sydney METRO | city & southwest

CHATSWOOD TO SYDENHAM

SYDENHAM STATION AND SYDNEY METRO TRAINS FACILITY SOUTH MODIFICATION SUBMISSIONS REPORT

NSW GOVERNMENT | Transport for NSW

NSW MAKING IT HAPPEN

EXECUTIVE SUMMARY

Executive summary

Sydney Metro City & Southwest has been developed within the framework of the transport and planning strategies identified in State government policies. This includes the 12 NSW Premier priorities (established to grow the economy, deliver infrastructure, and improve health, education and other services across NSW), Sydney's Rail Future: Modernising Sydney's Trains, Draft Metropolitan Strategy for Sydney 2031 and the NSW Long Term Transport Master Plan. The project responds to these challenges delivering a step-change in the capacity of Sydney's rail network by providing a fully automated rail system across Sydney, supporting high demand with a high capacity, turn-up-and-go service.

Planning approval for Sydney Metro City & Southwest Chatswood to Sydenham was granted by the Minister for Planning under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 9 January 2017.

Transport for NSW is seeking to modify the approved project in relation to proposed changes around Sydenham in accordance with section 115ZI of the EP&A Act. A modification report was lodged with the Department of Planning and Environment and publically exhibited from 28 June 2017 to 9 August 2017.

Purpose of this report

During public exhibition of the modification report, 15 submissions were received by the Department of Planning and Environment. The Secretary of Department of Planning and Environment provided copies of the submissions to Transport for NSW.

This report provides:

- Clarifications to the information presented in the modification report
- Responses to the issues raised in submissions.

Clarifications

The clarifications provided in this report relate to:

- Minor changes to the proposed modification area
- Noise impacts to receivers near the interface with Sydney Metro City & Southwest Sydenham to Bankstown upgrade project
- Minor changes to the layout of the Sydney Metro Trains Facility South
- Adjustments to the Marrickville (Meeks Road) Railway Substation.

Overview of submissions

The Department of Planning and Environment received 15 submissions during the modification report exhibition period. Of these submissions, seven were from government agencies and one was from the local council. These agencies raised a range of issues relevant to their respective areas of interest and responsibility. Further information on key issues raised by each group is provided in Chapter 4 (Submissions received).

A total of seven submissions were received from the community (including individuals and organisations). These submissions raised a range of issues of personal interest or relevance.

Chapter 5 and Chapter 6 of this report present the issues raised in submissions and provide responses to these issues.

Next steps

The Department of Planning and Environment will, on behalf of the NSW Minister for Planning, review the modification report and this submissions report. Once the Department of Planning and Environment has completed its assessment, a draft assessment report will be prepared, which may recommend additional or revised conditions of approval.

The assessment report will then be provided to the NSW Minister for Planning (or delegate) for consideration. The Minister for Planning (or delegate) will then determine the application for the proposed modification and, if approved, may included any revised or additional conditions considered appropriate.

The NSW Minister for Planning's (or delegate's) determination, including any revised conditions of approval and the assessment report, will be published on the Department of Planning and Environment's website immediately after determination, together with a copy of this submissions report.

CONTENTS

Contents

Tables

Figures

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INTRODUCTION

CHAPTER ONE

1 Introduction

1.1 Overview

Planning approval for Sydney Metro City & Southwest Chatswood to Sydenham was granted by the Minister for Planning under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 9 January 2017.

Works at Sydenham as part of the approved project involve:

- A dive structure (about 400 metres long) and tunnel portal between Sydenham Station and Bedwin Road, Marrickville (the Marrickville dive structure). The dive structure would commence about 400 metres north of Sydenham Station and the Marrickville tunnel portal would be located about 840 metres north of Sydenham Station, to the south of Bedwin Road
- A services facility beside the Marrickville dive structure and tunnel portal, including a tunnel water treatment plant and a substation (for traction power supply)
- Signalisation of the Edinburgh Road / Edgeware Road / Bedwin Road intersection at Marrickville
- The temporary use of a construction site adjacent to the proposed dive structure.

Transport for NSW is seeking to modify the approved project in relation to proposed changes around Sydenham in accordance with section 115ZI of the EP&A Act. A modification report was lodged with the Department of Planning and Environment and publically exhibited from 28 June 2017 to 9 August 2017.

1.2 Need for the proposed modification

Sydenham Station and Sydney Metro Trains Facility South and associated works were considered for inclusion in the scope of works for the Sydenham to Bankstown upgrade project. As noted in the application report for that project, Transport for NSW has been investigating opening Sydney Metro City & Southwest in two phases. Further project planning has now identified that the Chatswood to Sydenham component (Phase 1) could be opened some months in advance of the Sydenham to Bankstown component (Phase 2) and could be extended through to Sydenham Station. A phased opening through to Sydenham Station would provide the opportunity to enable Sydney Metro services at Sydenham during the final shutdown of the T3 Bankstown Line that is required to complete construction of the Sydenham to Bankstown component.

The Sydenham to Bankstown State Significant Infrastructure Application Report noted that delivery of works to support the potential phased opening of Chatswood to Sydenham through to Sydenham Station could be accelerated under a separate planning approval. To provide opportunity for accelerated delivery of these works, Transport for NSW propose to include these elements of scope as part of the approved project through a project modification.

The proposed extension of the approved project to include the delivery of Sydenham Station to support metro operations would provide the following benefits:

- Customers on the T4 Eastern Suburbs and Illawarra Line and T2 Airport Line would be able to interchange at Sydenham to access metro services to places like Martin Place, Barangaroo, Victoria Cross, Macquarie Park and the Norwest Business Park. Faster and direct access to places like North Sydney and Macquarie University would give customers more choices and better connections to jobs and educational opportunities

- Improved interchange potential at Sydenham would reduce congestion on the T4 Eastern Suburbs and Illawarra Line and T2 Airport Line and reduce interchange movements at other stations, particularly Central Station
- Support the temporary transport strategy for the final shutdown of the T3 Bankstown Line required for the construction of the Sydenham to Bankstown project. The proposed extension would provide frequent turn-up-and-go metro services at Sydenham Station for travel to and from the CBD and Sydney's northwest to minimise the impact to existing customers who would temporarily need to travel to and from Sydenham Station via rail replacement bus services during this final shutdown.

To provide operational efficiency and flexibility, the proposed modification would also involve the conversion of a section of track to the south of Sydenham Station to metro standards, including the addition of another track-crossover. The T3 Bankstown Line tracks would be realigned to connect to the T2 Airport Line tracks to retain the ability for T3 Bankstown Line services to operate whilst platforms 1 and 2 are isolated for metro conversion.

The provision of the Sydney Metro Trains Facility South as part of the Chatswood to Sydenham project would result in more efficient operations of metro services during the potential phased opening of Sydney Metro City & Southwest as stabling facilities would be located across the metro line, avoiding the need to run empty metro trains.

1.3 Overview of the proposed modification

The proposed modification would involve the addition of the following key features to the project:

- Sydenham Station and precinct works – demolition and reconstruction of platforms 1 and 2 for metro rail operations and a new aerial concourse connecting to new station entries at Railway Parade and Burrows Avenue. Upgrades to transport interchange facilities and provision for active transport would be delivered as part of the station works
- Sydney Metro Trains Facility South – construction and operation of train stabling and maintenance facilities for the overall metro network. The scope includes earthworks, retaining walls, track and rail systems, construction of new buildings, enabling works to support future rail corridor development above the facility, plus operation of trains and maintenance activities within the stabling yard
- Track and rail system facilities – reconfiguration of existing track and rail systems to segregate the T3 Bankstown Line and the Goods Line, installation of metro tracks and rail systems including crossover and turnback facilities
- Adjustments to the Sydenham Pit and Drainage Pumping Station – including a new aqueduct over the pit, new pumping station and new maintenance access ramp
- Ancillary infrastructure and works – including fencing, maintenance access, utilities works, drainage, noise barriers, road and transport network works, bridge works, and temporary facilities to support construction.

An updated figure showing the proposed modification area and key features is provided in Chapter 2 of this report.

1.4 Purpose of this report

During public exhibition of the modification report, 15 submissions were received by the Department of Planning and Environment. The Secretary of Department of Planning and Environment provided copies of the submissions to Transport for NSW.

This report provides:

- Clarifications to the information presented in the modification report
- Responses to the issues raised in submissions.

The structure and content of this report are outlined in Table 1-1.

Table 1-1 Structure of this report

Chapter	Description
Chapter 1	**Introduction (this chapter)** Provides an overview of the proposed modification and outlines the purpose and content of this report.
Chapter 2	**Clarifications** Provides clarifications to the information presented in the modification report.
Chapter 3	**Community and stakeholder involvement** Provides details of the consultation, and community and stakeholder involvement activities carried out during the development of the modification report, during exhibition of the modification report and future consultation should the proposed modification be approved.
Chapter 4	**Submissions received** Provides a summary of the submissions received during the public exhibition of the modification report.
Chapter 5	**Government submissions** Identifies the issues raised by government agencies and local council, and provides responses to those submissions.
Chapter 6	**Community, business and other submissions** Identifies the issues raised by the community and provides responses to those submissions.
Chapter 7	**Revised consolidated environmental mitigation measures** Presents an updated consolidated list of environmental mitigation measures for the project.
Appendix A	**Additional noise mapping** Provides additional noise mapping covering the full modification area.
Appendix B	**Additional non-Aboriginal heritage technical information** Provides additional technical information in relation to potential non-Aboriginal heritage impacts.
Appendix C	**Flooding technical information** Provides additional technical information in relation to the flooding assessment.

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MODIFICATION REPORT CLARIFICATIONS

CHAPTER TWO

2 Modification report clarifications

This chapter clarifies information included in the modification report. The following clarifications are discussed:

- Minor changes to the proposed modification area
- Noise impacts to receivers near the interface with Sydney Metro City & Southwest Sydenham to Bankstown upgrade project
- Minor changes to the layout of the Sydney Metro Trains Facility South
- Adjustments to the Marrickville (Meeks Road) Railway Substation.

2.1 Minor changes to the proposed modification area

The proposed modification area presented in Figure 1-1 of the modification report has been revised to:

- Align with the proposed boundary of the Sydney Metro City & Southwest Sydenham to Bankstown upgrade project
- Include the proposed works to raise the western channel bank of the Eastern Channel north of Tempe Station (these works were discussed in Section 17.3 of the modification report).

Additionally, the Figure 1-1 in the printed versions of the document did not contain the shading indicating different work areas. The revised modification area, including relevant shading, is shown on Figure 2-1.

Additional noise mapping covering the full modification area is provided in Appendix A. The following additional mapping is provided:

- Receiver types for the full modification area
- Construction cosmetic vibration assessment for the full modification area
- Construction airborne noise contours for the full modification area
- Operational airborne rail noise contours for the full modification area.

This additional mapping includes receivers impacted by the Sydney Metro City & Southwest Sydenham to Bankstown upgrade project. As these projects would be progressed concurrently, this provides a cumulative assessment for the area where they interface.

Table 2-1 provides the predicted construction noise impacts for the relevant works within NCA03. This table includes all 1,150 receivers within this noise catchment, which extends to the west of Marrickville Station. As a result, not all these receivers would be affected by the proposed modification, rather this table presents the cumulative impacts to these receivers of both the proposed modification and the Sydenham to Bankstown upgrade project. A large proportion of the exceedances to receivers in this noise catchment would be from works required for the Sydenham to Bankstown upgrade project.

The results in Table 2-1 indicate that the largest predicted exceedances of noise management levels would be associated with track works undertaken during possession periods, particularly activities that include a rockbreaker, diamond saw and / or ballast tamper. These works would be undertaken for short durations across the construction period, eg typically around four days for ballast tamper works. As identified in the modification report, high-noise generating equipment, such as rockbreakers, would generally not be used during the night-time period to reduce the level of exceedances.

Table 2-1 Noise management level exceedances – proposed modification NCA03

Activity	Duration (weeks)	Number of Receivers															
		HNA[1]	With NML Exceedance[2]														
			Standard Daytime			Possession works											
						Daytime out of hours[3]			Evening			Night-time			Sleep Disturbance		
General worksites																	
Earthworks	6	1	271	42	2												
Earthworks – with breaker	6	4	496	200	28												
Piling	6	1	228	37	1												
Site establishment	4		146	16	1												
Operations	52		80	7	1												
Corridor works – ground and track																	
Earthworks	30	4	291	80	17	455	195	36	454	195	36	542	289	97	453	195	36
Earthworks – with breaker	10	21	546	254	69	438	377	169	435	377	169						
Trackform	< 2	1	254	56	13	377	145	24	377	145	24	539	254	69	289	80	17
Trackform – with ballast tamper	< 1	16	458	195	36	547	289	97	545	289	97	309	453	231	245	492	257
Corridor works – track support systems																	
Overhead wiring modifications	3	4	369	69	57	517	186	78	517	186	78	466	368	124	485	161	73
Comms and signalling works	12	4	369	69	57	517	186	78	517	186	78	466	368	124	516	184	78
Segregation fencing	6		254	66	25	439	108	68	439	108	68	531	253	89	438	106	68

Key

NML exceedance of less than 10dB

NML exceedance between 11dB and 20dB

NML exceedance of greater than 20dB

1 *Highly Noise Affected, based on ICNG definition (ie predicted LAeq(15minute) noise at residential receiver is 75 dBA or greater).*

2 *Based on worst case predicted noise levels.*

3 *Daytime out of hours refers to the period on Sunday between 7am – 8am, and Saturday between 1pm – 10pm.*

Figure 2-1 Proposed modification area

2.2 Noise impacts to receivers near the interface with Sydney Metro City & Southwest Sydenham to Bankstown upgrade project

The construction noise assessment provided in the modification report, and the additional assessment provided in Section 2.1 of this report, provides a cumulative impact assessment of the proposed modification and the Sydney Metro City & Southwest Sydenham to Bankstown upgrade project for the area where they interface. This would affect receivers in Noise Catchment Areas 02 and 03.

The works around the interface of the two projects would consist of 'general works' and 'corridor works'. The noise modelling of these works presents the worst-case levels when the works are at their closest point to each receiver. As these works move along the corridor, the relative noise levels to each individual receivers would decrease. When considering the proposed modification in isolation from the Sydney Metro City & Southwest Sydenham to Bankstown upgrade project, the worst-case noise levels presented in the modification report and in Section 2.1 of this report would be accurate to the end of the modification area (to around Meeks Road). Beyond this point to the west, within NCA03, noise levels from the proposed modification in isolation would gradually decrease. Receivers would generally be affected within an area of around 200 metres from the works.

The opposite would occur when considering the Sydney Metro City & Southwest Sydenham to Bankstown upgrade project in isolation. When these works are being undertaken at the eastern extent of the Sydney Metro City & Southwest Sydenham to Bankstown upgrade project, receivers within NCA02 would be impacted within an area of around 200 metres from the works, with the noise levels gradually decreases with distance from the individual works location.

2.3 Minor changes to the layout of the Sydney Metro Trains Facility South

The approved Sydney Metro City & Southwest Chatswood to Sydenham project included a southern services facility (comprising a traction substation and an operational water treatment plant) adjacent to the Marrickville dive structure.

To accommodate the Sydney Metro Trains Facility South, these facilities are required to be relocated to other sites within the stabling facility, as follows:

- The operational water treatment plant would be relocated to the southern portion of the site. This location is separated from the nearest residential receivers in order to limit potential odour impacts
- The traction substation would be relocated to above the dive structure.

The relocation of the water treatment plant also requires the relocation of the administration building from the location shown on Figure 6-2 of the modification report. The administration building would be located on the northern boundary of the site adjacent to Edinburgh Road. This would place the administration building adjacent to the proposed car parking area and avoid the need to staff and visitors to walk through an operational rail yard. Transport for NSW are currently working with Inner West Council regarding the façade treatment of the administration building where it interfaces with public roads.

The revised layout of the Sydney Metro Trains Facility South is provided as Figure 2-2.

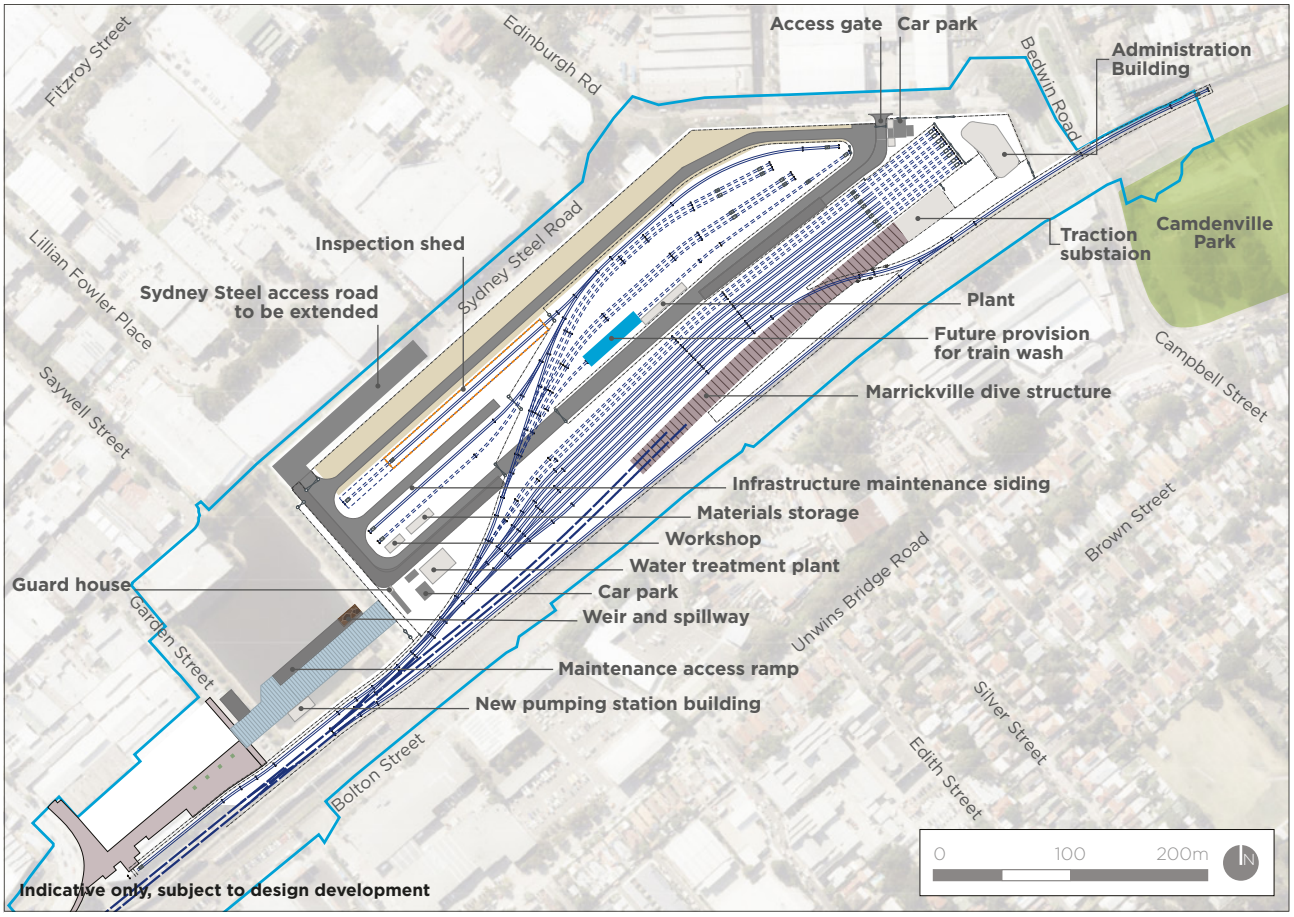

Figure 2-2 Sydney Metro Trains Facility South

2.4 Adjustments to the Marrickville (Meeks Road) Railway Substation

Further investigation has identified that adjustments would be required to the Marrickville (Meeks Road) Railway Substation to meet the traction power requirements of metro trains. This substation is located within the Sydenham Maintenance Centre and is listed on the RailCorp section 170 Heritage and Conservation Register.

The final scope of upgrade works to the substation would be developed during detailed design, however these works would be carried out in a sympathetic manner to minimise impacts on fabric, and heritage values and context.

The following section provides an overview of the potential impacts to the Marrickville (Meeks Road) Railway Substation. Further information, including historical background and potential impacts to other non-Aboriginal heritage items in the vicinity, are provided in Appendix B.

2.4.1 Marrickville (Meeks Road) Railway Substation – potential non-Aboriginal heritage impacts

The potential non-Aboriginal heritage impacts to the Marrickville (Meeks Road) Railway Substation are provided in Table 2-2.

Table 2-2 Marrickville (Meeks Road) Railway Substation – potential non-Aboriginal heritage impacts

Item	Significance	Impact type	Discussion
Marrickville (Meeks Road) Railway Substation RailCorp S.170 Heritage and Conservation Register (4801123)	Local	Direct	**Minor** The Marrickville (Meeks Road) Railway Substation is located within the study area outside the rail corridor. The building is located facing south on to the Illawarra Line within the Sydenham Triangle. The site is accessed via an overbridge via Way Street to the south and includes a substation building, a switch house, transformers and surrounding electrical equipment. The substation at Meeks Road would continue to operate as a substation in its current capacity with potential adjustment works to meet the requirements of metro trains. Provided that these works are designed and carried out in a sympathetic manner to minimise impacts on the fabric and heritage values of the substation, and that any additions to the building are designed to be sympathetic to the heritage context, it is expected the proposed modification would have a minor impact on the substation.
		Visual	**Minor** The substation at Meeks Road would continue to operate as a substation in its current capacity with potential adjustment works to meet the requirements of metro trains. Provided that these adjustment works and any additions to the building are designed and carried out in a sympathetic manner to minimise impacts on the substation, it is expected the project would have a minor visual impact. The heritage item is located approximately 445 metres away from Sydenham Station. Such distance would prevent any significant visual impacts onto the substation and would likely be negligible. Any views of the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the heritage item and would have a neutral visual impact.
		Potential direct	**Negligible** Vibration levels would be below the cosmetic damage screening criterion.

COMMUNITY AND STAKEHOLDER INVOLVEMENT

CHAPTER THREE

3 Community and stakeholder involvement

3.1 Consultation overview

The modification report was exhibited from 28 June 2017 to 9 August 2017. During this time, consultation activities were carried out to engage key stakeholders and the community on information in the modification report, encourage participation in exhibition activities and provide guidance on the submissions process.

Submissions on the proposed modification were received by the NSW Department of Planning and Environment during the exhibition period. The issues raised, and responses to them, are presented in Chapters 5 and 6.

3.2 Consultation prior to modification report exhibition

Engagement with the community and stakeholders about Sydney Metro City & Southwest began in June 2014 and continued through the preparation of the Chatswood to Sydenham Environmental Impact Statement.

Since the preparation of the Chatswood to Sydenham Environmental Impact Statement, consultation around Sydenham has included:

- Consultation with specific government agency groups including the Heritage Working Group and the Roads Integration Working Group
- Consultation with the community during preparation of the Sydenham to Bankstown Environmental Impact Statement (which initially included Sydenham Station and the Sydney Metro Trains Facility South)
- A community centre display at Marrickville Metro.

Feedback received during consultation activities has been considered in ongoing development of the proposed modification.

3.3 Consultation during modification report exhibition

The modification report was made available to view on the Department of Planning and Environment's website: www.majorprojects.planning.nsw.gov.au and the project website: www.sydneymetro.info.

Hard copies of the document were also available at Community Information Sessions and at the following locations:

- Inner West Council Customer Service Centre: 2–14 Fisher Street, Petersham
- Marrickville Library: corner of Marrickville and Petersham roads, Marrickville
- St Peters Library: 39 Unwins Bridge Road, Sydenham.

The Sydney Metro project team supported the public exhibition of the modification report through a variety of engagement methods and communication materials, as outlined below.

3.3.1 Community contact and information points

Table 3-1 outlines community contact and information points in use on the project.

Table 3-1 Community contact and information points

Activity	Detail
Community information line (toll free)	1800 171 386
Community email address	sydneymetro@transport.nsw.gov.au
Website	www.sydneymetro.info
Postal address	Sydney Metro City & Southwest: PO Box K659, Haymarket, NSW 1240
Transport for NSW community information centre	388 George Street, Sydney

3.3.2 Community information sessions

The project team hosted a series of community information sessions where displays and information about the proposed modification were available.

All members of the community were invited to attend these sessions and meet expert members of the project team and have any questions answered. There was no need to make a booking; visitors could drop in anytime within the advertised times.

There were 79 visitors at the three community information sessions. Table 3-2 outlines the date, time and location of community information sessions.

Table 3-2 Community information sessions

Date and time	Location	Attendees
Saturday 8 July, 10am – 1pm	Sydney Portugal Community Club, 100 Marrickville Road, Marrickville	20
Tuesday 18 July, 4pm – 7pm	Sydney Portugal Community Club, 100 Marrickville Road, Marrickville	21
Saturday 22 July. 10am – 1pm	Sydney Portugal Community Club, 100 Marrickville Road, Marrickville	38

Invitations to attend the sessions were included in:

- Postcard flyers handed out at Sydenham Station across four sessions during both the AM and PM peaks and delivered to properties within 500 metres of the station
- The Modification Summary document
- The Sydney Metro website
- Advertisements in local newspapers
- The Sydney Metro Facebook feed.

At the information sessions, copies of the modification report were available for visitors to view as were copies of the Modification Summary and the project newsletter. Information boards were also presented around the room with key information regarding the approved project and the proposed modification.

3.3.3 Place Managers

Place Managers build relationships and act as a feedback mechanism to help ensure community and stakeholder aspirations are consistently considered in the planning process. Their role is to be a direct point of contact between affected members of the community and the project team.

Place Managers will continue to play a vital role in maintaining close and ongoing contact with local communities and stakeholders during the design and delivery of Sydney Metro.

Place Managers have engaged impacted residents, tenants and businesses throughout the exhibition period (by phone, email, newsletter or doorknock) to ensure they were aware of the modification report, invite them to community information sessions and ensure they had the information they needed to make a submission on the proposed modification.

Place Managers can be contacted via the community information line (1800 171 386) or project email (sydneymetro@transport.nsw.gov.au).

3.3.4 Postcard flyers

Postcard flyers were developed to provide information about the proposed modification and advise the date and location of community information sessions. Around 1,300 flyers were handed out at Sydenham Station on 29 June, 30 June and 6 July 2017. These flyers were also delivered to properties located within 500 metres of the proposed modification.

3.3.5 Newspaper advertisements

Advertisements advising of the public exhibition of the proposed modification were placed in the following newspapers:

- Chieu Duong – 28 June 2017 and 11 July 2017
- Sydney Morning Herald – 28 June 2017
- Inner West Courier – 4 July 2017.

3.3.6 Email alerts to the project mailing list

Details regarding the proposed modification and the community information sessions were sent via email to around 3000 people on the project mailing list on 28 June 2017.

3.3.7 Facebook

Sydney Metro posted invitations and reminders regarding the community information sessions on its Facebook feed which has over 13,500 followers.

3.3.8 Website

Information on where to view the modification report and the community information sessions was made available on the project website.

3.3.9 Modification report summary document

A modification report summary document was prepared and made available electronically on the project website and also in hard copy. Hard copies were available at the community information centres, community information sessions, via place managers and other team members during meetings, briefings, doorknocks, and by request.

This summary document provided an overview of the approved Chatswood to Sydenham component of Sydney Metro City & Southwest and the proposed modification. Readers were also encouraged to review the modification report on the Department of Planning and Environment's website.

3.4 Consultation and engagement during construction

Should the proposed modifications be approved, the project team would continue to consult with the community and key stakeholders during the planning and construction of the project. In general, this ongoing consultation would involve:

- Provision of information to key stakeholders, local councils and other government agencies
- Provision of regular updates to commuters and the nearby community
- Development and implementation of a Community Communications Strategy.

Further details regarding stakeholder and community involvement requirements during project delivery are outlined in the Construction Environmental Management Framework (provided as part of the Submissions and Preferred Infrastructure Report for the approved project).

SUBMISSIONS RECEIVED

CHAPTER FOUR

4 Submissions received

4.1 Respondents

The Department of Planning and Environment received 15 submissions in response to the modification report during the public exhibition period (28 June 2017 to 9 August 2017). Submissions were accepted by:

- Electronic submission (online) – www.majorprojects.planning.nsw.gov.au/page/on-exhibition
- Post – Department of Planning and Environment, GPO Box 39, Sydney, NSW 2001.

The number of submissions received by respondent type is presented in Table 4-1.

Table 4-1 Submissions received by respondent type

Respondent type	Number of submissions
Government	7
Local council	1
Community	7
Total	**15**

4.2 Overview of issues raised

Submissions included two objections and three identified as being in support. The remainder of submissions did not state a position of support or objection to the proposed modification. Responses to issues raised in submissions are provided in Chapters 5 and 6.

4.2.1 Government

Four NSW government agencies and two NSW government owned corporations made submissions, raising a range of issues relevant to their respective areas of interest and responsibility. A summary of each agency's issues is provided below. Detailed responses are provided in Chapter 5.

Office of Environment and Heritage

The submission from the Office of Environment and Heritage identifies that the existing conditions of approval are sufficient to manage potential Aboriginal heritage impacts and raises issues relating to potential changes to flooding from the proposed modification.

Department of Primary Industries

The submission from the Department of Primary Industries notes that the proposed modification is anticipated to have minimal impacts on groundwater or Crown Land.

Department of Planning and Environment – Division of Resources and Geoscience

The submission from the Division of Resources and Geoscience identifies that there are no relevant resources or titles in the proposed modification area. As such, the Division of Resources and Geoscience do not have any comments.

Heritage Council of NSW

The submission from the Heritage Council of NSW raises issues relating to impacts to the State heritage listed Sydenham Railway Station Group and the Sydenham Drainage Pit and Pumping Station, and makes some suggestions in relation to future design and management of these impacts.

Environment Protection Authority

The submission from the Environment Protection Authority raises issues regarding the use of a noise management level for sleep disturbance during construction, and makes recommendations for additional conditions of approval.

Sydney Water

The submission from Sydney Water identifies that the proposed modification would directly impact one of their assets – the Sydenham Pit and Drainage Pumping Station and raises potential issues relating to management of stormwater and flooding, and maintenance of the pit for visual amenity.

Ausgrid

The submission from Ausgrid notes the requirement for ongoing consultation regarding the Ausgrid asset relocations associated with the proposed modification and have no further comment to make.

4.2.2 Inner West Council

The submission from the Inner West Council raises issues relating to:

- Impact to existing and future land use around Sydenham Station and the Sydney Metro Trains Facility South
- Traffic and transport during construction and operation, particularly in relation to pedestrian and cyclist routes to, from and around Sydenham Station
- Visual amenity impacts around the Sydney Metro Trains Facility South and at Fraser Park
- Potential changes to flooding
- Design of the interface of the station entries and the Sydney Metro Trains Facility South to the urban realm
- Impacts to heritage items, particularly Sydenham Pit
- Accessibility of the upgraded Sydenham Station.

Detailed responses to the issues raised by Inner West Council are provided in Chapter 5.

4.2.3 Community

The community, including individuals and organisations, raises a range of issues of personal interest or relevance. Detailed responses are provided in Chapter 6.

GOVERNMENT SUBMISSIONS

CHAPTER FIVE

5 Government submissions

5.1 Office of Environment and Heritage

Issue raised

The Office of Environment and Heritage considers that the existing conditions of consent in relation to Aboriginal cultural heritage are sufficient to manage works proposed by the modification.

Response

The Office of Environment and Heritage's comments are noted.

Issues raised

The modification report indicates that the modification will result in increases in flood depth and extent in the vicinity of Frederick and Sutherland streets. From a floodplain risk management perspective, it is prudent that the proponent adequately investigates the following:

- Identify additional properties that would be affected by over floor flooding in 1 per cent annual exceedance probability, which in existing conditions are subject to ground flooding only
- Identify additional properties that would be within the flood planning area, which are currently above the flood planning level
- Identify additional properties that would become flood affected due to the increase in the probable maximum flood extent
- Identify the potential for increase in flood damage due to the above points
- Address impacts on emergency management planning
- Undertake a consultation process with affected property owners and Inner West Council.

Response

The modification report identifies that, with the proposed drainage and flood improvements in place, flooding impacts with the proposed modification would generally be less than those identified for the approved project. Notwithstanding, there is predicted to be an increase in flood depths in some locations, including on Sutherland and Fredrick streets. Additional technical information relating to the flooding assessment is provided in Appendix C.

These potential impacts would be managed through the implementation of the existing mitigation measures and conditions of approval which are broadly consistent with the intent of suggestions made in the submission by the Office of Environment and Heritage. Ongoing consultation would be undertaken with the Office of Environment and Heritage as part of flood modelling carried out during detailed design.

5.2 Department of Primary Industries

Issue raised

The proposed modification works are anticipated to have minimal groundwater impact. If groundwater is intercepted as part of the modification, Department of Primary Industries (Water) should be consulted to determine licensing and assessment requirements under water management legislation and policy.

Response

The Department of Primary Industries' would be consulted as appropriate through the detailed design and construction phase.

Issue raised

The proposed modification works are anticipated to have minimal impact on Crown lands. However, if any Crown land is required for this modification it will need to be compulsorily acquired under provisions of the *Land Acquisition (Just Terms Compensation) Act 1991*.

Response

As identified in Section 4.2 of the modification report, the proposed modification would not be carried out on Crown land.

As further identified in Section 12.2.1 of the modification report, all property acquisition would be managed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*.

5.3 Department of Planning and Environment – Division of Resources and Geoscience

The submission from the Division of Resources and Geoscience identifies that there are no relevant resources or titles in the proposed modification area. As such, the Division of Resources and Geoscience do not have any comments.

5.4 Heritage Council of NSW

The submission from the Heritage Council of NSW notes that ongoing project work has been presented to the Heritage Working Group for Sydney Metro. In particular, works forming the proposed modification were presented to the Approvals Committee of the Heritage Council of NSW on 5 July 2017.

5.4.1 Sydenham Railway Station Group

Issue raised

It is considered that Chapter 14 – Non Aboriginal Heritage of the modification report has under assessed the impact of the works on the Sydenham Railway Station Group. The demolition of some items within the State heritage register group is described as a major direct impact but the new concourse is described as an 'overall moderate' indirect impact.

Direct impacts to the Sydenham Railway Station Group include the demolition of two of four significant station buildings and the removal of platform 1 (two of four original platforms), and also the parcels office and waiting sheds.

There would also be a considerable change to the character and setting of Sydenham Station through the proposed new canopy structure and new concourse. The concourse will connect to platforms 1 and 2 and facilitate passenger connections between Sydney Metro and Sydney Trains services. The new canopy is proposed to bridge across the concourse to cover all platform buildings. The canopy will be a very large structure along with new north and south entries to the station. It is understood that following consideration by the Design Review Panel (established under Condition E100) the new canopy has been re-oriented / turned and that there will be a 'gap' between the new canopies and the heritage platform buildings.

At the meeting on 5 July 2017 the Approvals Committee provided the following comments:

- The buildings to be retained are not celebrated in the new design. Retention of heritage items is positive, but how they are reflected in the new work is just as important

- There is community demand across Sydney for local character including heritage and sense of place to be reflected in new structures. Not all stations are the same and there should be local character reflected in the differences between stations. This could be addressed by a design focus on place making and identity
- New design should not replicate or mimic the heritage item but provide profile and perspective that respects and celebrates the heritage and sense of place
- Reducing the scale of the new structures, for example the platform canopies, is recommended.

It is recommended that the above comments and considerations should be incorporated into the Station Design and Precinct Plans that are required to be prepared for each station under Condition E101 before the commencement of permanent built surface works and / or landscaping at those stations.

The Approvals Committee further commented that:

- Capitalising on opportunities to interpret the heritage of the area through site hoardings and temporary structures during works and in the final design is encouraged.

It is noted that a Heritage Interpretation Plan is required for the project under Condition E21 and that Condition E21 (b) (i) refers to 'use of interpretative hoardings during construction' and that other conditions such as Condition E21 (b) (iv) refer to interpretation through 'station and precinct design'. These conditions of approval are considered sufficient to guide good outcomes for the project provided that they are implemented by the Proponent and monitored by the Department of Planning and Environment through existing mechanisms such as the Design Review Panel (established under Condition E100), consultation with the Heritage Working Group and with the Heritage Council of NSW.

While artist's impressions of the new concourse were provided, the Heritage Council Approvals Committee also requested that any future presentations from Sydney Metro include before and after images to better communicate the design, including images showing the elements of heritage significance would be valuable in future communications.

Response

The non-Aboriginal heritage assessment has not under assessed the potential impacts. The assessment correctly identifies that:

- Direct impacts to Sydenham Railway Station Group associated demolition of some elements would be major
- Indirect impacts on the character and setting of the station due to the new canopy structure would be moderate.

The comments made by the Approval Committee at the 5 July 2017 meeting are acknowledged and are continuing to be considered in the detailed design of the station. The outcome of this work would be reflected in the Station Design and Precinct Plan as required by Condition E101. Additionally, this design would be subject to review by the Design Review Panel (required by Condition E100) through which consultation with the Heritage Council of NSW (or its delegate) would occur.

Other mitigation measures and conditions of approval would also aid in the management of heritage impacts at Sydenham Station including:

- Mitigation NAH1 in relation to archival recording of the items to be demolished
- Condition E21 in relation to a heritage interpretation plan.

Issue raised

In reviewing the modification report it is noted that additional local heritage items associated with Sydenham Railway Station are the Sydenham (Illawarra Line) Underbridge (RailCorp s170 Heritage and Conservation Register – 4805746) and Brick Retaining Walls around the station on Railway Parade and Marrickville Road (Marrickville LEP – I287). There would be impacts to the bridge through strengthening of the piers and the removal of the existing brick wall would occur along with the station building on platform 1 of Sydenham Station.

Response

The impacts to local heritage items noted by the Heritage Council of NSW are considered and assessed in the modification report. Existing mitigation measures and conditions of approval would be implemented to manage these impacts.

Issue raised

There are no listed archaeological sites within or adjacent to the project area, which has nil to low archaeological potential and / or significance due to high levels of previous ground disturbance especially within the historic rail corridor. It is, therefore, considered that there would be no need for any new mitigation measures to manage archaeological issues for the proposed modification, as existing measures such as Construction Environmental Management Plans and relevant sub-plans and documents would continue to apply to the project.

Response

The Heritage Council of NSW's comments regarding archaeological potential are noted.

5.4.2 Sydenham Pit and Drainage Pumping Station

Issue raised

Chapter 14 – Non Aboriginal Heritage of the modification report is considered to have inconsistently assessed the impact of the proposed works on the Sydenham Pit and Drainage Pumping Station. This section of the report describes the proposed aqueduct over the pit as a 'moderate' impact but also then describes the visual impacts on Sydenham Pit and Drainage Pumping Station as a 'major' indirect impact.

Response

The non-Aboriginal heritage assessment has not inconsistently assessed the potential impacts. This section correctly identifies that:

- Direct impacts to Sydenham Pit and Drainage Pumping Station associated the proposed aqueduct would result be moderate
- Indirect visual impacts due to the proposed aqueduct and the Sydney Metro Trains Facility South would be major.

Issue raised

The Sydenham Pit and Drainage Pumping Station are situated very close to the proposed new Sydney Metro Trains Facility South. There is an interface with the works on the east and south sides of the pit. The Pumping Station is currently connected to two drainage channels / culverts, one open and one closed. To facilitate the Sydney Metro Trains Facility South, realignment and enclosing of existing drainage channels associated with the drainage pit is required.

The preferred option described in the modification report would be to install an aqueduct over the flood storage area (open pond / pit) and to construct a new pumping station building and access road / ramp. The new pumping station building has been reduced in bulk by retaining the existing pumping station, however, an adaptive re-use for the pumping station is not yet determined. The Sydenham Pit and Drainage Pumping Station would remain a Sydney Water asset after the completion of the Sydney Metro project.

At the meeting on 5 July 2017 the Approvals Committee provided the following comment:

- The replication of the form of the old pumping station in the structure of new pumping station is positive.

It is also noted that the Heritage Working Group has been advised that more recent design modifications have moved the new pumping station out of the actual pit into a 'cut and cover' mound on the western side, however, the exhibited modification report does not show this option.

It is considered that for the proposed works to be acceptable, the degree of direct impacts both physical and visual to these items should be mitigated as much as possible, and it is desirable that all design solutions be further considered that would minimise the impact on significant fabric, setting and views within the current State heritage register curtilage for the Sydenham Pit and Drainage Pumping Station.

Response

The modification report includes mitigation measures which aim to mitigate the impact of the works affecting the Sydenham Pit and Drainage Pumping Station. This includes:

- NAH7 – relating to sympathetic design, minimisation of impacts to the setting of heritage items, and developing the detailed design in consultation with a heritage architect
- NAH20 – relating to considering the relevant conservation management plan during the design of works directly impacting the Sydenham Pit and Drainage Pumping Station.

The detailed design of these elements would also be subject to review by the Design Review Panel (required by Condition E100) through which consultation with the Heritage Council of NSW (or its delegate) would occur.

5.4.3 General

Issue raised

The modification report has identified that some of the existing mitigation measures identified in the prior Environmental Impact Statement would need to be modified to include the items now affected by the proposed modification. Updated measures are:

- NAH1 – Archival Recording would now be required for Sydenham Pit and Drainage Pumping Station 1 and for Sydenham Railway Station Group: Platform 6 building and Platform 1 Parcels Office.
- NAH7 – Sympathetic Design (both items)
- NAH11 – Avoid further direct impacts (other than for those elements directly affected by the project). This would be required for the existing Sydenham Station and the Brick retaining walls near Sydenham Station.

The above changes are supported, however, it is considered that mitigation measure NAH4 – method for the demolition of existing buildings to be developed to minimise direct and indirect impacts to adjacent and / or adjoining heritage items, should now also be modified to include the Sydenham Station buildings.

Response

Transport for NSW agree with the recommendation from Heritage Council of NSW. A revised mitigation measure NAH4 to include reference to Sydenham Station has been included in Chapter 7 of this report.

5.5 Environment Protection Authority

Issue raised

The noise and vibration impacts methodology and modelling are consistent with those of the approved project and consistent with the Environment Protection Authority's experience of similar construction project, except the adoption of a sleep disturbance noise management level (NML) for construction noise of 55 dB(A) internal. A sleep disturbance NML is not supported by NSW policy. The Interim Construction Noise Guideline does not recommend a NML for sleep disturbance associated with construction noise. The Environment Protection Authority notes however that this NML is not used in the report for assessing impacts and the prediction methods and modelling are appropriate and represent those impacts likely to result from the project.

Response

The Environment Protection Authority's comments regarding the use of a NML for sleep disturbance is acknowledged and, as identified by the Environment Protection Authority, this NML is not solely used in the assessment.

The reference to a sleep disturbance NML of 55 dB is an overly simplistic summary of the criteria used to assess sleep disturbance from construction activities. The criteria applied is consistent with the approved project and includes an initial screening criterion of a maximum level 15 dB above the RBL, normally during the night-time period (10 pm to 7 am). Where this criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required. The more detailed analysis uses guidance provided in the Road Noise Policy which concludes that:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions
- One or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly.

The level of 55 dB(A) internal is adopted on the basis of the above guidance.

Issue raised

The report includes commitments by the proponent to confirm details of proposed noise barriers during detailed design, and the implement feasible and reasonable procedural mitigation measures to minimise noise emissions from the train stabling facility. In addition, the proponent commits to offering at-property treatment if proposed measures should these proposed measures not be sufficient to reduce noise to below the relevant criteria. This approach is consistent with the Rail Infrastructure Noise Guideline.

Response

The Environment Protection Authority's comments are noted.

Issue raised

The Environment Protection Authority considers that the conditions applying to the approved project are appropriate and should apply to the modification.

The Environment Protection Authority recommends that consideration be given to the following:

- An additional conditions be added to the approval requiring the proponent to maximise as much as practicable, the use of work trains to minimise heavy vehicle movements
- An additional condition be added requiring the formation of a Utility Management Coordination Agency and development and implementation of a Utilities Management Strategy.

Response

The Environment Protection Authority's comment regarding the conditions of approval are noted. As identified in the modification report, the existing conditions of approval would apply to the proposed modification.

Consideration of alternative transport options was provided in the Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement. This assessment identified that the use of rail for construction purposes around the Marrickville dive site may be feasible at this site subject to further investigations regarding rail safety risks and the identification of a suitable destination for unloading spoil in proximity to a reuse or disposal site. In particular, a rail siding would need to constructed on the southern side of the rail corridor and, as such, material would need to be transported across the suburban rail lines which may result in safety risks and impacts to passenger rail operations. The potential for non-road spoil transport methods would continue to be investigated in accordance with Condition E84.

The Environment Protection Authority's concerns are acknowledged. The project has committed to a robust method to identify and manage potential cumulative impacts. This includes coordination with, amongst others, the relevant utility providers. In addition, a Sydney Metro Utility Working Group has already been established by Sydney Metro to identify, manage and coordinate proposed utility works. Representatives from the affected utility providers form part of this working group. This working group would ensure that the proposed works are coordinated with the planned activities of relevant utility providers.

5.6 Sydney Water

Issue raised

The construction of the stabling yards, within a low-lying flood prone area, has the potential to increase stormwater flows that are being diverted into Sydney Water's Sydenham Pit and Drainage Pumping Station. To resolve this, Sydney Water will be required to pump out higher volumes from the pit into Eastern Channel. This raises two key issues for Sydney Water and the Council in respect of stormwater management for the surrounding area, including:

- Possible reduction in the existing stormwater network capacity. The Sydenham Pit and Drainage Pumping Station is currently the only mitigation against stormwater flooding in the area. Increased flow into the pit may also reduce capacity in the stormwater network and limit the ability to add further flows from surrounding urban development
- An increase to the pump out rate from the Sydenham Pit and Drainage Pumping Station will require the pump station to the upgraded to ensure higher reliability and reduce potential for flooding if the pit fills in a downpour.

Response

The need to increase the pump out volume from the Sydenham Pit and Drainage Pumping Station is acknowledged in Section 17.3.2 of the modification report. To facilitate this, the proposed modification includes the provision of a new pumping station adjacent to Garden Street.

The potential changes to the capacity of the stormwater network and flood mitigation in the area is identified and assessed in Section 17.3.2 of the modification report. A number of drainage works, as outlined in Section 6.6.4 of the modification report, are proposed in the area around the Sydenham Pit and Drainage Pumping Station to manage these changes.

Any residual impacts would be managed through the implementation of the existing mitigation measures and conditions of approval.

Issue raised

The existing Sydenham Pit and Drainage Pumping Station was built in 1935 and while some parts of the walls and floors have been repaired it is likely that the proposal to modify the pit will raise significant structural issues which will need to be addressed.

Response

Sydney Water's comments regarding potential structural issues relating to Sydenham Pit and Drainage Pumping Station are acknowledged. This would be addressed during the detailed design of any works directly impacting the pit.

Issue raised

The pit in its current location is not publicly accessible. Providing pedestrian access would require consideration of the future cleaning and maintenance requirements to ensure the pit provides visual amenity for the public traversing the area.

Response

The primary purpose of the aqueduct of the Sydenham Pit and Drainage Pumping Station is for the conveyance of water. Chapter 3 of the modification report also identifies that the aqueduct could provide a potential future pedestrian connection across Sydenham Pit and Drainage Pumping Station to Sydenham Station. In the event this aqueduct is made accessible to the public in the future, adjustments to the cleaning and maintenance regimes may need to be considered. These requirements would be determined in consultation with Sydney Water.

Issue raised

Consideration also needs to be given to future proofing the stormwater culverts leading to the pit as the construction above them will prevent future changes.

Response

The proposed realignment and enclosure of the existing open channels through the Sydney Metro Trains Facility South would generally follow the alignment of the proposed access roads. This would provide for ease of ongoing maintenance access.

Ongoing consultation would be undertaken with Sydney Water regarding the detailed design of elements impacting their assets and future access requirements. Potential constraints to future upgrades of Sydney Water infrastructure would be included in this consultation.

Issue raised

As the works around the stabling yards and the Sydenham Pit and Drainage Pumping Station are being conducted by two separate contractors, care needs to be taken to ensure that works are congruent and coordinated. Staging of the works will also need to be carefully considered to ensure that there is no increased flooding risk while the works are being undertaken. The stormwater network will be required to be fully operational at all times and as such access to Sydney Water assets will need to be maintained during construction and subsequent operations.

Response

Transport for NSW acknowledges the importance of coordination between different construction stages and contracts so that there is no increase to flood risk. Ongoing consultation would be undertaken with Sydney Water so that appropriate access is maintained during construction.

Issue raised

The information provided is of high level and greater detail is required for Sydney Water to accurately assess the impact on assets and the potential flooding in the area.

Response

Ongoing consultation would be undertaken with Sydney Water regarding the detailed design of elements impacting their assets and potential drainage related impacts.

5.7 Ausgrid

Issue raised

Ausgrid note the requirement for ongoing consultation regarding the Ausgrid asset relocations associated with the proposed modification and have no further comment to make.

Response

Ausgrid's comments are noted.

5.8 Inner West Council

5.8.1 Land use

Issue raised

Inner West Council is concerned over the significant loss of employment, industrial and in particular creative uses in this precinct that have been forced to relocate as a result of the Marrickville dive site / Sydney Metro Trains Facility South. It is noted that the modification report states that 'the design of the Sydney Metro Trains Facility South allows for future rail corridor development above and around the facility and the future development would allow Sydenham Station Creative Hub vision to be realised'. To enable this to be realised, provision for development over the Sydney Metro Trains Facility South that is already committed to should be furthered, with Sydney Metro providing space that will harbour creative industries and enable their return to Sydenham.

Response

As identified in Section 6.7 of the modification report, the proposed modification would include enabling works at the Sydney Metro Trains Facility South for future rail corridor development. This would include civil works for a screening development and structural works including piles, columns and a deck over the stabling facility.

This would effectively provide space for future development. Any future development of this space, and the type of use, would be subject to a separate approval process. Consultation with Inner West Council would be undertaken regarding the type of development.

Issue raised

The area adjacent to the Sydney Metro Trains Facility South is host to one of Sydney's longest-standing curated graffiti walls. Consideration should be given to how this wall might survive post-construction, but moreover how graffiti as an intrinsic element of the local neighbourhood will be addressed moving forward.

Response

Potential impacts to the graffiti wall were acknowledged as part of the assessment of the approved project. Mitigation measure LV17 commits to investigating opportunities to provide a permanent wall for street art in consultation with Inner West Council.

5.8.2 Transport and traffic

Issue raised

Inner West Council recommends that further consideration be given to traffic arrangement around Sydenham Station, with the primary aim of improving access to, from and around the station for pedestrians and cyclists. Realignment of the one-way system via Railway Parade and Buckley Street should be examined in the interests of improving road and pedestrian safety and enhancing local amenity. This would potentially allow northbound and southbound bus stops to be located on the western side of the station, adjacent to the new entry plaza. In turn this would improve transition for all interchange passengers whilst simultaneously reducing conflict between heavy goods vehicles and pedestrians on Burrows Avenue.

Response

The proposed modification provides improved access to, from and around the station for pedestrian and cyclists. These arrangements would be further developed as part of the Interchange Access Plans required by Condition E92 and the Station Design and Precinct Plan required by Condition E101.

Transport for NSW is currently investigating the feasibility of the suggested traffic changes and will discuss the outcome of this assessment with Inner West Council.

Issue raised

The pedestrian crossing on Railway Parade should be designed so as to achieve optimal pedestrian connectivity and ease of interchange between bus and rail whilst ensuring accessibility for all.

Response

The detailed design of the pedestrian crossing would be considered during the development of the Interchange Access Plans required by Condition E92 and the Station Design and Precinct Plan required by Condition E101 and would consider factors such as pedestrian access, customer interchange, accessibility, and road network performance.

Issue raised

The report includes commentary that there is 'potential for cycle routes along Railway Parade and Gleeson Avenue to be provided by Inner West Council'. The report also identifies that there are poor connections to the station at present and outlines that the modification has been designed to enhance the pedestrian and cycle accessibility of the station. Thus the opportunity must be seized for Sydney Metro to commit to delivering improved pedestrian and cycle routes to, from and around the station as part of this modification, working with Inner West Council to implement effectively.

Response

The proposed modification includes enhanced pedestrian and cycle links to, from and around the station including new station entries and pedestrian plazas, new pedestrian crossing facilities and connection to existing cycle route in the west.

These would be further developed as part of the Interchange Access Plans required by Condition E92 and the Station Design and Precinct Plan required by Condition E101. The modification report also included a new mitigation measures (OpT6) in relation to working with Inner West Council in relation to the active transport corridor.

Issue raised

There appears to be some contradiction with regard to any impact to on-street parking around the Sydney Metro Trains Facility South during construction periods. This is referred to as 'no impact' but also as 'resulting in additional demand' in various sections of the modification report. Sydney Metro is to ensure a higher proportion of its workers access the site during construction and operation via train (or other sustainable modes) in order that demand for on-street parking from construction workers in negligible.

Response

In relation to parking impacts during construction around the Sydney Metro Trains Facility South, the modification report identifies that:

- There may be additional competition for car parking due to construction workers
- Construction worker parking would be provided at the Sydney Metro Trains Facility South.

In accordance with mitigation measure T12 workers would be encouraged to use public and active transport to minimise construction workers parking on local streets.

Issue raised

The need for a permanent bus layover facility at 117 Railway Road is questionable. Should any changes take place, this portion of Railway Road / Burrows Avenue should be remodelled to accommodate existing parking whilst capitalising on the removed bus stop area on Burrows Avenue in the interests of creating an improved landscaped environment.

Response

As described in Section 6.3 of the modification report, the bus layover is required to accommodate rail replacement buses operated by Sydney Trains that currently use Burrows Avenue north of Gleeson Avenue. This existing facility would no longer be available due to the new station forecourt. The new bus layover facility would also be used by temporary transport bus services required for the possessions of the T3 Bankstown Line to support construction of the Sydenham to Bankstown component of Sydney Metro City & Southwest.

The detailed design of the facility would consider opportunities to create an improved landscape environment at this location.

Issue raised

The modification designs should be amended to include a superior active transport corridor route via Fraser Park and the land to the south of Fraser Park, which will provide the desired level of connectivity outlined in the Sydenham to Bankstown Urban Renewal Strategy (unlike the suggested route via Marrickville Road / Meeks Road).

Response

To facilitate improved cycle connections to the station, the proposed modification includes a connection from existing cycle routes in the west (including Meeks Road) to Sydenham Station.

The latest draft of the Sydenham to Bankstown Urban Renewal Corridor Strategy (Department of Planning and Environment, 2017) includes a cycle connection from Sydenham Station, via Fraser Park and the land to the south of Fraser Park. As part of the detailed design process, Sydney Metro will explore opportunities to integrate with other project and planned infrastructure. This would be achieved through mitigation measures OpT6 (provided in the modification report) which relates to working with Inner West Council in relation to the active transport corridor.

Issue raised

New cycle and pedestrian connectivity around the Sydney Metro Trains Facility South as identified in the Design Guidelines is welcome and should be designed as a whole-of-street approach with opportunities for tree plantings and other relevant streetscape elements.

Response

The Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines identify that the design would enable pedestrian and cycle connections along the frontage of the stabling facility. The guidelines also include a requirement to maximise street trees and landscape verge areas to Sydney Steel Road and Edinburgh Street.

Issue raised

Whilst it is noted that the signalisation of the Edinburgh Road / Bedwin Road / Edgeware Road intersection was included in the approved project, the designs included in the modification report are not consistent with Council's preferred design outcomes, which would better meet the needs of pedestrians and cyclists at this location and tie in with work being undertaken by WestConnex along Bedwin Road.

Response

The signalisation of the Edinburgh Road / Bedwin Road / Edgeware Road intersection forms part of the approved project and is not within the scope of this modification.

Transport for NSW will continue to work with Inner West Council, Roads and Maritime Services and other stakeholders to achieve an intersection arrangement that achieves a favourable construction and end state outcome. An optimum outcome would need to be a balanced consideration of road user safety, pedestrian and cyclist accessibility and traffic flow efficiency. Transport for NSW is committed to a signalised intersection outcome at this location that achieves the optimum balance between these often competing considerations.

Issue raised

There is meagre assessment within the report of cumulative impact associated with the modification – in particular it should be noted that there will be additional construction traffic for both Sydenham Station and Sydney Metro Trains Facility South elements of the proposal, which have not been quantified in conjunction with other construction traffic impacts from developments such as WestConnex and Marrickville Metro.

Response

The cumulative impact assessment within Chapter 20 of the modification report provides consideration of additional cumulative impacts to the approved project.

These potential cumulative impacts would continue to be managed through the process established by mitigation measure CU1.

5.8.3 Environment

Issue raised

The proposed 2.5 metre vegetation buffer around the perimeter of the Sydney Metro Trains Facility South site is welcome. This must be provided in addition to the proposed four metre wide pedestrian and cycle path around the perimeter of the site.

Response

Inner West Council's comments regarding the vegetation buffer zone around the Sydney Metro Trains Facility South are noted. The Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines identify that the design would enable pedestrian and cycle connections along the frontage of the stabling facility. The latest version of the design guidelines can be found at www.sydneymetro.info.

Issue raised

Environmental impact to the 'Meeks Road Triangle' site must be kept to an absolute minimum.

Response

The implementation of the existing mitigation measures and conditions of approval would minimise environmental impacts for all aspects of the proposed modification, including at the Weeks Road Triangle site.

Issue raised

Areas around the Sydney Metro Trains Facility South that are to experience a negative visual impact during construction should receive a noticeable improvement during operations. Streets designed around the perimeter of the site should be carried out in conjunction with Council and be designed for increased tree canopy, new pedestrian and cycle connectivity, improvements to road layouts and enhanced parking conditions where applicable.

Response

The design of the Sydney Metro Trains Facility South would be guided by the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines. These guidelines include provision for landscaping in some location within the facility, maximising streets trees and landscape verge areas to Sydney Steel Road and Edinburgh Road and enabling pedestrian and cycle connections along the frontage of the facility. The latest version of the design guidelines can be found at www.sydneymetro.info.

Issue raised

Visual amenity from Fraser Park toward the rail corridor is stated as being negatively impacted during construction due to the removal of trees from within the rail corridor. Visual amenity from this location is stated as undergoing no perceived change during operation, which implies that trees have been replanted and thus views returned to their previous state. However the report also states that no trees from within the rail corridor are to be replanted, which appears incongruent with the above statement.

Response

Appendix F of the modification report provides further information on the factors resulting in the visual impact ratings. In summary, the higher impact during construction is due to the presence of construction equipment and construction works which would be visible in the view from Fraser Park. During operation, views within the park would be enclosed by a noise barrier which would also obstruct views to the infrastructure and movement of trains. The loss of some vegetation in the corridor is acknowledged in the assessment, however the treed skyline of Tillman Park would remain a feature of this view.

5.8.4 Flooding

Issue raised

The modification report provides scant information regarding flooding, despite being a significant part of the modification. No details of proposed infrastructure are provided and unlike other areas such as noise and traffic, no technical appendix relating to flooding is provided. No afflux diagrams are shown with the exception of what is presumed to be the probable maximum flood event. In this context it is hard to comment on the suitability or otherwise of the proposed modifications to drainage and flood management in the area.

Proposed flood mitigation should consider future plans for the Marrickville valley as set out in the Eastern Channel East Floodplain Risk Management Study and Plan (FRMSP) and Marrickville Valley Draft FRMSP. Specifically attention is drawn to:

- Lord Street drainage upgrade (Eastern Channel East FRMSP option R1)
- Murray Street drainage upgrade (Eastern Channel East FRMSP option R8)
- Industrial area drainage upgrade (Marrickville Valley Draft FRMSP option FM15.10)
- Bolton Street drainage upgrade (Marrickville Valley Draft FRMSP option FM14.1).

The works set out in Council's existing plans seek to reduce flood risk rather than maintain it at current levels as per the proposed mitigation measures. Enabling woks by Sydney Metro should facilitate at least the same reductions as those proposed by these plans.

Response

Consistent with the approach to the assessment of the modification, the report provides an assessment of the potential change in impacts compared to the approved project. A description of the proposed drainage and flood mitigation infrastructure is described in Section 6.6.4 of the modification report.

The modification report identifies that, with the proposed drainage and flood improvements in place, flooding impacts with the proposed modification would generally be less than those identified for the approved project. Notwithstanding, there is predicted to an increase in flood depths in some locations. Additional technical information relating to the flooding assessment is provided in Appendix C.

These impacts would be managed through the implementation of existing mitigation measures and conditions of approval. These mitigation measures commit to, where feasible and reasonable, not worsen existing flood characteristics up to and including the 100 year average recurrence event.

Issue raised

The proposed flood mitigation should also consider the likely outcomes of the WestConnex work around Campbell and May streets and the Camdenville Basin.

Response

The WestConnex New M5 project includes drainage modifications in the Eastern Channel catchment upstream of the Sydney Metro Trains Facility South site. The WestConnex works require the expansion of an existing upstream stormwater detention basin at Camdenville Park. The existing basin is operated by Inner West Council, and stormwater is pumped from the basin to the Council stormwater system upstream of the Eastern Channel. The design for these works being undertaken by WestConnex was not available when the flood modelling to support the modification report was undertaken. Information regarding the proposed Westconnex design has become available since flood modelling was completed. The proposed Westconnex design does not increase peak pumping rates from the basin, but does increase the duration of pumping which may impact downstream flooding in some flood events. Inner West Council is also investigating whether the pump system can be replaced with a gravity drainage system which would connect to the Sydenham Pit. Future stages of design will need to consider the impacts of the proposed works by Westconnex and Inner West Council.

The cumulative impact assessment in Chapter 20 of the modification report identifies that consultation would continue with the WestConnex Stage 2 delivery team in relation to the coordination of flooding and hydrology works in the vicinity of the proposed modification.

Issue raised

The detention basin and pump out to Eastern Channel is the only means of draining the low lying areas of the Marrickville Industrial area and Eastern Channel East catchments. Given the 100+ year expected lifespan of the proposed works, consideration should be given to what the 'end state' of the catchment will be and that all proposed flood mitigation options can be accommodated without affecting other areas.

Particular attention is drawn to the Carrington Road area which is earmarked for significant development (as included in the Sydenham to Bankstown Urban Renewal Strategy) and is susceptible to increased flooding should 'end state' flows exceed the capacity of the Eastern Channel resulting in overtopping in this location. The Carrington Road proposal includes an option for diverting a part of the development site into the Eastern Channel. It seems that there will be a conflict for the capacity of the lower segment of the Eastern Channel between Sydney Metro and the developer for the Carrington Road site. The drainage proposal from Sydney Metro does not consider such demand for the increased capacity from the development in the downstream catchment.

Response

The flood modelling undertaken for the proposed modification is based on existing conditions with the addition of the Sydney Metro infrastructure. Any future developments would need to consider potential flood impacts on the development and from the development, inclusive of the Sydney Metro infrastructure.

Based on the flood modelling carried out to date, the Sydney Metro works are not anticipated to result in any changes to flood depth in the Carrington Road area.

Issue raised

The modification report notes that 'a proposed raised western channel bank near Tempe Station would keep flows within the Eastern Channel', however this area is not within the proposed modification area, which creates concerns about who would be responsible for this work and whether it would be competed as part of the Sydney Metro works. Imposing future works on Council and / or Sydney Water is not acceptable. It is suggest that the proposed modification area be modified accordingly to include the channel wall raising.

Response

The proposed raising of the western channel bank near Tempe Station would be undertaken as part of the Sydney Metro works. A figure showing the revised modification area is provided in Chapter 2 of this report.

Issue raised

Any proposed flood mitigation should seek to reduce flood risk in all events up to the 100 year event rather than maintaining them at their current levels as per the proposed mitigation measures. Consideration will need to be given to the segment of Eastern Channel between Sydenham Station and its outlet adjacent to Tempe Station. Further, consideration will also be required to be given to the proposed modification area in addition to the upper catchment within potential diversion options for flood flows following implementation of improvement works at the flood affected areas. Consideration solely of the modification area would not address the current and emerging flood issues in the upper catchment and would also limit opportunities to undertake flood mitigation works in the future.

Response

There is no requirement on the project to reduce flood impacts. As noted in responses above, the project is committed to, where feasible and reasonable, not worsen existing flood characteristics up to and including the 100 year average recurrence event.

Issue raised

The modification report includes commentary that 'consultation would continue with the WestConnex Stage 2 delivery team in relation to the coordination of flooding and hydrology works in the vicinity of the proposed modification'. Whilst this is essential, to date this had been lacking and it is vital that this occurs sooner rather than later.

Response

Transport for NSW has had regular consultation with Sydney Motorway Corporation and the WestConnex Stage 2 delivery team. This would continue as both projects are progressed.

5.8.5 Strategic alternatives

Issue raised

No detailed consideration is apparent within the report in relation to the complex land use responses that are likely to develop as a result of increases accessibility created by Sydney Metro. In particular this includes resultant greater residential densities at the expense of existing employment lands, increased demand for social and cultural infrastructure that would result from increase population and the ability of existing public transport feeder services to accommodate increase demand in order to reduce private car dependency and parking demand.

Response

Changes to land use and land zoning are a matter for the Department of Planning and Environment.

Issue raised

With regard to the elimination of options for the new Sydney Metro Trains Facility South, it is noted that Sydenham appears to be have been chosen predominantly due to operational efficiency and cost reasons. Council wishes to express concern with regard to the additional reason of Sydenham apparently having the 'ability to provide capacity beyond the requirements to project opening', should this imply future expansion of the site into industrial employment lands that are already under threat.

Response

The reasons for Sydenham being the preferred location for the stabling facility are outlined in Section 3.3 of the modification report and include:

- Efficiency of train operations if Sydney Metro City & Southwest were to open in two phases
- Ability to provide capacity beyond the requirements of project opening
- Support maintenance facilities
- Better alignment with surrounding land use
- Limited potential to impact threatened species and vegetation communities
- Limited potential to impact the community with no residential property acquisition requirements.

Any expansion of the facility to meet future capacity beyond the requirements of project opening would be contained within the area being acquired and developed as part of the proposed modification.

5.8.6 Urban realm

Issue raised

The design principles for Sydney Metro provide a sound basis to guide design of stations, surrounding environment and other infrastructure required. The concept designs should be further evaluated against these design principles and Council and the public should be consulted on these to ensure there is consistency with and appropriate application of these design principles. The planning and design of Sydenham Station and its surrounding environment should also take into consideration the public domain opportunities identified in the revised draft Sydenham to Bankstown Urban Renewal Corridor Strategy (which was released in July 2017 and thus has not yet been considered in the modification report).

Response

The detailed design of the Sydenham Station would be guided by the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines and developed as part of the Station Design and Precinct Plans required by Condition E101. Inner West Council would be consulted as part of this process. The latest version of the design guidelines can be found at www.sydneymetro.info.

Issue raised

The creation of entry forecourt / plazas on either side of Sydenham Station is strongly supported to improve the station entry legibility, pedestrian circulation and general improvement on public domain around the station, giving pedestrian prioritisation of space over vehicle space. The new entrances would be highly visible from views along Sydenham Road and George Street thus enhancing station entry legibility. Furthermore, Sydenham Station will finally become an accessible interchange station with the creation of new entrances at the northern end of the platforms. Circulation space at the north eastern entry, both inside and outside of the station boundary appears tight, which will need further consideration to ensure there is adequate circulation space for safety, accessibility and comfort.

Response

The detailed design of the Sydenham Station would be guided by the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines and developed as part of the Station Design and Precinct Plans required by Condition E101. This would consider accessibility requirements of the station and circulation space at the entries. The latest version of the design guidelines can be found at www.sydneymetro.info.

Issue raised

The provision of a pedestrian plaza created by the acquisition of 11 Sydenham Road, connecting through to Garden Street and the Sydenham Pit is strongly supported. This will further enable the Sydney Metro plans for a new pedestrian and cycle route around the perimeter of the Sydney Metro Trains Facility South connecting Sydenham Station with Bedwin Road / Edinburgh Road via Sydney Steel Road. It will also support opportunities for public domain enhancement, open space use and business activation near Sydenham Station and around the Sydenham Pit. The residual land from the acquisition of 11 Sydenham Road presents additional opportunity for activation of the newly created plaza areas. In addition, setting back any future development slightly from Sydenham Road could enable an enlarged public plaza fronting Sydenham Road.

Response

Any future use of the residual land at 11 Sydenham Road would be subject to a separate approval process. Development controls on this site are a matter for the Department of Planning and Environment and Inner West Council.

Issue raised

The Sydney Metro Trains Facility South proposal presents an opportunity to achieve some of the public domain, connectivity, open space and business activation intentions identified in the Sydenham to Bankstown Fine Grain Study (2016), amongst other studies. There are further opportunities to enhance the edge around the Sydenham Pit to enable its use for passive recreation and to better enable the appreciation and utilisation if this unique piece of infrastructure, reflected in its State heritage listing. It is identified in the modification report that the new aqueduct could enable public access on top and the redundant pump station could be utilised for publicly accessible purposes. This is strongly supported, provided that a pathway also allows connection around the north eastern side of the Sydenham Pit back to Sydney Steel Road, so that it is not a terminating path. The design treatment of the aqueduct, new pump station, pit access and landscaping edge around the perimeter of the stabling facility is important, especially given the future pedestrian intensification occurring in the area and the intention for this to be developed as an active transport route, as noted previously.

Response

The design of the aqueduct and other elements around Sydenham Pit and Drainage Pumping Station would be guided by the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines. This includes specific requirements for the Sydenham aqueduct. The latest version of the design guidelines can be found at www.sydneymetro.info.

Provision of pedestrian and shared paths beyond those identified in the modification report are outside the scope of the project. As identified in mitigation measures OpT6, Transport for NSW would work with UInner West Council in relation to the active transport corridor.

Issue raised

It is important to consider the design of the northern end of the Sydney Metro Trains Facility South which will be located opposite the southern entry to the expanded Marrickville Metro shopping centre.

Response

The design of the Sydney Metro Trains Facility South would be guided by the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines. This includes specific requirements for the facility and its interface with surrounding streets. The latest version of the design guidelines can be found at www.sydneymetro.info. Transport for NSW would consult with Inner West Council regarding the design of the Sydney Metro Trains Facility South, particularly where it interfaces with public areas.

Issue raised

A high standard of design and consultation with Council and the public will be required for the concept design to ensure a good outcome is achieved and that impact on the State heritage items are minimised.

Response

Inner West Council would continue to be consulted as part of the development of the Station Design and Precinct Plans required by Condition E101.

Consultation with the public through the construction phase is described in the Construction Environment Management Framework (provided as part of the Sydney Metro City & Southwest Chatswood to Sydenham Submissions and Preferred Infrastructure Report).

Issue raised

The modification report acknowledges that the new concourse would provide an important cross-corridor link between Sydenham Road and Sydenham Green, particularly avoiding the need to cross the railway line via Gleeson Avenue, which presents an accessibility barrier. However, plans indicate that this will be a paid concourse, which limits the public nature of the crossing. Provision of an unpaid concourse would be preferable in the interests of improving pedestrian connectivity in the local area for all.

Response

The general public would be able to access this aerial concourse for use as a cross corridor link through the use of an Opal card (with tap on / tap off at zero cost).

5.8.7 Heritage

Issue raised

Council is concerned with regard to the significant adverse impacts to heritage items within the modification, particularly the Sydenham Pit and Drainage Pumping Station, and requests that Sydney Metro continue to work closely with Council on how such items are managed during construction.

Response

Management of potential heritage impacts would be through the implementation of mitigation measures described in the modification report and the relevant conditions of approval.

Consultation with Inner West Council would continue through the design and construction phases of the project.

5.8.8 Accessibility

Issue raised

Concerns raised with regard to how the *Disability Standards for Accessible Public Transport 2002* (DSAPT) and *Disability Discrimination Act 1992* (DDA) requirements are being interpreted and applied across a station that will continue to be operated under two separate systems. Clarity is requested on how accessible interchange between Sydney Metro and Sydney Trains services at Sydenham Station will be achieved across the station.

Response

All new elements of the station are being designed to meet DSAPT and DA requirements. Lifts from the platforms and the new aerial concourse would provide accessible interchange between Sydney Metro and Sydney Trains services.

Issue raised

Consideration needs to be given to the issue of glare from glass platform barriers that may obstruct legibility for travellers with vision impairment.

Response

Platform screen doors would be design in accordance with the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines. This includes specific requirements in relation to accessibility and considerations for the platform screen doors. The latest version of the design guidelines can be found at www.sydneymetro.info.

Issue raised

Additional consideration is needed with regard to tactile ground indicators proposed for use along the platform edges and at gate entry points. DSAPT control will likely not have given due consideration to new technology such as this during their composition.

Response

Tactile ground indicators would be implemented in accordance with the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines. The latest version of the design guidelines can be found at www.sydneymetro.info.

Issue raised

Clarity is sought on service standard and relevant procedures should lifts become out of service.

Response

The proposed new aerial concourse would provide a single lift to each platform. When combined with the existing concourse fronting Gleeson Avenue this would provide two lifts on each platform. This would provide redundancy in the event a lift is out of service.

Issue raised

Consideration should be given to the management and prioritisation of passenger movement, including lift use and boarding principles, during operational times.

Response

There are no current plans to implement priority lift use or boarding arrangements. Notwithstanding, the Sydney Metro product would provide accessible features at Sydenham Station including:

- Accessible lifts to all platforms
- Accessible toilet facilities
- Level access between the platform and metro trains
- Wheelchair spaces and separate priority seating on metro trains.

In addition, staff would be available at the station if assistance is required.

Issue raised

Additional mobility parking may be required in addition to improved taxi and drop-off locations in the interests of ensuring good accessibility.

Response

The modification report (in Section 6.3) identifies that the existing accessible parking bays on Burrows Avenue would be retained. Consideration of additional accessible parking bays would form part of the Interchange Access Plans required by Condition E92 and the Station Design and Precinct Plans required by Condition E101.

Issue raised

Consideration should be given to the most appropriate location for accessible toilets within the station.

Response

The location of accessible toilets within the station would be considered during detailed design.

Issue raised

At present platform 1 at Sydenham Station provides connectivity to the only platforms at Redfern Station with lift access, thereby enabling access to agencies such as People with Disability Australia. Removal of this connectivity required address within the context of the wider network.

Response

Redfern Station platforms 6 and 7 currently provide lift access. These platforms are serviced by the T2 Line. These platforms would continue to be accessible from Sydenham Station by using the T2 services from Sydenham Station platforms 3 and 4.

Issue raised

The modification report should refrain from using the term 'the disabled'. Please refer to the NSW Disability Inclusion Act and the United Nations Convention on the Rights of Persons with Disabilities for a clearer understanding of these terms and appropriate use.

Response

This term is used once in the modification report and Transport for NSW acknowledges that more appropriate terminology should have been used in this instance.

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COMMUNITY SUBMISSIONS

CHAPTER SIX

6 Community submissions

6.1 Sydney Airport

Issue raised

Sydney Airport recommends that directly connecting Sydney Airport to the Sydney Metro line should be considered. Sydenham Station is only around 1.5 kilometres from the airport's northern boundary. A metro linkage from that station to Sydney Airport would significantly enhance public transport access for hundreds of thousands of Sydneysiders and visitors beyond the reach of the existing heavy rail or bus network by providing a frequent, high capacity connection.

To improve the business case for such a connection, Sydney Airport suggest the line could continue from the airport's two terminal precincts through areas of Sydney's southern suburbs that have been targeted for new high density residential development, including in an around Pagewood / Eastgardens, the Anzac Parade Corridor from La Perouse to Kingsford and the proposed Randwick health and education super precinct.

Response

Provision of a metro line to Sydney Airport and beyond to the eastern suburbs is outside the scope of this Sydney Metro project. Interchange between Sydney Metro services and Airport line services can be achieved at Central Station and would be supported by the proposed Central Walk modification.

In addition, Sydney Metro City & Southwest would enable additional capacity and help to reduce crowding on the Airport Line.

6.2 Anonymous 1

Issue raised

Provision should be made for pedestrian access over the railway lines from Mary Street, St Peters into the new Sydenham Creative Hub that also accesses the station from the northern end. That way residents from Marrickville on the western side and residents from St Peters on the north eastern side can more easily access both Sydenham Station and the metro network. The current access to Sydenham Station is quite isolated from residents and additional access would be a good idea.

Response

Provision of a connection across the corridor into the Sydenham creative hub is outside the scope of the Sydney Metro project. Notwithstanding, the project does not preclude such a connection being provided in the future.

Pedestrian access to Sydenham Station would be improved as part of the proposed modification through two new station entries on either side of the station and a new accessible aerial concourse. Transport for NSW would also work with Inner West Council to facilitate the proposed active transport corridor. This would provide good station access for residents on both the western and eastern sides of the station.

6.3 Joseph Capolupo

6.3.1 Loss of car spaces

Issue raised

The loss of 36 car spaces is unacceptable. The spaces are being lost because of this 'State significant' project and shouldn't be deferred to the local government to manage after the project is complete.

The car spaces around Sydenham Station are important as they are used by commuters as well as local business customers and employees. Losing this many in a small area will push people further away from the station into neighbouring residential streets or discourage customers to local business.

A simple solution is to utilise the land that is being acquired at 11 Sydenham Road for a construction site, in front of the new northern entrance on Sydenham Road. This would be an ideal location to replace the 36 car spaces and to also provide kiss-and-ride.

Response

The loss of 36 car parking scapes would allow for new station pedestrian plazas and active transport facilities. As noted in Section 10.3.1 of the modification report, Transport for NSW would work with Inner West Council to complete a parking study to investigate alternative options to minimise the long-term impact on parking and other kerbside uses in local streets.

In accordance with the station access hierarchy provided in the Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement, commuter car parking at stations within 10 kilometres of the Sydney CBD is not provided. The exact location of kiss-and-rise facilities would be identified as part of the Interchange Access Plans required by Condition E92.

6.3.2 Additional kiss-and-ride

Issue raised

An additional kiss-and-ride is needed at the new northern entrance on Sydenham Road. This area is currently used as a kiss-and-ride (and car park) for those who live in Marrickville and the area north of Sydenham. Removing a kiss-and-ride from this area will mean unsafe drop-offs / pick-ups will occur, as there won't be any other option on this side of the station. People are already making unsafe drop-offs / picks-ups at the bus stops on Railway Parade and at the lights on Gleeson Avenue overbridge, before heading back down Marrickville Road.

The kiss-and-ride on Burrows Avenue is an inconvenient location and longer drive for those travelling from the Marrickville side of Sydenham Station, especially during peak times.

A simple solution is to utilise the land that is being acquired at 11 Sydenham Road for a construction site, right in front of the new northern entrance on Sydenham Road. This would be an ideal location for a kiss-and-ride (and carpark). The traffic lights planned for this area could double as entry to the car park allowing for a safe way to drop-off and pick-up. Another location would be to utilise the curb before the bend on to Railway Parade. This may work as it will be before the traffic lights that will be installed.

Response

Kiss-and-ride facilities on the Sydenham Road side of the station have not been proposed in the concept design due to space constraints with the primary access plaza, the change in road levels on this side and the space required for bus services.

Kiss-and-ride facilities are proposed to be provided in Burrows Avenue on the other side of the station, however the final location of kiss-and-rise facilities would be identified as part of the Interchange Access Plans required by Condition E92. This would include consideration of opportunities for kiss-and-ride of the Sydenham Road side of the station.

6.4 Danias Holdings

Issue raised

Danias Holdings support the proposal to build a new northern entrance to Sydenham Station and to create a new active pedestrian plaza on the northern side of Sydenham Road and Burrows Avenue. The proposed new entrance and plaza will help to activate the Sydenham Precinct as it transitions from an old industrial area into a modern enterprise zone that attracts new business particularly creative industries. It will also be of great assistance to the new residents moving into Marrickville.

The new entrance will make accessing the new metro service much easier for the residents living on the west side of Sydenham Station. This has the mutually beneficial outcome of increasing patronage for the metro and encouraging investment in the area. It will also enable customers to readily access the local businesses.

Response

The support for the proposed modification is noted.

6.5 Anonymous 2

Issue raised

The modification report summary shows an image of people crossing a platform between a metro and Sydney Train and the suggestion is this is Sydenham. However the plan of the station shows the metro platform being to the north east of the existing platforms. It is understood that the metro platforms cannot be curved, which platform 1 and 2 currently are. This requires new platforms to the north east of the existing platform 1 and 2. The description is clearly wrong.

The design needs a lot more work to be viable. Belief that there is not sufficient space available to include the two platforms, the shunt platform and the stations services building, as well as the interchange with Railway Parade in the area designated.

Response

The image in the modification report summary is a view north east from platforms 2/3 at a point where Sydney Metro and Sydney Trains services overlap. Cross platforms interchange between Sydney Trains services on platform 3 and Sydney Metro services on platform 2 would be possible. The modified platforms 1 and 2 would be straight to accommodate Sydney Metro services as described in Table 6-1 and Figure 6-1 of the modification report.

To the north of the station, the metro tracks would be located to the west of the current rail corridor and over the existing open drains. This provides sufficient space for the new platforms, the shunt track to the stabling facility, the station services building and the plaza on Railway Parade.

Issue raised

The idea that people will interchange from the T2 and T4 trains at Sydenham to a metro train when the change involves a significant walk, at worse from the south west end of the existing platforms, over the existing elevated concourse, then north east to the end of the existing platform 1, to go toward the city and beyond, needs to be reviewed. The location of the new metro platforms is in the wrong place.

It would appear that the location of the metro platforms must be located further towards the city than shown, as there is insufficient width of the corridor to accommodate the metro platforms, avoid issues with the open drains and spillway to the south west of the Sydenham Pit and Drainage Pumping Station. Furthermore it would appear that having room between the pit and the metro tracks, plus the shunt track, as well as a fence and both the metro and existing Sydney Train tracks will require platform 6 to be straightened and for these existing train tracks to be relocated in an easterly direction.

Response

Sydenham Station would provide interchange opportunities between metro services, and existing Sydney Trains T2 and T4 services. Most interchange movements would involve a walk of between 100 and 200 metres. Customers wishing to access destinations such as Waterloo, Barangaroo, Macquarie Park. Macquarie University or other locations in the north-west would be likely to interchange at Sydenham Station.

To the north of the station, the metro tracks would be located to the west of the current rail corridor and over the existing open drains as correctly shown in Figure 6-1 of the modification report. This provides sufficient space for the new platforms, the shunt track to the stabling facility, the station services building and the plaza on Railway Parade. There is no requirement to straighten platform 6 or move these existing lines in an easterly direction.

Issue raised

The shunt facility should be the full length of a metro train, to provide a turn-back in future, so that a reduced frequency of trains can be timetabled west to Bankstown, whilst maintaining a higher frequency to the city.

Response

The shunt track to the stabling facility provides sufficient space for a metro train to clear the main tracks and access the facility.

Cross-over facilities in the metro tracks around Sydenham Station provide the flexibility to turn-back metro trains if required in the future for operational efficiencies.

Issue raised

The design does not address the predicted more intense rain storms occurring as a result of climate change. Simply enclosing these spillways is not enough. They will be under parts of the new metro line, which may be subject to inundation in severe rainstorms, as the enclosed spillways reach their limit. This will put further pressure on the existing tunnel under Railway Parade and the Botany Goods Line.

Response

The drainage design considers climate change scenarios. This will continue to be considered during the detailed design of the project.

Issue raised

The drawing in relation to the Sydney Metro Trains Facility South is confusing as it shows the two main metro tracks proceeding to the Marrickville dive, which is presumed to be the tunnel to Waterloo, but one track coming out of the marshalling yard and joining the existing corridor towards St Peters. This contradicts the stated need to maintain separate right of way for the metro.

Response

The line leaving the stabling facility and heading north along the existing corridor is a shunt track for metro trains to access and egress the stabling facility. This line does not join to the existing Sydney Trains lines.

Issue raised

Concerns regarding the future of the XPT facility and the possibility of this being relocated. The aging XPT fleet is proposed to be replaced with similar train sets. Therefore it would be very expensive to replace the XPT fleet and the XPT service facility.

More planning should be undertaken to incorporate the XPT facility and the XPT train operational requirements into the design.

Figures in the report show that XPT trains and T3 trains (which currently use platforms 1 and 2) will use the tracks passing platforms 3 and 4, while the tracks on platforms 1 and 2 are converted to metro. It is believed that the junction to the south west of these platforms will have excessive curves and will not be conductive to good train operation. The phase 1 schematic also refers to freight operations, which is suspected to be an error.

Response

The proposed modification does not require the Sydenham Maintenance Centre (the XPT facility) to be relocated. The proposed modification includes adjustment to the entry tracks to this facility so that it can continue to be accessed by the intercity train fleet after Sydney Metro is operational.

Issue raised

The assumption for future expansion of the metro seems to be that it will go to Bankstown. There appears to be no consideration for other spurs and the ability to extend the metro to the nearest higher density areas, such as the Wolli Creek, Arncliffe, Banksia and Rockdale precinct or the Wolli Creek, Turella and Bardwell Park precinct.

Response

As part of Sydney Metro City & Southwest, Transport for NSW will be converting the T3 Bankstown Line to metro operations (subject to approval). The justification for this will be provided in the Sydenham to Bankstown Environmental Impact Statement.

No assumptions have been made in the design regarding future expansion of Sydney Metro. The design does not preclude future metro lines to the south.

Issue raised

The ideal location for the metro platforms would be under the existing platforms, which will make it much easier to change from T2 or T4 trains to the metro, but this is likely to be technically challenging to build safely, for a reasonable cost and to allow metro trains to access the Sydney Metro Trains Facility South. The low flight path at Sydenham excludes building the metro platforms above the existing platforms.

The next option is to consider building the platforms in Railway Parade, by elevating the existing roadway above the station. This may facilitate a tunnel to the south west for future spur lines from Sydenham. This needs to be incorporated into this phase and the design and platform location re-visited before proceeding as currently planned.

Response

The metro platforms at Sydenham are on the western side of the station to enable the connection to the existing Bankstown Line (which will be converted to metro operations between Sydenham and Bankstown). Metro platforms in another location would have required the metro lines to cross over Sydney Trains tracks (the T2 and / or the T4 line) which would have impacted operational efficiencies or required significant works to construct a bridge or tunnel.

Other options suggested in the submission would result in an increase in the cost of the station works at Sydenham and other potential impacts including:

- Underground platforms:
  - would present difficulties accessing the Sydney Metro Trains Facility South and connecting back to the Bankstown Line prior to Marrickville Station
  - would result in increased heritage impacts to Sydenham Station due to likely cut-and-cover construction method
  - would require additional land acquisition to the west of Sydenham Station for a tunnel dive.
- Platforms in Railway Parade would require substantial changes to the existing road network.

Issue raised

The report states that the T3 Bankstown Line slows down the network because of the way it merges with T2 Airport, Inner West and South Line. Whilst it is possible at Central for trains to do this, the current train operation only has the T3 Bankstown Line sharing track with a limited T2 service from Campbelltown prior to Central, and the rest of the T2 line after Central Station.

Removing the T3 trains will not solve the capacity links on the T2 Airport Line because other services will need to be supplied to service St Peters and Erskineville stations. Suggestion that the original design of six tracks (or in the interim a dual directional 5th track) between Sydenham and to after the T4 tunnel to Redfern at Erskineville as well as the proposed metro link is needed. The increased tracks will allow express trains to overtake stopping trains resolving a part of the bottleneck.

There is currently very little incentive for Bankstown Line passengers to change trains at Sydenham Station during peak hour, because both the T2 (particularly) and most T4 trains either, do not stop, or, if they do, are already full by the time they reach Sydenham Station during peak hour. The design at Sydenham Station plus the lack of capacity on the existing network appears to be designed to ensure T3 passengers continue on to Central Station before changing from the metro to the existing network to access Museum, St James or Circular Quay stations.

There is no provision for T2 passengers boarding between Padstow and Turella stations to utilise the metro without changing trains twice, at Wolli Creek and Sydenham stations, based on the present operations of the T2 Line.

Response

The need and justification for Sydney Metro City & Southwest is established in the Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement.

The T3 and T2 lines currently merge immediately to the north of Sydenham Station. The conversion of the Bankstown Line would remove the need for Bankstown services to use the City Circle, providing additional train paths for other lines. This would enable a fundamental change in the suburban network service plan and allow additional capacity on the T2 Line. It is anticipated that Sydney Metro, together with signalling and infrastructure upgrades across the existing network, can increase the capacity of train services from about 120 per hour today, to up to 200 services beyond 2024. This means that the railway network across Sydney will have room for an extra 100,000 train customers an hour in the peak.

6.6 Eagle Partners

Issue raised

The modification report claims that passenger interchange between current train services operated by Sydney Trains and the proposed metro trains, is a prime purpose of the application. It is thus disappointing that just one page of the report is devoted to the 'design strategy' for Sydenham Station. Being a junction station, it is already an important interchange station. Given that the metro trains routing to the north will offer new destinations and faster trip-times for some travellers than are presently available, the degree of interchange might be expected to substantially increase.

It is therefore disappointing that Transport for NSW has not adopted a station design put to it in November 2015 which involved the lowering of the railway tracks serving Sydenham platforms 1 ("Up" Metro) and 3 ("Up" T2 Airport Line), which would have enabled across-the-platform, same-direction interchange for passengers between metro trains and T2 Airport Line trains in both directions – inbound and outbound. It would have enabled significant travel-time savings for thousands of future passengers. It would also have simplified wayfinding and its associated signage. Less ambulant passengers would have had less need to use stairs, escalators or lifts.

By actually encouraging interchange at Sydenham, that design may well have provided more passenger accommodation on Sydney Trains' services at St Peters and Erskineville stations, the potential shortage of which has generated considerable public concern.

The Minister for Planning might consider whether a further cost/benefit analysis of the above alternative station design is warranted as a condition of approval.

Response

The provision of metro services at Sydenham Station is expected to result in an increase in the number of interchange movements at the station. Efficient interchange between existing Sydney Trains services and Sydney Metro services would be possible by using the proposed aerial concourse at the northern end of the station.

Lowering of the tracks and associated platforms would increase the cost of the works at Sydenham Station and would:

- Present difficulties for trains accessing the Sydney Metro Trains Facility South and connecting back to the Bankstown Line prior to Marrickville Station
- Result in increased heritage impacts to Sydenham Station due to likely cut-and-cover construction method
- Require additional land acquisition to the west of Sydenham Station
- Require additional works to protect the lowered tracks from flood water.

Issue raised

A notable omission from the plans provided in the report is the provision of escalators between the proposed elevated concourse and the platforms. The Transport for NSW Design Guidelines for Sydney Metro City & Southwest, Chatswood to Sydenham, dated June 2017, Item 4.1.4 – Circulation Elements state 'All Sydney Metro platforms are to be served by escalators and lifts. Lifts and escalators are to provide direct access from entry concourse to platform level'.

It should be a condition of any approval that escalators be provided between the proposed elevated concourse and the station platforms.

Response

The intent of this part of the design guideline document is for escalator and lift access to be provided to underground station platforms from street level entry concourses. In the case of Sydenham, the northern entry plaza would be at the same level as Platform 1. Access to and from Platform 2 (Sydney Metro Bankstown bound Sydney Metro trains) would be via stairs and a lift. The numbers of passengers using this platform is not considered large enough to warrant the installation of an escalator.

6.7 Ian Hill

Issue raised

Opposition to the proposed modification due to the following reasons:

- Sydney Metro System is incompatible with existing rolling stock
- The Sydney Metro decreases passenger comfort due to many design weaknesses, including less seating and long standing times, types of seats and seating direction, narrower carriages leading to congestion, and lack of train guards
- The Sydney Metro is being rolled out too quickly without public evaluation and experience
- The Sydney Metro is fuelling a real-estate bubble with developers rushing to exploit Government plans to forever change the nature of suburbs at the expense of residents
- High density urbanisation along transport corridors leads to unfavourable transport outcomes due to a high percentage of occupiers not using the transport corridors and criss-crossing the city to work or recreation using alternative transportation by necessity and adding to traffic congestion
- Sydney Metro system is adding to the radial nature of the transport system through closure of interconnecting lines
- Sydney Metro trains cannot be used on existing lines due to undersized carriages
- Sydney's current rolling stock cannot be used on metro lines due to undersized loading gauge
- Loss of Sydney Trains services on existing rail lines including the Bankstown Line and the Epping to Chatswood Rail Line
- Loss of rail services for Yagoona and Birrong.

Response

The issues raised are outside the scope of the proposed modification at Sydenham. Consideration of the need and justification for Sydney Metro is provided in the Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement. Further information regarding the Sydenham to Bankstown component of Sydney Metro City & Southwest will be provided in the Environmental Impact Statement for that project.

Issue raised

Concerns raised regarding heritage impacts to Sydenham Station including:

- Loss of Sydenham station heritage platforms 1 and 2 and platforms buildings including the Parcels building and platform 6 building
- Imposition of the new awning system at the north end which will dominate the site and remove the last significant part of all platforms. Reducing the height of the canopy would enhance the heritage values
- Lack of symmetry arising from the modernisation of Platform 1.

Suggest moving the metro platforms further north so as to have no such impacts and change the north and east station access to preserve the heritage elements. A subway might also be an improvement.

Response

Justification for the heritage impacts at Sydenham Station is provided Section 3.5.2 of the modification report. These impacts would be managed through the implementation of existing mitigation measures and conditions of approval.

Moving the metro platforms to the north would not achieve the necessary interchange between Sydney Metro and Sydney Trains services at Sydenham Station.

Issue raised

Concerns raised regarding heritage impacts to Sydenham Pit and Drainage Pumping Station due to the imposition of an aqueduct. Sydenham Pit and Drainage Pumping Station should be conserved as an operating element of the Sydney stormwater system, continuing its historic function. The significant fabric is testament to the skill of past trades people. The surviving historic fabric of Exceptional and High significance should be retained and conserved.

Response

Justification for the heritage impacts at to the Sydenham Pit and Drainage Pumping Station is provided Section 3.5.2 of the modification report. These impacts would be managed through the implementation of existing mitigation measures and conditions of approval.

The proposed interventions as part of the Sydney Metro works would not affect the ongoing use of the pit as an operating element of the Sydney stormwater system and would have minimal impact on the existing wall and floor of the pit.

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REVISED ENVIRONMENTAL MITIGATION MEASURES

CHAPTER SEVEN

7 Revised environmental mitigation measures

The list of mitigation measures presented in Chapter 21 of the modification report has been revised based on the submissions received.

Table 7-1 provides the revised consolidated environmental mitigation measures. This table supersedes the mitigation measures presented in the submissions reports for the Victoria Cross Station and Artarmon Substation modification and the Central Walk modification. New mitigation measures or additions to existing mitigation measures are shown in **bold** text, with deletions shown with a ~~strikethrough~~. This table assumes that the Victoria Cross Station and Artarmon Substation, Martin Place Station and Central Walk modifications are approved without changes.

As per the approach for the approved project, the location(s) applicable to each mitigation measure are identified by using a unique identifier as follows:

- STW – Surface track works
- CDS – Chatswood dive site
- AS – Artarmon substation
- CN – Crows Nest Station
- VC – Victoria Cross Station
- BP – Blues Point temporary site
- GI – Ground improvement works
- BN – Barangaroo Station
- MP – Martin Place Station
- PS – Pitt Street Station
- CS – Central Station
- WS – Waterloo Station
- MDS – Marrickville dive site (this area also includes the necessary mitigation measures for the Sydney Metro Trains Facility South)
- SS – Sydenham Station
- STWS – Surface track works south
- Metro rail tunnels – Metro rail tunnels not related to other sites (eg TBM works)
- PSR – Power supply routes.

Table 7-1 Revised environmental mitigation measures

ID	Mitigation measure	Applicable location(s)[1]
Construction traffic and transport		
T1	Ongoing consultation would be carried out with (as relevant to the location) the CBD Coordination Office, Roads and Maritime Services, Sydney Trains, NSW Trains, the Port Authority of NSW, Barangaroo Delivery Authority, local councils, emergency services and bus operators in order to minimise traffic and transport impacts during construction.	All except metro rail tunnels
T2	Road Safety Audits would be carried out at each construction site. Audits would address vehicular access and egress, and pedestrian, cyclist and public transport safety.	All except metro rail tunnels
T3	Directional signage and line marking would be used to direct and guide drivers and pedestrians past construction sites and on the surrounding network. This would be supplemented by Variable Message Signs to advise drivers of potential delays, traffic diversions, speed restrictions, or alternate routes.	All except metro rail tunnels
T4	In the event of a traffic related incident, co-ordination would be carried out with the CBD Coordination Office and / or the Transport Management Centre's Operations Manager.	All except metro rail tunnels
T5	The community would be notified in advance of proposed road and pedestrian network changes through media channels and other appropriate forms of community liaison.	All except metro rail tunnels
T6	Vehicle access to and from construction sites would be managed to ensure pedestrian, cyclist and motorist safety. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals and modifications to existing signals or, on occasions, police presence.	All except metro rail tunnels
T7	Additional enhancements for pedestrian, cyclist and motorist safety in the vicinity of the construction sites would be implemented during construction. This would include measures such as: • Use of speed awareness signs in conjunction with variable message signs near construction sites to provide alerts to drivers • Community educational events that allow pedestrians, cyclists or motorists to sit in trucks and understand the visibility restrictions of truck drivers, and for truck drivers to understand the visibility from a bicycle; and a campaign to engage with local schools to educate children about road safety and to encourage visual contact with drivers to ensure they are aware of the presence of children • Specific construction driver training to understand route constraints, expectations, safety issues, human error and its relationship with fitness for work and chain of responsibility duties, and to limit the use of compression braking • Use of In Vehicle Monitoring Systems (telematics) to monitor vehicle location and driver behavior • Safety devices on construction vehicles that warn drivers of the presence of a vulnerable road user located in the vehicles' blind spots and warn the vulnerable road user that a vehicle is about to turn.	All except metro rail tunnels
T8	Access to existing properties and buildings would be maintained in consultation with property owners.	All except metro rail tunnels
T9	All trucks would enter and exit construction sites in a forward gear, where feasible and reasonable.	All except metro rail tunnels

ID	Mitigation measure	Applicable location(s)[1]
T10	Any relocation of bus stops would be carried out by Transport for NSW in consultation with Roads and Maritime Services, the CBD Coordination Office (for relevant locations), the relevant local council and bus operators. Wayfinding and customer information would be provided to notify customers of relocated bus stops.	All except metro rail tunnels
T11	For special events that require specific traffic measures, those measures would be developed in consultation the CBD Coordination Office (for relevant locations), Roads and Maritime Services, Barangaroo Delivery Authority (for relevant locations) and the organisers of the event.	BN, MP, PS, CS
T12	Construction sites would be managed to minimise construction staff parking on surrounding streets. The following measures would be implemented: • Encouraging staff to use public or active transport • Encouraging ride sharing • Provision of alternative parking locations and shuttle bus transfers where feasible and reasonable. Transport for NSW would work with local councils to minimise adverse impacts of construction on parking and other kerbside use in local streets, such as loading zones, bus zones, taxi zones and coach zones.	All except metro rail tunnels
T13	Construction site traffic would be managed to minimise movements in the AM and PM peak periods.	All except metro rail tunnels
T14	Construction site traffic immediately around construction sites would be managed to minimise movements through school zones during pick up and drop off times.	All except metro rail tunnels
T15	Pedestrian and cyclist access would be maintained at Crows Nest during the temporary closure of Hume Street, and at Martin Place during the temporary partial closure of Martin Place. Wayfinding and customer information would be provided to guide pedestrians and cyclists to alternative routes.	CN, MP
T16	Timing for the temporary closure of the Devonshire Street tunnel would avoid periods of peak pedestrian demand. Wayfinding and customer information would be provided to guide pedestrians to alternative routes.	CS
T17	Consultation would occur with the Harbour Master, Roads and Maritime Services and Sydney Ferries' to ensure shipping channels are maintained during the Sydney Harbour ground improvement works.	GI
T18	During the closure of existing entrances to Martin Place Station, marshalls would be provided during the AM and PM peak periods to direct customers to available access and egress points.	MP
T19	Where existing parking is removed to facilitate construction activities, alternative parking facilities would be provided where feasible and reasonable.	All except metro rail tunnels
T20	Alternative pedestrian routes and property access would be provided where these are affected during the construction of the power supply routes.	PSR
T21	The potential combined impact of trucks from multiple construction sites would be further considered during the development of Construction Traffic Management Plans.	All except metro rail tunnels

ID	Mitigation measure	Applicable location(s)[1]
T22	Where existing footpath routes used by pedestrians and / or cyclists are affected by construction, a condition survey would be carried out to confirm they are suitable for use (eg suitably paved and lit), with any necessary modifications to be carried out in consultation with the relevant local council.	All except metro rail tunnels
T23	Specific station management measures would be implemented during pedestrian movement Phase 2. This would include strategies such as encouraging passengers to exit platforms at the closest stair case or escalator, signage and marshalling of passengers waiting to board to minimise those waiting adjacent to hoarding and to direct passengers so that that there is even distribution along the platform.	CS
T24	The temporary closures of footpaths on Chalmers Street would not occur at the same time as the temporary closure of the Devonshire Street Tunnel.	CS
T25	During the closure of Randle Lane, traffic control would be provided at either end. Reversing movements out of Randle Lane onto Elizabeth Street would not be carried out during the peak periods of 7 am to 10 am and 3 pm to 7 pm.	CS
T26	During the closure of Randle Lane, access to basement car parking would be maintained where feasible and reasonable. If access cannot be maintained, alternative parking would be arranged subject to consultation and agreement of affected owners or residents.	CS
T27	Detailed construction planning would be coordinated with the Sydenham to Bankstown project and the Temporary Transport Strategy arrangements to minimise impacts on the traffic and transport network.	SS
T28	The connectivity provided by the pedestrian route that extends from Elliot Street along the eastern boundary of 52 McLaren Street to McLaren Street would be retained during construction (in conjunction with suitable pedestrian management measures along the McLaren Street frontage).	VC
Operational traffic and transport		
OpT1	Enhancement of pedestrian infrastructure in the vicinity of Victoria Cross and Martin Place stations would be investigated further in consultation with (as relevant to the location) the CBD Coordination Office, Roads and Maritime Services and the relevant local council.	VC, MP
OpT2	Access would be maintained to neighbouring properties.	All except metro rail tunnels
OpT3	The design of the interface between the Frank Channon Walk extension and the signalised intersection at Mowbray Road / Hampden Road (including any shared zone proposal) would be developed in consultation with Roads and Maritime Services and Willoughby Council.	CDS
OpT4	Transport for NSW would work with local councils to minimise adverse impacts of operation on parking and other kerbside use in local streets, such as loading zones, bus zones, taxi zones and coach zones.	All except metro rail tunnels
OpT5	During detailed design, Transport for NSW would consult with Inner West Council, Roads and Maritime Services and other stakeholder on strategies to reduce the number of staged pedestrian marked foot crossings at the Edinburgh Road / Edgeware Road intersection.	MDS
OpT6	Transport for NSW would work with the Inner West Council to facilitate staged completion of relevant sections of the proposed active transport corridor between Sydenham and Bankstown subject to funding.	SS
OpT7	Transport for NSW would work with the Inner West Council to complete a parking study to manage the long term impacts of parking loss around Sydenham Station.	SS

ID	Mitigation measure	Applicable location(s)[1]
Construction noise and vibration		
NV1	The Construction Noise and Vibration Strategy would be implemented with the aim of achieving the noise management levels where feasible and reasonable. This would include the following example standard mitigation measures where feasible and reasonable: • Provision of noise barriers around each construction site • Provision of acoustic sheds at Chatswood dive site, Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and Marrickville dive site • The coincidence of noisy plant working simultaneously close together would be avoided • Offset distances between noisy plant and sensitive receivers would be increased • Residential grade mufflers would be fitted to all mobile plant • Dampened rock hammers would be used • Non-tonal reversing alarms would be fitted to all permanent mobile plant • High noise generating activities would be scheduled for less sensitive period considering the nearby receivers • The layout of construction sites would consider opportunities to shield receivers from noise. This would also include carrying out the requirements in relation to construction noise and vibration monitoring.	All
NV2	Unless compliance with the relevant traffic noise criteria can be achieved, night time heavy vehicle movements at the Chatswood dive site, Crows Nest Station, Victoria Cross Station (southern) and Waterloo Station sites would be restricted to: • The Pacific Highway and Mowbray Road at the Chatswood dive site • The Pacific Highway, Hume Street and Oxley Street at the Crows Nest Station construction site • McLaren Street, Miller Street and Berry Street at the Victoria Cross Station southern construction site • Botany Road and Raglan Street at the Waterloo Station construction site.	CDS, CN, VC, WS
NV3	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	All except metro rail tunnels
NV4	Feasible and reasonable measures would be implemented to minimise ground borne noise where exceedences are predicted.	All
NV5	Feasible and reasonable mitigation measures would be implemented where power supply works would result in elevated noise levels at receivers. This would include: • Carrying out works during the daytime period when in the vicinity of residential receivers • Where out of hours works are required, scheduling the noisiest activities to occur in the evening period (up to 10 pm) • Use of portable noise barriers around particularly noisy equipment such as concrete saws.	PSR

ID	Mitigation measure	Applicable location(s)[1]
NV6	Transport for NSW would engage an Independent Acoustic Advisor to act independently of the design and construction teams and provide oversight of construction methods, construction noise and vibration planning, management and mitigation, and construction noise and vibration monitoring and reporting. The key responsibilities of the Independent Acoustic Advisor would include: • Assurance of contractor noise and vibration planning, modelling, management and monitoring practices • Verification of compliance with relevant guidelines and approval requirements • Audit noise and vibration management practices.	All
NV7	Alternative demolition techniques that minimise noise and vibration levels would be investigated and implemented where feasible and reasonable. This would include consideration of: • The use of hydraulic concrete shears in lieu of hammers/rock breakers • Sequencing works to shield noise sensitive receivers by retaining building wall elements • Locating demolition load out areas away from the nearby noise sensitive receivers • Providing respite periods for noise intensive works • Methods to minimise structural-borne noise to adjacent buildings including separating the structural connection prior to demolition through saw-cutting and propping, using hand held splitters and pulverisers or hand demolition • Installing sound barrier screening to scaffolding facing noise sensitive neighbours • Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods.	All except metro rail tunnels
NV8	Opportunities to minimise heavy vehicles movements on Randle Lane at night would be further investigated during detailed construction planning.	CS
NV9	Measures would be implemented to reduce work health and safety noise exposure for station workers, retail staff and members of the public within Central Station. These would include: • The use of hoarding and / or temporary noise barriers around construction sites • Providing hearing protection to station staff employees where appropriate • Providing specific work health and safety noise training to commercial receiver employers including guidance on managing their employees during highly noisy periods • The use of signage around construction sites to inform the general public of high noise exposure areas.	CS
NV10	Further background monitoring would be conducted at a receiver addressing McLaren Street during the preparation of the Construction Noise and Vibration Impact Statements to confirm the applicable noise management levels for construction.	VC
NV11	Opportunities to minimise heavy vehicle movements from the Victoria Cross Station northern construction site at night would be further investigated during detailed construction planning.	VC
NV12	**Ballast tamping and rock breakers would not be undertaken during the night-time period (10pm to 7am) except where circumstances arise that require the use of this plant to ensure the rail corridor is made safe for the operation of trains by the conclusion of a scheduled rail possession.**	**STWS**

ID	Mitigation measure	Applicable location(s)[1]
Operational noise and vibration		
OpNV1	The height and extent of noise barriers adjacent to the northern and southern surface track works would be confirmed during detailed design with the aim of not exceeding trigger levels from the *Rail Infrastructure Noise Guidelines* (Environment Protection Authority, 2013). At property treatments would be offered where there are residual exceedances of the trigger levels.	STW, STWS
OpNV2	Track form would be confirmed during the detailed design process in order to meet the relevant ground-borne noise and vibration criteria from the *Rail Infrastructure Noise Guidelines* (EPA, 2013) and the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* (DECC, 2007a).	Metro rail tunnels
OpNV3	Stations and ancillary facilities including train breakout noise from draught relief shafts would be designed to meet the applicable noise criteria derived from the *Industrial Noise Policy* (EPA, 2000).	All except metro rail tunnels
OpNV4	Procedural mitigation measures would be implemented to minimise noise emissions from the Sydney Metro Trains Facility South with the aim of meeting the relevant criteria derived from the *Industrial Noise Policy* (Environment Protection Authority, 2000). This would consider measures such as: • Minimising the number of trains being cleaned simultaneously • Cleaning trains without air conditions systems in use • Limit cleaning and start-up operations during the night-time and early morning periods to the trains stabled furthest from the most affected residences. In the event that procedural measures are not sufficient to achieve compliance with the criteria derived from the *Industrial Noise Policy*, at-property treatments would be offered to affected receivers.	MDS
OpNV5	Further detailed investigations would be undertaken of the phased operations once the detail of these changes are determined. This investigation would include determination of the likely change in noise levels at receivers and consideration of the need for any feasible and reasonable mitigation measures taking into consideration the likely duration of the phased operations.	STWS
Land use and property		
LP1	Opportunities to integrate the eastern entry with local strategic planning initiatives would be investigated in consultation with City of Sydney Council.	CS
Business impacts		
BI1	Specific consultation would be carried out with businesses potentially impacted during construction. Consultation would aim to identify and develop measures to manage the specific construction impacts for individual businesses.	All
BI2	A business impact risk register would be developed to identify, rate and manage the specific construction impacts for individual businesses.	All
BI3	Appropriate signage would be provided around construction sites to provide visibility to retained businesses.	All except metro rail tunnels

ID	Mitigation measure	Applicable location(s)[1]
Non-Aboriginal heritage		
NAH1	Archival recording and reporting of the following heritage items would be carried out in accordance with the NSW Heritage Office's *How to Prepare Archival Records of Heritage Items* (1998a), and *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006): • The internal heritage fabric and any non-original elements removed from within the curtilage of Mowbray House, Chatswood • The interior, exterior and setting of the shop at 187 Miller Street, North Sydney • The fabric and setting of the North Sydney bus shelters requiring removal and temporary relocation at Victoria Cross Station and Blues Point temporary site • Any component of the Blues Point Waterfront Group and the McMahons Point South heritage conservation area to be directly affected or altered, including vegetation and significant landscape features • Hickson Road wall in the vicinity of proposed ventilation risers and skylights for Barangaroo Station • The interior, exterior and setting of the 'Flat Building' at 7 Elizabeth Street, Sydney • Martin Place, between Elizabeth and Castlereagh streets, Sydney • The heritage fabric of areas of the existing Martin Place Station affected by the project • The Rolling Stock Officers Garden, Rolling Stock Officers Building and Cleaners Amenities Building in Sydney Yard and any other component of the Sydney Terminal and Central Railway Stations group to be removed or altered • The Bounce Hostel building (former MGM building) • Directly impacted parts of the Congregational Church at Waterloo • Sydenham Pit and Drainage Pumping Station 1 • Sydenham Railway Station Group: Platform 6 building and Platform 1 Parcels Office.	CDS, VC, BP, MP, CS, WS, MDS, SS
NAH2	The archaeological research design would be implemented. Significant archaeological findings would be considered for inclusion in heritage interpretation (as per NAH8) for the project and be developed in consultation with the relevant local council.	CDS, CN, VC, BP, BN, MP, PS, CS, WS, PSR
NAH3	An Exhumation Policy and Guideline would be prepared and implemented. It would be developed in accordance with the *Guidelines for Management of Human Skeletal Remains* (NSW Heritage Office, 1998b) and NSW Health Policy Directive – Exhumation of human remains (December, 2013). It would be prepared in consultation with NSW Heritage Office and NSW Health.	All except metro rail tunnels
NAH4	The method for the demolition of existing buildings and / or structures at Chatswood dive site, Victoria Cross Station, Martin Place Station, Pitt Street Station, Central Station, Waterloo Station **and Sydenham Station** would be developed to minimise direct and indirect impacts to adjacent and / or adjoining heritage items.	CDS, VC, MP, PS, CS, WS, **SS**
NAH5	Prior to total or partial demolition of heritage items at Victoria Cross and Martin Place stations, and the Bounce Hostel building (former MGM building at Central Station), heritage fabric for salvage would be identified and reuse opportunities for salvaged fabric considered. This would include salvage and reuse of heritage tiles to be impacted at Martin Place Station.	VC, MP, CS
NAH6	An appropriately qualified and experienced heritage architect would form part of the Sydney Metro Design Review Panel and would provide independent review periodically throughout detailed design.	All

ID	Mitigation measure	Applicable location(s)[1]
NAH7	The project design would be sympathetic to heritage items and, where reasonable and feasible, minimise impacts to the setting of heritage items. The detailed design for Martin Place Station, Central Station, Sydenham Station and the aqueduct over the Sydenham Pit and Drainage Pumping Station would be developed with input from a heritage architect.	STW, CDS, CN, VC, BN, MP, PS, CS, WS, MDS, SS
NAH8	Appropriate heritage interpretation would be incorporated into the design for the project in accordance with the NSW Heritage Manual, the NSW Heritage Office's *Interpreting Heritage Places and Items: Guidelines* (August 2005), and the NSW Heritage Council's *Heritage Interpretation Policy*.	CDS, CN, VC, BP, BN, MP, PS, WS
NAH9	A Central Station heritage interpretation plan would be developed and implemented. It would be consistent with the *Central Station Conservation Management Plan* (Rappoport and Government Architects Office, 2013) and in accordance with the guidelines identified in NAH8.	CS
NAH10	The detailed design of the Sydney Yard Access Bridge would be carried out in accordance with the relevant specific element principles in the Design Guidelines.	CS
NAH11	Except for heritage significant elements affected by the project, direct impact on other heritage significant elements forming part of the following items would be avoided: • The Blues Point Waterfront Group (including the former tram turning circle, stone retaining wall, bollards and steps) • The Millers Point and Dawes Point Village Precinct • The existing Martin Place Station • Sydney Terminal and Central Railway Stations group • Sydney Yard (including the Shunters Hut and Prince Alfred Sewer) • The existing Sydenham Station • Brick retaining walls near Sydenham Station.	BP, BN, MP, CS, SS, STWS
NAH12	Power supply works would be designed and constructed to avoid impacts to the Tank Stream and Bennelong Stormwater Channel.	PSR
NAH13	The design and detailed construction planning of work at Central Station would consider the requirements of the *Central Station Conservation Management Plan* (Rappoport and Government Architects Office, 2013) and include consideration of opportunities for the retention, conservation and / or reuse of original and significant heritage fabric and movable heritage items. Consultation would be carried out with Sydney Trains and the Heritage Council of NSW during design development.	CS
NAH14	The final design and location of the new connection and opening at Martin Place Railway Station would minimise removal of the significant red ceramic tiling where feasible and reasonable.	MP
NAH15	Opportunities for the reuse of any tiles at Martin Place Railway Station that are removed would be investigated.	MP
NAH16	Opportunities for the reuse of the circular seating within Martin Place Station would be investigated.	MP
NAH17	Opportunities for the salvage and reuse of the bus shelters temporarily removed at Victoria Cross and Blues Point would be investigated in consultation with North Sydney Council.	VC, BP
NAH18	Works at Central Station would be carried out with the oversight of heritage specialists.	CS

ID	Mitigation measure	Applicable location(s)[1]
NAH19	Subject to outcomes of consultation with the church, temporary and permanent works at the Congregational Church would: • Minimise impacts to heritage fabric • Be sympathetic to the heritage values and architectural form of the building.	WS
NAH20	The design and detailed construction planning of works directly impacting the Sydenham Pit and Drainage Pumping Station would consider the requirements of the *Sydenham Pit & Drainage Pumping Station 1 Conservation Management Plan* (Sydney Water, 2004).	MDS
NAH21	The internal and external finishes of the infilled openings between 9-19 Elizabeth Street and the Commonwealth Bank of Australia building would be developed in consultation with a heritage architect.	MP
Aboriginal heritage		
AH1	Aboriginal stakeholder consultation would be carried out in accordance with the NSW Office of Environment and Heritage's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.	All
AH2	The cultural heritage assessment report would be implemented.	All
AH3	Archaeological test excavation (and salvage when required) would be carried out where intact natural soil profiles with the potential to contain significant archaeological deposits are encountered at the Blues Point temporary site, Barangaroo Station, Martin Place Station, Pitt Street Station, Central Station, Waterloo Station and Marrickville dive site. Excavations would be conducted in accordance with the methodology outlined in the Aboriginal cultural heritage assessment report	BP, BN, MP, PS, CS, WS, MDS
AH4	Appropriate Aboriginal heritage interpretation would be incorporated into the design for the project in consultation with Aboriginal stakeholders.	All
AH5	Feasible and reasonable mitigation at the ground improvement locations would be identified in consultation with the Office of Environment and Heritage.	GI
AH6	The Aboriginal cultural heritage assessment report would address areas of archaeological potential associated with the power supply routes.	PSR
AH7	The cultural heritage assessment report would be updated to include the scope of the proposed modification.	CS
Landscape character and visual amenity		
Construction		
LV1	Where feasible and reasonable, the elements within construction sites would be located to minimise visual impacts, for example materials and machinery would be stored behind fencing.	All except metro rail tunnels
LV2	Existing trees to be retained would be protected prior to the commencement of construction in accordance with *Australian Standard AS4970 the Australian Standard for Protection of Trees on Development Sites and Adjoining Properties*.	All except metro rail tunnels
LV3	Lighting of construction sites would be oriented to minimise glare and light spill impact on adjacent receivers.	All except metro rail tunnels
LV4	Visual mitigation would be implemented as soon as feasible and reasonable after the commencement of construction, and remain for the duration of the construction period.	All except metro rail tunnels

ID	Mitigation measure	Applicable location(s)[1]
LV5	Opportunities for the retention and protection of existing trees would be identified during detailed construction planning.	All except metro rail tunnels
LV6	The design and maintenance of construction site hoardings would aim to minimise visual amenity and landscape character impacts, including the prompt removal of graffiti. Public art opportunities would be considered.	All except metro rail tunnels
LV7	The selection of materials and colours for acoustic sheds would aim to minimise their visual prominence.	CDS, CN, VC, BN, MP, PS, WS, MDS
LV8	Tunnel boring machine retrieval works at the Blues Point temporary site would be timed to avoid key harbour viewing events.	BP
LV9	Benching would be used where feasible and reasonable at Blues Point temporary site to minimise visual amenity impacts.	BP
LV10	Temporary impacts to public open space would be rehabilitated in consultation with the relevant local council and / or landowner.	All except metro rail tunnels
Operation		
LV11	Cut off and direct light fittings (or similar technologies) would be used to minimise glare and light spill onto private property.	CDS, AS, CS, MDS
LV12	Where feasible and reasonable, vegetation would be provided to screen and visually integrate sites with the surrounding area.	STW, CDS, AS, MDS
LV13	Identify and implement appropriate landscape treatments for Frank Channon Walk.	STW, CDS
LV14	The architectural treatment of Artarmon substation would minimise visual amenity and landscape character impacts.	AS
LV15	The Harbour cycles sculpture at North Sydney would be reinstated at a location determined in consultation with North Sydney Council.	VC
LV16	The P&O Fountain, the mid-20th century bas relief sculpture and the Douglas Annand glass screen at 55 Hunter Street would be reinstated at a location determined in consultation with City of Sydney Council.	MP
LV17	Opportunities would be investigated to provide a permanent wall for street art at Marrickville dive site in consultation with Marrickville Council.	MDS
LV18	Noise barriers would be transparent where they are augmenting existing transparent noise barriers.	STW
LV19	Notification processes in relation to moral rights for public art and architecture under Commonwealth Copyright Act 1968 would be carried out.	All except metro rail tunnels

ID	Mitigation measure	Applicable location(s)[1]
Groundwater and geology		
GWG1	A detailed geotechnical model for the project would be developed and progressively updated during design and construction. The detailed geotechnical model would include: • Assessment of the potential for damage to structures, services, basements and other sub-surface elements through settlement or strain • Predicted changes to groundwater levels, including at nearby water supply works. Where building damage risk is rated as moderate or higher (as per the CIRIA 1996 risk-based criteria), a structural assessment of the affected buildings / structures would be carried out and specific measures implemented to address the risk of damage. With each progressive update of the geotechnical model the potential for exceedance of the following target changes to groundwater levels would be reviewed: • Less than 2.0 metres – general target • Less than 4.0 metres – where deep building foundations present • Less than 1.0 metre – residual soils • Less than 0.5 metre – residual soils (Blues Point) (fill / Aeolian sand). Where a significant exceedance of target changes to groundwater levels are predicted at surrounding land uses and nearby water supply works, an appropriate groundwater monitoring program would be developed and implemented. The program would aim to confirm no adverse impacts on groundwater levels or to appropriately manage any impacts. Monitoring at any specific location would be subject to the status of the water supply work and agreement with the landowner. The geotechnical model and groundwater monitoring program would be developed in consultation with the Department of Primary Industries (Water).	All
GWG2	Condition surveys of buildings and structures in the vicinity of the tunnel and excavations would be carried out prior to the commencement of excavation at each site.	All
Soils, contamination and water quality		
Construction		
SCW1	Updated desktop contamination assessments would be carried out for Chatswood dive site, Victoria Cross Station, Artarmon substation, Blues Point temporary site, Barangaroo Station, Central Station, Waterloo Station and the Sydenham Maintenance Centre site within surface track works south. If sufficient information is not available to determine the remediation requirements and the impact on potential receivers, then detailed contamination assessments, including collection and analysis of soil and groundwater samples would be carried out. Detailed contamination assessment would also be carried out for the Barangaroo power supply route within Hickson Road and the Marrickville power supply route adjacent to Sydney Park and Camdenville Oval. In the event a Remediation Action Plan is required, these would be developed in accordance with *Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a site auditor would be engaged.	CDS, AS, VC, BP, BN, CS, WS, STWS, PSR
SCW2	Prior to ground disturbance in high probability acid sulfate areas at Barangaroo Station, Waterloo Station, Marrickville dive site, Sydenham Station and the surface track works south, testing would be carried out to determine the presence of acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the *Acid Sulfate Soil Manual* (Acid Sulfate Soil Management Advisory Committee, 1998).	BN, WS, MDS, SS, STWS

ID	Mitigation measure	Applicable location(s)[1]
SCW3	Erosion and sediment control measures would be implemented in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2* (Department of Environment and Climate Change, 2008a). Measures would be designed as a minimum for the 80th percentile; 5-day rainfall event.	All except metro rail tunnels
SCW4	Discharges from the construction water treatment plants would be monitored to ensure compliance with the discharge criteria in an environment protection licence issued to the project.	All except metro rail tunnels
SCW5	A silt curtain would be used around the Sydney Harbour ground improvement work barges.	GI
SCW6	A water quality monitoring program would be implemented to monitor water quality within Sydney Harbour during ground improvement work. The water quality monitoring program would be carried out to detect any potential impacts on the water quality of Sydney Harbour from the ground improvement work and inform management responses in the event any impacts are identified. Specific monitoring locations and frequencies would be determined during the development of the program in consultation with the Environment Protection Authority.	GI
Operation		
SCW7	Discharges from the tunnel water treatment plant would be monitored to ensure compliance with the discharge criteria determined in consultation with the NSW Environment Protection Authority.	MDS
Social impacts and community infrastructure		
SO1	Direct impacts to public open space at the Blues Point temporary site would be minimised.	BP
SO2	Specific consultation would be carried out with sensitive community facilities (including aged care, child care centres, educational institutions and places of worship) potentially impacted during construction. Consultation would aim to identify and develop measures to manage the specific construction impacts for individual sensitive community facilities.	All except metro rail tunnels
Biodiversity		
B1	An ecologist would be present during the removal of any hollow-bearing trees.	CDS
B2	Potential bat roosting locations at Central Station, Waterloo Station and Marrickville dive site, Sydenham Station and the surface track works south would be checked by a qualified ecologist or wildlife handler prior to demolition. Any bats found would be relocated, unless in torpor, in which case the relocation would be delayed until the end of the torpor period.	CS, WS, MDS, SS, STWS
B3	The local WIRES group and / or veterinarian would be contacted if any fauna are injured on site or require capture and / or relocation.	All except metro rail tunnels
B4	Procedures would be developed and implemented, in accordance with the National System for the Prevention and Management of Marine Pest Incursions, during Sydney Harbour ground improvement works to avoid transportation of marine pests from other locations, particularly the marine alga *Caulerpa taxifoli*.	GI

ID	Mitigation measure	Applicable location(s)[1]
Flooding and hydrology		
Construction		
FH1	Detailed construction planning would consider flood risk at Barangaroo Station, Martin Place Station and the Waterloo Station construction sites. This would include identification of measures to, where feasible and reasonable, not worsen existing flooding characteristics up to and including the 100 year annual recurrence interval event in the vicinity of the project. Not worsen is defined as: • A maximum increase flood levels of 50mm in a 100 year Average Recurrence Interval flood event • A maximum increase in time of inundation of one hour in a 100 year Average Recurrence Interval flood event • No increase in the potential for soil erosion and scouring from any increase in flow velocity in a 100 year Average Recurrence Interval flood event.	BN, MP, WS
FH2	The site layout and staging of construction activities at Marrickville dive site would avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required.	MDS
FH3	Overland flow diversions during construction at the Marrickville dive site would meet the following criteria, where feasible and reasonable: • Not worsen existing flooding characteristics up to and including the 100 year annual recurrence interval event in the vicinity of the project • Dedicated evacuation routes would not be adversely impacted in flood events up to and including the probable maximum flood. This may include the requirement for changes to existing arrangements for flood warning systems and signage. Construction planning for the Marrickville dive site would be carried out in consultation with the State Emergency Services and Inner West Council. Not worsen is defined as: • A maximum increase flood levels of 50mm in a 100 year Average Recurrence Interval flood event • A maximum increase in time of inundation of one hour in a 100 year Average Recurrence Interval flood event • No increase in the potential for soil erosion and scouring from any increase in flow velocity in a 100 year Average Recurrence Interval flood event.	MDS
Operation		
FH4	Where feasible and reasonable, detailed design would result in no net increase in stormwater runoff rates in all storm events unless it can be demonstrated that increased runoff rates as a result of the project would not increase downstream flood risk.	STW, AS, MDS, SS, STWS
FH5	Where space permits, on-site detention of stormwater would be introduced where stormwater runoff rates are increased. Where there is insufficient space for the provision of on-site detention, the upgrade of downstream infrastructure would be implemented where feasible and reasonable.	STW, AS, MDS, SS, STWS
FH6	Detailed design would occur in consultation with Inner West Council to ensure future drainage improvement works around the Marrickville dive site, Sydenham Station and the surface track works south would not be precluded.	MDS, SS, STWS

ID	Mitigation measure	Applicable location(s)[1]
FH7	Consultation would be carried out with Inner West Council to ensure flood-related outcomes of the project are consistent with any future floodplain risk management study and / or plan developed for the Marrickville Valley Catchment.	MDS, SS, STWS
FH8	The frequency of Sydney Trains rail service disruptions due to flooding would not be increased in the vicinity of the Marrickville dive structure, Sydenham Station and the surface track works south.	MDS, SS, STWS
FH9	Design of the project would be reviewed to, where feasible and reasonable, not worsen existing flooding characteristics up to and including the 100 year annual recurrence interval event in the vicinity of the project. Detailed flood modelling would consider: • Potential changes to flood prone land and flood levels • Potential changes to overland flow paths • Redistribution of surface runoff as a result of project infrastructure • Behaviour of existing stormwater runoff • Potential changes required to flood evacuation routes, flood warning systems and signage. Flood modelling to support detailed design would be carried out in accordance with the following guidelines: • *Floodplain Development Manual* (NSW Government, 2005b) • *Floodplain Risk Management Guideline: Practical Consideration of Climate Change* (DECC, 2007b) • *Floodplain Risk Management Guide: Incorporating Sea Level Rise Benchmarks in Flood Risk Assessments* (DECCW, 2010c) • *New guideline and changes to section 117 direction and EP&A Regulation on flood prone land, Planning Circular PS 07-003* (NSW Department of Planning, 2007). Flood modelling and consideration of mitigation measures would be carried out in consultation with the relevant local councils, the Office of Environment and Heritage and the State Emergency Services. Not worsen is defined as: • A maximum increase flood levels of 50mm in a 100 year Average Recurrence Interval flood event • A maximum increase in time of inundation of one hour in a 100 year Average Recurrence Interval flood event • No increase in the potential for soil erosion and scouring from any increase in flow velocity in a 100 year Average Recurrence Interval flood event.	All except metro rail tunnels
FH10	During detailed design, project infrastructure would be designed to meet the following criteria, where feasible and reasonable: • Locate station and service entrances to underground stations above the greater of the 100 year annual recurrence interval flood level plus 500mm or the probable maximum flood level • Provide site surface grading and drainage collection systems at the Chatswood and Marrickville dive structures to manage the risk of local catchment and overland flooding for events up to and including the probable maximum flood event • Locate aboveground rail system facilities (such as traction power supply sub stations) at least above the 100 year annual recurrence interval flood level plus 500mm • Protect facilities that are identified as being critical to emergency response operations from the probable maximum flood level.	All except metro rail tunnels

ID	Mitigation measure	Applicable location(s)[1]
Air quality		
AQ1	The engines of all on-site vehicles and plant would be switched off when not in use for an extended period.	All
AQ2	Plant would be well maintained and serviced to minimise emissions. Emissions from plant would be considered as part of pre-acceptance checks.	All
AQ3	Construction site layout and placement of plant would consider air quality impacts to nearby receivers.	All except metro rail tunnels
AQ4	Hard surfaces would be installed on long term haul routes and regularly cleaned.	All except metro rail tunnels
AQ5	Unsurfaced haul routes and work area would be regularly damped down in dry and windy conditions.	All except metro rail tunnels
AQ6	All vehicles carrying loose or potentially dusty material to or from the site would be fully covered.	All except metro rail tunnels
AQ7	Stockpiles would be managed to minimise dust generation.	All except metro rail tunnels
AQ8	Demolition would be managed to minimise dust generation.	All except metro rail tunnels
AQ9	Ventilation from acoustic sheds would be filtered.	CDS, CN, VC, BN, MP, PS, WS, MDS
Hazard and risk		
Construction		
HR1	All hazardous substances that may be required for construction would be stored and managed in accordance with the *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005) and *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (Department of Planning, 2011).	All
HR2	Dial before you dig searches and non-destructive digging would be carried out to identify the presence of underground utilities.	All
HR3	A hazardous material survey would be completed for those buildings and structures suspected of containing hazardous materials (particularly asbestos) prior to their demolition. If asbestos is encountered, it would be handled and managed in accordance with relevant legislation, codes of practice and Australian standards.	CDS, CN, VC, MP, PS, CS, WS, MDS, SS
HR4	The method for delivery of explosives would developed prior to the commencement of blasting in consultation with the Department of Planning and Environment and be timed to avoid the need for on-site storage.	CN, VC, BN, MP, PS, WS
Operation		
HR5	All hazardous substances that may be required for operation would be stored and managed in accordance with the *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005) and *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (Department of Planning, 2011).	All

ID	Mitigation measure	Applicable location(s)[1]
Waste management		
Construction		
WM1	All waste would be assessed, classified, managed and disposed of in accordance with the *NSW Waste Classification Guidelines*.	All
WM2	100 per cent of spoil that can be reused would be beneficially reused in accordance with the project spoil reuse hierarchy.	All
WM3	A recycling target of at least 90 per cent would be adopted for the project.	All
WM4	Construction waste would be minimised by accurately calculating materials brought to the site and limiting materials packaging.	All
Operation		
WM5	Generation of operation phase waste would be minimised.	All
Sustainability		
Construction		
SUS1	Sustainability initiatives would be incorporated into the detailed design and construction of the project to support the achievement of the project sustainability objectives.	All
SUS2	A best practice level of performance would be achieved using market leading sustainability rating tools during design and construction.	All
SUS3	A workforce development and industry participation strategy would be developed and implemented during construction.	All
SUS4	Climate change risk treatments would be incorporated into the detailed design of the project including: • Ensuring that adequate flood modelling is carried out and integrated with design • Testing the sensitivity of air-conditioning systems to increased temperatures, and identify potential additional capacity of air-conditioning systems that may be required within the life of the project, with a view to safeguarding space if required • Testing the sensitivity of ventilation systems to increased temperatures and provide adequate capacity.	All
SUS5	An iterative process of greenhouse gas assessments and design refinements would be carried out during detailed design and construction to identify opportunities to minimise greenhouse gas emissions. Performance would be measured in terms of a percentage reduction in greenhouse gas emissions from a defined reference footprint.	All
SUS6	25 per cent of the greenhouse gas emissions associated with consumption of electricity during construction would be offset.	All
Operation		
SUS7	Sustainability initiatives would be incorporated into the operation of the project to support the achievement of the project sustainability objectives.	All
SUS8	Periodic review of climate change risks would be carried out to ensure ongoing resilience to the impacts of climate change.	All
SUS9	A workforce development and industry participation strategy would be developed and implemented during operation.	All
SUS10	100 per cent of the greenhouse gas emissions associated with consumption of electricity during operation would be offset.	All

ID	Mitigation measure	Applicable location(s)[1]
Cumulative impacts		

CU1	Transport for NSW would manage and co-ordinate the interface with projects under construction at the same time. Co-ordination and consultation with the following stakeholders would occur, where required:
	• CBD Coordination Office
	• Department of Planning and Environment
	• Roads and Maritime Services
	• Sydney Trains
	• NSW Trains
	• Sydney Buses
	• Sydney Water
	• Port Authority of NSW
	• Willoughby Council
	• North Sydney Council
	• City of Sydney Council
	• Marrickville Council
	• Sydney Motorways Corporation
	• Barangaroo Delivery Authority
	• Emergency service providers
	• Utility providers
	• Construction contractors.
	Co-ordination and consultation with these stakeholders would include:
	• Provision of regular updates to the detailed construction program, construction sites and haul routes
	• Identification of key potential conflict points with other construction projects
	• Developing mitigation strategies in order to manage conflicts. Depending on the nature of the conflict, this could involve:
	  ♦ Adjustments to the Sydney Metro construction program, work activities or haul routes; or adjustments to the program, activities or haul routes of other construction projects
	  ♦ Co-ordination of traffic management arrangements between projects.
		All

1 *STW: Surface track works; CDS: Chatswood dive site; AS: Artarmon substation; CN: Crows Nest Station; VC: Victoria Cross Station; BP: Blues Point temporary site; GI: Ground improvement works; BN: Barangaroo Station; MP: Martin Place Station; PS: Pitt Street Station; CS: Central Station; WS: Waterloo Station; MDS: Marrickville dive site (including the Sydney Metro Trains Facility South); SS: Sydenham Station; STWS: Surface track works south Metro rail tunnels: Metro rail tunnels not related to other sites (eg TBM works); PSR: Power supply routes.*

ADDITIONAL NOISE MAPPING

APPENDIX A

RECEIVER TYPES

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Operational Noise & Vibration Measurement Positions

- Noise
- Noise & Vibration

Ambient Noise

- Monitoring Locations
- Project Area
- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

Receiver Types

- Residential
- Commercial
- Other (Educational)
- Other (Medical)
- Other (Place of Worship)
- Other (Childcare)
- Other (Remaining)
- Outdoor Active
- Outdoor Passive
- Aquisitions

Transport for NSW

Sydney Metro City & Southwest

Site Plan & Sensitive Receivers

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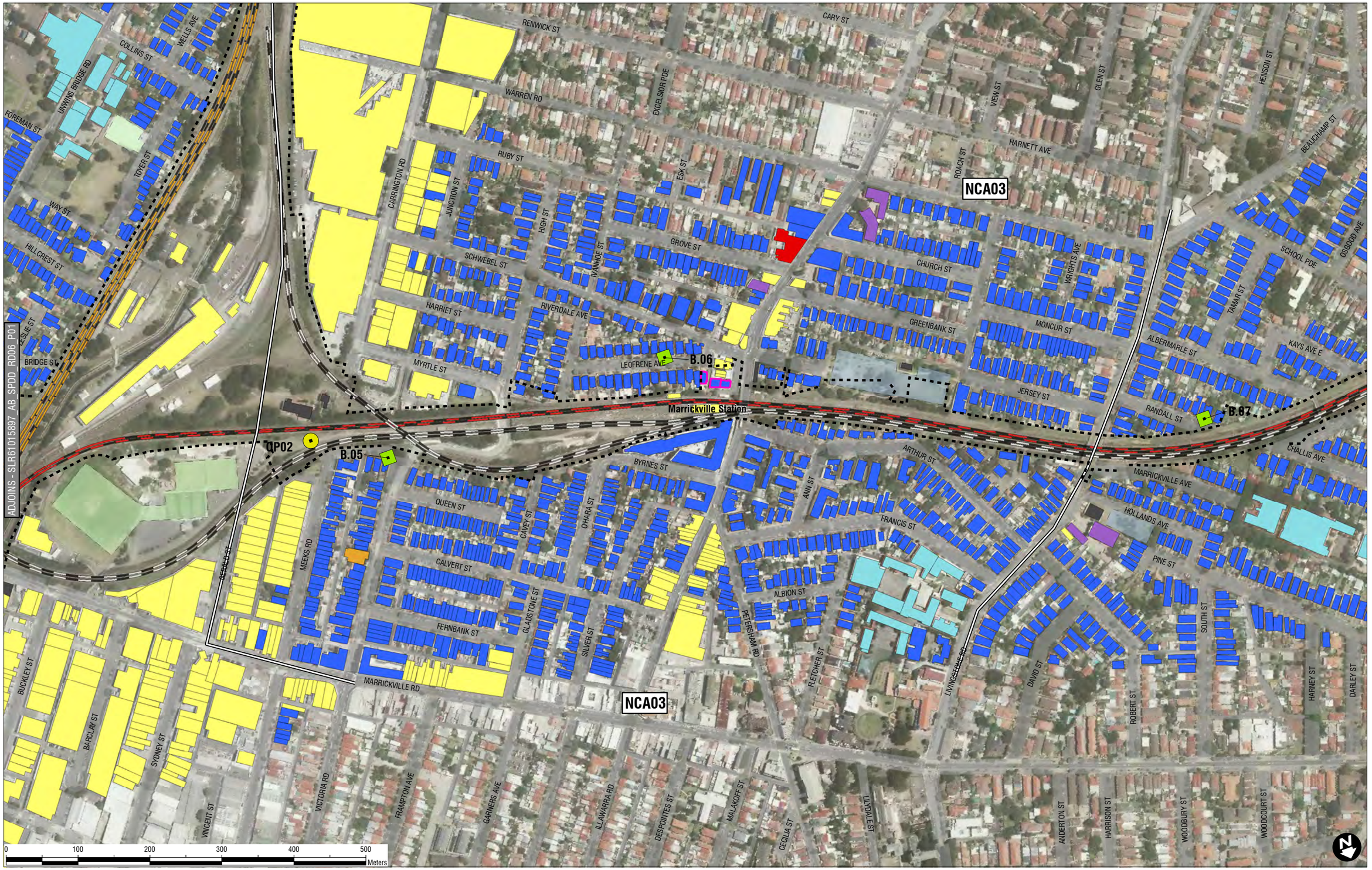

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- Aquisitions

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Site Plan & Sensitive Receivers

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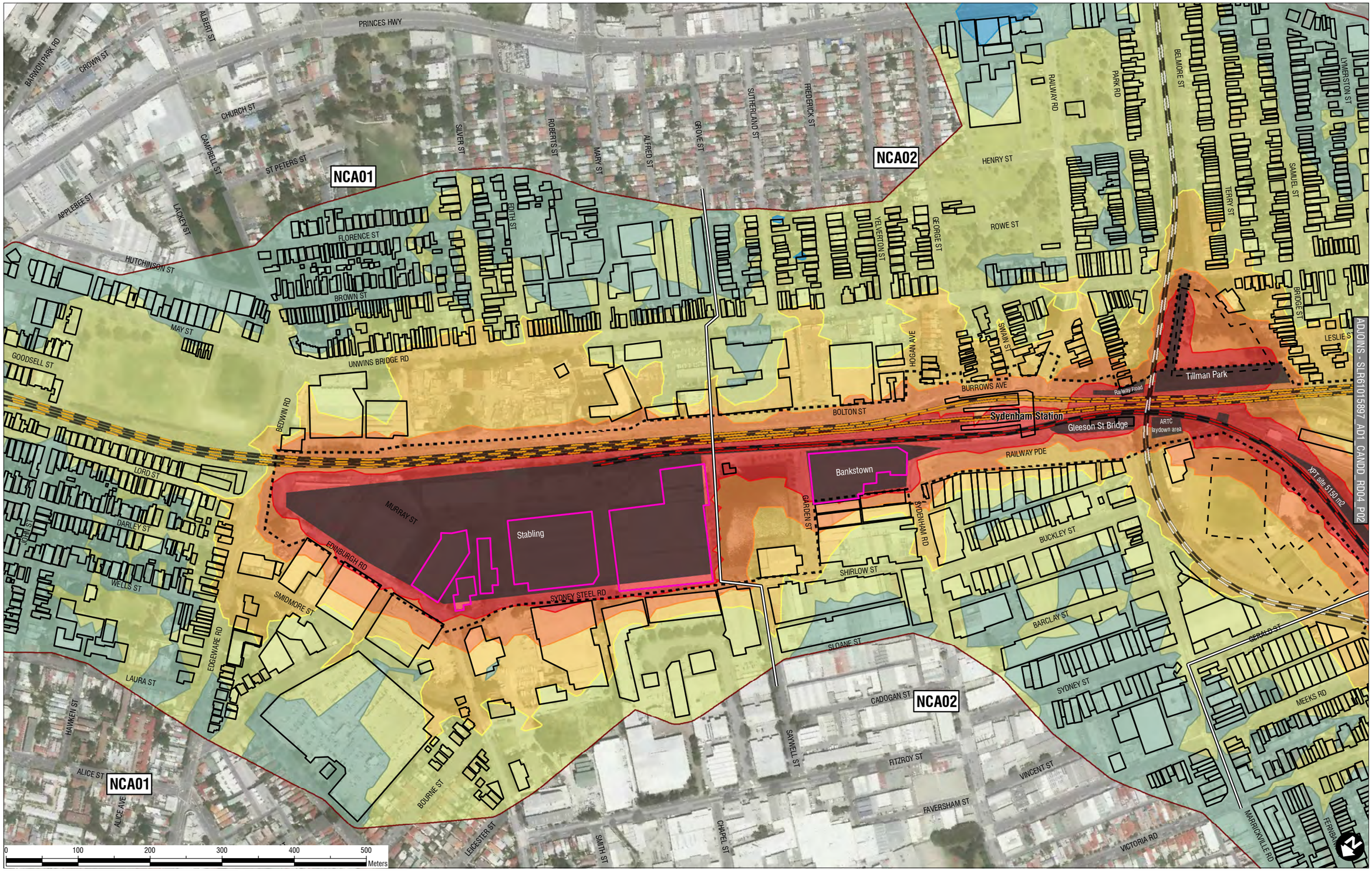
CONSTRUCTION AIRBORNE NOISE CONTOURS



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- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks
- Noise Contour Calculation Boundary

Worst Case Daytime Construction Noise

- < 40 dBA
- 40 - 50 dBA
- 50 - 60 dBA
- 60 - 70 dBA
- 70 - 80 dBA
- > 80 dBA

- Worksites
- Compounds
- Project Area

Assessed Receivers

- Buildings
- Outdoor
- Aquisitions

Note:
*Noise contours are indicative and represent the worst-case noise levels predicted for all scenarios operating in the period

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Construction Airborne Noise Contours Worst-case Daytime Construction Noise Predictions

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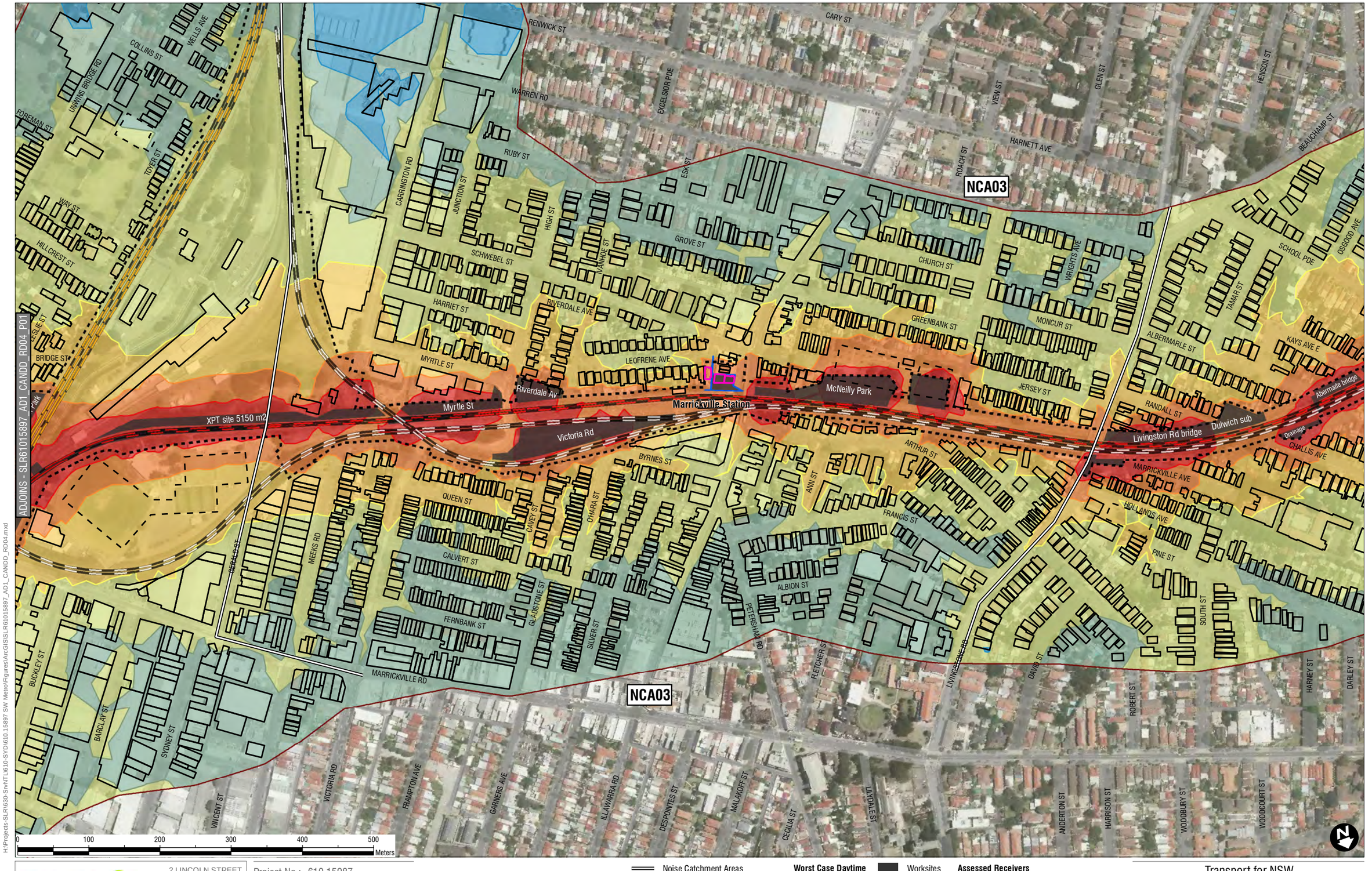

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- Noise Catchment Areas
- Freight Rail Tracks
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- Noise Contour Calculation Boundary

Worst Case Daytime Construction Noise

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- 50 - 60 dBA
- 60 - 70 dBA
- 70 - 80 dBA
- > 80 dBA

- Worksites
- Compounds
- Project Area

Assessed Receivers

- Buildings
- Outdoor
- Aquisitions

Note:
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Construction Airborne Noise Contours Worst-case Daytime Construction Noise Predictions

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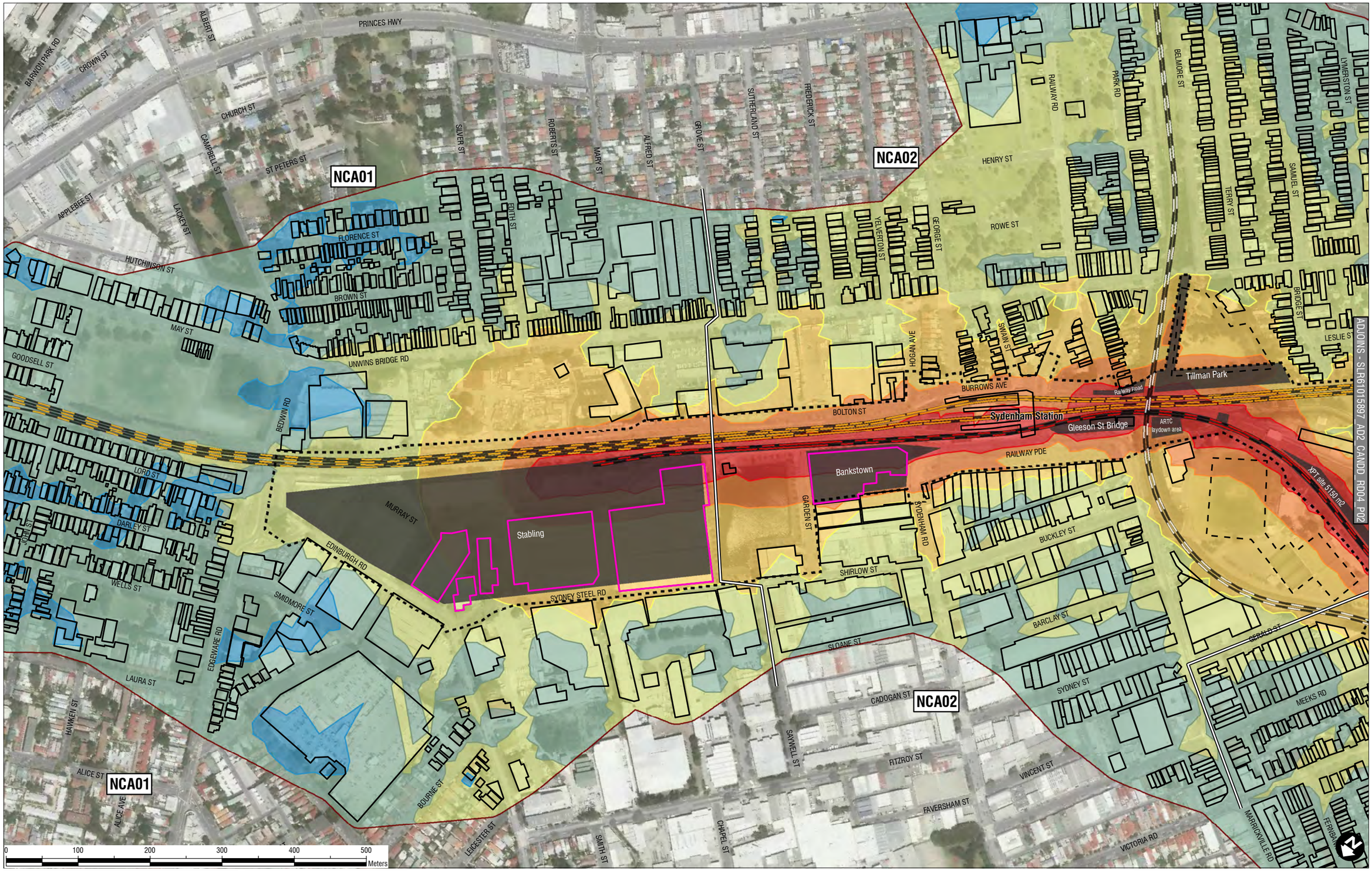

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- Noise Catchment Areas
- Freight Rail Tracks
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Worst Case Night-time Construction Noise

- < 40 dBA
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- Worksites
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Assessed Receivers

- Buildings
- Outdoor
- Aquisitions

Note:
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Transport for NSW

Sydney Metro City & Southwest

Construction Airborne Noise Contours Worst-case Night-time Construction Noise Predictions

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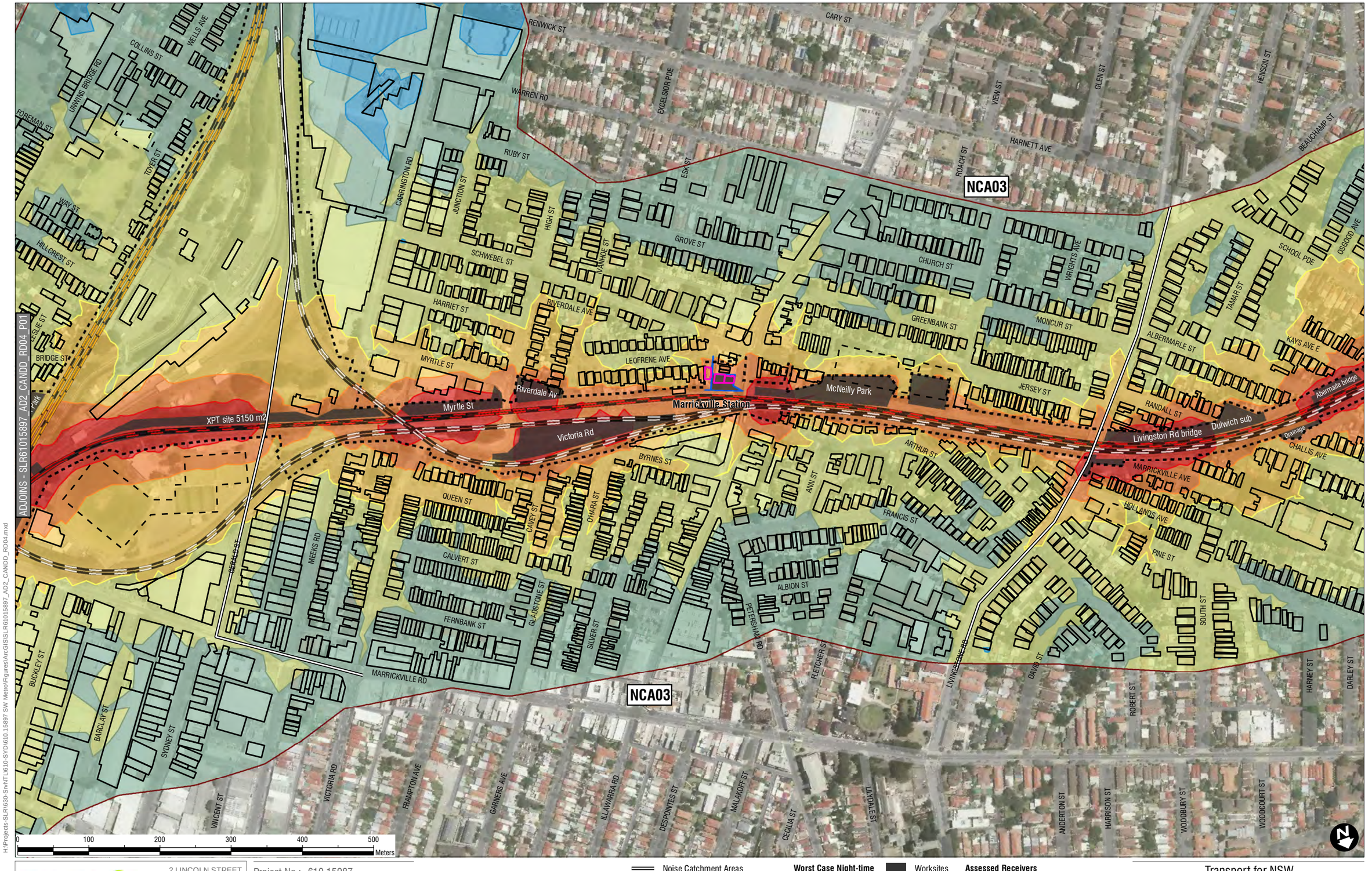

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Worst Case Night-time Construction Noise

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- 40 - 50 dBA
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- 70 - 80 dBA
- > 80 dBA

- Worksites
- Compounds
- Project Area

Assessed Receivers

- Buildings
- Outdoor
- Aquisitions

Note:
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Transport for NSW

Sydney Metro City & Southwest

Construction Airborne Noise Contours Worst-case Night-time Construction Noise Predictions

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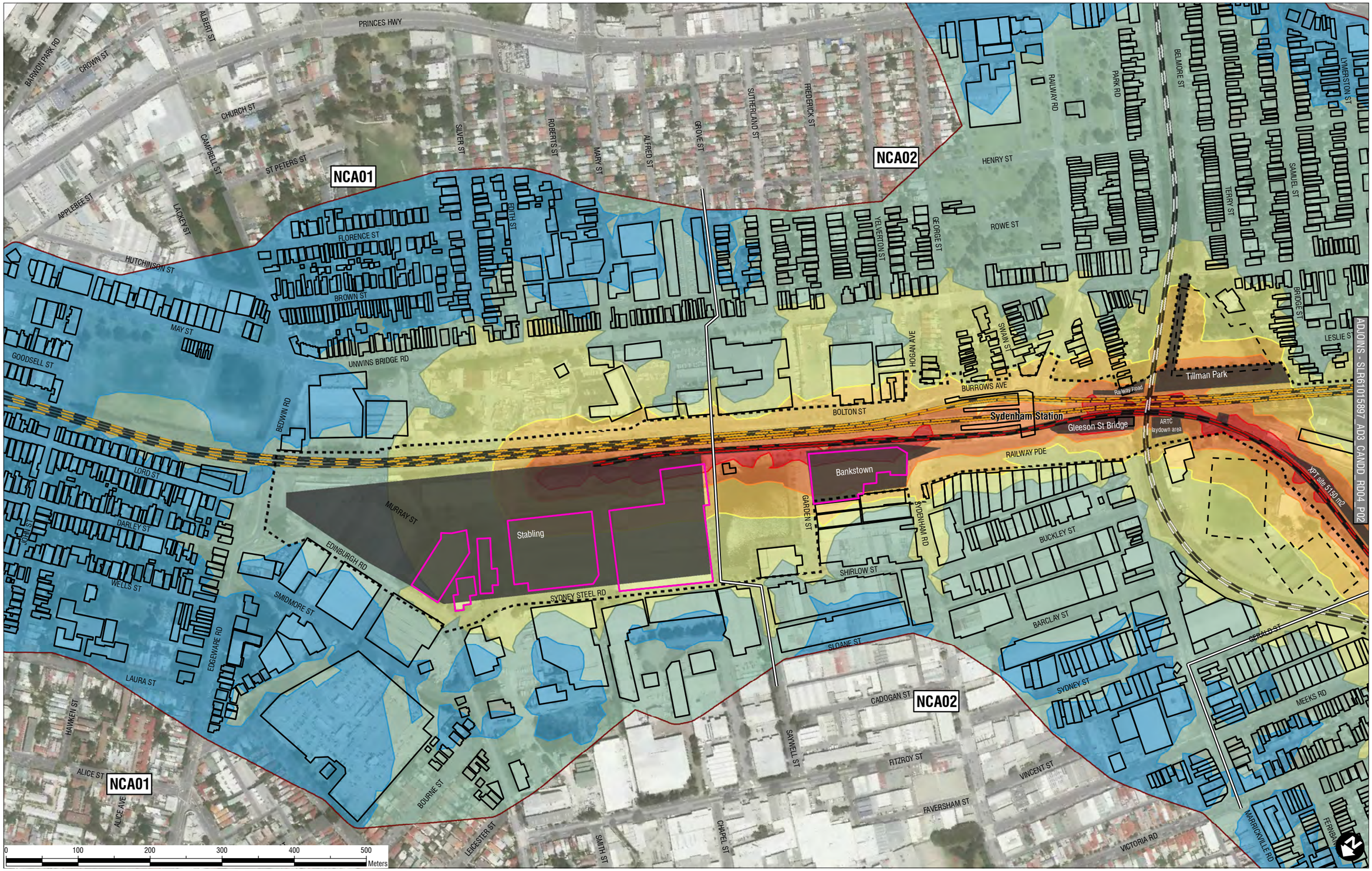

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- Noise Catchment Areas
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- Metro Rail Tracks
- Sydney Trains Rail Tracks
- Noise Contour Calculation Boundary

Worst Case Night-time Construction Noise

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- 40 - 50 dBA
- 50 - 60 dBA
- 60 - 70 dBA
- 70 - 80 dBA
- > 80 dBA

- Worksites
- Compounds
- Project Area

Assessed Receivers

- Buildings
- Outdoor
- Aquisitions

Note:
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Transport for NSW

Sydney Metro City & Southwest

Construction Airborne Noise Contours Worst-case Night-time (No Intensive Plant) Construction Noise Predictions

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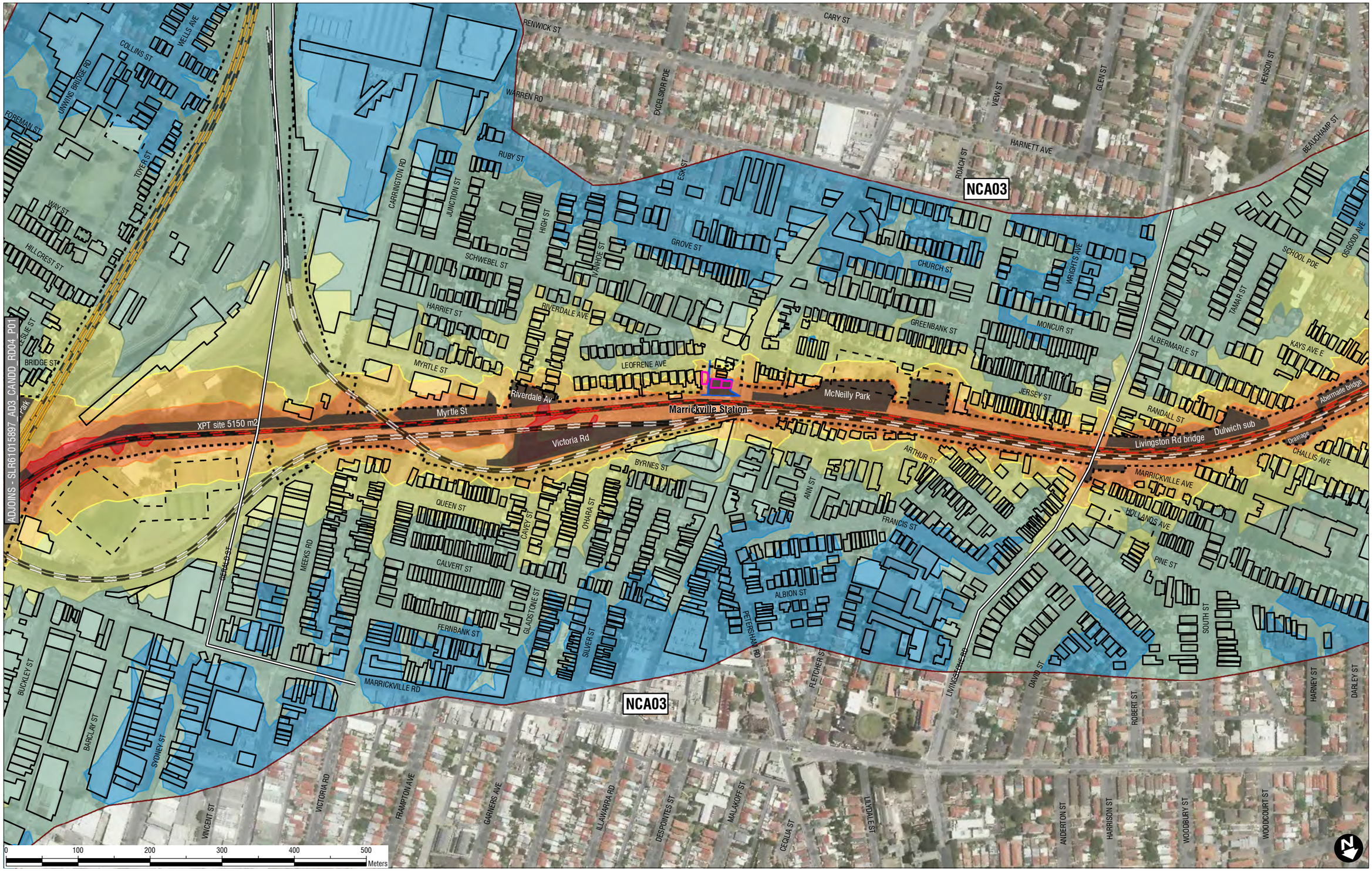

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Worst Case Night-time Construction Noise

- < 40 dBA
- 40 - 50 dBA
- 50 - 60 dBA
- 60 - 70 dBA
- 70 - 80 dBA
- > 80 dBA

- Worksites
- Compounds
- Project Area

Assessed Receivers

- Buildings
- Outdoor
- Aquisitions

Note:
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Transport for NSW

Sydney Metro City & Southwest

Construction Airborne Noise Contours Worst-case Night-time (No Intensive Plant) Construction Noise Predictions

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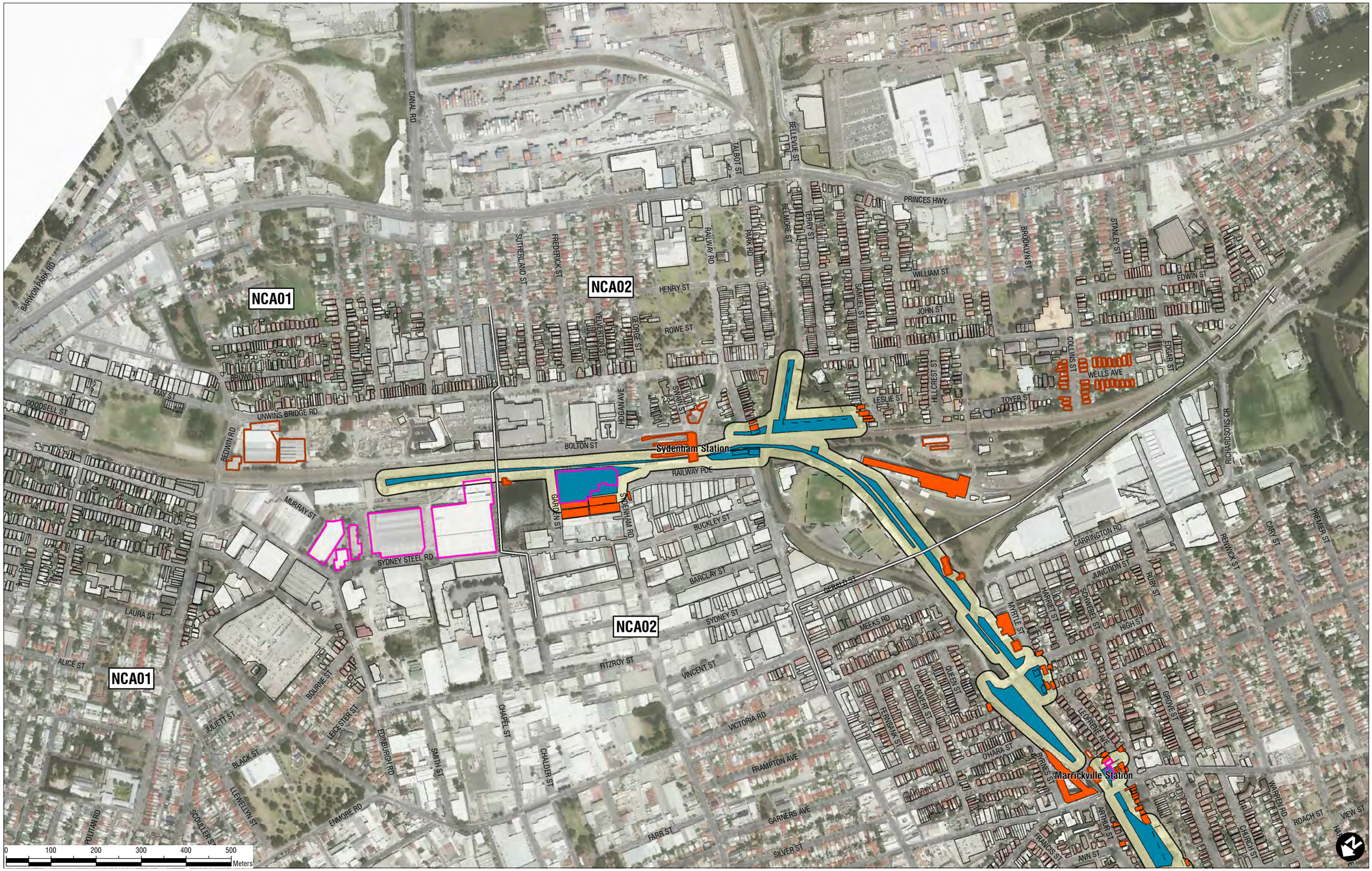
CONSTRUCTION COSMETIC VIBRATION ASSESSMENT



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Noise Catchment Areas

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions
- Heritage Listed Buildings

- Works Location (Vibration)
- Vibration Cosmetic Damage Safe Working Distance
- Exceedance of Cosmetic Vibration Criteria (7.5mm/s)

Note:
*Construction mitigation areas are indicative
*The two most stringent mitigation categories have been shown only

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Cosmetic Damage Vibration Assessment Exceedance of Screening Criteria

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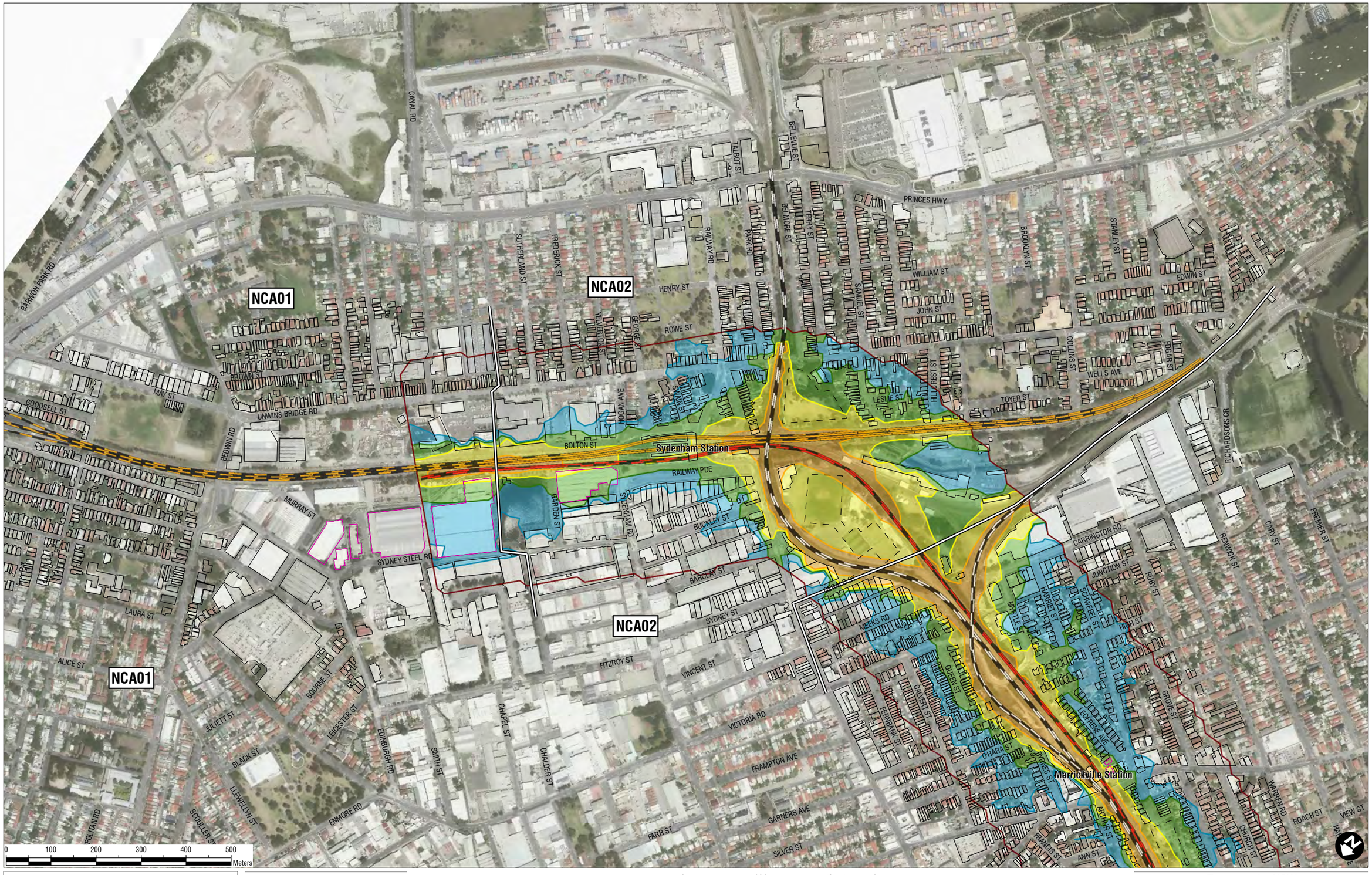
OPERATIONAL AIRBORNE RAIL NOISE CONTOURS



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- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

2024 Daytime LAeq(15hr) Noise Contours

- 55 dBA LAeq(15hr)
- 60 dBA LAeq(15hr)
- 65 dBA LAeq(15hr)
- 70 dBA LAeq(15hr)
- Noise Contour Calculation Boundary

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions

Note:
* Noise contour grid spacing: 20m
* Noise contour height above ground: 4.5m

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Operational Airborne Noise Contours 2024 Daytime LAeq(15hr) With Project

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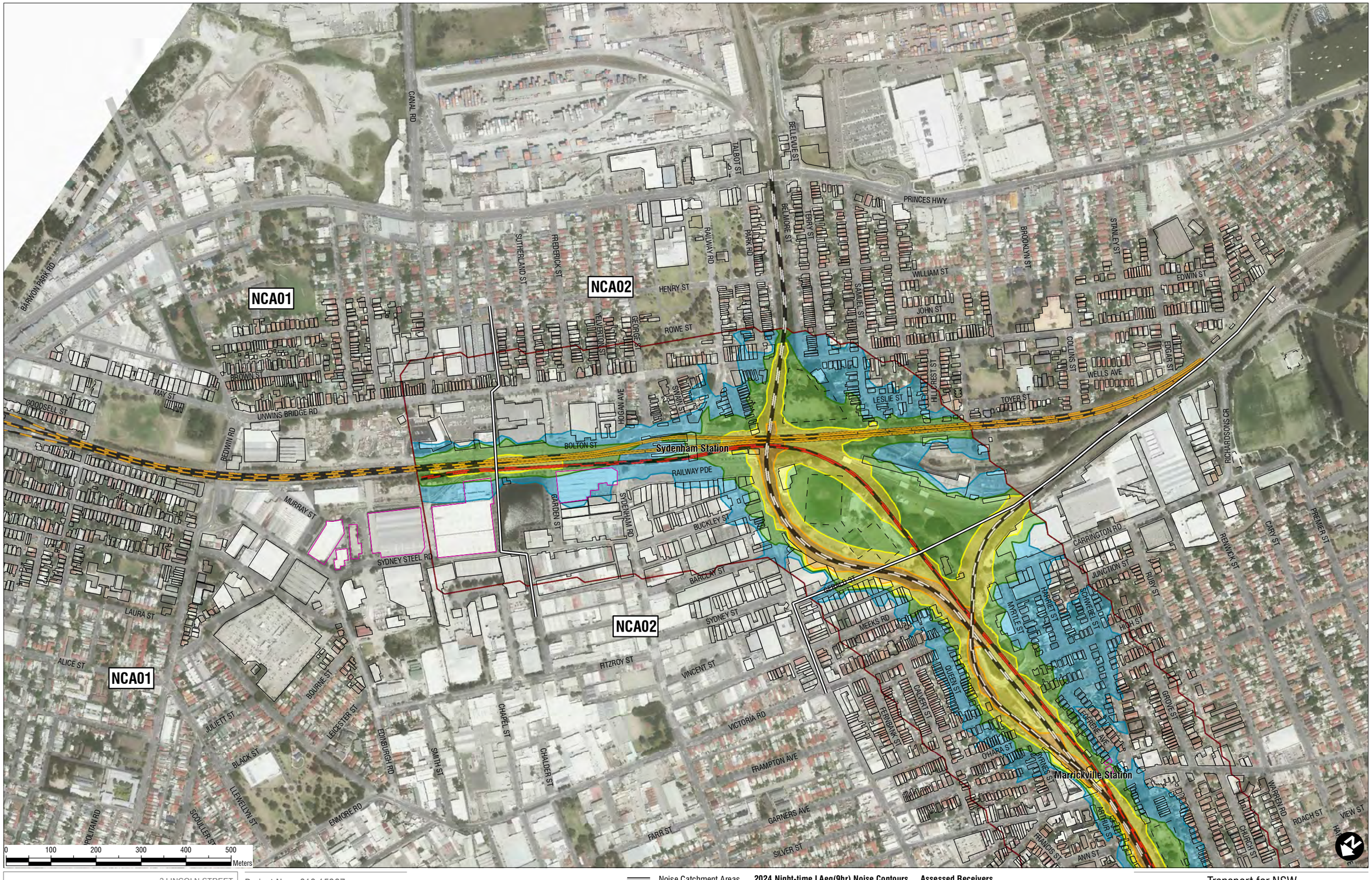

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Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56

- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

2024 Night-time LAeq(9hr) Noise Contours

- 55 dBA LAeq(15hr)
- 60 dBA LAeq(15hr)
- 65 dBA LAeq(15hr)
- 70 dBA LAeq(15hr)
- Noise Contour Calculation Boundary

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions

Note:
* Noise contour grid spacing: 20m
* Noise contour height above ground: 4.5m

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Operational Airborne Noise Contours 2024 Night-time LAeq(9hr) With Project

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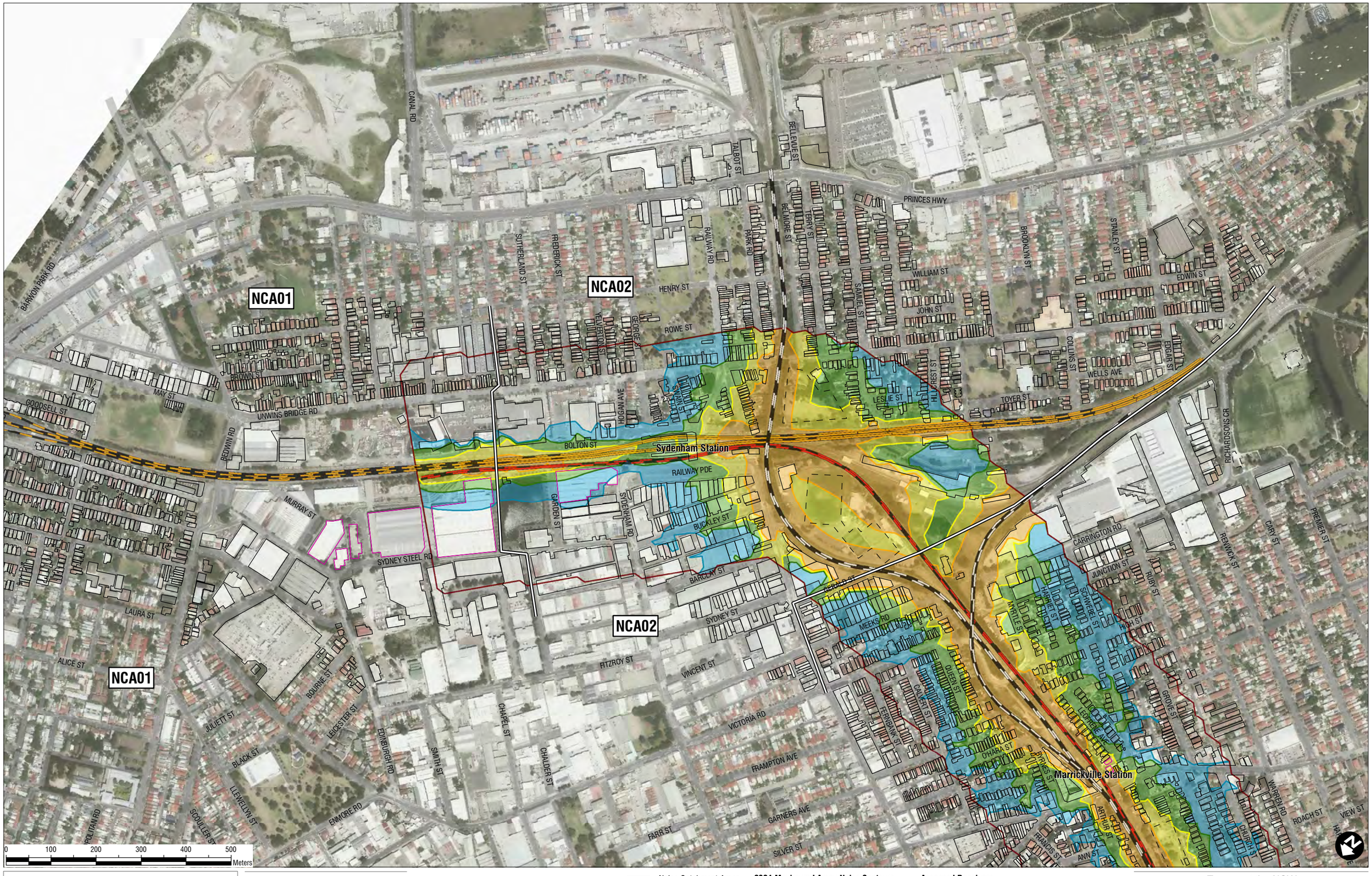

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- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

2024 Maximum LAmax Noise Contours

- 75 dBA LAmax
- 80 dBA LAmax
- 85 dBA LAmax
- 90 dBA LAmax
- Noise Contour Calculation Boundary

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions

Note:
* Noise contour grid spacing: 20m
* Noise contour height above ground: 4.5m

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Operational Airborne Noise Contours
2024 Maximum LAmax
With Project

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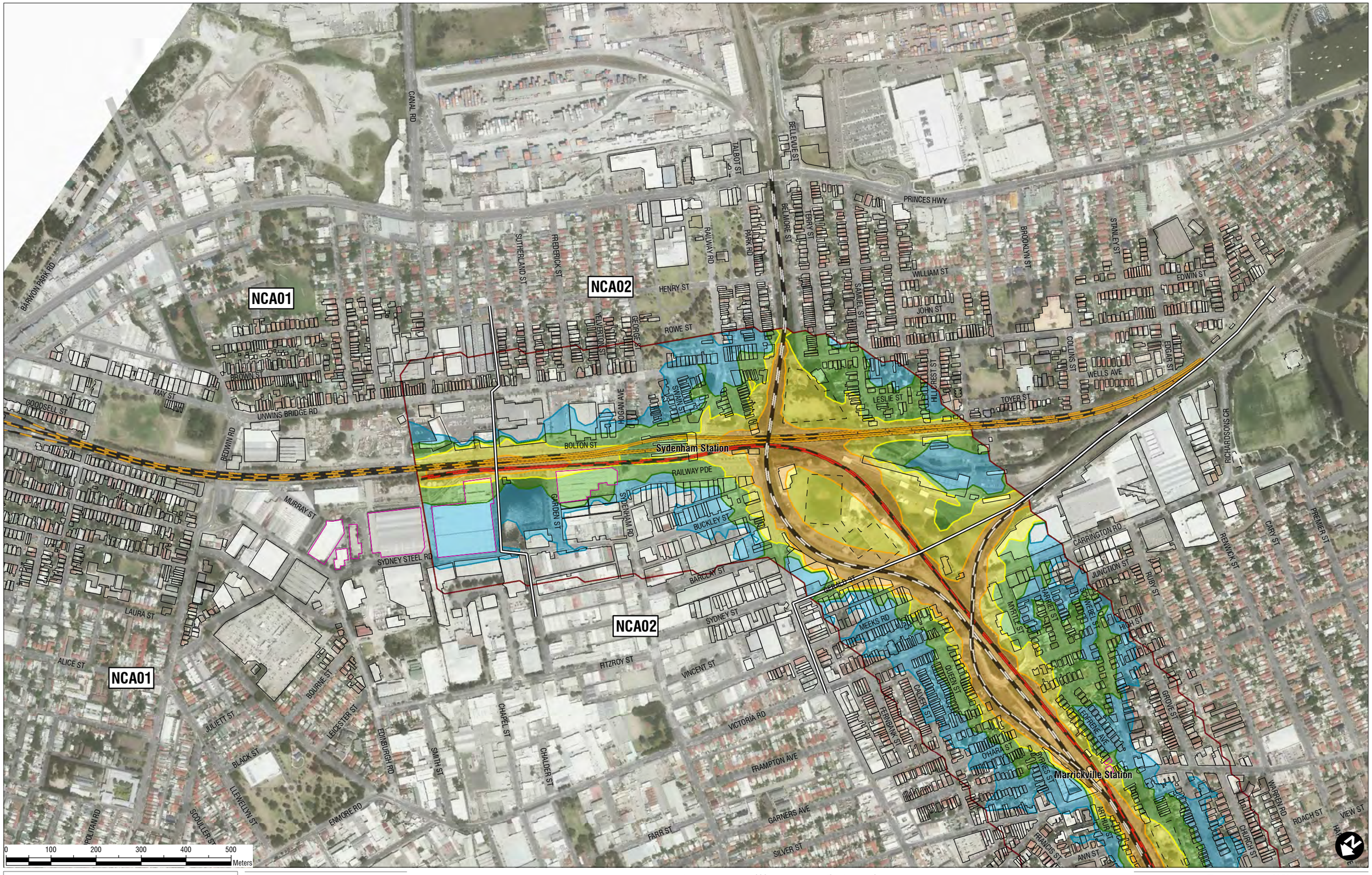

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Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56

- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

2034 Daytime LAeq(15hr) Noise Contours

- 55 dBA LAeq(15hr)
- 60 dBA LAeq(15hr)
- 65 dBA LAeq(15hr)
- 70 dBA LAeq(15hr)
- Noise Contour Calculation Boundary

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions

Note:
* Noise contour grid spacing: 20m
* Noise contour height above ground: 4.5m

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Operational Airborne Noise Contours 2034 Daytime LAeq(15hr) With Project

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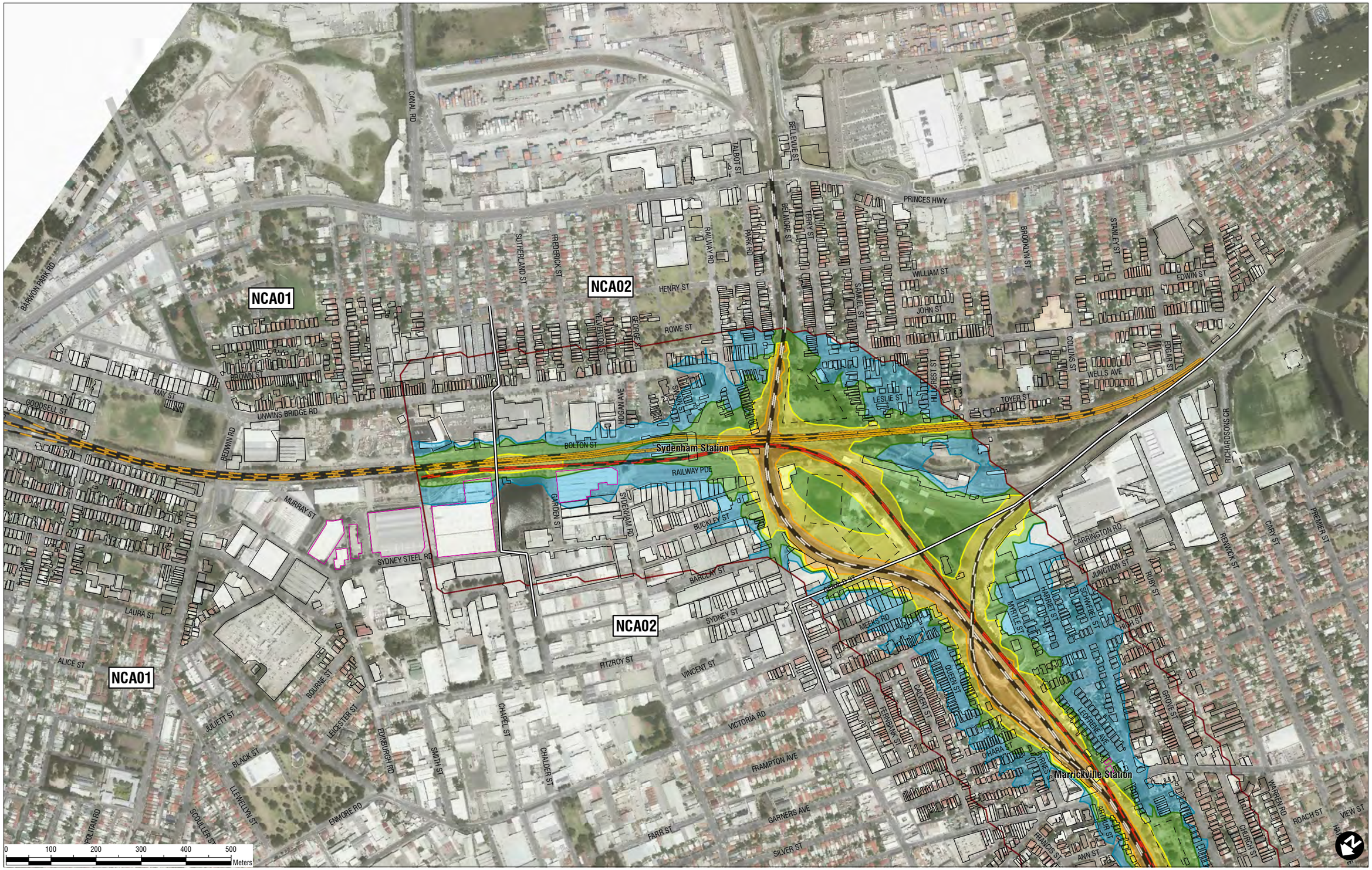

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- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

2034 Night-time LAeq(9hr) Noise Contours

- 55 dBA LAeq(15hr)
- 60 dBA LAeq(15hr)
- 65 dBA LAeq(15hr)
- 70 dBA LAeq(15hr)
- Noise Contour Calculation Boundary

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions

Note:
* Noise contour grid spacing: 20m
* Noise contour height above ground: 4.5m

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Operational Airborne Noise Contours 2034 Night-time LAeq(9hr) With Project

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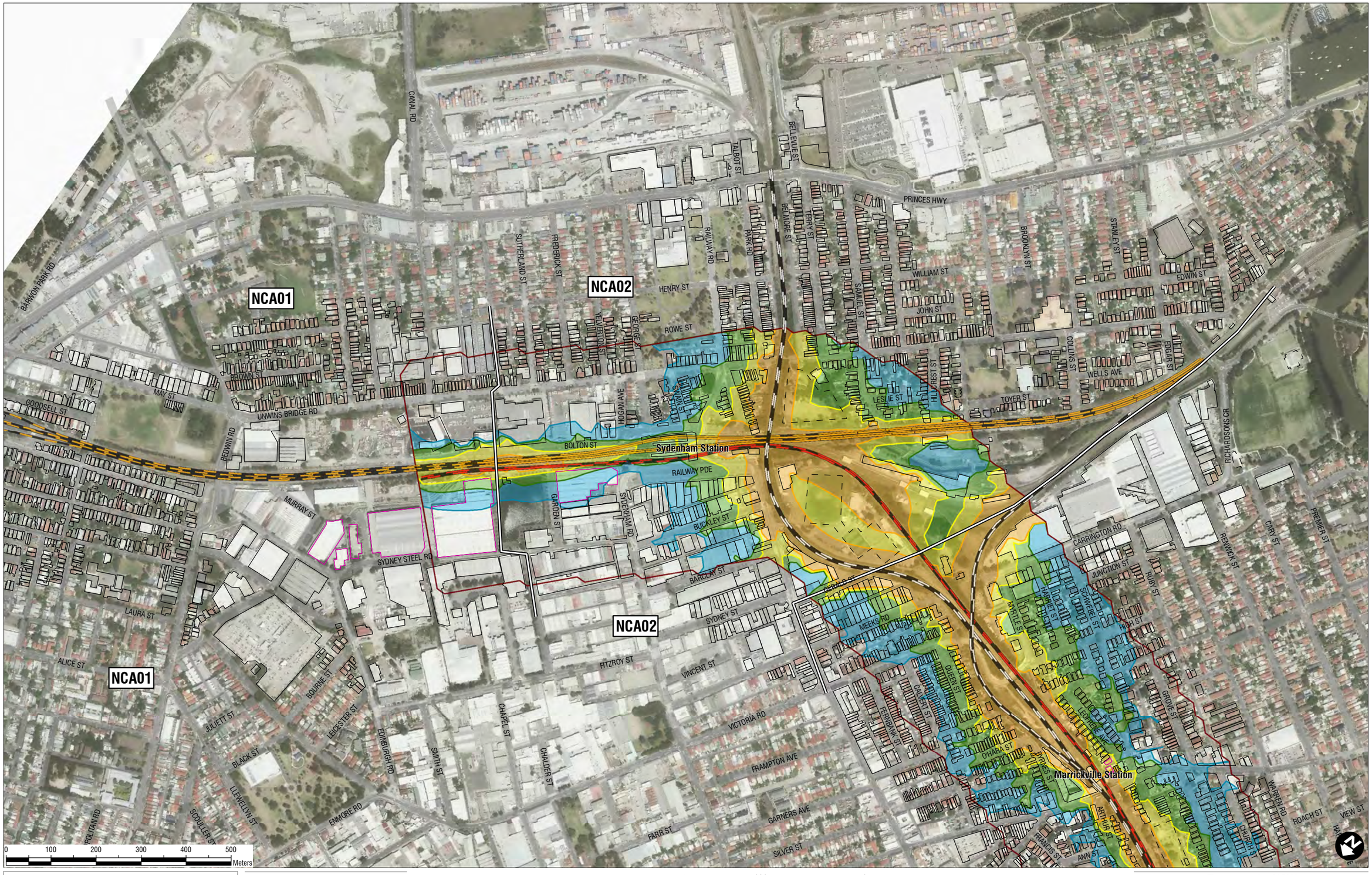

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Projection:	GDA 1994 MGA Zone 56

- Noise Catchment Areas
- Freight Rail Tracks
- Light Rail Tracks
- Metro Rail Tracks
- Sydney Trains Rail Tracks

2034 Maximum LAmax Noise Contours

- 75 dBA LAmax
- 80 dBA LAmax
- 85 dBA LAmax
- 90 dBA LAmax
- Noise Contour Calculation Boundary

Assessed Receivers

- Buildings
- Outdoor
- Acquisitions

Note:
* Noise contour grid spacing: 20m
* Noise contour height above ground: 4.5m

Transport for NSW

Sydney Metro City & Southwest Chatswood to Sydenham Sydenham Station Junction Modification

Operational Airborne Noise Contours
2034 Maximum LAmax
With Project

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ADDITIONAL NON-ABORIGINAL HERITAGE TECHNICAL INFORMATION

APPENDIX B

Additional non-Aboriginal heritage technical information

This appendix provides the following non-Aboriginal heritage information:

- Additional information regarding the historical background of key non-Aboriginal heritage items
- Additional information regarding potential impacts to additional non-Aboriginal heritage items.

Additional historical background

Sydenham Station

The Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement provided an overview of the historical background of the area around Sydenham Station. This section provides additional information focused on the station.

As described in the State heritage register listing, Sydenham Station was constructed between 1884 and 1962 by C. & E. Miller and William Robinson (Figure 1 and Figure 2). It was originally built on a duplicated line from Illawarra Junction to Hurstville. The station opened as Marrickville Station but it was given its present name in 1895 with the opening of the Belmore branch line. In 1907 the platforms were extended. In 1907 the line from Edgeware Road to Sydenham was quadruplicated to serve the Belmore to Bankstown extension when it opened in 1909. This resulted in confining both buildings on island platforms so that passengers had to reach the platforms by an extended footbridge.

A new timber overhead booking office on a steel support frame was built between Platforms 3 and 4 and steel footbridges were eventually extended to all platforms around 1914. The overhead footbridge at Sydenham is a haunched beam design which consists of tapered cantilevers resting on platform trestles and supporting shallow beams over the railway tracks where headroom over rolling stock can be critical. The footbridge was manufactured by Dorman Long & Co. Ltd. Middlesbrough England (stamped on posts), which also engineered the Sydney Harbour Bridge.

To provide for the proposed Eastern Suburbs Railway, two additional tracks were constructed so that in 1925 the standard brick building on Platform 6 was built (Figure 3 and Figure 4). In 1926 the lines were electrified at Sydenham. Soon after, in 1927 the refreshment room was opened for factory workers in the area. As the additional tracks were never utilised for the Eastern Suburbs Railway they have been mainly used for the Bankstown Line trains. In 1962 a brick parcels office building was constructed on Platform 1 but closed in the late 1980s (Figure 5 to Figure 7).

The weatherboard ticket office on the overhead footbridge burnt down in the mid-1980s. In the late 1980s a new brick overhead booking office and a new metal-clad shop were built on the existing c. 1914 footbridge structure, and new canopies built over the stairs and connected to platform buildings. A Transport Access Program upgrade of the station was completed in 2013 with the removal of the 1980s overhead booking office and footbridge and the construction of a new concourse, four lift shafts, access stairs, new canopy structure and a new station building at overbridge level (Figure 8). The original station master's residence was demolished in 2014.

It is not clear what date the northern platform, waiting sheds and northern boundary wall were constructed. What is known is that these elements were not present in 1943. As platform 1 would have been required to be constructed prior to the 1962 Parcels Office, it would have been built between 1943 and 1962. The brick boundary wall located along the northern side of the station appears to be constructed of an identical brick and bonding to the parcels office and may also be dated 1962. The waiting sheds on platform 1, partly made of the brick boundary wall and new brick work, appear to post-date these structures. The south-western portion of the brick boundary wall is likely to have been built circa 1920-25 at time of construction of the overbridge and Platform 6, its curved form also associating with Inter-War architecture.

Today the station consists of the 1884 platforms and platform buildings, the 1920s Gleeson Avenue overbridge, the 1925 platform and platform building, the 1962 parcels office (closed in the 1980s), waiting sheds, brick boundary walls and a new concourse and stairs.

Figure 1 View of Platform 2/3 building, south-west aspect

Figure 2 View of Platform 2/3 and 4/5 buildings, south-west aspect

Figure 3 View of Platform 1 waiting shed, west aspect

Figure 4 View of Platform 6 building, south aspect

Figure 5 View of Platform 1 parcels office, north aspect

Figure 6 View of Platform 1 parcels office, south-east

Figure 7 View of Platform 1 parcels office, south aspect

Figure 8 View of overbridge, south-west aspect

Sydenham (Illawarra Line) Underbridge

The Sydenham Underbridge was designed by the Way and Works Branch, NSW Government Railways and constructed with day labour. The bridge is a single span, single track, steel Pratt truss over the Illawarra Line, with 37.5 metre span between brick abutments (Figure 9 to Figure 12). The bridge is in good condition with the following defects: mild corrosion of truss, stringers, cross girders and bracing members. The bridge carries the single-track Botany Line over the Illawarra Line. The Botany Line was opened on 11 October 1925.

Figure 9 View of underbridge, south-west aspect

Figure 10 View of underbridge, west aspect

Figure 11 View of abutment, north-west aspect

Figure 12 View of underbridge, north-west aspect

Brick Retaining Walls

The brick retaining walls are tall and curve as they change height over their length. They are constructed with dark bricks with rounded red brick capping (Figure 13 to Figure 23). The walls have Colonial bond with four projecting courses, five courses below this below the capping. The walls are in fair to good condition. These brick retaining walls are associated with the Bankstown rail line which was opened in 1895. This line required a number of cuttings and embankments to be constructed within the study area.

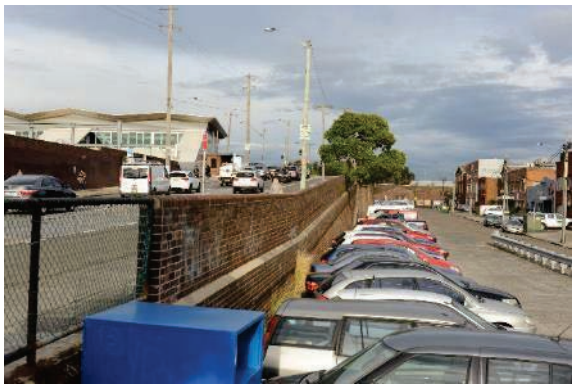


Figure 13 View of Railway Parade retaining wall, south-west aspect

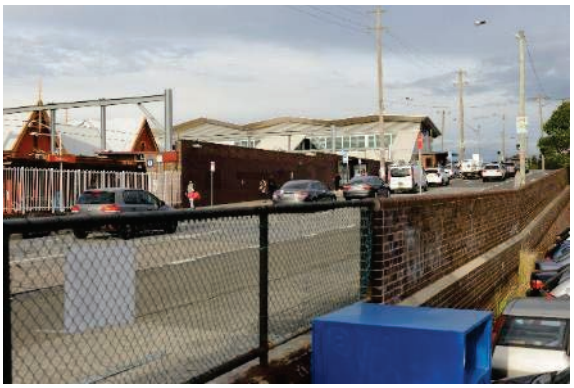


Figure 14 View of Railway Parade retaining wall, south-west aspect

Figure 15 View of Railway Parade retaining wall, south aspect

Figure 16 View of Railway Parade retaining wall, south-west aspect

Figure 17 View of Railway Parade retaining wall, north-east aspect

Figure 18 View of Railway Parade retaining wall, south-west aspect

Figure 19 View of Railway Parade retaining wall, north-east aspect

Figure 20 View of Railway Parade retaining wall, north-east aspect

Figure 21 View of Marrickville Road retaining wall, north-west aspect

Figure 22 View of Marrickville Road retaining wall, south-west aspect

Figure 23 View of Marrickville Road retaining wall, south-west aspect

Sewage Pumping Station 271

The Sewage Pumping Station 271 was designed and built by the Public Works Department.

The complex consists of a combined boiler house and engine room, a large chimney stack and a residence (Figure 24 to Figure 35). The pumping station / boiler house is designed in classic Federation Romanesque style (Figure 24 and Figure 28). Decorative Gothic buttresses with steep copings flank its sides, round headed windows surmounted by arches of rusticated sandstone typify the window openings, and the walls and gables are accentuated by machicolation motifs. The gables have sandstone copings with bracketed kneelers. The windows are small paned figured glass with pivotal awnings typical of the Federation style. The internal doors are round headed diagonal panelled double doors and are similar in style to the external doors.

The building originally had a slate roof with terracotta hips, ridges and finials. Both the boiler and engine house have since been clad in terracotta tile. The gable roofs have monitors, which are centrally placed and continue approximately half the length of the roof and are fitted with fixed steel louvres. The roof truss in the engine house is a delicate hand-wrought Warren truss strengthened internally with matchboarding. The exposed rafters are rounded on the ends and this attention to detail is typical of the quality of carpentry throughout. The internal pilasters, which correspond with the buttresses, hold the overhead crane rail. The overhead crane is a simple undertrussed steel girder hand operated crane typical of the early twentieth century.

The residence is an unadorned two storey brick building designed in Federation Queen Anne style (Figure 33 and Figure 34). Masonry is English bond and the facade is accentuated by timber filigree detailing.

The chimney stack is polychromatic brickwork on a square base which changes to an octagonal shaft some three metres above the ground (Figure 35). It is finished with an ornate cap. The stack is a local landmark.

The station is substantially intact and in good condition. The residence building is in good condition and the fabric is substantially intact.

A series of low level sewage pumping stations were constructed to transport waste against gravity by means of a series of rising mains. The low level portions of Marrickville, Newtown, Erskineville, Alexandria and St Peters are still serviced by a low level sewer which discharges into the wells of Marrickville Pumping Station. The sewage is then pumped to the high level of the Eastern Branch of the Southern and Western Suburbs Ocean Outfall Scheme (SWOOS). Marrickville SPS also receives stormwater discharge from the Central stormwater channel during certain high tides in the Cooks River.

Figure 24 View of pumping station, south-east aspect

Figure 25 View of brick paving, north-east aspect

Figure 26 View of pumping station, south-west aspect

Figure 27 View of retaining wall and brick paving, south-east aspect

Figure 28 View of pumping station, north-west aspect

Figure 29 View of pumping station, with stack and residence in background, north-west aspect

Figure 30 View of pumping station and stack, north-east aspect

Figure 31 View of pumping station and brick paving, south aspect

Figure 32 View of retaining wall, north-west aspect

Figure 33 View of residence, north-east aspect

Figure 34 View of residence, north-west aspect

Figure 35 View of stack, west aspect

Marrickville (Meeks Road) Railway Substation

Marrickville Railway Substation was designed and built by NSW Government Railways in 1926. It is located facing south on to the Illawarra Line within the Sydenham Triangle. The site is accessed via an overbridge via Way Street to the south. The site includes the substation building, the switch house, transformers and surrounding electrical equipment (Figure 36 to Figure 41).

The Marrickville Railway Substation was designed and constructed as part of the transport scheme envisaged by JJC Bradfield to enhance and promote the development of Sydney with electrification of the suburban railway network. As the suburban railway lines were converted from steam to electric traction, substations, located approximately eight kilometres apart were required for efficiency in direct current (DC). A 1500 volts DC system to power the overhead conductors was adopted for the NSW Railways.

Locations for substations were determined by topographical conditions, anticipated loading conditions and calculated economic distances between adjoining substations. The main railway junctions were considered ideal sites in order to service more than one line.

Marrickville Railway Substation located within the Sydenham Triangle was one of 15 built during the period 1926-1932 as part of the electrification of the suburban network. Each substation was built to a standard design and layout and consisted of three main areas: the main building or converter room; the transformer area; and the switch house. Their interiors were required to house the equipment needed to convert 33,000 volts AC from the substations to the 1500 volts DC required by trains. The early substations were housed with two large rotary converters – one for normal use, the other as backup in case of failure. Travelling overhead cranes were erected that could travel the full length of all buildings.

The main building at Meeks Road closest to the tracks served the electric trains, while the smaller building behind it provided a temporary switch station for high voltage feeders from White Bay power station, serving both the trains and the nearby trams at Tempe Depot.

During 1960-1963 substation equipment was replaced from 25 Hz to 50 Hz systems. More recently (1990s), electric traction technology has advanced with modern silicon diode rectifiers that have made many of the brick substation buildings redundant. Of the 15, eight remain in operational use (2009).

The substation at Meeks Road continues to operate as a substation, and was recently upgraded to increase its traction supply c. 2009-10.

Figure 36 View of substation, south aspect

Figure 37 View of substation, south-east aspect

Figure 38 View of substation, north aspect

Figure 39 View of railway corridor with substation on right, south-west aspect

Figure 40 View of substation, east aspect

Figure 41 View of substation, south aspect

Additional impact assessment

The potential impacts to additional non-Aboriginal heritage items are provided in Table 1. These items are shown on Figure 42.

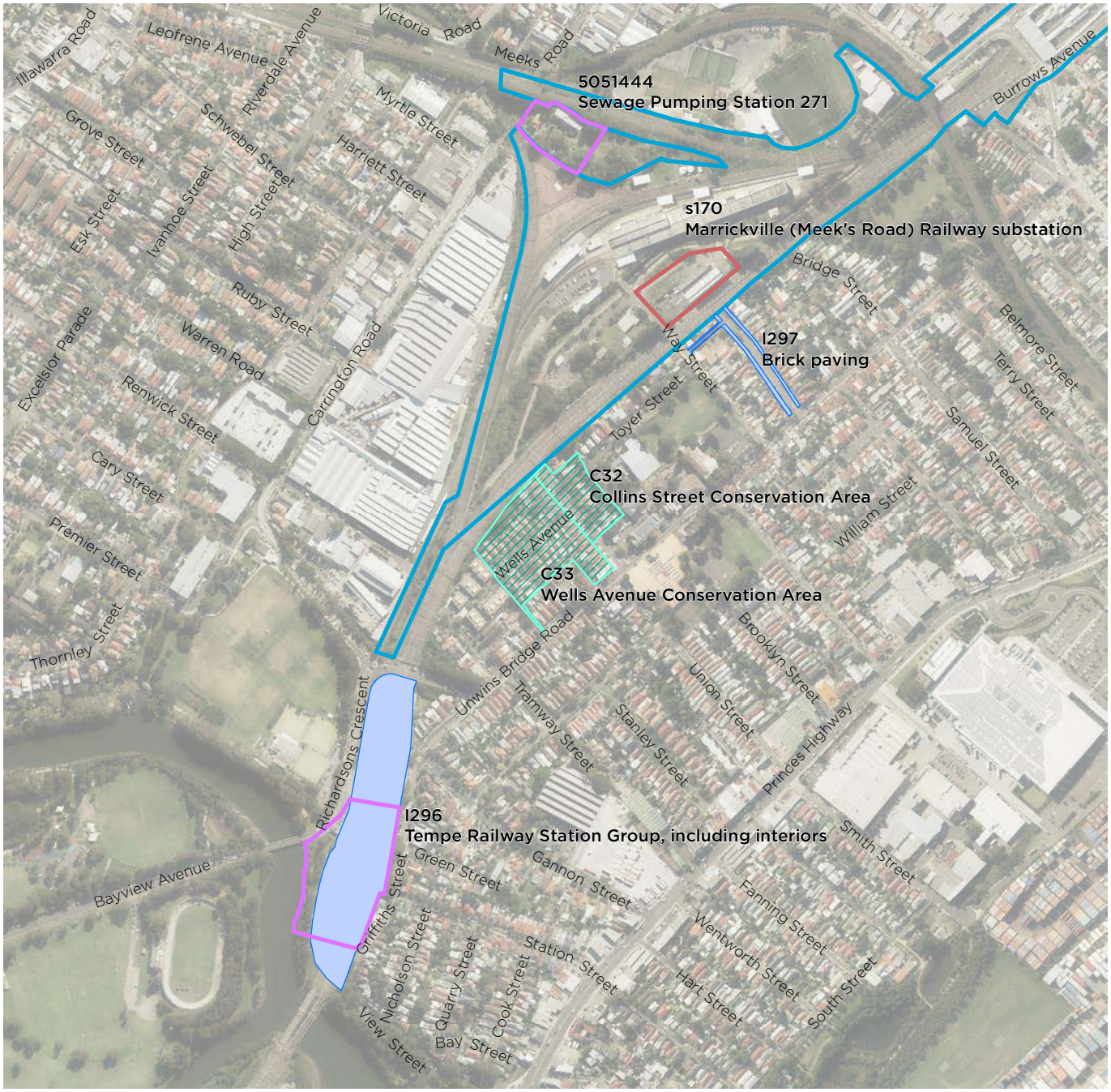
Table 1 Additional non-Aboriginal heritage impact assessment

Item	Significance	Impact type	Discussion
Sewage Pumping Station 271 SHR (01342) Sydney Water S.170 Heritage and Conservation Register (4571727) Marrickville LEP 2011 (I67)	State	Direct	**Neutral** No direct impacts to the Sewage Pumping Station 271 are proposed as part of the proposed modification.
		Visual	**Negligible** The heritage item is located approximately 550 metres away from Sydenham Station. Such distance would prevent any significant visual impacts onto the pumping station and would likely be negligible. Any views of the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the heritage item and would have a neutral visual impact. Visual impacts on the Sewage Pumping Station 271 would be negligible.

Item	Significance	Impact type	Discussion
		Potential direct	**Minor** The closest façade of this item may experience vibration levels above the screening criterion for cosmetic damage. Further assessment and management would be undertaken in accordance with mitigation measure NV3.
Marrickville (Meeks Road) Railway Substation RailCorp S.170 Heritage and Conservation Register (4801123)	Local	Direct	**Minor** The Marrickville (Meeks Road) Railway Substation is located within the study area outside the rail corridor. The building is located facing south on to the Illawarra Line within the Sydenham Triangle. The site is accessed via an overbridge via Way Street to the south and includes a substation building, a switch house, transformers and surrounding electrical equipment. The substation at Meeks Road would continue to operate as a substation in its current capacity with potential adjustment works to meet the requirements of metro trains. Provided that these works are designed and carried out in a sympathetic manner to minimise impacts on the fabric and heritage values of the substation, and that any additions to the building are designed to be sympathetic to the heritage context, it is expected the proposed modification would have a minor impact on the substation.
		Visual	**Minor** The substation at Meeks Road would continue to operate as a substation in its current capacity with potential adjustment works to meet the requirements of metro trains. Provided that these adjustment works and any additions to the building are designed and carried out in a sympathetic manner to minimise impacts on the substation, it is expected the project would have a minor visual impact. The heritage item is located approximately 445 metres away from Sydenham Station. Such distance would prevent any significant visual impacts onto the substation and would likely be negligible. Any views of the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the heritage item and would have a neutral visual impact.
		Potential direct	**Negligible** Vibration levels would be below the cosmetic damage screening criterion.

Item	Significance	Impact type	Discussion
Brick paving Marrickville LEP 2011 (I297)	Local	Visual	**Negligible** The brick paving along Hillcrest Street and Hillcrest Lane is located opposite the Marrickville (Meeks Road) Railway substation and directly against the project area boundary. The Marrickville (Meeks Road) Railway substation would continue to operate as a substation in its current capacity with potential adjustments works to meet the requirements of metro trains. Provided that these adjustment works and any additions to the building are designed and carried out in a sympathetic manner to minimise impacts on the substation, it is expected the project would have a negligible visual impact on the heritage brick paving. Any views of the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the heritage item and would have a neutral visual impact.
		Potential direct	**Negligible** Vibration levels would be below the cosmetic damage screening criterion.
Wells Avenue Heritage Conservation Area Marrickville LEP 2011 (C33)	Local	Visual	**Neutral** The Wells Avenue Heritage Conservation Area is located south-west of the Marrickville (Meeks Road) Railway substation, approximately 250 metres at its most proximate end. There are no significant views from the Heritage Conservation Area to the Marrickville (Meeks Road) Railway substation. The northern boundary of the Heritage Conservation Area is located along the railway tracks. Any views on the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the Heritage Conservation Area and would have a neutral visual impact.
		Potential direct	**Negligible** Vibration levels would be below the cosmetic damage screening criterion.

Item	Significance	Impact type	Discussion
Collins Street Heritage Conservation Area Marrickville LEP 2011 (C32)	Local	Visual	**Neutral** The Collins Street Heritage Conservation Area is located south-west of the Marrickville (Meeks Road) Railway substation, approximately 70 metres from its most proximate end and 200 metres from where it is part of the buffer zone. There are no direct views from the Heritage Conservation Area to the area of works apart from some very limited views from the north-west corner of the Heritage Conservation Area onto the railway tracks. Any views on the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the Heritage Conservation Area and would have a neutral visual impact. The character of the Heritage Conservation Area and views to and from the Heritage Conservation Area would not be impacted by the works.
		Potential direct	**Negligible** Vibration levels would be below the cosmetic damage screening criterion.
Tempe Railway Station Group, including interiors SHR (01266) Marrickville LEP 2011 (I296) RailCorp S.170 Heritage and Conservation Register (4801155)	State	Visual	**Neutral** The Tempe Railway Station Group is located approximately 150 metres south of the proposed Eastern Channel bank raising works. At such a distance, there are no direct views from the heritage item onto the area of works. Any views on the new metro tracks and overhead wiring would be in keeping with the current views and vistas of the item and would have a neutral visual impact. The character of the item and views to and from the item would not be impacted by the works.
		Potential direct	**Negligible** Vibration levels would be below the cosmetic damage screening criterion.



KEY

- Proposed modification area
- s170 Heritage
- State Heritage Register
- LEP Conservation Area - General
- LEP heritage item - General

Indicative only, subject to design development

0 200 m

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FLOODING TECHNICAL INFORMATION

APPENDIX C

Flooding technical information

The modification report provided an overview of flood modelling including methodology and potential impacts associated with the project. Submissions received during exhibition of the modification report, including from the Office of Environment and Heritage and Inner West Council, requested additional details. This appendix provides further information on the flood modelling methodology and potential flood impacts in a range of events.

Flood modelling methodology

Around the Sydney Metro Trains Facility South and Sydenham Station flood modelling was undertaken using TUFLOW software. The events modelled were:

- Existing case:
  - 63 per cent, 39 per cent, 18 per cent, 10 per cent, five per cent, two per cent and one per cent Annual Exceedance Probabilities (AEPs)
  - one per cent AEP + 10 per cent increase for climate change
  - probable maximum flood (PMF)
- Post-developed case:
  - one per cent AEP
  - one per cent AEP + 10 per cent increase for climate change
  - PMF.

Potential impacts

The modification report provided a discussion of flood modelling results for the one per cent AEP and the PMF events, and compared these outcomes to the flood outcomes of the approved project. The report also provided mapping of changes to flood levels (compared to the existing situation) for the PMF event.

Overall the report concluded that, with the proposed drainage and flood improvements in place, flooding impacts would generally be less than those identified for the approved project.

This section provides the following flood mapping for the existing, and with modification situations:

- The one per cent AEP plus 10 per cent flood level change
- The one per cent AEP plus 10 per cent velocity change
- The one per cent AEP plus 10 per cent provisional flood hazard
- The PMF flood level change (as was provided in the modification report)
- The PMF velocity change
- The PMF provisional flood hazard.

This additional mapping does not change the outcomes of the flooding assessment provided in the modification report. Additionally the mitigation measures, which provide a performance standard for the project, would continue to apply.

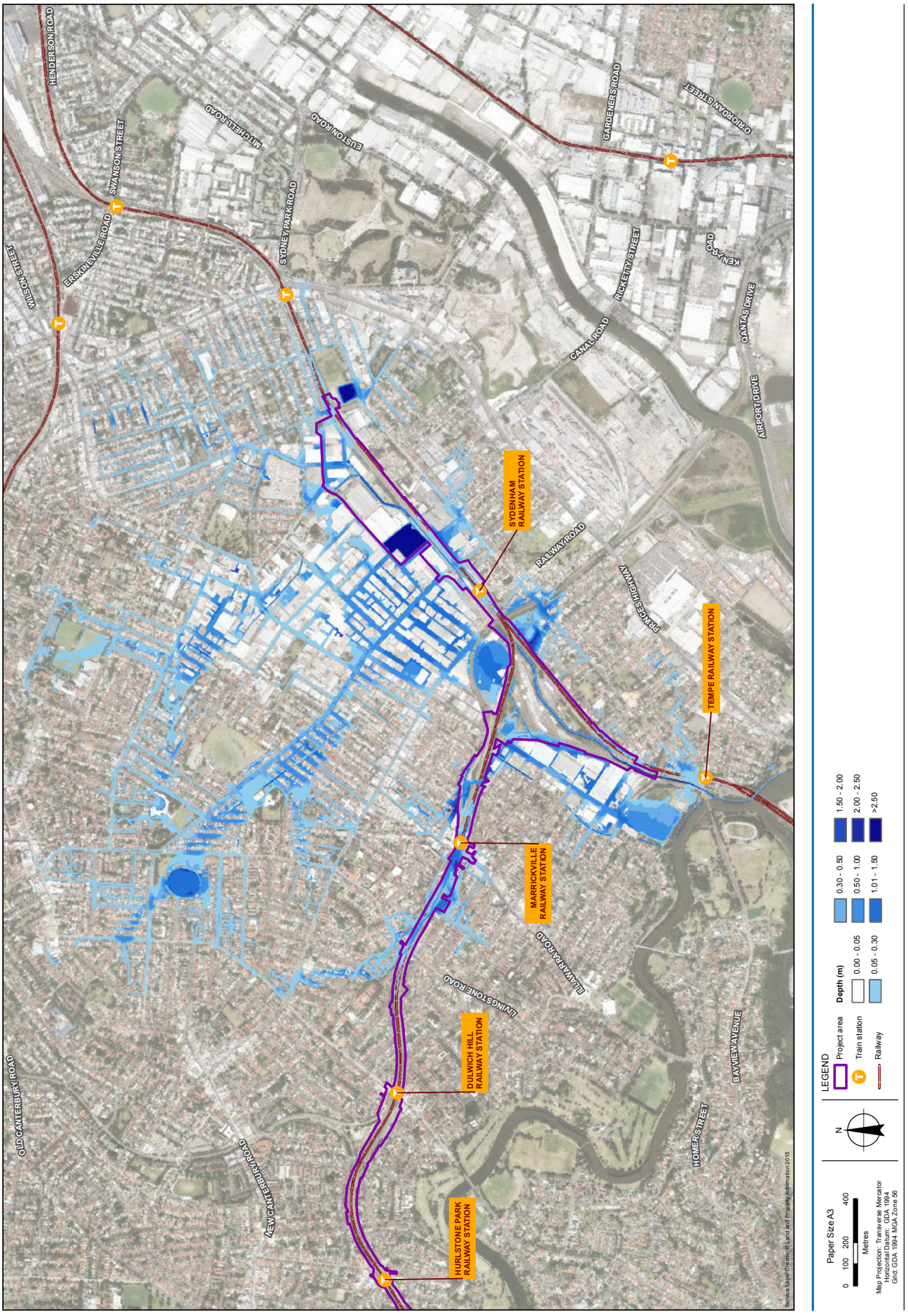

Figure 1 One per cent AEP plus 10 per cent flood level – existing

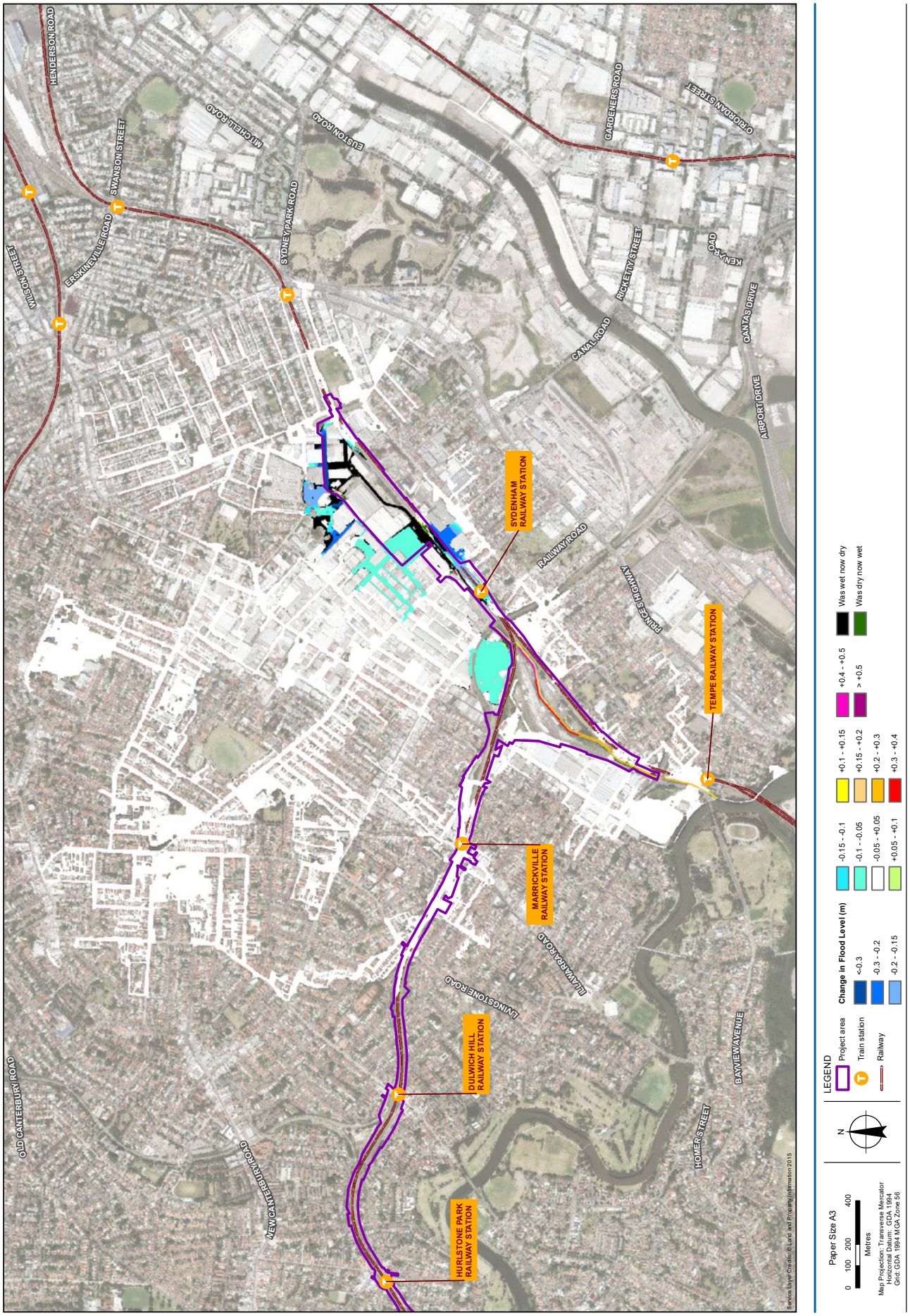

Figure 2 One per cent AEP plus 10 per cent flood level change with modification

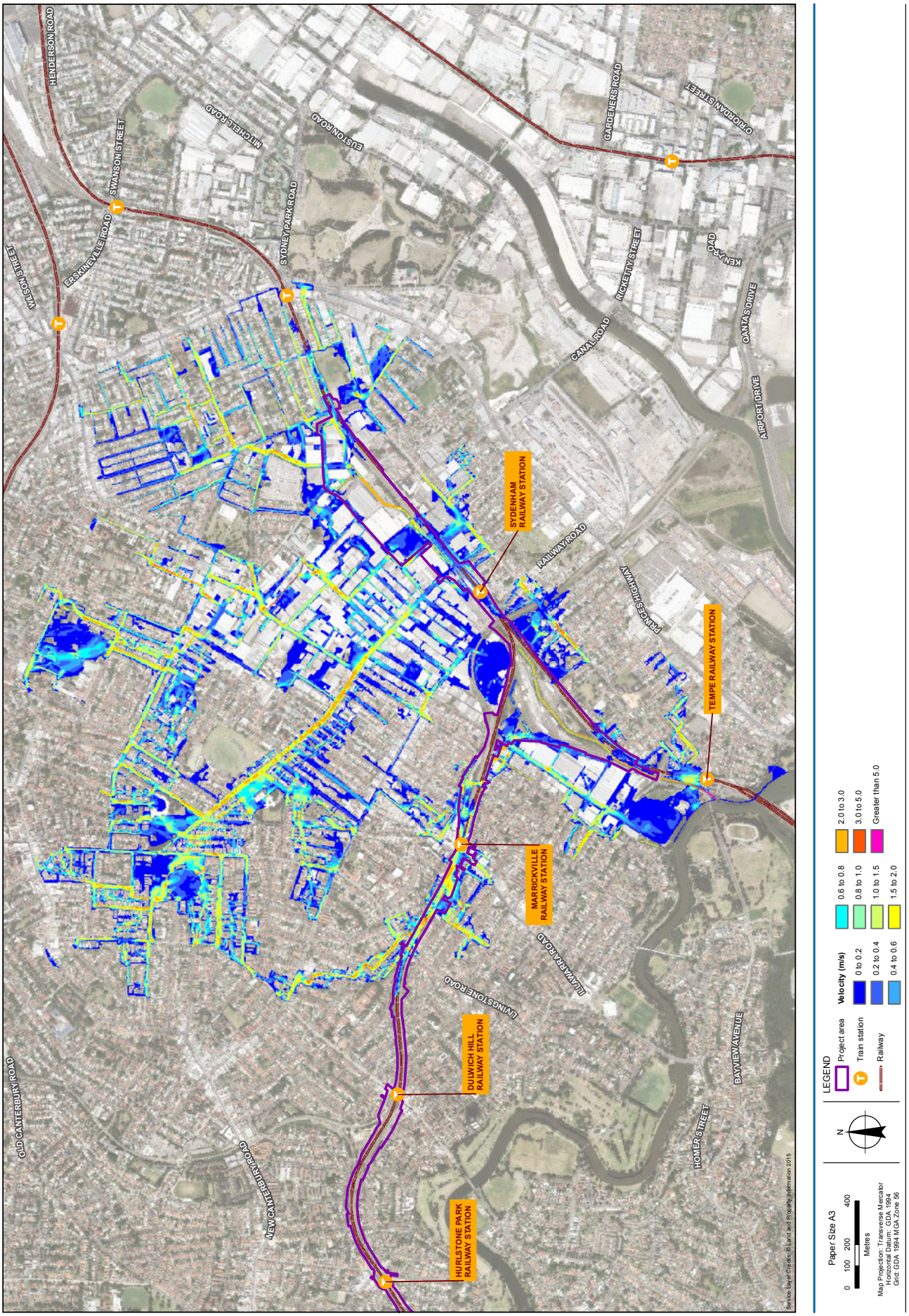

Figure 3 One per cent AEP plus 10 per cent velocity – existing

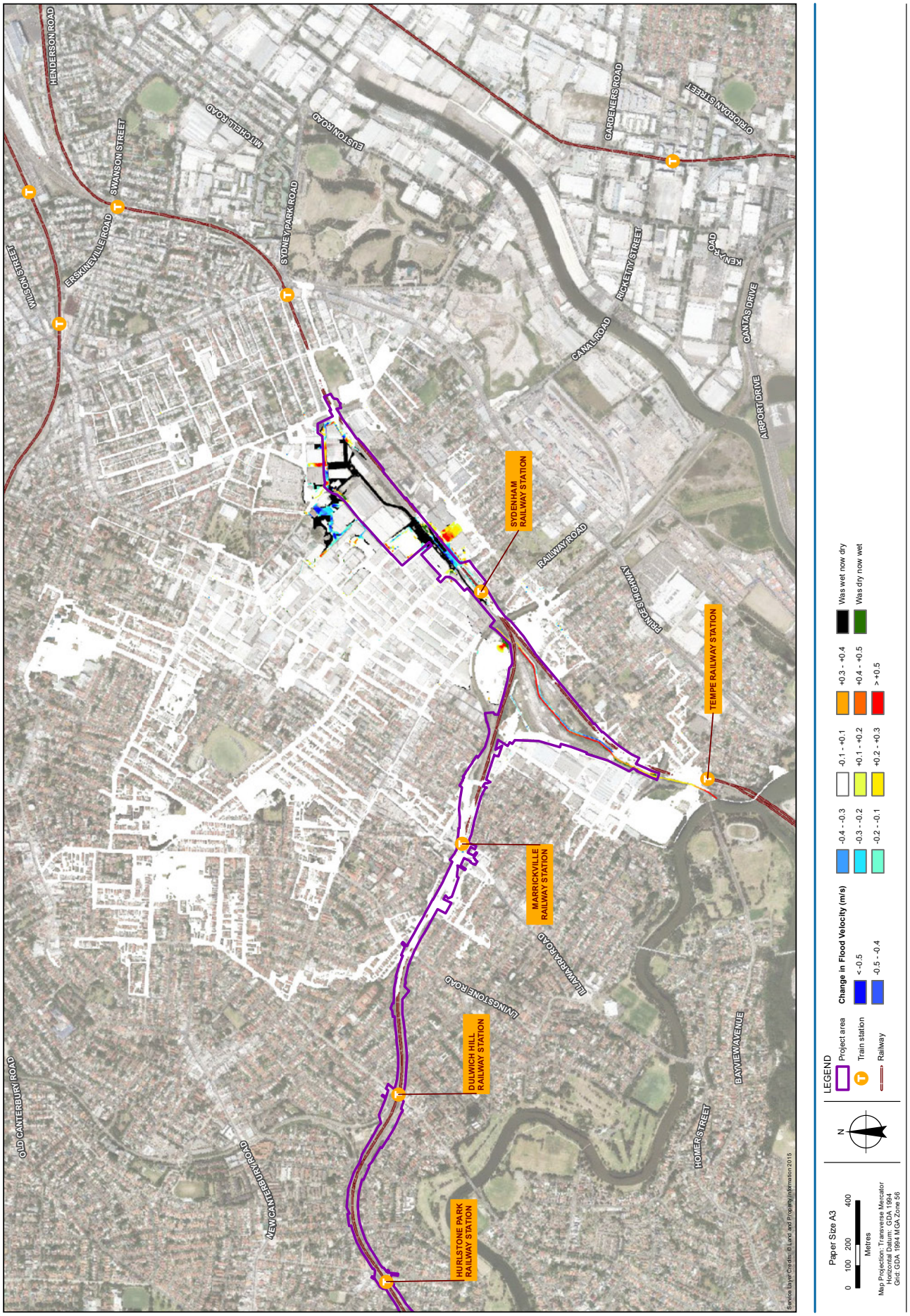

Figure 4 One per cent AEP plus 10 per cent velocity change with modification

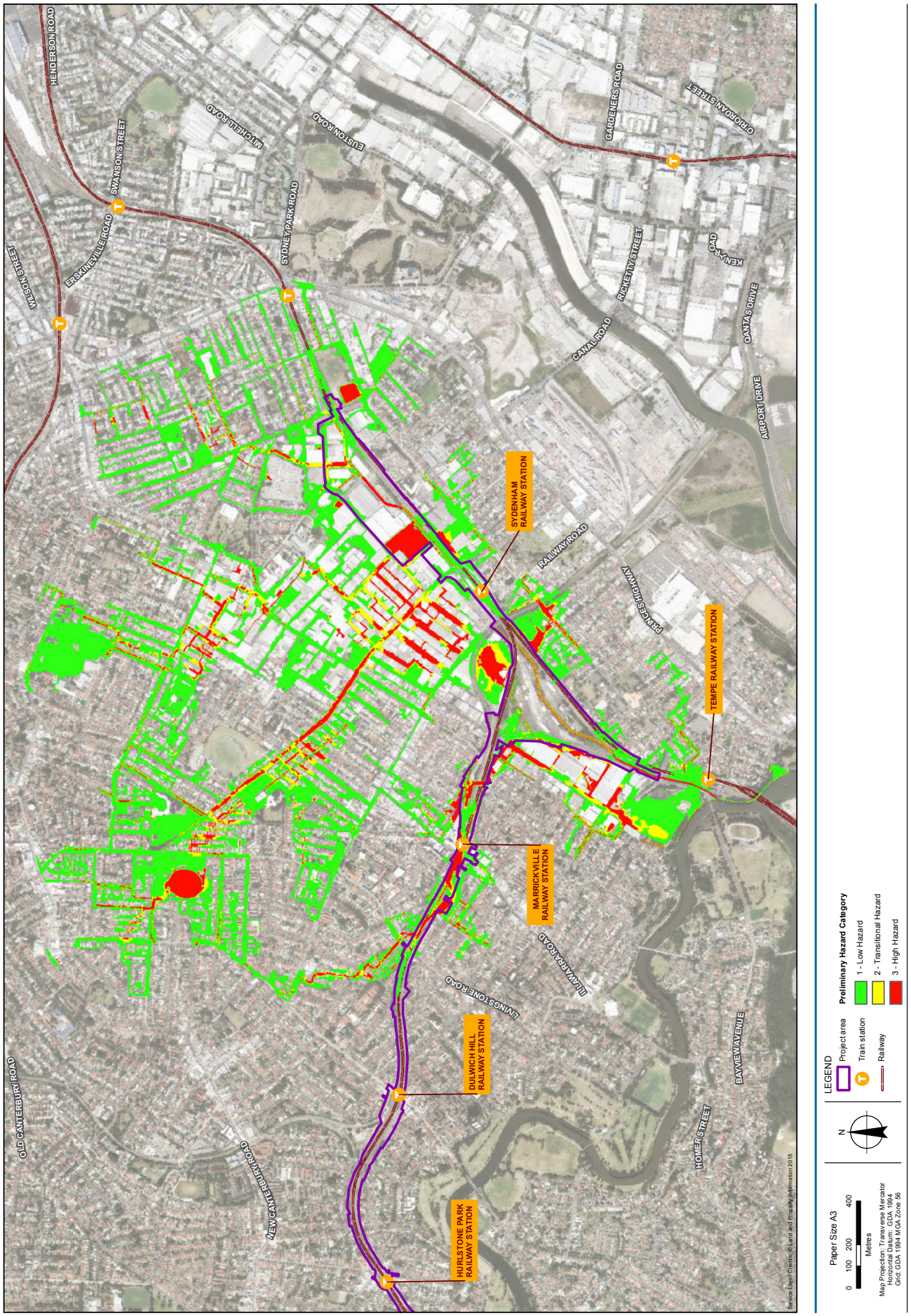

Figure 5 One per cent AEP plus 10 per cent provisional flood hazard – existing

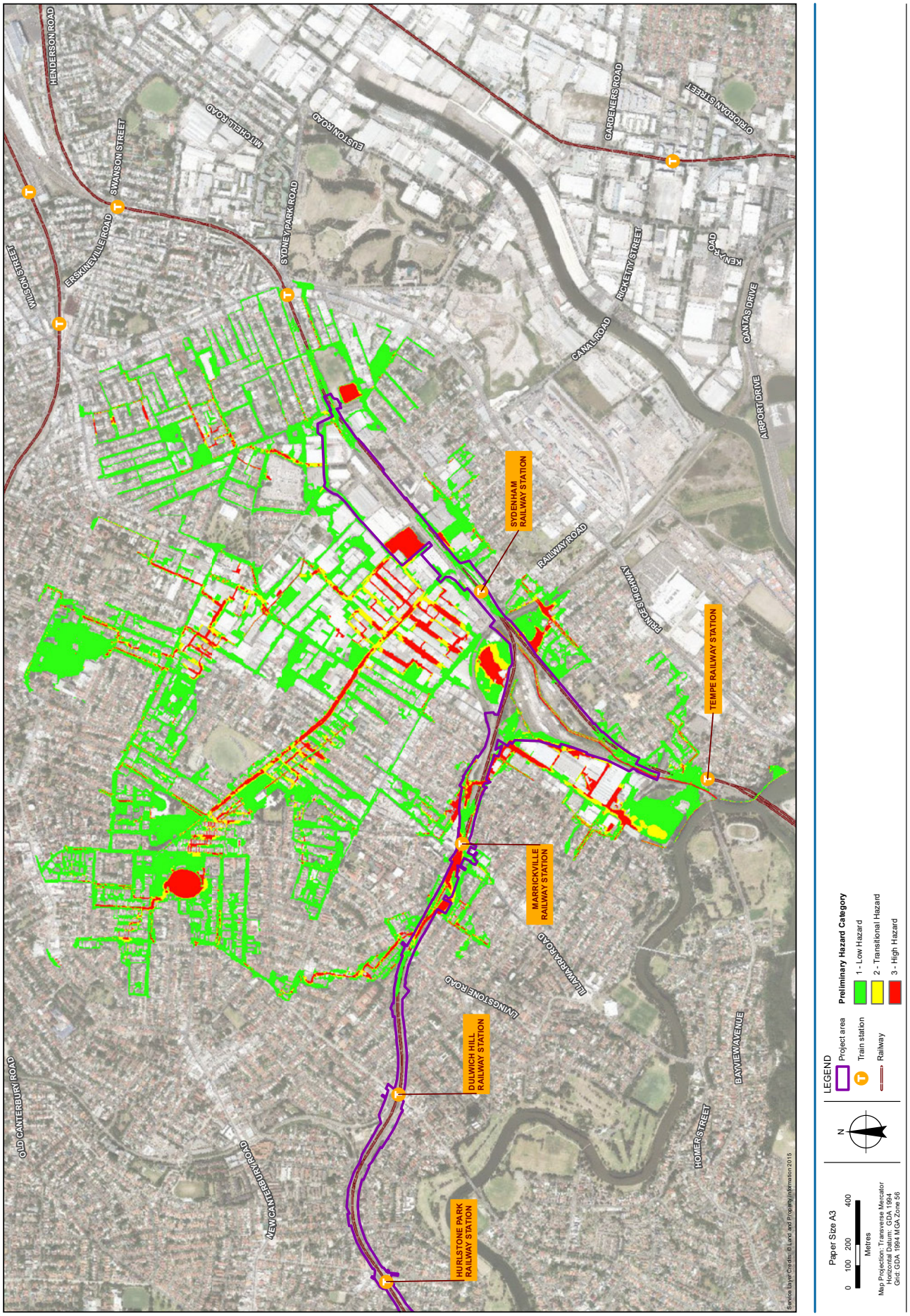

Figure 6 One per cent AEP plus 10 per cent provisional flood hazard with modification

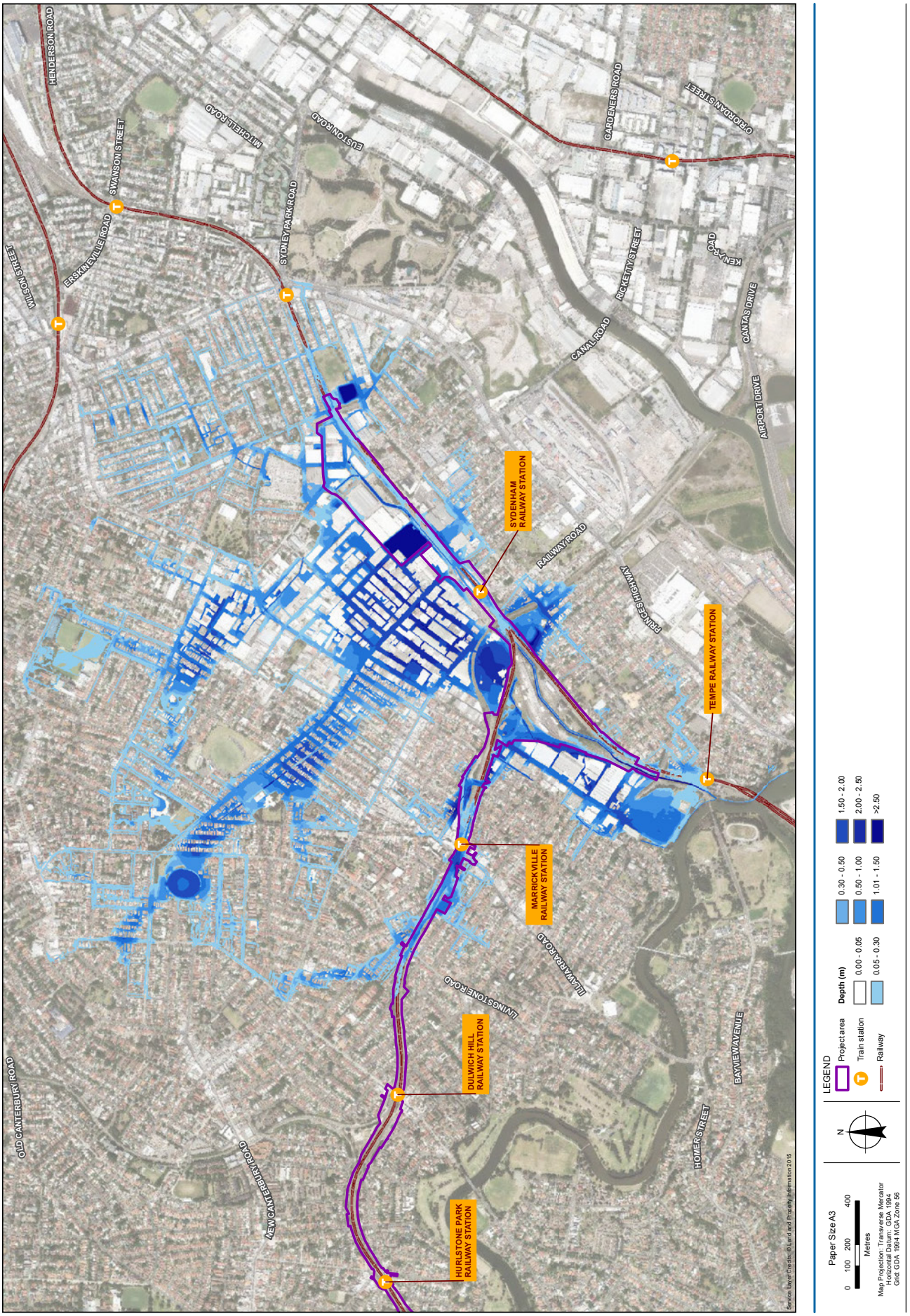

Figure 7 PMF flood level – existing

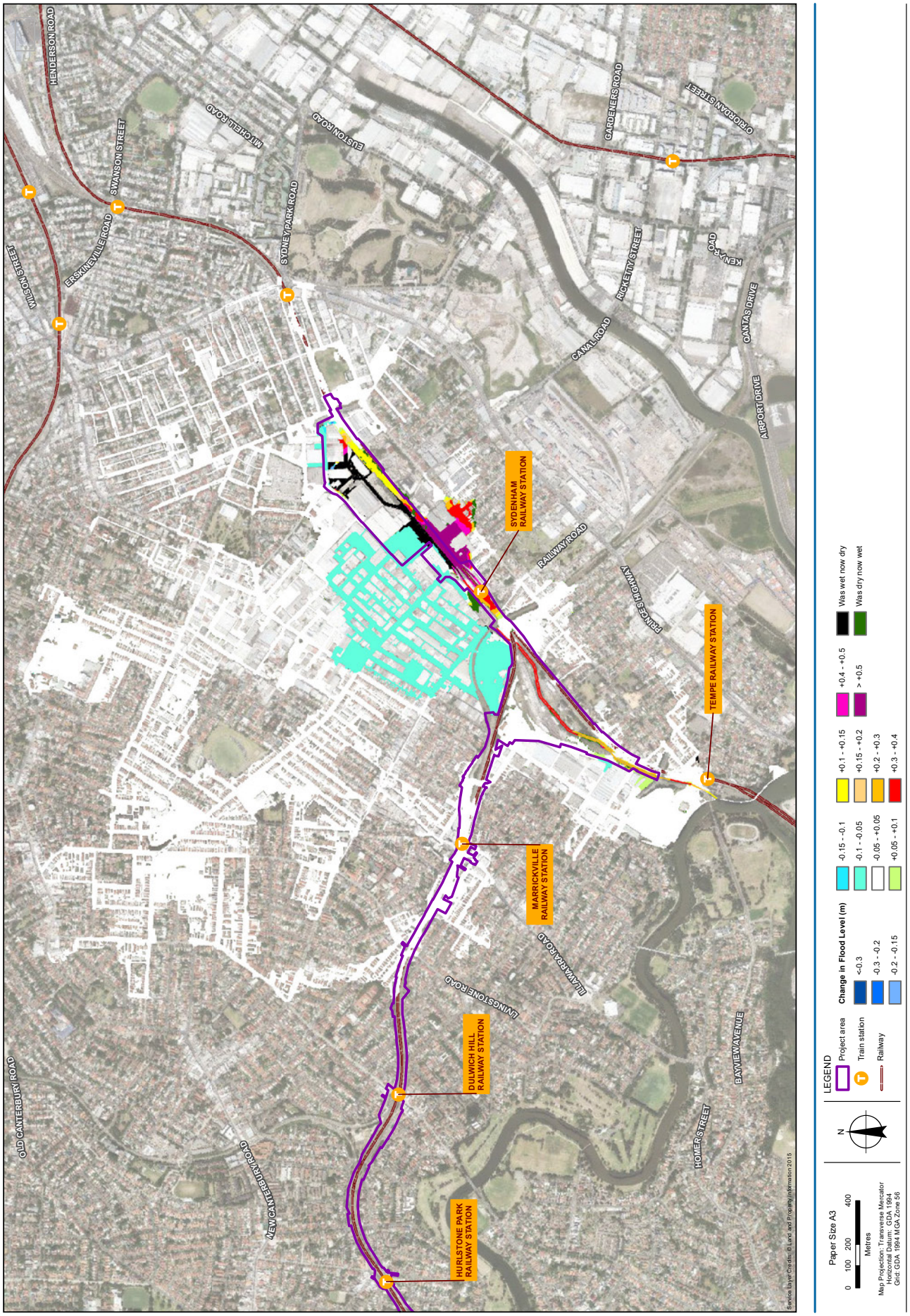

Figure 8 PMF flood level change with modification

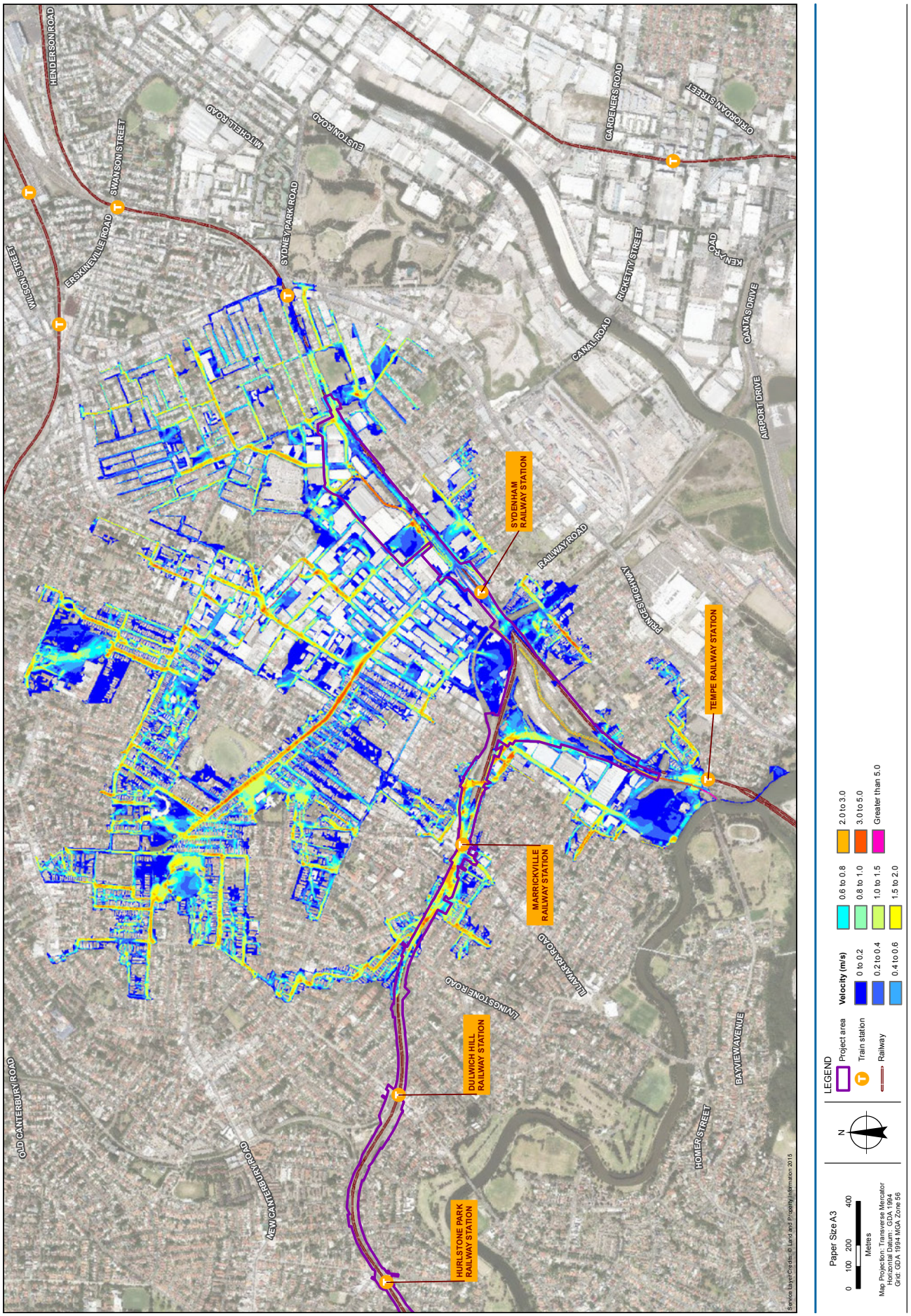

Figure 9 PMF velocity – existing

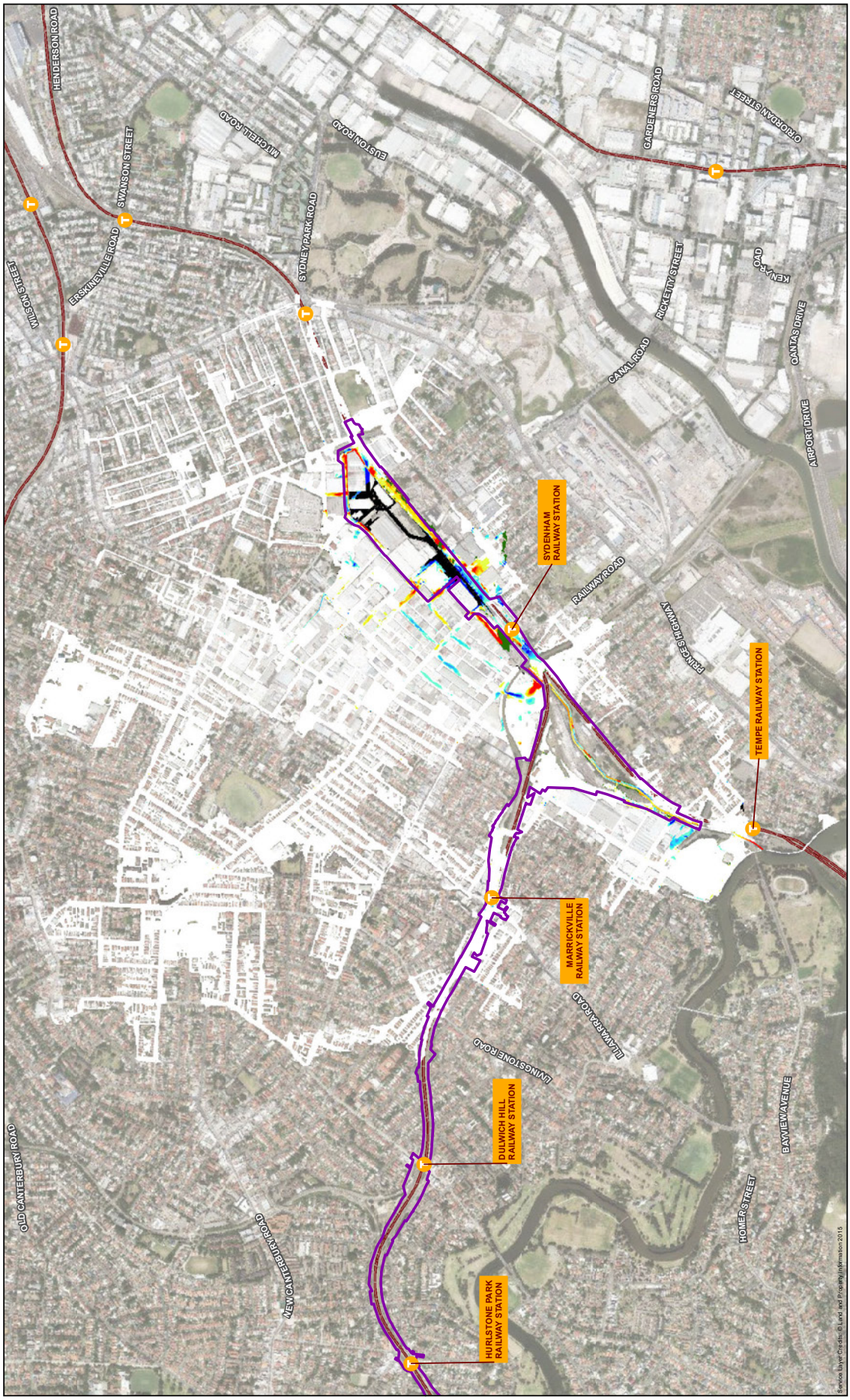

Figure 10 PMF velocity change with modification

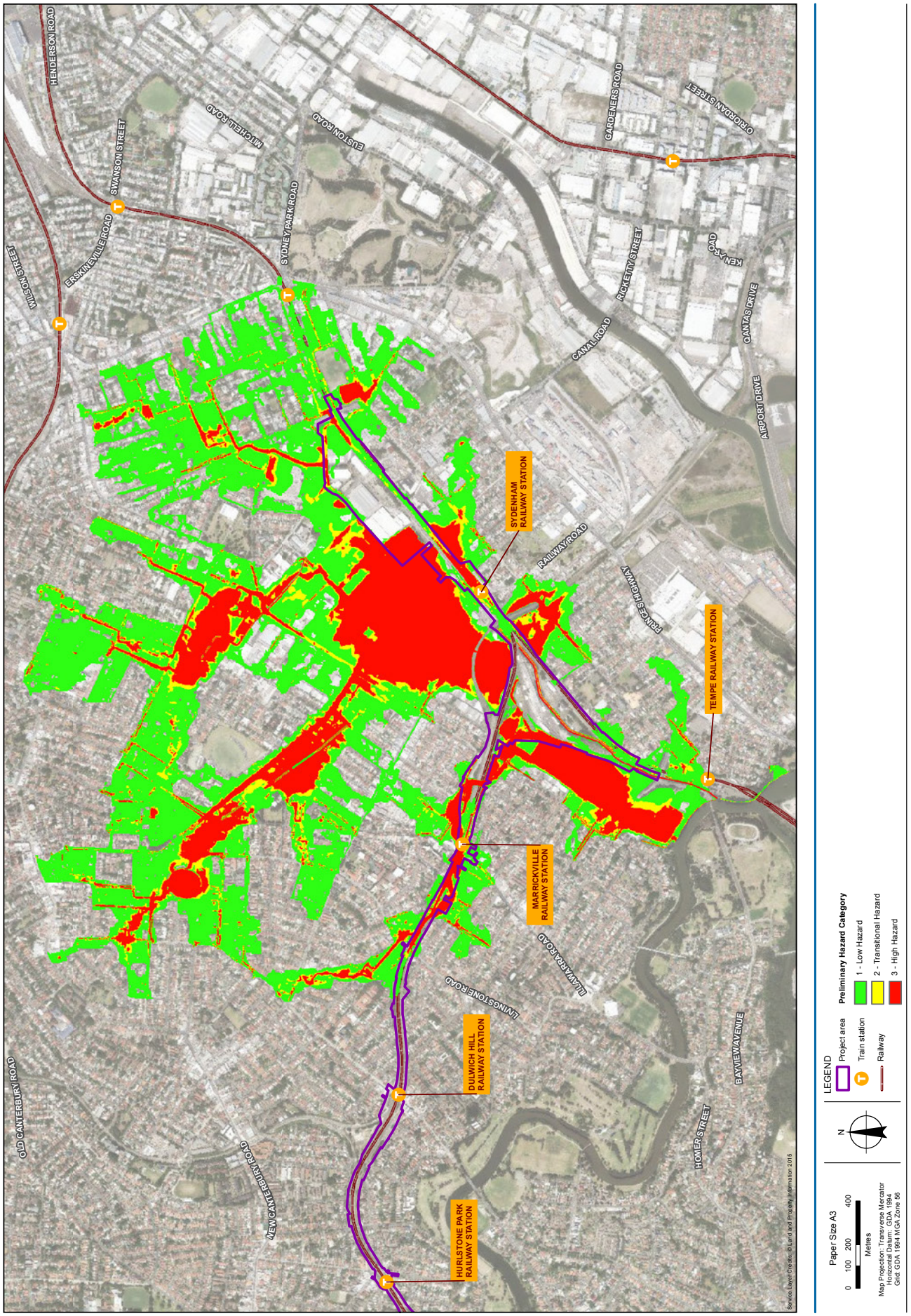

Figure 11 PMF provisional flood hazard – existing

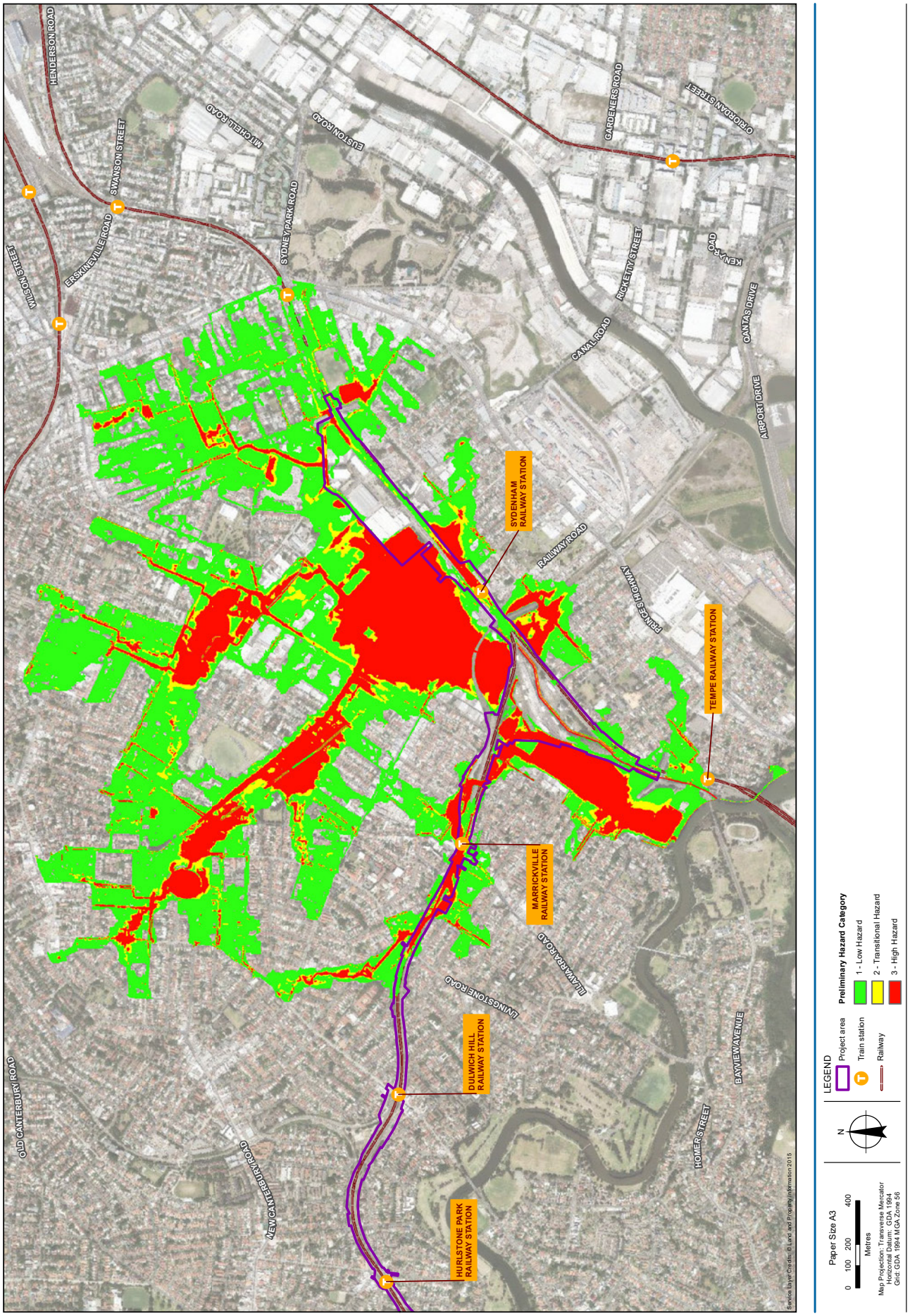

Figure 12 PMF provisional flood hazard with modification

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CHATSWOOD TO SYDENHAM

SYDENHAM STATION AND SYDNEY METRO TRAINS FACILITY SOUTH MODIFICATION SUBMISSIONS REPORT