



# Wahroonga Estate Update Report on Sequencing of Road Upgrade Works

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Client // Australasian Conference  
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Office // NSW  
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# Wahroonga Estate

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Issue: E-Dr 11/10/16

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GTA Consultants Office: NSW

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# 1. Introduction

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In November 2011 Halcrow prepared a report on road works required for the Wahroonga Estate development project titled "Wahroonga Estate – Traffic Report, Timing of Upgrade Works".

This report assessed the expected cumulative traffic generation of the Estate as it was developed with a specified development time frame and dates were specified for individual development components. On the basis of this, road upgrades for different intersections along and parts thereof along Fox Valley Road and The Comenarra Parkway were determined to be required by certain fixed dates. These fixed dates were subsequently incorporated in a draft Deed of Agreement between the Australasian Conference Association (ACA) and the NSW Roads and Maritime Services (Roads and Maritime).

Following further design investigations and changes in market conditions, namely planning approvals related issues for the different types of development, there is now some uncertainty about the timing of some elements of the total development package.

In view of this, it is considered necessary to adopt alternative methods for the sequencing of road improvements:

- Intersection upgrades at locations such as Fox Valley Road-The Comenarra Parkway, Main Hospital entry and the new Wahroonga School intersection would be completed prior to the occupation of the particular development components rather than specific dates.
- The Pacific Highway-Fox Valley Road intersection is to be upgraded by Roads and Maritime with a partial contribution from the applicant, as agreed with Roads and Maritime during the initial deed negotiations.
- Widening and intersection improvements from the north of the development site along Fox Valley Road (i.e. Ada Avenue and Lucinda Avenue) be undertaken on the basis of cumulative traffic generation figures.
- Widening of Comenarra Parkway to Browns Road be completed in line with the residential development on Comenarra Parkway.

This report suggests alternative triggers for road and intersection upgrades that are not dependent on a fixed time frame for development. The analysis and traffic generation assumptions are the same as those assumed previously. The only difference is that trigger points for development are changed from a fixed time basis to be tied with occupation of particular developments.

It is understood that Roads and Maritime is no longer willing to enter into a Deed of Agreement for the road works. As such, the ACA will seek an approach whereby the road upgrade works are conditioned with development components under the overarching Concept Approval for the Wahroonga Estate as detailed in this report.

There is evidence of this approach having been adopted by the NSW Department of Planning and Environment (DoPE) in the past, with the State Significant Development approval SSD5535 aligning the new school intersection with Stage 3 of the School development component (refer condition C14).

This report has been developed specifically to support the Modification lodged with DoPE for the proposed upgrades to support the development of the Wahroonga Estate.

## 2. Traffic Generation Rates

Table 2.1 sets out the traffic generation rates for the different types of proposed development. These generation rates are the same as those used previously and would be used to assess future development applications unless it is more appropriate to use alternative rates based on the future traffic generation of the site.

**Table 2.1: Traffic Generation Rates Adopted in Assessment**

Developments	Trip Generation Rates
Hospital Expansion*	
- Stage 1A	0.70(AM) and 0.89(PM) veh trips/additional staff
- Stage 1B	0.85(AM) and 0.85(PM) veh trips/additional staff
- Stage 3	0.83(AM) and 0.84(PM) veh trips/additional staff
Residential	
- Houses/Town houses (Staff Accom.)	0.85 veh trips/dwelling
- Studio/1-Bed units (Staff Accom.)	0.28 veh trips/dwelling
- Studio/1-Bed units (Student Accom.)	0.21 veh trips/dwelling
- Studio/1-Bed units (Private use)	0.36 veh trips/dwelling
- 2/3 bedroom units (Private use)	0.52 veh trips/dwelling
- Retirement units	0.2 veh trips/dwelling
School	
- Years 7-10	0.38 veh trips/student
- Years 11-12	0.44 veh trips/student
Commercial	1.44 veh trips/100m <sup>2</sup> GFA

NOTE: \* - traffic generation rates for hospital expansion have been derived from Sydney Adventist Hospital Proposed Staged Alterations and Additions Fox Valley Road, Wahroonga, Assessment of Transport, Traffic and Parking Implications, July 2010, Transport and Traffic Planning Associates report.

### 3. Development Components and Estimated Traffic Generation

Table 3.1 sets out the approved land use components and the estimated traffic generation for each of these. These are generally as per the approved Concept Plan.

Table 3.1: Estimated Traffic Generation

Developments	Activity Measure	Estimated Traffic Generation (veh trips/peak hour)
Hospital Expansion		
- Stage 1A	158 (AM) and 88 (PM) additional staff	111 (AM) and 78 (PM)
- Stage 1B	86 (AM) and 78 (PM) additional staff	73 (AM) and 66 (PM)
- Stage 3	157 (AM) and 79 (PM) additional staff	131 (AM) and 66 (PM)
- Total	401 (AM) and 245 (PM) additional staff	315 (AM) and 210 (PM)
Residential#		
- Houses/Town houses (Staff Accom.)	15 reduced units	-12 (AM/PM)
- Studio/1-Bed units (Staff Accom.)	5 reduced units	-1 (AM/PM)
- Studio/1-Bed units (Student Accom.)	61 additional units	13 (AM/PM)
- Studio/1-Bed units (Private use)	92 additional units	33 (AM/PM)
- 2/3 bedroom units (Private use)	295 additional units	153 (AM/PM)
- Total	530 additional units	186 (AM/PM)
School		
- Prep to Year 10	385 additional students	146 (AM only)
- Years 11-12	180 additional students	79 (AM only)
- Total	565 additional students	225 (AM only)
Commercial	7,000m <sup>2</sup> additional GFA	101 (AM/PM)
<b>Total</b>		<b>827 (AM) and 497 (PM)</b>

NOTE: # - Residential components for this analysis excludes trips to/from the Mount Pleasant precinct as the additional traffic would use the Pennant Hills Road rather than the Fox Valley Road intersections.

Table 3.1 also shows the indicative development schedule and the traffic generation by each stage.

Table 3.2 presents the cumulative traffic generation based on the indicative order of delivery, as at the date of this report. However, the cumulative traffic generation may vary depending on the timing of each development component. The order of development components shown in Table 3.2 are only indicative and may vary.

The cumulative traffic impact will be used, in some instances, to support the development components to which roadworks are aligned.

**Table 3.2: Estimated Traffic Generation for Each Development Component and Cumulative Traffic Generation**

Development Components	Additional Traffic Generation (veh trips/peak hour )	Additional Traffic Generation (veh trips/peak hour ) - cumulative
Hospital – Carpark	-	-
Hospital – Education Centre Stage 1	-	-
Hospital – CSB Expansion Stage 1A, 1B & Entry	184 (AM) & 144 (PM)	184 (AM) & 144 (PM)
Wahroonga School		
a. Stage 1 (Middle School)	84 (AM only)	268 (AM) & 144 (PM)
b. Stage 2 (Playing Field)	-	-
c. Stage 4 (PE Courts)	-	-
Commercial	101 (AM/PM)	369 (AM) & 245 (PM)
Wahroonga School		
d. Stage 3 (Junior School)	91 (AM only)	460 (AM) & 245 (PM)
Residential – Fox Valley Road	90 (AM/PM)	550 (AM) & 335 (PM)
Hospital – Education Centre Stage 2	-	550 (AM) & 335 (PM)
Wahroonga School		
e. Stage 5 (Junior School)	(included above)	-
f. Stage 6 (Senior School)	50 (AM only)	600 (AM) & 335 (PM)
Hospital – Shannon Building	131 (AM) & 66 (PM)	731 (AM) & 401 (PM)
Residential – Comenarra Parkway	35 (AM/PM)	766 (AM) & 436 (PM)
Other Fox Valley Road Residential	37 (AM/PM)	803 (AM) & 473 (PM)

The cumulative traffic generation figures presented in Table 3.2 are about 45-50 vehicles per hour less than the figures presented in the previous Halcrow report, *Wahroonga Estate – Traffic Report, Timing of Upgrade Works (4 November 2011)*. The difference in figures is due to the residential trips generated by the Mount Pleasant precinct. The current analysis, that is the figures shown in Table 3.2, excludes trips to and from the Mount Pleasant precinct as this traffic would generally use the Pennant Hills Road intersection rather than the intersections on Fox Valley Road and/or The Comenarra Parkway.

## 4. Road Works to Accompany Specific Development Component

It is proposed that the following intersection upgrades would be completed prior to the occupation of the particular development components rather than specific dates as is supported by practical considerations and cumulative traffic generation figures.

### 4.1 Main Hospital Entry

The upgrade of the Main Hospital Entry intersection was completed in line with the occupation of the Stage 1A and 2 Hospital development (consistent with the Project Approval for the Hospital project) and the following plan prepared by Northrop:

- Ultimate option sheet 6, drawing number SK2.06, revision C.

### 4.2 The Comenarra Parkway and Fox Valley Road

#### 4.2.1 Interim Upgrade

The interim upgrade works at this intersection will involve widening of eastern side of The Comenarra Parkway- Fox Valley Road intersection.

Originally an interim upgrade of this intersection was required in time for the opening of Stage 1 of the Hospital expansion as detailed in the Project Approval for the Hospital development.

However, as the land required for this widening to take place is partially on the existing Seventh Day Adventist Mission Hostel, which will be demolished prior to the construction of the Commercial buildings at this site, it is practical for the interim upgrade to commence after the demolition of the existing hostel building.

Hence it is proposed that the requirement to undertake the interim upgrade works are completed prior to the occupation of the Commercial building.

The interim works are as shown in the following plans prepared by Northrop:

- Interim option sheet 1, drawing number SK1.01, revision C
- Interim option sheet 2, drawing number SK1.02, revision C.

#### 4.2.2 Ultimate Upgrade

The ultimate upgrade works at this intersection will involve widening of western side of The Comenarra Parkway-Fox Valley Road intersection to Browns Road.

It is proposed that the ultimate upgrade of the Comenarra Parkway and Fox Valley Road intersection be undertaken prior to the occupation of the Hospital - Shannon Building, in accordance with the Project Approval (note: referred to as Stage 3 in the Project Approval).

The ultimate upgrade works are as shown in the following plans prepared by Northrop:

- Ultimate option sheet 2, drawing number SK2.02, revision C
- Ultimate option sheet 3, drawing number SK2.03, revision C
- Ultimate option sheet 4, drawing number SK2.04, revision C
- Ultimate option sheet 5, drawing number SK2.05, revision C.

### 4.3 Proposed Signalised Intersection at the New Wahroonga School Access

It is proposed to complete the construction of a signalised intersection at the new Wahroonga School access road with Fox Valley Road prior to the occupation of Stage 3 (junior school) school development as has been conditioned in the SSD5535 approval from DoPE. Until then, vehicular access to the middle school (Stage 1 school development) will be gained via the upgraded Hospital access road, in accordance with the approved strategy determined in SSD5535.

The Wahroonga School access intersection works are as shown in the following plan prepared by Northrop:

- Ultimate option sheet 7, drawing number SK2.07, revision C.

### 4.4 Fox Valley Road Widening and Intersection Upgrades

The Halcrow Report identified road improvement requirements for different levels of traffic generation. For the purposes of the Deed of Agreement, these were then specified against specific timelines for individual development components.

Using the previous capacity analysis<sup>[1]</sup>, triggers for the specified upgrade works required along Fox Valley Road were summarised in Table 4.1.

**Table 4.1: Upgrade works required based on traffic generation threshold**

Traffic threshold (veh/hr)	Widening/ intersection upgrade required
450 veh/hr additional trips	Upgrade Fox Valley Rd-Lucinda Ave to signalised intersection
	Widen southbound lanes on Fox Valley Rd between Lucinda Ave and the development site
830 veh/hr additional trips	Upgrade Fox Valley Rd-Ada Ave roundabout to provide two southbound lanes
	Widen southbound lanes on Fox Valley Rd between Lucinda Ave and Pacific Hwy

The comparison of the traffic threshold shown in Table 4.1 and the cumulative traffic generation presented in Table 3.2 indicates that the 450 vehicles per hour threshold would be reached when the Wahroonga School Stage 3 (junior school) is occupied and approach the 830 vehicles per hour threshold when the other Fox Valley Road residential developments are occupied.

It is noted, however, that there is already considerable upgrade works attributed to the Stage 3 school, and as such ACA does not propose to complete the upgrade of this intersection with this development component.

As a compromise, ACA proposes to complete all of the works detailed in Table 4.1 prior to the hospital - Shannon Building when the cumulative traffic generation would be 600 vehicles per hour (AM) and 335 vehicles per hour during the AM and PM peak hours, respectively.

These works are as shown on the following plans:

- Ultimate option sheet 8, drawing number SK2.08, revision C, prepared by Northrop
- Ultimate option sheet 9, drawing number SK2.09, revision C, prepared by Northrop

<sup>1</sup> Wahroonga Estate – Traffic Report, Timing of Upgrade Works, Halcrow, 4<sup>th</sup> November 2011 (Chapter 4.3 & 4.4)

- o Sketch from Wahroonga Estate - Review of Generalised Widening Along Fox Valley Road, prepared by Transport and Traffic Planning Associates, dated 14 March 2014.

Based on the above, it is proposed that the relevant consent condition include the elements below:

The Proponent as part of future development applications is to undertake detailed road upgrade works prior to issue of Occupation Certificates for the staged development of the site as outlined below:

- a) The road upgrade works to be undertaken by the Proponent, include:
  - i. Upgrade to the Main Hospital Entry intersection prior to Occupation Certificate for Stage 1A Hospital (note: works already complete)
  - ii. Interim upgrade of the intersection of The Comenarra Parkway and Fox Valley Road, prior to the Occupation Certificate of the Commercial building
  - iii. New signalised intersection between Fox Valley Road and the Wahroonga School prior to the Occupation Certificate for the Wahroonga School – Stage 3 (junior school)
  - iv. Ultimate upgrade of (including upgrading of the existing traffic signals) at the intersection of The Comenarra Parkway and Fox Valley Road, prior to the Occupation Certificate of the hospital - Shannon Building (Stage 3)
  - v. Two southbound travel lanes along Fox Valley Road from the Pacific Highway to the development site, including reconstruction (or upgrade to a signalised intersection) of the existing roundabouts at the Fox Valley Road/Ada Avenue intersection and the Fox Valley Road/Lucinda Avenue intersection prior to the Occupation Certificate of the hospital - Shannon Building (Stage 3)
  - vi. Widening The Comenarra Parkway to provide two traffic lanes in each direction between Fox Valley Road and Browns Road, prior to the Occupation Certificate of Residential – Comenarra.
- b) the monetary contributions to be provided by the Proponent include:
  - i. A monetary contribution towards the estimated total cost of upgrading the Pacific Highway and Fox Valley Road intersection, comprising the equivalent of 25 per cent of the estimated total cost of traffic signal/civil upgrade works and land acquisition costs associated with the upgrade of the Pacific Highway and Fox Valley Road intersection based on Detailed Design Cost as determined by Quantity Surveyor, where:

**Detailed design cost** means the estimated total costs of construction, design, environmental assessment, completion and handover of the Pacific Highway/Fox Valley Road intersection based on:

- a) The detailed design documents
- b) The reasonable costs incurred by roads and Maritime in preparing the detailed design documents
- c) Reasonable project management costs for co-ordinating activities associated with the Pacific Highway/Fox Valley Road intersection
- d) The costs associated with all land acquisitions to be undertaken by Roads and Maritime to affect the Pacific Highway/Fox Valley Road intersection, including the compensation payable to the dispossessed land owners and all other costs incurred in connection with the land acquisition process, as determined by Roads and Maritime

- e) Reasonable consultant, contractor and subcontractor costs to construct the Pacific Highway/Fox Valley Road intersection
- f) All costs reasonably incurred by Roads and Maritime in association with the Pacific Highway/Fox Valley Road intersection, an estimate of which will be provided by Roads and Maritime in accordance with any relevant road works work authorisation deeds (WADs), including but not limited to:
  1. Roads and Maritime costs (internal and external) in reviewing any detailed design documents and providing approvals and any other consents, conditions or directions in respect of the Pacific Highway/Fox Valley Road intersection
  2. Roads and Maritime project management costs for coordinating activities associated with the Pacific Highway/Fox Valley Road intersection
  3. The cost of surveillance and associated administration of surveillance of the Pacific Highway/Fox Valley Road intersection
  4. Costs associated with any review of the likely environmental impact of the Pacific Highway/Fox Valley Road intersection
  5. Costs of emergency or special traffic control measures required by Roads and Maritime as a result of the carrying out of the Pacific Highway/Fox Valley Road intersection.

**Detailed design document includes:**

- a) A drawing, specification, construction document, design calculation, software, sample, model, pattern and the like created for the construction of the Pacific Highway/Fox Valley Road intersection upgrade
- b) A schedule setting out particulars of all notices, tests, hold points and materials as required by the individual sections of the Pacific Highway/Fox Valley Road intersection upgrade and the requirements of Roads and Maritime, identifying all notification periods
- c) Any geotechnical investigation relating to the Pacific Highway/Fox Valley Road intersection upgrade
- d) Details of all land acquisitions and utility adjustments required to undertake the Pacific Highway/Fox Valley Road intersection upgrade.

**Land acquisition** means the acquisition of any interest in land, which Roads and Maritime undertakes in accordance with the Land Acquisition (Just Terms Compensation) Act 1991 in order to affect the road works including the process of negotiation with any land owner, the engagement of consultants and legal representatives, Roads and Maritime internal decision making processes, consultation with other authorities, the preparation of reports, the carrying out of land surveys, the preparation and registration with land and property information of plans of acquisition and any court appeal process.

**Road works WAD(s)** means a works authorisation deed in respect of all or any part of the Road Works as reasonably required by the Roads and Maritime, in the form generally set out in Annexure C, subject to such amendments as may be considered reasonably appropriate by Roads and Maritime having regard to the nature of the road works.

**Quantity surveyor** means an independent quantity surveyor and member of the Australian Institute of Quantity Surveyors.

The monetary contribution is to be made when Roads and Maritime has finalised the design, acquired land and is ready to commence work, however, no earlier than 31 December 2016.

- ii. A monetary contribution in the amount of \$670,000 (subject to indexation from the base date 1 July 2012 in line with the percentage increase, if any, in the Bureau of Transport and Communications Economics Road Construction and Maintenance Price Index Index), being 100 per cent of the estimated total cost of upgrading the Comenarra Parkway and Kissing Point Road intersection, being the following works:
  - a) A left turn slip lane (with minimum 50 metres storage) for the movement of traffic turning into Kissing Point Road (north)
  - b) Two eastbound through lanes
  - c) One right turn lane (minimum 50 metres storage) for the movement of traffic turning into Kissing Point Road (south)
  - d) A single westbound through lane.

The monetary contribution is to be made at the same time as the monetary contribution at item b. i. above and attributed to the Pacific Highway and Fox Valley Road intersection works.

## 4.5 Widening of Comenarra Parkway to Browns Road

The widening of Comenarra Parkway to Browns Road is to be completed in line with the residential development on Comenarra Parkway due to the practicalities of undertaking these works in parallel with the residential development on the Comenarra Parkway.

## 5. Pacific Highway and Fox Valley Road Intersection

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This intersection requires a major upgrade to overcome both existing deficiencies and the effects of the traffic that will be generated by the Wahroonga Estate. In view of this, it was agreed that Wahroonga Estate would make a financial contribution towards these works. The exact timing of the upgrade will depend on the availability of Roads and Maritime funds to cover the balance of the upgrade costs.

In order to expedite these works, it was proposed that Wahroonga Estate also contributes towards them with funds that it may otherwise have been required to contribute towards improvements at the Kissing Point Road-The Comenarra Parkway intersection. This intersection is somewhat remote from the Wahroonga Estate and discussions with Ku-ring-gai Council officers indicated that any improvements to this intersection would be problematic due to land constraints.

The timing for the Wahroonga Estate contribution to these works to be made was specified in the Deed as being 2016.

It is proposed that Pacific Highway intersection works-in-kind contribution be made when Roads and Maritime has finalised design and is ready to commence works, however, no earlier than 31 December 2016.

## 6. Summary of Triggers for Wahroonga Estate

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This report presents the cumulative traffic generation based on an indicative sequencing of project components to estimate the required staging of the proposed road network improvements. The proposed staging for these works is summarised below:

- The upgrade of the Main Hospital Entry intersection was completed in line with the occupation of the Stage 1A and 2 hospital development.
- Interim upgrade at The Comenarra Parkway-Fox Valley Road intersection would be completed prior to the occupation of the Commercial building.
- The ultimate upgrade of the Comenarra Parkway and Fox Valley Road intersection would be undertaken prior to the occupation of the Hospital - Shannon Building.
- The construction of a signalised intersection at the new Wahroonga School access road with Fox Valley Road would occur prior to the occupation of Stage 3 (junior school) school development.
- Widening of Fox Valley Road and associated intersection upgrades would occur prior to completion of the hospital - Shannon Building.
- Widening of Comenarra Parkway to Browns Road would be completed in line with the residential development on Comenarra Parkway.
- Ultimate upgrade at Pacific Highway-Fox Valley Road intersection – It is proposed that Pacific Highway intersection works-in-kind contribution to be made when the Roads and Maritime Services has finalised design and is ready to commence works, however, no earlier than 31 December 2016.

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