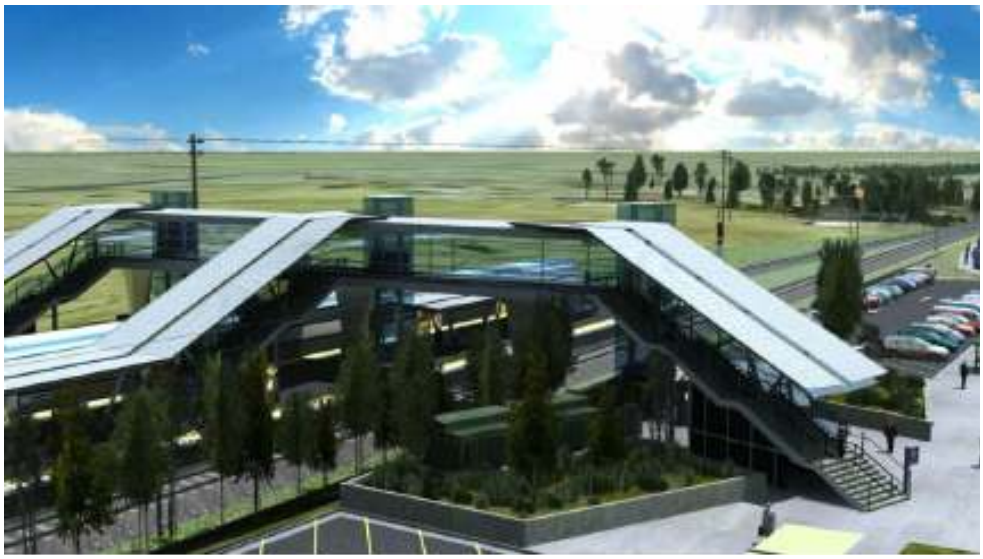
MAJOR PROJECT ASSESSMENT
Quakers Hill to Vineyard Duplication



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

October 2009

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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 area. This is to be achieved by reconfiguring the current network of 14 rail corridors into 5 clearways that can operate independently, and therefore minimise the risk of service disruptions whilst increasing the capacity of the rail network to meet the growing rail travel demands of western Sydney.

The Richmond Branch line essentially comprises a single track between Quakers Hill and Richmond, which restricts the ability to run more services as trains in one direction have to wait for trains in the other direction. The duplication of the rail line will allow for increased train services and efficiency. In addition, the rail line runs though the North West Growth Centre, an area of land designated for urban release with associated employment and population growth. The duplication of the rail will ensure the provision of key public transport infrastructure to the North West Growth Centre and will support the proposed employment and population increases.

The proposed duplication of the Richmond Branch Line between Quakers Hill and Vineyard involves the construction of an additional rail line, along with the relocation of Schofields and Vineyard stations along and other associated ancillary works. The construction is to be staged, with Stage 1 consisting of the construction of the project between Quakers Hill and the relocated Schofields Station and Stage 2 comprising the remainder of the works north of the relocated Schofields Station to Vineyard and including the relocated Vineyard Station.

Following a detailed assessment of the Environmental Assessment, Submissions Report and the submissions received during the exhibition of 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 environmental constraints associated with the project. Of particular note are the socio-economic impacts resulting from the relocation of Schofields Station, land use, traffic and car parking impacts and the construction noise impacts of the project. These impacts were reflected in the 89 submissions received from Government agencies, Council and the local community during the exhibition of the Environmental Assessment.

With regard to the socio-economic impacts of the relocation of Schofields Station, the Department notes that the project is occurring in the North West Growth Centre, an area that will undergo significant change in the future and considers that the relocated station will better cater for the imminent population increase that the region will experience. Therefore, the Department has concluded that the impacts are considered acceptable given the benefits the total project will provide to the general public through improved land use and transport integration and rail network capacity and performance.

The confined nature of the project corridor significantly restricts the ability of some 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 in the conditions of approval and the Proponent's Statement of Commitments.

Despite the recommended conditions of approval, the Department acknowledges 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, including the short term nature of these impacts. With regard to operational impacts, it is important to contextualise the project within the broader development of the region and that the project is occurring within and adjoining an existing rail corridor.

Consequently, the Department recommends that the Minister for Planning approve the Quakers Hill to Vineyard Duplication Project, 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 minimising the risk of service disruptions whilst increasing the capacity of the rail network to meet the growing rail travel demands of metropolitan Sydney. Figure 1 provides an outline of the projects that form part of the Rail Clearways program.

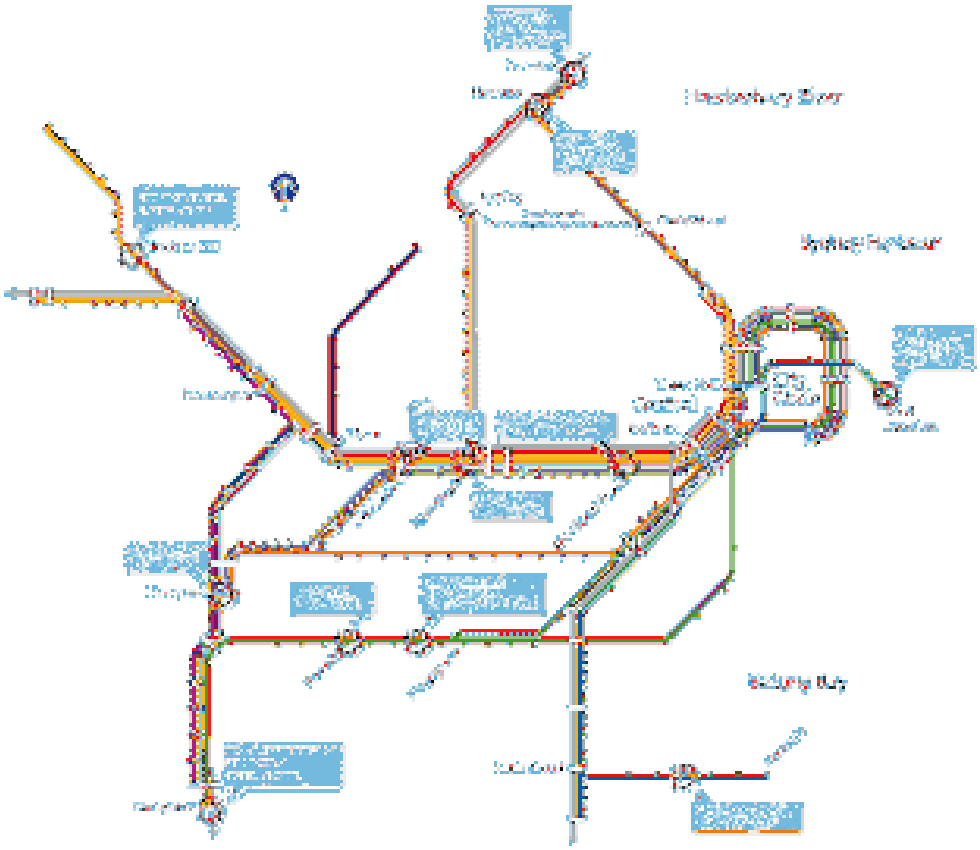

Figure 1 – Rail Clearways

The proposed duplication of the Richmond Branch Line between Quakers Hill and Vineyard, the project that is the subject of this report, forms part of the Clearways Program.

1.2 The Richmond Branch Line

The project is located within and adjacent to the existing rail corridor of the Richmond branch line between Quakers Hill and Vineyard in Sydney's North West region. The majority of the project works would be undertaken within the Blacktown local government area, with the exception of the proposed upgrade of the existing substation at Vineyard, and signalling works to extend towards Mulgrave Substation, which would be undertaken within the Hawkesbury local government area.

The existing single-track route on the Richmond branch line is congested and patronage is growing rapidly. The double track route will enable additional services to reduce crowding as well as strengthen reliability through the continuation of double tracks to Vineyard. This project will also provide capacity for additional peak services on the Richmond branch line to cater for future passenger demand.

1.3 The Surrounding Environment

It is expected that Sydney will grow by an additional 1.1 million people by 2031, which will require the provision of an additional 640,000 new homes and 500,000 new jobs, with 30 to 40 per cent of homes to be located in land release areas and the majority of the land release to be within the North West and South West Growth Centres. The Growth Centres are being planned to ensure that Sydney's growth occurs in a sustainable way and to the highest standards, providing:

- a diversity of housing ranging from traditional houses to higher density apartments,
- fair and easy access to public transport, jobs, shops, services and open spaces,
- protected bushland and waterways which enhance biodiversity values and provide green, leafy suburbs, and
- a diversity of employment options and direct public transport links to major employment areas outside the Growth Centres.

The Growth Centres are being planned and developed at a precinct level, with the process considering where town centres should be located, the mix and type of housing and key transport routes. Consequently, there will be significant change to the existing land use type, location and form, and transport infrastructure over the next 20 to 30 years.

The project is centrally located in the North West Growth Centre. The project directly borders the planned precincts of Schofields, Schofields West, Alex Avenue, Riverstone, Riverstone West and Vineyard and is considered to be key public transport infrastructure, which will assist in ensuring that the North West Growth Centre is developed in a sustainable manner. Due to the expected significant change in land use, this assessment has sought to consider both the existing and proposed environment. The following paragraphs provide a brief description of land uses in key areas adjoining the project in their current and proposed form.

Quakers Hill is a suburban town centre, with local shops and facilities clustered around the station on both sides of the rail corridor, and an at grade pedestrian crossing providing a direct pedestrian and cycle connection between these uses. Car parking is distributed around the station with 118 formal Railcorp commuter car parking spaces, with parking demand currently exceeding capacity. Quakers Hill is not within the North West Growth Centre, however the Department notes that a 200 space commuter car park is proposed to be built adjoining the town centre as part of the Government's Commuter Car Parking Strategy and that the existing at grade crossing forms part of the proposed Rouse Hill to Breakfast Creek cycle route.

The railway corridor between Quakers Hill and Schofields Station comprises a mix of residential, rural, open space and special use areas including the Nirimba Education precinct and HMAS Nirimba and the former Schofields aerodrome. This section of the corridor is adjacent to the Alex Avenue and Schofields, North West Growth Centre precincts. The Alex Avenue Precinct is one of the first release Precincts in the North West Growth Centre. Planning for the Alex Avenue Precinct is expected to provide for up to 7,000 homes. The Precinct will be supported by a new Schofields town centre adjoining the relocated Schofields rail station. Smaller neighbourhood centres will provide local retail and community services. Schofields Road will be an important regional road link to the east and west. Figure 2 identifies the Alex Avenue precinct draft indicative layout plan.

Schofields Station is adjoined by a mix of commercial, residential, open space and special use areas and is located within Schofield village centre. The commercial area is on the eastern side of the station and is connected to the western residential area by an at grade pedestrian crossing of the rail corridor. A formal 74 space car park is located on the eastern side of the corridor, with parking demand currently exceeding capacity. The station is located adjacent the West Schofields, Riverstone and Schofields, North West Growth Centre precincts. Riverstone Precinct is one of the first release precincts in the North West Growth Centre and is expected to accommodate around 8,500 homes. The existing Schofields village centre is to be retained and developed as a neighbourhood centre. Figure 3 identifies the Riverstone precinct draft indicative layout plan.

The rail corridor between Schofields and Riverstone Stations comprises a mix of rural, residential, open space and special uses. This section of the corridor is adjacent the Riverstone and West Schofields, North West Growth Centre precincts. Land use surrounding Riverstone Station comprises a mix of commercial, rural, open space and residential areas. Local shops and facilities are clustered around the eastern side of the corridor. Multi modal access across the corridor is provided at the Garfield Road level crossing. A 62 space commuter car park is provided at the station, with parking demand currently exceeding capacity.

Riverstone Station adjoins the Riverstone and Riverstone West, North West Growth Centre precincts. The Riverstone West Precinct is the first employment precinct within the North West Growth Centre to be completely rezoned and has the potential for 12,000 jobs. Figure 4 identifies the Riverstone West Precinct zoning plan.

The railway corridor between Riverstone and Vineyard stations comprises a mix if of rural, industrial, residential, open space and special uses, with land uses surrounding Vineyard station dominated by rural areas and bushland, with scattered rural residential areas. Pedestrian access across the rail corridor is alongside the Bandon Road level crossing and there are no formal cycle, pedestrian or parking facilities at the station. Vineyard Station adjoins the Riverstone, Riverstone West, and Vineyard North West Growth Centre precincts. The Riverstone and Riverstone West Precinct plans identify a relocated Vineyard Station to the south of its current location, adjoining a local centre and light industrial uses.

The development of the North West Growth Centre will be accompanied with a range of transport enhancements, including the Quakers Hill to Vineyard rail duplication. The change in urban form will also facilitate a change in how stations will be accessed with a general increase in bus interchange facilitated by bus network changes as the North West Growth Centre develops. This matter is further explored in the Traffic and Transport assessment section of this report.

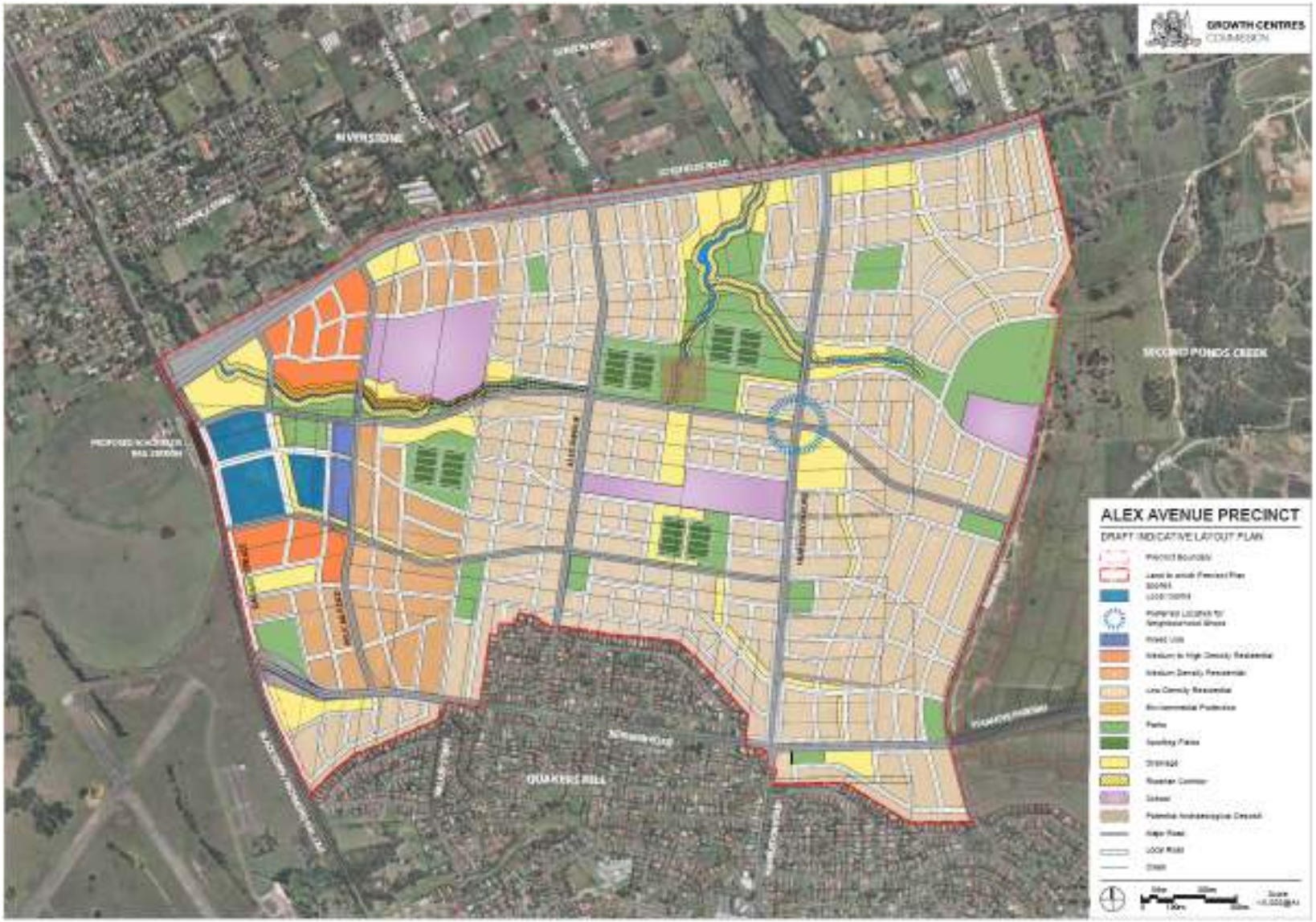

Figure 2 – Alex Avenue Precinct – Draft Indicative Layout Plan

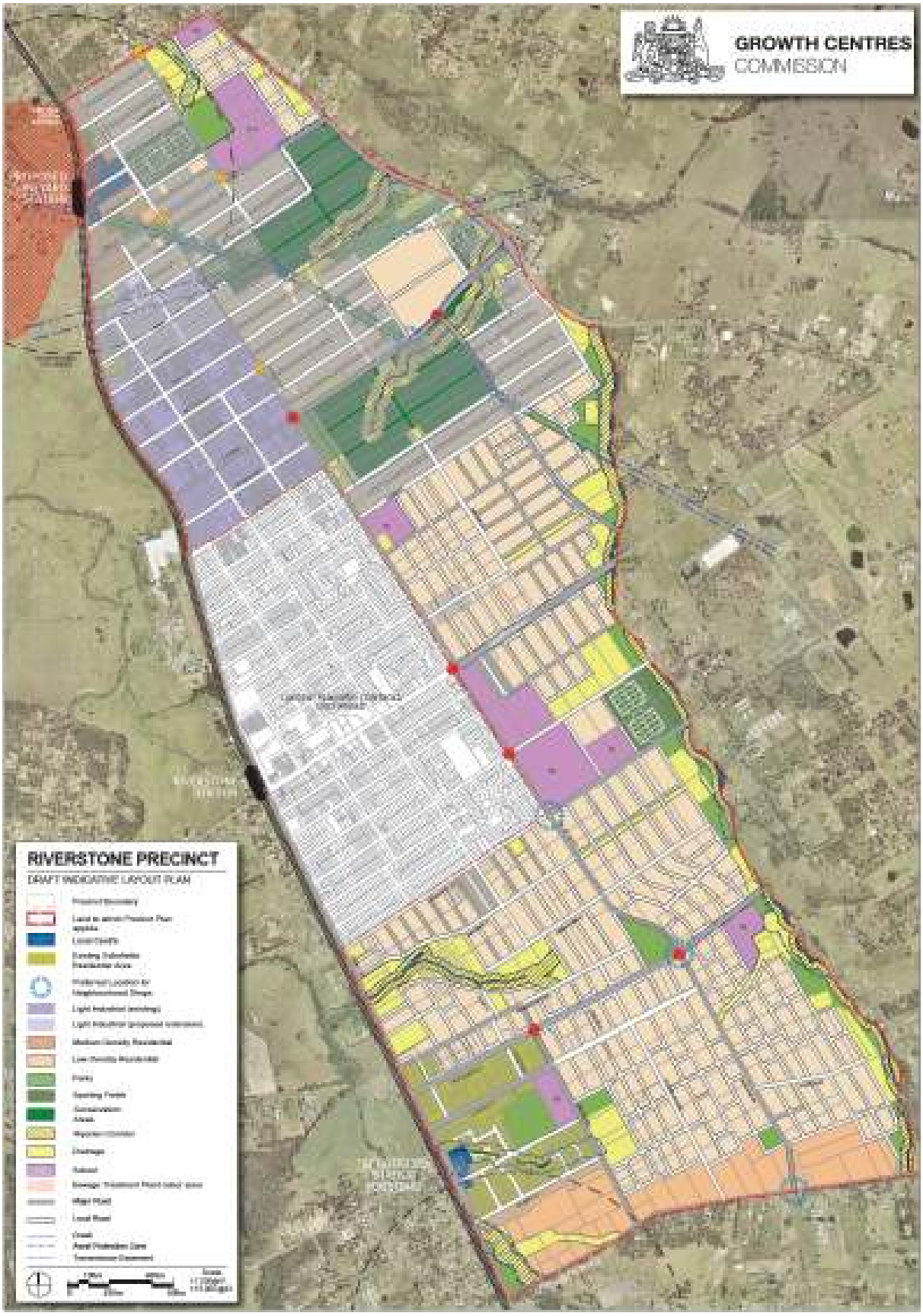

Figure 3 – Riverstone Precinct – Draft Indicative Layout Plan

Figure 4 – Riverstone West Precinct –Indicative Layout Plan

2. PROPOSED DEVELOPMENT

2.1 Project Description

The project would involve the construction and operation of approximately 10.1 km of new track between Quakers Hill and Vineyard in Sydney's north-west. The track is already duplicated at Riverstone Station and both of the existing tracks would remain. The proposed new track work would require the widening of the existing rail corridor at various locations to accommodate the additional track.

Key corridor features of the project include:

- new tracks would be constructed as follows:
  - between Quakers Hill and the relocated Schofields Station, the new track would be constructed mainly on the western side of the existing track, and would include widening the existing rail corridor to a nominal width of 30m (widening increases towards the relocated Schofields and Vineyard stations). The new track would become the Down Main track (i.e. the track on which trains travel away from Sydney),
  - between the relocated Schofields and Riverstone stations, the new track would be constructed on the eastern side of the existing track. This would become the new Up Main track (i.e. the track on which trains travel towards Sydney), and
  - between the Riverstone and relocated Vineyard stations, the new track would be constructed on the western side of the existing track. This would become the Down Main track.
- turnbacks (a track from which train services terminate and change direction) and turnouts (the intersection and mechanisms for the meeting of two tracks) would be provided. This proposed track work would require the widening of the existing rail corridor to accommodate the additional track.

Key Station features of the project include:

- Quakers Hill – removal of the at grade pedestrian crossing to improve safety. This is to be replaced by RailCorp Easy Access Upgrade works that are separate to this proposal,
- Schofields – the station is to be relocated approximately 800m to the south east of its existing location. The relocated station would provide easy access across the rail corridor, incorporate a bus interchange on the eastern side of the corridor and car parking for approximately 230 spaces on both sides of the rail corridor. The existing Schofields Station would be demolished and rehabilitated, and the existing pedestrian level crossing would be replaced with a footbridge and ramps. A shared user path would be provided along Railway Terrace to connect the existing Schofields Station to the relocated station,
- Riverstone – the station would be upgraded to ensure compliance with current access standards, and the existing Garfield Road pedestrian level crossing would be replaced by a new covered footbridge at the southern end of the station, and
- Vineyard - the stations would be relocated to a new location approximately 250m south east of the existing location to allow for the provision of a turnback facility, pedestrian footbridge, bus interchange facility and car parking. The car park is proposed to be built in two stages to meet commuter demand over time, with the first phase providing approximately 70 spaces and in total 220 spaces. The existing station would be demolished following the commission of the relocated station.

Other corridor features of the project include:

- a new substation would be constructed at Schofields, near the corner of Burdekin Road and Railway Parade, adjacent to the eastern boundary of the rail corridor,
- the existing substation at Vineyard would be upgraded, and
- other project related works including new overhead wiring, modifications to the existing signalling system, culvert works, and the adjustment, relocation and protection of utilities, and Westminster Street overbridge at Riverstone would be reconstructed.

It is intended that the project be constructed in two stages – Stage 1 being for the construction of all components of the project between Quakers Hill and the relocated Schofields Station (including removal of the existing Schofields Station and construction of a Schofields pedestrian footbridge), and Stage 2 comprising the remainder of works north of the relocated Schofields Station as far as Vineyard and including the relocated Vineyard Station. It is anticipated that Stage 1 construction would take approximately 24 months to complete, with delivery of Stage 2 deferred until a date to be determined.

Figure 5 – Main Features of the Project (Parsons Brinkerhoff, July 2009)

Figure 6 – Main Features of the Project (Parsons Brinkerhoff, July 2009)

Figure 7 – Main Features of the Project (Parsons Brinkerhoff, July 2009)

Figure 8 – Main Features of the Project (Parsons Brinkerhoff, July 2009)

Figure 9 – Main Features of the Project (Parsons Brinkerhoff, July 2009)

2.2 Project Need

The project will facilitate and achieve commitments made in key government strategies including, 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 current Richmond Branch Line essentially comprises a single track between Quakers Hill and Richmond which restricts the ability to run more services as trains in one direction have to wait for trains in the other direction. The Richmond Branch Line is centrally located within the North West Growth Centre, an area of land designated for release to accommodate Sydney's new housing. Specifically, the project will:

- increase service frequency for the existing and future population of the area (increased demand for rail services are expected as a result of predicted growth in patronage, substantial population increases as a result of the development of the North West Growth Centre, and a mode shift from private vehicles to rail transport resulting from increased transport prices),
- address increased demand for rail services and transport facilities as a result of the proposed development of the North West Growth Centre,
- improve accessibility at stations though design of easy access provisions,
- provide for car parking and kiss-and-ride facilities at relocated Schofields and Vineyard stations,
- improve the ability of operations to recover during disruptions through reducing the extent of single track sections on the Richmond Branch Line,
- improved capacity, service reliability and reduced bottlenecks on the Richmond Branch Line,
- provide additional peak hour train services,
- reduce station congestion, and
- reduce service delays on other rail lines on the CityRail network.

In addition to the above transport related outcomes, the project would also assist in delivering the development objectives of the North West Growth Centre, including through the relocation of Schofields and Vineyard Stations. The project will allow for the planning and delivery of a diversity of housing and employment opportunities around transport nodes thus ensuring a high level of accessibility by providing easy access to public transport, jobs, shops, services and open spaces, both within and outside the Growth Centres.

Prior to and during exhibition, the community raised concern on why the Government was no longer proceeding with the Nirimba Station, which was identified in the *Sydney Metropolitan Strategy* and the *Preliminary Infrastructure Report for the North West and South West Growth Centres* (2005). This station was proposed to be located at the corner of Railway Terrace and Burdekin Road, approximately 1.5km south of Schofields Station. The Department notes that following detailed studies of planning for the initial release of precincts, the Government formed the view that the relocation of Schofields Station, in preference to the redevelopment of the existing station and construction of a new station at Nirimba, would better support the planned development of the area.

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

Clause 80 of *State Environmental Planning Policy (Infrastructure) 2007* provides that development for the purpose of the Rail Clearways program and rail infrastructure facilities may be carried out by or on behalf of a public authority without consent. As the Proponent (TIDC) is a public authority, the Project does not require development consent under the Infrastructure SEPP. Therefore, the Project requires approval under Part 3A of the Act.

3.3 Relevant Environmental Planning Instruments

State Environmental Planning Policy No. 19 – Bushland in Urban Areas - 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.

A flora and fauna assessment was undertaken for the project, which took into consideration the need to protect and preserve bushland as part of the project. The construction of the car park for the relocated Vineyard Station would require the removal of a section of vegetation along Riverstone Parade, between Norwood and Ashford roads, at Vineyard. This vegetation fits the description of bushland in SEPP 19, however, it is also noted that area is within land subject to the Growth Centres Biodiversity Certification order and is subject to the offset provisions of this order.

It is considered that the provision of the car park at Vineyard Station is in the public interest, however it is noted that the proponent would consider alternate car park options during the detailed design for the phase 2 car park. This assessment would consider the amount of disturbance to bushland, with a view to minimise the project's impact where possible. The aims and objectives of SEPP 19 have been considered and further addressed within this report.

State Environmental Planning Policy No 44 – Koala Habitat Protection - SEPP 44 details development controls that apply to land in the relevant LGAs for which a development application has been made, and which is more than one hectare in size. Development applications in relation to such land cannot be approved prior to certain investigations of koala habitat to determine whether the land constitutes 'potential' or 'core' habitat.

It is unlikely that the proposed area of impact within the Hawkesbury LGA would fit the definition of 'core koala habitat', as defined by SEPP 44. Preferred habitat was not present during biodiversity surveys, deeming unlikely that the project would impact on land which fits the definition of 'potential koala habitat', as defined by SEPP 44.

State Environmental Planning Policy No 55 – Remediation of Land - A consent authority must not grant consent to the carrying out of any development on land unless it has considered whether the land is

contaminated, and if so, if the land will or can be made suitable for the purpose for which the development is proposed. The principles of SEPP 55 have been considered as follows:

- A phase 1 contamination assessment has been undertaken for the project. The assessment identified a number of locations within the study area with moderate to high risk of encountering contaminants during excavation;
- A phase 2 contamination assessment is currently underway for these areas and will considered as part of the detailed design process; and
- Further assessment is underway to evaluate areas outside the existing rail corridor required for construction of the project. However, given the historic land uses for these areas, it is unlikely that contamination will present a major problem.

The aims and objectives of SEPP 55 have been considered and further addressed within the hazards and risk section of this report. Notwithstanding, the Department has recommended a condition requiring the Proponent prepare and submit a Soil Contamination Report detailing the outcomes of the phased 2 contamination investigations.

State Environmental Planning Policy (Sydney Region Growth Centres) 2006 - The project is partly located within the North West Growth Centre. The SEPP sets out the statutory plans and processes that will apply in the growth centres. The primary function of the SEPP is the coordination of sustainable land release for urban development within each growth centre. The project borders or traverses the follow precincts: Vineyard, Riverstone West, Riverstone, Schofields West, Schofields and Alex Avenue. Of these precincts, Riverstone West, Riverstone and Alex Avenue are amongst the first to be released for urban development.

The project is strategically located in the centre of the North West Growth Centre and will support sustainable land release through the provision of additional rail services to the region. It is considered that the project is consistent with, and will help facilitate achieving the aims of, the SEPP. Additionally, the environmental assessment has adequately assessed hydrological, soil and ecological matters consistent with the SEPP, which are further addressed in this report.

3.4 Minister's Approval Power

The environmental assessment was placed on public exhibition from 29 April 2009 until 1 June 2009 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.

4. CONSULTATION AND ISSUES RAISED

4.1 Introduction

The Department exhibited the Environmental Assessment from the 29 April 2009 until 1 June 2009 and received 89 submissions of which ten were from Government agencies.

4.2 Submissions from the Public

The primary issues raised in submissions received from the public can be categorised as follows:

The Relocation of Schofields Station
- Difficulty for the less mobile to access the relocated station;
- Loss of property value;
- Change of character to the existing Schofields Village; and
- Impact upon local Schofields shops.

Traffic Impacts
- Noise and safety impacts from construction traffic;
- Construction traffic will disrupt access to private property; and
- Operational traffic will have adverse noise and access impacts.

Design
- Adverse heritage impacts on Schofields and Riverstone station; and
- Station design should be consistent with the existing Riverstone station.

Noise
- Construction traffic noise would be excessive; and
- Insufficient mitigation methods for increase in operational noise impacts.

Hydrology
- Concern in relation to potential flooding impacts.

It is of note that the most common specific issues raised in submissions were the relocation of the existing Schofields Station, construction and operational traffic impacts (with regards to safety, access and noise), and socio-economic impacts relating to loss of business to the Schofields shops.

4.3 Submissions from Government Agencies

The Department received submissions from the Department of Environment and Climate Change, the NSW Roads and Traffic Authority, Landcom, the Ministry of Transport, the Department of Water and Energy (NSW Office of Water), the Department of Defence and Railcorp. In addition, Blacktown City Council and Hawkesbury City Council made submissions.

Table 4.1 – Summary of Agency Submissions

Agency	Concerns
Department of Environment, Climate Change and Water	• Construction noise impacts. • Operational noise and lack of commitment to mitigation measures. • Application of biodiversity certification measures. • Adequacy of ecological assessment. • Flooding assessment and mitigation. • Provision of bicycle facilities.
RailCorp	• Acknowledged support for the project.
Department of Transport and Infrastructure	• Consultation in relation to provision of bus services. • Bicycle access and parking. • Provision of car parking responding to long

	term needs. • Consideration of long term bus capacity and access.
Department of Defence	• Operational noise impacts upon future residential development. • Relocation of services and utilities.
Blacktown City Council	• Relocation of Schofields Station. • Timing of Garfield Road overpass. • Exhibition period inadequate. • Deferral of Stage 2. • Land zoning. • Heritage impacts to residences, a war memorial and Riverstone Station. • Impacts upon Council land. • Car parking demand and traffic flow assessment. • Operational noise assessment for future development. • Adequacy of flooding and culvert assessment.
Landcom	• Operational noise assessment for future development. • Relocation of Schofields Stations. • Details of retaining wall.
Hawkesbury City Council	• Road access for suburbs to the west. • Bus connection from the Western Line to the Richmond Line. • Car parking at Vineyard Station.
Roads and Traffic Authority	• Consultation in relation to Schofields Road and Garfield Road crossing options. • Future traffic performance taking into account growth within North West Growth Centre. • Future car parking demand. • Provision of bicycle friendly stations.
NSW Office of Water	• Rehabilitation of riparian vegetation. • Culvert design.

4.4 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 comment in relation to the issues identified. Following consideration of the submissions, and additional refinement of the project design, the Proponent proposed three (3) amendments to the project as follows:

- The Schofields pedestrian footbridge is proposed to be moved to within the site of the existing Schofields Station commuter car park, instead of being located north of the current level crossing, as proposed in the EA;
- Modifications to the alignment and width of the proposed utility corridor between Quakers Hill and the relocated Schofields Station;
- The incorporation of the proposed Quakers Hill footbridge into the planned Easy Access Upgrade program at Quakers Hill Station.

In addition, the Proponent prepared an amendment to the Submission Report, which was as a result of continuing discussions with the Department of Defence. The Department of Defence advised the Proponent that it was not satisfied with the proposed relocation of a sewer main through the former Schofields Aerodome. As such, the amendment provides that a relocated sewer line is to be located wholly with the Nirimba Education Precinct (TAFE) within a previously cleared area.

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, subject to condition. As such, a Preferred Project Report was not required for the project.

The Department consulted with key regulatory agencies, with respect to the Submissions Report. Generally agencies were satisfied with responses to submissions and the revised Statement of Commitments. Notwithstanding, key outstanding issues raised by agencies include the following.

Transport and Access - The Roads and Traffic Authority raised concerns regarding the adequacy of car parking and locations, and the need to accelerate the provision of adequate facilities to encourage public transport patronage in the absence of extensive bus services in the area; and the need for the project to facilitate future crossing points of the corridor, including the Schofields Road crossing. This matter is further discussed in section 5.3.

The NSWTI requested that they be consulted during detailed design on matters relating to transport and access changes and these matters have been incorporated into the recommended conditions of approval.

Ecology - the DECCW provided commentary on provisions relating to the compensatory habitat package and these have been incorporated into the recommended conditions of approval. The NSW Office of Water reiterated its advice in relation to watercourse crossings, including the bridging of category 2 watercourses and the use of naturalised culvert bases for category 3 watercourses to enhance aquatic/riparian connectivity, and the minimisation of downstream impacts and stream armouring. This matter is further discussed in section 5.8.

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:

- land use;
- socio-economic impacts;
- traffic and transport;
- noise and vibration;
- non-indigenous heritage;
- Indigenous heritage; and
- hydrology.

5.1 Landuse

Issues
The project is to primarily occur within the North West Growth Centre and Stage 1 of the project would coincide with the early stages of development of the Alex Avenue and Riverstone precincts, which are identified by the Strategies and Urban Release Branch of the Department (formally the Growth Centres Commission) as precincts for early land release. The project, including Stage 2, would support the development of the North West Growth Centre as a whole.

The Alex Avenue and Riverstone precincts have been planned to concentrate high density development in the vicinity of the Richmond Branch Line, with town centres located adjacent to the relocated train stations at Schofields and Vineyard. The Riverstone West precinct has been planned to locate a business centre adjacent to Riverstone Station to maximise the opportunity for the use of public transport by the Riverstone West workforce. As the draft precinct plans for Alex Avenue, Riverstone and Riverstone West have been developed in conjunction with the proposed Quakers Hill to Vineyard Duplication Project, the construction of the project would integrate with the development of the Alex Avenue, Riverstone and Riverstone West precincts.

The relocated Schofields and Vineyard stations are to be integrated into the Alex Avenue and Riverstone Precincts through the provision of a network of roads, pedestrian paths and cycleways, which would provide direct linkages between town centres and the relocated stations and across the rail corridor. The provision of a new pedestrian footbridge at Riverstone Station would support the establishment of a strong linkage between the Riverstone and Riverstone West precincts. Pedestrian connections would also be facilitated by grade separated crossings at the relocated Schofields Station, at the existing Schofields Station and at the relocated Vineyard Station.

The operation of the project is expected to have impacts on a range of land use matters, including noise, visual amenity and traffic. Whilst these matters are considered in later sections of this report, the operation of the project will have land using planning impacts on land adjacent to the rail corridor in the following manner:

- Potential provision of buffer areas on either side of the rail corridor to mitigate sensitive receivers from potential noise, vibration and visual impacts;
- Encouraging planning controls requiring residential setbacks from the rail corridor;
- Encouraging land uses on either side of the corridor that are not sensitive to the noise and visual impacts of the project;
- Encouraging urban design that minimises noise and vibration impacts on any future residential development alongside the rail corridor;
- Supporting transit orientated development based on high value land uses in the vicinity of the Schofields, Riverstone and Vineyard Stations, including retail, commercial and higher density residential development; and
- Focusing transport interchanges at the Schofields and Vineyard stations through the provision of interchange facilities.

There will also be some land use construction impacts as a result of construction worksites and compounds. The establishment and operation of these construction compounds would have temporary adverse amenity impacts on surrounding properties, including increased noise, reduced air quality, increased traffic and

reduced visual amenity. It is expected that the land use impacts will be the greatest at the following construction site compounds due to the type and proximity of surrounding land uses:

- Seldon Street South, Quakers Hill (in close proximity to residential dwellings and has the potential to have a high noise and visual amenity impact);
- Richmond Line Alliance Project Office, Bridge Street, Schofields (has the potential to have noise, traffic and visual amenity impacts on Bridge Street residences); and
- Existing Schofields Station (has the potential for high noise impacts to surrounding receivers);

Issues Raised in Submissions
The public did not directly raise landuse impacts in submissions. However, it is noted that many of the public submissions did raise issues associated with landuse (for example noise), and these matters are considered under the relevant sections of this report.

Landcom raised concern that the Environmental Assessment failed to adequately address the noise and vibration impacts on future land uses, with particular regard to the North West Growth Centre areas. The Department of Defence raised similar concerns at the potential for adverse noise impacts on Commonwealth land that holds development potential.

Blacktown City Council raised concerns that the closure of the existing Schofields Station would not be consistent with the aims and directions as outlined in the Metropolitan Strategy and the Northwest Subregional Strategy.

Consideration
Both Landcom and the Department of Defence are concerned that the Project will result in adverse noise and vibration impacts upon future land development potential. Whilst this report will consider noise impacts under the relevant section, it is considered appropriate to consider potential future land use issues associated with noise impacts here.

The Department notes these concerns and recognises that the duplication of the railway will result in increased noise and vibration in areas that have yet to be developed. However, it is important to contextualise the project within the broader objectives of the North West Growth Centre and to consider that there is an existing rail line with associated noise and vibration impacts for any future land development adjoining the corridor.

The project will assist in facilitating the development of the North West Growth Centre by providing enhanced public transport infrastructure, along an established transport corridor, that will facilitate the positive integration of transport and land use in the region. Accordingly, the project has been and will continue to be considered as part of developing land uses for the North West Growth Centre. The Department also notes that future development should also respond to existing and proposed noise sources and the Department has provided guidance on this matter in its recent guideline *Development Near Rail Corridors and Busy Roads* (DoP, 2008).

Whilst the Department strongly supports the provision of noise and vibration mitigation measures to existing development adjoining the corridor, in this instance it does not consider it reasonable for the Proponent to implement noise mitigation measures in response to future planning scenarios. Notwithstanding, the Department recommends a condition of approval that requires the Proponent to consult with the Department and Blacktown Council during the detailed design of the project in order to facilitate appropriate rail infrastructure and land use planning responses to further minimise potential noise and vibration impacts, having particular consideration to future land uses of the North West Growth Centre.

The Department also identifies the value of ensuring that the detailed design of the project responds to the ongoing development of the North West Growth Centre, particularly in relation to access, and has recommended conditions of approval requiring further design and consultation in this regard. This matter is considered further in the traffic and transport section of this report.

With regard to the concerns raised by Blacktown Council, the Department considers that the project is consistent with the variety of planning instruments in effect. In particular, the Department notes that the project is consistent with the *Metropolitan Strategy, City of Cities – A Plan for Sydney's Future*. The aims for the document include:

- To support centres with transport infrastructure;
- To increase and concentrate jobs in western;

- To ensure that access to a diversity of housing, jobs, services and open space is more equally distributed;
- To improve environmental outcomes; and
- To improve transport connections.

Blacktown Council's comments were made in regards to the relocation of the Schofields Station. However, the relocation will be integrated with the relevant Growth Centre Release areas, which will allow for an appropriate range of development to be located in proximity to the relocated station. This will, in turn, assist in meeting the objectives of the Metropolitan Strategy by providing an improved transport connection allowing the community to pursue a variety of employment and housing opportunities. Notwithstanding, the relocation of the existing Schofields Stations is considered in more depth in the Socio-Economic section of this report.

In relation to the construction compound impacts, each issue that may occur as a result of construction is discussed in depth in the relevant sections of this report. However, the Department considers that the operation of construction compounds may have land use and amenity impacts which are specific to individual compounds. In order to address this concern, the Department recommends a number of conditions of approval, which would include the following requirements:

- Where a site compound has been identified as having a high environmental risk in the Environmental Assessment, an assessment of the adequacy of the mitigation measures would be required to be submitted to the Director-General, demonstrating that there will be no significant adverse impacts on adjoining receivers; and
- Prior to the establishment of any construction compound not identified in the documentation submitted to the Department, the Proponent would be required to obtain the Director-General's approval for the management of the construction site compound(s).

The Department considers that the project is generally compatible with the existing land uses of the surrounding area. In addition, the project responds to the future land uses that will most likely occur as part of the North West Growth Centre land releases.

5.2 Socio-Economic Impacts

Issue
The most significant socio-economic impacts associated with the project relate to the relocation of Schofields Station approximately 800m to the south of its existing location. The existing Schofields Station is the focal point for Schofields village, with a number of small businesses located in close proximity to the station. A pedestrian level crossing located at the station acts as the connection point between the eastern and western sides of Schofields. During community information sessions, a number of Schofields residents expressed concern that the relocation of Schofields Station would destroy community connectivity and cohesion of the Schofields village and that without mitigation, the removal of the station could have the following impacts on the Schofields community:

- Create a sense of isolation because of the removal of a key transport facility;
- Trigger migration from the existing Schofields village to properties located closer to the relocated station; and
- Create a sense of abandonment if the old station site is not adequately rehabilitated.

The relocation of the Schofields Station would create an inconvenience for residents surrounding the existing station, including some increased distances and travel times. The provision of pedestrian and cyclist access from the existing station to the relocated Schofields Station would partly address access issues, whilst the provision of a car park on the western side of the relocated Schofields Station would accommodate park-and-ride commuters accessing the train station from the western side of the corridor.

With regard to the potential impacts upon businesses as a result of reduced patronage from rail users, survey data collect by Railcorp in 2008 indicated that approximately 13% of people who used the Schofields village shops did so on their way to and/or from Schofields Station. Although the data did not indicate the specific shops visited by commuters, some shops are more likely to be effected more than others. It is expected that the Schofields Newsagency and Simply Bakery will be the most significantly affected business as a result of the relocation.

The relocation of Vineyard Station is unlikely to have significant impact on the surrounding community or businesses due to the existing dispersed nature of development and its distance from the station.

With respect to the areas surrounding the corridor, the socio-economic impacts are expected to be low and short term, being primarily during the construction phase. During the construction there will be minor and short term impacts on visual amenity, access, business disruption, traffic, noise and air quality. Other social and economic impacts associated with the operation of the project relate to issues such as traffic, access, noise and landscaping matters. These matters are addressed in other sections of this report.

Issues Raised in Submissions

There were a significant number of submissions received from the public regarding socio-economic impacts, specifically in relation to the relocation of Schofields Station. These submissions covered issues such as access for the elderly and disabled, changes to the characteristics of the town centre, impacts upon business and loss of value to properties.

Blacktown Council raised concern with the relocation of Schofields Station due to:

- Impacts on business viability; and
- Inability of many existing Schofields residents to walk to the relocated Schofields Station.

Landcom raised concern with the relocation of Schofields Station, noting that the change would have a significant impact on the existing community, shops, commercial premises and services.

Figure 5.1 – Businesses located in Schofields

Consideration
The Department considers that the relocation of Schofields Station will result in changes, particularly in the short and medium term, to the existing Schofields village. It is noted that this change may result in negative impacts, such as reduced accessibility to the station for some members of the community and potential economic loss to existing business.

Notwithstanding these impacts, it is important to consider the relocation of the station within the regions strategic framework, particularly in regards to the North West Growth Centre. The relocation of Schofields Station would aid in facilitating a sustainable and integrated urban outcome. In particular, the proposal to relocate Schofields Station has led to planning for a new local centre adjacent to the station, within the Alex Avenue Precinct. The Precinct is to accommodate up to 7000 new homes and is proposed to accommodate higher density residential development in the vicinity of the proposed station.

The Department considers the proposed location to be appropriate as the surrounding areas are largely undeveloped and would therefore allow development to be undertaken with an appropriate density and form, which would maximise land use and transport integration. This would assist in the Government meeting its desired strategic goals, including facilitating growth in centres and along major corridors and at transport nodes.

It is noted that a number of the public submissions raised no objection to the opening of a relocated Schofields Station, however, were objectionable to the closure of the existing Schofields Station. With regard to the possibility of the two stations operating concurrently, the Department considers that the separation distance of approximately 800m does not facilitate the need for two stations and would likely be inefficient. As has been noted by the Proponent in the Submissions Report, having two stations in such close proximity to each other would increase travel times and require additional resources to operate.

The Department acknowledges that the relocation of the Schofields Station may have an impact upon local businesses within the existing Schofields village. The Department considers that the Proponent has adequately demonstrated that the majority of businesses will not be significantly affected, as they are not overtly reliant on rail passengers. For businesses that are identified as having the potential to be impacted upon, changes occurring within the North West Growth Centre, in combination with the project, need to be considered.

The existing Schofields Station is located with the Riverstone Precinct of the North West Growth Centre. As part of this plan, it is envisaged that opportunity exists for the existing Schofields village to undergo revitalisation and for its role to be solidified as a neighbourhood centre. As such, it will continue to service the needs of the existing and future local community, which will grow with the ongoing development of the North West Growth Centre. Notwithstanding, the relocation of the Schofields Station may also procure opportunities for impacted business to re-establish themselves, if the economic impacts were to be such as to threaten the economic viability of a particular business.

Submissions were received in relation to potential loss of property values. The Department notes that there are numerous factors affecting property values within and outside the scope of the project. Whilst some properties will become less accessible to the station, it is also noted that access will be improved for others and that improved frequency of trains and facilities would likely have a positive effect on property values.

The Department also notes that the relocation of Schofields Station will contribute in a change in identity to the Schofields village area, albeit a minor change. As noted above, the existing village centre will continue to serve the local community and function as a neighbourhood centre. With regard to the concerns raised with connectivity, the Proponent has reiterated in the Submissions Report that the provision of the pedestrian footbridge at the existing Schofields Station is expected to maintain the east-west community linkage within the Schofields village by providing easy access across the rail corridor. In order for this link to be integrated with the village and that the station is appropriately rehabilitated, the Department has recommended a condition requiring the preparation of a Station Design and Landscape Plan to be approved by the Director-General.

The issue of access to the station is primarily addressed in the traffic and transport section of this report, however, the Department has recommended a condition of approval which requires the Proponent to prepare a Schofields Station Transition Plan, which would identify measures to ensure the provision of equitable access between the Schofields village centre and the relocated Schofield Station and would address the rerouting of buses, cycle and pedestrian facilities, parking facilities and community safety.

With regard to potential construction based impacts, such as visual amenity, access impacts, traffic etc, these impacts have been addressed in other sections of this report. Notwithstanding, the Department recommends a condition of approval requiring the preparation of a Construction Environmental Management Plan, which will ensure that any potential construction based impacts will be mitigated as far as practicable.

5.3 Traffic and Transport

Issue

Road Network

The road network in the Project area comprises state, regional and local roads, with the majority of the roads in the project area being local roads. On the eastern side of the project area (east of the rail corridor), two key access roads are located parallel to the rail line: Railway Terrace, between Garfield Road East and Burdekin Road; and Riverstone Parade, which connects Bandon Road to Garfield Road East.

There are four roads that cross the rail corridor in the Project area, providing limited east west connection. These roads are:

- Quakers Hill Parkway – a four-lane dual carriageway located north of Quakers Hill station and grade separated.
- Westminster Street – a two-lane road located 400 metres north of Schofields station and grade separated.
- Garfield Road West – a two-lane road (with a parking lane) connecting to Garfield Road East directly south-east of Riverstone station with a level crossing.
- Bandon Road – a two-lane road at Vineyard station with a level crossing.

There is an additional private driveway with an at-grade level crossing of the rail line at the Riverstone Meatworks. This driveway connects Riverstone parade with the meatworks industrial site and is currently used by a transport company.

In February 2007, the then Minister for Roads announced a Riverstone Railway overpass would be constructed to improve safety of vehicles and trains at the Garfield Road level crossing. The RTA has investigated and assessed a number of route options and it is understood that this assessment is ongoing.

Construction Traffic and Access Impacts

In general, construction traffic would use designated routes. Construction vehicles would not use weight-restricted local roads, as far as possible. It is noted that the Proponent has attempted to determine the routes according to the road network hierarchy so that State Roads are the most commonly used, followed by Regional roads. The use of other local roads would be limited to access compounds and construction sites. The proposed access routes may result in the following minor impacts:

- The full road closure of Westminster Street overbridge (approximately 3 days), which would result in traffic detouring to Carnavon Road, Garfield Road West and Railway Terrace;
- Railway Terrace and Riverstone Parade may experience partial short-term lane closures;
- Additional traffic impacts on Garfield Road East in the Riverstone town centre as construction equipment, materials, and spoil vehicles would need to cross Garfield Road in order to access Riverstone Parade and Railway Terrace; and
- In the Riverstone town centre, construction vehicle trips are expected to add up to approximately 20 vehicles per hour to existing flows, increasing traffic flows on Railway Terrace and Riverstone Parade by approximately 6% and 4%.

The construction traffic impacts would also result in the temporary loss of car parking in the following manner:

- Schofields – approximately 5 car spaces on Railway Terrace during construction of the footbridge. This impact is expected to be negligible if station operations have already been transferred to the relocated Schofields Stations. If the footbridge is constructed prior to the transfer of service, then any existing commuter car parking spaces lost prior to the commissioning of the relocated Schofields Station would be offset at a ratio of 1:1 to ensure that the net number of parking spaces at the existing Schofields Station is maintained; and
- Riverstone – approximately 10 spaces to allow enabling works and upgrade of the Station;

It is further noted that the construction of the Project may have temporary impacts in relation to pedestrian and bicycle access, however these are expected to be adequately managed through appropriate construction staging and management.

Operational Traffic and Access Impacts

The road network in the area is expected to undergo substantial change due to the development of the North West Growth Centre. Therefore, the impact of additional vehicles due to the project on the road network in 2031 is difficult to predict. However, the scale of the additional vehicle trips has been estimated and the project is expected to impact the road network due to the attraction of additional vehicles to the station precincts. The greatest impact is predicted at Riverstone, where almost 476 additional vehicles (including buses) are expected to access the area surrounding the station within the AM peak hour. This is approximately equivalent to around one third of the capacity of one traffic lane. These vehicles will come from all directions, dispersing traffic impact over a number of access roads.

The Department notes that the Level Crossing Strategy Council has released a level rail crossing list, which ranks each crossing based on safety. The Garfield Road level crossing at Riverstone is ranked at number one as being the highest priority in needing increased safety standards. Further, in terms of the functionality of the project, the Department notes that a grade separated road crossing of the rail line at Riverstone would be needed to achieve the optimal benefit from Stage 2 of the project. Accordingly, if an alternate grade separated road crossing is not completed prior to the increase in train services, then the traffic performance of the Garfield Road level crossing would be expected to fall and safety risks increased. The Department understands that the Roads and Traffic Authority has been assessing options for a grade separated crossing, however this assessment has not been finalised.

In the case of Schofields, approximately 500 vehicles are expected to access the station in the peak hour (2031). This traffic volume will be spread over the future road network and will be divided between the eastern and western sides, distributing the impact. In the short term through 2011, up to 150 vehicles are expected to access the western side of the station via Bridge Street in the AM peak. Whist this will present and increase in traffic compared to the existing flows on Bridge Street, by local road standards it is a low level of traffic. As new roads are constructed to the western side of the station in the future, the burden on Bridge Street would be relieved.

In relation to pedestrian and cycle access, the key issues are to ensure that the project is integrated with the development of the North West Growth Centre, that the design does not preclude future facilities and that adequate access and facilities are maintained and/or provided.

Commuter Parking

Impacts upon parking demand are also predicted, particularly at Schofields and Riverstone stations. It is predicted that the relocated Schofields Station will have a demand of 461 spaces in 2031, however provision for 230 spaces is to be provided. At Riverstone Station the demand for spaces in 2031 is expected to be 581, however, the current demand of 158 spaces is not being met and no additional spaces are proposed as part of this project. The Department notes that at the relocated Schofields Station, the car parking provisions have been designed for the short-medium term, and that there is nothing to preclude the construction of additional car parking spaces to meet future demand as part of the development of the North West Growth Centre, which would be independent of this Project. In relation to Riverstone Station, the Submissions Report notes that car parking upgrades are not proposed under this Project, but that upgrading at other stations would help to alleviate demand at Riverstone.

Issues Raised in Submissions

The public raised a number of concerns in relation to traffic impacts. The issues raised related primarily to the construction traffic impacts, operational traffic impacts and accessibility to the relocated Schofields Station.

Blacktown City Council is concerned that whilst the 'meatworks' level crossing is proposed for closure and the RTA will replace the Garfield Road level crossing, these are not included as part of the application. Concerns were also raised in relation to the provision of car parking.

Hawkesbury City Council requested provision of a bus connection from the Western Line to the Richmond Line and Rouse Hill and for the provision of improved commuter car parking at Vineyard Railway Station.

The RTA notes that it is currently considering a wide range of options for Schofields Road and Garfield Road and requests that the Proponent collaborate with the RTA to ensure that the detailed design and construction of the Quakers Hill to Vineyard upgrade facilitates cost-effective future rail crossing at Schofields Road and Garfield Road. Concern was also raised in relation to the future traffic predictions, car parking spaces and bicycle storage.

Consideration

Construction Traffic and Access Impacts

The Department accepts that there will be construction traffic and access impacts as a result of this project and that it is an unavoidable impact of major infrastructure construction. In relation to the RLA project office site compound, this will involve the majority of heavy construction vehicles using Vernon Street, whilst predominately light vehicles would use Bridge Street during construction, although these impacts have been decreased as a result of making the meatworks construction compound the primary compound instead of the RLA project office.

The Proponent has identified specific construction traffic routes with the aim of minimising impacts and has committed to the preparation of construction traffic management plans to manage impacts. Accordingly, the Department has reinforced this commitment through a recommended a condition of approval requiring the preparation of a Construction Traffic Management Plan to ensure that construction traffic impacts are managed effectively. The Department also considers that access impacts should be minimised and has recommended conditions of approval in relation to the maintenance of property access and commuter parking spaces during construction (and operation in relation to access).

Operational Traffic and Access Impacts

The Department considers that the Garfield Road level crossing issue has not been adequately resolved and notes that the RTA has yet to make a decision on how a grade separated crossing would be provided at Riverstone station to replace the existing at-grade level crossing. To reflect these concerns, the Department recommends a condition of approval requiring the Proponent, in coordination with the RTA, ensure that alternative vehicle and pedestrian access across the rail line in the vicinity of the Garfield Road crossing is provided prior to the commencement of Stage 2 operation. In relation to broader road and traffic infrastructure requirements, the Department considers that these will be appropriately managed through the North West Growth Centre process.

In relation to the issue of station accessibility, the primary concern relates to the relocation of Schofields Station 800m to the South of the existing station. In order to maximise connectivity, a shared user path would be provided along Railway Terrace to connect the existing Schofields Station with the relocated Schofields Station. Pedestrian access to the relocated Schofields Station from the western side of rail corridor would be provided via the extension of Bridge Street. The Department is satisfied that these measures would provide for suitable access for able bodied people. However, it is noted that there may be access issues for less mobile people (such as the elderly and disabled) who currently reside in close proximity to the existing Schofields Station and may find it difficult to physically access the relocated Schofields Station location.

As such, the Department recommends a condition of approval requiring the preparation of a Schofields Station Transition Plan, which would identify measures, in consultation with relevant government agencies, to ensure the provision of equitable access between the Schofield Village Centre and the relocated Schofields Station, including the rerouting of buses, cycle and pedestrian facilities, parking facilities and community safety.

With respect to the removal of the at grade Quakers Hill pedestrian crossing, the Department does not consider that the Proponent has adequately assessed the impacts of this proposal and is not satisfied that relying on a third party project will address the access requirements of the Quakers Hill community. Accordingly, the Department has recommended a condition of approval requiring that a grade separated crossing be provided in accordance with the Environmental Assessment, unless otherwise approved by the Director-General, after considering further assessment of this issue.

Further, in relation to access for pedestrians and cyclists during the operation of the project, the Department recommends a number of conditions, which require the following:

- The provision of bicycle racks and lockers at the opening of each station to encourage active transport;
- That the final design of the relocated Schofields Stations is integrated with the North West Growth Centre precinct plans, including pedestrian access to the future town centre;
- That the final design of the relocated Vineyard Station is to be integrated with the North West Growth Centre precinct plans, including access to the Riverstone West precinct; and
- That the Project does not preclude the provision of cycle routes proposed as part of the North West Growth Centre.

Commuter Parking
In relation to parking demand and the proposed provision of parking, the Department notes the following:

Station	Current Demand	2012 Demand	2031 Demand	Provision
Schofields	172	185	461	230
Riverstone	158	208	581	62 (as per existing)
Vineyard	0	5	55	220 (70 in phase 1)
Total	330	398	1097	512 (including a nominal 150 spaces at Riverstone)

Table 5.1 Parking Demand and Provision

At Schofields the provision of 230 spaces is expected to meet short to medium term demand. Longer term demand is expected to be partly absorbed by ongoing street development and ongoing government commuter parking initiatives in coordination with precinct planning. At Riverstone, the current demand exceeds supply and the ability to provide additional parking is constrained by existing and future development. At Vineyard, 220 staged spaces are proposed, including 70 spaces as part of phase 1. No changes in parking are proposed at Quakers Hill as part of the project, but it is noted that the government is proposing to build approximately 200 additional spaces as part of the Commuter Car Park Strategy. When viewed on a whole of line context, the project and the Quakers Hill Project would provide an additional 650 spaces. It should also be noted that this number does not include on street parking supply that will also be provided as precincts are developed.

The Department notes that the project will not in itself provide sufficient parking in the longer term; however, short and medium term supply will generally be met and the Proponent has committed to ongoing consultation with key agencies and Blacktown Council regarding the provision of parking at Vineyard Station. Whilst the Department supports initiatives to encourage the use of public transport, including the provision of parking spaces, it considers that the project in itself is not the sole contributor to patronage growth and parking space demand. This is a consequence of the future development of the North West Growth Centre and therefore the provision of supporting infrastructure, bus service enhancements etc needs to be coordinated through a range of government initiatives. Accordingly, the Department considers that the proposed levels of parking proposed as part of the project to be appropriate.

The Department notes that the project does not incorporate additional rail crossing points except at Stations. The Department considers that provision of additional crossing points, as advocated by the RTA is not the responsibility of the Proponent, as they are not directly related to the project, rather they are related to the development of the North West Growth Centre. It is also noted that in the absence of the project, such crossing points would be required to cross the existing corridor. Notwithstanding, the Department considers that it would be advantageous for the Proponent to design the project to minimise the future development costs of future crossings in consultation with the RTA and has recommended a condition of approval to address this matter.

The provision of a bus connection from the Western Line to the Richmond Line and Rouse Hill as advocated by Hawkesbury City Council is not considered to be within the scope of this project.

5.4 Construction Noise and Vibration

Issue
Airborne Noise
Construction noise impacts of infrastructure projects is a key issue to the community and is an issue that needs to be proactively managed by the Proponent, as impacts, whilst often of a short duration, are often unavoidable.

The construction noise impacts of this project were assessed in accordance with the *Environmental Noise Control Manual* (EPA, 1994). During bridge and station construction, it is predicted that sensitive receivers would be subject to exceedances of the construction noise goals, by as much as 40dB(A). These exceedances are primarily due to minimal distances between construction sites and receivers, with the greatest noise impacts associated with piling works. Corridor and earthworks and in particular track laying activities, are also expected to result in noise level exceedances of up to 40dB(A) at the closest receivers.

However, lower noise levels would occur when the plant is located away from receivers or operating on less noise-intensive tasks.

Construction compounds may also have adverse noise impacts if not appropriately managed. The compounds which have been identified as being of high risk in relation to noise are:

- Seldon Street South – predicted noise level of 70dB(A) at 30m;
- RLA project office – predicted noise level of 83dB(A) at 10 and 69dB(A) at 50m;
- Existing Schofields – predicted noise level of 80dB(A) at 10m and 74dB(A) at 20m;
- Westminster – predicted noise level of 80dB(A) at 10m and 74dB(A) at 20m; and
- Riverstone – predicted noise level of 81dB(A) at 10 and 69dB(A) at 40m.

Traffic Noise

The traffic assessment predicts that off-site truck noise levels would comply with the road traffic noise criteria at offset distance of great than 20 metres. It is noted that individual truck noise will be perceptible; however, the assessment concluded that this would not have a major impact on the acoustic amenity of the area. In addition, traffic diversions during construction would result in localised increases in traffic noise, although these increases are predicted to be small. An 80% increase in local traffic volume corresponds to a noise increase of approximately 2.5dB(A) for a given receiver.

Vibration

Construction vibration can generate impacts on human comfort and to the structural integrity of adjacent buildings. For this project, the potential vibration impact during construction would primarily be in relation to human response. A number of plant items have the potential to result in adverse human responses close to construction sites (the closest of which would be typically 10-15 metres from these activities). Ground vibration levels for vibratory sheet piling are likely to comply with the human comfort criteria at distance exceeding 20 metres from a building; however, the Proponent notes that vibratory poles may be used at closer distance in the event of suitable ground conditions.

Construction vibration levels are expected to comply with the building damage criteria but may be perceptible during vibratory rolling. Notwithstanding, vibration monitoring would be required to establish appropriate buffer distances, particularly in relation to heritage structures. It is noted that the Proponent has committed to undertaking monitoring consistent with the Proponent's Construction Noise Strategy.

Ground-borne Noise

Ground-borne noise in buildings is caused by the transmission of ground-borne vibration rather than the direct transmission of noise through air. For this project, it is noted that the major source of ground-borne noise would result from excavation using rock breakers and soil compaction using vibratory rollers. The Proponent has used the *Construction Noise Strategy (Rail Projects)* (TIDC 2007) to determine objectives, which provides for a maximum permissible level of 40dB(A), providing that the Proponent or contractor is able to demonstrate that best available technology and best management practices are being employed to minimise emission levels.

The closest receivers are generally no closer than 10-20 metres. At these locations, the predicted regenerated noise levels are expected to be approximately 56-69 dB(A) (for a light 300kg rock breaker) and 62-75dB(A) (for heavy 1,600kg rock breaker). This would represent a potential exceedance of up to 35dB(A) of the regenerated noise criterion.

Issues Raised in Submissions

Public submissions raised concern that construction traffic noise will be excessive.

The DECCW considers that the construction noise mitigation measures are generalised and notes that a noise management plan should be implemented.

Consideration

Airborne and Groundborne Noise

Construction noise impacts are likely to be significant at times and difficult to minimise to levels that achieve the construction noise objective due to the space limitations of the corridor 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 will move along the project corridor as required. Notwithstanding, the Department considers that there are reasonable steps to be undertaken which will successfully mitigate the

actual impacts of construction related noise. 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;
- the implementation of a construction noise and vibration management plan and monitoring program within the Construction Environmental Management Plan, prepared in consultation with DECCW;
- the restriction of construction hours for audible construction work to 7:00 am to 6:00pm Monday to Friday, and 8:00 am to 1:00 pm on Saturdays, with the exception of work that is necessary for emergency or safety reasons, or that is approved by the applicable Environmental Protection Licence or an approved Out of Hours Work protocol; and
- a complaints handling and response program to ensure the concerns of any stakeholders along the corridor are appropriately addressed.

The Department also notes that during the assessment period, guidelines relating to construction noise changed. The Department has therefore recommended a condition requiring that the Proponent implement all reasonable and feasible mitigation measures with the aim of achieving the construction noise management levels as described in the *Interim Noise Guideline* (DECC, 2009).

In relation to Construction Site compounds, the Department notes the stationary nature of these facilities and the risk they have in relation to noise impacts on surrounding properties. Accordingly, the Department has recommended a condition requiring that the Proponent seek approval of the Director-General for compounds that have a high noise risk, so that the Department can assess the adequacy of the proposed noise mitigation measures.

Traffic Noise

The Department recognises that it is not realistic to prohibit heavy vehicle movements along local roads to eliminate this impact, given the conflicting objectives - of 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, although it is noted that impacts will be minor. Notwithstanding, the Department believes that these impacts should be minimised to the greatest extent practicable and has recommended a condition of approval that requires the Proponent to prepare and implement a Construction Traffic Management Plan, to identify haulage routes, access points and measures to minimise potential access and land use conflicts.

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. Accordingly, the Department has not recommended any conditions of approval relating to this issue.

Vibration

The Department is satisfied with the assessment of vibration impacts which concludes that there is potential to have adverse human impacts. The Department notes that the nature of construction is prohibitive in avoiding such impacts and it is further noted that these impacts are temporary and will move along the project corridor as work progresses, therefore ensuring that a particular receiver will not be exposed for a prolonged period of time.

Notwithstanding, it is appropriate that the Proponent adopt safe working distances and to mitigate impacts, where practicable. As such, the Department recommends a condition of approval requiring the Proponent to prepare a Construction Noise and Vibration Management Plan to detail how construction noise and vibration would be minimised, managed and monitored.

5.5 Operational Noise

Issue

Rail Noise

The rail noise assessment was undertaken in accordance with the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* (IGANRIP) and assumed that stages 1 and 2 would be commissioned by 2013, thus representing a conservative assessment. At the majority of existing sensitive locations adjacent to the project area, the future noise levels resulting from the project comply with the noise trigger levels, with the project related noise levels exceeding the trigger levels at two locations on the Up Side of the railway corridor and one location on the Down Side of the railway corridor. These exceedances are predicted to occur at residential receivers located on Manor house Boulevard, Quakers Hill, and Bridge Street and

Tain Place, Schofields. In addition, there was one trigger level exceedance at the Quakers Hill Pre-School. At these locations, receivers are in close proximity to the existing track, and the Proponent has committed to implementing mitigation measures following detailed design, including rail dampers.

Road Traffic Noise

Bus interchange facilities are not currently in operation at the proposed interchange locations at the relocated Schofields and Vineyard stations, and it is therefore predicted that there would be an increase in noise levels, particularly from bus operations. However, it is noted that heavy vehicles regularly use nearby roads currently and on this basis maximum noise levels are unlikely to be significantly different.

In relation to Schofields Station, the following noise exceedances are predicted:

- At a distance of 20m, the future noise levels would exceed both day time and night time noise criteria, in relation to the land use development associated with collector roads criterion;
- At distance less than 70m, the *Environmental Criteria for Road Traffic Noise* (ECRTN) criterion for local roads would be exceeded; and
- Additional light traffic on Bridge Street would lead to a minor noise exceedance of 0.6dB(A), which is considered to be imperceptible for most people.

In relation to Vineyard Station, the following noise exceedances are predicted:

- At a distance of less than 30m, the ECTRN criterion for land use developments associated with collectors roads would be exceeded; and
- At a distance of less than 70m, the ECTRN criterion for local roads would be exceeded.

The Department notes that whilst road traffic noise would be noticeable, the predicted noise levels from vehicle operations at the closest residential properties to the relocated Schofields and Vineyard stations generally meet the appropriate ECRTN criteria. Notwithstanding, the Proponent has committed to designing the project to minimise these impacts to the greatest extent practicable.

Ground-borne Noise

For surface rail projects, the effect of ground-borne noise tends to be less of an issue than for underground rail projects, due to airborne noise emissions generally being much higher than the ground-borne noise levels. However, in cases where airborne noise levels are attenuated, ground-borne noise emissions may be audible. In accordance with IGANRIP, the ground-borne noise levels must be higher than the airborne noise level in order to trigger further assessment. The airborne noise mitigation strategy will be finalised during the detailed design of the project, as such, the Proponent proposes to undertake a detailed ground-borne noise assessment at the detailed design stage, once the mitigated airborne noise levels are known at the relevant locations.

Vibration

The vibration level during train pass-by events would comply with vibration trigger levels at all residential, office, school, educational institutions and places of worship locations. However, the Department notes that for some train pass-bys, vibrations levels would be perceptible within about 23m (for a train travelling 80 km/h), however there would be a low probability of adverse disturbance.

Issues Raised in Submissions

Public Submissions raised concern that higher train volumes will lead to an increase in noise and that proposed noise mitigation measures are inadequate.

Landcom and Blacktown City Council raised concern that the assessment did not directly consider the likely future development alongside the rail corridor.

Department of Defence raised concerns that the potential for adverse noise impacts on Commonwealth land that holds recognised residential development potential has not been adequately assessed.

Consideration

The Department notes that the project occurs along an existing road and rail corridor and as such there will be minor increases in existing road and rail noise levels, primarily as a result of the duplication leading to an increase of train movements and interchange operations. Whilst the project generally complies with relevant noise levels, the noise modelling indicates that the operation of the project will lead to exceedances at some locations, which will require mitigation.

The proponent has identified a number of possible mitigation measures that may be utilised to achieve the relevant noise criteria including:

- Source control measures such as rail dampers;
- Acoustic shielding, including earth mounds and noise barriers; and
- Receiver controls, involving higher performance windows, doors and seals to minimise the transmission of noise into the structure.

Further, the Proponent has provided possible measures for mitigating ground-borne noise and vibration. These methods involve the use of resilient ballast mats and resilient under sleeper pads.

The above mitigation measures are generally considered to be successful, although their success is dependent upon the context in which they are used. Notwithstanding, the Department is satisfied that the proposed potential mitigation methods will be successful in mitigating the forecasted noise impacts and notes that the precise mitigation methods and their effectiveness will be detailed in an operational noise and vibration management report, which is to be submitted to the Director-General.

Accordingly, the Department recommends a range of conditions of approval requiring the following:

- The project is to be designed and operated with the objective of not exceeding the airborne and ground-borne noise trigger levels identified in the IGANRIP for existing residential and sensitive land uses;
- The project is to be designed and operated with the objective of not exceeding the vibration goals for human exposure;
- The preparation of an operational noise and vibration management report, in consultation with the DECCW and directly affected sensitive receivers, to confirm mitigation measures; and
- A program to confirm the noise and vibration emission performance of the project during operation and the implementation of remedial measures, if necessary.

It is noted that a number of submissions raised concern in relation to noise impacts upon future land uses. Whilst this issue has been considered in the land use section of this report, the Department considers that the noise assessment undertaken has appropriately responded to this matter. In noting that the project is a duplication of an existing rail line that will facilitate future development by providing key transport infrastructure to the North West Growth Centre, the Department considers that the project should only respond to existing development and that future land use development and planning should also reflect the prevailing and future noise environment. Accordingly, the Department recommends a condition requiring that the Proponent consult with the Department and Blacktown City Council to ensure appropriate land use and rail infrastructure responses are developed. The Department is satisfied with the Proponents response to road traffic noise levels and notes that this environment is likely to significantly change as development in the North West Growth Centre proceeds.

5.6 Non-Indigenous heritage

Issue

The Proponent has identified that the project would have a heritage impact on the Quakers Hill to Vineyard rail corridor and upon the Riverstone Railway Station and Yard Group, which is listed on the State Heritage Register (SHR), RailCorp's S170 Heritage and Conservation Register, Blacktown Local Environmental Plan 1998 (Blacktown LEP) and by the National Trust.

Riverstone Railway Station and Yard Group is noted as an excellent composite group of station and service buildings with several unusual buildings located in the metropolitan area and retaining its original track arrangements. The proposed pedestrian bridge and its associated lifts, access ramps and stairs would be a significant structure in the context of the existing station. Notwithstanding, the new additions have been designed in a manner which will avoid any direct impact on the heritage significance of the station precinct, and would not substantially compromise the integrity of the listed items. In addition, as these additions would

be free standing, they could be removed in the future, if required, without discernible effect. It is also noted that there will be heritage impacts to the existing platform (Platform 1) with the addition of tactiles to aid the vision impaired, general resurfacing and grade re-profiling. The impact would involve minor modification of the platform structure and would not significantly alter its component fabric or function.

The rail corridor is not listed with any formal heritage register, however it is considered that structural items, such as cuttings, culverts and embankments, have potential to further the understanding of the changes in building practices and materials used in the construction and upgrade of nineteenth century railway lines. The heritage assessment concludes that the project is complementary and would allow the Quakers Hill to Vineyard railway line to continue in its intended function as an operational piece of railway infrastructure.

Issues Raised in Submissions

Public submissions raised concern with heritage impacts upon the existing Schofields Station, that the Riverstone Station should be heritage listed and restored, and the impacts upon historically significant culverts along the rail line.

Blacktown Council raised concern in relation to potential impacts upon adjacent heritage items at Riverstone and requested archival recording.

Consideration

The Department considers that the greatest impact at Riverstone Station will potentially result from the installation of the proposed pedestrian footbridge. The heritage assessment identified that the impacts associated with the footbridge are indirect and that the proposed works would not have a direct physical impact on the heritage buildings that compromise the station complex. Whilst the Department notes that the impacts will be indirect, involving visual, size, scale and overshadowing, it considers that these matters should be further considered in the final design of the footbridges. In order to ensure that any potential heritage impact is mitigated as far as practicable, the Department recommends a condition of approval requiring the Riverstone Station upgrade and footbridge is designed in a manner that will ensure that heritage impacts are minimised in relation to its visual, bulk and scale impacts.

With respect to the public submission concerning the existing Schofields Station, it is noted that the Schofields station siding was initially located further south of the current Schofields Station and it is not expected that any remnants of the original platform remain or would be in the vicinity of the relocated station. It is further noted that the current Schofields Station is relatively new and therefore does not hold any heritage significance. As such, the Department is satisfied that there will be no heritage impacts upon Schofields Station.

The Department notes that the drainage culverts along the rail corridor have all been identified as being of local significance and that they appear to be representative of late nineteenth century brick culvert technology common to the expansion of the railways at this time. However, it is noted that they are not unique, and that the upgrading of the drainage culverts represents an ongoing process of technological change to meet changing demands on the transport system of western Sydney. The Proponent has committed to completing an archival recording of all structural and landscape components and stop work provisions will be implemented in the event of archaeological remains being found, which is considered to be an acceptable response to this issue.

The issue of adjacent heritage items raised by Blacktown Council relates to a series of houses and a war memorial in the vicinity of Riverstone Station. The Department acknowledges that these properties have not been specifically considered in the heritage assessment for the Project. However, the Department understands that there will not be direct impacts and considers that whilst the design of Riverstone Station may have minor setting impacts upon the noted heritage items, there appears to be no immediate direct impact to the heritage items. Notwithstanding, the Department has recommended that these items be considered in the final design of the works to ensure any indirect impacts are minimised.

5.7 Indigenous Heritage

Issues

The Project is located within the area of the Darug linguistic tribal group. The Darug are thought to have occupied land stretching from the Hawkesbury River in the north, to Appin in the south, and west into the Blue Mountains. However, very little of the material culture of the Darug survives apart from stone tools, the material of these generally coming from the gravel beds of the Nepean River or silcate outcrops adjacent to

South and Eastern creeks. Basalt pebbles were used for chopping tools and hatchet heads, while chert and silcate were fashioned into items such as scrapers, spear barbs and cutting tools.

The project and study area falls within the boundary of the Deerubbin LALC, Darug Tribal Aboriginal Corporation, Darug Custodian Aboriginal Corporation, Darug Land Observations and Darug Aboriginal Cultural Heritage Assessments and consultation has been undertaken with the registered Aboriginal stakeholders throughout the assessment.

The Aboriginal heritage assessment revealed that whilst no registered Aboriginal sites are situated within the boundaries of the study area, the project would impact upon seven archaeological sites and ten areas of potential archaeological deposits (PADs). A description of the sites is detailed below.

Site ID	Landform Element	Site Type
QV1	Upper slope (part of the QV complex)	Isolated find (red silcrete flaked piece)
QV2	Upper slope (part of the QV complex)	Isolated find (red silcrete flaked piece)
QVP	Upper slope (part of the QV complex)	PAD
QV3	Creek flat	Isolated finds (yellow silcrete broken retouched flake)
QV4	Creek flat	Artefact scatter (silcrete flakes)
Q1	Creek flat	PAD
Q2	Alluvial terrace	PAD
Q3	Creek flat	PAD
Q4	Ridge line/upper slope	PAD
S1	Ridge line/upper slope	PAD
S2	Low rise hill	PAD
QV5	Lower slope	Isolated find (red silcrete flaked piece)
QV6	Hill top	Isolated find (broken hammer stone)
QV7	Hill top	Three isolated finds (orange chert flakes)
V1	Hill top	PAD
V2	Hill top	PAD
V3	Creek flat	PAD

Table 5.2 - Archaeological Sites

Past land use activities, including the original construction and ongoing maintenance of the existing rail corridor, are likely to have substantially affected the integrity of sub-surface deposits within the rail corridor and many adjoining areas, and consequently the corridor has been identified as having low heritage constraint. Notwithstanding, areas of moderate to high heritage constraint were identified in the vicinity of the corridor.

PAD QVP, comprised of archaeological sites QV1, QV2 and previously recorded AHIMS sites 45-5-503 can be considered as a complex of sites that represent a component of a once inter-connected cultural landscape, a feature which is disappearing and has high heritage constraint. This PAD adjoins the corridor to the south of the relocated Schofields Station and whilst not impacted by station works, will be partly impacted through the widening of the corridor. The Proponent has also amended the project by reconfiguring a proposed utilities corridor. This utilities corridor was assessed as having the most significant impact on this PAD, and the reconfiguration has now removed this impact.

The archaeological sites identified provide an important link to the once extensive cultural landscape of the region and are of high social value to Aboriginal people today and the identified PADs have the potential to hold archaeological material in its primary context and as such they have the potential to generate meaningful scientific information on past Aboriginal land use. The works associated with the project will involve disturbance to all of the identified sites and therefore the impacts need to be appropriately managed. The *Aboriginal Archaeological and Cultural Heritage Assessment and Statement of Heritage Impact,* identified a range of management recommendations associated with the recording of sites, avoidance of areas of high heritage constraint (ie PAD QVP Complex), test excavations and surface collection.

Issues Raised in Submissions
No Public submissions raised concerns in relation to Indigenous Heritage

No agencies raised Indigenous Heritage as a concern, however DECCW provided advice on specific mitigation recommendations, including consultation requirements.

Consideration
The Department notes the findings of the heritage assessment and recognises that the project corridor has undergone development in the past which may have impacted upon the integrity and value of archaeological deposits. Notwithstanding, Aboriginal heritage is highly valued and any impacts upon it must be avoided or mitigated where possible. In this respect, the Department notes that the Proponent has significantly reduced its impact to PAD site QVP, which has high value, through amendments to the project, consistent with the recommendations of the of the heritage assessment. The relocation of the service corridor, whilst increasing impacts to PAD Q3, will further reduce impacts to PAD Q2, Q4, and S1, which have been identified as having moderate heritage constraint.

The Department also notes that the Proponent has committed to preparing an Aboriginal Heritage Management Plan to be prepared in consultation with registered Aboriginal stakeholders. This plan would include management measures to salvage and conserve aboriginal objects, protect objects and sites outside of disturbance areas, respond to the discovery of new items, and staff induction on Aboriginal heritage.

The Department considers that the mitigation and management methods outlined in the Environmental Assessment and the Proponent's commitments to be generally sufficient and considers the likelihood of any significant impacts upon Aboriginal heritage to be minimal. However, in order to ensure that all steps are taken to prevent any adverse impacts, the Department recommends a number of conditions of approval, which will require:

- The Proponent, to the greatest extent practicable, minimise impacts to sites identified as having moderate to high significant constraint;
- Recommendations identified in the *Aboriginal Archaeological and Cultural Heritage Assessment and Statement of Heritage Impact* Report to be followed, except having a cultural officer being present for earth moving works not marked for archaeological management, as this is not supported by DECCW and is not considered to add value or be a practical response;
- The Proponent is to manage artefacts from identified sites that may be impacted, in consultation with the DECCW and the registered Aboriginal stakeholders; and
- If any previously unidentified Aboriginal heritage items are discovered prior to or during construction, they shall be registered with the DECCW. Impact to these sites shall be avoided and if this is not possible, mitigation for impact shall occur in consultation with the DECCW.

5.8 Hydrology

Issue
Construction
The project may potentially impact on water quality through potential pollution of stormwater run-off with sediments, fuels and other materials from construction sites. Further, the widening of fill embankments, cuttings, excavations and clearing of vegetated land could result in increased erosion and subsequent sediment delivery to local waterways.

In addition, there could be temporary impacts to local surface water system behaviour during the construction of the project. These impacts could result in loss of floodplain storage and temporary distribution of flood flows as a result of material stockpiles and works within flowpaths and at culvert crossings.

There is also potential for the project to intercept saline groundwater where excavation is required in high water table areas.

Operation
The study area is located in the lower reaches of the Eastern Creek catchment, approximately 10km from its confluence with the Hawkesbury River. Parts of the study area are located in areas that are proned to flooding. It is also noted that the existing regional Hawkesbury-Nepean flood behaviour of the greater Hawkesbury-Nepean catchment currently results in sections of the existing rail corridor being inundated and overtopped as a result of backwater influences by as much as 2.7m for a 100 year ARI storm event.

Significant sections of the project will impinge on the Hawkesbury-Nepean floodplain, which includes the Eastern Creek catchment. The associated embankment that would be built for the project would impinge into the full range of flood risk categories and therefore may have an impact on the flood behaviour of the Hawkesbury-Nepean floodplain. However, the volume associated with the embankment is relatively small

when compared to the overall volume of floodwaters expected for a Hawkesbury Nepean catchment wide flood event and is therefore likely to have a minimal effect on flood level for all events up to and including the Probable Maximum Flood.

The Department also notes that if the changes to culvert crossing are not adequately designed, then the project would have the potential to exacerbate local flooding impacts by:

- Increasing run-off flow and volume from additional impervious surfaces;
- Affecting the ability of the existing culverts to deal with the increased run-off and causing water to pond to higher levels behind the rail embankment;
- Changing the behaviour of existing culverts and impacting on informal detention systems that may currently assist in attenuating flood peaks within Eastern Creek; and
- Changing downstream velocities, and therefore, increasing erosion potential due to the extension of culverts.

However, based on preliminary culvert designs, the Proponent has demonstrated that localised flooding impacts can be adequately managed or reduced.

With regard to water quality impacts, there is potential for stormwater runoff to become contaminated with surface contaminants, which may be washed into the stormwater system from stations, car parks, the rail corridor and exposed surfaces. It is noted that contaminated stormwater could adversely impact the water quality in Eastern Creek and its tributaries. Further, run-off from the new car parks and bus interchange facilities at Schofields and Vineyard could be contaminated with fuel, oil or other chemicals from leaking cars and buses using these facilities.

Issues Raised in Submissions
Public submissions raised concern with potential flooding impacts.

Blacktown City Council raised concern with the comprehensiveness of the list of culverts, water course impacts, lack of information for culvert crossings and accuracy of flooding conclusions.

Department of Water and Energy raised concern in relation to the design of the culverts, particularly in relation to the in-stream environment and channel erosion.

DECCW raised concern with the determination of flood risk categories and culvert capacity and noted that the project area would be susceptible to erosion and sedimentation and therefore recommended an erosion and sedimentation control plan be developed and that vegetation be left in place for as long as possible.

Consideration
Construction
In relation to potential construction impacts, it is noted that construction of this nature in the vicinity of a water courses need to be appropriately managed to prevent sedimentation and runoff inadvertently being transported into nearby watercourses. The Department notes that there is a range of standard and tested management mechanisms available to ensure that watercourses systems are not impacted. As such, the Department recommends a condition of approval requiring the preparation of a Soil and Water Quality Management Plan, which is to detail how excavated and imported materials will be managed and water courses protected throughout construction. This plan is required to be developed in consultation with the DECCW and have consideration of existing industry standards including *Managing Urban Stormwater: Soils and Construction* and take into account the potential for flooding within and adjoining the project area.

To protect watercourses from the potential interception of saline groundwater, the Department has recommended a condition of approval requiring the preparation of a Soil Salinity Report. The report is to be prepared in consultation with DECCW and detail that the project does not adversely impact on saline groundwater and avoids or mitigates impacts on local and regional salinity process and will have minimal impact on recharge to groundwater systems.

Operation
The Department is satisfied that the potential for flooding impacts has been adequately assessed and that the assessment can be further refined during the detailed design process. The Proponent, in the Submissions Report, undertook detailed assessment of Stage 1 works, which demonstrated that the impact on flood level would remain as per current levels or be slightly reduced in risk or impact. It is also noted that the project would not affect flood evacuation routes or procedures. The Department also notes that the

Proponent has committed to preparing a Flood Impact Assessment in consultation with relevant agencies during the detailed design.

The Department also notes that the duplicated track and associated embankment works would not exceed the elevation of the existing rail embankment at any location where overtopping currently occurs and that stormwater detention would be provided for new impervious surfaces, thus further reducing flooding impacts.

The Department considers at this stage, the concerns raised by the agencies can be addressed through the detailed Flood Impact Assessment process and is satisfied that the project can be designed in a manner which will not exacerbate the flooding characteristics of the surrounding area. Notwithstanding, the Department recommends a number of conditions of approval which will require that the project, to the greatest extent practicable, is designed to not worsen existing flooding characteristics, and that where flooding characteristics are altered and affect access, property or infrastructure, the Proponent shall identify and implement further mitigation methods.

In relation to culvert design, the Department notes that DWE (NSW Office of Water) has provided mapping determining Category 2 and 3 watercourses and supports the naturalisation of these watercourses where feasible. As such, the Department has recommended a condition requiring both categories, where culverts are to be replaced, incorporate naturalised bases and that where feasible, Category 2 watercourse culverts should be bridged.

In relation to operational water quality impacts, the Department notes that the project has the potential to increase pollutants entering the stormwater system and that the volume of pollutants attributable to the project would be minor in comparison to that resulting from the North West Growth Centre. Notwithstanding, the Department considers that the project should not exacerbate pollutant levels entering watercourses and has recommended a condition of approval requiring that the Proponent comply with section 120 of the *Protection of the Environment Operations Act 1997*, which prohibits the pollution of waters. The Department considers that this achievable through the implementation of the water quality management measures that have been identified in the Environmental Assessment and which the Proponent has committed to refining in the detailed design of the project.

5.9 Other Issues

Flora and Fauna

Issue

The project would involve the clearance of up to 4.33 hectares of native vegetation, including the following endangered ecological communities:

Community Type	Amount to be cleared
River-flat Eucalypt Forest on Coastal Floodplains	1.39 hectares
Cumberland Plain Woodland	1.15 hectares
Shale Gravel Transition Forest	1.71 hectares
Derived Grassland (previously shale gravel transition forest)	0.08 hectares

Table 5.3 Endangered Ecological Communities

The majority of the study area occurs within the North West Growth Centre and partly within the applicable biodiversity certified area. Threatened biodiversity listed under the *Threatened Species Conservation Act* (TSC Act) in the study area occurs in these certified areas. The result of these species being located in the certified areas is that generally threatened species assessment is not required and that offsets are to be implemented as part of the overall development of the North West Growth Centre. As a consequence, the Proponent argued that it was not required to provide offsets. However, both the Department and the DECCW had reservations as to the applicability of biodiversity certification to Part 3A projects. This is discussed in further detail below.

Notwithstanding, the Proponent erred on the side of caution and undertook significance assessments for threatened species that had a moderate or greater likelihood of occurring within the study area. This assessment followed the requirements detailed in the draft *Guidelines for Threatened Species Assessment* (DECC, 2005). This assessment concluded that the impacts to threatened biodiversity would be minimal, with threatened species avoided and the clearing required consisting predominately of previously cleared and highly disturbed vegetation. The assessment also concluded that the project was unlikely to significantly increase fragmentation, disturb habitat connectivity, or increase the existing disturbance regimes within the

study area to the extent that the project would have a significant impact on this community or its recover. However, the assessment noted an exception with respect to the relocated Vineyard Station car park area. This area is considered to contain good condition Shale Gravel Transition Forest (listed as endangered under the TSC Act). This area has been identified as core habitat, however no threatened species were recorded in the area.

Additionally, the project will include a 5 metre wide utility corridor on the eastern side of the rail corridor. This would result in the clearance of 0.08 hectares of Alluvial Woodlands (River-flat Eucalypt Forest or Coastal Floodplains) and 0.01 hectares of Shale Plains Woodland (Cumberland Plain Woodland). It is noted that this clearance is located in an area that is not accredited with biodiversity certification under the Growth Centres SEPP or within the area defined as the North West Growth Centre, and is therefore subject to offsets.

Significance assessments were also undertaken for threatened biodiversity in the study area listed under the *Environment Protection and Biodiversity Conservation Act 1999* for the Cumberland Plain Woodland and *Pultenaea parviflora*. These assessments concluded that the Project is unlikely to have a significant impact due to the small size, high level of weed infestation, isolated and disturbed nature of the *Pultenaea parviflora* habitat and that areas of Cumberland Plain Woodland in the subject site were degraded, isolated and small.

Issues Raised in Submissions
In its original submission, the DECCW noted that biodiversity certification did not apply to projects for which Part 3A approval is sought under the Act and consequently the Proponent would be required to assess impacts and provide offsets in accordance with the Part 3A Guidelines. Additional issues raised by the DECCW include gaps in data information, indirect impacts, and the impact of the Vineyard Station car park on the Shale Gravel Transition Forest.

However, in subsequent correspondence, the DECCW advised that where a proposal that does not benefit from biodiversity certification falls within an identified certified area, and should the proposal not be able to avoid impact on identified threatened species habitat or endangered ecological communities, no offset would be required. The DECCW considered that offsets for the identified certified areas have already been negotiated and agreed to during the process to grant biodiversity certification to the Growth Centres SEPP and offsetting should not be required again. This position has also been confirmed by the Department's Office of Strategies and Land Release.

The DWE (Office of Water) raised concern with the potential disturbance of riparian corridors.

Consideration
The project is occurring along an existing rail corridor and as such, much of the flora and fauna located along this corridor has previously been disturbed resulting in minimal impacts to biodiversity. However, the Department notes the significance of the Shale Gravel Transition Forest in good condition at the proposed Vineyard Station car park area. Given the good condition of this endangered ecological community, it is considered that strong consideration be given to minimising damage to this area. As such, the Department recommends a number of conditions of approval which would provide for the following:

- Requiring the Proponent to minimise the clearing of native vegetation along the corridor with the objective of reducing impacts to threatened species and Endangered Ecological Communities;
- Requiring the final design of the relocated Vineyard Station car park and bus interchange to be configured to minimise impacts to threatened biodiversity to the greatest extent practicable; and
- Requiring the Proponent to undertake a pre-clearing survey to confirm the location of Endangered Ecological Communities, threatened flora species and hollow-bearing trees identified in and adjacent to the works and to protect for the duration of construction those areas not subject to direct project impacts.

The Department considers the advice of the DECCW, in relation to biodiversity certification, to warrant determinative weight. As such, the Department considers that the Proponent would not be responsible for providing offsets for the clearing of native vegetation within the North West Growth Centre. However, the the clearing of 0.08 hectares of Alluvial Woodlands and 0.01 hectares of Shale Plains Woodland, which is outside of the biodiversity certification area is required to be offset. Therefore, the Department recommends a condition of approval requiring the loss be offset.

The Department further notes that the project has the potential to result in adverse impacts upon riparian zones and that existing riparian zones should be protected and rehabilitated where feasible due to the role they play in a dynamic watercourse system. As such, the Department recommends conditions of approval

requiring that riparian zones affected by the project be rehabilitated in order to restore a natural functioning watercourse.

Visual Amenity

Issue

Construction of the project may result in temporary visual amenity changes including security fencing, temporary storage of material, heavy machinery and new structures as they are constructed. In particular, it is noted that the reconstruction of Westminster Street overbridge would be a highly visible construction activity due to the height of the bridge and the topography of the surrounding land.

With regard to the operational visual amenity changes, visual changes will occur in the following areas:

- relocated stations and associated transport infrastructure at Schofields and Vineyard,
- new pedestrian overbridges at Schofields and Riverstone (and potentially Quakers Hill);
- demolition of the disused (existing) existing stations at Schofields and Vineyard; and
- rail corridor impacts, including loss of vegetation as a result of corridor widening, overhead wiring and any retaining walls, noise walls (or other structural mitigation measures), embankments and rail tracks.

Issues Raised in Submissions

A number of public submissions have identified concerns with visual amenity impacts, particularly with regard to the design of stations.

Consideration

With regard to the construction phase of the project, the Department considers that visual impacts are an unavoidable component of the project, and whilst there will be periods where the construction works are visually intrusive, these impacts are temporary in nature.

The Department notes that a number of submissions have suggested that the design of new stations should be consistent with the design of the existing Riverstone Station. However, replicating a structure of heritage significance is not considered to be an appropriate response in protecting the heritage significance of a particular item. On the contrary, it is more appropriate that the new stations are designed in a more contemporary manner so that the new stations and the heritage significance of stations can be easily differentiated.

In relation to the operational visual amenity changes, the Department considers that there will be visual changes to the area as a result of the project, but that these are consistent with the existing rail corridor environment. It also notes that these changes will also take place in the context of broader regional change as the North West Growth Centre is developed. Whilst the Department considers that the project will not have any significant adverse visual amenity impacts, it does recommend a condition of approval for the preparation of a Station Design and Landscape Plan to ensure that the final design of the project incorporates design measures to enhance the design and landscaping of the project.

Soils and Contamination

Issue

The soils within the project area comprise of soils from the Blacktown and South Creek soil landscape groups, which are associated with poor drainage (Blacktown soils) and are subject to frequent flooding (South Creek soils). This may result in issues during construction and it is noted that further geotechnical investigations would be required during detailed design phase of the project to assess the stability of these soils for construction.

There are also a number of locations with a moderate to high potential of being contaminated due to past uses. The uncovering of these materials could pose health risks to construction workers and prevent the reuse of spoil for other works within the project area. Contaminants could also result in off-site impacts associated with the mobilisation of on-site contamination, particularly via stormwater systems, and during the process of transportation and disposal of contaminated soil. In order to fully identify the contaminated materials, the Proponent notes that it is in the process of preparing a Phase 2 contamination assessment.

Issues Raised in Submissions

No public submissions received regarding soils and contamination.

The DECCW noted that any contamination investigation should be undertaken in a manner consistent with DECCW guidelines.

Consideration
The Department considers that the potential impacts in relation to contamination should be further investigated in the Phase 2 contamination assessment. As the detailed results are not yet available for assessment, the Department recommends a condition requiring the Proponent to prepare a Soil Contamination Report, incorporating the Phase 2 contamination investigations, which would detail whether or not the soil is suitable for the intended land use or can be made suitable for reuse through remediation, the likely remediation strategy for addressing any contamination that has been encountered, and how the environmental and health risks will be appropriately mitigated and managed during the disturbance, remediation and removal of contaminated soil.

In regards to the stability of soil, the Department notes that the Proponent has committed to undertaking further geotechnical investigation to determine the extent of fill material and soil stability within the construction footprint. It is noted that in cases where fill material underlies structural foundations, it would be replaced with engineered fill which would provide for stability of embankments, cuttings and excavations. This Department considers that this approach is adequate and has recommended a condition of approval to ensure that all waste and fill materials, whether imported or generated on site, be assessed, classified managed and disposed of in accordance with the *Waste Classification Guidelines* (DECC, 2009).

Air Quality and Greenhouse Gases
Issue
There may be temporary air quality impacts through dust-generating activities including loading of aggregate materials onto trucks, operation of bulldozers, scrapers and excavators, movement of vehicles on unsealed roads and wind erosion from exposed surfaces. These impacts may affect properties located adjacent to the existing rail line at Quakers Hill and Schofields.

It is also expected that there would be an increase in greenhouse gas emissions, particularly carbon dioxide during construction as a result of operating construction machinery and the removal of vegetation. Indirect greenhouse emissions would also be associated with the consumption of electricity and emissions embodied in the products used on-site, particularly steel and concrete.

It is expected that air quality impacts from operation would be minor, with potential contributors being emissions from private vehicles utilising parking, kiss-and-ride, taxi facilities at the stations and the introduction of the bus interchange facilities at the relocated Schofields and Vineyard railway stations.

Long term, it is predicted that the project will benefit local and regional air quality through the provision of more frequent public transport services into an area that would otherwise be heavily reliant on private vehicle use. As such, it is predicted that this would result in substantially reduced combustion of diesel and petrol fuel from private vehicles.

Issues Raised in Submissions
No public submissions directly raised concerns with air quality and greenhouse gases.

The DECCW noted that bicycle storage and parking should be provided to minimise greenhouse gases.

Consideration
The Department considers that air quality impacts during construction have the potential to result in adverse impacts upon the local environment. This is the case in most infrastructure construction projects and it is necessary to ensure that construction is undertaken in a manner which avoids and/or minimises any adverse impacts. The air quality impacts that occur during construction are usually attributable to dust. The Department therefore recommends a condition requiring the proponent to construct the project in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust, on the receiving environment. In the event that dust emissions were to be visible, the proponent is required to identify and implement all practicable dust mitigation measures, such that emissions of visible dust are minimised as far as practicable.

The Proponent has committed to a range of measures to mitigate greenhouse gas emissions, such as undertaking efficient work practices and maintaining construction equipment. The Department considers that greenhouse gas emissions related to this project to be relatively low and it is not expected that there would be any significant adverse environmental impacts. The Department also notes that in the long term, the project could have beneficial impacts upon greenhouse gas emissions as a more reliant and frequent rail service is likely to encourage people to use public transport as opposed to private motor vehicles. In relation to the comments received by DECCW, the Department has recommended a number of conditions requiring

the Proponent to provide adequate bicycle storage and to ensure that the project does not preclude the provision of cycle routes that are proposed as part of the North West Growth Centre.

The Department has also assessed the project in relation to Waste, Energy and Demand on Resources; Hazards and Risks; Public Safety; Services and Utilities; and Cumulative Impacts and considers that these matters have been adequately addressed in the Environmental Assessment, Response to Submissions and the Proponent's Statement of Commitments.

6. CONCLUSIONS AND RECOMMENDATIONS

Following a detailed assessment of the Environmental Assessment, Submissions Report and the submissions received during the exhibition period for the project, the Department is satisfied that the project is justified and that 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 environmental constraints associated with the project. Of particular note are the potential land use and socio-economic impacts resulting from the relocation of Schofields Station, operational traffic and access issues and noise impacts.

In relation to land use, the Department considers that it is important to contextualise the project within the broader direction and objectives of the North West Growth Centre and to consider that there is an existing rail line with associated noise impacts, which is required to be considered by any future land development adjoining the corridor. The project will assist in facilitating the development of the North West Growth Centre by providing enhanced public transport infrastructure, along an established transport corridor, that will facilitate the positive integration of transport and land use in the region. Accordingly, the project has been and will continue to be considered as part of developing land uses for the North West Growth Centre.

Socio-economic impacts, particularly in the short term, are expected as a result of Schofields Station being relocated 800m south of its current location. This includes a minor loss of business for businesses currently surrounding the existing Schofields Station and a greater distance to the new Schofields Station for some residents currently residing in close proximity to the station. The Department also notes that this aspect of the project is occurring in the North West Growth Centre and that the relocation of Schofields Station would aid in facilitating an integrated urban form in connection with the land releases of the region.

The station relocations will assist in meeting the objectives of the Metropolitan Strategy by providing improved land use and transport integration. Therefore, the Department considers that the relocation of Schofields Station, in the medium to long term, will better serve a greater number of people. However, it does note the importance of ensuring that in the short term, access is maintained between the Schofields village and the relocated station.

Traffic impacts are expected primarily during the construction phase of the project and relate to temporary road/lane closures and construction vehicle traffic, which can be managed through the implementation of a comprehensive traffic management plan. In relation to operational traffic impacts, the Department continues to hold concerns regarding the Garfield Road level rail crossing, which has been identified as dangerous and would potentially restrict the performance of the project and the road network, until a grade separated crossing is implemented in the vicinity of the existing crossing. The Department considers this issue should be resolved prior to the commencement of Stage 2 operations.

With respect to the removal of the at grade Quakers Hill pedestrian crossing, the Department does not consider that the Proponent has adequately assessed the impacts of this proposal and is not satisfied that relying on a third party project will address the access requirements of the Quakers Hill community. Accordingly, the Department considers that this matter must be further assessed by the Proponent.

The recommended conditions of approval for the project also provide for the mitigation and management of other key impacts associated with the project during the detailed design, construction and operational phases of the project, such as heritage and hydrology. 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 operation impacts of the project on the surrounding environment are managed to acceptable levels and that the amenity of local residents and rail commuters is protected.

Consequently, the Department recommends that the Minister for Planning approved the Quakers Hill to Vineyard Duplication Project, 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