John Renshaw Drive, Black Hill Industrial Precinct

Detailed Evaluation of SMEC Report compared to GTA Report

Prepared by: GTA Consultants (NSW) Pty Ltd for Broaden Management

on 10/12/2020

Reference: N171072

Issue #: B

GTAconsultants

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	27/10/2020	Final	William Finlay	Bryan Li, Robert Dus	Rhys Hazell	Rhys Hazell
B	10/12/2020	Updated with minor amendments	William Finlay	Bryan Li, Robert Dus	Rhys Hazell	

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1. INTRODUCTION

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1.1. Background

Broaden Management (Broaden) previously engaged GTA Consultants (GTA) to provide traffic and transport advice for the proposed large lot of 200-hectare industrial development on land at DP1057179 on John Renshaw Drive, Black Hill. Extensive engagement with Transport for NSW (TfNSW) resulted in the need to complete a VISSIM microsimulation model that considers the entire industrial precinct which is made up of the subject site and neighbouring Coal and Allied Land industrial estate development.

TfNSW provided GTA with an extract from the broader M1 to Raymond Terrace (M12RT) model in which to progress the VISSIM model. TfNSW imposed many specific parameters and assumptions that had to be incorporated into the model and while several of these were not agreed and formed part of extensive discussions, were adopted. The GTA model was ultimately completed adopting all the TfNSW specified parameters and modelling assumptions. These included:

- background traffic growth rates
- traffic generation rates
- traffic distribution
- model horizon years
- site access arrangements, and location
- the need for a precinct wide model
- developable areas and site development ratios.

GTA finalised the model and associated report in May 2020 with all received by TfNSW at that time. With significant ongoing TfNSW consultation and several other subsequent letters and correspondence from TfNSW to Cessnock City Council, and responses in this regard, it was clear that agreement on the model outputs was not forthcoming. TfNSW subsequently engaged SMEC to complete an additional traffic based assessment of the precinct development however given the obvious differences in the two model parameters, the SMEC brief remains unclear.

With subsequent correspondence between TfNSW and Cessnock City Council ahead of the Panel Hearing held on 15 October 2020, and with the SMEC report issued just four days in advance of the hearing, Broaden seeks a detailed evaluation of the SMEC report and to finally allow objective comparison with the GTA assessment.

It is also important to note that there have been numerous separate modelling assessments completed in the area, mostly around the M1 / John Renshaw Drive / Weakleys Drive signalised intersection. These reports adopt different parameters, including background traffic growth rates with one even showing the intersection failing within five years.

TfNSW has not provided a copy of their brief as provided to SMEC and which resulted in the conclusion reached by SMEC. Understanding this brief is critical to the potential traffic mitigation solutions and ensuring accurate and realistic comparison. GTA has also received no professional or constructive feedback from TfNSW on the two modelling reports submitted in November 2019 and May 2020. Both reports resulted in significant costs to the applicant to cover the critical modelling scenarios of the total precinct and applicants site in isolation. Both reports were also made available to Council and the Regional Planning Committee.

1.2. Purpose of this Report

The purpose of this report is to identify and compare the key parameters, assumptions and conclusions drawn from the two traffic assessments.

This report sets out a detailed evaluation of the impacts associated with the proposal as presented in the traffic assessment with consideration of the following:

- The traffic generating characteristics of the proposed development (and precinct).
- The assumptions used throughout the modelling assessment.
- The transport impact of the proposed development on the surrounding network.
- The mitigation measures proposed to mitigate the traffic effects of the proposal.
- Suitability of the documented access arrangements for the site.

1.3. References

In preparing this report, reference has been made to the following documents:

- Black Hill Traffic Modelling, Traffic Analysis Report, prepared by SMEC, dated 9 October 2020 - (SMEC report).
- John Renshaw Drive, Black Hill Industrial Precinct, Microsimulation Modelling Options Testing Report, prepared by GTA Consultants, dated 26 May 2020 – (GTA report).
- Other project related information and stakeholder correspondence.
- Other documents as referenced in the context of this report.

2. SUMMARY OF PROPOSED DEVELOPMENT

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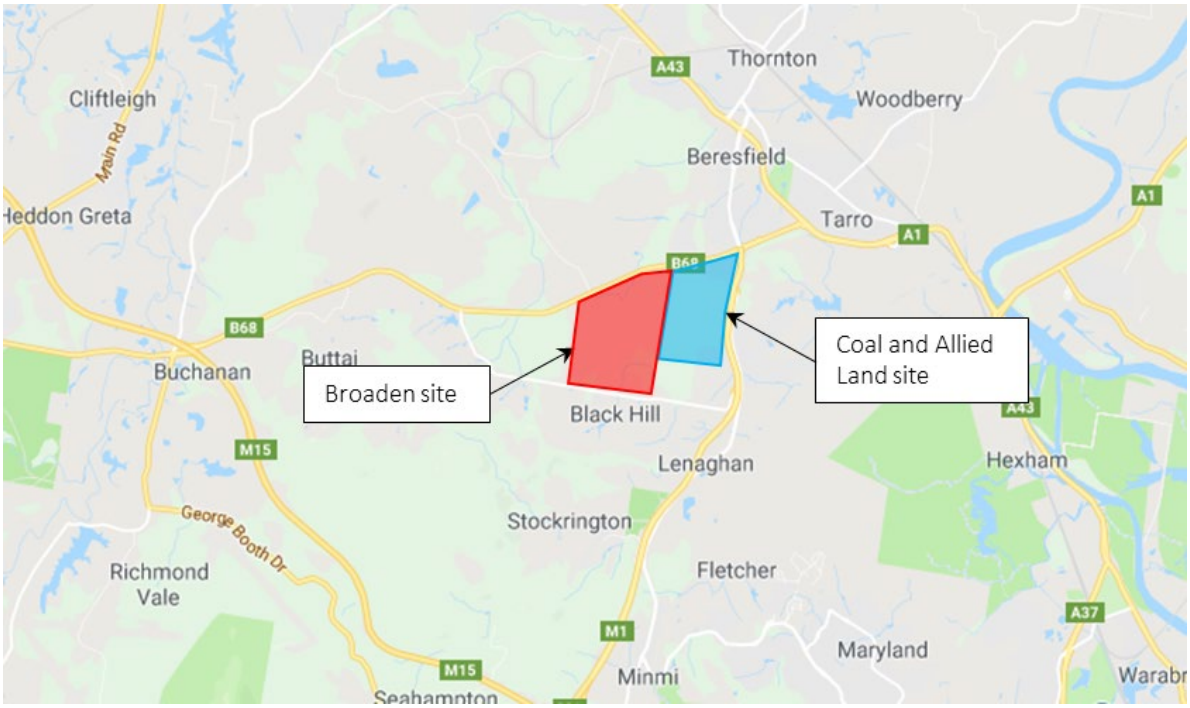
2.1. Subject Site

The subject site is illustrated in Figure 2.1 and also indicates the location of the Industrial Precinct comprising both the Broaden site and the Coal and Allied Land site. The Industrial Precinct is on John Renshaw Drive in Black Hill and close to the northern end of the M1 Motorway. The key road corridors that surround the Industrial Precinct include:

- Pacific Motorway (M1): north-south motorway that runs along the eastern boundary of the Industrial Precinct.
- John Renshaw Drive: east-west road which runs along the northern boundary of the Industrial Precinct which also provides a connection between the Hunter Expressway (M15) and the Pacific Motorway (M1) / New England Highway (A43).
- Weakleys Drive: north-south continuation of the M1 corridor to connect with the New England Highway (A43).

The M1 / John Renshaw Drive / Weakleys Drive signalised intersection is also centrally located within the study area, immediately north-east of the Industrial Precinct.

Figure 2.1: Industrial Precinct



Base image source: Google Maps

The Industrial Precinct location and extent outlined in the SMEC report is consistent with the GTA report.

2.2. Developmental Proposal

The development proposal has been prepared for and executed by the Broaden site and as per the TfNSW requirement to incorporate the additional Coal and Allied Land site to form the Industrial Precinct. Critically, and as part of the development proposal, a separate model was completed and

documented to define the impacts associated with full development of the Broaden site only. This allowed for the impacts of the Broaden site development to be mitigated while also considering the M12RT link and background traffic growth as required by TfNSW. The SMEC assessment however considers the entire Industrial Precinct in isolation thus not allowing for direct comparison.

2.2.1. Staging

The Industrial Precinct and its impact on the surrounding network in both the GTA and SMEC reports have been assessed in stages based on the expected level of Gross Floor Area (GFA) development for the precinct. The respective design years at each completion stage are summarised in Table 2.1.

It is important to note that the both the Broaden site and the Coal and Allied Land site are assumed as being developed in unison for the purposes of this assessment. This is a consistent assumption between the GTA and SMEC assessments.

Table 2.1: Industrial Precinct staging

Industrial Precinct Stage	Design Year (GTA report)	Design Year (SMEC report)
25% GFA developed	2023	2028, 2038, 2048
50% GFA developed	2026	2028, 2038, 2048
75% GFA developed	2029	2028, 2038, 2048
100% GFA developed	2032	2028, 2038, 2048

As indicated in Table 2.1, while the Industrial Precinct stages are consistent between the GTA and SMEC assessments **the future year assumptions are significantly different, and a 2048 horizon year is unusual when completing future year growth and modelling scenarios per se. The 2048 horizon has the potential to extrapolate any such inconsistencies or broad assumptions in the model that may cause uninterpretable results. Confirmation of the TfNSW brief to SMEC is necessary in this regard.**

This would have an obvious impact on the assessment of road network impacts for each of the stages and when the development may trigger additional road network modifications to accommodate the additional traffic loaded on the road network. **Further, the SMEC report reviews 2028 as the first design year compared to 2023 as GTA was required to do, noting that by 2029 the industrial precinct was 75% developed in the GTA report. This brings into question the point of the SMEC assessment in light of the proposed Industrial Precinct itself.**

Given this, it is very difficult to draw any direct comparisons due to the inconsistent assumptions between the GTA and SMEC traffic assessments. The SMEC assumptions clearly vary from the modelling assumptions as specified by TfNSW for adoption in the GTA assessment with confirmation of the TfNSW brief to SMEC obvious.

2.2.2. Vehicle Access

The development proposal(s) for the Industrial Precinct includes two new signalised intersections and one unsignalised intersection on John Renshaw Drive. A comparison of the GTA and SMEC assumptions in this regard has been summarised below:

- **Eastern access** – The SMEC assessment has included the proposed left-in / left-out intersection servicing the Coal and Allied Land site, located between the central access and the M1 / John

Renshaw Drive / Weakleys Drive intersection. TfNSW specifically required the eastern access be excluded from the GTA model with traffic to utilise the central access instead.

- Central access – The GTA and SMEC assessments differ on the location of the main signalised intersection that is to form a central common access point for the precinct. In the GTA assessment, the intersection location is consistent with the Concept Plan for the precinct and essentially between the boundary of the Broaden site and the Coal and Allied Land site to clearly form a shared access for both sites. This again was a specific direction from TfNSW and considered appropriate for modelling purposes. The SMEC assessment however assumes that this main intersection is located firmly on the Coal and Allied Land site (see Figure 2.2 and Figure 2.3 respectively) and about 250 metres east of the Concept Plan intersection location. The SMEC intersection location is also in the same location as that rejected by Land and Environment Court proceedings (for the Coal and Allied Land site) earlier in 2020. It is also understood that **TfNSW objected to this alternative intersection location in the LEC and given the obvious inconsistencies with the Concept Plan and benefit to the Coal and Allied Land site, confirmation of the TfNSW brief to SMEC is necessary**. Nevertheless, it has to be assumed that both assessments use the central access to facilitate traffic movements for both sites as there is no other alternative. The indicative intersection layouts are shown in Figure 2.4 and Figure 2.5. While each of the layouts are broadly similar, the GTA assessment allowed for greater intersection capacity by applying longer southbound departure lanes, west approach right turn lane and east approach left turn lane. The GTA assessment reviewed the intersection on the basis of providing sufficient capacity for both the Coal and Allied Lane site as well as the Broaden site, and the proposed mitigation measures sought to benefit the whole Industrial Precinct. This is of obvious benefit to both development sites and the broader road network.
- Western access – Both the GTA and SMEC assessments have assumed the western access is located opposite the existing Donaldson Mine access and propose to construct a four-leg signalised intersection. The indicative layout for the western access is illustrated in Figure 2.6 and Figure 2.7 for the GTA and SMEC assessments respectively. Again, there are key differences in the two intersection configurations, with the SMEC layout including additional measures, including:
  - additional east approach through lane
  - additional south exit lane
  - additional south approach right turn lane
  - additional west exit lane
  - additional west approach left turn lane.

Figure 2.2: Internal Layout – GTA Report

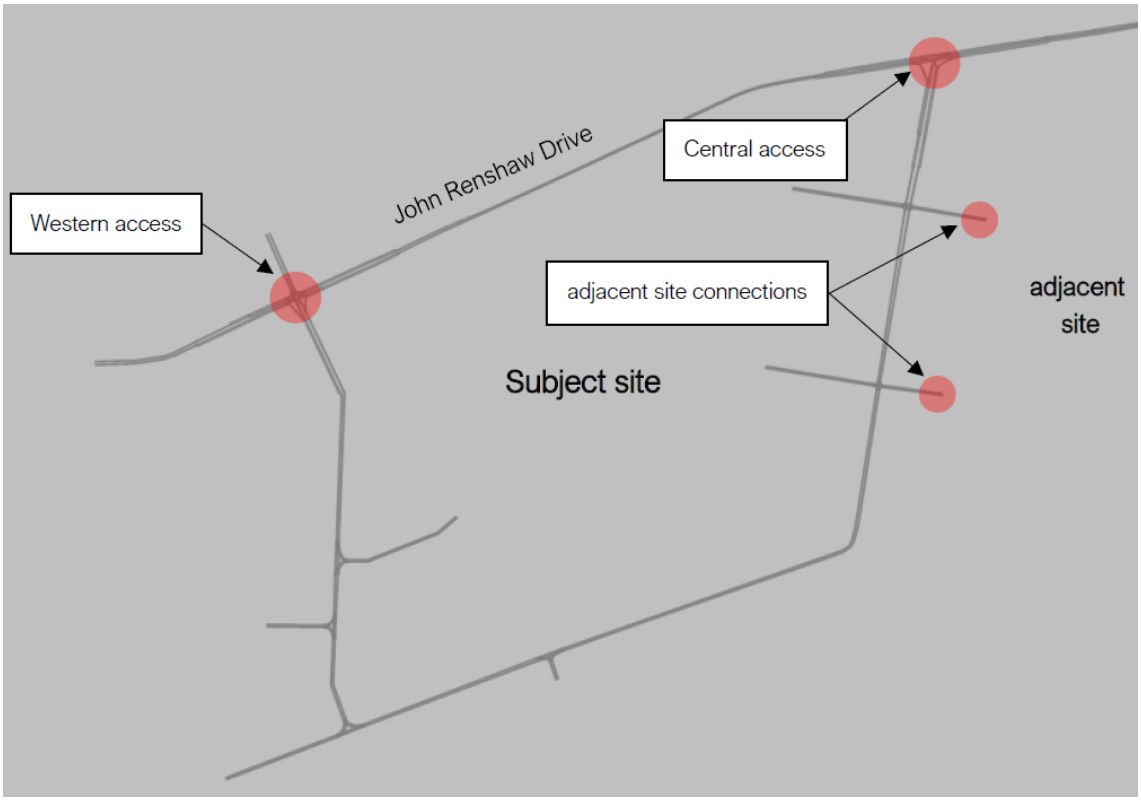
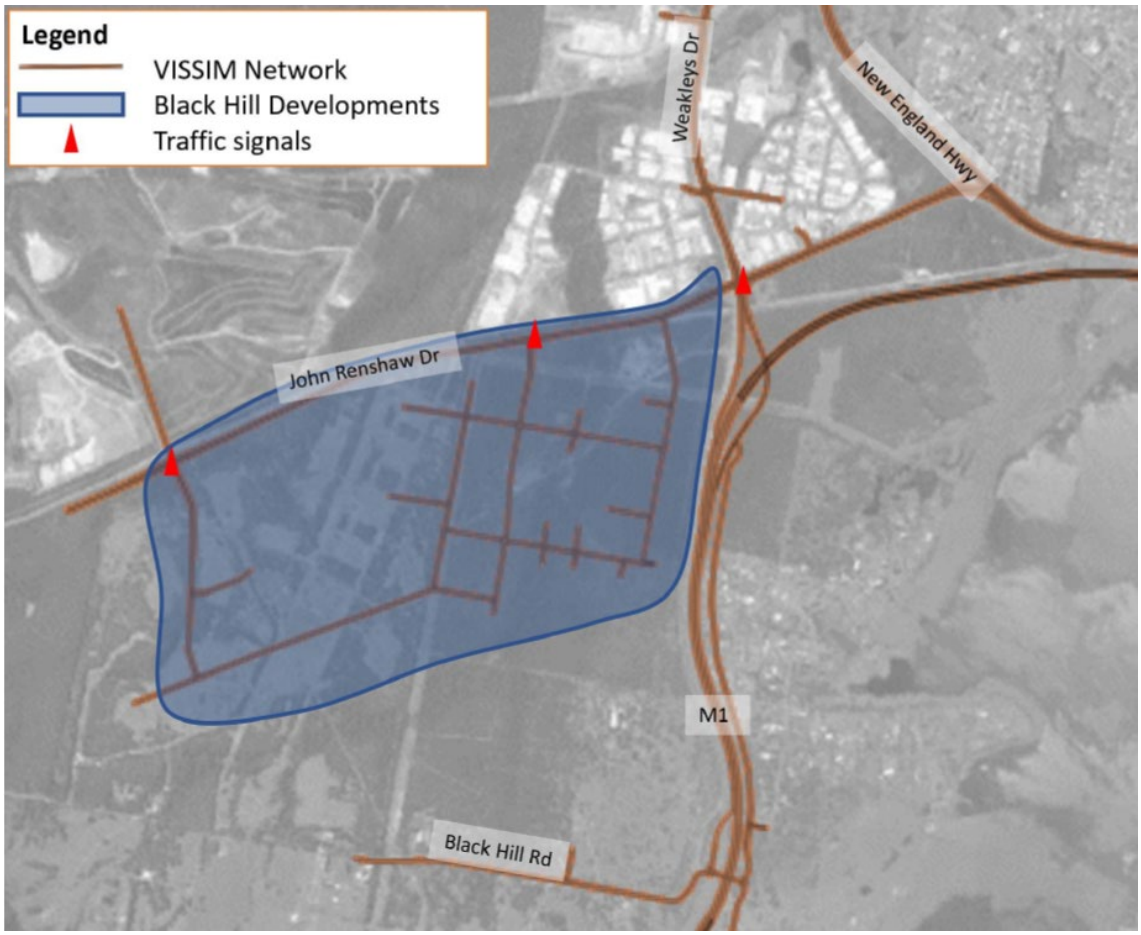


Figure 2.3: Internal Layout – SMEC Report



Source: Figure 2-4 of SMEC report.

Figure 2.4: Proposed Central Access – GTA Report

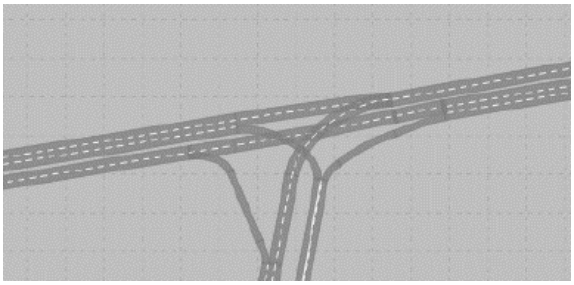
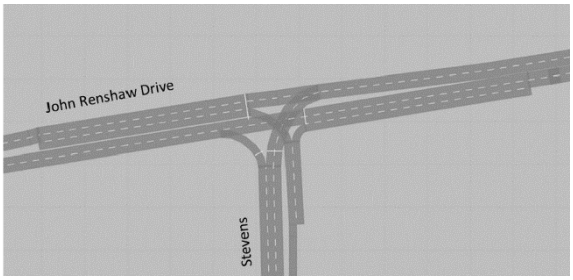


Figure 2.5: Proposed Central access – SMEC Report



Source: Figure 2-6 of SMEC report.

Figure 2.6: Proposed western access – GTA report

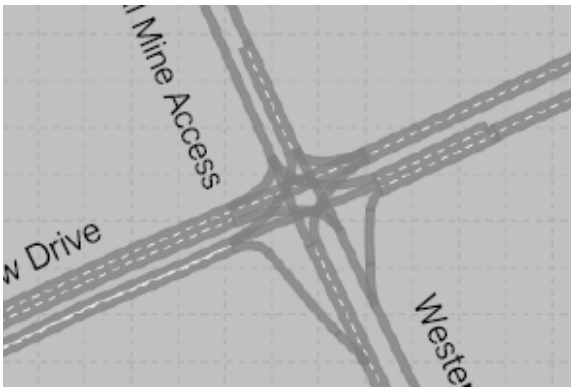
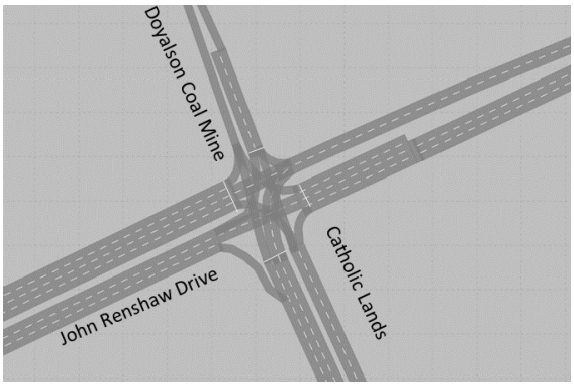


Figure 2.7: Proposed western access – SMEC report



Source: Figure 2-5 of SMEC report.

3. REVIEW OF TRANSPORT ASSESSMENT

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3.1. Model Extents

The GTA and SMEC reports have each utilised the existing TfNSW calibrated and validated model with both making adjustment to the model extents. Figure 3.1 and Figure 3.2 depict the GTA and SMEC model extents respectively.

While most of the model extents are consistent between the GTA and SMEC models, **the SMEC model extent excludes the Glenwood Drive intersections in Thornton**. This area formed part of early discussions between GTA and TfNSW however ultimately needed to be included in the model itself. Based on the GTA assessment, future year scenarios were observed to have significant congestion developing at these Thornton intersections, an issue TfNSW itself identified. **Exclusion of these intersections would bias the road network performance as the cumulative impacts of this congestion onto Weakleys Drive and the New England Highway is not reflected in the SMEC assessment. As such, this makes direct comparison of the GTA and SMEC assessments unnecessarily difficult. Given the obvious inconsistencies, confirmation of the TfNSW brief to SMEC is necessary.**

Figure 3.1: VISSIM Model Extent – GTA Report

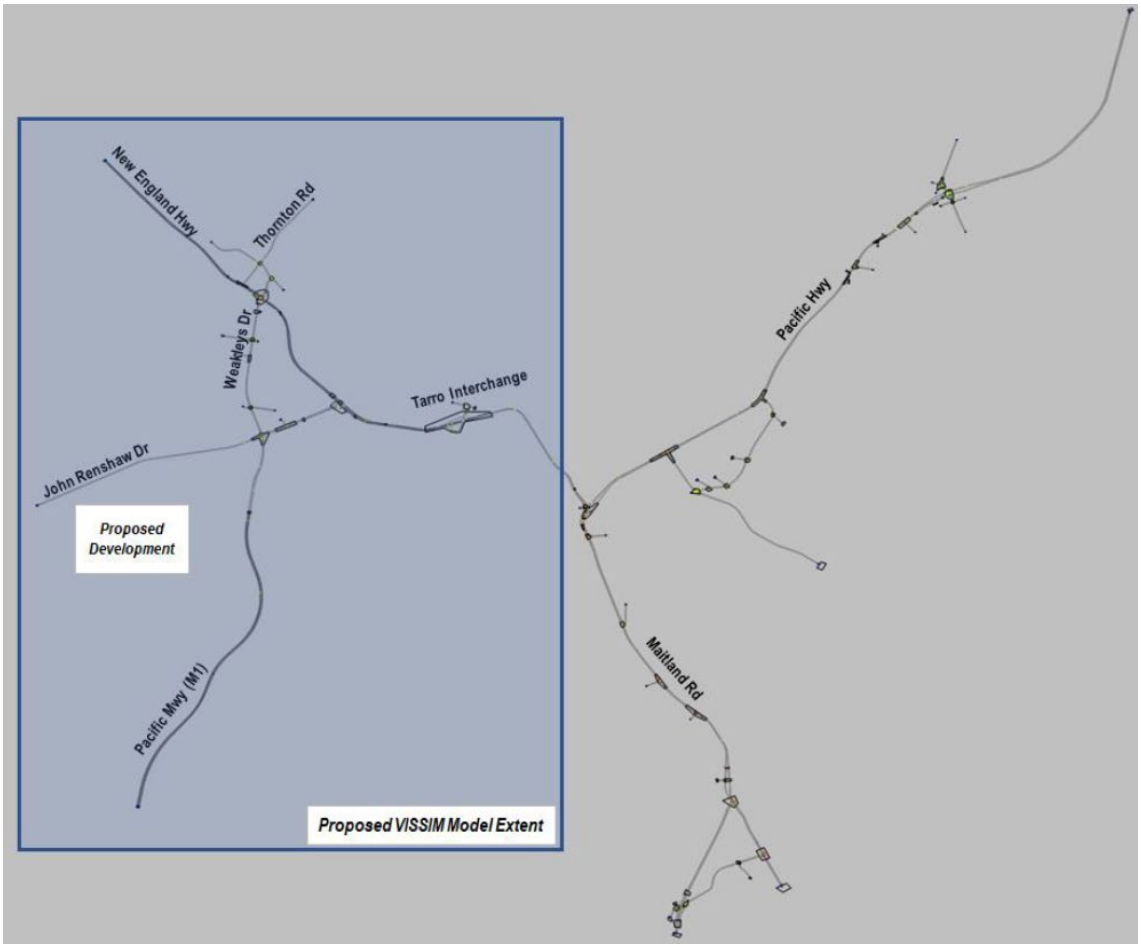


Figure 3.2: VISSIM Model Extent – SMEC Report

Source: Figure 2-3 of SMEC report.

There is no reference in the SMEC report as to whether they calibrated and validated their "truncated" base model to ensure that it still matches the observed data set. This is a basic requirement as any changes to a calibrated and validated base year model (e.g. cropping the extents) should be followed by either a sensibility check that it is still valid and/ or re-calibrated and validated.

Further, the GTA assessment updated the base model road network and re-calibrated it to reflect the latest configuration of the M1 / John Renshaw Drive / Weakleys Drive intersection (from roundabout to signals) which does not appear to have been undertaken by SMEC. The GTA assessment identified that the reconfiguration of the M1 / John Renshaw Drive / Weakleys Drive intersection, as well as general traffic behaviour changes between 2017 and 2019 resulted in changes to travel patterns and traffic volumes through the intersection (and broader network) as a result of converting the roundabout to signals. This does not appear to be accounted for in the SMEC report, which is also limited by the inability to assess the current and future 2028 operation of the intersection.

3.2. Background Traffic Generation and Distribution

3.2.1. Background Traffic Generation

The GTA report, as required by TfNSW in email correspondence dated 6 September 2019, had to adopt a background traffic growth assumption of 1.5% per annum to the base model demands up to the respective design years.

The SMEC report does not detail the applied background traffic growth assumptions. Review of the report appears to indicate a background traffic growth rate of about 0.8% to 1.3% per annum. This has been calculated based on the Existing and Future Do Minimum scenario demands, as shown in Table 3.1.

It is obvious that the SMEC assessment assumes lower background traffic growth rates (especially in the early years) and while the differences may not appear significant, it can result in improved road network performance prior to development, with less traffic on the network. In addition, it would also result in a lower proportion of background traffic growth compared to site generated traffic which can impact apportionment of costs. Importantly, the minimum 0.8% growth rate appears to have been adopted for the period to 2028, further minimising background traffic growth and skew apportionment even further. **Justification for such variances in the applied background growth rates is necessary.** These assumptions and the impact on the analysis should be reviewed in further detail and confirmed for consistency.

Table 3.1: Background Traffic Growth – SMEC Report

Peak Period	Year	Demand [1]	Growth (per annum)
AM Peak	2018	25,171	-
	2028	27,067	0.8%
	2038	30,551	1.1%
	2048	35,096	1.3%
PM Peak	2018	26,895	-
	2028	30,046	1.2%
	2038	33,578	1.2%
	2048	37,231	1.3%

[1] Traffic demand sourced from Table 2-5 of SMEC report.

3.2.2. Site Traffic Generation and Distribution

The traffic generation and distribution assumptions for the Industrial Precinct are summarised in Table 3.2, noting that the distribution assumptions for the precinct have also been estimated by TfNSW and reflect their preferences and assumptions. The GTA and SMEC assessments utilise the same assumptions with the exception of the south and west trip distributions, which vary slightly.

The GTA report assessed three modelling options; two for the Industrial Precinct and one for the Broaden site alone. The two precinct assessments include:

- Option 2B that adopts the model assumptions as specified by TfNSW, including consistent traffic generation rates between the two development sites and assesses the traffic impacts based on these assumptions.
- Option 2A that adopts traffic generation rates that more accurately represent the expected traffic generation rates for each site based on TfNSW' own data. This references the Guide to Traffic Generating Developments Updated traffic surveys (TDT 2013/04a) and specifically, Site 1 Erskine Park industrial Estate and Site 3 Wonderland Business Park, Eastern Creek.

These sites are of similar size, location (with respect to road networks and public transport services) and are definitively large lot industrial estates, the same as proposed on the Broaden site.

The SMEC report contemplates only one development scenario comprising the same (incorrect) traffic generation rates associated with the two different development sites.

It is critical to recognise the very different traffic generation rates that will be associated with each of the two development sites. Large lot industrial precincts (Broaden site) generate significantly less traffic than smaller lot industrial precincts (Coal and Allied Land site). Comparatively, the applicable rates are 0.185 vehicle trips (large lot) and 0.38-0.40 vehicle trips (smaller lots) per 100 square metres of GFA. It could also be argued that the Coal and Allied Land site would generate higher traffic generation rates and closer to 0.55 vehicle trips and similar to the existing industrial precinct to the north.

The SMEC report improperly adopts the same traffic generation rates for each site – this will clearly not eventuate given that the Broaden site comprises an industrial development covering 39 large lots and the Coal and Allied Land site comprises a 200 lot light industrial subdivision.

In short, one rate is at least half the other and is clearly significant in assessing the traffic related impacts and apportionment of costs. SMEC then assumes an even apportionment of costs which is patently incorrect. Direct modelling comparison is hence not possible.

However, without the means to compare such critical and starkly differing modelling approaches, this evaluation has only been able to compare the GTA Option 2B with the SMEC report. **Clearly the apportionment of costs is not equal as suggested by the SMEC report. Given these obvious inconsistencies, confirmation of the TfNSW brief to SMEC is necessary.**

Table 3.2: Traffic generation and distribution constants

Type		GTA Report (Precinct 2B)	SMEC Report
Trip Generation	AM	both sites: 0.38 per 100m2 GFA [2]	both sites: 0.38 per 100m2 GFA [2]
	PM	both sites: 0.4 per 100m2 GFA [2]	both sites: 0.4 per 100m2 GFA [2]
Entry / Exit Movements	AM	66.3% / 33.7%	66.3% / 33.7%
	PM	36.3% / 63.7%	36.3% / 63.7%
Heavy Vehicle Percentage	AM	20%	20%
	PM	15.5%	15.5%
AM Trip Distribution (Entry / Exit)	South	30% / 15%	35% / 20%
	West	25% / 25%	20% / 20%
	East	25% / 40%	25% / 40%
	North	20% / 20%	20% / 20%
PM Trip Distribution (Entry / Exit)	South	15% / 30%	20% / 35%
	West	25% / 25%	20% / 20%
	East	40% / 25%	40% / 25%

Type		GTA Report (Precinct 2B)	SMEC Report
	North	20% / 20%	20% / 20%
Lot Yield		26% GFA	26% GFA

While the above assumptions have been adopted for both reports, slight differences are evident in their usage, as outlined in Table 3.3. However, these differing assumptions are likely to have a negligible impact on the model performance.

Table 3.3: Background Traffic Distribution

Direction	GTA Report	SMEC Report
North	Traffic heading north from the Industrial Precinct will travel via Weakleys Drive and head north though the New England Highway.	Traffic heading north from the Industrial Precinct will travel via Weakleys Drive and head north through to Thornton and onto the New England Highway with the traffic split based on existing trip matrices.
East	Traffic heading east from the Industrial Precinct will travel via John Renshaw Drive through to the New England Highway heading south.	Traffic heading east from the Industrial Precinct will travel via John Renshaw Drive through to the New England Highway heading both south and north. AM peak (entry / exit): South 20% / 20%; North 5% / 20% PM peak (entry / exit): South 20% / 20%; North 20% / 5%

There is also strong evidence to suggest that a greater proportion of traffic would arrive and depart the precinct on John Renshaw Drive to and from the west. While GTA slightly modified the TfNSW model assumptions (from 20% to 25%), other substantiative information (as detailed in a separated assessment prepared by Barr Property) indicates that this could be significantly higher, and in the order of 45%. **This would clearly have a significant impact of the model outcomes and extent of intersection upgrades.**

3.2.3. M12RT Impact

For the GTA report, while the M12RT bypass has not been physically included in the modelling assessment, the expected impact of the M12RT bypass on future year traffic demands has been provided by TfNSW. Table 3.4 outlines the agreed assumptions regarding the reduction (or redistribution) of traffic demand following the implementation of the M12RT bypass.

Table 3.4: M12RT bypass traffic redistribution

Movement	AM Peak Redistribution	PM Peak Redistribution
Northbound right turn at M1 / John Renshaw Drive / Weakleys Drive intersection	**65%** of current or future demands to be redistributed onto the M12RT bypass.	**40%** of current or future demands to be redistributed onto the M12RT bypass.
Southbound left turn at M1 / John Renshaw Drive / Weakleys Drive intersection	**45%** of current or future demands to be redistributed onto the M12RT bypass.	**35%** of current or future demands to be redistributed onto the M12RT bypass.

For the SMEC report, the M12RT has been physically coded into the model (see Figure 2.3). The midblock traffic volumes provided in the report (see Figure 3.3 and Figure 3.4) demonstrate that the impact of the M12RT is experienced on John Renshaw Drive for vehicles travelling eastbound and westbound.

The volumes produced at Site 2 (John Renshaw Drive) demonstrate a strong reduction from the 2018 scenario to the 2028 scenario across both AM and PM peaks due to the introduction of the M12RT. Comparatively, Site 1 (M1) and Site 2 (Weakleys Drive) demonstrate a consistent increase in volumes across the 2018, 2028 and 2038 scenarios, indicating that the introduction of M12RT provides negligible impact at these two locations.

The impact of the M12RT is significantly different in the two reports and will likely result in varying traffic patterns, particularly at the M1 / John Renshaw Drive / Weakleys Drive intersection. Given these obvious inconsistencies, confirmation of the TfNSW brief to SMEC is necessary.

Figure 3.3: Midblock Traffic Volume Forecast AM Peak – SMEC Report

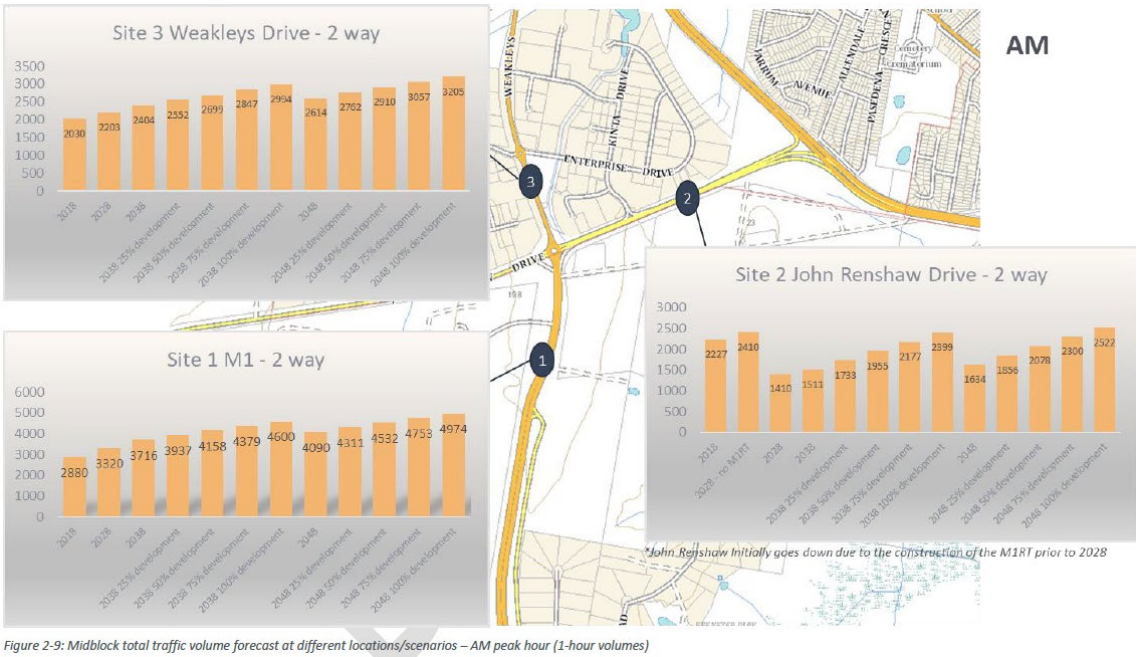


Figure 2-9: Midblock total traffic volume forecast at different locations/scenarios – AM peak hour (1-hour volumes)

Source: Figure 2-9 of SMEC report.

Figure 3.4: Midblock Traffic Volume Forecast PM Peak – SMEC Report

Figure 2-10: Midblock total traffic volume forecast at different locations/scenarios – PM peak hour (1-hour volumes)

Source: Figure 2-10 of SMEC report.

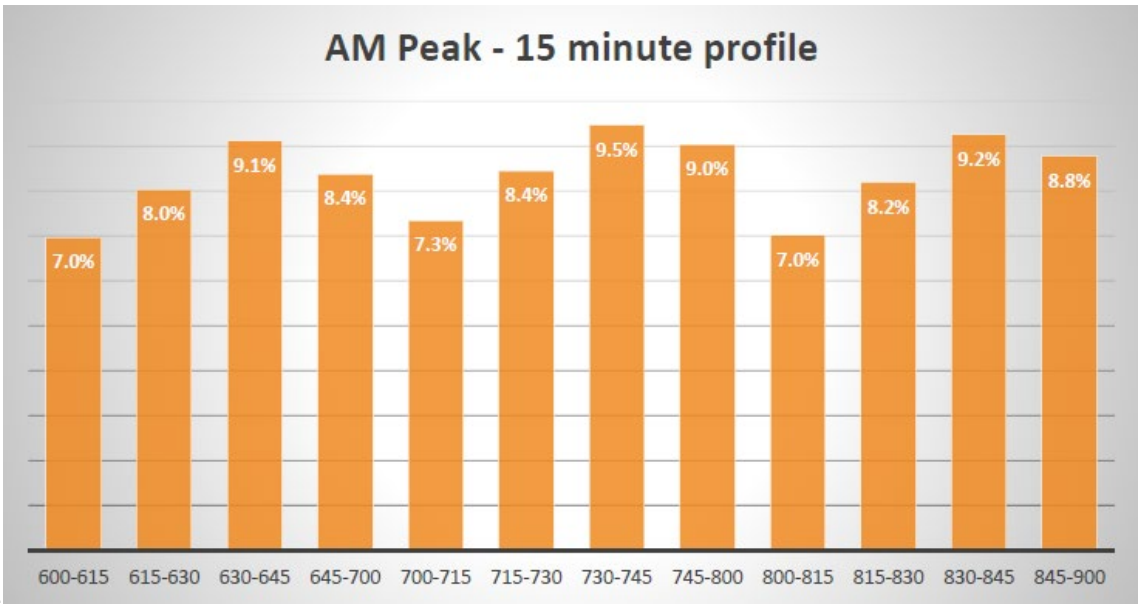
3.3. Traffic Profiles

For the GTA report, the Industrial Precinct traffic generation has been applied as a constant across each time interval for each of the modelled peak hours. This is a conservative approach to represent a worst case scenario where site traffic generation aligns with the road network peaks. This was discussed with TfNSW and ultimately completed at their request. In reality, it is expected that the profile of traffic generation for the Industrial Precinct may vary according to individual site operations. This is most applicable to the Broaden large lot industrial site and less so for the Coal and Allied Land site. **This further affects the peak period traffic impacts associated with each site.**

For the SMEC report, the Industrial Precinct traffic generation is different having been developed into 15 minute traffic profiles (see Figure 3.5 and Figure 3.6) using traffic surveys from the nearby Beresfield Industrial Park. This results in fluctuating traffic generation across each 15 minute period and is likely more aligned with the activity of an industrial site.

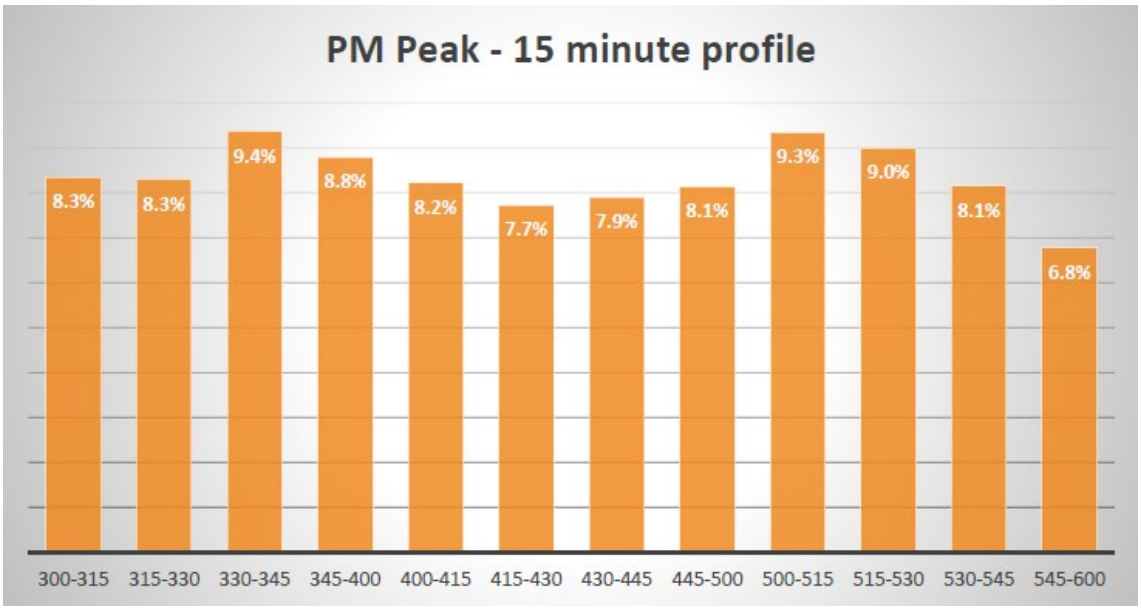
As such, the constant traffic generation applied in the GTA assessment compared against the fluctuating traffic generation would be expected to produce different traffic patterns across the modelled periods. Confirmation of the TfNSW brief to SMEC is necessary in this regard.

Figure 3.5: AM Peak – 15 Minute Profile – SMEC Report



Source: Figure 2-8 of SMEC report.

Figure 3.6: PM Peak – 15 Minute Profile – SMEC Report



Source: Figure 2-8 of SMEC report.

3.4. Mitigation Measures

The GTA report and SMEC report both include mitigation measures to improve road network performance. However, **each assessment incorporates different mitigation measures at different and very much later stages**, as outlined in Table 3.5.

Table 3.5: Mitigation Measures Summary

Mitigation Measure	GTA Report (Precinct 2B)	SMEC Report
Weakleys Drive Southbound Duplication		✓
John Renshaw Drive Duplication	✓	✓
Weakleys Drive Roundabout conversion to Signalised Intersection		✓
M1 / John Renshaw Drive / Weakleys Drive Intersection Upgrades	✓	✓
Black Hill Ramps		✓

The GTA report introduced all mitigation measures outlined above from the 50% GFA developed stage (2026) and onwards.

The SMEC report introduced the mitigation measures at a variety of stages, with all the measures not contemplated in the GTA report (three in total) introduced well after 2032 (in 2038 and 2048). This is highlighted in Figure 3.7. Again, confirmation of the TfNSW brief to SMEC is necessary in this regard.

Figure 3.7: Mitigation Measures Staging Timeline – SMEC Report

Scenario	MIT #	1	2	3	4	5	6	7
	MIT	Weakleys Drive SB duplication	John Renshaw Drive duplication	Weakleys Drive roundabout converted to signalised intersection	Weakleys Drive/John Renshaw intersection upgrades	Further Weakleys Drive/John Renshaw intersection upgrades	Black Hill Ramps	Provide more infrastructure to the network (see note below)
2028 without M1RT	0-25%		x		x			
	26-50%		x		x			x
2028	0-25%		x		x			
	26-50%		x		x			
	51-75%		x		x			
	76-100%		x		x			
2038	0-25%	x	x		x			
	26-50%	x	x		x	x		
	51-75%	x	x		x	x	x	
	76-100%	x	x		x	x	x	
2048	0-25%	x	x		x			
	26-50%	x	x		x	x	x	
	51-75%	x	x		x	x	x	
	76-100%	x	x	x	x	x	x	

Source: Figure 5-7 of SMEC report.

It is demonstrated that the SMEC report has introduced significantly more mitigation measures compared to the GTA report – all additional measures necessary in 2038 and later. The reasons for such significant additional works are unknown however it could be considered obvious that little account for effectively targeting this to achieve best outcomes has contributed. For example, the Black Hill road ramps on the M1 south of the precinct were definitively instructed to not form part of the GTA model given historical consultation and the absence of direct access to Black Hill Road for

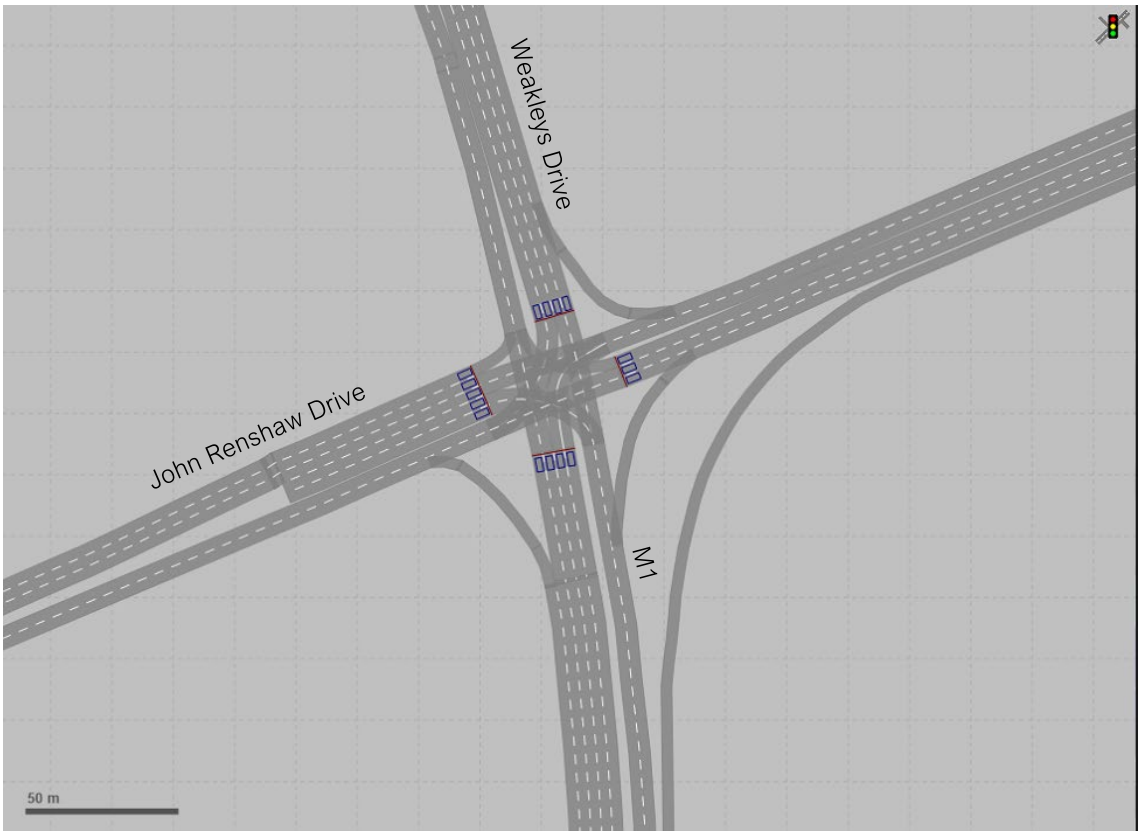
both sites. To now observe such measures that clearly improve the SMEC model outputs over the GTA model does not allow for direct comparison. It is not clear why the SMEC model contemplates such measures when use of Black Hill Road for the purposes of access to the precinct has not been realistic for many years. Clearly such measures, if implemented (however unlikely this may be) would:

- result in significant changes to the local road network
- require extensive consultation with the Black Hill Community
- create an undesirable cut-thru (including for heavy vehicles)
- affect a National Highway that is subject to significant upgrades as part of the M12RT link.

Such measures would clearly also remove traffic from the M1 / John Renshaw Drive / Weakleys Drive intersection and potentially create traffic impacts that have not yet been contemplated. Confirmation of the TfNSW brief to SMEC is necessary in this regard.

Furthermore, the mitigation measures introduced at the critical M1 / John Renshaw Drive / Weakleys Drive intersection differ for the two assessments. The GTA report made the following upgrades in agreement with TfNSW (see Figure 3.8).

Figure 3.8: Mitigation works modelled for M1 / John Renshaw Drive / Weakleys Drive



The mitigation measures introduced at M1 / John Renshaw Drive / Weakleys Drive intersection for the SMEC report are demonstrated in Figure 3.9 and Figure 3.10.

Figure 3.9: M1 / John Renshaw Drive / Weakleys Drive Mitigation Measure – Stage 1

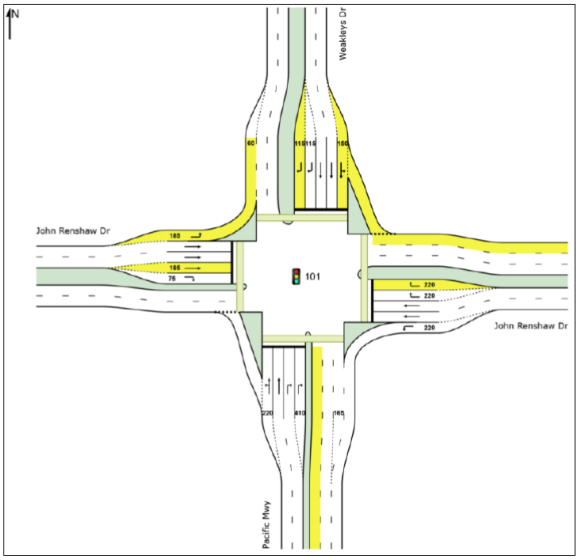


Figure 3.10: M1 / John Renshaw Drive / Weakleys Drive Mitigation Measure – Stage 2

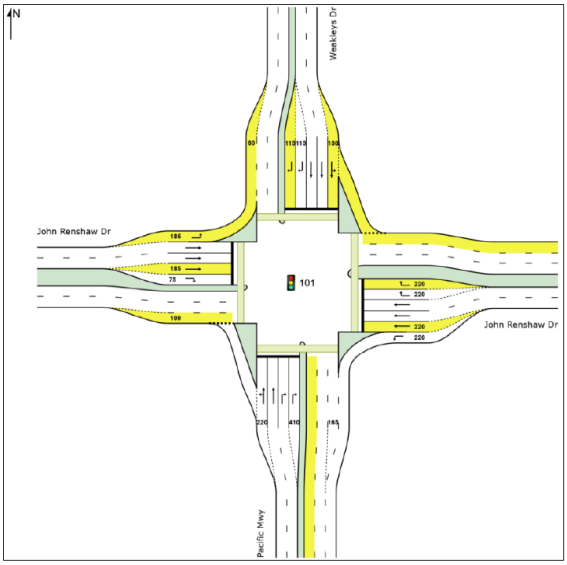


Table 3.6: M1/ John Renshaw Drive/ Weakleys Drive Intersection Mitigation Layout Summary

Approach	Movement	GTA	SMEC Stage 1	SMEC Stage 2
North	Left	Slip lane	Slip lane	Slip lane
	Through	2 lanes	3 lanes	3 lanes
	Right	2 lanes	2 lanes	2 lanes
East	Left	Slip lane	Slip lane	Slip lane
	Through	2 lanes	2 lanes	3 lanes
	Right	1 lane	2 lanes	2 lanes
South	Left	Slip lane	Slip lane	Slip lane
	Through	2 lanes	2 lanes	2 lanes
	Right	2 lanes	2 lanes	2 lanes
West	Left	1 lane	Slip lane	Slip lane
	Through	2 lanes	3 lanes	3 lanes
	Right	2 lanes	1 lane	1 lane

The differences in mitigation measures at the M1 / John Renshaw Drive / Weakleys Drive intersection in summary:

- Between the GTA report and SMEC report stage 1:
  - Additional north approach through lane – SMEC Report.
  - Additional east approach right turn lane – SMEC Report.
  - Additional west approach through lane – SMEC Report.
  - Additional west approach right turn lane – GTA Report.
  - Introduction of a west approach left slip lane – SMEC Report.
- Between SMEC report stage 1 and stage 2:
  - Additional east approach through lane in stage 2.

3.5. Model Results

Overall and as discussed, it is difficult to draw any such direct comparisons between the GTA and SMEC assessments given the different assumptions that have been adopted, namely:

- Different levels of background growth and M12RT assumptions.
- Different model extents.
- Different model years.
- Different development traffic generation rates and demand profiles.
- Different road network mitigation options.

By way of example and in order to remove some of the bias from the differences in model extents, rather than reviewing the overall network performance metrics a review of the performance of the critical M1 / John Renshaw Drive / Weakleys Drive intersection has been undertaken for similar scenarios and considered to provide a reasonable indicator of performance.

It is evident in both assessments that the network would experience congestion issues with or without the development in the future year scenarios due to the pressures on the M1 / John Renshaw Drive / Weakleys Drive intersection. For the future do nothing scenarios GTA records a LOS E and D in the AM and PM peak (2032) respectively and SMEC records a LOS D and F in the AM and PM peak (2028) respectively. This is naturally more evident with the inclusion of the Industrial Precinct traffic, particularly at the latter stages given the increase in traffic demands. For the 100% GFA developed scenarios with mitigation measures GTA records a LOS F for both peaks (2032) while SMEC records a LOS C and F (2028).

The GTA assessment concluded that the network, with the respective proposed mitigation measures, was able to accommodate the demands through to the 50% GFA developed stage (2026). With the 50% No M12RT (2026), 75% (2029) and 100% (2032) GFA developed stages demonstrating a change in queues and delays experienced across the network indicating that the network is unable to accommodate the increased demand.

In comparison, the SMEC assessment concluded that the network, with the respective proposed mitigation measures, will be able to accommodate the 100% GFA developed (2048). However, it is noted that the proposed mitigation measures within the SMEC report (as detailed in Section 3.4) go

beyond what has been contemplated in the GTA report. Most notably, significantly increasing the footprint of the M1 / John Renshaw Drive / Weakleys Drive intersection, the duplication of Weakleys Drive and the proposal to introduce new ramps on the M1 at Black Hill Road to allow direct access to the precinct from the south. The introduced mitigation measures provide additional throughput at the M1 / John Renshaw Drive / Weakleys Drive intersection and divert traffic from the key study area. **These additional mitigation measures would undoubtedly provide a significant benefit as reflected in the SMEC report. The scale and type of mitigation measures vary distinctly from the GTA assessment, which were produced in collaboration with TfNSW. Confirmation of the TfNSW brief to SMEC is necessary in this regard.**

Both assessments conclude that a high level of traffic demand will be travelling in the network, particularly in the latter stages of development and that a significant level of involvement and intervention will be required to accommodate the Industrial Precinct.

4. CONCLUSIONS AND RECOMMENDATIONS

04

4.1. Summary

GTA has completed an evaluation of the Black Hill Traffic Modelling, Traffic Analysis Report, prepared by SMEC, dated 9 October 2020. The purpose of the review is to compare the assumptions used and conclusions drawn compared to the John Renshaw Drive, Black Hill Industrial Precinct, Microsimulation Modelling Options Testing Report, prepared by GTA Consultants, dated 26 May 2020.

As summary of the key findings are provided below:

- GTA modelled the traffic impacts of the industrial precinct and Broaden site in isolation all while adopting all the TfNSW specified parameters and modelling assumptions and formed as part of extensive TfNSW consultation. The Coal and Allied Land site has also been included as part of a precinct wide assessment, and at the specific request of TfNSW though should not form the basis of the assessment itself. In contrast, the SMEC assessment does not consider the impacts of the Broaden site in isolation.
- There are several differences in the underlying assumptions for each of the GTA and SMEC assessments. This makes a direct comparison of the assessments very difficult as the assumptions affect the road network impact, most notably:
    - Different model extents – the SMEC assessment excludes the Glenwood Drive intersections in Thornton. TfNSW required GTA to include these intersections in the assessment which was found to be one source of congestion in future year scenarios. Surely modelling consistency is key and TfNSW should have required SMEC work to the same parameters.
    - Different background traffic growth rates – the GTA assessment had to adopt a higher per annum growth rate than SMEC noting that the SMEC report excludes defining the adopted growth rates. Lower early year growth rates also skew the relative impacts of background traffic and site generated traffic.
    - Different design years (and assumed completion of development stages) – the SMEC 2048 horizon year is abnormal, being extensively longer than typically expected as part of modelling future year impacts given that such long periods have the potential to cause uninterpretable results. The SMEC report also reviews 2028 as the first design year compared to 2023 as GTA was required to do, noting that by 2029 the industrial precinct is 75% developed in the GTA report. Again, most of the SMEC mitigation measures are only introduced after 2038. This brings into question the point of the SMEC assessment in light of the proposed Industrial Precinct itself.
    - Different central access intersection location – the SMEC report contemplates an intersection 250m east of the Concept Plan intersection location and also undermines TfNSW objections raised as part of the Coal and Allied Land site LEC proceedings.
    - Different traffic generation rates – distinctly different rates for each of the two development sites are obvious though not contemplated in the SMEC report (which assumes incorrectly that the same generation rates apply to each site). The Broaden site would generate traffic at minimum half the rate of the Coal and Allied Land site. Subsequent mention of apportionment of costs based on incorrect information is clearly inappropriate.
    - Different traffic distribution – there is also strong evidence to suggest that a greater proportion of traffic would arrive and depart the precinct on John Renshaw Drive to and from the west. This would clearly have a significant impact to the extent of mitigation works.

  - Different assessments of the effects of the M12RT introduction – GTA had to adopt demand adjustments based on TfNSW requirements while SMEC imbedded the M12RT in their model.
  - Different mitigation measures – these vary though most obvious where the SMEC report contemplates new M1 connections with Black Hill road south of the site, despite this having to be excluded from the GTA report. Such measures would clearly remove traffic from the M1 / John Renshaw Drive / Weakleys Drive intersection and potentially create traffic impacts that have not yet been contemplated.

- Traffic profile assumptions of site generated traffic differ between the two assessments with GTA assuming a conservative approach and applying a constant hourly traffic generation in each of the modelled peak hours. SMEC based their assessment on the profile of another Industrial Precinct.
- The network would struggle with or without the development in the future years due to the pressures on the M1 / John Renshaw Drive / Weakleys Drive intersection and that with the addition of the Industrial Precinct, a significant level of intervention will be required to accommodate development traffic. Both assessments, in their distinctly separate ways demonstrate, to an extent, that the proposed mitigation measures would assist with future network performance.
- The SMEC assessment does not consider the traffic impacts on the study area from a development perspective and certainly does not assess the impacts of the Broaden site in isolation. The Coal and Allied Lane site must be regarded an addition to the model, not the basis for it.
- There are clearly several inconsistencies between the GTA and SMEC assessments. This is most obvious in the items highlighted above with the ability for direct and consistent comparison of the model outputs not apparent.
- Broaden has completed extensive consultation with TfNSW over recent years, all while endeavouring to positively support all TfNSW modelling requirements and working in close collaboration.
- Understanding the TfNSW brief to SMEC is critical to the potential traffic mitigation solutions and ensuring accurate and realistic comparison. Broaden has incurred significant costs in delivering the two critical modelling scenarios with no professional or constructive feedback received from TfNSW to date.

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