

5. Project justification

5.1 Project objectives

The key objective of the Project is to provide a significant improvement to existing services on the Richmond Branch Line by increasing capacity and reliability, thereby attracting increased patronage to rail transportation in the region.

Specifically, the objectives of the Project are to:

- improve service reliability by reducing the amount of single track running on the Richmond Branch Line (affecting services all the way to Berowra)
- increase the capacity for morning peak services from four trains per hour (comprising two from Richmond and two from Quakers Hill) to up to eight trains per hour in the Up Main (City-bound) direction (two from Richmond and six from Vineyard), with an equivalent increase in the afternoon peak
- improve transport infrastructure facilities to meet future demand with respect to land releases associated with the development of the North West Growth Centre (NWGC)
- provide greater operational flexibility and robustness.

5.1.1 Staged Approach

The Project will be staged into two separate stages. Stage 1 will include the construction of all components of the Project between Quakers Hill and the new Schofields Station (including removal of the existing Schofields Station and construction of a new pedestrian footbridge at Schofields). Stage 2 comprises the remainder of works north of the new Schofields station as far as Vineyard and including the new Vineyard Station.

It is envisaged that Stage 1 construction will commence in 2009 and will take approximately 24 months to complete. Stage 2 will commence after Stage 1 is completed, however delivery of Stage 2 is currently deferred, with a date for commencement to be determined.

Staging of this project will enable the overall Project objectives to be met, despite the current deferment of Stage 2 to a later date. Construction of Stage 1 in the short-term provides a new station (Schofields) consistent with the Growth Centres Commission (GCC) objectives for the NWGC. Importantly, the staged delivery of the Project generally complements the proposed timetable for the initial release of the Alex Avenue precinct as part of the plans for the NWGC. The Alex Avenue precinct is located immediately adjacent to the new Schofields station location, which is identified as a fundamental component of the draft precinct plans placed on public exhibition in late 2008 (GCC 2008a).

Stage 1 completion will also meet the objective of reducing the amount of single track running on the Richmond Branch Line. Completion of Stage 2 will build upon the benefits delivered as part of the Stage 1 works to meet the overall Project objectives, and may include further improvements in line with the development of the NWGC.

5.2 Need for the Project

The current Richmond Branch Line comprises a single track between Quakers Hill and Richmond — with the exception of a number of passing loops at several stations to provide for train crossings. The existing track layout restricts the frequency of trains travelling between Richmond and the City, as trains operating in one direction must wait for services in the opposite direction to pass. At present, the single track is operating at capacity.

The Richmond Branch Line is centrally located within the NWGC (refer Figure 1-1) and is a significant feature of the strategy for the area — to develop transit-oriented towns located on either side of the existing rail line. Predicted regional growth, particularly growth associated with the NWGC, will increase the demand for train services and compound demands on current operations. For example, in 2006 there were approximately 480 patrons per 3.5-hour AM peak at Schofields Station. This figure is expected to increase to 1,850 patrons for the same 3.5-hour AM peak by 2031 (refer Section 3.2.11).

The duplication of the track, and associated station upgrades, is necessary to:

- increase network capacity for the existing and future populations of the area (increased demand for rail services are expected as a result of general population increases, substantial population increases as a result of the development of the NWGC, and a mode shift from private vehicles to rail transport resulting from increased fuel prices)
- address increased demand for rail services and transport facilities as a result of the proposed development of the NWGC
- improve accessibility at stations through design of easy access provisions
- ensure provision of car parking at the new Schofields and Vineyard stations
- improve the ability of operations to recover during disruptions by reducing the extent of single track sections on the Richmond Branch Line.

The staged delivery of the Project will not dissolve the key drivers or need for the Project on completion of Stage 1. Stage 2, whilst currently deferred until a later date, will meet the current Project needs upon completion.

5.3 ‘Do nothing’ alternative

The North West region of Sydney will experience substantial growth over the next 25 years regardless of whether the Quakers Hill to Vineyard rail line is duplicated, with the construction of over 140,000 new dwellings (NSW Department of Planning 2007). The additional population is likely to place increasing demand on the existing public transport and road networks in the North West region. This is likely to increase the reliance on private vehicle travel, potentially with resultant social, environmental and economic impacts.

If the duplication of the rail line between Quakers Hill and Vineyard does not proceed, Richmond and City services using the track would remain limited to the existing track and, with significant population growth in the area anticipated, network operations would become unsustainable in terms of the capacity and number of services, as well as station infrastructure, such as platform width and parking. With the inability of the transport system to meet the needs of the growing population, commuters would seek alternative transport arrangements, such as private vehicle travel, thereby placing more strain on local and main road network, and contributing to increased vehicle emissions and traffic congestion.

Failure to provide adequate and efficient public transport into and out of the region would also limit the ability of the local population to access a variety of employment opportunities and educational facilities, and would reduce economic growth in the area.

State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (the Growth Centres SEPP) is the initial environmental planning instrument component for the Sydney Metropolitan Strategy; the Growth Centres SEPP applies to any land within the growth centres and is discussed further in Section 2.3. Two of the aims of the Growth Centres SEPP are to:

- enable the establishment of vibrant, sustainable and liveable neighbourhoods that provide for community well-being and high quality local amenity
- provide for the orderly and economic provision of infrastructure in, and to, those growth centres.

As the Richmond Branch Line is one of the central transport features of the NWGC, failure to upgrade the existing infrastructure would mean failure to meet the aims of the Growth Centres SEPP.

A 'no duplication' scenario is likely to result in more people travelling to existing stations to use existing train services. This would see increased demand on the already 'at capacity' commuter car parking at those stations that provide parking, and an increase in patronage on trains along the Main Western Line, which already carries high demand from the growing North West region.

Community connectivity, access and linkages between the planned precincts would need to be managed by public bus transport. The existing community is heavily reliant on car travel, with low patronage on existing bus services. However, the Ministry of Transport (MoT) has signalled its plans for improved bus services (refer Chapter 3) associated with the development of the NWGC, independent of the Project. Under a 'do nothing' scenario, the poor level of interchange facilities at the existing Schofields and Vineyard stations would constrain the efficiency of more frequent bus services.

The added capacity that the Project would provide will be integral to the North West region's growth through creating sustainable communities, and linking precincts and people to employment, community services and infrastructure.

In summary, the following consequences would be likely to occur should the Project not proceed:

- Richmond and City services using the track would remain limited. As the population within the NWGC increases over the next 25 years, these services would become unsustainable in terms of the capacity and frequency of services.
- The operational capacity of existing station interchanges would not be able to accommodate increased demand as a result of the significant growth in patronage expected within the NWGC.
- With the inability of the existing transport system to meet the needs of the growing population, the proportion of private vehicle use would increase its share as the main mode of transport journeys to and from the NWGC. This would lead to a significant increase in traffic congestion and would have considerable impacts on accessibility as the NWGC develops.

- Public transport patronage demand could exceed service capacity and limit accessibility of public transport for many in the NWGC.
- The planned levels of urban consolidation and commercial development specified in the Growth Centres SEPP (refer Section 2.3) may not be achieved in the timeframes proposed by Growth Centres Commission (GCC).
- There would be increased congestion pressure on key access roads, including Garfield Road, Riverstone Parade and Railway Terrace, as more commuters would choose to drive in response to increased congestion on the existing rail network.

While not proceeding with the Project would avoid short- to medium-term localised amenity (e.g. noise and visual impacts), social and property impacts, in the long-term, the consequences of not proceeding with the Project are likely to far outweigh the short- to medium-term environmental, social and economic impacts associated with the construction and operation of the Project. The adverse consequences of not proceeding in the long-term would include increased road network congestion and associated air pollution, and reduced accessibility.

5.4 Options considered for the Project

The development of the Project design has involved the consideration of a number of different options regarding station locations, track alignment and platform arrangement.

The design options have been developed with consideration of a range of issues and requirements, including:

- compliance with project objectives and functional requirements
- constructability
- environmental and heritage constraints
- potential impacts on the surrounding community
- availability of RailCorp resources to support construction
- cost.

The options considered for the respective components of the Project are described and discussed below, and relate to:

- station location options for Schofields and Vineyard
- track alignment options.

5.4.1 Station location options

A number of options for station locations were considered as part of the design development for Schofields and Vineyard station, as shown in Figure 5-1. This section describes the options considered.

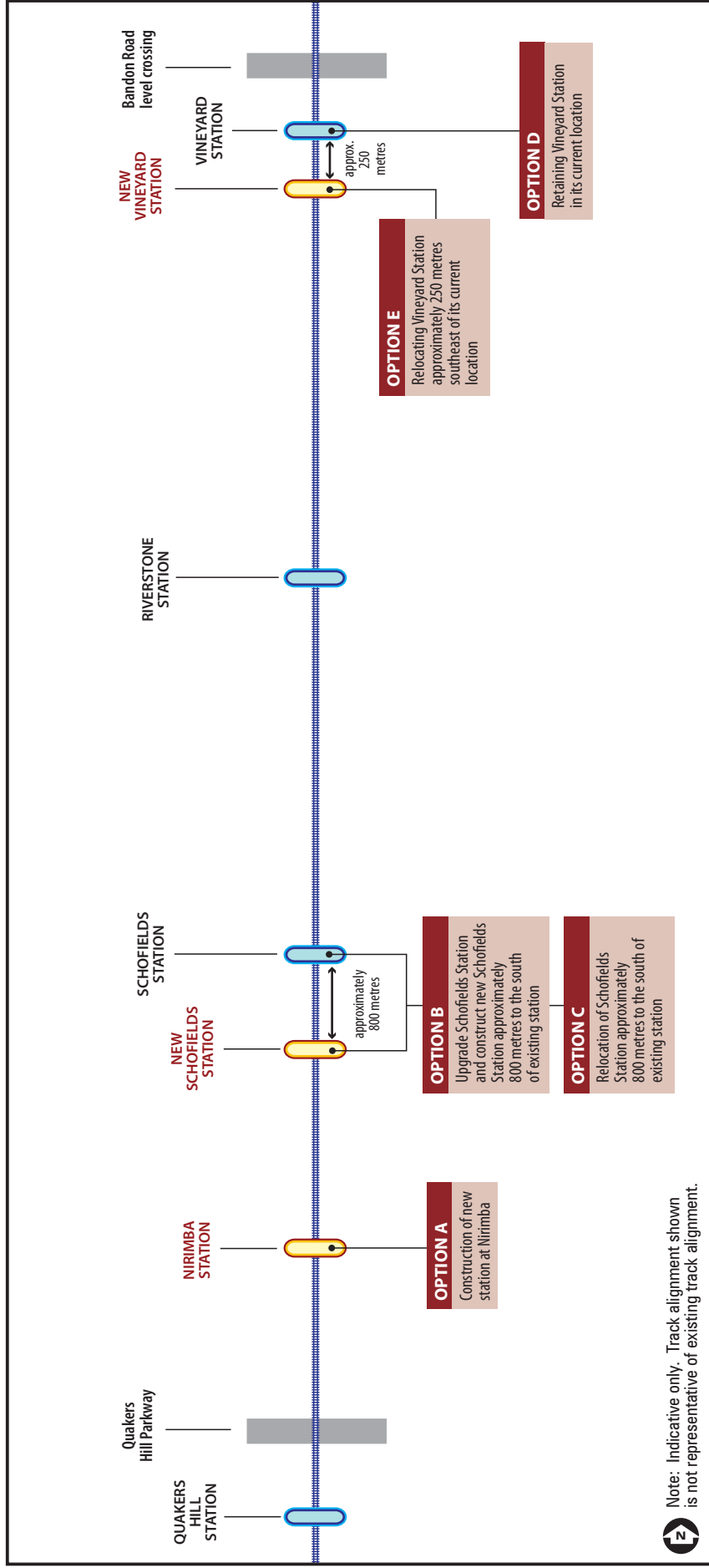


Figure 5-1 Station location options

Schofields/Nirimba

New Nirimba Station

The construction of a new station at Nirimba (refer Figure 5-1) was first identified in the Sydney Metropolitan Strategy (NSW Government 2005a). The Strategy identified improvements to transport interchanges, stations, bus stops, and train and bus services. The construction of a new station at Nirimba was also identified in the NSW Government's (2005c) *Preliminary Infrastructure Report for the North West and South West Growth Centres*.

The new Nirimba Station was proposed to be located at the corner of Railway Terrace and Burdekin Road, approximately 2 kilometres north of Quakers Hill Station and 1.5 kilometres south of Schofields Station.

Construct a new station and upgrade Schofields Station

This option would involve upgrading the existing Schofields Station and building an additional station approximately 800 metres south of the current station near the corner of Railway Terrace and Pelican Road.

Relocation of Schofields Station

This option proposed to consolidate the planned Nirimba Station and Schofields Station into a new Station approximately 800 metres south of the existing Schofields Station.

Vineyard Station

Retaining Vineyard Station in current location

The option considered for retaining Vineyard Station in its current location included positioning crossovers and turnbacks on the city or country side of the existing station. Positioning crossovers and turnbacks on the country side of the existing station would impact the operation of the Bandon Road pedestrian and vehicular level crossing. Four options were considered for upgrading Vineyard Station in its current location which comprised:

- a new, curved side platforms and two crossovers on the City side of the station in lieu of a turnback
- a new, curved island platform and two crossovers on the City side of the station in lieu of a turnback
- a curved island platform at the existing station and a turnback located north of Bandon Road
- a straight island platform at the existing station and a turnback located north of Bandon Road.

Relocating Vineyard Station

This option, as illustrated in Figure 5-1, proposed to relocate Vineyard Station approximately 250 metres south-east of the current station location. This option allowed for all crossovers and turnbacks to be located on the City side of Bandon Road, whilst still being able to avoid locating structures beneath the adjacent 133 kV power line easement. Two alternative platform and track arrangements for Vineyard Station were developed:

- a new straight side and island platform and crossovers on the City side of the station in lieu of a turnback
- a new straight side and island platform with a turnback facility between the station and Bandon Road.

5.4.2 Track alignment options

A number of different solutions to the issues identified in Section 5.2 have been developed and considered by Transport Infrastructure Development Corporation of NSW (TIDC), RailCorp and other government stakeholders in the development of the track alignment for the Project. The options can be logically separated into the following:

- Option 1 — new track on eastern side of the existing line
- Option 2 — new track on western side of the existing line
- Option 3 — a combination of new track on the eastern and western sides of the existing line with 4 metre track separation
- Option 4 (the preferred option) — a combination of new track on the eastern and western sides of the existing line with an approximate 6.4 metre track separation.

These options are illustrated in Figure 5-2 and are described below.

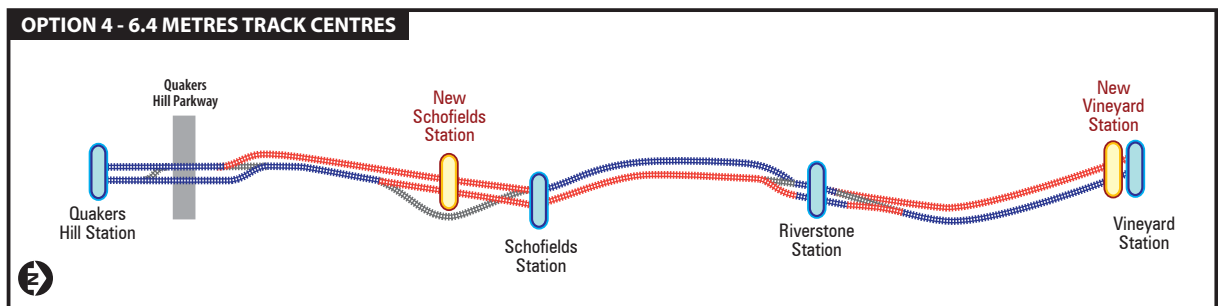
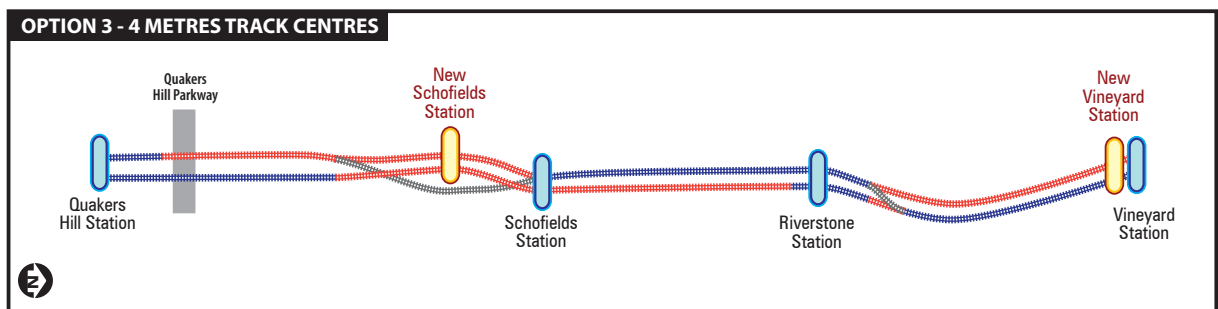
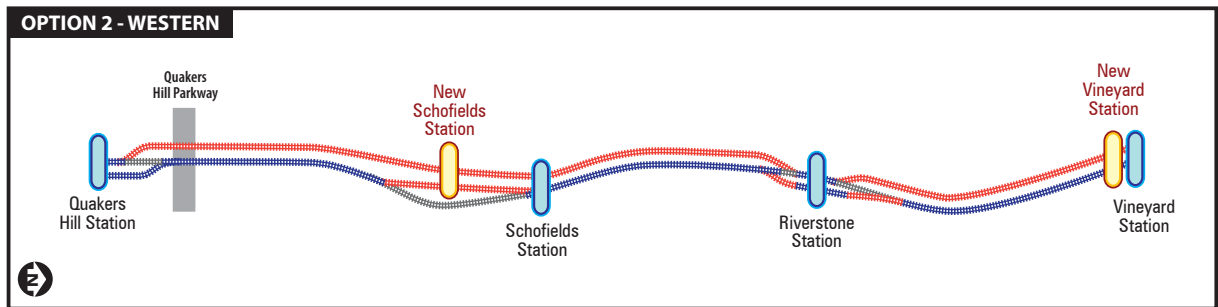
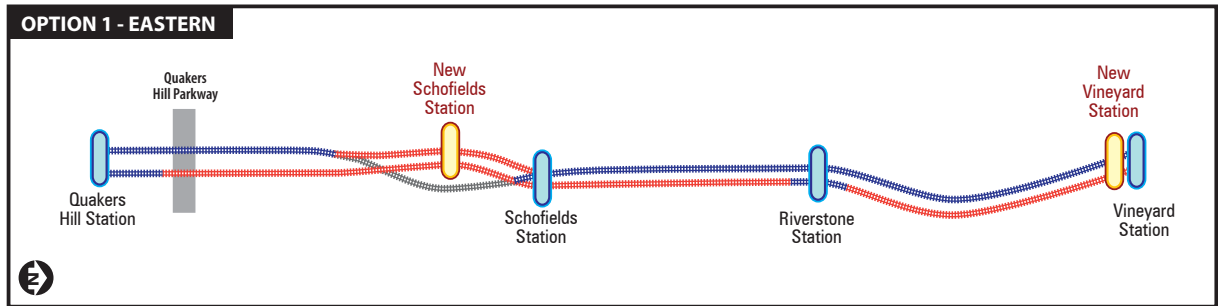
Option 1 — new track on eastern side of the existing line

Option 1 would involve the construction of a new track on the eastern side of the existing single line track (with a 4 metre separation distance). The new track would become the Up Main (the track on which trains head towards Sydney) and the existing track the Down Main (the track on which trains head away from Sydney).

This option would be predominantly located within the current rail corridor and would require the relocation of signalling infrastructure that is located on the eastern side of the rail corridor.

Option 2 — new track on western side of the existing line

Option 2 would involve the construction of a new track on the western side of the existing single line (with a 4 metre separation distance). This new track would become the Down Main and the existing track would become the Up Main. This option would be predominantly located within the current rail corridor, with the exception of the station interchanges at new Schofields and Vineyard.



Note: Indicative only.

Existing railway track Proposed railway track Removal of existing track

Figure 5-2 Schematic diagram of project options

Options 3 and 4 — combinations of new track on eastern and western side

Options 3 and 4 are combinations of Option 1 and Option 2, with the location of the track best placed according to the local constraints along the alignment. The positioning of the alignment would be similar for both options; however, the main differences between the options would relate to the extent of works that extend outside of the existing rail corridor boundary. In this regard, Option 3 would be mainly contained within the current rail corridor, while Option 4 would require additional land acquisition outside of the existing rail corridor due to an increased separation between the existing and new tracks. Each of the options are described in further detail below.

Option 3 — 4 metre track separation

Option 3 would include the construction approximately 10.1 kilometres of track predominantly within the existing rail corridor, with the new track approximately 4 metres away from the existing track. Exceptions would occur where the new track is located outside the existing rail corridor for the construction of the new proposed stations at Schofields and Vineyard.

The new track would be located on the western side of the existing track between Quakers Hill station and the new Schofields Station, continuing north on the eastern side of the existing track between the new Schofields and Riverstone stations. North of Riverstone Station, the new track would be located on the western side of the existing track to the new Vineyard Station.

Option 4 — 6.4 metre track separation

As detailed above, the track configuration of Option 4 would be very similar to that identified for Option 3. The new track (approximately 10.1 kilometres in length) would be predominantly located on the western side of the existing track between Quakers Hill and the new Schofields Station (with a small section of track constructed on the eastern side just north of Quakers Hill Station), continuing north on the eastern side of the existing track between the new Schofields and Riverstone stations. North of Riverstone Station, the new track would be located on the western side of the existing track.

However, for Option 4, the separation distance between the existing and new tracks would be 6.4 metres between Quakers Hill and the new Schofields Station, and between the new Riverstone and Vineyard stations (as opposed to 4 metres for Option 3). The track separation distance for the middle portion between the new Schofields and Riverstone stations would be 4 metres as also stated for Option 3.

The increased track separation distance proposed in Option 4 would extend the footprint of the Project beyond the existing rail corridor boundary in areas where the 6.4 metre track centres are proposed (i.e. between Quakers Hill Parkway overbridge and the new Schofields Station, and between the new Riverstone and Vineyard stations). Accordingly, this would require the acquisition of land adjacent to the rail corridor in these areas.

5.5 Selection of the preferred option

5.5.1 Station location options

Schofields station options

In 2006, the Department of Planning released the NWGC Structure Plan. The Structure Plan identified transport hubs and a major town centre to the south of the existing Schofields Station, including an additional station near Nirimba. Schofields Station was to be upgraded as part of the duplication of the Richmond line identified in the Structure Plan.

Since this time, the GCC had commenced detailed studies and planning for the initial release of precincts of the NWGC, including Alex Avenue, Riverstone, Riverstone West and North Kellyville. Draft precinct plans for Riverstone and Alex Avenue were placed on public exhibition between November 2008 and February 2009 (GCC 2008a, 2008c), while plans for Riverstone West were placed on public display between March and April 2009 (GCC 2009a).

Following on from these investigations for the Alex Avenue and Riverstone precincts, a whole-of-government view was formed 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.

In particular, consideration of the options identified the following:

Relocation

- Relocating Schofields Station would allow regional and local bus services to be focused on one major station, as opposed to creating two smaller transport centres. The creation of two smaller centres would require bus services to be split between the two locations resulting in decreased services at any one location in comparison with a single consolidated station location. The relocation of Schofields Station would also enhance the function of the town centre by creating greater transport and land use focus on a single location.
- The relocation of Schofields Station would provide for an even spacing of stations along the Richmond Rail Line, assisting in the establishment of a uniform town centre hierarchy, and functional roles between the Riverstone town centre and the new Alex Avenue town centre. The operation of two stations (i.e. Quakers Hill/Nirimba or Schofields/new Schofields) in close proximity of each other would increase travel times for commuters using the rail line and would require additional resources to operate.
- Relocation of Schofields Station would potentially enable a much larger population to live within walking distance of the station following development of the NWGC, and would allow for the provision of rail services to the existing Schofields community and future residential communities proposed as part of the NWGC.
- The relocation of Schofields Station would allow for the provision of improved transport infrastructure facilities that are required to meet the future patronage demand with respect to land releases associated with the development of the NWGC.

- The new Schofields Station is better placed to facilitate the development of greater commercial and retail employment opportunities in close proximity to the new station, enhancing opportunities for people to live and work within the NWGC.
- The relocation of Schofields Station would provide increased transport opportunities to the NWGC early in the staged release of land within the Alex Avenue and Riverstone precincts. This would provide residents with access to local services and high quality public transport in the early stages of development.
- The new Schofields Station would provide opportunities to integrate a commuter car park and bus/rail interchange with the station.
- Relocation of Schofields Station to the top of an adjacent rise would have the benefit of improving train operations by minimising the occurrence of platform overshooting (trains not coming to a stop prior to the end of the platform) as is sporadically experienced at the existing Schofields Station.

Impact of flooding

- The fragmented ownership and flooding impacts around the existing Schofields Station would limit the ability to provide higher densities closer to the station and thus limit the efficiency of transit-oriented development.
- The area around the proposed new Schofields Station is not affected by the 1 in 100-year flood level allowing for higher density of transit-oriented development to occur around the proposed station on a greenfield site.

Existing transport and demographic factors

- Nirimba Station would not be located at the area proposed to have the highest densities of development as being planned for the NWGC.
- There is limited space and opportunity to improve the existing Schofields Station with associated bus interchange and car parking facilities within the land currently used for car parking.
- The opportunity to revitalise the Schofields village centre would be limited if Schofields Station was upgraded due to the large area required to upgrade the station with bus interchange and commuter parking facilities.

Constructability

- The new Schofields Station could be constructed away from the existing 'live rail' tracks allowing rail services to continue uninterrupted until the final connection of the track to the existing line occurs.

Vineyard Station options

As the new Vineyard Station would form the northern terminus of the duplicated track, the track configuration would need the ability to terminate trains arriving from Blacktown and return them back toward Blacktown (i.e. turnback facilities). Accordingly, a critical component of the options selection process for Vineyard Station related to the location of track crossovers and turnbacks.

For these reasons, the outcomes of the options assessment identified that the upgrading of Vineyard Station in its current location (for all four options considered) was not preferred as:

- the provision of crossovers and turnback arrangements to the north of the station would extend beyond Bandon Road, increasing the time the level crossing would need to be closed to vehicular and pedestrian traffic
- the retention of the station in its existing location would mean that the platforms would remain curved, making surveillance of passengers alighting and boarding trains difficult, which is inconsistent with RailCorp standards for the construction of new platforms.

Relocation of Vineyard Station approximately 250 metres south-east of its current location with turnbacks and crossovers located on the country side of Vineyard Station was found to be the preferred option as it would:

- not impact on the operation of the Bandon Road level crossing
- allow the new station to be constructed away from the existing 'live rail' tracks, allowing rail services to continue uninterrupted until the final connection of the track to the existing line occurred
- improve operation of the bus interchange and car parking approximately 250 metres south of Bandon Road by increasing the sight distance for pedestrians crossing Riverstone Parade
- allow for the new station to be built with straight platforms, providing optimal surveillance of passengers boarding and alighting trains
- allow for easy incorporation of accessible public transport into the new station.

5.5.2 Selection of the preferred track option

All track options were assessed based on broad evaluation criteria, including: engineering, environmental, community, safety and operational criteria, construction staging and program, and cost considerations. A summary of the assessment is provided below.

Engineering constraints

Options 1, 2 and 3 involve the construction of the new track 4 metres from the existing track for the entire length of the Project rail corridor. Due to RailCorp safety requirements, the majority of works for construction of the new track for these three options would be required to be undertaken within the 'live rail' environment. This would require a significant allocation of limited RailCorp resources to support such arrangements (and additional rail possessions), thus placing considerable constraint on the constructability of the Project.

Options 1 and 3 would require the relocation of signalling infrastructure and other utilities currently located on the eastern side of the track, particularly between Quakers Hill and Schofields. Option 1 (eastern side) would have the greatest impact on the existing signalling infrastructure and overhead wiring.

While Options 2 and 4 would result in fewer impacts on rail signalling and power infrastructure relocations along the Project rail corridor, Option 4 (6.4 metre track centres) would have the least impact on signalling infrastructure and the added advantage of requiring significantly less reliance on RailCorp resources. This, therefore, provides greater rail reliability and efficiency in the construction of the Project as the majority of works could be undertaken separately from the 'live rail' environment.

Options 2, 3 and 4 would involve a greater proportion of earthworks and retaining walls, with Options 2 and 3 requiring retaining wall structures at the rear of residential properties between Quakers Hill and Schofields. Option 4 would require the greatest proportion of earthworks of any of the four options as works would extend outside of the existing rail corridor; however, this would also serve to lessen impacts on community receivers in the residential areas Manorhouse Boulevard and Reycroft Avenue given the new track in Option 4 would be located further from existing sensitive receivers compared to the other options.

Option 4 would minimise impacts on the existing signalling infrastructure between Riverstone and Vineyard stations where the track is proposed to be located on the western side of the existing track.

Environment and community

In considering environmental and community criteria, Options 1 and 3 were identified as having potential for greater environmental impacts in relation to construction and operational noise, vibration, dust and traffic impacts. Notably, the construction of the new track on the eastern side of the corridor (Option 1) would increase noise impacts to existing residents on Manorhouse Boulevard and Reycroft Avenue between Quakers Hill Station and the new Schofields Station. Conversely, Option 4 would minimise noise and vibration impacts by constructing the new track the furthest distance from these existing residential receivers. Option 4 would also have the least reliance on rail possessions allowing for more work to occur outside of possessions and during normal working hours.

Between the new Schofields Station and Riverstone Station, residents generally reside on both sides of the track, with existing roads in between. Therefore, these impacts would be similar for all options.

Option 1 would require less land acquisition for the corridor (particularly between Quakers Hill and new Schofields Station and between Riverstone and Vineyard) than Option 4, which would require the greatest area of land acquisition. In addition, due to the greater area required, Option 4 would have a greater potential for ecological impacts through clearing of patches of existing flora and fauna habitats and a greater impact on Indigenous heritage areas. However, based on findings of the specialist studies undertaken, these impacts are not anticipated to be significant (refer Sections 8.6 and 8.8).

Safety and operations

All options considered would achieve safe and reliable operation of the Richmond Branch Line. However, Option 2 was considered likely to have marginally greater operational constraints than Options 1, 3 and 4. This is primarily due to the required slewing of track to fit through the Quakers Hill Parkway overbridge and the connection to the existing track alignments through Riverstone Station, as the track is on the western side for Option 2 at these points (as opposed to Options 1, 3 and 4 where the track is on the eastern side providing a greater opportunity to fit through the above-mentioned areas).

As detailed above, the construction of Option 4 would have the additional benefit of allowing a large proportion of the works to be constructed outside the 'live rail' environment. This would result in the Project being constructed with less of a reliance on rail possessions and would provide for greater rail reliability and the minimisation of safety risks during construction. This would also benefit maintenance of the track during operation.

Construction staging, program and cost

In terms of construction staging and program, each option would require a number of track possessions and mid-week night works (where feasible) to complete the works. While the details of the possessions have not been determined for both Stage 1 and Stage 2, it is anticipated there will be two, 2-week long possessions with a total of up to approximately 30 possessions (inclusive of weekend possessions). Option 4, however, would require less work to be completed during possessions, thus minimising the reliance on RailCorp resources. Accordingly, Option 4 is likely to have the quickest construction time.

Options 2, 3 and 4 would involve new track on the western side of the rail corridor between Riverstone and Vineyard, having the benefit of aligning with the existing loop track at Riverstone Station.

5.6 The preferred option

Based on the above assessments, option 4 was selected as the preferred option was selected on the basis of its overall engineering, environmental, community, safety and operational criteria, construction staging and program, and cost benefits.

The preferred option consists of:

- relocation of Schofields Station approximately 800 metres south of the existing Schofields Station
- relocation of Vineyard Station approximately 250 metres south-east of the existing Vineyard Station
- provision of the duplicated track in accordance with the alignment described in Option 4 (i.e. new track located on the eastern and western side at approximately 6.4 metre track centres).

This preferred option, as described in Chapter 6, is the subject of this Environmental Assessment.