4.0 Future Transport Conditions and Capacity

4.1 Road Network

This section reviews the likely impacts of changes to the traffic flows on the road network for the future assessment years (2024 and 2034) without the proposed concept occurring at the site. These future assessment years have been chosen as they represent the estimated timeframes for:

- 2024 - the initial stage of the proposed concept with the container terminal operating at a capacity of 600,000 TEU per annum;
- 2034 - the final stage of the proposed concept with the container terminal operating at a capacity of 1 million TEU per annum.

While the development of the Hunter Expressway (F3 – Branxton) and the F3 – Raymond Terrace upgrade works are likely to occur during this time period, the expected impact on Industrial Drive is difficult to predict. Site access and egress is not likely to be impacted significantly and hence have not been considered in detail as part of this study. They are likely to provide some traffic relief on Industrial Drive by diverting traffic to other routes, which would have a positive impact on traffic operations along Industrial Drive.

4.1.1 Intersection Performance

A growth rate of 1% per annum has been determined based on consultation with the RTA. This yearly growth rate has been applied to the existing intersection flows to determine the future traffic conditions in 2024 and 2034, without the proposed concept. This growth rate is significantly higher than the observed average growth rate of 0.27% per annum which is based on historical traffic volumes on Industrial Drive between 1995 and 2004.

The intersections of Industrial Drive / George Street and Industrial Drive / Ingall Street have been assessed using SIDRA Intersection 3.2 for the two future year scenarios. The intersection layouts were tested unchanged from the base layouts.

Industrial Drive / George Street

The 2024 AM and PM peak hour performance results for the intersection of Industrial Drive / George Street are presented in **Table 4.1** and **Table 4.2** respectively.

Table 4.1: 2024 AM Peak Intersection Performance, Industrial Drive / George Street – without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Industrial Drive (S Leg)	1,307	B	0.544	15.3	159
George St (E)	49	D	0.074	49.1	17
Industrial Drive (N Leg)	2,056	B	0.861	22.3	368
George St (W)	153	E	0.427	58.4	50
All Vehicles	**3,565**	**B**	**0.861**	**21.6**	**368**

Source: AECOM, 2010

Table 4.2: 2024 PM Peak Intersection Performance, Industrial Drive / George Street – without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Industrial Drive (S Leg)	1,778	B	0.839	24.1	305
George St (E)	62	D	0.072	43.2	15
Industrial Drive (N Leg)	1,741	B	0.815	21.5	279
George St (W)	88	D	0.169	48.5	23
All Vehicles	**3,669**	**B**	**0.839**	**23.8**	**305**

Source: AECOM, 2010

The results indicate that in 2024 the intersection is likely to continue performing at LOS B in both AM and PM peak hours. The additional back ground traffic growth has a minor impact on the performance of the intersection of Industrial Drive / George Street. In both peaks, the intersection has spare capacity.

The 2034 AM and PM peak hour performance results for the intersection of Industrial Drive / George Street are presented in **Table 4.3** and **Table 4.4** respectively.

Table 4.3: 2034 AM Peak Intersection Performance, Industrial Drive / George Street – without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Industrial Drive (S Leg)	1,441	A	0.555	14.4	182
George St (E)	54	E	0.095	60.3	23
Industrial Drive (N Leg)	2,270	B	0.879	20.0	444
George St (W)	169	F	0.567	70.9	63
All Vehicles	**3,934**	**B**	**0.879**	**20.7**	**444**

Source: AECOM, 2010

Table 4.4: 2034 PM Peak Intersection Performance, Industrial Drive / George Street – without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Industrial Drive (S Leg)	1,963	B	0.872	26.6	382
George St (E)	68	D	0.088	48.5	19
Industrial Drive (N Leg)	1,923	B	0.848	22.7	343
George St (W)	97	D	0.207	54.7	28
All Vehicles	**4,051**	**B**	**0.873**	**25.8**	**380**

Source: AECOM, 2010

The results indicate that in 2034 the intersection is likely to continue performing at LOS B in both AM and PM peak hours. The additional background traffic growth has a minor impact on the performance of the intersection of Industrial Drive / George Street. In both peaks, the intersection has spare capacity, although in both the AM and PM peak periods the queue lengths on Industrial Drive are significant (444m in the AM peak and 382m in the PM peak).

Industrial Drive / Ingall Street

The 2024 AM and PM peak hour performance results for the intersection of Industrial Drive / Ingall Street are presented in **Table 4.5** and **Table 4.6** respectively.

Table 4.5: 2024 AM Peak Intersection Performance, Industrial Drive / Ingall Street - without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Ingall St (S Leg)	179	D	0.632	48.7	53
Industrial Drive (E Leg)	1,295	B	0.674	20.8	157
Ingall St (N Leg)	118	D	0.765	45.2	37
Industrial Drive (W Leg)	2,010	B	0.763	17.5	207
All Vehicles	**3,602**	**B**	**0.765**	**21.1**	**207**

Table 4.6: 2024 PM Peak Intersection Performance, Industrial Drive / Ingall Street - without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Ingall St (S Leg)	193	D	0.559	50.3	79
Industrial Drive (E Leg)	1,769	E	0.954	61.7	472
Ingall St (N Leg)	217	E	0.895	61.7	76
Industrial Drive (W Leg)	1,505	C	0.943	31.6	195
All Vehicles	**3,684**	**D**	**0.954**	**48.8**	**472**

Source: AECOM, 2010

The results indicate that in 2024, the intersection is likely to perform at LOS B and D in the AM and PM peak respectively. Similar to the intersection of Industrial Drive / George Street, the additional background traffic growth between the existing traffic flows and 2024 traffic flows appears to have a minor impact on the intersection in the AM peak hour, however the LOS in the PM peak hour falls from LoS B to D. The PM peak hour experiences a higher degree of saturation than the AM peak hour, particularly on Industrial Drive and is operating close to capacity. This is due to a high amount of through traffic on Industrial Drive in the westbound direction.

The 2034 AM and PM peak hour performance results for the intersection of Industrial Drive / Ingall Street are presented in **Table 4.7** and **Table 4.8** respectively.

Table 4.7: 2034 AM Peak Intersection Performance, Industrial Drive / Ingall Street - without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Ingall St (S Leg)	198	D	0.635	47.7	58
Industrial Drive (E Leg)	1,432	B	0.763	23.3	187
Ingall St (N Leg)	129	D	0.800	47.3	40
Industrial Drive (W Leg)	2,220	B	0.858	25.0	292
All Vehicles	**3,979**	**B**	**0.858**	**26.2**	**292**

Source: AECOM, 2010

Table 4.8: 2034 PM Peak Intersection Performance, Industrial Drive / Ingall Street - without development

Location	Demand Flow (veh/h)	Level of Service	Deg of Satn (v/c)	Aver Delay (sec)	95% Back of Queue (m)
Ingall St (S Leg)	213	E	0.771	66.8	112
Industrial Drive (E Leg)	1,953	F	1.048	174.9	993
Ingall St (N Leg)	240	F	1.008	120	134
Industrial Drive (W Leg)	1,662	C	1.000	38.9	317
All Vehicles	**4,068**	**F**	**1.048**	**110.4**	**993**

Source: AECOM, 2010

The results indicate that in 2034, the intersection is likely to perform at LOS B in the AM peak and LOS F in the PM peak. The additional background traffic growth between the existing traffic flows and 2034 traffic flows appears to have an impact on the intersection in the PM peak hour. The intersection exceeds capacity, with long average delays and queue lengths on Industrial Drive of approximately 1km in the PM peak hour. The through movement on Industrial Drive in the westbound direction is responsible for the high DoS, long average delays and queue lengths on this approach.

Therefore, the results suggest that in 2034 the intersection of Industrial Drive and Ingall Street will require upgrading to accommodate background traffic growth.

5.0 Transport Implications of Development Options

5.1 Introduction

This section contains analysis of the impact of the proposed concept, as proposed by NPC and shown in **Figure 5.1**, on the road and rail networks.

The Berth Precinct is expected to contain up to seven berths to support the five land-based precincts, with the Container Terminal Precinct requiring the use of three berths and the General Purpose, Bulk and General, Bulk Liquids and the NPC Operations Precincts each requiring the use of one berth. It is possible that one of the Container Terminal Precinct berth (Berth 4) may be shared with the General Purpose Precinct.

At full operating capacity in 2034, the following maximum ship movements are anticipated:

- 100 ships per annum for the General Purpose Precinct and the Bulk and General Precinct combined;
- 40 ships per annum for the Bulk Liquids Precinct; and
- 420 ships per annum for the Container Terminal Precinct.

The turnaround time for ships to load and unload while at berth is normally between one and two days.

The waterside impact of these additional ship movements on the operations and capacity of the Port of Newcastle has not been assessed in this report, although it has been discussed in Section 5.2.6 of the EA document. However, the potential landside road and rail impacts associated with the additional cargo volumes and shipping movements have been assessed in this report and on the basis of conservative (maximum) trade volumes.

Relevant RTA guidelines, including the RTA Guide to Trip Generating Developments were consulted in association with this assessment. Detailed trade forecasts were provided by NPC and these have been used to predict trips generated by the proposed concept.

5.2 Precinct Development Potential

The existing and potential use for each precinct is discussed in **Table 5.1**.

Table 5.1: Precinct Development Potential

Precinct	Existing Use	Potential Use	Timing (from 2009)
NPC Operations (Berth 1)	None	NPC dredger vessel NCP Offices	5 - 10 years
Bulk & General Purpose (Berth 2)	Nothing	Use by bulk businesses including grain storage, briquettes, coke cargos and other infrastructure	2 - 10 years
General Purpose (Berth 3 and may share Berth 4 with the Container Terminal Precinct)	General cargo handling facility (Mayfield No.4 berth) – operational in 2010	Cargo; Break bulk; Containers; Heavy machinery; RO/RO	2- 25 years
Container Terminal (Berths 4, 5 & 6)	Koppers Carbon Materials & Chemicals – use of Berth facility only – tar piped to offsite facility	Containers	13 - 25 years
Bulk Liquid (Berth 7)	None	Facility for the receival, storage, blending and distribution of fuels and biofuels	2 - 5 years

Source: Newcastle Port Corporation, May 2009

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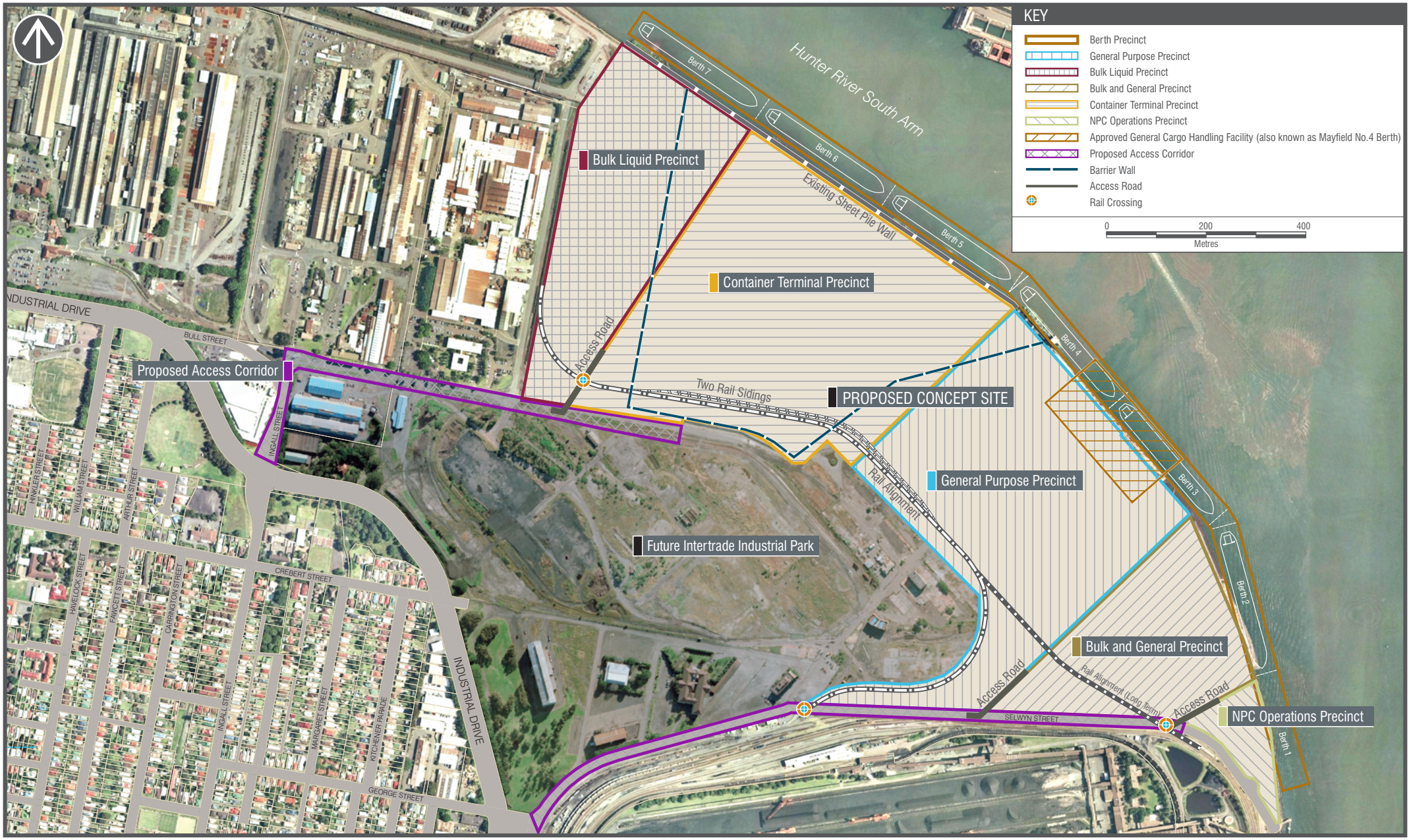

AECOM

CONCEPT PLAN

Transport Assessment

Mayfield Site Port-Related Activities Concept Plan

Figure 5-1

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