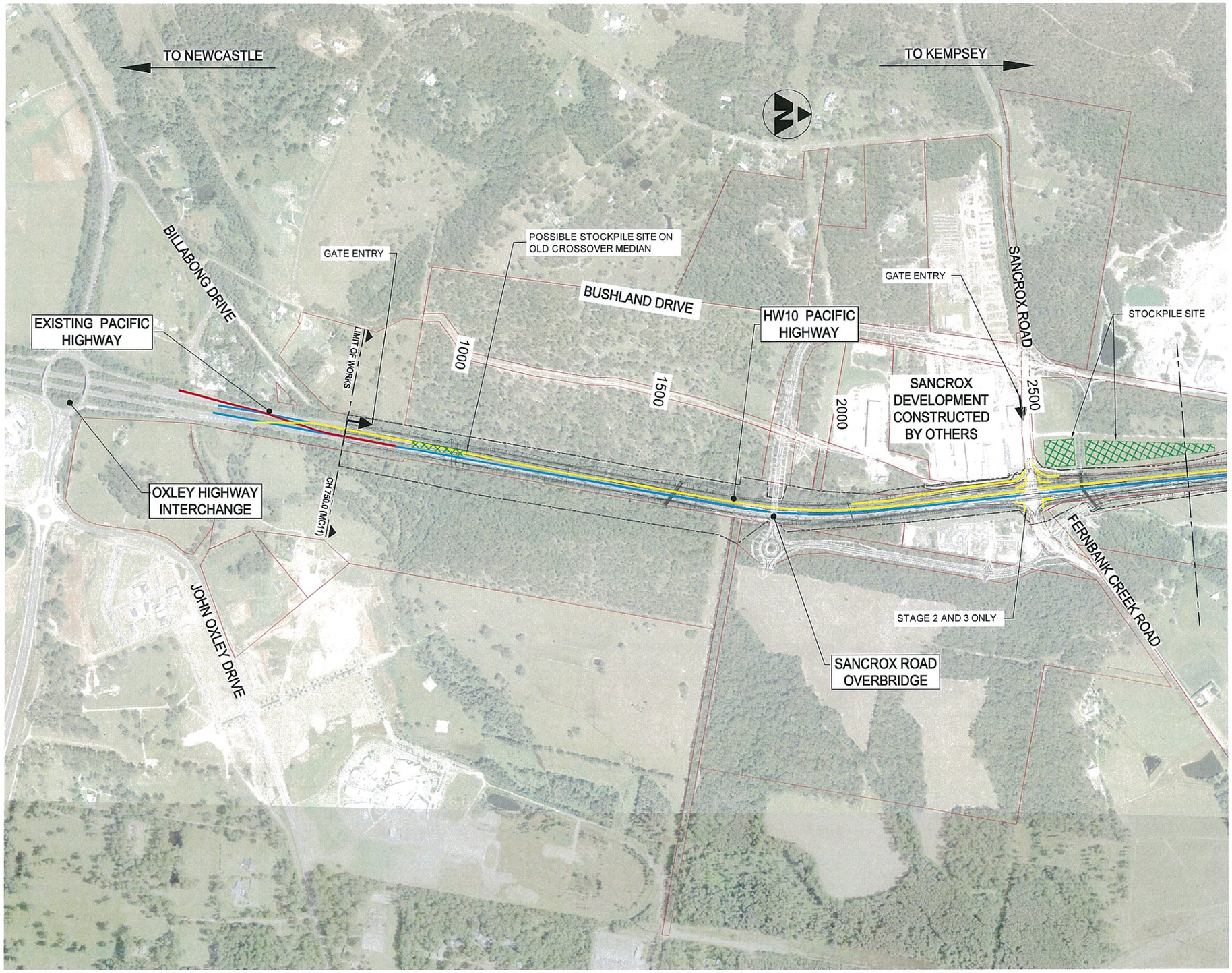
Appendix B

Temporary Traffic Barrier Locations, Speed Zones & Site Access Points

A4 copies of these drawings are included here.



LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

100KPH EXISTING | 80KPH DURATION OF WORK | 80KPH EXISTING

NOT FOR CONSTRUCTION

JOINS SHEET 2

PRODUCED: 3 September 2013 AT 6:22:39 PM USER: Print Machine

PLOT DRIVER: NONE FILE PATH: S:\01 Projects\90002\ACAD\DRAWINGS\OH2K-CIV-TM-0051.dwg

PEN TABLE: RMS_A3.ctb 25mm ON ORIGINAL A3 ORIGINAL

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

This sheet may be prepared using colour and may be incomplete if copied

SCALES 0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

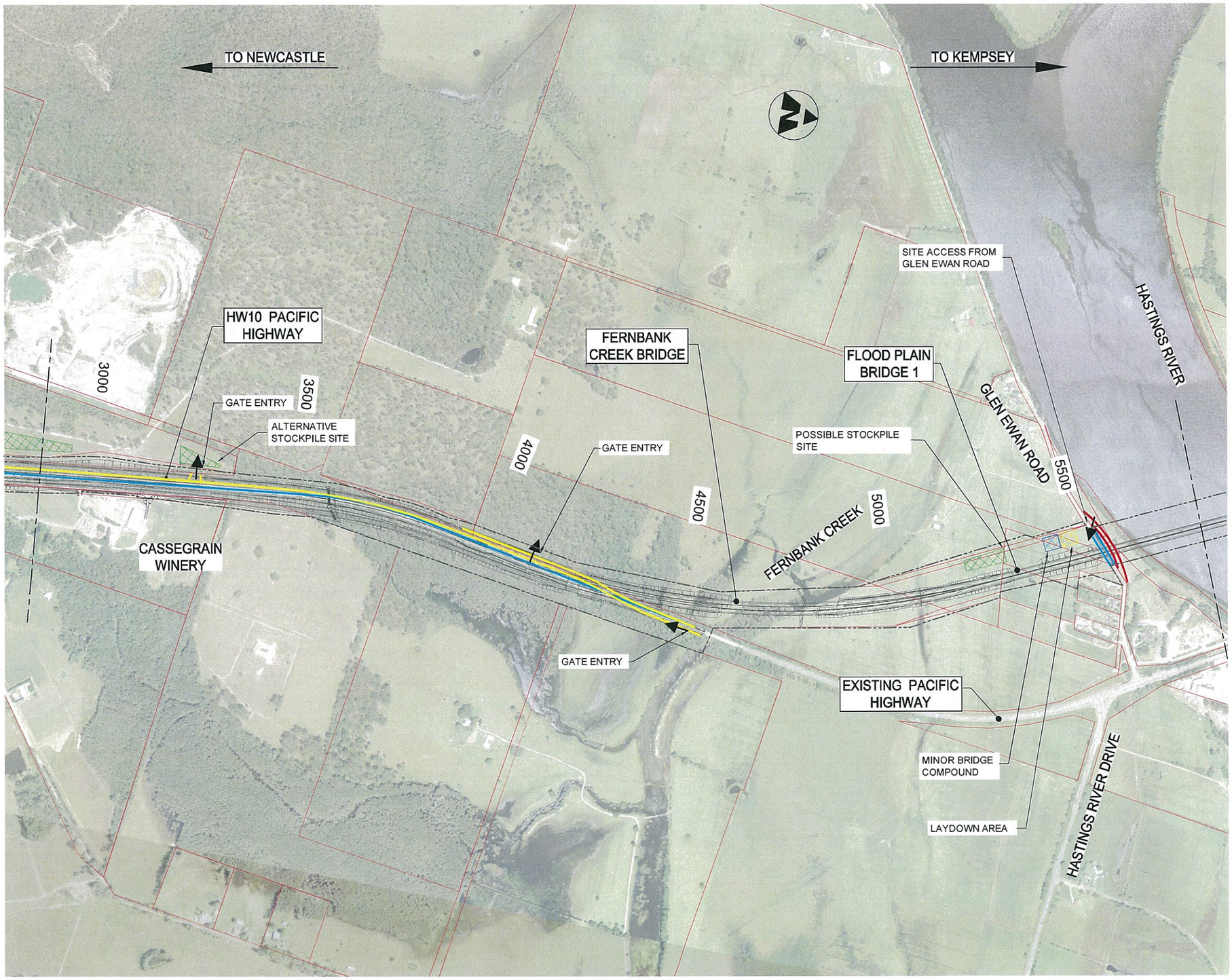
DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		
REVIEWED AO		

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 1

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0051	TENDER	1	1

REGISTRATION NUMBER	SHEET No.
T.B.C.	TM-0051



LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

JOINS SHEET 1

JOINS SHEET 3

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

This sheet may be prepared using colour and may be incomplete if copied

A3 ORIGINAL

SCALES

0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT

DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED AO

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 2

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0052	TENDER	1	1

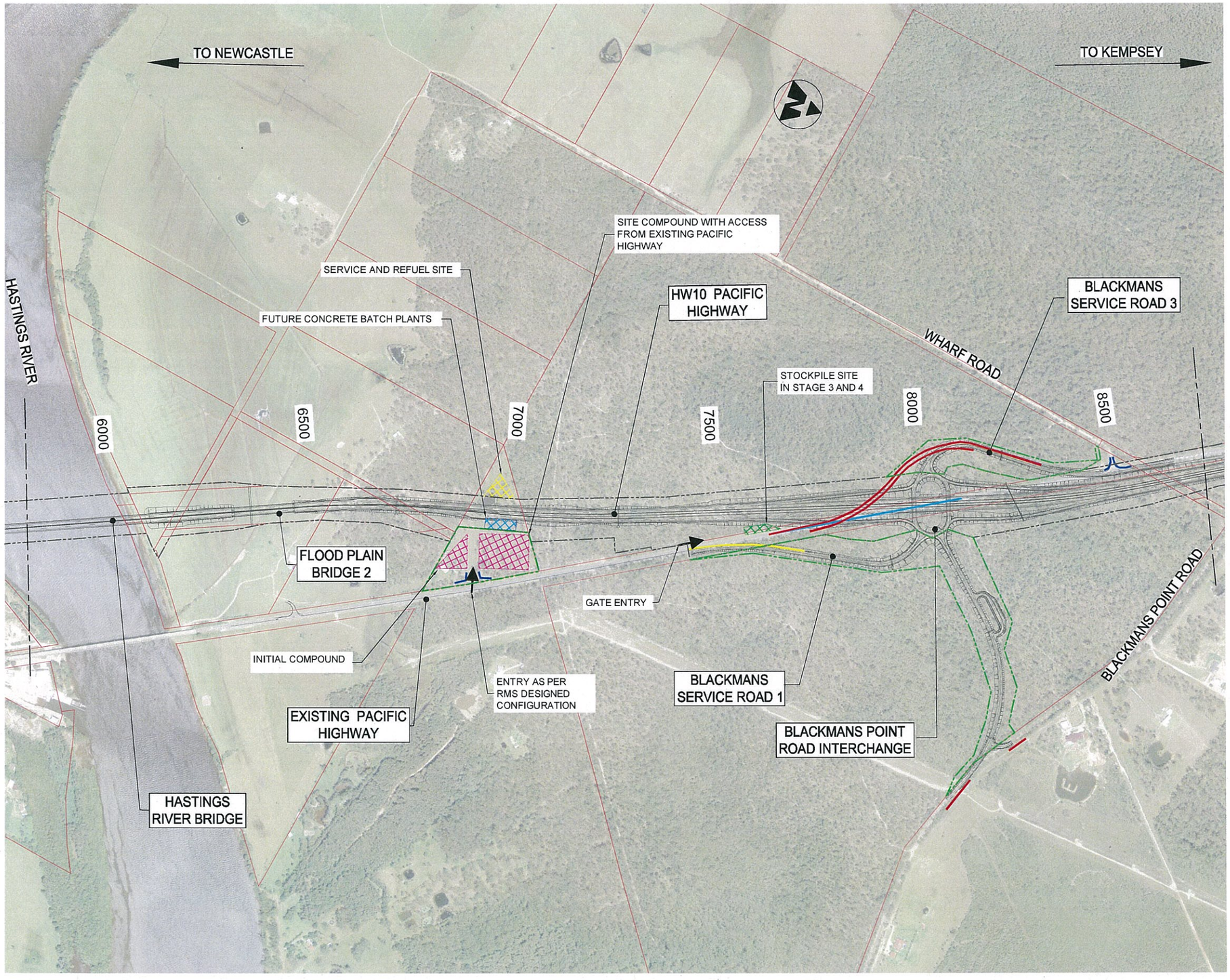
REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0052

PRODUCED: 3 September 2013 AT 6:23:13 PM USER: Print Machine

PLOT DRIVER: NONE FILE PATH: S:\01 Projects\90002\ACAD\DRAWINGS\OH2K-CIV-TM0052.dwg

PEN TABLE: RMS_A3.ctb 25mm ON ORIGINAL



LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

80KPH
DURATION OF WORK

60KPH
STAGES 2,3,4

80KPH

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

A3 ORIGINAL

This sheet may be prepared using colour and may be incomplete if copied

SCALES
0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED. AO.

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 3

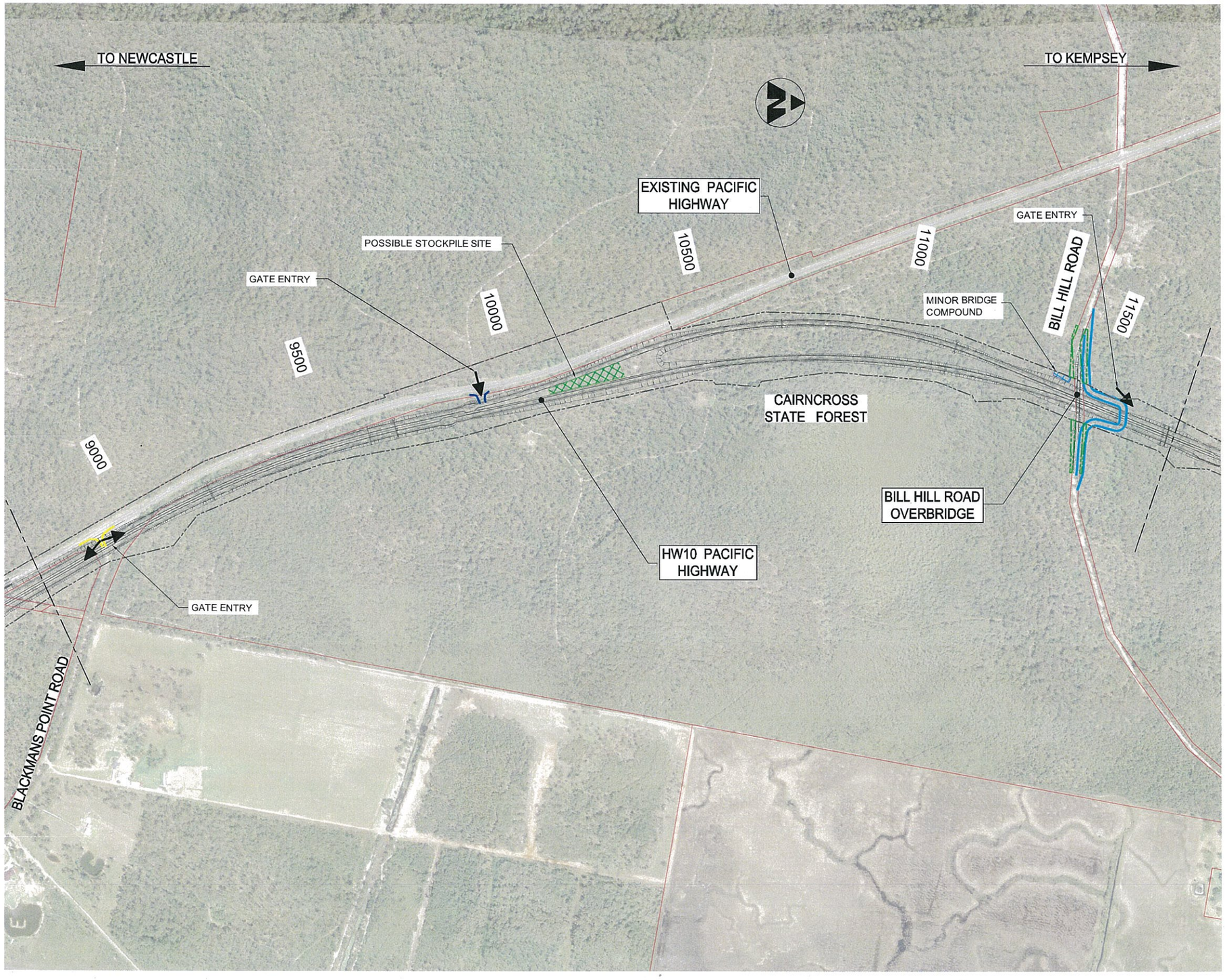
DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0053	TENDER	1	1

REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0053

JOINS SHEET 2

JOINS SHEET 4



LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

This sheet may be prepared using colour and may be incomplete if copied

A3 ORIGINAL

SCALES

0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED. AO.

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 4

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0054	TENDER	1	1

REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0054

JOINS SHEET 3

JOINS SHEET 5

PRODUCED: 3 September 2013 AT 6:24:16 PM USER: Print Machine

PLOT DRIVER: NONE

FILE PATH: S:\01 Projects\90002\ACAD\DRAWINGS\OH2K-CIV-TM-0054.dwg

PEN TABLE: RMS_A3.ctb

1 5 10 15 20

25mm ON ORIGINAL

LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

JOINS SHEET 4

JOINS SHEET 6

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

A3 ORIGINAL

This sheet may be prepared using colour and may be incomplete if copied

SCALES

0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED. AO

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 5

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0055	TENDER	1	1

REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0055

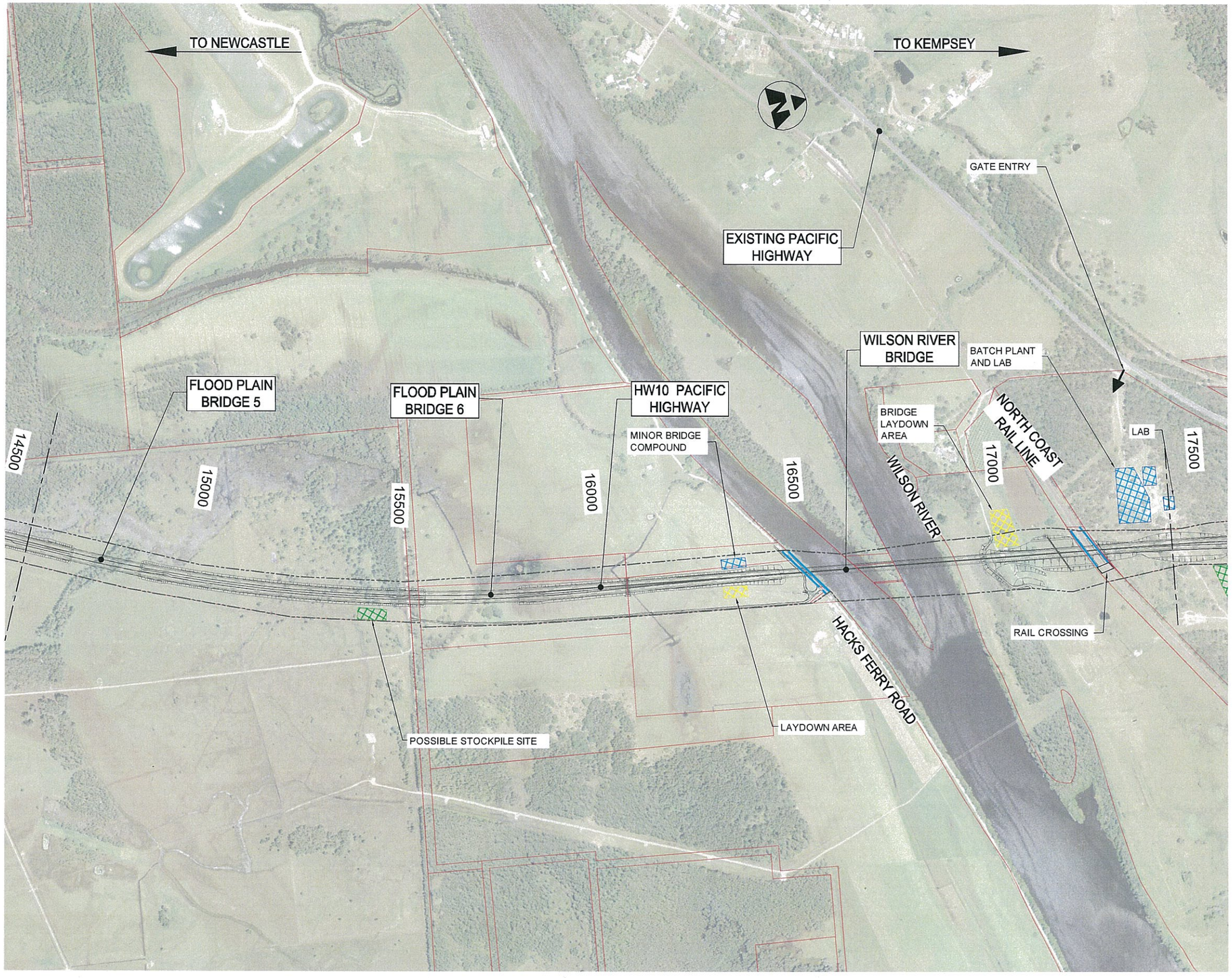
PRODUCED: 3 September 2013 AT 6:24:53 PM USER: Print Machine

PLOT DRIVER: NONE

FILE PATH: S:\01_Projects\90002\ACAD\DRAWINGS\OH2K-CIV-TM-0055.dwg

25mm ON ORIGINAL

TEN TABLE: RMS_A3.ctb



LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

JOINS SHEET 5

JOINS SHEET 7

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

This sheet may be prepared using colour and may be incomplete if copied

A3 ORIGINAL

SCALES

0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED. AO.

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 6

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0056	TENDER	1	1

REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0056

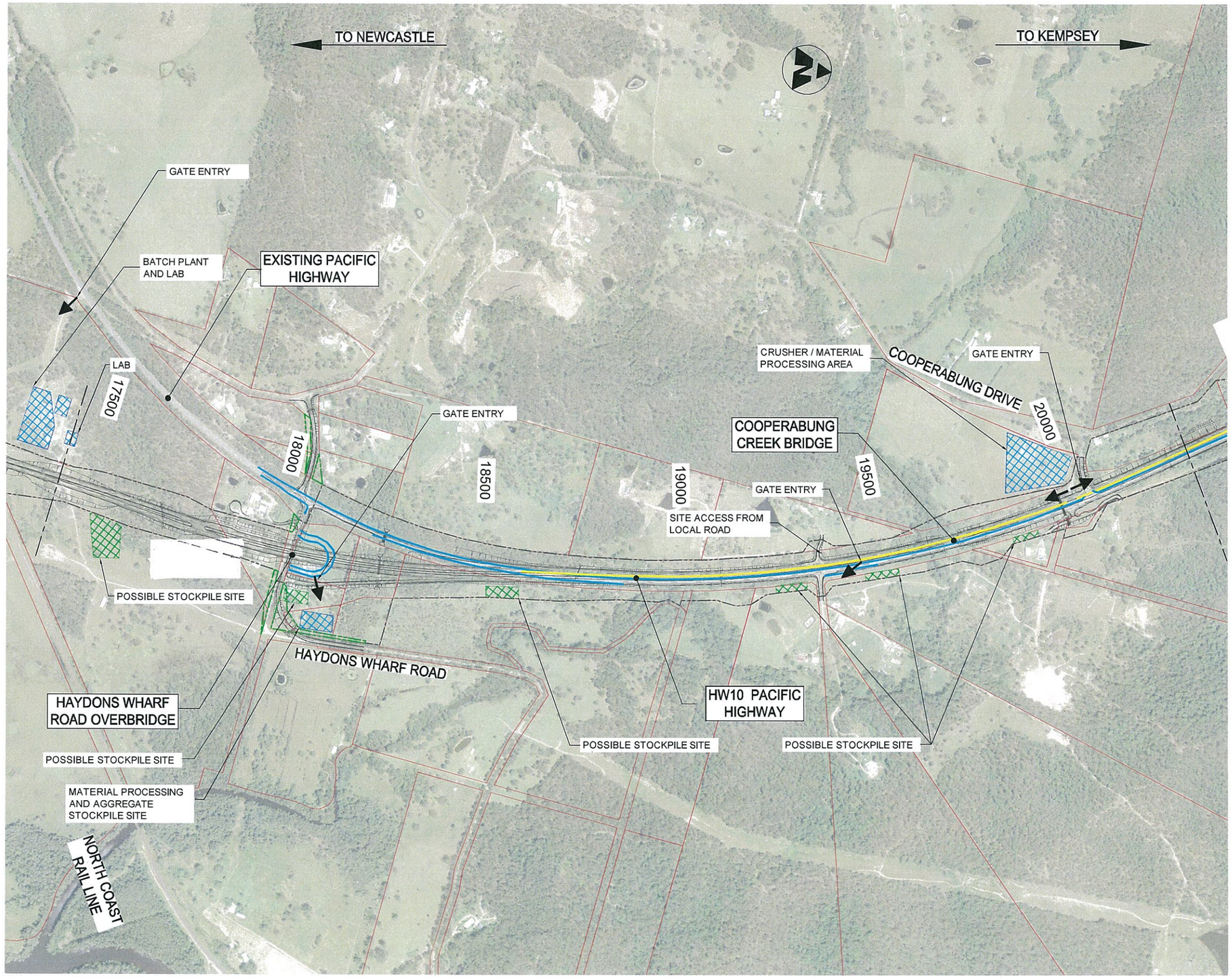
PRODUCED: 3 September 2013 AT 6:25:31 PM USER: Print Machine

PLOT DRIVER: NONE

FILE PATH: S:\01 Projects\90002\ACAD\DRAWINGS\OH2K-CIV-TM-0056.dwg

25mm ON ORIGINAL

PEN TABLE: RMS_A3.ctb



LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

80KPH
DURATION OF WORK

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

A3 ORIGINAL

This sheet may be prepared using colour and may be incomplete if copied

SCALES
0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

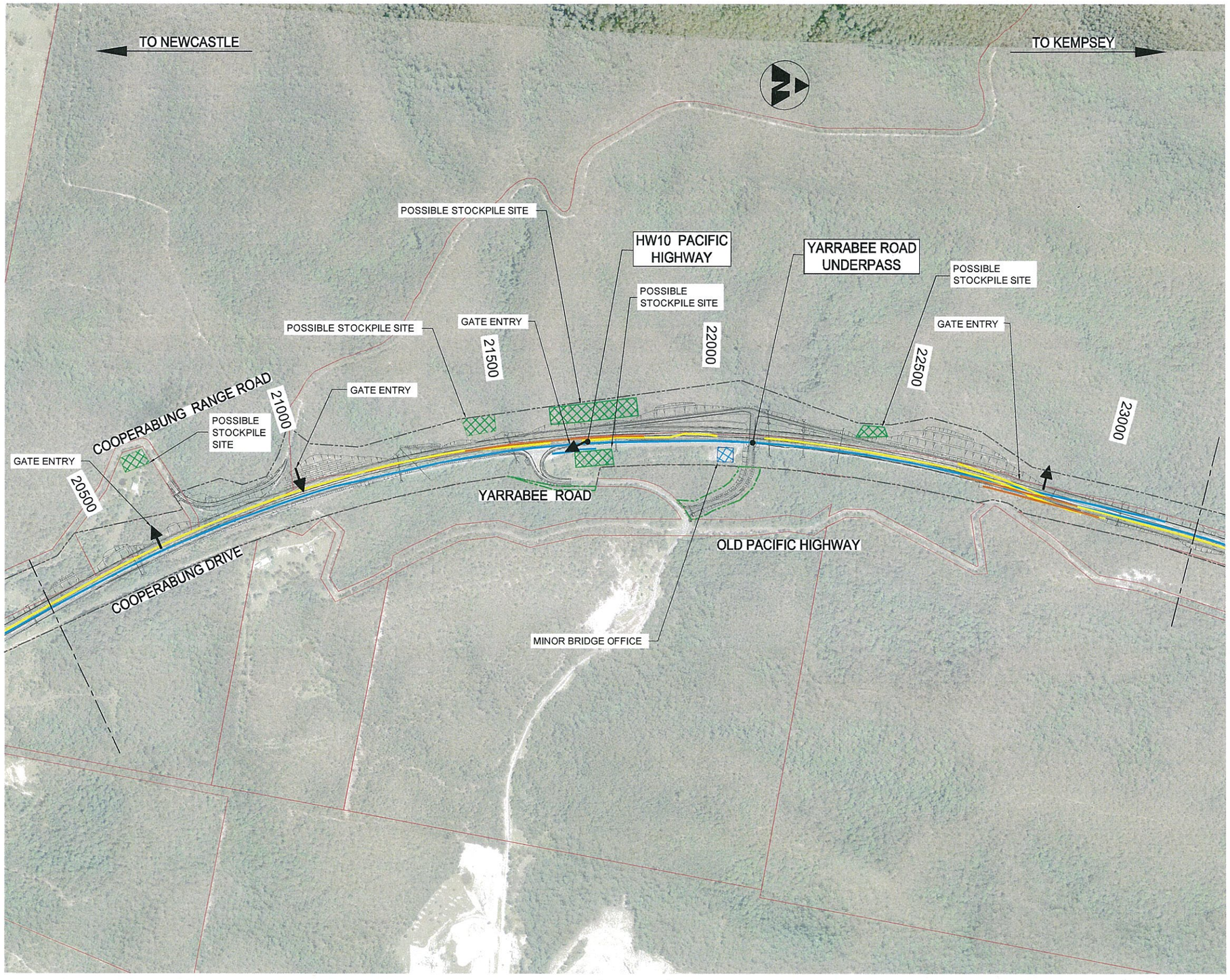
DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		
REVIEWED AO		

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 7

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0057	TENDER	1	1

REGISTRATION NUMBER	SHEET No.
T.B.C.	TM-0057



80KPH
DURATION OF WORK

LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

JOINS SHEET 7

JOINS SHEET 9

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

This sheet may be prepared using colour and may be incomplete if copied

A3 ORIGINAL

SCALES
0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED. AO.

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 8

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0058	TENDER	1	1

REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0058

PRODUCED: 3 September 2013 AT 6:26:53 PM USER: Print Machine

PLOT DRIVER: NONE FILE PATH: S:\01 Projects\90002\ACAD\DRAWINGS\OH2K-CIV-TM-0058.dwg

26mm ON ORIGINAL

PEN TABLE: RMS_A3.ctb

LEGEND

- SITE BOUNDARY (SWTC APP 2)
- PACIFIC HIGHWAY UPGRADE
- EXISTING HIGHWAY/LOCAL ROADS
- TYPE F BARRIER - STAGE 1
- TYPE F BARRIER - STAGE 2
- TYPE F BARRIER - STAGE 3
- TYPE F BARRIER - STAGE 4
- WATERFILLED BARRIER
- SITE ACCESS/GATE ENTRY
- SITE ACCOMMODATION
- STOCK PILE AREAS
- REFUEL/SERVICE SITES AND LAYDOWN AREAS
- OFFICE COMPOUND/BATCH PLANT

NOTES

LENGTH OF TYPE F BARRIER = 14968m (STAGE 1)

LENGTH OF TYPE F BARRIER = 1930m (STAGE 2)

LENGTH OF TYPE F BARRIER = 11769m (STAGE 3)

LENGTH OF TYPE F BARRIER = 1049m (STAGE 4)

LENGTH OF WATERFILLED BARRIERS = 267m

STOCKPILE LOCATIONS ARE INDICATIVE ONLY

NOT FOR CONSTRUCTION

ISSUE	DATE	ISSUE / AMENDMENT DESCRIPTION
1		TENDER ISSUE

This sheet may be prepared using colour and may be incomplete if copied

A3 ORIGINAL

SCALES

0 50 100 150 200m

CO-ORDINATE SYSTEM: MGA Zone 56 HEIGHT DATUM: A.H.D.

DRAWING CHECK PRINT		
DATE RAISED 03 / 09 / 13	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION TI		

REVIEWED AO

ROADS AND MARITIME SERVICES

PACIFIC HWY UPGRADE - OXLEY HWY TO KUNDABUNG
TEMPORARY BARRIER LOCATIONS SITE ACCESS
& SPEED ZONES DURING CONSTRUCTION
SHEET 9

DRAWING	STAGE	VOL	ISSUE
OH2K-CIV-TM-0059	TENDER	1	1

REGISTRATION NUMBER: T.B.C.

SHEET No.: TM-0059

PRODUCED: 3 September 2013 AT 6:27:55 PM USER: Print Machine

JOINS SHEET 8

PLOT DRIVER: NONE

FILE PATH: S:\01_Projects\900024\CAD\DRAWINGS\OH2K-CIV-TM0059.dwg

25mm ON ORIGINAL

'EN TABLE: RMS_A3.ctb

Appendix C

Construction Traffic Intersections Analysis

PROJECT CODE: 90002
PROJECT: PACIFIC HIGHWAY UPGRADE – OXLEY HIGHWAY TO KUNDABUNG
SUBJECT: **OH2Ku – Construction Traffic Intersection Assessment**
DATE: 2 June 2014

---

1. Introduction

During the construction phase of the Pacific Highway Upgrade, seven construction compound sites are proposed to be established at selected local roads. During the construction period these sites will be accessed by construction staff and their vehicles via nominated local roads and their associated intersections. Proposed access points are summarised in **Table 1.**

Table 1 Proposed Construction Compound Site Locations

Minor Road	Type of Construction Compound Site	Intersection	Intersection Control
Station 5400	Minor	Pacific Highway/Glen Ewan Road	Give Way
Station 6900	Main	Pacific Highway/New Intersection	Give Way - 2 Stage
Station 11400	Minor	Pacific Highway/Bill Hill Road	Give Way
Station 16400	Minor	Pacific Highway/Hacks Ferry Road	Give Way
Station 17300	Main	Pacific Highway/Wilmaria Road	Give Way - 2 Stage
Cooperabung Drive	Minor	Pacific Highway/Cooperabung Drive	Give Way - 2 Stage
Yarrabee Road	Minor	Pacific Highway/Yarrabee Road	Give Way - 2 Stage

As a result of the increase in traffic associated with construction activity, the operational performance of these intersections may be affected by the combination of both existing general traffic and additional construction traffic.

An Intersection performance analysis has been carried out to assess the operational performance of these intersections with the forecast 2016 traffic and the proposed geometric configurations.

The purpose of this technical note is to document the methodology used to estimate the construction traffic volumes at the nominated intersections, and to document the corresponding intersection performance analyses and commentary.

The key procedures involved during the assessment are:

- Extract relevant data sources;
- Undertake appropriate assumptions in relation to traffic volumes;
- Estimate 2016 construction traffic turning volumes at the nominated intersections;
- Estimate 2016 general/ background traffic turning volumes at the nominated intersections;
- Undertake operational performance analysis for those intersections; and
- Provide conclusions based on the analysis and commentary on the appropriateness of the concept design intersection layouts.

1.1 Data Sources and Assumptions

From the report Pacific Highway Upgrade – Oxley Highway to Kundabung *SWTC Appendix 09 – Geometric Performance and Design Requirements*, the following traffic data inputs have been extracted for analysis purposes:

- 2016 Average Annual Daily Traffic (AADT) Volumes; and
- Heavy vehicle (HV) proportions.
- Information on proposed worksite construction traffic for each location has been provided by the project team.

At Cooperabung Drive, no traffic data was provided in Appendix 9. Pacific Highway Upgrade – Oxley Highway to Kundabung *SWTC Appendix 12 –Pavement Performance and Design Requirements;* Table 12.8 provides traffic volumes for Local Roads for which the pavement is designed for. This data has been used to supplement data found in Appendix 9. Refer to **Table 2a and 2b** for details of traffic data and data source used for intersection assessment.

2. 2016 Turning Traffic Volumes Estimation

2.1 2016 General Traffic

The 2016 turning volumes of general/ background traffic have been estimated by adopting the SWTC values where available, and then making assumptions to fill in the remaining required detail. The assumptions made were derived based on professional judgement by observing adjacent land uses, access points, road hierarchy, and possible route choices.

Additional assumptions made in the assessment and their potential impacts on the results include:

- The peak hour traffic volume has been estimated by assuming 10% of the AADT occurs in each of the peak hours.
- The directional traffic volumes have been estimated based on the assumption that 50% of AADT would travel north and 50% of AADT would travel south during the morning peak period. This estimate has been made as a result of examining adjoining land use and the location of adjacent centres of employment, as well as some understanding of regional travel patterns. The 50% directional split is determined as appropriate based on findings from *Table E1 of the Highway No.10 - Pacific Highway Upgrade - Traffic Forecasting Report.*
- The AM peak period has been adopted for modelling, as this period has been assumed to coincide with the highest concentration of construction arrival movements. Anecdotal observation of other large road construction projects indicates that the staff arrival period in the morning is more condensed compared to the departure period in the afternoon. The morning arrival period also coincides with higher southbound right turn conflict at most locations. If Construction times vary, the arrival during the peak will be reduced and therefore the assessment is conservative.
- It is assumed that the peak hour of background traffic flow coincides with the peak period of arrivals to the worksite compounds, between approximately 06:00am to 08:00am.
- Existing Pacific Highway traffic has been calculated by adding the SWTC Appendix 9 2016 “Main Carriageways” traffic with the 2016 “Local Road” traffic where required.
- The location of “Sancrox Road to Blackmans Point Interchange” has been adopted for the determination of Pacific Highway traffic at Glen Ewan Road and the Main Compound at Stn 6900. The main compound will be by others, although it has been included in this assessment for completeness.
- The location of “Blackmans Point Interchange to Haydons Wharf Road Half Interchange” has been adopted for the determination of Pacific Highway traffic at Bill Hill Road, Stn 11400, Hacks Ferry Road, Stn 16400 and Wilmaria Road, Stn 17300.
- The location of “Haydons Wharf Road Half Interchange to Yarrabee Road” has been adopted for the determination of Pacific Highway traffic at Cooperabung Drive and Yarrabee Road.
- The location of “North of Yarrabee Road” has been adopted for the determination of Pacific Highway traffic at Stn 23700.

2.2 Construction Traffic

The construction traffic has been estimated based on the supplied information about workforce size, working hours, average hourly heavy vehicle flows and appropriate assumptions, which are outlined below:

- Station 6900, and Wilmaria Road are proposed to include the main construction compounds or batch plants, with a workforce of around 300 personnel. Yarrabee Road is proposed as a satellite compound with a workforce size of 100 personnel for modelling purposes. Other sites assessed for intersection performance are considered minor and construction volumes similar to Yarrabee Road are adopted.
- The staff arrival and departure periods at the main worksite compound is expected to occur over a one hour period, with the arrival and departure period of one hour at satellite compounds.

- Due to the distance from regional towns where the workforce is expected to be sourced and the construction site, it is expected that construction staff may share their vehicles to minimise the travel costs. As this number cannot be accurately estimated, no allowance for car pooling has been applied to the nominated workforce size to determine the construction light vehicle (LV) volume.
- An average of 20 heavy vehicle (HV) movements per hour to/ from all construction sites has been adopted as a minimum;
- An average of 30 heavy vehicle (HV) movements per hour to/ from main compounds or batch plants has been adopted;
- Based on the proximity and the density of surrounding regional town centres, it is assumed that 25% of construction workforce vehicle trips will be generated to/ from the northern regions and the remaining 75% to / from the southern regions. Based on location of cuts and quarry sites, construction workforce heavy vehicle trips are assumed to be generated equally from the northern regions and southern regions.
- For modelling purposes, it is assumed that 20% of light vehicles that enter the intersections in the AM peak will leave again in the AM peak, and that 100% of heavy vehicles will enter and leave during the AM peak.

Based on the above assumptions, the 2016 light vehicle (LV) and heavy vehicle (HV) total turning volumes at the nominated intersections have been estimated. These details are shown below in **Tables 2a and 2b**, and Figure 1 to Figure 7, which include both estimated existing background traffic and proposed construction traffic for the AM peak hour. The numbers in these figures represent separate LV and HVs (see legend in Figure 1).

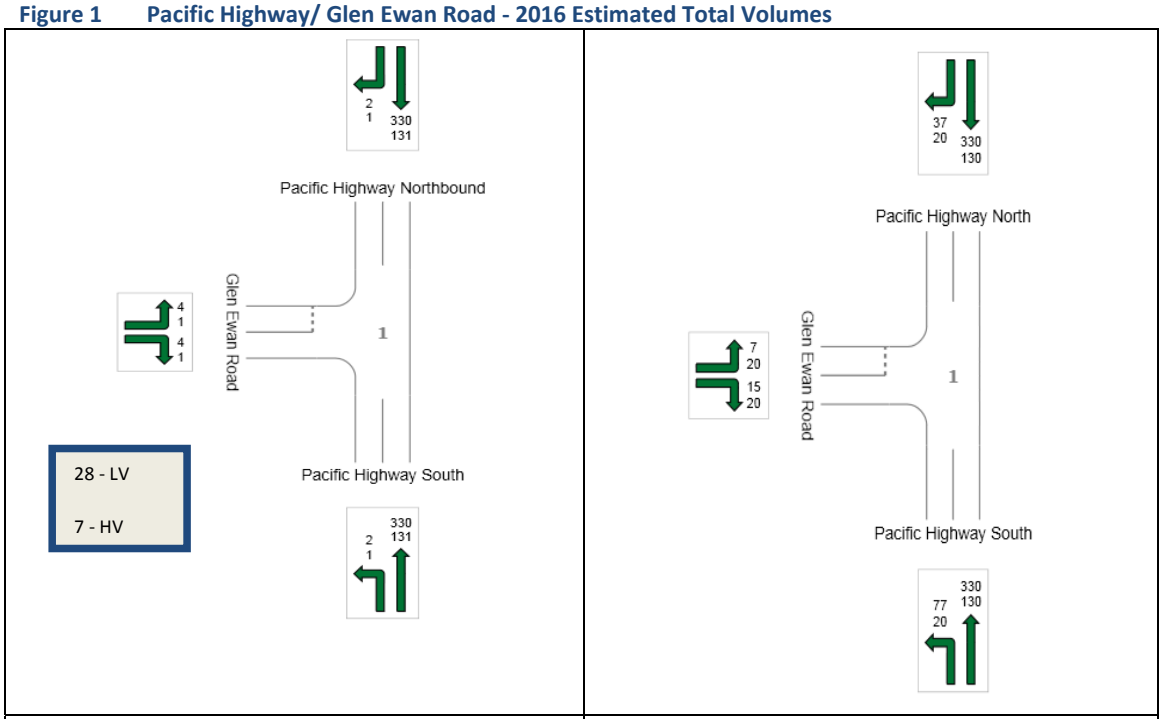
Table 2a Existing Traffic Volumes

Location	2016 Estimated Traffic Volume (Base Case) (10% of AADT)	2016 Estimated Turning Volume (Base Case) (10% of AADT)	Data Source
Pacific Hwy/Glen Ewan Road	660 LV, 262 HV	4 LV, 1 HV	SWTC App.9 and 12
Pacific Hwy/Stn 6900 (By others)	660 LV, 262 HV	Not Applicable	SWTC App.9 and 12
Pacific Highway/ Stn 11400 Bill Hill Road	864 LV, 260 HV	12 LV, 3 HV	SWTC App.9 and 12
Pacific Highway/ Stn 16400 Hacks Ferry Road	864 LV, 260 HV	4 LV, 1 HV	SWTC App.9 and 12
Pacific Highway/ Stn 17300 Wilmaria Road	864 LV, 260 HV	Not Applicable	SWTC App.9 and 12
Pacific Highway/ Cooperabung Drive	948 LV, 279 HV	12 LV, 3 HV	SWTC App.9 and 12
Pacific Highway/ Yarrabee Road	948 LV, 279 HV	29 LV, 21 HV	SWTC App.9 and 12

Table 2b Construction Traffic Volumes

Location	2016 Estimated Traffic Volume (Design Case)	2016 Estimated Turning Volume (Design Case)	Data Source
Pacific Hwy/Glen Ewan Road	660 LV, 262 HV	104 LV, 41 HV	SWTC App.9/12, Construction estimate
Pacific Hwy/Stn 6900 (By others)	660 LV, 262 HV	300 LV, 60 HV	SWTC App.9/12, Construction estimate
Pacific Highway/ Stn 11400 Bill Hill Road	864 LV, 260 HV	120 LV, 43 HV	SWTC App.9/12, Construction estimate
Pacific Highway/ Stn 16400 Hacks Ferry Road	864 LV, 260 HV	104 LV, 41 HV	SWTC App.9/12, Construction estimate
Pacific Highway/ Stn 17300 Wilmaria Road	864 LV, 260 HV	300 LV, 60 HV	SWTC App.9/12, Construction estimate
Pacific Highway/ Cooperabung Drive	948 LV, 279 HV	120 LV, 43 HV	SWTC App.9/12, Construction estimate
Pacific Highway/ Yarrabee Road	948 LV, 279 HV	129 LV, 61 HV	SWTC App.9/12, Construction estimate

Figure 1 Pacific Highway/ Glen Ewan Road - 2016 Estimated Total Volumes



Existing Traffic - no construction vehicles | *Construction traffic included*

Figure 2 Pacific Highway/ Stn 6900 Main Compound - 2016 Estimated Total Volumes

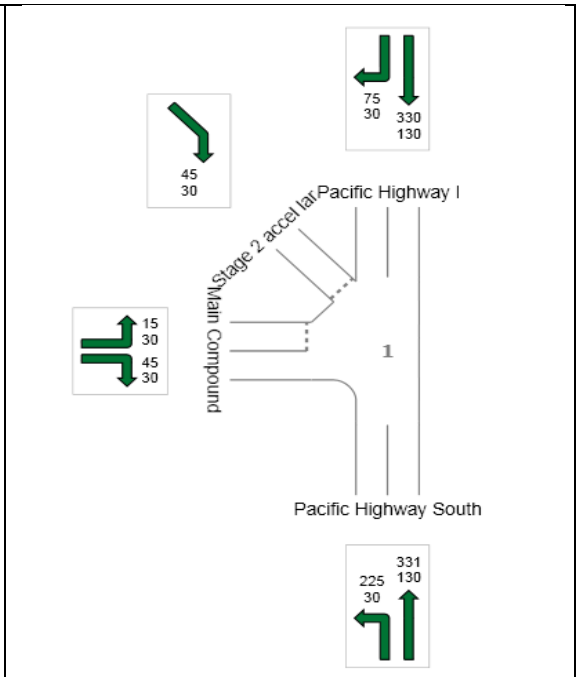
Not Applicable	
Existing Traffic - no construction vehicles	*Construction traffic included*

Figure 3 Pacific Highway/ Stn 11400 Bill Hill Road - 2016 Estimated Total Volumes

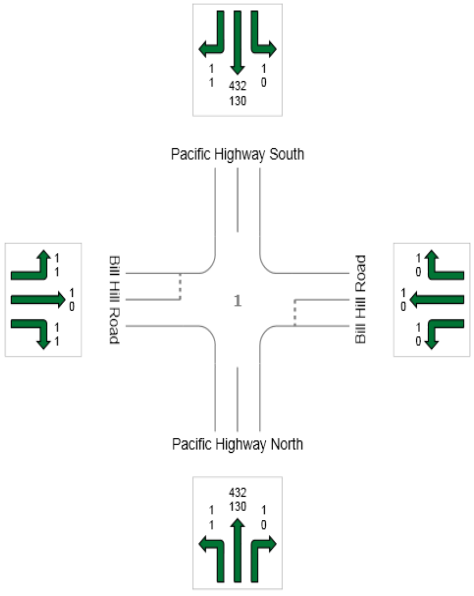
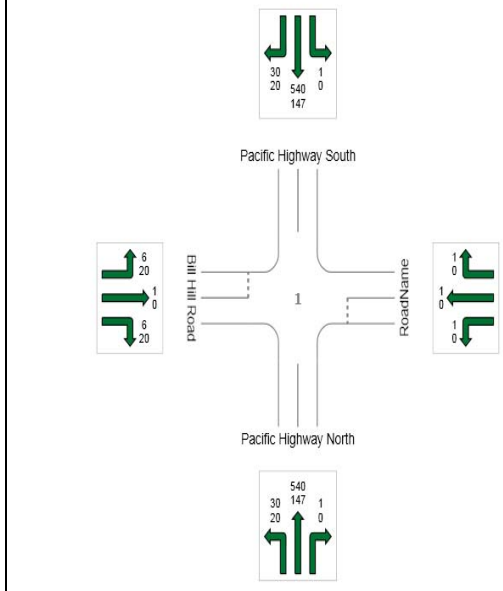
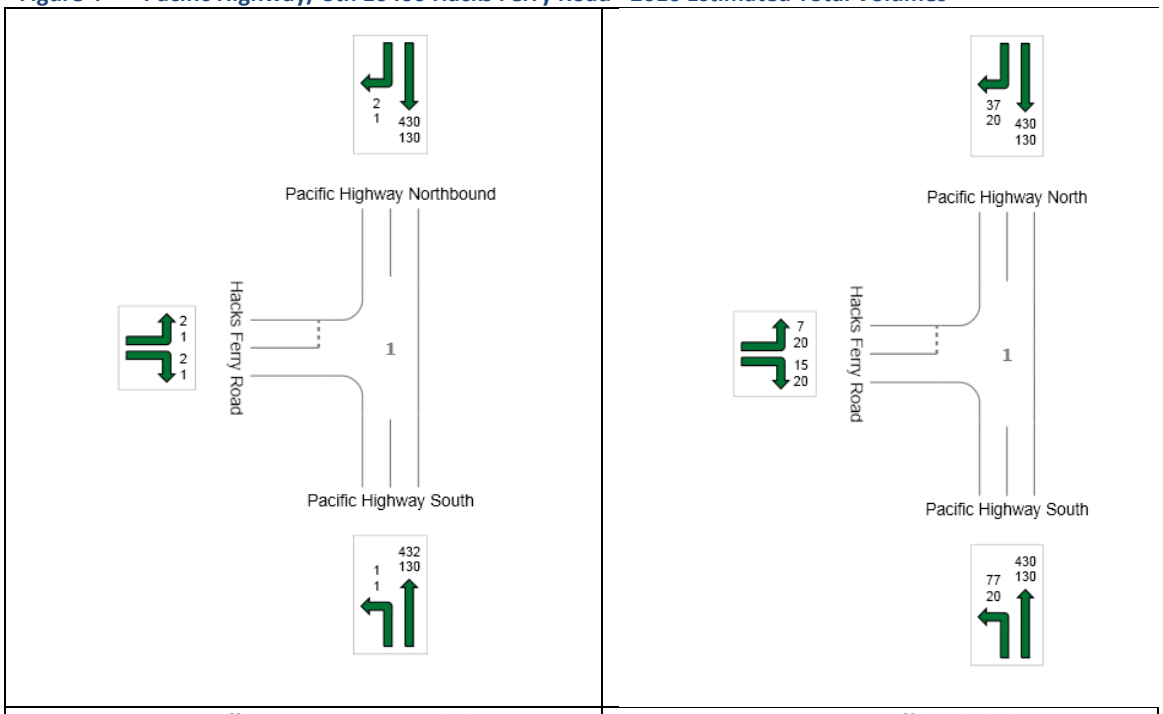
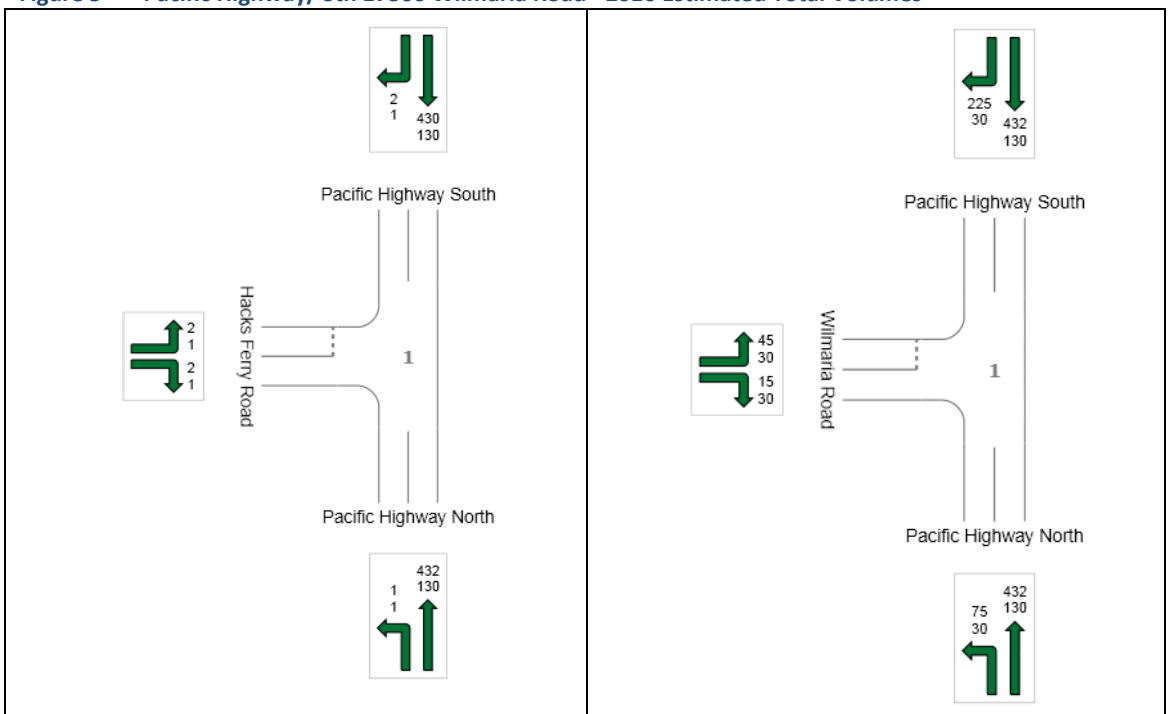
	
Existing Traffic - no construction vehicles	*Construction traffic included*

Figure 4 Pacific Highway/ Stn 16400 Hacks Ferry Road - 2016 Estimated Total Volumes



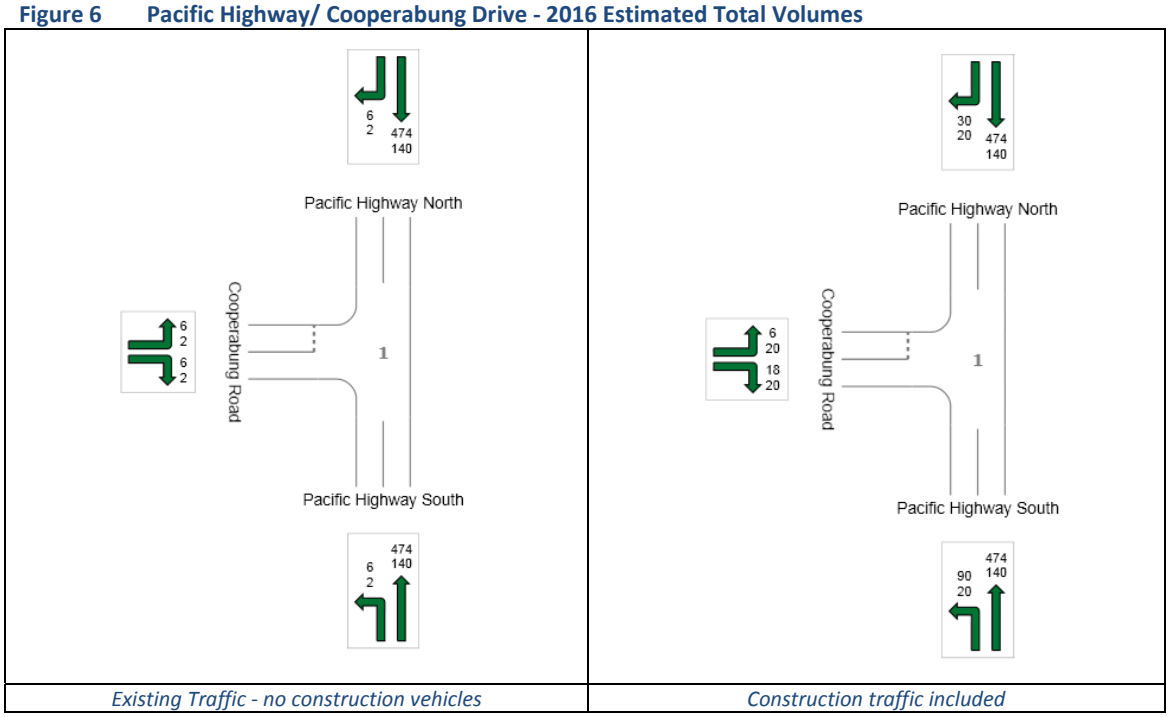
Existing Traffic - no construction vehicles | *Construction traffic included*

Figure 5 Pacific Highway/ Stn 17300 Wilmaria Road - 2016 Estimated Total Volumes



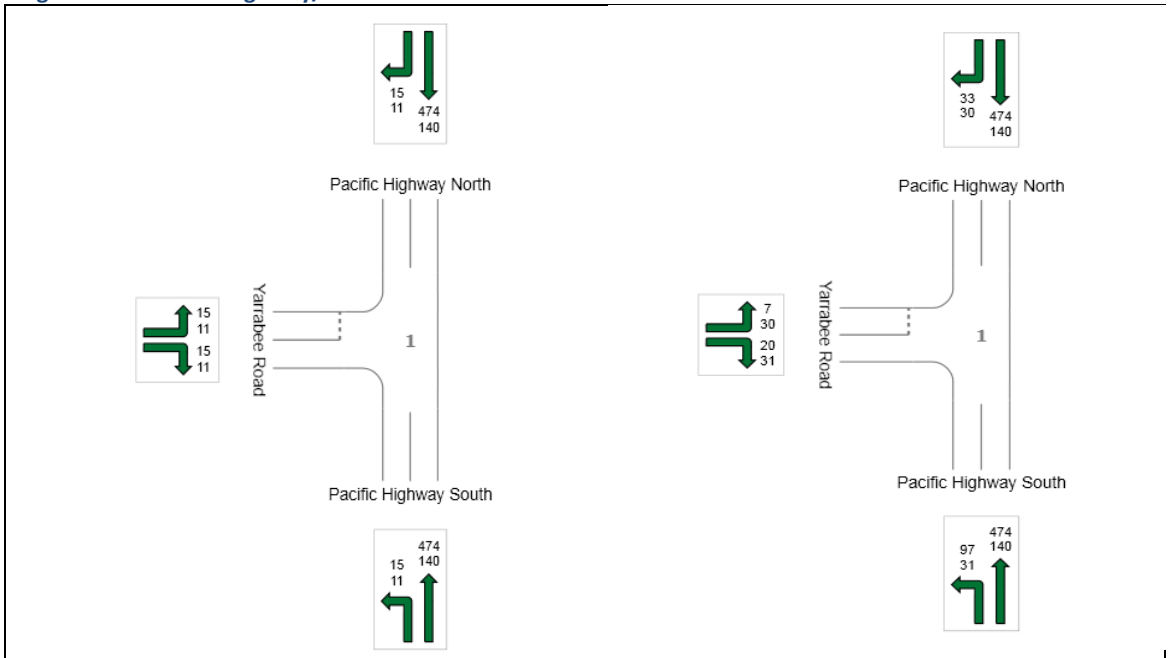
Existing Traffic - no construction vehicles | *Construction traffic included*

Figure 6 Pacific Highway/ Cooperabung Drive - 2016 Estimated Total Volumes



Existing Traffic - no construction vehicles | *Construction traffic included*

Figure 7 Pacific Highway/ Yarrabee Road - 2016 Estimated Total Volumes



Existing Traffic - no construction vehicles | *Construction traffic included*

3. Intersection Performance Analysis

3.1 SIDRA Analysis

The nominated intersections with the proposed geometric configurations (refer Figure 6 to Figure 10 below) have been analysed by using SIDRA Intersection[1] (v5.1). The RMS NSW prefers the Level of Service (LoS) as the measure of intersection performance.

Level of Service (LoS):

Level of Service (LoS) is a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/ or passengers. This measure is used in planning design and operation of intersections.

The intersection operational conditions in terms of LoS measure are classified into five categories as listed in **Table 3**.

Table 3 Level of Service (LoS) Categories (RMS NSW)

LOS	Description	RMS NSW - Control Delay in seconds (d)
A	Good	d ≤ 14.5
B	Good with minimal delays and spare capacity	14.5 < d ≤ 28.5
C	Satisfactory with spare capacity	28.5 < d ≤ 42.5
D	Satisfactory but operating at capacity	42.5 < d ≤ 55
E	At capacity and incidents will cause excessive delays	55 < d ≤ 70.5
F	Unsatisfactory and requires additional capacity	70.5 < d

(Source: Austroads (1988)

All temporary intersections are required to satisfy the requirements of the SWTC 7.15.1(s), which states that the capacities of all intersections with the existing highway and any replacement intersections that are part of temporary works being used by existing highway traffic must be maintained, as a minimum, at the levels that existed at the intersection prior to the commencement of construction.

To ensure that this requirement is satisfied, a base case analysis needs to be undertaken prior to the temporary intersection design. The base case should use the same traffic volumes as the design case, with construction movements removed. For expediency, as the design case analysis confirms that Level of Service B or C is achieved at each proposed site compound, the design case including construction traffic is deemed acceptable and the base case has not been assessed.

New temporary intersections were designed to provide seagull intersection arrangements as per Figure 9.23 of Appendix 9 of the SWTC. In the case of the intersection at Glen Ewan Road, the intersection is configured as a modified local access similar to Appendix 9 Figure 9.18.

Indicative deceleration and acceleration lane lengths have been used in the modelling shown below in **Figure 9 to Figure 15.** At the main compound by others, actual acceleration and deceleration lane lengths have been used. For the purposes of this assessment, queuing has been ignored for right turn deceleration lengths, as in all cases the deceleration requirement is longer than the storage requirement.

The SIDRA modelling has been undertaken for all intersections using the 2016 estimated total volumes (general traffic plus construction traffic). The main objective of this analysis is to determine the proposed LoS and the required storage length for right turn bays. The Detailed Design process will determine appropriate lengths of auxiliary lanes and combined with storage requirements will give total the length of right turn bays required.

These intersections were modelled in SIDRA as two stage intersections, to confirm the level of service achieved meets SWTC requirements with additional construction traffic.

A two stage intersection analysis allows SIDRA to analyse the right turn movement using a two stage gap acceptance process, which provides for a vehicle turning right to cross into the central area, store, then accelerate and merge into the traffic stream.

A two stage crossing shows significant improvements to LoS and delay when assessed against a standard intersection with similar traffic volumes. Refer to Figure 8 below.

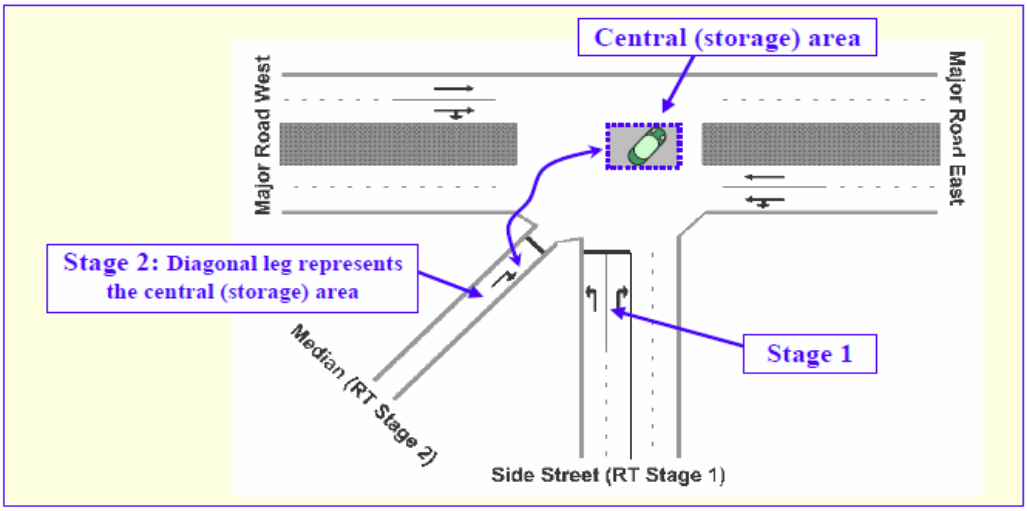


Figure 8 Two stage crossing

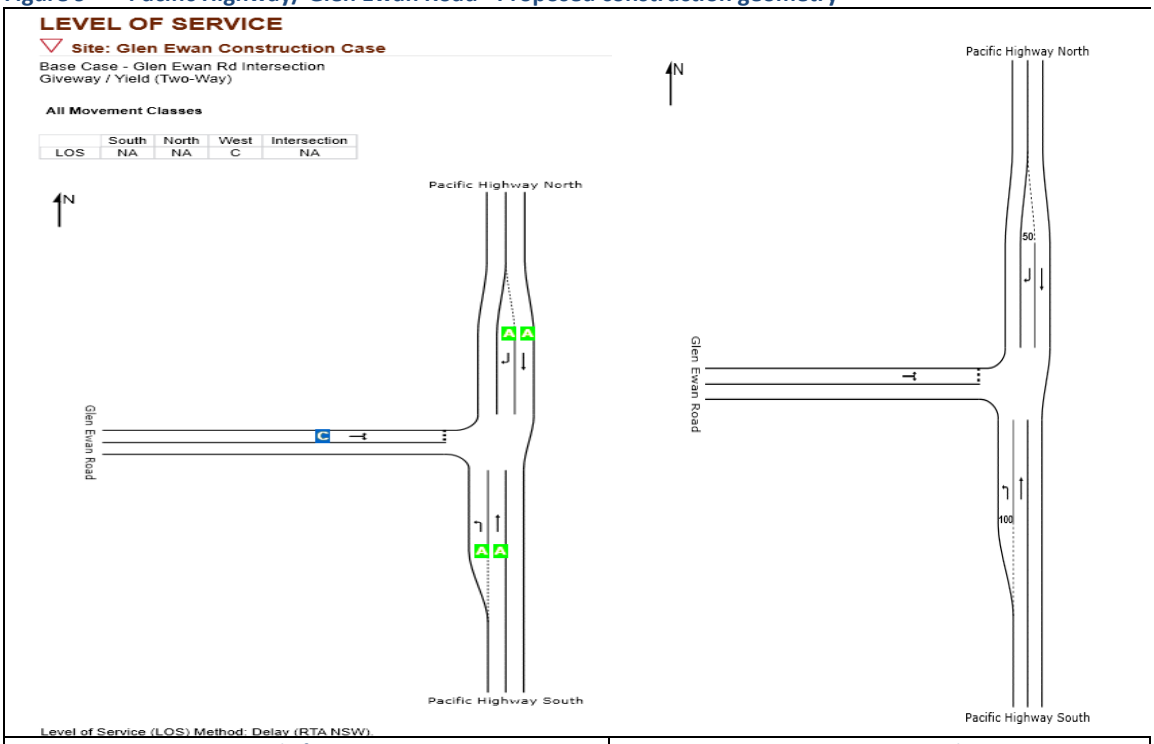
Appropriate critical gap and follow up headway values are applied that allow for the acceleration length right turning vehicles have to speed up before merging. A fictitious diagonal leg is used to diagrammatically represent the central area/acceleration lane.

RMS delay method was used to calculate Level of Service. Sidra parameters were set to a 60min peak flow period, 95% peak flow factor, 1.2 persons/vehicle and a 100% constant flow scale.

Assessment using this methodology shows that all intersections achieve a Level of Service C as a minimum. 95% back of queue lengths are acceptable for the intersection arrangements shown and deceleration lengths and storage requirements are provided where required.

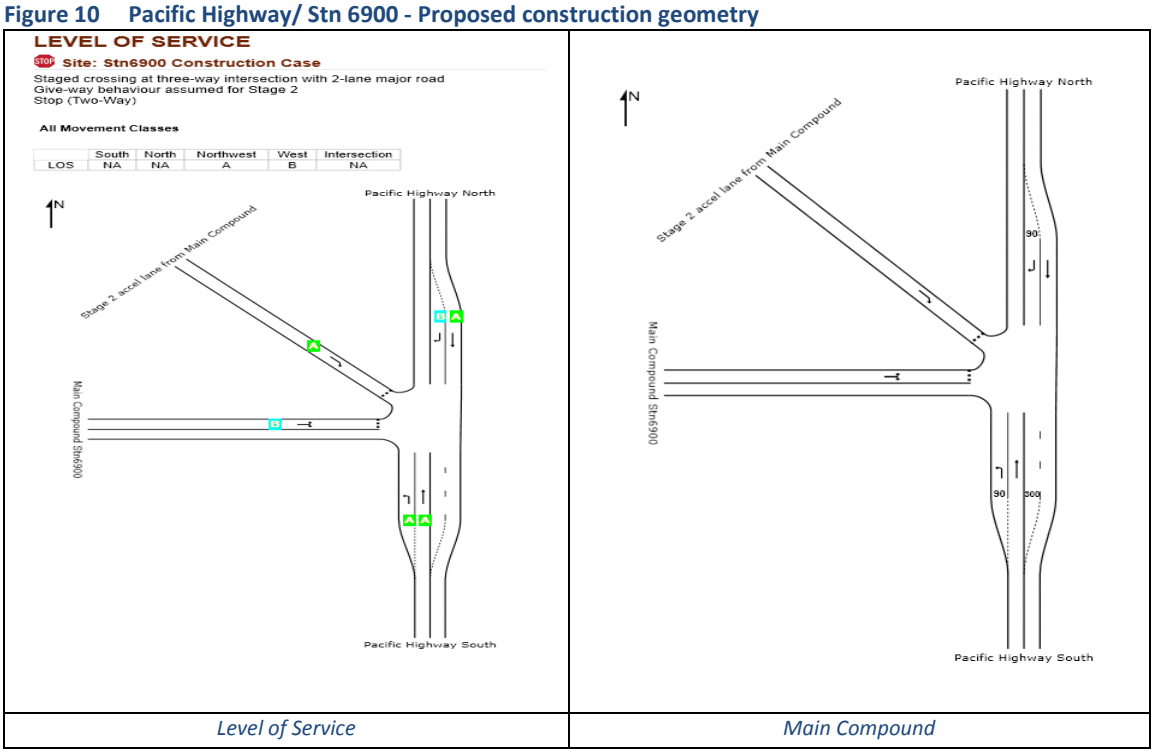
[1] SIDRA Intersection is an intersection analysis software package, which estimates intersection capacity, level of service, performance, and predicts the effectiveness of intersection operation.

Figure 9 Pacific Highway/ Glen Ewan Road - Proposed construction geometry



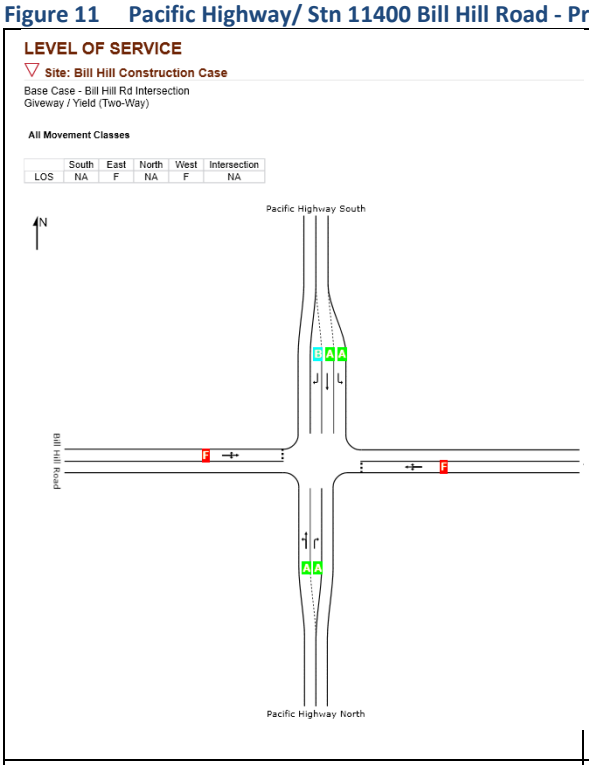
Level of Service | *Minor Compound*

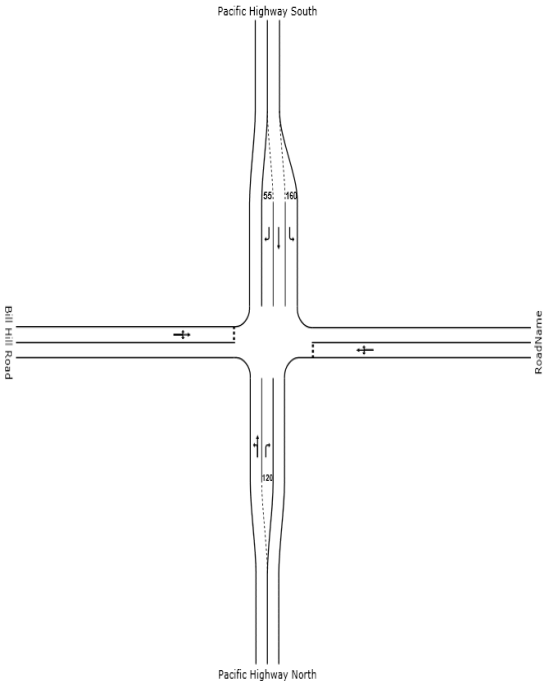
Figure 10 Pacific Highway/ Stn 6900 - Proposed construction geometry



Level of Service | *Main Compound*

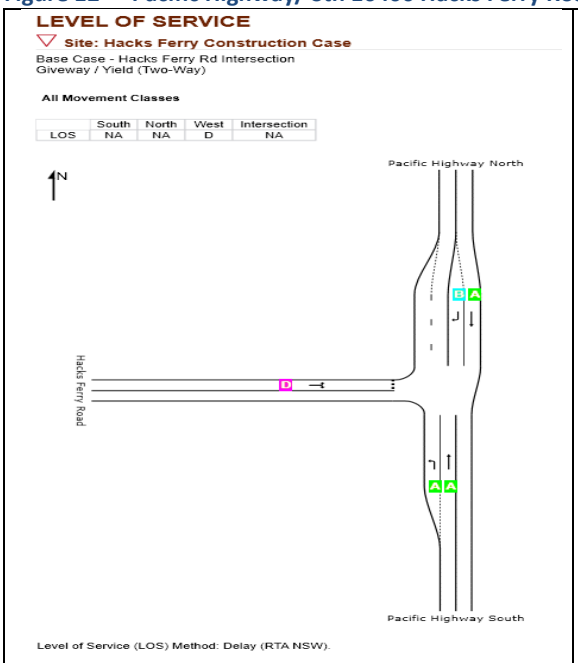
Figure 11 Pacific Highway/ Stn 11400 Bill Hill Road - Proposed construction geometry as per existing

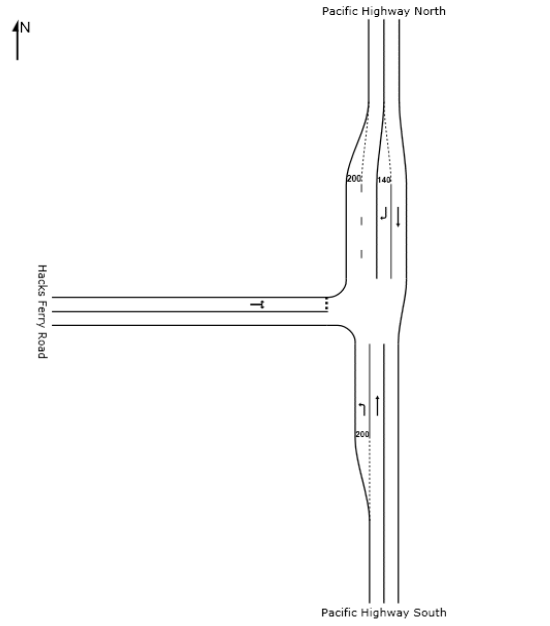




Level of Service | *Minor Compound*

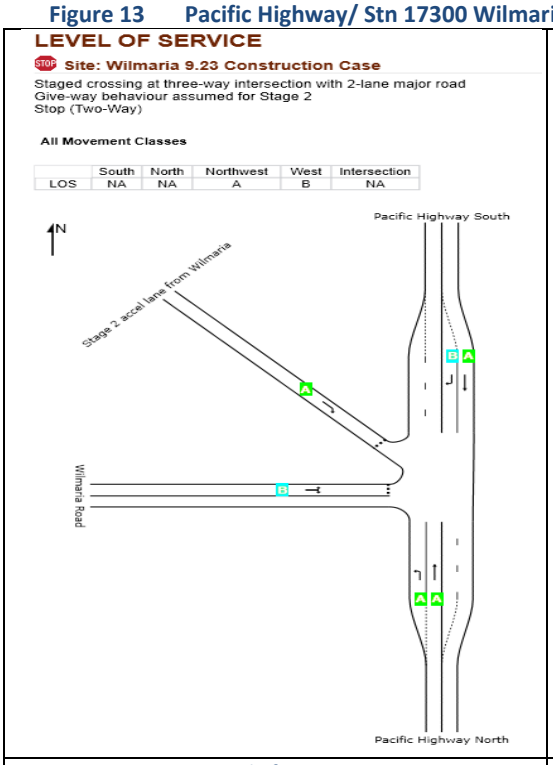
Figure 12 Pacific Highway/ Stn 16400 Hacks Ferry Road - Proposed construction geometry as per existing



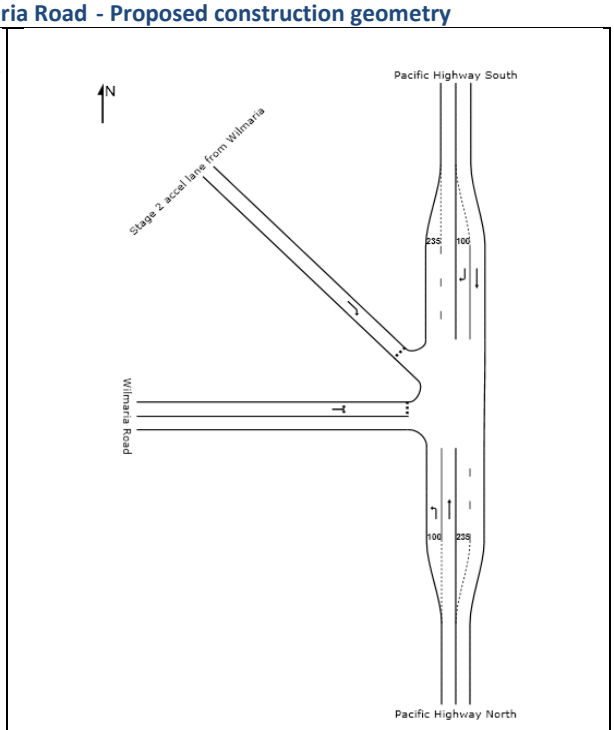


Level of Service | *Minor Compound*

Figure 13 Pacific Highway/ Stn 17300 Wilmaria Road - Proposed construction geometry

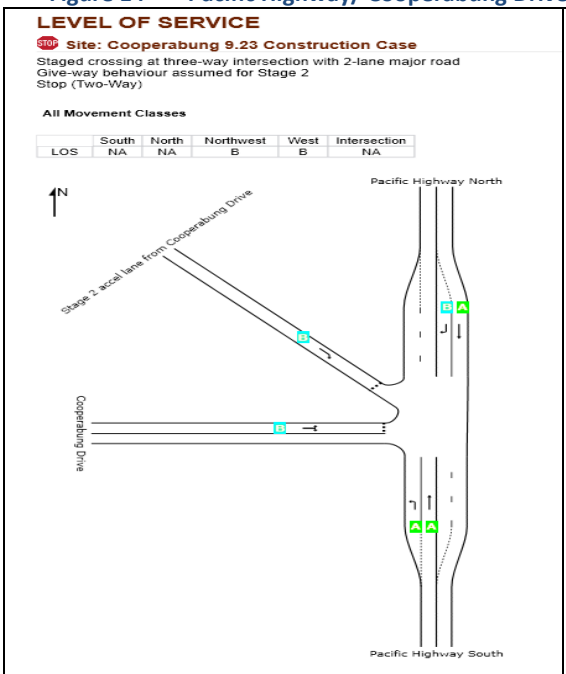


Level of Service

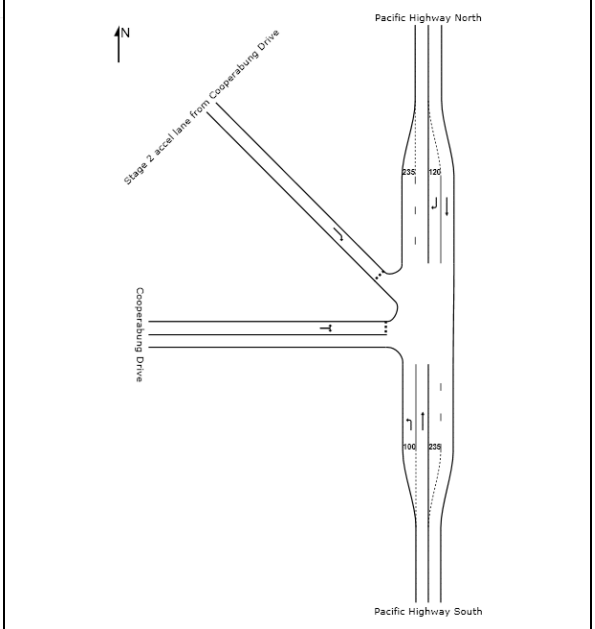


Major Compound

Figure 14 Pacific Highway/ Cooperabung Drive - Proposed construction geometry

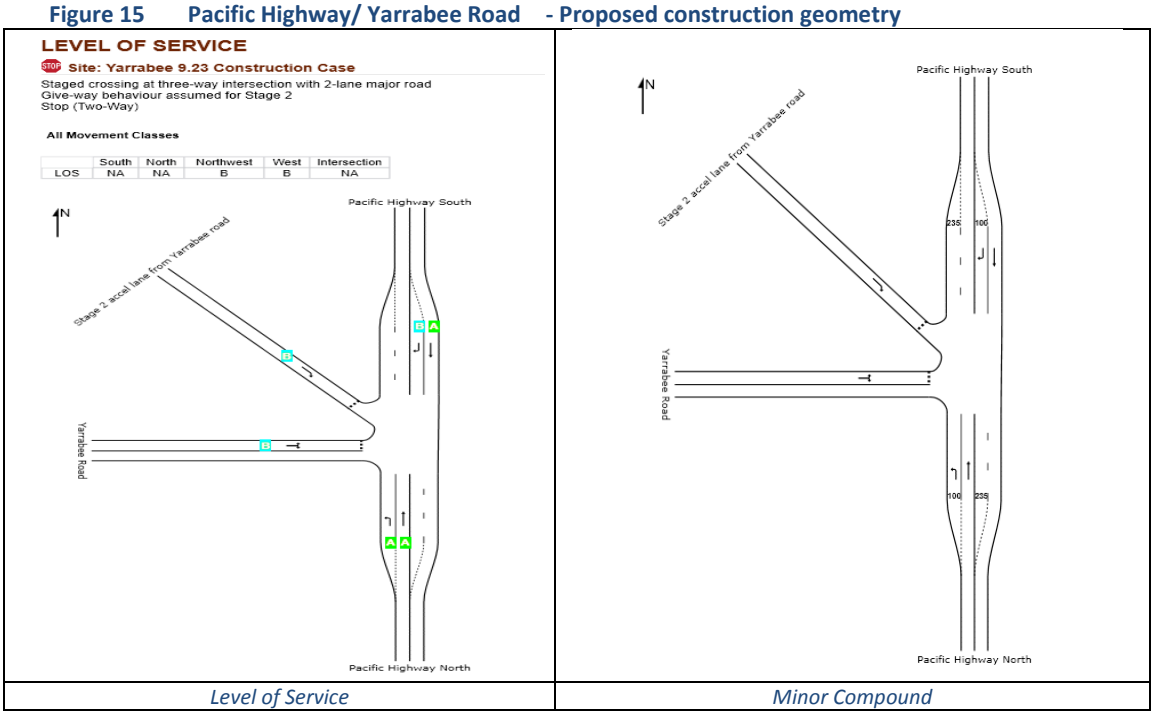


Level of Service



20m of storage SB Right turn bay

Figure 15 Pacific Highway/ Yarrabee Road - Proposed construction geometry



Level of Service | *Minor Compound*

The SIDRA analysis results are shown in **Table 4.**

Table 4 SIDRA Summary

Intersection	Intersection Control	Maximum Queue in Right turn slip lane (m)	LoS worst movement	Worst Delay (s)
Pacific Highway/Glen Ewan Road	Give Way	9	C	14.8 (Glen Ewan SB RT)
Pacific Highway/6900	Give Way – 2 Stage	11	B	13.1 (Compound SB RT)
Pacific Highway/Bill Hill Road	Give Way	7	F	>100 (Bill Hill Road)
Pacific Highway/Hacks Ferry Road	Give Way	9.4	D	>100 (Hacks Ferry Road)
Pacific Highway/ Wilmaria Road	Give Way - 2 Stage	20	B	15.1 (Wilmaria Road NB RT)
Pacific Highway/ Cooperabung Drive	Give Way - 2 Stage	12.1	B	13.4 (Cooperabung Drive SB RT)
Pacific Highway/ Yarrabee Road	Give Way - 2 Stage	9.2	B	15.4 (Pac Hwy NB RT)

The analysis results indicate that all intersections that are being upgraded to provide 2-stage crossings to cater for construction traffic are expected to perform well within capacity without any significant issues. The LoS results of these intersections are 'B' or 'C', which indicate that the overall performance is good with minimal delays at the approaches.

Based on the SWTC guidelines, the right turn slip lane along the northern approaches have a length equal to the required storage, plus the required deceleration lengths dependant on the prevailing speed limit.

From the analysis it can be seen that storage in addition to standard deceleration lane lengths is only required for the right turn into a main compound at Wilmaria Road, and that 20m in addition to the required deceleration length is sufficient to ensure Level of Service of B is achieved. Where practically possible to provide additional storage, i.e. where additional storage can be provided without the need to construct temporary pavements, it should be considered during detailed design.

It is noted that the intersection geometry shown at Pacific Highway/ Glen Ewan Road does not consider the existing seagull intersection with Hastings River Drive. Glen Ewan Road is proposed to be used for access mainly from the north.

It is noted that the intersection geometry shown at Pacific Highway/ Stn 6900 Main Compound does not provide a dedicated northbound acceleration lane. This intersection will still operate satisfactorily.

The analysis results indicate that the intersections at Bill Hill Road, and Hacks Ferry Road are expected to operate above capacity, with delays being experience on the local road. The LoS for each of these intersections is 'F', which is no worse than the base case analysis. The addition of construction traffic does cause additional delay on the local road.

To improve the performance of Hacks Ferry Road, it is recommended that the existing painted median for right turn traffic heading north be converted to an acceleration lane. This would reduce gap acceptance time required and the intersection performance would be expected to be similar to other intersections of this type on the project.

To improve the performance of Bill Hill Road, a southbound acceleration lane has been modelled. The level of service for the intersection remains as 'F'. Bill Hill Road will have construction vehicles entering from the north, and returning to the north from the construction site. An unsignalised four way intersection is generally not safe, therefore further investigation at the implementation phase of the project is required.
As the right turn from site is the movement causing the intersection to perform poorly, alternate intersection or construction access arrangements to improve performance and safety will need to be considered.

All other proposed site access locations shown on the drawings, but not considered as part of this technical note have been omitted from traffic analysis as they are new site gates that are not located at an existing intersection and are therefore not assessed.

4. Conclusion

During the construction phase of the Pacific Highway upgrade, minor and major worksites and compounds will be established at existing local roads at Glen Ewan Road, Bill Hill Road, Hacks Ferry Road, Wilmaria Road, Yarrabee Road and Cooperabung Drive. These intersections may be adversely impacted by the addition of construction traffic movements and an assessment has been carried out to determine the operational performance of these intersections using forecast 2016 traffic, estimated construction traffic and proposed intersection configurations as per the SWTC.

New temporary intersections for site access will also be required at locations on the Pacific Highway that do not currently have a local road or intersection, and these locations have not been assessed.

The 2016 construction traffic has been estimated based on workforce estimates of size and the number of average hourly construction heavy vehicles, and adopting SWTC values where available.

Additional assumptions have been made regarding the location of regional town centres and access routes to assess the proportions of construction traffic by direction and vehicle occupancy rate.

Based on the SWTC Appendix 9 requirements, Pacific Highway Intersections used by construction traffic are required to provide dedicated deceleration lanes including any additional storage requirements, and acceleration lanes. Queue lengths for vehicle storage during peak periods have been calculated using SIDRA, however in most cases these queues are relatively short, and a practical approach to queuing based on expected bunching of heavy vehicle arrivals may be more appropriate.

One intersection, Cooperabung Drive, requires additional storage above the minimum deceleration lane length.

The results indicate that all intersections that are upgraded to the standard defined in Appendix 9, Figure 9.23 are expected to operate satisfactorily without significant delay in the AM peak. Overall intersection performance is likely to be good, i.e LoS C or better.

The existing intersection at Hacks Ferry Road should be upgraded by revising the existing linemarking to provide a seagull intersection arrangement as per Figure 9.23.

The existing intersection at Bill Hill Road does not provide a satisfactory level of service in either the existing condition, or with the addition of construction traffic. Consideration to either upgrading the intersection or revising construction access is required prior to construction commencing.

If you have any queries regarding these findings please don't hesitate to contact me.

Kind regards,

Adam O'Shea
Design Manager
ATOL Consulting Pty Ltd

Appendix D

Traffic Control Plans – Traffic/Construction Staging

These plans will be completed for each location specific activity and submitted with the ROL approval.

Appendix E

Traffic Incident Response Plan

Traffic Incident Management & Response Plan

E.1 Traffic Incident Management Scope

The traffic incident management strategy is based on the following principles:

- Incident detection;
- Incident verification;
- Incident response;
- Incident recovery; and
- Incident review (post-recovery).

The Incident Response Plan, as it relates to traffic management, has been developed to ensure the following outcomes:

- Mitigate the effect of the incident;
- Clear the incident as soon as practicable and safe to do so;
- Return the site and adjacent roads to normal conditions as soon as possible;
- Investigate and report on the incident together with recommendations for avoidance of similar incidents; and
- Review the effectiveness of the responses and recommending improvements if necessary to the plan.

The Incident Response Plan details the planning, process actions and responses to incidents and includes the following elements:

- Provide written standard response procedures for managing incidents and supporting each incident type;
- Include an incident classification system defining the magnitude of incident type as minor, significant, or major;
- Provide supplementary detail for each incident type describing additional measures to be undertaken, in the event of an incident being classified or escalated to major;
- Include links to existing NSW state emergency management framework (DISPLAN) and protocols for information exchange between Lend Lease, RMS and emergency services;
- Establish an area-based sectional system to describe the locations of incidents and detail these on plans showing main traffic routes in each section of the Works; and
- Develop standard incident reporting forms for the consistent logging of incidents by traffic management staff for incident records.

Below are the generic Incident Response Plan classifications that will apply to the project in response to managing minor incidents by Lend Lease.

Table E-1: Incident Response Plan Classifications

Classification No.	Incident Description	In Use
IRP-01	Construction spillage (not in a road-related area)	Y
IRP-02	Motor vehicle accident classified as minor/routine	Y
IRP-03	Broken down haulage vehicle on state/regional road	Y
IRP-04	Small vehicle stationary or broken down	Y
IRP-05	Abandoned vehicle	Y
IRP-06	Vehicle on fire	Y
IRP-07	Significant traffic congestion	Y

Classification No.	Incident Description	In Use
IRP-08	Non-hazardous material spillage in trafficable lane	Y
IRP-09	Hazardous material spillage in trafficable lane	Y
IRP-10	Stray animal in trafficable lane	Y
IRP-11	Slippery road/pavement surface	Y
IRP-12	Pavement failure	Y
IRP-13	Civil unrest/demonstration or protest	Y
IRP-14	IRP systems failure due to power outage	Y
IRP-15	Service/utility failure impacting on road network	Y
IRP-16	Road occupancy breach without RMS approval	Y

In accordance with the Project Deed and Section 6 of the RMS Traffic Control at Worksites Manual, Lend Lease will provide an incident management and response capability to manage unplanned incidents on the road network. This capability will:

- Be available for shift work where required, ensuring that resources are available for incident response during construction hours;
- Undertake training appropriate to the duties of working in an incident response crew;
- Ensure that traffic control vehicles are fully equipped and are ready to attend incidents when called out;
- Provide assistance to other RMS traffic commanders or emergency services when required; and
- Ensure all appropriate procedures are implemented during an incident or traffic control activity to provide for the safety of the public and workforce.

Lend Lease will provide and operate the necessary infrastructure, services, resources and systems to monitor, manage and control traffic flow on the affected maintenance areas of the road network. It should be noted that the management of traffic incidents requires a formal delegation of powers from the TMC and relevant emergency services (NSW Police). As Lend Lease has not been delegated this authority, Lend Lease will only provide assistance to other RMS traffic commanders or emergency services. The Traffic Manager is the interface with all emergency services.

Responses to incidents will be managed in accordance with the Incident Management Plan developed by the Traffic Manager and in line with Section 3.5.6 of the Traffic Control at Worksites Manual.

E.2 Traffic Incident Detection & Management System

Traffic incident detection and management will occur using the following systems and resources that may be available to Lend Lease:

- Transport Management Centre software applications, CMCS, IRIS, RMS Intranet, etc.;
- SCATS data;
- Typical transport management centre work station;
- Transport Management Centre; and
- NSW Police and Emergency Services.

When an incident has been detected by Lend Lease, a resource will be used to validate the incident. Once validated the Traffic Manager will inform RMS, the Community Manager and local council (where appropriate) of the incident and follow the procedures contained in the Incident Response Plan and the procedure in Clause 6.2.1 of the Traffic Control at Worksites Manual.

The Traffic Manager will log all detected traffic incidents and initiate the pre-planned Traffic Incident Response Plans once the incidents are logged. These may also call for a predetermined variable message sign strategy to be activated depending on the nature and magnitude of the incident.

The RMS Representative, Community Relations Manager and local council (where appropriate) will be immediately informed of all incidents that will affect the free-flow of traffic. During the incident the Traffic Manager will keep the RMS Representative informed on the timing and progress in rectifying the incident.

The RMS Representative can advise the Traffic Manager of any incidents in the area that have been detected or reported through the existing 131 700 public reporting number. This information may also be obtained through the use of the CMCS and IRIS system.

All reported and detected incidents will be logged and stored in a database. Details of all incidents will be taken by the Traffic Manager to coordinate the correct resources to respond to the incident. A report will be filed within two days with the incident details, including the response times to attend and rectify the minor incidents. The reported incident details will be submitted to RMS in the format acceptable to the RMS Representative.

The Traffic Manager will ensure that all incidents are logged, investigated and reported to both RMS and Lend Lease management for action as required. The Traffic Manager will modify procedures or controls to ensure the causes of these incidents are rectified and amend the TMSP if needed.

E.3 Traffic Incident Response Resources (Field Crews)

Lend Lease will have all the necessary Traffic Incident Response Plans and physical resources available to manage minor road incidents that may occur during construction. A response vehicle and other plant such as a contract towing resource will be managed by Lend Lease and will be available to the traffic management team and located at the main project office. The response vehicle will be fitted out with personal protective equipment, signs, lights, traffic cones, barricades, fire extinguishers, spare fuel, environmental spill kits and sand to cater for oil spills etc.

During road occupancies on roads with high traffic volumes such as the Pacific Highway, queuing may occur which could hinder emergency services. Areas for which this may be a problem are to be identified during the initial site inspection. During road occupancy of these areas field crews are to have at least two personnel with blue card certificates who can be used to stop traffic in both directions in order to allow emergency vehicles to pass through.

Emergency services are to be advised ahead of road occupancies of their location and expected times. Lend Lease will also consult emergency services and relevant stakeholders in developing any additional strategies to ensure the safe passage of vehicles should an emergency arise.

Table E-2: Minimum Requirements for the Dissemination of Information to the Community

Road	Contact	Number
All	Police	000
All	Ambulance	000
All	Fire	000
All	Tow Truck	000
Pacific Highway	RMS Traffic Safety Manager	TBC
	Transport Management Centre	(02) 83961686
Local Roads north of Stn 750	Port Macquarie – Hastings Council	TBC

E.4 Traffic Incident Response

The project interfaces with the Pacific Highway in various locations throughout the project. The area supervisors will be issued with contact lists for RMS, Emergency services, and towing companies. In the event of an incident RMS and emergency services (depending on severity) will first be notified and allowed to take control of the incident. The area supervisor will then assess the incident and contact other relevant parties (Traffic Manager, project staff, towing company, etc.). There will be appropriate Traffic Control Plans developed in accordance with the Traffic Control at Worksites manual in order to deploy traffic management assets. In Emergency Incidents Clause 3.5.6 of the Traffic Control at Worksites Manual will be followed.

Attached are typical TCPs for incidents on the Pacific Highway.

Local Roads Incident Response Plan

Local roads will be interfaced with at numerous locations along the project. The area supervisor for each of the respective interface points will have contact lists for the relevant councils and where relevant, RMS. In the event of an incident the area supervisor will contact the local council and the Traffic Manager. Depending on the severity of the incident they will also contact emergency services and towing services. In the first instance the response will be directed by the relevant authority whether it be RMS, local council or emergency services. At their discretion Lend Lease will implement the appropriate Traffic Control Plan and depending on the severity, clause 3.5.6 of the Traffic Control at Worksites Manual will be followed.

Attached is a typical TCP for an incident on a Local Road.

E.5 Traffic Accidents on Public Roads within the Work Site

In the event of a traffic accident occurring within the Construction Site or at other locations affected by Lend Lease work, the Traffic Manager will immediately notify the RMS Representative of the occurrence of the accident, record the facts and photograph the approach to the accident site, including the location of all safety devices and signs, as soon as possible after the accident. A report with this information will be forwarded to the RMS Representative within two days of the occurrence of the accident.

E.6 Out of Hours Contact

There are a number of long term worksites located near the construction accesses. Occasionally traffic control devices may need to be adjusted or maintained out of hours. In these circumstances the General Superintendent (TBA) has been nominated as the Emergency Controller and can be contacted 24hrs on (TBA). Once the General Superintendent has been contacted the General Superintendent will contact the appropriate personnel responsible in order to implement a suitable response.

Insert Typical Incident Response TCPs here

Appendix F

Traffic Management Procedures

Refer to RTA's Traffic Control at Worksites Manual

RTA Traffic Control at Worksites Manual

The RTA's Traffic Control at Worksites Manual (2010) can be found on RMS website at the following link:

RTA's Traffic Control at Worksites Manual (2010)

Attached for ease of reference are the relevant checklists and forms which are required to be completed.

Attach TCAW Appendix F here

Appendix G

Traffic Control Risk Management

The attached preliminary risk assessment is to be considered in the detailed site-specific SWMs prepared in consultation with the traffic control workforce.

Item	Potential Hazard (What May Cause an Injury/Illness to Occur)	Risk Ranking High-Med-Low	Hazard Controls (What Controls can be put in place to Prevent an Injury/Illness) NB: Controls Must Not Raise Or Create An Increased Risk	Who will Ensure this is Done
1	• Incorrect signage causing confusion to motorists and construction vehicle drivers; • Incorrect spacing of signs or stopping point with a potential to cause a motorist to brake heavily or the roadwork's catching drivers by surprise	2/M 2/M	1. Use TCWS standard TCPs where possible; 2. Minor modifications, as per TCWS, may be made by a 'RED' card qualified person; 3. TCP can only be developed/drawn up by an 'ORANGE' card qualified person (Design and Inspect TCPs); and 4. Developed TCPs must have the HOLD POINT released by RMS and be implemented at the worksite before any work commences,	Traffic Control Engineer
2	• Vehicle collision; • Traffic Controller or worker hit by traffic during site set-up	1/H 1/H	1. Plant, equipment and work activity cannot establish onto site nor commence until such time as the Traffic Control set-up is completed; 2. Traffic Controllers to plan their set up in accordance with industry practice, using such devices as the light board and flashing lights to warn approaching traffic of a potential hazard, as well as starting at the approach to the worksite and then proceeding through and past the worksite; and 3. Set-up and work must comply with the dates and times specified in the ROL.	Engineer, Foreman, Traffic Controllers
3	• Exposure to local road or highway traffic; • Incorrect location of signs, road furniture; • Vehicle, pedestrian or workers collision	1/H 2/M 1/H	1. Sign markings to be set out as per TCP; 2. Vehicle driver to remain in the vehicle, only the passenger may dismount from the passenger side only and mark the road edge; 3. Vehicle driver to ensure vehicle is placed to protect the worker ahead, maintaining a distance of at least 5m behind the worker while they are marking; and 4. High visibility clothing, vehicle used with flashing light to warn traffic, signs to be marked for placement well clear of the carriageway; 5. Depending on the nature of the area, it may be prudent to deploy Traffic Controller/s to slow traffic through an area while marking; 6. Ensure escape routes are available at all times, constantly check and employ a 'what if' attitude at all times while close to a carriageway or road.	Engineer, Foreman, Traffic Controllers
4	• Worker or Traffic Controller hit by traffic; • Signs being blown into oncoming traffic	1/H 1/H	1. Sign set out as per TCP before establishing plant, equipment and personnel into the work area; 2. Ensure signs are set up clear of roadway and are properly	Engineer, Supervisor, Traffic Controllers

Item	Potential Hazard (What May Cause an Injury/Illness to Occur)	Risk Ranking High-Med-Low	Hazard Controls (What Controls can be put in place to Prevent an Injury/Illness) NB: Controls Must Not Raise Or Create An Increased Risk	Who will Ensure this is Done
	• Traffic 'rear-ender' collisions • Driver complacency when a worksite is unmanned but signs are still deployed; • Workers hit by traffic; • Manual handling injuries from lifting and placing signs and sandbags.	2/M 2/M 1/H 1/H	secured to remain in position during winds, rain, or passing traffic; 3. Monitor oncoming traffic queuing distances and release traffic if queue exceeds allowed limits in accordance with ROL, 4. Signs must be covered when leaving the work area during or at the end of the shift; 5. Nobody may enter an uncontrolled road or Highway or cross the Highway, unless it is properly controlled under Traffic Control conditions; 6. Traffic Control equipment and crew is to be sufficient to effect the requirements of the ROL, TCP and otherwise satisfy the requirements of the work; 7. Use work vehicle as physical barrier between oncoming traffic when establishing signage etc.; 8. Reference PMP and VMP; 9. Always walk with eyes pointing at oncoming traffic (avoid pointing back to oncoming traffic); and 10. Deploy signs starting from furthest point from work site	
5	• Exposure to traffic; • Struck by vehicles; • Covers on signs blowing off and signs being exposed; • Signs being moved by others. Traffic in work zone.	1/H 1/H 2/M 2/M	1. Signs must be closed off from the furthest end of signage and work towards traffic; 2. Always have visual contact with traffic; 3. Signs to be covered so that they do not open due to wind 4. Traffic Control Crew is to be vigilant and regularly check signage; 5. Supervisor must conduct a regular, recorded Inspection; and 6. PMP and VMP	Engineer, supervisor, Traffic Controllers
6	• Drivers and workers less sensitive / unable to detect potential hazards when approaching or passing work zone; • Workers less visible at night; • Traffic Controllers deployed on or near a local road or Highway.	1/H 1/H 1/H	1. Task Lighting provided by day-maker(s) and allow more time for traffic to respond to control measures being enforced; 2. Reflective tape and reflectors such as Chevron Boards are to be used during night works; 3. Workers inside the delineated work area to wear High-visibility clothing with reflective strip as a minimum; 4. Traffic Controllers and workers deployed on or otherwise exposed to traffic at night must wear White Overalls with Reflective Strip (RMS approved); 5. Traffic Controllers must not turn their backs to traffic and to	Engineer, Supervisor, Traffic Controllers

Item	Potential Hazard (What May Cause an Injury/Illness to Occur)	Risk Ranking High-Med-Low	Hazard Controls (What Controls can be put in place to Prevent an Injury/Illness) NB: Controls Must Not Raise Or Create An Increased Risk	Who will Ensure this is Done
			have access to an escape route at all times; 6. Ensure there is adequate room inside the site so tail of vehicles does not protrude from the gate into live traffic at any time; and 7. PMP and VMP	
7	• Blocking local roads or Highway; • Damaging road signs and guide posts; • 'Bellying' out on mounds and dips in road.	2/M 2/M 2/M 2/M	1. Check TCP and VMP access to site, use traffic control where necessary; 2. Ensure there is sufficient space inside the work zone to allow vehicles and trucks to move well clear of the traffic; 3. Check clearance around corners and bends, set up signage off to the side of access gates; and **4.** Check clearance at dips on local roads and mounds on-site and only access site when suitable vehicle or truck for the conditions present. Modify dips and mounds to allow free accesses as required.	Engineer, Foreman
8.	• Hitting / falling onto roadway; • Hanging over / obstructing roadway and road users; • Items and objects placed on Barriers; • Motorists distracted by construction works i.e. gawk factor; • Leaving signs open causing drivers to be complacent through work zones when no workers present; • Traffic Controllers distracted by construction activity	1/H 1/H 2/M 1/H 2/M 2/M	1. Ensure adequate distance between machinery, equipment and workmen and the moving traffic lane; 2. Worksite set up in accordance with the TCP; 3. Workers not to wander outside work zone, must be paying attention to work, be aware of traffic control and movements of traffic at all times; 4. Nobody may place anything on top of a Traffic Barrier at any time for any period of time; 5. Workers who are close to roadways must remain alert for straying vehicles; 6. Nobody may sit on or stand near Traffic Barriers; 7. Personnel to maintain at least 1m clearance behind a Traffic Control Barrier, or lesser distance if it is allowed in the area Traffic Management Plan; and 8. Traffic Controllers are to watch oncoming traffic and must not turn their back to watch the construction activity.	Supervisor, Traffic Controllers
9.	• Vehicle Collision; • Person/Worker collision; • Blind spots.	1/H 1/H 2/M	1. Remove signs starting from worksite walking away from worksite; and 2. Ensure truck positioned between traffic controller and oncoming traffic.	Supervisor, Traffic Controllers
10.	• Pedestrians	1/H	1. Adequate pedestrian access must be maintained at all times to ensure pedestrians have safe passage past (or through) work areas and TCPs; and	Traffic Coordinator, Supervisor, Traffic Controllers

Item	Potential Hazard (What May Cause an Injury/Illness to Occur)	Risk Ranking High-Med-Low	Hazard Controls (What Controls can be put in place to Prevent an Injury/Illness) NB: Controls Must Not Raise Or Create An Increased Risk	Who will Ensure this is Done
			2. Where this cannot be maintained, alternate pedestrian access must be established	

Appendix H

Construction Traffic & Safety Management Sub-Plan MCoA Compliance Tables

B.1 CEMP Requirements

The attached Oxley Highway to Kundabung (OH2K) Traffic Management and Safety Plan (TMSP) has been developed to address the minimum requirements of Appendix 21.9, 27 and 43 of the NSW Roads and Maritime Services (RMS) Scope of Works Technical Criteria (SWTC) and Minister's Conditions of Approval B31a for the Design and Construct section of the Pacific Highway Upgrade Project.

Lend Lease will comply with this TMSP to enable it to fulfill its traffic management and safety obligations under the Deed. The TMSP is also structured to satisfy those planning requirements emanating from:

- Representations reports from environmental planning submissions;
- Minister's Conditions of Approval (MCoA);
- RMS General and Technical Specifications (particularly G10);
- Relevant Australian Standards;
- Road Occupancy License (ROL) conditions of approval; and
- RMS Traffic Control at Worksites manual (September 2010).

B.2 Minister's Conditions of Approval

The MCoA relevant to this Plans are listed in Table 1 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 1: Conditions of Approval relevant to the TMSP

CoA No.	Condition Requirements	Document Reference
B21	The Proponent shall ensure that the project is designed in consultation with DPI (Forests) to ensure that access of a standard that is at least equivalent to that currently existing and which meets relevant road safety standards is maintained within state forests to enable continued forestry operations, fire management and recreation during construction and operation unless otherwise agreed with DPI (Forests).	TMSP 3.1.2
B22	The Proponent shall ensure that the project is designed to incorporate appropriate signage for townships along the existing highway that are bypassed by the project, in consultation with the relevant council and community. The signage policy shall be consistent with the Roads and Maritime Service's standard signposting policy and provide information on the range of services available within the towns including advice that the route through the towns may be taken as an alternative to the highway	TMSP 4.4.1
B31	As part of the Construction Environment Management Plan for the project required under condition B30 of this approval, the Proponent shall prepare and implement the following sub-plan(s): (a) A Construction Traffic Management Plan, prepared in accordance with RMS' QA Specification G10 - Control of Traffic and Traffic Control at Work Sites Manual (2010) to manage disruptions to highway and local traffic movements as a result of construction traffic associated with the project. The Plan shall be developed in consultation with Council and shall include, but not necessarily be limited to:	Traffic Management and Safety Plan (TMSP)
B31 (a) (i)	– Identification of construction traffic routes and quantification of construction traffic volumes (including heavy vehicle/spoil haulage) on these routes;	TMSP 4.10.2 TMSP Appendix C
B31 (a) (ii)	– Details of vehicle movements for construction sites and site compounds including parking, dedicated vehicle turning areas, and ingress and egress points;	TMSP 4.1, TMSP Appendix B
B31 (a) (iii)	– Details of potential impacts to traffic on the existing highway and associated local roads including intersection level of service and potential disruptions to pedestrians, public transport, parking, cyclists and property access	TMSP 4.1, 4.7, 4.8, 5.0 TMSP Appendix C

CoA No.	Condition Requirements	Document Reference
B31 (a) (iv)	– Details of temporary and interim traffic arrangements to address potential impacts;	TMSP 3.0, 4.5, 4.6 TMSP Appendix A
B31 (a) (v)	– A response procedure for dealing with traffic incidents; and	TMSP 4.3 and Appendix E
B31 (a) (vi)	– Mechanism for the monitoring, review and amendment of this Plan.	TMSP 2.6
C23	The roads likely to be used by the project's heavy construction vehicles shall be identified in the Traffic Management Sub-plan required under Condition B31 (a). Road dilapidation reports shall be prepared for local roads likely to be used by the project's construction traffic, and a copy of the report(s) shall be provided to the relevant council, prior to use by the project's heavy construction vehicles. Any damage resulting from the use of the identified local roads by the project's heavy construction vehicles, aside from that resulting from normal wear and tear, shall be repaired at the cost of the Proponent, unless otherwise agreed by the relevant council.	TMSP 4.1, 4.2 and Appendix B

B.3 RMS Statement of Commitments

RMS Statement of Commitments relevant to this Plans are listed in Table 2 below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 2: RMS Statement of Commitments relevant to the TMSP

Ref #	Condition Requirements	Document Reference
T1	Pre-construction dilapidation reports will be prepared for all non-arterial roads likely to be used by construction traffic. Copies of the reports will be provided to the relevant roads authority.	TMSP Sections 3 and 4
T2	Post–construction dilapidation reports will be prepared for the roads assessed in T1 above. Copies of the reports will be provided to the relevant roads authority. Any damage resulting from construction, (not normal wear and tear), will be repaired or an alternative arrangement for road damage will be agreed with the relevant roads authority.	TMSP 4.1 and 4.2
T3	Construction vehicle movements, work programs and traffic control measures will be planned to avoid or minimise impacts on traffic through the implementation of all feasible and reasonable design, and mitigation and management measures.	TMSP Section 4 and Appendix A, B and C
T4	The centre spans of the bridges over the Hastings River and the Wilson River will be no lower in height than the existing bridges to ensure navigational clearance is maintained.	TMSP 3.2.2, 3.2.3
T5	Consultation with those residents whose access will be affected during construction will be undertaken.	TMSP 3.1.2, 4.8
T6	Signposting and crossing points will be provided for cyclists at the on and off ramps at interchanges offering a safer cycling and pedestrian environment.	TMSP 4.7
T7	Provision will be made to maintain access for the existing bus operation.	TMSP 4.7

Appendix I

Consultation Meeting with Hastings Council and Roads and Maritime Services

Consultation Meeting Minutes

Lend Lease

Meeting minutes

Meeting:	Oxley Highway to Kundabung, Pacific Highway Upgrade Introduction with Port Macquarie Hastings Council (PMHC)
Date:	13 August 2014
Time:	9am to 10am
Location:	SES Building, Central Road, Port Macquarie

Attendees:	**PMHC**	**Lend Lease Engineering**	**RMS**
	Duncan Clarke	Jason Voigt (JV)	John McKechnie
	John Hanlon	Justine Voigt (JuV)	
	Phil (admin)	Pat Statham (PS)	
		David Hanna (DH)	

Distribution:	Per attendees, Ian Old (Lend Lease)
Next Meeting:	TBA
Note:	Purpose of meeting was to discuss possible impacts on local roads by construction activity during the upgrade of the Pacific Highway between Oxley Highway and Kundabung.

Item No.	Comments / Actions
1.0	**Introduction** - JV provided an overview of LLE work and proposed use of Glen Ewan Road and Hacks Ferry Road. - Glen Ewan Road: proposed use for bridge related construction activities and mass haul for the embankment. Expectation is for heavy use. - Hacks Ferry Road: proposed use for access to Wilsons River Bridge embankment. Heavy and wide load vehicles would use the road for bridge materials deliveries. Expectation is heavy daily use until alignment is suitable. - Construction is expected to begin later in the year, following CEMP approval.
2.0	**LLE proposal** - LLE recognises the potential impact on the two local roads. It was acknowledged that neither road is currently in a good condition and wet weather would significantly reduce the standard of the roads. - LLE proposes to stabilise Glen Ewan Road, reseal it and widen it where possible to 5-6m. - LLE proposes to spray seal Hacks Ferry Road with appropriate preparation.

Page 1

Appendix J

Potential Traffic and Delivery Impacts for Glen Ewan and Hacks Ferry Roads

Potential Traffic & Delivery Impacts for Glen Ewan and Hacks Ferry Roads

Location	Potential Impact	Timeframes
Glen Ewan Road Earthworks	• Haulage of general fill from Sancrox project: 35,000m3 in truck and dogs = 2,900 truck loads. For a daily production of 2,500m3 this equates to 200 truckloads per day.	• 14 days
	• Delivery of quarried product for hard standing of Hastings bridge compound and provision of all weather access: 500m3, or 40 truck loads (truck and trailer).	• 2 days
	• Delivery of screened rock for wick drain area south of Glen Ewan Road: 1,000m3, or 20 truck loads.	• 1 day
	• Delivery of rock for piling platforms: 2,500m3 or 150 truck loads	• 5 days
	• Various deliveries of geotextile, temporary pipes, fencing materials, materials for sediment and erosion control: 50 deliveries over 3 months	• 3 months
	• Delivery of rock for loadout jetty for Hastings River Bridge: 3,000m3 or 180 truckloads delivered at a rate of 60 loads per day.	• 3 days

Location	Potential Impact	Timeframes
Glen Ewan Road Structures	• Casing deliveries – Up to 20 deliveries a week. • Reinforcement – Up to 10 deliveries a week. • Concrete deliveries – up to 60-65 Agi deliveries in a week. • Girders – 4 girders a day / 20 girders a week	• 3 to 4 weeks • 30 weeks • 30 weeks • 8 weeks NOTE: These are NOT concurrent activities and would occur over a year
Hacks Ferry Road Earthworks	• Delivery of screened rock for wick drain areas sth of the Wilson River: 20,000m3 = 1,200 truckloads total over a 4 week period. • Various deliveries of geotextile, temporary pipes, fencing materials, materials for sediment and erosion control: 150 deliveries over a 3 month period. • Quarried product for hardstanding of Wilson River bridge compound and provision of all weather access: 1,500m3, or 120 truck loads (truck and trailer) • Rock for piling platforms: 3,500m3 or 210 truck loads (truck and trailer) • Rock/sand for Wilson River bridge platform: 25,000m3 delivered in truck and dogs, 1,700 truck loads delivered at a rate of 60 trucks per day. • Water truck 10 times a day	• 4 weeks • 3 months • 7 days • 8 days • 1 month • Daily while activities occur (unless road is sealed)
Hacks Ferry Road Structures	• Casing deliveries – Up to 20 deliveries a week – over a period of 3 or 4 weeks. • Reinforcement – Up to 10 deliveries a week – over 30 weeks. • Concrete deliveries – up to 60-65 Agi deliveries in a week – over 30 weeks. • Girders – 4 girders a day / 20 girders a week – over 8 weeks	• 3 to 4 weeks • 30 weeks • 30 weeks • 8 weeks

Location	Potential Impact	Timeframes
	in total	NOTE: These are NOT concurrent activities and would occur over a year NOTE 2: Options of using barges is being considered to reduce the impact on local roads
Light Vehicles	• Up to 150 movements per day	• While construction continues at either road location, or until an alternate access can be provided through the construction site

Appendix K

Schematic Overview Plan of Proposed Gates

Schematic Overview Plan of Proposed Gates

Appendix L

Site Plans for Main Ancillary Facility, Compounds and Batch Plants

Site Plans for Main Ancillary Facility, Compounds and Batch Plants