



Planning Approval Consistency Assessment Form

SM-17-00000111

Metro Body of Knowledge (MBoK)

Assessment name:	SMDS Corridor Design Clashes
Prepared by:	Jonny Steele – Metron T2M Dan Keegan - JHLOR
Prepared for:	Sydney Metro – Southwest Metro Corridor Works
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For information – do not alter:

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Table of contents

1. Existing Approved Project	3
2. Description of proposed development/activity/works.....	4
3. Timeframe.....	6
4. Site description	6
5. Site Environmental Characteristics	6
6. Justification for the proposed works.....	8
7. Environmental Benefit	10
8. Control Measures.....	10
9. Climate Change Impacts.....	10
10. Impact Assessment – Construction.....	11
11. Impact Assessment – Operation.....	14
12. Consistency with the Approved Project.....	16
13. Other Environmental Approvals	17
Author certification	18
Environmental Representative Review.....	18
Appendix A – Location of identified design clashes and consolidation of habitats following ecological inspection	20
Appendix B – Threatened Ecological Community Clash Detection Report	22
Appendix C – Location of identified design clashes and consolidation of habitats following ecological inspection by Arcadis	23
Appendix D – Arcadis Addendum Report for TEC Clashes at Garnet Street, Dulwich Hill and Railway Parade, Lakemba	25

The Planning Approval Consistency Assessment Form should be completed in accordance with [SM-17-00000103 Planning Approval Consistency Assessment Procedure](#).

1. Existing Approved Project

Planning approval reference details (Application/Document No. (including modifications)):

SSI_8256 Sydney Metro City & Southwest – Sydenham to Bankstown

SSI_8256 Sydney Metro City & Southwest – Sydenham to Bankstown Modification 1 – October 2020

Date of determination:

12/12/2018

Type of planning approval:

Critical State Significant Infrastructure

Description of existing approved project you are assessing for consistency:

Construction and operation of a metro rail line, approximately 13km long, between Marrickville and Bankstown, including ten metro stations and associated ancillary infrastructure. The works include station works, track and rail system facility works and other works to support metro operations. Works within the rail corridor include the installation of security fencing and combined services routes in order to support metro operations.

The Sydney Metro City & Southwest – Sydenham to Bankstown – EIS - Technical Paper 9 - Biodiversity Assessment Report prepared by GHD (2017) identified a number of threatened ecological communities (TEC) and native plant community types (PCTs) throughout the corridor. The biodiversity assessment for the approved project was undertaken based on the assumption that all vegetation within the rail corridor would need to be removed to construct the project, with the exception of:

- Native vegetation that would require biodiversity offsets if removed (specifically areas of 'Turpentine - Grey Ironbark open forest on shale', 'Degraded Turpentine - Grey Ironbark open forest on shale' and 'Broad-leaved Ironbark – Grey Box'
- Identified areas of the threatened species Downy Wattle located within the rail corridor between Punchbowl and Bankstown stations (SPIR, 2018).

This Planning Approval Consistency Assessment (PACA) has been prepared to demonstrate that the Project's design is consistent with the Approved Project and complies with the requirements of the relevant Conditions of Approval (CoA) and Relevant Revised Environmental Mitigation Measures (REMMs).

Relevant background information (including EA, REF, Submissions Report, Director General's Report, MCoA):

The Sydney Metro City & Southwest – Sydenham to Bankstown – Environmental Impact Statement (September 2017)

The Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions and Preferred Infrastructure Report (June 2018)

The Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions Report (September 2018)

Sydenham to Bankstown Modified Conditions of Approval (October 2020)

SMCSWSWM-MTM-WEC-EM-REP-000003 – Design Clash Review: Sydney Metro Southwest Metro Design Services (METRON T2M, 2021)

SMCSWSSJ-JHL-WEC-EM-REP-000018 Addendum to TEC Clash Consistency Assessment

All proposed works identified in the assessment would be undertaken in accordance with the mitigation measures identified in the EIS, SPIR, SR and the Conditions of Approval.

2. Description of proposed development/activity/works

Describe ancillary activities, duration of work, working hours, machinery, staffing levels, impacts on utilities/authorities, wastes generated or hazardous substances/dangerous goods used.

Metron T2M are developing the design for the conversion of the T3 Bankstown Line between Marrickville and Bankstown Stations to Sydney Metro Rail Standards under the Southwest Metro Design Services (SMDS) contract. The design prepared by Metron T2M will be provided to follow on Contractor(s) for construction.

As part of SMDS, Metron T2M are developing the design for the fencing and combined services routes, required for the operation of the Project. During the development of the rail corridor Stage 1 design, a number of design clashes with areas mapped as 'Turpentine - Grey Ironbark open forest on shale', 'Degraded Turpentine - Grey Ironbark open forest on shale' and 'Broad-leaved Ironbark – Grey Box' were identified. These clashes were reviewed further with the design development process. The review resulted in a number of clashes being resolved, through re-design. However, due to the constrained nature of the rail corridor, re-design was unable to resolve four residual clashes between the proposed security fencing/combined services route and the areas mapped as 'Turpentine - Grey Ironbark open forest on shale', 'Degraded Turpentine - Grey Ironbark open forest on shale' and 'Broad-leaved Ironbark – Grey Box', in the EIS, at the following locations:

- Challis Avenue, Between Marrickville and Dulwich Hill Stations – Security fence encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ in the EIS (2017);
- Dudley Street, between Marrickville and Dulwich Hill Stations – Security fence encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ in the EIS (2017);
- Garnet Street, between Dulwich Hill and Hurlstone Park Stations – Security fence encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ in the EIS (2017); and
- Moreton Street, between Belmore and Lakemba Stations – Security fence and combined services route encroaches into area mapped as ‘Turpentine – Grey Ironbark open forest on shale’ in the EIS (2017).

Site assessment and ground-truthing of the EIS mapping has been undertaken and has confirmed that the design of the proposed security fencing and combined services routes at the above locations would not affect any threatened ecological communities (refer to the assessment below and the report appended to Appendix B).

John Holland Laing O’Rourke Joint Venture (JHLOR) have been awarded the Southwest Metro Corridor works (SMC). This includes the construction of the above listed design elements within the corridor between Sydenham and Bankstown. JHLOR’s designer Arcadis has continued on with the design that was commenced by Metron T2M and completed to Stage 3 design. During the completion of the design by Arcadis a number of design changes have been made, including the additional of a number of local containment routes for services associated with the operation of the Sydney Metro trains. These local routes generally connect trackside equipment to the Combined Service Route (CSR). JHLOR and Arcadis have identified an additional two routes that will impact on areas identified as Degraded Turpentine - Grey Ironbark open forest on shale within the EIS. Those areas are;

- Garnet Street, between Dulwich Hill and Hurlstone Park Stations – local route encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ on the southern side of the rail corridor as per the EIS (2017); and
- Railway Parade, between Lakemba and Wiley Park Stations – local route encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ on the southern side of the rail corridor as per the EIS (2017);

Site assessment and ground-truthing of the EIS mapping has been undertaken and has confirmed that the design of the local routes at the above locations would not affect any threatened ecological communities (refer to the assessment below and the report appended to Appendix D)

3. Timeframe

When will the proposed change take place? For how long?

Construction of the corridor elements would commence from Quarter 1 2021, and is scheduled to finish around Quarter 3 2022.

4. Site description

Provide a description of the site on which the proposed works are to be carried out, including, Lot and Deposited Plan details, where available. Map to be included here or as an appendix. Detail of land owner.

Installation of corridor elements are proposed within the existing Sydney Trains rail corridor, at locations outlined in Section 2.0.

5. Site Environmental Characteristics

Describe the environment (i.e., vegetation, nearby waterways, land use, surrounding land use), identify likely presence of protected flora/fauna and sensitive area.

The EIS's Biodiversity Assessment Report (GHD 2017) was prepared to describe the impacts of the Project on biodiversity values. The main components of the methodology for the biodiversity assessment were:

- Desktop assessment to describe the existing environment and landscape features of the study area and to identify the suite of threatened biota potentially affected by the project
- Field survey to describe the biodiversity values of the project area and surrounding study area and determine the likelihood of threatened biota and their habitats occurring in the project area or being affected by the project

The assessment identified the following protected habitat types at the locations shown in Appendix A, that are subject to a design clash as a result of Project's design.

Challis Avenue between Marrickville and Dulwich Hill stations – north side of rail line

A 0.02-hectare patch of PCT was mapped (GHD (2017)) within the rail corridor, extending approximately 45 metres west from the Albermarle Street overbridge. This vegetation was categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor), as shown in Figure 5 below. The EIS biodiversity assessment (GHD 2017) concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC “Sydney Turpentine Ironbark Forest”, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

Dudley Street between Marrickville and Dulwich Hill stations – south side of rail line

A 0.06-hectare patch of PCT was mapped (GHD 2017) within the rail corridor, extending approximately 72 metres east from the Wardell Road overbridge. This vegetation was categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor), as shown in Figure 6 below. The biodiversity assessment (GHD 2017) concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC “Sydney Turpentine Ironbark Forest”, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

Garnet Street between Dulwich Hill and Hurlstone Park stations – north side of rail line

A 0.09-hectare patch of native vegetation was mapped (GHD 2017) on the north side of the rail line, extending approximately 140 metres east from the Garnet Street overbridge. The vegetation was categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor), as shown in Figure 7. The biodiversity assessment (GHD 2017) concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC “Sydney Turpentine Ironbark Forest”, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

Moreton Street between Belmore and Lakemba stations – north side of rail line

A 0.09-hectare patch of native vegetation is mapped within the rail corridor, extending about 130 metres west from the Moreton Road overbridge (GHD 2017). This vegetation is categorised as Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – medium) and Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor) as shown in Figure 8 below. The biodiversity assessment (GHD 2017) concluded that areas of Turpentine – Grey Ironbark open forest on shale fall within the definition of the TEC Sydney Turpentine Ironbark Forest.

The assessment identified the following protected habitat types at the locations shown in Appendix C, that are subject to a design clash as a result of Project’s design.

Garnet Street between Dulwich Hill and Hurlstone Park Stations – south side of rail line

A 0.05 hectare patch of native vegetation is mapped by GHD (2017) on the south side of the rail line, extending about 97 metres east from the Garnet Street overbridge. This area of vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do

not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The installation of the CSR on the south side of the track would require the clearance of approximately 41m² of mapped PCT

Railway Parade between Lakemba and Wiley Park Stations – north side of rail line

A 0.08-hectare patch of native vegetation is mapped within the rail corridor, extending approximately 94 metres west from the area south of the intersection between Railway Parade and Alice Street North. This vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The installation of the LCR would require the clearance of approximately 72m² of PCT

6. Justification for the proposed works

Address the need for the proposed works, whether there are alternatives to the proposed works (and why these are not appropriate), and the consequences with not proceeding with the proposed work.

To permit the operation of the Sydenham to Bankstown Project, new security fencing along the length of the rail corridor must be installed. Due to the absence of drivers to react to unforeseen conditions (such as corridor intrusion by a member of the public), maintaining the integrity and security of the rail corridor is critical to maintaining safe operations. The current Sydney Trains corridor boundary fencing does not provide sufficient protection for the most part, and as such requires upgrading to anti-climb security fencing in accordance with *BS 1722:2017 “Specification for Anti-intruder fences in chain link and welded mesh”*.

In designing the alignment of security fencing, a number of design clashes with EEC or native vegetation communities as mapped in the EIS were identified. These clashes were reviewed further during the design development process. The review resulted in a number of clashes being resolved, through re-design. However, due to the constrained nature of the rail corridor, re-design was unable to resolve four residual clashes between the proposed security fencing/combined services route and the areas mapped as ‘Turpentine - Grey Ironbark open forest on shale’, ‘Degraded Turpentine - Grey Ironbark open forest on shale’ and ‘Broad-leaved Ironbark – Grey Box’ in the EIS, at the following locations:

- Challis Avenue, Between Marrickville and Dulwich Hill Stations – Security fence encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ in the EIS (2017);

- Dudley Street, between Marrickville and Dulwich Hill Stations – Security fence encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ in the EIS (2017);
- Garnet Street, between Dulwich Hill and Hurlstone Park Stations – Security fence encroaches into area mapped as ‘Degraded Turpentine - Grey Ironbark open forest on shale’ in the EIS (2017); and
- Moreton Street, between Belmore and Lakemba Stations – Security fence and combined services route encroaches into area mapped as ‘Turpentine – Grey Ironbark open forest on shale’ in the EIS (2017).

Refer to Design Clash Review: Sydney Metro Southwest Metro Design Services for an overview of these clashes.

In reviewing the mapped as ‘Turpentine - Grey Ironbark open forest on shale’, ‘Degraded Turpentine - Grey Ironbark open forest on shale’ and ‘Broad-leaved Ironbark – Grey Box’ in the EIS, it was obvious that the polygons demarcating these areas were inaccurate, with some extending out of the rail corridor onto sections of road pavement, over areas of existing Sydney Trains cleared haul roads and areas of ballasted track.

In response to these inaccuracies, Metron T2M organised site inspections of these areas by a Senior Ecologist to ground-truth the habitats present, and to confirm the accuracy of the vegetation mapping within the EIS and reflected the species composition present on-site. The Senior Ecologist conducted site inspections on 4 December 2019 and 19 December 2020 to ground truth the areas mapped as ‘Turpentine - Grey Ironbark open forest on shale’, ‘Degraded Turpentine - Grey Ironbark open forest on shale’ and ‘Broad-leaved Ironbark – Grey Box’ in the EIS at Challis Avenue, Dudley Street, Garnet Street and Moreton Street.

The site visit involved the inspection of sites within the rail corridor and sampling of patches using vegetation plots in accordance with the Framework for Biodiversity Assessment (FBA) as well as rapid assessment points. Where applicable, data collected from FBA plots was entered into the online biobanking calculator (v4.0) to review site value scores for vegetation. The results of the survey are detailed in the Design Clash Review report. Based on the findings of the inspection, a number of vegetation communities were re-classified. Refer to Appendix A for a summary of the reclassification.

Through site inspection and sampling, it can be demonstrated that the Project’s design will not impact upon vegetation mapped as ‘Turpentine - Grey Ironbark open forest on shale’, ‘Degraded Turpentine - Grey Ironbark open forest on shale’ and ‘Broad-leaved Ironbark – Grey Box’, consistent with the Approved Project. These findings also confirm that the Project’s design complies with Revised Environmental Mitigation Measure B1, which states *‘Detailed design and construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically Downy Wattle, Turpentine – Grey Ironbark open forest on shale, Degraded Turpentine – Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box’*.

Arcadis’ ecologist has drawn the same conclusion as T2M Metron. When the areas of Degraded Turpentine - Grey Ironbark open forest on shale at Garnet Street, Dulwich Hill and Railway Parade Lakemba where inspected it was found that the broad mapping undertaken within the EIS was inaccurate. As per the report within Appendix D, these areas have been remapped and have been found to not meet the criteria

for characterisation as an Endangered Ecological Community. As such the proposed design can be implemented without impacting on any EEC.

7. Environmental Benefit

Identify whether there are environmental benefits associated with the proposed works. If so, provide details:

N/A

8. Control Measures

Will a project and site specific EMP be prepared? Are appropriate control measures already identified in an existing EMP?

Construction of the corridor elements would be undertaken in accordance with the JHLOR's approved CEMP.

9. Climate Change Impacts

Is the site likely to be adversely affected by the impacts of climate change? If yes, what adaptation/mitigation measures will be incorporated into the design?

N/A

10. Impact Assessment – Construction

Attach supporting evidence in the Appendices if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	Design development was carried in the first instance out to avoid impacts to areas mapped as degraded Turpentine – Grey Ironbark open forest on shale, Turpentine – Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box. This process resulted in the avoidance of four design clashes. Where designs could not avoid these areas, ground truthing and sampling was carried out by the Metron T2M and Arcadis Senior Ecologist and confirmed that the Project's design will not impact on Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and 'Broad-leaved Ironbark – Grey Box habitats, which is consistent with the Approved Project. Refer to Appendix B for further information. Any construction impacts will continue to be managed through the implementation of JHLOR's Construction Environmental Management Plan.	No additional measures required	Y	Y	
Water	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Air quality	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Noise vibration	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Indigenous heritage	No change from the EIS and SPIR	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Non-indigenous heritage	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Community and stakeholder	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Traffic	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Waste	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Social	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Economic	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Visual	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Urban design	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Geotechnical	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Land use	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Climate Change	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Risk	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Other	No change from the EIS and SPIR	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Management and mitigation measures	The relevant mitigation measures identified in the approval documentation would continue to apply to Proposed activity.	No additional measures required.	Y	Y	

11. Impact Assessment – Operation

Attach supporting evidence in the Appendix if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Water	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Air quality	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Noise vibration	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Indigenous heritage	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Non-indigenous heritage	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Community and stakeholder	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Traffic	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Waste	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Social	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Economic	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Visual	No change from the EIS and SPIR	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Urban design	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Geotechnical	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Land use	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Climate Change	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Risk	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Other	No change from the EIS and SPIR	No additional measures required.	Y	Y	
Management and mitigation measures	No change from the EIS and SPIR	No additional measures required.	Y	Y	

12. Consistency with the Approved Project

Based on a review and understanding of the existing Approved Project and the proposed modifications, is there is a transformation of the Project?	No. The proposed works would not transform the Project. The Project would continue to provide a metro line between Sydenham and Bankstown.
Is the project as modified consistent with the objectives and functions of the Approved Project as a whole?	Yes. The proposed works would be consistent with the objectives and functions of the Approved Project.
Is the project as modified consistent with the objectives and functions of elements of the Approved Project?	Yes. The changes identified in this assessment are consistent with the objectives and functions of the Approved Project.
Are there any new environmental impacts as a result of the proposed works/modifications?	No. The Project's design does not result in any new environmental impacts beyond those considered in the Approved Project.
Is the project as modified consistent with the conditions of approval?	Yes, the Project would be consistent with the Conditions of Approval.
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed works are understood.
Are the impacts of the proposed activity/works able to be managed so as not to have an adverse impact?	Yes. The impacts of the proposed works can be managed so as to avoid an adverse impact.

13. Other Environmental Approvals

Identify all other approvals required for the project:

N/A

Author certification

To be completed by person preparing checklist.

I certify that to the best of my knowledge this Consistency Checklist:

- Examines and takes into account the fullest extent possible all matters affecting or likely to affect the environment as a result of activities associated with the Proposed Revision; and
- Examines the consistency of the Proposed Revision with the Approved Project; is accurate in all material respects and does not omit any material information.

Name:	Daniel Keegan	Signature:	
Title:	Environmental Manager		
Company:	JHLOR	Date:	21/06/21

Environmental Representative Review

(Additional step for Chatswood to Sydenham project only – if this is a CA against a Northwest Project or REF delete this table)

As an approved ER for the Sydney Metro City & Southwest project, I have reviewed the information provided in this assessment. I am satisfied that mitigation measures are adequate to minimise the impact of the proposed work.

Name:	N/A	Signature:	
Title:		Date:	

This section is for Sydney Metro only.

Application supported and submitted by

Name:	Yvette Buchli	Date:	21/06/2021
Title:	Associate Director Planning Approvals	Comments:	
Signature:			

Based on the above assessment, are the impacts and scope of the proposed activity/modification consistent with the existing Approved Project?

- Yes ☒ The proposed activity/works are consistent and no further assessment is required.
- No ☐ The proposed works/activity is not consistent with the Approved Project. A modification or a new activity approval/ consent is required. Advise Project Manager of appropriate alternative planning approvals pathway to be undertaken.

Endorsed by			
Name:	Fil Cerone	Date:	22 June 2021
Title:	Director City & Southwest, Environment, Sustainability & Planning	Comments:	
Signature:			

Appendix A – Location of identified design clashes and consolidation of habitats following ecological inspection

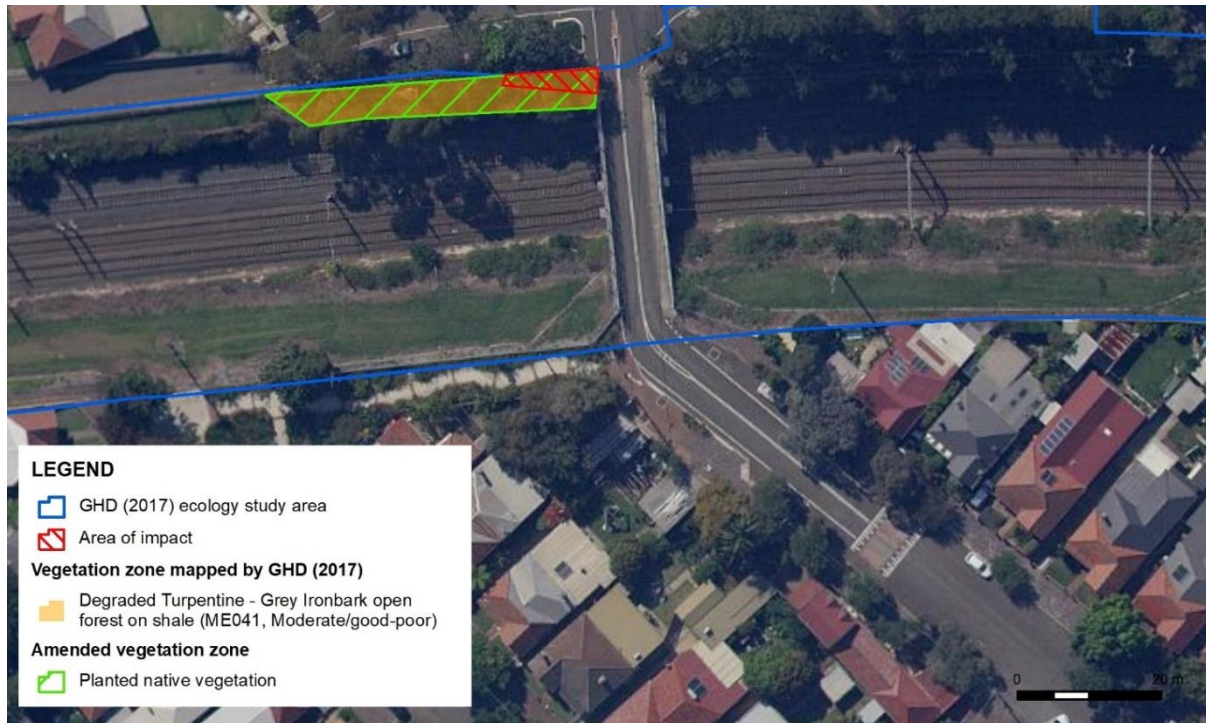


Figure 1: Amended habitat following ecological inspection at Challis Avenue



Figure 2: Amended habitat following ecological inspection at Dudley Street



Figure 3: Amended habitat following ecological inspection at Garnet Street



Figure 4: Amended habitat following ecological inspection at Moreton Street

Appendix B – Threatened Ecological Community Clash Detection Report

METRON T2M

Design clash review: Threatened Ecological Communities and Native Plant Communities

Sydney Metro Southwest Metro Design Services (SMDS)

Document No: SMCSWSWM-MTM-WEC-EM-REP-000003

Revision	Date	Suitability Code	TeamBinder Doc. Number	TB Revision
P04	25/02/202125/02/21	For coordination	SMCSWSWM-MTM-WEC-EM-REP-000003	D

Approval Record

Function	Position	Name	Date
Prepared by	Senior Ecologist	Jane Rodd	25/02/2021
Technical Checker	Environmental Compliance Manager	Jonathan Steele	25/02/2021
Reviewed by	Corridor Civil Lead	Sean Martin	25/02/2021
Coordinated by	Corridor Package Lead	George Davis	25/02/2021
Approved by	Design Manager	Luke Palmer	25/02/2021

Amendment Record

Changes made to this document since its last revision, which affect its scope or sense, are marked in the right margin by a vertical bar (|).

Date	Rev	Amendment Description	By
31/03/20	P01	Issued for Review	J. Steele
18/05/20	P02	Updated to address comments & optimise option 4	J. Steele
02/10/2020	P03	Update to address comments	J. Steele
25/02/2021	P04	Update to include Moreton Street	J.Steele/J.Rodd

Information Class: Standard

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Executive summary

A review of the Stage 2 design in November 2019 identified nine clashes in eight locations within the Metron T2M study area where design clashed with areas mapped as Threatened Ecological Communities (TECs) or native Plant Community Types (PCTs). Revised Environmental Mitigation Measure (REMM) B1 requires design to avoid direct impact to TEC and PCTs, and where this cannot be achieved Condition of Approval (CoA) E3 applies.

This document sets out Metron T2M's approach to comply with REMM B1 for the identified clashes. This has involved a three-step clash resolution process as summarised below:

1. Preliminary redesign review for easily avoided clashes
2. Site assessment to ground truth the accuracy of the mapping of TEC/PCT (including the extent, nature of, condition of, etc.) in the Technical Paper 9 - Biodiversity Assessment Report prepared by GHD (2017) to understand whether it has changed over time and to confirm whether there is a clash
3. Undertake a detailed review of design options where compliance with B1 is not straightforward to achieve due to other factors (e.g. clashes with other infrastructure).

This process has resulted in removing all TEC clashes.

Four clashes were removed through local containment route (LCR)/combined services route (CSR) design being realigned to avoid the mapped TEC and *Acacia pubescens*.

PCT mapping was originally undertaken during the EIS development in 2017. This mapping was updated to reflect the current condition of the PCT areas within the rail corridor following additional ground truthing, conducted by an ecologist in 2019 and 2020. This revised mapping has resulted in the removal of four clashes. A multi-criteria analysis (MCA) was completed for a fence line clash at South Terrace, Bankstown (~18km Sydney Metro Chainage, near Gardenia Avenue and Carnation Avenue), which could not be removed through preliminary redesign review or ground truthing. The MCA resulted in the realignment of the fence line close to the railway. This option removes the TEC clash, does not impact the road safety, does not impact the community and does not require land acquisition and boundary change.

This option does increase the construction complexity requiring a possession and this will reduce maintenance access for Sydney Trains.

Therefore, to minimise impacts to Sydney Trains Operations and remove any TEC clash from the fencing upgrade, the following measures are recommended:

- Staged installation of the new fence (~275m):
 - Posts installed during interim state – Sydney Trains Operations
 - Panels installed during end state – Sydney Metro Operations
- Supervision of fencing works by a qualified and experienced ecologist.

Please see Appendix A for more detail.

Contents

1. Introduction	5
2. Methodology.....	6
2.1 Redesign review	7
2.2 Ground truth survey	7
2.3 Clash MCA	7
3. Clash identification.....	8
3.1 Threatened ecological communities/native plant community types	8
3.2 Clashes	9
4. Clash analysis	15
4.1 Challis Avenue between Marrickville and Dulwich Hill stations – north side of rail line	15
4.2 Dudley Street between Marrickville and Dulwich Hill stations – south side of rail line	18
4.3 Garnet Street between Dulwich Hill and Hurlstone Park stations – both sides of rail line	22
4.4 Railway Parade between Lakemba and Wiley Park stations – north side of rail line	26
4.5 Breust Place, west of Punchbowl station – north side of rail line	27
4.6 South Terrace, west of Punchbowl station – south side of rail line	28
4.7 South Terrace, east of Bankstown station – south side of rail line	29
4.8 Moreton Street, between Belmore and Lakemba stations – north side of rail line	34
5. Conclusion	39
Appendix A. Multi-criteria analysis: fencing options at South Terrace, Bankstown.....	41

1. Introduction

A review of the Stage 2 design in November 2019 identified nine clashes in eight locations within the Metron T2M study area where design clashed with areas mapped as Threatened Ecological Communities (TECs) or native Plant Community Types (PCTs). The TEC and PCT areas were mapped in the Technical Paper 9 - Biodiversity Assessment Report prepared by GHD (2017), that is part of the Transport for New South Wales Sydney Metro City & Southwest Sydenham to Bankstown Upgrade Environmental Impact Statement.

Revised Environmental Mitigation Measure (REMM) B1 (TfNSW Sydney Metro City and Southwest - Sydenham to Bankstown Upgrade - Submissions Report, Appendix C) requires design to avoid direct impact to TEC and PCTs:

Detailed design and construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box.

In accordance with CoA E3, if impacts cannot be avoided, they must be offset:

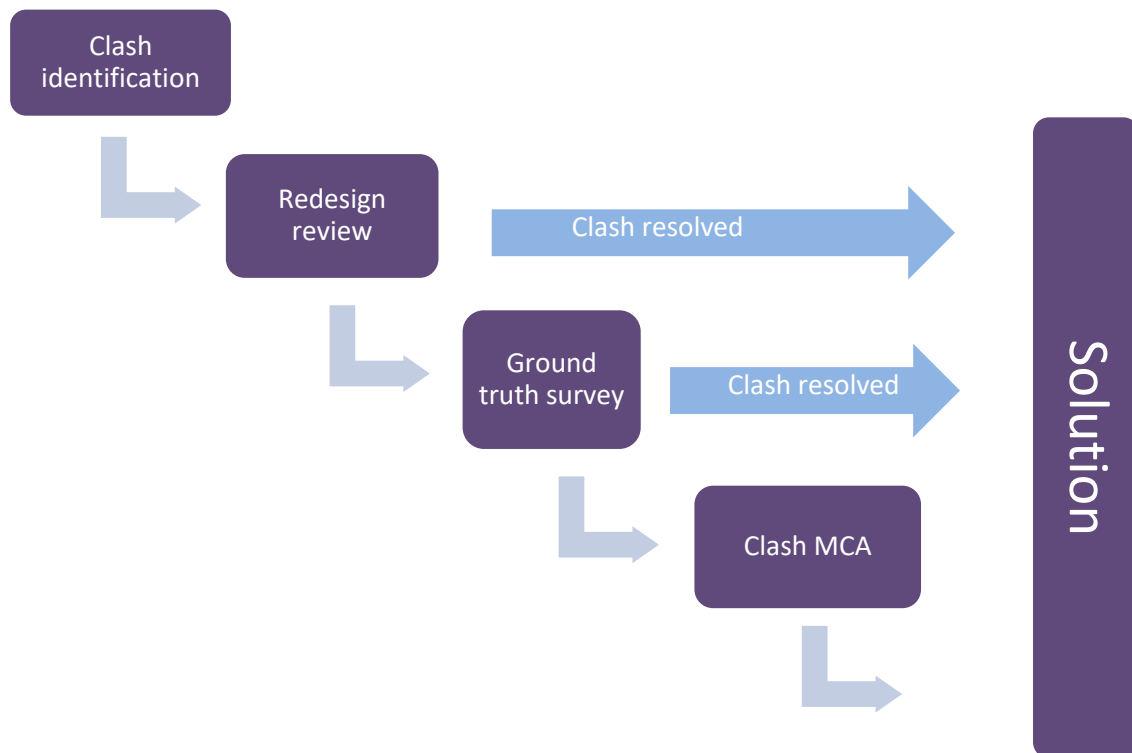
Where impacts to threatened ecological communities or endangered species cannot be avoided, they must be offset in accordance with the requirements of the NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014) in agreement with OEH.

This document sets out Metron T2M's approach to comply with REMM B1 and CoA E3 for the identified clashes. This has involved a three-step clash resolution process as detailed in Section 2.

2. Methodology

Figure 2-1 provides a flow chart showing the clash resolution process. Subsequent steps would be excluded following resolution of a clash.

Figure 2-1: Process for clash resolution



2.1 Redesign review

Design teams reviewed the possibility for realignment of the design element that is clashing with the TECs/PCTs.

2.2 Ground truth survey

The biodiversity value of the clash locations was reviewed by a senior ecologist to check the extent of the TEC/PCT compared with those identified in the Technical Paper 9 - Biodiversity Assessment Report prepared by GHD (2017). The review comprised the following tasks:

- Review of biodiversity assessment and mapping prepared by GHD (2017) to support the project EIS
- Review of current and historical aerial photographs to determine the current and historical extents of vegetation on each site.
- Inspection of sites from outside the rail corridor fence. Site inspections were conducted by Jane Rodd, Senior Ecologist, on 4 December 2019. Mapping updates were only made where areas of vegetation were sufficiently visible to ensure accurate identification of vegetation communities and their condition.
- Inspection of sites within the rail corridor and sampling of patches using vegetation plots in accordance with the Framework for Biodiversity Assessment (FBA) as well as rapid assessment points. Site surveys were conducted by Jane Rodd, Senior Ecologist, on 19 December 2020.
- Comparison of site inspection results with biodiversity mapping and, where applicable, final determinations for TECs/PCTs.
- Where applicable, data collected from FBA plots was entered into the online Biobanking calculator (v4.0) to review site value scores for vegetation.

2.3 Clash MCA

To determine the optimal resolution to a residual clash, a multi-criteria analysis (MCA) was conducted. The MCA considered five options for addressing the clash against six different criteria:

1. Biodiversity
2. Road safety impacts
3. Constructability
4. Property ownership/ Maintenance
5. Stakeholders
6. Community impacts

The criteria were weighted with respect to the above order and meaning that biodiversity impacts were given the highest weighting.

3. Clash identification

3.1 Threatened ecological communities/native plant community types

Technical Paper 9 - Biodiversity Assessment Report prepared by GHD (2017) mapped two PCTs in the project study area, both of which are listed as TECs under the *Threatened Species Conservation Act 1995* (which has been subsequently repealed and replaced by the *Biodiversity Conservation Act 2016* (BC Act)) (Table 3-1).

Table 3-1: PCTs and corresponding TECs mapped in the project study area by GHD (2017)

Mapped PCT	Corresponding TEC
Turpentine - Grey Ironbark open forest on shale (PCT 1281)	Areas in moderate/good – medium condition comprise an occurrence of Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (critically endangered, BC Act). Areas in moderate/good – poor condition do not comprise an occurrence of Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion or any other TEC.
Broad-leaved Ironbark - Grey Box - <i>Melaleuca decora</i> grassy open forest (PCT 724)	Areas in moderate/good – medium condition comprise an occurrence of Shale gravel transition forest in the Sydney Basin Bioregion (endangered, BC Act)

Areas of Degraded Turpentine – Grey Ironbark open forest on shale are not considered by GHD (2017) to fall within the definition of the TEC Sydney Turpentine-Ironbark Forest because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The areas that have been mapped as Broad-leaved Ironbark - Grey Box - *Melaleuca decora* grassy open forest are generally dominated by a canopy of planted, non-local native trees, or do not support a tree canopy, but native and exotic shrubs. These areas have been assigned to PCT 724, and the TEC Shale gravel transition forest in the Sydney Basin Bioregion, by GHD (2017) due to clause 8 of the final determination for the TEC which states:

8. *Disturbed Shale Gravel Transition Forest remnants are considered to form part of the community including where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact.*

The presence of scattered local native shrubs and grasses in patches identified as this TEC, even though species diversity is low, is an indicator that the natural soil and seedbank is partially intact. As such, the condition threshold for meeting the description of this TEC is very low.


None of the vegetation recorded in the study area meets the criteria for any TECs listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (GHD., 2017).

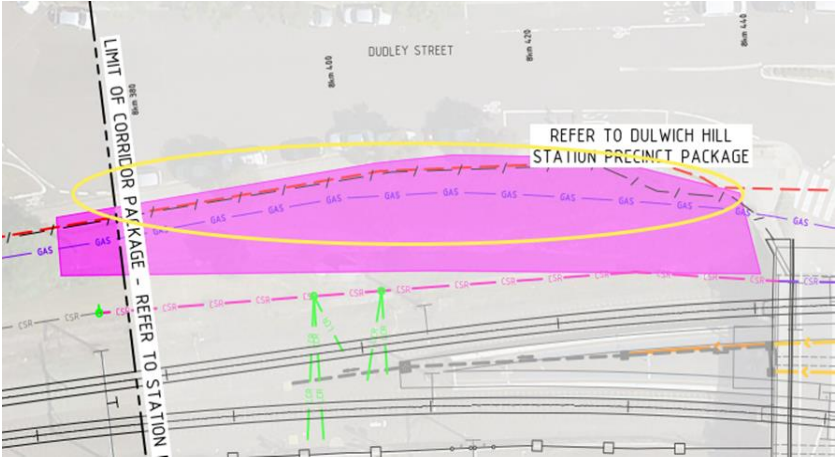
One threatened flora species, *Acacia pubescens* (Downy Wattle) was recorded by GHD (2017) in the study area. This species is listed as Vulnerable under the EPBC Act and the BC Act. A total of about 654 stems of *Acacia pubescens* were recorded in the study area, with most recorded in areas mapped as Broad-leaved Ironbark - Grey Box - *Melaleuca decora* grassy open forest.


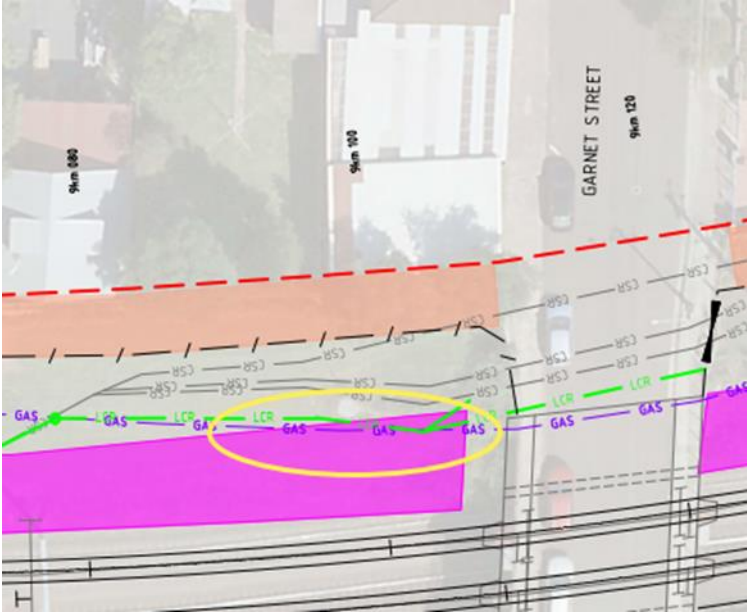
3.2 Clashes

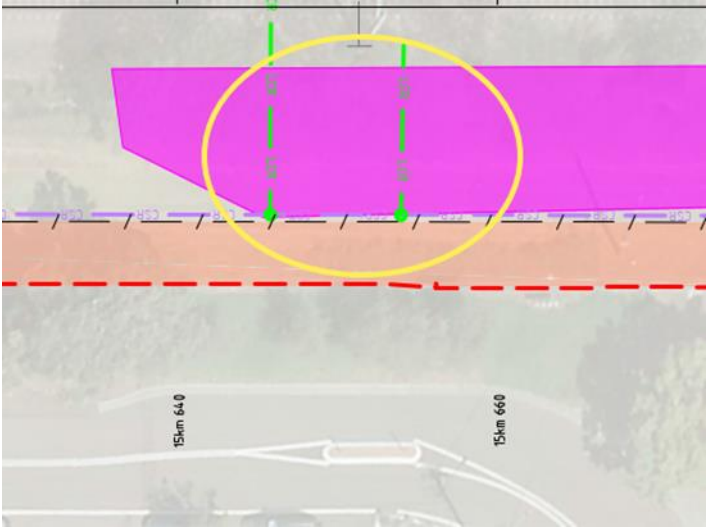

A review of the Stage 2 design in November 2019 identified eight locations within the Metron T2M study area where design clashed with areas mapped as TEC/PCT. Table 3-2 summarises the details and location of the identified clashes.

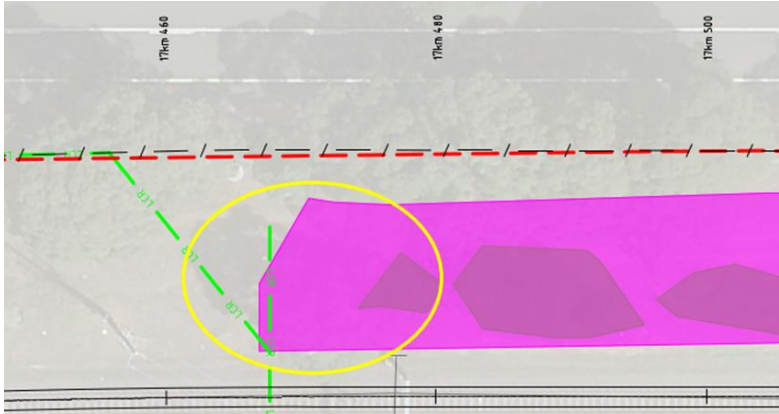

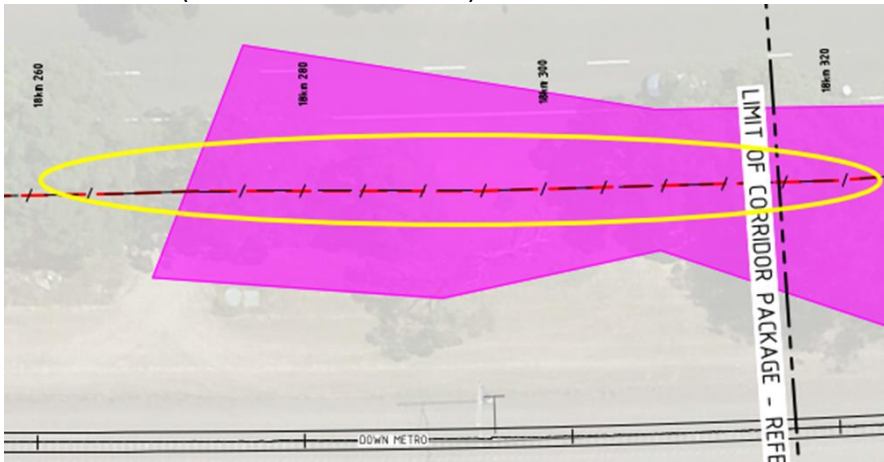
Table 3-2: Summary of clashes with TEC

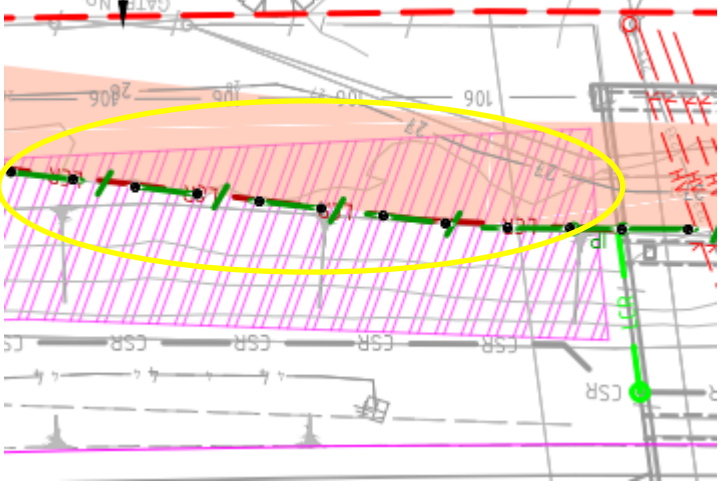
Location	Details of clash
Challis Avenue between Marrickville and Dulwich Hill stations – north side of rail line	<p>New fence encroaches into PCT (8km-100 to 8km-150).</p>  <p>[Key: PCT– purple, fence – black dash]</p>

Location	Details of clash
<p>Dudley Street between Marrickville and Dulwich Hill stations – south side of rail line</p>	<p>New fence encroaches into PCT (8km-370 to 8km-440).</p>  <p>[Key: PCT – purple, fence – black dash]</p>

Location	Details of clash
Garnet Street between Dulwich Hill and Hurlstone Park stations – both sides of rail line	<p>To north of rail line - New fence encroaches into PCT, following existing fence line (8km-960 to 9km-100)</p>  <p>[Key: TEC – purple, fence – black dash]</p> <p>To south of rail line – local communications route (LCR) encroaches into PCT (9km-080 to 9km-100):</p>  <p>[Key: TEC – purple]</p>

Location	Details of clash
Railway Parade between Lakemba and Wiley Park stations – north side of rail line	<p>LCR clashes with PCT (eastern section of patch) (15km-640 to 15km-660).</p>  <p>[Key: TEC – purple]</p>
Breust Pl, west of Punchbowl station – north side of rail line	<p>CSR and LCR clash with TEC (17km-180 to 17km-260).</p>  <p>[Key: TEC – purple]</p>

Location	Details of clash
South Terrace, west of Punchbowl station – south side of rail line	<p>LCR encroaches into TEC (17km-470 to 17km-475):</p>  <p>[Key: TEC – purple]</p>
South Terrace, east of Bankstown station – south side of rail line	<p>New fence encroaches into TEC, following existing fence line. Eastern clash (18km030 to 18km-340):</p>  <p>[Key: TEC – purple, fence – black dash]</p> <p>Western clash (18km-270 to 18km-340):</p>  <p>[Key: TEC – purple, fence – black dash]</p>

Location	Details of clash
Moreton Street, between Belmore and Lakemba stations – north side of rail line	<p>New fence and LCR clash with TEC (14km-530 to 14km-660).</p>  <p>[Key: TEC – purple hatch Fence – green dash LCR – red dash]</p>

4. Clash analysis

4.1 Challis Avenue between Marrickville and Dulwich Hill stations – north side of rail line

4.1.1 Clash impact

A 0.02-hectare patch of PCT is mapped within the rail corridor, extending approximately 45 metres west from the Albermarle Street overbridge. This vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment (GHD 2017) concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The fence line clash would require the clearing of approximately 31m² of the PCT, as shown in Figure 4-1.

Figure 4-1: Challis Avenue - area of clash



4.1.2 Redesign review

Realignment – trackside – The width of the PCT at this location would preclude realigning the fence trackside.

Realignment – roadside - Moving the fence alignment to the roadside - outside the current project boundary – would require purchase of council land. The proximity of the realigned fence to Challis Avenue could also create a traffic safety issue.

4.1.3 Ground truth survey

4.1.3.1 Historical aerial photography

The 1943 aerial photograph shows this area appears to be largely cleared, with some small trees or shrubs growing on the rail batter slope, as inferred from shadows visible immediately to the south of the mapped patch. In comparison, the most recent aerial photograph shows dense vegetation across the site including larger tree crowns. Both aerial photographs are shown in Figure 4-2.

Figure 4-2: Challis Avenue - 1943 historical photo and current aerial photo



Department of Finance, Services & Innovation (2018) SKM Sydney 1943 orthorectified black and white aerial imagery

4.1.3.2 Site walkover

The patch of vegetation was sampled with a rapid assessment point (R5). The vegetation observed on site consists of scattered small trees and shrubs over a disturbed grassy ground layer. Trees and shrubs within the rail corridor are mainly native species, including *Allocasuarina littoralis* (Forest She-oak), *Acacia parramattensis* (Sydney Green Wattle), *Casuarina glauca* (Swamp Oak), *Melaleuca*

nodosa (Prickly-leaved Paperbark), *Callistemon viminalis* (Weeping Bottlebrush), *Brachychiton acerifolius* (Flame Tree) and the non-local native *Grevillea robusta* (Silky Oak). One small tree of the non-local native species *Corymbia ficifolia* (Red Flowering Gum) occurs in the east of the patch, and a larger tree of *Eucalyptus saligna* (Sydney Blue Gum) is growing in the western extent of the patch. The exotic tree and shrub species *Celtis sp.*, *Olea europaea* subsp. *cuspidata* (African Olive) and *Lantana camara* are also present.

The ground layer is dominated by exotic grasses such as *Avena sp.* (Oats), *Ehrharta erecta* (Panic Veldtgrass) and *Bromus catharticus* (Prairie Grass), with weedy herbs such as *Brassica sp.* and *Bidens pilosa* (Cobblers Pegs) and vines such as *Araujia sericifera* (Mothvine) and *Anredera cordifolia* (Madeira Vine) frequently occurring. Two tussocks of the native grass species *Cymbopogon refractus* (Barbed Wire Grass) were observed in the central eastern part of the patch.

Figure 4-3: Challis Avenue site photos



Scattered shrubs over disturbed groundcover



Scattered shrubs over disturbed groundcover

The mapped patch comprises native shrubs and small trees, most of which are likely to have been planted, over a sparse exotic ground layer. Some shrubs may have regenerated naturally, however given the mixture of native shrub species observed and the absence of native groundcover species across most of the patch, this is unlikely.

Only one of the native shrub species observed (*Acacia parramattensis*) is characteristic of the mapped PCT (Turpentine – Grey Ironbark open forest on shale (ME041)), and there are no characteristic ground cover species present. The planted native vegetation on this site is not consistent with the PCT and therefore the classification of this vegetation has been revised to planted native vegetation, which has removed the clash.

Figure 4-4: Challis Avenue – revised mapping



The remapping of the habitat has removed the clash, and the fence line design is compliant with REMM B1. Undertaking a clash MCA is not considered necessary.

4.2 Dudley Street between Marrickville and Dulwich Hill stations – south side of rail line

4.2.1 Clash impact

A 0.06-hectare patch of PCT is mapped within the rail corridor, extending approximately 72 metres east from the Wardell Road overbridge. This vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment (GHD 2017) concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The fence line clash would require the clearing of approximately 84m² of the PCT, as shown in Figure 4-5.

Figure 4-5: Dudley Street - area of clash



4.2.2 Redesign review

Realignment – trackside – The width of the PCT at this location would preclude realigning the fence trackside. Gas pipes and CSR would also constrain the potential for realignment.

Realignment – roadside - Moving the fence alignment to the roadside - outside the current project boundary – would require purchase of council land. The adjacent shared pathway would preclude movement of the fence line roadside.

4.2.3 Ground truth survey

4.2.3.1 Historical aerial photography

The 1943 aerial photograph shows this area is largely cleared, with a few small trees or shrubs visible, as shown in Figure 4-6. The current aerial photograph shows the site remains cleared, with one small tree visible in the east.

Figure 4-6: Dudley Street – 1943 historical photo and current aerial photo



Department of Finance, Services & Innovation (2018) SKM Sydney 1943 orthorectified black and white aerial imagery

4.2.3.2 Site walkover

The patch of vegetation was sampled with a rapid assessment point (R4). The vegetation consists of patches of native grass cover interspersed with weedy exotic shrubs, grasses, and herbs. There are several large patches of native grasses, dominated by *Themeda triandra* (Kangaroo Grass), with *Rytidosperma tenuius* (Wallaby Grass) and *Dichelachne micrantha* (Shorthair Plumegrass) also common.

The area within about 20 metres of the Wardell Street overbridge is disturbed compared with areas further east, with high abundance of weedy exotic species such as *Foeniculum vulgare* (Fennel) and *Sida rhombifolia* (Paddys Lucerne). Grasses in this western section of the patch include the widely planted cosmopolitan native species *Cynodon dactylon* (Couch), *Paspalum dilatatum* (Paspalum) and *Sorghum leiocladum* (Johnson Grass). Some *Lantana camara* (Lantana) is also present.

Further in the east of the patch there is mixed occurrence of native grasses and weedy exotic species. Although trees are largely absent from the patch, there are isolated individuals of the native species *Pittosporum undulatum* (Sweet Pittosporum) and the exotic *Cinnamomum camphora* (Camphor Laurel). There are planted trees of the non-local native species *Lophostemon confertus* (Brush Box) in the rail corridor to the east of the patch.

Figure 4-7: Dudley Street site photos



Native grass dominance in east of patch



Exotic dominance in west of patch

The mapped patch comprises patches of native grass interspersed with weedy exotic shrubs, grasses, and herbs. The western 20 metres of this patch does not appear to be native vegetation, with exotic species dominant. It is possible that the native grass in the central and eastern parts of the patch has been planted, but it may have regenerated from retained soils on the site. The native grassland is considered significant given that it is likely to be one of the only patches of native grass in the locality and is used by Council as a seed collection site. A 1-2 metre strip along the southern boundary of the patch is pavement outside the fenced area.

The mapping has been amended to exotic grassland in the western 0.01 hectares of the patch and pavement in the southern 61 square metres of the patch, with 0.05 hectares of Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor) in the east of the patch. The mapped area of grassland includes an approximately five metre buffer around the area observed as native grassland during site inspections. The buffer has been applied to safeguard the integrity of the native grassland, which is a native grassland seed collection point, used by the Inner West Council.

As previously identified by GHD (2017), Degraded Turpentine – Grey Ironbark open forest on shale does not comprise an occurrence of the TEC Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion, as it does not have an open forest or woodland structure and does not contain the characteristic tree species as listed in the final determination. The reclassification of the exotic dominated areas in the west of the patch and the pavement along the southern edge of the patch has removed the clash. The existing fence is largely downslope of the area of native grass cover, and direct impacts on the area of native vegetation as a result of the fence replacement would be negligible.

Figure 4-8: Dudley Street – revised mapping



The remapping of the habitat has removed the clash, and the fence line design is compliant with REMM B1. Undertaking a clash MCA is not considered necessary.

4.3 Garnet Street between Dulwich Hill and Hurlstone Park stations – both sides of rail line

4.3.1 Clash impact

A 0.09-hectare patch of native vegetation is mapped on the north side of the rail line, extending approximately 140 metres east from the Garnet Street overbridge. Another patch is mapped to the south of the rail line, extending about 97 metres east from the Garnet Street overbridge.

Both areas of vegetation are categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The installation of the fence along the north of the rail line could result in direct impacts to the northern edge of the PCT; these would be minor, extending less than a metre in width, and require clearance of up to 93 m² of vegetation. The installation of the LCR on the south side of the track would require the clearance of approximately 10m² of PCT. The areas of impact are shown in Figure 4-9.

Figure 4-9: Garnet Street - area of impact



4.3.2 Redesign review

Fence realignment (north side) – trackside – The width of the PCT at this location would preclude realigning the fence trackside.

Fence realignment (north side) – roadside - Moving the fence alignment to the roadside - outside the current project boundary – would require purchase of council land. The proximity of the realigned fence to The Parade could also create a traffic safety issue and could result in the loss of community off-road car parking.

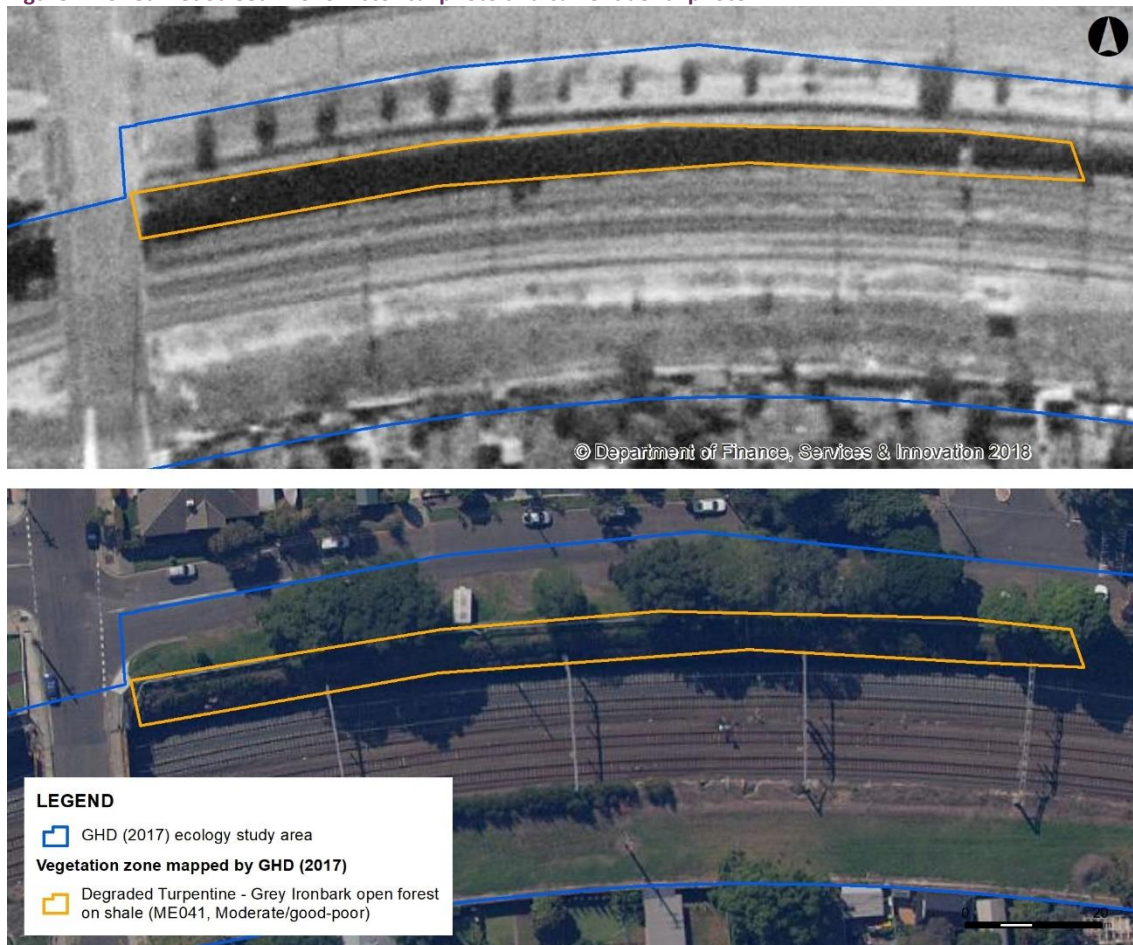
LCR realignment – the LCR was realigned to avoid the mapped PCT.

4.3.3 Ground truth survey

4.3.3.1 Historical aerial photography

The 1943 aerial photograph shows the site as largely in shadow, with possible shrub cover present. A row of small tree crowns is visible to the north of the site. The current aerial photograph shows the site also largely in shadow, with some areas visibly cleared. There are larger tree crowns overlapping the northern edge of the site. The aerial photographs are shown in Figure 4-10.

Figure 4-10: Garnet Street – 1943 historical photo and current aerial photo



Department of Finance, Services & Innovation (2018) SKM Sydney 1943 orthorectified black and white aerial imagery

4.3.3.2 Site walkover

The mapped patch on the north side of the rail line consists of a slope with dense cover of exotic species including *Foeniculum vulgare* (Fennel), *Cestrum parqui* (Green Cestrum), *Rubus anglocandicans* (Blackberry), *Ageratina adenophora* (Crofton Weed), *Chloris gayana* (Rhodes Grass), *Cenchrus clandestinum* (Kikuyu) and *Araujia sericifera* (Mothvine). A row of mature *Ficus* sp. (Figs) are planted in the road verge outside the rail corridor to the north of the mapped patch.

Figure 4-11: Garnet Street site photos



Exotic vegetation on north side of rail line



Exotic vegetation on north side of rail line

The mapped patch comprises exotic shrubs, grasses, and herbs. It is possible that a native ground layer component is present, however no native species were observed within the area inspected. This vegetation is not considered to be consistent with Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor), as mapped by GHD (2017), or any other PCT. The classification of this entire 0.09 ha patch of vegetation has been revised to Exotic scrub or forest (Figure 4-12), which has removed the clash.

Figure 4-12: Garnet Street – revised mapping



The remapping of the vegetation has removed the fence clashes, and the design is compliant with REMM B1. Undertaking a clash MCA is not considered necessary.

4.4 Railway Parade between Lakemba and Wiley Park stations – north side of rail line

4.4.1 Clash impact

A 0.08-hectare patch of native vegetation is mapped within the rail corridor, extending approximately 94 metres west from the area south of the intersection between Railway Parade and Alice Street North. This vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The installation of the LCR would require the clearance of approximately 72m² of PCT as shown in Figure 4-13.

Figure 4-13: Railway Parade - area of clash



4.4.2 Redesign review

LCR realignment – the LCR was realigned to avoid the mapped PCT. No further clash resolution is required.

4.5 Breust Place, west of Punchbowl station – north side of rail line

4.5.1 Clash impact

A 0.06-hectare patch of native vegetation is mapped within the rail corridor, extending approximately 95 metres west from the area south of Breust Place. This vegetation is categorised as Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest (ME004, Moderate/good). The biodiversity assessment concluded that areas of Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest fall within the definition of the TEC Shale/gravel Transition Forest.

A total of 0.005 hectares of occupied habitat for the threatened flora species *Acacia pubescens* (Downy Wattle) are mapped within the patch, as well as 20 individual stems.

The installation of the CSR and LCR would require the clearance of approximately 248m² of TEC, as well as impacting three stands of *Acacia pubescens*, as shown in Figure 4-14.

Figure 4-14: Breust Place – area of clash



4.5.2 Redesign review

LCR and CSR realignment – the LCR and CSR were realigned to avoid the mapped TEC and *Acacia pubescens*. No further clash resolution is required.

4.6 South Terrace, west of Punchbowl station – south side of rail line

4.6.1 Clash impact

A 0.13-hectare patch of native vegetation is mapped within the rail corridor, west of Punchbowl station, comprising a 138-metre-long strip. This vegetation is categorised as Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest (ME004, Moderate/good). The biodiversity assessment concluded that areas of Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest fall within the definition of the TEC Shale/gravel Transition Forest.

A total of 0.05 hectares of occupied habitat for the threatened flora species *Acacia pubescens* (Downy Wattle) are mapped within the patch, as well as one isolated individual.

The installation of the LCR would require the clearance of approximately 22m² of TEC, as shown in Figure 4-15.

Figure 4-15: South Terrace (west of Punchbowl) – area of clash



4.6.2 Redesign review

LCR realignment – the LCR was realigned to avoid the mapped TEC. No further clash resolution is required.

4.7 South Terrace, east of Bankstown station – south side of rail line

4.7.1 Clash impact

Two patches of native vegetation are mapped within the rail corridor to the north-east of South Terrace: one 95-metre-long strip of 0.14 hectares and a 185-metre-long strip of 0.4 hectares. This vegetation is categorised as Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest (ME004, Moderate/good). The biodiversity assessment concluded that areas of Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest fall within the definition of the threatened ecological community (TEC) Shale/gravel Transition Forest.

A 0.004-hectare patch of occupied habitat for the threatened flora species *Acacia pubescens* (Downy Wattle) is mapped within the patch.

The installation of the fence, assuming a three-metre-wide footprint, would require the minimum clearance of approximately 835m² of TEC, as shown in Figure 4-16.

Figure 4-16: South Terrace (east of Bankstown Station) - area of clash



4.7.2 Redesign review

Realignment – trackside – The south-eastern patch of the TEC is wide, terminating close to the rail track. Its proximity could preclude the re-alignment of the fence trackside.

Realignment – roadside – The width of the TEC at this location would preclude realigning the fence roadside.

4.7.3 Ground truth survey

4.7.3.1 Historical aerial photography

The 1943 aerial photograph (Figure 4-17) shows this area is partly cleared road reserve and partly cleared grassland, with a row of planted trees visible along the fence line. The current photo shows dense cover of tree crowns across most of the site.

Figure 4-17: South Terrace – 1943 historical photo and current aerial photo



Department of Finance, Services & Innovation (2018) SKM Sydney 1943 orthorectified black and white aerial imagery

4.7.3.2 Site walkover

The north-western patch was sampled with a rapid assessment point (R1) and consists of a few trees of the local native species *Eucalyptus fibrosa* (Red Ironbark) and the local native shrubs *Melaleuca nodosa* (Prickly-leaved Paperbark), *Acacia decurrens* (Black Wattle), *Polyscias sambucifolia* (Elderberry Panax) and *Bursaria spinosa* (Blackthorn). Most of the trees were located immediately adjacent to the existing fence. The ground layer was mainly comprised of leaf litter, and was observed to support exotic grasses including *Ehrharta erecta* (Panic Veldtgrass) and *Chloris gayana* (Rhodes Grass), with some small patches of the native grass *Rytidosperma tenuius* around the bases of trees and shrubs. The ground layer around the trees appeared to be regularly mown. In the south-east of this patch are planted mature trees of the non-local native species *Eucalyptus camaldulensis* (River Red Gum) and *Eucalyptus microcorys* (Tallowwood) with some *Acacia longifolia* (Sydney Golden Wattle) and weedy grass in the understorey.

The south-eastern patch was sampled with an FBA quadrat (Q1) and is dominated by planted trees of the non-local native species *Eucalyptus microcorys*, with occasional occurrence of *Eucalyptus camaldulensis*, *Eucalyptus saligna* (Sydney Blue Gum), *Corymbia citriodora* (Lemon Scented Gum) and *Lophostemon confertus* (Brush Box). There is one tree of the local native species *Syncarpia glomulifera* (Turpentine) at the south-eastern extent of the patch. Along the south-western boundary of the patch, between the fence line and the road edge, is a row of mature trees of *Eucalyptus microcorys*, likely the small trees visible on the 1943 aerial photo (Figure 4-17). There are native shrubs scattered throughout the patch, including *Pittosporum undulatum* (Sweet Pittosporum), which is particularly abundant in the south-east of the patch, *Acacia longifolia*, *Melaleuca nodosa*, *Daviesia ulicifolia* (Gorse Bitter Pea) and *Allocasuarina littoralis* (Forest She-oak).

The ground layer is generally sparse and is dominated by exotic grasses across most of the patch, including *Ehrharta erecta*, *Eragrostis curvula*, *Setaria parviflora*, *Dietes grandiflora* (Fortnight Lily) and *Freesia* sp. Native grasses and graminoids were frequently observed, mainly in patches, including *Rytidosperma tenuius*, *Cymbopogon refractus*, *Lomandra longifolia* (Spiny-headed Mat-rush), *Entolasia stricta* (Wiregrass) and *Austrostipa* sp.

The patch of *Acacia pubescens* in the south-east of this area was observed to be in approximately the same location as mapped by GHD (2017). There is an existing haul road intersecting the south-eastern patch; the road is a cleared dirt track with exotic grasses growing along the edges and central strip.

Figure 4-18: South Terrace site photos



Trees of *Eucalyptus fibrosa* in north-western patch



Northern extent of south-eastern patch; existing haul road visible on left

GHD (2017) calculated a site value score of 38.54 for areas of vegetation mapped as Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest (ME004, Moderate/good), using data collected from two locations, including South Terrace, in 2016. Assessment of data collected from the patch at South Terrace in 2020 calculated a site value score of 33.16, which is above the FBA offset threshold for threatened ecological communities.

The smaller mapped patch in the north-west is consistent with the GHD (2017) mapping of Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest (ME004, Moderate/good), and the TEC Shale/gravel transition forest, excepting the area of planted trees and exotic ground layer in the south-east of this patch. The mapping has been amended to include only areas with substantial native ground cover.

The larger patch in the south-east is dominated by planted non-local native trees, mainly *Eucalyptus microcorys* (Tallowwood), with two large trees of the local native species *Eucalyptus saligna* that are likely to have been planted. There is a native shrub layer and mixed ground layer with some patches dominated by exotic species, and others with abundant native ground cover species present. This vegetation loosely meets the criteria for the TEC Shale/gravel transition forest, but only due to the presence of scattered shrub and grass elements. The mapping has been amended to exclude exotic-

dominated areas, planted native vegetation and the existing haul road (Figure 4-19). The fence line clash with the TEC remains.

Figure 4-19: South Terrace – revised mapping



4.7.4 Clash MCA

The installation of the new fence along the existing alignment would result in disturbance of some areas of TEC along South Terrace. This disturbance would form a direct impact to the TEC.

To determine the optimal resolution to the clash, a Multi-Criteria Analysis (MCA) has been conducted (Appendix A). The MCA considered five options for addressing the clash against six different criteria; the criteria were weighted, with biodiversity impacts given the highest weighting. The impacts of each option on the TEC are analysed in Table 4-1.

Table 4-1: Impact of each fencing option on areas of TEC

Option	Impacts
Option 1: Keep the existing fence alignment	Some parts of the shrub and ground layer at the edge of the TEC would be subject to minor and temporary disturbance because of this option. No trees that are characteristic of the TEC would be removed or impinged upon, if footings are micrositied in the northern patch of TEC.
Option 2: Move the fence alignment to between roadside trees and TEC	Some parts of the shrub and ground layer at the edge of the TEC would be subject to minor and temporary disturbance because of this option; there is a smaller area of impact than in Option 1. No trees that are characteristic of the TEC would be removed or impinged upon, if footings are micrositied in the northern patch of TEC.
Option 3: Move the fence alignment to the kerb line	There would be <u>no impacts</u> to areas mapped as TEC.
Option 4: Move the fence alignment to the rail track edge	There would be <u>no impacts</u> to areas mapped as TEC.
Option 5: Do nothing – leave existing fence in place	There would be <u>no impacts</u> to areas mapped as TEC.

The MCA found that Option 4 is the best scoring solution due to the following:

- Removes the TEC clash
- Does not impact the road safety
- Does not impact the community
- Does not require land acquisition and boundary change

However, option 4 increases the construction complexity, requiring a possession, and will reduce maintenance access for Sydney Trains. Therefore to minimise impacts to Sydney Trains Operations and remove any TEC clash from the fencing upgrade, the following measures are recommended:

- Staged installation of the new fence (~275m):
 - Posts installed during interim state – Sydney Trains Operations
 - Panels installed during end state – Sydney Metro Operations
- Supervision of fencing works by a qualified and experienced ecologist.

4.8 Moreton Street, between Belmore and Lakemba stations – north side of rail line

4.8.1 Clash impact

A 0.09-hectare patch of native vegetation is mapped within the rail corridor, extending about 130 metres west from the Moreton Street overbridge. This vegetation is categorised as Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – medium). The biodiversity assessment concluded that areas of Turpentine – Grey Ironbark open forest on shale fall within the definition of the TEC Sydney Turpentine Ironbark Forest.

The installation of the fence and LCR, assuming a three-metre-wide footprint, would require the minimum clearance of approximately 64.55m² of TEC. These impacts are shown below in Figure 4-20.

Figure 4-20: Moreton Street (between Belmore and Lakemba stations) - area of clash



4.8.2 Redesign review

Realignment – trackside – The width and length of the habitat at this location would preclude realigning the fence or LCR trackside.

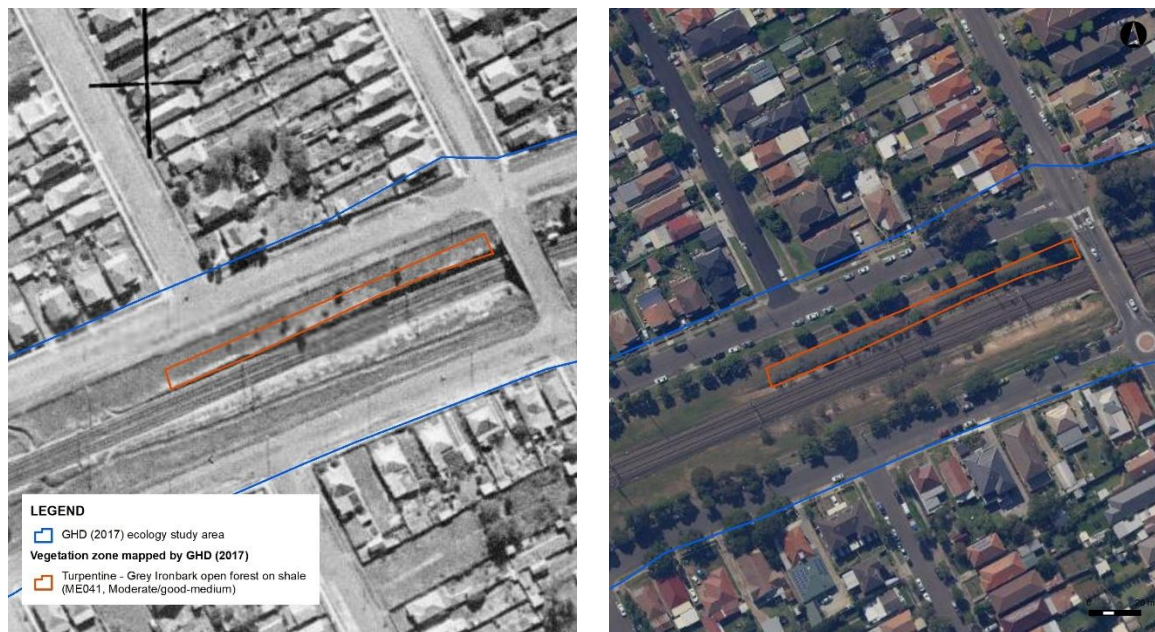
Realignment – roadside - Moving the fence and LCR alignment to the roadside would impact the space available for the adjacent shared pathway (to be constructed), precluding movement of the fence and LCR roadside.

4.8.3 Ground truth survey

4.8.3.1 Historical aerial photography

The 1943 aerial photograph (Figure 4-21) shows this area is largely cleared, with a few scattered small trees visible. The current photo of the mapped match shows mixed tall vegetation along the southern half, with grassland in the northern half.

Figure 4-21: Moreton Street - 1943 historical photo and current aerial photo



Department of Finance, Services & Innovation (2018) SKM Sydney 1943 orthorectified black and white aerial imagery

4.8.3.1 Site walkover

The patch was sampled with an FBA quadrat (Q4) and consists of alternating patches of native and exotic dominated vegetation on the steep slope adjoining the rail line. One tree of *Syncarpia glomulifera* (Turpentine) and another of *Eucalyptus* sp. are the only native trees occurring within the patch.

Patches of native dominated vegetation are characterised by shrubs of *Acacia parramattensis* (Sydney Green Wattle), *Cassinia* sp. and *Dodonaea triquetra* (Large-leaf Hop-bush), the non-local native species *Acacia saligna* and the exotic species *Ochna serrulata* (Mickey Mouse Plant) and *Cotoneaster* sp. Ground cover includes patches dominated by the native grass *Rytidosperma tenuius*, with *Bothriochloa decipiens* (Redleg Grass) and *Themeda triandra* (Kangaroo Grass) also present at lower densities, as well as the widely planted cosmopolitan native species *Cynodon dactylon*. There are some patches of native vegetation with a higher exotic component, particularly in the eastern parts of the site.

The area of vegetation on the slope within about 35 metres of the Moreton Street overbridge supports exotic dominated vegetation, with *Acacia saligna*, *Cotoneaster* sp. and *Ligustrum sinense* interspersed with several shrubs of the native species *Acacia parramattensis* and one small tree of *Casuarina glauca*. The ground cover in this area is characterised by exotic grasses such as *Lolium perenne*, *Briza subaristata*, *Paspalum dilatatum*, *Eragrostis curvula* and *Avena* sp. Further to the west of the patch there is more exotic dominated vegetation, with dense cover of *Acacia saligna* and weedy ground cover characterised by *Asparagus aethiopicus*, *Avena* sp., *Paspalum dilatatum*, *Cenchrus clandestinus* (Kikuyu) and *Briza minor*.

The north-western section of the patch is comprised of mown exotic grassland. A row of *Lophostemon confertus* (Brush Box) are planted in the road verge outside the rail corridor to the north of the mapped patch.

Figure 4-22: Moreton Street site photos



Native grass dominant in central section of patch



Exotic dominated vegetation in north-east of patch

GHD (2017) calculated a site value score of 39.58 for areas of vegetation mapped as Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good), using data collected from two locations, including Moreton Street, in 2016. Assessment of data collected from the patch at Moreton Street in 2020 calculated a site value score of 15.8, which is below the FBA offset threshold for threatened ecological communities.

Despite this low site value score, one small (0.01 hectare) area within the patch is still broadly consistent with the GHD (2017) mapping of Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good), and the TEC Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion. Another 0.02 hectares of native vegetation are more consistent with Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). These areas are not consistent with the TEC Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion, as they do not have an open forest or woodland structure and do not contain the characteristic tree species as listed in the final determination.

The mapping has been amended to reclassify some smaller patches as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor) and areas dominated by exotic species to Exotic scrub or forest (Figure 4-23). The revised mapping also excludes areas of mown grassland from the north-western half of the patch.

Figure 4-23 Moreton Street – revised mapping



The remapping of the vegetation has removed the fence clashes, and the design is compliant with REMM B1. Undertaking a clash MCA is not considered necessary.

5. Conclusion

Table 5-1 details all clashes and solutions. The clash resolution process has demonstrated design compliance with REMM B1 through redesign and ground truth remapping of the TEC or PCT for all identified clashes.

For South Terrace (18km-030 to 18km-210 and 18km-270 to 18km-340) an MCA was completed (Appendix A), which found that Option 4 (moving fence line close the railway), is the best scoring solution.

Table 5-1 - Clash solution summary

Location	Chainage – from	Chainage – to	Asset	Details	Solution
Challis Avenue between Marrickville and Dulwich Hill stations – north side of rail line	8km-100	8km-150	Fence	New fence encroaches into PCT.	The ground truth survey found the PCT mapping to be incorrect and revised the habitat to planted native vegetation, removing the clash with the new fence.
Dudley Street between Marrickville and Dulwich Hill stations – south side of rail line	8km-370	8km-440	Fence	New fence encroaches into PCT.	The ground truth survey found the PCT mapping to be incorrect and revised the area near to the bridge as exotic grassland, removing the clash with the new fence.
Garnet Street between Dulwich Hill and Hurlstone Park stations – both sides of rail line	8km-960	9km-100	Fence	New fence encroaches into PCT	The ground truth survey found the PCT mapping on the northern side of the rail corridor to be incorrect and revised the habitat to exotic scrub or forest, removing the clash with the new fence.
	9km-080	9km-100	LCR	LCR encroaches into PCT	The LCR was realigned to avoid the mapped PCT.
Railway Parade between Lakemba and Wiley Park stations – north side of rail line	15km-640	15km-660	LCR	LCR encroaches into PCT	The LCR was realigned to avoid the mapped PCT.
Breust Pl, west of Punchbowl station – north side of rail line	17km-180	17km-260	CSR and LCR	CSR and LCR clash with TEC	The LCR and CSR were realigned to avoid the mapped TEC and <i>Acacia pubescens</i> .

Location	Chainage – from	Chainage – to	Asset	Details	Solution
South Terrace, west of Punchbowl station – south side of rail line	17km-470	17km-475	LCR	LCR encroaches into TEC	The LCR was realigned to avoid the mapped TEC
South Terrace, east of Bankstown station – south side of rail line	18km-030	18km-210	Fence	New fence encroaches into TEC	<p>A residual clash remained following the ground truth survey of the TEC. A multi-criteria analysis (MCA) was carried out to identify the most suitable solution to minimise the impact of the clash on the TEC. The MCA found that Option 4 (moving fence line close to the railway) is the best scoring solution due to the following:</p> <ul style="list-style-type: none"> • Removes the TEC clash, • Does not impact the road safety, • Does not impact the community • Does not require land acquisition and boundary change <p>This option does <u>increase</u> the construction complexity requiring a possession and this will <u>reduce</u> maintenance access for Sydney Trains. However, this was considered acceptable given that this section of fence (~275m) could be staged for end state installation.</p>
	18km-270	18km-340	Fence	New fence encroaches into TEC	
Moreton Street, between Belmore and Lakemba stations – north side of rail line	14km-530	14km-560	LCR	LCR encroaches into TEC	The ground truth survey found the TEC mapping to be incorrect and revised the habitat mapping, removing the clash with the LCR.
	14km-530	14km-560	Fence	New fence encroaches into TEC	The ground truth survey found the TEC mapping to be incorrect and revised the habitat mapping, removing the clash with the fence.

Appendix A. Multi-criteria analysis: fencing options at South Terrace, Bankstown

Introduction

The proposed fence for a section of the Metron T2M design north-east of South Terrace, Bankstown, follows the alignment of the existing fence. The replacement of the fence will require disturbance of the shrub and ground layers of two patches of Broad-leaved Ironbark – Grey Box – *Melaleuca decora* grassy open forest mapped in this location (Figure 1). This vegetation meets the criteria for the threatened ecological community (TEC) Shale/gravel Transition Forest.

To avoid impacting the TEC, several options for moving the fence alignment have been considered. Following a workshop between project engineers and environmental specialists, a multi-criteria analysis (MCA) was compiled, with inputs from all attendees, to determine the optimal alignment.

Methodology

Five options for addressing the clash were considered:

Option 1: Keep the existing fence alignment as per the current design

TEC Impact, no road safety impact, poor construction access, located on RailCorp property, no change to maintenance access, visually unobtrusive to the public.

Option 2: Move the fence alignment south-west to between the roadside trees and the TEC

TEC Impact, medium road safety impact, minor construction challenges with tree constraints, located on Council property, expansion of maintenance area, visually unobtrusive to the public.

Option 3: Move the fence alignment to the kerb line of South Terrace, outside of the trunks of roadside trees

No TEC Clash, major road safety impact requiring introduction of new kerb lines and drainage along road, reduction of on-street parking for residents, located on Council property, expansion of maintenance area, visually obtrusive.

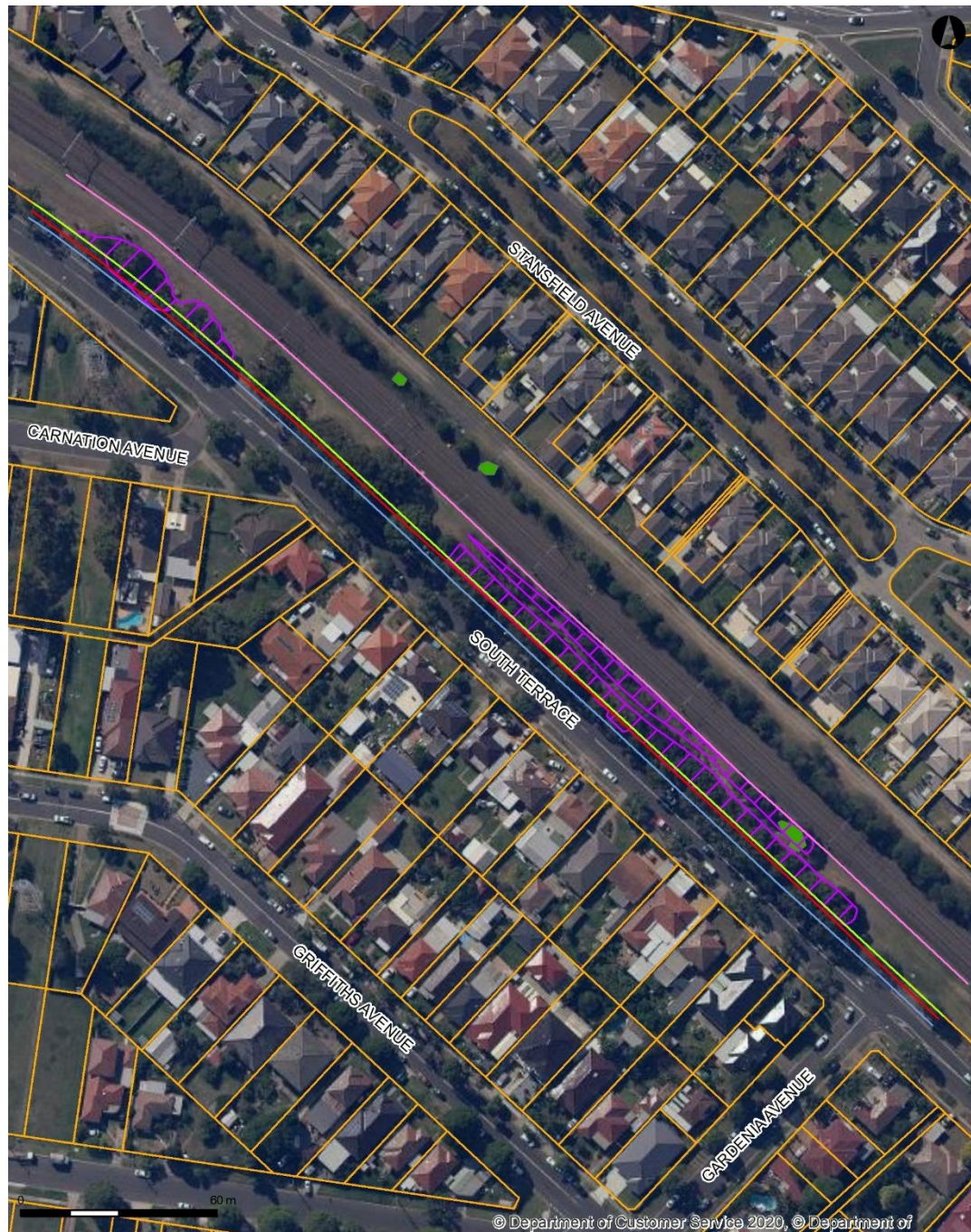
Option 4: Move the fence alignment to the rail track edge

No TEC Clash, no road safety impact, complex construction in a possession, located on RailCorp property, increased Sydney Trains interface for trackside equipment, corridor access, expansion of maintenance area interface clashes, visually unobtrusive to the public.

Option 5: Do nothing – leave existing fence in place.

No TEC clash, no road safety impact, visually unobtrusive, does not meet safety requirements for Unattended Train Operation (GoA 4) so is not compatible with operation of Metro network.

The indicative alignments of options 1 to 4 are shown in Figure 1.



LEGEND

Fencing options

- Option 1
- Option 2
- Option 3
- Option 4
- Lot

Amended vegetation zone

- Broad-leaved Ironbark - Grey Box - Melaleuca
- decora grassy open forest (ME004, Moderate/good)

Threatened flora records (GHD 2017)

- Acacia pubescens (patch)

Figure 1. Indicative alignment of Options 1 to 4

The analysis considered each option against seven weighted criteria. These criteria and the weighting assigned to each are listed in Table 1.

Table 1. Assessment criteria

Criterion	Aspects considered	Weighting	Weighting Justification
Biodiversity	Level of clearing/ disturbance to TECs and/or threatened species	6	This is the key criteria of the analysis, where whichever option selected must minimise the impact on TECs. Purpose of the analysis
Road safety impacts	Requirement for RSA	5	The road safety of a new fence position needs to be considered. The proximity of the fence to the road could exacerbate the road safety for vehicles and/or pedestrians Road Safety
Constructability	Requirement for alternative fencing type Requirement for alternative installation method, needing additional time Potential new drainage design for kerb and gutter Potential concession to clearance from track Potential specific design requirement for fence support near tracks	4	The construction complexity needs to be considered including: <ul style="list-style-type: none"> Accounting for the construction time for alternative fence types and installation methods (hand digging etc.). The additional construction works required (track support, kerbs, tree removal etc.). The accessibility of the construction area from a machinery perspective and possession/non-possession. Constructability
Rail boundary	Location of fence within Council or RailCorp property Existing fence to be retained Increased maintenance required by Sydney Metro Unable to maintain area fenced off between existing and new fence Access within rail boundary will be removed	3	The rail boundary position impacts several different aspects of the rail corridor (maintenance, access, security etc.) and altering this position could create asset ownership issues and/or interface challenges Boundary Ownership/ Maintenance Access
Stakeholders	Council Community Local Traffic Committee Sydney Trains Community	2	Stakeholder management is a consideration of each design, where stakeholder listed requirements need to be considered. Increasing impact to different stakeholder is rated within this criterion.

Criterion	Aspects considered	Weighting	Weighting Justification
			Stakeholder Impact
Community impacts	Reducing or removing the availability of parking on the north-east side of South Terrace	1	Community impacts associated with design and construction of the proposed option have been considered in this Criterion i.e. - requiring OOHW to install the fence during possessions / loss of informal car parking Publicity

Each option was evaluated against the listed criteria, with scores between zero and five assigned for each option. Values were assigned per Table 2 and a score of zero indicated a fatal flaw that excluded the option from further consideration.

Each score was multiplied by the respective weighting to produce a weighted score.

Table 2. Assessment scoring

Criterion	Score	Description
Biodiversity	5	No TEC Impact
	1	TEC Impact
Road safety impacts	5	No road safety Impact
	4	Minor road safety Impact
	3	Medium road safety Impact
	2	Major road safety Impact
	1	Significant road safety Impact
Constructability	5	Standard construction with good access
	4	Minor construction challenges with good access
	3	Construction in a possession or poor access
	2	Complex construction within a possession
	1	Significantly complex construction in possession with poor access
Rail boundary	5	No boundary change or maintenance access changes
	4	Minor boundary change and maintenance access changes
	3	Medium boundary change and maintenance access changes
	2	Major boundary change/purchase and maintenance access changes
	1	Significant boundary change/purchase and constrained maintenance access
Stakeholders	5	No stakeholder impact
	4	Minor stakeholder impact
	3	Individual & medium stakeholder impact

Criterion	Score	Description
	2	Several & major stakeholder impact
	1	Multiple & significant stakeholder impact
Community impacts	5	No community impact
	4	Minor community impact
	3	Medium community impact
	2	Several & major community impact
	1	Multiple community & publicity impact

Results

The results of the MCA are presented in Table 2. Option 4 is the best scoring solution due to the following:

- Removes the TEC clash,
- Does not impact the road safety,
- Does not impact the community
- Does not require land acquisition and boundary change
- This option does increase the construction complexity requiring a possession and this will reduce maintenance access for Sydney Trains. However, this was considered acceptable given that this section of fence (~275m) could be staged for end state installation.

Option 5 (do nothing) is not compliant with GOA4 requirements for operation, so has not been considered further.

Table 2. Multi-criteria analysis

Criterion	Weighting	Option 1 Keep existing alignment		Option 2 Moving fence between roadside trees and TEC		Option 3 Moving fence to kerb line		Option 4 Moving fence to track side		Option 5 Do Nothing - Leave existing fence in place	
		Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Biodiversity	6	1	6	1	6	5	30	5	30	5	30
Road safety impacts	5	5	25	3	15	2	10	5	25	5	25
Constructability	4	3	12	4	16	3	12	2	8	5	20
Rail boundary	3	5	15	4	12	3	9	2	6	5	15
Stakeholders	2	4	8	3	6	1	2	5	10	0 (Non-compliant)	0 (Non-compliant)
Community impacts	1	4	4	3	3	3	3	5	5	5	5
Total			70		58		66		84	Non-compliant	

Appendix C – Location of identified design clashes and consolidation of habitats following ecological inspection by Arcadis



Figure 5: Amended habitat following ecological inspection at Garnet Street (southern side)



Figure 6: Amended habitat following ecological inspection at Railway Parade between Wiley Park and Lakemba Stations

Appendix D – Arcadis Addendum Report for TEC Clashes at Garnet Street, Dulwich Hill and Railway Parade, Lakemba

Technical Memorandum

Date: 16/06/2021

To: Dan Keegan (JHLOJV)

Cc: Ketan Patel (Arcadis), Jane Rodd (Arcadis)

From: Ben Fethers (Arcadis)

Addendum to Planning Approval Consistency Assessment SM-21-00036038

1. Introduction

The Sydney Metro City & Southwest – Sydenham to Bankstown – EIS - Technical Paper 9 - Biodiversity Assessment Report prepared by GHD (2017) identified a number of threatened ecological communities (TEC) and native plant community types (PCTs) throughout the corridor. The biodiversity assessment for the approved project was undertaken based on the assumption that all vegetation within the rail corridor would need to be removed to construct the project, with the exception of:

- Native vegetation that would require biodiversity offsets if removed (specifically areas of 'Turpentine - Grey Ironbark open forest on shale', 'Degraded Turpentine - Grey Ironbark open forest on shale' and 'Broad-leaved Ironbark – Grey Box')
- Identified areas of the threatened species Downy Wattle located within the rail corridor between Punchbowl and Bankstown stations (SPIR, 2018).

This addendum considers two areas of mapped vegetation within the Southwest Metro Corridor boundary, as follows:

- An area to the south of the rail line and east of the Garnet Street overbridge, between Dulwich Hill and Hurlstone Park railway stations.
- An area to the south of Railway Parade between Lakemba and Wiley Park railway stations.

Both of these areas were initially considered in the clash report prepared by T2M (SMCSWSWM-MTM-WEC-EM-REP-000003), however the clashes were considered to be resolved through redesign.

This addendum has been prepared as the design for both areas has since been reinstated, however the vegetation being impact has been reclassified following further survey.

Garnet Street between Dulwich Hill and Hurlstone Park Stations

Clash impact

A 0.05 hectare patch of native vegetation is mapped by GHD (2017) on the south side of the rail line, extending about 97 metres east from the Garnet Street overbridge. This area of vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The installation of the CSR on the south side of the track would require the clearance of approximately 41m² of mapped PCT. The area of impact is shown in Figure A1.

Figure A1: Garnet Street - area of impact



Ground truth survey

The site was inspected on 19 December 2020 by Jane Rodd, Senior Ecologist. The mapped patch of Degraded Turpentine – Grey Ironbark open forest on shale on the south side of the rail line consists of a steep slope with dense cover of exotic groundcover species, including *Ageratina adenophora* (Crofton Weed), *Plantago lanceolata* (Plantain), *Paspalum dilatatum* (Paspalum), *Avena sp.* (Oatgrass), *Eragrostis curvula* (African Lovegrass), *Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush), *Briza maxima* (Quaking Grass) and the widely planted cosmopolitan native grass species *Cynodon dactylon* (Couch).

There are scattered shrubs and small trees throughout the patch, mainly exotic species such as *Jacaranda mimosifolia* (Jacaranda), *Ailanthus altissima* (Tree of Heaven), and *Ulmus parvifolia* (Chinese Elm), with the native species *Pittosporum undulatum* (Sweet Pittosporum) and *Casuarina glauca* (Swamp Oak) observed as isolated individuals.

Figure A2: Garnet Street site photos



Exotic vegetation on south side of rail line (looking west towards Garnet Street overbridge)

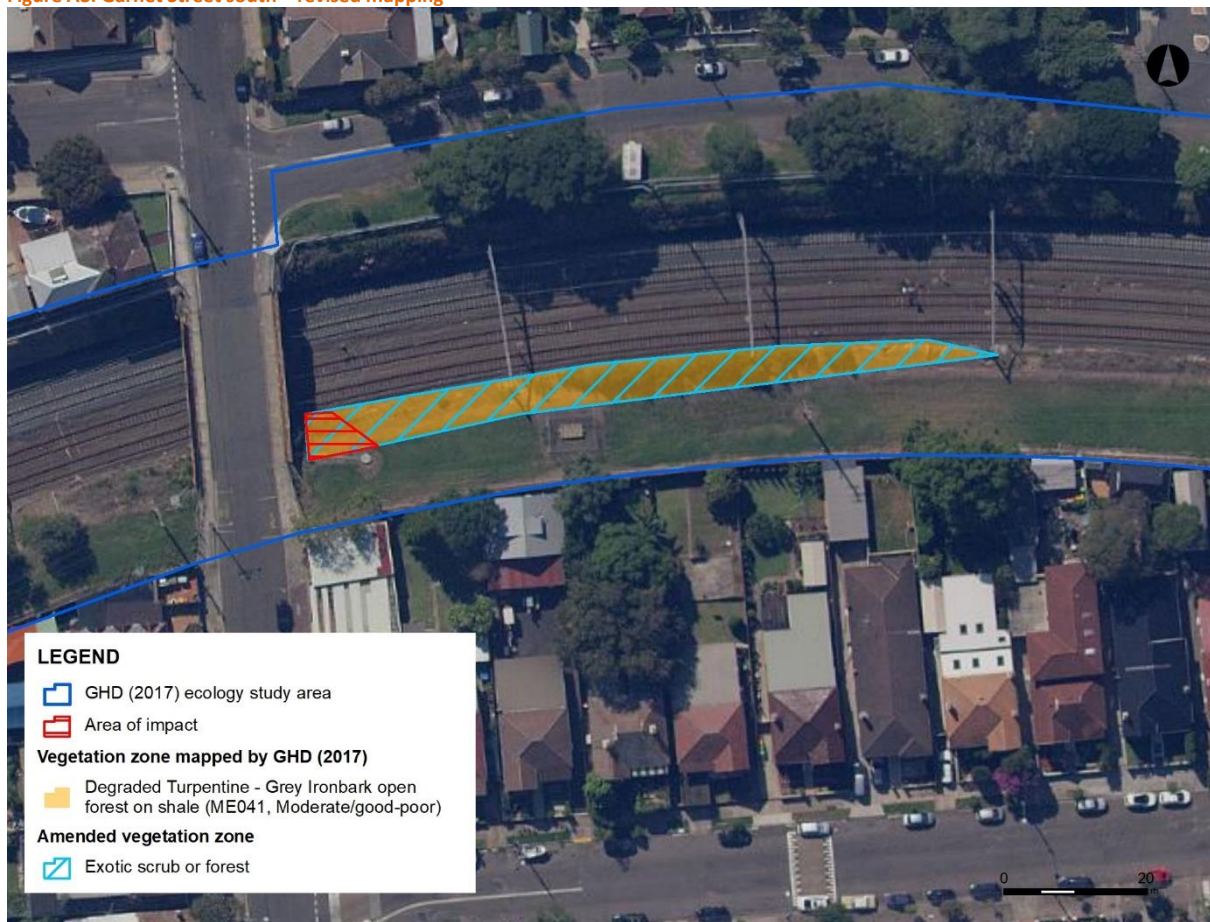


Exotic vegetation on south side of rail line (looking east)

The mapped patch is dominated by exotic trees and shrubs, grasses, and herbs. It is possible that a native ground layer component is present, however few native species were observed within the area inspected. This vegetation is not considered to be consistent with Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor), as mapped by GHD (2017), or any other PCT. The classification of this entire 0.05 ha patch of vegetation has been revised to Exotic scrub or forest (

Figure A3), which has removed the clash.

Figure A3: Garnet Street south – revised mapping



The remapping of the vegetation has removed the fence clashes, and the design is compliant with REMM B1. Undertaking a clash MCA is not considered necessary.

Railway Parade between Lakemba and Wiley Park railway stations

Clash impact

A 0.08-hectare patch of native vegetation is mapped within the rail corridor, extending approximately 94 metres west from the area south of the intersection between Railway Parade and Alice Street North. This vegetation is categorised as Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor). The biodiversity assessment concluded that areas of Degraded Turpentine – Grey Ironbark open forest on shale do not fall within the definition of the TEC Sydney Turpentine Ironbark Forest, because they do not have a forest or woodland structure and do not include any characteristic canopy species.

The installation of the LCR would require the clearance of approximately 72m² of PCT as shown in Figure A4.

Figure A4: Railway Parade - area of clash



Ground truth survey

The site was inspected on 19 December 2020 by Jane Rodd, Senior Ecologist. Patch was inspected from the top of the slope, as the middle and lower sections of the slope could not be safely accessed. The areas in the south-west of the patch were not able to be inspected in detail due to the dense shrub cover at the top of the slope.

The vegetation of the mapped patch of Degraded Turpentine – Grey Ironbark open forest on shale consists of dense shrub cover on the slope above the rail line, with several *Acacia* spp. observed, including the local native species *Acacia longifolia* (Sydney Golden Wattle) and *Acacia parramattensis* (Parramatta Wattle) and the invasive non-local native species *Acacia saligna* (Golden Wreath Wattle), which is most abundant, particularly in the north-east of the patch. The native small tree species *Melaleuca styphelioides* (Prickly-leaved Tea Tree) was observed further to the west in the patch. The exotic species *Cinnamomum camphora* (Camphor laurel), *Cestrum parqui* (Green Cestrum), *Ligustrum lucidum* (Broad-leaved Privet) and *Foeniculum vulgare* (Fennel) are also abundant. The ground layer in the north-east of the patch was dominated by exotic grass and groundcovers.

The mapped patch includes areas of cleared grassland that support exotic grasses such as *Lolium perenne* (Perennial Ryegrass), *Avena* sp. (Oat Grass) and *Bromus catharticus* (Prairie Grass) and the widely planted cosmopolitan native grass *Cynodon dactylon* (Couch).

Figure A5: Railway Parade site photos



Vegetation dominated by *Acacia saligna* (looking south-west)



Ground layer of vegetation in the east of the patch

The mapped patch is dominated by exotic shrubs, grasses, and herbs in the north-east of the patch. Some native shrubs are present and are dominant in small areas in the south-west of the patch. It is possible that a native ground layer component is present, particularly on the middle and lower slopes of the south-western parts of the patch, however few native species were observed within the area inspected. The vegetation in the north-east of the patch is not considered to be consistent with Degraded Turpentine – Grey Ironbark open forest on shale (ME041, Moderate/good – poor), as mapped by GHD (2017), or any other PCT. The classification of the north-eastern part of the patch of vegetation has been revised to Exotic grassland and Exotic scrub or forest (Figure A6), which has removed the clash.

Figure A6: Railway Parade – revised mapping

