

# **ENVIRONMENTAL RISK AND IMPACT ASSESSMENT**

**PROPOSED CHANGES TO THE APPROVED PROJECT LAND**

**TAS-CYP-SDL-ZWD-  
REP-XLP-NAP-X0006  
Rev C**

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# 1 Introduction

## 1.1 Overview

Cross Yarra Partnership (CYP) has been contracted by Melbourne Metro Rail Authority (MMRA) to design, build and maintain the tunnels and stations for the Metro Tunnel Project, (the Project). The project includes two nine-kilometre train tunnels and five new underground train stations, linking the north-west Sunbury rail corridor and the south-east Cranbourne/Pakenham rail corridor, unlocking additional capacity in the existing City Loop. The five new underground stations are located at Arden, Parkville, CBD North, CBD South and Domain.

This report details an Environmental Risk and Impact Assessment of the additional Project Land proposed by CYP for Melbourne Metro. Effective environmental risk management is a continuous, collaborative and forward-looking process that anticipates potential impacts so that project related activities can be planned and managed to manage and, where applicable, mitigate adverse impacts. Environmental risk is a function of the likelihood of an adverse event occurring and the consequence of the event. CYP will continue to apply a robust and transparent environmental risk assessment process across all phases and components of the Project including construction and operational phases.

The project has already undergone an extensive and robust planning assessment process. As part of this, MMRA published an Environment Effects Statement (EES) and draft Planning Scheme Amendment (GC45) that included an integrated assessment of the potential environmental, social, economic and planning impacts of the project, and the approach to managing these impacts.

In developing the EES, MMRA undertook a comprehensive engagement program to seek input from stakeholders and the community. This included stakeholders and the community having the opportunity to provide formal submissions during a public exhibition period, which were then presented to an Inquiry and Advisory Committee. The key focus of the Committee's review, findings and recommendations was the planning and environmental control framework for the Project, which resulted in a report prepared for the Minister for Planning.

In December 2016, the Minister for Planning released his Assessment of the environmental effects of the project. The Assessment was undertaken in line with the *Environment Effects Act 1978* and completed the EES process. The Minister's Assessment concludes that the environmental effects of the Project are acceptable, provided appropriate mitigation and management is implemented. The Minister subsequently approved a Planning Scheme Amendment and Incorporated Document for the Project. The Incorporated Document, under Section 4.7 Environmental Management Framework (EMF), required an EMF to be approved. The EMF ensured the inclusion of Environmental Performance Requirements (EPRs), which address sixteen environmental factors. This comprehensive process will be referred to as the EES and PSA processes.

The EPRs measurements ensure that there is a clear, unambiguous and transparent set of controls in place to guide Project delivery. The EPRs define the project-wide environmental outcomes that must be achieved during design, construction and operation of Melbourne Metro, (regardless of the design solutions adopted). While it will not be possible to avoid all effects and impacts, the recommendations and outcomes of the public submission, Inquiry and Ministerial Assessment; found the EPRs should provide an effective way to manage potential risk.

It is therefore these EPRs that will be used to assess the ability for CYP to appropriately manage and mitigate the proposed changes outside of Project Land. As a consequence of this an updated ERA and EIA has been undertaken for the proposed changes to the Project Land.

## 1.2 Approach

The proposed CYP changes to design and approved Project Land encompasses:

- Parkville Station to CBD North Station
- CBD North Station
- CBD South Station
- Additional road surface works.

These proposed changes are deemed to be minor compared to the initial EES and PSA processes and planning scheme amendment GC45, which incorporated the concept design. This planning scheme amendment is seeking to incorporate improvements to the concept design, which take excursion outside of the approved Project Land. Despite the difference in the scale of change, CYP and MMRA must ensure a similar risk appraisal and impact assessment process is undertaken to ensure that all relevant risks and impacts are captured and actively considered throughout the Project. The process will:

- Provide a robust and transparent approach to managing the environmental impacts of the Project
- Respond to changes to environmental impacts and risks to ensure they are adequately assessed and mitigated
- Assist with prioritising issues requiring mitigation and management.

Application of the EPRs through this process allowed CYP to identify any additional controls required to address risks from both the construction and operational phases of the Project. The outcomes of the CYP ERA will be implemented through the Environmental Management System (EMS), Construction Environmental Management Plan (CEMP) and various sub-plans.

The scope of the risk assessment includes all activities to be undertaken by the Project Company (CYP) as defined in the Project Scope and Technical Requirements (PS&TR). Figure 1 shows the relationship between the different risk assessments completed for the Project. The ERA prepared by CYP has been framed to feed directly into the management framework for the Project and link with the specific management plans for each phase and precinct. This will ensure a direct connection between the risk assessment, compliance with EPRs, approval conditions and secondary approvals.

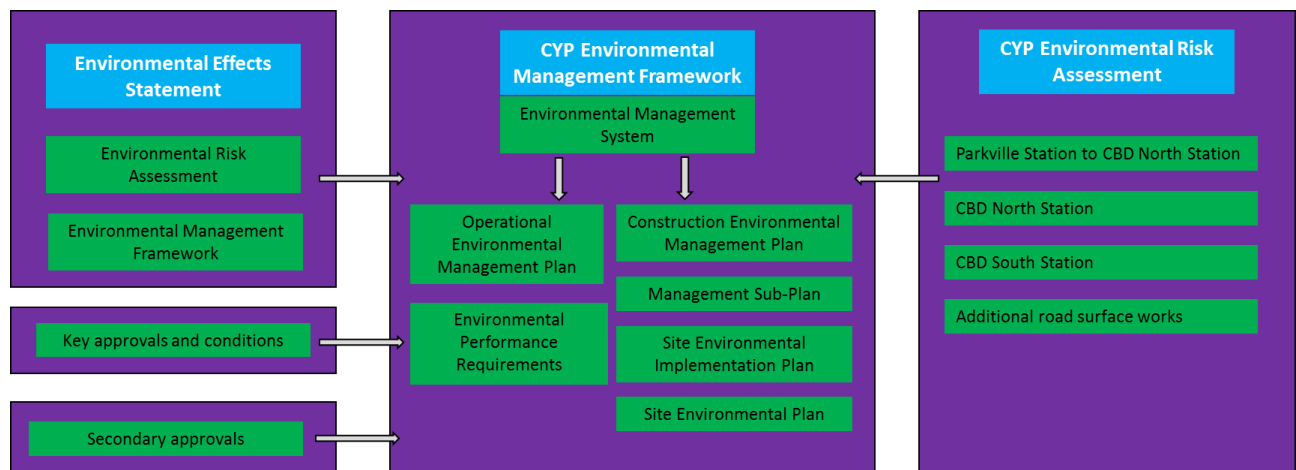


FIGURE 1: MELBOURNE METRO ENVIRONMENTAL RISK ASSESSMENT FRAMEWORK

## 1.3 Scope

The following sections outline the extent and location of CYP design changes, which will result in modifications of the approved Project Land, as approved by Amendments GC45 and GC67.

The changes generally relate to the following works at Parkville Station, CBD North Station and CBD South Station:

- **Rail alignment:** The modified rail alignment represents a change in horizontal or vertical alignment (i.e. change in track geometry).
- **Underground support structures:** Underground support structures are ancillary structures that are used for stabilisation of a primary structure such as a shaft, station box or tunnel:
  - Usually rock bolts are shorter in length and used predominantly along the rail tunnels.
  - Rock anchors are longer in length and can be used to support shafts at the stations.

In both instances, each stabiliser can sit 1.5 to 2 metres apart and protrude at an angle.

Note: The underground support structures will be used temporarily by CYP to provide ground support during the construction phase and then will remain in situ pending removal or modification as part of any future redevelopment by others.

CYP are further refining the tunnel construction methodology and will confirm the use of these underground support structures or other construction techniques during the detailed design process.

- **Pedestrian adits:** A pedestrian adit is a permanent underground passage that connects the tunnel or station to a ground level access point and has a primary purpose of facilitating passenger movements.
- **Construction adits:** A construction adit is an underground passage that will connect the station to a ground level access point. It is typically used for the movement of equipment, materials and excavated material. It can also be used for storage purposes.
- **Flinders Street Station platform works:** Additional lifts connecting the station platforms to the Degrares Street Underpass/Campbell Arcade Underpass.
- **Additional road areas:** Additional road areas are road reserves required for construction management, together with temporary and legacy road requirements. TMPs will be prepared and implemented in accordance with the approved EPRs, for each area, setting out specific traffic management activities and legacy roadworks. Generally, temporary traffic management will involve signs, workers and possible signage line marking adjustments. Legacy roadworks will generally involve the re-surfacing of road, kerb and channels, road works, pedestrian/cycle crossings, and hard and soft landscaping.

There are also a series of changes to project land related to surface road works. These changes are described below.

### 1.3.1 Parkville Station to CBD North Station

The design and construction changes to the approved Project Land at Parkville Station and between Parkville Station and CBD North Station entail changes to the rail tunnel alignment and the provision of additional underground support structures. See Figure 2, **Error! Reference source not found.**, **Error! Reference source not found.** and Figure 5 in Section 1.4 for detail.

Also, because of the CYP design and construction phase changes, two properties will be removed from the approved Project Land. They are 212 Berkeley Street, Carlton and 214 Berkeley Street, Carlton.

Table 1 provides a breakdown of the location of changes to the approved Project Land resulting from the enhancements and changes at Parkville Station and between Parkville Station and CBD North Station.

TABLE 1: PARKVILLE STATION TO CBD NORTH STATION CHANGES TO PROJECT LAND

Element	Location of change to approved Project Land
<b>Rail tunnel alignment</b>	Excursion outside of the approved Project Land is as follows: <ul style="list-style-type: none"> <li>• south of Grattan Street (near the corner of Bouverie Street), Carlton</li> <li>• south of Church Street, Carlton</li> <li>• Lincoln Street North, Carlton</li> <li>• Swanston Street, Lincoln Street North to Pelham Street, Carlton</li> <li>• Swanston Street, south of Kelvin Place and north of Queensberry Street, Carlton.</li> </ul>
<b>Additional underground support structures</b>	Excursion outside of the approved Project Land is as follows: <ul style="list-style-type: none"> <li>• southern side of Grattan Street, east of Royal Parade and west of Barry Street</li> </ul>

### 1.3.2 CBD North Station

The design and construction changes to the approved Project Land at CBD North Station relate to changes to the rail tunnel alignment and additional underground support structures. See Figure 6 and Figure 7 in Section 1.4 for detail.

Table 2 provides a breakdown of the location of changes to the approved Project Land resulting from the above enhancements and changes at CBD North Station.

TABLE 2: CBD NORTH STATION CHANGES TO THE APPROVED PROJECT LAND

Element	Location of change to approved Project Land
<b>Rail tunnel alignment</b>	Excursion outside of the approved Project Land is three metres or less as follows: <ul style="list-style-type: none"> <li>• along Swanston Street, between Franklin Street East and Little Lonsdale Street (east of alignment)</li> <li>• along Swanston Street between Franklin Street West and Little Lonsdale Street (west of alignment)</li> </ul>
<b>Additional underground support structures</b>	Excursion outside of the approved Project Land as follows: <ul style="list-style-type: none"> <li>• north and south Franklin Street West, between Swanston Street and Stewart Street</li> <li>• south of Franklin Street East</li> <li>• along Swanston Street, between Franklin Street West and A'Beckett Street <ul style="list-style-type: none"> <li>▪ 391 Swanston Street</li> </ul> </li> <li>• north of Literature Lane and between south of Literature Lane and north of Little La Trobe Street</li> <li>• along Swanston Street between La Trobe Street and Little Lonsdale Street (east of alignment)</li> <li>• south Franklin Street East</li> </ul>



	<ul style="list-style-type: none"> <li>▪ south Franklin Street East along Swanston Street, between south Franklin Street to Red Cape Lane between La Trobe Street (east side of alignment)</li> </ul>
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### 1.3.3 CBD South Station

The design and construction changes to the approved Project Land at CBD South Station involve changes to the rail tunnel alignment, additional underground support structures, and construction adits and works to Flinders Street Station platforms and work to the Degrares Street Underpass/Campbell Arcade.

The improvements to Flinders Street Station lifts include:

- installation of passenger lift supporting structures, lifts, power and controls
- removal of one stairwell serving each platform to accommodate new lifts
- modification and/or reinstatement works required to the existing platform structures (including platform canopy)
- any identified platform strengthening works to address structural issues

The works at Degrares Street Underpass and Campbell Arcade will include:

- unblocking and cleaning drains in Degrares Street Underpass and repairing/refurbishing any critical water pumps to ensure Degrares Street Underpass meets applicable watertightness Codes of Practice.
- removal of any loose or cracked wall tiles
- retention of existing finishes where practicable with appropriate cleaning and localised repairs
- installation of new finishes using materials similar to those initially used.

See Figure 8, Figure 9 and Figure 10 in Section 1.4 for detail.

As a consequence of CYP's design modifications, the car parking area located at Chapter House Lane, adjoining St.Paul's Cathedral, is to be omitted from the Project Land.

Part of Campbell Arcade within the Flinders Street road reserve was included in the Project Land under Amendment GC45 and is already subject to the provisions of the project's Incorporated Document. Accordingly it is not part of this draft Amendment

Table 3 below provides a breakdown of the location of changes to the approved Project Land resulting from the changes at and around CBD South Station.

TABLE 3: CBD SOUTH STATION CHANGES TO THE APPROVED PROJECT LAND

Element	Location of change to approved Project Land
<b>Rail tunnel alignment</b>	<p>Excursion outside of the approved Project Land are as follows:</p> <ul style="list-style-type: none"> <li>• between Collins Street and Flinders Lane (west side of alignment)</li> <li>• between the southern side of Collins Street and the northern side of Flinders Lane (west side of alignment)</li> <li>• south Flinders Lane to north Flinders Street (east side of alignment)</li> <li>• a small section of the Federation Square forecourt (east side of alignment).</li> </ul>
<b>Additional underground support structures</b>	<p>Excursion outside of the approved Project Land are as follows:</p> <ul style="list-style-type: none"> <li>• along Swanston Street, between southern side of Bourke Street Mall and the northern side of Collins Street (east and west side of alignment)</li> <li>• along Swanston Street, between south of Collins Street and the north Flinders Lane (west side of alignment only)</li> <li>• along Swanston Street between south Flinders Lane and north Flinders Street (east side of alignment only)</li> </ul>
<b>Pedestrian adit</b>	<p>A pedestrian adit will be required to link CBD South Station with Federation Square. This will sit parallel to St.Paul's Cathedral footprint and Swanston Street, between south of Flinders Lane and north of Flinders Street.</p> <p>Another pedestrian adit will be required to provide an emergency egress from the tunnel to City Square. This will sit under Melbourne Town Hall footprint and the footpath at the corner of Collins Street and Swanston Street.</p>
<b>Construction adit</b>	A construction adit extending diagonally south from Flinders Lane towards Swanston Street, under

Element	Location of change to approved Project Land
	the north western corner of St.Paul's Cathedral.
<b>Flinders Street Station platform works</b>	The CYP design changes at Flinders Street Station will require an extension to the approved Project Land to include the middle section of Flinders Street Station Platforms.  Works will occur at Degraves Street Underpass/Campbell Arcade.

### 1.3.4 Additional road surface works

In addition to the proposed CYP modifications to the tunnel and station design, there is a requirement for additional roads to be added to the Project Land. This will be for construction purposes and legacy road works as follows:

Construction road works:

- allow for construction work to be carried out safely and ensure that travel, either through or around, work sites can be appropriately managed keeping traffic delays to a minimum by strategically managing traffic (motorists, pedestrians and cyclists), which may include but is not limited to;
  - detours
  - night works
  - working adjacent to traffic
  - safety barriers
  - access to adjoining properties.
  - entries and exits to include clear advanced warning signage
  - complying with safety guidelines and regulations.

In most instances, this is likely to be short term and on a day to day basis. There is the potential for some longer-term impacts of up to three months

Legacy road works include:

- road adjustment, line marking and resurfacing
- minor adjustments to kerb and channel
- pedestrian/cycle crossings
- bus stop adjustment
- new tramways with overhead wires
- footpath resurfacing
- landscaping.
- drainage and utility works

Overall, these works will have some longer-term impacts of two to six months.

See Figure 11 to Figure 19 in Section 1.4 for more detail.

Table 4 below provides a breakdown of the location of changes to the approved Project Land resulting from the above additional road surface works.

TABLE 4: ADDITIONAL ROAD SURFACE WORKS CHANGES TO THE APPROVED PROJECT LAND

Element	Location of change to Project Land	Road management activity	Legacy road works
<b>Arden Street</b>	Located south of North Melbourne Football Club and north of Laurens Street and west of Fogarty Street and west of Dryburgh Street. Expected use of the road is 3 months	✓	✗
<b>Royal Parade</b>	Located south of Storey Street to Genetics Lane. The area is required for road management lanes 2, 3, 4 (west to east) and legacy works to be carried out on the tram tracks. Expected use of the road is 3 months	✓	✓
<b>Grattan Street</b>	Located east of Bouverie Street and west of Swanston Street. Expected use of the road is 3 months	✓	✗
<b>Cardigan Street</b>	Located is located north of Victoria Street and south of Earl Street. Expected use of the road is 3 months	✓	✗
<b>Flinders Street</b>	Located east of Queen Street and west of Elizabeth Street. Expected use of the road is 3 to 6 months	✓	✓
<b>Flinders Lane</b>	Located west of Elizabeth Street and east of Swanston Street. More specifically, the western half of this area is required for temporary traffic management. Located west of Swanston Street	✓	✓

	and east of Russell Street. Expected use of the road is 3 to 6 months		
<b>Kings Way</b>	Located south of Palmerston Crescent and north of Albert Road. Expected use of the road is 3 to 4 months	✓	✓
<b>Albert Road</b>	Located west of Kings Way and east of Stead Street. Expected use of the road is 3 to 6 months	✓	✓
<b>Toorak Road</b>	Located west of Darling Street and east of Claremont Street. Expected use of the road is 2 to 3 months	✓	✓

## 1.4 Study Area

The study area for the appraisal of the additional Project Land includes land located within the City of Melbourne, City of Port Phillip and City of Stonnington as shown on Figure 2 through Figure 19.

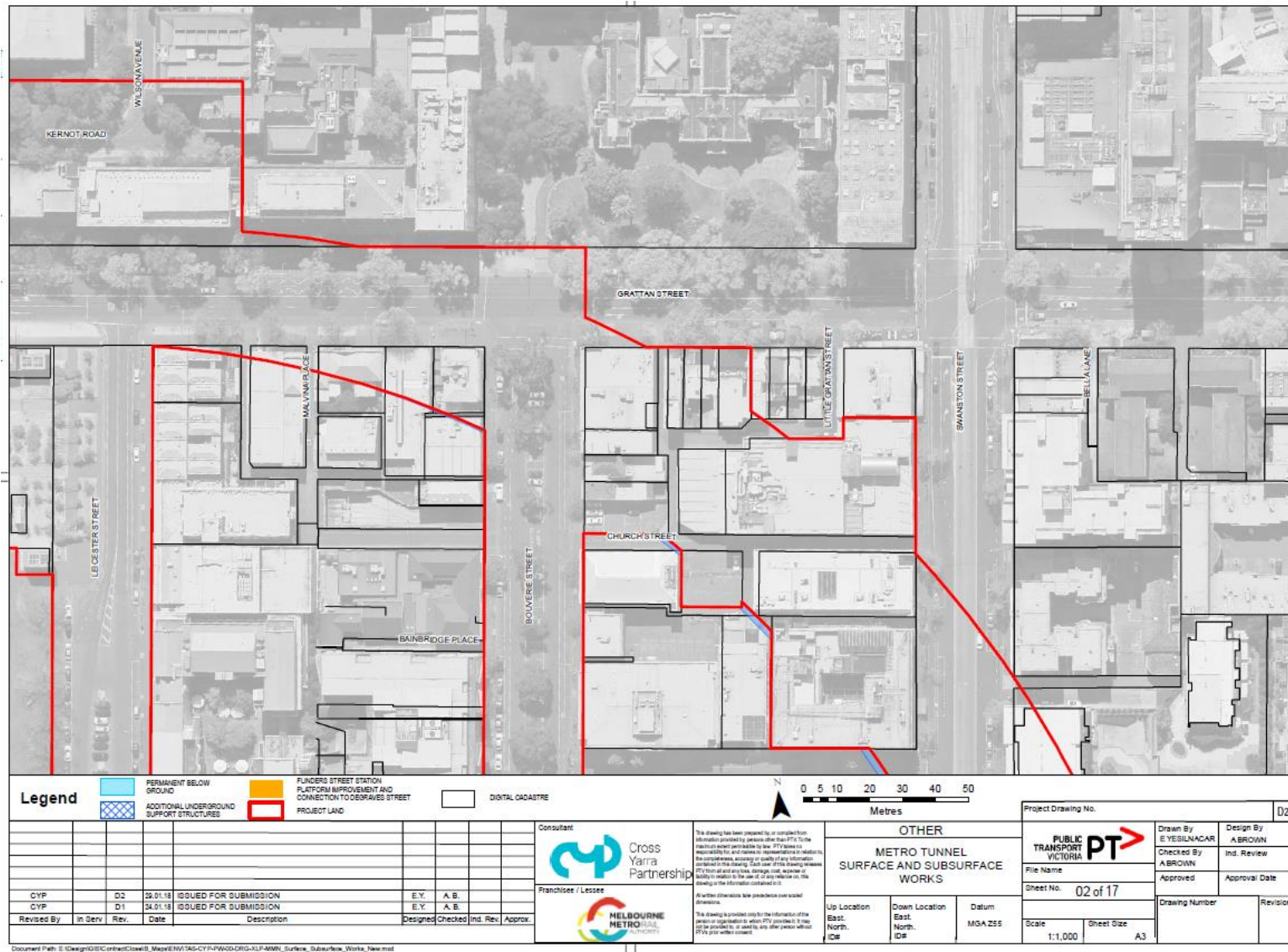


FIGURE 2: ADDITIONAL PROJECT LAND REQUIRED FOR PERMANENT BELOW GROUND BETWEEN PARKVILLE STATION AND CBD NORTH STATION



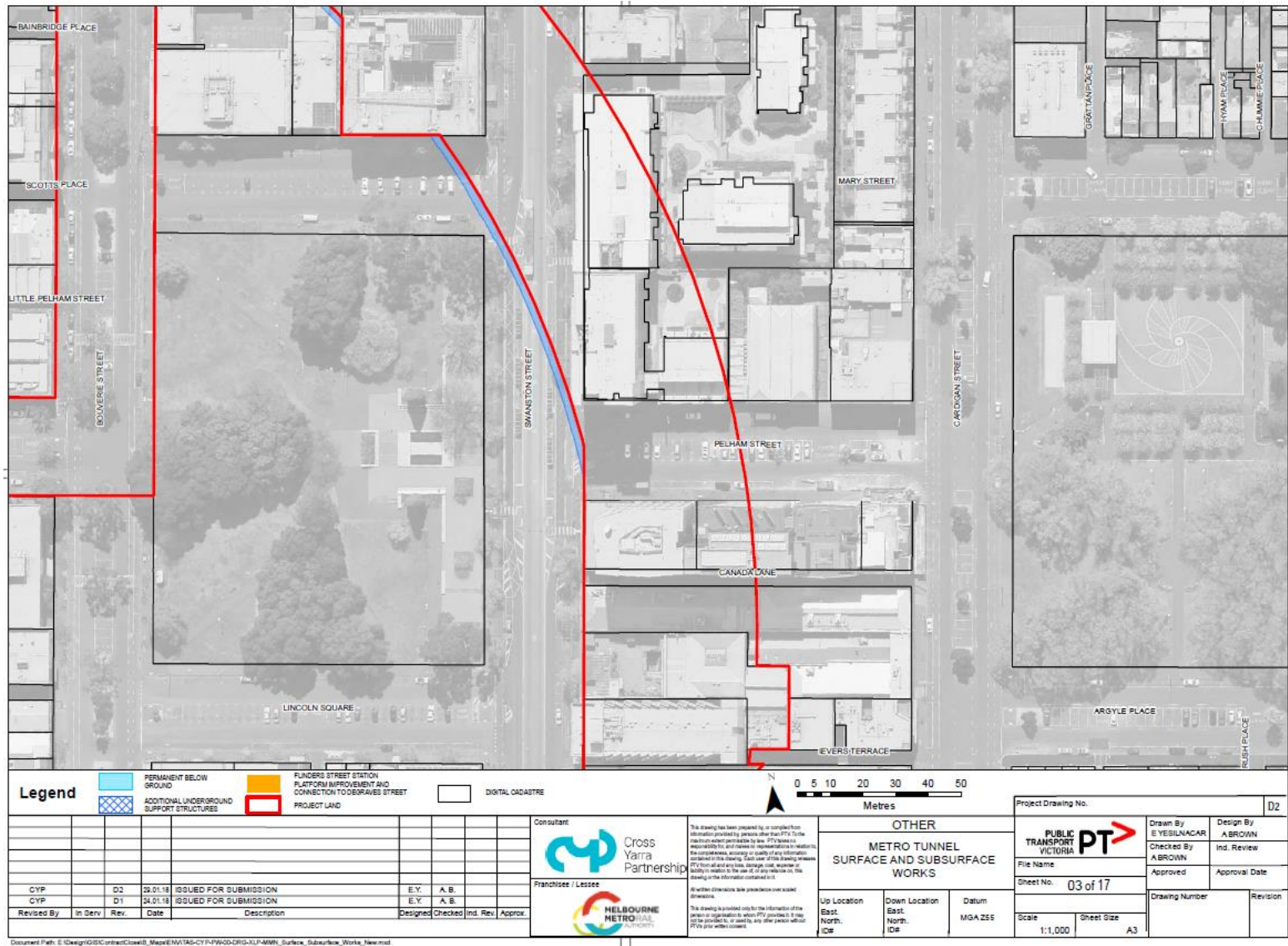


FIGURE 3: ADDITIONAL PROJECT LAND REQUIRED FOR PERMANENT BELOW GROUND BETWEEN PARKVILLE STATION AND CBD NORTH STATION

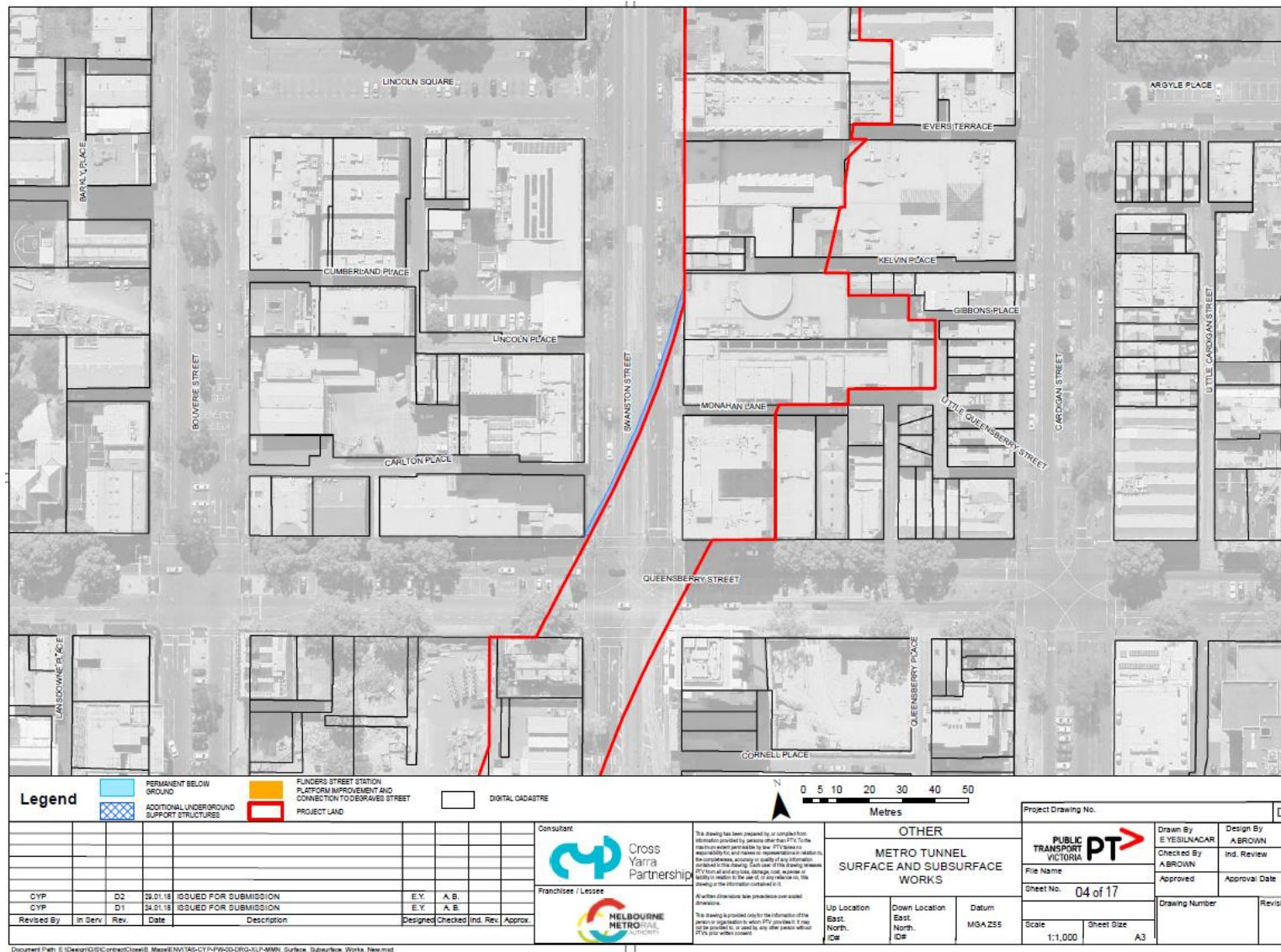


FIGURE 4: ADDITIONAL PROJECT LAND REQUIRED FOR PERMANENT BELOW GROUND BETWEEN PARKVILLE STATION AND CBD NORTH STATION



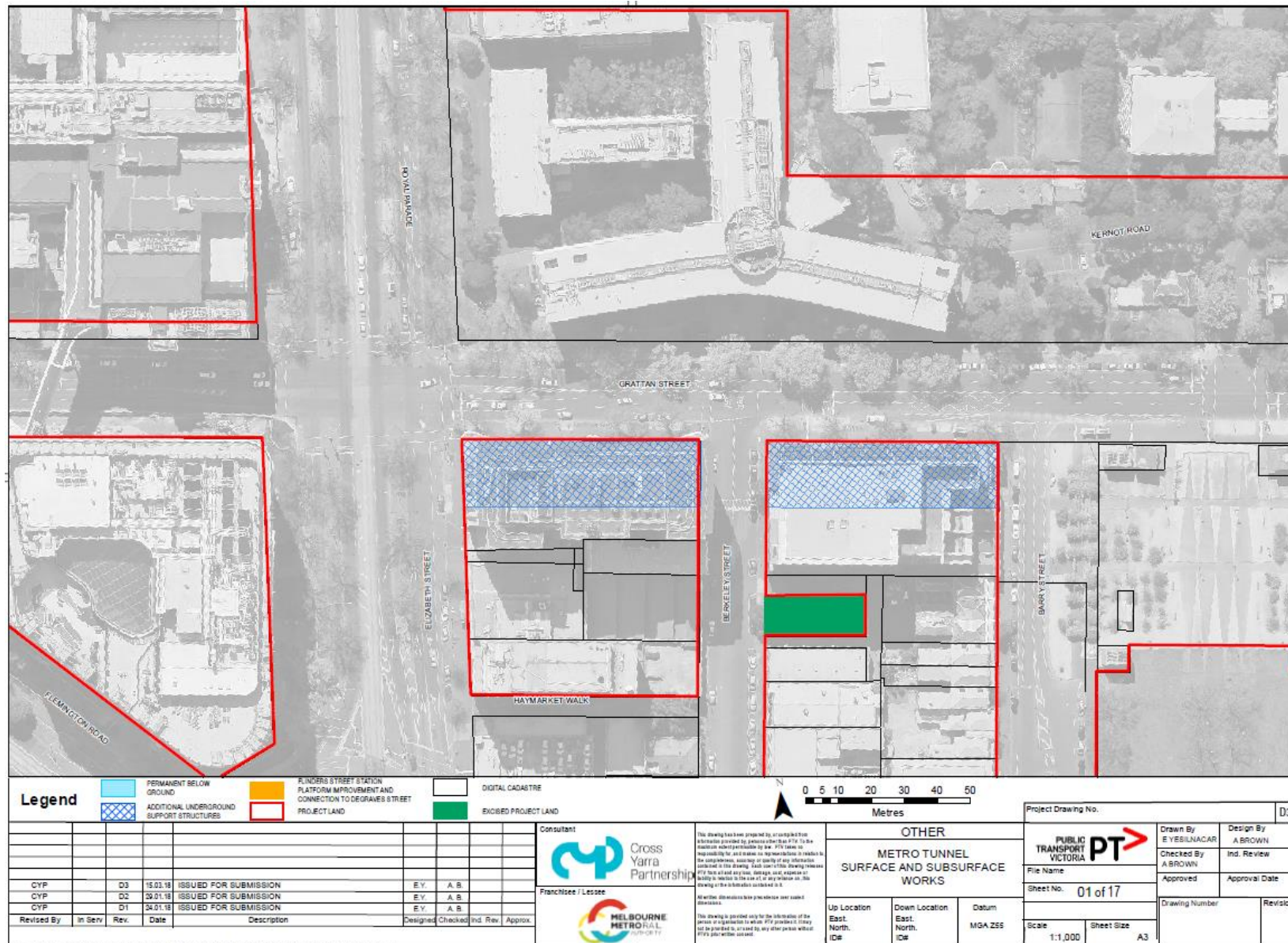


FIGURE 5: ADDITIONAL PROJECT LAND REQUIRED FOR UNDERGROUND SUPPORT STRUCTURES AT PARKVILLE STATION AND EXCISED LAND

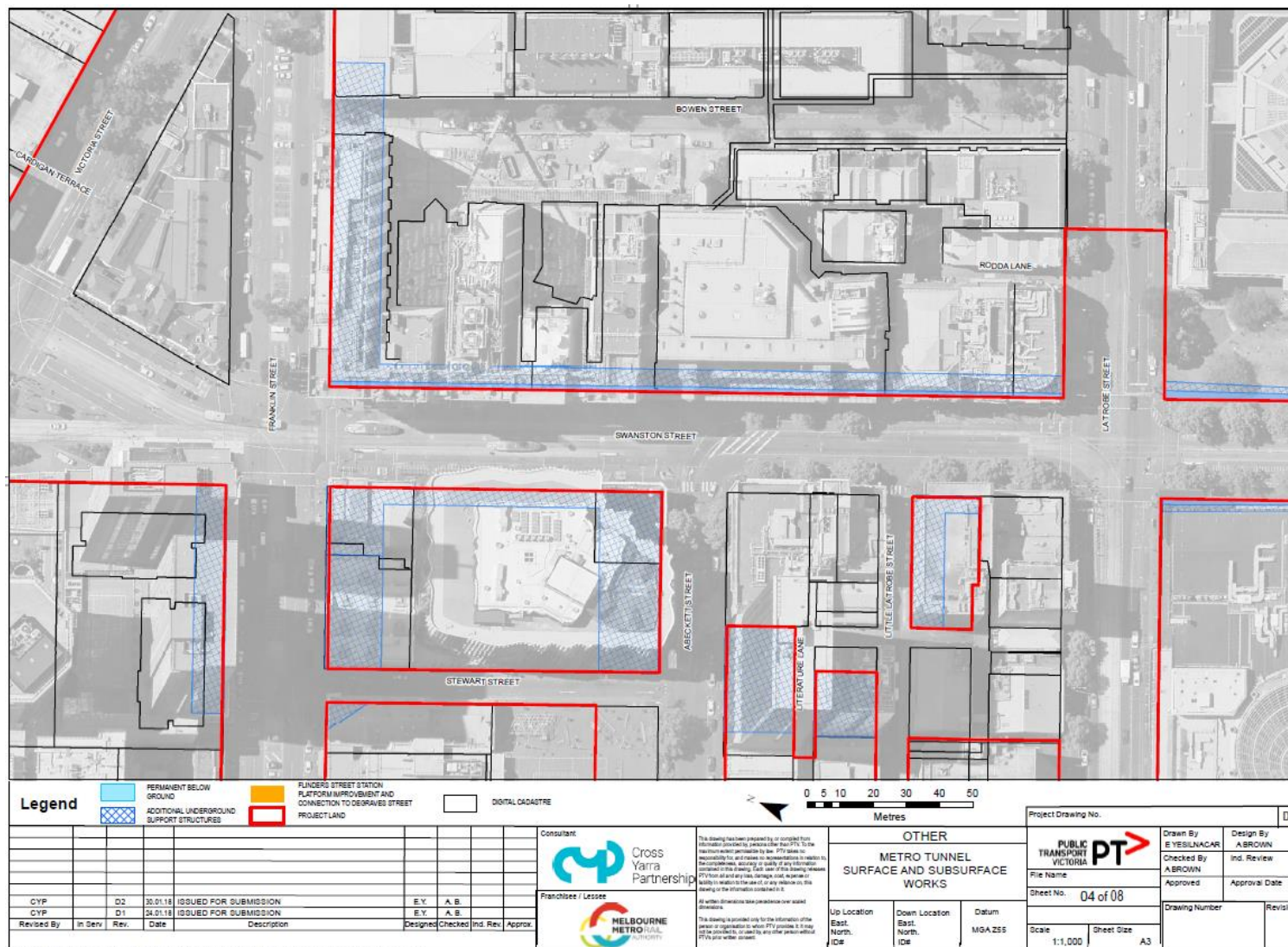


FIGURE 6: ADDITIONAL PROJECT LAND REQUIRED FOR UNDERGROUND SUPPORT STRUCTURES AND PERMANENT BELOW GROUND AT CBD NORTH STATION



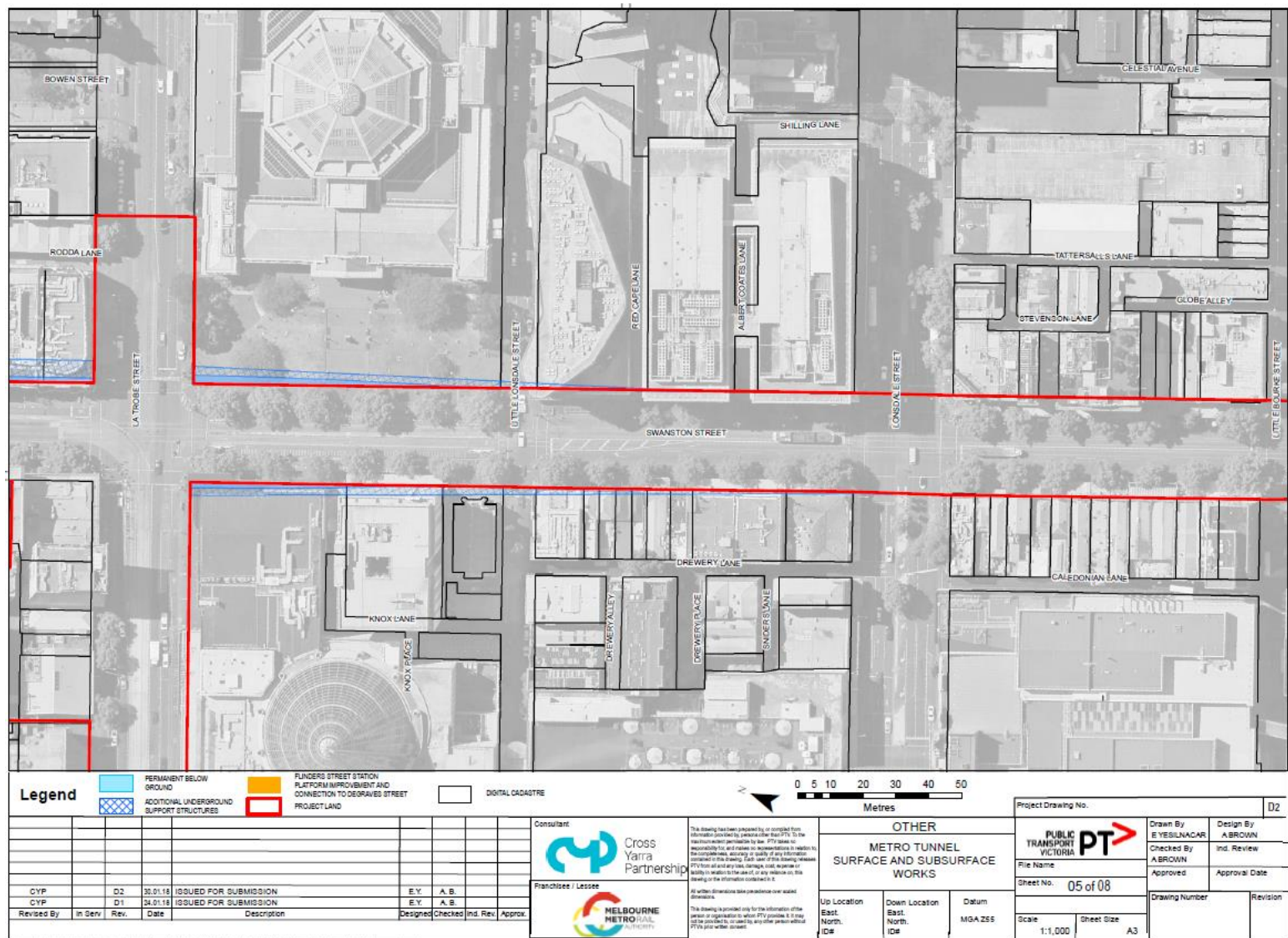


FIGURE 7: ADDITIONAL PROJECT LAND REQUIRED FOR UNDERGROUND SUPPORT STRUCTURES AND TUNNEL ALIGNMENT AT CBD NORTH STATION

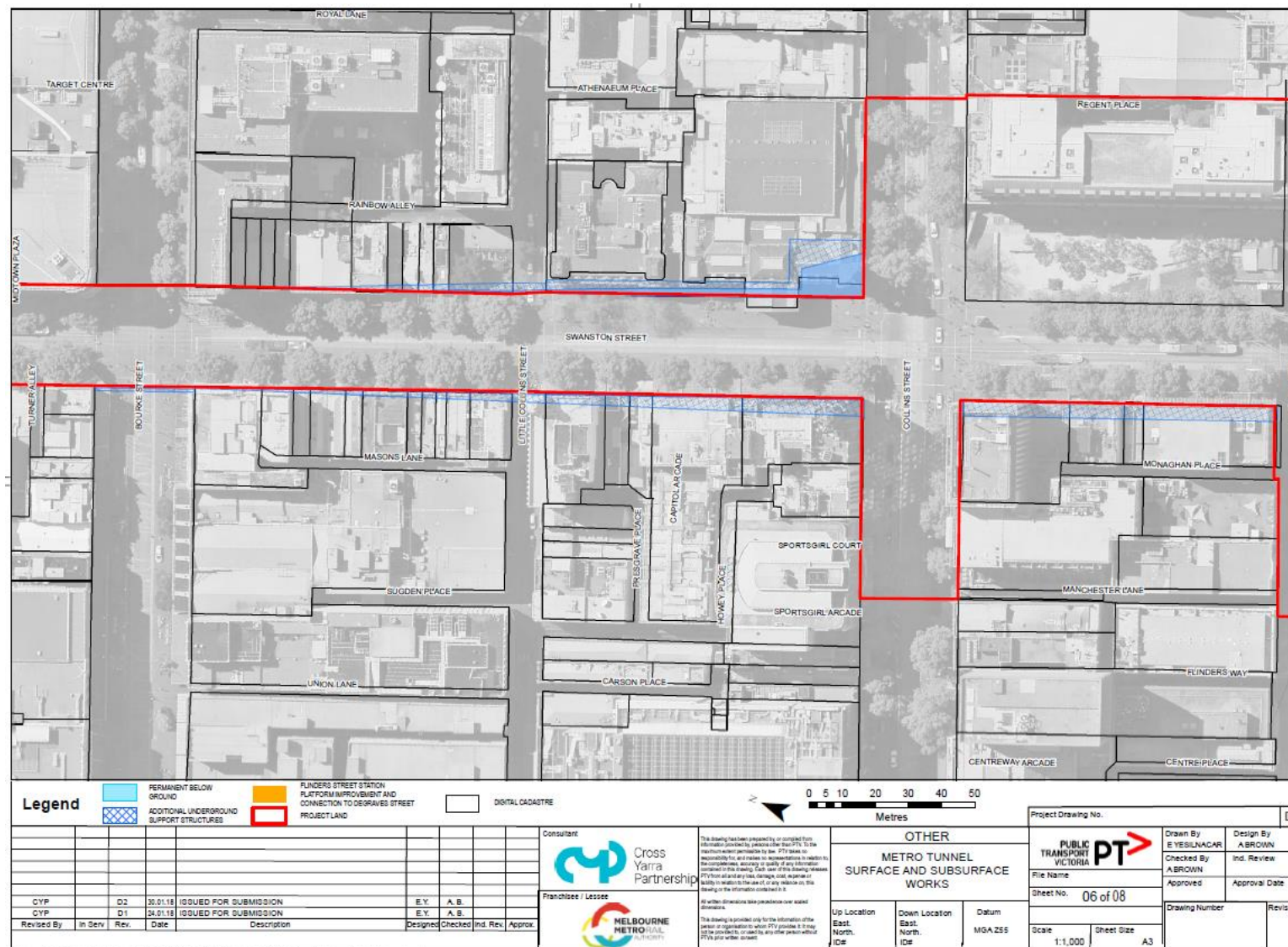


FIGURE 8 ADDITIONAL PROJECT LAND REQUIRED FOR UNDERGROUND SUPPORT STRUCTURES AND TUNNEL ALIGNMENT AT CBD SOUTH STATION



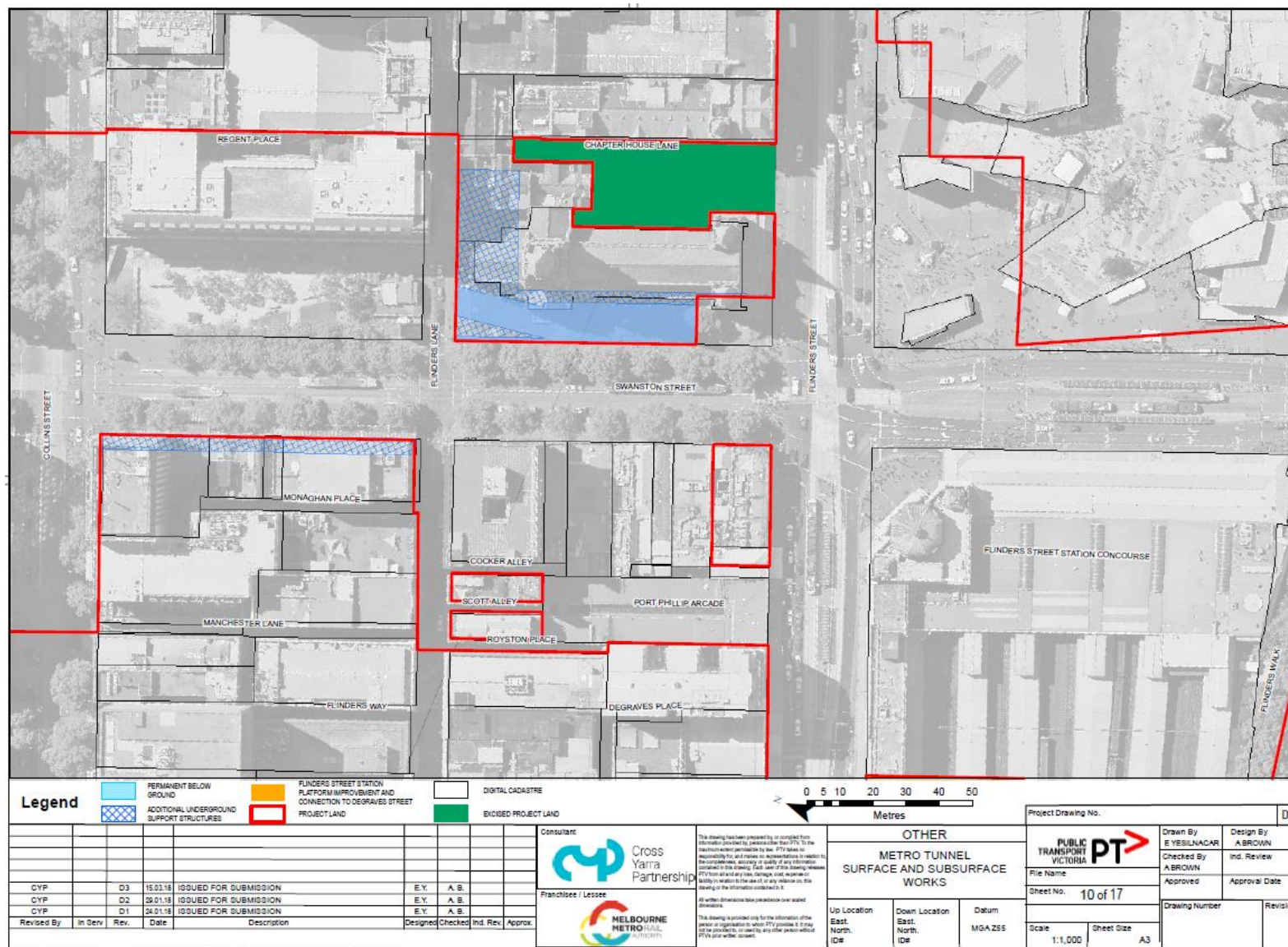


FIGURE 9: ADDITIONAL PROJECT LAND REQUIRED FOR UNDERGROUND SUPPORT STRUCTURES , TUNNEL ALIGNMENT AT CBD SOUTH STATION AND EXCISED LAND

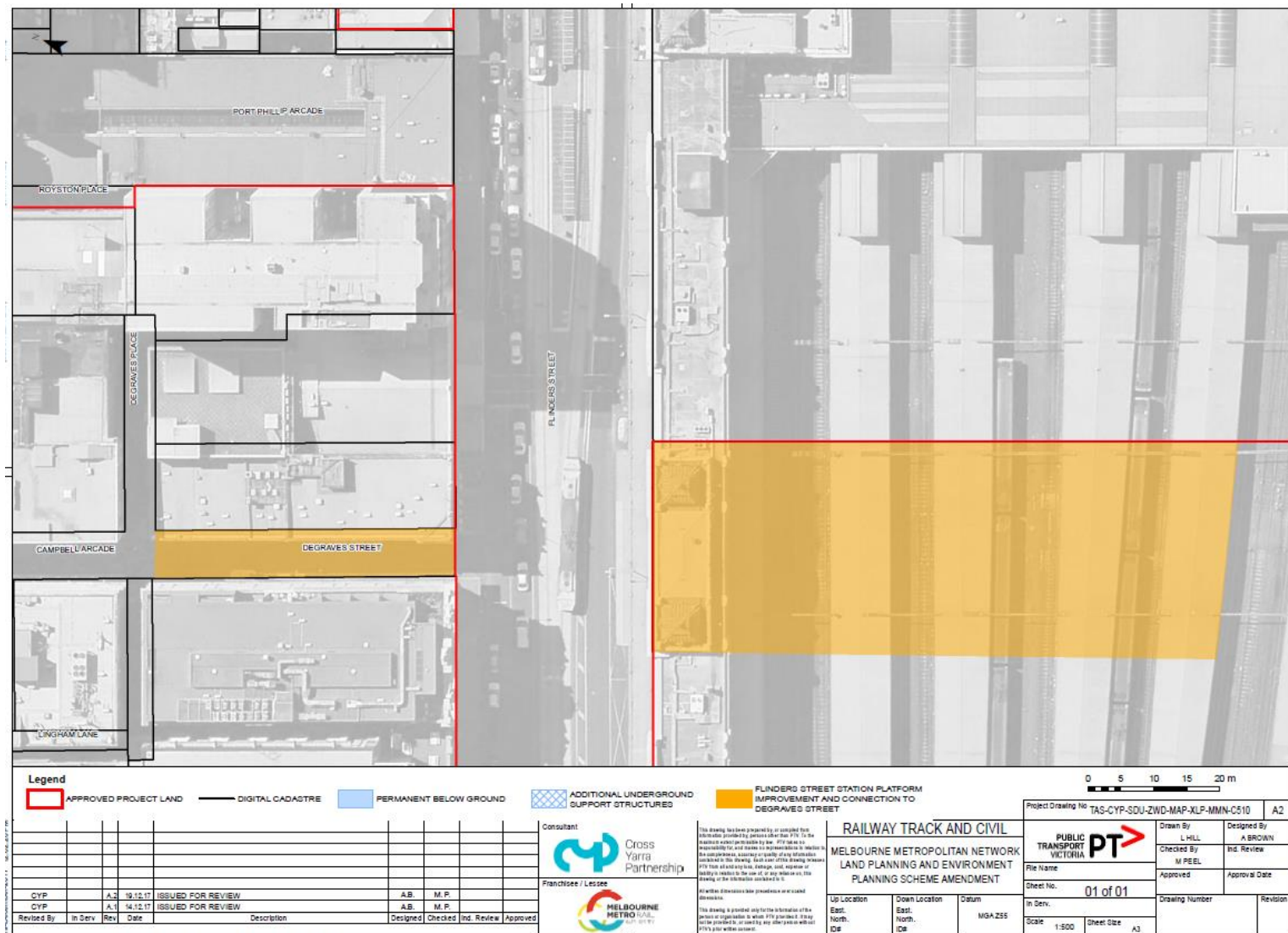


FIGURE 10: ADDITIONAL PROJECT LAND REQUIRED AT CAMPBELL ARCADE FOR FLINDERS STREET STATION CONNECTION AND FLINDERS STREET STATION MID-PLATFORM CONNECTION



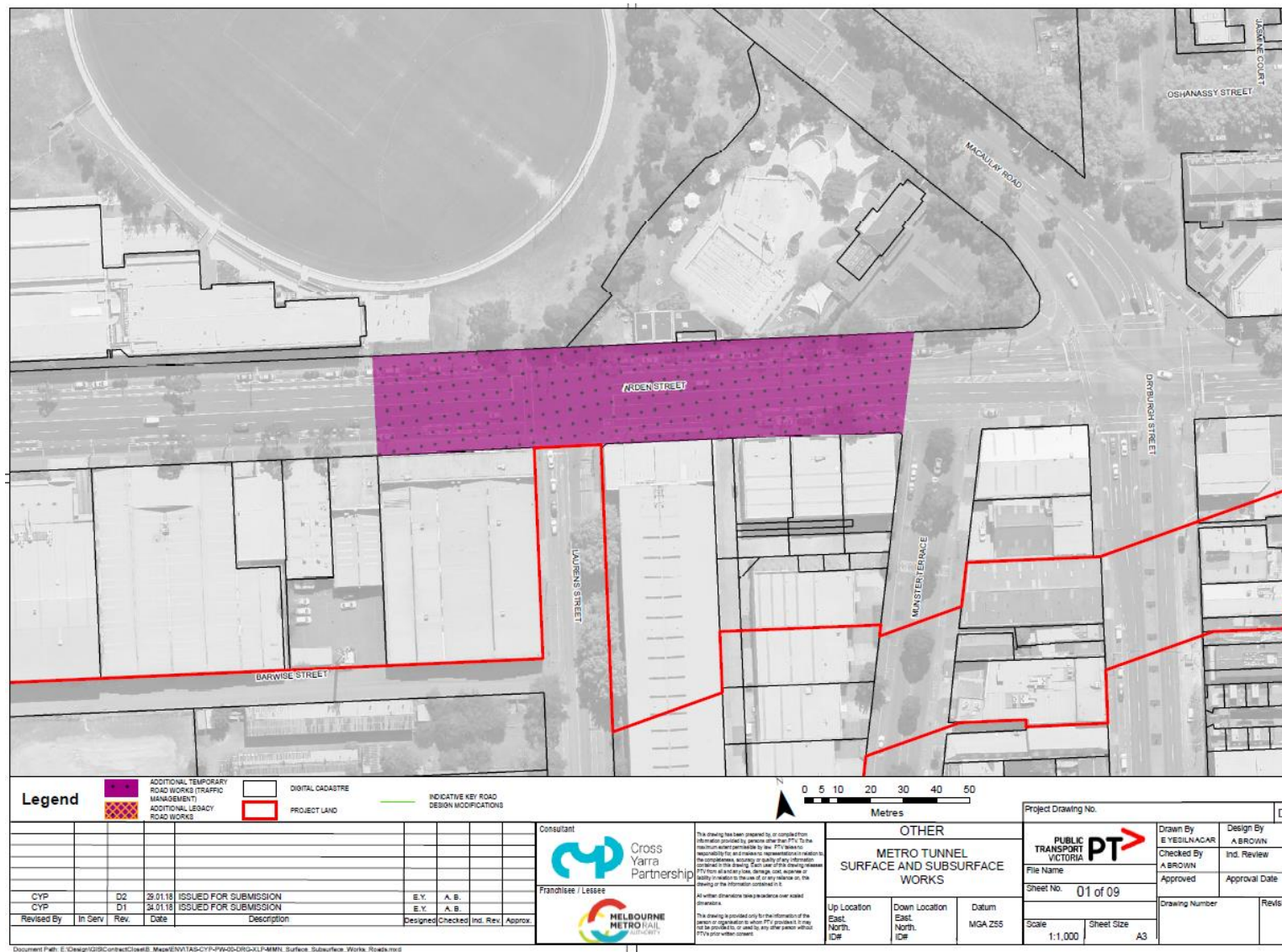


FIGURE 11: ARDEN STREET ADDITIONAL ROAD SURFACE WORKS

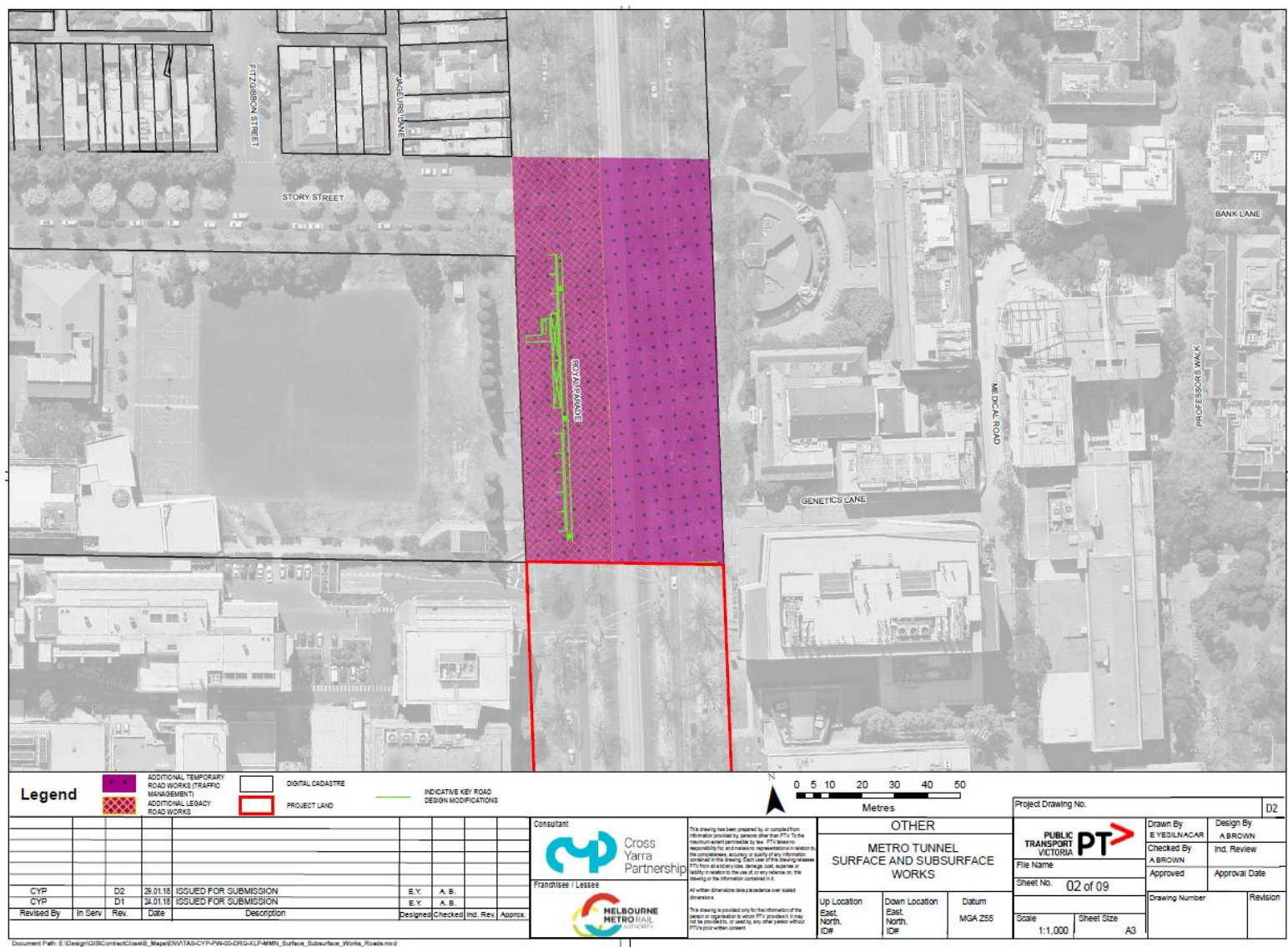


FIGURE 12: ROYAL PARADE ADDITIONAL ROAD SURFACE WORKS



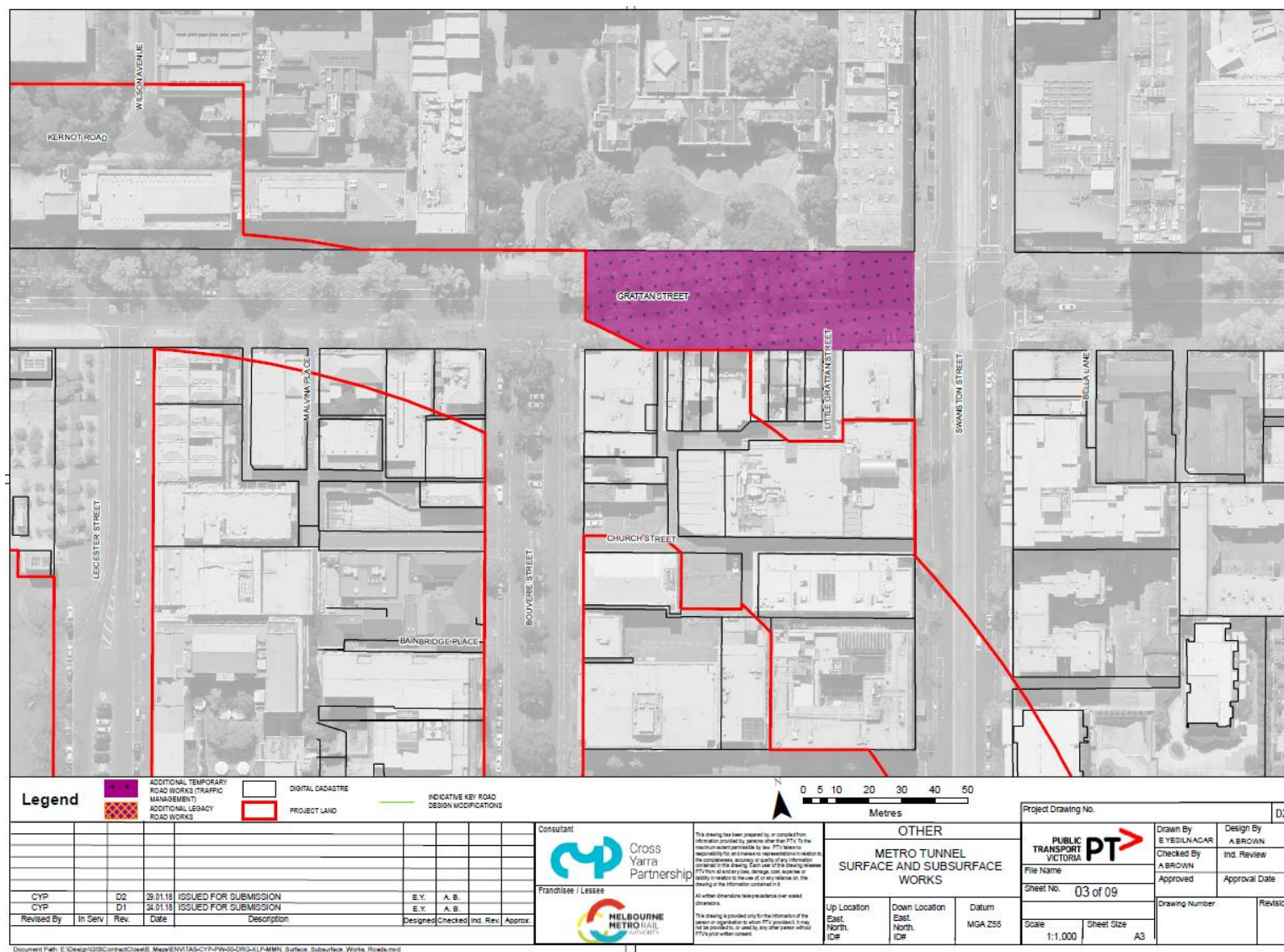


FIGURE 13: GRATTAN STREET ADDITIONAL ROAD SURFACE WORKS

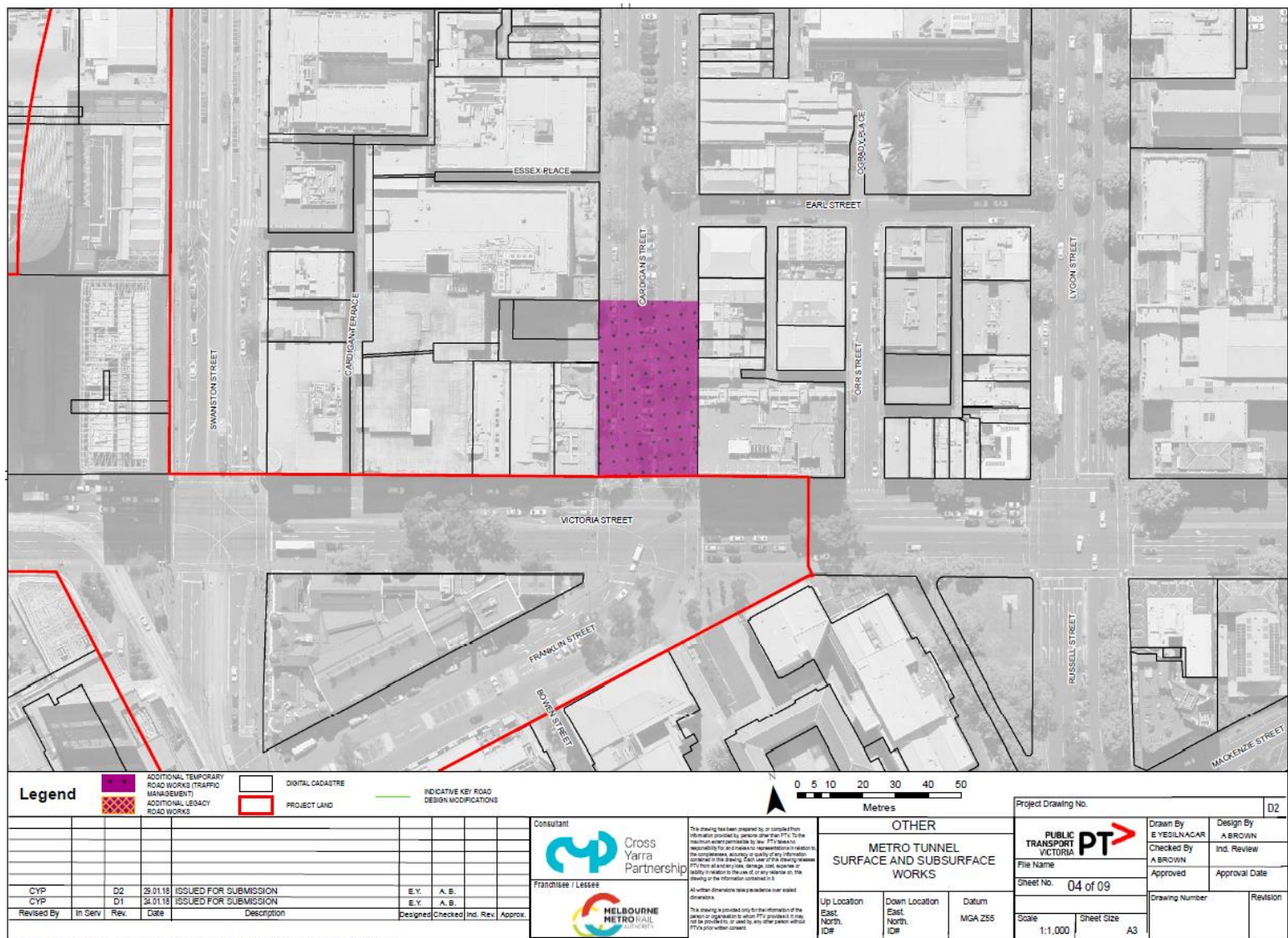


FIGURE 14: CARDIGAN STREET ADDITIONAL ROAD SURFACE WORKS



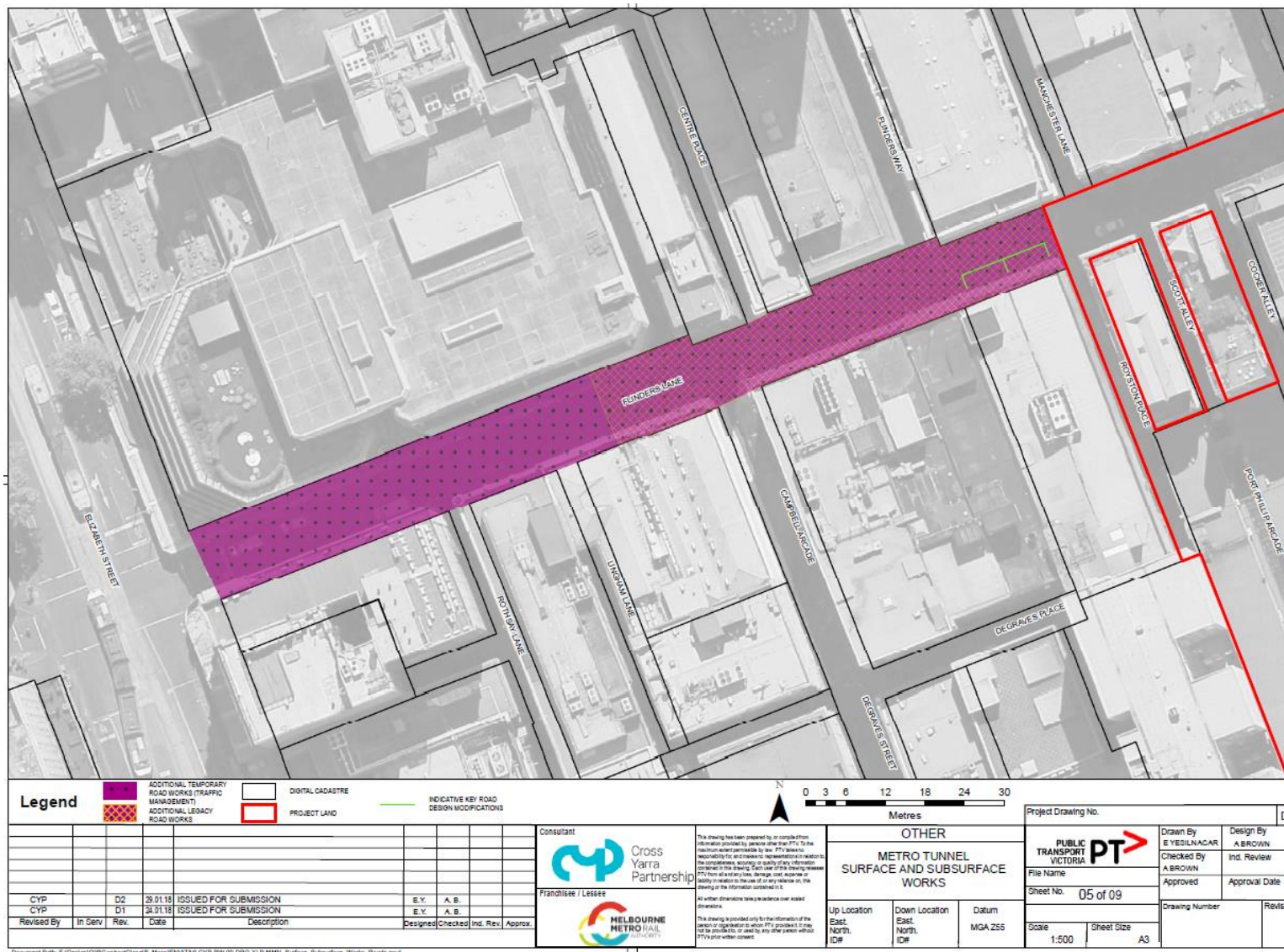


FIGURE 15: FLINDERS LANE ADDITIONAL ROAD SURFACE WORKS

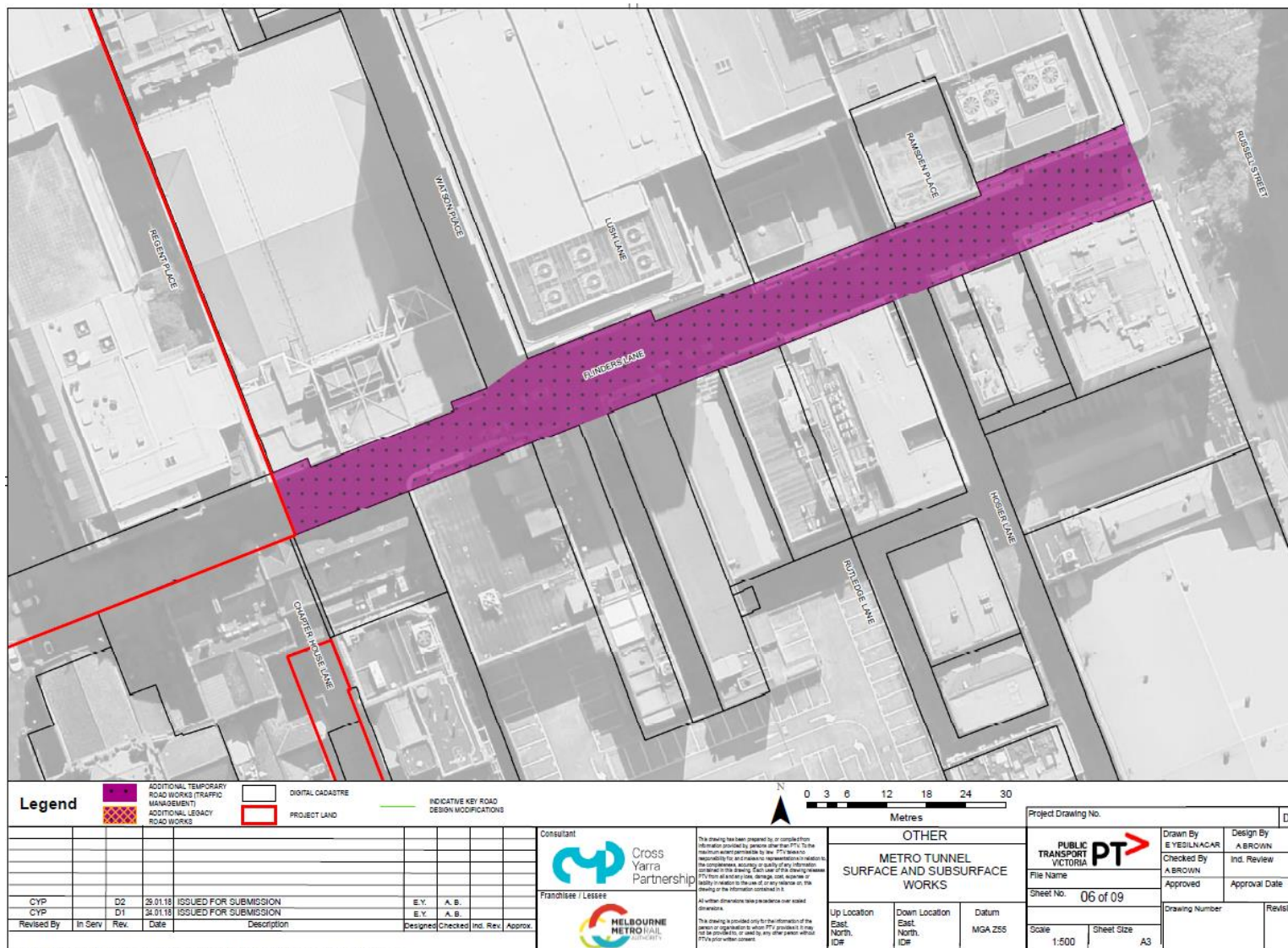


FIGURE 16: FLINDERS LANE ADDITIONAL ROAD SURFACE WORKS



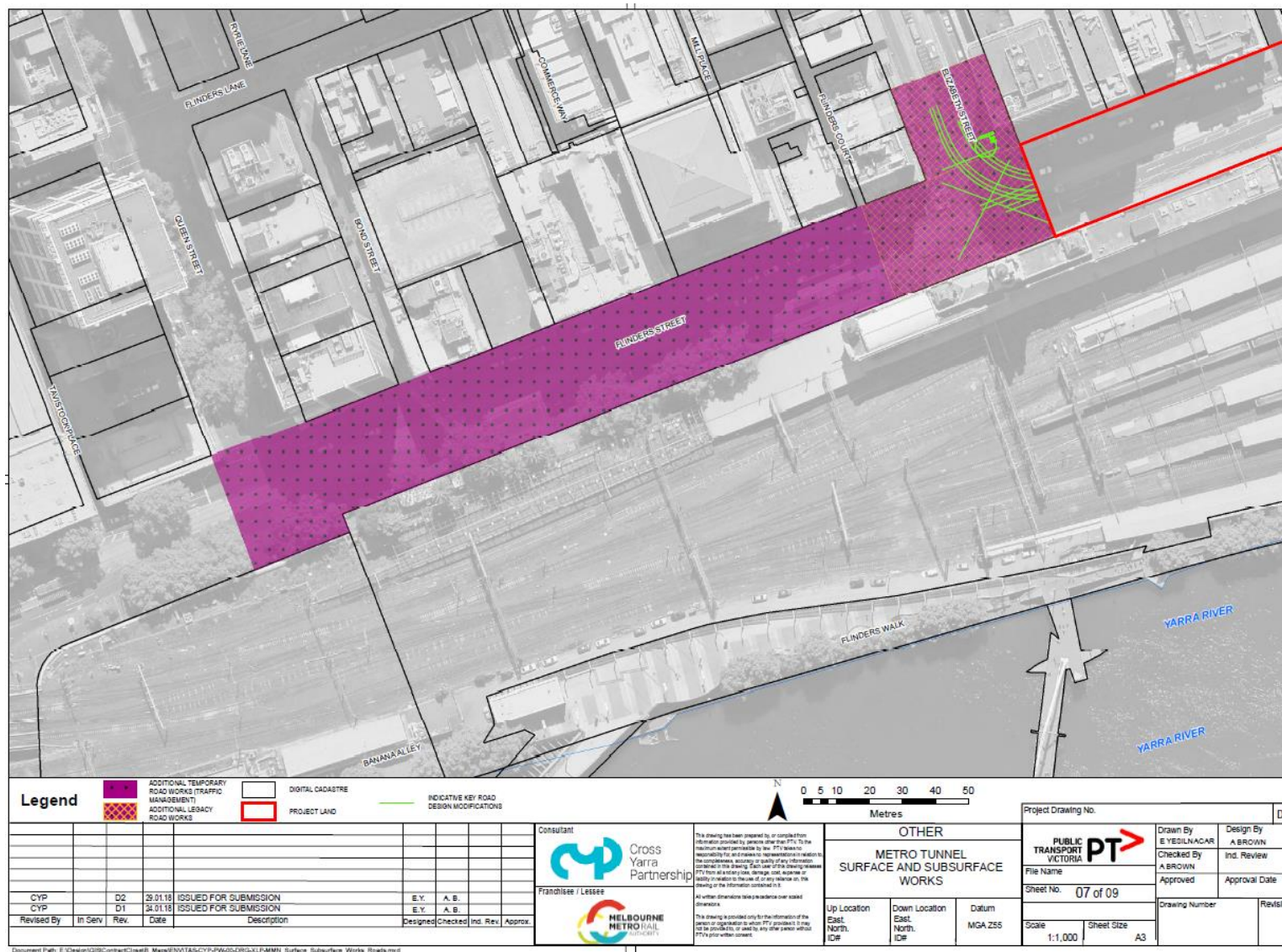


FIGURE 17: FLINERS STREET ADDITIONAL ROAD SURFACE WORKS

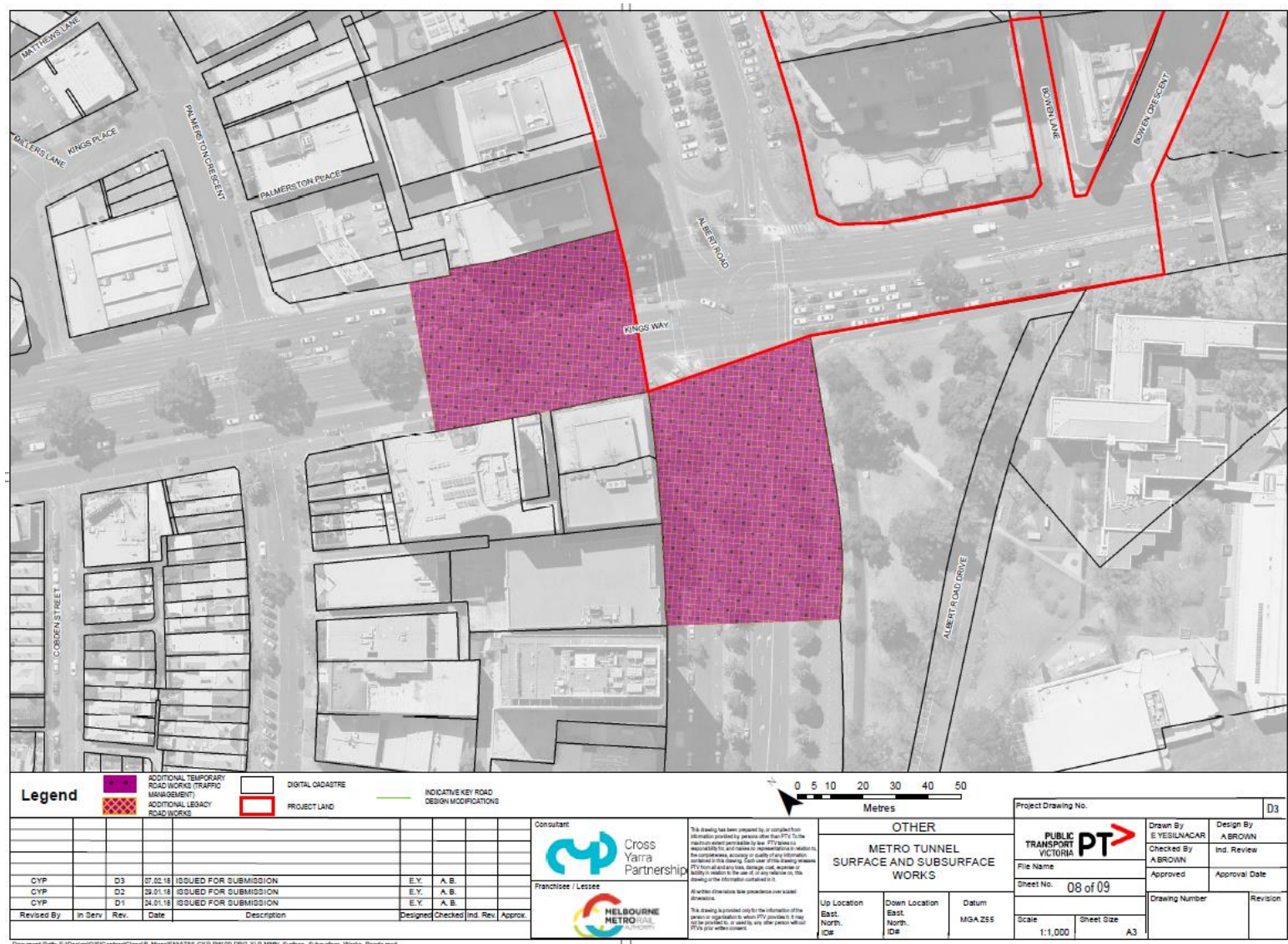


FIGURE 18: KINGS WAY AND ALBERT ROAD ADDITIONAL ROAD SURFACE WORKS



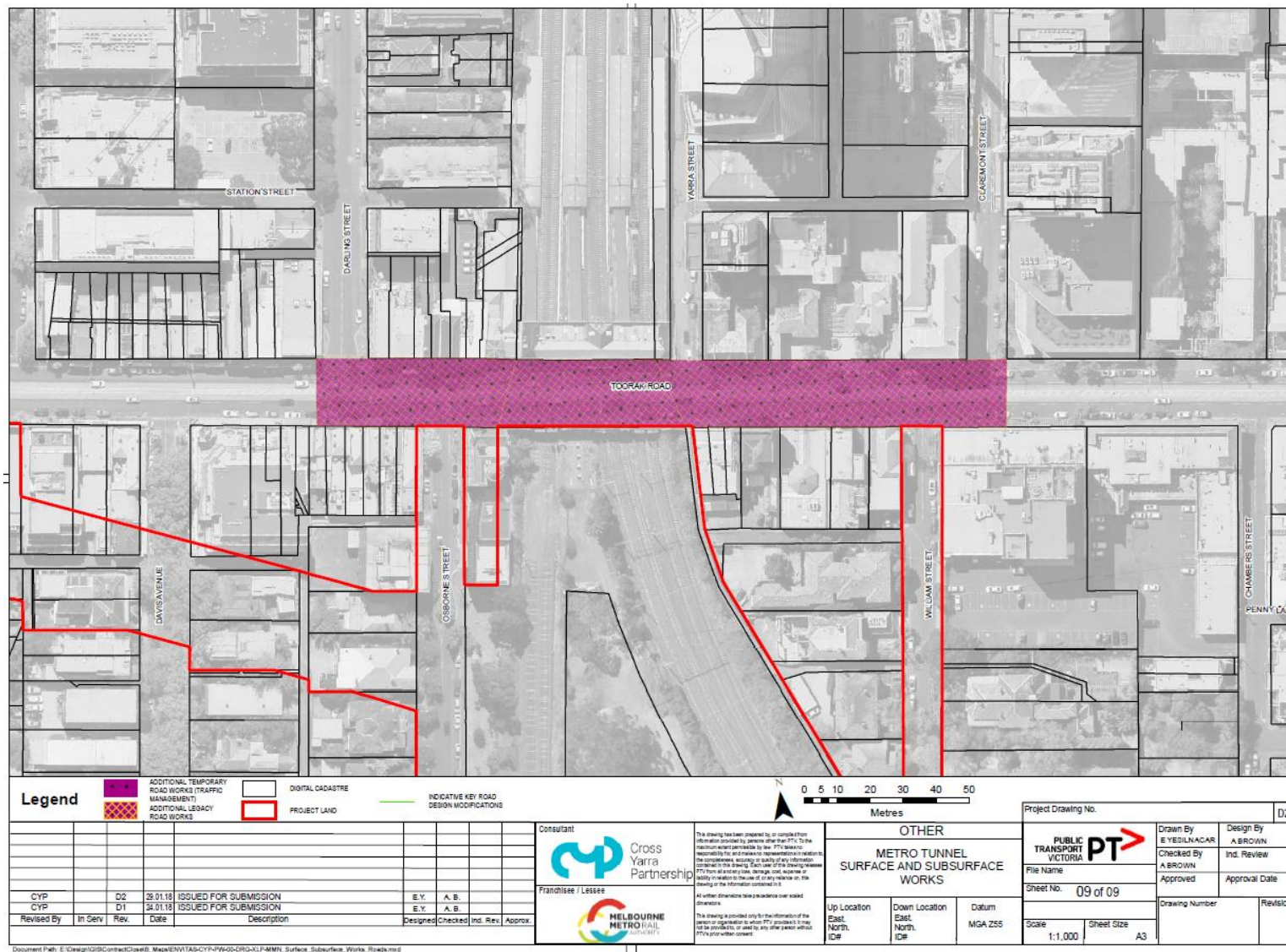


FIGURE 19: TOORAK ROAD ADDITIONAL ROAD SURFACE WORKS

## 2 Methodology

The CYP ERA process is based on the requirements of Risk Management Standards AS/NZS ISO 31000:2009, as depicted in Figure 20 below. ISO 31000:2009 provides principles and generic guidelines on risk management and represents a standardised risk management approach. It provides a structured approach for the risk assessment and is widely used for EESs and EIAs.

The ERA process initially involved the definition of the context and scope of the additional Project Land required for the additional works. This entailed the preparation of a Project Description for buildings and works located outside of the existing approved Project Land. Following this, an initial environmental risk screening using the EPRs was undertaken. The approach followed by CYP involved the application of the EPRs as an assessment tool, an approach that accords with the framework established as a result of the Ministerial Assessment for Melbourne Metro process for the Project.

Each discipline had direct responsibility for assigning risk ratings to each environmental aspect. The assessment considered all receptors (sensitive or otherwise). These risk ratings are summarised in Section 3 of this report.

Based on the risks identified, analysed and evaluated as part of this ERA, the need for a detailed impact assessment for certain disciplines were identified. As a desktop assessment, the ERA entailed a high-level appraisal only.

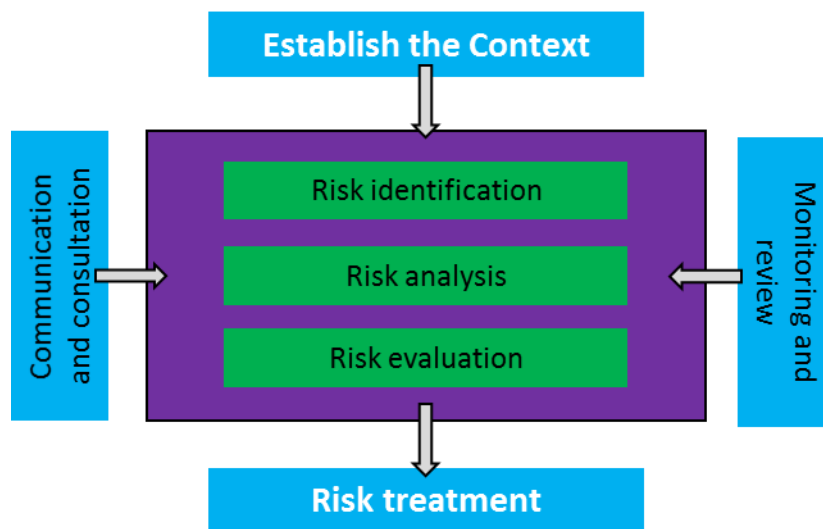


FIGURE 20: RISK ASSESSMENT PROCESS

### 2.1 Define context, opportunities and constraints

Establishing the external and internal context for the Project helped define the parameters to be considered in the CYP ERA. More specifically, these parameters included:

- External context – external environment in which the Project will be undertaken
- Internal context – CYP's culture, processes, governance and policies.

The external context was defined using the risk assessment information provided in the Ministerial Assessment. This information was updated, as required, to respond to the proposed CYP design changes. The internal context was separately defined by the development of CYP's design, processes and policies, which are consistent with the EMF for the Project.

The external and internal context will change over time and will be regularly reviewed and updated by CYP throughout the detailed design, construction and operational phases of the Project.

#### 2.1.1 Risk identification

To identify and capture environmental risks, the potential impacts of the Project were identified for a range of environmental aspects (i.e. technical areas). Impact pathways are sources of risk, areas of impact, events and their causes, and potential consequences. These were identified based on the context and proposed CYP project activities.

The environmental aspects that CYP considered as part of the ERIA were:

- Aboriginal cultural heritage
- Air quality
- Urban ecology (including aquatic ecology, terrestrial flora and fauna, arboriculture)
- Business
- Contaminated land and spoil management (including acid sulphate soils)
- Electromagnetic interface
- Greenhouse gas emissions
- Groundwater
- Ground movement and land stability
- Historic heritage
- Landscape and visual
- Land use and planning (including land use and project land)
- Noise and vibration
- Community and stakeholder (including social impacts)
- Surface water
- Resource use and efficiency
- Transport (includes pedestrian, active transport, vehicles and public transport).

## 2.1.2 Risk analysis

For each aspect and impact pathway, a consequence was assigned for each consequence category. Based on the level of consequence assigned for each risk, refer to Table 8 overleaf, a cumulative score was calculated for each potential impact pathway.

Based on the cumulative score, risks were rated as low, medium and high as shown in Figure 21. This is generally consistent with the EES and PSA processes risk analysis.

Cumulative score	Risk rating
3	Low
4	Low
5	Medium
6	Medium
7	High
8	High
9	High

FIGURE 21: INITIAL RISK SCREENING - RISK RATING

## 2.2 Updated environmental risk assessment

The purpose of the ERA for the CYP design changes is to comprehensively evaluate all potential additional environmental risks for each of the identified changes during the construction and operation phases of the Project. Through this environmental appraisal process, controls have been identified by the technical disciplines to mitigate and manage the risks to a satisfactory level and meet the EPRs.

### 2.2.1 Risk identification

To identify the new and/or modified risks arising from the CYP changes located outside of the approved Project Land, we adopted an approach, which is in accordance with the previous ERA undertaken. CYP identified the relevant aspect of the environment, the project activity and the impact pathway.

For each aspect, the potential impact pathways from the range of project activities were assessed:

- *Aspect* - aspect of the environment to be impacted
- *Activity* - project activity which would cause the impact
- *Impact Pathway* - pathway from the activity which causes the impact (cause) on the aspect of the environment (effect).

The activities considered as part of the updated environmental risk assessment fall within the construction and operational phases of the Melbourne Metro Tunnel.

The following definitions can be applied to each activity:

- *Site establishment* - creating construction sites e.g. temporary fencing, lay down areas
- *Excavation* - the removal of soil from the surface down
- *Operation of Tunnel Boring Machine* - boring of the twin tunnels
- *Extraction of Tunnel Boring Machine* - removal of Tunnel Boring Machine, often in sections
- *Cross passage excavation* - creation of tunnel perpendicular to the twin tunnels
- *Underground support structures* - underground support structures are ancillary structures that are used for stabilisation of a primary structure such as a shaft, station box or tunnel
- *Haulage* - bring materials to and from site
- *Road works* - building or repair work on a road (only in relation to construction and road construction management)
- *Tram works* - building or repair work on the trams network of tracks, and includes tram stops, shunting areas and associated passenger facilities (only before operation of trams)
- *Fit out* - creating the interior of the station e.g. lighting and signage (only before station operation)
- *Operations* - operation (only for the twin tunnels)
- *Reinstatement* - where appropriate, re-establish the environments directly and in-directly affected by construction
- *Maintenance* - regular maintenance and unplanned maintenance/emergency response (for the twin tunnels).

The project activities considered are provided in Table 5 and are assessed in relation to each of the proposed Project changes arising from CYP's design.

TABLE 5: PROJECT ACTIVITY APPLICABILITY

	CYP PROJECT CHANGES	Parkville and CBD North Stations	CBD North Station and Swanston Street	CBD South Station and Swanston Street	Additional road surface works
	ACTIVITY				
Construction Phase	Site establishment	X	X	X	✓
	Excavation	X	✓	✓	X
	Operation of TBM	✓	X	X	X
	Extraction of TBM	X	X	X	X
	Cross passage excavation	✓	✓	✓	X
	Underground support structures	✓	✓	✓	X
	Haulage	X	X	✓	✓
	Road works	X	X	X	✓
	Tram works	X	X	X	✓
	Fit out	X	X	✓	X
	Reinstatement	X	X	✓	✓
Operation phase	Operation	✓	✓	✓	X
	Maintenance	✓	✓	✓	X

## 2.2.2 Initial risks

After identifying the potential impact pathway for each aspect and activity, a likelihood and consequence score was assigned to each risk. These ratings were assigned assuming that no controls are applied to reduce the risk.



CYP adopted the likelihood definitions detailed in Table 6 and the consequence definitions in Table 7 to build a risk rating based on the risk matrix in Table 8.

TABLE 6: LIKELIHOOD DEFINITIONS

Likelihood	Description
<b>Almost Certain</b>	Almost certain to occur during the project/contract life
<b>Likely</b>	Considered likely to occur during the project life/contract
<b>Possible</b>	Considered possible to occur during the project life/contract
<b>Unlikely</b>	Considered unlikely to occur during the project life/contract
<b>Rare/Remote</b>	Considered a rare occurrence to happen during the project life/contract

TABLE 7: CONSEQUENCE DEFINITIONS

Consequences	Environment and natural resources
<b>Negligible</b>	No detectable change in a local environmental setting. No detectable impact on economic, cultural, recreational, aesthetic or social values.
<b>Minor</b>	Short-term, reversible changes, within natural variability range, in a local environmental setting. Short-term, localised impact on economic, cultural, recreational, aesthetic or social values
<b>Moderate</b>	Long-term but limited changes to local environmental setting that are able to be managed. Significant and/or long-term change in quality of economic, cultural, recreational, aesthetic or social values in local setting. Limited impacts at regional level
<b>Major</b>	Long-term, significant changes resulting in risks to human health and/or the environment beyond the local environmental setting. Significant, long-term change in quality of economic, cultural, recreational, aesthetic or social values at local, regional and State levels. Limited impacts at national level
<b>Severe</b>	Irreversible, significant changes resulting in widespread risks to human health and/or the environment at a regional scale or broader. Significant, permanent impact on regional economy and/or irreversible changes to cultural, recreational, aesthetic or social values at regional, State and national levels

TABLE 8: RISK MATRIX

Likelihood	Consequence				
	Negligible	Minor	Moderate	Major	Severe
<b>Almost Certain</b>	Low	Medium	High	Very High	Very High
<b>Likely</b>	Low	Medium	Medium	High	Very High
<b>Possible</b>	Low	Low	Medium	High	High
<b>Unlikely</b>	Very Low	Low	Low	Medium	High
<b>Rare/Remote</b>	Very Low	Very Low	Low	Medium	Medium

## 2.2.3 Identification controls

Following the assessment of initial risks by the technical disciplines, the controls, or mitigation measures required to reduce these risks were identified. Controls were developed to target the activity and impact pathway in order to reduce either the likelihood or consequence, or both of the risk occurring. These controls will be incorporated by CYP into the relevant management plan for implementation during construction and operational phases of the Project.

## 2.2.4 Residual risk

After identifying controls, the residual risk was assessed by CYP and the technical disciplines using the same criteria as for the initial risk, but incorporating the application of controls. Additional control measures were identified for any residual risks above high, to reduce the risk to an acceptable level.

## 2.3 Risk Register

A risk register was established to document the findings of the risk assessment process. The risk register contains details of impact pathways, their consequences, planned controls inherent in the Project Description, an initial risk assessment, additional treatment measures (Environmental Performance Requirements), and the revised risk assessment (residual risk). This complete CYP risk register is provided in **Appendix A - CYP Environmental Risk Register**.

### 2.3.1 Monitoring and review

The risk assessments undertaken for the Project will be monitored and reviewed regularly by CYP to incorporate and address new information as it emerges. The Construction Environmental Management Plan (CEMP) specifies both the timing and methodology for this review process.

## 2.4 Stakeholder Engagement

MMRA, with the assistance of CYP, will be undertaking stakeholder engagement for proposed PSA GC82 including consultation with affected Councils and key landowners. In recognition that project progress and decisions can be enhanced through dialogue with the community and relevant stakeholders, MMRA has developed core principles and goals for the planning and construction of the project, described in Table 9. CYP shares these principles and goals. Furthermore, the findings from this series of impact assessments will inform refinement of the Communication and Stakeholder Engagement Strategy.

TABLE 9: PRINCIPAL AND GOALS OF THE STAKEHOLDER AND ENGAGEMENT STRATEGY

Principle	Goal
<b>Effective</b>	Engagement is open, consistent, inclusive, accessible and transparent throughout planning and delivery of the project
<b>Timely</b>	Engagement spans all stages of the project, ensuring information is provided to stakeholders as the project develop and feedback is responded to and incorporated in the project's development
<b>Meaningful</b>	Engagement is clear on the elements of this project that can be influenced by the community and stakeholders, how the feedback will be used and is explicitly on which elements of the project are fixed and the reason for this
<b>No surprises</b>	Engage early to gain understanding of interests, concerns, requirements and preferred outcomes. Close the loop to determine how feedback has been considered

A three phase approach has been developed. Phase 1 – Early Engagement, Phase 2 - Engagement to support public display of draft PSA and Phase 3: Engagement post PSA. The Consultation and Summary Report provides further detail of the process and outcomes and next steps.

### *Phase 1: Early Engagement*

#### **Key stakeholders –government agencies / entities /precinct based**

Engagement was focused on briefing key stakeholders particularly government departments and agencies, and Councils on the proposed changes to the Project Land. MMRA and CYP held stakeholder meetings to outline the PSA process and to obtain feedback leading up to submission of the draft PSA to the Minister for Planning. Where possible, MMRA and CYP used existing stakeholder meetings to discuss the PSA. Key messages were high level with the provision of information tailored to the specific needs of the stakeholder.

CYP and MMRA held meetings with each of the following stakeholder stakeholders as part of the ongoing stakeholder engagement strategy:

- City of Maribyrnong
- City of Melbourne
- City of Port Phillip
- City of Stonnington

- DELWP
- EPA
- Heritage Victoria
- Melbourne Water
- Parkville Precinct Reference Group
- Public Transport Victoria (PTV)/TfV
- State Library
- Transport for Victoria (TfV)
- VicRoads.

### **Landowner/Tenant Engagement**

Strata land acquisition will be required for the proposed CYP design and construction changes to Project Land. Further, temporary occupation may also be required for the Project Land changes at 2 and 2A Chambers Street, South Yarra, for the purposes of the Rail Infrastructure Alliance (RIA), which is yet to be appointed.

MMRA commenced early engagement with the impacted property owners and tenants as part of PSA GC82 and will continue to do so throughout the PSA process.

Letters were sent to landowners and tenants about the proposed changes to Project Land in PSA GC82. The letters outlined the impact to their property, the planning process, how to be involved and how to contact the project for assistance or support.

MMRA and CYP held meetings with each of the following stakeholders as part of the ongoing stakeholder engagement strategy:

- Capitol Theatre
- Federation Square
- MATC
- Melbourne Central
- Manchester Unity
- QV Building
- RMIT University
- University of Melbourne.

### **Road Surface Works**

A number of roads will be included in the draft PSA to enable construction management and some legacy roadworks. Engagement with stakeholders will occur before these permanent changes are undertaken. The nature of the road surface works and the broad timelines (where available) was provided in letters to relevant stakeholders.

### *Phase 2: Engagement to support public display of draft PSA*

The PSA will be on display for 30 calendar days with the following proposed communications tools.

### **Targeted Letters**

Information packs were provided to landowners and tenants, tailored to whether the proposed impact on the property is as follows:

- newly within the Project Land
- newly within the DDO
- an increase in the Project Land
- an increase in the DDO
- adjacent to the road surface works

Strata divestment and DDO-related change information packs included:

- Letters to landowners advising of the proposed changes to the PSA and potential acquisition of strata / a potential Design and Development Overlay (DDO) on their property
- Maps relevant to the property
- Invitation to provide feedback online or contact the project team
- The information packs will outline the time frames for the PSA process, opportunity to provide feedback, the strata divestment process (if relevant) and address any immediate questions.

The draft PSA and supporting documents will be published on the Metro Tunnel website for 30 calendar days. An online feedback form will also be made available for the duration of the draft PSA public display period for landowners and tenants to provide feedback on the PSA process and potential impacts on their property. These comments will be responded to, as outlined in Phase 3 of the consultation process. A consultation summary report will be produced to support formal submission of draft Amendment GC82.

### *Phase 3: Engagement post PSA*

CYP will provide a response and update on the issues raised to prescribed stakeholders, key stakeholders, Reference Groups, and the community. Prescribed stakeholders will receive a response on their feedback including through comprehensive briefings.

Key stakeholders will be responded to formally in writing, and in stakeholder meetings. CYP will include presentations on the feedback received to the Parkville Precinct Reference Group and Community Reference Groups. Organisations and members of the community who provide feedback either online through the survey or in writing will be responded to, where email or address details are provided.

In accordance with the existing approved Environmental Performance Requirements and the project's contractual Project Scope & Technical Requirements, further detailed technical assessments are being undertaken including of building and asset condition, ground movement, groundwater, noise and vibration, and Electro Magnetic Interference (EMI). These assessments variously involve stakeholder consultation, and are used to inform design and construction of the project

## 3 Legislation, Policy and Guidelines

### 3.1 Commonwealth Government

Commonwealth Government legislation which provided context for the report is detailed in Table 10 below.

TABLE 10: COMMONWEALTH LEGISLATION

Legislation	Relevance
<b><i>Disability Discrimination Act 1992</i></b>	<p>The <i>Disability Discrimination Act 1992</i> provides legal protection for everyone in Australia against discrimination based on disability. The relevant objectives for this assessment are:</p> <ul style="list-style-type: none"> <li>a) to eliminate, as far as possible, discrimination against persons on the ground of disability in the areas of: <ul style="list-style-type: none"> <li>(i) work, accommodation, education, access to premises, clubs and sport</li> <li>(ii) the provision of goods, facilities, services and land</li> <li>(iii) existing laws</li> <li>(iv) the administration of Commonwealth laws and programs</li> </ul> </li> <li>b) to ensure, as far as practicable, that persons with disabilities have the same rights to equality before the law as the rest of the community</li> <li>c) to promote recognition and acceptance within the community of the principle that persons with disabilities have the same fundamental rights as the rest of the community.</li> </ul> <p>The most relevant clauses for this assessment are:</p> <ul style="list-style-type: none"> <li>▪ Section 23: Access to premises</li> <li>▪ Section 24: Goods, services and facilities</li> <li>▪ Section 26: Land</li> </ul>

Consideration was also given to the EPBC Act, but as there are no protected values under that Act affected by the proposed changes, as explained in the original referral of the project in 2015, it was of limited relevance to the ERA.

### 3.2 State Government

State Government legislation and policy which provided context for the report is detailed in Table 11 below.

TABLE 11: STATE GOVERNMENT LEGISLATION AND POLICY

Legislation/policy	Relevance
<b><i>Environment Effects Act 1978</i></b>	<p>The <i>Environment Effects Act 1978</i> provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. The Act does this by enabling the Minister for Planning administering the Environment Effects Act to decide if an Environment Effects Statement (EES) should be prepared. The EES process provides for the analysis of potential effects on environmental assets and the means of avoiding, minimising and managing adverse effects. It also includes public involvement and the opportunity for an integrated response to a proposal</p> <p>This process occurred in 2015 and subsequently the EES concluded that achieving the outcomes set by the recommended Environmental Performance Requirements would ensure Melbourne Metro achieves acceptable environmental, social and economic outcomes. Subsequently the Inquiry and Advisory Committee (IAC) Report (2016) concluded the EPR adequately respond to the environmental, social and economic impacts that have been identified in the EES, and provide appropriate actions and controls to minimise impacts from the Project during construction and operation. Finally, the Minister for Planning confirmed as a whole, the EPRs proposed, with the changes recommended by the IAC, are acceptable.</p>
<b><i>Planning and Environment Act 1987</i></b>	<p>The <i>Planning and Environment Act 1987</i> sets out the objectives for planning in Victoria. The relevant objectives for this assessment are to:</p> <ul style="list-style-type: none"> <li>▪ secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria</li> <li>▪ protect public utilities and other assets and enable the orderly provision and coordination of public utilities and other facilities for the benefit of the community</li> </ul>

	<ul style="list-style-type: none"> <li>ensure that the effects on the environment are considered and provide for explicit consideration of social and economic effects when decisions are made about the use and development of land.</li> </ul>
<b>Transport Integration Act 2010</b>	<p>The <i>Transport Integration Act 2010</i> provides a key legislative context for the assessment of transport projects. The Act lists transport system objectives and uses relevant to transport. Section 11 outlines the principles for the integration of transport and land use including:</p> <ul style="list-style-type: none"> <li>The transport system should provide for the efficient integration of transport and land uses and facilitate access to social and economic opportunities</li> <li>Transport and land use should be effectively integrated to improve accessibility and transport efficiency with a focus on: <ul style="list-style-type: none"> <li>a) maximising access to residences, employment, markets, services and recreation.</li> <li>d) facilitating better access to, and greater mobility within, local communities.</li> </ul> </li> </ul>
<b>Public Health and Wellbeing Act 2008</b>	<p>The <i>Public Health and Wellbeing Act 2008</i> outlines the state's role in promoting, protecting and reducing inequalities in public health and wellbeing. The objectives of this Act are set out in section 4, and the key relevant ones are listed below:</p> <ul style="list-style-type: none"> <li>Public health and wellbeing includes the absence of disease, illness, injury, disability or premature death and the collective state of public health and wellbeing</li> <li>The objective of this Act is to achieve the highest attainable standard of public health and wellbeing by: <ul style="list-style-type: none"> <li>b) promoting conditions in which persons can be healthy</li> <li>c) reducing inequalities in the state of public health and wellbeing.</li> </ul> </li> </ul>
<b>Victorian Charter of Human Rights and Responsibilities Act 2006</b>	<p>This charter is a tool to protect human rights and freedoms. The most relevant section for this assessment is Section 20 Property Rights: A person must not be deprived of his or her property other than in accordance with the law.</p>
<b>State Planning Policy Framework</b>	<p>The State Planning policy context provides a framework for integrated policy decision making with regards to how land is used and developed across the state. This framework is consistent across the state and is contained with the local municipal planning scheme. The most relevant clauses for this assessment are:</p> <p>Section 11 Settlement:</p> <ul style="list-style-type: none"> <li>Planning is to facilitate sustainable development that takes full advantage of existing settlement patterns, an investigate in transport and communication, water, sewerage and social facilities.</li> </ul> <p>Section 15 Built environment and heritage:</p> <ul style="list-style-type: none"> <li>Creating quality built environments supports the social, cultural, economic and environmental wellbeing of our communities, cities and towns.</li> <li>Land use and development planning must support the development and maintenance of communities with adequate and safe physical and social environments for their residents, through the appropriate location of uses.</li> </ul> <p>Section 19 Infrastructure:</p> <ul style="list-style-type: none"> <li>Planning for development of social and physical infrastructure should enable it to be provided in a way that is efficient, equitable, accessible and timely.</li> <li>Planning is to recognise social needs by providing land for a range of accessible community resources, such as education, cultural, health and community support (mental health, aged care, disability, youth and family services) facilities.</li> </ul>

## 4 Environmental Risk Assessment

### 4.1 ERA Workshop

An initial ERA workshop for the proposed CYP design changes located outside of the approved Project Land was held on 18 September 2017. The workshop comprised representatives of the CYP Land, Planning and Environment team, MMRA representatives and various technical disciplines. The purpose of the workshop was to populate the CYP Environmental Risk Register (**Appendix A - CYP Environmental Risk Register**).

Input from disciplines was sought in relation to noise and vibration, surface water, contaminated land and acid sulfate soils, groundwater, land use, business and social, and transport impacts and controls. The following section highlights the initial findings from the initial ERA workshop, followed by a desktop analysis undertaken by each technical discipline.

### 4.2 Initial risk identification

The initial risk ratings (i.e. risks without controls) provided by the technical disciplines identified the risk areas where additional mitigation or remedial measures were deemed necessary. The discipline assessment undertaken at the environmental risk workshop and individual assessments identified the following initial risks across all activities:

- 0 very high initial risk
- 35 high initial risks
- 110 medium initial risks
- 152 low initial risks
- 203 very low initial risks.

These initial risks are specified geographically in Table 12 below. As part of the discipline risk assessment some impact pathways and/or likelihood/consequence ratings were either omitted or edited against activities if they were deemed unsuitable or irrelevant to the specific activity. Impact pathways were included in **Appendix A** to address all risks associated with modifying the approved Project Land and the identified changes. The identified key risk areas above 'medium' related to business, land use and planning, transport, noise and vibration, and ground movement.

TABLE 12: INITIAL RISK QUANTITIES

CYP PROJECT CHANGES	Parkville to CBD North	CBD North Station and Swanston Street	CBD South Station and Swanston Street	Additional road works
Quantity - Initial risks				
Very High	0	0	0	0
High	7	5	15	11
Medium	15	21	48	22
Low	32	40	55	38
Very Low	56	48	58	31

### 4.3 Residual risk identification

Following the discipline assessment of the initial risks at the environmental risk assessment workshop, appropriate project controls were added to reduce the likelihood and/or consequence of these risk occurring; thereby reducing the residual risk levels.

These controls were based on:

- application through the EES and PSA processes
- application of the EMF
- compliance with the EPR

- measures included in the CYP draft CEMPs
- Measures included in the various CYP draft sub plans.

Overall, and as described in Table 12, the initial risk ratings of "medium", "low" and "very low" formed 92% of the total risk quantities. However, the impact pathways were reassessed by applying the EPRs and mitigation measures listed above. This resulted in 100% of the risk classifications being either "medium", "low" and "very low", as described in Table 13 below.

TABLE 13: RESIDUAL RISK QUANTITIES

CYP PROJECT CHANGES	Parkville to CBD North	CBD North Station and Swanston Street	CBD South Station and Swanston Street	Additional road works
<b>Quantity - Residual Risks</b>				
<b>Very High</b>	0	0	0	0
<b>High</b>	0	0	0	0
<b>Medium</b>	9	6	13	8
<b>Low</b>	34	52	83	55
<b>Very Low</b>	67	56	76	39

It is therefore considered that potential impact can be managed through the EPRs. The Ministerial Assessment supports this process and confirms the environmental effects can be adequately mitigated and managed within acceptable parameters through the use of EPRs.

The remaining 'medium' residual risks are further discussed in Section 3.4 below.

## 4.4 Key residual risk results

Table 14 below shows that a total of **nine** residual risks associated with the area between Parkville and CBD North Stations were rated 'medium'. The cross-passage excavation and maintenance activities associated with the works between Parkville and CBD North Stations have residual risk ratings of either 'low' or 'very low' are outlined in **Appendix A**.

TABLE 14: MEDIUM OR GREATER RESIDUAL RISKS FOR PARKVILLE STATION AND CBD NORTH STATION

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant discipline EPRs	Other Specific Mitigation Measures
<b>Parkville to CBD North - Operation of the TBM</b>					
<b>Land Use and Planning</b>	15	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or development. If property acquisition is undertaken, it will be in accordance with the established legal framework (i.e. MTPFA and LACA). The Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Noise and Vibration</b>	16	Vibrations from TBM operation exceeding thresholds/limits, impacting on sensitive equipment, property and/or assets.	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. The Noise and Vibration Impact Assessment can be found in Appendix B.



Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant discipline EPRs	Other Specific Mitigation Measures
	17	Noise from TBM operation exceeding thresholds/limits, impacting on sensitive receptors.	Medium	EPR NV3, NV4, NV5, NV6, NV13, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. The Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Parkville to CBD North – Cross Passage</b>					
<b>Noise and Vibration</b>	38	Vibrations from TBM operation exceeding thresholds/limits, impacting on sensitive equipment, property and/or assets.	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. The Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Parkville to CBD North – Additional Underground Support Structures</b>					
<b>Ground Movement</b>	54	Ground movement from construction equipment operation damaging infrastructure, utilities and/or buildings	Medium	EPR GM1, GM2, GM3, GM4, GM5 and GM6	Additional ground support structures has the potential to result in ground movements which may affect the structure. Detailed assessment and consideration of settlement mitigation measures as part of the EPR will appropriately mitigate the risk. A targeted Ground Movement Impact Assessment can be found in Appendix B.
<b>Land Use and Planning</b>	58	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to be undertaken address any planned future land uses and/or development. If property acquisition is undertaken, it will be in accordance with the established legal framework (i.e. MTPFA and LACA). A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Noise and Vibration</b>	59	Vibrations from piling exceeding thresholds/limits, impacting on sensitive equipment	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
	60	Noise emissions from piling exceeding thresholds/limits, impacting on sensitive receptors and sensitive equipment	Medium	EPR NV3, NV4, NV5, NV6, NV13, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant discipline EPRs	Other Specific Mitigation Measures
<b>Parkville to CBD North - Operation</b>					
<b>Electro Magnetic Interference</b>	75	EMI emissions from operation of infrastructure impacting on sensitive equipment	Medium	EPR EMI2	The risk remains medium as there may be relocation of equipment required. If relocation of equipment is included in the risk assessment then the risk level would be lower. Although the risk remains medium, there are no new facilities affected, and the existing facilities affected have already been consulted with.

Table 15 shows only **six** residual risks associated with the works at CBD North Station which were rated at, or greater than, 'medium'. The cross-passage excavation, operation and maintenance activities associated with the widening of Swanston Street all have residual risk ratings of either 'low' or 'very low' are outlined in **Appendix A**.

TABLE 15: MEDIUM OR GREATER RESIDUAL RISK FOR CBD NORTH STATION

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant Discipline EPRs	Other Specific Mitigation Measures
<b>CBD North Station - Excavation</b>					
<b>Noise and Vibration</b>	128	Vibrations from excavation exceeding thresholds/limits, impacting on sensitive equipment	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Surface Water</b>	134	Floodwaters entering construction site resulting in discharge that impacts on water quality and beneficial uses	Medium	Addressed by EPR SW1, SW2	The risk remains medium as excavations may increase the possibility of flooding. Installation of a flood barrier at the interface of the existing Degraes Street Underpass/Campbell Arcade and the proposed passageway to CBD South Station will mitigate risk along with the EPRs.
<b>CBD North Station – Cross Passage</b>					
<b>Noise and Vibration</b>	151	Vibrations from excavation exceeding thresholds/limits, impacting on sensitive equipment	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>CBD North Station – Underground Support Structures</b>					
<b>Land Use and Planning</b>	171	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to be undertaken to address any planned future land uses and/or development. If property acquisition is undertaken, it will be in accordance with the established legal framework (i.e. MTPFA and LACA). A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Noise and Vibration</b>	172	Vibrations from underground support structures exceeding thresholds/limits,	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant Discipline EPRs	Other Specific Mitigation Measures
		impacting on sensitive equipment.			not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Noise and Vibration</b>	173	Noise emissions from piling exceeding thresholds/limits, impacting on sensitive receptors and sensitive equipment	Medium	EPR NV3, NV4, NV5, NV6, NV13, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.

Table 16 outlines a total of **thirteen** residual risks for the connection to CBD South Station that have a residual risk rating of greater than medium. All other residual risks rating of 'low' and 'very low' associated with this activity are outlined in **Appendix A**.

TABLE 16: MEDIUM OR GREATER RESIDUAL RISKS – CBD SOUTH STATION

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant Discipline EPRs	Other Specific Mitigation Measures
<b>CBD South Station - Excavation</b>					
<b>Ground Movement</b>	236	Ground movement from construction equipment operation damaging infrastructure, utilities and/or buildings	Medium	EPR GM1, GM2, GM3, GM4, GM5 and GM6	Extension of adits to the west of St Paul's has a higher potential to result in ground movements which may adversely affect the structure. Detailed assessment and consideration of settlement mitigation measures as part of the EPR will mitigate the risk. A targeted Ground Movement Impact Assessment can be found in Appendix B.
<b>Land Use and Planning</b>	241	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to be undertaken to address any planned future land uses and/or development. If property acquisition is undertaken, it will be in accordance with the established legal framework (i.e. MTPFA and LACA). A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Noise and vibration</b>	242	Vibrations from excavation exceeding thresholds/limits, impacting on sensitive equipment	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Surface Water</b>	248	Floodwaters entering construction site resulting in discharge that impacts on water quality and beneficial uses	Medium	EPR SW1 & SW2	Exposes the CBD South Station to known flooding problems within Campbell Arcade. Development and implementation of a flood immunity risk assessment and of emergency flood management measures will mitigate these risks.
<b>Transport</b>	249	Road closure and construction traffic causing increased	Medium	EPR T1, T2, T3, T4, T5, T6 & T7	It is likely that construction works will have an impact on the road network. Construction works vary from 2 - 6

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant Discipline EPRs	Other Specific Mitigation Measures
		congestion and delays, impacting transport network efficiency and connectivity			months in duration. Consequences will be mitigated as far as practical/possible through the identified EPRs and Traffic Management Plan processes.
<b>CBD South Station – Cross Passage</b>					
<b>Noise and vibration</b>	265	Vibrations from excavation exceeding thresholds/limits, impacting on sensitive equipment	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>CBD South Station – Underground Support Structures</b>					
<b>Ground Movement</b>	282	Ground movement from construction equipment operation damaging infrastructure, utilities and/or buildings	Medium	EPR GM1, GM2, GM3, GM4, GM5 and GM6	Extension of adits to the west of St Paul's has a high potential to result in ground movements which may adversely affect the structure. Detailed assessment and consideration of settlement mitigation measures as part of the EPR will mitigate the risk. A targeted Ground Movement EIA can be found in Appendix B.
<b>Land Use and Planning</b>	286	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or development. If property acquisition is undertaken, it will be in accordance with the established legal framework (i.e. MTPFA and LACA). A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Noise and Vibration</b>	287	Vibrations from underground support structures exceeding thresholds/limits, impacting on sensitive equipment and receptors	Medium	EPR NV3, NV4, NV5, NV8, NV9, NV10, NV11, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Transport</b>	293	Road closure and construction traffic causing increased congestion and delays, impacting transport network efficiency and connectivity	Medium	Addressed by EPR T1, T2, T3, T4, T5, T6 & T7	It is likely that construction works will have an impact on the road network for up to six months. Consequences will be mitigated as far as practical/possible through the identified EPRs and Traffic Management Approval processes.
<b>CBD South Station - Haulage</b>					
<b>Transport</b>	313	Road closure and construction traffic causing increased congestion and delays, impacting transport network efficiency and connectivity	Medium	EPR T1, T2, T3, T4, T5, T6 & T7	It is likely that construction works will have an impact on the road network for up to 6 months. Consequences will be mitigated as far as practical/possible through the identified EPRs and Traffic Management Plan approval processes.
<b>CBD South Station - Fitout</b>					
<b>Land Use and Planning</b>	326	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant Discipline EPRs	Other Specific Mitigation Measures
					development. If property acquisition is undertaken, it will be in accordance with the established legal framework (i.e. MTPFA and LACA). A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>CBD South Station - Reinstatement</b>					
<b>Social and Community</b>	349	Impacts on ability to access workplace, recreational facilities, open space, residences, retail and/or services	Medium	EPR SC1, SC3, SC4, SC6 & SC10	Occupation of Campbell Arcade will disrupt access to and from facilities, workplaces and retail. Access to some businesses and art installations in Campbell Arcade will be disrupted, however numerous alternatives are available in the CBD. A Social and Business Impact Assessment can be found in Appendix B.

Table 14 outlines a total of **eight** residual risks for additional road works that have a residual risk rating at, or greater than, medium. All other residual risk ratings of 'low' or 'very low' associated with this activity are outlined in **Appendix A**.

TABLE 17: MEDIUM OR GREATER RESIDUAL RISKS ADDITIONAL ROAD WORKS

Aspect	Ref	Impact Pathway	Residual Risk Rating	Relevant Discipline EPRs	Other Specific Mitigation Measures
<b>Additional Road Works - Site Establishment</b>					
<b>Land use and planning</b>	418	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or development. A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Additional Road Works - Roadworks</b>					
<b>Land use and planning</b>	454	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or development. A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Transport</b>	461	Road closure and construction traffic causing increased congestion and delays, impacting transport network efficiency and connectivity	Medium	EPR T1, T2, T3, T4, T5, T6 and T7	During additional road works, traffic impacts may result, however the affects will be managed and mitigated through EPRs and the Traffic Management Plan processes.
<b>Additional Road Works - Tramworks</b>					
<b>Land Use and Planning</b>	474	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or development. A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Noise and Vibration</b>	476	Noise emissions from structural works exceeding thresholds/limits, impacting on sensitive receptors	Medium	EPR NV3, NV4, NV5, NV6, NV13, and NV21	Further noise and vibration impact assessments will be undertaken to establish whether the guideline targets will be achieved. If they will not be achieved, management and mitigation measures will be designed and implemented in accordance with the EPRs. A Noise and Vibration Impact Assessment can be found in Appendix B.
<b>Transport</b>	481	Road closure and construction traffic causing increased congestion and delays, impacting transport network efficiency and	Medium	EPR T1, T2, T3, T4, T5, T6 & T7	During additional road works, traffic impacts may result, however the affects will be managed and mitigated through EPRs and the Traffic Management Plan processes.



		connectivity			
<b>Additional Road Works - Reinstatement</b>					
<b>Land Use and Planning</b>	494	Impact on existing or future land use	Medium	EPR LU1	Detailed land use and planning impact assessment to address any planned future land uses and/or development. A Land Use and Planning Impact Assessment can be found in Appendix B.
<b>Transport</b>	501	Road closure and construction traffic causing increased congestion and delays, impacting transport network efficiency and connectivity	Medium	EPR T1, T2, T3, T4, T5, T6 & T7	During additional road works, traffic impacts may result, however the affects will be managed and mitigated through the EPRs and the Traffic Management Plan processes.

## 5 Analysis of Discipline Findings and Results

The following section summarises the individual discipline findings and appraises technical areas where potential risks may require further investigation. Overall, there were twelve technical studies were undertaken which evaluated whether the existing EPRs were sufficient to manage and mitigate risks associated with the CYP project changes located outside of the approved Project Land.

### 5.1 Air quality

An initial air quality assessment was undertaken by CYP. From an air quality perspective, the proposed CYP design changes are deemed to be minor with only a low or very low residual risk level registered as a result of activities undertaken in conjunction with the Project changes. The existing, approved EPR controls pertaining to air quality should therefore mitigate most risk, particularly through the implementation of plan(s) for dust management and monitoring to be developed in consultation with the EPA. On this basis, a detailed impact assessment and additional EPRs for air quality are not required.

### 5.2 Arboriculture and biodiversity

An initial arboriculture and biodiversity risk assessment was undertaken by CYP. For the majority of biodiversity and arboriculture risk ratings, the ratings were assessed as either 'very low' or 'low' risk based on the fact that the additional works are either subterranean, or they do not affect any known biodiversity values.

The only CYP project change where potential risk was identified related to the additional road works in Parkville, which have the potential to affect existing street trees. In this respect, the existing EPRs can adequately mitigate these risks and thereby effectively reduce the risks to a low risk level. Furthermore, the development of a Tree Protection Plan and, where applicable, a tree replacement program will appropriately manage potential risks. On this basis, a detailed impact assessment and additional EPRs for arboriculture and biodiversity are not required.

### 5.3 Aboriginal and historic cultural heritage

An initial risk assessment of Aboriginal and historic cultural heritage was undertaken by Andrew Long and Associates (ALA) on behalf of CYP. The appraisal confirmed an overall 'low' risk level for the project changes from an Aboriginal cultural heritage perspective. In accordance with the *Aboriginal Heritage Act 2006*, a new Cultural Heritage Management Plan (CHMP) will be prepared to cover the additional Project land emanating from the CYP design changes.

The initial historic heritage assessment undertaken by ALA confirmed an overall 'low' to 'medium' risk associated with the proposed changes and the impact on identified historical cultural heritage. Risk pathways associated with the modified rail tunnel alignment and/or the additional underground support structures along Swanston Street are essentially no different to the tunnel section previously assessed. Similarly, those pathways associated with additional temporary and legacy roadworks are not dissimilar to impacts previously assessed, and being largely confined to existing roads, are generally of low risk.

Further assessment of the new mid-platform connections to Flinders Street Station is however required to fully understand and mitigate potential impacts of the CYP modified design. Additional permit(s) maybe required under the *Heritage Act 2017* for these works.

The risk assessment previously prepared by MMRA for the original PSA for the Project are essentially focussed on design and or construction and not on operations. For this reason, based on the initial risk assessment undertaken by ALA, a more detailed impact assessment of all aspects was undertaken.

### 5.4 Business and Social

An initial business and social risk assessment was undertaken by CYP. Residual business risks were generally considered to be either 'low' or 'very low' for the CYP design changes related to additional underground support structures along Swanston Street and around the CBD North and CBD South stations and the modified rail tunnel alignment.

Additional impacts can be appropriately managed via the preparation of disruption plans as stipulated in the existing EPRs. Residual business risks were however rated as 'medium' for some aspects, due to the potential inconvenience to businesses from the construction phase works and additional roads required across the alignment. The impacts on public access to places of work, residence and leisure associated with the change to

access within the Flinders Street Railway Station complex and lane closures from additional works; will need to be explored further as part of a detailed impact assessment.

A number of businesses are located along the streets affected by the CYP additional road works, and therefore some of the residual risks are rated at a 'medium' level. Whilst the disruption would be somewhat mitigated by the disruption plans and ongoing consultation with affected businesses, there is expected to still be a level of business disruption. Further work was identified to form part of the detailed impact assessment.

The majority of residual business and social risks are rated as either 'low' or 'very low'. Given the extent of changes to the approved Project Land, few additional receptors will be impacted. The potentially crucial impact would be access to retail, commercial and residential properties as well as transport. Where there are likely to be additional business and social impacts, they would be of a short duration only, usually on a day to day basis due to the lane or road closures required for traffic management. Reinstatement following the works should help ensure the public realm is restored to a quality and inclusive place. The specific Business Disruption Plans, Community and Stakeholder Engagement Management Frameworks and Plans in the existing EPRs will help to mitigate business and social impacts.

The detailed impact assessment for business and social aspects will need to further analysis to understand the impact of the changes to the approved Project land. More specifically, a detailed impact assessment will:

- Build on the outcomes of the ERA, complete an assessment of the likely impacts of the design changes, management measures to reduce the impact(s) and confirm conclusions
- Document the assessment in a report suitable to accompany the Melbourne Metro - Amended Project Land PSA.

## 5.5 Contaminated land and spoil management

An initial contamination land and spoil management assessment was undertaken by CYP. From a contaminated land and spoil management perspective, the proposed CYP design changes are considered minor given that the design changes will have only a slight increase in the volume of soil to be managed in accordance with EPRs C1, C2, C3 and C4. Furthermore, a Spoil Management Plan, Acid Sulphate Soil and Management Sub Plan and Remedial Management Plan will mitigate and manage impacts.

## 5.6 Electro-magnetic interference

An initial EMI assessment was undertaken by CYP. It is expected that there will be no impact with electric fields external to the tunnel given the propagation characteristics and will be limited to the tunnel and station box environs. The expected impacts to external stakeholders will arise from magnetic fields and large moving metal masses. There are potential issues to be aware of including:

- Operation of TBM in Parkville Area
  - Large slow-moving metal mass (e.g. the TBM) may impact on MRIs (Medical Equipment), which may result in preconstruction mitigation being required (however this is unlikely) such as at receiver mitigations such as active and passive shielding.
- Cross passage Excavation in Parkville Area
  - Large slow-moving metal mass (Excavator) may impact on MRIs (Medical Equipment) which may result in preconstruction mitigation being required (however this is extremely unlikely), as equipment is smaller and slower moving, such as at receiver mitigations such as active and passive shielding
- Operations in Parkville Area
  - Large fast-moving metal mass (Train) may impact on MRIs (Medical Equipment) which may result in preconstruction mitigation being required (however this is unlikely), such as:
    - At source mitigations such as passive shielding
    - At receiver mitigations such as active and passive shielding
    - Possible relocation of equipment
- Extremely Low Frequency Electromagnetic Fields emission (Trains and OHLE) may impact on MRIs (Medical Equipment) and Electron Microscopes which could possibly result in mitigation being required, such as:
  - At source mitigations such as passive shielding and dipole bonds
  - At receiver mitigations such as active and passive shielding
  - Possible relocation of equipment
- Maintenance in Parkville Area
  - Large slow-moving metal mass (Rail Grinder) may impact on MRIs (Medical Equipment) which may result in mitigation being required (however this is unlikely), such as:
    - Operational mitigation likely to cover Maintenance
    - Communication of abnormal works and coordinate times to limit impact
- Abnormal Network Configurations may impact on MRIs (Medical Equipment) and Electron Microscopes which may result in mitigation being required (however this is unlikely), such as:

- Operational mitigation likely to cover maintenance
- Communication of abnormal works and coordinate times to limit impact.

Overall, there are no new facilities affected, and the existing facilities affected have already been consulted with. Furthermore, the identified risks should however be managed through the development of an Electromagnetic Compatibility Management Plan and are in accordance with the existing, approved EPRs.

## 5.7 Ground movement

An initial ground movement assessment was undertaken by CYP. The risk assessment summarises ground movement issues from the Project changes and concludes that there will be no adverse issues associated with ground movement effects, which cannot be suitably mitigated by the EPRs, particularly through the Ground Movement Plans for each work package. There is provision for further assessment of the impacts the change in Project Land will have as a result of ground movement. For individual Project changes, these include:

### Parkville Station and CBD North Station:

- Ground movements in relation to the tunnel alignment, based on the EES alignment and an amended alignment are likely to be near identical, is based on geological conditions and tunnel depth. Likewise, the effect on structures are likely to be similar between the two alignments.
- At Parkville Station, a critical programme driver is having a clear zone in the lower portion of the box to enable TBM passage. It is proposed to provide temporary ground anchors at the lower levels of the station box to reduce internal propping requirements. Temporary ground anchors would extend around the perimeter of the box. The inferred zone which may extend beyond the approved Project Land boundary. These works are not anticipated to have a greater effect on ground movements than those previously assessed in the EES and PSA processes.
- Ground movement effects in this area, are dominated by the excavation of the CBD South station shafts. Overall, the impacts are not anticipated to significantly differ from those assessed in the EES. However, as this is a desktop assessment with indicative design; and given the proximity of sensitive equipment; CYP have been conservative in their results.
- The existing EPRs for ground movements will mitigate any potential effects as a result of the proposed works between Parkville and CBD North
- Ground movement effects as assessed within Chapter 19 (Ground Movement Effects) of the EES and PSA processes show the extent of ground movements >5mm extend beyond the mined cavern footprint.
- As the proposed amendment works footprint, extend beyond the EES and PSA processes works footprint, it would be reasonable to assume the extent of ground movements >5mm would increase by the same amount. The magnitude of the ground movements is not expected to be more adverse than those assessed for the EES and PSA processes.

### CBD North Station

- Ground movement effects as assessed within Chapter 19 (Ground Movement Effects) of the EES shown the extent of ground movements >5mm extend beyond the mined cavern footprint.
- As the proposed amendment works footprint, extend beyond the EES works footprint, it would be reasonable to assume the extent of ground movements >5mm would increase by the same amount. The magnitude of the ground movements is not expected to be more adverse than those assessed for the EES.
- Any increase of adverse effects on structures and/or assets both within and outside of the project land boundary as a result of the change of scope is considered to be minimal and will be mitigated via the EMF and existing EPRs.
- Temporary ground anchors, which extend beyond the approved Project Land may be required to replace internal propping at several shafts in CBD North. The primary support method for the shafts will be internal propping, however at the level of the adits direct entry will be required for construction and internal propping will not be possible. It is noted that other zones may be required within the approved Project land. These works are not anticipated to have a greater effect on ground movements than assessed in the Melbourne Metro EES and PSA processes.

### CBD South Station and Federation Square Adit

- The extent of the adit from Federation Square at CBD South extends outside of the approved Project Land and below the western edge of St Paul's Cathedral. There is another pedestrian adit from CBD South under Collins Street and the Town Hall. The new adits are likely to generate ground movements over a larger extent than identified in the Melbourne Metro EES and PSA processes. As a consequence, there is a higher potential for ground movements to have an adverse effect on the heritage listed St Paul's Cathedral and Melbourne Town Hall. A targeted impact assessment is recommended to consider these two sensitive receptors.
- Sensitive features inside St Paul's include imported marble finishes, patterned tiles, glass mosaics and stained-glass windows.
- The existing EPRs will mitigate risk of ground movement effects on the structure, through designing the works to mitigate ground movements (GM2), complete a detailed assessment of movements and mitigation



measures (GM3), confirm the condition of the structure (CM4), careful construction practices (GM5) and complete any required remedial work (GM6).

- The residual assessed risk from a ground movement perspective is considered to be medium.

#### **Additional road surface works**

- Ground movement effects are not typically considered to be an issue with road surface works. The risk of excavation, movement, instability and effects on utilities associated with road surface works are normally addressed as part of standard, good construction practice.
- We do not consider the proposed changes to Project Land will have any different effects to those considered as part of the Melbourne Metro EES and PSA processes.

## **5.8 Groundwater**

An initial contamination groundwater assessment was undertaken by CYP. Key groundwater changes and findings include:

- The impact pathway for groundwater seepage to structures and/or groundwater extraction resulting in mobilisation of groundwater contamination has been updated to include vapour intrusion to underground structures (applicable to all project changes).
- Available depth to groundwater information in the vicinity of CBD South Station indicates extraction of groundwater is likely to be required during construction of the Degrares Street link. As a result, initial likelihood of extraction of groundwater mobilising contamination, impacting on relevant groundwater beneficial uses has been increased to Likely. Initial risk ratings remain unchanged.
- It has been assumed that the proposed Degrares Street link will be completely tanked/sealed, in accordance with EPRs, and therefore groundwater impacts during operational phases have been reduced to unlikely and/or rare/remote. Initial risk ratings have been reduced as a result.
- Amendments throughout to provide consistency of terminology used with relevant EPRs.

The existing, approved EPRs should appropriately manage the groundwater impacts associated with the changes to Project Land, particularly through the development of ground water models, consistent with the Australian Groundwater Modelling Guidelines, Groundwater Management Plans for each work package and the Groundwater Disposal Strategy.

## **5.9 Land use and planning**

An initial land use and planning assessment was undertaken by CYP. Using the existing approved EPR control LU1 across all of the project changes will ensure that prior to commencement of relevant works and a suitable Land Use Management Plan for construction and operation will be implemented in order to minimise impacts on existing land uses. Furthermore, the Communication and Stakeholder Strategy associated with the project changes will ensure that appropriate consultation and communications occurs with affected land managers for public land, local councils, private land owners and tenants and other interested stakeholders.

Overall, the changes to approved Project Land support and give effect to the relevant policies themes expressed in the State Planning Policy Framework (SPPF) and Local Planning Policy Framework (LPPF).

The *Planning and Environment Act 1987* provides a planning framework that establishes planning schemes as the principal way of setting out objectives, policies and controls for the use, development and conservation of land within Victoria. The State objectives around transport clearly specify the need to locate transport routes to achieve the greatest overall benefit to the community and with regard to making the best use of existing social, cultural and economic infrastructure, minimising impacts on the environment and optimising accessibility, safety, emergency access, service and amenity. The Melbourne Metro Project achieves these objectives, and these Project changes will maximise the benefits of the Metro Tunnel.

Melbourne City Council's LPPF contains a transport vision for the city that seeks to maximise the use of sustainable modes of transport, in particular, public transport. The changes to the approved Project Land support this vision by ensuring that the Project delivers an efficient transport system, which is vital for the economic, cultural and social operation of the city.

The existing EPRs have been developed through the EES and PSA processes and post approval processes to address the environmental risks and impacts through a performance-based approach that seeks to achieve an overall net community benefit.

The exact extent of properties to be acquired at strata will be determined following detailed design. Any land occupation and/or acquisition will be undertaken in accordance with the legislative requirements of the *Major Transport Projects Facilitation Act 2009* and *Land Acquisition and Compensation Act 1986*.

In undertaking a desktop land use and planning assessment of the project changes, the following key risks and themes were considered:

- The impact of land acquisition on the land use character of the area and potential change to built form
- The change of built environment and land use and its compliance with relevant legislative guidelines and State and local planning policy including strategic planning studies
- Access implications and the potential impact to existing land use
- The presence of any encumbrances, (depth limitations based on indicative tender data and design of approximately 10 metres)
- Opportunities for the Project to improve the built environment.

#### **Parkville Station to CBD North Station**

- Parkville Station and tunnel modifications will result in limited impacts on current and future land use and development above ground as the majority of works associated with this Project change are located below ground and entail strata divestment. Design refinement regarding the station location and rail alignment has the potential to further minimise land use and planning impacts and ensure that the number of new affected landholders, tenants and stakeholders is directly minimised
- Additional ground support structures will require further investigation as they will be permanently in place and temporarily used, therefore potentially impacting on future development in a different way to other construction activities.

#### **CBD North Station**

- The land use and development impacts between CBD North and CBD South station precinct are considered acceptable as the majority of works including rock bolts would still be located within the Swanston Street road reserve. The depth at which additional project land is affected is significant and outside of any realistic subterranean development envelope (i.e. car park), particularly given applicable heritage and height controls. DDO1-A1, DDO2, DDO2-A1, DDO3, DDO4, DDO70 apply to the area between CBD North and South. DDO2-A1 stipulates a maximum building height of 40m along Swanston Street with the aim of retaining a feeling of openness and intimate scale for pedestrians.
- The extended application of the DDO will protect and safeguard Melbourne Metro infrastructure, but it could have impacts on future development, albeit limited. Design refinement regarding the station location and rail alignment has the potential to further minimise land use and planning impacts and ensure that the number of new affected landholders, tenants and stakeholders is minimised.
- Additional ground support structures will require further investigation as they will be permanently in place and temporarily used, therefore potentially impacting on future development in a different way to other construction activities.

#### **CBD South Station**

- The project changes relating to the new connection to Flinders Street Station and adits below St Paul's Cathedral will be impacted by the Victorian Heritage Register, Heritage Inventory and Heritage Overlays. Further research and collaboration with cultural historic and social, community and business disciplines will provide more detailed insight into the impacts that these works will have on these places of historic significance. Council and Heritage Victoria seek to protect elements that add to the area's significance, therefore undertaking below strata works at the Town Hall and St. Paul's Cathedral should have minimal impact on the significant land use character contribution to these uses. The impacts on Flinders Street Station will be more significant during construction, however reinstatement and enhancement will ensure minimal impact on the historic and visual character of the station precinct.
- The land use and development impacts between CBD North and CBD South station precinct are considered acceptable as the majority of works including rock bolts would still be located within the Swanston Street road reserve. The depth at which additional project land is affected is significant and outside of any realistic subterranean development envelope (i.e. car park), particularly given applicable heritage and height controls. DDO1-A1, DDO2, DDO2-A1, DDO3, DDO4, DDO70 apply to the area between CBD North and South. DDO2-A1 stipulates a maximum building height of 40m along Swanston Street with the aim of retaining a feeling of openness and intimate scale for pedestrians.
- The extended application of the DDO will protect and safeguard Melbourne Metro infrastructure, but it could have impacts on future development, albeit limited. Design refinement regarding the station location and rail alignment has the potential to further minimise land use and planning impacts and ensure that the number of new affected landholders, tenants and stakeholders is minimised.
- Additional ground support structures will require further investigation as they will be permanently in place and temporarily used, therefore potentially impacting on future development in a different way to other construction activities.

#### **Surface Road Works**

- Additional Surface Road Works may result in temporary limitations on access to properties along the affected roads. It is understood that the road surface works will not result in a permanent change in road function albeit that legacy assets such as landscaping and urban design treatments may be introduced in the road reserve.

- Given the potential for land use and development change and the potential extent of acquisition, the overall residual risk rating associated with the Project changes is assessed as medium. However, a detailed land use and planning assessment will most likely reduce these impacts as more information becomes available and mitigation measures can be identified and implemented to reduce the overall land use and planning risk level(s).

The detailed land use and planning impact assessment will include:

- A review of the legislative framework for the study area, including the Melbourne, State and Local Planning Policy Frameworks, zones, overlays and other provisions,
- A review of relevant Ministerial directions and planning practice notes,
- A review of current planning permit applications and recently approved permits,
- A baseline land use survey to identify existing and proposed land uses and development along and adjacent to the additional Project Land.

## 5.10 Noise and vibration

An initial noise and vibration assessment was undertaken by CYP. The nature of the risk is unchanged compared to that considered as part of the Melbourne Metro EES and PSA process. It is however the location of the impact that is changing. Therefore, the EPRs remain appropriate for the changes to the approved Project Land, specifically the EPA Publication 1254 Noise Control Guidelines, Noise and Vibration modelling, monitoring and targets, Vibration Dose Values (for human comfort), PRINP and the Construction Noise and Vibration Management Plan; will provide the management and mitigation controls required.

A detailed discipline impact assessment will follow this assessment to determine how the guiding target levels of the EPRs will be complied with. These items relate to:

- Construction-phase impacts, particularly underground support structures and TBM operations
- Operational noise and vibration impacts in the Parkville to CBD North area, for receivers where the proposed change results in the railway being located closer.

The impact assessment will need to focus on qualitative and quantitative data analysis to understand the noise and vibration impacts of the changes to the approved Project Land. More specifically, an impact assessment will:

- Develop an operational ground borne noise and vibration model of modified tunnel alignment between Parkville Station and CBD North Station
- Undertake preliminary operational ground borne noise and vibration modelling of modified tunnel alignment.
- Prepare operational ground borne noise and vibration assessment.
- Undertake preliminary desktop construction noise modelling and assessment, considering road surface works
- Undertake preliminary construction vibration modelling for revised modified tunnel alignment
- Prepare preliminary desktop construction vibration assessment for modified tunnel alignment, tunnel widening, and construction of new connection to Flinders Street Station.
- Complete an assessment of the likely operation and construction stage noise and vibration impacts of the CYP design changes, management measures to reduce the impact and conclusions, and prepare reporting suitable for public consultation.

## 5.11 Surface water

An initial surface water assessment was undertaken by CYP. All proposals, except the Degraves Street and Campbell Arcade connection, result in no change to the existing surface water risk assessment.

Degraves Street Underpass and Campbell Arcade is known to be susceptible to flooding. The entrances to this underpass are below the 0.1% AEP (1 in 1000yr ARI) flood level of the Yarra River resulting in a risk of flooding to the CBD South Station and tunnels. These risks are covered by EPR SW1 and SW2.

The risk rating was based on the likelihood being 'likely'. Although hydraulic modelling is yet to be carried out for the area, there is numerous anecdotal accounts of flooding within the existing underpass. The impact was deemed to be 'moderate'. Based on the methodologies outlined above, the risk rating was found to be medium.

In order to reduce the risk rating, it is proposed to install a flood barrier at the interface of the existing Degraves St Underpass/Campbell Arcade and the proposed passageway to CBD South Station. This flood barrier will prevent the ingress of flood waters from the existing Degraves Street Underpass to the proposed CBD South Station. It is not proposed to protect the existing underpass from surface water inflows. Appropriate flood warning systems, yet to be determined, would be provided as per the case for Western Portal and Arden Station.

Overall, the EPRs will be able to satisfactorily manage and mitigate any potential risks, particularly through the preparation of the Water Sensitive Urban Design Strategy and ongoing consultation with the water authorities.

## 5.12 Transport

An initial transport assessment was undertaken by CYP. It was identified that the following changes would have negligible/no impact to the operations of the surface network due to the modifications being subterranean or not of significant difference to create an increased adverse impact:

- Modifications to the rail alignment between Parkville and CBD North
- Widening of the project land along Swanston Street
- Introduction of temporary underground structures
- Roadworks – Construction.

A series of additional construction road works requirements have been identified in addition to those outlined by the reference case. It is likely that construction works associated with the above will have an impact on the road network. While traffic management to mitigate these impact is Business as Usual for the approval of temporary traffic management events, the impacts to the surface transport network and travelling public will be further mitigated through the EPRs captured under T1, T2, T3, T4, T5, T6 & T7.

Management of all the transport modes throughout this project duration will require short-term traffic and transport management, particularly at Flinders Street, Flinders Lane and Toorak Road. Traffic Management is likely to include lane closures lasting from a day to a week and required for activities such as large plant deliveries, access constraints utility relocation or geotechnical investigation. The general requirements detailed in this TMP will feed through to the Precinct Transport Management Plans, Transport Management Implementation Plans and Traffic Guidance Schemes and have a direct effect on the implementation of short-term transport control measures. The measures within these requirements will consider the cumulative effect of the closures in order to manage these constrained areas.

Overall, the existing EPRs will manage the changes to roads by:

- Ensuring that the traffic management plans and events are developed in consultation and collaboration with the relevant transport stakeholders and agencies through the TTWG (EPR T1).
- Ensuring the traffic management plans to be cognisant of the impacts of the project as a whole and schedule accordingly to minimise cumulative impacts as far as practicable (EPR T2).
- Identifying alternative working methodologies to minimise impacts (eg. after hours work) (EPR T2)
- Allowing the traffic management plans to be evolved and accommodate lessons learned through ongoing monitoring (EPR T2).
- Recognising and accommodate priority movements within each precinct (EPR T3)
- Establishing an upfront understanding regarding the impacts of parking associated with construction activity and identification of how priority facilities will be accommodated (EPR T3)
- Establishing a strategy to minimise the impact of parking associated with construction activities from further reducing the public parking supply (EPR T3)
- Maintaining a continuous public transport network through and around the works zones (EPR T4)
- Ensuring the impacts to active transport users are minimised recognising diversions to these users is of greater impact and consequence than motorised transport (EPR T5).
- Encouraging users to adopt alternative travel options to decrease the volume of traffic on the road network, with the intent to assist offset the impact of construction activities (EPR T7)

## 5.13 Recommendations

Where necessary, recommendations have been provided for specific aspects and/or technical discipline in Table 18 below.

TABLE 18: RECOMMENDATIONS

Aspect / Discipline	Recommendation
<b>Air quality</b>	No further assessment is required.
<b>Arboriculture and biodiversity</b>	No further assessment is required.
<b>Aboriginal cultural and historical heritage</b>	A new CHMP including the new project land will be required. A historic heritage impact assessment will be required.  To address the matters outlined above, this discipline will therefore require a detailed impact assessment.
<b>Business and social</b>	The business and social impacts, particularly access to workplaces and residential buildings will require further investigation.



Aspect / Discipline	Recommendation
	To address the matters outlined above, this discipline will therefore require detailed impact assessment.
<b>Contaminated land and spoil management</b>	No further assessment is required.
<b>Electro-magnetic interference</b>	<p>The risk remains moderate at Parkville to CBD North during operation of the station as relocation of equipment may be required. If relocation of equipment could be confirmed, the risk assessment the risk would be lower.</p> <p>No further assessment is required.</p>
<b>Ground movement</b>	Detailed assessment and consideration of settlement mitigation measures as part of the EPR will mitigate the risk. It is recommended that a detailed impact assessment be undertaken for identified sensitive receptors, Melbourne Town Hall and St.Paul's Cathedral only.
<b>Ground water</b>	No further assessment required.
<b>Land use and planning</b>	<p>It is recommended a detailed land use and planning assessment be undertaken; building on the EES and PSA processes to include:</p> <ul style="list-style-type: none"> <li>▪ a review of the legislative framework for the additional land in the changes, including the Melbourne, State and Local Planning Policy Frameworks, zones, overlays and other provisions,</li> <li>▪ a review of relevant Ministerial directions and planning practice notes,</li> <li>▪ a review of current planning permit applications and recently approved permits,</li> <li>▪ a baseline land use survey to identify existing and proposed land uses and development along and adjacent to the proposed project changes.</li> </ul> <p>To address the matters outlined above, this discipline will therefore require a detailed impact assessment.</p>
<b>Noise and vibration</b>	<p>To further investigate the items where potential compliance with the noise and vibration guideline target levels in the EPRs is currently uncertain, the following investigations are recommended:</p> <ul style="list-style-type: none"> <li>▪ Operational noise and vibration modelling for the revised Parkville to CBD North alignment</li> <li>▪ Construction noise and vibration modelling for the revised Parkville to CBD North alignment</li> <li>▪ Construction noise and vibration modelling for the insertion of underground support structures</li> <li>▪ Construction noise and vibration modelling of the Degrares St piling works</li> <li>▪ Construction noise and vibration modelling of the additional road works activities.</li> </ul> <p>To address the matters outlined above, this discipline will therefore require a detailed impact assessment.</p>
<b>Surface water</b>	<p>Install a flood barrier at the interface of the existing Degrares St Underpass/Campbell Arcade and the proposed passageway to CBD South Station to mitigate risk.</p> <p>No further assessment is required.</p>
<b>Transport</b>	No further assessment required.

## 6 Risk Assessment Summary

In summary, although several risks were identified throughout the initial environmental risk assessment for the construction and operation phases of the Project, many of the existing EPR controls are sufficient to mitigate or lessen environmental risks associated with the proposed Project land changes. Specifically, when the EPR controls were applied to each activity, the 38 high risk initially identified were reduced to medium at the residual risk stage. Arboriculture, air quality, biodiversity, greenhouse gas, groundwater, urban design and landscaping rated low or very low across all aspects and activities.

Risk identified as medium or above, were confined to the following aspects:

- Business, community and social
- Land use and planning
- Historic Aboriginal and cultural heritage
- Noise and vibration
- Electromagnetic interface
- Surface water
- Ground movement
- Transport

To ensure appropriate measures are in place to manage these risks, detailed impact assessments are being undertaken for business and social; land use and planning, historic aboriginal and cultural heritage and noise and vibration.

To limit EMI and surface water risks, the recommendations will be considered further during the design phase. Although transport incurs a medium residual risk for works carried out at CBD South and additional road works, these risks should be managed through the Traffic Management Plan process. Ground movement EPRs require a detailed assessment of structures, control of works and radiation, however even if these are applied there is still an unavoidable potential that damage could occur.

Based on the initial environmental risk assessment, there are no unacceptable environmental risks arising from the proposed CYP changes to the approved Project Land. Those risks identified by technical discipline as 'high' or 'medium' including for business and social; land use and planning; Aboriginal and historic cultural heritage; ground movement, and noise and vibration will be subject to the detailed impact assessment process.

## 7 Impact Assessment

### 7.1 Introduction

The ERA process initially involved the definition of the context and scope of the additional Project Land required for the additional works. This entailed the preparation of an updated Project Description for buildings and works located outside of the approved Project Land. Following this, an initial environmental risk screening using the EPRs was undertaken (See Section 5). The approach involved the application of the EPRs as an assessment tool, an approach that accords with the framework established during the EES and PSA processes for the Project. This resulted in the Environmental Risk Register being produced to clearly identify any adverse impacts (See **Appendix A**). The results identified five disciplines as requiring further detailed analysis in the form of an Environmental Impact Assessment. These disciplines were Business and Social, Ground Movement, Historical Cultural Heritage, Land Use and Planning and Noise and Vibration.

The impact assessment process for these five disciplines has been designed to assess the potential positive and adverse impacts of the changes to the approved Project Land resulting from CYP design changes. It assesses new potential impacts arising during construction and operation, and includes consideration of both direct and indirect impact.

The main objective of the impact assessment process was to identify any potential risks that could not be managed by the current approved EPRs and support MMRA's proposed planning scheme amendment (GC82), including an updated Incorporated Document with revised Project Land. A discipline specific approach was adopted by all discipline. The analysis and findings of each assessment are outlined in Section 7.3. **Appendix B** contains a full copy of the individual impact assessment reports for each technical discipline.

### 7.2 Methodology

Each discipline adopted a methodology appropriate for their study, (refer **Appendix B** for individual methodologies). Generally, the methodology implemented for each study included an analysis and summary of relevant legislation, policy and guidelines as well as the implications and potential approval requirements. Following this, a study of the existing conditions was undertaken for each discipline, providing a contextual background to each locality and the relevant components required for consideration as part of the assessment. The impact assessments evaluated the change in conditions as a result of the works in additional Project Land, the impacts these have on the locality and the ability for the EPRs to satisfactorily manage and mitigate these risks. Any stakeholder engagement undertaken or required in the future was then discussed as part of the assessment. Finally, assumptions and limitations were described for each technical area.

Business and Social, Historical Cultural Heritage, Land Use and Planning and Noise and Vibration undertook an analysis of all of the proposed CYP changes to the approved Project Land. Ground Movement however undertook a targeted approach, focusing on the Melbourne Town Hall and St.Paul's Cathedral in particular. These two receptors were identified due to the potential impacts of the adits occurring within each footprint. As a consequence, there is a higher potential for ground movements to have an adverse effect on the heritage listed assets of St Paul's Cathedral and Melbourne Town Hall.

### 7.3 Analysis and Findings

#### 7.3.1 Business and Social

The business and social impact assessment considers the effects of the proposed CYP design and construction changes on private residential property owners, occupiers, the operators and users of affected social infrastructure. It also considers the potential new or additional impacts on amenity, the social fabric of the community and recreational values; The business assessment considered a number of businesses that are influenced by the CYP design and construction changes relating to the rail tunnel alignment, additional underground support structures, as well as along roads that will be required for construction phase traffic management and legacy road works.

Given the nature of the environments in which the proposed CYP design and construction changes are located, some level of business and community disruption will occur. Disruption will predominantly involve temporary impediments in access to businesses and social infrastructure during the construction phase. The existing EPRs will ensure affected parties are provided with timely information and are consulted in relation to the implementation of appropriate mitigation measures.

Overall, the proposed CYP design and construction changes are unlikely to create adverse and destructive business and/or social impacts. A certain level of disruption in access to social infrastructure and businesses may be expected, nevertheless, it is likely to be of a short-term duration (i.e. a day to a week for activities) duration. Full implementation of existing EPRs is expected to manage and mitigate the residual risk rating of all potential risks to 'low' or 'very low'.

### 7.3.2 Historic Cultural Heritage

Due to the thoroughness of the Historical Heritage Impact Assessment undertaken by Lovell Chen in 20 April 2016, it was considered unnecessary to reiterate many of the sensitivities associated with the proposed changes in the approved Project Land. Only in those instances where relatively substantial changes are proposed, is it necessary to expend upon what was contained within the initial historic heritage assessment. In most cases, there is no significant increase to direct physical impact(s) to listed heritage places, as most of the proposed works are to be undertaken at strata (below ground) or superficial in nature. Additional land required for rail tunnel alignments would be subject to the same impacts as per those previously assessed with the exception that a slightly wider horizontal alignment in some places.

This project comprises a realignment of the connection to Flinders Street Station, which will require no impact on the Flinders Street forecourt. The mid-platform connection works will however impact on the heritage fabric in a different manner to the originally assessed connection evaluated under the EES and PSA processes. However, the overall impact is relatively limited and localised and can be mitigated through adherence to the EPRs. The operation impacts were considered and it was concluded these can be appropriately managed through the current EPRs. Furthermore, there will be additional permit (s) required under the *Heritage Act 2017* any works in the Arcade.

Potential adverse impacts associated with construction related vibration and ground movement could also take place, nevertheless, these detrimental impacts were assessed as part of the EES and PSA processes in the historical cultural heritage assessment, noise and vibration assessment and the ground settlement and land stability assessment. Implementation of these measures will suffice for the proposed works in the additional Project Land.

### 7.3.3 Land Use and Planning

This discipline assessment addresses issues relating to impacts on land use, the built form, land acquisition, access and existing planning controls and approved development. Overall, there is a high diversity of land use within the CBD including retail, office, commercial, residential, education and civic purposes. Outside of the CBD, there is similarly a diversity of land uses including industrial, residential, health and research, educational and parkland purposes.

The primary issues identified and assessed in this assessment included: potential constraints on future development of land due to the presence of the underground infrastructure; land acquisition within each component and potential for temporary and permanent access issues to impact on existing land uses.

Overall, there is an established net community benefit that will result from the inclusion of the additional Project Land to facilitate the construction and operation of the Melbourne Metro. These include:

- accommodating and supporting ongoing design improvements across Parkville Station, CBD North Station and CBD South Station
- providing commuters seamless access from the new railway stations to existing railway stations to the middle of Flinders Street Station platforms
- provide safe and less restricted construction space for the excavation works due
- allow for more efficient constructing techniques
- reduce the geotechnical stress
- allow the trams 19, 57 and 59 to integrate into the current tram network along Flinders Street
- allow more trams onto the network overall
- public realm restoration post construction

Full implementation of relevant EPRs is expected to reduce the residual risk rating of most of potential land use and planning risks to either 'low' or 'very low'. Therefore, no additional EPRs are warranted for the proposed CYP design and construction changes outside of the approved Project Land.

### 7.3.4 Noise and Vibration

The changes to Project Land involve many of the locations that relate to temporary works for traffic management, which have minimal noise and vibration impacts. The Project Land changes however with the potential for noise and vibration impacts are mostly located between Parkville and Flinders Street Station. These environments include significant ambient transport noise, including trams, trains and/or traffic. The environments also include



sources typical of a city centre, pedestrians, building services and regular construction works. Therefore, the existing ambient noise and vibration levels are relatively high in many locations.

In general, the proposed changes to the approved Project Land do not introduce any additional noise and vibration impacts over those outlined as part of the initial EES and PSA processes. Therefore, the existing EPRs are considered appropriate for managing noise and vibration from the construction and operational phases of the Project, and no changes to the EPRs are recommended.

### 7.3.5 Ground Movement

The ground movement impact assessment has been specifically carried out for the CBD South Station component. The intention of this assessment was to identify and report the predicted ground movement and assess associated building damage for two specific buildings - St Pauls Cathedral and Melbourne Town Hall.

The assessment criteria adopted by the ground movement impact assessment was based on classifications proposed by Burland (1995) where the building damage is considered that affects 1. Aesthetics (i.e the appearance of the building), 2. Serviceability, (i.e the effect on the function of the building), and 3. Stability. The categories are related to the tensile strain that the building will experience

In terms of findings, the Melbourne Town Hall overall building damage score is 2. This was based on only one line (line 26) indicating this score, and one line (line 29) indicating a score of 1. The majority of the building lines have a score of 0. The overall building damage score for St.Paul's Cathedral is 1. This was represented by three lines (4, 12 and 26) indicating this score. The majority of the building lines have a score of 0.

In this instance, St.Paul's Cathedral and Melbourne Town Hall have been identified for a Phase 3 assessment. The Phase 3 assessments may identify buildings where specific attention is required, however the designation of any protection, mitigation or remediation works needs to consider the specific building form. Although a Phase 3 assessment is required, these are overall considered acceptable based on classifications proposed by Burland (1995). Burland (1995) is generally accepted as industry standard. In light of this, the established EPRs contain appropriate techniques to mitigate any possible adverse effects that could be experienced as a result of construction works.

Overall, based on available information the works to be completed by CYP at strata (i.e. below ground) under the Melbourne Town Hall and St. Paul's Cathedral are considered technically acceptable and capable of being managed by the current EPRs. As part of the CBD South Station works, it is noted an inspection and monitoring program will be undertaken during the design phases as outlined by the EPRs GM4 and GM 5. Furthermore, isolated locations of repair work may be required, but will be adequately managed through EPR GM5.

## 8 Impact Assessment Summary

The Environmental Impact Assessment has been prepared by CYP for the additional Project Land. It considers the additional construction and operation components as a consequence of CYP's detailed design for Melbourne Metro. The purpose of the impact assessment was to assess the potential positive and adverse impacts of the CYP design changes located outside of the approved Project Land. Addressing both construction and operational phases, this report identified potential beneficial opportunities, mitigation measures to manage adverse impacts, and pressure tested the existing EPR's for application and, if necessary, augmentation.

For assessment purposes, the additional Project Land was divided into four components to assess the potential impacts on the locality and surrounding communities. This included Parkville Station to CBD North Station, CBD North Station, CBD South Station and the project wide additional road surface works. Each discipline employed their own methodology to robustly assess the technical based impacts of the CYP design changes on the additional Project Land. Importantly, all of the discipline confirmed that potential adverse impacts can be appropriately managed by adopting and implementing relevant EPRs.

In summary, no additional EPRs are required, thereby ensuring that the Melbourne Metro Project will meet the objectives set by the EES and PSA processes requirements and the approved EMF.

# Appendix A - CYP Environmental Risk Register

# Appendix B – Environmental Impact Assessments