Transport Infrastructure
Development Corporation

Transport Infrastructure Development Corporation

North West Rail Link

Supplementary Submissions Report

March 2008

EXECUTIVE SUMMARY

North West Rail Link

The NWRL comprises a new 22 km, twin-track passenger rail line from Epping Station to Rouse Hill via Castle Hill. The project also includes the construction of six new stations at Franklin Road, Castle Hill, Hills Centre, Norwest, Burns Road and Rouse Hill.

The project requires approval from the Minister for Planning in accordance with Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

On 18 March 2008, the NSW Government re-affirmed its commitment to build a new heavy rail line to the North West of Sydney with the announcement of the North West Metro. The concept plan described in this report, if approved, would form part of the North West Metro.

The North West Metro is a 38km rail line which will run from Rouse Hill through Norwest, Castle Hill, Epping, Top Ryde, Gladesville, Drummoyne, Rozelle and Pyrmont before reaching Wynyard, Martin Place and St James.

Environmental Assessment and Concept Plan

The North West Rail Link Environmental Assessment and Concept Plan (the environmental assessment) for the construction and operation of the North West Rail Link (the project) was placed on public exhibition from 22 November 2006 to 2 February 2007 as required by section 75H(3) of the EP&A Act. Written submissions were invited during this period. Over 1,600 submissions were received during and immediately following public exhibition.

Preferred Project Report

On 19 February 2007, the Director General of the Department of Planning required that, in accordance with Section 75H(6) of the EP&A Act, the Transport Infrastructure Development Corporation (TIDC) respond to the issues raised in the submissions.

TIDC prepared a preferred project report, which provided responses to issues raised in submissions received during the public exhibition of the environmental assessment. It also included information about additional studies undertaken since the environmental assessment was placed on public exhibition, and provided details on proposed modifications to the concept plan as described in the environmental assessment.

Modifications to the concept plan presented in the environmental assessment were proposed following additional investigations undertaken by TIDC. The modifications described in the preferred project report included:

1. Construction and operation of a direct tunnel connection between Epping and Franklin Road stations, rather than a surface connection on the Northern Line between Epping and Beecroft.
2. Moving Norwest Station approximately 100 metres to the east within the proposed rail corridor.

The preferred project report also included the revised statement of commitments for the project, which outlined the future assessment and, where applicable, the proposed management and mitigation measures, which would be undertaken should the concept plan be approved.

The preferred project report was placed on public exhibition from 6 June to 6 August 2007. Written submissions were invited during this period and approximately 3,360 submissions were received.

Supplementary Submissions Report

On 15 August 2007, the Director General of the Department of Planning required that, in accordance with Section 75H(6) of the EP&A Act, the Transport Infrastructure Development Corporation (TIDC) respond to the issues raised in the submissions received in response to the exhibition of the preferred project report.

TIDC prepared this supplementary submissions report to submit to the Department of Planning.

The supplementary submissions report provides responses to issues raised in submissions received during the public exhibition of the preferred project report. It is informed by, and includes, additional studies undertaken since the preferred project report was placed on public exhibition. This includes an independent options review report for the tunnel alignment between Epping and Franklin Road stations, ground borne noise study and property information.

Submissions received and assessed

Submissions in response to the public exhibition of the preferred project report were received by the Department of Planning up to and following the public exhibition period.

Submissions received relate specifically to the concept plan, which is for a new passenger heavy rail line from Epping Station to Rouse Hill via Castle Hill generally within a preferred rail corridor.

Approximately 3,360 submissions were received. The submissions received included over 3,000 form letters and 338 other individual submissions. This report considers all submissions received up until 31 August 2007.

All submissions received were catalogued and recorded on a submissions database. Individuals who sent submissions have not been identified in this report. Each submission has been given an identification number, and this has been used in the report to allow individuals to identify where their issues have been addressed. An assessment of each individual submission was undertaken, identifying all issues raised and coding the issues.

Scope and content of submissions

Responses to issues raised are addressed in the following categories: tunnel alignment between Epping and Franklin Road stations; noise and vibration; geotechnical; traffic and parking; property issues; communication and consultation; construction issues; and other issues associated with the project.

The majority of issues raised focused on the preferred tunnel alignment between Epping and Franklin Road stations, specifically:

- Potential noise and vibration impacts from the rail tunnel;
- Perceived loss of property value due to the proposed rail tunnel; and
- The effectiveness of community consultation undertaken by TIDC.

Three alternative tunnel alignment options were proposed in community submissions. These options, along with the three options presented in the preferred project report, were assessed in the options review report. It found that option 1 (green) alignment was still preferred because of the following advantages:

- Lowest life cycle costs including an indicative capital cost ranging from $20 to $60 million less than the other options;

- It is shorter than the other alignments by between 230 and 650 metres and provides shorter journey times;
- Least construction impacts including the shortest construction period, up to 36,000 cubic metres less spoil and fewer truck movements than the other options;
- Best ride quality due to straight alignment and the elimination of any reverse curves.
- It would consume the least energy and generate the least greenhouse gas emissions during construction and operation; and
- It would not impact on the approved corridor for the Epping to Parramatta Rail Line.

Conclusion

The Minister for Planning is responsible for determination of the concept plan. The Minister for Planning's determination and all associated assessment documentation, including the supplementary submissions report, will be made publicly available.

Should the concept plan be approved, further environmental assessment would be undertaken consistent with any conditions of approval and the statement of commitments, including further community and stakeholder consultation.

The NSW Government re-affirmed its commitment to build a new heavy rail line to the North West of Sydney with the announcement of the North West Metro, which is a 38km rail line which will run from Rouse Hill through Norwest, Castle Hill, Epping, Top Ryde, Gladesville, Drummoyne, Rozelle and Pyrmont before reaching Wynyard, Martin Place and St James.

TIDC will be seeking project approval for the whole of the North West Metro. This will be subject to further detailed investigation, environmental assessment and community involvement prior to seeking project approval. The next stage of community consultation will occur with the publication of an Environmental Overview report due for completion in October 2008.

As part of the detailed investigations for the overall North West Metro a comprehensive review of the alignment, stabling and stations would occur. At this stage the alignment for the North West Metro is envisaged to be consistent with the concept plan between Epping and Rouse Hill except for the tunnel alignment connecting into any new underground North West Metro station at Epping and the connections to the existing Epping Station.

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1. Introduction

1.1 Background

1.1.1 The North West Rail Link

North West Sydney is one of the major growth areas in the Sydney metropolitan region. To improve access to employment and educational opportunities for existing and future residents, and to alleviate the growing traffic congestion in this area, the NSW Government proposes to build a new heavy rail line linking Epping with the regional centres of Castle Hill and Rouse Hill.

On 18 March 2008, the NSW Government re-affirmed its commitment to build a new heavy rail line to the North West of Sydney with the announcement of the North West Metro. The concept plan described in this report would form part of the North West Metro.

The North West Metro is a 38km rail line which will run from Rouse Hill through Norwest, Castle Hill, Epping, Top Ryde, Gladesville, Drummoyne, Rozelle and Pyrmont before reaching Wynyard, Martin Place and St James.

1.1.2 Environmental Assessment and Concept Plan

The *North West Rail Link Environmental Assessment and Concept Plan* (the environmental assessment) for the construction and operation of the North West Rail Link (the project) was placed on public exhibition from 22 November 2006 to 2 February 2007 as required by section 75H(3) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Written submissions were invited during this period. Over 1,600 submissions were received during and immediately following the public exhibition.

The project described in the environmental assessment involved the construction and operation of a twin track passenger railway, approximately 23 km in length, connecting with the existing Northern Line north of Epping Station and terminating at Rouse Hill. The project would be delivered in two stages. The first stage, between Epping and Hills Centre Station, is proposed to be operational by 2015. The second stage, between Hills Centre Station and Rouse Hill, is proposed to be operational by 2017.

The project requires approval from the Minister for Planning in accordance with Part 3A of the EP&A Act.

1.1.3 The preferred project report

On 19 February 2007, the Director General of the Department of Planning required that, in accordance with Section 75H(6) of the EP&A Act, the Transport Infrastructure Development Corporation (TIDC) respond to the issues raised in the submissions received in response to exhibition of the environmental assessment.

TIDC prepared a preferred project report, which was exhibited from 6 June to 6 August 2007.

The preferred project report provided responses to issues raised in submissions received during the public exhibition of the environmental assessment. It also included information about additional studies undertaken since the environmental assessment was placed on public exhibition, and

provided details of proposed modifications to the concept plan as described in the environmental assessment.

The modifications described in the preferred project report included:

1. Construction and operation of a direct tunnel connection between Epping and Franklin Road stations, rather than a surface connection on the Northern Line between north of Epping and Beecroft.
2. Moving Norwest Station approximately 100 metres to the east within the proposed rail corridor.

Following a decision to adopt the direct tunnel connection from Epping Station to Franklin Road Station as part of the project, a review of the tunnel alignment was undertaken. Three feasible options were investigated:

- Environmental assessment alignment (blue) - passing below Beecroft Road and Castle Hill Road;
- Option 1 (green) – passing below the M2 Motorway, Cheltenham Park, Beecroft Park and Castle Hill Road; and
- Option 2 (pink) - passing below the M2 Motorway, Pennant Hills Golf Course and Castle Hill Road.

The preferred project report identified that the preferred alignment for the direct tunnel connection was option 1 (green) and therefore the concept plan was modified to include this alignment.

The preferred project report also included the revised statement of commitments for the project, which outlined the future assessment and, where applicable, the proposed management and mitigation measures, which would be undertaken should the concept plan be approved.

1.1.4 Supplementary submissions report

On 15 August 2007, the Director General of the Department of Planning required that, in accordance with Section 75H(6) of the EP&A Act, the Transport Infrastructure Development Corporation (TIDC) respond to the issues raised in the submissions received in response to the exhibition of the preferred project report.

TIDC prepared this supplementary submissions report to submit to the Department of Planning.

The supplementary submissions report provides responses to issues raised in submissions received during the public exhibition of the preferred project report. It is informed by, and includes, additional studies undertaken since the preferred project report was placed on public exhibition. An independent options review report for the tunnel alignment between Epping and Franklin Road stations is included in Appendix B.

1.2 Submissions received

1.2.1 Submissions

Submissions in response to the public exhibition of the preferred project report were received by the Department of Planning up to and following the public exhibition period.

Number of submissions

Approximately 3,360 submissions were received including:

- Over 3000 form letters;
- 308 other written submissions from the general public;
- 11 written submissions from state and local government agencies;
- 16 written submissions from private organisations/companies or community groups; and
- Three petitions, with a total of 133 signatures, with two opposing the preferred green alignment (with 46 signatures in total), and one (with 87 signatures) opposing the pink alignment.

This report considers all submissions received up until 31 August 2007.

Methodology for reviewing community submissions

All submissions received were catalogued and recorded on a submissions database for analysis purposes. Individuals who sent submissions have not been identified in this report. Each submission has been given an identification number, and this has been used in the report to allow individuals to identify where their issues have been addressed (refer Appendix A). A letter will be sent to those who sent in a submission advising them of their identification number when the supplementary submissions report is made public.

An assessment of each individual submission was undertaken, identifying all issues raised and coding the issues. The list of issue categories is provided in Section 3.1. Table A.1 in Appendix A shows where the issues raised by each submission are addressed in the this report.

Issues are addressed in Section 3 of this report. Many of the issues raised were matters of detail that cannot be fully investigated at the concept plan level. These issues have been noted and would be resolved as part of the further design development and environmental assessment planned for the next stage of the project.

1.2.2 Scope and content of the supplementary submissions report

This supplementary submissions report has been prepared to provide responses to the issues raised in the submissions.

The report includes:

- A description of the background to preparation of the supplementary submissions report, status of the project to date, and a summary of how the submissions were processed (Section 1);
- An outline of the community and stakeholder consultation undertaken by TIDC during exhibition of the preferred project report (Section 2);
- TIDC's responses to the issues raised in the submissions (Section 3);
- The statement of commitments representing the investigations and mitigation measures that would be undertaken to inform and guide future design, planning and assessment of the project (Section 4);
- An outline of what happens next in relation to the assessment of the project (Section 5); and
- The additional studies undertaken since the preferred project report was placed on public exhibition. Appendix B contains an independently prepared options review report which responds to submissions made in relation to the proposed direct tunnel connection between Epping and Franklin Road stations. The options review report undertakes further review of alignment options, including a comprehensive analysis of six alignments. The options review report includes specialist information on noise and property issues.

2. Community involvement

2.1 Consultation associated with the environmental assessment

During preparation and exhibition of the environmental assessment a number of communication activities were undertaken, as listed below:

- Project information line (1800 684 490) and project email address;
- Distribution of planning update newsletters (2);
- Advertising;
- Stakeholder meetings;
- Project website updates;
- Summary brochure;
- Public exhibition and display - 22 November 2006 to 2 February 2007;
- Staffed community information sessions (4);
- Letters to property owners; and
- Station precinct planning workshops.

Further information on these activities is provided in the environmental assessment and the preferred project report.

2.2 Consultation associated with the preferred project report

The preferred project report was exhibited by the Department of Planning from 6 June to 6 August 2007. During that time, the community and stakeholders were invited to provide comment on any aspects of the project outlined in the report. Details of the communication activities to inform the community about the project and exhibition of the preferred project report (including the locations and times of the community information sessions) are outlined below.

2.2.1 Letters to submitters and property owners

TIDC sent a letter to persons/organisations that sent a submission in response to exhibition of the environmental assessment, advising of the completion of the preferred project report and their submission number. Property owners within the proposed rail corridor were also directly notified by letter.

2.2.2 Public exhibition

Copies of the preferred project report were available for review at the following locations:

- Baulkham Hills Shire Council;
- Baulkham Hills Library;
- Blacktown City Council;
- Castle Hill Library;

- Epping Library;
- Hornsby Shire Council;
- Pennant Hills Library;
- Department of Planning, Information Centre, Sydney;
- Transport Infrastructure Development Corporation, Chatswood; and
- Nature Conservation Council of NSW, Sydney.

2.2.3 Community information sessions

Four staffed community information sessions were held to discuss the project and the preferred project report with interested members of the community. The sessions were held at the following times and locations:

- Castle Hill: Thursday 14 June 2007, Baulkham Hills Shire Council Administration Building;
- Bella Vista: Saturday 26 June 2007, Village Green Community Centre;
- West Pennant Hills: Thursday 21 June 2007, West Pennant Hills Valley Community Centre; and
- Epping: 19 July 2007, Epping Baptist Church Upper Hall

The community information sessions provided an opportunity for members of the community to meet the project team and discuss any questions; review information on the indicative station precinct plans; and provide input into the next stage of the design process.

2.2.4 Planning Update No. 3

A planning update newsletter was distributed to the local community and to the project mailing list advising of the exhibition of the preferred project report and outlining the next steps. The newsletter was also made available at the public exhibition venues and community information sessions.

2.2.5 Stakeholder meetings

Meetings were held with stakeholders such as government agencies to provide an update on the project and discuss the next steps. Meetings were also held to discuss the indicative station precinct plans and provide an opportunity for people to input to the next stage of the design process. Meetings were held with the following stakeholders:

- Hornsby Shire Council;
- Baulkham Hills Shire Council;
- Blacktown Shire Council;
- Department of Planning; and
- Beecroft Cheltenham Civic Trust.

2.2.6 Website

The preferred project report was available to download from the TIDC website at www.tidc.nsw.gov.au.

2.2.7 Advertisements

Advertisements were placed in local newspapers by the Department of Planning advising of the exhibition of the preferred project report and the locations and times of the community information sessions. Advertisements were placed in the following newspapers:

- Hills News (on 12 June and 10 July 2007);
- Hills Shire Times (on 12 June and 10 July 2007);
- Northern News Kellyville (on 12 June and 10 July 2007);
- Northern District Times (on 13 June, 11 July and 18 July 2007);
- Rouse Hill Times (on 13 June and 11 July 2007);
- Gladesville Weekly Times (on 13 June and 11 July 2007); and
- Hornsby Advocate (on 14 June and 12 July 2007).
- Sydney Morning Herald (on 6 June, 27 June and 18 July)
- Daily Telegraph (on 6 June, 27 June and 18 July)

2.2.8 1800 number and email

The 1800 number and email address were available for the community to contact TIDC with any questions or concerns.

3. Responses to issues raised in submissions

3.1 Overview

This section provides TIDC's responses to the issues raised in submissions. The vast majority of submissions raised issues relating to the potential impacts of the construction and operation of the direct tunnel connection between Epping and Franklin Road stations, as described by the preferred project report.

93% of submissions support a direct tunnel connection between Epping and Franklin Road stations, however the majority of these (99%) are opposed to the preferred (green) alignment. 6.5% are opposed to any direct tunnel connection.

A number of alternative direct tunnel options have been proposed in submissions, including the 'red', 'gold' and 'brown' alignments. These alternatives generally seek to minimise the tunnel alignment beneath residential properties. They are the subject of the majority of the 3000 form letters. A comprehensive assessment of these alignments, along with the three options presented in the preferred project report, has been undertaken and is presented in Appendix B – *North West Rail Link Options Review Report – Epping to Franklin Road stations*.

The issues raised in submissions have been broadly grouped into nine categories as shown in Table 3.1. The following sections summarise the issues raised in submissions (boxed) and then provide TIDC's responses to the issues (Sections 3.2 to 3.10 below).

Issues previously raised in submissions during the exhibition of the environmental assessment are addressed in the preferred project report, which should be read in conjunction with the supplementary submissions report.

Table 3.1 Issue categories

Section	Issue grouping/type	No of submissions*
3.2	Issues relating to the alignment of the direct tunnel connection between Epping and Franklin Road stations, as described by the preferred project report	3242
3.3	Noise and vibration issues	3062
3.4	Geotechnical issues	572
3.5	Traffic, parking and public transport issues	524
3.6	Property issues, including property values	1038
3.7	Communication and consultation issues	2621
3.8	Issues related to construction practices and timing	56
3.9	Other issues associated with the direct tunnel connection not captured in the above categories	279
3.10	Other issues	87

* Note: Many submissions raised multiple issues

Table A.1 in Appendix A identifies the individual submissions received (by number) and the issue category raised by each submission.

A summary of the key issues raised in the government agency submissions is provided in Appendix A (Table A2), together with where these issues have been addressed in this report.

A summary of the key issues raised in the form letter submissions is provided in Appendix A (Table A3). All issues raised in form letters are included in Table 3.1.

3.2 The tunnel alignment between Epping and Franklin Road stations

3.2.1 Change from a surface connection to a direct tunnel connection

Issues included:

- Reasons for the change in alignment, including concerns that the alignment was only changed in response to the number of objections;
- If surface sections are proposed in new development areas because they are cheaper than tunnelling, why is a tunnel preferred compared to the surface section in Beecroft/Cheltenham?;
- The surface connection would service more commuters because passengers from Beecroft and Cheltenham could access the line directly;
- Many more people/properties are affected by the direct tunnel connection than the surface alignment; and
- Concerns that the direct tunnel connection is invalid under the EP&A Act as it was not part of the previous concept plan.

Reasons for alignment changes

Section 7.1 of the preferred project report outlined the reasons why the concept plan was modified to include a direct tunnel connection between Epping Station and Franklin Road Station instead of a surface connection (quadruplication) on the Northern Line between Epping and Beecroft and a tunnel connection from the Beecroft portal to the Franklin Road Station.

The preferred project report outlined that a direct tunnel option has the following advantages over the surface connection:

- Significantly reduced project risk associated with construction (works adjacent to and integrated with an operating rail line would no longer be required);
- Provides physical separation of trains on the North West Rail Link from the Northern Line;
- Will involve minimal impacts on the existing rail network during construction;
- Simpler and less expensive to maintain (more reliable);
- Less expensive construction works (due to the significant civil works required for the surface connection and the requirement to interface with the operating rail network); and
- Reduced impact on local communities and the environment, particularly in relation to potential operational noise impacts, visual changes, clearing of vegetation and heritage impacts.

The direct tunnel connection provides a passenger rail link that reduces the potential environmental impacts associated with surface works, particularly those associated with the proposed tunnel dive site south of the Beecroft Village Green.

As stated in the preferred project report, RailCorp has undertaken a review of the Epping to Franklin Road stations tunnel option and confirmed that both the surface connection on the Northern Line and the alternative direct tunnel option would be acceptable from an operational perspective. Taking into account project cost, operational flexibility, reliability and impacts to the existing rail network during construction and maintenance, RailCorp has concluded that its preferred configuration would be the Epping Station to Franklin Road Station direct tunnel option.

The preferred project report noted that approximately 1,190 submissions received in response to the exhibition of the environmental assessment opposed the surface works on the Northern Line between Epping and Beecroft and that approximately 1,070 submissions supported the alternative Epping Station to Franklin Road Station tunnel option. Issues raised in these submissions were taken into consideration in the comparative review of options as part of the preferred project report. As described above a number of factors were taken into consideration in determining the preferred option, including technical, environmental, economic and social issues.

Surface sections preferred in new development areas compared to surface works in Beecroft/Cheltenham

As described above, there were a number of reasons why a direct tunnel connection between Epping and Franklin Road stations was selected rather than a surface connection on the Northern Line. It is true that generally surface alignments are less expensive than tunnel alignments and are more feasible in areas which are not constrained by existing development. Cheltenham and Beecroft are well established residential areas with very different characteristics to a new development area. The options assessment documented in the preferred project report identified that the construction and operational costs of the surface connection on the Northern Line (particularly the costs associated with the dive structure at Beecroft) were estimated to exceed the direct tunnel connection.

Connections for commuters in Cheltenham and Beecroft

Direct connections to the North West Rail Link would not have been possible from Beecroft Station as the previously proposed surface alignment would have connected to the Northern Line south of Beecroft Station. Operationally, commuters who currently access Beecroft and Cheltenham stations could access the line directly from Epping or Franklin Road stations.

More people/properties affected by direct tunnel connection than the surface alignment

The previously proposed alignment between Epping and Franklin Road stations included a surface section (quadruplication) along the Northern Line from Epping Station to Beecroft and a tunnel section from the dive at Beecroft to Franklin Road Station. The surface section would have been constructed within the existing (surface) rail corridor and therefore there would have been minimal 'direct' property impacts (i.e. properties needing to be acquired for this project). Impacts on properties adjacent to the surface connection would have been 'indirect' and included temporary noise, traffic and visual impacts during construction and ongoing noise and visual impacts during operations.

Based on the estimate of total numbers of dwellings affected by alternative alignments detailed in the land use and property comparison in Appendix B of the options review report, 229 dwellings would be above the previously proposed tunnel section between the Beecroft dive and Franklin Road Station (shown as brown alignment) compared to 339 dwellings above the preferred direct tunnel alignment (green option) between Epping and Franklin Road stations.

While there are more dwellings above the preferred direct tunnel alignment, it is important to consider the nature of the impacts in addition to the number of people and properties affected.

The direct property impacts of the preferred tunnel alignment would largely be confined to the likely required surface works, including a ventilation building (and potentially an emergency egress facility) near the mid tunnel point (refer to Section 3.2.5 below for further details). The potential for indirect impacts (or "affectation") would be largely as a result of ground-borne noise impacts during construction, which would be temporary in nature. Ground-borne noise during operation can be

mitigated through track design and (if necessary) operational measures, such as reduced train speeds.

All the direct tunnel alignment options would be located below residential areas. While the preferred alignment (green option) would be located below a greater number of residential dwellings than three of the other alignments, all the alignments are predicted to result in very low operational ground-borne noise and vibration levels subject to appropriate track design.

Statement of commitment 20 notes that processes would be established for detailed ground-borne noise predictions, management of activities and machinery during construction and noise monitoring and reporting. Statement of commitment 2 notes that community consultation strategies for the construction stage will be implemented. For example, targeted notification of tunnel construction progress would be undertaken for the duration of tunnel boring machine excavation and all reasonable and feasible mitigation measures to minimise impacts would be implemented.

Further discussion of property impacts is contained in Section 3.6.

Validity of the direct tunnel connection

A direct tunnel connection between Epping and Franklin Road stations was identified and described as an alignment alternative under consideration in Section 6.5 of the environmental assessment report. In this document it was explained that further studies were required to assess its viability and that it did not form part of the concept plan proposal for which TIDC was seeking approval.

As noted in Section 1.1.3 of this report, on 19 February 2007, the Director General of the Department of Planning required that, in accordance with Section 75H(6) of the EP&A Act, TIDC respond to the issues raised in the submissions received during public exhibition of the Environmental Assessment project report.

Section 75H of the EP&A Act provides for the following:

> '(6) The Director-General may require the proponent to submit to the Director-General:
>
> (a) a response to the issues raised in those submissions, and
>
> (b) a preferred project report that outlines any proposed changes to the project to minimise its environmental impact, and
>
> (c) any revised statement of commitments.
>
> (7) If the Director-General considers that significant changes are proposed to the nature of the project, the Director-General may require the proponent to make the preferred project report available to the public.'

A preferred project report is prepared when changes to the project described in the environmental assessment are proposed. Section 8 of the preferred project report describes a revised concept plan incorporating the direct tunnel connection between Epping and Franklin Road stations. In accordance with the requirements of the EP&A Act, the project (concept plan) is described in the preferred project report. Changes made to the concept plan are considered in accordance with section 75H(6)(b) of the EP&A Act with regard to minimising the potential environmental impacts of the concept plan. The preferred project report was on public exhibition from 6 June 2007 to 6 August 2007.

3.2.2 Alignment of the preferred option for the direct tunnel connection

Issues included:

- The alignment presented in the preferred project report was not previously proposed – the proposed rail line was to take a different route;
- Recommendations that following main roads and reserves should be standard design practice. Alternatively, submissions noted that, if the tunnel would have no surface impacts, why avoid running under residential properties?; and
- Queries related to the reasons for straightening the alignment in Epping, Cheltenham and Beecroft compared with other areas and other rail alignments (such as the Airport Link).

Alignment not previously proposed

A direct rail tunnel connection between Epping and Franklin Road stations was identified and described as an alignment alternative under consideration in Section 6.5 of the environmental assessment (blue alignment). It was explained that further studies were required to assess its viability and that it did not form part of the concept plan proposal for which TIDC was seeking approval.

A thorough comparative review of three direct tunnel alignment options was undertaken.

The options included:

- Environmental assessment alignment (blue);
- Option 1 (green); and
- Option 2 (pink).

Option 1 (green) alignment was chosen as preferred due to the following identified key advantages:

- It is shorter and straighter than the other two alignments;
- It has significantly less properties above the corridor than the environmental assessment (blue) alignment; and
- While there are marginally more properties above this corridor than Option 2, it is generally deeper.

The results of this review were documented in Chapter 7 of the preferred project report, which was on public exhibition from 6 June 2007 to 6 August 2007.

Whilst the alignment option that has now been chosen as preferred (Option 1 – green) was not identified in the environmental assessment, the exhibition of the preferred project report has provided the community with an opportunity to make submissions and comment on the preferred option. This is consistent with the process under Part 3A of the *Environmental Planning and Assessment Act, 1979*.

The submissions made in relation to the exhibition of the preferred project report have included the identification of three more alternative direct tunnel alignments referred to in this report as the Gold, Brown and Red alignments. A detailed review of all of the alignment options (ie. those identified in the preferred project report and subsequently by the community) has been now undertaken and is documented in the options review report (Appendix B). The options review report has concluded that the preferred option remains the 'green' direct tunnel alignment (see further discussion below).

A detailed description of the options selection process is contained in Chapter 2 and Chapter 4 of the options review report.

Opportunities to follow main roads and reserves

TIDC understands that, in general, the community would prefer the tunnel to be located below public land such as roads or parks rather than under residential properties. However, all rail alignments must consider numerous design constraints, such as curve, gradient, topography and station locations.

A tunnel alignment review was undertaken in response to submissions to the exhibition of the environmental assessment which attempted to maximise the amount of rail tunnel corridor under public land where possible whilst also considering the numerous design constraints of a rail alignment (refer to Section 3.2.3 and the options review report in Appendix B of this report for further details).

While the preferred alignment ('green' option) would be located below a greater number of residential dwellings than three of the other alignments, all the alignments are predicted to result in very low operational ground-bourne noise and vibration levels subject to appropriate track design.

Other underground rail lines in Sydney are located below both roads/public land and residential areas. For example, the Airport Rail Link follows the alignment of local roads, but is largely located below residential properties. The Epping to Chatswood Rail Line is also located below residential areas.

Reasons for straightening the alignment

As noted above, all rail alignments must consider numerous design constraints, such as curve, gradient, topography and station locations. Where feasible, straighter sections of track are preferred as they offer improved journey times and passenger comfort, reduced construction, maintenance and operating costs.

The options review report contained in Appendix B of this report notes that the proposed alignment is preferred because of the following key advantages:

- Lowest life cycle costs including an indicative capital cost ranging from $20 to $60 million less than the other options;
- It is shorter than the other alignments by between 230 and 650 metres and provides shorter journey times;
- Least construction impacts including the shortest construction period, up to 36,000 cubic metres less spoil and fewer truck movements than the other options;
- Best ride quality due to straight alignment and the elimination of any reverse curves;
- It would consume the least energy and generate the least greenhouse gas emissions during construction and operation; and
- It would not impact on the approved corridor for the Epping to Parramatta Rail Line.

Other sections of the project (after Franklin Road Station) have been subject to refinement and include sections of straight track and sections that follow main roads, such as Castle Hill Road, Showground Road, Salisbury Road and Norwest Boulevard. The alignment has also been chosen to link with the proposed station locations.

3.2.3 Suggested alternative alignments and options

Submissions raised a number of alternative tunnel alignments and also alternative public transport options. Suggestions included:

- Alternative tunnel alignments between Epping and Franklin Road stations, such as
  - a tunnel that passes beneath Beecroft Road, the M2 Motorway, Pennant Hills golf course, parklands and Pennants Hill Road to Thompson's Corner, then to Franklin Road Station (referred to in some submissions as the gold or yellow option);
  - a tunnel under the Northern Line (referred to as brown option);
  - a route which runs under Boronia Avenue;
  - a route from Epping via Carlingford Road, Jenkins Road/Oaks Road, power lines, Cumberland State Forest and Castle Hill Road;
- Other alternative tunnel alignments, such as
  - extension of the Carlingford Line to Franklin Road Station (referred to in some submissions as the red option);
  - a route via Pennant Hills station, Boundary Road (Pennant Hills) and Castle Hill Road, which would link to Castle Hill Station; and
- Surface alignments (including surface light rail)

Alternative tunnel alignments between Epping and Franklin Road stations

TIDC has now undertaken a comprehensive review of five tunnel alignments between Epping and Franklin Road stations, which is provided in Appendix B. This review included the following alignments:

- The 'blue' alignment, which was included as an alternative alignment to the Reference Scheme in the environmental assessment;
- The 'green' alignment, which was identified in the preferred project report and adopted as a modification to the concept plan;
- The 'pink' alignment, which was identified in the preferred project report;
- The 'gold' alignment, which was proposed in community submissions to the preferred project report;
- The 'brown' alignment, which was proposed in submissions to the preferred project report and during community information sessions.

A sixth 'red' option was proposed, which connected directly to Carlingford Station, in community submissions but was not included in the options review shortlist as it would not meet the project objectives. It would not provide a direct link from North West Sydney to the global arc centres of Sydney (North Ryde, Chatswood, St Leonards, North Sydney and the Sydney CBD), there would be insufficient capacity on both the Carlingford and Main Western Lines to accommodate the forecast demand for the North West Rail Link train services during peak periods and it would increase journey times between the North West and Sydney CBD.

The three alternative alignments proposed in community submissions were the subject of almost 3000 form letters, with 74% expressing support for the gold option, 22% for the red option and less than 1% for the brown option.

Support for the 'gold' option was the subject of a large percentage of form letter submissions. The gold option was not selected as the preferred option as it would have the longest tunnel and the greatest number of track curves. It is the worst performing option in terms of capital cost, spoil generation and spoil haulage, ride quality, journey time, maintenance, energy consumption during construction and operation and life cycle costs. The 'gold' alignment would also have the greatest construction risk as it would be located in the vicinity of piles for the Murray Farm Road overbridge, Kent Street pedestrian overbridge and the Beecroft Road flyover.

An alignment that follows below Boronia Avenue was considered to be too similar to the blue alignment and therefore does not warrant further investigation.

An alignment from Epping via Carlingford Road, Jenkins Road/Oaks Road, Cumberland State Forest and Castle Hill Road, connecting to Franklin Road Station is considered too lengthy and circuitous to warrant further investigation.

Other alternative tunnel alignments – extend the Carlingford Line

Connecting the North West Rail Link to the Carlingford Line, via a tunnel between Franklin Road Station and Carlingford, would not provide direct links between the new major growth and employment areas of the metropolitan region. Specifically, this alternative would not directly link North West Sydney to the 'global arc' centres of Sydney, including the CBD.

This rail connection would also not take advantage of key centres soon to be part of the CityRail network with the opening of the Epping to Chatswood Rail Line.

In addition, operation of the project during the morning two hour peak could involve at least eight trains per hour during peak periods (initially), and up to 12 trains per hour in the longer term, carrying up to approximately 14,000 passengers towards the CBD. There would be insufficient capacity on both the Carlingford and Western Lines to accommodate this demand, requiring significant (and costly) amplification to both corridors. Demand/capacity at existing rail stations would also be increased by additional arrival/departure to/from the CBD via the Western Line rather than spreading arrival/departure movements to/from north of the harbour.

Overall, it is likely that a rail connection from the North West via Carlingford would increase journey times between the North West and destinations on the global arc, making rail a less attractive option.

Other alternative tunnel alignments – link between (existing) West Pennant Hills Station and (proposed) Castle Hill Station

Connecting the North West Rail Link to the Northern Line, via a tunnel between Castle Hill Station and West Pennant Hills Station, would require significant additional surface works along the Northern Line between West Pennant Hills and Epping to cater for the NWRL project.

This would have significant costs and risks and potentially have significant environmental impacts. Taking into account project cost, operational flexibility, and impacts to the existing rail network during construction, maintenance and reliability, RailCorp has concluded that its preferred configuration would be a direct tunnel option.

Overall, it is likely that a rail connection from the North West via West Pennant Hills that utilises a surface link (quadruplication) along the Northern Line (between West Pennant Hills and Epping) would result in lengthier journey times between the North West and destinations on the global arc, and would make rail a less attractive option.

Alternative surface alignments (including light rail options)

Tunnel alignments are preferred as part of the NWRL project within the existing built up urban environment. Opportunities for surface alignments are extremely limited between Epping and the Balmoral Road Release Area. The environmental assessment identified a potential alternative surface alignment west of the Hills Centre Station, however, the preferred project report concluded that this would not be progressed.

A surface light rail (or bus way) alternative would also be restricted in identifying and acquiring a surface alignment between Epping and the Balmoral Road Release Area. In addition, light rail would have significantly less capacity to service the estimated patronage. Section 6.2 of the environmental assessment and section 3.4.2 of the preferred project report noted that heavy rail outperformed light rail options in both economic and non-economic appraisal results.

3.2.4 Alignment options considered and criteria used to evaluate options

Concern was raised regarding selection of the preferred rail tunnel alignment between Epping and Franklin Road stations. Issues related to the evaluation process included:

- Whether sufficient alignment options have been considered;
- Provide a detailed analysis of the impacts of all options, including number of properties, costs, heritage, social and environmental impacts;

Issues related to the selection criteria included:

- Assess the advantages and disadvantages of all options;
- Directness of route should not be prioritised over property impacts;

Issues related to reasons for selecting the preferred option included:

- The route which is the most economical and causes least disturbance should be adopted;
- Cost difference between options; and
- Cost saving alone should not be the basis for decision making.

The option evaluation process

Following the decision to adopt a direct tunnel connection from Epping to Franklin Road stations as part of the project, a review of options for the tunnel alignment was undertaken. The preferred project report presented a summary of TIDC's review of three direct tunnel alignments, which was undertaken to ensure that the alignment selected was the optimal alignment considering the range of technical, environmental and social factors that apply to the project. The review also considered submissions to the environmental assessment.

Section 7.2 of the preferred project report includes an analysis of the three identified direct tunnel alignment options comparing factors such as length of tunnel, cost, property affectation and tunnel depth. Heritage, social and environmental impacts were not assessed as they were seen as being similar for each option.

In response to submissions to the preferred project report, TIDC committed to undertaking further review of alignment options, including a comprehensive analysis of five alignments. This included three alignment options detailed in the preferred project report and two alignment options identified by the community – the gold and brown alignments. A sixth red alignment option, which involved a connection between Carlingford and Franklin Road stations, was also proposed in community submissions but was not included in the options review short list as it did not meet the project objectives. The options assessment is contained in an independently prepared options review report and is provided in Appendix B.

The five direct tunnel alignment options between Epping and Franklin Road stations that have now been assessed sufficiently cover all alignment options. Other alignment options between Epping and Franklin Road stations are likely to have similar disadvantages as options already considered in comparison to the preferred alignment.

Chapter 4 of the options review report (Appendix B) provides a more comprehensive comparison of all relevant criteria between the five direct tunnel alignment options between Epping and Franklin Road stations.

Selection criteria used to assess options

As described above, the preferred project report assessed the advantages and disadvantages of the direct tunnel options. Property affectation was a factor in this comparative assessment along with technical, environmental, and operational factors.

The options review report (Appendix B) contains a more comprehensive comparison of the five direct tunnel alignment options between Epping and Franklin Road stations. Selection criteria have been used in the comparative assessment under the categories of:

- Construction;
- Potential impacts to the environment (includes community and social); and
- Operation and maintenance.

Further details are provided in the options review report in Appendix B.

Reasons for selection of the preferred option

As detailed in Section 3.2.1 the preferred project report identified that the Option 1 (green) alignment was chosen as preferred due to the following key advantages:

- It is shorter and straighter than the other two alignments;
- It has significantly less properties above the corridor than the environmental assessment (blue) alignment; and
- While there are marginally more properties above this corridor than Option 2 (pink), it is generally deeper.

A more thorough assessment of the options is contained in the options review report (Appendix B). This report considered five direct tunnel connection alignment options for the Epping to Franklin Road stations section of the North West Rail Link project.

The options review report concluded that the Option 1 (green) alignment was still preferred because of the following key advantages of the green alignment relative to the other options:

- Lowest life cycle costs including an indicative capital cost ranging from $20 to $60 million less than the other options;
- It is shorter than the other alignments by between 230 and 650 metres and provides shorter journey times;
- Least construction impacts including the shortest construction period, up to 36,000 cubic metres less spoil and fewer truck movements than the other options;
- Best ride quality due to straight alignment and the elimination of any reverse curves;
- It would consume the least energy and generate the least greenhouse gas emissions during construction and operation; and
- It would not impact on the approved corridor for the Epping to Parramatta Rail Line.

All the direct tunnel alignment options would be located below residential areas. While the green alignment would be located below a greater number of residential dwellings than three of the other alignments, all the alignments are predicted to result in very low ground-borne noise and vibration levels subject to appropriate track design (refer to Section 3.3 for further discussion of ground-borne noise).

3.2.5 Location of supporting infrastructure along the alignment

Issues related to the requirement, location and design of ancillary infrastructure, including:

- Lack of requirement (or standards) for egress points on underground railways;
- Design and location of ventilation facilities (including need for filtration and/or potential health and environmental impacts of the ventilation shaft);
- Location of the egress facility and potential impacts on Chilworth Reserve - should be located near the M2 or a major road, not near bushland or residential areas;
- Egress facility should be partially underground with graffiti resistant finishes and landscaping;
- Location of water treatment plants and pumping stations; and
- Rail alignment in the vicinity of the proposed F3 Freeway to M2 Motorway road tunnel connection.

Requirement for supporting infrastructure

As noted in the preferred project report, tunnel ventilation will be based on a push-pull method, which relies on the use of tunnel ventilation fans at each station working in unison with a pre-determined strategy to achieve required ventilation levels within the tunnel and in an emergency smoke control within the tunnel. In addition to the tunnel ventilation system, a track exhaust system is also used.

The tunnel ventilation fans and track exhaust at each of the stations would be housed in service buildings located at or below the surface.

Tunnel emissions (via ventilation points) would not affect air quality as electric trains would operate on the project. Very small quantities of brake dust would be emitted at locations where trains are required to slow or stop at stations. These emissions would not result in any impacts on surrounding receptors or require filtration.

In accordance with the National Fire Protection Association Standard for Fixed Guideway Transit and Passenger Rail Systems, NFPA 130 (2003), cross passages for emergency egress to the opposite tunnel would be located 533 metres from each station, followed by spacings no greater than 243 metres apart. Emergency egress stairs, draught relief and ventilation structures would be incorporated into the station structures, along with associated equipment.

A Fire Life Safety Strategy will be prepared by TIDC as part of the concept design process in consultation with NSW Fire Brigades and other stakeholders that will help determine the ventilation design and emergency egress facilities.

Location and Design of Egress Facility

Depending on the results of the Fire Life Safety Strategy and other investigations as part of the concept design, a service building may be required near the midpoint of the tunnel between Epping and Franklin Road stations to optimise the ventilation performance. These stations are over 6 km apart, whereas other stations are only approximately 2-3 km apart. The service building would typically contain a transformer room, switch room, extinguishing gas room, hydrant booster valve set, storage and/or amenities, and the fan plant room (including ventilation tunnel and shaft). The service building may include an emergency egress facility.

Chilworth Reserve has not been selected as a location for the service building /egress facility. As stated in the preferred project report, no location for this potential facility has been selected and if the facility is required a comparative assessment taking into consideration accessibility, surrounding

development and environmental considerations would need to be undertaken. The location and design of this facility is subject to further design, planning and assessment as part of the next stage of the project.

The facility would be designed to minimise the footprint and above surface elements. Some elements of the facility would need to be above ground to allow for ease of maintenance. Details of finishes and landscaping would be addressed as part of the next stage of the project which will include the next stage of consultation including exhibition of the environmental assessment report.

Water treatment plants and pumping stations

As noted in the preferred project report, one or more water treatment plants would be required for the project to treat the inflow of groundwater prior to discharge. Tunnel lining would restrict groundwater inflows, but some seepage would still occur. Seepage water entering the rail tunnels needs to be collected at the low points and pumped to water treatment plants where any pollutants are removed or treated prior to discharge or reuse.

Possible locations for a permanent water treatment plant(s) are subject to further design of the rail tunnel and investigations into water recycling and reuse options.

Rail alignment in the vicinity of the proposed F3 Freeway to M2 Motorway road tunnel connection

The Commonwealth Government proposes the development of a road to link the F3 Freeway at Wahroonga to the Sydney Orbital. The preferred corridor for the link is the 'purple' option, which is mostly in tunnel, and would connect the F3 Freeway at Wahroonga to the M2 Motorway at the Pennant Hills Road interchange. So as not to preclude the future development of the purple alignment, it is desirable that the alignment of the North West Rail Link has a vertical clearance from the purple option of at least two tunnel diameters.

Based on current information, there would be approximately 24 metres clearance between the proposed NWRL rail tunnel and the F3 to M2 road tunnel, which is adequate to ensure that construction risks are minimised.

3.3 Noise and vibration issues

3.3.1 Noise and vibration criteria

Issues included:

- No criteria have been set for noise levels during construction and operation;
- What vibration levels will be applied during construction and operation?
- The operational noise level criteria should be 0dBA;
- The operational noise level criteria should be 20dBA;
- Operational noise limits should be based on the experience of the Airport Rail Link and the Epping to Chatswood Rail Line;
- Guarantees that the criteria will be met;
- Will the noise be perceptible if criteria have been met? and
- The *Interim Guidelines for the Assessment of Noise from Rail Infrastructure Projects* indicates that ground borne noise cannot be accurately predicted.

Noise criteria

Construction Noise

As noted in the environmental assessment, the levels used for assessing the airborne noise impact from construction sites are set in the *Environmental Noise Control Manual* prepared by the Department of Environment and Climate Change.

The guidelines set out a general approach to the control of airborne noise from construction sites involving the following:

- Limiting hours of operation for 'noisy' construction work;
- Use of silenced equipment; and
- Compliance with noise emission objectives which vary according to the duration of the construction period.

As the overall duration of the proposed construction program would be greater than 26 weeks, the L_{A90} background + 5 dBA noise goal would be applicable to residential and other noise sensitive receiver locations (e.g. schools, hospitals, nursing homes, etc). The L_{A90}[1] background noise level is measured during the relevant time period (day, evening or night). For retail and commercial buildings, it is generally accepted that receivers are 5 dBA to 10 dBA less sensitive to noise emissions than residential receivers.

[1] LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration) or simply the background level.

Operational Noise

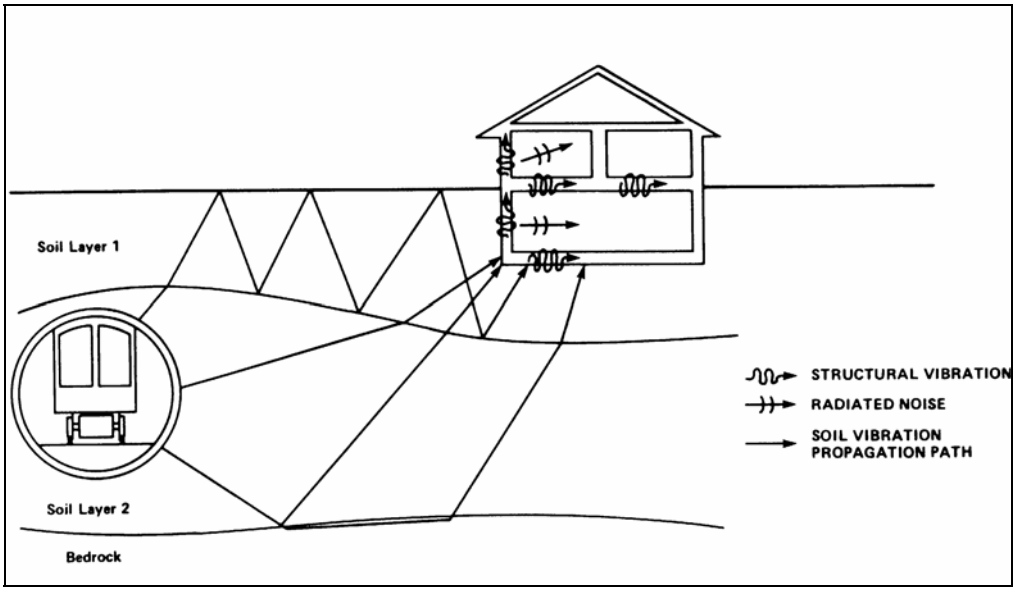
As noted in Section 3.9 of this report, TIDC is seeking approval of the concept plan for the project under Part 3A of the EP&A Act. Further noise studies would be undertaken during the next stage of the assessment process.

As noted in the preferred project report, as part of the further design development and environmental assessment, the *Interim Guidelines for the Assessment of Noise from Rail Infrastructure Projects*[2] (Interim Guidelines) prepared by the Department of Environment and Climate Change, describe the process for the assessment of potential noise impacts associated with rail developments in a consistent and transparent manner. The guideline establishes 'noise trigger levels' and a process to establish project-specific noise levels for residential and other uses (e.g. schools, community facilities or facilities that may be sensitive to noise). The noise trigger levels presented in the Interim Guidelines are the levels that trigger the need to conduct an assessment of potential noise and vibration impacts and to examine what mitigation measures would be feasible and reasonable to implement to ameliorate these impacts. Importantly, the noise trigger levels are not intended to be applied automatically in any mandatory sense as conditions in statutory approvals or licences.

The Interim Guidelines note that social survey research conducted over the last 30 years and across different countries has shown that reaction to noise varies widely from individual to individual. Because of this, it is not possible to adopt noise criteria that would guarantee no one will experience an impact from noise.

As noted in the preferred project report, ground-borne noise is created when vibrations produced at the track by trains running in the tunnels travel up through the ground and into buildings, causing flat surfaces in the building to vibrate faintly. The vibration should not be strong enough to be felt, but may create an audible noise in the building (see Figure 1 below). Ground-borne noise is also sometimes referred to as 'regenerated' or 'radiated' noise.

Figure 3.1 Ground-borne noise Source: Heggies, 2007



[2] Department of Environment and Climate Change, February 2007

The ground-borne noise and vibration investigations to be undertaken during the project environmental assessment stage would be based on experience gained on recent rail tunnel projects such as the Epping to Chatswood Rail Line and the Airport Rail Link. The ground-borne noise levels represent noise levels inside buildings and are measured/predicted and then assessed at the centre of the most potentially affected habitable room.

A noise level of 0dBA is the threshold of human hearing, whilst 20dBA is equivalent to noise levels at night-time in a rural house; 40dBA is equivalent to the noise levels of a quiet fan or air conditioning; and 60dBA is equivalent to the noise levels of a conversation at 2 metres.

Setting operational ground-borne noise level criteria of 20 dBA or less is not realistic in an urban environment. The "A" in dBA indicates that the noise measurement has been weighted to match human hearing characteristics. A two (2) dBA increase or decrease in noise level may be just noticeable to the human ear, while a 10 dBA increase or decrease corresponds to a doubling or halving in 'loudness' of noise to the human ear.

The Interim Guidelines offer commentary leading to some observations in relation to ground-borne noise. The Interim Guidelines indicate that it is reasonable to conclude that internal ground-borne noise levels from trains in tunnels at or below 30 dBA L_{Amax} will not result in adverse reactions, even where the source of noise is new and occurs in areas with low ambient noise levels (i.e. where outdoor background sound levels are in the order of 30 dBA or lower).

International practice typically applies levels of 35-40 dBA L_{Amax} for the design of underground rail systems. Such levels provide reasonable environmental outcomes for most urban residential situations, even in busy underground systems where there are large numbers of train "pass-by" noise events.

The trigger levels in the Interim Guidelines which will be applied to the NWRL project are 35 dBA LAmax at night and 40 dBA during the day for residential receivers. These guideline noise trigger levels are aimed at providing a reasonable basis for triggering the assessment of impacts from ground-borne noise. The Interim Guidelines state that the trigger levels are necessarily set to the lower end of the range of possible trigger values so that potential impacts on quieter suburban locations are addressed. In practice, higher levels of ground-borne noise than the trigger levels for assessing impacts may be suitable for urban areas where background noise levels are relatively high.

The Interim Guidelines indicate that in relation to potential sleep disturbance, ground-borne noise levels from trains not exceeding 45 dBA L_{Amax} (indoors) appear to be desirable.

Background noise levels and other ambient noise are important factors in whether ground-borne noise is noticeable (higher background noise levels generally 'mask' other noises). The anticipated ground-borne noise levels from a rail tunnel would be well below most other noises in a typical suburban environment.

The Interim Guidelines do not state that ground-borne noise cannot be accurately predicted, rather that the prediction of ground-borne noise and vibration levels is complex and is still a developing field with no standard calculation methods. Predictions for new underground railway lines are usually based on a combination of measurement data obtained for similar trains, track type and ground conditions, and the use of empirical formulae to account for factors such as changes in train speed, distance, ground type and building foundation type. Due to the variable nature of some of these factors, it is normal practice to include some conservatism in the modelling process and apply an appropriate

safety factor. For this reason, the measured ground-borne noise and vibration levels after project opening are in most cases lower than the predicted levels.

While the numerical prediction processes may not be exact, conservatism and the use of a prudent safety factor results in high confidence that intended outcomes will be achieved in practice. The options review report contains a preliminary ground-borne noise study which undertakes an assessment of the initial ground borne noise issues for the tunnel alignment options (refer to Appendix B for further detail).

Vibration criteria

As noted in the environmental assessment, the standards normally used as a basis for assessing the risk of vibration damage to structures are German Standard DIN 4150 Part 3 1999 and British Standard BS 7385 Part 2 1993. For continuous vibration or repetitive vibration with potential to cause fatigue effects, DIN 4150 provides the following peak particle velocity values as safe limits, below which even superficial cosmetic damage is not to be expected:

- 10 mm/s for commercial buildings and buildings of similar design;
- 5 mm/s for dwellings and buildings of similar design; and
- 2.5 mm/s for buildings of great intrinsic value (e.g. heritage listed buildings).

Human comfort is normally assessed with reference to British Standard BS 6472 1992 or Australian Standard AS 2670.2 1990. For daytime activities, the limiting objective for continuous vibration at residential or commercial receivers is V_{rms} 0.4 mm/s.

3.3.2 Potential noise impacts

Issues were raised in relation to potential construction and operational impacts, including:

- Sound engineers have estimated that the noise level expected for the tunnel will be very loud.
- How much noise and vibration will reach the surface during construction and operation?
- What impacts will I experience? At what tunnel depth will impacts be experienced?
- What will be the impacts on wildlife in reserves along the route?
- How does the shale and clay overburden compare to sandstone in the transmission and regeneration of noise and vibration to the surface? and
- Different rock types perform differently. How to ensure that vibration will be imperceptible or barely perceptible?

Construction impacts

The preferred project report noted that during construction, it is expected that ground-borne noise would be experienced as a result of the construction of the tunnel. Section 9.3.4 of the environmental assessment notes that ground-borne noise during construction (created when vibrations produced by the tunnel boring machine travel up through the ground and into buildings causing flat surfaces in the building to vibrate) is generally correlated with depth of the tunnel. Vibration would generally be below human comfort levels, but may create an audible noise within a building.

As shown in Figure 1, a number of other factors also influence ground-borne noise levels, including the geology of the area (including the physical properties of the soil and rock layers and reflections between these different layers) and the acoustic characteristics of the building, primarily the building's

foundations and the type of floor and wall materials. Generally speaking, the vibration loss is greater in shale and clay compared with sandstone (and therefore the vibration transmitted to dwellings is less) with the vibration loss being greater at higher frequencies.

Based on experience gained from the Epping to Chatswood Rail Line, ground-borne noise during construction could be up to a maximum level of 50 dBA above a tunnel depth of approximately 25 metres. However, ground-borne noise at this level would typically only occur over a period of approximately 2 to 3 days at any one location for each of the two tunnels as tunnelling activities pass below.

These sorts of noise levels during construction can be disruptive to residents and schools above the alignment. Impacts on wildlife in nearby reserves and the koala park on Castle Hill Road are not anticipated to be significant. Consultation with the koala park owners would be undertaken to identify any potential disturbance during construction.

Statement of commitment 20 notes that processes would be established for detailed ground-borne noise predictions, management of activities and machinery during construction and noise monitoring and reporting. Statement of commitment 2 notes that community consultation strategies for the construction stage will be implemented. For example, targeted notification of tunnel construction progress would be undertaken for the duration of tunnel boring machine excavation and all reasonable and feasible mitigation measures to minimise impacts would be implemented.

Operational impacts

Ground-borne noise would be assessed in accordance with the Interim Guidelines as described in section 3.3.1 above. Statement of commitment 22 provides for an operational noise assessment in accordance with the Interim Guidelines,

3.3.3 Potential for vibration impacts and property damage

Issues included:

- Impacts on schools etc above the tunnel;
- Impacts on heritage properties;
- Potential for damage to properties above the tunnel; and
- Impacts of multiple tunnels.

Potential impacts – schools, heritage properties

As noted in the preferred project report, the risk of damage to buildings, swimming pools or other structures from vibration during construction should be negligible given the proposed tunnel depths. Section 9.3.4 of the environmental assessment notes that ground-borne noise during construction (created when vibrations produced by the tunnel boring machine or other tunnelling equipment travel up through the ground and into buildings causing flat surfaces in the building to vibrate) could be up to a maximum level of 50 dBA above a tunnel depth of approximately 25 metres. The corresponding vibration level encountered at buildings above the tunnel construction activities would be less than standards at which damage would be expected. This is also the case for heritage properties. Construction of twin tunnels simultaneously would not result in additional risk. Experience from construction of the Epping to Chatswood Rail Line, which was constructed as twin tunnels, indicates

that there is low risk of vibration damage during the tunnel construction phase, provided that prudent construction and excavation management procedures are followed.

Statement of commitment 20 notes that processes would be established for detailed ground-borne noise and vibration predictions, management of activities and machinery during construction and vibration monitoring and reporting. Statement of commitment 2 notes that communication strategies for the construction stage would be implemented. For example, building condition surveys would be offered to property owners for all structures within a specified distance of the tunnel alignment. These surveys would be undertaken prior to construction as a precautionary measure. If a property owner believed damage had been caused as a result of construction, the building condition survey could be used to assess the claim.

During operation, as noted in the preferred project report, both ground-borne noise and physical vibration in a building are caused by the same mechanism - vibration reaching the building after travelling through the ground.

The standards normally used as the basis for assessing the risk of vibration damage to structures are German Standard DIN 4150 Part 3 1999 and British Standard BS 7385 Part 2 1993. As it is generally more difficult to achieve the criteria for ground-borne noise, than the criteria in the physical vibration standards, the design measures implemented to control ground-borne noise would ensure that vibration levels from the operation of trains in the tunnel would be sufficient in relation to vibration standards.

3.3.4 Mitigation measures

Issues included:

- What measures are available to minimise potential impacts of regenerated noise?
- TIDC should commit to the implementation of mitigation measures;
- The most advanced noise minimisation technology for track and rolling stock should be applied through residential areas; and
- Floating track slab type trackform should be used for tunnels near residential properties and sensitive receivers.

Noise mitigation

Statement of commitment 22 provides for an operational noise assessment in accordance with the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects*, including the identification of acoustic mitigation measures to meet, where reasonable and feasible, the design goals. Statement of commitment 24 provides for an investigation of feasible and reasonable mitigation measures to manage operational vibration in consultation with Councils, the Department of Environment and Climate Change and RailCorp.

The impacts of ground-borne noise and vibration during operation of the project would be minimised through appropriate track design. Different types of track design can be used to reduce the level of vibration caused at the track, and hence the level of vibration that reaches the surface.

Based on experience gained from the Epping to Chatswood Rail Line, the project is likely to use two types of technologically advanced track structures which have been chosen for their ability to reduce vibration and thus ground-borne noise. These are called “Direct Fix” track and “Floating Slab” track.

Both track types substantially reduce ground-borne noise and are used around the world on other rail lines. The direct fix track will have rubber isolation providing a high level of noise attenuation, but in areas where higher levels of attenuation are needed, a floating slab track will be used. Typical details of the two types of track slab are shown in Figure 2 of the ground-borne noise study (refer to Appendix B of this report).

The selection of Direct Fix or Floating Slab at various locations would be determined during the design development and assessment process to be undertaken to mitigate ground-borne noise. The design of the project would be developed to minimise ground-borne noise at the source (i.e. the train on the track).

It is not appropriate to provide the most advanced noise minimisation technologies in areas where the tunnel depth, track design, train speeds and other factors dictate that the ground-borne noise levels will be below the ground-borne noise trigger levels. This is on the basis that most people would not be noticeably affected by ground-borne noise levels below the trigger levels. Provision of the most advanced and costly noise minimisation technology (floating slab track) is not warranted (or cost-effective) in areas where it will not provide a noticeable benefit to the community.

The level of ground-borne noise generated at the source is also affected by the condition of the rails used in the track and the condition of the wheels of the trains. As the future operator of the NWRL, RailCorp would develop a schedule for regular maintenance of the rail track and wheels of trains.

3.3.5 Further studies

Issues included:

- Background noise and vibration studies should be undertaken, including installation of noise and vibration loggers;
- Further operational noise impact assessment should be undertaken; and
- Commitment to doing further studies.

Further studies

As noted in Section 3.9 of this report, TIDC is seeking approval of the concept plan for the project under Part 3A of the EP&A Act, and in-depth studies are not required at this stage of the assessment process. However, the environmental assessment included a preliminary noise and vibration assessment (refer to Appendix C in Volume 2 of the environmental assessment for further details). More recently there have been investigations into the predicted likely ground borne noise levels for the Epping to Franklin Road stations tunnel alignment options (refer to options review report contained in Appendix B of this report for further details).

Statement of commitment 20 notes that processes would be established for detailed ground-borne noise predictions, management of activities and machinery during construction and noise monitoring and reporting. Statement of commitment 2 notes that community consultation strategies for the construction stage will be implemented. For example, targeted notification of tunnel construction progress would be undertaken for the duration of tunnel boring machine excavation and all reasonable and feasible mitigation measures to minimise impacts would be implemented.

Statement of commitment 22 provides for an operational noise assessment in accordance with the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects*, including:

- Modelling of operational noise impacts (including ground borne noise) in more detail as part of the design development;
- Identification of acoustic mitigation measures to meet, where reasonable and feasible, the design goals; and
- Select representative locations for the project at which it is appropriate to later assess compliance.

3.4 Geotechnical issues

3.4.1 Geotechnical environment

Issues included:

- Amount of clay and shale cover to the tunnel at Grace Avenue, Beecroft;
- The hill at Thompson's Corner is a landslip area;
- Have geotechnical conditions been taken into account in the project design?; and
- Issues with tunnelling in the vicinity of the M2 Motorway.

Grace Avenue Beecroft

Preliminary geological investigations undertaken show that the land under Grace Street comprises of shale, underlying Mittagong formation and sandstone. The tunnel alignment under this location will be at a depth of approximately 59 metres and in sandstone.

Thompsons Corner

The proposed construction methodology at Thompsons Corner will be tunnel boring machine and not open cut construction. The proposed tunnels are also extremely deep at this point. Consequently, landslip should not be an issue.

Geotechnical conditions and the project design

As noted in Section 3.9 of this report, TIDC is seeking approval of the concept plan (otherwise known as a concept plan approval or concept approval) for the project under Part 3A of the EP&A Act. In-depth geotechnical studies have not been undertaken at this stage of the assessment process.

Concerns raised have been noted and would be addressed during detailed geotechnical investigations, which would inform design development and environmental assessment planned for the next stage of the project (statement of commitment 35).

Tunnels have been constructed successfully in Sydney, other parts of Australia and internationally, with the ground cover above the tunnel varying from very shallow to very deep and in a range of ground conditions, including shale.

Procedures and measures will be implemented to address and mitigate the particular risks associated with tunnel construction along the route of the project. The design will respond to the varying geotechnical considerations along the route.

Design and construction interface with the M2 Motorway

The M2 Motorway and its associated peripheral structures (which include Murray Farm Road Overbridge, Kent Street Pedestrian Overbridge, the Beecroft Road Flyover and the Northern Line Rail Bridge) are significant infrastructure elements that are supported by different civil structures, such as viaduct or bridges with deep footings and piles. At this stage it is anticipated that the proposed tunnel alignment can be constructed to cross below the M2 Motorway and would only potentially intersect with the Kent Street Pedestrian Overbridge where there would be some potential for short-term closure during construction. The risks of other alignment options on structures associated with the M2 Motorway are described in the options review report.

3.4.2 Impact on groundwater

Issues included:

- Impact on the water table and natural groundwater springs, and potential for drying of clay and impacts to houses; and
- Impact on trees and waterways, including impacts on Devlin Creek.

Potential for impacts

As noted in the preferred project report, there is potential for the tunnel to impact on groundwater. This will be dependent on the method of construction used and the type of lining installed. In areas that are particularly sensitive, a tunnel lining could be installed which prevents the lowering of the groundwater table. This is one of a number of issues that would be addressed during design.

Statement of commitment 35 provides for detailed geotechnical and groundwater investigations to be undertaken to inform design development.

As noted in the preferred project report, there would be potential for adverse changes to creeks and subsequent changes in riparian vegetation if water drawdown occurred as a direct result of the construction of the rail tunnel. However, provided that appropriate tunnel design is implemented (such as tunnel lining), the likelihood of significant water drawdown or impacts on riparian vegetation is considered low.

3.4.3 Potential Geotechnical Impact on properties

Issues included:

- Risk of subsidence and property collapse,
- Concern regarding stability of homes in Carlisle Crescent with three tunnels in the vicinity.
- Risks in areas where the tunnel is located close to the ground surface;
- Potential for impacts on holding tanks at the Mobil service station on Beecroft Road;
- Potential for impacts on apartment blocks with garages below street level; and
- Impacts on creeks including Devlin Creek.

As the tunnel is excavated, the tunnel will be supported. The support will be determined based on a number of criteria, including the geological conditions and control of ground movement. This will address the potential for subsidence and stability issues in both the short and long term.

All structures above the tunnelling work areas would be identified and assessed in detail so that ground support required could be identified and implemented as required. Structures such as apartment blocks, below street garages and any fuel holding tanks in the vicinity of the rail tunnel are likely to be well above the tunnel and therefore would not be physically impacted, It is noted that the Mobil service station on Beecroft Road is located outside the proposed rail corridor.

For all tunnelling, ground level settlement would be monitored and any additional ground support required would be identified and implemented.

The rock in the vicinity of an active creek is in general highly fractured. Tunnel excavation under a creek would be carried out with care considering factors such as the possible high stress conditions and depth of weathering that may exist under the creek with supplementary ground treatment undertaken as necessary.

With the current vertical alignment the lowest cover to creek bed above the tunnel crown is approximately 5 metres at Devlins Creek and therefore will require additional ground stabilisation measures prior to excavation to maintain the stability of the tunnel to minimize ground movement above the tunnel, as well as to deal with any potential groundwater inflow issues.

There would be multiple engineering solutions to mitigate the risk of subsidence in shallow sections of tunnel alignment. The details of these will be outlined as part of the next stage of environmental assessment.

3.5 Traffic, parking and public transport issues

Issues included:

- Impact on existing traffic and parking issues at Epping;
- Maximise parking availability, bus interchanges and other facilities at stations to encourage public transport use;
- Access arrangements for Franklin Road Station;
- Have construction traffic impacts been taken into account, particular the increase in heavy vehicle traffic? and
- Potential traffic impacts along Norwest Boulevard during operation.

Potential traffic impacts at Epping

No additional commuter parking in the vicinity of Epping Station is proposed as part of the project. The NWRL is proposing commuter parking at Franklin Road Station.

The upgrade of Epping Station, as part of the Epping to Chatswood Rail Line, includes an integrated transport interchange which will improve bus connections.

Epping has been designated as a town centre under the NSW Government's Metropolitan Strategy. The focus on public transport links to Epping Station is consistent with the NSW Government's policies to encourage public transport to centres.

When complete, each new and upgraded station on the Epping to Chatswood Rail Line, including Epping and Chatswood stations, will provide easy access facilities, improved links with other public transport services and safe pick-up and drop-off areas for private vehicles.

During the planning phase of the Epping to Chatswood Rail Line, provisions for improved bus and drop off facilities, rather than additional commuter car parks, were proposed to encourage commuters to use public transport to reach the stations. Surveillance and monitoring of these facilities and any impacts on traffic flow will occur as part of the early operational stages of the Epping to Chatswood Rail Line in accordance with the Minister's Conditions of Approval.

Planning for station access and parking

Station precinct planning

TIDC engaged Cox Richardson Architects and Planners to prepare the first stage of station precinct plans for the new underground stations.

The indicative precinct plans were shown and described in the preferred project report. The plans represent how the new stations could be integrated into the future urban fabric. They show that the stations and associated surface facilities, including commuter car parking and bus interchanges, could be accommodated within the nominated precincts. The plans are indicative only, and were prepared to highlight potential configurations and issues.

Station precinct planning is occurring in consultation with local councils and other key stakeholders. There will also be further opportunities for community input.

TIDC is not seeking approval for the indicative precinct plans as part of the concept plan for the project. Approval for the design of the station precincts would occur at the next stage in the planning approval process.

Statement of commitments 11 to 19 provide for future planning of station precincts, access and parking.

Parking

Section 7.2.9 of the environmental assessment identifies the opportunities and constraints associated with commuter parking at each station.

Decisions to provide commuter parking necessitate balancing a range of factors, for example:

- Provision of parking provides the opportunity for commuters to drive to the station in order to access the rail network;
- Commuter parking generates traffic movements (a high proportion during the peak periods), which can congest roads, intersections and areas around stations and impact on local amenity;
- Commuter parking is expensive to provide and takes up valuable land around stations which could be used for land uses that bring value to (and derive value from) the investment in commuter rail; and
- Commuter parking, by its nature, can impact on the viability of feeder bus services, as they can divert potential users from public transport to private vehicles.

The locations, scale, design and quantum of park-and-ride facilities at stations would be reviewed during future design development and the precinct planning process (statement of commitment 12).

Accessibility to Franklin Road Station

TIDC is aware of the difficulties associated with vehicular access to the proposed Franklin Road Station, which would be located to the north of Castle Hill Road in Cherrybrook (near the boundary with

West Pennant Hills), west of Franklin Road and east of Robert Road. This station would serve the population catchments of Cherrybrook and West Pennant Hills. A station in this area presents an opportunity to provide convenient bus access and park and ride facilities.

The site was chosen because of the large amount of available undeveloped land and proximity to a main road and catchment area. It would have a large catchment area for walking/cycling, buses, kiss and ride, and park and ride.

The presence of both Franklin Road and Castle Hill stations presents an opportunity for the development of bus routes linking residents in surrounding areas (such as Cherrybrook, West Pennant Hills, Thompson's Corner, Oakhill, Round Corner/Kenthurst, and Dural) to the stations.

Detailed traffic and transport investigations would be undertaken to inform access arrangements to the Station precinct (statement of commitments 11 and 12). Statement of commitments 14 and 15 specifically address known traffic access issues associated with Franklin Road Station.

Traffic impacts during construction

As noted in the preferred project report, the potential impacts of traffic generated during the construction phase were outlined in the Section 9.2.2 of the environmental assessment, which identified potential impacts associated with safety, road capacity, congestion, amenity and disruption to pedestrians/cyclists, and bus services (including bus transitways). Traffic impacts are expected to occur at all construction sites (including station sites) and as a result of the transportation of spoil.

These impacts require further assessment during the next stage of the planning process. While it is likely that these impacts would be consistent with the environmental assessment, they would be assessed (and dealt with) in more depth during the construction planning process when the details of the construction process and staging are more developed.

Statement of commitment 16 aims to minimise and manage traffic impacts associated with construction, whilst statement of commitment 18 aims to minimise traffic disruptions associated with construction in the vicinity of major roads.

Potential traffic impacts along Norwest Boulevard during operation

As noted in section 5.4.1 of the preferred project report, the potential operational characteristics associated with proposed stations were outlined in section 9.2.3 of the environmental assessment. Characteristics considered included the key access modes of vehicles (park and ride, kiss and ride, servicing), public transport (bus), taxi, cyclists and pedestrians.

Potential traffic impacts at each station could not be fully addressed at the concept plan stage. Statement of commitment 11 states that further studies would be undertaken to consider the integration of each station with the local area during operation to ensure that predicted patronage and mode access are catered for during operation.

Studies for Norwest Station would consider local connectivity requirements and the potential impacts of traffic accessing the station from Norwest Boulevard. Updated road design and planning information would be obtained, including any proposal by the RTA to widen the road.

Potential impacts on the road network surrounding each station would be investigated in accordance with the statement of commitment 17, which identifies that future traffic modelling/analysis would be undertaken.

Commuter parking at Norwest Station is addressed in section 3.10.2 of this report.

3.6 Property issues

3.6.1 Property values, acquisition and compensation

Issues include:

- Potential for impacts on property values in the vicinity of the direct tunnel connection;
- Compensation payable for decrease in property values or other project impacts (e.g. regenerated noise);
- The Government's acquisition policy; and
- Need to resolve acquisition of properties as quickly as possible.

Property values and compensation within or in the vicinity of the rail tunnel corridor

The ability to predict the effect of a project on property values is difficult due to the complex range of factors that affect the value of a property. A number of studies have been undertaken that conclude that a correlation between a tunnel corridor and a long-term decrease in property value cannot be made.

Three reports were cited in Section 5.20.1 of the preferred project report. A report titled 'Proposed Parramatta Rail Link – Impacts on Property Values – Independent Peer Review' (prepared by Hill PDA consulting in December 2001) was also included in the Director General's Assessment Report for the Parramatta Rail Link, which is available from the Department of Planning and included in Appendix C of this report.

However, until construction is complete and the railway line is operational TIDC recognises that the tunnel may create negative perceptions. If a property owner is wishing to sell their property, TIDC is willing to brief the real estate agent on the issues so they can then provide informed information to potential buyers.

The presence and location of a rail tunnel and/or rail corridor should not result in physical impacts to properties or facilities on the surface above the tunnel. Both ground-borne noise and vibration would be subject to stringent design requirements to ensure that potential impacts are minimised (as described in sections 3.3 and 3.4).

TIDC will adhere to the Government's acquisition policy as set out in the *Land Acquisition (Just Terms Compensation) Act 1991.* Acquisition of stratum for a tunnel is not subject to compensation. The issue of compensation is a matter of broader Government policy, and TIDC is unable to offer compensation to property owners above the proposed corridor.

Acquisition

The Department of Planning, who are acquiring properties for the project will negotiate with the owners of properties that would be directly impacted by surface sections of the project to partially or completely acquire their property as required, in accordance with the terms of the *Land Acquisition (Just Terms Compensation) Act 1991*.

The *Land Acquisition (Just Terms Compensation) Act 1991* outlines the timeframes and procedures for the property acquisition process. The Department of Planning has initiated the acquisition process for properties directly affected.

3.6.2 Property impacts

Issues include:

- Pre-condition surveys for homes along the tunnel route;
- Compensation as a result of any property damage; and
- Compensation available for residents/businesses experiencing construction impacts.

Property impacts

The risk of damage to buildings or other structures from vibration during construction is low given the proposed tunnel depths. The vibration level encountered at buildings above the tunnel during construction would be less than levels at which damage would be expected.

Statement of commitment 2 notes that communication strategies for the construction stage of the corridor would be implemented. As a precautionary measure, property owners within a specified distance based on a geotechnical risk assessment would be offered a free pre-condition survey prior to construction commencing. If a property owner believed damage had been caused as a result of construction, the precondition survey would be used to assess the claim.

If damage to property has occurred as a direct result of construction activities, this damage would be rectified at no cost to the property owner.

Compensation available for residents/businesses experiencing construction impacts

There is no compensation proposed for residents and businesses during the construction of the North West Rail Link. TIDC and its contractors will work closely with affected businesses and residents to ensure that impacts are minimised and managed to ensure the least possible inconvenience.

During construction, mitigation measures would be implemented as identified by statement of commitment 45. Mitigation measures would require more detailed investigation, but would typically include maintaining access throughout the construction period and minimising noise and dust impacts. These measures would assist in minimising the significance of these impacts.

3.6.3 Other issues

Issues included:

- Requests for information on property values associated with the construction and operation of the Epping to Chatswood Rail Line;
- It is stated that development above, below and adjacent to the tunnel would have to be designed to take the project into consideration. What does that mean for existing properties?
- Will the tunnel result in an easement shown on the property title? Does the *Land Acquisition (Just Terms Compensation) Act 1991* apply to substratum acquisition?

Epping to Chatswood rail tunnel

A report titled '*Proposed Parramatta Rail Link – Impacts on Property Values – Independent Peer Review*' (prepared by Hill PDA consulting in December 2001) was included in the Director General's Assessment Report for the Parramatta Rail Link, which is available from the Department of Planning and included in Appendix C of this report.

Future development potential

As noted in the preferred project report, proposed development above, below and adjacent to the rail tunnel, or otherwise potentially impacting on the construction and operation of the project, would have to be designed taking the project into consideration.

The presence of the project corridor does not preclude future development (or redevelopment of existing properties as detailed in sections 3.6.2 and 3.4.3) above the corridor. The extent of the potential constraint can only be determined based upon the type of development proposed and the location of the development. Sensitive design of any surface development could successfully mitigate the potential for physical impacts of the development on the project. The project would also incorporate appropriate design parameters to ensure that the potential for operational impacts (for example, ground-borne noise), are minimised.

Acquisition of land for tunnel

The environmental assessment noted in Section 9.1.2, that the substratum required for the rail tunnel would be acquired in outright ownership by TIDC. This type of acquisition would allow owners of properties above the rail tunnel to have a clear property title with no tunnel easement shown.

The *Land Acquisition (Just Terms Compensation) Act 1991* does not apply to substratum acquisition.

3.7 Communication and consultation issues

3.7.1 Adequacy of information provided and consultation undertaken

Concerns were raised in submissions regarding:

- The extent of consultation undertaken was too limited,
- Notification about the exhibition of the preferred project report and community information sessions was not adequate. Why are residents within 250 metres being notified if TIDC claims impacts of the tunnel are minimal;
- Limited access to information about the project; and
- Level of detail provided about the project, including direct tunnel options, was inadequate.

Extent of consultation activities undertaken

TIDC considers that significant consultation has been undertaken for the project. Consultation activities have gone beyond the requirements of the EP&A Act. Under Part 3A of the Act (Section 75H(3)), the Director General of the Department of Planning must make an environmental assessment publicly available for at least 30 days. The environmental assessment was on exhibition for 72 days.

Section 4 of the environmental assessment provides information on consultation undertaken prior to, and during, preparation of the environmental assessment.

Section 2 of this report provides information on consultation undertaken during exhibition of the environmental assessment and preferred project report. The preferred project report was on exhibition for 60 days.

Notification about consultation

Individual letters were sent to properties located within the proposed rail corridor. A project update was letter box dropped to residents within 250 metres of the rail corridor and within 500 metres of the station precincts. The project update clearly identified the locations and times of the community information sessions.

TIDC notes that there was a delay in letterbox deliveries due to the unusual storm events during the first half of June 2007.

Advertisements were placed in local newspapers by the Department of Planning advising of the exhibition of the preferred project report and the locations and times of the community information sessions. Advertisements were placed in the following newspapers:

- Hills News (on 12 June and 10 July 2007);
- Hills Shire Times (on 12 June and 10 July 2007);
- Northern News Kellyville (on 12 June and 10 July 2007);
- Northern District Times (on 13 June, 11 July and 18 July 2007);
- Rouse Hill Times (on 13 June and 11 July 2007);
- Gladesville Weekly Times (on 13 June and 11 July 2007); and
- Hornsby Advocate (on 14 June and 12 July 2007).
- Sydney Morning Herald (on 6 June, 27 June and 18 July)
- Daily Telegraph (on 6 June, 27 June and 18 July)

This level of notification provides an opportunity for potentially affected stakeholders and the wider community to become more informed about the project. TIDC recognises that people have an interest in what is occurring within their community, even if it does not directly affect them. Further environmental assessment of the project would identify specific impacts and mitigation measures for local residents and other stakeholders within or beyond this zone as appropriate.

Access to information about the project

A range of opportunities and methods were provided for the community to acquire more information about the project. As outlined in Section 2 of this report, these included:

- Project information line (1800 number) and project email;
- Planning update newsletters;
- Four staffed community information sessions were held during preferred project report exhibition period, advertised and notified in local newspapers; dates and locations;
- Public exhibitions;
- Stakeholder meetings;
- Advertisements in local newspapers; and
- TIDC website.

Level of detail provided about the project, including on direct tunnel options was inadequate

TIDC has prepared the environmental assessment and preferred project report in accordance with the requirements of the EP&A Act and the Director General's requirements to describe and assess the NWRL project and the key issues associated with the project.

The level of detail provided about the project reflects the current level of planning and design, which is at the concept plan stage. The next stages of planning and design would provide additional detailed information on the project. Future consultation would be undertaken, as described in section 3.6.2.

Further assessment of the direct tunnel options is contained within the options review report (Appendix B).

3.7.2 Submissions period

Concerns were raised regarding the submission period and a number of requests were received seeking an extension of the submissions period.

Submissions period

The preferred project report was placed on exhibition on 6 June 2007 for a period of 30 days. The Department of Planning determined (in consultation with TIDC) to extend the exhibition period to 60 days (two months) to allow the community and stakeholders more time to provide comments on the modifications to the concept plan outlined in the report.

The formal exhibition period ended on 6 August 2007. However, submissions were received and accepted by the Department of Planning and TIDC up to the end of August 2007.

3.7.3 Future consultation

Issues included:

- Information on the future consultation process;
- Establish community groups to input to the studies undertaken as part of the project approval process;
- Establish area specific community liaison groups prior to construction;
- Updates should be provided as information becomes available; and
- Consultation should be undertaken in relation to the design and location of external structures.

Future consultation process

Communications processes would be developed and implemented throughout delivery of the project (statement of commitment 2) to engage the community and stakeholders.

TIDC will be seeking further project approvals for the NWRL in accordance with the provisions of the EP&A Act. This will provide further opportunities for consultation with community and stakeholders. In addition, TIDC will continue to deliver a high standard of information to the community through the website, planning updates, information phone line and media.

During the future station precinct design, TIDC will be consulting councils, government, community, business and interest groups.

3.8 Construction practices and timing

Issues included:

- Overall timeframe of construction;
- Where will the tunnel boring machine start from?; and
- Mitigation of impacts, including duration and hours per day.

Construction timeframe

Construction is expected to begin in late 2009, with the first stage of the project (between Epping and Hills Centre Station) proposed to be completed by 2015. Construction of the second stage (between Hills Centre Station and Rouse Hill) would continue until 2017.

Construction planning and mitigation of impacts

Investigations into construction methods and planning have been ongoing and will continue as the project develops. Commitments have been included to guide construction planning, inform future impact assessment, and ensure that the construction strategy minimises the potential for environmental impacts.

A construction strategy would be developed for the tunnel to inform construction planning and confirm detailed activities and methodologies at each construction site (statement of commitment 4). Detailed construction methodologies at each construction site would be developed, including spoil management, with the aim of minimising environmental impacts and informing future impact assessment (statement of commitment 5).

Statement of commitment 20 notes that a detailed noise and vibration assessment of the proposed construction activities would be undertaken as part of design development and would include the investigation of the potential need for reasonable and feasible mitigation in accordance with relevant policies and guidelines.

Traffic modelling and traffic management analysis would be undertaken for the roads and intersections impacted by the project during the project construction (statement of commitment 17). A detailed construction methodology for the construction over and/or under roads would be developed in consultation with the RTA and Councils with the aim of minimising traffic disruptions (statement of commitment 18).

Tunnel boring machines

As noted in the preferred project report, following further investigations, it is apparent that constructing the tunnel for Stage 1 from a single site i.e. at Hills Centre Station, would have potentially negative construction program and timing risk implications. This risk is a result of issues such as:

- Potential breakdown of spoil conveyor;
- Transport of plant and materials along a long section of tunnel;
- Interface with station construction activities; and
- Ability to remove the tunnel boring machines.

In addition, as noted in the preferred project report, tunnel access is no longer available from the previously proposed surface works associated with the surface works on the Northern Line and is also not available at Epping.

Therefore, another major tunnel support construction site would be required. At this stage, it is considered that the Franklin Road Station site may be a suitable location. This site would also provide construction support for launching the tunnel boring machines and for tunnel spoil removal.

The use of Franklin Road Station as a major tunnel support site would need to take account of the potential for impacts on surrounding land uses and would require extensive planning and the implementation of appropriate mitigation measures. The construction sites associated with the project would be subject to refinement in terms of construction activities, location and size as a result of further planning and design work.

Duration and hours of work

Construction details will be addressed as part of the further design and assessment stage. Above ground works activities will be generally carried out between:

- 7.00 and 18.00 Monday to Friday; and
- 8.00 and 13.00 on Saturdays

It may be necessary for some works to be undertaken outside these hours. This includes work affecting:

- Arterial roads where partial closures can only occur outside these hours
- Trunk infrastructure and utilities where shutdowns would cause an interruption/inconvenience over a wide area.

The community would be informed of any out of hour's work, with the exception of unscheduled work required for safety or emergency reasons.

Underground tunnelling work and support activities are expected to occur on a 7 day, 24 hour basis.

The tunnel support construction sites (involving spoil removal, tunnel boring machine launch etc) would generally involve 24 hour a day operations subject to meeting strict environmental management requirements.

3.9 Other direct tunnel connection issues

3.9.1 Scope of project and studies undertaken

Issues included:

- Need for more in-depth studies and consultation prior to approval;
- The statement of commitments do not commit to details on issues such as noise limits;
- Status of quadruplication of the main Northern Line and need for direct tunnel connection if quadruplication is required; and
- Impacts of the future Epping to Carlingford Rail Tunnel.

Scope of studies undertaken

TIDC is seeking approval of the concept plan for the project (otherwise known as a concept plan approval or concept approval) under Part 3A of the EP&A Act.

In August 2005 the EP&A Act was amended to include a new part, known as Part 3A, which consolidates the assessment and approval regime for all major projects that need the approval of the Minister for Planning. Previously these were dealt with under Parts 4 and 5 of the EP&A Act.

Part 3A of the EP&A Act establishes an assessment and approval regime for development that is declared to be a Part 3A project by either a State Environmental Planning Policy or Ministerial Order (Section 75B). Part 3A of the EP&A Act provides for two distinct types of approval that can be granted by the Minster for Planning. These are an approval of a concept plan under section 750 (concept plan approval), and an approval to carry out a project (project approval).

The project was declared to be a project to which Part 3A applies by an order made by the Minister for Planning on 7 April 2006.

On 3 July 2006 the Minister for Planning authorised TIDC to prepare a concept plan for the project.

The environmental assessment was prepared in accordance with the Director General's environmental assessment requirements issued on 12 July 2006.

The project approval process is described further in section 5.

As the environmental assessment has been prepared for a concept plan for the project, detailed information on all aspects and associated impacts is not yet available. The impact assessments undertaken for the environmental assessment have been undertaken to a broad level. Where more detailed assessment is required, this forms part of the statement of commitments for the project.

The concept plan assessment and approval process enables a proponent to obtain approval for the key parameters of a major, complex project whilst allowing necessary flexibility to undertake more detailed design and assessment of the specific components of the project. This enables matters such as the suitability of a site/route and key environmental issues to be resolved early in the project planning process.

A concept plan approval would ensure better integration of land use and transport planning in the local government areas affected by the project. Importantly, concept plan approval would also enable further community involvement in the refinement of the project. A detailed Stakeholder Involvement Plan will be developed outlining the key methods and activities that would be adopted in consulting the local community. The purpose of the stakeholder involvement plan would be to ensure that information is presented and received in a clear manner, that all key stakeholder groups are reached through various communications activities, and that community and stakeholder views are sought and become an integral part of the Environmental Assessment (EA) process.

Statement of commitments

As noted in the preferred project report, the environmental assessment included a draft statement of commitments prepared to outline the investigations and mitigation measures that TIDC would undertake to ensure that the future planning, assessment and design of the project minimises the potential for environmental impacts. The final statement of commitments was provided in the preferred project report, and a copy is provided in section 4 of this report.

The final statement of commitments incorporates recommendations from Government agencies, local councils and community submissions where appropriate.

The statement of commitments includes those commitments relevant to the concept approval phase. Additional measures would be developed as part of any further approval process for the project, including mitigation measures for operational noise (statement of commitment 22).

Noise will be assessed in accordance with the "*Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects*" (IGANRIP) (NSW Government - April 2007). IGANRIP sets noise trigger levels to guide assessment.

Quadruplication of the Northern Line

As noted in the preferred project report, the *State Infrastructure Strategy* identifies commitments to improve rail freight operations within the Sydney metropolitan area. The *State Plan*[3] includes amplification of the main north track which may include surface works (quadruplication) of the Northern Line between Strathfield and Hornsby to assist freight movements. The Commonwealth Government's AusLink *Sydney Urban Corridor Strategy*[4] also identifies the upgrading of the Northern Line (Main North Line) as a priority.

The reasons for the selection of a direct tunnel alignment between Epping and Franklin Road stations was detailed in the preferred project report and summarised in section 3.2 of this report. Any future upgrade of the Northern Line for freight purposes would be considered as part of that project and not associated with the NWRL.

Potential impacts of the future Epping to Carlingford Rail Tunnel

The proposed rail tunnel connecting Epping and Carlingford was approved by the Minister for Planning in February 2002 as part of the Parramatta Rail Link. The potential impacts of this project were assessed as part of the Environmental Impact Statement and planning approvals process undertaken at that time.

Notwithstanding, the Conditions of Approval established by the Minister for Planning for the approved rail tunnel between Epping and Carlingford includes a requirement to undertake an updated environmental impact assessment. Condition of Approval No. 2 for the Parramatta Rail link states:

> 2. If any section of the [Parramatta Rail Link] Project between Chatswood and Westmead has not been commenced by the end of the first quarter of 2007, updated environmental impact assessment shall be undertaken for that section of the project to the satisfaction of the Director-General [of the Department of Planning]. This assessment shall address all relevant issues identified in the REA [(Relevant Environmental Assessment documents)] and shall take into account any changes to land uses and surrounding environments as applicable at the time. The updated assessment shall be based on relevant environmental standards and criteria applicable at that time.

[3] The State Plan, A New Direction for NSW, NSW Government, 2006

[4] Sydney Urban Corridor Strategy (draft), AusLink, 2007

3.9.2 Train operations

Issues included:

- Impacts on train services at Beecroft Station and nearby residences ;
- Safety of train speed in the tunnel;
- Implications of an accident in the tunnel, including risk to households above tunnel;
- Will the rail line always be an electrified passenger only line?
- How the NWRL would integrate with the Epping to Chatswood Rail Line.

Beecroft Station

The project would not directly affect train services on the Northern Line at Beecroft Station. RailCorp is responsible for operating the rail network to meet demand and network constraints.

A significant benefit of the NWRL project would include relieving capacity constraints on the Northern Line services, therefore offering improved reliability and comfort for passengers using Beecroft and Cheltenham services.

Train speed and rail safety

As noted in the preferred project report, the rail alignment is generally designed to maximise potential train speeds to reduce journey times. Maximum design speeds of up to 115 km/hour are possible for the project. However, curved sections of the alignment, such as between Castle Hill and Hills Centre Station, may reduce design speeds to about 95 km/hour.

Average train speeds during operation would be less than the design speed. The tunnels and rail lines will be designed to enable trains to operate safely at these speeds.

Safety is a key component of all rail projects, including the North West Rail Link. Safety has and would be a focus throughout all stages of project development, from the early design stages right through to construction and commissioning.

Strict safety risk management processes would be used to ensure that safety risks are identified and that measures are implemented to ensure that the level of risk is minimised. The railway would also be designed to meet the latest statutory and RailCorp standards for track alignment and structural strength.

A comprehensive fire and life safety assessment will be undertaken in future stages of the design process.

The risk to properties above the rail tunnel due to an incident is considered to be extremely low. There are no examples known to TIDC of damage to properties above a rail tunnel due to an incident in a tunnel. Requirements of the design standards would ensure that potential train accidents and multiple fire scenarios would be investigated during the design process and mitigation measures incorporated into the design.

Type of rail line

The project will be an electrified passenger only rail line.

Integration with the Epping to Chatswood Rail Line

The NWRL will integrate with the Epping to Chatswood Rail Line (ECRL) at Epping.

3.9.3 Other issues and impacts

Issues included:

- Why does the tunnel corridor have to be 60 metres wide?;
- Poor design of surface facilities should not continue. Damaged surface areas should be fully rehabilitated;
- Concerns about electro-magnetic radiation resulting from the tunnel;
- Air quality impacts of the tunnel;
- Impacts of Franklin Road Station precinct on the surrounding environment and land use; and
- Has a station at Thompson's Corner been considered?

Size of corridor for which approval is sought

TIDC is seeking approval of the concept plan for a passenger rail line generally within a 60 metre wide corridor for the tunnel sections, stations and the interim stabling facility, and a 40 metre wide corridor in remaining areas. These corridor widths in some cases would be wider than that required for the physical infrastructure and therefore allows for some flexibility during design development.

Design and rehabilitation of work sites

As noted by the preferred project report, new above ground structures, stations and changes to urban form at the interface between stations and the existing urban environment would result in a visual change to the existing environment.

Statement of commitments 40 to 44 provide for measures to ensure that the project design is informed by best practise landscape and urban design principles and minimises visual impacts. The project design would ensure integration with the surrounding area.

Environmental controls would be established on work sites before general construction commences. The establishment of work sites would occur after environmental management plans are developed and will contain clear rehabilitation requirements to ensure work sites are restored to a high standard.

Potential effects of electro-magnetic fields

As noted in the preferred project report, investigations undertaken for the Epping to Chatswood Rail Line concluded that impacts of electro-magnetic fields on human health are unlikely, given that high frequency emissions would be attenuated by surrounding rock and that levels of electro-magnetic radiation produced by the project would be consistent with that associated with other rail lines. There are no Australian Standards for exposure to electro-magnetic radiation, although NSW Health advocate a limit of 4 milliGauss for residential exposure. The likely levels resulting from the rail tunnel would be well below this criterion.

Air quality

Air quality impacts were assessed in section 10.1 of the environmental assessment. The project has the potential to generate dust emissions during construction. Detailed environmental management plans would be developed to ensure that this issue is managed.

During operation, tunnel emissions (via ventilation points) would not affect air quality as electric powered trains would use the project. Very small quantities of brake dust would be emitted at locations where trains are required to slow or stop at stations. These emissions would not result in any impacts on surrounding receptors or require filtration.

Franklin Road Station precinct planning

As noted in the preferred project report and Section 3.5 above the first stage of station precinct plans for the new underground stations have been prepared.

The indicative precinct plans were presented and described in the preferred project report. Statement of commitments 11 to 19 provide for future planning of station precincts, access and parking.

A concept plan approval would ensure better integration of land use and transport planning in the local government areas affected by the project by providing certainty to local council's that the project is proceeding. This will assist TIDC and the local councils to proceed with the development of precinct planning to ensure that the station design and adjoining land uses are properly integrated.

Has a station at Thompson's Corner been considered?

As noted in the preferred project report, during the early development of the project (prior to 2005) a number of alternative station locations were considered. The initial station and interchange options were compared based on a range of issues including:

- Potential vehicular and pedestrian access points;
- Connectivity to surrounding pedestrian catchments;
- Bus servicing patterns;
- For underground stations - closeness to the surface;
- Patronage potential;
- Engineering feasibility;
- Rail operational constraints regarding station spacing;
- Land use and availability; and
- Potential densification of the station precinct.

Thompsons Corner was previously considered as a potential station location, however a number of issues resulted in it not being selected, including:

- The station would be very deep (50 metres) and therefore difficult to construct and design (requiring long escalators or rapid lift only access);
- Rail alignment resulting from the station in this location would have an undesirable approach gradient from the east;
- Proximity to West Pennant Hills that is already serviced by existing access to stations on the Northern Line (such as Beecroft and Pennant Hills);
- Few opportunities for park and ride facilities; and

- Limited vehicular access without grade-separated access roads.

3.10 Other issues

3.10.1 Project impacts

Issues include:

- Objection to the viaduct rather than at grade or tunnel across Elizabeth Macarthur Creek floodplain;
- Impact on Bella Vista and Norwest Business Park, including development potential;
- Potential ecological impacts, including level of assessment;
- Project should incorporate and consider Aboriginal heritage values;
- Flooding and surface water issues, including the need for a detailed floodplain study and potential for impacts on Elizabeth Macarthur and Cattai Creeks;
- Impacts on the New Rouse Hill (Rouse Hill Town Centre) and Mungerie House; and
- Stringent mitigation measures are required to minimise noise and vibration impacts from the stabling facility.

Viaduct

A section of rail on viaduct from Samantha Riley Drive and over the Windsor Road/Old Windsor Road intersection, as described in the environmental assessment and preferred project report, is proposed as part of the project. The rail alignment in this location traverses the Elizabeth Macarthur/Caddies Creek floodplain. Issues regarding the section of viaduct were addressed in the preferred project report.

Crossing the floodplain requires particular attention to the selection of design and construction methodologies, to minimise impacts to this area and keep the rail line above the 1 in 100 year flood level, where the proposed alignment crosses Caddies Creek.

A rail tunnel in this location is possible, but would be difficult and more costly to construct due to the geology (shale) and topography. Additionally, a tunnel section in this location would have greater impacts on the hydrogeology of the area. It is therefore considered appropriate to construct the rail line above ground in this section.

Further design and development of the surface alignment would be undertaken. Additional visual impact assessment would also be undertaken and measures to mitigate visual impacts would be developed (statement of commitments 40, 41 and 42).

Impacts on Bella Vista and Norwest

The preferred project report noted that the potential for adjustments to the rail alignment in the vicinity of Bella Vista were investigated in response to concerns from residential property owners within or adjacent to the proposed rail corridor.

The preferred alignment through the Norwest Business Park and Bella Vista area is considered to be the optimal alignment based on the technical, social, environmental and other factors that influence the rail design.

A response to issues raised relating to future development potential for properties above the tunnel is provided in Section 3.6.3 above.

Ecological issues

Responses to issues raised regarding the potential for ecological impacts as a result of the project are provided in the preferred project report.

Based on the assessment to date and the potential ecological impacts, statement of commitments 27 and 28 establish processes for:

- Detailed ecological assessment to be undertaken at all construction sites; and
- Negotiation of biodiversity protection measures in accordance with the draft Growth Centres Conservation Plan[5] and the Department of Environment and Climate Change's draft Guidelines for biodiversity certification of environmental planning instruments[6]. These documents set agreed processes and methodologies for survey and assessment of biodiversity values.

Aboriginal heritage

An assessment of the potential impacts of the project on indigenous heritage was undertaken in consultation with the Aboriginal community, as described in Section 9.6 of the environmental assessment and Section 5.12.1 of the preferred project report.

Statement of commitment 33 states that the Indigenous Heritage protocol and methodology developed for the Growth Centres would continue to be applied as the project progresses. Consultation with the Department of Environment and Climate Change and relevant groups (including the Deerubbin Local Aboriginal Land Council, Metropolitan Local Aboriginal Land Council, Darug Tribal Aboriginal Corporation, and Darug Custodians Aboriginal Corporation) would continue.

Statement of commitment 34 aims to avoid or manage construction related impacts.

Further cultural heritage assessments to fulfil the requirements of the Growth Centres Commission methodology would be undertaken during the project approval stage.

[5] www.gcc.nsw.gov.au/information/draft-growth-centres-conservation-plan.aspx

[6] http://www.nationalparks.nsw.gov.au/npws.nsf/Content/biodiversity_certification_draft

Flooding and surface water issues

The design of the project would consider issues relating to surface water and flooding in accordance with State and local government requirements, such as the NSW Government Floodplain Development Manual 2005 (statement of commitment 38).

The final statement of commitments also outlines that the following would occur:

- Detailed investigation of the hydrology and hydraulics would be undertaken as part of the design development at each construction site (statement of commitment 36). This would include a two-dimensional model of the Caddies Creek confluence to facilitate a better understanding of the discharges at the confluence of the creeks and associated design requirements;
- Investigations into the construction and operational impacts on the Elizabeth Macarthur Creek would be undertaken (statement of commitment 37); and
- Further investigations into the location, size and treatment levels of a water treatment plant(s) (statement of commitment 39).

Rouse Hill Town Centre and impacts on Mungerie House

TIDC would consult Baulkham Hills Shire Council, the Department of Planning, Landcom and other stakeholders to ensure that development of the project reflects requirements in relation to planning, construction and operation of the town centre at Rouse Hill.

TIDC will be liaising with key stakeholders during precinct planning for Rouse Hill Station (statement of commitment 9) to ensure construction impacts are minimised (statement of commitments 6 and 7).

The heritage review undertaken for the environmental assessment (refer Appendix H of the environmental assessment) noted that the project would run between Mungerie House and Windsor Road, and that the main impact would be on vistas and the connection between the house and Windsor Road. The report also noted that it was understood that the driveway connection between the house and Windsor Road would not be maintained due to developments such as the construction of the North West Transitway and the new town centre.

Interim stabling facility noise impacts

The preferred project report notes that it is likely that operation of the interim stabling facility at Rouse Hill would occur when development of the surrounding area (Area 20 of the North West Growth Centre) has commenced. It was noted that TIDC has been discussing land use issues with the Growth Centres Commission in regard to this site, which would continue as part of the next stage of design. Consideration of a permanent stabling facility is associated with the NWRL extension studies currently being undertaken by the Ministry of Transport, with input from TIDC, Railcorp, Growth Centres Commission, Department of Planning and other government stakeholders.

In relation to noise mitigation, the preferred project report notes that it may be possible to minimise the potential for impacts by providing buffer distances between the stabling facility and residential development, or by locating less sensitive land uses (such as light industrial and/or commercial) closest to the facility.

Statement of commitment 23 notes that the extent of any physical noise mitigation measures would be determined in consultation with the Department of Environment and Climate Change and the Growth Centres Commission. In addition, a review of the results of RailCorp's investigations into addressing horn noise issues would be undertaken and applied as relevant to the stabling operations.

3.10.2 Design and delivery

Issues include:

- Commercial viability of the project, other similar projects have not met patronage projections;
- Commercial restrictions on the Government in building alternative forms of (public) transport in the vicinity of the M2;
- Design and location of Norwest Station, including provision of commuter parking and the need for a second station in the Norwest business park;
- Alternative rail tunnel alignment in the vicinity of Norwest Business Park and Bella Vista;
- Need to move Hills Centre station as the location at Castle Hill Showground is inaccessible from residential areas;
- Timeframe for operation of the temporary stabling facility west of Hills Centre Station;
- Project should be constructed in a single stage;
- Future extension beyond Rouse Hill; and
- Alternative surface alignments, such as constructing the route along the Parramatta to Rouse Hill bus route.

Commercial viability

As noted by the preferred project report, the cost estimates of the project are being refined and will be finalised prior to construction commencing. Cost estimates will be subject to external review and verification.

Section 5.3 of the environmental assessment notes that the estimated patronage would be up to 24 million per annum (by 2021) and is expected to continue to grow as the North West region continues to develop. As with all public infrastructure projects, the social and environmental benefits and the economic appraisal have been considered as part of the overall evaluation of the project.

Commercial restrictions as a result of the M2 Motorway

There are no commercial restrictions on the Government building public infrastructure in the vicinity of the M2 Motorway.

Norwest Station

The preferred project report recognised concerns regarding the design of Norwest Station, which included the need for dedicated commuter parking.

Indicative plans for the Norwest Station precinct were discussed in the preferred project report. The provision of commuter parking at this location is not currently considered feasible due to access and space constraints. However, shared parking arrangements would be further investigated in consultation with Council, RailCorp, the Ministry of Transport and surrounding landowners (statement of commitment 13).

A number of submissions recommended that a second station should be provided within the Norwest Business Park. During the design development a number of alternative station locations were considered. The proposed station locations were chosen to maximise access to the surrounding catchment area. A second station in the Norwest Business Park is likely to be too close to the proposed station to receive sufficient patronage for it to be viable.

Additionally, an additional station would increase travel times between Rouse Hill and the CBD.

Overall, it is considered that other areas of the Norwest Business Park could be better serviced by a high frequency bus service connecting with both Burns Road and Norwest stations.

As a result of further investigations undertaken since exhibition of the environmental assessment, the location of Norwest Station was moved by 100 metres to the east. This was described in the preferred project report.

The proposed location adjacent to Norwest Boulevard provides for ready access to public transport and kiss and ride facilities.

Alternative rail tunnel alignment in the vicinity of Norwest Business Park and Bella Vista

Section 6.4.1 of the environmental assessment and section 3.8.1 of the preferred project report address alternative rail tunnel alignments in the vicinity of Norwest Business Park and Bella Vista. A number of modifications to the proposed alignment have occurred since an alignment was first presented publicly in 2002.

These changes have arisen from the outcomes of specialist studies and their recommendations, and the need to address concerns raised by the community, government agencies and other stakeholders.

A 'northern alignment' was considered, which would locate the alignment in the vicinity of the existing transmission line and include a station on the northern boundary of the Norwest Business Park at Spurway Drive (near Solent Circuit). However, this alignment and station location was considered to have a number of limitations, including:

- Accessibility of the station for pedestrians – the Castle Hill Country Club forms a significant barrier to access and would limit patronage potential;
- Accessibility of the station for public transport and vehicles, which would be required to use local roads;
- Increased distance to the high density commercial developments in Norwest Business Park;
- The requirement for a large cutting through the northern portion of the Bella Vista estate; and
- Flooding and environmental risks associated with crossing Elizabeth Macarthur Creek in cutting.

The preferred alignment through the Norwest Business Park and Bella Vista area is considered to be the optimal alignment based on the technical, social, environmental and other factors that influence the rail design. This alignment provides for a station below Norwest Boulevard, which is the preferred location based on accessibility (particularly public transport and kiss and ride facilities) and integration with future development of the business park.

TIDC acknowledges that precinct planning for Norwest Station requires further development, including an assessment of traffic and transport issues. Statements of commitment 9, 11 and 13 specifically address the future design development that would be undertaken for the proposed Norwest Station. Future assessment and precinct planning would involve stakeholders, including land owner and developers within the business park.

Hills Centre Station

The preferred project report recognised concerns raised regarding the design of Hills Centre Station, particularly the ability for this station to be accessible from surrounding land uses.

Indicative plans for the Hills Centre Station precinct, including commuter parking, were discussed in the preferred project report. It was noted that the accessibility of the station from the commercial precinct to the west of Cattai Creek requires further assessment in the next stage of the design process.

Significant additional investigations and planning is required for this station precinct to ensure that the project delivers an accessible and well connected station that is appropriate to the surrounding area. Consultation and planning would be ongoing with Baulkham Hills Shire Council and other stakeholders.

Some submissions to the environmental assessment recommended moving Hills Centre Station to Carrington Road. The location of Hills Centre Station was subject to investigation prior to the North West Rail Link Overview Report (2002). A location on Carrington Road was investigated, and offered a potentially more visible station location and direct access for traffic. However, significant construction issues were identified at this site, including greater flooding risks, traffic disruptions and construction adjacent to residential properties.

Temporary stabling facility west of Hills Centre Station

As noted in the preferred project report, as part of Stage 1 of the project, a temporary stabling facility would be constructed adjacent to Hills Centre Station. This facility would be used to stable trains and allow trains to turnback. The temporary stabling facility would be located within the tunnels to the west of the station. The facility would be refitted as running tunnels as part of Stage 2 of the project. Stub tunnels would be required at the western end of the interim stabling facility for connection with the Stage 2 tunnelling works.

The function of the temporary stabling facility is to provide stabling for four eight-car trains during operation of Stage 1 (for two years between 2015 and 2017). The facilities would also provide for the inspection and internal cleaning of the trains during operation of Stage 1.

Project staging

In November 2006, the NSW Premier released the Urban Transport Statement outlining the transport projects to be implemented by the NSW Government over the next ten years.

A key initiative of the Urban Transport statement was the accelerated delivery of the NWRL. The accelerated program will bring forward staging of the NWRL to deliver services between Epping and Hills Centre Station, by 2015. The second stage, between Hills Centre Station and Rouse Hill, is proposed to be operational by 2017.

Future extension beyond Rouse Hill

The preferred project noted that any future extension is not part of the North West Rail Link project for which TIDC is seeking concept approval and would be subject to a separate environmental assessment and approvals process. The Ministry of Transport is currently investigating future extension options beyond Rouse Hill.

Surface alignment along the Transitway

An alternative surface alignment replacing the Parramatta to Rouse Hill Transitway would be unacceptable. The Transitway provides a different, but complementary, public transport service allowing improved local services to operate and providing a rapid link between Parramatta and Rouse Hill.

4. Statement of commitments

The environmental assessment included a draft statement of commitments prepared to outline the investigations and mitigation measures that would be undertaken to ensure that the future planning, assessment and design of the project minimises the potential for environmental impacts.

The preferred project report included an amended statement of commitments taking into account investigations done following public exhibition and the issues raised in submissions. The final statement of commitments for the project, which is unchanged from that presented in the preferred project report, is provided in Table 4.1.

The statement of commitments would be informed by the future design development and assessment and the recommendations and mitigation measures outlined within the environmental assessment and the preferred project report.

Table 4.1 Final statement of commitments

Desired outcome	Action
Sustainability strategies	
Project development and delivery based around core sustainability principles.	1. Core sustainability principles would be developed for the design and construction of the project covering the following themes: ◗ Energy ◗ Greenhouse emissions ◗ Water ◗ Community and stakeholder involvement ◗ Biodiversity ◗ Resource recycling/minimisation To develop the principles a benchmarking exercise would be undertaken to enable sustainability goals and objectives to be determined, which would provide clear result areas and targets under each theme.
Communication processes	
A framework for community and stakeholder involvement is developed.	2. Communications processes would be developed and implemented throughout delivery of the project. These would include: – Opportunities to input into the design process such as at station precincts and structures and proposed mitigation measures (e.g noise barriers) for construction and operations; – Methods to inform the community of the progress and performance of the project and issues of interest to the community; – Processes to receive and manage complaints; and – Consultation with affected property owners. 3. Ongoing consultation would occur with Government agencies regarding issues raised during previous consultation and as identified within the Environmental Assessment and Concept Plan and the Preferred Project

Desired outcome	Action
	Report.
Design and construction strategies	
Potential for environmental impacts minimised by integrating assessment of environmental issues with development of design and construction strategies.	4. A construction strategy would be developed confirming detailed construction activities and methodologies at each construction site for the construction of the tunnel. 5. Detailed construction methodologies at each construction site would be developed, including spoil management, with the aim of minimising environmental impacts and informing future impact assessment.
Land use, property and infrastructure planning	
The project is integrated with land use planning of surrounding areas.	6. Consultation with Councils, the Growth Centres Commission, RailCorp and other relevant stakeholders would be undertaken to ensure environmental planning instruments reflect planning, construction and operation of the project and include integrated planning provisions for appropriate development controls within the vicinity of the rail line and stabling facility. 7. Land use and property impacts of the project, including construction sites and all ancillary facilities, would be further assessed in consultation with Councils and surrounding landowners. 8. A Land Asset Management Strategy to address 'land surplus to use', post construction would be developed jointly with the Department of Planning (Land Management Branch) in consultation with Councils, Growth Centres Commission and RailCorp. This strategy would investigate opportunities for land amalgamation of parcels severed by the project and identify opportunities for development that is consistent with surrounding land use planning. 9. Consultation with relevant Councils, government agencies, utility providers, land owners and communities involved in the planning of precincts in the vicinity of each station would be undertaken with the aim of encouraging transit-orientated development around each station. The role of each station within the context of provision of public transport services would be established, including the need and capacity of park and ride facilities, establishing connections with other transport modes (including the potential for integrated ticketing), and integrating pedestrian and cyclist facilities. 10. Further investigations would be undertaken with respect to the planned expansion of the Castle Hill Shopping Centre and integration of the project with the Castle Hill Draft Master Plan.
Traffic, transport, parking and access	
(i) Stations (including interchanges, commuter parking and other facilities) are planned and delivered in recognition of current and future traffic, transport and access requirements. (ii) Potential for traffic and transport impacts minimised during construction and operation.	11. At each station, further studies would be undertaken to consider the integration of the station with the local area to ensure that predicted patronage and mode access are catered for during operation. Studies would consider local connectivity requirements; pedestrian modelling (including emergency access); bicycle facilities; the potential impacts of traffic accessing the station from the surrounding road network; parking requirements and the integration of the Transitway and other bus services with the new rail stations. These investigations would be undertaken in consultation with Councils, RailCorp, Ministry of Transport and the Roads and Traffic Authority. 12. The location, scale, design and quantum of park-and-ride facilities at the Franklin Road, Hills Centre and Burns Road Station would be reviewed during further design. This is to be undertaken with reference to relevant

Desired outcome	Action
	parking policies and in consultation with Councils, RailCorp and the Ministry of Transport. 13. In consultation with Councils, RailCorp, the Ministry of Transport and surrounding landowners, investigate opportunities for 'shared use' or complementary parking facilities adjacent to Norwest Station. 14. In consultation with the RTA and Councils, investigate the feasibility of providing a direct access point to the Franklin Road site from Castle Hill Road and the potential for a signalised intersection at the intersection of Glenhope Road with Castle Hill Road. 15. In consultation with the RTA and Councils investigate potential access improvements to Franklin Road Station from areas to the north. 16. The design of construction activities would consider access points, surrounding intersections, bus routes and pedestrian flows. 17. Traffic modelling and traffic management analysis would be undertaken for the roads and intersections impacted by the project during the project construction and operation. This analysis would consider existing and planned road upgrades. 18. A detailed construction methodology for the construction over and/or under roads would be developed in consultation with the RTA and Councils with the aim of minimising traffic disruptions (including construction of the bridge over Windsor Road at Kellyville and cut and cover construction under Norwest Boulevard, Windsor Road and Burns Road). 19. Maintenance access points would be identified and planned in consultation with RailCorp and Councils.
Noise and vibration	
Design development and assessment adopts best practise measures to minimise construction and operational noise and vibration impacts.	20. A detailed noise and vibration assessment of the proposed construction activities, including blasting if required, would be undertaken as part of design development and would include the investigation of the potential need for reasonable and feasible mitigation in accordance with relevant policies and guidelines. 21. Consult with local Councils, Growth Centres Commission and RailCorp in relation to land use planning and development controls to minimise the need for physical noise mitigation. 22. In regard to operational noise, the Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects (Department of Planning, 2007) would be used to implement the following activities: – Modelling of operational noise impacts (including ground borne noise) in more detail as part of the design development; – Identification of acoustic mitigation measures to meet, where reasonable and feasible, the design goals; and – Select representative locations for the project at which it is appropriate to later assess compliance. 23. In regard to train stabling operational noise, the following would be undertaken: – Determine the extent of any physical noise mitigation measures in consultation with Department of Environment and Climate Change, RailCorp and Growth Centres Commission; and – Review the results of RailCorp's investigations into addressing horn noise and consider the feasibility in consultation with RailCorp of

Desired outcome	Action
	implementing a low volume horn test. 24. Investigate feasible and reasonable mitigation measures to manage operational vibration in consultation with Councils, the Department of Environment and Climate Change and RailCorp.
Flora and fauna	
Assessment and management of biodiversity impacts is consistent with the regional approach to biodiversity management within the North West Growth Centre i.e. maintain or improve biodiversity values.	25. Design of waterway crossings and structures would be undertaken with reference to the Guidelines for Design of Fish and Fauna Friendly Waterway Crossings (Fairfull and Witheridge 2003) and Fish Passage Requirements for Waterway Crossings (2003) and considering the quality of riparian habitat present, in consultation with the Department of Primary Industries (NSW Fisheries) and other relevant Government agencies. 26. The location of structures associated with the rail tunnel, such as ventilation shafts, emergency egress/access points and discharge/runoff outlets, would be assessed with respect to the potential application of SEPP 19. 27. A detailed ecological assessment would be undertaken at all construction sites and along above ground sections of the project corridor. The assessment would identify areas to be avoided (where practicable), construction related impacts and how these can be managed; and, where required, describe measures to offset significant impacts on threatened species and/or endangered ecological communities. This assessment would be undertaken in consultation with the DECC, the Growth Centres Commissions, RailCorp and the Commonwealth Department of Environment and Water Resources as appropriate. 28. 'Improve and Maintain' assessments on biodiversity values would be undertaken to identify the potential impacts of the project and benefits from protection measures to be implemented. The methodology adopted for all parts of the project would be consistent with the draft Growth Centres Conservation Plan (GCC, 2007) and DEC's draft Guidelines for biodiversity certification of environmental planning instruments (2007).
Spoil	
Opportunities for beneficial reuse of spoil identified.	29. Further investigations would be undertaken as part of the design development into opportunities for beneficial reuse of spoil. As a result of these investigations further assessment of transport options and routes for spoil movement would be undertaken.
Heritage	
Potential for environmental impacts on indigenous and non indigenous heritage minimised through management measures that are consistent with established protocols and guidelines.	30. Additional research would be undertaken to determine the history and potential heritage significance of the sites identified in Castle Hill. Site-specific archaeological assessments would be undertaken in the event that they are found to have heritage significance. 31. Site-specific archaeological assessments would be undertaken for the two archaeological sites identified along Old Windsor Road and Windsor Road. 32. A view analysis would be undertaken to and from Rouse Hill House and its estate and the Glenhope property. If required appropriate mitigation measures would be identified. 33. The Indigenous Heritage protocol and methodology developed for the Growth Centres would continue to be applied as the project progresses, in consultation with DECC and relevant Indigenous groups. 34. A detailed assessment would be undertaken in the vicinity of sites

Desired outcome	Action
	identified to have moderate to high archaeological potential. The assessment would identify areas to be avoided, construction related impacts and how these can be managed; and, where required, salvage excavation prior to any subsurface impact on the deposit. Advertising for interested parties would need to be undertaken prior to any subsurface investigation, in accordance with DECC requirements.
Geology, geotechnical and groundwater	
The project design minimises potential risks associated with geotechnical issues and groundwater.	35. Detailed geotechnical and groundwater investigations would be undertaken involving site investigations to inform future design development.
Hydrology and surface water	
The project design minimises potential risks associated with hydrology and surface water.	36. A detailed flood assessment would be undertaken in accordance with appropriate NSW Government guidelines and in consultation with Councils and relevant Government agencies. This would include a two dimensional model of the Caddies Creek confluence to facilitate a better understanding of the discharges at the confluence of the creeks and associated design requirements. 37. Investigations into the construction and operational impacts on the Elizabeth Macarthur Creek would be undertaken in accordance with relevant NSW Government guidelines. 38. The floodplain storage impacts would be defined during design development in accordance with the relevant NSW Government guidelines. 39. Further investigations into the location, size and treatment levels of a water treatment plant(s) would be undertaken in consultation with DECC, Councils and RailCorp. Investigations would include identifying discharge points, determining the receiving water quality and water re-use/recycling opportunities.
Visual impacts, landscape and urban design	
The project design is informed by best practise landscape and urban design principles and minimises visual impacts.	40. The following architectural, landscape and urban design principles would be used to guide the design of the new stations and transport interchanges, civil works (such as noise walls, embankments and the viaduct section) and/or the stabling facility concepts: – Reinforce the role of the station and transport interchange within its surrounding neighbourhood as the principal transport and community facility within the locality. – Stations and the stabling facility would be designed in the context of the scale, character and image of the surrounding area and enhance the presentation of the area to visitors, residents and travellers. – Maintain or improve the links across the project and to surrounding areas and activities. Where a connection between adjacent areas is desirable, pedestrian bridges or underpasses would be considered. – Easy access facilities would be incorporated into the station designs and integrated with the associated transport interchanges. – Movement networks should improve existing, or establish new comfortable and inviting pedestrian environments, including equitable access within the railway station and adjoining areas. – A design theme would be established for bridges/viaduct to link the overall rail design together. The design would ensure that the

Desired outcome	Action
	structures are simple, integrated with the surrounding area and finished to a high quality. Fencing, parapets and any railing on the bridges would also be integrated with the overall design. – Establish a hierarchy of access to stations consistent with NSW Govt policy package *"Integrating land –use and transport"* i.e prioritise public transport and other non-car based access to the rail stations and adjoining areas where possible. – Station precinct design should facilitate new development that reflects the highest standards and quality of design. 41. Visual impact assessment of the project would be undertaken as part of design development. This would consider both the existing and future urban environment to identify impacts and potential mitigation measures, such as architectural, landscape and/or urban design treatments. Additional assessments would apply to pedestrian and cycle facilities; proposed bridging structures; cutting and embankment treatments; landscape treatment projects; design of the stations and stabling facility; proposed acoustic treatments; and any visual buffer areas as required. 42. Measures to mitigate visual impacts and deliver high quality design outcomes would include: – Where noise walls are proposed, potential visual impacts would be minimised by implementation of urban design measures, developed in consultation with adjacent property owners (mitigation measures might include plantings and high quality facings near residential areas). – Earth mounding would be considered where space allows and where significant vegetation would not be lost. – The design of any civil works, such as noise walls, retaining walls, the viaduct and underpasses would adopt CPTED principles, including the need for unobstructed views into and outside of the underpass, effective drainage and ventilation, wide corridors and good lighting. – Light spill would be minimised as much as possible to reduce impacts on surrounding existing and future residents in accordance with relevant standards. 43. TIDC's Design Review Panel would guide the application of architectural, landscape and urban design principles throughout the design development. 44. Public art and interpretation would be incorporated into architectural elements or urban design treatments and would be assessed and implemented with design themes and urban design criteria (eg. graffiti management).
Economic impacts	
Potential business impacts identified and considered as part of design development.	45. An assessment of the potential impacts and benefits of construction and operation on adjacent businesses would be undertaken in consultation with business owners during the design phase.

5. Conclusion and next steps

This supplementary submissions report has been prepared to respond to issues raised in submissions to the exhibition of the preferred project report. In submitting this report, TIDC has sought approval from the Minister for Planning for the concept plan as described in the preferred project report. TIDC does not propose to make any further changes or modifications to the concept plan.

This supplementary submissions report has addressed the outcomes of the consultative process conducted during and following the public exhibition of the preferred project report for the proposed NWRL.

In addressing both compliance with legislative requirements and the requirements of the consultative process, this Supplementary Submissions Report demonstrates that:

- TIDC has considered all issues arising from the submissions on the preferred project report and concept plan and provided a written response to the issues (Chapter 3).
- Additional studies and assessments are detailed in Appendices B, C and D.

In consideration of the above, it is proposed that the NWRL project as described in the preferred project plan should proceed for the approval of the Minister for Planning. No changes to the statement of commitments are proposed.

Next Steps

The Department of Planning will, on behalf of the Minister for Planning, review the environmental assessment, the preferred project report, and supplementary submissions report. Once the Department has completed its assessment, a draft assessment report will be prepared for the Director-General of the Department of Planning, which may include recommended conditions of approval.

The assessment report will then be provided to the Minister for Planning for consideration. The Minister for Planning may then approve the concept plan (with any conditions considered appropriate) or refuse to give approval.

The Minister for Planning's determination, the Director-General's report and the supplementary submissions report will be made publicly available. A letter will be sent to those who sent in a submission advising them of their identification number following determination of the concept plan by the Minister for Planning.

Should the concept plan be approved, further environmental assessment would be undertaken consistent with any conditions of approval and the statement of commitments, including further community and stakeholder consultation.

The NSW Government re-affirmed its commitment to build a new heavy rail line to the North West of Sydney with the announcement of the North West Metro, which is a 38km rail line which will run from Rouse Hill through Norwest, Castle Hill, Epping, Top Ryde, Gladesville, Drummoyne, Rozelle and Pyrmont before reaching Wynyard, Martin Place and St James.

TIDC will be seeking project approval for the whole of the North West Metro. This will be subject to further detailed investigation, environmental assessment and community involvement prior to seeking

project approval. The next stage of community consultation will occur with the publication of an Environmental Overview report due for completion in October 2008.

As part of the detailed investigations for the overall North West Metro a comprehensive review of the alignment, stabling and stations would occur. At this stage the alignment for the North West Metro is envisaged to be consistent with the concept plan between Epping and Rouse Hill except for the tunnel alignment connecting into any new underground North West Metro station at Epping and the connections to the existing Epping Station.

Appendix A

Summary of submissions

Table A.1 Issue analysis by submission number

The first column of table shows the submission number assigned to each submission. The second column shows the issues raised by each submission. A response to all issues raised is provided in Section 3 of this report.

Individual submissions

1289	3.2, 3.4, 3.3, 3.6, 3.7
1290	3.2, 3.3, 3.4, 3.6, 3.7
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1293	3.10
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1295	3.10
1296	3.10
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1300	3.7
1301	3.7
1302	3.7
1303	3.7
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1305	3.7
1306	3.7
1307	3.7
1308	3.7
1309	3.7
1310	3.7
1311	3.7
1312	3.7
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1314	3.7
1315	3.7
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1319	3.7
1320	3.2, 3.3, 3.5, 3.6, 3.7, 3.9,
1321	3.2, 3.9
1322	3.2, 3.3, 3.4, 3.6
1323	3.2
1324	3.2
1325	3.2
1326	3.2
1327	3.2
1328	3.2, 3.3
1329	3.2
1330	3.2
1331	3.2
1332	3.2
1333	3.2
1334	3.2
1335	3.2
1336	3.2
1337	3.2
1338	3.2
1338	3.4
1339	3.2
1340	3.2, 3.3, 3.4
1341	3.2, 3.3, 3.4, 3.6, 3.7, 3.9
1342	3.7
1343	3.2
1344	3.2, 3.6
1345	3.2, 3.3, 3.4, 3.5, 3.6, 3.9
1346	3.2, 3.3, 3.4, 3.6, 3.7, 3.9
1347	3.2, 3.3, 3.4, 3.6, 3.7, 3.9
1348	3.2
1349	3.2, 3.7
1350	3.2, 3.7
1351	3.2, 3.3, 3.6, 3.7
1352	3.2, 3.2, 3.3, 3.6, 3.7
1353	3.2, 3.7
1354	3.2, 3.7
1355	3.7
1356	3.3, 3.2
1357	3.2, 3.3, 3.4, 3.6, 3.7, 3.9
1358	3.2, 3.3, 3.6, 3.7, 3.9
1359	3.2
1360	3.5, 3.6, 3.8, 3.4
1361	3.2

1362	3.6, 3.3,
1363	3.2
1364	3.2
1365	3.2, 3.7
1366	3.2, 3.7
1367	3.2, 3.6, 3.7, 3.8
1368	3.7,
1369	3.2, 3.3, 3.6, 3.7
1370	3.2
1371	3.2
1372	3.2, 3.6
1373	3.2
1374	3.2
1375	3.2
1376	3.2
1377	3.2, 3.3, 3.7
1378	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
1379	3.2
1380	3.2
1381	3.2
1382	3.2
1383	3.2
1384	3.2, 3.3, 3.6, 3.7
1385	3.6, 3.7
1386	3.7
1387	3.2, 3.3, 3.6, 3.7
1388	3.7, 3.9
1389	3.2
1390	3.2, 3.2, 3.3
1391	3.2, 3.2, 3.3, 3.6, 3.7, 3.9
1392	3.2, 3.3, 3.6, 3.7, 3.9
1393	3.3, 3.6, 3.7
1394	3.2
1395	3.2
1396	3.2, 3.3, 3.5, 3.7
1397	3.2, 3.3, 3.6, 3.7
1398	3.2
1400	3.2
1401	3.2
1402	3.2
1403	3.2, 3.3, 3.6, 3.7
1404	3.2, 3.7
1406	3.2, 3.3, 3.6, 3.9
1407	3.2, 3.3, 3.6, 3.7
1408	3.2, 3.7
1409	3.2, 3.4, 3.6, 3.7, 3.10
1410	3.2, 3.7
1411	3.2, 3.3, 3.4, 3.9
1412	3.2, 3.3, 3.6
1413	3.2, 3.3, 3.6
1414	3.2, 3.3, 3.4, 3.6, 3.9
1415	3.2
1416	3.2
1417	3.2
1418	3.2, 3.7
1419	3.2, 3.3, 3.6
1420	3.2, 3.3, 3.6, 3.7, 3.9
1421	3.7
1422	3.2, 3.3, 3.6, 3.7
1423	3.7
1424	3.2
1425	3.2
1426	3.2, 3.9
1427	3.2
1428	3.7
1430	3.2, 3.9
1431	3.2, 3.4, 3.7
1432	3.2, 3.3, 3.4
1798	3.2
2130	3.2, 3.2, 3.5
2131	3.2
2132	3.2
2133	3.2
2134	3.2, 3.3, 3.4, 3.6
2135	3.2, 3.3, 3.7
2136	3.2, 3.7
2137	3.2
2139	3.2
2140	3.2, 3.3
2141	3.2, 3.6, 3.10
2142	3.10
2143	3.8, 3.10
2144	3.2, 3.5
2145	3.2, 3.10
2146	3.5, 3.9, 3.10,
2148	3.4, 3.8
2149	3.3, 3.10
2150	3.10
2151	3.2, 3.7
2152	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
2153	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10
2154	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10

3826	3.2, 3.3, 3.5, 3.6, 3.9
3827	-
3828	3.2, 3.7, 3.9, 3.10
3829	3.2, 3.4, 3.5, 3.8, 3.10
3830	3.2, 3.4
3831	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.10
3832	3.2, 3.3, 3.4, 3.5, 3.6, 3.7
3833	3.2, 3.5, 3.10
3834	3.2, 3.5
3835	3.2, 3.3, 3.5, 3.6, 3.8, 3.10
3836	3.2, 3.2, 3.4, 3.5, 3.6, 3.7, 3.8
3837	3.5, 3.6, 3.8
3838	3.5, 3.10
3839	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.10
3840	3.2, 3.3, 3.6
3841	3.2, 3.3, 3.6
3842	3.2, 3.3, 3.4, 3.6, 3.8, 3.9, 3.10
3843	3.2, 3.5, 3.6, 3.9, 3.10
3844	3.2, 3.3, 3.5, 3.10
3845	3.2, 3.6, 3.7, 3.9
3846	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.9, 3.10
3847	3.2, 3.6, 3.8, 3.9
3848	3.6, 3.7, 3.10
3849	3.2, 3.3, 3.5, 3.6, 3.7, 3.9
3850	3.2, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.9, 3.10
3851	3.2, 3.3, 3.5, 3.9, 3.10
3852	3.2, 3.6, 3.7, 3.8, 3.10
3853	3.3, 3.6, 3.7, 3.10
3854	3.2, 3.3, 3.7, 3.8
3855	3.2, 3.7
3856	3.2, 3.3, 3.6, 3.9, 3.10
3857	3.5, 3.10
3858	3.2, 3.6
3859	3.2, 3.6, 3.7
3860	3.2, 3.2, 3.3, 3.4, 3.6, 3.9
3861	3.7, 3.9
3862	3.2, 3.5, 3.6, 3.10
3863	3.2, 3.4, 3.6, 3.7, 3.7, 3.8, 3.9, 3.10
3864	3.2, 3.7, 3.8, 3.9, 3.10
3865	3.2, 3.7, 3.9
3866	3.2, 3.3, 3.6, 3.7, 3.8, 3.10
3867	3.21, 3.3, 3.4, 3.6, 3.7, 3.8, 3.10
3868	3.2, 3.9
3869	3.2, 3.3, 3.6, 3.7, 3.8, 3.9
3870	3.2, 3.3, 3.6
3871	3.2, 3.3, 3.6
3872	3.2, 3.8, 3.9, 3.10
3873	3.2, 3.3, 3.6, 3.7
3874	3.2, 3.3, 3.6
3875	3.2, 3.4, 3.5, 3.6
3876	3.2, 3.6, 3.7
3877	3.2, 3.3, 3.10
3878	3.2, 3.10
3879	3.2, 3.3, 3.6
3880	3.2, 3.3, 3.6, 3.9
3881	3.2, 3.3, 3.6, 3.7, 3.9
3882	3.2, 3.3, 3.6, 3.9, 3.10
3883	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10
3884	3.2, 3.3, 3.5, 3.6, 3.7
3885	3.2, 3.3, 3.5, 3.9
3886	3.2, 3.4, 3.5, 3.6, 3.7
3887	3.2, 3.6
3888	3.10
3889	3.6
3890	3.2, 3.3, 3.7
3891	3.2, 3.5, 3.7, 3.9, 3.10
3892	3.2, 3.3, 3.5, 3.7, 3.9, 3.10
3894	3.2, 3.3, 3.9
3895	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3896	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3897	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3898	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3899	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3900	3.2, 3.3, 3.6, 3.9
3901	3.2, 3.4, 3.9

3902	3.2
3903	3.2, 3.3, 3.5, 3.9
3904	3.2
3905	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.9, 3.10
3906	3.2
3907	3.7
3908	3.2, 3.3, 3.4, 3.7, 3.9
3909	3.2, 3.3, 3.4, 3.6, 3.7, 3.10
3910	3.2, 3.3, 3.4, 3.7, 3.9
3911	3.2, 3.3, 3.4, 3.7, 3.9
3912	3.2, 3.3, 3.4, 3.7, 3.9
3913	3.2, 3.9, 3.10
3914	3.2, 3.6
3915	3.2, 3.7, 3.9, 3.10
3916	3.2, 3.3, 3.6
3917	3.2, 3.3, 3.6, 3.7, 3.9
3918	3.6, 3.7
3919	3.5, 3.9, 3.9, 3.10
3920	3.2, 3.3, 3.5, 3.9, 3.10, 3.10
3921	3.2, 3.5, 3.9
3922	3.2, 3.3, 3.4, 3.5, 3.6, 3.7
3923	3.10
3924	3.2, 3.5, 3.7
3925	3.2, 3.3, 3.5, 3.6, 3.7, 3.8
3926	3.3, 3.6, 3.7, 3.9
3927	3.3
3928	3.2, 3.5, 3.6, 3.7, 3.9
3929	3.6
3930	3.6, 3.7
3931	3.2, 3.3, 3.7, 3.9
3932	3.9
3933	3.2, 3.6, 3.7
3934	3.2, 3.3, 3.6, 3.7, 3.9
3936	3.10
3937	3.2
3938	3.6, 3.7
3939	3.2, 3.3, 3.5, 3.6, 3.7,3.10
3940	3.21
3941	3.7, 3.10
3942	3.6
3943	3.2, 3.6, 3.7, 3.9
3944	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3945	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
3946	3.9
3948	3.9
3949	3.9, 3.10
3950	3.9
3951	3.9
3952	3.9
3953	3.9
3954	3.9
3957	3.9
3958	3.2, 3.3, 3.4, 3.6, 3.7
3959	3.2, 3.3, 3.4, 3.6, 3.7
3960	3.2, 3.3, 3.6, 3.9
3961	3.2, 3.3, 3.4, 3.6, 3.8
3962	3.3
3963	3.3
3964	3.2, 3.5, 3.6, 3.7, 3.8, 3.9
3965	3.2, 3.3, 3.5, 3.7, 3.8
3966	3.2, 3.3, 3.6, 3.9, 3.10
3967	3.2, 3.3, 3.6, 3.7, 3.9
3968	3.3, 3.4, 3.6, 3.7, 3.9, 3.10
3969	3.3, 3.4, 3.7, 3.9, 3.10
3970	3.3, 3.4, 3.7, 3.7, 3.9, 3.10
3971	3.3, 3.4, 3.7, 3.9, 3.10
3972	3.2
3973	3.10
3974	3.2, 3.3
3975	3.2, 3.3, 3.6, 3.9
3976	3.2, 3.7
3977	3.2, 3.3, 3.7
3978	3.2, 3.3, 3.6, 3.7
3979	3.2, 3.3, 3.6, 3.7
3980	3.2, 3.3, 3.6, 3.7
4027	3.6
4028	3.6, 3.7
4029	3.6
4030	3.6, 3.7
4031	3.9
4032	3.5, 3.7
4033	3.10
4034	3.2, 3.3, 3.4, 3.5, 3.6, 3.7,

	3.10,
4035	3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.9, 3.10
4037	3.3, 3.4, 3.7, 3.9, 3.10,
4038	3.2, 3.3, 3.6, 3.7, 3.9, 3.10
4039	3.2, 3.3, 3.6, 3.7, 3.8, 3.9, 3.10
4040	3.2, 3.9, 3.10
4041	3.2, 3.9, 3.10
4042	3.2, 3.3, 3.4, 3.6, 3.7, 3.9, 3.10
4043	3.2, 3.3, 3.6, 3.7, 3.10
4044	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10
4045	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10
4046	3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.9, 3.10

Table A.2 Government agency submissions

Agency	Issues raised	Where addressed in this report
Federal Government	◗ Level of community consultation	Section 3.7
The Hon. John Howard (former) Member for Bennelong	◗ Quality of noise impact assessments	Section 3.3
	◗ Effect on property prices	Section 3.6
	◗ Level of information on direct tunnel options assessment	Section 3.2
NSW Government (Greg Smith, Member for Epping)	◗ Extension of submissions period	Section 3.7
	◗ Detail of noise and vibration assessments	Section 3.3
	◗ Depth of tunnelling and concerns about possible subsidence	Section 3.4
	◗ Effect on property prices	Section 3.6
	◗ Lack of commuter parking	Section 3.5
	◗ Alternative routes	Section 3.2
Ministry for Transport	◗ Quadruplication of the Main Northern Line in the future to improve rail freight operations	Section 3.9
	◗ Interim stabling facility and future extension of NWRL	Section 3.10
	◗ Provision of commuter car parking at Castle Hill Station	Section 3.5
RailCorp	◗ Comments on statement of commitment 40 in relation to the stabling facility	Noted
Department of Water and Energy	◗ Potential for impacts of the tunnel on Devlin Creek	Section 3.4
	◗ Potential for impacts of the cut and cover sections on Elizabeth Macarthur and Cattai Creeks	Section 3.10
Department of Environment and Climate Change	◗ Impacts on ecology	Section 3.10
	◗ Aboriginal cultural heritage assessment	Section 3.10
	◗ Noise assessment	Section 3.3
	◗ Noise statement of commitments	Noted
	◗ Environment protection licence likely to include groundwater discharge licence limits	Noted
	◗ Supports implementation of sustainability principles	Noted

Agency	Issues raised	Where addressed in this report
Growth Centres Commission	◗ Interim stabling facility	Section 3.10
Blacktown City Council	◗ Interim stabling facility, including noise and vibration issues	Section 3.10
	◗ Traffic, parking and access impacts	Section 3.5
	◗ Surface water and flooding	Section 3.10
Hornsby Shire Council	◗ Supports a tunnel option that passes beneath existing infrastructure	Section 3.2
	◗ Extension of submissions period	Section 3.7
	◗ Consider other options for direct tunnel connection	Section 3.2
	◗ Conduct further consultation	Section 3.7
	◗ Detailed assessment of noise and vibration impacts	Section 3.3
	◗ Ventilation and emergency egress building	Section 3.2
	◗ Ecological impacts	Section 3.10
	◗ Construction amenity impacts	Section 3.8
	◗ Traffic management around station precincts	Section 3.5
	◗ Precinct design for Franklin Road Station	Section 3.5
Baulkham Hills Shire Council	◗ Objects to two stage delivery	Section 3.10
	◗ Tunnel extension to facilitate connections to Parramatta via Carlingford	Section 3.2
	◗ Assist Council financially during planning and construction phase	Noted
	◗ Objection to viaduct	Section 3.10
	◗ Extend line beyond Rouse Hill	Section 3.10
Department of Education and Training	◗ Detailed assessment of noise and vibration impacts	Section 3.3
	◗ Construction impacts to existing education facilities along the alignment	Section 3.8
	◗ Traffic impacts and access to school sites	Section 3.5

Agency	Issues raised	Where addressed in this report
	◗ Beecroft Public School within 60 metre corridor of direct tunnel alignment	Section 3.2
	◗ Structural damage to buildings	Section 3.6

Table A.3 Form letter submissions

Form Letter	Issues (with reference to the section of this report where the issues are addressed)
Form A1 (125 received)	An objection to a rail tunnel alignment between Epping and Franklin Road stations. ◗ Alignment of the rail tunnel was not previously proposed (3.2) ◗ Property value (3.6) ◗ Adequacy of community consultation (3.7) ◗ Potential noise and vibration impacts (3.3) ◗ Justification for selecting a rail tunnel alignment over a surface alignment, including impacts and cost (3.2) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Adequacy of environmental assessment (3.9)
Form A2 (9 received)	An objection to a rail tunnel alignment between Epping and Franklin Road stations. ◗ Alignment of the rail tunnel was not previously proposed (3.2) ◗ Property value (3.6) ◗ Adequacy of community consultation (3.7) ◗ Adequacy of environmental assessment (3.9) ◗ Potential noise and vibration impacts (3.3) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Support for an alternative (pink) rail tunnel alignment identified in the preferred project report (3.2 and Appendix B)
Form B1 (1680 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Standard of proposed noise mitigation (3.3) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Support for an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form B2 (326 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Standard of proposed noise mitigation (3.3) ◗ Support for an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form C (462 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Alignment of the rail tunnel was not previously proposed (3.2)

Form Letter	Issues (with reference to the section of this report where the issues are addressed)
	◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Validity of the project with regard to the *Environmental Planning & Assessment Act 1979* (3.2) ◗ Property value (3.6) ◗ Potential noise and vibration impacts (3.3) ◗ Potential for property impacts during construction of the rail tunnel (3.4) ◗ Justification for selecting a rail tunnel alignment over a surface alignment, including impacts and cost (3.2) ◗ Potential traffic impacts in the vicinity of Epping Station (3.5) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Support for an alternative (red) rail tunnel alignment connecting Franklin Road Station with the Carlingford Line (3.2 and Appendix B)
Form D (4 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Alignment of the rail tunnel was not previously proposed (3.2) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Property value (3.6) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Potential noise and vibration impacts, particularly associated with different geotechnical conditions (3.3) ◗ Potential impacts of the tunnel on groundwater (3.4) ◗ Potential for property impacts during construction of the rail tunnel (3.4) ◗ Location and potential impacts of service and ventilation facilities(3.2) ◗ Construction issues (3.8) ◗ Future consultation to be undertaken (3.7) ◗ Operational impacts at Beecroft Station (3.9) ◗ Support for an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form E (10 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Potential noise and vibration impacts (3.3) ◗ Support for an alternative (pink) rail tunnel alignment identified in the preferred project report OR an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form F	An objection to the preferred (green) rail tunnel alignment between Epping and

Form Letter	Issues (with reference to the section of this report where the issues are addressed)
(55 received)	Franklin Road stations. ◗ Support for an alternative (gold) rail tunnel alignment (3.2 and Appendix B) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7)
Form F2 (5 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7)
Form G (9 received)	Support for the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. (3.2 and Appendix B)
Form H (72 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Property value (3.6) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Potential noise and vibration impacts (3.3) ◗ Justification for selecting a rail tunnel alignment over a surface alignment, including impacts and cost (3.2) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Location and potential impacts of service and ventilation facilities(3.2) ◗ Support for an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form I (182 received)	An objection to the preferred (green) rail tunnel alignment and the alternative (pink) rail tunnel alignment identified in the preferred project report between Epping and Franklin Road stations. ◗ Property value (3.6) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Potential noise and vibration impacts (3.3) ◗ Support for an alternative (red) rail tunnel alignment (3.2 and Appendix B)
Form J (18 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations and, in particular, an identified location of a service facility. ◗ Location and potential impacts of service and ventilation facilities(3.2)
Form K (9 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations.

Form Letter	Issues (with reference to the section of this report where the issues are addressed)
	◗ Alignment of the rail tunnel was not previously proposed (3.2) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Property value (3.6) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Construction issues (3.8) ◗ Future consultation to be undertaken (3.7) ◗ Potential noise and vibration impacts, particularly associated with different geotechnical conditions (3.3) ◗ Potential impacts of the tunnel on groundwater (3.4) ◗ Potential for property impacts during construction of the rail tunnel (3.4) ◗ Lack of geotechnical information (3.4) ◗ Location and potential impacts of service and ventilation facilities(3.2) ◗ Operational impacts at Beecroft Railway station (3.9) ◗ Support for an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form L (3 received)	An objection any rail tunnel alignment that would be located in the vicinity of Castle Howard Road. ◗ Alignment of the rail tunnel was not previously proposed (3.2) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Property value (3.6) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Potential for property impacts during construction of the rail tunnel (3.4) ◗ Adequacy of environmental assessment (3.9) ◗ Potential noise and vibration impacts (3.3) ◗ Lack of geotechnical information (3.4) ◗ Location and potential impacts of service and ventilation facilities(3.2) ◗ Support for the reference scheme (blue) rail tunnel alignment identified in the preferred project report OR an alternative (pink) rail tunnel alignment identified in the preferred project report OR an alternative (gold) rail tunnel alignment (3.2 and Appendix B)
Form M (12 received)	An objection to the preferred (green) rail tunnel alignment between Epping and Franklin Road stations. ◗ Alignment of the rail tunnel was not previously proposed (3.2) ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7)

Form Letter	Issues (with reference to the section of this report where the issues are addressed)
	◗ Property value (3.6) ◗ Potential noise and vibration impacts (3.3) ◗ Potential for property impacts during construction of the rail tunnel (3.4) ◗ Justification for selecting a rail tunnel alignment over a surface alignment, including impacts and cost (3.2) ◗ Construction issues (3.8) ◗ Impacts on local school (3.8) ◗ Future consultation to be undertaken (3.7) ◗ Potential traffic impacts in the vicinity of Epping Station (3.5) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Support for an alternative (red) rail tunnel alignment (3.2 and Appendix B)
Form N (24 received)	A submission that the preferred project report is inadequate and that the preferred (green) tunnel alignment should be reconsidered. ◗ Adequacy of community consultation, including a request for an extension of the PPR exhibition period (3.7) ◗ Adequacy of environmental assessment (3.9) ◗ Validity of the project with regard to the *Environmental Planning & Assessment Act 1979* (3.2) ◗ Potential noise and vibration impacts (3.3) ◗ Justification for selecting the preferred rail tunnel alignment over other tunnel alignment options (3.2 and Appendix B) ◗ Status of potential rail upgrades for rail freight (3.9) ◗ Potential electro-magnetic radiation (3.9) ◗ Location and potential impacts of service and ventilation facilities(3.2) ◗ Operational issues (3.9) ◗ Justification for selecting a rail tunnel alignment over a surface alignment, including impacts and cost (3.2) ◗ Potential for property impacts during construction of the rail tunnel (3.4) ◗ Property value (3.6)

Appendix B

NWRL Options Review Report Epping to Franklin Road Stations

Appendix C

Proposed Parramatta Rail Link Impacts on Property Values Independent Peer Review