



Transport for NSW  
Wickham Transport Interchange  
Traffic Impact Assessment

July 2014





# Executive summary

## **Background**

In 2012, the NSW Government announced the truncation of the heavy rail line at Wickham, as part of the *Newcastle Urban Renewal and Transport Strategy*. Following consideration of options to cease railway operations, it was decided that a new Wickham Station would be constructed on land to the west of Stewart Avenue and that the residual heavy rail corridor comprising the existing Wickham Station and areas to the east would be reviewed for suitability as part of the initial stage of the Newcastle Light Rail project.

The proposal to truncate the Newcastle Branch Line at Wickham and deliver the new station and transport interchange at Wickham would result in a change of transport mode for trips to and from Newcastle. Rail replacement bus services would be implemented from Broadmeadow and Hamilton to the Newcastle Station during construction of the new station and transport interchange and following the opening of the new interchange.

Modifications to the road network are also proposed, including the removal of the railway crossing boom gates and signals at Stewart Avenue and the closure of Railway Street at the level crossing.

## **Purpose of report**

This report has been prepared to support the review of environmental factors (REF) for the proposal. It provides information about the potential impacts of the project as an input to the determination process. The purpose of the traffic assessment is to:

- describe the existing traffic and transport context
- assess the potential traffic and transport impacts
- provide recommendations for measures to mitigate the potential impacts.

The impacts considered in this report are of a strategic nature, and further work will be undertaken to detail the impacts and formulate traffic management plans at a localised level. The findings of this assessment should be considered during development of the comprehensive traffic and transport management plans.

## **Existing road network**

The existing road network in the suburbs surrounding the proposed new interchange is shown in Figure 2.1 with the key arterial roads in the vicinity of the proposed interchange, as well as the local roads within the immediate neighbourhood.

Roads and Maritime Services (RMS) has authority over classified roads under the *Roads Act 1993*. Classified roads within the study comprise:

- HW10 Pacific Highway – Stewart Avenue south of Hunter Street, Hunter Street west and Maitland Road
- MR316 Hannell Street and Industrial Drive
- MR 82 Parry Street and Donald Street

Each of these classified roads, as well as other arterial and key local roads (including the various intersections and level crossings), are identified where changes are proposed.

The daily flows on these major arterial roads into Newcastle are generally between 20,000 and 30,000 vehicles per day. Because of the volume of existing traffic and the relative scale of the interchange proposal, these flows are unlikely to change markedly as a result of the proposal.

However, peak hour volumes and turning movement changes at key intersections will be the main determinant of traffic patterns and behaviour on the road network around the interchange.

Daily traffic volumes on the minor roads in Wickham were calculated from peak hour volume counts at key intersections in the area. The on-street parking capacity and utilisation survey identifies that approximately 700 vehicles enter and depart the Wickham area on a typical weekday.

The key intersecting points of this network, as relevant to this study, are shown in Table E.1.

**Table E.1** Traffic intersections in the study area

Intersection location	Type
Honeysuckle Drive/Hannell Street	3 way signals (T intersection)
Hunter Street/Stewart Avenue	4 way signals
King Street/Parry Street/Stewart Avenue	4 way signals
Hunter Street/Tudor Street/Railway Street	4 way signals
Maitland Road/Albert Street/Sheddon Street/Ivy Street	4 way signals
Hannell Street/Throsby Street	3 way signals
Hannell Street/Cowper Street	Roundabout
Hunter Street/Steel Street	4 way signals

There are four level crossings along the railway line between Hamilton and Newcastle – Beaumont Street, Railway Street, Stewart Avenue and Merewether Street. These railway controlled crossings create significant delays for traffic at the crossing point and adjacent intersections. There are also safety risks to the high number of vehicle and pedestrian traffic movements across the railway line.

The major level crossing is on the Stewart Avenue/Hannell Street route across the railway. This will be removed with the rail truncation but may ultimately be replaced with traffic signals for the future light rail. The railway level crossing at Stewart Avenue in Wickham creates significant delays for the north-south vehicular traffic, especially during the peak periods.

### **Proposed interchange development**

The changes to the road network as a result of the proposal are initially limited to:

- The removal of the Stewart Avenue level crossing.
- The permanent closure of the Railway Street level crossing.

This will result in short term adjustments to traffic flows in and around the Wickham area, primarily as a result of redistribution of traffic from the existing Railway Street level crossing.

The proposed interchange would be provided with temporary access facilities north of the new station concourse, broadly bounded by Station Street, Railway Street and Hannell Street in Wickham.

Short term parking facilities would be located in Station Street north of the station. Existing local buses would continue to pick up/drop off in Hunter Street continue to use the existing bus interchange at Newcastle east during development of the new interchange. Changes to parking, street widths, traffic directions and intersections would be undertaken within the area to facilitate increased circulation of traffic after the removal of the Railway Street level crossing.

Access to Station Street is proposed by way of Bishopsgate Street and Charles Street. Alterations to Station Street to accommodate the third station platform, together with short term parking and taxi bays would also be provided. Station access to these facilities would be located in Station Street, to the north of the station interchange.

### ***Other road network changes***

During the construction of the interchange, it is expected that there would be other road network adjustments with new crossings of the rail corridor opened to traffic or modified as follows:

- Opening of Steel Street to all road users for north-south access between Honeysuckle Drive and Hunter Street.
- Removal of the boomgates and related rail infrastructure at Merewether Street level crossing.

The impacts of these road network changes are not part of the Wickham Transport Interchange proposal but will have an influence on the performance of intersections in the vicinity of the proposal site. A detailed regional traffic model is currently being developed to account for changes resulting from the proposal, as well as these other changes, to identify the overall effect on traffic conditions. These results will be provided subsequent to public display.

### ***Intersection performance***

The three key intersections in and around the proposed interchange which will be most affected by revised traffic flows and turning movements are:

- Honeysuckle Drive/Hannell Street
- Hunter Street/Stewart Avenue
- Hunter Street/Tudor Street/Railway Street.
- Hannell Street/Throsby Street

Current and future intersection performance parameters have been derived from traffic modelling of each intersection for the following scenarios:

- 2014 Base network with existing traffic flows
- December 2014 with Stewart Avenue level crossing removed and Railway Street level crossing permanently closed

The removal of the level crossing on Stewart Avenue would remove the current delay to traffic flows in Stewart Avenue and through the intersections at Honeysuckle Drive and Hunter Street (especially during the peak hours) associated with rail movements. Based on a survey conducted over three consecutive weekdays in May 2014, the boom gate closures resulted in the interruption of traffic movements for approximately 22 per cent and 19 per cent of the AM and PM peak hours respectively.

The current daily traffic volume on Railway Street is about 3,500 vehicles per day while the volume of traffic carried by Stewart Avenue is about 17,500 vehicles per day. The removal of the level crossing in Railway Street, while resulting in a diversion of traffic to other crossing locations, is unlikely to result in a marked deterioration in traffic conditions as a result of the benefit to traffic flows overall when the boom gates are removed. Further detailed regional traffic modelling is currently being undertaken to confirm these concepts.

In summary, the proposal is likely to result in the following key impacts:

- The intersection of Honeysuckle Drive/Hannell Street is likely to have an acceptable level of service for all current and future scenarios.
- The intersection of Hunter Street/Stewart Avenue currently operates with a poor level of service, and will continue to operate to a poor level of service into the future as additional vehicles will use the intersection.
- The intersection of Hunter Street/Tudor Street/Railway Street is expected to result in an improvement in level of service with the permanent closure of the rail crossing. It is projected that the intersection will continue to operate to an acceptable level of service in 2021.

### ***Bus movements***

During the operation phase of the interchange, Newcastle Buses will continue to operate on current routes along Hunter Street. Transport for NSW proposes that until the light rail project is operational, a rail replacement shuttle bus service will carry passengers from the new interchange to the existing Newcastle railway station.

The regional and interstate bus services will continue to terminate at the existing Newcastle Bus Interchange in Watt Street at Newcastle Station.

### ***Car parking***

The proposed interchange includes the removal of up to 75 on-street parking spaces in Station Street for the provision of the third track, station platform, kiss and ride, and taxi facilities. Overall, given the number of parking spaces available in the Wickham area, while this loss may increase local competition for parking, there is sufficient supply in the local area to accommodate demand.

### ***Pedestrian and cyclists***

A URS Pedestrian Footbridge Requirement Study conducted in May 2014 included an assessment of the permanent closure of the Railway Street level crossing. This study concluded that:

- There would be a minimal impact on pedestrian movements in the Railway Street Precinct.
- The most affected group will be those wishing to access surrounding residential properties on a daily basis and patrons of a hotel located 50 metres north of the current level crossing. The permanent closure of the crossing will add an additional 750 metre walk for these residents and patrons.
- There is a minimal impact on public transport access, largely due to the presence of alternative bus stops north of the rail line.

As there are no recognised cycle routes north of the rail line in the Wickham area, the proposed transport interchange is unlikely to have an impact on cyclists.

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# 1. Introduction

## 1.1 Background

In 2012, the NSW Government announced the truncation of the heavy rail line at Wickham as part of the *Newcastle Urban Renewal Strategy*. Following consideration of options to cease railway operations, it was decided that a new station at Wickham would be constructed on land to the west of Stewart Avenue and that the residual heavy rail corridor comprising the existing Wickham Station and areas to the east would be reviewed for suitability as part of the initial stage of the Newcastle Light Rail project.

## 1.2 Overview of the proposal

The proposal to truncate the heavy rail line at Wickham and deliver the new transport interchange involves:

- removal of rail services between Wickham Station and Newcastle Station
- constructing and operating a new train stabling facility to the north of Hamilton Station, within the existing rail corridor
- constructing and operating a new station and transport interchange at Wickham for pedestrians, cyclists, buses and heavy rail to the west of Stewart Avenue.

Rail replacement bus services would be implemented during and following construction to enable train passengers to complete their journeys into and out of Newcastle.

To continue operating the rail network to the west of the new Wickham Station, a number of modifications to the rail infrastructure and services between Wickham and Hamilton stations are required. This would involve:

- terminating services along the Newcastle Branch Line at Hamilton Station during construction of the new station and transport interchange
- installing new crossovers and turnouts to facilitate the movement of trains between the three rail tracks
- constructing and operating a new head shunt rail track, about 700 metres in length between the Maitland Road overpass and new station at Wickham
- ancillary infrastructure including traction power supply, signalling and overhead wiring.

Some road works would also be required, involving the removal of the railway crossing boom gates and signals at Stewart Avenue, and the closure of Railway Street at the level crossing.

The design of the transport interchange makes allowance for the future provision of light rail. The Newcastle Light Rail project will be subject to a separate environmental impact assessment/planning approval process.

### 1.3 Purpose and scope of this report

This report has been prepared to support the review of environmental factors (REF) for the Wickham Transport Interchange project. It provides information about the potential impacts of the project as an input to the determination process. The purpose of the traffic assessment is to:

- describe the existing traffic and transport context of project
- assess the potential traffic and transport impacts of the project
- provide recommendations for measures to mitigate the potential impacts.

The impacts considered in this report are of a strategic nature, and further work will be undertaken to identify impacts and formulate traffic management plans at a localised level. The findings of this assessment should be considered during development of the comprehensive traffic and transport management plans.

### 1.4 Report structure

This report consists of the following sections:

- **Section 1 – Introduction:** provides an overview of the project and the scope of the traffic impact assessment
- **Section 2 – Description of existing environment:** describes the road network and traffic conditions in the vicinity of the project area
- **Section 3 – Proposed development:** summarises the changes that the project will place on the transport network and traffic conditions
- **Section 4 – Impact Assessment:** discusses the likely impacts and implications of the changes to the transport network and traffic conditions
- **Section 5 – Recommendations:** proposes mitigation measures to address the defined impacts
- **Section 6 – Conclusion:** presents a summary of the study findings.

## 2. Existing transport network

### 2.1 Existing road network and traffic conditions

The existing road network including key arterial roads and local roads in the suburbs surrounding the proposal site is shown in Figure 2.1.

#### 2.1.1 Classified roads

Roads and Maritime Services (RMS) has authority over roads classified under the *Roads Act 1993*. Classified roads within the study are:

- HW10 Pacific Highway – Stewart Avenue south of Hunter Street, Hunter Street west and Maitland Road
- MR316 Hannell Street and Industrial Drive
- MR 82 Parry Street and Donald Street.

Each of these classified roads, arterial roads and key local roads (including the various intersections and level crossings) are described in the following sections where changes are proposed. These are split between the areas around the existing railway stations at Wickham and Hamilton.

#### 2.1.2 Newcastle West and Wickham

##### **Hunter Street**

Hunter Street is a two-way four lane undivided road that runs for approximately 3.2 kilometres generally east-west between Newcastle East and Newcastle West, eventually becoming Maitland Road. Considered as Newcastle's main street, it is mixed use residential/commercial on its western end and a local shopping and café precinct in the eastern mall area. There are several signalised intersections along Hunter Street with particular relevance to the proposal at Steel Street, Stewart Avenue and Tudor Street/Railway Street.

The existing railway line runs parallel to Hunter Street on its northern side.

##### **King Street and Parry Street**

King Street is a major arterial road that runs parallel to Hunter Street, one block to the south. It is a four lane divided road on the section from Union Street to Stewart Avenue. The adjacent land is generally commercial but also has a number of hotels and residential apartment blocks along its length. The western leg of the intersection with Stewart Avenue is Parry Street, also a four lane divided road, which connects with Donald Street, Hamilton and ultimately becomes Newcastle Road to the western suburbs and the M1 Motorway.

##### **Honeysuckle Drive**

Honeysuckle Drive runs generally east-west on the northern side of the existing rail line. It is bounded by Hannell Street to the west and Merewether Street to the east. Honeysuckle Drive services the emerging commercial office space, residential and restaurant/bar precinct that is adjacent to Newcastle Harbour. The intersection of Honeysuckle Drive and Hannell Street is the only access to the Honeysuckle Precinct from the northern, western and southern suburbs of the city. It is adversely impacted by level crossing closures in peak periods, with traffic signal delays and queues exacerbated by unsynchronised rail closures.





### ***Stewart Avenue/Hannell Street***

Stewart Avenue and Hannell Street form a major arterial road that runs generally north-south through the study area. These roads are currently divided by the railway crossing between Hunter Street and Honeysuckle Drive. This crossing causes significant delays during peak periods. These roads are both dual carriageway with two lanes in each direction. These roads carry traffic from the southern and northern suburbs to Newcastle West.

### ***Railway Street***

Railway Street is a local road that runs north-south in the project area approximately 350 metres west of Stewart Avenue, effectively parallel to Hannell Street, from Hunter Street through to Annie Street, Wickham. This street carries local traffic accessing residents and businesses in Wickham, as well as providing an alternative route between Hannell Street and Maitland Road. Railway Street is generally busy in peak times, with delays caused by the railway level crossing and the adjacent signalised intersection with Hunter Street. The road is two-way, single lane in each direction.

The northern end of Railway Street is used to unload cars (from delivery trucks) bound for dealerships on the southern end of the existing level crossing.

### ***Albert Street***

Albert Street is the main sub-arterial road through Wickham, connecting Maitland Road (the western extension of Hunter Street) and Hannell Street. It also provides another access to Railway Street. In recent years, Albert Street has experienced increased traffic as a result of the development of the Honeysuckle Precinct.

### ***Station Street***

Station Street runs east-west immediately north of and parallel to the railway line, east from Railway Street. It is closed at the eastern end, with no direct access from Hannell Street, however it can be accessed from Bishopsgate Street. The primary use of Station Street at present is all day parking by employees of the Honeysuckle Precinct and other nearby businesses. Opposite Station Street is Railway Lane for access to properties west of Railway Street.

### ***Other local streets***

There are numerous local streets in the Wickham area which provide access between Hannell Street and Railway Street. The most prominent of these streets are Throsby Street, Union Street and Bishopsgate Street. These streets service a wide range of residential, light industrial and commercial businesses in Wickham. Also of note is Dangar Street which is a short cul-de-sac at Hannell Street, opposite Honeysuckle Drive.

The Wickham area is currently undergoing urban renewal with new residential development reversing trends of 40-50 years ago when light industry replaced the previous residential uses.

## **2.1.3 Hamilton and Islington**

### ***Tudor Street***

Tudor Street is a major arterial route through Hamilton, connecting Broadmeadow to Newcastle West. It is the primary route for Newcastle Buses with multiple routes using this street for access to Hunter Street. Land use along the street is primarily commercial with numerous car dealerships at the eastern end.

### **Donald Street**

Donald Street is a major arterial road that connects Newcastle West to the western suburbs. It provides the most direct route to the M1 Motorway and the new Hunter Expressway. In the Hamilton area, it is a four lane divided road. The adjacent land use includes residential and retail.

### **Maitland Road**

Maitland Road is the western extension of Hunter Street, crossing the railway line at the Islington overbridge. From that point, it continues in a north-westerly direction through the shopping strip at Islington, and on to Tighes Hill and Mayfield. Key intersections on Maitland Road in the vicinity of the proposal site are at Albert Street and Beaumont Street.

### **Beaumont Street**

Beaumont Street is a busy restaurant, local shopping and café precinct running generally north-south. There is significant pedestrian activity with three pedestrian crossings between Tudor Street and Maitland Road. There are three signalised intersections within the same area. Parking is generally on-street and is time-regulated. Hamilton Station is located towards the northern end of Beaumont Street between Donald Street and Maitland Road. Beaumont Street is a two way, single lane road.

### **Other local streets**

There are other local streets of note on the Islington side of the railway line. Ivy Street and Fern Street provide an alternative access to Beaumont Street, from Maitland Road and Albert Street. These streets are immediately north of the railway line.

#### **2.1.4 Key intersections**

The various roads described above form the western precincts of the Newcastle inner city road network. The key intersecting points of this network (as relevant to this study) are shown in Figure 2.2 and described in Table 2.1.

**Table 2.1 Key intersections in vicinity of interchange**

<b>Intersection location</b>	<b>Type</b>	<b>Description and context</b>
Honeysuckle Drive/ Hannell Street	3 way signals (T intersection)	Major signalised intersection and western access to Honeysuckle Precinct. Close to the existing railway level crossing
Hunter Street/ Stewart Avenue	4 way signals	Intersection of two major arterial routes, east-west to/from Newcastle and north-south along western edge of Newcastle West
King Street/ Parry Street/ Stewart Avenue	4 way signals	Intersection of two major arterial routes, east-west to/from Newcastle and north-south along western edge of Newcastle West
Hunter Street/ Tudor Street/ Railway Street	4 way signals	Tudor Street meets Hunter Street at an acute angle, Railway Street is opposite Tudor Street, accessing the Wickham area across the railway level crossing about 150 metres north of the intersection

Intersection location	Type	Description and context
Maitland Road/ Albert Street/ Sheddon Street/ Ivy Street	4 way signals	This intersection has five-legs (Ivy Street is one way in only). It is on the northern side of the railway line, situated west of the Maitland Road overbridge. Traffic to/from the Honeysuckle Precinct uses Albert Street to connect with Honeysuckle Drive, by way of Hannell Street.
Hannell Street/ Throsby Street	3 way signals (T intersection)	This intersection provides the only opportunity for southbound access to Hannell Street south of the Cowper Street roundabout
Hannell Street/ Cowper Street	Roundabout	Major roundabout facilitating turning movements from Hannell Street to/from Carrington and Wickham
Hunter Street/ Steel Street	4 way signals	Hunter Street and Steel Street meet at a standard four way signalised intersection. Steel Street currently provides access to King Street to the south. Hunter New England Health and fast food outlets are located to the north, where it is currently terminated by the railway corridor.



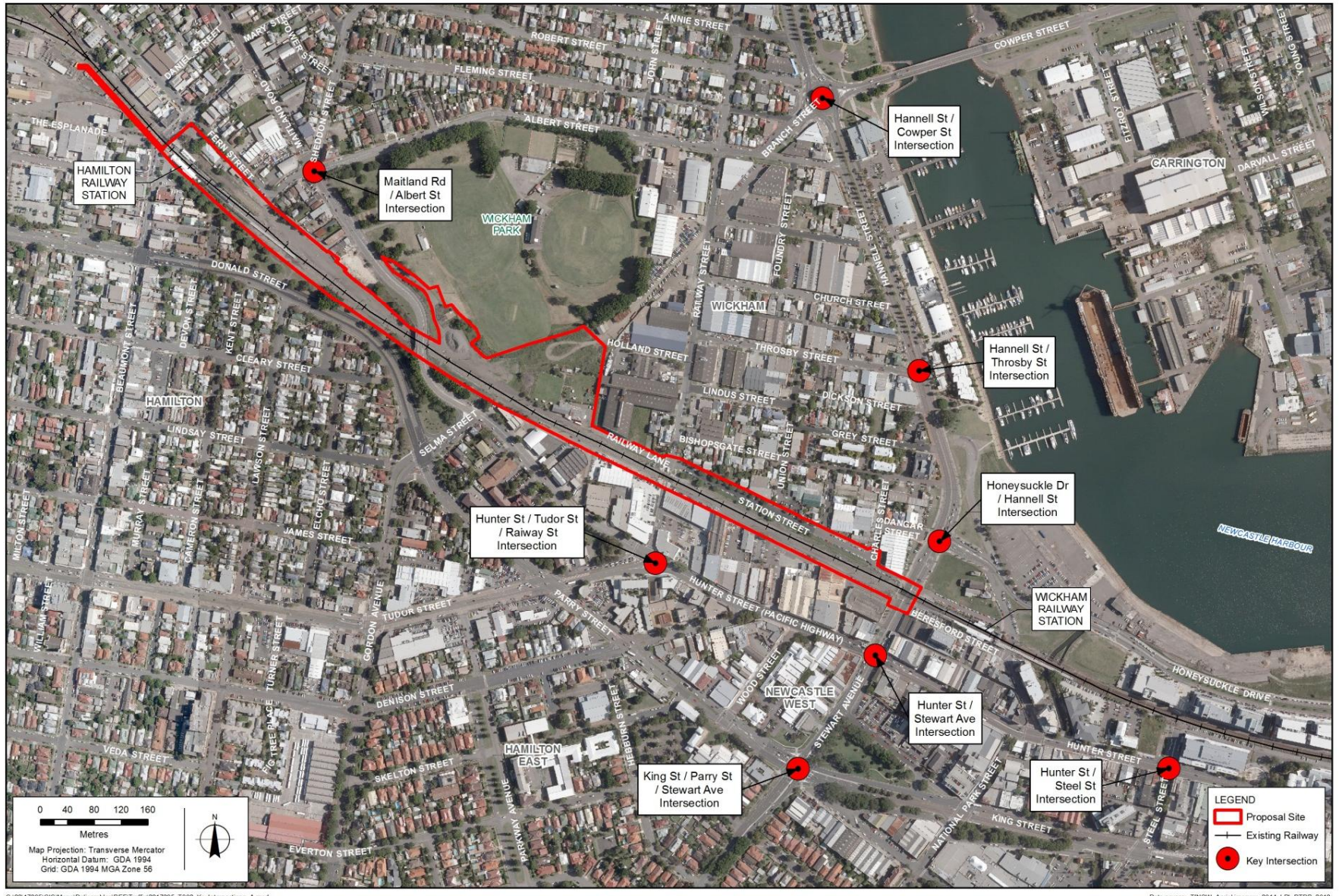


Figure 2.2 Key road intersections in the study area



### 2.1.5 Existing railway level crossings

There are four level crossings along the railway line between Hamilton and Newcastle – Beaumont Street, Railway Street, Stewart Avenue and Merewether Street. These controlled railway crossings create significant delays for traffic at the crossing point and adjacent intersections. There are also safety risks to the high number of vehicle and pedestrian traffic movements across the railway line. A description of each of these level crossings is outlined in Table 2.2.

Table 2.2 Existing railway level crossings

Level crossing	Current usage
Beaumont Street	Primarily local traffic usage between Maitland Road and the commercial area of Hamilton
Railway Street	Mixed use between local traffic accessing residential and commercial areas in Wickham and through traffic to Hannell Street or Maitland Road
Hannell Street/ Stewart Avenue	Commuters from northern and southern suburbs and through traffic on major north-south arterial route
Merewether Street	Access for motorists and pedestrians to/from the Honeysuckle Precinct to/from Hunter Street

The major level crossing is on the Stewart Avenue/Hannell Street route across the railway. This will be removed with the rail truncation but may ultimately be replaced with traffic signals for the future light rail. The railway level crossing at Stewart Avenue in Wickham creates significant delays for the north-south vehicular traffic, especially during the peak periods.

A survey undertaken in May 2014 measured the level crossing closure times over a 12 hour period for three consecutive days. The survey results showed that over these three survey days, the average crossing closure times for morning (AM) and afternoon (PM) peak periods were as follows:

- Between 8am and 9am the gates were closed for 13 minutes (22% of the AM peak hour).
- Between 5pm and 6pm the gates were closed for 11 minutes (19% of the PM peak hour).

The longest delays are incurred when two trains arrive within a few minutes of each other, requiring the boom gates to stay down for a longer period.

### 2.1.6 On-street parking in Wickham

The streets in the Wickham area are used for parking by residents, businesses, visitors and local employees. The area offers generally unrestricted (free) parking within a 15 minute walk to major employment and leisure precincts in the city. Accordingly Wickham is an area of high parking demand.

A parking survey of the on-street parking utilisation and capacity in the Wickham area during a typical weekday was conducted in May 2014 to determine the total available number of on-street parking spaces, the parking demand and duration of occupancy. The scope of the area surveyed is shown in Figure 2.3.



#### Location

1. Albert St
2. Greenway St
3. Church St
4. Foundry St
5. Unknown St
6. Throsby St
7. Dickson St
8. Lindus St
9. Grey St
10. Bishopsgate St
11. Dangar St
12. Holland St
13. Railway Ln
14. Station St
15. Railway St
16. Union St
17. Wickham St
18. Charles St

Figure 2.3 Wickham on-street parking survey area

The findings of the survey are presented in Table 2.3. It was found that the Wickham area has a total of 771 on-street parking spaces with the vast majority being unrestricted. Parking restrictions exist on the following streets:

- Throsby Street: 2 spaces 5P
- Grey Street: 8 spaces 2P
- Bishopsgate Street: 15 spaces 2P
- Dangar Street: 7 spaces 2P
- Union Street: 6 spaces 2P
- Wickham Street: 5 spaces 2P

All other parking spaces in Wickham (west of Hannell Street) are unrestricted, with the exception of a loading zone located on Dickson Street. To the east of Hannell Street, closer to Honeysuckle Drive, parking spaces are metered.

Table 2.3 Summary of parking survey at Wickham north of the railway

Street	Existing spaces	Peak demand (per cent)	Average stay (h:min)
Station Street	93	99	8:34
Railway Street	89	90	6:34
Dangar Street	11	91	8:15
Charles Street	22	100	7:05
Wickham Street	20	90	6:37
Union Street	64	78	6:06
Bishopsgate Street	52	75	6:23
Grey Street	60	82	6:52
Lindus Street	35	91	6:45
Dickson Street	25	76	7:42
Throsby Street	58	64	5:01
Unknown Lane	25	32	5:54
Church Street	61	80	5:33
Foundry Street	45	67	6:21
Greenway Street	48	65	5:25
Albert Street (east of Railway Street)	26	81	4:47
<b>Sub-total restricted</b>	<b>43</b>	<b>-</b>	<b>-</b>
<b>Sub-total unrestricted</b>	<b>728</b>	<b>-</b>	<b>-</b>
<b>TOTAL</b>	<b>771</b>	<b>75</b>	<b>6:07</b>

## 2.1 Daily traffic volumes

The daily traffic volumes on the major arterial and minor roads in the study area have either been directly provided by Roads and Maritime or generated from intersection counts provided by same. The conduct of a comprehensive traffic survey was outside the scope for this REF, although multiple intersection and midblock counts have been conducted by others in recent years. Daily volume counts from Roads and Maritime sources are shown in Table 2.4.

These volumes represent typical daily flows on the key four-lane arterial roads into Newcastle. Because of the volume of existing traffic and the relative scale of the proposal, these flows are unlikely to change markedly as a result of the proposal. Peak hour volumes and turning movement changes at key intersections are discussed in detail in latter sections of this report.

Daily traffic volumes on the minor roads in Wickham have been calculated from peak hour volume counts at key intersections in the area. The on-street parking capacity and utilisation identified in Section 2.1.5 identifies that approximately 700 vehicles come into and depart the Wickham area on a typical weekday. This statistic and other peak to daily volume calculations provide a confident approximation (volumes rounded) of traffic volumes on these minor roads as shown in Table 2.5.

Table 2.4 Published AADT data for classified roads

Station	Road	Location	AADT			
			2008	2010	2012	2013
05.593	Stewart Avenue	North of Parry Street	17,512	18,589	Not available	Not available
05.209	Hannell Street	North of Greenway Street	22,442	Not available	28,746	28,994
05.323	Donald Street	Railway overbridge	28,662	Not available	30,920	30,591
05.276	Tudor Street	North of Parry Street	8,669	Not available	Not available	Not available
05.279	Maitland Road	North of Mary Street	21,026	Not available	Not available	Not available

Table 2.5 Estimated traffic volumes on local roads in Wickham

Street	Daily traffic (VPD)	Source data / road function
Railway Street	3,500	From traffic count at Hunter Street intersection; entry to Wickham from south, some through traffic.
Station Street	500	Parking study, minimal through traffic, mostly residential, commercial and parking.
Throsby Street	1,000	Secondary exit and entry point to the Wickham area through the traffic lights on Hannell Street.
Albert Street, east of Railway Street	4,000	From traffic count of Hannell Street roundabout supplied by RMS; entry to Wickham from the north.
Albert Street, west of Railway Street	2,500	From traffic count at Maitland Road intersection supplied by RMS; entry to Wickham from west.

## 2.2 Intersection traffic volumes

The existing intersections identified in Section 2.1.3 operate at various degrees of capacity (or saturation) during peak periods. Some delays are apparent due to high traffic volumes for certain movements and railway level crossing closures often exacerbate these delays.

Total volumes passing through the respective intersections are shown for both the morning (AM) and afternoon (PM) peak periods in Table 2.6. These volumes are intersection counts that were obtained from RMS. The table shows that the intersections on the key Hannell Street/Stewart Avenue north-south route are most utilised with between 3,000 and 5,000 vehicles per hour passing through the Honeysuckle Drive, Hunter Street and King Street/Parry Street signalised intersections.



Table 2.6 Total traffic volumes for key intersections during peak periods

Intersection location	Type	Total AM peak hour traffic volume	Total PM peak hour traffic volume
Honeysuckle Drive/ Hannell Street	3 way signals (T intersection)	3,014	2,752
Hunter Street/ Stewart Avenue	4 way signals	3,441	4,338
King Street/Parry Street/ Stewart Avenue	4 way signals	4,097	4,615
Hunter Street/ Tudor Street/ Railway Street	4 way signals	1,923	2,102
Maitland Road/ Albert Street	4 way signals	1,646	1,697
Hannell Street/ Cowper Street	Roundabout	2,877	3,463
Hunter Street/ Steel Street	4 way signals	1,476	1,452

Source: various RMS traffic counts

### 2.3 Existing intersection performance

The performance of the road network is largely dependent on the operating performance of intersections which form critical capacity control points on the road network.

The Level of Service provided to motorists is a measure of intersection performance, factoring in traffic volumes, intersection geometry, turning facilities and traffic signal phasing. It is derived from the overall delay to vehicles averaged over the whole intersection and allocated on an alphabetical scale as defined in Table 2.7. The Level of Service calculations and definition are also able to be applied on any given leg of the intersection or any movement (through or turning) on individual approaches.

Table 2.7 Level of service criteria for intersections

Level of service	Average delay per vehicle (seconds/vehicle)	Intersection performance
A	< 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity, incidents will cause excessive delays.

The intersection performance can be derived from traffic modelling of the geometry and traffic volumes in a number of software packages. For this investigation, the outputs from a city centre Paramics model developed for the Newcastle Light Rail project (GHD, 2014) have been made available.

This provides base year (2014) intersection performance of the existing road network for five of the key intersections in and around Wickham. The results of modelling, which are summarised in Table 2.8, indicate that:

- during the morning peak, the intersection of Hunter, Tudor and Railway streets operates with a level of service F
- during the afternoon peak, the intersection of Honeysuckle Drive and Hannell Street operates with a level of service F
- all other intersections operate with an acceptable level of service of D or better.

**Table 2.8 Existing intersection performance**

Intersection	AM peak		PM peak	
	Level of service	Average delay (secs)	Level of service	Average delay (secs)
Honeysuckle Drive/Hannell Street (three way traffic signals)	C	29	F	103
Hunter Street/Stewart Avenue (four way traffic signals)	E	58	D	50
King Street/Parry Street/Stewart Avenue (four way traffic signals)	D	47	D	52
Hunter Street/Tudor Street/Railway Street (four way traffic signals)	F	71	C	30
Hunter Street/Steel Street (four way traffic signals)	A	11	A	12

Source: Newcastle Light Rail Paramics model (GHD, 2014)

One of the contributing factors to traffic congestion in Newcastle and the results shown in the above table, is the operation of railway level crossings, which causes significant delays for pedestrians and motorists. The level crossing delay surveys, quoted in Section 2.1.5, confirm that the Stewart Avenue level crossing is closed for approximately 20 percent of the AM and PM peak periods. These closures and resultant queues/traffic signal interactions contribute to delays and poor Levels of Service.

It should be noted that revisions are currently being made to the Newcastle Light Rail traffic model to better reflect existing (2014) base conditions. The updated modelling results are expected to be different from those in Table 2.8 above.

## 2.4 Other transport modes

### 2.4.1 Bus network

The local and regional bus network in Newcastle is currently provided by five bus operators – Newcastle Buses, Port Stephens Coaches, Hunter Valley Buses, Rover Coaches and Busways. Interstate coaches that stop in Newcastle are operated by Greyhound Australia and Premier Motor Services.

#### *Newcastle Buses*

Newcastle Buses is operated by the State Transit Authority (NSW Government) and runs bus services throughout Newcastle and Lake Macquarie. There are over 7000 regular services each week and 1,400 school bus services.

Thirty bus routes currently use Hunter Street to terminate at the Newcastle Bus Interchange which is located adjacent to Newcastle Railway Station. Newcastle Buses has a total of ten bus stops in each direction along Hunter Street.

#### *Regional buses and interstate coaches*

The regional buses in Newcastle provide a valuable transport link to communities in the greater Hunter, Port Stephens and Mid-North Coast regions. The interstate coaches run by Greyhound Australia use Newcastle as a stop on their Sydney to Brisbane routes. At present, these services operate out of the Newcastle bus interchange near the existing Newcastle Railway station. A summary of the number of weekday services operated by each company through the Newcastle Bus Interchange is shown in Table 2.9, with the peak hour volumes as shown between 7.30am and 8.30am.

Table 2.9 Weekday regional bus and interstate coach services

Operator	AM peak in	AM peak out	24 hour in	24 hour out
Port Stephens Coaches	3	3	18	18
Hunter Valley Buses	3	3	27	27
Rover Coaches	1	1	4	4
Busways	1	1	4	4
Greyhound Australia	0	0	5	5
Premier Motor Coaches	0	0	1	1
<b>Total</b>	<b>8</b>	<b>8</b>	<b>61</b>	<b>61</b>

#### *Cyclists*

There are no dedicated cyclist paths in the study area, the closest being in Honeysuckle Drive to the east. A narrow, non-separated cyclist lane (about 0.5 metres wide) is provided on Stewart Avenue/Hannell Street near the proposed interchange. However due to its narrow nature and the large traffic volumes on this road, it is not highly utilised.

A safer option for cyclists is to use the Railway Street level crossing for north–south movements in the area as it has much lower traffic volumes, and develops into a wide street north of the rail line. No cyclist counts exist for the area.

## ***Pedestrians***

Pedestrian traffic in and around the proposed Wickham Transport Interchange consists of three main groups:

- city workers walking to and from their parked cars
- residents
- customers and patrons of a number of commercial and entertainment venues.
- Bus and train passengers walking to and from Broadmeadow, Hamilton and Wickham stations.

Many of these pedestrians currently use the Railway Street level crossing. A count conducted by URS (URS, 2014) showed that 285 pedestrians used the crossing between 7am and 10pm on a typical weekday. Earlier pedestrian studies also found a significant number of patrons from a hotel in Railway Street used the crossing on a weekend night. No other pedestrian counts exist for the area.



## 3. Proposed development

### 3.1 Operations phase

The proposed new Wickham Transport Interchange would be provided with access facilities north of the new station concourse in Station Street. This would include facilities for short term parking for kiss and ride drop offs and taxi bays as shown in Figure 3.1.

Existing local buses would continue to pick up/drop off in Hunter Street, and continue to use the existing bus interchange at Newcastle East during development of the new interchange.

Access to Station Street is proposed by way of Bishopsgate Street and Charles Street. Alterations to Charles and Station Streets to maintain safe conditions for road users and accommodate the third track and station platform would also be required.

#### 3.1.1 Changes to the Wickham road network

##### ***Railway Street***

Railway Street at the level crossing would be permanently closed in each direction preventing travel across the rail corridor in this location. The southern side of the street would be converted to a hammerhead-style cul-de-sac, allowing vehicles to complete a U-turn. The northern side of the crossing would have kerb and gutter extended across Railway Street from Station Street to Railway Lane. This loss of the direct north-south access to the Hunter Street/Tudor Street intersection would result in the increased use of other streets in the road network to compensate.

##### ***Stewart Avenue/Hannell Street***

The manually controlled boom gates on Stewart Avenue would be removed. This will significantly improve travel times for motorists, pedestrians and cyclists that currently use Stewart Avenue due to the extra road storage space provided and avoided disruption to traffic movements.

On the western side of Stewart Avenue, footpath, and kerb and gutter modifications would be provided for shuttle bus pick-up areas. A dedicated kerbside lane and a right turn bus priority signal would be provided at the Honeysuckle Drive intersection. The bus priority signal would provide safe and efficient bus movements from Stewart Avenue into Honeysuckle Drive.

A pedestrian fence would be installed along the median of Stewart Avenue between Hunter Street and Honeysuckle Drive to encourage pedestrians to cross safely at traffic signals.

##### ***Hannell Street/Honeysuckle Drive intersection***

The existing signalised intersection would remain largely unchanged with the interchange development. There will be a modification to the intersection signal phasing to incorporate the proposed right turn bus priority signal (this is discussed further in Section 3.1.2).

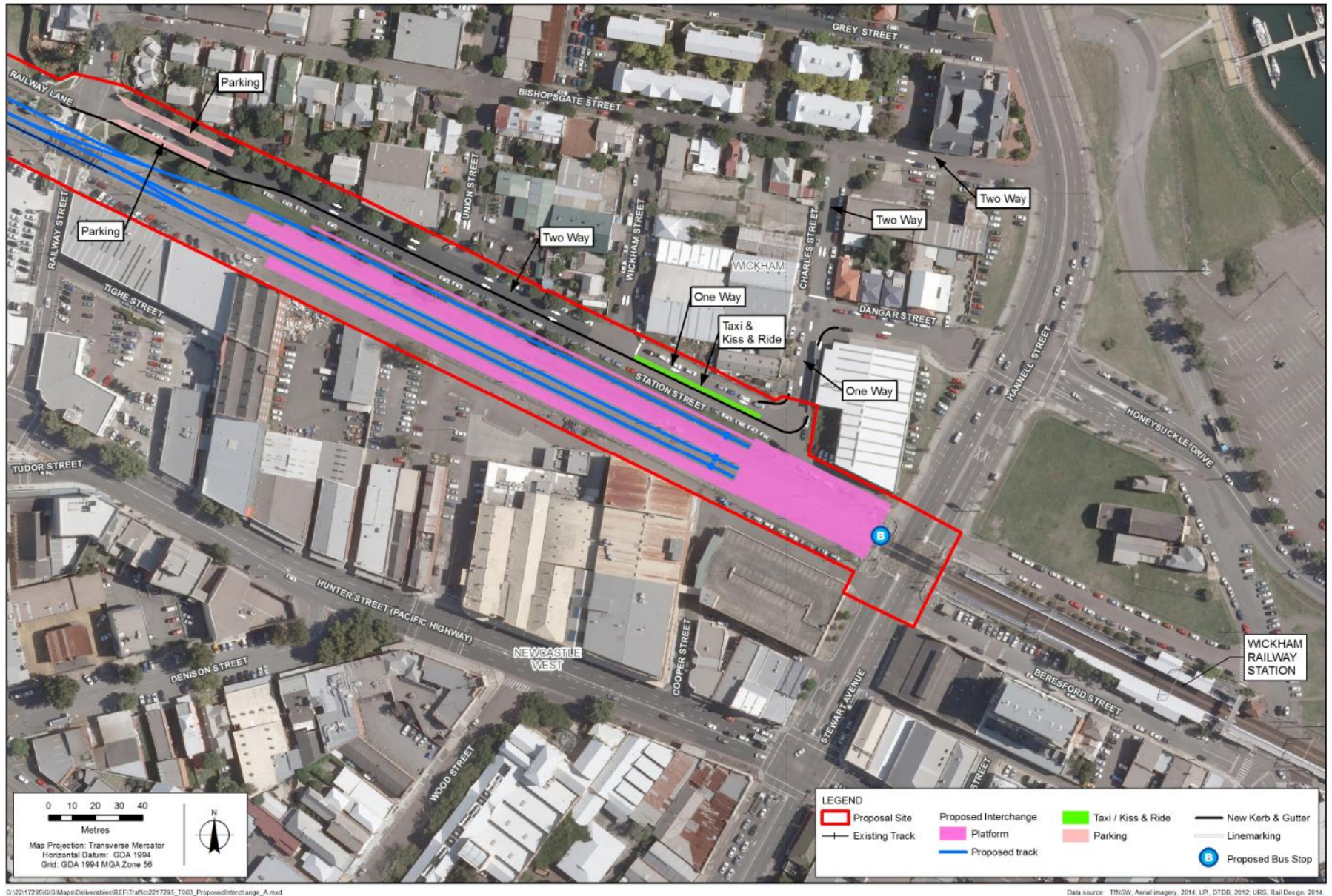


Figure 3.1 Proposed interchange facilities

### ***Dangar Street/Bishopsgate Street***

Dangar Street will remain closed with no direct access to Hannell Street. Approximately 50 metres north of Dangar Street is Bishopsgate Street which allows for left turn movements for light vehicles to access Station Street by way of Charles Street.

This will act as a new access point to Wickham and will partially compensate for the permanent closure of the Railway Street level crossing. Altered traffic flows will result at the intersection of Bishopsgate Street and Hannell Street, as vehicle flows change across the network.

### ***Charles Street***

Charles Street will be one way in the southbound direction from Dangar Street to Station Street. The section of Charles Street that is north of Dangar Street will remain bi-directional to retain property access.

Realigned kerb and gutter and a footpath would be provided on the eastern side Charles Street (south of Dangar Street). As a result, it is estimated that 4 existing on-street parking spaces would be removed.

### ***Station Street***

Station Street will undergo substantial changes to traffic conditions as a result of the rail corridor widening and the provision of the proposed interchange facilities. These include:

- Narrowing of Station Street between Union Street and Charles Street to accommodate the third rail track, train platforms, kiss and ride, and taxi set down areas.
- Reduced road reserve widths arising from these changes will require new footpath and realigned kerb and gutter on the southern side of Station Street.
- Station Street between Charles Street and Wickham Street would become one-way westbound.
- Station Street will be kept bi-directional between Wickham Street and Railway Street to allow vehicles travelling southbound on Railway Street to exit the area along Union Street.
- To achieve these changes, it is estimated that up to 71 of the 93 existing on street car parking spaces would need to be removed on both sides of Station Street.

#### **3.1.2 Rail replacement bus service**

Following completion of the new station and interchange in 2016, and prior to the commencement of Newcastle Light Rail services, a rail replacement bus service will be provided to allow passengers to complete their journey to the former Civic or Newcastle Stations.

### ***Frequency***

Train passengers would board the rail replacement bus from a proposed new bus stop on the western side of Stewart Avenue at the eastern end of the station concourse. It would be scheduled to meet the trains at the new station wherever possible. Additional services during peak periods or for special events in Newcastle would be scheduled as required. Drop-offs occur only in the eastbound direction at Civic and Newcastle stations with two additional stops in-between to replicate, as closely as possible, the future light rail stop locations. In the westbound direction, the bus would be for boarding passengers only that are travelling to the new station to transfer to a train service.



### **Route**

The proposed rail replacement bus route would be designed to mirror the proposed light rail stops as closely as possible along Hunter Street. The eastern terminus will be at the existing Newcastle Bus Interchange. The western terminus will be at Wickham Station.

### **Arrangement**

An indented bus bay would be created immediately east of the station concourse on the western side of Stewart Avenue. This arrangement would avoid commuters walking to the existing bus stops on Hunter Street.

There is also an existing bus stop approximately 50 metres north of the proposed station which is not used for regular bus services. It is proposed to merge the proposed bus bay with the existing bus bay to form a short bus lane.

At the intersection with Honeysuckle Drive, it is proposed to provide a bus lane and priority signal, allowing shuttle buses a priority right turn into Honeysuckle Drive. A similar bus priority signal that already exists in Newcastle is shown in Figure 3.3.

Kerb and pavement works, traffic signal modifications, line-marking, signage, lighting and a shelter will be provided for this bus stand. Relevant approvals would be sought from key stakeholders to implement this solution.

### **Patronage**

A train patronage survey was undertaken in 2013 for railway stations from Broadmeadow to Newcastle. The passenger counts are summarised in Table 3.1 and Figure 3.2. The table and figure show that the total number of journeys to and from Wickham, Civic and Newcastle stations is about 4,720 during the construction period. This is approximately 2,350 people, assuming return trips.

The total number of journeys on a weekday to Civic and Newcastle stations only is 3,600 or about 1,800 people per day. Therefore it is estimated that about 77 percent of the total daily train passengers might be potential customers for the post-construction shuttle bus or the future light rail.

Table 3.1 Newcastle Branch Line Weekday Passenger Counts

Direction	From Sydney to Newcastle		From Newcastle to Sydney		From Hunter Line to Newcastle		From Newcastle to Hunter Line		Totals		
	Station	Passenger Ons	Passenger Offs	Passenger Ons	Passenger Offs	Passenger Ons	Passenger Offs	Passenger Ons	Passenger Off	On	Off
Broadmeadow	84	812	871	96	0	0	0	0	955	908	<b>1,863</b>
Hamilton	67	657	685	68	72	633	615	56	1,439	1,414	<b>2,853</b>
Wickham	7	257	247	7	10	291	265	12	529	567	<b>1,096</b>
Civic	3	403	390	6	4	405	362	7	759	821	<b>1,580</b>
Newcastle	0	636	603	0	0	406	399	0	1,002	1,042	<b>2,044</b>
<b>All Stations</b>	<b>161</b>	<b>2,765</b>	<b>2,796</b>	<b>177</b>	<b>86</b>	<b>1,735</b>	<b>1,641</b>	<b>75</b>	<b>4,684</b>	<b>4,752</b>	<b>9,436</b>

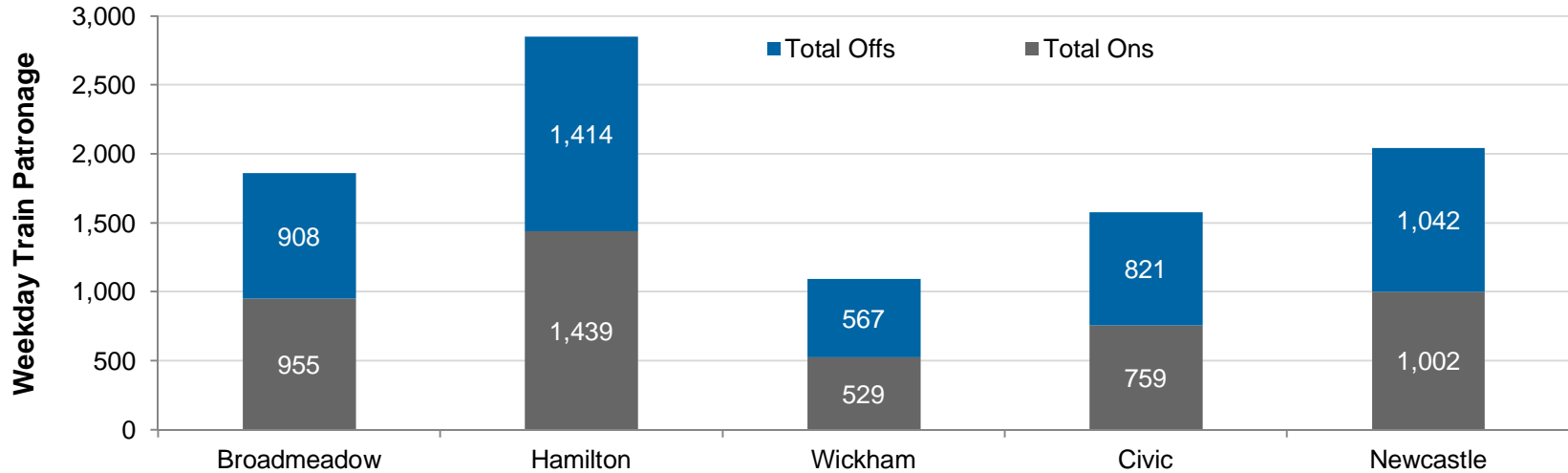


Figure 3.2 Newcastle Branch Line weekday passenger patronage



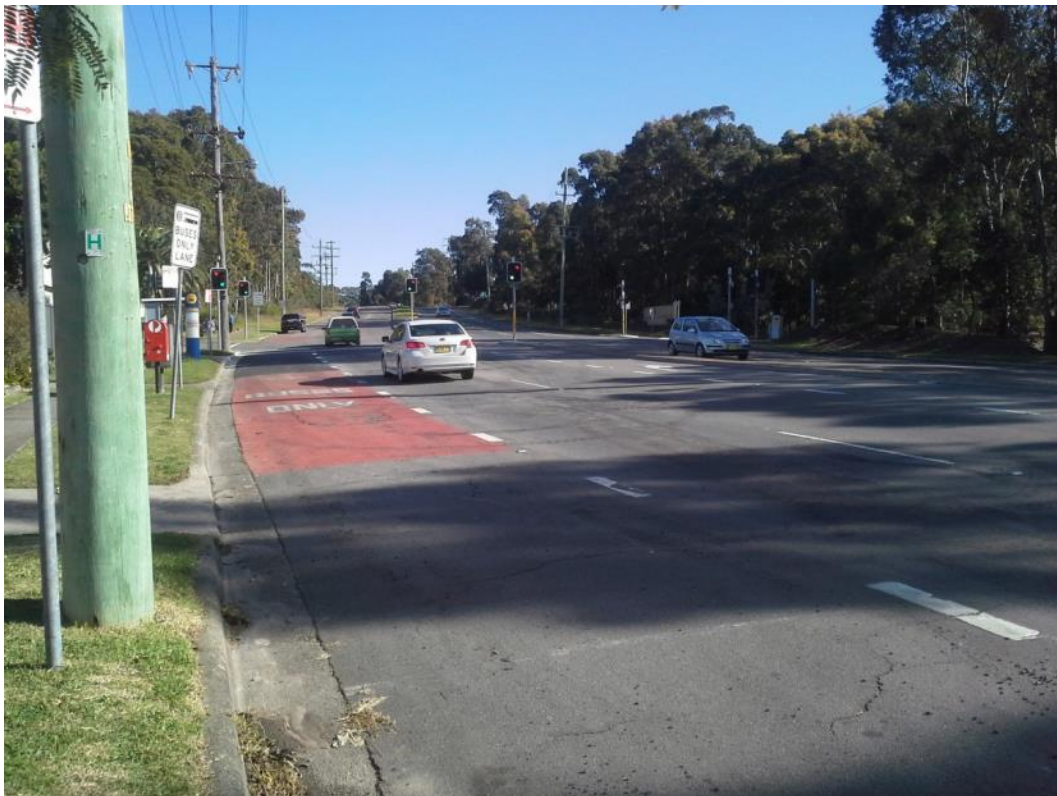


Figure 3.3 Bus priority signal, University Drive, Callaghan

## 3.2 Construction phase

Construction of the proposal is currently forecast to commence in December 2014. The proposal is anticipated to take approximately 24 months to complete and is expected to be commissioned in December 2016. Construction activities would overlap between the key stages outlined as follows:

- Stage 1: Establish site compound at the location of the former Morrow Park Bowling Club south of Wickham Park and undertake early works.
- Stage 2: Cease rail services east of Hamilton Station, which will operate temporarily as the easternmost station of the Newcastle Branch Line.
- Stage 3: Construct stabling yard north of Hamilton Station.
- Stage 4: Construct new station and interchange at Wickham.

It is anticipated that up to 100 construction staff (typical working day) and approximately 150 construction staff (during rail closedown periods) would typically be required on-site during the construction period.

### 3.2.1 Site compound locations

The proposed location for the construction compound (including stockpile sites and laydown areas) is south of Wickham Park and north of the railway corridor (and includes the former Morrow Park Bowling Club site). The site extends from the eastern side of the Maitland Road overbridge to Railway Lane and adjoins the railway corridor as shown on Figure 3.4. Subject to confirmation, entry to the site from Maitland Road would be left-in only and exits would be enabled at Railway Lane.

Once a construction contractor has been selected, the location of the construction compound(s) would be reviewed. Should the preferred location differ from the location considered by the REF, consultation would be undertaken with Transport for NSW to confirm the suitability of the location and whether any additional environmental impact assessment is required.

### 3.2.2 Site access

Site access is proposed at multiple locations along the railway corridor between Beaumont Street and Stewart Avenue. Figure 3.4 shows the proposed site compound and access points. The site would be accessed from six locations with five being on the northern side of the corridor.

#### ***Fern Street***

- Fern Street site entry is by an existing gate. This allows all movements except for right out as there is no access to Maitland Road from Ivy Street.
- The exit at Fern Street requires construction traffic to use the Beaumont Street intersection. This intersection is busy but allows all traffic movements. This potentially poses a safety risk for straight or right turning movements.

#### ***Maitland Road***

- Entry is by an existing driveway on the southern side of Wickham Park, immediately west of the railway overpass. The entry and exit to Maitland Road would be a left in, left out arrangement due to an existing raised concrete median.
- Due to the tight turning circle required, it is recommended that only light vehicles be allowed to exit the construction site using the access point. Entry for heavy vehicles will be possible with some driveway modifications and widening required.

#### ***Old railway formation onto Railway Street***

- Access is by an unsealed drive running generally northeast from the former Morrow Park Bowling Club to where it joins Railway Street approximately 400 metres north of the existing railway level crossing. This would allow right in left out turning movements.

#### ***Railway Lane***

- Railway Lane leads directly to the former Morrow Park Bowling Club where the main site compound is proposed to be located. Entry and exit movements from Railway Lane will be right in, left out.

#### ***Station Street***

- The exact location of this access point will be confirmed during detailed design, prior to commencement of construction. There is no existing access to the rail corridor from Station Street. However, it is assumed that the access point will be towards the eastern end of the street for both separation from the Railway Lane access and for convenience for construction of the new interchange.

#### ***Donald Street***

- An existing gate to the railway corridor is available off Donald Street in Hamilton, opposite the Lawson Street intersection. This is expected to be used infrequently for access as only minor works are proposed on the southern side of the railway corridor.



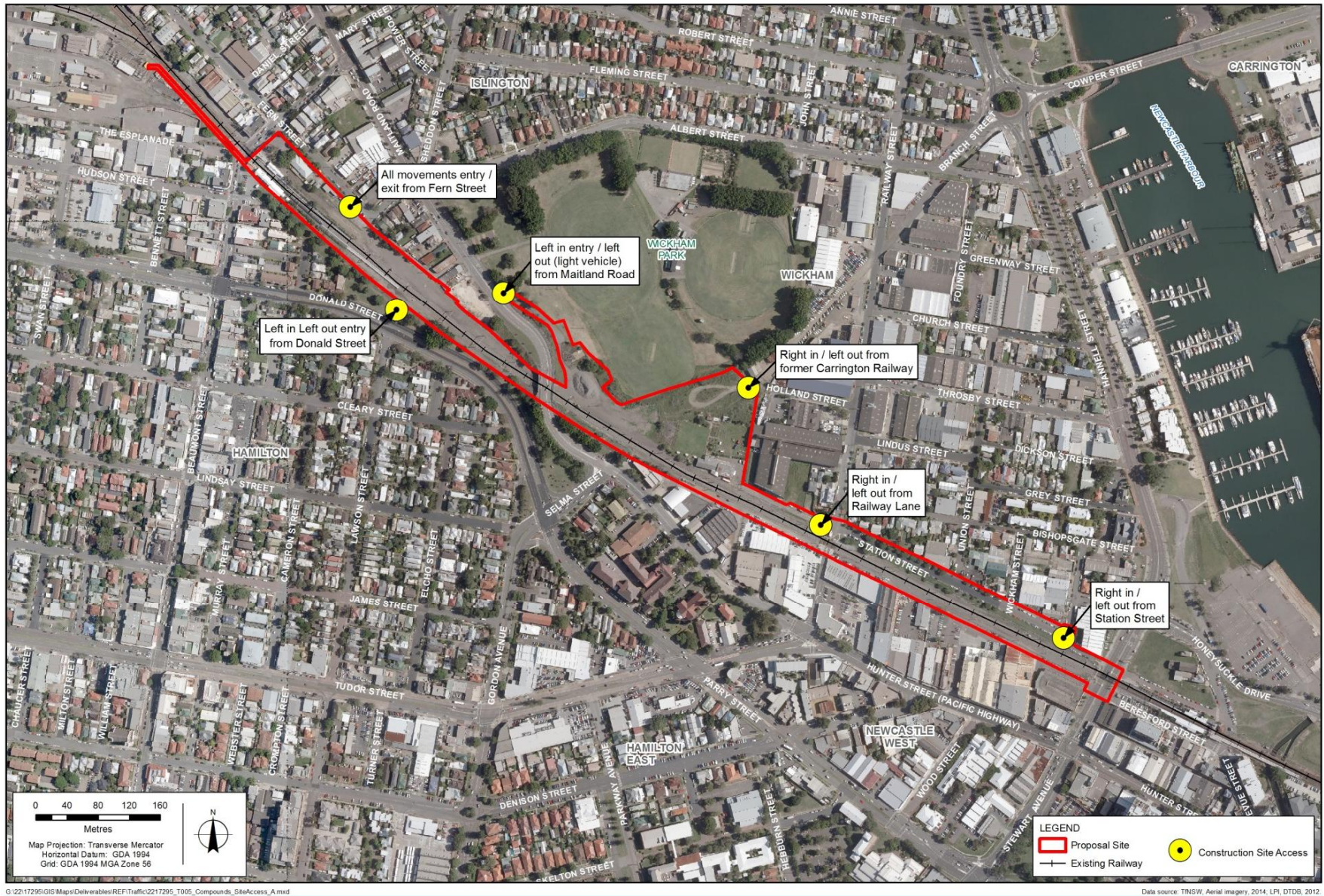


Figure 3.4 Site access points and construction compound



### 3.3 Interim arrangements

#### 3.3.1 Description

During construction of the new interchange and stabling facilities, trains will terminate at either Hamilton Station or Broadmeadow Station. These stations will be used temporarily as a bus transfer point to shuttle passengers into Newcastle. Section 3.3.4 provides more details of the proposed shuttle bus services.

#### 3.3.2 Changes to the road network

There will be no physical changes to the road network in Hamilton to accommodate the temporary terminus. The level crossing at Beaumont Street will be retained. No changes to the lane configuration or traffic capacity will occur.

Minor changes to Beaumont Street, including the potential removal of a street tree, the provision of seating/shelter and signage, may be provided for the temporary bus shuttle service. This would be subject to separate planning approvals following further design definition.

There are no changes to the road network or transport facilities proposed at Broadmeadow Station as part of the new interchange proposal. There are improvements proposed to bus facilities at Graham Road, but these would be subject to separate planning approvals following further design definition.

#### 3.3.3 Temporary access arrangements

##### ***Vehicular access***

Vehicular access arrangements are not required to change at Hamilton Station or Broadmeadow Station during this interim operating scenario.

##### ***Bus access***

No changes to existing local bus services in either timetabling or routes would be required.

#### 3.3.4 Shuttle bus service

During the period when trains are terminating at either Broadmeadow or Hamilton Stations, shuttle buses would enable train passengers to travel into and out of Newcastle. The bus services would be timetabled to meet trains in both directions wherever possible. A detailed timetable would be provided prior to the start of construction.

There is no current plan to change existing public bus routes during construction.

##### ***Pedestrians and cyclists***

Pedestrian and cyclist access arrangements during the interim operating scenario are expected to remain as they are at both Hamilton and Broadmeadow stations.

## 4. Impact assessment

### 4.1 Operation

#### 4.1.1 General traffic impacts

The changes to the road network (as discussed in detail in 3.3.2) as a result of the Wickham Transport Interchange are initially limited to:

- Removal of the Stewart Avenue and Merewether Street boom gates and the permanent opening of these roads to vehicular traffic.
- Permanent closure of the Railway Street level crossing.

This will result in adjustments to traffic flows in and around the Wickham area, primarily as a result of redistribution of traffic from the existing Railway Street level crossing.

During the construction of the interchange, other road network changes (further described in Section 3.2) are expected to provide improvements to north-south access across the former rail corridor. These additional improvements to the road network are not part of this proposal but will have an impact on the performance of intersections in the vicinity of the interchange.

#### ***Removal of the Stewart Avenue level crossing***

The removal of this level crossing is expected to result in substantially improved performance of three key intersections on the north-south Stewart Avenue/Hannell Street route as follows:

- Honeysuckle Drive/Hannell Street
- Hunter Street/Stewart Avenue
- Parry Street/Stewart Avenue

These intersections all experience adverse effects due to the operation of the level crossing, as discussed in Section 2.1.5. The removal of the Stewart Avenue level crossing would result in a benefit to traffic flows along Stewart Avenue to Hannell Street during peak traffic periods, with a 20 percent increase in capacity across the railway corridor arising from the removal of level crossing closures.

The substantially improved north-south traffic flow and the elimination of extensive level crossing queues will also provide more intersection capacity and reduced delays for turning movements to and from this route at the key Honeysuckle Drive and Hunter Street intersections.

These preliminary findings are expected to be confirmed by more detailed and expanded regional traffic modelling currently being undertaken.

#### ***Railway Street level crossing permanent closure***

The permanent closure of Railway Street at the level crossing will cause traffic to be diverted to other parts of the road network. Access to/from the Wickham area is sought as either a through route between other arterial roads such as Tudor Street, Donald Street, Hannell Street and Maitland Road or as a destination (residential, work or parking) in its own right.

For through traffic, drivers will quickly become aware of the street closure and adjust driving patterns to find their respective optimal path through the network, either diverting to the Stewart Avenue/Hunter Street intersection or the Maitland Road/Albert Street intersection, by the Islington overbridge. There may also be minor increases in travel across other level crossings further west at Beaumont Street or Clyde Street.



The net result is that daily and peak hour volumes currently using the Railway Street level crossing will be dissipated across the road network and absorbed with an expected no net increase in congestion because of the capacity benefits provided by the removal of boom gates and signals at Stewart Avenue.

For traffic passing through the greater Wickham area, the closure will result in a minor trip change, with little or no expected impact or travel time increase.

For drivers with Wickham as a destination (estimated at up to 1,000 vehicles per day) the level crossing closure will result in some difficulties gaining access to/from the immediate Wickham area. The nature and scale of the street layouts means that alternative access/egress options are not ideal, with expected increases in incoming traffic from Hannell Street by Bishopsgate Street and Throsby Street, as well Maitland Road by Albert Street.

The departure journeys are potentially more problematic with an expected increase in right turn movements from Throsby Street to Hannell Street.

#### ***Hannell Street/Honeysuckle Drive intersection modifications***

The western kerb line on Hannell Street would be realigned to provide for bus pickup areas associated with the proposed bus shuttle service. This will include a bus priority signal for right turns into Honeysuckle Drive. Changes to phasing to accommodate this movement are expected to have minor increased delays for vehicles turning right into Honeysuckle Drive.

#### ***Bishopsgate Street, Charles Street and Station Street***

The proposed arrangement is for light vehicles to access Station Street by Bishopsgate Street and Charles Street. Most of these vehicles will exit Wickham using Railway Street to travel to either Throsby Street or Albert Street. These streets will most likely not observe a significant increase or decrease in total traffic volumes compared to their current levels.

#### ***Throsby Street***

Throsby Street will become a key exit point from Wickham for traffic wishing to proceed south along Hannell Street and traffic flows will increase over existing levels. Any increase in green time for the Throsby Street leg of the intersection to accommodate this increase has the potential to increase delays for north-south traffic on Hannell Street.

### **4.1.2 Assessment of operational traffic**

#### ***Operational traffic generation***

The new interchange facilities on Station Street will attract additional traffic to Wickham. Taxis and private vehicles will use these facilities, accessing Station Street from Hannell Street by Dangar Street and Charles Street.

Assumptions in relation to peak hour traffic generation have been made as follows:

- 50 private vehicles
- 10 taxis

This peak hour traffic generation equates to estimated daily flows as outlined in Table 4.1, distributed across the Wickham road network for travel north, south and west as shown.

Table 4.1 Operational traffic generation

Street	Operational traffic generation (vehicles per day)	
	Taxis	Private vehicles
Station Street	100	500
Railway Street, south of Throsby Street	100	500
Railway Street, north of Throsby Street	50	250
Throsby Street	50	250
Albert Street, east of Railway Street	30	150
Albert Street, west of Railway Street	20	100

#### 4.1.3 Parking impacts

##### *Changes to existing conditions*

The proposed Wickham Transport Interchange includes the removal of on-street parking (expected to be 71 spaces) on Station Street as a result of the interchange construction and provision of kiss and ride and taxi facilities. There would also need to be some parking changes on Charles Street with four spaces removed.

It is expected that there will be a shift of parking into streets further north as the spaces are removed and interchange becomes operational, which will have impacts on residents and businesses in the affected streets.

##### *Future demand*

There will be an increase in the demand for parking during the operational phase of the new interchange. This demand will result from city workers, and those who wish to park their cars near the station to use the transport networks that will operate through the interchange. It is currently not known what this demand will be, and it is recommended that this be investigated further. This further investigation is however beyond the scope of this traffic study.

Future development in Newcastle West as part of urban renewal plans by UrbanGrowth and additional office developments in the Honeysuckle area will increase demand for parking in the Wickham area.

#### 4.1.4 Access arrangements

##### *Bus access*

Transport for NSW proposes that Newcastle Buses will continue to operate on current routes along Hunter Street. It is understood that until the light rail project is operational, a shuttle bus service will carry passengers from the new interchange to the former Newcastle Station.

##### *Pedestrians and cyclists*

URS undertook a Pedestrian Footbridge Requirement Study in May 2014. This study included a pedestrian impact assessment of the permanent closure of Railway Street level crossing. The assessment concluded this would have a minimal impact on pedestrian movements in the Railway Street precinct.

The assessment indicated that the most affected group will be those wishing to access surrounding residential properties on a daily basis and patrons of a hotel on Railway Street (Lass O'Gowrie), which is located 50 metres north of the current level crossing. The closing of this crossing will:

- add an additional 750 metres walk for these residents and hotel patrons
- add an average of 20 metres additional walking distance to Hunter Street bus stops.

Since there are no recognised cycle routes north of the railway line in the Wickham area, the proposed transport interchange is unlikely to have a noticeable impact on cyclists. Cyclists that currently proceed north over the rail line using Railway Street will however be required to utilise the busier roads of Stewart Avenue/Hannell Street or Maitland Road.

#### 4.1.5 Rail passenger journey times

During operation of the new interchange, there will be changes to rail passenger journeys involving transfer to a shuttle bus service which will result in increased journey times compared to completion of the journey by heavy rail. This will also be the case during the preceding construction phase.

Trip times are predicted to increase. This could lead to a decrease in rail patronage and a subsequent increase in private car usage.

## 4.2 Construction

The construction of the new interchange is expected to take 24 months with a commissioning date in December 2016. During this period, there will be significant construction activity that will have an impact on the general road network in and around the Hamilton and Wickham areas. These impacts are discussed further below.

### 4.2.1 Construction worker parking

Designated worker parking areas will be provided either within the site compound or adjacent to the rail corridor to minimise inconvenience to railway users, residents and local businesses during the construction period. Where parking is allocated next to the rail corridor assets, effective means of maintaining safety of workers from moving components would be provided.

### 4.2.2 Construction vehicle movements

The construction of the proposal would involve a significant number of vehicles movements in and around the construction site and compound areas. Construction vehicle movements would comprise:

- heavy vehicles: a third of the daily total of the heavy vehicles would occur in the peak periods with the majority of deliveries occurring in the early morning.
- light vehicles: light vehicles are expected to arrive during peak periods only.

The estimated numbers of heavy and light construction vehicles in peak hour are provided in Table 4.2.

Table 4.2 Estimated peak hourly construction vehicle movements

Peak hour traffic volumes (two way)						
Type	Ivy Street	Wickham Park	Railway Lane	Railway Street	Station Street	Total
Heavy vehicles	12	8	28	2	32	<b>82</b>
Light Vehicles	15	15	90	15	15	<b>150</b>

The delivery of some infrastructure components, such as roofing panels and beams, may be considered oversized deliveries. These deliveries would be undertaken in accordance with the requirements of relevant authorities, so as not to cause undue interruption or compromise the safety of the road network.

#### 4.2.3 Access roads

The roads leading to the access points discussed in Section 3.2.2 will experience increased heavy vehicle traffic during the construction phase of the proposal. The number of additional heavy vehicles on surrounding streets is estimated in Table 4.3.

Table 4.3 Additional heavy construction vehicles on surrounding streets

Street	Additional heavy vehicles (peak hour)	Additional heavy vehicles (daily)
Railway / Albert Streets	62	186
Station Street	32	96
Maitland Road	20	60

It is concluded from these traffic volumes that:

- Railway Street and Albert Street will observe a significant increase in heavy vehicle traffic. Measures would be undertaken to reduce or eliminate heavy vehicle queues of idling trucks along Railway Street. This additional traffic will be offset by the closure of the Railway Street level crossing and the absence of traffic which would have otherwise used these same streets which will eliminate through traffic along Railway and Albert Streets.
- Station Street would experience an increase in heavy vehicle traffic, although it will be to a lesser extent than that experienced by Railway and Albert Streets. Measures would be taken to reduce idling queues along the street.
- Maitland Road would experience a small increase in heavy vehicles, however as it is currently a busy arterial road with limited residential properties, the impact would be less noticeable.

#### 4.2.4 Access intersections

The intersections in and around the site will experience an increase in construction vehicle movements during the construction period. The impacts of these increases will be especially noticeable at the local road intersections due to the current low traffic volumes.

The impacts to local roads surrounding Broadmeadow Station and Hamilton Station potentially impacted by commuter shuttle buses during construction will be addressed in a separate study.

#### 4.2.5 Rail passenger journey times

Similar to the operational phase, rail passenger journeys are expected to lengthen as a result of the need to transfer to a bus to complete the trip into Newcastle.

## 5. Mitigation measures

The proposed mitigation measures are:

- Traffic management plans would be prepared and provided to the relevant roads authority as required.
- Heavy vehicles would be restricted to specified routes, with the aim of avoiding local streets, high pedestrian areas and school zones. Where feasible, route markers would be installed for heavy vehicles along designated routes.
- Limit off-site construction vehicle parking in designated areas. Areas of temporary on-street parking during peak construction events would be identified in the traffic management plans to minimise the impact on surrounding facilities, properties and businesses particularly railway patrons.
- The queuing and idling of construction vehicles in residential streets would be minimised.
- An emergency response plan would be developed for construction traffic incidents.
- Where required, public communications would be conducted to warn the community and local residents of vehicle movements and anticipated effects on the local road network relating to site works in accordance with the CEMP.
- Access to all private properties adjacent to the works would be maintained during construction, unless otherwise agreed by relevant property owners.
- During project inductions, all heavy vehicle drivers would be provided with the emergency response plan for construction traffic incidents.
- Completion of more detailed, regional traffic modelling to confirm the preliminary findings of this report. This modelling will consider the impact of traffic diverted following the closure of the Railway Street level crossing and the effect of the proposal on key intersections in the study area.



## 6. References

Bitzios, 2009. *Newcastle City Centre Traffic and Transport Study - Traffic and Transport Options Modelling Report*, Newcastle City Council

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Transport for NSW, 2014 – *Wickham Terminus Construction Period Services and Operational Plan*

URS, 2014 *Pedestrian Footbridge Requirement Study*, Transport for NSW



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