

Road safety upgrades on Stewart Avenue at the Parkway Avenue and Kemp Street intersections, Hamilton South

Submissions report

Roads and Maritime Services | December 2017



Roads and Maritime Services

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December 2017

Prepared by Jacobs and Roads and Maritime Services
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Document controls

Approval and authorisation

Title	Road safety upgrades on Stewart Avenue at the Parkway Avenue and Kemp Street intersections, Hamilton South
Accepted on behalf of Roads and Maritime NSW by	Natalie Perfrement Project Engineer/Contract Manager
Signed	
Dated	19 December 2017

Document status

Document status	Date	Prepared by	Reviewed by
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Executive summary

Roads and Maritime Services (Roads and Maritime) proposes to carry out road safety improvements to the intersections of Stewart Avenue/Parkway Avenue and Stewart Avenue/Kemp Street, in Hamilton South. The proposed intersection upgrades (the proposal) would improve safety, and reduce the crash rate and severity at both intersections. The proposal includes:

- Providing dedicated right turn facilities out of Parkway Avenue (eastern side) into Stewart Avenue to address crashes involving vehicles turning right from Parkway Avenue (east) into Stewart Avenue
- Banning right turns in and out, of Kemp Street on the eastern side of Stewart Avenue to address crashes involving vehicles turning right out of, and into the residential street.

The main features of the proposal are as outlined in the Review of Environmental Factors (REF).

The REF was publically displayed between Monday 25 September 2017 and Monday 17 October 2017 at the Newcastle City Council Administration Building. The REF was placed on the Roads and Maritime project website and made available for download. The display locations and website link were advertised in Newcastle Herald on Thursday 28 September 2017.

Notification of the REF, contact methods, closing date for submissions, location of the hard copy documents, and project website were distributed to 2100 residences and businesses in the vicinity of the proposal on Monday 25 September 2017.

An email inviting comments was sent on Monday 25 September 2017 to six individuals who had requested email notification of the proposal update during the initial consultation period (February to March 2017).

Roads and Maritime received 36 submissions in response to the REF from 33 respondents. Thirty one of these submissions were received during the public display period, and five were received after the close of the public display period. All submissions received have been considered in the preparation of this report.

Nine of the respondents supported all aspects of the proposal, three respondents supported the Stewart Avenue/Parkway Avenue improvements, and two respondents supported the Stewart Avenue/Kemp Street improvements.

Two of the respondents objected to all aspects of the proposal, five of the respondents objected to the Stewart Avenue/Parkway Avenue improvements and twelve respondents objected to the Stewart Avenue/Kemp Street improvements.

Four respondents provided no objection or support for the proposal.

Three of the respondents also made submissions to Newcastle City Council and the local State Member for Newcastle regarding their opposition to the proposal. A meeting was held between the respondents, Member for Newcastle and Roads and Maritime.

Many of the comments made by respondents were the same as submissions made during the REF consultation period including concern that:

- Banning of movements at Kemp Street will push traffic onto nearby streets
- Heritage impacts due to physical changes to the median on Parkway Avenue
- Potential impacts to trees in the median on Parkway Avenue
- Length of the proposed right turn bay on Parkway Avenue, which some respondents indicated needs to be extended
- The same outcome could be achieved with changes to lane configurations and/or re-phasing of existing traffic lights on Parkway Avenue and Stewart Avenue.

Additional comments made by respondents in submissions are summarised below:

- Concerns regarding night time works and support for proposed daytime construction works to minimise sleep disturbance
- Request for clarification that the arborist will be on site during evening earthworks activities
- Request for the management of vibration impacts to adjacent buildings during construction
- Concern that widening into the median on Parkway Avenue will affect the root system of the trees within the median and that road widths provided in the REF suggest a larger impact than that considered in the arborists specialist report.

Roads and Maritime has responded to these comments in this submissions report as follows:

- Pre-construction traffic surveys of the Stewart Avenue intersections with local roads from Parkway Avenue to Cram Street were carried as part of the preparation of the REF. These surveys found that peak traffic movements into and out of Kemp Street were small. It is likely that traffic associated with movements that will now be banned under the proposal would make use of the traffic light controlled intersection at Parkway Avenue, as there would be little or no travel time benefit in using other routes. Following post-construction surveys proposed for July 2018, and a review of updated crash history of Stewart Avenue in consultation with Newcastle City Council, the need for additional works will be considered
- As detailed in the REF, the proposal would have a minor impact on the aesthetic setting of the Hamilton South Garden Suburb Heritage Conservation Area (HCA). However, the proposed changes would not significantly affect the status of Parkway Avenue as a principal street of heritage significance
- An AQF5 qualified arborist has been engaged by Roads and Maritime to assist in identifying and implementing measures to maintain the health of the median trees as detailed in the REF. A preconstruction assessment has been carried out and management measures have been identified
- The arborist would be onsite with Roads and Maritime during all earthworks activities adjacent to the mature trees in the Parkway Avenue median, regardless of the time those works occur
- As detailed in the REF, the proposed length of the right turn lane would minimise impact to the median and mature trees, and be sufficient to address the right turn crash history by allowing for arrow signal controlled right turns out of the eastern side of Parkway Avenue
- As detailed in the REF, reconfiguration of existing lanes on Parkway Avenue, and the modification of existing traffic light phasing at the Stewart Avenue intersection was considered in option 1 and 3. Traffic modelling of each option showed an increase in delays to traffic and reduction in overall performance of the intersection. Rephasing of the traffic light operation without reconfiguring lanes would have a similar negative result
- Modelling of traffic light phasing with either split approach phasing and diamond phasing (refer to **Section 2.2.2**) has been carried as part of design development. It was concluded that diamond phasing had the least queue length/intersection delay
- In response to the support for the alternative construction method detailed in the REF, Roads and Maritime consulted with residents and Newcastle City Council. Following this consultation, it is now proposed that the majority of road construction works would be carried out under a temporary day works detour of Parkway Avenue between National Park Street and Stewart Avenue during the January 2018 school holiday period
- In addition to safeguards to minimise vibration on site detailed in the REF an independent pre-construction building condition survey of properties has been offered to property owners within 50 metres of the works
- The Parkway Avenue median would be reduced by only three metres as indicated in the REF arborist specialist report. Proposed traffic lane widths in the concept design shown in the REF suggested a larger reduction (an additional 230 millimetres). The detailed design for the

proposal would limit the median reduction to three metres with minor adjustments to lane widths.

Changes to the proposal design since public display of the REF include preference change from night to predominantly day construction works, minor traffic light post adjustments and minor adjustments to lane widths.

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1 Introduction and background

1.1 The proposal

Roads and Maritime Services (Roads and Maritime) propose to carry out road safety improvements to the intersections of Stewart Avenue/Parkway Avenue and Stewart Avenue/Kemp Street, in Hamilton south. The proposed intersection upgrades (the proposal) would improve safety, and reduce the crash rate and severity at both intersections. The proposal includes:

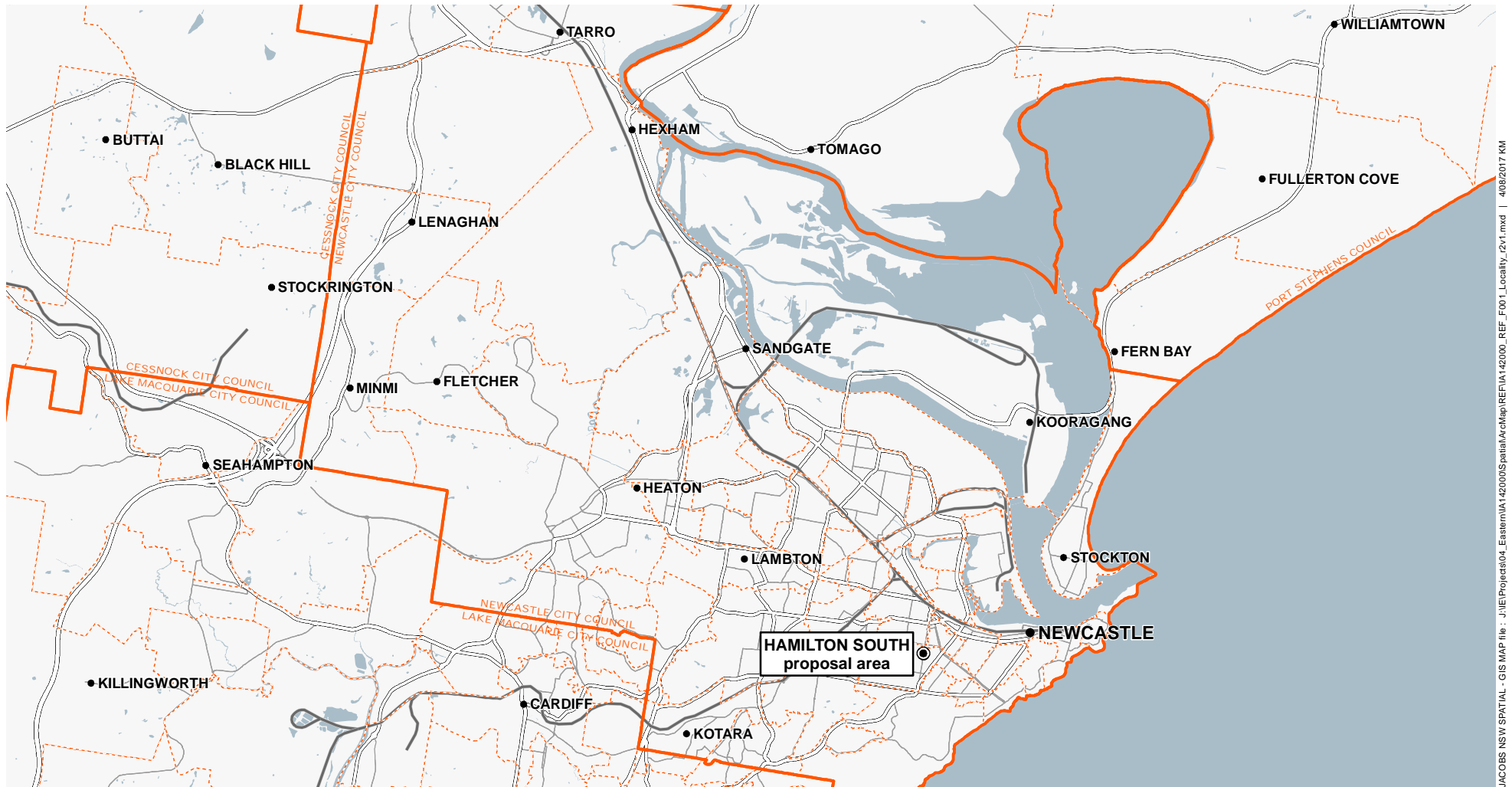
- Providing dedicated right turn facilities out of Parkway Avenue (eastern side) into Stewart Avenue to address crashes involving vehicles turning right from Parkway Avenue (east) into Stewart Avenue
- Banning right turns in and out of Kemp Street on the eastern side of Stewart Avenue to address crashes involving vehicles turning right out of, and in to the residential street.

Key features of the proposal would include:

- Widening Parkway Avenue (east) to provide a 45 metre long dedicated right turn lane including a 15 metre taper for westbound motorist turning on to Stewart Avenue and adjustment of the traffic lights to provide for this right turn phase
- Installation of a raised concrete median on Kemp Street (east) at Stewart Avenue to permanently ban right turn movements in to and out, of Kemp Street (east)
- Protection and retention of existing Norfolk and Cook Pines in the area of works
- Ancillary construction facilities, including site compounds and stockpile sites
- Temporary site facilities located in kerbside parking that would reduce existing provision for parking during construction by up to four parking spaces.

A more detailed description of the proposal is found in Section 3 of the REF prepared by Roads and Maritime in September 2017.

Figure 1-1 shows the locality of the proposal. **Figure 1-2** identifies the key features of the proposal.



Legend

- | | | |
|---|---|---|
| Local government boundary | Primary/arterial road | Railway |
| Suburb boundary | Secondary road | Waterway |

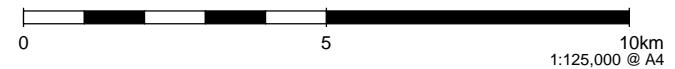


Figure 1.1 | Locality

Road Safety Intersection Upgrades, Stewart Avenue & Parkway Avenue, Stewart Avenue & Kemp Street, Hamilton South

Data sources

Ausimage 2016, RMS 2017, LPI 2017, Geoscience Australia 2006



JACOBS NSW SPATIAL - GIS MAP file - J:\IE\Projects\04_Eastern\IA142000\Spatial\Map\REF\IA142000_REF_F002_Proposal_2v1.mxd | 4/08/2017 KM

Figure 1.2 | The proposal
Road Safety Intersection Upgrades, Stewart Avenue & Parkway Avenue, Stewart Avenue & Kemp Street, Hamilton South

Data sources
Ausimage 2016, RMS 2017, LPI 2017

1.2 REF display

Roads and Maritime prepared the REF to assess the environmental impacts of the proposal. The REF was publically displayed for 22 days between Monday 25 September 2017 and Monday 17 October 2017 at the Newcastle City Council Administration Building (Ground Floor, 282 King Street, Newcastle). The REF was uploaded to the Roads and Maritime project website and made available for download. The display locations and website link were advertised in the Newcastle Herald on Thursday 28 September 2017.

A newsletter notifying the commencement date of the REF public display period, contact methods, closing date for submissions, location of the hard copy documents, and project website was distributed to 2100 residences and businesses in the vicinity of the proposal on Monday 25 September 2017. An email providing a link to the REF on the project website and inviting comments was sent on Monday 25 September 2017 to six individuals who had requested email notification during the initial consultation period (February 2017 to March 2017).

1.3 Purpose of the report

This submissions report relates to the REF prepared for the proposed road safety improvements to the intersections of Stewart Avenue/Parkway Avenue and Stewart Avenue/Kemp Street, in Hamilton South, and should be read in conjunction with that document.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Roads and Maritime. This submissions report summarises the issues raised and provides responses to each issue (refer to **Chapter 2**). It details investigations carried out since finalisation of the REF (**Chapter 3**), describes and assesses the environmental impact of changes to the proposal (**Chapter 4**) and identifies new or revised environmental management measures (**Chapter 5**).

Changes to the proposal since the public display of the REF include one minor traffic light post adjustment made in the proposal design, preference change from night to predominantly day construction works, and minor adjustments to lane widths.

No project changes are proposed that would require the preparation of a preferred infrastructure report.

2 Response to issues

Roads and Maritime received 36 submissions up until 8 November 2017. Table 2.1 lists the respondents and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in **Chapter 2** of this report.

Table 2.1: Respondents

Respondent	Submission No.	Section where issues are addressed
Individual	1	Section 2.2.3 (letter of support which requested additional works outside the scope of the proposal)
Individual	2	Section 2.2.1
Individual	3	Section 2.2.1
Individual	4	Sections 2.2.1, 2.3.1
Individual	5	Sections 2.2.1, 2.3.1
Individual	6	Sections 2.2.1, 2.2.2
Individual	7	Sections 2.2.1, 2.2.2, 2.2.3, 2.3.1
Individual	8	Sections 2.2.1, 2.2.3
Individual	9	Section 2.2.1
Individual	10	Sections 2.2.2, 2.2.6, 2.3.1
Individual	11	Section 2.2.1
Individual	12	Sections 2.2.1, 2.2.3 (letter of support which requested additional works outside the scope of the proposal)
Individual	13	Sections 2.2.1, 2.2.3, 2.2.5
Individual	14	Sections 2.2.1, 2.2.2, 2.2.4
Individual	15	Sections 2.2.1, 2.2.3 (letter of support which requested additional works outside the scope of the proposal)
Individual	16	Sections 2.2.1, 2.2.3
Individual	17	Sections 2.2.5, 2.2.6, 2.3.1, 2.4.1
Individual	18	Sections 2.2.1, 2.2.3
Individual	19	Section 2.2.1
Individual	20	Sections 2.2.1, 2.2.2, 2.3.1, 2.4.1, 2.5.2, 2.5.3
Individual	21	Sections 2.2.1, 2.2.2, 2.2.3, 2.2.5, 2.4.1, 2.5.1, 2.5.2, 2.5.3
Individual	22	Sections 2.2.2, 2.2.4, 2.4.1, 2.5.1, 2.5.2, 2.5.3
Individual	23	Sections 2.2.1, 2.2.3
Individual	24	Section 2.2.1 (letter of support which requested additional works outside the scope of the proposal)
Individual	25	Sections 2.2.1, 2.2.3
Individual	26	Section 2.6.1

Respondent	Submission No.	Section where issues are addressed
Individual	27	Section 2.2.1
Individual	28	Sections 2.4.1, 2.5.1, 2.6.3
Individual	29	Sections 2.2.1, 2.2.3
Individual	30	Sections 2.2.1, 2.2.3, 2.2.4
Individual	31	Sections 2.3.1, 2.4.1, 2.5.1, 2.5.2, 2.5.3
Individual	32	Sections 2.2.1, 2.2.3, 2.2.4, 2.6.2, 2.6.3
Individual	33	Section 2.2.3 (letter regarding safety issues of the local area which are outside the scope of the proposal)
Individual	34	Sections 2.2.4, 2.4.1, 2.5.1, 2.5.2, 2.7.1
Individual	35	Sections 2.2.2, 2.2.3, 2.4.1
Individual	36	Section 2.2.3, 2.2.6, 2.6.3

2.1 Overview of issues raised

A total of 36 submissions were received in response to the display of the REF from members of the community. Five of the submissions were received after closing of submissions, three were from individuals who had made previous submissions where no new issues were raised which specifically related to the proposal. The break down of the submissions are as follows:

- Nine of the respondents supported all aspects of the proposal (27 per cent)
- Two of the respondents objected to all aspects of the proposal (Six per cent),
- Four respondents provided no objection or support for the proposal (12 per cent)
- Three respondents supported the Stewart Avenue/Parkway Avenue improvements (Nine per cent)
- Two respondents supported the Stewart Avenue/Kemp Street improvements (Six per cent)
- Five of the respondents did not support the Stewart Avenue/Parkway Avenue improvements (15 per cent)
- Twelve of the respondents did not support the Stewart Avenue/Kemp Street improvements (36 per cent)
- Ten respondents provided no comment on the Stewart Avenue/Parkway Avenue improvements (30 per cent)
- Four respondents provided no comment on the Stewart Avenue/Kemp Street improvements (12 per cent).

Each submission has been considered individually to understand the issues raised. The issues raised in each submission have been identified and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and Roads and Maritime's response to these issues form the basis of this chapter.

No formal response was received from Newcastle City Council during consultation as required under the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP). However, councillors have made enquiries regarding the proposal on the behalf of residents. No new issues other than those addressed in this submission report were raised.

Three of the respondents also made submissions to Newcastle City Council and the local State Member for Newcastle regarding their opposition to the proposal. A meeting was held between the respondents, Member for Newcastle and Roads and Maritime on 28 November 2017. No new issues were raised or additional safeguards proposed.

Many of the comments made by respondents were the same as submissions made during the REF consultation period including concern for:

- Banning of movements at Kemp Street will push traffic onto nearby streets
- Heritage impacts due to physical changes to the median on Parkway Avenue
- Potential impacts to trees in the median on Parkway Avenue
- The length of the proposed right turn bay on Parkway Avenue, which some respondents indicated needs to be extended
- The same outcome could be achieved with changes to lane configurations and/or re-phasing of existing traffic lights on Parkway Avenue and Stewart Avenue.

Additional comments made by respondents in submissions are summarised below:

- Concerns regarding night time works and support for proposed daytime construction works to minimise sleep disturbance
- Request for clarification that the arborist will be on site during evening earthworks activities
- Request for management of vibration impact to adjacent buildings during construction
- Concern that the widening into the median on Parkway Avenue will affect the root system of the trees within the median and that road widths provided in the REF suggest a larger impact than that considered in the arborist specialist report.

2.2 Traffic and transport

2.2.1 Operational traffic impacts on Stewart Avenue and surrounding streets

Submission numbers

2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 23, 24, 25, 27, 29, 30, 32

Issue description

Respondents raised the following issues relating to the banning of right turns and through movements in and out of Kemp Street:

- The ban would increase traffic congestion on Parkway Avenue
- The ban would increase traffic flow to other local streets, such as Kenrick Street, Jenner Parade and Stanley Street
- Suggested the intersection treatment at Kemp Street and Stewart Avenue should be replicated at the intersection of Kenrick Street and Stewart Avenue
- Suggested peak period right turn bans be maintained rather than banning movements at Kemp Street
- Suggested signage could be improved and made more visible on Stewart Avenue
- Access and safety for students at Hamilton South Primary School may be affected by banning right turn movements at Kemp Street
- Potential increased traffic flow in the streets immediately south of Kemp Street.

Respondents raised concerns about increased traffic on Stewart Avenue in response to the development of the public transport interchange and commercial and residential development in Newcastle West.

Response

The suggestion that more traffic would use Parkway Avenue as a result of increased traffic efficiency and ban right turns is difficult to measure as this is part of a grid network with many options to travel and would come down to individual driver behaviour. Modelling of the intersection performance indicates that even with the proposal the average delay on the eastern leg of the intersection of Stewart Avenue and Parkway Avenue would still be around one minute during peak periods. The objective of the proposal is to improve safety at the intersection of Stewart Avenue and Parkway Avenue.

While the changes to intersection arrangements and the banning of right turns may result in minor increases to traffic in Parkway Avenue and surrounding local streets, as local motorists adjust their travel routes, these changes are unlikely to be substantial.

The Kemp Street works have been proposed to respond to the high number of crashes and reported near misses at this location. The suggestion that the intersection treatment at Kemp Street and Stewart Avenue should be replicated at the intersection of Kenrick Street and Stewart Avenue is out of scope for this proposal. However, Roads and Maritime and Newcastle City Council are currently reviewing other intersection in the locality.

Pre-construction traffic surveys were carried out on Stewart Avenue intersections between Parkway Avenue and Cram Street mid-week during July 2017. Roads and Maritime plans to carry out post-construction traffic surveys in July 2018 under similar conditions.

The pre-construction surveys demonstrated that the number of movements out of and into Kemp Street are small and that the scope for traffic to be pushed onto other local streets is similarly small, especially during school peak hours. In the morning peak hour only 20 vehicles perform movements out of Kemp Street that will be banned (the right turn into Kemp Street is already banned in the morning peak period, though seven vehicles were counted performing this movement). In the afternoon peak hour, only 11 vehicles performed these movements. In the afternoon school peak, only a small number of vehicles (21) make the right turn into Kemp Street. A larger number (43) made the right turn in the afternoon peak hour and outside of peak hours.

It is likely that traffic associated with movements that will be banned under the proposal, would make use of the traffic light controlled intersection at Parkway Avenue, as there would be little or no travel time benefit in using other routes.

When the proposal has been completed and post-construction surveys conducted, the traffic survey data as well as updated crash history of Stewart Avenue intersections will be reviewed in consultation with Newcastle City Council within three months of the survey to identify impacts and any resultant needs. These will be considered for corrective action depending on their priority. Feedback from residents and the public would be invited for any future projects as part of Roads and Maritime's community consultation process.

Removing right turn movements into and out of Kemp Street (east) onto Stewart Avenue will improve safety for motorists accessing Hamilton South Public School. The risk of potential vehicle crashes will be reduced, and students who cross Kemp Street (east) will have improved pedestrian facilities.

The proposal would also include improvements to warning, regulatory, and information signage regarding the changes in road conditions. This would include supplementary line markings at the Stewart Avenue and Parkway intersection.

2.2.2 Traffic lights

Submission numbers

6, 7, 10, 14, 20, 21, 22, 35

Issue description

Respondents queried why existing traffic light phasing was not altered rather than the proposed construction of right turn lane on Parkway Avenue and Stewart Avenue intersection upgrade.

Respondents queried if the adjustment of the traffic lights at Stewart Avenue and Parkway Avenue would allow northeast bound right hand turns without arrows at the low traffic times.

Response

During the proposal's design development alternative options were investigated which included options 1 and 3 referenced in the REF. The alternatives did not adequately resolve the source of the high number of crashes and near misses associated with traffic turning right from Parkway Avenue (east) onto Stewart Avenue, and were both found to increase delays to traffic and reduce overall performance of the intersection.

During design development, two options were considered for the phasing of the traffic lights with or without a right hand turn lane:

- Split approach – to fully control the right turn out of Parkway Avenue without a right turn lane would require the lights to operate with a through and right turn phase from the east, followed by a through and right turn phase from the west. In traffic engineering, this is known as 'split approach phasing'.
- Diamond phase – with the new right turn bay and the existing right turn bay on the western approach, the right turns will operate together in one phase, and the through traffic in another phase. In traffic engineering, a phase with opposing right turns is known as 'diamond phasing'.

Where there are large through movements and smaller opposing right turn movements, diamond phasing generally provides a better traffic flow outcome than split approach phasing. This is because it maximises the time available in the traffic light cycle for the through movements, which can operate during parallel pedestrian phases, unimpeded by right turning vehicles. For the Stewart Avenue/Parkway Avenue intersection, the benefits of this approach have been confirmed in the traffic modelling carried out for this proposal. The modelling indicates diamond phasing provided a much better outcome in terms of queue length and intersection delay.

With right turn hold arrows installed on both Parkway Avenue approaches, turning off the arrow controls outside of peak times would not be appropriate due to the high traffic volumes on Stewart Avenue and the need to provide safe turning for road users for all times of day.

2.2.3 Traffic safety

Submission numbers

1,7, 8,12, 13, 15, 16, 18, 21, 23, 25, 29, 30, 32, 33, 35, 36

Issue description

Respondents raised the following issues with traffic safety:

- Potential for increased traffic in Kenrick Street and the resulting safety risk around Hamilton South Public School for children, parents and school staff

- Respondents identified that some motorists have been witnessed exceeding the speed limit in Kemp Street and the need for improved signage
- Respondents raised concerns with illegal/dangerous queuing in the approach to Stewart Avenue on Parkway Avenue, as vehicles attempted to form two lanes when only one traffic lane was marked. Load limits (five tonne gross vehicle mass) on Parkway Avenue are currently being exceeded
- 'Local traffic only' signage is currently being ignored by delivery vehicles using Kenrick Street to access retail premises in The Junction
- Sight lines to approaching vehicles at intersections are currently being impacted by parked vehicles and standing buses at Stewart Avenue
- Respondent requested additional crash data for Stewart Avenue during and outside of peak hours
- Respondent requested dedicated turn phases on Smith St/Glebe Rd signals as well as slip lane at intersection of Alice Street and City Road (outside of scope)
- Respondent queried why the proposed changes were not undertaken when the traffic lights were installed.

Several respondents suggested that a three lane approach be installed at the Parkway Avenue/Stewart Avenue intersection to allow motorists to turn left, proceed straight, or turn right independently. These respondents requested line marking to redesignate lanes at the Parkway Avenue intersection be trialled.

Respondents also made suggestions for additional items which are out of scope of the proposal and included signage, addition of speed humps prior to roundabouts that intersect with Parkway Avenue and pedestrian crossings outside Newcastle High School.

Response

Concerns regarding potential for increased traffic in adjacent streets have been addressed in the response included in **Section 2.2.1**.

Parkway Avenue, Kemp Street and Kenrick Street are local roads under the management of Newcastle City Council. Roads and Maritime will provide details of the concerns raised regarding speed signage, line marking, parking and load limit exceedances on these local roads to Newcastle City Council.

Roads and Maritime will review stopping arrangements in the vicinity of intersections on Stewart Avenue, and crash histories at intersections, and install regulatory stopping restrictions if they are necessary.

The suggestions regarding Smith St/Glebe Rd signals and Alice Street/City Road are out of scope for this proposal. However, Roads and Maritime will forward the suggestions to Newcastle City Council as these are local roads.

A three lane approach on Parkway Avenue (east) cannot be safely achieved without widening into the median for the proposed right turn lane. The three lane approach will be achieved under the proposal. Road crash data history for Stewart Avenue is summarised in Section 6.1.1 of the REF. Revised crash data is provided in **Section 3.4**. Roads and Maritime would continue to review crash data for Stewart Avenue and propose any additional works as required.

It is noted that the development of the proposal project is to address the right turn crash history at the intersection. It is typical for safety upgrades to be implemented over time as crash history and traffic data is collected that provide justification for the work.

2.2.4 Local routes

Submission numbers

14, 22, 30, 32, 34

Issue description

Several respondents were concerned that their existing travel routes would be affected when travelling along Kemp Street and they would be forced to find another route.

Respondents queried if the paved median crossover in Parkway Avenue will remain for residents to access their properties.

Concerns were also raised that buses use Parkway Avenue to access the nearby bus depot in Hamilton, and the role of Parkway Avenue as a collector road and supposed to be a low to moderate capacity road.

Response

The proposed right turn bans, and through movement ban, may affect some travel paths. Residents in these streets may need to choose alternative travel routes to reach their destinations. Safe, traffic light controlled right turn movements are, or will be provided, at the adjacent Parkway Avenue.

The paved median crossover would remain in Parkway Avenue.

Parkway Avenue is a local collector road joining Steward Avenue which is classified as a state highway (A43 Pacific Highway). As Parkway Avenue joins this significant road, the intersection needs to connect safely. This is one of the main objectives of the proposal.

Buses currently following both school and public routes travel along Parkway Avenue and will continue to do so.

2.2.5 Cycleways

Submission numbers

13, 17, 21

Issue description

Respondents queried the necessity of retaining the bicycle lane due to the low usage of the cycle lane by cyclists. Concerns were also raised in terms of cyclist safety, given the tendency of drivers to misuse the cycle path space for illegal queuing/crossing of Stewart Avenue.

Response

The cycle lane will be retained on Parkway Avenue because it is an integral component of the Newcastle cycle path network.

Roads and Maritime has observed through motorists crossing the cycle lane to get around motorists waiting to turn right. Motorists will be less likely to cross into the cycle path when a separate right turn bay is provided for right turning motorists.

2.2.6 Parkway Avenue design

Submission number(s)

10, 17, 36

Issue description

Respondents raised concern that a 45 metre right turn lane is not long enough to accommodate vehicles seeking to turn right at Stewart Avenue.

Respondents raised concern that the typical cross section included in the REF indicated greater than a three metre reduction in the Parkway Avenue median detailed in the arborist specialist report.

Response

The right turn bay length design seeks to balance disturbance to the Parkway Avenue median whilst providing a safety improvement. The right turn lane is short in length and is being constructed to accommodate the numbers of vehicles attempting to make a right turn each traffic light cycle. The proposed length of the right turn lane will address the right turn crash history at the intersection as it will be of sufficient length to allow for signal arrow controlled right turns out of the eastern side of Parkway Avenue.

The Parkway Avenue median will be reduced by only three metres as indicated in the REF arborists specialist report. Proposed traffic lane widths in concept designs in the REF suggested a larger reduction (an additional 230 millimetres). The detailed design for the proposal will limit the median reduction to three metres with minor adjustments to the lane widths indicated in the REF. Refer to **Figure 2-1**.

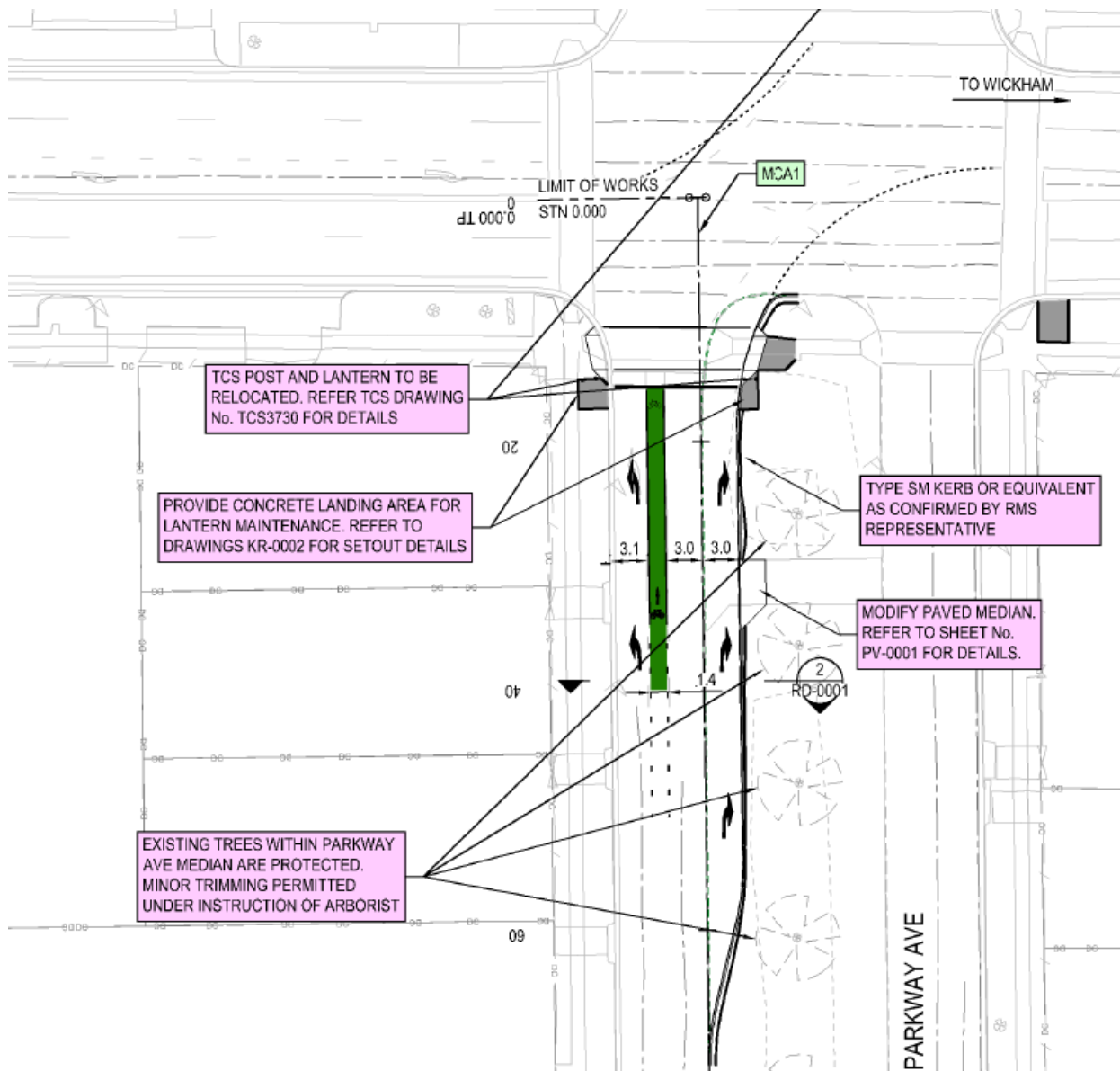


Figure 2-1 Stewart Avenue/ Parkway Avenue intersection

2.3 Non-Aboriginal heritage

2.3.1 Impacts on non-Aboriginal heritage

Submission numbers

4, 5, 7, 10, 17, 20 ,31

Issue description

Respondents raised the following issues with non-Aboriginal heritage:

- Potential impacts to the Hamilton South Garden Suburb Heritage Conservation Area (HCA) associated with the proposal
- Potential impacts to existing Norfolk Island Pines in Parkway Avenue which contribute to heritage values in the HCA (refer to **Section 2.4.1**).

Response

A Statement of Heritage Impacts (SoHI) was prepared as part of the REF (Appendix E) for the proposal. The SoHI concluded that in the context of the Hamilton South Garden Suburb HCA there would be a minimal change of the physical appearance of the whole Parkway Avenue as the median would remain relatively unaltered apart from the three metres by 45 metres (plus taper) of widening into the median. All trees will be retained. Accordingly changes to its aesthetic significance would be minor.

The SOHI also concluded that status of Parkway Avenue as a principal street of significance would not be diminished by the proposal and the impact on the aesthetic significance of Kemp Street would be minor. The proposal would potentially have a minor impact on the social significance and setting of the HCA. However, these changes would not significantly affect the local community's use of, or appreciation of the place.

The arborist report prepared as part of the REF (Appendix F) concluded that the impact of the construction on these trees would be minimised by implementing the safeguards and management measures detailed in the REF to maintain/improve the health of the Norfolk Island Pine and Cook Pines within the Parkway Avenue median. Further discussion of the potential impact on the trees in the Parkway Avenue median is included in **Section 2.4.1**.

2.4 Biodiversity

2.4.1 Impacts on Parkway Avenue median trees

Submission numbers

17, 20, 21, 22, 28, 31, 34, 35

Issue description

Concerns were raised by the respondents in regards to the potential for impacts on the substantial mature Norfolk Island Pine and Cook Pine trees in Parkway Avenue, and the subsequent potential for tree fall and property damage. Concerns related to the proposed construction methodology, assessment method and proposed mitigation measures.

Respondents requested that Roads and Maritime carry out hand excavation of roots and investigation of the trees' root systems by methods consistent with the requirements of AS4970-2009.

Concerns were also raised in submissions regarding different distances being referred to in the REF for the extent of encroachment into the root zone/median.

Concerns were also expressed regarding exhaust fume discharge adjacent to mature Norfolk Island Pine and Cook Pines within the Parkway Avenue median.

Response

The arborist report prepared as part of the REF (Appendix F) concluded that the mature Norfolk Island Pine and Cook Pines within the Parkway Avenue median would not be impacted by the proposal. An arborist would be monitoring all relevant construction activities with the potential to impact on these substantial trees which contribute to the heritage values of the Hamilton South Garden Suburb HCA. The arborist has conducted assessments consistent with AS4970-2009.

The Parkway Avenue median will be reduced by only three metres. Proposed traffic lane widths in the concept design in the REF suggested a larger reduction (an additional 230 millimetres). The detailed design for the proposal will limit the median reduction to three metres with minor adjustments to lane widths. The typical section and traffic lane configuration has been modified as shown in **Figure 2-1**.

Roads and Maritime has engaged an AQF5 qualified arborist to assist in identifying and implementing measures to maintain the health of the trees as detailed in REF. The arborist will be on site during construction for both day and evening works. A preconstruction assessment has been carried out and implementation of measures such as mulching and watering have commenced.

The arborist report concluded that there will be no encroachment into the Structural Root Zone of the trees. The Structural Root Zone is calculated as three to five times the tree diameter at breast height and by the formula: $(\text{diameter} \times 50) \times 0.64$ (in accordance with AS4970-2009).

Because the Structural Root Zone is not encroached upon, hand excavation is not required. Hand digging of the excavation trench is also not a viable option as geotechnical investigations of the subsurface material has identified large broken sandstone blocks and sand which would be unfeasible to remove by hand digging.

An additional safeguard has been included in **Table 5.2**, which states “*Should any spreader roots be encountered during the excavations, work would stop and the arborist will assess the roots and advise construction on any treatment*”.

Because works avoid the Structural Root Zone, no increased risk of storm damage, or property damage/insurance risk is considered likely.

The impacts on exhaust fumes on Norfolk Island Pine and Cook Pines within the Parkway Avenue median is discussed in **Section 3.5**.

2.5 Noise and Vibration

2.5.1 Construction hours

Submission numbers

20, 21, 22, 28, 31, 34

Issue description

Several respondents raised concerns with the potential for noise and vibration impacts during construction, particularly in terms of the impacts of out of hours works (OOHW) during the evening and night periods. In those responses support was given for the alternative construction approach where works would be conducted predominantly in the day under a short duration closure of Parkway Avenue (westbound) between National Park and Stewart Avenue, for all traffic with property accesses maintained for residents.

Respondents were concerned that noise, vibration and lighting during night construction could potentially impact residential amenity and that the health of sensitive receivers within the vicinity of the works could be adversely affected.

Response

In response to the support for the alternative construction method detailed in the REF, Roads and Maritime has consulted residents adjacent to the proposed works and Newcastle City Council.

Following this consultation, Roads and Maritime now propose that the majority of road construction works on Parkway Avenue will be conducted during the day under a temporary day road closure between National Park Street and Stewart Avenue during the January 2018 school holiday period. Access to the closed section of the road will be maintained for residents and their visitors at all times. Roads and Maritime has considered the potential impact of detours (refer to **Section 3.2**).

Some construction will need to be carried out during evening and night periods (OOHW) to minimise disruption to traffic and to maximise the safety of construction workers such as line marking, asphalt works on Stewart Avenue, and traffic light installation.

Circumstances may arise during construction where OOHW are required, and nearby properties are predicted to be highly noise affected (i.e. experience noise levels greater than 75dB(A)). Where this is the case, opportunities to minimise impacts (as described in Section 6.3.5 of the REF) on highly noise affected receivers, including the provision of alternative accommodation, will be considered in consultation with affected receivers.

Where there are complaints about noise from an identified work activity, the work activity will be reviewed, and where feasible and reasonable, additional control measures implemented. This may include monitoring to confirm that predicted impacts are in line with levels predicted in the REF.

A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP). The NVMP will generally follow the approach in the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009).

All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of the project, construction period and works hours, contact information for project management staff, complaint and incident reporting, and how to obtain further information.

As outlined in the REF, the nearest receivers along Parkway Avenue are about 10 to 15 metres away and as such conservative estimates found that vibration impact on human comfort levels would be possible if vibration intense machinery is used. However, Roads and Maritime has reviewed the construction methodology and selected less vibration intense machinery such as static or oscillating rollers to reduce this potential impact (refer to **Section 3.1**).

2.5.2 Structural damage

Submission numbers

20, 21, 22, 31, 34

Issue description

Several respondents were concerned that the proposal would have the potential to cause structural damage to their properties. Some of these respondents requested a building condition survey prior to construction.

Response

An additional structural vibration impact assessment has been carried out (refer to **Section 3.1**). To reduce the risk of vibration impacts to structures, it is proposed that static or oscillating rollers will be used during construction. These rollers are low vibration and are not expected to disturb buildings or pipework below the road surface. The proposed construction equipment and techniques are not anticipated to result in any damage to existing adjacent buildings.

In addition, Roads and Maritime has offered property owners within 50 metres of the proposal, the option to have an independent assessor carry out building condition surveys at Roads and Maritime expense prior to construction commencing.

Vibration monitoring would be carried out during construction under the NVMP prepared in accordance with the Roads and Maritime Construction Noise and Vibration Guideline (2016).

Where there are complaints about vibration from an identified work activity, the complaint would be investigated, the work activity will be reviewed, and where feasible and reasonable, additional control measures implemented.

2.6 Social and economic

2.6.1 Property value impacts

Submission numbers

23

Issue description

A respondent raised concerns that their property value may decrease due to increased traffic on Kenrick Street.

Response

Impacts on property values are not anticipated with the implementation of the proposal as any redistribution of traffic is expected to be small, as described in **Section 2.2.1**.

2.6.2 REF Determination

Submission numbers

32

Issue description

Respondents queried the environmental impact assessment process and the opportunity for appeals under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Response

This proposal has been assessed under the environmental impact assessment provisions of section 111 of the EP&A Act. Having regard to the REF, issues raised in submissions, and the findings of this submissions report, Roads and Maritime will determine whether to proceed with the proposal. Should Roads and Maritime determine to proceed, conditions would be applied to the approval to minimise impacts on the environment. This Submissions Report is part of the environmental assessment process.

Under the EP&A Act and the *Land and Environment Court Act 1979* there are no grounds for third party merit appeals for Part 5 determinations. However, should a third party seek judicial review of

the legality of the decision making process, the Land and Environment Court has jurisdiction under Class 4 to review Part 5 determinations, issue injunctions and other orders.

2.6.3 Community consultation

Submission numbers

28, 32, 36

Issue description

Respondents queried the process of considering submissions as part of the environmental impact assessment process for the proposal.

Response

Roads and Maritime has made the REF available for public display and comment. Issues raised by respondents have been considered as part of design development, and additional environmental impact assessment has been carried out to respond to issues raised in submissions (refer to **Chapter 3**). This Submissions Report summarises issues raised in submissions and how Roads and Maritime has responded to these issues.

The Submissions Report will be publically available once finalised on the Road and Maritime website www.rms.nsw.gov.au. Any further community updates will also be included on this website.

A start of construction notification would be sent via letter box drop to a number of residents around the proposal a minimum of five working days prior to the commencement of construction of the proposal.

2.7 Contamination

2.7.1 Impacts on Ausgrid oil filled cables

Submission number(s)

34

Issue description

Respondents indicated concern that the proposal may interfere with Ausgrid oil filled electricity cables.

Response

Roads and Maritime consulted with Ausgrid to confirm the location of its assets in the vicinity of the proposal. The proposed work would not intersect with existing Ausgrid infrastructure. **Section 3.1** of this report does however include a management measure that Roads and Maritime will consult with Ausgrid who will determine whether an Ausgrid representative be on site during earthworks activities near their underground asset.

3 Additional assessment

Following the public display of the REF, Roads and Maritime has carried out additional environmental impact assessment to minimise the environmental impacts of the proposal.

3.1 Vibration impacts

3.1.1 Summary

During the preparation of the REF, the preliminary construction methodology used to inform the noise and vibration impact assessment indicated that the only vibration intensive plant proposed during construction of the proposal was a medium vibratory roller. For a roller of this size, there is a risk of building damage occurring at properties within about 12 metres of the work area. Given the sandy soil conditions, and consequent lower vibration transmission rates, it was concluded that building damage was unlikely to occur during the works.

However, it has been identified that there is a risk of human comfort impacts for receivers located within about 40 metres of the works. To address this potential impact a low vibration, oscillating compaction roller would be used instead of the vibratory rollers assessed as part of the REF. Ground vibration levels would be substantially reduced when using this type of roller.

3.1.2 Additional management and mitigation measures

To respond to the additional assessment discussed above, the following changes to the mitigation measures are proposed.

Number	Impact	Environmental safeguard	Responsibility	Timing
NV-8	Vibration	<ul style="list-style-type: none"><u>Use quieter and less vibration emitting construction methods where reasonable and feasible.</u><u>Vibration monitoring equipment will be used at the commencement of works activities to confirm vibration levels are within the acceptable range to prevent cosmetic building damage.</u>	Construction contractor	Construction

3.2 Traffic diversion for day works

In response to the support for the alternative construction method detailed in the REF, Roads and Maritime has consulted with residents and Newcastle City Council and will be conducting the majority of road construction works under a temporary day works detour of Parkway Avenue between National Park Street and Stewart Avenue during the January 2018 school holiday period.

Residents whose property or driveway access is via Parkway Avenue between National Park Street and Stewart Avenue, both the eastern approach and the western approach, were provided with a letter on 21 November 2017 explaining the proposed detour and requesting their permission for the temporary day works road closure as well as any conditions of that permission. All the residents who responded agreed to the temporary day works road closure and detour.

Eastbound traffic will be detoured via Darby Street and Union Street, then King Street or Glebe Road. Traffic control at the Parkway Avenue and National Park Street intersection will redirect non-

local traffic to these collector roads thereby eliminating potential noise and traffic impacts to National Park Street from the proposed diversion detailed in the REF.

During the preparation of the REF, the preferred route for general traffic diversions was not finalised. This has now been confirmed as along King Street, Union Street, Darby Street, and Glebe Road. The roads are mostly arterial roads, which typically carry a high volume of traffic on a daily basis. However, as the construction period for this proposal is during the school holidays, these roads will be carrying a substantially lower than normal traffic volume. This will reduce the impact of the diverted traffic.

Given the few options for the management of temporary road traffic noise increases, this diversion for the carrying out of day works would be a suitable method at reducing potential noise impacts relative to OOHV.

3.2.1 Additional management and mitigation measures

Roads and Maritime now propose to carry out day works with traffic diversions to minimise the need for OOHV.

The day works detour option would require up to five non-consecutive nights during that period to carry out asphalt and traffic light works on Stewart Avenue, weather permitting.

3.3 Pre-construction traffic surveys

Pre-construction traffic surveys of the Stewart Avenue intersections with local roads from Parkway Avenue to Cram Street have been carried out (as detailed in Table 5-2 of the REF) and post-construction traffic surveys are planned for July 2018.

The pre-construction surveys demonstrated that movements out of and into Kemp Street are small and that the scope for traffic to be pushed onto other local streets is small, especially during school peak hours. In the morning peak hour only 20 vehicles perform movements out of Kemp Street that will be banned (the right turn into Kemp Street is already banned in the morning peak period, though 7 vehicles were counted performing this movement). In the afternoon peak hour, only 11 vehicles performed these movements. In the afternoon school peak hour, only a small number of vehicles (21) make the right turn into Kemp Street. A larger number (43) make the right turn in the later afternoon peak hour and outside of peak hours.

It is likely that traffic associated with movements that will be banned under the proposal, would make use of the traffic light controlled intersection at Parkway Avenue, as there would be little or no travel time benefit in using other routes.

When the proposal has been completed and post-construction surveys conducted, the traffic survey data as well as updated crash history of Stewart Avenue intersections will be reviewed in consultation with Newcastle City Council within three months of that data collection.

These will be considered for corrective action depending on their priority. Comment from residents and the public would be invited for any future projects as part of Roads and Maritime's community consultation process.

3.4 Revised crash data

Following the public display period, Roads and Maritime has reviewed crash data for Stewart Avenue/Kemp Street intersection for non-peak traffic.

In the five year period between July 2008 and June 2013 there were nine recorded crashes at the intersection of Stewart Avenue and Kemp Street. Two were crashes involved traffic crossing Stewart Avenue from Kemp Street, one of which was during non-peak hour period.

In the period July 2013 to June 2016 there have been an additional five crashes at the intersection of Stewart Avenue and Kemp Street. One crash involved traffic crossing Stewart Avenue from Kemp Street which was during non-peak traffic period.

3.5 Air quality impacts to heritage trees

Emissions from construction equipment will include products of combustion, and most substantially carbon monoxide (CO), oxides of nitrogen (NO_x including NO₂) and particulate matter (as PM₁₀ and PM_{2.5}). Concentrations of these substances, due to the construction equipment, have been predicted using the Roads and Maritime air quality screening tool known as TRAQ. The predicted concentrations have then been compared to EPA air quality criteria in order to determine the potential impacts.

The following assumptions were made for the TRAQ simulation:

- The mix of construction vehicles would be 25 per cent light duty commercial petrol, 25 per cent light duty commercial diesel, 25 per cent heavy duty commercial petrol, and 25 per cent rigid truck
- Up to 13 construction vehicles would be moving simultaneously along the upgrade area every minute, equating to an equivalent of 780 vehicle movements per hour
- Per annum emission factors for 2016 for a residential road type
- Residential land-use for the dispersion calculations.

Nitrogen dioxide (NO₂) is the substance most likely to affect the health of plants and trees. From TRAQ, the predicted maximum NO₂ concentration in the vicinity of the construction area was 89 µg/m³, which includes maximum existing background levels. This result can be compared to the EPA's air quality impact assessment criterion for NO₂ which is 246 µg/m³. The predicted concentration of 89 µg/m³ is lower than the EPA criterion of 246 µg/m³ which suggests that emissions from the construction equipment will not cause any adverse air quality impacts to the surrounding area.

Further information on TRAQ can be found on the Roads and Maritime website.

During operation of the proposal it is not expected that bringing cars closer to the Norfolk Island Pine and Cook Pines within the Parkway Avenue median would impact on the health of these trees. Many species of pine trees are commonly found in urban environments around the world and perform well in these environments. Car exhaust has not been identified in the literature as a significant problem for Norfolk and Cook Pine Trees.

4 Changes to the proposal

4.1 Day works traffic detour

In response to the support for the alternative construction method detailed in the REF, Roads and Maritime has consulted with residents and Newcastle City Council and with their agreement will be conducting the majority of road construction works under a temporary day works detour of Parkway Avenue between National Park Street and Stewart Avenue during the January 2018 school holiday period.

Eastbound traffic will be detoured via Darby Street and Union Street, then King Street or Glebe Road. Traffic control at the Parkway Avenue and National Park Street intersection will redirect non-local traffic to these collector roads thereby eliminating potential noise and traffic impacts to National Park Street from the proposed diversion detailed in the REF.

4.2 Minor traffic light adjustment

The need for an additional minor traffic light adjustment was identified in the development of the design during a safety in design workshop following the public display. The traffic light post located in the median on the western side of Stewart Avenue has an audiotactile push button for pedestrians who find themselves in the median area and are unable to complete crossing Parkway Avenue during a walk phase. The traffic light post is currently located too far into the median to be accessed by some people with disabilities. It is intended to relocate this post closer to the crossing and provide a standard concrete pad behind the post for future maintenance. Refer to **Figure 4-1**.

To complete this adjustment, a shallow excavation to a depth of about 225 millimetres would be required to accommodate a small concrete pad area behind the post. The traffic light post would be relocated using an offset plate fixed to the existing post footing eliminating need to dig a new traffic light post footing. The excavations would be about seven metres from the nearest median tree.

The arborist would be on site and assess trees prior to any excavations within the western Parkway Avenue median. This has been added as an additional safeguard in **Table 5.1**. The additional concrete landing area and changes required are consistent with the conclusion of the SoHI as there would be a minimal change of the physical appearance of the whole Parkway Avenue as the median would remain relatively unaltered. The changes are consistent with the impact in the REF and no further environmental assessment are required.

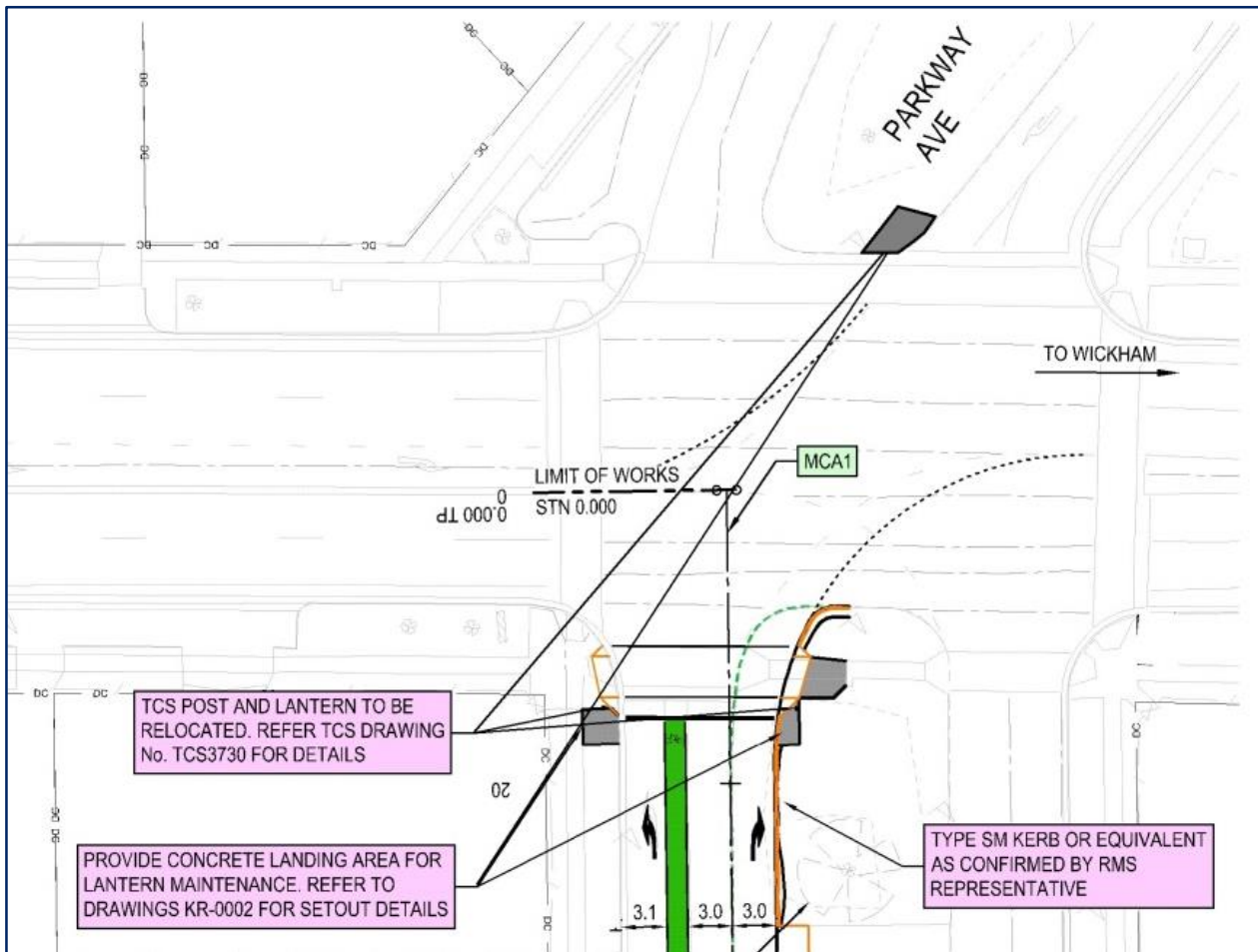


Figure 4-1 Updated proposal design showing concrete landing area for traffic light adjustment.

4.3 Minor adjustments to lane widths

The detailed design for the proposal would limit the median reduction to three metres with minor adjustments to lane widths. The typical section and traffic lane configuration has been modified as shown in **Figure 2-1**.

5 Environmental management

The REF for the road safety improvements on Stewart Avenue at the Parkway Avenue and Kemp Street intersections, Hamilton South identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (Section 7 of the REF).

After consideration of the issues raised in the public submissions, the safeguard and management measures have been revised. Amended/additional mitigation measures include:

- Clarification of temporary fencing installation for and kerb construction and around the Norfolk and Cook Island Pines (refer to B-3 in **Section 5.2**)
- Clarification of proposed mulching on the Parkway median (refer to B-4 in **Section 5.2**)
- Development of a hygiene protocol (refer to B-5 in **Section 5.2**)
- If spreader roots are encountered during excavation (refer to **Section 2.4.1**)
- An arborist to be on site and assess trees prior to any excavations within the western Parkway Avenue median (refer to **Section 4.2**)
- Clarification of screening for night works (refer to NV-4 in **Section 5.2**)
- The use of quieter and less vibratory intensive plant to reduce potential vibration impacts (refer to **Section 3.1.2**)
- Vibration monitoring measures prior to the commencement of works (refer to **Section 3.1.2**)
- Clarification that an arborist will be on site during construction (refer to NH-3 **Section 5.2**)
- Clarification of wording in the contaminants control measures (refer to SW-3 in **Section 5.2**)
- Day works to be implemented with traffic diversions to minimise the need for OOHV (refer to **Section 3.2.1**)

Should the proposal proceed, environmental management will be guided by the framework and measures outlined below.

5.1 Environmental management plans

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by environment staff, Hunter Region, prior to the commencement of any on site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), and QA Specification G10 – Traffic Management.

5.2 Summary of safeguards and management measures

The REF identified a range of environmental outcomes and management measures that will be required to avoid or reduce the environmental impacts (Section 7.2 of the REF).

After consideration of the issues raised in the public submissions, the environmental management measures for the proposal (refer to Chapter 7.2 of the REF) have been revised. Should the project proceed, the environmental management measures in **Table 5.1** will guide the subsequent phases of the proposal development. Additional and/or modified environmental safeguards and management measures to those presented in the REF have been **underlined** and deleted measures, or parts of measures, have been struck out.

Table 5.1: Summary of environmental safeguards and management measures

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
General				
GEN1	General – minimise environmental impacts during construction	<p>A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity.</p> <p>As a minimum, the CEMP will address the following:</p> <ul style="list-style-type: none"> • Any requirements associated with statutory approvals • Details of how the project will implement the identified safeguards outlined in the REF • Issue-specific environmental management plans • Roles and responsibilities • Communication requirements • Induction and training requirements • Procedures for monitoring and evaluating environmental performance, and for corrective action • Reporting requirements and record-keeping • Procedures for emergency and incident management • Procedures for audit and review. <p>The endorsed CEMP will be implemented during the undertaking of the activity.</p>	Contractor / Roads and Maritime project manager	Pre-construction / detailed design
GEN2	General – notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least <u>five working</u> days prior to commencement of the activity.	Contractor / Roads and Maritime project manager	Pre-construction
GEN3	General – environmental awareness	<p>All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk:</p> <ul style="list-style-type: none"> • Areas of heritage significance • Working in urban areas 	Contractor / Roads and Maritime project manager	Pre-construction / detailed design

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		<ul style="list-style-type: none"> Noise management during night works Protecting the Norfolk and Cook Island Pines within the median of Parkway Avenue. 		
GEN4	General – environmental awareness	<p>Standard construction hours:</p> <ul style="list-style-type: none"> Monday to Friday 7.00 am to 6.00 pm Saturdays 8.00 am to 1.00 pm No construction on Sundays or Public Holidays. <p>Works outside standard construction hours (including those detailed within this REF) will be undertaken in accordance with the management and mitigation measures detailed within the Noise and Vibration Management Plan.</p>	Contractor	Construction
GEN5	General – environmental awareness	The Roads and Maritime Project Manager will notify the Roads and Maritime Environment Manager at least five days prior to the commencement of the activity. The notification will include a copy of any local community notification undertaken (GEN2).	Contractor	Pre-construction / detailed design
Traffic and transport				
TT1	Traffic and transport	<p>A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime <i>Traffic Control at Work Sites Manual</i> (RTA, 2010) and <i>QA Specification G10 Traffic Management</i> (Roads and Maritime, 2008). The TMP will include:</p> <ul style="list-style-type: none"> Confirmation of haulage routes Measures to maintain access to local roads and properties Site specific traffic control measures (including signage) to manage and regulate traffic movement Measures to maintain pedestrian and cyclist access Requirements and methods to consult and inform the local community of impacts on the local road network Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads A response plan for any construction traffic incident 	Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		<ul style="list-style-type: none"> Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic Monitoring, review and amendment mechanisms. 		
TT-2	Property access, pre-construction	Requirements for any changes to local access arrangements will be confirmed during detailed design in consultation with the local road authority and any affected landowners.	Roads and Maritime	Pre-construction / detailed design
TT-3	Reduce speeds, traffic delays and disruptions during construction	Road users and local communities will be provided with timely, accurate, relevant and accessible information about changed traffic arrangements and delays owing to construction activities.	Roads and Maritime and Construction Contractor	Construction
Biodiversity				
B-1	Biodiversity	Flora and Fauna Management measures will be incorporated and implemented as part of the CEMP.	Contractor	Detailed design / pre-construction
B-2	Stockpiles, plant and ancillary sites	Vehicle parking, machinery, construction compounds, material stockpiles and the like, will be located in cleared or disturbed areas, not within the drip-zone of vegetation, nor to be retained or within other protected or exclusion zones identified in CEMP.	Contractor	Construction
B-3	Impact to trees on Parkway Median	<p>All personnel working on site will receive training to ensure awareness of the sensitivity of the Norfolk and Cook Island Pine trees within the road median and the required protection measures. Protection measures include:</p> <ul style="list-style-type: none"> The area around the base of the tree will be fenced off as a TPZ to retain the existing median strip except for the three metres to be used for the road widening <u>and up to two metres for the non-destructive footing (wide concrete blocks) of the temporary fencing, and kerb construction</u> Tree protection fencing will not be able to be easily moved and will represent a significant barrier to prevent construction works being carried out within the fenced area 	Contractor	Construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		<ul style="list-style-type: none"> The TPZ will extend for the width of the median strip, excluding the proposed road widening, to the fifth tree back from Stewart Avenue for the duration of construction Signage will be attached to the tree protection fencing denoting that this is a TPZ which must not be encroached upon The signage will contain the name and contact number of the Site Arborist and the City of Newcastle Council contacted should damage to the trees occur The signage will remain in place for the duration of the construction All site personnel will be made aware of tree requirements and protection measures. 		
B-4	Maintain / Improvement to health of the trees on Parkway Avenue median prior to construction	<ul style="list-style-type: none"> Install leaf or brush mulch to a depth of 125 millimetres over the entire grassed median strip area <u>prior to commencement of the works.</u> Mowing maintenance will also be eliminated Mulch will need to be topped up annually to the 125 millimetres depth A coarse mulch will be used to prevent the mulch blowing or washing away Retaining a mowing strip along the currently grassed median, immediately beside the roadway of 1-2 metres width could also be employed if mulching to the edge of the road is not suitable. Apply a complete fertiliser on top of the mulch at about one handful per square metre Supplementary watering using water cart to the trees during dry spells, especially during summer Supplementary watering will be conducted, on a weekly basis and in the absence of adequate natural rainfall, at least out to the drip-lines of the trees and preferably out to the width of the median strip Supplementary watering will continue for a period of two years post construction The site arborist will supervise and treat any exposed tree root/s during excavation. Roots over about 25 millimetres in diameter should be cleanly cut prior to excavation machinery digging up any roots Excavation vehicles or equipment will not rip at or remove roots along the face of excavation next to the trees. In the event the vehicles 'grab' at 	Roads and Maritime Contractor	Pre-construction, construction and post construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		roots during works, the machinery operator will stop work immediately and allow the roots to be cut before continuing <ul style="list-style-type: none"> Excavation materials and waste will not be stored within the fenced TPZ Cement washes, fuel and other chemicals will not be washed into the root area of trees Underground services will be designed to use common trenches as far away from tree roots as possible. 		
B-5	<u>Hygiene protocol to protect trees</u>	<u>A hygiene protocol will be developed and implemented in accordance with the best practice measures in the Biodiversity Guidelines – Protecting and managing biodiversity on RTA projects, to minimise risks associated with potential introduction and spread of Phytophthora into vegetated areas adjoining or in the immediate vicinity of the construction site. The protocol will be included in the CEMP.</u>	<u>Roads and Maritime Contractor</u>	<u>Pre-construction and construction</u>
B-6	<u>Protection of trees</u>	<u>Should any spreader roots be encountered during the excavations, work will stop and the arborist will assess the roots and advise construction on any treatment</u>	<u>Roads and Maritime Contractor</u>	<u>Construction</u>
B-7	<u>Assessment of tree on the western Parkway Avenue median</u>	<u>There will be no excavations within the Structural Root Zone for the traffic light adjustment within the western Parkway Avenue median. An arborist will undertake assessment of the Structural Root Zone of the pine tree prior to any excavation within the western Parkway Avenue median.</u>		
Noise and vibration				
NV-1	Project planning	<ul style="list-style-type: none"> Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the <i>Interim Construction Noise Guideline</i> (ICNG) (DECC, 2009) and in order to remove or reduce the need for out of hour's activities, consideration should be given to road traffic diversions which would allow the work area to be closed to normal road traffic during daytime hours Out of Hours Works (OOHW) should be kept to a minimum Truck routes to and from the worksite will be via major roads where possible. 	Roads and Maritime / Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
NV-2	Site induction	All personnel working on site will receive training to ensure awareness of requirements of the NVMP. Site-specific training will be given to personnel when working in the vicinity of sensitive receivers.	Contractor	Pre-construction / construction
NV-3	Noise source mitigation	<ul style="list-style-type: none"> • Site layout will be such that the use of tonal reversing beepers is reduced during night time hours. If necessary, tonal beeper will be substituted with alternative warning devices such as non-tonal alarms or visual aids • Plant will be fitted with noise control devices, where practicable, including acoustic lining of engine bays and air intake/discharge silencers • Doors/hatches will be shut during operation of plant and equipment • Hatches/enclosures will be checked regularly to ensure that seals are in good working order and doors close properly against seals • Materials will not be dropped from heights • Residential-grade mufflers will be used on plant • Equipment will be operated in the correct manner including replacement of engine covers, repair of defective silencing equipment, tightening of rattling components, repair of leakages in compressed air lines and shutting down equipment not in use. 	Contractor	Pre-construction / construction
NV-4	Screening	Temporary screening will be installed around immobile plant including daymakers during night works.	Contractor	Construction / construction
NV-5	Noise and vibration	<p>All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least five working days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:</p> <ul style="list-style-type: none"> • The project • The construction period and construction hours • Contact information for project management staff • Complaint and incident reporting • How to obtain further information. 	Contractor	Pre-construction / construction
NV-6	Out of hours works construction	<ul style="list-style-type: none"> • Circumstances may arise during construction where works outside of standard construction hours are essential and sensitive receivers are assessed to be highly noise affected (ie experience noise levels greater than 75dB(A)). Where this is the case, opportunities to minimise impacts on highly noise effected receivers, including the provision of alternative 	Contractor	Construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		<p>accommodation, will be considered in consultation with those affected receiver(s).</p> <ul style="list-style-type: none"> Where there are complaints about noise from an identified work activity, the work activity will be reviewed, and where feasible and reasonable, action additional control measures. This may include monitoring to confirm that predicted impacts are in line with levels predicted in this assessment. 		
NV-7	Operational noise management	<u>It is recommended</u> that noise monitoring would be is-carried out before and after the upgrade to determine actual changes in operational noise.	Roads and Maritime	Pre-construction / post construction
NV-8	Vibration	<ul style="list-style-type: none"> Should construction methods change to include equipment likely to generate high vibration impacts, or should any heritage items be discovered in the vicinity of the works, a vibration assessment should be carried out Where there are complaints about vibration from an identified work activity, the work activity will be reviewed, and where feasible and reasonable, additional control measures implemented. <u>Use quieter and less vibration emitting construction methods where reasonable and feasible.</u> <u>Vibration monitoring equipment will be used at the commencement of works activities to confirm vibration levels are within the acceptable range to prevent cosmetic building damage.</u> 	Construction contractor	Construction
<u>NV-9</u>	<u>Compaction machinery</u>	<ul style="list-style-type: none"> <u>To reduce the risk of vibration impacts to structures, static or oscillating rollers will be used during construction.</u> 	Construction contractor	Construction
<u>NV-10</u>	<u>Vibration Monitoring</u>	<ul style="list-style-type: none"> <u>Vibration monitoring will be undertaken at the commencement of vibration generating activities to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.</u> 	Construction contractor	Construction
Non-Aboriginal heritage				
NH-1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management measures will be implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage.	Contractor	Detailed design / pre-construction
NH-2	Non-Aboriginal heritage	<ul style="list-style-type: none"> The <i>Standard Management Procedure - Unexpected Heritage Items</i> (Roads and Maritime, 2015) will be followed in the event that any 	Contractor	Construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		<p>unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered</p> <ul style="list-style-type: none"> Work will only re-commence once the requirements of that Procedure have been satisfied. 		
NH-3	Protection of trees during construction	Appropriate management measures will be put in place to ensure the Norfolk and Cook Island Pines are not impacted as recommended by the arborist report (Apex 2017). The recommendations include: <u>an arborist on site during construction</u> , signage promoting the establishment of a tree protection zone, mulching, watering, removable tree protection fencing, fertilisation, and appropriate care during construction and the relocation of services.	Roads and Maritime /Contractor	Pre-Construction / construction and operation
NH-4	Non-Aboriginal heritage	Non-Aboriginal heritage awareness training will be provided for contractors prior to commencement of construction works to ensure understanding of potential heritage items that may be impacted during the proposal, and the procedure required to be undertaken in the event of discovery of historical heritage materials, features or deposits, or the discovery of human remains.	Contractor	Construction
NH-5	Managing community expectations	In order to address the potential impacts on social significance, additional management options will be considered such as temporary interpretative signage during construction to explain the significance of the place to the community and how the proposal has considered this.	Road and Maritime	Pre-construction / Construction
Landscape character and visual impacts				
LC-1	Visual impact of work sites	Project work sites, including construction areas and supporting facilities (such as storage compounds and offices) will be managed to minimise visual impacts, including appropriate storage of equipment, parking, stockpile screening and arrangements for the storage and removal of rubbish and waste materials.	Contractor	Construction
LC-2	Light spill from work sites	Temporary lighting would be sited and designed to avoid light spill into residential properties and identified sensitive receptors.	Contractor	Construction
Hydrology, water quality and flooding				
SW1	Erosion and sedimentation	Soil and Water management measures will be implemented as part of the CEMP. The mitigation measures would be prepared and implemented in	Contractor	Construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		accordance with <i>The Blue Book - Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) and RMS G38 specification (Soil and Water Management).		
SW-2	Soil and water	A site specific Erosion and Sediment Control Plan/s (ESCP) will be prepared and implemented as part of the CEMP.	Contractor	Construction
SW-3	Contaminants entering receiving environments during construction	Control measures to minimise the risk of water pollution will be implemented including: <ul style="list-style-type: none"> All fuels, chemicals, and liquids will be stored at least 50 metres away from the existing stormwater drainage system and stored in an impervious bunded area within the compound site Plant and maintenance machinery will be refuelled in impervious bunded areas in the designated compound area <u>or carried out off-site.</u> Vehicle wash downs and/or concrete truck washouts would be carried out within a designated bunded area of an impervious surface or carried out off-site. 	Construction contractor	Construction
Topography, geology, soils and contamination				
S-1	Contaminated land	Contaminated Land Management measures will be prepared in accordance with the <i>Guideline for the Management of Contamination</i> (Roads and Maritime, 2013) and implemented as part of the CEMP. Measures will provide details for dealing with: <ul style="list-style-type: none"> Areas of known contamination (if applicable) Unexpected contamination finds Any land contamination caused by the proposal. 	Contractor	Detailed design / pre-construction
S-2	Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime Environment Manager and/or EPA.	Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
S-3	Accidental spill	A site specific emergency spill plan will be developed, and include spill management measures in accordance with the <i>Roads and Maritime Code of Practice for Water Management</i> (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers).	Contractor	Detailed design / pre-construction
Socio-economic, property and land use				
SE-1	Socio-economic	<p>A Communication Plan (CP) will be prepared as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum):</p> <ul style="list-style-type: none"> • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. <p>The CP will be prepared in accordance with the <i>Community Involvement and Communications Resource Manual</i> (RTA, 2008).</p>	Contractor	Detailed design / pre-construction
SE-2	Interruptions to utility services	The Construction contractor will inform residents before any interruptions to utility services that may be experienced during utility adjustments in accordance with the Community Engagement Plan.	Construction contractor	Construction
Other safeguards				
AQ-1	Air quality	<p>Air Quality management measures will be prepared and implemented as part of the CEMP. The measures will include, but not be limited to:</p> <ul style="list-style-type: none"> • Potential sources of air pollution • Air quality management objectives consistent with any relevant published EPA and/or OEH guidelines • Mitigation and suppression measures to be implemented • Methods to manage work during strong winds or other adverse weather conditions • A progressive rehabilitation strategy for exposed surfaces. 	Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
A-1	Aboriginal Heritage	The <i>Standard Management Procedure - Unexpected Heritage Items</i> (Roads and Maritime, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place.	Contractor	Detailed design / pre-construction
W-1	Waste	<p>Waste management measures will be prepared and implemented as part of the CEMP. The waste management measures will include but not be limited to:</p> <ul style="list-style-type: none"> • Measures to avoid and minimise waste associated with the project • Classification of wastes and management options (re-use, recycle, stockpile, disposal) • Statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • Procedures for storage, transport and disposal • Monitoring, record keeping and reporting. <p>The waste management measures will be prepared taking into account the <i>Environmental Procedure - Management of Wastes on Roads and Maritime Services Land</i> (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets.</p>	Contractor	Detailed design / pre-construction
U-1	Utilities	<p>Prior to the commencement of works:</p> <ul style="list-style-type: none"> • The location of existing utilities and relocation details will be confirmed following consultation with the affected utility owner • If the scope or location of proposed utility relocation works falls outside of the assessed proposal scope and footprint, further assessment will be undertaken. 	Contractor	Detailed design / pre-construction
HAZ-1	Hazards and risk management	<p>A Hazard and Risk plan will be prepared and implemented as part of the CEMP, if the existing 33kV lines are still operational. The plan will include, but not be limited to:</p> <ul style="list-style-type: none"> • Details of hazards and risks associated with the activity 	Contractor	Detailed design / pre-construction

No.	Impact	Environmental safeguards and management measures	Responsibility	Timing
		<ul style="list-style-type: none"> Measures to be implemented during construction to minimise these risks Record keeping arrangements, including information on the materials present on the site, material safety data sheets, and personnel trained and authorised to use such materials A monitoring program to assess performance in managing the identified risks Contingency measures to be implemented in the event of unexpected hazards or risks arising, including emergency situations. <p>The HRMP will be prepared in accordance with relevant guidelines and standards, including relevant Safe Work Australia Codes of Practice, and EPA or Office of Environment and Heritage publications.</p>		

5.3 Licensing and approvals

Licences and approvals required for the proposal are listed in **Table 5.2**.

Table 5.2: Summary of licensing and approval required

Instrument	Requirement	Timing
<i>Roads Act 1993</i>	Road Occupancy Licence would need to be obtained as necessary prior to construction commencing.	Prior to start of the activity.
<i>Ausgrid NS156</i>	Approval to work near high voltage underground assets. Conducted in accordance with <i>NS156 Working Near or Around Underground Cables – Ausgrid</i> , including requirement for Ausgrid representative on site during excavation works within one metre of Ausgrid's asset where deemed required by Ausgrid.	Prior to start of the activity.

6 References

Roads and Maritime Services 2017, *Road safety upgrades on Stewart Avenue at the Parkway Avenue and Kemp Street intersections, Hamilton South Review of Environmental Factors*, Newcastle, NSW.



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