APPENDIX 8

Construction Traffic Assessment

Kooragang Coal Terminal

Stage 4 Project

Fourth Dump Station and Fourth Ship Loader Project

Construction

Traffic Impact Assessment Final

October 2009

prepared for

Port Waratah Coal Services Pty Ltd

prepared by

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Executive Summary

STAP has completed a detailed assessment of the potential traffic impacts arising from the construction of the 4th Dump Station & 4th Ship Loader Project (Stage 4 Project) at the Port Waratah Coal Services Kooragang Coal Terminal (KCT), and has determined that the Stage 4 Project would have no significant impacts on the local transport network. Specifically, STAP has determined: -

- The impacts of the Stage 4 Project are limited to the additional access, traffic and parking demands associated with the construction of the proposed additional infrastructure; once operating, the new infrastructure implemented for the Stage 4 Project would not increase traffic or parking demands above levels previously approved for the Site by the Department of Planning.

- The construction traffic demands of the Stage 4 Project are moderate, and would be generated for a relatively short period, at a time when significant existing construction trips in the local area – and specifically those associated with the adjacent Newcastle Coal Infrastructure Group Coal Export Terminal – have all but abated.

- Appropriate access routes are available for both light and heavy vehicles for the duration of the construction period, and the additional trips generated during this period would not compromise the efficient operation of the key intersections of Cormorant Road & Egret Street, and Cormorant Road & Teal Street. Beyond these key intersections, the additional trips would have no significant impact on traffic operations.

- **Based on the availability of numerous local access routes; the moderate construction traffic demands; the reduction in trip generation from adjacent local construction projects; and the significant capacity within the Kooragang Island industrial precinct, STAP has concluded that the construction traffic generated by the Stage 4 Project will have no significant impact on the local traffic network.**

- All KCT access points to be utilised by Stage 4 Project construction vehicles are existing approved access points, and will continue to operate at a high level of service.

- Temporary parking areas can be provided on-site for construction staff parking demand.

Further to these general conclusions, STAP provides the following recommendations: -

- That the existing KCT Construction Traffic Management Protocol operating at the Site be revised to account for the completion of the Tourle Street Bridge and the more efficient regional connectivity provided by the new bridge to Industrial Drive and Pacific Highway.

- That parking be provided off-street to meet construction staff parking demand.

Introduction

Port Waratah Coal Services Pty Ltd (PWCS) proposes the construction and operation of a 4th Dump Station & 4th Ship Loader (the Stage 4 Project) at the Kooragang Coal Terminal (KCT - The Site). In 2007, PWCS obtained project approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to increase the approval capacity throughput at KCT to a nominal 120 Mtpa.

PWCS has identified a potential benefit to the current and approved KCT facility to have 'sprint capacity' to meet the overall 120 Mtpa throughput following short term disruptions to operations. Short term delays in throughput result from a variety of occurrences, such as closures of the coal transportation chain, unplanned maintenance outages, and port and rail interruptions due to bad weather. The additional 'sprint capacity' is proposed to be achieved through the construction and operation of additional coal handling infrastructure at KCT.

PWCS have consulted with the Department of Planning (DoP) in regard to this Project and confirmed that the 2007 Project Approval (Approval No. 06_0189) can be modified under Section 75W of the EP&A Act.

This Traffic Impact Assessment (TIA) for the Stage 4 Project comprises part of the larger Environmental Assessment (EA) to be submitted to the DoP in support of the application to modify the Project Approval (06-0189). The assessment has been undertaken in accordance with Director-General's requirements for the EA.

Significantly, the Stage 4 Project will not generate additional long term access, traffic or parking demand at the Site. The Stage 4 Project allows for significantly greater efficiency of coal movement and loading without increasing operating vehicular traffic above the levels approved as part of the 2007 Project Approval. **The only period which will generate additional access, traffic and parking demands is the Stage 4 Project construction period, which is expected to last for up to 24 months**. This TIA investigates the potential impacts associated with this construction period, as this is the only period during which access, traffic and parking demands would have the potential to adversely impact the surrounding road network.

To assess these potential impacts, Stapleton Transportation & Planning Pty Ltd (STAP) has undertaken a rigorous assessment of the existing operation of the local road network, and the manner in which that network would operate during the Stage 4 Project construction period. This has included: -

- Observations of the local road network and detailed reference to our previous work in the area, including the past identification of ongoing key local issues by Newcastle City Council and the RTA.

- An overview of current activities in the local area – and specifically construction and operational traffic demands generated by adjacent sites – so as to determine an appropriate base traffic load for the assessment of potential future impacts.

- A review of the general traffic and transport guidelines and assessment criteria relevant to an assessment of this type, including: -
    - State Environmental Planning Policy 11: Traffic Generating Developments (SEPP 11)
    - RTA Guide to Traffic Generating Developments (RTA Guide)
    - AS 2890.1:2004 Parking Facilities Part 1: Off-Street Car Parking (AS 2890.1)
    - AS 2890.2:2002 Parking Facilities Part 2: Off Street Commercial Vehicle Facilities (AS 2890.2)

- Sourcing of available traffic data, including the commissioning of new surveys, and the analysis of intersection performance using appropriate RTA approved modelling (SIDRA).

1 The Existing Local Area

1.1 The Kooragang Coal Terminal

Port Waratah Coal Services Limited (PWCS) owns and operates the Kooragang Coal Terminal (KCT) and Carrington Coal Terminal (CCT) in the port of Newcastle in New South Wales. The two terminals receive, assemble, blend and load coal from the Hunter Valley onto ships for export to customers around the world.

The KCT commenced operations in 1984, and handles the majority of the PWCS operations. One of the primary advantages (by design) of the KCT is that coal is exclusively transported to the site by rail. Trains enter the Site via rail loops and coal is emptied from bottom-dumping wagons. The coal is transported on a series of conveyors to the stockpile areas, and then conveyed to stacking machines which discharge the coal onto stockpile pads. Coal is assembled in vessel cargo lots; the total KCT stockpile capacity is over two million tonnes.

Coal is reclaimed from the stockpiles by bucket wheel reclaimers and is carried on a dedicated system of conveyors to the ship-loaders; the conveyors run from the Site over Curlew Street, along Cormorant Road, and around to the berths on the Hunter River (South Channel); coal cargoes are reclaimed and moved by conveyor to the wharf area and loaded by ship-loading machines directly into the holds of designated vessels.

With coal movements exclusively provided by the rail infrastructure and conveyor system, road traffic demands are low. Road vehicle access points to the KCT are located in Curlew Street (**Access 1A** - primary administration and operations office); in Raven Street west of Curlew Street (**Access 1B** - construction access driveway for current KCT approved upgrades); and at the northern end of Cormorant Road (**Access 2** - emergency and occasional operations access). Additionally, access points are provided to the wharves/berthing areas from both Heron Road and in Cormorant Road east of Teal Street (**Access 3**).

The Site in its local context is shown in **Figure 1.1**; the proposed Stage 4 Project works are also shown.

Figure 1.1 The Kooragang Coal Terminal Site

1.2 Kooragang Island Industrial Precinct

The broader area of Kooragang Island is a highly industrialised precinct north of Newcastle; industrial facilities revolve principally around port related activities.

On Kooragang Island, and specifically sites off Cormorant Road and Heron Road, storage, processing and distribution sites dominate, specifically because of the berthing facilities available on the northern side of the Hunter River (South Channel). Major projects approved in recent years include the current KCT upgrade; the Newcastle Coal Infrastructure Group Coal Export Terminal (NCIG CET) to the west of Egret Street; the Cargill Oilseed Processor (COP) to the south of Raven Street; and other smaller industrial projects.

The highly industrialised/commercialised nature of the precinct has a number of significant benefits, including: -

- Immediate access to the regional road network – and specifically Cormorant Road to either Industrial Drive (south, east and west) or Nelson Bay Road (north) - via wide industrial feeder roads including Greenleaf Road, Heron Road, Egret Street, Raven Street and Curlew Street. Many of these roads have restricted access vehicle approval, meaning that they are approved for the use of oversized heavy vehicles. Further details on the road network are provided in **Section 1.3**.

- Kooragang Island does not have a residential population, with the wider precinct long identified for industrial development, and as such there is significant separation between the precinct and the nearest residential centres. This minimises potential impacts on residents, including noise and traffic impacts.

- There is significant sharing of facilities and infrastructure in the area. The creation and constant redefinition over many decades of Kooragang Island has culminated in a precinct that provides for all of the demands of heavy industry; this is not limited to the provision of an appropriate road and port infrastructure network, but also rail connections and feeder industries located within the precinct.

These are all important factors to consider as part of the traffic and transport assessment. While the traffic generation of the construction period of the Stage 4 Project will be relatively minor and short-term (refer to **Section 2**), there are many alternative locations where that same generation would have a significant impact on the existing local area, be it from traffic, noise or other impacts. The location of the Site within the precinct provides the greatest opportunity to minimise any such impacts during the Stage 4 Project construction period, after which the operation of the Stage 4 Project would not generate additional trips over those already approved for the KCT.

1.3 Local Road Network

1.3.1 General Road Classification

In order to better define the local road network which services the Site and which will provide access for vehicles required for the construction of the Stage 4 Project, it is appropriate to classify the adjacent local and regional roads according to a road hierarchy. Roads are classified in a number of ways, but the most basic classification is in accordance with the volume of traffic they should appropriately carry. The RTA classifications guidelines are as follows: -

- **Arterial Road:**

  Generally a main road road carrying over 15,000 vehicles per day (1,500vph) and fulfilling a role as a major regional or inter-regional link.

- **Sub-arterial Road:**

  A secondary inter-regional links normally carrying between 5,000 and 20,000 vehicles per day (500 to 2,000 vph).

- **Collector Road:**

  A road which provides key linkages between local roads and arterial or sub-arterial, a collector road generally carries between 2,000 and 10,000 vehicles per day (250 to 1,000 vph). In industrial/commercial environments, the upper limit is generally acceptable, but in a residential environment flows are generally more limited.

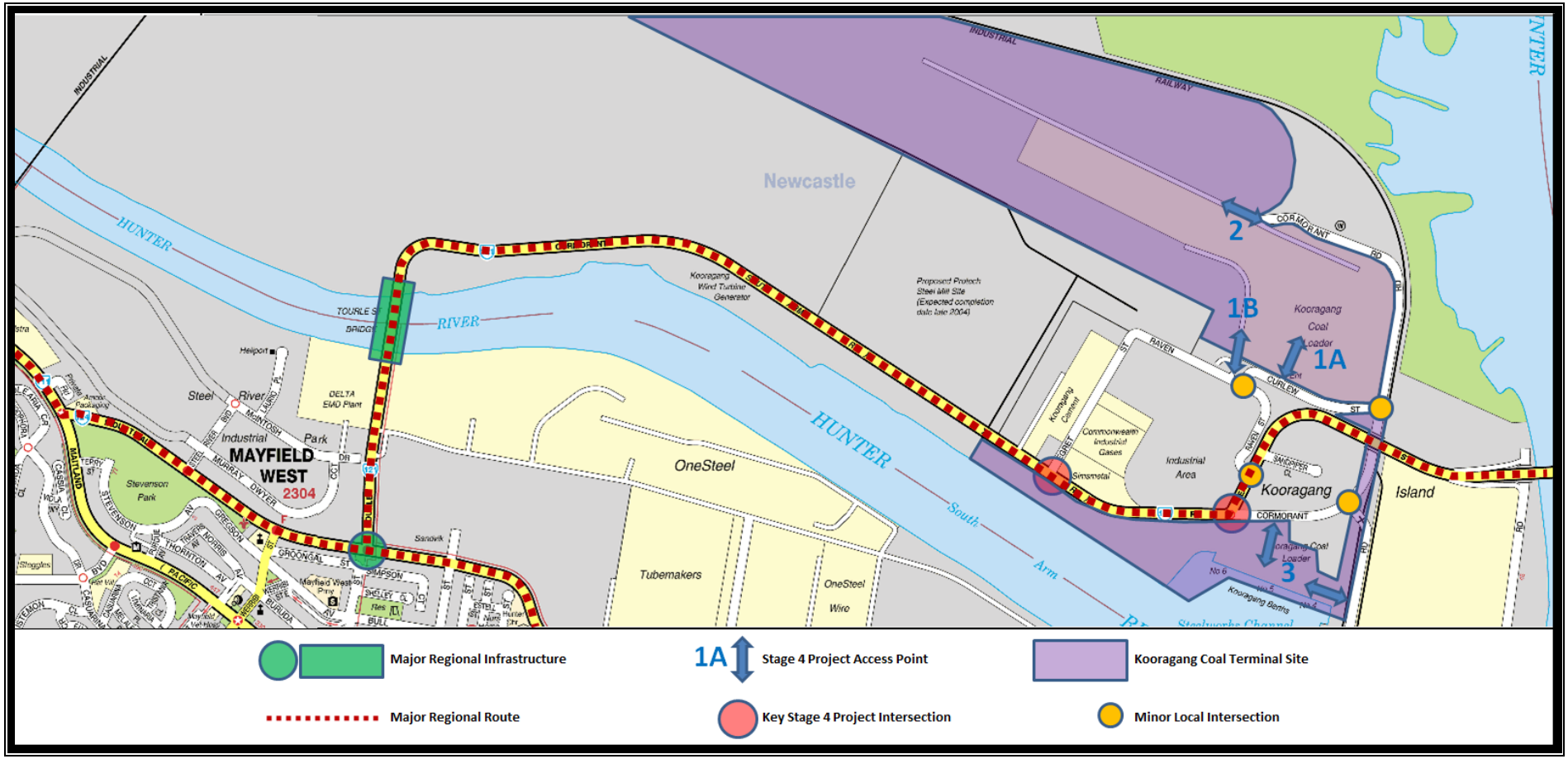
- **Local Road:**

  A local road provides access to individual allotments and nominally carries lower flows of less than 3,000 vehicles per day (300 to 350vph). As for collector roads, local roads can generate flows at the upper limit (or indeed over) in some commercial and industrial environments without impacting on general amenity, traffic efficiency or safety.

1.3.2 Key Local & Regional Roads

The broader road network which will provide access for the Stage 4 Project construction traffic, and more broadly for existing Kooragang Island operations, is shown in **Figure 1.3.2**. Key intersections – detailed further in **Section 1.3.3** below - are also shown.

Figure 1.3.2 The Road Network



Key roads within the network include: -

- **Pacific Highway**

  The Pacific Highway is a regional arterial road which connects through to Kooragang Island via the Industrial Drive intersection to the south-west of the Site; while a southern route along the Pacific Highway is also available to the south-east, most industrial (heavy) traffic links to the Pacific Highway through Hexham, which then provides access to the F3.

- **Industrial Drive**

  Industrial Drive is an arterial road which links between Kooragang Island and the Pacific Highway, and also into Newcastle and the industrial precincts on the southern side of the Hunter River (including Carrington).

- **Cormorant Road**

  Cormorant Road is part of Main Road (MR) 108 and accommodates through traffic movements between Newcastle (and regional links) and Kooragang Island and then northern centres. MR 108 comprises a number of individually named sections (i.e. Tourle St, Cormorant Road, Teal St, Nelson Bay Road).

  Cormorant Road provides two lanes over the new Tourle Street bridge with a 60 kilometre per hour (km/h) posted speed limit, then 80km/h posted speed limit through to Stockton. On the approach to Egret Street, Cormorant Road widens to a four lane undivided carriageway, which continues to the roundabout at the intersection of Teal Street. To the east of the Teal Street roundabout the road continues as a very wide two lane undivided road providing access to industrial roads (Heron Street, Curlew Street) and then through to the rear of the KCT (**Access 2**). Cormorant Road is under the jurisdiction of the RTA between Industrial Drive and Teal Street.

- **Egret Street**

  Egret Street is a wide local industrial road with a 60km/h posted speed limit. It connects to Cormorant Road at its southern end and turns to Raven Street at its northern end. Egret Street is under the jurisdiction of Newcastle Ports Corporation.

- **Raven Street**

  Raven Street is a wide local industrial road with a 60km/h posted speed limit. It connects to Egret Street at its western end; provides an intersection with Curlew Street to the north; and then winds back to Teal Street north of the intersection with Cormorant Road, where access is restricted by

median to left in and left out. Access is provided to the KCT (**Access 1B**) west of Curlew Street. Raven Street is under the jurisdiction of Newcastle Ports Corporation.

- **Curlew Street**

  Curlew Street is a wide local industrial road with a 60km/h posted speed limit. It connects to Raven Street at its western end and then extends to Cormorant Road to the east. Curlew Street provides access to the KCT north-east of Raven Street (**Access 1A**).

In general, the local and sub-regional road network providing access to and within Kooragang Island exhibits the hallmarks of a well designed industrial system, with local wide local access roads with broad shoulders and turning aprons to accommodate large vehicles. Much of the area is designated for the use of restricted access vehicles.

1.3.3 Key Local & Regional Traffic Intersections & Infrastructure

The key local and regional traffic intersections within the vicinity of the KCT site are also shown in **Figure 1.3.2** above, and include:

- **Industrial Drive & Tourle Street**

  This is a major signalised intersection which - based on our observations, and discussions with the RTA and Council for recent past projects on Kooragang Island and through Newcastle - provides significant capacity by virtue of the number of approach and turn lanes on each leg of the intersection, and traffic flows significantly below future design capacity. STAP is of the opinion that the traffic generated by the Stage 4 Project will have no impact on the operation of this intersection during peak periods as a result of the relatively low Stage 4 Project flows; the short construction timeframe; the early (and late) work periods proposed; and the reduction in flows as a result of the winding down in NCIG CET construction.

- **Cormorant Road & Teal Street**

  This high capacity roundabout was updated some years ago by the RTA after operating as a priority intersection with poor geometry and a history of accidents. Much of the Stage 4 Project construction traffic will utilise this intersection through the construction period, and as such it has been assessed in detail in following sections.

- **Cormorant Road & Egret Street**

  This intersection previously operated as a priority T intersection allowing all movements, but significant delays were experienced by vehicles departing Egret Street to Cormorant Road (right hand turn) based on the speed and volume of passing traffic in Cormorant Road.

As a result, the right hand turn from Egret Street to Cormorant Road was restricted as one of the DoP conditions for the development of the NCIG CET.

Notwithstanding the provision of Left Turn Only signage line markings on the Egret Street approach to Cormorant Road, our observations and the traffic surveys (**Section 1.4** below) confirm that the intersection design still physically provides for right hand turn movements to Cormorant Road, and that vehicles are making this movement, particularly in the afternoon departure peak.

Traffic flows to and from Egret Street have increased over recent years, based on the construction of adjacent sites including the current KCT upgrades; the NCIG CET construction; and the COP construction and operation. The most detailed recent traffic assessment of the intersection – provided by Masson Wilson Twiney (MWT) in their Newcastle Coal Export Terminal Road Traffic Assessment 2006 (MWT CET RTA) – determined the following: -

…the Cormorant Road/Egret Street intersection suffers peak hour congestion problems for particular turning movements. Vehicles wishing to turn right out of Egret Street suffer large delays as a result of the volume of passing traffic and the lack of suitable gaps for traffic to pull into…

The Egret Street/Cormorant Road intersection currently allows all movements. As a condition of consent on the planning approval for the expansion of the Cargill Oilseed Processing Facility (approved April 2006), the operator has been requested to review haulage routes for truck movements to ameliorate impacts on this intersection. NCC have also raised concern over the intensification of turning traffic movements through this intersection (particularly right turns onto Cormorant Road).

***It is proposed to provide left in/left out of Egret Street only at the Cormorant Road intersection**. Vehicles wishing to turn right into Egret Street would be able to turn left at the Cormorant Road/Teal Street roundabout and use Cormorant Road/Curlew Street/Raven Street. Vehicles wishing to turn right out of Egret Street could also use this route or turn left onto Cormorant Road and u-turn at the Cormorant Road/Teal Street roundabout.*

The MWT CET RTA then provides the following conclusion/recommendation: -

- *Prohibition of right turn movements at the Cormorant Road/Egret Street intersection. This would require the installation of a central carriageway median island to prevent right turns.*

- *…road works would be designed in accordance with the RTA Road Design Guide (RTA, 1996). These road works would be undertaken by a suitably licensed contractor in consultation with the RTA and NCC.*

Further to the submission of the NCIG CET application (Part 3A) to the DoP, a Project Approval was provided (2007) which includes the following conditions of consent in *Schedule 2*: -

2.31: *The Proponent shall ensure that the intersection of Cormorant Road/Egret Street is designed and constructed in accordance with the RTA's Road Design Guide and the relevant AustRoads guidelines to the satisfaction of the RTA. The Proponent shall ensure that the intersection includes, as a minimum:*

a) traffic movements shall be physically restricted to left in/left out and right in only; and

b) the existing intersection shall be modified to include the construction of concrete medians in Cormorant Road.

There is therefore a difference between the recommendations made by MWT in the CET RTA and the conditions provided by the DoP, and specifically the DoP allowing the retention of the right hand turn into Egret Street. STAP is of the opinion – based on our modelling of the intersection (see **Section 1.5**) – that the right hand turn movement from Cormorant Road to Egret Street does not experience heavy delay specifically due to the low number of vehicles making this turn and the availability of a turning lane, and as such there is justification in its retention by the DoP.

Further to the receipt of the NCIG CET DoP conditions, Connell Hatch prepared a Construction Traffic Management Plan in June 2007 (NCIG CET CTMP); this includes a detailed discussion of the issues at the intersection, and a plan (NCIG CET CTMP Figure 5) for the upgrade of the intersection, essentially providing an extended concrete median in Cormorant Road to prevent right hand turn movements from Egret Street (but – as per the DoP conditions – retain the right hand turn into Egret Street from Cormorant Road).

The operation of this intersection without the upgrade has been a well documented concern of both the RTA and Council (as reported in both the MWT CET RTA and the NCIG CET CTMP), and the correspondence provided to the DoP by the RTA and Council as part of the Environmental Assessment for the NCIG CET further notes these general concerns.

It is our understanding that further to the current provision of road signage indicating the banned turn, a design for a formal median eliminating the movement is currently under consideration by the RTA, which would eliminate the right hand turn movement from Egret Street to Cormorant Road.

- **Teal Street & Raven Street**

This local access intersection provides left in and left out access only with deceleration and acceleration lanes in Teal Street providing for the movements to and from Raven Street respectively. It has been our observation that a small number of vehicles will depart Raven Street and then turn immediately right via the protected right hand turn lane to Sandpiper Close so as to turn back towards Newcastle, but this is a very minor movement even during peak periods.

- **Curlew Street & Cormorant Road**

  This is a wide local intersection capable of accommodating large heavy vehicles. Traffic flows through the intersection are very low due to the low traffic generators in Cormorant Road north of Curlew Street.

- **Raven Street & Curlew Street**

  This is a wide local intersection capable of accommodating large heavy vehicles, and provides for the primary inbound access to the KCT via a secured entry point immediately north-east of the intersection. A proportion of the additional trips generated by the construction works for the Stage 4 Project will utilise this access point (**Access 1A**).

- **Raven Street & KCT Construction Access Driveway**

  A construction access driveway to KCT is provided in Raven Street to the west of the Curlew Street intersection. This is a wide access point capable of accommodating large heavy vehicles, and sight distances and vehicles speeds are appropriate. A proportion of the additional trips generated by the construction works for the Stage 4 Project will utilise this access point (**Access 1B**).

- **Curlew Street & KCT Access Driveway**

  A minor access driveway is also provided between the KCT Construction Access Driveway (**Access 1B**) and Curlew Street; this is 'signposted' as a one-way link allowing vehicles to depart the construction area directly to an intersection with Curlew Street rather than requiring them to enter Raven Street and then turn back into Curlew Street. 'No Entry' signage is provided at Curlew Street, i.e. vehicles cannot enter the KCT Construction Access Driveway directly from Curlew Street, only depart to it.

- **Tourle Street Bridge**

  The other important piece of infrastructure in the local area is the Tourle Street Bridge, which has recently been upgraded by the RTA to a new two-lane bridge to replace the old bridge. **The provision of a two-lane bridge by the RTA is a good indicator of the capacity of the local network; that is, the RTA considers the provision of a single lane bridge more than appropriate to forecast traffic flows for the area, and based on all our past work STAP would agree with this conclusion**.

  The new bridge provides significantly improved carriageway stability and swept paths to and from Cormorant Road, where the old bridge required relatively tight turns which were not considered appropriate for some of the larger vehicles utilising the local road network. The new bridge was opened in May 2009, and the RTA has recently called for registrations of interest for the removal of the old bridge.

1.3.4 Local Network Summary

In summary, it is our opinion that the basic local and regional traffic infrastructure on Kooragang Island operate at a high level of service based on broad geometry and available turning lanes; excellent sight distances; and – perhaps most importantly – relatively low traffic flows away from the primary arterial and sub-arterial routes (i.e. Cormorant Road and Teal Street). Further detail on traffic flows and capacity of the local intersections is provided in **Section 1.4** and **Section 1.5.**

1.4 Local Traffic Flows

In order to better define existing local traffic flows, STAP commissioned intersection surveys in July 2009 at the key local intersections which would be potentially impacted by the construction period of the Stage 4 Project; these surveys were completed in July 2009. The intersection surveys were augmented by available counts commissioned for other recent local projects; and the RTA's annual average daily traffic (AADT) figures.

1.4.1 AADT Data

The RTA provides data from its permanent and sample count stations generally every 3 – 4 years, allowing for an analysis of general trends in key arterial and sub-arterial roads for planning purposes. The most recent data for the Hunter Region is from 2004, which show the following AADT flows for local and regional network: -

- Industrial Drive (east of Tourle Street) 30,717 vehicles
- Nelson Bay Road (Stockton Bridge) 18,966 vehicles
- Tourle Street (north of Industrial Drive) 24,052 vehicles

Data from earlier years for the Tourle Street site provided in the RTA *Traffic Volume Data for Hunter and Northern Regions 2004* suggests that there has not been significant growth in the network which will provide for the Site, with all flows increasing only very marginally over the past 10 years: -

- 1995 23,393 vehicles
- 1998 24,637 vehicles
- 2001 23,650 vehicles

In Cormorant Road between Egret Street and Teal Street, STAP has estimated a current average flow of approximately 24,000vpd based on the results of the July 2009 intersection surveys (**Section 1.4.2 below**) and other recent traffic studies in the area.

1.4.2 Intersection Survey Data

With reference to classified counter surveys of the broader area commissioned by STAP in 2007 and data provided in the MWT CET RTA, STAP has identified broader peak periods as occurring in the local area between approximately 6:00am and 9:00am in the morning, and then between 3:00pm and 6:00pm in the afternoon-evening. Significant construction projects – such as the current NCIG CET construction – can over the construction period lead to an earlier morning arrival peak and a slightly earlier afternoon departure peak.

In order to provide current traffic volume counts at the key local Intersections, STAP commissioned Curtis Traffic Surveys Pty Ltd to complete vehicle movement counts over these extended morning and evening peak periods at the following locations: -

- Cormorant Rd & Teal St
- Cormorant Road & Egret Street

These intersections are the same as those identified for detailed assessment in the MWT CET RTA.

1.4.3 Traffic Data Summary & Issues

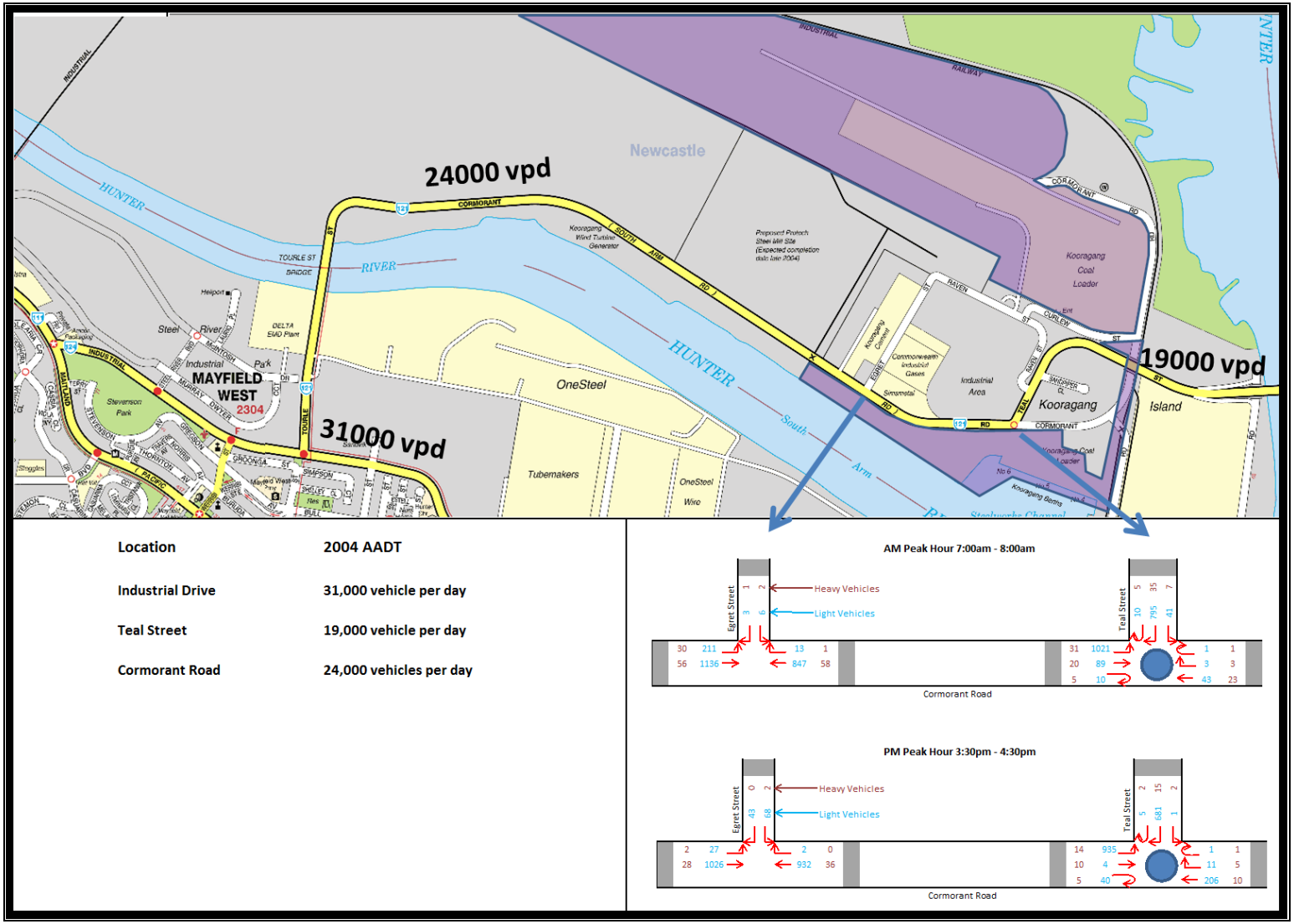
Available AADT data as well as peak hour data at the two key intersections, being Cormorant Road & Egret Street, and Cormorant Road & Teal Street, is provided in **Figure 1.4.3**.

During the period of traffic count data collection, a significant number of trips were observed to be associated with construction activities for the NCIG CET. This was particularly the case for the Cormorant Road and Egret Street intersection.

Reference to the MWT CET RTA suggests that at present the NCIG CET is generating in the order of 200 trips to Egret Street over an extended AM peak period (primarily inbound trips) and a similar number in an extended PM peak period departing via Egret Street (theoretically to the Teal Street roundabout for a U-turn). While the MWT CET RTA [appropriately for a worst case assessment] assigned maximum trips to single peak hours, the traffic surveys and our on-site observations suggest that construction staff arrive and depart over broader periods (1 – 2 hours). This is not an uncommon occurrence at large construction sites.

Notwithstanding, based on the construction timeframe for the NCIG CET, the NCIG CET construction traffic generation will soon abate, with the operational period set to commence in early 2010 generating only a fraction of the trips generated by the construction period. **This is significant, as it means that the trips generated by the construction period for the Stage 4 Project are highly unlikely to coincide with the higher generation construction period for the CET.** This issue is examined in more detail in **Section 2**.

Figure 1.4.3 Traffic Data Summary



1.5 Existing Intersection Operation

Overall, based on our observations and previous assessments on Kooragang Island, the local network operates at a good level of service, with most roads and intersections having significant spare capacity.

This is particularly the case for those intersections away from the primary Cormorant Road – Teal Street arterial route, where low observed peak traffic flows, coupled with excellent intersection geometry and sight distances, ensures a high standard of performance at the minor intersections including Cormorant Road & Curlew Road; Curlew Road & Raven Street; Cormorant Road & Heron Road; and at the Site access intersections.

In our opinion the flows generated by the short construction period of the Stage 4 Project only have the potential to impact the key intersections of Cormorant Road with Egret Street, and with Teal Street; as stated above, these are the same intersections previously examined as part of the NCIG CET assessment process. STAP has therefore examined the operation of these two intersections using the SIDRA intersection model to more precisely determine their current (and future) performance.

1.5.1 Intersection Operation Assessment - SIDRA

SIDRA is an RTA approved intersection performance model that determines key performance measures for 'isolated' intersections, be they priority, roundabout or signal controlled. The analysis includes: -

- Surveyed peak hour traffic flows, speed profiles and sight distances;
- Existing intersection geometry and priority control: and
- Existing lane availability and utilisation based on the time period and/or local conditions.

SIDRA reports the following key performance measures: -

- **Level of Service**

  Level of Service (LoS) is a basic performance indicator assigned to an intersection based on average delay. For signalised and roundabout intersections, LoS is based on the average delay to all vehicles, while at priority controlled intersections LoS is based on the worst approach delay. The RTA LoS criteria, which have been used in the assessment, are provided below: -

Level of Service (RTA Method)	Control delay per vehicle in seconds (d) (including geometric delay)		
	Signals and Roundabouts	Rating	Stop and Give Way / Yield Signs
A	d < 14.5	Good	d < 14.5
B	14.5 < d < 28.5	Good with acceptable delay	14.5 < d < 28.5
C	28.5 < d < 42.5	Satisfactory	28.5 < d < 42.5
D	42.5 < d < 56.5	Near capacity	42.5 < d < 56.5
E	56.5 < d < 70.5	At capacity	56.5 < d < 70.5
F	70.5 < d	Over capacity	70.5 < d

- **Delay**

  Delay represents the difference between interrupted and uninterrupted travel times through an intersection, and is measured in seconds per vehicle in this assessment. Delays include queued vehicles accelerating and decelerating from/to the intersection stop, as well as general delays to all vehicles travelling through the intersection. With reference to the LoS criteria above, the average intersection delay for signals and roundabouts represents an average of delays to all vehicles on all approaches, while for priority intersections the average delay for the worst approach is used.

- **Degree of Saturation**

  Degree of Saturation (DoS) is defined as the ratio of demand (arrival) flow to capacity. DoS above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). The capacity of the movement with the highest DoS is reported.

1.5.2 Existing Intersection Performance Results

In our assessment, we have included all aspects of the existing operation of the two intersections. Additionally, at the intersection of Cormorant Road & Egret Street STAP has provided two analysis scenarios, one being the intersection operation including the surveyed 'banned' right hand turn movements, and the other with those movements reassigned (to the left turn movement from Egret Street to Cormorant Road) as is legally provided for, and as would occur if the intersection upgrade is completed.

Table 1.5.2 below provides the results of the SIDRA intersection analysis.

Table 1.5.2 Existing Intersection Performance

Existing 2009	Average Delay Intersection		Level of Service Intersection		Average Delay Worst Movement		Level of Service Worst Movement		Degree of Saturation	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Cormorant Rd & Teal St	12	12	A	A	19	19	B	B	0.375	0.326
Cormorant Road & Egret Street (Existing)	<10	<10	n/a	n/a					1	1
RHT Egret to Cormorant					>100	>100	F	F		
LHT Cormorant to Egret					25	15	B	B		
Cormorant Road & Egret Street (Banned RHT))	<10	<10	n/a	n/a	28	16	B	B	0.316	0.276

1.5.3 Intersection Performance Analysis

The SIDRA analysis shows that the intersection of Cormorant Road & Teal Street currently operates at a high level of service during the peak hour, with low average delays and significant spare capacity.

The results at this intersection and indeed the traffic flows upon which they are based, are very similar to those provided in the MWT CET RTA for the 'future' conditions (i.e. during the construction period of the NCIG CET), i.e. they generally represent slightly higher flows than surveyed by MWT in 2006 (i.e. as they include in 2009 the NCIG CET construction flows), but capacity remains available, confirming the future assessment provided in the MWT CET RTA.

At the Cormorant Road & Egret Street intersection the right hand turn demand from Egret Street to Cormorant Road – particularly in the PM departure peak – leads to significant delays. While the delay to this right hand turn movement is in some ways acceptable given that the delay is to an illegal turn, the more significant issue is that drivers may attempt to depart Egret Street to the west utilising a gap in the eastbound through flow that is not appropriate to the speed of traffic in Cormorant Road, increasing the chance of an accident.

It is our opinion that the intersection upgrade will need to be consolidated in the near future – and most likely prior to the commencement of the Stage 4 Project construction - and that after such will perform at a good level of service, even with the additional current demands of the NCIG CET construction traffic (see also **Section 2** below).

1.6 Existing Network Summary

Our review of the existing local traffic network shows that it currently operates at a good level of performance, with significant spare capacity; numerous available local access routes; and caters for all vehicle types. The entry points to the Site in particular are well away from the key activity intersections and regional route, and have clear access paths that are utilised to minimise network impacts.

The only location where there are any significant delays is at the intersection of Cormorant Road & Egret Street which, as detailed in sections above, has not to date been upgraded as conditioned by the DoP for the NCIG CET. Notwithstanding, STAP has been advised by Umwelt Australia, who are coordinating the preparation of the EA for the Stage 4 Project, that discussions between NCIG CET and the RTA are currently underway to finalise a design which would remove the right hand turn from Egret Street to Cormorant Road.

2 The Stage 4 Project

2.1 The Stage 4 Project

As outlined in **Section 1**, PWCS proposes the construction and operation of a fourth dump station and fourth ship loader infrastructure to provide additional 'sprint capacity' at the KCT to meet the overall 120 Mtpa throughput following short term disruptions to operations.

In 2007 PWCS received approval from the Minister for Planning for an increase in the throughput of the KCT from 77mtpa to a nominal 120mtpa. PWCS are seeking to modify the approval under Section 75W of the EPA Act 1979 to enable the construction and operation of the fourth dump station and fourth ship loader at KCT. Significantly, PWCS are not proposing or seeking to increase the approved maximum throughput capacity of 120 mtpa.

PWCS have an ongoing program of construction activities associated with continued development and commissioning of the KCT under existing approvals. PWCS manage construction related traffic through a number of operational procedures and protocols in order to minimise potential impacts on the surrounding road network.

In 2008, PWCS developed a Construction Traffic Management Protocol (KCT CTMP) in accordance with the provisions of 2007 Project Approval (06-0189). The KCT CTMP outlines the processes undertaken to manage heavy vehicle movements associated with construction activities at the KCT, and complements the existing traffic management processes implemented by PWCS through inductions and the like. The KCT CTMP has been approved by the RTA, Newcastle City Council and the DoP, and is further examined in **Section 2.4.3** below.

The Stage 4 Project is shown in **Figure 2.1**.

Figure 2.1 The KCT Stage 4 Project

2.2 Traffic Characteristics of the Stage 4 Project

As outlined above, the Stage 4 Project does not provide for an increase over the previously approved operational capacity of the KCT, nor does it propose operational traffic generation increases over the total generation approved under existing development consents for the KCT. As such, the only potential for traffic impacts associated with the Stage 4 Project relates to the construction period, which is expected to take up to 2 years to complete.

2.2.1 Construction Staff Numbers & Locations

During the Stage 4 Project construction period, PWCS has estimated the following staff schedule: -

- Up to 100 construction staff 1 – 6 months
- Up to 150 construction staff 7 – 9 months
- **Up to 300 construction staff 10 – 15 months**
- Up to 150 construction staff 16 – 18 months
- Up to 80 – 100 construction staff 19 – 24 months

The peak period of activity therefore will occur over only 6 months. Notwithstanding, and as detailed in sections below, STAP has provide a worst case assessment based on this peak construction traffic generation period.

Staff will access the site at 3 different sites: -

- Existing approved KCT site access points in Curlew Road and Raven Street (designated by STAP as **Access 1A** - Curlew Street; and **Access 1B** – Raven Street) – 40% of staff

- Existing approved KCT site access point in Cormorant Road (**Access 2**) – 40% of staff

- Existing approved KCT wharves access points in Cormorant Road east of the Teal Street roundabout; and in Heron Road south of Cormorant Road (**Access 3**) – 20% of staff

These access points are shown above in **Figure 1.1** and **Figure 1.3.2**.

It is important to stress that access to each of the Stage 4 Project construction locations will be exclusively via existing KCT access points, each of which has been previously approved by the relevant consent authorities. Further, as noted in **Section 1.3.3** above, each of these access points have been observed to operate well with generally low peak flows and virtually no delays.

No new access points to the KCT are required for the Stage 4 Project.

2.2.2 Heavy Vehicle Numbers

The construction materials required for the Stage 4 Project are estimated to generate approximately 200 heavy vehicles (400 heavy vehicle trips) over the 24 month construction period. Some materials/machinery will require the use of oversized vehicles under escort; these movements will require special consideration and are examined in **Section 2.4.3** below.

As for construction staff, materials will be delivered to each of the construction locations; at this time it is estimated that a similar proportional demand as for staff will be generated to each construction area.

2.3 Traffic Generation

2.3.1 Staff Trips

In our previous work on industrial sites in the area, it is has been our observation that there is an average use of car sharing and all but no use of public transport; as such, the traffic generation of the staff has been assessed as generating up to a 80:100 vehicles to staff ratio; this is the same generation rate as used in the recent MWT CET RTA, and tallies with our past work on industrial sites in Newcastle, Carrington and on Kooragang Island. As such: -

- For the construction periods when there are up to 100 staff on-site, approximately 80 trips would be generated in the AM peak period, and approximately 80 trips in the PM peak period.

- For the construction periods when there are up to 150 staff on-site, approximately 120 trips would be generated in the AM peak period, and approximately 120 trips in the PM peak period.

- **For the construction periods when there are up to 300 staff on-site, approximately 240 trips would be generated in the AM peak period, and approximately 240 departure trips in the PM peak period**.

The majority of trips in the AM peak period will be arrival trips, while the majority of trips in the PM peak period would be departure trips.

Work hours are expected to be from 7:00am – 6:00pm, with additional shift construction work at times, and the potential for some overlap with different staff operations; however, this would not increase on-site staff over those levels outlined above in **Section 2.2.1**. The Stage 4 Project construction period morning arrival peak would therefore generally correspond with the existing AM peak hour (7:00am – 8:00am), while the evening departure peak period would generally occur after the existing PM peak hour (3:30pm – 4:30pm). Through all construction periods there is expected to be a minor additional daily generation associated with visitors, minor contractors etc. However, these flows would generally occur outside of peak traffic periods and would not in our opinion impact the assessment provided on the basis of maximum construction staff numbers.

2.3.2 Heavy Vehicle Trips

The construction period for the Stage 4 Project will generate an estimated 200 heavy vehicles over the 24 month construction period, or on average of less than 1 vehicle trip per day.
Notwithstanding, for the detailed intersection assessment provided below in **Section 2.6**, STAP has assigned 3 arrival and 3 departure movements to each of the peak hours (in addition to staff trips) to account for potential peak periods during the construction period. Such a peak could conceivably occur at one time or another during the construction period, specifically during inception or with the arrival of a major piece of infrastructure, but are expected to be extremely rare.

2.4 Trip Distribution

2.4.1 Construction Staff Arrival Trips

Based on our past work – and with reference to the distribution profile provided in the MWT CET RTA – STAP estimates that up to 85% of the construction workforce will arrive from Newcastle, (i.e. from Industrial Drive and then Cormorant Road), while 15% will arrive via Stockton Bridge.

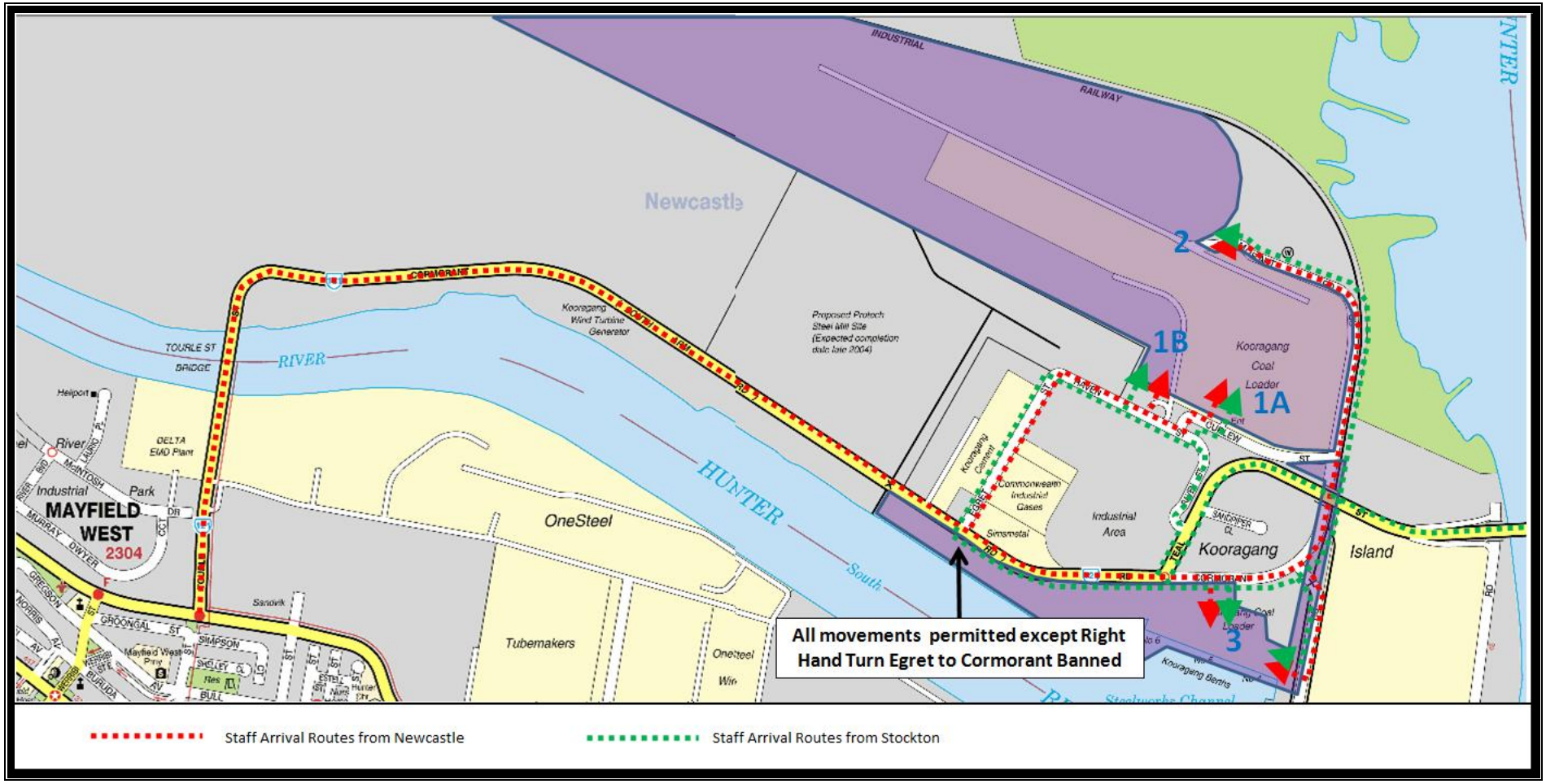
For trips to **Access 1A** (Curlew Street) and **Access 1B** (Raven Street) trips can be made via Cormorant Road to Egret Street without delay via the available deceleration/turning lane, i.e. without impacting eastbound traffic in Cormorant Road or affecting the left turn movement out of Egret Street. it should be noted that the opposed right hand turn movement from Cormorant Road to Egret Street is very low during the peak period.

For trips to either **Access 2** (Cormorant Road at rear of the KCT) or **Access 3** (Wharves via either Cormorant Road Driveway or Heron Road Driveway) vehicles would continue directly along Cormorant Road through the Teal Street roundabout and then disperse from Cormorant Road.

For arrival trips from the north-east, trips to **Access 1A** and **Access 1B** can be made via the Teal Street & Cormorant Road roundabout and then the existing right hand turn bay to Egret Street, but in our opinion staff are more likely to utilise the Teal Street roundabout to complete a U-Turn and enter via Raven Street as this provides a shorter route without delay at Egret Street. For trips to **Access 2** and **Access 3**, arrival trips would turn left at the Teal Street roundabout.

These arrival trip routes are shown in **Figure 2.4.1**.

Figure 2.4.1 Stage 4 Project Staff Arrival Routes



2.4.2 Construction Staff Departure Trips

Other sites with access to Egret Street (i.e. the NCIG CET and COP) specify (in their planning applications) the use of Egret Street to Cormorant Road, and then (in the case of the NCIG CET) a U-Turn at the Teal Street roundabout to direct trips back towards Newcastle. Given the capacity of the roundabout, this can in our opinion be achieved with relative ease.

Along with this route via Egret Street, for **Access 1A** and **Access 1B** a viable route is also available to Curlew Street, and then to Cormorant Road through (westbound) the Teal Street roundabout for trips towards the west (Newcastle). This route has the benefit of not requiring any 'backtracking' or intersection delays.

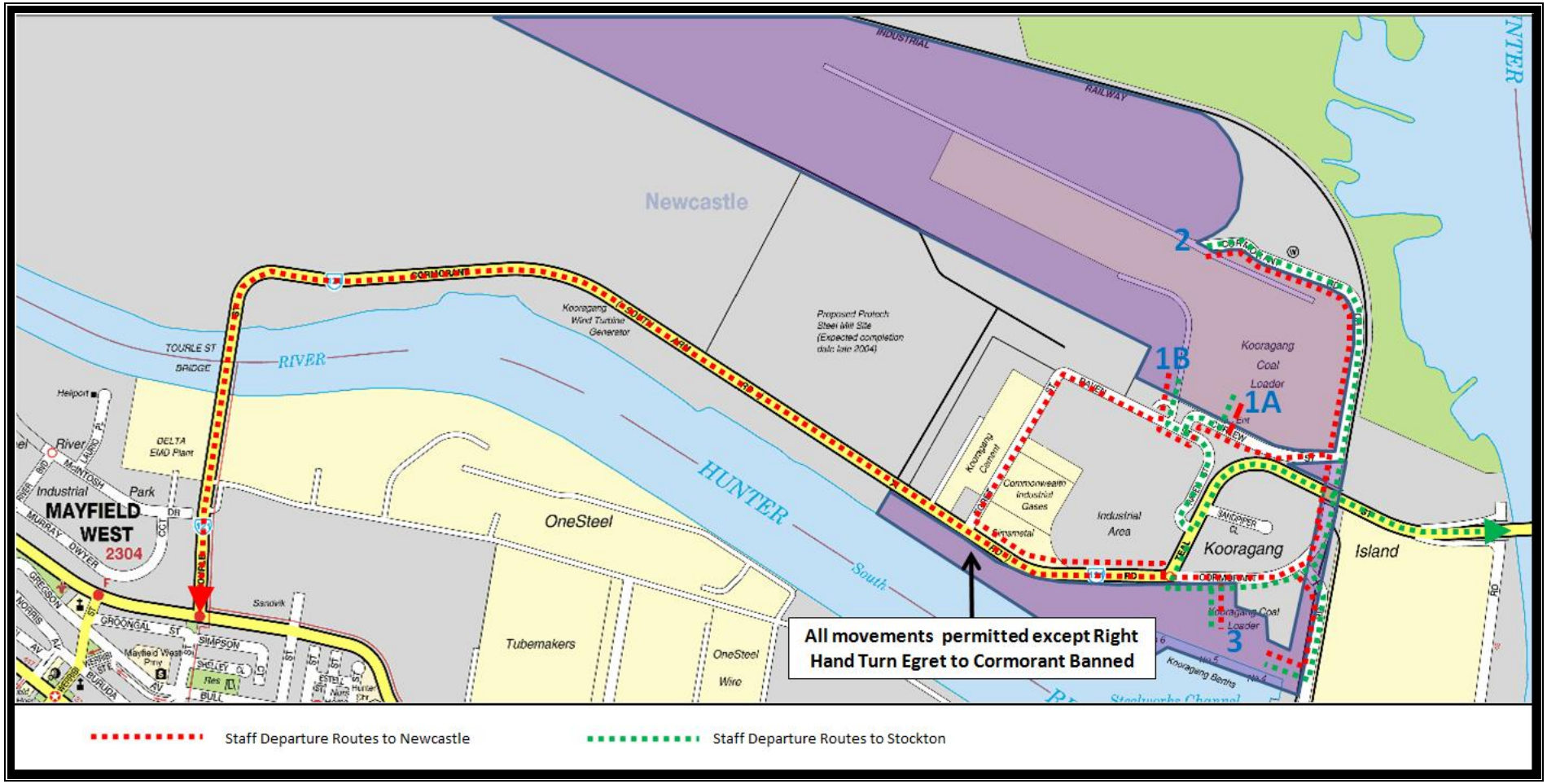
Based on the elimination of the right hand turn movement from Egret Street to Cormorant Road, and further the low construction flows and short construction timeframe of the Stage 4 Project, the use of either of these routes would in the opinion of STAP be appropriate, and it is estimated that trips from **Access 1A** and **Access 1B** will generally split between the two routes.

Departure trips to Newcastle from **Access 2** and **Access 3** would use the Cormorant Road route, i.e. westbound through the Teal Street roundabout along Cormorant Road.

For trips to the north, from **Access 1A** and **Access 1B** vehicles would use Raven Street to Teal Street; this route would also be available for those departing **Access 2** (i.e. via Curlew Street to Raven Street) or else they would use Cormorant Road and turn right at the Teal Street roundabout. Vehicles departing **Access 3** would use Cormorant Road and turn right at the Teal Street roundabout.

These departure trip routes are shown in **Figure 2.4.2**.

Figure 2.4.2 Stage 4 Project Staff Departure Routes



2.4.3 Heavy Vehicle Trips

As part of the 2007 Project Approval, the KCT CTMP was established by PWCS and subsequently approved by the DoP. Section 7.0 of the KCT CTMP sets out the protocols for the movement of heavy and oversized vehicles, and is reproduced below: -

The Construction Traffic Management Protocol will, where possible, adhere to the following principles for heavy vehicles and oversized loads:

- *Approach Kooragang Island from the north to relieve the congestion at the Tourle Street Hunter River bridge construction area. Access to the site will then be by use of Teal Street, Cormorant Road and Curlew Street.*
- *Use Egret Street/Raven Street for access to KCT for deliveries from the K7 wharf area;*
- *Use Raven Street for the transportation of waste concrete construction materials to Boral's recycling plant on Kooragang Island;*
- *Heavy vehicle loads are only to use designated entry and exit points at KCT;*
- *Heavy vehicle loads are to be delivered outside peak traffic hours, where possible*
- *Oversized loads will be transported according to the requirements of the RTA and police, and have the appropriate approvals and escorts as required*
- *Temporary road closures, if required, will be undertaken with the approval of RTA and police, and in accordance with any specific requirements; and*
- *Power line management, if required for oversized lines, will be in consultation with Energy Australia, and in accordance with any specific requirements; and*
- *Work method statements are to be completed for all heavy vehicle and oversized loads being transported to KCT to identify all hazards and controls to manage the associated risks.*

It is anticipated that much of the machinery and plant required for the Stage 4 Project construction will be sourced from local and regional manufactures to the south and west of the Site, i.e. the most efficient access route to the KCT will be via Industrial Drive and the Tourle Street Bridge to Cormorant Road. This route is not contrary to the CTMP when the completion of the Tourle Street Bridge is taken into account, i.e. the Protocol established specifically to avoid the bridge construction area is now redundant – indeed, one of the primary reasons for the new bridge construction was to provide the strength and geometry such as to provide for heavy vehicle traffic to and from Kooragang Island from the appropriate regional routes, being Industrial Drive and the Pacific Highway.

STAP would therefore recommend the following minor amendments to the access routes for the Stage 4 Project, to be incorporated into a revised KCT CTMP: -

- *Heavy vehicles arriving from the north-east use the route as determined in the KCT CTMP, and for departure utilise Raven Street to Teal Street.*

- *Heavy vehicles arriving from the south/west utilise Egret Street from Cormorant Road; and for departure utilise Curlew Street and Cormorant Road, or Egret Street to Cormorant Road and the Teal Street roundabout.*

- *Heavy vehicles transporting materials between the wharf area and* ***Access 1A*** *and* ***Access 1B*** *utilise Egret Street from Cormorant Road (right hand turn) for arrivals; and Egret Street to Cormorant Road (left hand turn) for departures.*

- *Heavy vehicles transporting materials between the wharf area and Access 2 and Access 3 utilise Cormorant Road for arrivals and departures.*

STAP would further recommend that the other protocols established in the existing KCT CTMP be retained for the construction period for the Stage 4 Project; this particularly includes the special requirements for the coordination and oversight of the movement of oversized vehicles.

The proposed heavy vehicle routes are shown in **Figure 2.4.3.**

2.5 Stage 4 Project Traffic Assignment

2.5.1 Stage 4 Project Assigned Flows

Based on the traffic generation and distribution of the Stage 4 Project outlined above, the trips generated to and from the KCT during the peak construction period (i.e. 300 staff plus peak heavy vehicle loading) are shown in **Figure 2.5.1** (AM Peak Hour) and **Figure 2.5.2** (PM Peak Hour).

While STAP would stress that this peak construction period will only occur over 6 months (outside of which time trips would be effectively halved) the use of the peak construction generation provides in our opinion a worst case assessment appropriate to such a significant, albeit short-term, project.

Figure 2.4.3 Heavy Vehicle Routes

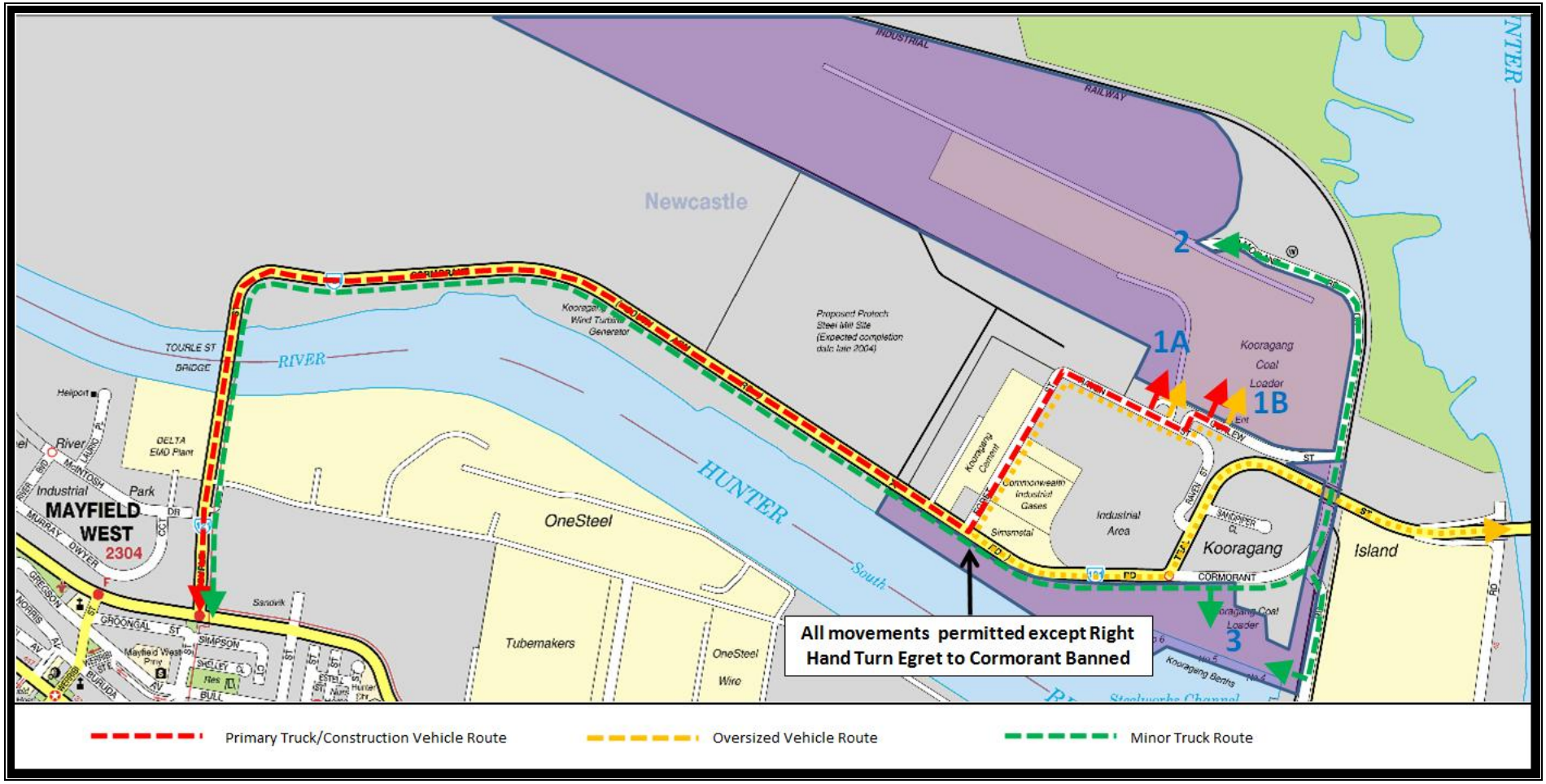


Figure 2.5.1 Stage 4 Project Flows, AM Construction Peak Hour 7:00am – 8:00am

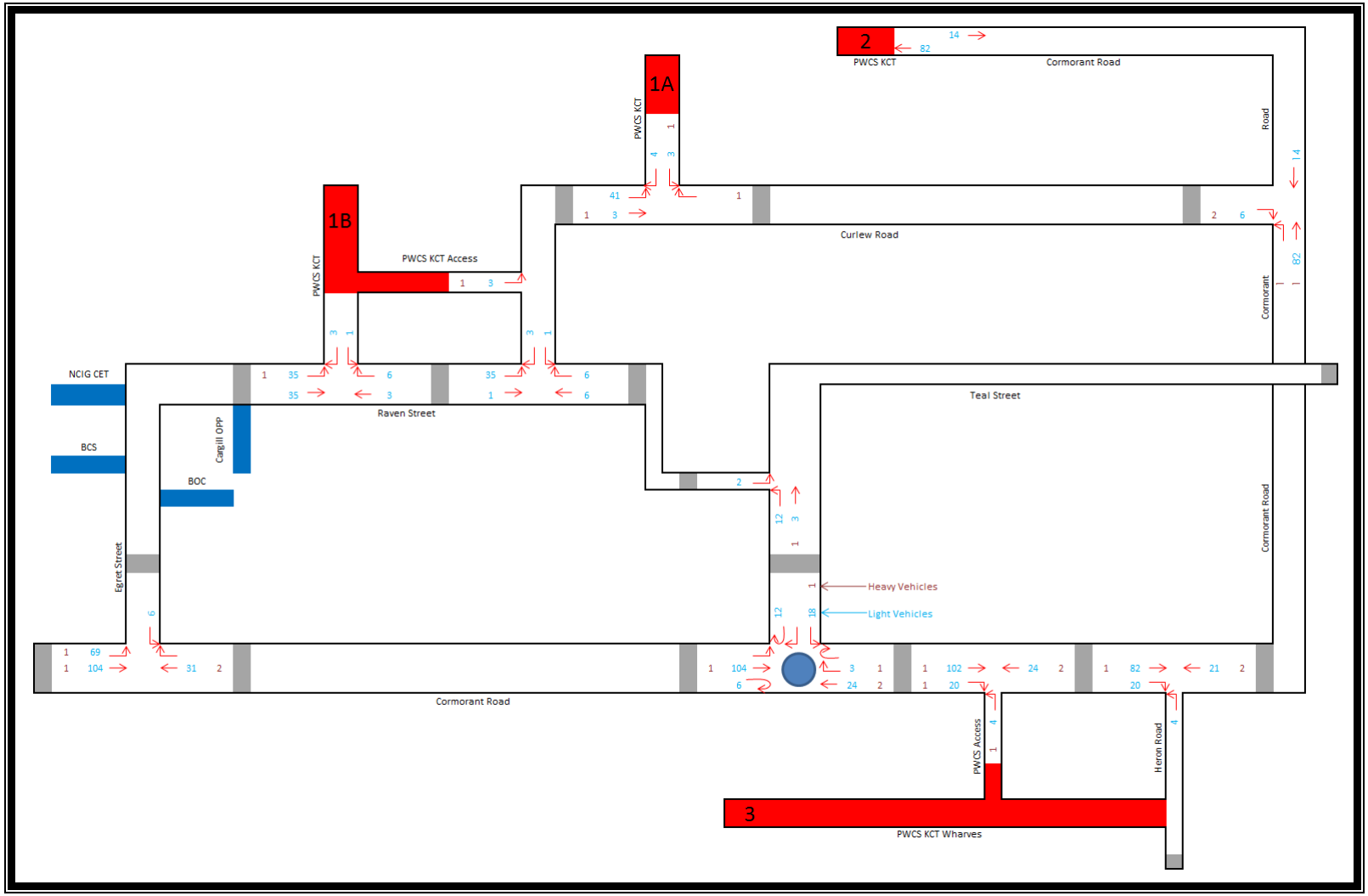
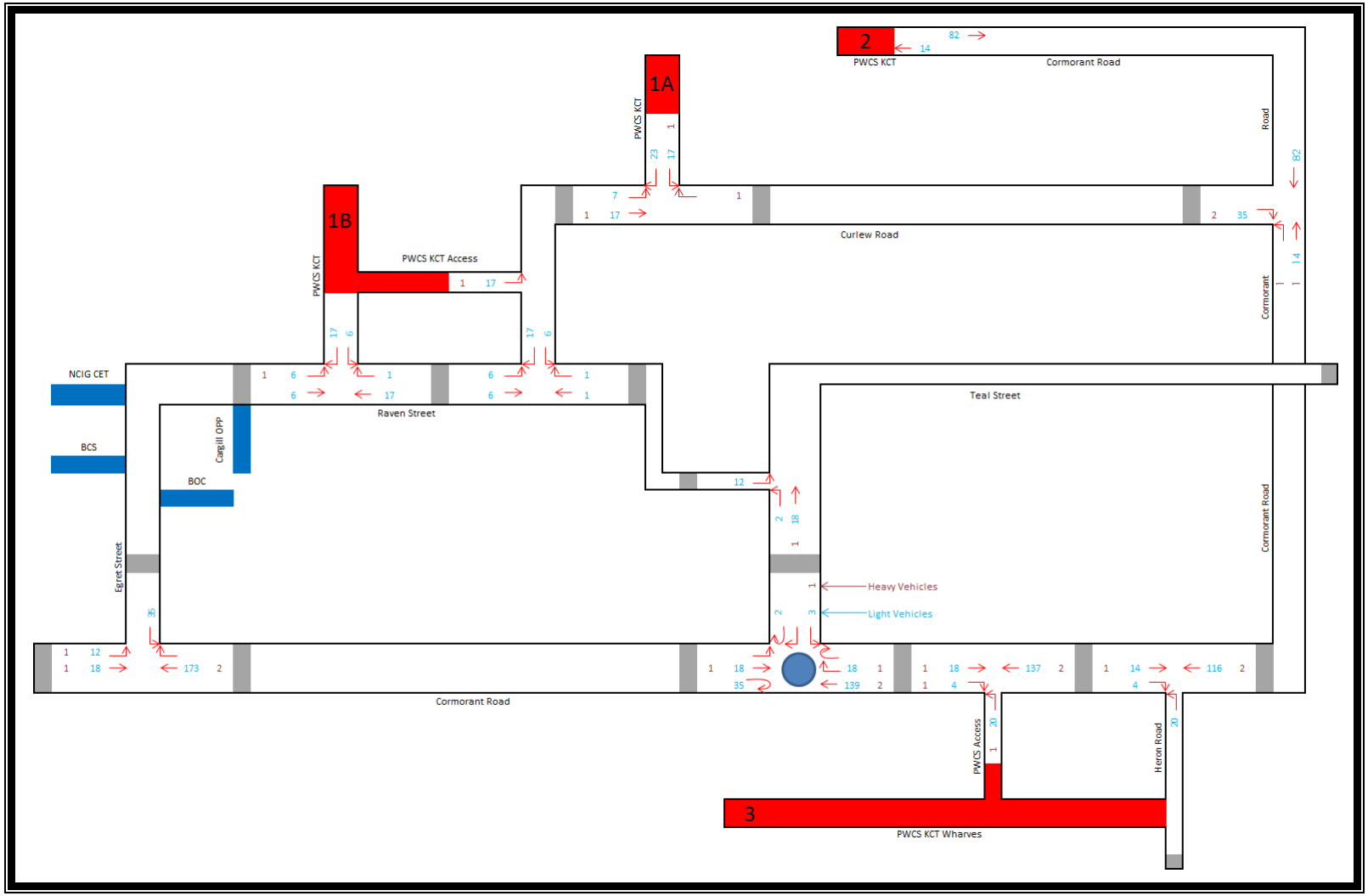


Figure 2.5.2 Stage 4 Project Flows, PM Construction Peak Hour 5:30pm – 6:30pm



2.5.2 Additional Route & Generation Issues

The trip paths identified by STAP have been established with the understanding that the existing right hand turn issue at the intersection of Cormorant Road & Egret Street will be resolved, i.e. the right hand turn will be eliminated, thereby allowing the intersection to perform at a good level of service. For this reason – and further to the analysis of the future performance of the intersection with additional flows provided below in **Section 1.6** – STAP see no reason to restrict additional short-term movements generated by the Stage 4 Project to this intersection.

It is also the case that the peak construction period for the nearby NCIG CET is expected to end in the near future (early 2010) and as such the peak flow to these local intersections currently being generated from the NCIG CET would be significantly reduced prior to the commencement of the Stage 4 Project construction period.

Notwithstanding, our analysis has included the current levels of NCIG CET construction traffic, essentially providing a 'super-peak' assessment that at worst would represent flows for a six month period, but realistically provides for flows significantly in excess of those which will be generated at the key intersections during the Stage 4 Project peak construction period, likely to occur in 2011.

2.6 Traffic Assessment

2.6.1 Assessment Traffic Flows

In order to determine the potential impacts of the construction vehicle traffic on the key local intersections during of the construction period, STAP has assigned the Stage 4 Project peak traffic generation (i.e. 300 staff) as identified in **Section 2.4** above to the two key local intersections, being Cormorant Road & Egret Street, and Cormorant Road & Teal Street.

STAP notes that for the Cormorant Road & Egret Street intersection we have again provided an assessment with and without the surveyed right hand turn movement from Egret Street to Cormorant Road.

2.6.2 2012 Base Year

For this assignment, STAP has used a design year of 2012, which is expected to be the final year of construction; as such, we have factored the existing traffic flows by an annual increase of 1.5% (as agreed with the RTA for our past local assessments, though we note this is generally higher than historical data suggests) to represent traffic growth. This base year has been analysed alone to determine the effect of general background traffic flow changes on the two intersections without the additional construction traffic associated with the Stage 4 Project.

As discussed above in **Section 2.5.2**, STAP has also retained the existing flows which are currently being generated to and from the NCIG CET site through these intersections; it is our opinion – based on available NCIG CET planning documents - that by the time the Stage 4 Project construction period commences the NCIG CET construction will be largely completed, and flows reduced significantly (with reference to the MWT CET RTA, up to a 75% reduction in peak NCIG CET flows).

The resulting 2012 flows without the additional Stage 4 Project peak construction traffic flows are shown in **Figure 2.6.2.1** (AM Peak) and **Figure 2.6.2.2** (PM Peak)

Figure 2.6.2.1 2012 Average Annual Increase Only AM Peak 7:00am – 8:00am

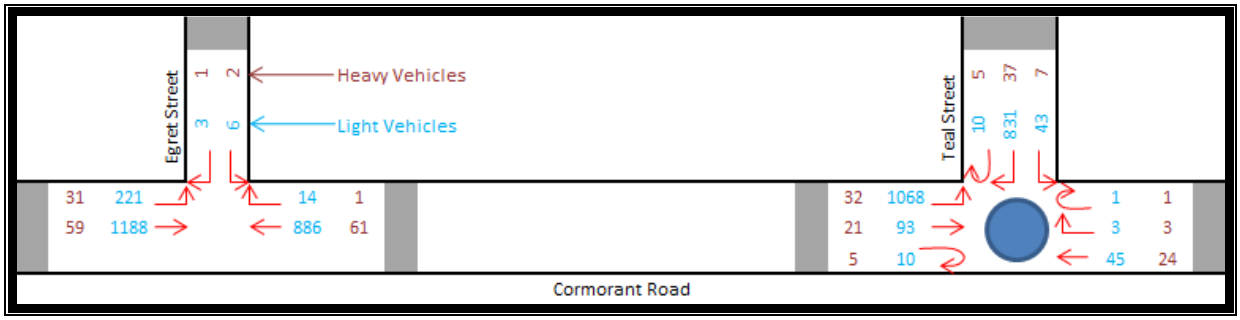


Figure 2.6.2.2 2012 Average Annual Increase Only PM Peak 3:30pm – 4:30pm

2.6.3 Total Future Stage 4 Project Flows

To these 2012 base flows STAP has added the additional traffic generated by the peak construction period of the Stage 4 Project. As identified in **Section 2.3.1**, while the Stage 4 Project construction peak arrival period will generally coincide with the existing AM peak hour, the peak departure period is likely to occur after the existing PM peak hour (i.e. at a time when existing intersection flows are lower). Notwithstanding, the assignment of these trips to the existing peaks provides for a worst case assessment.

The total resulting flows are shown in **Figure 2.6.3.1** (AM Peak Hour) and **Figure 2.6.3.2** (PM Peak Hour).

Figure 2.6.3.1 2012 Average Increase & Peak Stage 4 Project AM Peak Hour 7:00am – 8:00am

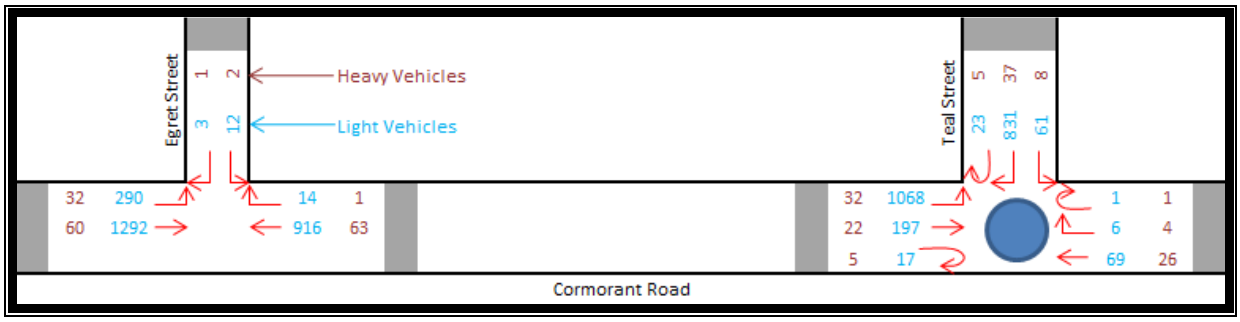
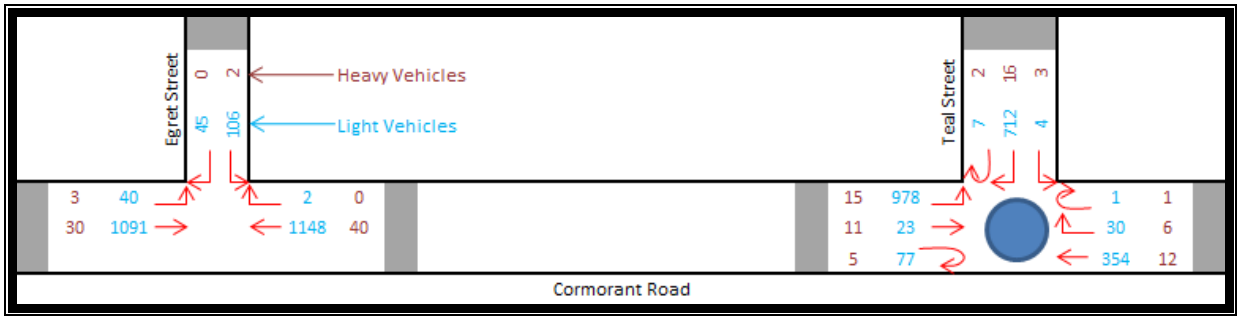


Figure 2.6.3.2 2012 Average Increase & Peak Stage 4 Project PM Peak Hour 3:30pm – 4:30pm



2.7 Future Intersection Performance

STAP has re-examined the performance of the key intersections using the SIDRA model. The assessment has been completed to assess network performance for the additional base year 2012 generation, and then with the addition of the Stage 4 Project peak construction generation.

The results of the SIDRA assessment are provided below in the following tables: -

- **Table 2.7.1** 2012 Average Annual Increase Only
- **Table 2.7.2** 2012 Average Annual Increase Plus Peak Stage 4 Project

Table 2.7.1 2012 Average Annual Increase

2012 Annual Average Increase Only	Average Delay Intersection		Level of Service Intersection		Average Delay Worst Movement		Level of Service Worst Movement		Degree of Saturation	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Cormorant Rd & Teal St	<10	<10	n/a	n/a	20	19	B	B	0.392	0.341
Cormorant Road & Egret Street (Existing)	<10	<10	n/a	n/a					1	1
RHT Egret to Cormorant					>100	>100	F	F		
LHT Cormorant to Egret					27	16	B	B		
Cormorant Road & Egret Street (Banned RHT))	<10	<10	n/a	n/a	30	16	C	B	0.33	0.288

Table 2.7.2 2012 Average Annual Increase Plus Peak Stage 4 Project

2012 Average Annual Increase Plus Stage 4 Project Peak Construction Period	Average Delay Intersection		Level of Service Intersection		Average Delay Worst Movement		Level of Service Worst Movement		Degree of Saturation	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Cormorant Rd & Teal St	12	12	n/a	n/a	19	19	B	B	0.429	0.35
Cormorant Road & Egret Street (Existing)	<10	<10	n/a	n/a					1	1
RHT Egret to Cormorant					>100	>100	F	F		
LHT Cormorant to Egret					28	16	B	B		
Cormorant Road & Egret Street (Banned RHT))	<10	<10	n/a	n/a	32	17	C	B	0.358	0.313

2.8 Future Traffic Impact Assessment

The SIDRA and general traffic assessment shows that the additional traffic to be generated by the Stage 4 Project during its peak construction period will have no significant impact on the operation of the key local intersections. Specifically: -

- The operation of the intersection of Cormorant Road & Teal Street is virtually unchanged by the additional construction traffic, and continues to operate at a LoS "B" with significant spare capacity, and only moderate delays to the worst approach. Average delays to all movements represent a LoS "A".

- The operation of the legal movements at the intersection of Cormorant Road & Egret Street are similarly virtually unchanged by the additional construction traffic, with the left hand turn from Egret Street to Cormorant Road in particular generally unaffected by the short term increases in eastbound flow in Cormorant Road. This movement would operate at LoS "C" under legal conditions in 2012 as a result of average annual increases in the passing flow, and remain at LoS "C" with the additional peak Stage 4 Project construction traffic. Overall, the increase in delay between the existing and future tests is only 4 seconds, straddling the RTA LoS "B" and LoS "C" threshold.

- **In reality, it is our opinion that prior to the Stage 4 Project peak construction, the heavy existing turning movement – generated by the NCIG CET – will have significantly abated, and the enforcement of the right hand turn ban would generally see this intersection operate at LoS "B" with or without the Stage 4 Project peak construction traffic**.

- The delay to the observed right hand turn movement from Egret Street to Cormorant Road – if retained (or at least if it continues to occur) - would deteriorate even further under all conditions; in our opinion this justifies the implementation of measures to ensure that the turn is firmly restricted as per the recommendations of the MWT CET RTA and the conditions of the DoP for the NCIG CET.

- With reference to the general traffic flows generated along the access roads through the precinct in **Figure 2.5.1** and **Figure 2.5.2** above, these flows would not in our opinion change the general character or operation of these local industrial roads over the Stage 4 Project peak construction period, after which time they would return to their observed very low daily flows.

- All construction vehicles will be utilising existing approved access points, and STAP is of the opinion that each of these access points will continue to operate at high levels of service based on their low-moderate traffic flows, good sight distances and excellent intersection geometry.

- Finally, it is essential to recognise that the construction period for the Stage 4 Project is expected to occur over a period of only 2 years, and that the peak generation used in the critical assessment above would only occur for approximately 6 months of that period. After this time, traffic flows would essentially return to existing levels, and indeed further when it is considered that the NCIG CET peak construction period would also have come to an end.

2.9 Site Parking

Reference to the potential for only moderate car sharing as discussed in sections above suggests that the parking demand during the Stage 4 Project could be up to 240 parking spaces across the three construction locations under peak construction conditions.

Temporary car parks would be provided at each of the Stage 4 Project construction areas, and specifically off-street parking in existing KCT construction parking areas in proximity to each of the nominated construction traffic access points. Again, it is important to stress that access to these off-street parking areas will only be via existing KCT access points.

The number of spaces which would be required at each of the parking areas would generally be proportional to the number of construction staff at each of the work sites, and these parking areas could be reused following the completion of the peak construction period.

As such, this would require the provision of up to 100 temporary spaces off **Access 1A/1B** and **Access 2**; and 40 spaces of **Access 3**. Based on our on-site observations, there is more than adequate space to provide for this level of parking on a temporary basis, which would include appropriate access aisle widths and turning areas so that all vehicles enter and departed each access point in a forward direction as they do at present.

Any Stage 4 Project heavy vehicle parking demand would also be provided off-street.

3 Conclusions & Recommendations

3.1 Conclusions

STAP has completed a detailed assessment of the potential traffic impacts arising from the implementation of the 4th Dump Station & 4th Ship Loader Project (Stage 4 Project) at the Port Waratah Coal Services Kooragang Coal Terminal (KCT), and has determined that the Stage 4 Project would have no significant impacts on the local transport network. Specifically, STAP has determined: -

- The impacts of the Stage 4 Project are limited to the additional access, traffic and parking demands associated with the construction of the proposed additional infrastructure; once operating, the new infrastructure implemented for the Stage 4 Project would not increase traffic or parking demands above levels previously approved for the Site by the Department of Planning.

- The construction traffic demands of the Stage 4 Project are moderate, and would be generated for a relatively short period at a time when significant existing construction trips in the local area – and specifically those associated with the adjacent Newcastle Coal Infrastructure Group Coal Export Terminal – have all but abated.

- Appropriate access routes are available for both light and heavy vehicles for the duration of the construction period, and the additional trips generated during this period would not compromise the efficient operation of the key intersections of Cormorant Road & Egret Street, and Cormorant Road & Teal Street. Beyond these key intersections, the additional trips would have no significant impact on traffic operations.

- **Based on the availability of numerous local access routes; the moderate construction traffic demands; the reduction in trip generation from adjacent local construction projects; and the significant capacity within the Kooragang Island industrial precinct, STAP has concluded that the construction traffic generated by the Stage 4 Project will have no significant impact on the local traffic network.**

- All KCT access points to be utilised by Stage 4 Project construction vehicles are existing approved access points, and will continue to operate at a high level of service.

- Temporary parking areas can be provided on-site to accommodate construction staff parking demands.

3.2 Recommendations

Further to these conclusions, STAP provides the following recommendations: -

- That the existing KCT Construction Traffic Management Protocol operating at the Site be revised to account for the completion of the Tourle Street Bridge and the more efficient regional connectivity provided by the new bridge to Industrial Drive and Pacific Highway.

- That parking be provided off-street to meet construction staff demands at each of the Stage 4 Project construction areas.