from the subject development site.
  - VicTrack or the ARO believe the proposed development may cause concerns to rail operation and/or rail safety.



# Detailed design

## Throw protection screens

Measures must be considered at the design phase to minimise risks from vandalism involving objects being thrown onto, or in front of, passing trains, or into the rail corridor. These actions can have safety implications for rail passengers and ARO staff and can adversely affect rail operations. There are also costs associated with repair of infrastructure damage coupled with train delays as facilities are repaired and, in worst case scenarios, as accidents are cleared.

Recommended measures to avoid hazards:

- Consider safety risks and hazards early, at the design phase.
- Balconies and windows should be set back from the boundary to railway land.
- Windows close to the rail boundary should have restricted openings to prevent objects being thrown from them.
- Where there is potential for objects to be thrown onto or in front of passing trains, incorporate 'throw protection screens'. These screens should be permanent, fixed and durable; and should not protrude onto railway land.

Note: Throw screens can adversely impact on the amenity and presentation of developments. Where possible, other methods such as setbacks or changes to layout and design should be employed to prevent objects falling or being thrown onto the rail corridor.

## Glare from building finishes and lighting

Glossy or highly reflective materials are not suitable on facades of buildings or advertising adjacent to the rail corridor. It can cause temporary blinding effects or driver distraction, particularly around sunrise and sunset.

Recommended measures to prevent glare and lighting issues:

- At the design stage consider potential impacts taking into account site aspect, shadowing and the pattern of sun movement.
- Avoid reflective finishes (metal, glass) on facades which face the rail corridor.
- Avoid red, green and yellow colours which are used in signalling systems and can therefore cause driver distraction or confusion.
- Design dwellings so that any existing light from the rail corridor does not cause a nuisance for future occupants.

In some instances, depending on the building size, finishes, location and topography, rail stakeholders may require a detailed reflectivity study to be prepared by the applicant to confirm that driver distraction will not be an issue. This is usually determined by the ARO's signals sighting committee.

The report must address potential sun glare from any reflective surfaces of the development. This is to assess the potential impact of any reflective sun glare on train drivers' sight in the vicinity of the subject land (in particular that any such glare does not interfere with a driver's viewing of signals or the track in either direction). The development must be constructed in accordance with the recommendations of the approved report to the satisfaction of the responsible authority.

## Landscaping

Plant and tree species close to the rail boundary must be of a type that will not cause any future overhang onto railway corridor or disturbance of railway operations, including overhead power cables or underground cables.

It is important that the visibility of signals are not obstructed, either by directly blocking the signals or reducing the line of sight at curves.

There are particular requirements for sightlines at level crossings for both road and rail vehicles. Reference must be made to Australian Level Crossing Assessment Model ALCAM and AS1742 Part 7. The standard calls for wider areas of open space around crossings. Vegetation should be controlled to minimise obstructions. The same follows for curves in the tracks.

Landscape plans associated with development adjacent to the rail corridor must:

- ensure that maintenance of landscaping should not require access to the railway corridor
- ensure that landscaping does not block a train driver's visibility of signals and sightlines within the railway corridor
- ensure that plant species that are likely to overhang are not located near the common boundary
- take into account electrified rail infrastructure including overhead and underground cables.

## Graffiti

Graffiti and related defacement of surfaces can become a cost and safety issue along railway corridors. Graffiti can also adversely affect the train passenger experience. The costs of surveillance, physical removal and repair can be significant on an annual basis. Removal of graffiti can be dangerous to undertake and interrupt rail operations.

Recommended measures to avoid graffiti include:

- Consider measures at the design stage to avoid the need for costly removal measures later.
- Treat boundary fencing and other surfaces with a graffiti proof finish.
- Landscape walls to reduce visual exposure—although any vegetation should avoid affecting the visibility of train drivers, not require ongoing maintenance and not have expansive root systems.
- Provide a setback from the boundary of the rail corridor to allow walls to be cleaned of graffiti without the need to access the rail corridor.

VicTrack and DoT recommend conditions to be placed on permits for development adjoining rail to address graffiti clean up. In some cases, a graffiti maintenance agreement may be required. At a minimum, it is expected that:

- Any graffiti that appears on the wall must be cleaned or removed as soon as practicable to the satisfaction of the ARO.
- The cost of any clean-up or removal of the graffiti from the wall must be paid for by the developer or body corporate of the land.
- Additional costs may be associated with accessing the rail corridor to carry out the cleaning.

## Electrolysis

Electrolysis is an electro-chemical reaction involving an electrolyte and metals. With rail networks, the electrolysis results from ground leakage of the electrical current which powers the train from 1,500 volt overhead wires. This stray or leakage current can then cause accelerated corrosion of nearby metallic structures. This can lead to:

- weakening of the structure integrity of buildings or structures
- corrosion of gas, sewerage, water pipes or electricity cables causing leakages and related damage
- accelerated deterioration of metal finishes (e.g. fences, awnings, balustrades).

Electrolysis and related corrosion can be minimised by selecting suitable building materials and avoiding using metal finishes in the vicinity of high voltage electricity.

To minimise the effect of 'stray current' electrolysis designers should:

- keep metallic services such as pipelines away from the tracks
- insulate all water and gas pipes, and power or communications cables with metallic sheaths
- use isolating joints to divide any buried structure into short lengths
- use insulating coatings
- use polymeric coatings on reinforcement bars
- use fly ash (water reducing admixtures or superplasticizers) in the concrete mix for concrete structures
- avoid connecting boundary fencing to fencing at electrical substations or railway stations.

## Development near substations in the rail corridor

Electrical substations located within the rail corridor provide essential infrastructure to power the rail network. Without substations, the rail system cannot operate.

By definition, a substation is any enclosed, fenced or pole mounted location in which high voltage is generated, converted, controlled or transformed. Substations consist of both above and below ground infrastructure. In some situations, signalling communications equipment is co-located on substation sites.

Because of the use of high voltage electricity, safety for the public and railway workers is of paramount importance in relation to the siting and design of any development near substations.

Where any planned new development may potentially encroach upon substations in the rail network, the following is to be adhered to:

- When developing adjacent to a rail line, the site context plan should identify the location of any substations in the rail corridor.
- If development (including retaining walls or foundations) is within close proximity of the substation, (up to 20m) the earth potential rise zone (EPR) of the substation should be identified. Development within the EPR can impact negatively on public safety, the operation of the substation and other infrastructure. Due to the significant risks associated with high voltage electricity, it is important that investigations are carried out by a suitably qualified electrical engineer. It may be necessary to undertake a full electrical earthing study to inform the design and ensure safety.
- Development should have a minimum clearance of 15m horizontally and vertically from a rail substation.
- Consultation on the siting and design of development near substations must be undertaken with the ARO who can advise on requirements in relation to substations.

In addition to the requirements of the ARO, the Energy Network Australia provides a comprehensive range of information and guidelines on substations.

## Maintenance

Rail is a high risk environment to enter for the purpose of building maintenance. Entry is prohibited except with the permission of the ARO.

During the design phase of the development, consideration should be given to how future maintenance will be undertaken safely without the need to access the rail corridor. This includes window and façade cleaning, graffiti removal, painting and building repairs.

It should also be possible for a building to be maintained so that workers and equipment can meet the minimum electrical safety clearances necessary.

Access for maintenance should be located within the development and should avoid access from the railway corridor.

Access via the railway will require agreement with the relevant ARO.

A maintenance agreement with the rail stakeholders may be required. Any graffiti and vandalism of the railway corridor must be fixed, cleaned or removed by the developer, body corporate or owners as soon as practical to the satisfaction of the relevant ARO. Costs must be paid by the developer, body corporate or owners.

Buildings should be setback 4.6m to the side or 6.4m under an electrical conductor.





# Boundary fences and walls

Preventing unauthorised access onto railway land is essential to minimising risk to human safety and causing potential disruptions to train services.

It is the responsibility of the adjoining land owner to provide and maintain a compliant fence<sup>10</sup>.

The permit holder must, at all times, ensure that the common boundary with railway land is fenced at the permit holder's expense, to prohibit unauthorised access to the rail corridor.

At the subdivision stage, DoT will require fencing to be erected prior to the issue of a statement of compliance. Photos of the erected fence and potential site inspection by the rail operator may be required before VicTrack and DoT will consent to the issue of a statement of compliance.

Boundary fencing should:

- consider the effect of electrolysis and avoid connecting to fencing at electrical substations or railway stations.
- not block train driver sightlines along the rail corridor
- be erected prior to the issue of the statement of compliance.

## Metropolitan and regional areas

In new subdivisions and in regional areas, fencing will generally be required to be 1,800mm black cyclone mesh fence.

Fencing for residential properties in metropolitan areas will generally be required to be either 1800mm black cyclone mesh or 1800mm timber paling fence with rails on the railway land side.

Fencing that is required will vary depending on the context and the ARO should be contacted for their preferred fencing specification.

## Fence and wall construction detail

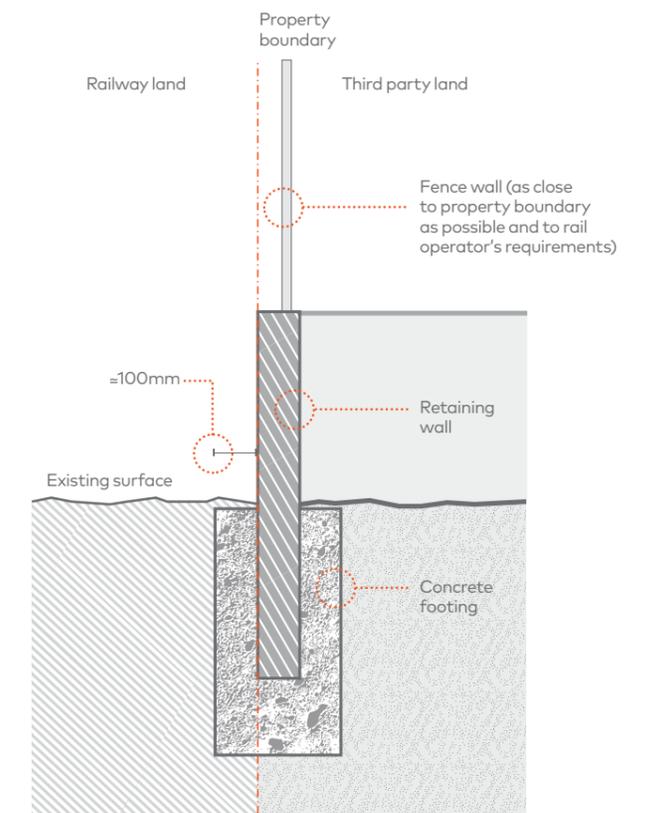


Figure 7

Walls must be constructed with foundations within the development site boundaries. A minor encroachment of only 100mm will be permitted for boundary fences.

<sup>10</sup> Under Section 61 of the Rail Management Act 1996 (Vic) VicTrack and the rail and tram operators are exempt from the requirement to fence their boundary.

## Acoustic walls

Acoustic walls on railway land boundaries should only be used only as a last resort. Unless carefully planned for, acoustic walls raise issues that are not easily resolved. From the outset consideration should be given to maintenance and liability.

Acoustic walls on the common boundary to railway land require VicTrack and rail operator consent.

An application to VicTrack must:

- demonstrate compliance with the necessary Australian Standard including the requirement for crash protection measures under AS5100
- demonstrate compliance with Victorian Safety (Installations) Regulations 2009 Part 3 Division 2
- demonstrate no impact on signals and sighting
- demonstrate no impact on overland flow
- provide evidence of any other necessary approvals (i.e. council planning permit)
- show that all permanent infrastructure is located off VicTrack land (no ground anchors in VicTrack land unless approved)
- ensure the design shows the proximity to existing rail and communication asset locations (above and below ground).

- confirm that the appropriate legal indemnity agreements with DoT and VicTrack are in place prior to construction commencing to ensure that the cost of any damage caused to transport infrastructure is reimbursed by the permit holder
- ensure the external finish of the wall is designed to minimise graffiti and that the ongoing management of cleaning graffiti is addressed in an agreement which allows the wall owner to enter the rail corridor for graffiti removal purposes
- confirm that VicTrack will not be responsible for maintenance of the new asset, including the rail corridor side of the wall
- confirm the contractor is responsible for identification and protection of services in the vicinity of the works. If required, the relevant utility companies shall be contacted and coordinated with so as to minimise service disruptions.

The proposed wall may be required to go through a risk assessment with representatives from VicTrack and rail stakeholders. The applicant is responsible for all costs.

On completion of the works, the applicant is required to demonstrate that all disturbed land and drains have been reinstated and made good.

## Crash protection walls

Any development adjoining the rail corridor must have regard to the regulated rail clearances which ensure not only the safe separation for trains and operating rail infrastructure, but adequate space and access for its ongoing maintenance. If the building structure is within 20m of the nearest rail line, the structure may require derailment protection as per AS5100.

Structures with particular requirements include: overbridges, footbridges, tunnels, retaining walls, air space developments and building load bearing structures.

The standards for structures within or that interface with the rail corridor include but are not limited to:

- AS 5100.2-2004 Bridge Design;
  - AS5100.1-Scope and General Principles-2004 -11. Collision Protection Section 11.3.1 refers to "other structures over or adjacent to the rail tracks"
  - AS5100.2-Design Loads-2004 -11. Collision Loads Section 10.4.1 refers to "developments adjacent to railways"
  - AS5100.2-Design Loads-2004 -11. Collision Loads Section 10.4.3 refers to "structures located within 10m of the centre-line of the railway track"
- Relevant Australian Standards for utility services
- Relevant ARO standards including MTM, V/Line and ARTC.

The developer should carry out a risk assessment to quantify the level of risk and the controls that need to be put in place. The key stakeholders include VicTrack, DoT and the relevant ARO. The results of this risk analysis may mean that simpler and less costly devices such as earth mounds, gabions, guard railings etc. may be permitted to provide protection. However, even if the analysis indicates a low probability of risk, provisions may be required to include in-built deflection resistance to the proposed structure.

Risk assessments should include assessment of:

- site condition, presence of cuttings or embankments and any other characteristics of the site
- derailment history of the site
- the type of proposed structure to be erected, including any potential for collapse and consequent damage to trains and other rail infrastructure
- track geometry and its likely effect on the proposed work
- track speed and whether this represents a risk to the integrity of the proposed structure
- type of rolling stock, both passenger and freight, utilising the track
- future tracks and types of rolling stock.

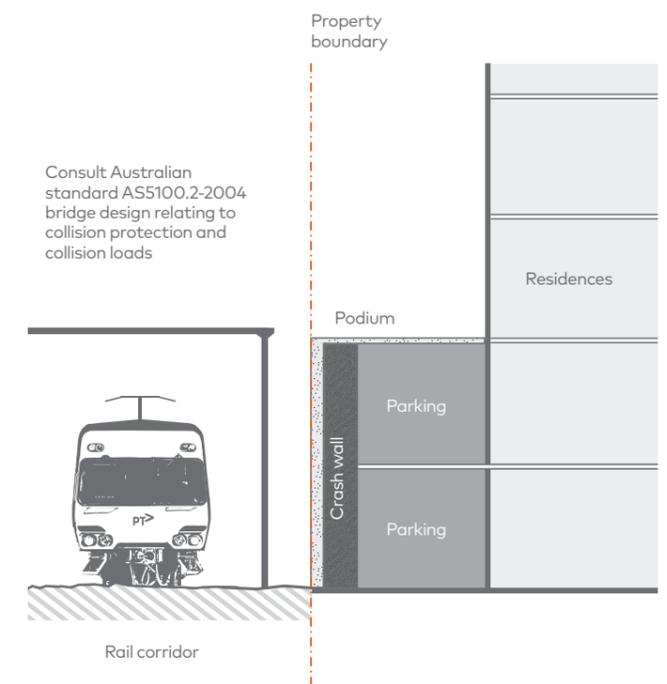


Figure 8

# Level crossings

All new railway crossings must provide for grade separation except with the approval of the Minister for Public Transport<sup>11</sup>. This includes pedestrian and cycle crossings.

Each existing railway crossing has a risk profile based on a number of factors such as visibility, existing protection at the crossing, frequency of trains passing through the area, the number of tracks, the nearby road geometry, the volume and type of road traffic over the crossing and the potential for motorists to queue on the crossing.

New development near an existing crossing may change the risk profile of a crossing where there is likely to be an increase in traffic or pedestrian activity on the crossing as a result of the development or if there will be a change in the type of traffic use.

Predicted changes to the risk profile of a crossing must be taken into account when considering a permit application. A formal risk assessment may be required to be undertaken to determine the appropriate mitigating measures. All costs of this exercise are expected to be borne by the permit applicant.

VicTrack and/or DoT may impose the following condition:

A risk assessment report prepared by a suitably qualified person (whose appointment and terms of reference are to be approved by the Head, DoT, the ARO and VicTrack) which assesses the operational and safety impacts the proposed development may have on traffic and pedestrian movements at the nominated level crossing in accordance with Australian Standard AS1742.3-2016, Manual of uniform traffic control devices, Part 7: Railway crossings. The risk assessment must:

- a) advise on what operational and safety improvements will need to be made to the crossing should the development be approved
- b) provide a cost estimate of operational/safety improvement works
- c) specify modifications that would need to be made to the subdivision in order to mitigate against adverse operational or safety impacts to the existing level crossing.



<sup>11</sup>Refer to Clause 18.02-35 of the State Planning Policy Framework



## Easements

Easements will not be supported on rail land. Easements represent an unacceptable constraint on rail land that can inhibit future transport plans.

New development should be designed to be entirely independent of rail land. In exceptional circumstances the grant of an easement is subject to VicTrack obtaining all necessary clearances and approvals, including, but not limited to:

- clearance for the grant of the Easement from the DoT
- the approval of the Government Land Monitor to the proposed grant (including the price payable for the grant)
- the approval of the Minister for Public Transport pursuant to section 125(1)(b) of the Transport Integration Act 2010 (Vic)
- the approval of the Treasurer pursuant to section 125(1)(b) of the Transport Integration Act 2010 (Vic).

# Construction considerations

## Construction methodology

Any demolition or excavation next to the rail corridor requires the approval of VicTrack and the ARO.

An application for demolition and bulk excavation adjoining the railway corridor must be accompanied by a demolition and construction management plan. The demolition and construction management plan must include (but not be limited to) details of management proposals to minimise impacts to railway corridor assets and the operation of the railway during construction and must set out objectives, performance and monitoring requirements for:

- protection of all rail infrastructure to ensure rail infrastructure is not damaged during demolition or construction
- mitigating disruption to train services
- management of drainage, effluent, material stockpiles, equipment storage, fencing and hoardings, to ensure railway land is not used for, or impacted by these activities outside of the licence area
- public safety, amenity and site security
- operating hours, noise and vibration controls
- air and dust management

- geotechnical investigations of the foundation design
- when access to the rail environment is required, specify:
  - the designation of any areas to be used under license during the construction process
  - approvals and permits required from the relevant ARO prior to the works commencing and prior to accessing the rail corridor
  - that the ARO will be contacted to obtain their conditions and safety requirements for works on, over, under or adjacent to public transport land and/or easements and electrical infrastructure
  - that access to the public transport areas during construction must conform to all of the necessary public transport operator/s guidelines and instructions
  - the rail safety requirements that must be adhered to by the permit holder
  - building clearance to aerial power lines as per the Victorian Electrical Safety (Installations) Regulations
  - design loadings for buildings nearest to the rail track is in compliance with Australian Standard 5100.2-2007 Design Loads.

## Demolition and geotechnical

There are a number of risks that contractors need to be aware of when carrying out demolition activity close to the rail corridor. Plant or materials from the demolition site could come in to contact with high voltage overhead cables or foul the rail track.

The geotechnical engineering and foundation design must consider the effects demolition will have on railway embankments, tunnels, cuttings, bridges and other infrastructure.

- Any demolition works should avoid areas where there is existing electrified rail infrastructure, including overhead cables.
- Demolition works requiring alteration at or below ground level should incorporate appropriate geotechnical engineering.

## Earthworks, excavation and retaining walls

Development adjacent to rail corridors or over existing tunnels has the potential to impact on safety and the operation of the rail network. Rail infrastructure both above and below ground (i.e. tunnels), can include a wide range of engineered structures, facilities or buildings which may be affected by proposals to build or carry out excavation and other adjacent works.

Excavation, other earthworks and building construction adjacent to rail corridors can have implications for the integrity of the rail system and its engineered structures and can increase safety risks if not appropriately designed, planned and managed. Poorly designed and implemented excavation, earthworks and construction can cause subsidence, deterioration of existing structures and can cause stress changes in the soil and rock. This may be a particular problem where excavations are deep, the on-site substrate (soil or rock) exhibits poor compressive strength, contains structural defects or there is groundwater seepage.

Underground electrical cables pose safety risks and risks to the integrity of the rail network if excavation or boring works cut or damage cables or other services. Any excavation works including horizontal or vertical boring or pile driving must avoid areas where there are existing underground electrical and other services.

Loading onto the rail corridor must be avoided given that it could potentially lead to structural damage, reduced structural capacity, detrimental damage to the serviceability of the structures, or displacement of the railway.

Recommended measures include:

- No temporary or permanent soil anchors should be installed in rail land and/or easements without the prior permission of VicTrack and Dot.
- Excavation works must be located, sited, designed and managed to minimise potential impacts such as slippage, slumping, creation of fissures or cracks, rock or earth falls, exacerbated ground movement, water inflows and structural failure.
- Any excavation works including horizontal or vertical boring, or pile driving must avoid areas where there is existing electrified rail infrastructure.
- Where filling and retaining walls are within the curve setback, the fill and retaining wall must avoid obstruction to signals.
- Excavation works must incorporate geotechnical engineering in the foundation design.

### Cranes, concrete pumps and other plant equipment

Cranes, concrete pumps and other equipment capable of moving into or across the airspace above rail corridors may cause safety and other issues if their operation is not strictly managed.

Aerial movements in the proximity of rail lines have a risk of:

- loss or failure of loads with safety implications on rail infrastructure
- overbalancing of crane or other equipment used in the aerial movements causing blockage of the rail corridor with the potential of collisions or derailments
- electrical arcing and potential electrocution of workers where the crane that is lifting equipment is in the proximity of overhead wiring or other electrical sources
- power outage as a result of arcing, causing train delays and potential cessation of services.

The use of cranes, concrete pumps and other plant equipment must:

- obtain the necessary approvals from the relevant ARO
- take account of the electrified rail infrastructure including overhead and underground cables
- meet the minimum clearances, including to setback 4.6m to the side or 6.4m under an electrical conductor. Refer to sag and sway in Building Design Near Overhead Powerlines (Energy Safe Victoria).

### Development near railway tunnels

Rail tunnels are an integral part of the rail network, particularly within the Melbourne CBD. Tunnels are located in the following locations of the rail network:

- Melbourne Underground Rail Loop (MURL)
- The Metro Tunnel
- Bunbury Street Tunnel under Bunbury Street, Footscray
- Heidelberg Tunnel under Darebin Street, Heidelberg
- South Geelong
- Watsonia Tunnel.

Development above the Metro Tunnel is assessed by Rail Projects Victoria as set out in Schedule 70 of Clause 43.02 of the Melbourne Planning Scheme.

For development above all other tunnels approval should be sought from VicTrack in consultation with the ARO.

Applications for approval should be accompanied by an assessment prepared by an appropriately qualified geotechnical and structural engineer.

Development in proximity to the MURL must comply with Section 54 of the *Transport (Compliance and Miscellaneous) Act 1983*.

An application must be accompanied by the following information, as appropriate:

- approval from the relevant ARO
- site and layout plans drawn to scale which show:
  - the boundaries and dimensions of the site
  - adjoining roads and infrastructure
  - relevant ground levels and surface levels to Australian Height Datum (AHD)
  - the layout and dimensions of existing and proposed buildings and works, including foundation details, loadings and proposed levels of bulk excavation or filling
  - the location and use of all existing and proposed buildings.
- sections and elevations drawn to scale which show:
  - the boundaries and dimensions of the site
  - the depth of any basements
  - the proposed foundations, including their form, founding levels and loads
  - the details of any proposed drainage system, including any discharge outlet.
- details relating to the staging of development and the likely timing of each stage.

### Protection Works Notice (PWN)

Under section 84 of the *Building Act 1993*, a protection works notice (PWN) must be served on the adjoining owner. The PWN should be issued to both VicTrack and the Rail Operator. The PWN should include in-principle acceptance from the relevant ARO that the works will not have a detrimental effect on rail infrastructure or on rail operations.

A plan must include:

- a cross section of the common boundary showing the proposed structure and retention system, railway embankments, rail tracks, overhead cables and services within the rail corridor
- a hoarding plan and details of how access to the rail corridor will be restricted
- details of how craneage and other mobile plant is restricted from slewing over the rail corridor
- details of scaffolding and gantries adjacent to the rail corridor
- a dilapidation report for the rail corridor adjacent to the proposed development.

# Legal agreements

The construction method for a development abutting the rail corridor must ensure that it does not interfere with train operations or adversely impact on railway land. For larger developments adjacent to the rail corridor, permit holders may be required to enter into legal agreement with VicTrack, DoT and the ARO to ensure rail assets are protected during the life of the development.

Legal agreements are bespoke and can vary depending on the rail assets that need to be protected and /or if a developer is delivering rail network improvements such as a new entrance, footpath upgrades or, an accessible tram stop. The range of agreements include:

- Deed of release and indemnity
- Access permit from the relevant rail operator
- Permit to disturb track
- Permit to work adjacent to VicTrack telecommunication assets
- Permit to work close to third party services.

Requirements in these agreements might include the following:

- track and/or tunnel monitoring with procedures in place to stop works and notify the relevant rail operator if limits have been exceeded
- safeworking in place for works adjacent to or within the rail corridor
- power outage or track possession.

The costs associated with any legal agreement must be met by the developer including any legal cost to VicTrack, DoT and ARO.

## Rail interface agreements

An interface agreement is a formal agreement between the permit holder and the ARO. It involves detailing relevant measures for the management of risks to safety associated with rail operations during the construction stage and on an ongoing basis.

The purpose of a Rail Interface Deed is to ensure that the Accredited Rail Operator is consulted and where possible, controls the construction of development adjacent or over the rail corridor and ensures that the permanent design has a suitable interface with rail operations.

## Construction agreements

The agreements to protect rail infrastructure during the construction period are:

- Deeds of indemnity and release. Typically parties to that agreement are DoT and VicTrack (and where required MTM)
- Construction control agreement - this is a more robust agreement that is put in place where transport assets and services are being delivered or protected.

## Ongoing agreements

There may be a need for an ongoing agreement to be put in place such as maintenance agreements and special considerations under s173 of the *Planning and Environment Act 1987*.

In some cases the rail stakeholders have an interest in the ongoing maintenance of structures close to the rail corridor. In such cases the permit holder must enter into a maintenance agreement with the rail stakeholders. This agreement will include the following;

- requirements for periodic structural assessments of building elements close to the rail corridor that, if failure occurred, would have a detrimental effect on rail infrastructure or rail operations
- procedures for removal of graffiti from facades facing the rail corridor
- procedures for the maintenance of building elements and other items close to the rail corridor.

## Access to the rail corridor during/after construction

Certain phases of construction or excavation may require access to the rail corridor and may require the ARO to stop trains running on adjoining tracks (track possession) and/or shutting off the power (power outage). For this to occur safely and minimise impacts on rail operations, early discussions must be held with the relevant ARO.

An agreement must be entered into with the relevant ARO to enable this work to be planned and proceeded within a safe and timely manner. The agreement will define the required involvement of rail staff and the controls which will be implemented in managing the access and/or the potential impacts on rail facilities.

## Insurance requirements

The standard insurance requirement is \$250 million public liability to be held by the developer, VicTrack and the development builder.

However, each situation varies and insurance will be dealt with on a case by case basis.

## Disclaimer

This document is not, nor should it be solely relied on as a substitute for making your own enquiries and or seeking professional advice. Nothing in this document diminishes the responsibility of users of this document for applying the requirements of any applicable law or standard.



# Typical permit conditions

When there is an interface between the rail corridor and a new development, there is a potential for impact on the safety, amenity and function of the rail corridor.

These impacts can vary depending on the context, location and scale of the development.

Common issues from development adjacent the rail corridor can include:

- Drainage onto the rail corridor can result in track movement and/or damage to underground infrastructure.
- Inappropriate fencing can undermine the security and safety of the rail corridor.
- Adjacent trees planted too close to the rail corridor can obstruct trains and cause delays through maintenance.
- Graffiti can adversely effect the train passenger experience. Delays and costs are incurred due to graffiti clean-up. Entry to the rail corridor is required for graffiti clean-up which impacts on safety of workers and can cause temporary line closure.
- Windows and balconies too close to the rail corridor can impact on new occupants in terms of amenity (noise and pollution).
- Windows and balconies can impact on VicTrack and the ARO by placing an unacceptable restriction over the rail corridor, as all windows and balconies require adequate light, air and outlook.
- Items that are thrown from balconies can cause accidents or distraction to train drivers.
- Development can require entry to the rail corridor for construction and/or maintenance. This can cause line closure and train disruptions.
- Construction in the rail corridor is hazardous for workers and is subject to stringent safety regulations. This can add cost, time and complication to the construction process.
- Excavation close to the rail corridor can damage underground infrastructure such as telecommunications.

- Development too close to tracks, overhead electrical infrastructure, signalling or other infrastructure can create hazards and inhibit the function of the rail corridor. Insurance can be required to indemnify developers in the event of accident or damage.
- Development with reflective surfaces and/or red, green and yellow colours can distract train drivers and cause confusion with signalling.
- Any development close to rail can impact on access and safety for rail workers in the rail corridor and pedestrians, cyclists and public transport users.

Where new development may impact on the rail corridor, VicTrack recommends planning permit conditions to Responsible Authorities and other referral authorities such as DoT to address these impacts as listed above.

The conditions can then be incorporated in planning permits to ensure the rail corridor is protected and safe.

The conditions are determined based on the specific context and issues raised by the proposed development.

VicTrack encourages pre-application discussions so we can discuss the types of conditions that are likely to be applied to a development.

Typical standard conditions can be obtained from VicTrack on request.





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