MAJOR PROJECT ASSESSMENT
Kingsgrove to Revesby Quadruplication – East Hills Line

Director-General's Environmental Assessment Report
Section 75I of the *Environmental Planning and Assessment Act 1979*

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EXECUTIVE SUMMARY

Rail Clearways, a NSW Government initiative, was developed to improve the reliability and capacity of heavy rail services in the Sydney metropolitan region. This is to be achieved by reconfiguring the current network of 14 rail corridors into five clearways that can operate independently, and therefore minimise the risk of service disruptions while increasing the capacity of the rail network to meet the growing rail travel demands of metropolitan Sydney.

The East Hills line between Kingsgrove and Revesby is currently congested due to Campbelltown express and local (all-stops) services sharing the existing duplicated track. This affects the efficiency, reliability and frequency of services on the East Hills Line, and compromises the ability of the service to cater for future patronage demand.

The proposed quadruplication of the East Hills line between Kingsgrove and Revesby involves the construction of two new tracks to separate local from express services along this section of the East Hills line. This forms part of *Clearway 3 (Campbelltown Express) and Clearway 4 (Airport and South).*

Following a detailed assessment of the Environmental Assessment, Response to Submissions and the submissions received during the exhibition period for the project, the Department is satisfied that the impacts of the project can be appropriately mitigated or managed to acceptable levels and therefore recommends that the project be approved subject to the recommended conditions of approval.

However, this does not imply that there are not significant environmental constraints to the project. Of particular note are the traffic and transport impacts, car parking impacts and the operational noise impacts of the project. This was reflected within the 49 submissions received from Government agencies, Council and the local community during the exhibition of the Environmental Assessment.

The confined nature of the project corridor significantly restricts the ability for these impacts to be avoided through project design. This has required a reliance on management and mitigation measures to minimise the impact and disruption to the community and commuters. This is reflected within the recommended conditions of approval and Proponent's Statement of Commitments.

Despite the recommended conditions of approval, the Department acknowledge that residual impacts will occur, however the majority of these impacts are confined to the construction phase of the project and must be considered within this context. Residual operational impacts, particularly noise and vibration, and the potential permanent losses to commuter car parking will also occur. However, the Department has concluded that these residual impacts are considered to be acceptable given the benefits the total project will provide to the general public through improved network capacity and performance.

Consequently, the Department recommends that the Minister for Planning approve the Kingsgrove to Revesby Quadruplication, subject to the recommended conditions of approval.

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1. BACKGROUND

1.1 The Rail Clearways Program

The Rail Clearways program is a NSW Government initiative to improve the capacity and reliability of the CityRail suburban network. This is to be achieved by reconfiguring the current network of 14 rail corridors into five clearways that can operate independently, and therefore minimum risk of service disruptions while increasing the capacity of the rail network to meet the growing rail travel demands of metropolitan Sydney. Figure 1 provides an outline of the 15 projects that form part of the Rail Clearways program. The proposed quadruplication of the East Hills Line between Kingsgrove to Revesby, the project that is subject to this report, forms part of Clearway 3 (Campbelltown Express) and Clearway 4 (Airport and South).

1.2 The East Hills Line and Surrounding Environment

The East Hills Line services south-west Sydney, and carries both local (all stops) services running via the Airport Line/City Circle and peak hour express services to Campbelltown via Sydenham.

The project corridor is confined to the East Hills line between Kingsgrove and Revesby stations, extends for approximately 7.5 kilometres and traverses three local government areas: Hurstville, Bankstown and Canterbury. The line is currently configured as four tracks east of Kingsgrove and of two tracks west of Kingsgrove to East Hills. This requires local and express services to share the same tracks between Kingsgrove and Revesby, which decreases the capacity, efficiency and reliability of the line.

A Clearways 3 project, the Revesby Turnback project, is currently under construction and is due for completion in 2008. It will relocate the local service terminus from East Hills to Revesby and consists of the realignment of existing tracks, a new track and crossovers, an additional island platform, and new pedestrian facilities (footbridge and platform lifts).

Figure 1 – Rail Clearways

1.3 The Surrounding Environment

The East Hills line between Kingsgrove and Revesby traverses fairly flat terrain with the railway line at grade or within cuttings for the majority of the corridor. Embankments occur in areas within Narwee, the Salt Pan Creek/Padstow region and on approach to under-bridges along the corridor.

The area surrounding the East Hills line is highly urbanised, with low to medium density housing located adjacent to the rail corridor and commercial uses and car parking facilities concentrated alongside train stations, the largest being at Revesby station. A number of educational and other public facilities are also located adjacent to the proposed rail corridor, including Beverly Hills Girls High School, Narwee Public School, Southside Montessori School and public reserves. Industrial uses are restricted to areas in Padstow close to Salt Pan Creek.

The rail corridor has been largely cleared of vegetation and by exotic grasses and weed species with the exception of small fragments of native regrowth along the margins of the rail corridor and area along Salt Pan Creek.

2. PROPOSED DEVELOPMENT

The proposed Kingsgrove to Revesby Quadruplication project is located within the rail corridor of the East Hills line and extends from approximately 500 metres east of Kingsgrove Station to 450 metres west of Revesby station (refer to Figure 2). This represents 7.1 kilometres of new track on the Up East Hills Main line (towards Central) and 7.7 kilometres of new track on the Down East Hills Main Line (away from Central).

2.1 Project Description

The project involves the construction of two new tracks to separate local from express services along this section of the East Hills line, with most works occurring within the existing rail corridor or within RailCorp land.

The new tracks will be constructed alongside the existing tracks, connecting with the four-track configuration at Kingsgrove and merging to the dual track rail configuration west of Revesby. Upon completion of the project, the four tracks will be configured for the express services to run on the outer (new) lines and local services to run on the inner (existing) tracks.

The works within the corridor will also necessitate alterations or additions to existing supporting rail and other surrounding infrastructure, including:

- replacement and/or extension of several road and pedestrian bridges and underpasses along the rail corridor, including at King Georges Road, Davies Road, Belmore Road and Salt Pan Creek (shown as red marks on Figure 2);
- adjustments to car parking facilities at Beverly Hills, Narwee, Padstow and Revesby Stations;
- alterations at Revesby Station, which integrate with the Revesby Turnback project;
- relocation and replacement of rail infrastructure and other utilities, including substations and RailCorp signalling depots; and
- extension and/or upgrade of drainage culverts, particularly in areas subject to local flooding.

Figure 2 – The Project Corridor (Sinclair Knight Merz 2007)

The construction of the project will also require major earthworks to widen existing cuttings or embankments to accommodate the new tracks. Embankments could be up to five metres in height and may require retaining walls for structural support. This will result in the loss of existing vegetation and car parking facilities (temporarily and permanently), depending on the particular location.

The project is to be delivered by an Alliance, and approximately 450 construction workforce employed during peak periods of the activity. Construction of the project is expected to take 32 months to complete with three distinct phases –

- site establishment, the relocation or protection of existing rail infrastructure and other utilities;

- major civil works, such as earthworks, culverts and bridges; and
- track construction, installation of signalling and communication infrastructure, and testing/commissioning of the new tracks.

Track possessions (overnight or weekend) would be required throughout the construction period. This will require construction work to occur outside standard construction hours.

Table 1, in conjunction with Figure 3 and Figure 4, provides a summary of the key features of the project.

Table 1 – Key Features of the Project

Component	Description
Rail Tracks	For the majority of the project, the two new tracks will be constructed on either side of the existing lines with the exception in the Salt Pan Creek area where the two new tracks will be construction on the southern side of the existing tracks. This will require the realignment of existing tracks on approach to the new bridge.
Bridge and underbridge extensions/ modifications	The extension or replacement of over- and under-bridges (road and pedestrian) to accommodate the widened rail corridor. These works will require full or partial closures. Traffic diversions would be put in place during these bridge works. Temporary access facilities would be provided to maintain access at all other locations.
Earthworks	Cutting and embankment formation widening, maintenance access, retaining walls, slope stabilisation, stormwater drainage and culvert extensions. Over 155,000 cubic metres of spoil would need to be excavated from the corridor.
Supporting Rail Infrastructure	Relocation and replacement of existing signalling and electrical infrastructure, including signalling supplies and signal huts and modifications to overhead wiring and signalling. This includes the development of a new Railcorp signalling depot to replace the existing facility at Riverwood and the construction of a substation at Revesby.
Commuter car parking	The development of currently vacant Railcorp land or Adjustments to car parking which may result in the permanent loss of car parking at Beverly Hills (27 spaces), Narwee (24 spaces), Padstow (92 spaces) and Revesby Station (83 spaces)*. With the exception of Padstow and Revesby, replacement parking has been identified to ensure no net (operational) loss. A further loss of parking may result temporarily during construction work.
Utilities adjustment, relocation and protection	Several utilities will need to be adjusted or relocated to accommodate the widened corridor or were impacted by bridge works, including telecommunications, gas and electricity. The ethane gas pipeline would not be relocated/adjusted and will be protected during construction works.
Station Adjustments	*Revesby Station –* Modifications or construction of new structures at Revesby Station, including: extension of the footbridge and concourse; construction of a booking office, station staff facilities and public toilets; upgrade of access to station, including lifts and stairs; realignment of Blamey Street and landscaping; adjustment to utilities, fencing/security and rail infrastructure systems. *Other Stations –* Minor modifications to existing platforms at Riverwood and Padstow Stations to accommodate the realigned tracks, and the lengthening of pedestrian underpass at Narwee. No other works proposed.
Noise Barriers	Construction of noise barriers. Approximately 7.5 kilometres of noise barriers are proposed, ranging from 1.5 metres to 4 metres. Final length, height and design are subject to further analysis of reasonable and feasible noise controls.
Property acquisition	Some private land may need to be acquired and property adjustments to leases held by various individuals and organisations over RailCorp land within the corridor. This includes the demolition of commercial premises at Narwee station, currently on RailCorp land.
Temporary and ancillary works	Construction compounds would be located as close as possible to the rail corridor, with most preferred locations identified in Council land. The compounds would contain staff facilities, storage areas for plant and equipment, and material stockpiles.

2.2 Project Need

Rail Clearways, a NSW Government initiative, was developed to improve the reliability and capacity of heavy rail services in the Sydney metropolitan region.

The East Hills line between Kingsgrove and Revesby is congested due to Campbelltown express and local (all-stops) services sharing the existing duplicated track. This affects the efficiency, reliability and frequency of services on the East Hills Line.

With continued growth in passenger demand, the quadruplication of the East Hills line was identified as component of the Rail Clearways program to resolve the current and predicted constraints, with the quadruplication providing for:

- increased capacity to run additional local and express services including the provision for future services from the South West Rail Link;
- improved service reliability by separating service types;
- simplified and better structured service patterns on the Airport and East Hills Line; and
- improved journey time for express services to the south west.

The project is also required to facilitate and achieve the commitments made by the NSW Government in the *City of Cities: A Plan for Sydney's Future* (Sydney Metropolitan Strategy) (2005), the *State Infrastructure Strategy* (2006) and the *Urban Transport Statement* (2006). These strategies identify the need to improve the capacity, reliability and integration of public transport services to support and facilitate growth in major centres and along major corridors and transport nodes. The East Hills Line is an important transport corridor within south-west Sydney, associated with the Campbelltown and Leppington centres, the South West Growth Centre, the M5 Motorway corridor, the City to the Airport/Port Botany corridor and three strategic bus corridors at Padstow, Beverly Hills and Kingsgrove. This project is required to ensure that service improvements are delivered to the East Hills Line and therefore contribute towards the realisation of these strategies.

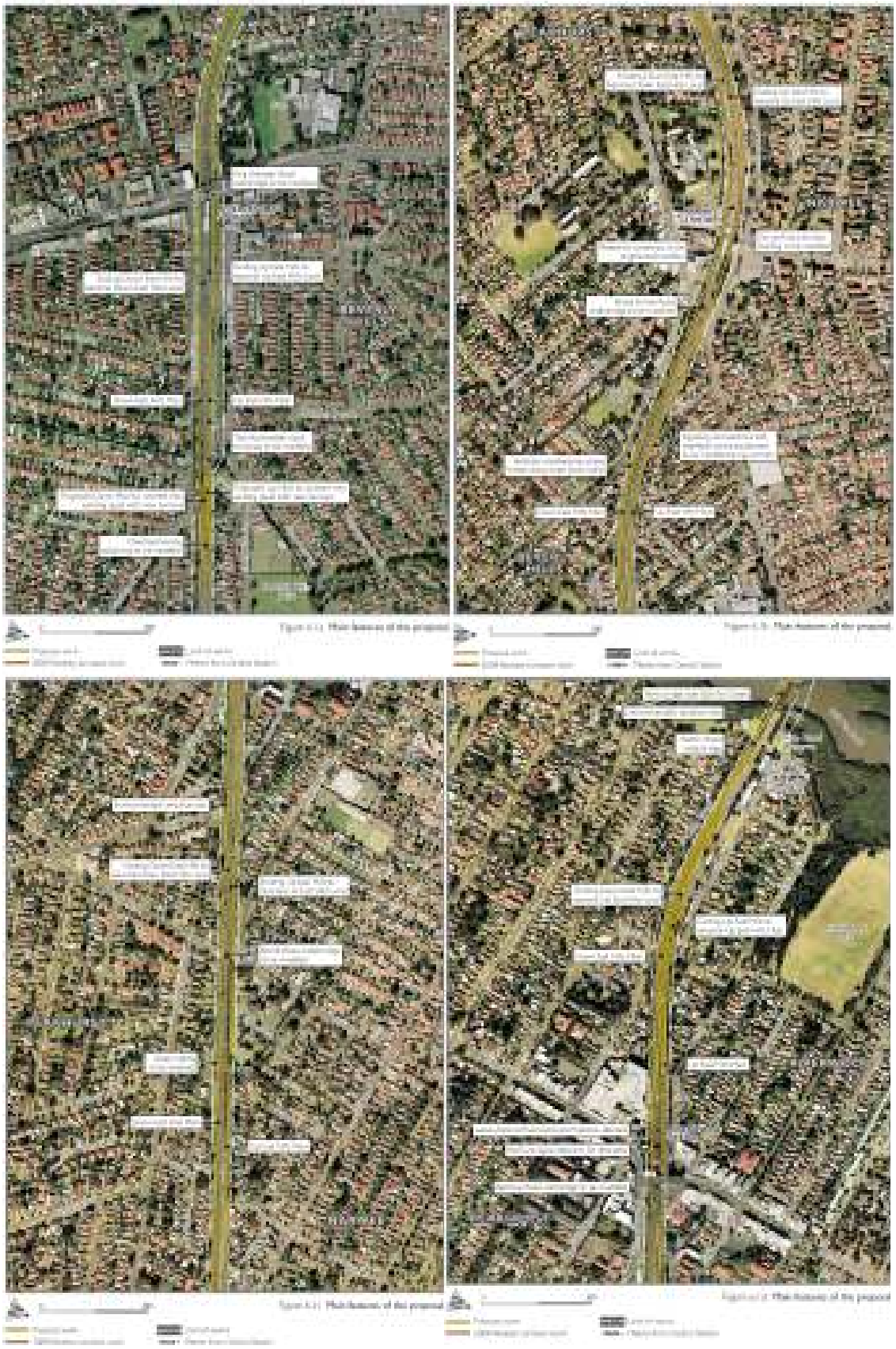

Figure 3 – Proposed Project Corridor (Sinclair Knight Merz 2007)

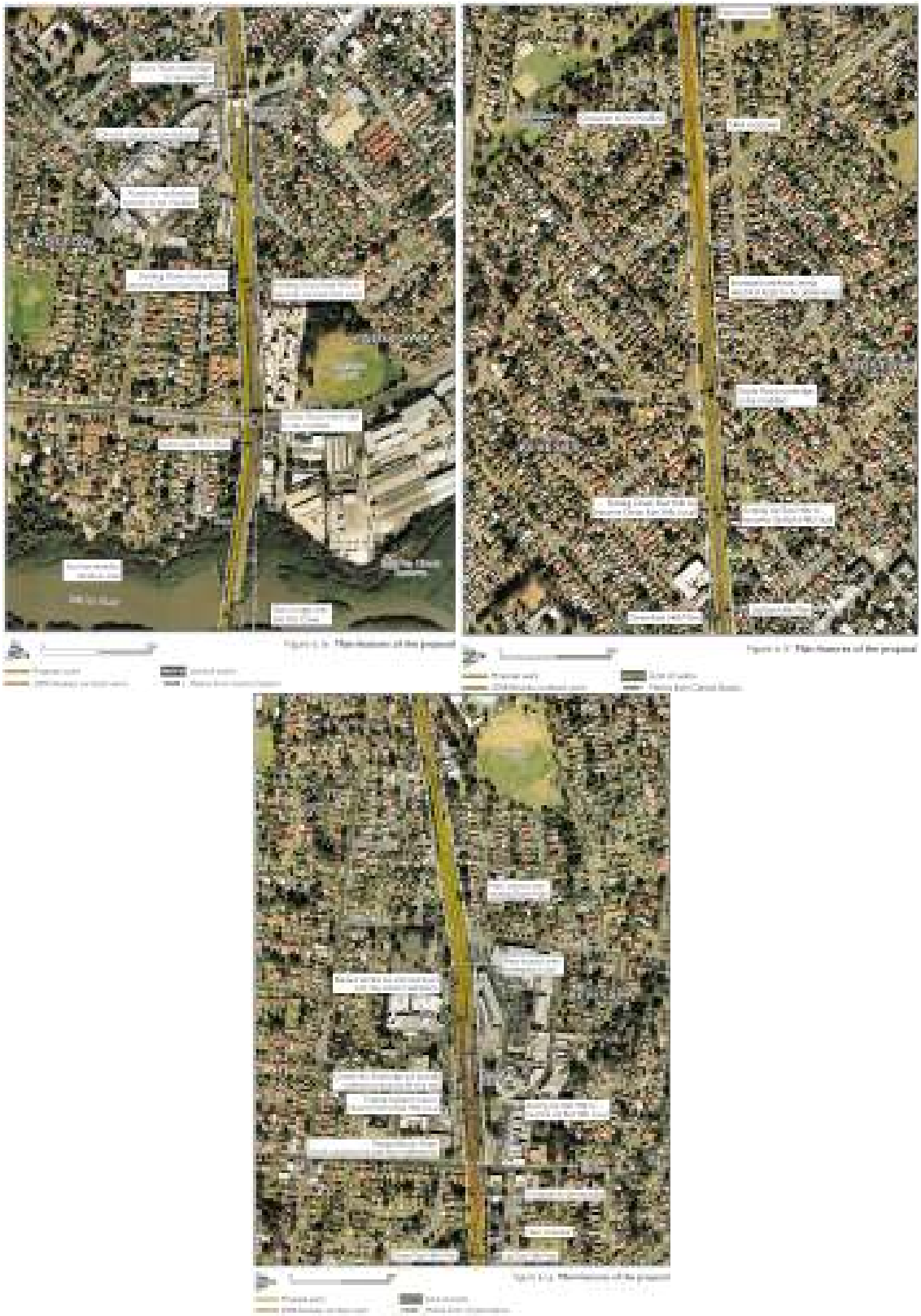

Figure 4 - Proposed Project Corridor (Sinclair Knight Merz 2007)

3. STATUTORY CONTEXT

3.1 Part 3A of the Act

By way of an order published in the Government Gazette on 29 July 2005, the Minister for Planning declared under section 75B(1) of the *Environmental Planning and Assessment Act 1979* (the Act) that development would be subject to Part 3A of the Act where:

- it is an activity subject to Part 5 of the Act for which the Proponent is also the determining authority; and
- in the opinion of the Proponent, the activity would significantly affect the environment and would (in the absence of the Order) require an environmental impact statement (EIS) to be obtained.

The proposed project is an activity under Part 5 of the Act for which the Proponent is also a determining authority. The Proponent also determined that the project would significantly affect the environment, and therefore would have required the preparation of an EIS. Consequently, the project is subject to the Minister's declaration and is therefore a project to which Part 3A of the Act applies.

3.2 Permissibility

The proposed project is permissible without development consent as it is a project identified within Schedule 1 of the *State Environmental Planning Policy No 63 – Major Infrastructure Projects* (SEPP 63).

It is noted that on 21 December 2007, *State Environmental Planning Policy (Infrastructure) 2007* was gazetted and SEPP 63 revoked. SEPP (Infrastructure) 2007 does not apply to the project by virtue of the savings provisions under clause 11(b) of that policy. However, it is noted that this policy would not have altered the permissibility of the project.

3.3 Relevant Environmental Planning Instruments

State Environmental Planning Policy No. 19 – Bushland in Urban Areas and *State Environmental Planning Policy No 55 – Remediation of Land* apply to the project. There are no other State Environmental Planning Policies that substantially govern the carrying out of the project.

State Environmental Planning Policy No. 19 – Bushland in Urban Areas applies to areas of the project located at Salt Pan Creek that are zoned for public recreation or open space. The aim of this policy is to protect and preserve bushland within urban areas. An approval authority cannot approve the disturbance of urban bushland unless it has undertaken an assessment of the need to protect the bushland, it is satisfied that the disturbance is essential for a purpose in the public interest and no reasonable alternative is available; and it is satisfied that the area to be disturbed is as small as possible and were disturbed it will be reinstated on completion of the work. Consideration must also be given to development adjacent to areas to which this policy applies.

The disturbance of these areas cannot be completely avoided as an additional crossing is required at Salt Pan Creek to complete the quadruplication. The Department is satisfied that the Proponent has minimised the footprint of disturbance as much as reasonably possible, has committed to rehabilitating disturbed areas and that construction management controls will mitigate any impacts to adjacent bushland.

State Environmental Planning Policy No 55 – Remediation of Land applies to the project. The policy aims to promote the remediation of contaminated land in order to reduce the risks to human health and the environment. Where land is contaminated, the policy requires that it is suitably remediated prior to any development taking place on it. This issue is discussed within Section 5 of this report.

3.4 Minister's Approval Power

The environmental assessment was placed on public exhibition from 7 November 2007 until 10 December 2007 and submissions invited in accordance with Section 75H of the Act. The Department has met all of its legal obligations so that the Minister can make a determination regarding the project.

It is also noted that the Environmental Assessment submitted in support of the subject application adequately addressed the Director-General's requirements issued for the project application.

3.5 Commonwealth Legislation

The Proponent determined that the project would be unlikely to have a significant impact on a matter of national environmental significance (threatened species and migratory species) or potential habitat if appropriate mitigation measures are implemented. Therefore, a referral to the Commonwealth Department of the Environment, Water, Heritage and the Arts under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was not made.

4. CONSULTATION AND ISSUES RAISED

4.1 Introduction

The Department received 49 submissions of which eight (8) were from Government agencies and two (2) were from local Councils. Of the 39 public submissions, 23 were received during the exhibition of the environmental assessment, and 15 were received following the close of the exhibition period. An additional public submission was received in response to the Proponent's Submission Report.

4.2 Submissions from the Public

The public submissions consisted of three (3) from special interest groups, three (3) from educational facilities, two (2) from businesses and 31 from local residents. Of these submissions, six (6) conditionally support the proposal, 20 did not state a submission and 12 objected to the proposal. Key issues raised in the submissions are summarised below.

1. Traffic and transport impacts, including:
   - temporary and permanent loss of car parking and overflow into local streets;
   - disruption and delays to local and flow-through traffic due to partial or full closures of roads and bridges during construction;
   - temporary reduction in access for pedestrians and cyclists during construction
   - access to stations during construction, including disabled access.;
   - damage to local roads from construction traffic;
   - impacts on local businesses due to road closures during construction;
   - impacts of construction traffic movements on the safety of school students and residents.
2. Noise and vibration impacts, including:
   - increased operational noise levels due to increased frequency of commuter and freight train services;
   - absence of acoustic walls along certain lengths of the track;
   - adequacy of the noise assessment;
   - impacts of construction noise on local amenity (residents and schools); and
   - impact on residential amenity and structural integrity of properties due to vibration.
3. Urban design impacts, including:
   - removal of vegetation (trees) along the railway corridor and streetscape impacts;
   - potential for graffiti on acoustic and retaining walls;
   - overshadowing and loss of visual amenity from acoustic walls;
   - design and appearance of overhead railway bridges;
   - consistency in the design of train stations and immediate surrounds with local design outcomes;
   - inadequate provision of cycle facilities at stations; and
4. Air quality impacts, including increased dust from construction works and increased train services.
5. Decrease in property values.
6. Loss in privacy resulting from train passengers overlooking residences.

4.3 Submissions from Government Agencies

The Department received submissions from the Department of Environment and Climate Change, the NSW Roads and Traffic Authority, Department of Primary Industries, the Department of Education and Training, the Ministry of Transport, NSW Maritime, Sydney Water and the Department of Water and Energy.

None of the agencies stated an explicit position but identified a number of key issues for further consideration/information including: noise and vibration impacts; ecological impacts; hydrological impacts; management of contaminated soils; traffic impacts; and accessibility by marine vessels along Salt Pan Creek.

Comments made by each agency are summarised below.

- The ***Department of Environment and Climate Change*** (DECC) did not object to the project but identified a number of concerns relating to the construction out-of-hours protocol, operational noise and vibration, biodiversity, indigenous heritage, stormwater management, erosion and sediment control, dust and soil contamination. With respect to operational noise and vibration, the DECC had concerns that freight noise had not been adequately addressed, questioned why some receivers where excluded from mitigation, and queried the assumptions and mitigation for vibration.

- The ***NSW Roads and Traffic Authority*** (RTA) did not object to the project but recommended that detailed traffic management plans be prepared with, and to the satisfaction of, the RTA and other relevant authorities. The RTA also recommended that a comprehensive communications and media strategy be implemented for King Georges Road and Davies Road to engage, inform and update local businesses, residents and commuters utilising the corridor about the disruptions during the major bridge works.
- The ***Department of Primary Industries (Fisheries)*** (DPI) was satisfied with the recommendations within the Environmental Assessment and recommended a compensation ratio of 2:1 be imposed for the loss of any marine vegetation and that the areas of mangrove dieback identified within the Environmental Assessment should be targeted for compensation. The DPI (Fisheries) requested that it be consulted to determine the final compensatory measures.
- The ***Ministry of Transport*** acknowledged the potential for future improvements to reliability, capacity and travel times on the East Hills Line as a result of the project. The Ministry indicated its support to the Proponent's mitigation measures for commuter car parking and noted its continued involvement with Railcorp and TIDC to investigate alternative car parking options.
- The ***Department of Education and Training*** (DET) expressed concern with the impacts on schools located adjacent to the rail corridor, specifically Beverly Hills Girls High School and Narwee Public School, during construction due to noise, vibration and spoil haulage. It was also requested that the Proponent consult with DET and the specific schools with respect to building treatments at the schools in order to maintain satisfactory internal noise levels.
- ***Sydney Water*** had concerns with the potential impacts on its assets along the corridor and the potential impacts on overland flow paths. It requested that a flood study be prepared to demonstrate that the proposed works do not adversely impact on flood behaviour.
- The ***Department of Water and Energy*** (DWE) noted the potential for groundwater to be encountered during excavation and stated that the Proponent would need to obtain any relevant licences under the Water Act 1912.
- ***NSW Maritime*** identified the need to prepare a Vessel Traffic Management Plan for works at Salt Pan Creek.

4.4 Submissions from Local Government

Submissions were received from Hurstville City Council and Bankstown City Council.

Bankstown City Council

Bankstown City Council objects to the approval of the project prior to the resolution of a number of issues that it considers should be addressed before the Minister determines the project. The key issues are summarised below.

- *Traffic and transport* – the proposal should demonstrate the provision of appropriate support services including commuter car parking, access arrangements and integration of other public transport services. Detailed traffic management plans should also be provided to demonstrate all impacts on the road network, pavement integrity, accessibility, safety and amenity have been addressed.
- *Council land impacts* – the impacts on Council land (roads and reserves) are not properly defined and there is a need to clarify the land requirements so that the Metropolitan Strategy requirements can be met.
- *Bridge design* – the proposed bridge designs for Memorial Drive and Doyle Road should include design measures identified by Council to improve traffic circulation. All bridge reconstructions should upgrade shared paths to improve accessibility.
- *Biodiversity* – objected to the signalling depot at 'East Hills 1' due to impacts on an Endangered Ecological Community, and recommended that the ecological offsets for the project (Salt Pan Creek) should be determined prior to approval.
- *Urban design* – the final detailed urban design plans must be integrated into Council's desired design outcomes for affected town centres. Council also highlighted opportunities to improve station entry points and integrate station plazas with neighbouring land uses (i.e. Padstow and Revesby Stations), and the need to consider local environmental values and conditions during the detailed design phase of the project. It also recommended that measures to minimise risk of graffiti (and remove graffiti) should also be included.

Hurstville City Council

Hurstville Council did not state an explicit position but noted that the project will have significant impacts during construction and operation along the rail corridor. The key issues of concern are summarised below.

- *Urban design* – the design of acoustic walls will have a significant visual impact. It recommended that the design should address overshadowing, should be of higher quality at prominent locations and

have landscaping measures incorporated to reduce visual impacts and risk of graffiti. Local heritage must also be considered in urban design plans.

- *Traffic and transport* – the project should address the impact of increased train patronage on local facilities and services and provide for their upgrade. Any losses in parking associated with the project during both construction and operation should be compensated for. Traffic diversions and haulage routes will have a significant impact on local streets and Council recommended that further assessment is required to accurately assess the impacts on residents and businesses. It also suggested that consideration be given to providing a cycleway within/adjoining the rail corridor.
- *Noise and vibration* – Council recommended that night works should be limited to minimise noise impacts and further information should be provided on the management of operational vibration impacts at affected locations.
- *Soil* – the risk of contaminated soil has not been properly identified. It also raised concerns regarding the disturbance of acid sulfate soils and consequent impacts on neighbouring mangroves, salt marsh and Swamp Oak forest.
- *Biodiversity* – concern over the loss of trees along the project corridor and that the assessment did not address DECC fauna studies at Salt Pan Creek.
- *Stormwater and flooding* – existing stormwater system deficiencies and impacts as a result of the project (including acoustic walls) need to be identified and addressed, including localised flooding impacts. It also stated that provision must be made to treat stormwater flows prior to discharge into Council and Sydney Water infrastructure, and management measures must be integrated with Council's policies for stormwater.

4.5 Submissions Report

On review of the issues identified in submissions, the Department required the Proponent to prepare a Submissions Report to address each of the issues raised in those submissions. As part of this process, the Proponent made specific comment in relation to each issue identified. Following consideration of the submissions, and additional development of the concept design, the Proponent proposed three (3) amendments to the project as follows:

- *Doyle Road Overbridge* – the temporary pedestrian bridge proposed to facilitate access during construction will become a permanent structure and services located along the existing bridge will be permanently relocated onto the pedestrian bridge. This will avoid the need to temporarily relocate and the services during construction and then relocate them back to their original position hence reducing night time noise impacts and the length of bridge closures;
- *King Georges Road* – the proposed two-lane northbound and two-lane southbound configuration at the bridge location during construction will become three-lane northbound and two-lane southbound facilitating improved traffic flows; and
- *Davies Road* – two lanes in both the northbound and southbound directions will be maintained during peak periods throughout the bridge construction period instead of the alternative option of a two- and one-lane configuration with tidal flow which was also assessed in the EA.

It is considered that these amendments are acceptable and do not significantly change the nature and scope of the original proposal nor will they result in additional adverse impacts. As such, a Preferred Project Report was not required for the project.

The Department provided the opportunity for Government agencies and local Councils to comment on the Submissions Report. Only the DECC, Department of Primary Industries (Fisheries) and RTA provided further comment to the Department.

The DECC provided a number of recommendations for the Department to consider as conditions of approval relating the vibration, timing of noise barriers, construction management, stormwater management, construction noise and vibration, Aboriginal Heritage and threatened species. These are discussed within Section 5 of this report.

The Department of Primary Industries (Fisheries) indicated that the offset ratio for mangroves is dependant on the availability of local mangroves suitable for rehabilitation.

The RTA reiterated the need for Traffic Management Plans and identified some concerns with the arrangements proposed at King Georges Road. The RTA also provided further comment on pedestrian access to railway stations, pedestrian facilities along reconstructed bridges and the impacts on car parking (temporary and permanent). These are discussed further within Section 5 of this report.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

After consideration of the Environmental Assessment, submissions, Submissions Report and the Government agency response to the Submissions Report, the Department has identified the following key environmental issues associated with the proposal:

- transport and traffic impacts, including regional and local traffic, and accessibility;
- commuter car parking impacts;
- operational and construction noise impacts;
- urban design and landscaping;
- ecological impacts; and
- land use hazards.

The Proponent has also assessed the potential impacts of the project on soils (including contamination, acid sulphate soils, erosion and sedimentation), hydrology, built heritage, Aboriginal heritage, property and land uses, and air quality. These issues are considered to be minor and although adequately assessed, require consideration and specific conditions of approval. The Department's consideration of these issues is addressed in Section 5.7.

5.1 Traffic and Transport

Issue

Bridge Construction and Road Closures

The Project will require the modification to and/or reconstruction of road overbridges at five (5) locations:

- King Georges Road at Beverly Hills Station;
- Belmore Road at Riverwood Station;
- Davies Road, Padstow;
- Memorial Drive at Padstow Station; and
- Doyle Road, Padstow.

The works, which will have the greatest impact on the surrounding transport network, are required to achieve the necessary clearances to accommodate the two additional tracks as well as meet predicted loadings. During the works, existing traffic arrangements will be disrupted by part and full road closures and traffic diversions. The nature and duration of the closures associated with the construction of the overbridges are summarised in Table 2.

Table 2 – Overview of Overbridge Works (as modified by the Submissions Report)

Overbridge Location	Nature and Duration of Closure and Restrictions
King Georges Road (Beverly Hills) (six lane)	• At present, the bridges provide a six lane configuration. Closure of three southbound lanes for six months with three lanes northbound and two lanes southbound in operation during construction. • Prohibition on certain turning movements to and from King Georges Rd and adjoining streets.
Doyle Road (Padstow)	• Closure of overbridge for nine months.
Davies Road (Padstow) (four lane)	• Closure of one southbound lane for 10 weeks. • Closure of northbound lanes for 12 months (upon completion of modifications to southbound bridge) with two lanes maintained for each direction of travel. • Prohibition of right hand turns from Davies Rd to Bridge St and Meager Ave, and from Bridge St and Meager Ave into Davies Rd northbound.
Belmore Road (Riverwood)	• Closure of southbound lanes for six months with two lanes of traffic, one in each direction, operating. • Closure of northbound bridge for six months, with two lanes of traffic, one in each direction, operating on new southbound bridge.
Memorial Drive (Padstow)	• Closure of overbridge for 7 months.

The closure of Memorial Drive and Doyle Road would result in the diversion of some 350-400 vehicles and 600 vehicles, respectively during the peak period. About 400 vehicles would be diverted as a result of the King Georges Road works.

The closure of roads and/or lanes would also adversely impact on intersection performance and result in additional traffic delays and congestion during the peak period.

The project will also require the construction of new underbridges on either side of existing tracks at:
- Broad Arrow Road, Narwee – two weekend road closures;
- Bonds Road, Riverwood – six week road closure; and
- Webb Street, Riverwood – six month road closure.

The construction of the underbridges will be relatively straightforward in terms of the required re-construction works and should only require two weekend road closures once the abutments are built. The temporary closures are expected to increase traffic along alternate routes.

Access by Pedestrians and Cyclists

The construction or extension of over- and under-bridges will result in modifications to pedestrian and cyclist access due to partial and full road closures. This includes impacts to pedestrian access at stations along the corridor, such as Beverly Hills and Riverwood.

In the majority of the cases, the Proponent has proposed to provide alternative temporary access arrangements where the diversion for pedestrians would be greater than 400 metres or will provide restricted access during the proposed construction activities. This includes the construction a new pedestrian bridge at Doyle Road (Padstow) and temporary bridge structures at King Georges Road (Beverly Hills), Belmore Road (Riverwood) and Davies Road (Padstow) to allow for pedestrian access at all times during overbridge works.

Exceptions to this are at:
- underbridge works, where pedestrian access would be prohibited but limited to when works would be underway, being two weekends and night-time periods for Broad Arrow Road and Bonds Road. Webb Street works would be undertaken over six months; and
- the southern section of the pedestrian bridge/cycleway over Salt Pan Creek will be closed for a period of 9-12 months and times when the northern section of the walkway would require temporary closure. Although there are two alternative crossings, both involve an approximate 4 km diversion.

Bus Operations

The Proponent has indicated that all bus routes will be affected by general traffic delays and any traffic congestion associated with the full or partial road closures required by the Project at Belmore Road, Memorial Drive and King Georges Road. The changes in bus routes and delays in travel time is likely to cause frustration to both bus drivers and patrons.

The Proponent has indicated that the existing bus terminus located alongside Padstow Station on Howard Ave may need to be temporarily relocated further along the avenue to accommodate construction work. As the terminus is only to be moved a short distance, it is unlikely to impact on bus patrons.

Construction Traffic

Earthworks, including truck and plant movements associated with haulage of excess stripping and/or cut material, and mobilisation and demobilisation of plant to worksites, will have an impact on the surrounding transport network. During the bulk earthworks phase, large volumes of spoil would need to be removed and either transported off site for disposal or to other locations within the corridor to be used as fill. This would involve heavy vehicles mainly using collector roads or minor arterials and, in some cases, local residential streets that are not designated to accommodate heavy vehicles. It will also involve the use of multiple access points on both sides of the rail corridor.

During the earthworks phase, up to 67,382 trucks would access the work sites over the construction period (assuming the worst case scenario that all excavated material is removed from the site and all fill is imported). The proposed haulage routes and access points may be used between 6 and 17 months, with the number of truck movements per day ranging from one to 40, depending on the location.

The proposed traffic increases on major (collector and arterial) roads resulting from haulage are unlikely to significantly affect motorists as they will only represent an incremental increase in the overall traffic volume.

However, local road and intersection performance may be adversely affected as these roads typically have low traffic volumes and so any large increases in traffic have a marked effect.

Heavy vehicle movements through local streets would also have the potential to damage the road pavement.

Staff movements are unlikely to have an adverse traffic impact as they would generally access and leave the site before and after the morning and evening peak periods. Staff would generally use the heavy vehicle haulage routes.

Issues Raised in Submissions

The key concerns raised in the public submissions were:

- the adverse impact of traffic diversions through local streets on residents' amenity;
- traffic delays due to increased traffic congestion;
- impeded access to local businesses resulting from restrictions in traffic movements during the construction of the King Georges Road overbridge; and
- the safety and suitability of locating multiple access points along, and detours through, sensitive land use areas.

Two (2) public submissions also raised concerns over pedestrian and cyclist access. One resident was concerned with the duration of the Salt Pan Creek Bridge closure (9-12 months) and raised the feasibility of including bike parking facilities at stations as part of the car parking strategy. The other submission raised concern over access to Revesby Station should ramps be removed.

Both Bankstown and Hurstville City Councils raised the following issues:

- the capability of the local road network to accommodate traffic increases;
- the diversion of traffic through local streets (and not the designated diversions) during road closures;
- increased traffic congestion resulting from reductions in trafficable lanes and/or restricted turning movements;
- extension of peak hour traffic due to road closures;
- the need to consult with the Councils in developing traffic management plans and submit the plans to the Councils for approval;
- the routing of heavy construction vehicles onto roads unable to accommodate the vehicle loads and dilapidation of local road pavements used as haulage routes; and
- accessibility by cyclists with Hurstville City Council requesting that provision for a cycleway either adjoining or within the tail corridor be considered as part of the proposal.

Other issues raised by Bankstown City Council can be summarised as follows:

- the need to upgrade overbridges to accommodate current best practice for shared path access;
- pedestrian access to all stations should be maintained during construction;
- the need to maintain bus and taxi access during construction;
- the routing of construction vehicles through town centres; and
- Council's concept drawings for widening Memorial Drive overbridge should be included into the final design.

The RTA recommended that a comprehensive communications and media strategy be developed for the King Georges Road and Davies Road works. It also indicated that Traffic Management Plans must be developed with, and to the satisfaction of, the RTA and all relevant authorities prior to construction commencing.

Consideration

Bridge Construction and Road Closures

The Department acknowledges that the proposed overbridge works will impact on traffic flows and intersection performance due to partial and full road closures. Although these impacts cannot be eliminated, they can be managed to reduce the impact to motorists and local residents and businesses. The Proponent has undertaken extensive network and intersection modelling involving a number of scenarios for the construction of each of the overbridges and underbridges.

Based on the outcomes of this modelling, the Proponent has developed arrangements which maximise the capacity of through movements and hence have the least impact on traffic in terms of both flow and duration of disruption. These arrangements involve maximising the number of lanes available to traffic (including utilisation of median strips), restrictions on turning movements and scheduling full and partial road and

bridge closures at different times to minimise cumulative impacts on the road network. The Department considers that the proposed arrangements are acceptable and notes that the Proponent is continuing to review engineering options to further reduce the time or capacity reductions required for these bridge works, as demonstrated through the improvements presented within the Submissions Report for King Georges Road and Davies Road. The Department and the RTA support this continuing innovation to the bridge designs, and the Department has recommended a condition of approval requiring the Proponent to continue investigations into engineering and management solutions to minimise the period of time in which closures occur (and associated detours), as well as the scale and duration of the capacity reduction.

The Department acknowledges that the Councils and local communities have concerns over the diversion of traffic through local streets. The Department recognises that drivers will always attempt to find the shortest route whether traffic flows are restricted due to road works or accidents, and as such, diversions cannot be eliminated. However, the number of diversions can be reduced by limiting the length of road closures and implementing appropriate traffic management measures, which is reflected within the Department's recommendations.

The Department has also recommended that the Local Area Traffic Management Plans be developed in consultation with the RTA, relevant local councils, emergency services and community stakeholders. The Plans would include details of the alterations to the road network and local traffic detours during full or partial closures of road over- and under-bridges, and will ensure that:

- appropriate traffic management measures, controls and directional signage are implemented to address concerns relating to traffic delays, congestion and detours;
- effective communication strategies are implemented to engage and inform motorists, transport providers, pedestrians/cyclists, commuters and local communities of the proposed traffic arrangements and detours in advance of works commencing, and throughout the works; and
- procedures are in place to effectively respond to breakdowns in proximity to bridge works/closures along major arterials to maintain traffic flows.

The Department also notes that some public submissions expressed concern with the elimination or restriction of allowable turning movements into neighbouring streets located in close proximity to the bridge works, and the safety implications of certain network changes that are required to cater for the proposed local-traffic detours. This was of specific concern for business operators located along Tooronga Road in Beverly Hills, which will have restricted access during works at the King Georges Road Bridge.

The proposed changes to the local road network are required to ensure the performance of the regional road network is maintained during the bridge works. Consequently, while the concerns of the local community are acknowledged, the Department is of the opinion that regional traffic flows along the affected major arterial roads must be given higher priority to local traffic requirements. Further, all changes are only required while bridge works are underway and all detours must meet relevant safety requirements of the relevant roads authority prior to implementation. In this respect, the Department considers that consultation with the affected business operators and the local community on Local Area Traffic Management Plans, the implementation of signage and communication strategies during bridge works, and the immediate reinstatement of pre-existing traffic network arrangements following the completion of the bridge works, is the most appropriate approach to address the concerns of the community. This has been reflected within the recommended conditions of approval.

Consequently, the Department is satisfied that the recommended conditions of approval should provide the necessary measures to ensure the temporary disruptions to local and regional traffic during bridge works are minimised as much as reasonable possible.

Access by Pedestrians and Cyclists

The Department notes that the anticipated interruptions to pedestrian access within the corridor would be temporary in nature and restricted to when construction work is underway at these locations. The Department is satisfied that the Proponent has appropriately identified where alternative access must be provided and/or will ensure that new (temporary or permeant) access is provided where diversions are too great. The Department has recommended that these arrangements (and associated directional signage arrangements) must be detailed within the recommended Construction Traffic Management Plan, which must be approved by the Director-General prior to the commencement of construction. The Department has also recommended that the temporary access arrangements at 'easy' access stations are designed as to maintain this access standard throughout the construction works. This will ensure that commuters requiring this service are not impacted by the project during construction.

The Department also notes that the project would have no permanent adverse impact on pedestrian or cycle access. In fact, pedestrian access to some stations (e.g. Narwee) will be improved and all pedestrian footpaths associated with bridge/road construction will be modernised and designed to current standards. The Department has also recommended that the Proponent should be required to upgrade or provide shared path facilities at all reconstructed bridges and incorporate these into the bridge design, where feasible. The Department has not extended this to all bridge works, as requested by Bankstown City Council and the RTA, given most bridge works only involve the extension of these structures (as opposed to demolition and reconstruction) and that any upgrade at these locations would be cost and time prohibitive, given the constraints to the engineering design and allowable track possessions.

The closure of the pedestrian/cycleway across Salt Pan Creek will unlikely affect rail commuters but is will impact those who currently utilise this connection point, primarily recreational users. The Department notes that it is not reasonable or feasible to provide an alternative temporary walkway due to the costs, and potential impacts on ecology. The Department concurs with the Proponent that the only practical measure is to provide users of the date and length of closure well in advance.

With respect to Hurstville City Council's request for a cycle path either within or adjoining the rail corridor, the Department considers that this would not be feasible as there is insufficient excess space and level land (at a safe distance from the rail lines) available along much of the length of the corridor. Further, the costs and impacts of acquiring and clearing land, constructing a cycle way, and erecting a barrier between the rail lines and cycle way, would make this proposal cost prohibitive.

Bus Operations

The Department acknowledges that there may be delays to bus services as a result of general traffic delays arising from the construction of the overbridges and underbridges and associated road closures. However, these delays are unavoidable consequences of the construction works. The Department notes that the Proponent has proposed traffic and intersection arrangements to maximise the capacity of through movements and reduce traffic delays.

The Proponent has discussed potential rerouting patterns with each bus operator and proposes to implement the following measures to minimise the impact on bus operations:

- provide suitable notice to bus operators of any changes to the construction program to ensure that operators have adequate time to inform patrons of changes to bus operating patterns; and
- work with Ministry of Transport and bus operators to use a variety of media to inform bus patrons of changes to routing patterns, bus stops and timetable changes prior to implementing any changes.

The Department considers these initiatives as adequate measures to minimise the impact on bus services and has incorporated a requirement for the Proponent to consult with transport providers in its recommended condition of approval for preparing Local Area Traffic Management Plans.

Construction Traffic

The Department acknowledges that access to the rail corridor during the bulk earthworks will require heavy vehicles to travel along local residential streets for at least part of the journey affecting sensitive receivers such as residents, schools, day care centres, churches and small businesses The Department recognises that it is not possible to prohibit heavy vehicles through local streets, and hence eliminate their impact, as in most instances access to the work sites can only be gained by traversing local streets. The Proponent has determined the proposed routes to be taken by heavy vehicles on the basis of trucks being able to manoeuvre safely through streets and at intersections, minimising the distance travelled to collector and arterial roads, and the location of and access to earthworks sites via existing RailCorp gates. The Department considers this approach to be practical and reasonable.

Although the impacts of heavy vehicles on the amenity and safety of sensitive receivers cannot be avoided, it is possible to reduce the level of impact through the implementation of appropriate mitigation and management controls. Consequently, the Department has recommended a number of conditions of approval that require the Proponent to:

- minimise construction traffic queuing and idling in local residential streets;
- minimise the use of local roads (through residential streets and town centres);
- comply with a Construction Vehicle Code of Conduct prepared to manage driver behaviour along the local road network;
- minimise or consolidate the number of construction vehicle access points; and
- minimise heavy vehicle movements past schools and childcare centres during morning arrival times and afternoon departure times.

The Department has also recommended a condition of approval requiring the Proponent to prepare a construction traffic management plan detailing:
- haulage routes and access points from construction work sites;
- construction vehicle volumes;
- measures for minimising peak time congestion and intersection impacts at local and arterial roads; and
- designated construction personnel parking areas.

With respect to Bankstown and Hurstville City Councils concerns regarding the impact of heavy vehicles on the road pavement, the Proponent has committed to undertaking condition surveys of the roads used by construction traffic and repairing any deterioration attributable to such traffic on completion of the project. The Department is satisfied this will adequately respond to the concerns of the Councils.

The Department is satisfied that the recommended conditions of approval should provide the necessary measures for managing the impacts of construction traffic to an acceptable level.

5.2 Commuter Car Parking

Issue
General parking and parking dedicated to commuter parking occurs alongside the rail corridor. There is a high demand for parking at the railway stations (Beverly Hills, Narwee, Padstow, Riverwood and Revesby Stations) along the rail corridor with an average utilisation rate of 95%. The construction of the project will result in existing commuter parking spaces being significantly affected with some of the spaces reinstated upon completion of construction activities and others permanently lost.

The Proponent has undertaken an assessment of the impact of the project on parking taking into account the number and size of work sites and the construction methodology employed. Based on a worst-case scenario, the following impacts are predicted during construction:
- Beverly Hills Station - approximately half of the parking spaces on Tooronga Terrace (40 spaces) and Morgan Street (28 Spaces) will not be available at various times during construction activities (i.e. 68 out of a total of 147);
- Narwee Station - all parking spaces to the north of the station (40) would be unavailable during construction (i.e. half of the total 82 spaces);
- Riverwood Station - an estimated 64 (26 to the north and 38 to the south) out of 92 spaces would be displaced;
- Padstow Station - some 92 spaces at Padstow (out of a total of 467), and western access to the existing multi-storey car park would be affected but maintained during construction; and
- Revesby Station - an estimated 85 spaces (out of a total of 152 spaces) would be lost at Revesby Station during construction.

The losses in car spaces described above equates to approximately 37% of all commuter parking spaces (350 spaces) on the East Hills line not being available, at one time or another, over the construction period.

The loss of car parking spaces will result in overflow to the surrounding residential streets where compensatory parking cannot be provided. This will impact on the amenity of residents and is likely to result in complaints by both residents and commuters who rely on parking in the vicinity of stations.

The Proponent has indicated that, subject to landholder agreement, there should be no net loss at Beverly Hills, Narwee and Riverwood Stations, upon completion of construction works. However, permanent losses will occur at Padstow (92 spaces) and Revesby Stations (83 spaces). The Proponent is currently investigating options to replace the lost commuter parking spaces at Padstow Station. RailCorp and the Ministry of Transport are currently investigating the provision of a 'park and ride' facility at Revesby Station in line with the commitments in the *Urban Transport Statement*: *Responding to the Challenges of Travel and Transport* (NSW Government, 2006) to cater for future growth and demand.

Issues Raised in Submissions
The temporary and permanent loss of parking, the overflow into the surrounding local streets, and the restrictions of available car parking for business customers and community facilities was a major concern identified within public submissions and local Councils.

The Ministry of Transport indicated its support to the Proponent's mitigation measures for commuter car parking and noted that it will continue to work with the Proponent and RailCorp in investigating alternative car parking options.

Consideration

The Department considers that the construction of the project will have a significant impact on car parking due to the large number of spaces that would be temporarily lost at each station. The project also has the potential to significantly impact on car parking in the long term as a result of the number of spaces that will be potentially lost if an appropriate strategy and plan for parking is not developed and implemented.

The Department acknowledges that it is not possible to avoid the loss of parking spaces during construction as the sites are required for complex construction activities (e.g. retaining walls and embankments) and site compounds. The Department notes that the Proponent is currently undertaking further investigations into options to accommodate parking demand during construction (and in the long term). These investigations include reconfigurations of existing parking areas, extensions to parking areas (where RailCorp land is available adjacent to the rail corridor), and the use of areas of land suitable for parking use that are either vacant or underused.

It is possible to minimise the number of parking spaces lost and length of time that they are lost during construction by implementing a number of measures such as identifying alternative parking locations, reconfiguring existing car park spaces, encouraging alternative transport arrangements, advising the commuter of changed parking arrangements, and ensuring there is no excessive use of land for construction activities. Consequently, the Department has recommended a condition of approval requiring the Proponent to prepare a commuter car parking strategy which identifies measures to minimise the length of time in which spaces would be lost or unavailable. This may include progressive release of occupied parking, the early scheduling of the permanent car parking solutions, and so on. This will assist in reducing the amount of overflow parking in residential streets and encourage commuters to park and ride rather than complete their journey by car due to inadequate parking availability.

The Department has also recommended a condition of approval requiring the Proponent to identify communication strategies to inform commuters of the closure or reduction in parking facilities. It is important that commuters are able to make alternative transport arrangements or locate other parking in advance of the proposed closure of parking areas so as to minimise their level of inconvenience and the impact on local residences through increased on-street parking. If adequate notice and/or compensatory parking are not provided in advance, there is the possibility that commuters may decide to make their journey by car. This would have a flow on effect in terms of increased vehicle numbers on roads, increased motor vehicle emissions (and hence impacts on air quality), and increased pressure on parking resources at destination points.

In addition, the Department has recommended a condition of approval which requires the Proponent to only occupy or remove car parking areas as described in the Environmental Assessment so as to avoid further reductions in parking availability.

With respect to long-term parking, the Department notes that the Proponent has aimed to maintain the existing level of parking provision at each station through reconfiguring existing parking areas or providing new permanent formalised parking areas adjacent to Beverly Hills, Narwee and Riverwood stations (subject to landholder agreement). The Department supports this approach and has recommended that a condition of approval that requires the fulfilment of this commitment following the completion of construction work. The Department has also recommended that the design of the new facilities are undertaken in accordance with the Urban Design and Landscape Management Plan to ensure any visual amenity impacts are appropriately addressed.

The Department notes that the Proponent is unable to provide a similar commitment of 'no net loss' at Padstow and Revesby stations, stating that it will attempt to minimise the loss. The level of parking lost will not be known until the completion of the investigations at these stations.

Other than walking, a significant proportion of commuters rely on commuter car parking to access Padstow and Revesby Stations with only small proportions of commuters choosing to travel by bus (refer to **Table 3**). It has been assumed by the Proponent that the majority of commuters choosing to drive originate from areas that are over one kilometre away from the railway stations. Consequently, in response to the loss of car parking, any shifts to walking modes will be unlikely and shifts to bus modes will be dependant on availability of these services. Further, it is also expected that demand will grow for all modes of access at Revesby

Station, with Revesby becoming a key station on the East Hills Line following the changes to the rail stopping patterns that will occur upon completion of this project. Consequently, the loss of parking at these stations will have an effect on the behaviour of rail commuters. This can range from increased use of private vehicles, increased pressure on parking resources at destination points or increased levels of on-street parking along neighbouring streets.

Table 3 – Mode of Access to Padstow and Revesby Stations

	Station	
Mode	**Padstow**	**Revesby**
Commuter car parking	33%	36%
Kiss-and-ride	31%	18%
Walking	28%	39%
Bus	8%	2%

It is noted that there are long-term strategic initiatives at Padstow and Revesby Stations that are consistent with the NSW Government's policies to reduce the reliance on private vehicles and to encourage public transport patronage. This may absorb the impact of this project – with the Miranda-Bankstown strategic bus corridor linking into Padstow Station and the NSW Government investigating options for a 'park and ride' facility and a commitment to upgrade the bus/rail interchange. The Department recognises that any solution to mitigate the impacts of this project must not conflict with these longer-term initiatives.

However, with significant proportions of commuters currently relying on commuter car parking to access these stations, and the absence of any definitive answers on the amount of parking to be lost or if viable access alternatives are available now, it is difficult to ascertain what level of impact the project will have in the immediate to medium term and if it is reasonable to rely on policies that are beyond the scope of this project to mitigate the direct impact that it generates.

In this respect, the Department does consider that targeting 'no net loss' during the Proponent's investigations is required to address the direct impacts of this project, which is reflected within the recommended conditions of approval. The Department considers that any loss can only occur if it can be demonstrated to the Director-General that the investigations have determined that the lost spaces cannot be reasonably reinstated, that the reduction has been minimised as much as possible and that any loss would be alleviated through initiatives being delivered in line with the *Urban Transport Statement* and the *Sydney Metropolitan Strategy.* The Department has recommended that the results of the investigations have to be presented to the Director-General within 12 months of construction commencing. This is to provide sufficient time for the Proponent to consult with the various stakeholders and/or reflect the investigations that have already commenced under the Urban Transport Statement, as well as providing sufficient time to resolve the secondary planning and/or environmental issues associated with any car parking expansion.

Overall, the Department recognises that the project will cause disruptions to commuters and the surrounding community due to the temporary and permanent loss of car parking, and accepts that these impacts cannot be avoided due to the corridor constraints. However, the Department is satisfied that the Proponent's statement of commitments and the recommended conditions of approval will ensure appropriate strategies are in place during construction to minimise this disruption as much as possible. In responding to permanent losses to car parking, the Department considers that the Proponent must reinstate displaced spaces to mitigate any permeant impacts on commuters, and where this not cannot be reasonably achieved, that the Proponent is able to quantify and justify these loses to the Director-General within the context of the NSW Government's strategic transport planning initiatives.

5.3 Operational Noise and Vibration

Issue

Airborne Noise

Due to limited offset distances between the rail line and adjacent development, sensitive receivers along the project corridor are already exposed to elevated rail noise levels that exceed the airborne noise trigger levels as set within the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* (DECC 2007) (IGANRIP).

Under the IGANRIP, the Proponent must assess and investigate reasonable and feasible mitigation where the project will increase rail noise by 2dB(A) L_{Aeq} / 3dB(A) L_{Amax} or more **and** the resulting rail noise levels will exceed the recommended noise criteria (referred to as 'noise trigger levels'). The combination of the criteria

is to reflect the accepted view that increases below 2dB(A) L_{Aeq} / 3dB(A) L_{Amax} would not have a noticeable impact on amenity and that such contributions to overall noise levels would be addressed over time through long-term noise management strategies, such as initiatives to reduce noise emissions from rolling stock.

The Proponent identified that the decrease in setback distances and the increase in train speeds along the express (outer) lines would increase the number of receivers that are above the overall noise trigger levels (refer to Table 4). The increase at these locations would typically be in the order of 5dB(A) (L_{Aeq}) in every hour and 4dB(A) in L_{AMax} levels, which would be clearly noticeable and warranted consideration by the Proponent for reasonable and feasible noise mitigation.

The constraints of the project corridor will require reliance on 'at source/receiver' (i.e. acoustic walls) and 'at receiver' (building treatments) mitigation. Approximately 7.5 kilometres of acoustic walls would be constructed, ranging from 1.5 metres to 4 metres along the project corridor. Where acoustic walls would not be cost effective (at the 69 receivers) 'at receiver' treatments have been proposed (refer to Table 4 and Table 5.

Table 4 – Number of receivers exceeding overall noise criteria in current and future scenarios (2021)

	Scenario		
	Existing Situation (2006)	**Future Situation without mitigation (2021)**	**Future Situation with acoustic walls (2021)**
Number of receivers above overall day time noise criteria ($65L_{Aeq(15h)}$ / 85_{LAmax})	92	317	69

Table 5 – Residual Exceedances and the Proposed Mitigation Response

Receiver	**Mitigation Response**
13 residential receivers recently constructed residential complexes	Investigate Council approval to determine if project impacts were addressed. If not, will investigate all reasonable and feasible mitigation.
51 residential receivers	A mix of receivers where no acoustic wall would be provided (where it doesn't provide sufficient mitigation) or residual exceedances occur with an acoustic wall (i.e. multi-story apartments). Building treatments would be considered at these locations.
Five schools and community centre buildings	Building treatments are to be considered to allow satisfactory internal noise levels to be achieved.

Ground-borne Noise

Ground-borne noise refers to noise that is generated inside buildings by ground-borne vibration produced by passing vehicles or rolling stock. Ground-borne noise is of relevance where it is higher than airborne noise and where ground-borne noise levels are expected to be audible within habitable rooms. Typically, ground-borne noise has greater relevance to tunnel projects; however there is a probable risk that reductions in airborne noise along the project corridor due to acoustic walls could result in ground-borne noise impacts becoming the dominant noise source. The Proponent has proposed to address this issue during detailed design, but considers that there should be no post-approval involvement by the Department or DECC with this issue.

Vibration

Vibration generated by the project has been assessed in accordance with IGANRIP and *Assessing vibration: A technical guideline* (DECC 2006). The DECC guideline provides preferred and maximum vibration dose criteria, with a low probability of adverse comment or disturbance to building occupants at vibration values below the preferred criteria. Adverse comment or complaints may be expected if vibration values approach the maximum criteria.

Based on the preferred vibration dose criteria for day and night, the Proponent determined that vibration levels up to 112dB would be permitted at residential receivers. This represents the allowable overall vibration level generated by an individual train pass-by on the nearest track. Given the preferred vibration dose criteria is a function of the number of pass-by during the assessment period, the value calculated will cover both the daytime and night-time period.

Two receivers exceed this criterion at present and vibration levels will be increased further to 118dB and 120dB as a result of the project. Vibration levels at all other locations would be perceptible (depending upon the distance from the project) but would be within DECC's preferred vibration dose criteria.

Issues Raised in Submissions

Rail noise and vibration was the key concern for the majority of the public submissions. These can be summarised as follows:

- the increase in freight noise as a result of the project had not been assessed within the Environmental Assessment;
- questioned how the noise and vibration assessment criteria was established, with specific concern that night-time noise and vibration had not been assessed;
- questioned how the location of proposed noise mitigation measures had been determined;
- concerns that night-time vibration impacts had not been sufficiently assessed and that the Proponent had not identified how it would address vibration impacts;
- questioned how future noise levels were determined, with specific reference to noise levels in proximity to Revesby Station.

Hurstville City Council and a number of public submissions had concerns with how urban design and amenity impacts associated with the walls (such as overshadowing, setbacks, graffiti risks, etc) would be addressed. The Department's consideration of these issues is addressed in section 5.5 of this report.

The Department of Education and Training noted that the operation and amenity of Beverly Hills Girls High School and Narwee Public School should not be compromised by the project. It indicated its willingness to work closely with the Proponent to facilitate the required building treatments at the required locations.

The DECC stated that it was satisfied with the assessment, the application of the IGANRIP and the mitigation measures proposed by the Proponent. However, it had concerns that changes to freight noise had not been sufficiently identified and/or assessed. The DECC also sought further clarification on the assumptions made within the vibration assessment, the final number of receivers that would require treatment to address residual exceedances, and the final mitigation measures for rail vibration impacts.

The DECC requested further clarification on the relationship between an individual train's vibration signal and the vibration-dose trigger level and the mitigation measures for the locations where the vibration would be exceeded. Following its review of the Submissions Report, the DECC raised no further issue with respect to noise and vibration other reiterating that the Proponent should have been clearer on the ramifications of freight noise and why it has not been addressed as part of the project. It also stated that it supported the installation of ballast matting to address vibration and potential ground-borne noise impacts at the two locations (Vanessa Street and Gregory Crescent).

Department's Consideration

Airborne Noise

The Department and the DECC are satisfied with the noise assessment undertaken by the Proponent for the project, and the methodologies applied in identifying the mitigation measures for the project. The Department acknowledges that some public submissions had concerns that night-time noise impacts had not been assessed given overall average night time trigger levels are more stringent (60dB(A)) and that background noise levels would be lower. While it is correct in assuming that background noise levels (and the applicable average noise criteria) would be lower during night-time periods, the total train movements during the day and night time period would result in an approximate 6dB(A) difference between the two time periods. Given the differences in noise levels and total train movements during day and night periods, it can be reasonably concluded that:

- any exceedance in daytime criteria would capture any exceedance in average night-time period;
- any increase in daytime periods would be greater and likely trigger both IGANRIP criteria to require mitigation measures to be investigated; and
- mitigation measures to reduce the increase in day-time noise levels would correspond with similar reductions in night-time noise levels.

Consequently, the Department is of the opinion that the use of the average day-time noise period is appropriate. The DECC also had no concerns with the noise criteria selected for the assessment.

The Department notes that the key source of noise emissions from the project is attributed to the rolling contact of steel wheels on steel rails. The ability to reduce noise emissions from this source, as part of this project, is fairly limited due to rail corridor limitations (being the quadruplication of an existing line) and is

more effectively addressed through longer-term 'at source' initiatives that will reduce noise emissions over time such as the upgrade of the dedicated passenger rail fleet. In this respect, the Department is satisfied that all possible 'at source' mitigation measures, such as bridge and rail design, have been incorporated into the proposed design wherever possible, and accepts that this has necessitated the greater reliance on 'at source/receiver' and 'at receiver' mitigation.

The Department believes that the construction of approximately 7.5 kilometres of acoustic walls will require careful examination due to the secondary societal impacts that these walls could generate, such as overshadowing, vista severance, aesthetic impacts and community opinions. This will require the Proponent to consult with the impacted properties, the general community and local Councils, and may result in changes to the heights and location of the acoustic walls, and the amount of receivers requiring building treatment.

Nevertheless, the provision of acoustic walls will provide significant noise reduction benefits to the community with reductions in the total number of receivers along the corridor that are exposed to noise levels above IGANRIP criteria (reduced from 92 to 69 receivers). Although this is a reduction in the total number of receivers that will be above accepted criteria, there are a limited number of new receivers that will now be exposed to noise levels above trigger noise criteria. Of particular note are the residences located along Meager Avenue, Padstow, which are located alongside the south-western abutment of the new Salt Pan Creek bridge and will not be provided with acoustic walls, as well as 13 receivers within recently constructed residential apartments.

For the 13 receivers, the Proponent has argued that the Council approvals for the new residential buildings should have required building treatments to respond to rail noise impacts. If so, the Department and DECC consider that any approval issued by Council would have only considered current rail noise levels and not contributions from the project. Consequently, the Department and the DECC considers that the Proponent's review of the operational noise controls (during detailed design) must consider all reasonable and feasible treatments at this location (should the development approvals have not covered rail contributions from this project). The Proponent has since adopted the commitment to undertake this review during the detailed design.

With respect to residences along Meager Ave (refer to Figure 5), the predicted noise impacts are attributed to the construction of both tracks directly adjacent to the property boundaries. Whilst building treatments would address internal noise levels, the project will further deteriorate the amenity of outdoor areas for these properties. Design alternatives were considered at areas in proximity to Salt Pan Creek, including the construction of two outer tracks that would have limited the impact at these particular receivers. The Department notes that this alternative was not adopted given the required two-bridge configuration would have resulted in greater environmental and economic costs, as well as the impacts on the Southside Montessori School, located directly adjacent to the corridor. In the context of the broader benefits gained by the project, longer-term noise abatement strategies and the alignment considerations, the Department considers that the proposed design at this location and the residual impacts (on outdoor areas) are acceptable.

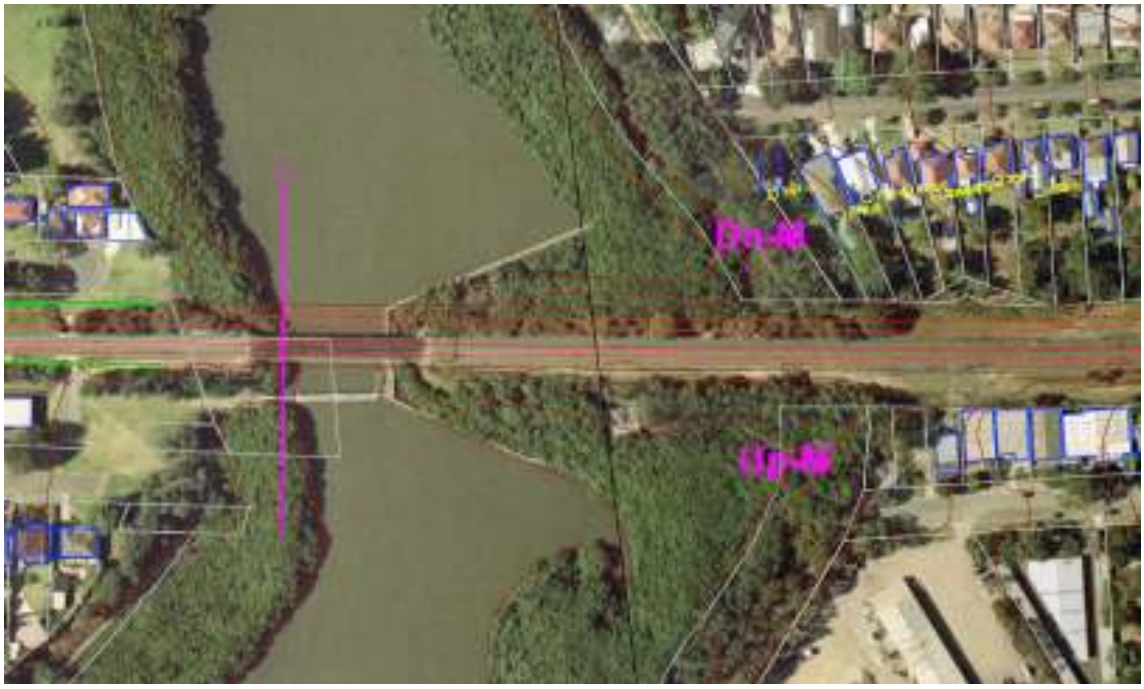

Figure 5 – Meager Street, Padstow

The Department also acknowledges that there are a number of receivers that will experience an increase in rail noise as a result of the project but for which the Proponent has not proposed further mitigation on the grounds that trigger criteria are not exceeded at those properties. The Department considers these increases would not lead to unacceptable impacts given the predicted noise levels are within accepted trigger criteria. Furthermore, it is expected that noise reductions at these receivers would be delivered over time in accordance with NSW Government rail noise policies, such as through improvements to rolling stock.

Consequently, the Department is satisfied that the proposed measures and noise mitigation strategy should ensure that noise contributions from the project are minimised and that the consultation process will ensure that an appropriate balance is reached with respect to the provision and design of the acoustic walls. This has been reflected within the recommended conditions of approval, which include:

- the submission of a review of the operational noise and vibration mitigation measures for the approval of the Director-General prior to the commencement of construction. This would detail what reasonable and feasible noise mitigation measures would be implemented to meet the IGANRIP noise goals and the timing for the implementation of these measures;
- a requirement for the design of physical noise mitigation measures to be determined in consultation with the relevant Councils and directly-affected property owners, with consideration given to the setback of buildings, overshadowing and prevention of graffiti and other forms of vandalism;
- a requirement for acoustic walls to have absorptive surfaces to minimise the impacts of noise reflection; and
- the submission of an operational noise audit within three months of opening to confirm the noise predictions and performance of the implemented noise mitigation measures, with additional measures to be implemented if necessary.

The Department is satisfied that the recommended conditions of approval should provide the necessary mitigation measures to minimise wherever possible the operational noise impacts generated by the proposed projects, and that any appropriate mechanisms are in place to confirm and re-evaluate the need for any further mitigation.

Freight Noise

The DECC and public submissions had concerns that the impacts from freight noise may worsen as a result of the proposal, as the frequency may increase due to the improved capacity of the line and the reduction in setbacks would increase noise levels generated by freight movements. The Department acknowledges that freight trains will likely utilise the outer express lines and that this will increase noise levels at receptors during these periods of use.

However, the East Hills line is not a shared corridor and is only used for freight purposes when the primary freight routes are closed for emergency reasons or maintenance. As this rail line is not a dedicated shared corridor and that any impact would be infrequent, the Department does not consider it to be reasonable (or feasible) for the Proponent to mitigate these impacts. The Department highlights that any permanent use of this line for freight would be subject to further environmental assessment and mitigation (if necessary), and that ongoing issues for the community associated with freight should be addressed through the relevant regulatory framework – namely Environment Protection Licences.

Ground-borne Noise

The Department and the DECC accepts that the likelihood of ground-borne noise impacts cannot be determined until the Proponent has finalised the detailed design of the project (including the design of acoustic walls), and that this impact is better established and considered at this stage. Conversely, there must be certainty that this issue is addressed prior to construction commencing as retrospective mitigation is difficult and/or impractical. Consequently, the Department has recommended that this assessment forms part of the Operational Noise and Vibration Review, which must be approved by the Director-General. This must identify where noise levels exceed the ground-borne noise trigger levels set within the IGANRIP and where mitigation measures have been incorporated into the final detailed design. The Department is satisfied that this will ensure any required mitigation measures are suitably incorporated into the final design of the project.

Vibration

The Department and the DECC are satisfied with the vibration assessment undertaken by the Proponent. The Department notes that two current residential properties are above the recommended criteria (112dB) and that the proposal will further increase vibration at these locations to 118dB and 120dB. The Department acknowledges that other receivers along the corridor currently experience perceptible intermittent vibration and that this may increase as a result of the project depending upon the distance from the project. However, these levels are within accepted preferred criteria and do not require mitigation.

The Department notes that ballast matting has been proposed at the locations were the criteria cannot be met, subject to feasibility. This can reduce vibration up to 5dB and provide corresponding ground-borne noise reductions by 5dBA to 10dBA. Whilst this would not reduce vibration levels to within preferred vibration dose values, the Department is satisfied that all reasonable and feasible mitigation measures would be implemented to ensure maximum levels for human comfort are not exceeded.

The Proponent will be required to confirm the assessment and the final mitigation measures, based on the detailed design of the project, within the recommended Operational Noise and Vibration Review. This must be submitted prior to the commencement of construction for the Director-General's approval. This is of particular relevance as retrospective mitigation is difficult and/or impractical, and therefore must be determined and incorporated into the final design.

5.4 Construction Noise and Vibration

Issue

Noise

Construction noise will exceed the criteria established within DECC's *Environmental Noise Control Manual*, which enables a 5dB(A) increase above current background noise levels. At the major construction zones (such as bridge and piling works), noise levels have been predicted to be more than 40dB(A) over the nominated criteria. Activities of shorter duration, namely earthworks and track laying, have been predicted to be between 20dB(A) and 40dB(A) depending on the proximity of receivers. A range of key mitigation measures has been proposed to mitigate these impacts, with each construction zone to be subject to further detailed assessment through the preparation of site-specific Construction Noise and Vibration Plans prior to the commencement of construction.

Weekend and night-time works will also be required throughout the construction period that will generate further potential impacts on the surrounding receivers, including sleep disturbance impacts. To manage these additional impacts, the Proponent has proposed an out-of-hours protocol, which sets out the assessment, consultation and approval steps to enable out-of-hours works to occur.

Traffic Noise

Heavy vehicles movements associated with the construction phase of the project will generate off-site impacts along the nominated haulage routes. Depending the location, haulage routes (and access points) may be used between 6 to 17 months, with approximately 4 to 8 heavy vehicle movements per hour during

busy periods. For the purposes of this assessment, the Proponent applied traffic noise criteria set within the DECC's *Environmental Criteria for Road Traffic Noise*.

Based on the maximum number of heavy vehicle volumes and likely setbacks of receivers along these routes, the Proponent has predicted contributions of 2dBA (L_{Aeq}) during daytime periods and 1dBA during night-time periods (to reflect potential night-time works) for receivers located 10 metres from the roadway. The Proponent states that these contributions demonstrate that the project will not have a major impact but has proposed a number of mitigation measures to minimise the risk of exceeding the criteria. These measures include the restriction of heavy vehicle movements to the daytime period to the greatest extent possible, restricting idling and queuing along residential streets and controlling driver behaviour.

The Proponent has also identified that local traffic diversions during under- and over bridge works will increase traffic noise levels along the nominated alternative routes. The Proponent states that in most cases the increase in traffic volumes will be much less that 80% and therefore will be below 2dBA. Consequently, the Proponent concluded that there would be no significant noise impact on receivers along these routes.

Vibration

Construction vibration can generate impacts on human comfort and the structural integrity of adjacent buildings. Given the proximity of neighbouring receivers to the project corridor, the risk of these impacts are high and must be carefully managed to ensure the project does not generate any adverse impacts to human comfort and neighbouring structures. To mitigate and manage these impacts, the Proponent has proposed to:

- adhere to the recommended safe working distances for buildings (based on DECC, British and German standards), and undertaken monitoring if these distances cannot be met;
- complete building condition surveys at building located in proximity to piling, excavation or other vibrational activities, and rectify any damage caused; and
- alter plant items in use (where possible) where adverse human response is likely and undertake monitoring to determine acceptable locations and duration of such activities.

Issues Raised in Submissions

Public submissions raised concerns with construction noise impacts on residential receivers, neighbouring schools and businesses. This included a submission from the Beverly Hills Intensive English Centre, located directly adjacent to the corridor.

The Department of Education and Training (DET) had similar concerns with respect to the impact on Narwee Public School and Beverly Hills Girls High School.

The DECC noted that the construction noise impacts will require best practice mitigation and management controls to be implemented given the level of impact. It noted its support of the key management commitments provided in the Environmental Assessment, but disagreed with aspects of out-of-hours protocol proposed by the Proponent given it is inconsistent with the DECC's licensing approach. The DECC also recommends the installation of operational mitigation measures as soon as possible to mitigate construction noise impacts.

Hurstville City Council supported the preparation of the site-specific Construction Noise and Vibration Plans.

Department's consideration

Noise

Construction noise impacts are likely to be significant and difficult to minimise to levels that achieve the construction noise objective due to the corridor limitations and the nature of the construction works required. However, the Department acknowledges that the noisiest activities will not occur for the entire construction period and that the site-specific Construction Noise and Vibration Plans would ensure that all reasonable and feasible measures are implemented to reduce noise emissions as much as possible. This has been reflected within the recommended conditions of approval, which include:

- the preferred use of bored piles (as opposed to the more intrusive driven piles) during construction works, unless otherwise approved by the Director-General;
- consultation with affected educational institutions to ensure construction works are not undertaken during examination periods unless alternative arrangements are reached with that organisation;
- the implementation of a construction noise and vibration management plan and monitoring program within the Construction Environmental Management Plan, prepared in consultation with DECC. This would include the Proponent's site-specific plans and the out-of-hours protocol;

- the restriction of construction hours for audible construction work to 7:00 am to 6:00pm Monday to Friday, and 7:00 am to 1:00 pm on Saturdays, with the exception of work that is necessary for emergency or safety reasons;
- the further limitation of activities resulting in impulsive or tonal noise emission (such as rock breaking, rock hammering, sheet piling, pile driving) to be limited to 9:00 am to 12:00 pm, Monday to Saturday and 2:00 pm to 5:00 pm Monday to Friday. Minimum one-hour respite periods are also required;
- complaints handling and response program to ensure the concerns of any stakeholders along the corridor are appropriately addressed; and
- the operational noise and vibration review to identify the timing associated with the implementation of the permanent physical noise mitigation controls.

With respect to out-of-hours activities, the Department accepts that night-time and weekend works are unavoidable given the limitations of construction activities coexisting with an active railway line. This will generate amenity impacts on neighbouring receivers that must be carefully managed to ensure best practice mitigation measures are proposed and that periods of respite are afforded to the community. Based on past experience, the Department considers that the proposed out-of-hours protocol provides an effective mechanism that assists in identifying low, medium and high risk activities and the required response from the Proponent. Such responses include further noise assessment, mitigation response (including alternative accommodation) and stakeholder consultation. This protocol has been incorporated into the recommended Construction Noise and Vibration Environmental Management Plan, which will require the Director-General's approval prior to the commencement of construction. The Department considers that the DECC's concerns, which relates to the number of consecutive nights of out-of-hours activities, can be resolved during the preparation of this protocol. It is also important to note that this protocol will not eliminate the need for the Proponent to obtain the approval of the Director-General or the DECC (via an Environment Protection Licence) prior to undertaking the specific works.

The Department notes that some submitters had concerns that construction noise impacts had not been assessed for all receivers along the corridor, particularly business operators and mixed-use buildings at Beverly Hills station. The Department notes that the assessment conducted focused on impacts at the nearest receiver in proximity to the major construction zones with a generic assessment of the noisiest activity outside these areas based on receiver setbacks. The Department considers this approach to be acceptable at this stage and that the site-specific Construction Noise and Vibration Plans will address impacts in greater detail to ensure that these impacts are adequately mitigated. This step will ensure that any mixed-use premises are appropriately identified and considered in the preparation of these plans.

Traffic Noise

The proposed access points and associated haulage routes were largely determined on the location of existing RailCorp gates and providing the shortest distance possible to arterial and collector roads. The Department acknowledges that this has resulted in requiring heavy vehicles, at some stage of the journey, to travel along local residential streets. These movements, particularly during activities of high intensity (such as spoil haulage) will have an impact on sensitive receivers located along these local roads, which includes schools and day care centres. However in recognising these impacts, it is important to note that the predicted 2dBA increase is attributed to the earthworks phase of the project and that actual noise traffic noise contributions will fluctuate depending on the stage of construction and the setback of receivers from the roadway.

The Department recognises that it is not realistic to prohibit heavy vehicle movements along local roads to eliminate this impact, given that the conflicting objectives - being providing safe access to and from the site, providing the shortest route possible to arterial and collector roads and minimising the impacts on sensitive receivers – cannot be catered for in all instances. Consequently, the Department believes that the temporary amenity impacts are better addressed through appropriate mitigation and management controls. In this respect, the Department has recommended a number of conditions of approval that require the Proponent to:

- minimise queuing and idling within residential streets;
- limit (wherever possible) the use of local roads;
- limit or consolidate the number of access points that are being actively utilised within any particular construction area;
- implement a Transport Code of Conduct to establish and monitor driver behavioural controls to minimise the generation of traffic noise (such as use of compression braking, heavy acceleration and vehicle maintenance); and
- prepare and implement a Construction Traffic Management Plan that identifies haulage routes, access points and measures to minimise potential access and land use conflicts.

The recommended community consultation strategy and complaints handling system will also ensure that residents and other receivers along the nominated routes are appropriately informed of the Proponent's activities and that the Proponent appropriately responds to any concerns or complaints of the community once works commence.

With respect to traffic noise contributions as a result of local traffic diversions, the Department accepts that the predicted contributions are within acceptable criteria and that the impacts would be temporary. The Department has not recommended any conditions of approval relating to this issue.

Vibration

The Department is satisfied that the Proponent has sufficiently identified high and medium risk activities that are likely to cause discomfort to the surrounding community and/or damage to surrounding buildings. The extent of these impacts will be dependant on local circumstances, including proximity of receivers, age of the building and local geology. The Department is satisfied that the Proponent has identified sufficient procedures and safeguards to ensure that appropriate site-specific controls are in place and has committed to undertake monitoring during high risk activities to ensure the adequacy of these controls.

The preparation and implementation of the site-specific Construction Noise and Vibration Plans is reflected within the Department's recommended conditions of approval, which also include:

- construction vibration criteria for human comfort and structural integrity;
- restriction of high-impact activities to 9am – 12pm and 2pm – 5pm Monday – Friday with the provision of a respite periods;
- complaints handling and response program to ensure the concerns of any neighbouring sensitive receiver are appropriately addressed.

The Department is satisfied that the recommended conditions of approval should provide the necessary mitigation measures to minimise wherever possible the vibration impacts generated by the proposed construction works, and that any appropriate mechanisms are in place to confirm and re-evaluate the need for any further mitigation.

5.5 Urban Design and Landscaping

Issue

Public visibility of the rail corridor is limited to stations, bridges, and where roads and pedestrian pathways run parallel to the corridor. All other views are only available to residences, commercial buildings and schools that share a common boundary with the rail corridor. Landscaping (where provided) along streets and within the rail corridor provides visual screening for these receptors.

The railway itself is of low visual quality of an inconsistent or poor urban design, generated by piecemeal upgrades and repairs over time. Station upgrades have occurred at Revesby, Padstow, Riverwood and Beverly Hills (to provide lift access), however pedestrian access and integration of these stations with surrounding commercial areas varies.

The proposal will alter the visual impacts of the rail corridor. The removal of vegetation, the widening of embankments/cuttings and the lengthening of new bridges will increase the visual intrusiveness of the rail corridor. The construction of the proposed acoustic walls will also alter the local landscape and generate significant visual impacts on neighbouring properties and publicly accessible areas. Car parking areas would also need to be extended at some stations in order to replace permanently lost car parking areas.

The Proponent has proposed a framework for the proposed urban design treatment of project elements to guide the design of the corridor and provide design solutions for major elements, such as noise walls, retaining walls, bridges and concourse areas. This includes:

- specific station precinct plans to maximise the opportunities to improve the integration of the stations with neighbouring commercial areas. This will include 'signature' landscaping and measures to improve security, lighting, signage and street furniture at these locations;
- minimising the use of retaining walls wherever possible to preferred earth mounds;
- providing a simplistic design approach to acoustic walls, with simple graphic patterns at railway precincts and bridge locations;
- maximising the opportunity for landscaping adjacent to noise walls and embankments to provide a visual screen of these structures, minimise the bulk and scale of these structures and minimise the risk of graffiti;

- protecting and retaining mature trees where possible, with the provision of new trees, shrubs and groundcover where the impact is unavoidable;
- providing dense vegetation where acoustic walls and embankments visually terminate the end of streets;
- consulting with individual property owners to determine colour, panelling (for overshadowing) and height of acoustic walls during detailed design; and
- aligning the new Salt Pan Creek bridge with the existing structure to minimise the intrusiveness of an additional bridge within this recreational and bushland corridor.

Issues Raised in Submissions

A number of public submissions had concerns with how urban design and amenity impacts associated with the walls (such as overshadowing, setbacks, graffiti risks, etc) would be addressed. Some of submissions identified preferred designs of the acoustic walls along their property boundary. These types of issues (i.e. design, colour, transparent panelling) will be determined during the detailed design phase of the project.

Bankstown City Council (BCC) stated that the final detailed urban design plans must be integrated it's desired design outcomes for affected town centres. BCC also highlighted opportunities to improve station entry points and integrate station plazas with neighbouring land uses, and the need to consider local environmental values and conditions during the detailed design phase of the project. It also recommended that measures to minimise risk of graffiti (and remove graffiti) should also be included.

Hurstville City Council noted that the design of acoustic walls will have a significant visual impact. It recommended that the design should maintain adequate solar access, should be of higher quality at prominent locations and have landscaping measures incorporated to reduce visual impacts and risk of graffiti. Local heritage must also be considered in urban design plans.

Department's Consideration

The visual impact of the project will be highly variable and dependant on the location and the available vistas to and from the railway line.

The Department considers that the proposed acoustic walls and embankments will have the greatest impact on the adjoining properties and neighbouring community, particularly at locations where heights exceed two metres, where existing landscaping must be removed or where the structures run parallel to road or pedestrian pathways. In this regard, the Department is satisfied that the Proponent has identified appropriate design and landscape solutions that will assist towards mitigating these impacts, including solutions to minimise the bulk and scale of the structures as well as minimising opportunities for graffiti. The Department considers that the preparation of the detailed urban design plans in consultation with the affected property owners, local community and Councils will also ensure that local considerations and Council strategies are suitably integrated into the final urban design solutions and reflect local values.

However, the Department recognises that residual amenity impacts from the acoustic walls will occur due to the corridor constraints, the limited setback of buildings from the railway line and high risk of graffiti. In this regard, the Department considers that the benefits gained by the acoustic walls would outweigh any secondary impact on visual amenity and that consultation with directly affected property owners on the final design of these walls (including height, colour, and solar access) and associated landscaping will assist in responding to these impacts.

With respect to public areas affected by the project, the Department notes that bridge reconstructions will provide potential opportunities for the Proponent to deliver benefits to the community by improving pedestrian access, station facilities and integrating stations with the surrounding commercial areas, such as Revesby and Padstow stations (refer to Figure 6). For these benefits to be realised, the Proponent will need to taken into account relevant Council's strategies and community views to ensure the final designs are consistent with the community's desired urban character and/or do not constrain future Council initiatives. The Department considers that the recommended conditions of approval will ensure that this consideration and consultation occurs during the detailed design phase of the project.

Works within certain station precincts will also include the expansion of car parking facilities. This will have an impact on nearby properties if not appropriately designed, particularly at locations where areas would be expanded into informal public open space. The Department believes that any localised impact must be considered in context of the broader benefit delivered to the community by offsetting the permanent loss of car parking facilities. In this respect, the Department is satisfied that any such impacts are minor and that the appropriate design and landscaping of the expanded facilities should suitably mitigate any impacts.

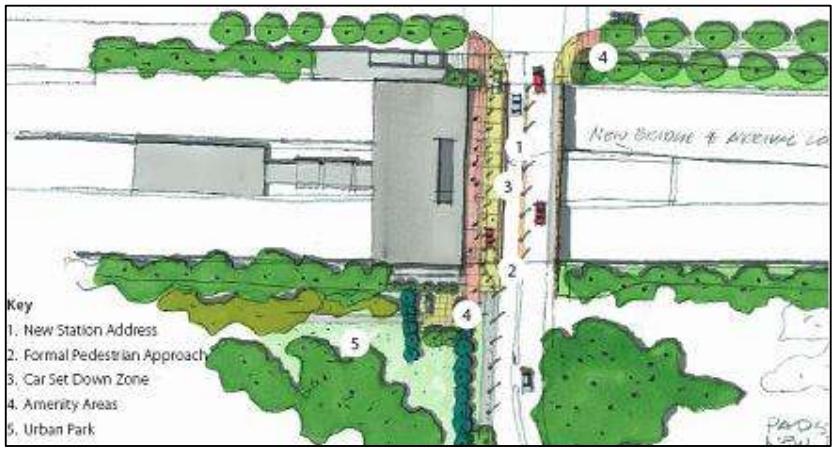

Figure 6 – Potential design option at Padstow Station (subject to further consideration)

Overall, the Department is satisfied that the Proponent has provided a sufficient framework to guide the final project design and to minimise the intrusiveness of the project as much as possible. The Department recognises that further work will need to be undertaken by the Proponent before the final design can be determined, including consultation with the community and local Councils. To reflect this, the Department has recommended the following conditions of approval:

- design physical noise mitigation measures in consultation with affected property owners and Councils, and with consideration of setback distances, overshadowing and prevention of graffiti and other forms of vandalism;
- consult with the broader community through the Community Communication Strategy on the proposed design solutions, including though the recommended Construction Community Liaison Group;
- investigate options to enhance shared path facilities at all reconstructed bridges to overcome current deficiencies; and
- prepare an Urban Design and Landscape Plan in consultation with Councils and community stakeholders, which must be approved by the Director-General prior to the commencement of construction. This plan will include final design plans for train station precincts and other built elements as well as final landscaping arrangements to enhance and maintain landscaped areas.

5.6 Ecology

Issue

The Proponent has identified that the project will impact on a number of threatened flora species and endangered ecological communities (EEC) located along the project corridor. These include:

- direct impact on 30 individuals of *Acacia pubescens* (Downy Wattle);
- direct impact on 20 individuals of *Acacia prominens* (Gosford Wattle);
- clearance of 0.12 hectares of Swamp Oak Forest (EEC); and
- clearance of 0.02 hectares of Coastal Saltmarsh (EEC).

Both of the EECs occur at Salt Pan Creek and are considered to be of high conservation values on a local scale.

The project will also result in the removal of 0.22 hectares of riparian mangrove forest. The mangrove forest is considered to be of high ecological importance, at a local level, for fish communities, and provides a high quality roosting, foraging and refuge area for birds.

The Proponent concluded that the project would not have a significant impact on threatened species, or their habitats, or on the endangered ecological communities, subject to the implementation of the proposed mitigation measures. This includes minimising the area of disturbance, preparing a Biodiversity Construction Management Plan and providing offsets for the flora species, EECs and areas of mangrove forest that would be directly impacted by the project. This will include making a contribution towards the generation or management of the habitat of *Acacia pubescens* and *Acacia prominens* on secure land nearby to compensate for the loss of these species or alternatively, if a suitable land area cannot be found, establishing a biobanking agreement at an established and secure biobanking site.

Issues Raised in Submissions

Only one (1) submission from the public addressed ecology and it questioned if the Environmental Assessment could determine what had happened to frog populations that use to frequent the area.

The DPI (Fisheries) was concerned with the impact of the proposal on the loss of marine vegetation, particularly the mangrove forest, and the need to compensate for any loss with replanting and rehabilitation of dieback areas. The DPI was satisfied with the proposed compensatory ratio to offset mangrove losses, noting that the 2:1 ratio would depend on the local availability of suitable habitat rehabilitation sites.

The DECC indicated that the proposal be assessed under the biobanking scheme and that the Biodiversity Offset Strategy should be prepared prior to construction commencing. It also suggested a more suitable offset for *Acacia pubescens* and *Acacia prominens* would be a contribution towards the regeneration or management of the habitat of populations nearby.

Bankstown City Council raised a number of concerns including:

- the possible location of a signalling depot (East Hills 1 site) in close proximity to an EEC;
- the need to protect the stand of *Acacia pubescens* in Meager Ave Padstow;
- the accuracy of vegetation mapping and assessment for Salt Pan Creek;
- the need to undertake further detailed investigations upon the completion of detailed design to accurately assess the impact on the Cooks River/Castlereagh Ironbark Forest and remnant trees; and
- the need to review the assessment under Section 5A of the EP&A Act upon completion of detailed design.

Bankstown City Council also requested that it be consulted on the preparation of the offset strategy and that an appropriate offset ratio be identified prior to approval being issued. It also recommended conditions of approval relating to stockpiling near native vegetation, seed collection and involvement in selection of plantings.

Hurstville City Council expressed concern regarding the impact of the proposed works on Salt Pan Creek in particular, impacts on biodiversity, disturbance of acid sulphate soils, and loss of mangroves, saltmarsh and Swamp Oak Forest. Council advised that the ecological assessment should take into account the DECC (2007) fauna study along Salt Pan Creek and assess the impact of the works at the creek on threatened species including microbat populations and migratory waterbird species protected under international agreements. Council also requested involvement in the development of the proposed Offset Strategy.

Consideration

The Department is satisfied that the impacts on threatened species, habitats and EECs cannot be totally avoided as the project is constrained to a narrow corridor that restricts the location of the railway lines. Furthermore, although the construction of an additional bridge would impact on the habitat and wildlife corridor provided along Salt Pan Creek, the Department is satisfied that the footprint has been minimised and that the structure would not significantly alter the barrier or edge effects that already occur in this locality.

The Department notes that while the assessment does not take into account a recent fauna study by DECC, the Proponent has advised that it will consider the results of the study once finalised by DECC in the detailed design and incorporate additional management measures as required. The Department is satisfied that this approach would enable any fauna species and habitats not already identified to be taken into consideration and any potential impacts assessed and managed as part of the Proponent's proposed Biodiversity Management Plan, which would be prepared as part of the Construction Environmental Management Plan.

Bankstown City Council's concerns regarding the need to protect threatened plant species and EECs during construction is noted, however the Department's considers the Proponent's commitments to minimise the footprint of the project, confirm the outcomes of the assessment through further field studies, and erect fencing to protect threatened (and other plant species) will adequately address these concerns. However, the Department does concur with Bankstown City Council with respect to the potential impacts of the signalling depot, noting that the Proponent has not yet determined the preferred location for this facility. An assessment of any environmental impacts, in particular biodiversity and threatened species issues, will need to be undertaken once a preferred location has been selected. As such, the Department has included a condition of approval recommending that the Project Approval does not permit the construction of the depot as part of the approval.

With respect to the Biodiversity Offsets Package, the Department is satisfied that this does not have to be finalised prior to the commencement of construction given the lead times associated with selecting the final offset measures and/or securing the available offsets. However, the Department does consider that a Biodiversity Offset Strategy should be finalised in consultation with DECC and approved by the Director-General prior to works commencing that would impact on the threatened species and EECs to ensure the ecological impact of the project can be offset. This would be complemented by the Biodiversity Offset Package, which would be determined and approved by the Director-General within 12 months of works commencing. The Package would identify the final offsets selected, as well as provide the framework for implementing, managing and monitoring the offsets over time to ensure the ecological outcomes are achieved. This has been reflected within the recommended conditions of approval for the project.

As the mangrove forest offsets are excluded from the biodiversity offsets package, the Department has recommended a separate condition to require the Proponent and the Department of Primary Industries (Fisheries) to agree on the compensatory measures prior to the commencement of mangrove removal, with the measures to be implemented to the satisfaction of DPI following the completion of works at Salt Pan Creek. This is to address the concerns of DPI with respect to the availability of suitable compensatory habitat in the local area.

Overall, the Department supports the conclusions of the Proponent's assessment and is satisfied that the proposed statement of commitments and the recommended conditions of approval will adequately minimise the impacts of the project.

5.7 Hazards and Risks

Issue
A major high-pressure ethane gas pipeline that runs from Moomba (South Australia) to Orica in Botany traverses part of the rail corridor on both sides, with crossings at a number of locations. The pipeline is a high risk element and will require protection during both construction and operation of the project.

The Proponent undertook a risk assessment to determine the likelihood of an ethane gas pipeline incident occurring as a result of the project. This assessment, which focused on construction risks, concluded that any incremental increase in risk as a result of the project could be offset by eliminating existing sources of external risks to the pipeline. This would ensure that the overall risk of the pipeline would remain within the Department's risk criterion for individual fatality (being one in a million per year). The mitigation measures would be formalised within an Ethane Gas Pipeline Management Plan.

In addition, the construction of the proposal will involve the storage and use of hazardous materials including diesel, lubrication oil, hydrating lime, oxy-acetylene and detonators. These would be stored within designated bunded storage areas, which would comply with the requirements of DECC and Australian Standards.

Issues Raised in Submissions
None of the submissions received from the public, local government council or State government authorities raised concerns regarding the pipeline.

In regards to hazardous materials, DECC advised that the Proponent's Statement of Commitments should be revised to include that: fuel, oil and hazardous chemicals be stored in secured, roofed and bunded areas; refuelling be undertaken in bunded and roofed areas; and equipment maintenance is undertaken in dedicated workshops incorporating appropriate pollution control equipment.

Consideration
The greatest risk to the ethane gas pipeline is a result of external interference. The Department is of the opinion that the depth and design safeguards of the pipeline itself will ensure that the operational risks of the project, such as train derailments, will not impact on the integrity of the pipeline. Conversely, construction activities associated with the project, such as excavation, use of vibrating equipment and ground loading, will have the potential to interfere with the pipeline itself and consequently pose the greatest risk.

The Department has reviewed the potential risks associated with the proposed construction activities and is satisfied that the overall risks associated with the pipeline will not be increased by the proposal, with the overall risk levels of the pipeline remaining with the Department's individual fatality risk criterion (for residential land use). The Department does not agree with the Proponent's conclusions that the impacts would be effectively eliminated by the proposed mitigation measures, but considers that the measures would ensure that the risk is offset to a considerable degree.

Consequently, the Department recommends that the Proponent must be required to submit a report for the Director-General's approval that details the finalised control and mitigation measures that would be adopted during construction and operation to ensure that any risks posed by the project are suitably offset and that the works do not result in an unacceptable increase in overall risk levels. This would be supported by a Construction Safety Study in accordance with the Department's *Hazardous Industry Planning Advisory Paper No.7: Construction Safety Guidelines*. The Department is satisfied that this approach will ensure appropriate controls are in place during construction and operation.

The Department notes the DECC's request for bunded areas to incorporate roofing. The Department considers that the DECC guidelines and Australian Standards provide appropriate guidance for the establishment of the storage areas, which may include roofing if considered practical. Consequently, the Department considers that a specific condition is not required and that the Proponent should be required (at a minimum) to satisfy the DECC guidelines and Australian Standards. This has been reflected within the recommended conditions of approval.

5.8 Other Issues

5.8.1 Soil Contamination

Issue

The Proponent has completed a Phase 1 contamination assessment and identified a range of potential sources of contamination along the rail corridor including: fill used for embankments; soils in the vicinity of substations, transformers, signal huts, underground service pits and trenches; adjacent service stations; and parking areas.

The disturbance of any contaminated soil has the potential to generate health and environmental impacts both on and off site. The Proponent is currently finalising the Phase 2 assessment, which will verify the type and location of contaminated material and detail the required remediation measures should contamination be identified. This would likely involve the removal of contaminated soil offsite for treatment and re-use/disposal. Preliminary results indicate that the site is, or can be made, suitable for the proposed use.

Issues Raised in Submissions

The DECC noted that only a Phase 1 contamination assessment had been undertaken to identify potential sources of contamination along the rail corridor. It indicated that any contaminated soil should be treated and disposed of using best practice, with uncontaminated soil being reused rather than landfilled. It also recommended that appropriate measures be put in place to manage runoff from any contaminated areas during construction.

Hurstville City Council questioned whether any contaminated land would be disturbed by the proposed construction works.

Consideration

Exposure to contaminated material through direct contact can adversely impact on the health of construction workers. The nature of health impacts experienced may be acute or chronic depending on the type, concentration and duration of exposure to the contaminants. In addition, if not properly contained, treated and/or disposed of, contaminated materials have the potential to have toxic effects on flora and fauna and adversely impact on water quality.

The Department notes that the Proponent has undertaken a Phase 1 contamination assessment to identify potential sources of contamination within the rail corridor and is currently in the progress of finalising the Phase 2 investigation involving sampling and analysis of potentially contaminated sites. The Proponent has also committed to preparing a risk-based management plan in accordance with *Contaminated Land Management Act 1997* and remedial action plan in the event that contaminants are present at levels above the intended land use criteria. The Department is of the opinion that such plans would contribute to the safe handling and management of any contaminated materials and thus reduce the likelihood of adverse health or other environmental impacts arising.

To ensure that Phase 2 investigations and proposed risk-based management and remedial action plans are satisfactorily implemented, the Department has recommended a condition of approval requiring the Proponent to submit a soil contamination report prior to construction commencing. The report is to detail the results of the Phase 2 contamination investigation, any required remediation, the proposed remediation strategies, and the associated management measures for handling and disposal of contaminated soil. The

Department is satisfied that this condition should provide for any contaminated material to be adequately identified and appropriately managed hence minimising the potential for exposure and adverse impacts.

5.8.2 Hydrology

Issue

A number of areas along the rail corridor have been identified as subject to local flooding. The construction of new infrastructure (including noise barriers and car parking areas) and the modification, realignment and/or installation of new drainage structures also has the potential to adversely impact on local flooding behaviour at these locations if suitable management measures are not implemented.

The proposed rail bridge over Salt Pan Creek also has the potential to alter flooding behaviour during construction and on completion. The preliminary hydraulic assessment determined that the new bridge structure could result in a minor increase in flooding of up to 0.02 metres upstream in areas up to 100 metres from the crossing.

Discharges from the corridor into adjoining waterways and drainage systems, particularly Salt Pan Creek, have the potential to impact on water quality.

Issues Raised in Submissions

Sydney Water is concerned with the impacts of the project on its assets and flooding risks. It indicated that a flood study would be required to demonstrate that the project will not adversely impact on flood behaviour within the catchment of the existing stormwater system.

Hurstville City Council raised concerns over the existing and potential impacts of noise barriers on overland flows, and identified the need to correct current drainage deficiencies and to treat stormwater captured within the rail corridor prior to discharge into creek systems. Council also recommended that a stormwater management plan be prepared to complement its Salt Pan Creek Stormwater Management Plan.

The DECC's main issue of concern was that there was no identification of the environmental values for Salt Pan Creek, Little Salt Pan Creek and Wolli Creek systems or the impact of the construction and operation of the project on these values.

Consideration

The Department acknowledges that the concept design was prepared considering the issues of track drainage, local catchments and larger catchments and has been developed on the basis that the proposal would not increase the risk of localised flooding. As such, the Department considers that the Proponent's approach to assess any potential drainage and localised flooding impacts during the detailed design of the project, and to consult with both the relevant Councils on cross drainage requirements and the relocation of any Council drains, and to consult with Sydney Water on any works in the vicinity of its assets, is satisfactory in responding to these issues.

In regards to Hurstville City Council's concerns on the potential impact of noise barriers on overland flows, the Proponent has indicated that where necessary, drains would be provided to intercept runoff and convey it to cross drainage. The Proponent has included remedial works in the concept design to address drainage issues associated with existing walls.

In response to the issues raised regarding drainage deficiencies, localised flooding and impacts on stormwater quality, the Department has recommended a condition of approval requiring the Proponent to take into account the following in the design of the rail corridor drainage infrastructure:

- relevant Council stormwater management policies;
- measures to minimise changes to afflux and flooding behaviour;
- integration into, and complementing of, existing Council and/or Sydney Water drainage infrastructure; and
- the need for stormwater treatment measures to treat discharges from the rail corridor.

The Department considers that the above condition will ensure that due consideration is given to the effective management of stormwater flows and quality during detailed design.

In regards to Sydney Water's request for a flood study, the Proponent has indicated that such a study will not be undertaken as the proposal is not anticipated to change the size of the stormwater catchment, the capacity of Sydney Water's existing stormwater system, or the flow path of stormwater. The Department

concurs that the study is not required on the basis that there will be no significant modifications to stormwater flows as a result of the proposal.

The Department acknowledges that the project has the potential to impact on the hydrology of Salt Pan Creek during both construction and operation. However, the impact would be limited to the floodplain areas comprising of recreational uses/open space with no impacts on residential or other property. The Department is satisfied with the Proponent's commitment to undertake further detailed hydraulic analysis as part of the detailed design phase to confirm the outcomes of the preliminary study.

The Department notes DECC's concern that environmental values have not been identified for Salt Pan Creek, Little Salt Pan Creek and Wolli Creek. The Proponent has indicated that the values have been documented in the Salt Pan Creek Stormwater Management Plan (prepared by Bankstown, Hurstville and Canterbury Councils in 1999) and that this Plan was reviewed and referenced as part of the environmental assessment. In regards to the impact of the project on the environmental values of the creek systems, the Department notes that the proposal incorporates a number of measures aimed at managing, minimising and/or offsetting the environmental impacts of the construction and operation of the project. It also includes the implementation of water treatment devices which will serve to improve the quality of discharges into Salt Pan Creek and a water quality monitoring program for the creek. The Department considers that the proposed management measures should minimise the potential for existing environmental values to be impacted.

Overall, the Department is satisfied that the Proponent's proposed mitigation measures and the Department's recommended conditions of approval should provide the necessary mitigation measures to minimise wherever possible the hydrological impacts of the project.

5.8.3 Non-Aboriginal Heritage

Issue

Each of the stations within the rail corridor is listed on the RailCorp Section 170 Register as an item of heritage significance. In addition, Beverly Hills Station is listed on the State Heritage Register as an item of State significance and on the National Trust (NSW) register. Although the project would not impact on the stations' facilities themselves, it will impact on the King Georges Road overbridge which is of significance due to its association with Beverly Hills station. The overbridge works would affect the original fabric of the Beverly Hills Station group, as listed on the State Heritage Register.

Issues Raised in Submissions

Hurstville City Council indicated that any works in the vicinity of the railway stations should recognise their heritage character and be of a higher quality in terms of materials and design.

Consideration

The Department acknowledges that the project will not directly impact on any items of State or local heritage significance. The King Georges Road overbridge has no local, regional or State significance and the new overbridge would retain a similar form to the existing structure. Furthermore, the sympathetic design of structures and the proposed landscaping will minimise any impact on the heritage values of Beverly Hills Station (and associated buildings).

However, as the demolition of the bridge structure would impact on the original fabric of the Beverly Hills Station group, the Department has recommended a condition of approval requiring the Proponent to undertake an archival recording of the King Georges Rd overbridge and its relationship to the Beverly Hills Station prior to demolition. The recommended Urban Design and Landscaping Plan will also require the Proponent to consider the heritage values of the Station group during the design of structures and landscaping in this area. The Proponent is required to consult with Council during the preparation of the plan and this will ensure that Council's concerns are appropriately addressed.

The Proponent has committed to implementing a Heritage Management Plan during construction to protect identified heritage items and respond to any previously unidentified items. The Department is satisfied that these measures are adequate to protect heritage items and has incorporated into the recommended Instrument of Approval a requirement for the Proponent to educate on-site personnel and "stop work" should any items be discovered.

5.8.4 Aboriginal Heritage

Issue

The rail corridor is highly disturbed from previous rail construction activities and no sites or places of Aboriginal heritage significance were recorded within the rail corridor. However, there is a need to ensure that any sites or places of Aboriginal significance uncovered during construction are identified, reported, assessed and appropriate management measures put in place.

The Proponent has committed to implementing a Heritage Management Plan, and ensuring that all personnel are trained on their responsibilities under the *National Parks and Wildlife Act 1974* and the procedures that must be followed in the event that an Aboriginal site or place is uncovered. The Proponent has also committed to immediately ceasing work and notifying the DECC if an Aboriginal site or place is uncovered.

Issues Raised in Submissions

The DECC stated that there is no indication in the Environmental Assessment of how Aboriginal sites or places of significance will be identified and therefore how any impacts will be avoided and mitigated. Consequently, it suggested that construction works be monitored by a qualified archaeologist. The DECC also stipulated that all employees and contractors should be inducted on the offences to knowingly destroy or disturb Aboriginal relics, and that any uncovered sites should be immediately reported to the DECC.

Consideration

The Department is satisfied that these Proponent's mitigation measures are adequate to protect heritage items and has incorporated into the recommended conditions of approval a requirement for the Proponent to educate on-site personnel and "stop work" should any items be discovered.

The DECC has suggested that a qualified archaeologist be employed to monitor construction works. The Department considers that due to the highly disturbed nature of the corridor, the length of the corridor, and that a number of construction sites would be operating simultaneously, it would not be reasonable to employ an archaeologist(s) to continually monitor the works, as suggested by DECC.

5.8.5 Property and Land Use

Issue

The Proponent intends to construct the works generally within the existing rail corridor on land owned by RailCorp. However, several adjustments to land and property will be required including:

- acquisition of land outside the rail corridor to allow for works associated with the project (an area of council land and a small commercial building adjacent to Narwee Station, and a small area of land on Blamey Street in Revesby);
- modification of land within the rail corridor which is either used for rail related uses (including car parks) which is now required for the project works or is leased by RailCorp to other users; and
- temporary use of land outside the corridor for construction purposes, mainly council owned land (informal open space) adjacent to the rail corridor at Narwee (Mercury Street and adjacent to Hannans Road/Penshurst Street), Riverwood (Bonds Road and end of Webb Street and Lillian Road at Salt Pan Creek) and Padstow (Doyle Street/McGirr Street and Memorial Drive/Padstow Parade).

Residential property boundaries fronting the rail corridor would be affected by the demolition of existing fences and replacement with noise barriers. Fences on or within the boundary of the rail corridor may need to be replaced with a retaining wall and/or noise barrier.

Issues Raised in Submissions

A number of the public submissions raised issues relating to property and land use including:

- the impact of the project on property values;
- compensation for devaluations in property;
- the impact of construction works and vibration (operational) on the structural integrity of residential dwellings and compensation for any damages;
- impacts in privacy of properties adjoining the rail corridor (when viewed from a train).

Consideration

The Department acknowledges that the acquisition of land and loss of open space cannot be avoided due to constraints imposed by limitations in space and/or topography of the existing embankments and cuttings. The Department considers that the proposed acquisition of land is relatively limited over the length of the project and the area of informal open space lost along the rail corridor would be small.

The Department notes that a small commercial building adjacent to Narwee Station would need to be acquired. This acquisition cannot be avoided if the necessary project works are to be constructed. No loss of private land is expected for the construction of the noise barriers.

The Proponent has committed to a range of mitigation measures to minimise the impacts of the project on surrounding land uses, properties, land owners and residents. These measures include:

- consultation with, and notification to, land owners of the nature and timing of works where property fences are located within or on the boundary of the rail corridor and need to be replaced;
- rehabilitation of temporarily leased lands outside the rail corridor to at least to pre-construction condition;
- notification to residents regarding any temporary restrictions to access;
- property condition surveys of buildings/structures potentially affected by piling, excavation or vibratory impact works both prior to and upon completion of works, and measures for seeking compensation for damages; and
- compliance with the *Land Acquisition (Just Terms Compensation) Act 1991*.

Furthermore, the installation of noise barriers and urban design and landscaping measures will serve to mitigate the impacts of the project on adjoining properties and surrounding land uses.

With respect to resident's concerns with privacy, the Department acknowledges that the location of railway lines closer to residences and the removal of vegetation will increase the visibility of certain neighbouring properties. However, the Department considers that any impact on privacy would be marginal given the train speeds along the outer tracks would minimise the opportunities for commuters to view into properties. Landscaping would also contribute towards reducing any impacts on privacy.

Based on these measures, the Department considers that the project would not significantly compromise land owners, residents or the nature of existing land uses.

5.8.6 Soil, Water and Air (Construction)

Issue

The construction of the project will require significant earthworks (excavation of approximately 290,200m^3 of material). Consequently, there is a high risk of erosion, sedimentation, air quality (dust) and water quality impacts arising during construction until the exposed surface areas are stabilised. The Proponent has implementing Erosion and Sediment Control Plans, consistent with the principles set out in Landcom's *Managing Urban Stormwater: Soils and Construction* (the Blue Book), to mitigate this impact. The Proponent has also committed to managing dust emissions using standards techniques including visual monitoring for dust, watering of exposed surfaces and minimising the area of exposed soils.

In addition, there is a high probability of the occurrence of acid sulphate soils in areas adjacent to Salt Plan Creek. This has both environmental and geotechnical impacts on the project if not properly managed. The Proponent has committed to containing, managing and disposing of any ASS in accordance with the NSW Acid Sulphate Soil Management and Advisory Committee guidelines and in consultation with the Department of Water and Energy.

Issues Raised in Submissions

The DPI raised the need for the preparation of sediment and erosion control plans to manage runoff into Salt Pan Creek and other drainage areas.

DECC suggested that erosion and sediment control plans be prepared for each work area during the detailed design phase and prior to the commencement of construction in accordance with the Blue Book. DECC also recommended that the Proponent should adopt controls to protect the environmental values of the receiving waters.

DECC also indicated that ASS and potential ASS (PASS) need to be assessed, removed and disposed of in accordance with *Environmental Guidelines: Assessment; Classification and Management of Liquid and Non-Liquid Wastes* (EPA, 1999).

Hurstville City Council requested that further consultation be undertaken with the Council on the management of ASS during the bridge construction works at Salt Pan Creek.

Three public submissions and the DECC raised the issue of dust being generated during construction works and impacting on the amenity of residents. The DECC also stated that the Proponent's proposed approach to dust suppression was reactive rather than proactive.

Consideration

The Department considers that the risk of erosion and sedimentation of waterways during construction can be managed through the implementation of Erosion and Sediment Control Plans (ESCPs). This has been reflected within the recommended conditions of approval.

The Department has recommended a condition requiring the Proponent to undertake all construction activities with the objective of preventing visible dust emissions and constructing the project in a manner that minimises dust impacts. The Department also notes that the Proponent has committed to preparing a Construction Dust Management Plan. This will further detail what mitigation measures will be implemented, which should include a combination of pro-active and reactive management controls to ensure compliance with the Department's recommended condition of approval.

The project works associated with the construction of the underbridge at Salt Pan Creek have the potential to excavate and expose ASS. The Proponent has committed to containing, managing and disposing of any ASS in accordance with the NSW Acid Sulphate Soil Management and Advisory Committee guidelines and in consultation with the Department of Water and Energy. The Department is satisfied with this approach as the guidelines set out best practice management practices for identifying and managing ASS. In addition, to the commitment specified by the Proponent, the Department has recommended a condition of approval requiring the Proponent to minimise the disturbance of ASS as well as the suspension and dispersal of sediments in and adjacent to Salt Pan Creek as a means of safeguarding against impacts arising from the exposure of ASS.

In regards to the DECC's requirement for assessing ASS prior to offsite removal, the Department has included a condition of approval requiring the Proponent to assess and all waste materials in accordance with *Environmental Guidelines: Assessment; Classification and Management of Liquid and Non-Liquid Wastes* (EPA, 1999).

6. CONCLUSIONS AND RECOMMENDATIONS

Following a detailed assessment of the Environmental Assessment, Response to Submissions and the submissions received during the exhibition period for the projects, the Department is satisfied that the impacts of the project can be appropriately mitigated or managed to acceptable levels and therefore recommends that the project be approved subject to the recommended conditions of approval.

However, this does not imply that there are not significant environmental constraints to the project. Of particular note are the traffic impacts during construction, car parking impacts and the operational noise impacts of the project.

Road network disruptions are expected due to the need to extend and/or reconstruct several under- and over- bridges located along the project corridor. This includes King Georges Road and Davies Road, two major arterial roads in south-west Sydney. The Department accepts that these bridge works are unavoidable as they must occur in order for the bridge structures to accommodate the additional tracks and adhere to weight loading requirements. Consequently, the Department considers that continued improvement to the engineering and management methods that minimise the time required for the bridge works and maximise the available road capacity during bridge works, combined with an effective communication strategy for both regional and local road users, is the only appropriate strategy to respond to these impacts. This has been reflected within the recommended conditions of approval.

The project will also cause disruptions to commuters and the surrounding community due to the temporary and permanent loss of car parking within station precincts. In most instances, the impacts will be limited to construction and the Department is confident that the recommended Construction Commuter Car Parking Strategy will provide measures to minimise the length of time in which spaces would be lost or unavailable and communication strategies to enable commuters to appropriately respond to the changes. Yet, permanent losses could potentially occur at Revesby and Padstow stations depending upon the outcomes of the parking investigations that would be conducted at each station. The Department acknowledges that strategic transport initiatives at these stations may absorb the impact in the long-term, however, the immediate impacts of the project must be mitigated and the Department considers that the Proponent must reinstate all displaced spaces to minimise any permeant impacts on commuters. Where this cannot be reasonably achieved, the Department has recommended that the Proponent must quantify and justify these loses to the Director-General within the context of the NSW Government's strategic transport planning initiatives to ensure commuters are still afforded with the opportunity to access and use the East Hills Line.

The construction of 7 kilometres of acoustic walls and the provision of building treatments will ensure that noise impacts of the project are minimised wherever possible, and that the consultation process will ensure that an appropriate balance is reached with respect to the provision and design of the acoustic walls. The Department recognises that there will be receivers that will experience increases in noise levels, but do not exceed the trigger noise levels of the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects*. The Department considers these impacts to acceptable given increases would not lead to unacceptable impacts with the predicted noise levels remaining below the accepted trigger criteria. Furthermore, it is expected that noise reductions at these receivers would be delivered over time in accordance with NSW Government rail noise policies, such as through improvements to rolling stock.

The recommended conditions of approval for project also provide for the mitigation and management of other key impacts associated with the projects during the detailed design, construction and operational phases of the project, such as construction noise and vibration, hydrology, visual amenity and construction traffic. The Department believes that these requirements shall provide for the implementation of best management practices during all phases of the project, and shall ensure that the construction and operational impacts of the project on the surrounding environment and the amenity of local residents and rail commuters are managed to acceptable levels.

The Department acknowledges that there will be residual impacts on the environment and local community regardless of the implementation of the recommended conditions of approval, particularly with respect to the impacts on the noise environment once the project is operational and potential permanent losses to commuter car parking. However, the Department has concluded that these residual impacts are considered to be acceptable given the benefits that the total project would provide to the general public through improved network capacity and performance.

Consequently, the Department recommends that the Minister for Planning approve the Kingsgrove to Revesby Quadruplication, subject to the recommended conditions of approval.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – STATEMENT OF COMMITMENTS

APPENDIX C – RESPONSE TO SUBMISSIONS

APPENDIX D – ENVIRONMENTAL ASSESSMENT