ANNEXURE D

Confirmation letter from OEH concerning BioBank calculations

NSW GOVERNMENT | Office of Environment & Heritage

Your reference: MP10_0103
Our reference: DOC14/49282
Contact: Krister Waern 02 6640 2503

Mr Steve Connelly
PLANNERS NORTH
PO Box 538
Lennox Head NSW 2478

Planners North
Received 22/04/14
Project SWR
☐ to be returned
☐ reviewed
☐ approved for use
☐ noted, file - no action required
☐ approved for payment ledger # .....
☐ action as follows

Dear Mr Connelly

Re: Biobanking Calculations for Settlers Ridge South West Rocks.

Thank you for contacting the Office of Environment and Heritage (OEH) with respect to the above development. I appreciate the opportunity to consult with you on this matter.

The Settlers Ridge Concept Plan Approval from the Department of Planning and Infrastructure (DP&I) dated 25 July 2013 required the re-calculation of biodiversity credits for the site in consultation with OEH. I understand your biobanking accredited consultant Mr Peter Parker has been liaising with Mr Krister Waern from my unit to finalise the biobanking credit requirement for the proposed development.

The biobanking calculations submitted to OEH on 7 April 2014 are acceptable to OEH.

If you require further information or clarification please contact Mr Krister Waern, Senior Operations Officer, on telephone 02 6640 2503.

Yours sincerely

15 April 2014

DIMITRI YOUNG
Senior Team Leader Planning, North East Region
Regional Operations

Locked Bag 914, Coffs Harbour NSW 2450
Federation House Level 7, 24 Moonee Street,
Coffs Harbour NSW 2450
Tel: (02) 6651 5946 Fax: (02) 6651 6187
ABN 30 841 387 271
www.environment.nsw.gov.au

BioBanking credit report

This report identifies the number and type of credits required at a DEVELOPMENT SITE.

Date of report: 10/04/2014 Time: 10:51:18AM Tool version: v2.1

Development details

Proposal ID:	0064/2014/1120D
Proposal name:	Settlers Ridge Development April 2014
Proposal address:	Gregory Street and Kieth Andrews Drive South West Rocks NSW 2431
Proponent name:	SJ Connelly CPP Pty Ltd
Proponent address:	PO Box 538 Lennox Head NSW 2478
Proponent phone:	0266877171
Assessor name:	Peter Parker
Assessor address:	Broken Head Road BROKEN HEAD NSW 2481
Assessor phone:	6685 3148
Assessor accreditation:	0064

Improving or maintaining biodiversity

An application for a red flag determination is required for the following red flag areas

Red flag	Reason

The application for a red flag determination should address the criteria set out in the BioBanking Assessment Methodology. Please note that a biobanking statement cannot be issued unless the determination is approved.

Additional information required for approval:

- ☐ Change to percent cleared for a vegetation type/s
- ☐ Use of local benchmark
- ☐ Change negligible loss
- ☐ Expert report...
- ☐ Request for additional gain in site value
- ☐ Predicted threatened species not on site
- ☐ Change threatened species response to gain (Tg value)

Ecosystem credits summary

Vegetation type [51]	Area (ha)	Credits required	Red flag
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast	15.49	1,157.00	No
Total	15.49	1,157	

Credit profiles

1. Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast, (NR228)

Number of ecosystem credits created	1,157
CMA sub-region	Macleay Hastings - Northern Rivers
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

Offset options - vegetation types	Offset options - CMA sub-regions
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast, (NR228) Blackbutt - bloodwood dry heathy open forest on Quaternary sands of the northern North Coast, (NR114) Blackbutt - bloodwood dry heathy open forest on sandstones of the northern North Coast, (NR115) Blackbutt - Needlebark Stringybark shrubby open forest on coastal sands of the North Coast, (NR116) Blackbutt - Spotted Gum shrubby open forest on sandstones of the lower Clarence Valley of the North Coast, (NR118) Pink Bloodwood - Red Mahogany - Smudgy Apple shrubby open forest on sandstone of northern North Coast, (NR218) Pink Bloodwood open forest of the coastal lowlands of the North Coast, (NR220) Scribbly Gum - Needlebark Stringybark heathy open forest of coastal lowlands of the northern North Coast, (NR227)	Macleay Hastings - Northern Rivers Clarence Lowlands Coffs Coast & Escarpment Clarence Sandstones

Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Brush-tailed Phascogale	Phascogale tapoatafa	15.49	310

BioBanking credit report

This report identifies the number and type of credits required at a BIOBANK SITE.

Date of report: 8/01/2014 Time: 5:34:30PM Tool version: v2.1

Biobank details

Proposal ID:	0064/2014/0994B
Proposal name:	Settlers Ridge Biobank January 2014
Proposal address:	Gregory Street and Kieth Andrews Drive South West Rocks NSW
Proponent name:	SJ Connelly CPP Pty Ltd
Proponent address:	PO Box 538 Lennox Head NSW 2478
Proponent phone:	0266877171
Assessor name:	Peter Parker
Assessor address:	Broken Head Road BROKEN HEAD NSW 2481
Assessor phone:	6685 3148
Assessor accreditation:	0064

Additional information required for approval:

- ☐ Use of local benchmark
- ☐ Expert report...
- ☐ Request for additional gain in site value

Ecosystem credits summary

Vegetation type	Area (ha)	Credits created
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast	27.90	223.00
Total	27.90	223

Credit profiles

1. Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast, (NR228)

Number of ecosystem credits created	223
CMA sub-region	Macleay Hastings - Northern Rivers
Minimum percent native vegetation cover class	31-70%
Minimum adjacent remnant area class	>100 ha

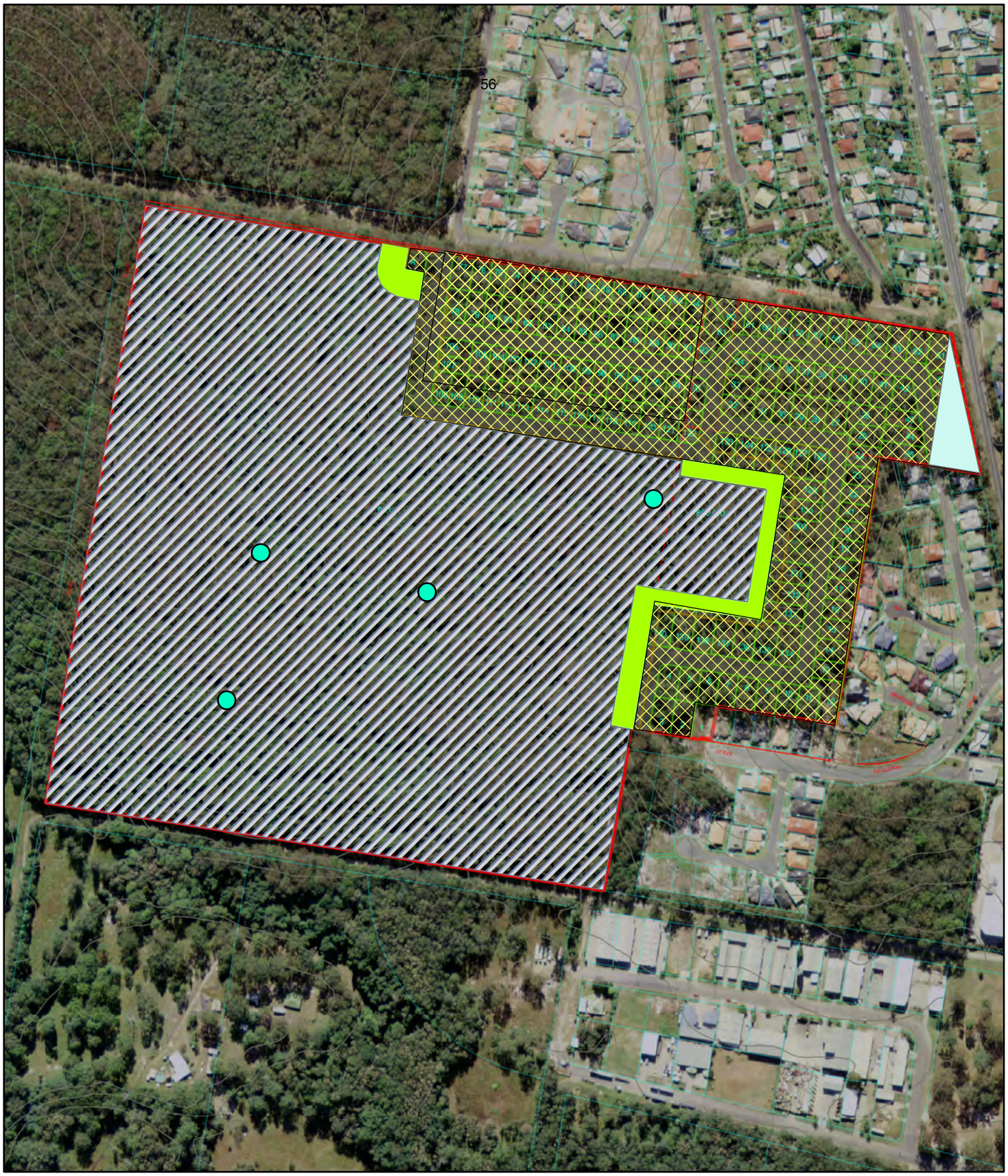
Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Masked Owl	Tyto novaehollandiae	27.90	31
Squirrel Glider	Petaurus norfolcensis	27.90	31
Brush-tailed Phascogale	Phascogale tapoatafa	27.90	31

Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Brush-tailed Phascogale	Fox control
Masked Owl	Exclude miscellaneous feral species
Masked Owl	Fox control
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast	Exclude miscellaneous feral species
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast	Feral and/or over-abundant native herbivore control
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast	Fox control
Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the North Coast	Maintain or re-introduce natural flow regimes
Squirrel Glider	Fox control



BioBank plots

3.1 ha development envelope

BioBank site 27.9 ha

Development site 14.59 ha

APZ 0.9 ha

N

0 125 250 Meters

1:5,000

ANNEXURE E

Updated Bushfire Report

BUSHFIRE MANAGEMENT PLAN

FOR

SUBDIVISION

AT

LOTS 31,57 and 223
SETTLERS RIDGE
SOUTH WEST ROCKS NSW 2431

FOR

PLANNERS NORTH

04 November 2013
Version A

Prepared by:

Barry Eadie Consulting Pty Ltd
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Bushfire Management Plan

For

Settlers Ridge

Subdivision – South West Rocks NSW 2431

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1. PURPOSE

This plan outlines the actions and responsibilities of Planners North, being the initial developer, the Community Association and individual lots owners in managing the level of Bushfire risk to the development from adjoining bushland.

The site has already been given development consent by Newcastle City Council (DA 04 / 2732) for a Staged Subdivision. In accordance with this consent the Council required that a Bushfire Management Plan be prepared that addressed the following requirements;

*A Bushfire Management Plan being prepared for each stage and certified by a suitably qualified consultant or the NSW Rural Fire Service as complying with the requirements of the document **'Planning for Bushfire Protection' (2006)** and the requirements of the Bushfire Safety Authority issued by the NSW Rural Fire Service on 28 July 2005, with two copies submitted to Council. The required Plan is to include, but not be limited to, the following and is to be submitted with documentation accompanying the Construction Certificate application in respect of each stage:*

a) Location of permanent Asset Protection Zones (APZ) and fire trails;

b) Location of temporary APZ's and fire trails such that adequate protection is provided to the subdivision at all times during development;

c) APZ establishment methods;

d) Location of habitat trees to be retained;

e) Existing topography, adjacent development and open space;

f) Access to services;

g) Extent of cut and fill, access points and "links" to public areas;

h) Existing and proposed plant species; and

i) Archaeological heritage.

The requirements of ***'Planning for Bushfire Protection' (2006)***, in relation to Bushfire Management Plans are listed as follows:

- *Contact person / department and details;*
- *Schedule and description of works for the construction of Asset Protection Zones and their continued maintenance;*
- *Management strategies, proposed schedule and description of works involving any remnant bushland within the property boundary;*
- *Details of access through any gate / fire trail system for remnant bushland areas.*

2. EXECUTIVE SUMMARY

These matters will be addressed as follows:

a) Location of permanent Asset Protection Zones (APZ) and fire trails:

See Appendix A (Estate APZ Plan). The permanent APZ's are those APZ that are adjacent to and on the bushland side of the fire buffer trail and perimeter roads. The permanent APZ and perimeter roads are detailed below.

North: Proposed Lots 51-77 and Lot 801 fronting Keith Andrews Avenue:

North: Keith Andrews Avenue with residential development further north.

North: Proposed Lots 135-140 back onto proposed fire buffer trail then Forest.

South: Proposed Lots. 1-3 front Steve Eagleton Drive.

South: Proposed Lots 7-12 back onto existing lots that front Steve Eagleton Drive

South: Proposed Lots 108-122 front proposed road then Forest.

South: Proposed Lots 123-127 back onto proposed fire buffer trail then Forest.

East: Proposed Lots 12-24 back onto existing residential lots.

East: Proposed Lots 46-51 back onto Gregory Street.

West: Proposed Lots 77 and 78 proposed road and Lot 801.

West: Proposed Lot 801 Forest.

West: Proposed Lots 106-108, proposed road then Forest.

West: Proposed Lots 129-133 and 140 back onto proposed fire buffer trail then Forest.

West: Proposed Lots 3 and 4 have proposed road and fire buffer trail to the West then Forest.

b) APZ establishment methods:

See body of this report section seven (7).

c) Access to services:

Reticulated power, water, telephone, gas and sewer services are readily accessible to all Lots within the estate and from and within the road network. Power is reticulated underground.

The requirements of ***'Planning for Bushfire Protection' (2006)***, in relation to Bushfire Management Plans are listed as follows:

- *Contact person / department and details;*
- *Schedule and description of works for the construction of Asset Protection Zones and their continued maintenance;*
- *Management strategies, proposed schedule and description of works involving any remnant bushland within the property boundary;*
- *Details of access through any gate/fire trail system for remnant bushland areas.*

All of these matters are addressed within the report.

3. OBJECTIVES

The objectives of this Bushfire Management Plan are to:

- Meet the requirements placed on the Developer by Concept Approval;
- Provide a mechanism to reduce the risk of bushfire damage to life, property and the environment on the site through the use of appropriate bush fire risk management strategies;
- Ensure, the Developer, The Community Association and individual Lot owners understands their bush fire management responsibilities;
- Provide a mechanism for effectively monitoring bush fire risk management strategies to increase the protection for the site.

4. SITE ASSESSMENT

The subject land consists of 4 parcels in 4 separate ownerships. They are Lot 31 (31.81 ha), Lot 57 (5.3 ha), Lot 223 (3.4 ha) and Vacant Crown Land (0.399 ha). The vacant sites form the last linkage between the older sections of South West Rocks, and the expanding urban development to the south.

This includes a local commercial / shopping precinct approximately 350m to the south of the site known as "The Rocks" shopping village and community centre.

To the north, there are scattered commercial developments randomly located along Gregory Street, before the road merges with the town centre of South West Rocks, some 1.5km away. Recreational facilities such as the South West Rocks Country Club, Surf Club, and South West Roxy Cinema are similarly located to the north of the site.

This project involves treating the 4 land parcels as a single integrated development parcel. It is expected that they will however be developed separately.

5. CONTACT DETAIL

Name of premises:	**Settlers Ridge**
Address:	Keith Andrews Avenue and Gregory Street, South West Rocks NSW 2431
Contact person:	**Stephen Connelly, Planners North**
Telephone:	**1300 66 00 87**
Date of plan:	04 November 2013
Date of review:	**XXX**

6. CONSTRUCTION OF THE ASSET PROTECTION ZONES

The Asset Protection Zones on the site will be constructed in accordance with section 4.1.3 of ***'Planning for Bushfire Protection' (2006)***.

The requirements of the APZ, in accordance with ***'Planning for Bushfire Protection' (2006)*** are:

- An IPA should provide tree canopy cover of less than 15% and should be located greater than 2 metres from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

- An OPA should provide a tree canopy cover of less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (usually September)

7. MANAGING BUSH FIRE FUEL TO REDUCE BUSH FIRE HAZARDS

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to manage bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some round cover is also needed to prevent soil erosion.

8. BUSH FIRE FUELS CAN BE MANAGED BY:

8.1 Raking or Manual Removal of Fine Fuels

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and barks should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

8.2 Mowing of Grass

Grass needs to be kept short, and where possible, green.

8.3 Removing or Pruning of Trees, Shrubs and Understorey

The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have continuous tree canopy leading from the hazard to the asset. Separate tree crowns by 2 to 5 metres. A canopy should not overhang within 2 to 5 metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

When choosing plants for removal, the following basic rules should be followed:

- Remove noxious and environmental weeds first. Your local council can provide a list or environmental weeds or ‘undesirable species’
- Remove more flammable species such as those with rough, flaky or stringy bark; and
- Remove or thin understorey plants, trees and shrubs less than 3 metres in height.

The removal of significant native species should be avoided.

Prune in accordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the trees.
- Decide which branches are to be removed before the commencement of work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.

There are three primary methods of pruning trees in APZ's:

1. Crown Lifting (skirting)

Remove the lowest branches (up to 2 metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning

Remove smaller secondary branches whilst retaining the main structural branches of a tree. Thinning may minimise the intensity of a fire.

3. Selective Pruning

Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

8.4 Slashing and Trittering

Slashing and trittering are economical methods of fuel reduction for large APZ's that have good access. However these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbours property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

8.5 Ploughing and Grading

Ploughing and grading can produce effective firebreaks; however, in areas where this method is applied, frequent maintenance is required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

8.6 Burning (Hazard Reduction Burning)

Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used my land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bushfires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document ***Standards for low Intensity Bush Fire Hazard Reduction Burning***, or contact your local RFS for advice.

8.7 Pile Burning

In, some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document ***Standards for Pile Burning***.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document ***Before You Light That Fire*** for further details.

9. LANDSCAPING AND BUSH FIRE HAZARD REDUCTION

Your home and garden can blend with the natural environment and be landscaped for protection at the same time.

To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and wind breaks.

Landscaping should be in accordance with section 4.4 of '***Newcastle City Council Development Plan' (2005)***.

9.1 Layout of Gardens in an APZ

When creating and maintaining a garden that is part of the APZ you should:

- Ensure that vegetation does not provide a continuous path to the house;
- Remove all noxious and environmental weeds.
- Plant or clear vegetation into clumps rather than continuous rows;
- Prune low branches 2 metres from the ground to prevent a ground fire from spreading into trees;
- Locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- Plant and maintain short green grass around the house as this will slow the fire and reduce the fire intensity. Alternatively, provide non flammable pathways directly around the dwelling;
- Ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low flammability plants and non flammable ground cover such as pebbles and crushed tile; and
- Avoid erecting brush type fencing and planting “pencil pine” type trees next to buildings, as these are highly flammable.

9.2 Removal of Other Materials

Woodpiles, wooden sheds, combustible material, storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc should be located away from the house. These areas should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

9.3 Other Protective Features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property’s APZ.

10. FREQUENCY OF BUSH FIRE RISK MANAGEMENT WORKS

The maintenance of the APZ's will be primarily the responsibility of Community Association. The Community Association will be required to maintain all Permanent APZ's and Bushfire Trails after their initial establishment by the Developer.

Individual Lot owners within the estate will also be responsible for maintaining bushfire fuel loads on their lots in accordance with Section 8 of this plan after their initial establishment by the Developer.

The APZ's will be maintained as Inner and Outer Protection Areas as is appropriate in accordance with Section 4.1.3 of ***'Planning for Bushfire Protection' (2006)***.

It is difficult to allocate fixed timetables for bush fire hazard reduction works, as some areas may require more works than others. However the general principle of monitoring the site in consultation with the NSW Fire Brigade should be carried out on an annual basis.

The frequency of mowing or slashing will vary but is usually undertaken where necessary based on visual inspection and prior to the fire season (annually). It is necessary to re-assess the frequency of hazard reduction works on an annual basis as part of the monitoring process to ensure that the management complies with the requirements as set out above.

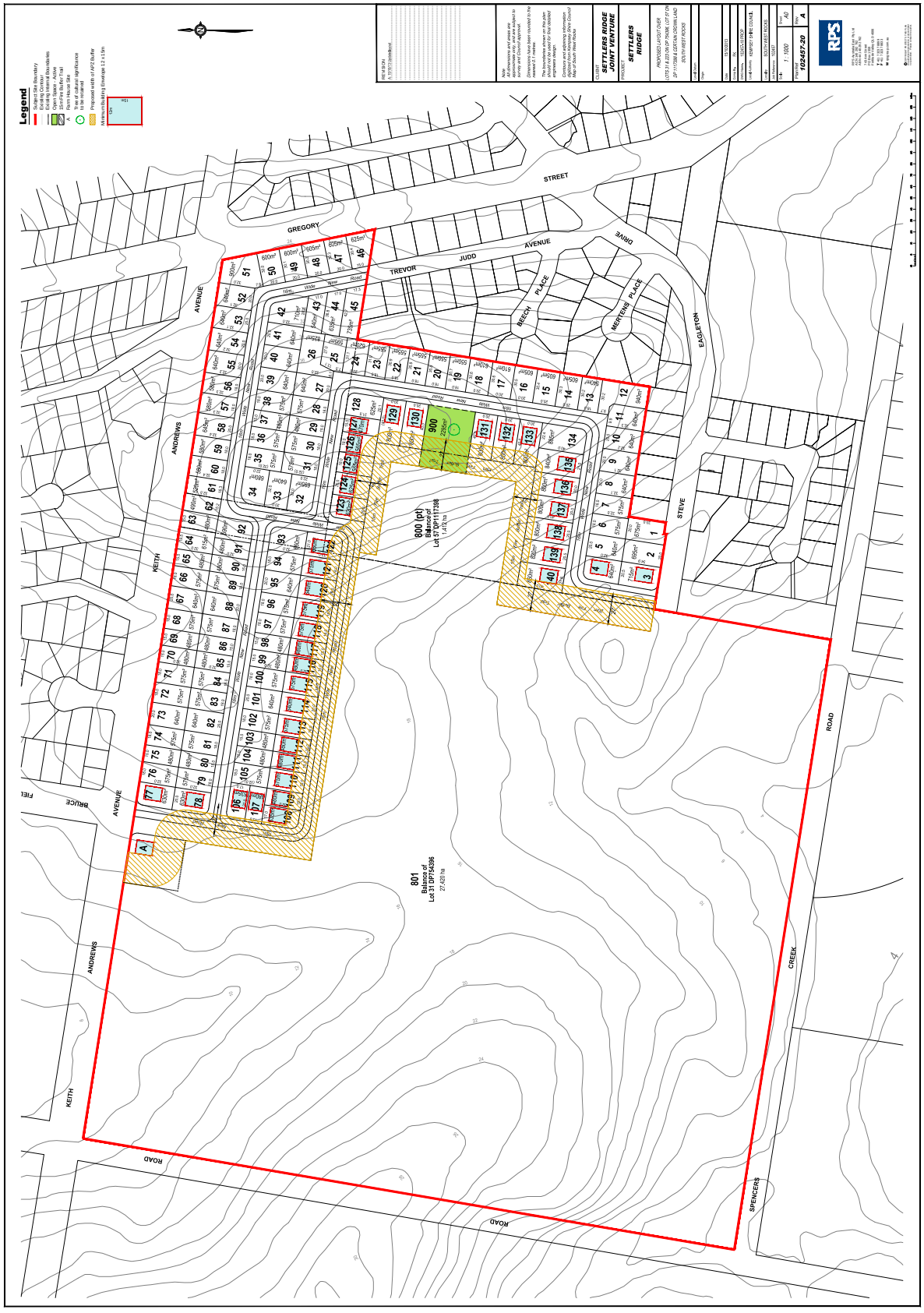
As a minimum standard however and due to the bush fire risk, the following maintenance procedure **MUST** be followed.

1. Immediately prior to September each year or if the fire season is brought forward by the NSW RFS, a suitably qualified Bushfire Consultant or an officer of the NSW Fire Brigade is to conduct a visual inspection of the Asset Protection Zones.
2. Following this inspection a report will be prepared on the status of the Asset Protection Zones and submitted to the Community Association. The report will outline what maintenance works, if any, are necessary to meet the requirements of this plan.
3. Following submission of the report to the Community Association if maintenance works are required these works are to be undertaken within 1 month of receiving the report.
4. Further inspections may also be necessary to confirm that the required maintenance works have been adequately completed and / or if additional inspections are required throughout the year to ensure the maintenance of APZ's. These inspections also will need to be undertaken by a suitably qualified Bushfire Consultant or an officer of the NSW Fire Brigade.

11. ACCESS

Access will be via the normal subdivision access provisions.

APPENDIX A - ESTATE APZ PLAN



ANNEXURE F

Updated Traffic Report

RoadNet

Traffic Impact Assessment

(Additional Information)

Settlers Ridge
Residential Development

Gregory Street
SOUTH WEST ROCKS

for

Planners North

November 2013

Document Control Sheet

Document Status	FINAL
Prepared By	Rohan Jayawardene
Reviewed By	Craig Nethery
Date	26 November 2013

Prepared by:

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1. INTRODUCTION

In August 2013 RoadNet was engaged by Planners North (formerly S J Connelly CPP Pty Ltd) to prepare a response to a request for further information to be provided as part of the Development Consent (Conditions DA 10_0103) provided by Kempsey Shire Council regarding the residential development known as Settlers Ridge, on Steve Eagleton Street South West Rocks. The development as currently proposed consists of 140 dwelling lots.

The concept approval requires that further information be provided / investigated for the following:

1. Investigate the level of impact likely to occur at the intersection of Gregory Street with Frank Cooper Street.
2. Provide analysis and consideration of the implications of Bruce Field Street potentially becoming a rat-run for future traffic accessing Gregory Street via Frank Cooper Street.
3. Consider the impacts of traffic generated by the site on the intersection of Trevor Judd Avenue with Steve Eagleton Drive.

This report provides the additional details.

FIGURE 1.1: Locality Plan

1.1 Background

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In September 2012 RoadNet submitted a Traffic Impact Assessment (TIA) report for a 154 lot development at the site. This report included an assessment of the Gregory Street/Steve Eagleton Street/Belle O'Connor Street roundabout from development generated traffic and a 15 year horizon, 2027 analysis.

The main access to the Settlers Ridge development is proposed via Steve Eagleton Drive, an existing collector road, approximately 400m west of Gregory Street/Steve Eagleton Street roundabout. The proposed internal circulation road network will also include a connection with the existing Keith Andrews Avenue to the north of the proposed development and continuation of Trevor Judd Avenue to the north and west.

A plan of the proposed development is attached as Appendix A.

1.2 Aim

As requested, the aim of this report is to:

- Assess impacts on the Gregory Street/Frank Cooper Street intersection existing and future expected traffic flows from the proposed development,
- Consider the impacts of traffic generated on the Trevor Judd Avenue/Steve Eagleton Street intersection,
- Provide analysis and consideration of the implications of Bruce Field Street potentially becoming a rat-run for future traffic accessing Gregory Street via Frank Cooper Street.

2. TRAFFIC IMPACTS

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The main access to the future 'Settlers Ridge' development is proposed via Steve Eagleton Drive, an existing road intersecting with Gregory Street.

An alternative access to the development is proposed through the existing residential estate to the north of the subject site via Bruce Field Street at the Keith Andrews Avenue intersection, onto Frank Cooper Street which in turn connects to Gregory Street, the major north-south link through South West Rocks.

2.1 Gregory Street/Frank Cooper Street Intersection

In order to assess the impact on Frank Cooper Street/Gregory Street intersection from development generated traffic, a peak hour manual intersection counts were completed on Thursday 21 October 2013:

- Morning peak period: 7:00am – 10:00 am; and
- Evening peak period: 3:00pm – 6:00pm

This traffic survey information is presented in Appendix B. The existing intersection operation was analysed using SIDRA computer software. Results are detailed in Table 2-1.

The intersection operation was analysed with proposed development generated traffic added to the intersection as well as an annual traffic growth of 1.8% provided by Kempsey Shire Council. To estimate the number of vehicles north-bound and south-bound at the Gregory Street/Steve Eagleton Street roundabout, the original TIA report used the following proportions:

- 40% Gregory Street north direction, and
- 55% Gregory Street south direction.

Figure 2-1 shows the estimated traffic flow at the intersection in 2028 pre-development (background only) and post-development (background + development generated).

2028 AM: pre-Development

					Gregory St					
				29	424	18				
				23	334	14				
				RT	TH	LT				
F-C	37	29	LT				RT	16	20	
St	4	3	TH				TH	1	1	
	27	21	RT				LT	16	20	
				LT	TH	RT				
				9	249	8				
				11	316	10				

2028 AM: post-Development

					Gregory St					
				36	424	18				
				23	334	14				
				RT	TH	LT				
F-C	53	29	LT				RT	16	20	
St	4	3	TH				TH	1	1	
	27	21	RT				LT	16	20	
				LT	TH	RT				
				9	249	8				
				11	316	10				

2028 PM: pre-Development

					Gregory St					
				38	349	24				
				30	275	19				
				RT	TH	LT				
F-C	33	26	LT				RT	13	17	
St	3	2	TH				TH	1	1	
	19	15	RT				LT	1	1	
				LT	TH	RT				
				28	356	19				
				36	452	24				

2028 PM: post-Development

					Gregory St					
				55	349	24				
				30	275	19				
				RT	TH	LT				
F-C	40	26	LT				RT	13	17	
St	3	2	TH				TH	1	1	
	19	15	RT				LT	1	1	
				LT	TH	RT				
				28	356	19				
				36	452	24				

Figure 2-1: Estimated future traffic at Gregory Street/Frank Cooper Street Intersection (15 = existing traffic; 36 = predicted traffic; LT = Left turn, TH = Through, RT = Right turn)

In this calculation it was assumed that 20% of development traffic will use the northern intersection, Frank Cooper Street/Gregory Street and Bruce Field Street.

Gregory Street/Frank Cooper Street priority intersection was analysed using SIDRA for the existing and 2028 future year, pre and post development traffic conditions. Results of these analyses are summarised in Table 2-1 and SIDRA output sheets are attached in Appendix C.

For this analysis a traffic growth of 1.8% per year was used, same as used in the previous report.

Table 2-1: Gregory Street/Frank Cooper Street Intersection Operation

Scenario	Worst LOS	Degree of Saturation	Average Delay (sec)
2013 Existing AM Peak	A	21%	3.4
2013 Existing PM Peak	A	21%	3.5
2028 Pre-Development AM Peak	A	28%	4.3
2028 Pre-Development PM Peak	B	30%	5.0
2028 Post-Development AM Peak	A	28%	4.5
2028 Post Development PM Peak	B	30%	5.2

The above results indicate that the intersection operation is "excellent" for all three scenarios.

Table 2-2 details the existing and expected traffic volumes on the Frank Cooper Street approach at the Frank Cooper Street/Gregory Street intersection.

Table 2-2: Peak Hour Traffic Volumes on local roads

	Frank Cooper St		
	Exist	Pre-Dev	Post-Dev
AM	53	68	84
PM	43	55	62

Kempsey Shire Council's version of the "Auspec-1 D01 Geometric Road Design" guidelines recommend a maximum of 100 tenements for a local street, or 2,000 vehicles per day or 200 vehicles per hour.

As can be seen from Table 2-2, development traffic using Frank Cooper Street/Gregory Street intersection and hence Bruce Field Street to access the site is minimal and well within the notional capacity of the road. It is not expected to have any adverse impact. Furthermore, as explained in the original TIA report, internal roads are likely to include traffic calming devices so as to keep vehicle speeds low as well as discourage "rat-run" through the site.

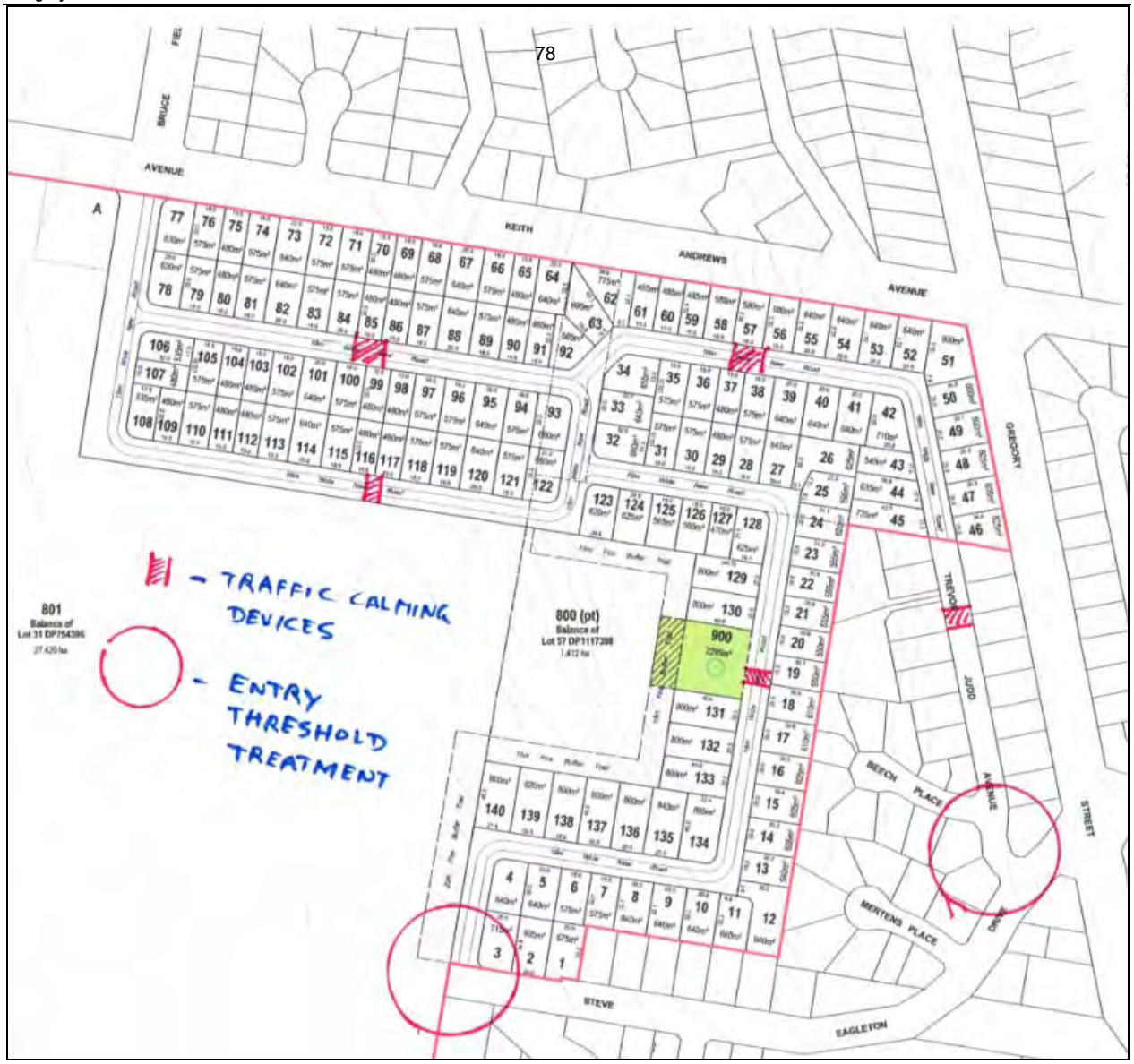

Figure 2-2: Traffic Calming Locations

2.2 Trevor Judd Street/Steve Eagleton Street Intersection

Currently, Trevor Judd Street is a cul-de-sac and services 37 dwellings. The total proposed post development (full occupation) will be 95 houses on this street. Since a total of 95 tenements are what is proposed on Trevor Judd Avenue it complies with AuSpec guidelines. Additionally, as explained in the previous section a percentage of the future development traffic will use other routes, especially houses at the east end of the street. Hence, the impact on Trevor Judd Avenue/Steve Eagleton Street intersection from development traffic will be minor.

3. CONCLUSION

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Kempsey Shire Council has requested additional assessment in accordance with Development Consent Conditions (DA 10_0103). These conditions include:

1. Assessment of impacts on Frank Cooper Street/Gregory Street intersection.
2. Trevor Judd Street/Steve Eagleton Street intersection, and
3. Potential rat running through Bruce Field Street.

The main points to note from this assessment are:

- Frank Cooper Street/Gregory Street intersection is expected to operate at Level of Service A in 2028 with development traffic, in both morning and evening peak periods
- Expected traffic increase in Bruce Field Street is well under the road capacity
- Expected traffic on Trevor Judd Street will be below that for a local street and hence no significant traffic issues at Trevor Judd Street/Steve Eagleton Street intersection is expected.
- Rat running through Bruce Field Street and Frank Cooper is not expected to be significant due to the proposed installation of traffic calming devices on the internal road network.

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APPENDIX A

Development Layout

Development Statistics

Total Site Area (Deed)	40.399 ha
Total Area of Active Open Space	2295 m²
Total No. of Residential Allotments	140
Courtyard Allotments 445 - 499 m²	25
Premium Courtyard Allotments 500 - 599 m²	48
Traditional Allotments 600 - 699 m²	48
Premium Traditional Allotments 700 m² +	19
Balance Allotments	2
Average Allotment Size	610 m²
Area of New Road	2.789 ha
Total Length of New 16.0m Wide Road	1622 m

Legend

- Subject Site Boundary
- Existing Contour
- Existing Internal Boundaries
- Open Space - Active
- 15m Fire Buffer Trail
- A Farm House Site
- Tree of cultural significance to be retained

N

801
Balance of
Lot 31 DP754396
27.420 ha

800 (pt)
Balance of
Lot 57 DP1117398
1.412 ha

REVISION
A: 07/05/13 Amend Balance Areas
B: 15/10/13 Amend Lot Layout
C: 30/10/13 Amend Lot 58-64 and 92-93

Note
All dimensions and areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

The boundaries shown on this plan should not be used for final detailed engineers design.

Contours and adjoining information digitized from Kempsey Shire Council Map of South West Rocks

CLIENT
SETTLERS RIDGE JOINT VENTURE

PROJECT
SETTLERS RIDGE

PROPOSED LAYOUT OVER
LOTS 31 & 223 ON DP 754396, LOT 57 ON DP 1117398 & CERTAIN CROWN LAND
SOUTH WEST ROCKS

Level Datum	
Origin	
Date	30 OCT 2013
Comp By.	FK
DWG Name.	102457-18C PROP
Local Authority	KEMPSEY SHIRE COUNCIL
Locality	SOUTH WEST ROCKS
Job Reference	102457
Scale	1 : 1000
Sheet	A0
Plan Ref	102457-18
Rev	C

RPS Australia East Pty Ltd
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ABN 44 140 292 762

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W rpsgroup.com.au

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140m

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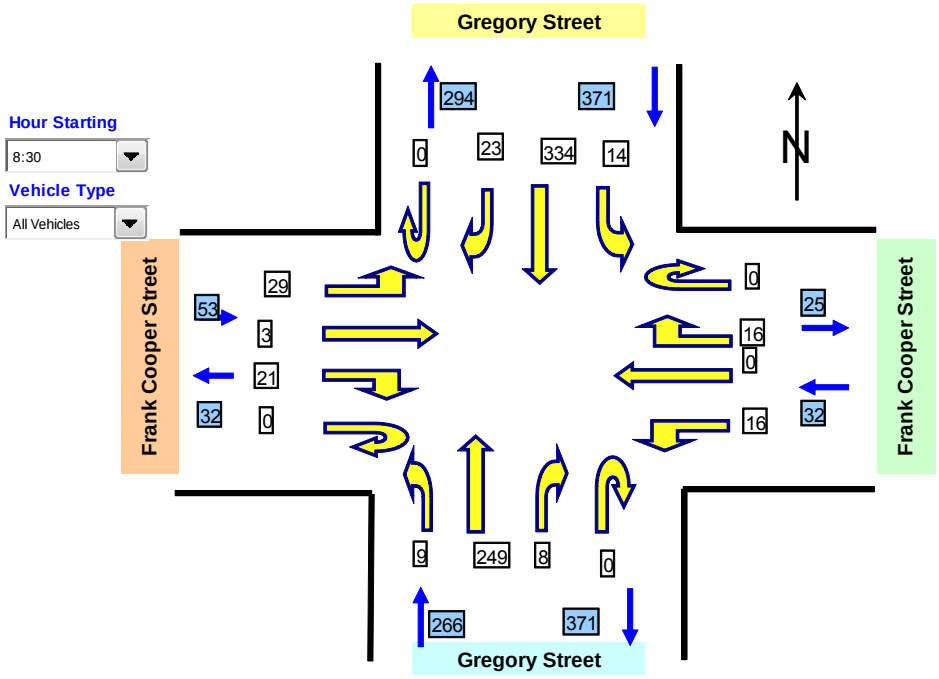
APPENDIX B

Traffic Counts

Job No.	13070P	83
Client	Planners North	
Suburb	South West Rocks	
Location	Gregory Street / Frank Cooper Street	
Day/Date	Thu, 21st Oct 2013	
Weather	Fine	
Description	Intersection Count	

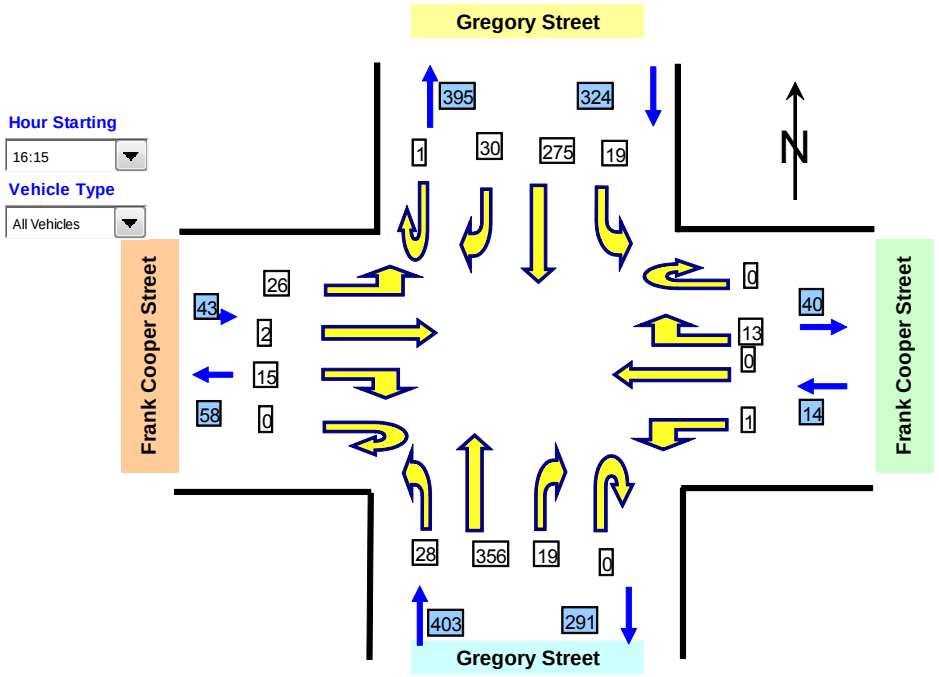
RoadNet Pty Ltd



* Note : Sum figures are not including each U-turn.

Job No.	13070P	84
Client	Planners North	
Suburb	South West Rocks	
Location	Gregory Street / Frank Cooper Street	
Day/Date	Thu, 21st Oct 2013	
Weather	Fine	
Description	Intersection Count	

RoadNet Pty Ltd



* Note : Sum figures are not including each U-turn.

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APPENDIX C

SIDRA Summaries

MOVEMENT SUMMARY

Site: Gregory-Frank Cooper _ExistAM

Gregory St/Frank Priority Intersection
AM Peak Exist-No Dev
TC 21-10-13

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Gregory St											
1	L	9	0.0	0.152	10.1	LOS A	1.2	8.7	0.53	0.50	49.1
2	T	262	4.0	0.152	2.0	LOS A	1.2	8.7	0.53	0.00	50.9
3	R	8	0.0	0.152	10.4	LOS A	1.2	8.7	0.53	0.97	49.1
Approach		280	3.7	0.152	2.5	NA	1.2	8.7	0.53	0.05	50.7
East: Frank Cooper St E											
4	L	17	0.0	0.056	11.5	LOS A	0.2	1.2	0.46	0.68	45.4
5	T	1	50.0	0.056	12.1	LOS A	0.2	1.2	0.46	0.75	46.3
6	R	17	0.0	0.056	11.8	LOS A	0.2	1.2	0.46	0.83	45.3
Approach		35	1.5	0.056	11.7	LOS A	0.2	1.2	0.46	0.76	45.4
North: Gregory St N											
7	L	15	10.0	0.214	10.0	LOS A	1.6	11.8	0.47	0.55	49.0
8	T	352	3.0	0.214	1.5	LOS A	1.6	11.8	0.47	0.00	51.6
9	R	24	0.0	0.214	9.9	LOS A	1.6	11.8	0.47	0.94	49.1
Approach		391	3.1	0.214	2.3	NA	1.6	11.8	0.47	0.08	51.3
West: Frank Cooper St W											
10	L	31	0.0	0.074	10.9	LOS A	0.3	1.8	0.42	0.66	46.1
11	T	3	0.0	0.074	9.6	LOS A	0.3	1.8	0.42	0.74	47.0
12	R	22	0.0	0.074	11.2	LOS A	0.3	1.8	0.42	0.81	45.9
Approach		56	0.0	0.074	10.9	LOS A	0.3	1.8	0.42	0.72	46.1
All Vehicles		761	3.0	0.214	3.4	NA	1.6	11.8	0.49	0.14	50.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gregory-Frank Cooper _ExistPM

Gregory St/Frank Priority Intersection
4:15-5:15 PM Peak Hr Exist-No Dev
TC 21-10-13

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gregory St											
1	L	31	0.0	0.016	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	375	1.0	0.212	1.6	LOS A	1.7	12.1	0.49	0.00	51.4
3	R	20	0.0	0.212	9.9	LOS A	1.7	12.1	0.49	0.93	49.2
Approach		425	0.9	0.212	2.5	NA	1.7	12.1	0.46	0.09	51.1
East: Frank Cooper St E											
4	L	1	0.0	0.001	9.0	LOS A	0.0	0.0	0.31	0.59	47.6
5	T	1	50.0	0.037	15.0	LOS B	0.1	0.8	0.60	0.82	43.6
6	R	14	0.0	0.037	14.5	LOS A	0.1	0.8	0.60	0.84	42.9
Approach		16	3.3	0.037	14.2	LOS A	0.1	0.8	0.58	0.83	43.2
North: Gregory St N											
7	L	20	10.0	0.012	8.6	LOS A	0.0	0.0	0.00	0.67	49.0
8	T	289	3.0	0.184	2.2	LOS A	1.5	10.7	0.54	0.00	50.5
9	R	32	0.0	0.184	10.5	LOS A	1.5	10.7	0.54	0.93	48.8
Approach		341	3.1	0.184	3.4	NA	1.5	10.7	0.51	0.13	50.3
West: Frank Cooper St W											
10	L	27	0.0	0.026	9.4	LOS A	0.1	0.6	0.37	0.67	47.3
11	T	2	0.0	0.036	12.3	LOS A	0.1	0.9	0.59	0.78	44.3
12	R	16	0.0	0.036	13.6	LOS A	0.1	0.9	0.59	0.81	43.6
Approach		45	0.0	0.036	11.0	LOS A	0.1	0.9	0.46	0.72	45.8
All Vehicles		827	1.8	0.212	3.5	NA	1.7	12.1	0.48	0.15	50.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gregory-Frank Cooper _2028AM pre-Dev

Gregory St/Frank Priority Intersection
AM Peak Exist-No Dev
TC 21-10-13

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Gregory St											
1	L	12	0.0	0.193	11.1	LOS A	1.8	12.9	0.62	0.40	48.5
2	T	333	4.0	0.193	2.9	LOS A	1.8	12.9	0.62	0.00	49.5
3	R	11	0.0	0.193	11.4	LOS A	1.8	12.9	0.62	1.00	48.5
Approach		355	3.8	0.193	3.4	NA	1.8	12.9	0.62	0.04	49.4
East: Frank Cooper St E											
4	L	21	0.0	0.085	13.0	LOS A	0.3	1.8	0.54	0.74	44.0
5	T	1	50.0	0.085	13.6	LOS A	0.3	1.8	0.54	0.79	44.8
6	R	21	0.0	0.085	13.3	LOS A	0.3	1.8	0.54	0.87	44.0
Approach		43	1.2	0.085	13.2	LOS A	0.3	1.8	0.54	0.81	44.0
North: Gregory St N											
7	L	19	10.0	0.275	10.7	LOS A	2.4	17.2	0.57	0.44	49.0
8	T	446	3.0	0.275	2.2	LOS A	2.4	17.2	0.57	0.00	50.1
9	R	31	0.0	0.275	10.6	LOS A	2.4	17.2	0.57	0.95	48.9
Approach		496	3.1	0.275	3.0	NA	2.4	17.2	0.57	0.08	49.9
West: Frank Cooper St W											
10	L	31	0.0	0.108	12.6	LOS A	0.4	2.6	0.52	0.70	44.4
11	T	4	0.0	0.108	11.4	LOS A	0.4	2.6	0.52	0.78	45.2
12	R	28	0.0	0.108	12.9	LOS A	0.4	2.6	0.52	0.87	44.3
Approach		63	0.0	0.108	12.7	LOS A	0.4	2.6	0.52	0.78	44.4
All Vehicles		957	3.0	0.275	4.3	NA	2.4	17.2	0.58	0.14	49.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gregory-Frank Cooper _2028PM pre-Dev

Gregory St/Frank Priority Intersection
PM Peak Exist-No Dev
TC 21-10-13

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gregory St											
1	L	38	0.0	0.297	10.9	LOS A	2.8	20.3	0.64	0.36	48.7
2	T	476	4.0	0.297	2.7	LOS A	2.8	20.3	0.64	0.00	49.0
3	R	25	0.0	0.297	11.1	LOS A	2.8	20.3	0.64	0.96	48.7
Approach		539	3.5	0.297	3.7	NA	2.8	20.3	0.64	0.07	49.0
East: Frank Cooper St E											
4	L	1	0.0	0.066	17.5	LOS B	0.2	1.4	0.70	0.71	40.3
5	T	1	50.0	0.066	18.1	LOS B	0.2	1.4	0.70	0.86	40.8
6	R	18	0.0	0.066	17.8	LOS B	0.2	1.4	0.70	0.91	40.2
Approach		20	2.6	0.066	17.8	LOS B	0.2	1.4	0.70	0.90	40.3
North: Gregory St N											
7	L	25	10.0	0.256	12.3	LOS A	2.5	17.9	0.68	0.32	47.6
8	T	367	3.0	0.256	3.7	LOS A	2.5	17.9	0.68	0.00	48.3
9	R	40	0.0	0.256	12.2	LOS A	2.5	17.9	0.68	1.00	47.6
Approach		433	3.1	0.256	5.0	NA	2.5	17.9	0.68	0.11	48.2
West: Frank Cooper St W											
10	L	35	0.0	0.101	12.9	LOS A	0.3	2.4	0.56	0.77	44.2
11	T	3	0.0	0.101	11.7	LOS A	0.3	2.4	0.56	0.80	44.9
12	R	19	0.0	0.101	13.2	LOS A	0.3	2.4	0.56	0.88	44.1
Approach		57	0.0	0.101	12.9	LOS A	0.3	2.4	0.56	0.81	44.2
All Vehicles		1048	3.2	0.297	5.0	NA	2.8	20.3	0.65	0.14	48.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gregory-Frank Cooper _2028AM post-Dev

Gregory St/Frank Priority Intersection
AM Peak Exist-No Dev
TC 21-10-13

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Gregory St											
1	L	12	0.0	0.193	11.1	LOS A	1.8	12.9	0.62	0.40	48.5
2	T	333	4.0	0.193	2.9	LOS A	1.8	12.9	0.62	0.00	49.5
3	R	11	0.0	0.193	11.4	LOS A	1.8	12.9	0.62	1.00	48.5
Approach		355	3.8	0.193	3.4	NA	1.8	12.9	0.62	0.04	49.4
East: Frank Cooper St E											
4	L	21	0.0	0.087	13.3	LOS A	0.3	1.9	0.55	0.75	43.8
5	T	1	50.0	0.087	13.9	LOS A	0.3	1.9	0.55	0.79	44.6
6	R	21	0.0	0.087	13.5	LOS A	0.3	1.9	0.55	0.87	43.8
Approach		43	1.2	0.087	13.4	LOS A	0.3	1.9	0.55	0.81	43.8
North: Gregory St N											
7	L	19	10.0	0.282	10.8	LOS A	2.5	17.7	0.57	0.44	48.9
8	T	446	3.0	0.282	2.2	LOS A	2.5	17.7	0.57	0.00	50.0
9	R	38	0.0	0.282	10.6	LOS A	2.5	17.7	0.57	0.95	48.9
Approach		503	3.0	0.282	3.2	NA	2.5	17.7	0.57	0.09	49.8
West: Frank Cooper St W											
10	L	56	0.0	0.133	11.8	LOS A	0.5	3.2	0.49	0.71	45.2
11	T	4	0.0	0.133	10.6	LOS A	0.5	3.2	0.49	0.77	46.0
12	R	28	0.0	0.133	12.1	LOS A	0.5	3.2	0.49	0.86	45.1
Approach		88	0.0	0.133	11.9	LOS A	0.5	3.2	0.49	0.76	45.2
All Vehicles		989	2.9	0.282	4.5	NA	2.5	17.7	0.58	0.16	49.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Gregory-Frank Cooper _2028PM post-Dev

Gregory St/Frank Priority Intersection
PM Peak Exist-No Dev
TC 21-10-13

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Gregory St											
1	L	38	0.0	0.297	10.9	LOS A	2.8	20.3	0.64	0.36	48.7
2	T	476	4.0	0.297	2.7	LOS A	2.8	20.3	0.64	0.00	49.0
3	R	25	0.0	0.297	11.1	LOS A	2.8	20.3	0.64	0.96	48.7
Approach		539	3.5	0.297	3.7	NA	2.8	20.3	0.64	0.07	49.0
East: Frank Cooper St E											
4	L	1	0.0	0.068	18.0	LOS B	0.2	1.4	0.71	0.72	39.9
5	T	1	50.0	0.068	18.6	LOS B	0.2	1.4	0.71	0.86	40.4
6	R	18	0.0	0.068	18.3	LOS B	0.2	1.4	0.71	0.91	39.9
Approach		20	2.6	0.068	18.3	LOS B	0.2	1.4	0.71	0.90	39.9
North: Gregory St N											
7	L	25	10.0	0.278	12.5	LOS A	2.7	19.7	0.69	0.30	47.3
8	T	367	3.0	0.278	3.9	LOS A	2.7	19.7	0.69	0.00	48.0
9	R	58	0.0	0.278	12.4	LOS A	2.7	19.7	0.69	1.01	47.3
Approach		451	3.0	0.278	5.5	NA	2.7	19.7	0.69	0.15	47.9
West: Frank Cooper St W											
10	L	42	0.0	0.114	12.8	LOS A	0.4	2.7	0.56	0.78	44.3
11	T	3	0.0	0.114	11.6	LOS A	0.4	2.7	0.56	0.80	45.0
12	R	20	0.0	0.114	13.1	LOS A	0.4	2.7	0.56	0.88	44.2
Approach		65	0.0	0.114	12.8	LOS A	0.4	2.7	0.56	0.81	44.3
All Vehicles		1075	3.1	0.297	5.2	NA	2.8	20.3	0.66	0.16	48.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.