



CAMBRAY CONSULTING

TRAFFIC ENGINEERING + TRANSPORT PLANNING

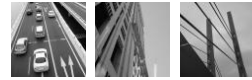


Moorebank Intermodal Precinct East – Stage 2 DEVELOPMENT APPLICATION REVIEW

*Prepared For NSW Department of Planning & Environment
20th November 2017*

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1.0 Introduction

Cambray Consulting Pty Ltd was engaged by the New South Wales Department of Planning and Environment (DPE) to undertake an independent review of the traffic and transport documentation prepared as part of a development application for the Moorebank Precinct East (MPE) – Stage 2 Proposal (Proposal).

This report summarises our review and recommendations.

1.1 Background

Concept Plan approval (MP 10_0193) for an intermodal terminal (IMT) facility at Moorebank, NSW, identified as the Moorebank Precinct East Project (MPE Project) was granted on 29th September 2014 from the NSW Department of Planning and Environment (DPE).

The Concept Plan for the MPE Project involves the development of an IMT, including a rail link to the Southern Sydney Freight Line (SSFL) within the Rail Corridor, warehouse and distribution facilities with ancillary offices, a freight village (ancillary site and operational services), associated stormwater infrastructure, landscaping, servicing, and works on the eastern side of Moorebank Avenue, Moorebank. Construction or operation of any part of the project was conditioned to be subject to separate approval(s) under the *Environmental Planning and Assessment Act 1979*.

The application which is the subject of this report is for the construction and operation of Stage 2 of the MPE Project under the MPE Concept Plan Approval for the MPE Project.

1.2 Proposal

The applicant, Sydney Intermodal Terminal Alliance (SIMTA) is seeking approval under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* for the construction and operation of the Proposal, comprising 300,000m² Gross Floor Area (GFA) of warehousing and distribution facilities and ancillary offices and freight village, as well as upgrading of approximately 1.5km of Moorebank Avenue.

The Proposal site is located approximately 27km south-west of the Sydney Central Business District (CBD) and is situated within the Liverpool Local Government Area (LGA).

More locally, the Proposal site is located to the east of Moorebank Avenue, approximately 800m south of the Moorebank Avenue / M5 Motorway intersection.

The Proposal site and the key roads surrounding the site are indicated in **Figure 1.1**.

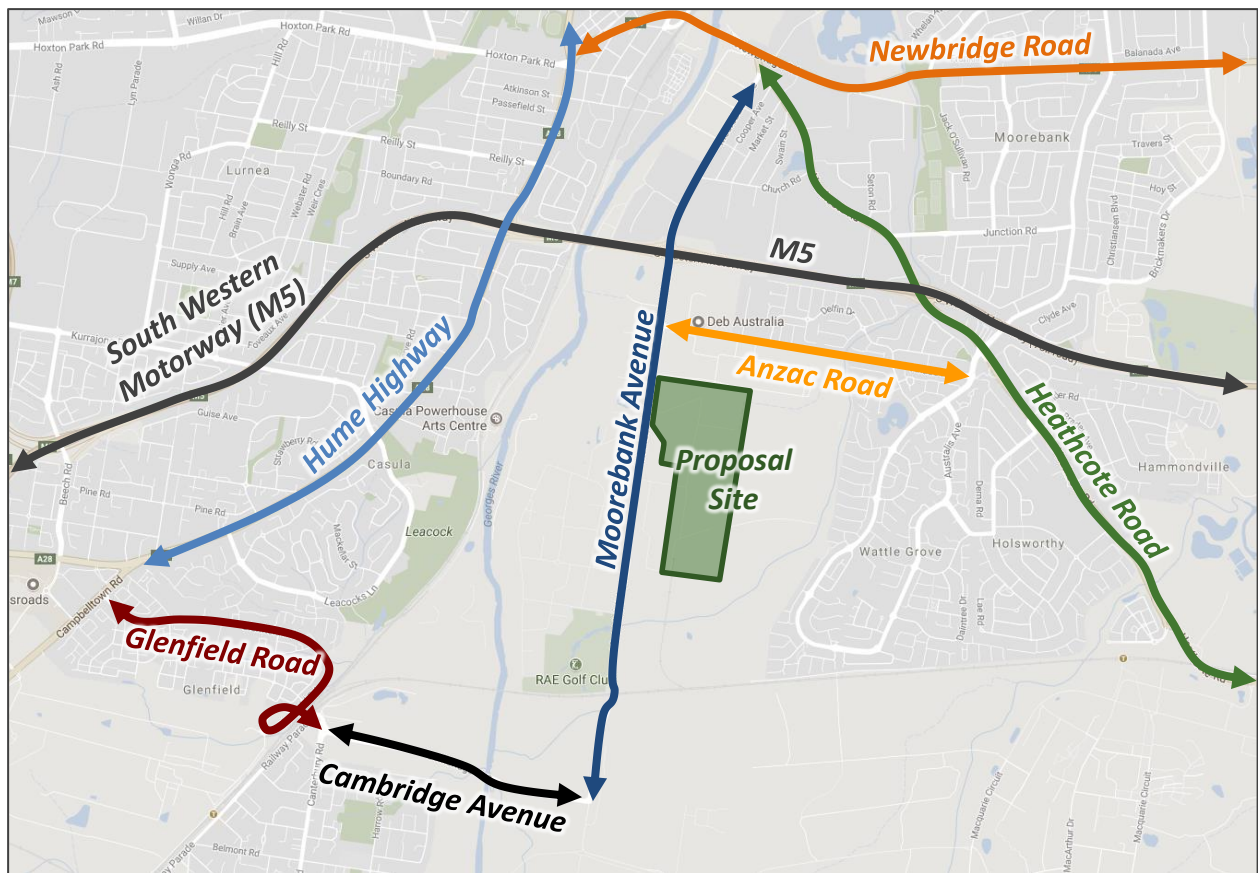


Figure 1.1 Site Location

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1.3 Scope of Services

As part of preparing this report, we undertook the following tasks:

- Completion of an inspection of the Proposal site and the surrounding road network to identify existing transport network conditions, constraints, and opportunities;
- A review of various traffic and transport documents prepared in relation to the development application by SIMTA's consultants, Arcadis;
- A review of various traffic and transport documents prepared in relation to the development application by NSW Government Departments, including Transport for NSW (TfNSW) and Roads and Maritime Services (RMS);
- A review of traffic and transport submissions prepared in relation to the development application by the public;
- Assessment of the information included in the abovementioned documents against relevant standards and guidelines, considering matters both internal and external to the Proposal site including, but not limited to:
 - Vehicle access locations;
 - Vehicle access configurations;
 - Required carparking provisions;
 - Internal road arrangements;
 - Heavy vehicle access;
 - Development servicing;
 - Existing and proposed pedestrian path provisions;
 - Existing and proposed public transport provisions;



- The impacts of expected Proposal traffic on the safety and efficiency of the surrounding transport network;
- The cumulative impacts of expected Proposal traffic and traffic associated with other proposed developments nearby, on the safety and efficiency of the surrounding transport network;
- Evaluation of the appropriateness and effectiveness of proposed management and mitigation measures; and
- Identification of recommended actions and conditions of approval which could be applied to avoid, minimise, mitigate, and/or manage the residual traffic and transport impacts of the Proposal.

1.4 Documents Reviewed

The following key documents were reviewed as part of preparing this report:

- Moorebank Precinct East Stage 2 Proposal: Construction Traffic Impact Assessment – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016);
- Moorebank Precinct East Stage 2 Proposal: Operational Traffic and Transport Impact Assessment – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016);
- Moorebank Precinct East Stage 2 Proposal: Preliminary Construction Traffic Management Plan – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016);
- Moorebank Precinct East Stage 2 Proposal: Preliminary Operational Traffic Management Plan – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016);
- Moorebank Precinct East Stage 2 Proposal: Response to Submissions – SSD 16_7628 – Part 4, Division 4.1, State Significant Development (Arcadis, July 2016);
- Response to MPE Stage 2 (SSD 7628) and MPW Stage 2 (SSD 7709): Request for information email – Attachment A (Arcadis, undated);
- Letter from Transport for NSW: Notice of Exhibition – Moorebank Precinct East (MPE) Stage 2 Application SSD 7628 (undated);
- Letter from Transport for NSW: Moorebank Precinct East Stage 2 Application (SSD7628) Response to Submissions (13th October 2017);
- Letter from Transport for NSW: Notice of Exhibition – Joint Exhibition of Four (4) State Significant Development Applications (10th June 2017);
- MPE Stage 2: TfNSW Second Response – Attachment A (Arcadis, undated);
- Moorebank Precinct East Stage 2 Proposal: Response to Submissions – Appendix C1: M5 Motorway/Moorebank Avenue Interchange Sensitivity Text – Part 4, Division 4.1, State Significant Development (Arcadis, July 2017);
- Moorebank Precinct East Stage 2 Proposal: Response to Submissions – Appendix C2: SIDRA Traffic Movement Diagrams – Part 4, Division 4.1, State Significant Development (Arcadis, July 2017);
- Moorebank Precinct East Stage 2 Proposal: Response to Submissions – Appendix C3: Consolidated Traffic Table – Part 4, Division 4.1, State Significant Development (Arcadis, July 2017); and
- Moorebank Precinct East Stage 2 Proposal: Response to Submissions – Appendix I: Consolidated Project Description – Part 4, Division 4.1, State Significant Development (Arcadis, July 2017).



1.5 Limits of Report

This report takes into account the particular instructions and requirements of our client. Cambray Consulting has taken care in the preparation of this report, however it neither accepts liability nor responsibility whatsoever in respect of:

- Any use of this report by any third party;
- Any third party whose interests may be affected by any decision made regarding the contents of this report; and/or
- Any conclusion drawn resulting from omission or lack of full disclosure by the client, the clients' consultants or any other party.

1.6 Safety in Design

Within our scope, we have identified safety in design issues and potential hazards, whenever reasonably practicable within our field of expertise. Due to our limited and upfront role on this project, it is not considered reasonably practicable to identify all potential hazards which may occur throughout the life of a project, including during detailed design and construction activities. It is strongly recommended that safety in design issues be reviewed during all ensuing design and construction stages of the project.

1.7 Qualifications

This report was prepared by:

- Andrew Douglas, Director – BE Civil (Hons), MSc Env Man, FIEAust, CPEng; and
- Nathan Edwards, Transport Engineer – BE Civil (Hons), BCom Finance, MIEAust, MAITPM.



2.0 EIS Documents Review

2.1 Overview

It is specifically noted that we reviewed the following traffic and transport documents prepared as part of the Environmental Impact Study (EIS):

- Moorebank Precinct East Stage 2 Proposal: Construction Traffic Impact Assessment – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016);
- Moorebank Precinct East Stage 2 Proposal: Operational Traffic and Transport Impact Assessment – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016);
- Moorebank Precinct East Stage 2 Proposal: Preliminary Construction Traffic Management Plan – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016); and
- Moorebank Precinct East Stage 2 Proposal: Preliminary Operational Traffic Management Plan – Part 4, Division 4.1, State Significant Development (Arcadis, December 2016).

2.2 Construction Traffic Impact Assessment

Table 2.1 summarises the issues we identified based on our review of the Construction Traffic Impact Assessment.

Table 2.1 CTIA – Traffic and Transport Review – Issues Summary

Item	Document Ref.	Description of Item/Issue	Comment
Site Access	CTIA, Sect 1.3	<p>The report indicated that, as part of the Proposal, intersections along Moorebank Avenue will be upgraded, including:</p> <ul style="list-style-type: none"> • Moorebank Avenue / MPE Stage 2 access; • Moorebank Avenue / MPE Stage 2 central access; and • MPW Northern Access / MPE Stage 2 southern emergency access. <p>However, the Proposal site plans only identified one (1) access intersection on Moorebank Avenue.</p>	The report and the Proposal plans do not appear to be consistent.
Traffic Generation	CTIA Sect 6.1	No evidence was provided to support the daily traffic volumes identified.	The traffic analysis results documented may not be representative of future road network performance.
Traffic Distribution	CTIA Sect 6.2	The report indicated that no light vehicles associated with the Proposal will traverse Cambridge Avenue.	It is considered that some traffic generated by the development would use this road. The traffic analysis results documented may not be representative of future road network performance.



Item	Document Ref.	Description of Item/Issue	Comment
Intersection Analysis	CTIA Sect 7	No information was provided with respect to the SIDRA analysis undertaken, including inputs and settings. Only summary outputs were provided.	The traffic analysis results documented may not be representative of future road network performance. Further details and justification is required.
Moorebank Avenue Upgrade – Public Transport	CTIA Sect 7.5 & 8	Discussion in relation to Moorebank Avenue works impacting public transport was vague.	It is unclear how the works will impact public transport and how any such impacts are proposed to be mitigated.
Moorebank Avenue Upgrade – Active Transport	CTIA Sect 8	Discussion in relation to Moorebank Avenue works impacting the existing active transport network was vague.	It is unclear how the works will impact the existing active transport networks and how any such impacts are proposed to be mitigated.
Intersection Analysis	CTIA Appendix A	SIDRA analysis inputs and outputs were not provided.	The traffic analysis assumptions and results cannot be reviewed and checked for consistency with information provided in the report.



2.3 Preliminary Construction Traffic Management Plan

It is noted that beyond the cover page, the Preliminary Construction Traffic Management Plan (PCTMP) is no different to the Preliminary Operational Traffic Management Plan (POTMP). It is not clear if this is the result of drafting error.

However, it is noted that construction and operational traffic impacts are likely to be significantly different and therefore are required to be assessed and managed separately. A PCTMP addressing the management of construction specific impacts should be prepared.

Table 2.2 summarises the issues we identified based on our review of the PCTMP.

Table 2.2 PCTMP – Traffic and Transport Review – Issues Summary

Item	Document Ref.	Description of Item/Issue	Comment
Management Strategies	PCTMP, Sect 5.0	Limited details in relation to proposed traffic management strategies were provided.	Whilst the plan is expected to be refined, it is not clear whether appropriate management strategies have been or could be identified.
Monitoring	PCTMP, Sect 5.0	The report indicated that a trip generation survey for truck movements will be undertaken 24 months after the commencement of operation of the site. Additional surveys will be undertaken progressively as the MPE site is developed. The report does not identify why this data will be collected, what it would be used for, etc.	It is not clear how this survey data will be used to identify or manage such traffic impacts post commencement of operations. Conditions should be worded such that if the surveys indicate traffic impacts beyond those put forward by the proponent that a further assessment, works or contributions are triggered.



2.4 Operational Traffic and Transport Impact Assessment

Table 2.3 summarises the issues we identified based on our review of the Operational Traffic and Transport Impact Assessment (OTTIA).

Table 2.3 OTTIA – Traffic and Transport Review – Issues Summary

Item	Document Ref.	Description of Item/Issue	Comment
Site Access	OTTIA, Sect 1.5	<p>The report indicated that, as part of the Proposal, intersections along Moorebank Avenue will be upgraded, including:</p> <ul style="list-style-type: none"> Moorebank Avenue / MPE Stage 2 access; Moorebank Avenue / MPE Stage 2 central access; and MPW Northern Access / MPE Stage 2 southern emergency access. <p>However, the Proposal site plans only identified one (1) access intersection on Moorebank Avenue.</p>	<p>The report and the Proposal plans do not appear to be consistent.</p> <p>Further coordination is required to clarify what has been assessed is consistent with what is proposed.</p>
Moorebank Avenue Upgrades	OTTIA, Sect 1.5	<p>The report indicated that, as part of the Proposal, intersections along Moorebank Avenue will be upgraded, including:</p> <ul style="list-style-type: none"> Moorebank Avenue / MPE Stage 2 access; Moorebank Avenue / MPE Stage 2 central access; and MPW Northern Access / MPE Stage 2 southern emergency access. 	<p>It is not clear how these intersection upgrades will be constructed as part of the broader proposed upgrade of Moorebank Avenue, nor whether this will be adequate to mitigate the impacts of the Proposal in the context of cumulative impacts.</p>
Site Access	OTTIA, Sect 1.5 & 5.2.2, Fig 5-6	<p>It was estimated that approximately 3% of employees will utilise Moorebank Avenue (south of the Proposal site) to travel to / from the site by car.</p> <p>The Proposal site plan indicated that the MPE Stage 2 access is to approach Moorebank Avenue at an approx. 45 degree angle.</p>	<p>The proposed approach angle is likely to make it difficult for drivers to turn right into, and left out of the site.</p> <p>It is recommended that intersection plans be modified to achieve appropriate approach angles in accordance with the <i>Austrroads Guide to Road Design</i>.</p>



Item	Document Ref.	Description of Item/Issue	Comment
Traffic Assessment Methodology	OTTIA Sect 1.12	Consultation with various stakeholders, including RMS, is mentioned in the report. However, meeting minutes, presentations, or responses from RMS arising from such meetings were not included.	It is unclear if the assessment is consistent with the outcomes of consultation with RMS.
Traffic Generation	OTTIA Sect 5.1	The report indicated that Proposal trip generation estimates were based on information outlined documents prepared by Parsons Brinckerhoff and Neil Matthews Consulting. However, it does not clearly articulate how the information in these documents was used to estimate Proposal traffic generation.	It is unclear if the assessed Proposal traffic generation is consistent with the information outlined documents prepared by Parsons Brinckerhoff and Neil Matthews Consulting.
Traffic Distribution	OTTIA Sect 5.2	The report indicated that traffic distribution is a key factor in determining the impact of the Proposal on roads and intersections. However, it does not include any supporting evidence for the adopted Proposal traffic distributions.	The traffic analysis results documented may not be representative of future road network performance.
Intersection Analysis	OTTIA Sect 5.7.3	No information was provided with respect to the SIDRA analysis settings.	The traffic analysis results documented may not be representative of future road network performance.
Intersection Analysis	OTTIA Sect 5.7.3	Existing and future turning movements at the assessed intersections were not identified. SIDRA analysis outputs were not provided.	The traffic analysis assumptions and results cannot be reviewed and checked for consistency with information provided in the report.
Intersection Analysis	OTTIA Sect 5.7.3	The traffic analysis results suggested that a number of the intersections assessed will perform better with the addition of Proposal traffic. Some intersections are expected to perform significantly better. It is considered unlikely that additional traffic volumes would improve the performance of signalised intersections in particular.	The traffic analysis results documented are unlikely to be representative of future road network performance. Hence, the conclusions drawn should not be relied upon without further assessment.



Item	Document Ref.	Description of Item/Issue	Comment
Intersection Upgrades	OTTIA Sect 5.7.3 & 6.1.2	<p>The report suggested that a number of intersections are to be upgraded to address the impacts of background and cumulative traffic.</p> <p>The report also indicated that these upgrades are in no way due to Proposal traffic.</p> <p>However, it is noted that Proposal traffic forms part of the cumulative traffic assessed.</p>	<p>It is likely that Proposal traffic would contribute toward the need to upgrade the intersections identified.</p> <p>Reasonable and relevant conditions should therefore be considered.</p>
Intersection Upgrades	OTTIA Sect 5.7.3 & 6.1.2	<p>The report identified, at a high level, the intersection upgrades required to mitigate the impacts of background and cumulative traffic.</p> <p>Specific upgrades were not identified.</p>	<p>It is unclear precisely what the proposed intersection upgrades constitute, whether the intersection upgrades could be accommodated within the existing road reserve and more broadly, if they are likely to be feasible.</p>
Intersection Analysis / Upgrades	OTTIA Sect 5.7.3 & 6.1.2	<p>The analysis undertaken assumed that a number of intersection upgrades will be in place in 2019 and 2029.</p> <p>There is no certainty surrounding the construction of these upgrades.</p>	<p>The analysis indicated that without the assumed upgrades, a number of intersections will perform beyond generally accepted performance thresholds.</p> <p>Reasonable and relevant conditions should therefore be considered.</p>
Intersection Upgrades	OTTIA Sect 5.7.3 & 6.1.2	<p>The report suggested that a number of intersections are required to be upgraded to address the impacts of background and cumulative development traffic.</p> <p>However, the expected operation of the upgraded intersections without Proposal traffic was not identified.</p>	<p>It is unclear how Proposal traffic affects the operation of the upgraded intersections.</p> <p>It is considered that an understanding of Proposal traffic impacts is required to identify works required to offset the impacts of Proposal traffic.</p>
Intersection Analysis	OTTIA Sect 5.9	<p>The report indicated that assessed cumulative traffic volumes included traffic associated with the MPE Stage 1 Proposal and the MPW Stage 2 Proposal.</p> <p>However, the assumed traffic generation of these Proposals was not identified or justified.</p>	<p>It is unclear what traffic volumes were assessed.</p>



Item	Document Ref.	Description of Item/Issue	Comment
Crash / Accident Impact	OTTIA Sect 5.11	The report indicated that the Proposal is expected to increase the number of vehicle crashes on Moorebank Avenue and Cambridge Avenue notwithstanding the proposed road network upgrades.	The reporting indicated that additional measures may be required to mitigate the Proposal's impact on road safety. Such a statement alone is vague and requires further detailed consideration.
Public and Active Transport	OTTIA Sect 5.12 & 5.13	It was suggested that TfNSW will be consulted in relation to Public and Active Transport provisions during detailed design.	The detailed design stage is likely to be too late to incorporate this infrastructure, particularly if TfNSW requests cannot be accommodated. Earlier engagement with TfNSW is recommended.
Moorebank Avenue Upgrade	OTTIA Appendix D	A preliminary Moorebank Avenue upgrade plan was included in Appendix D, however the proposed works could not be clearly identified due to the extremely small size of the figure.	It was unclear whether the road upgrades could be accommodated within the construction area identified and if the upgrades are likely to be feasible. Further detailed drawings are required to be provided.

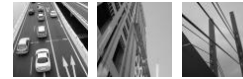


2.5 Preliminary Operational Traffic Management Plan

Table 2.4 summarises the issues we identified based on our review of the Operational Traffic Management Plan (POTMP).

Table 2.4 POTMP – Traffic and Transport Review – Issues Summary

Item	Document Ref.	Description of Item/Issue	Comment
Management Strategies	POTMP, Sect 5.0	Limited details in relation to proposed traffic management strategies were provided.	Whilst the plan is expected to be refined, it is not clear whether appropriate management strategies could be identified. More considered and detailed traffic management procedures are required.
Monitoring	POTMP, Sect 5.0	The report indicated that a trip generation survey for truck movements will be undertaken 24 months after the commencement of operation of the site. Additional surveys will be undertaken progressively as the MPE site is developed. The report does not identify why this data will be collected, what it would be used for, etc.	It is not clear how this survey data will be used to identify or manage such traffic impacts post commencement of operations. Conditions should be worded such that if the surveys indicate traffic impacts beyond those put forward by the proponent that a further assessment, works or contributions are triggered.



3.0 Responses to TfNSW Submissions – Review

Following the submission of the Environment Impact Study (EIS), Transport for NSW (TfNSW) issued a formal submission on 10th June 2017 which raised a number of queries in relation to the EIS traffic and transport analysis and reporting.

We reviewed the queries raised by TfNSW from a transport and traffic perspective, and in our opinion all are appropriate and reasonable.

We also undertook a review of the responses to the TfNSW queries prepared by Arcadis. A summary of our review is provided in **Table 3.1**.

Table 3.1 TfNSW Submissions Responses – Review

Aspect	Issue	Arcadis/Proponent Response	Comment
Conditional support	<p>TfNSW provided conditional support for the following:</p> <ul style="list-style-type: none"> The MPW Concept Modification RtS progressing to the PAC for Consideration; The MPE Concept Plan Modification 2 progressing to the PAC for consideration; and A deferred commencement consent for any approval granted for the MPE Stage 2 Proposal or MPW Stage 2 Proposal requiring an agreement for State Road Network mitigation for ultimate concept plan development, prior to Stage 2 construction. 	<p>TfNSW conditional support for the progression of the MPE Concept Plan Modification 2 is noted. However, deferred commencement consent for the MPE Stage 2 Proposal is deemed unnecessary as there is considered to be adequate information provided within the EIS to allow for the assessment of the MPE Stage 2 Proposal.</p> <p>An agreement would be made separately in consultation with Roads and Maritime Services (RMS) regarding any State Road Network mitigation required based on the Precinct model once it is available.</p>	<p>Based on our review of the response to submissions documents received, we do not believe there is sufficient information to indicate that the MPE Stage 2 Proposal has identified a suite of works that can appropriately mitigate the Proposal's transport network impacts.</p> <p>We therefore support TfNSW's deferred commencement of consent for the MPE Stage 2 Proposal construction works, in the absence of the further cumulative traffic assessment and other information being sought.</p>
Network impacts	<p>The traffic study documented in the proponent's Stage 2 OTTIA found that the broader road network in the study area would need to be upgraded to cater for the forecast traffic increases</p>	<p>Section 7.5.2 of the MPE Stage 2 EIS identified the following intersections as requiring upgrades as part of the Proposal:</p> <ul style="list-style-type: none"> Moorebank Avenue/MPE Stage 2 Moorebank; Avenue/MPE Stage 1 northern 	<p>It was not clearly identified in the MPE Stage 2 EIS and responses to submission documents how the Proposal brings about the need to upgrade Moorebank Avenue.</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
	<p>from the proposed development and general background growth. Despite this, the proponent is not proposing any mitigation works beyond those along Moorebank Avenue, referring to the broader contributions being determined once the ultimate development cumulative assessment is completed.</p>	<p>access;</p> <ul style="list-style-type: none"> Moorebank Avenue/MPE Stage 1 central access; and Moorebank Avenue/MPE Stage 1 southern emergency access. <p>In addition, the Proposal would include upgrades to approximately 1.4km of Moorebank Avenue. These upgrades would include modifications to lane configurations, including widening, and vertical alignment adjustment.</p> <p>Additional intersections were also identified in Section 7.6 of the EIS, which would operate at an unsatisfactory level of service without the Proposal (i.e. resulting from growth in background traffic or cumulative traffic). These intersections include:</p> <ul style="list-style-type: none"> Moorebank Avenue / Anzac Road; M5 Motorway / Moorebank Avenue; M5 Motorway / Hume Highway; Moorebank Avenue / Newbridge Road; Moorebank Avenue / Heathcote Road; and M5 Motorway / Heathcote Road. <p>Recommended improvements to these intersections are suggested, however as these intersections would operate unsatisfactorily regardless of the Proposal, these improvements are not included as mitigation measures for the Proposal.</p>	<p>It is noted that Proposal traffic forms part of the cumulative traffic assessed. It is therefore considered likely that Proposal traffic would, in some way, bring about the need to upgrade the intersections identified in Section 7.6 of the MPE Stage 2 EIS – i.e. the following intersections:</p> <ul style="list-style-type: none"> Moorebank Avenue / Anzac Road; M5 Motorway / Moorebank Avenue; M5 Motorway / Hume Highway; Moorebank Avenue / Newbridge Road; Moorebank Avenue / Heathcote Road; and M5 Motorway / Heathcote Road. <p>This submission item was not adequately addressed and it requires further assessment. Alternatively, conditions may be imposed which require appropriate improvements to these intersections, absent further assessment.</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
Trip generation	The proponent shall provide a simplified table, detailing the key assumptions for each stage along with likely accumulative trip generation. The figures should take into account and include an updated delivery schedule, aligned with the trip generation numbers.	A table, detailing the trip generation (daily and peak) for the construction and operation of the Proposal as well as the key operational trip generation assumptions used is provided in Appendix C of this RtS.	<p>The cumulative, daily traffic volumes identified suggest that the traffic analysis prepared as part of the MPE and MPW Concept Approvals estimated that the Proposals would generate significantly higher heavy vehicle (HV) traffic volumes.</p> <p>Concept Approval, HV = 10,798 Now Estimated, HV = 5,988 It is unclear why these volumes are so different.</p> <p>This submission item has not been adequately addressed.</p>
Trip generation	The proponent shall provide information regarding the likely daily and peak hour movements generated by the construction and operational stages of the proposed development.	<p>As detailed in Appendix C of the RtS, the Proposal would generate 3,993 light vehicle trips and 564 heavy vehicle trips per day during operation.</p> <p>During the AM peak, the Proposal would generate 252 light vehicle trips per hour, and 99 heavy vehicle trips per hour.</p> <p>During the PM peak, the Proposal would generate 80 light vehicle trips per hour and 105 heavy vehicle trips per hour.</p>	This submission item is considered to be addressed. However, it should be reviewed against any further responses provided in future for consistency.
Traffic Generation	The traffic generation does not include the proposed 8,000m ² of retail, commercial and light industrial uses on the site. Further information is needed regarding the traffic generation of all proposed land uses.	The traffic generation rates used to undertake the traffic analysis was based on previous traffic surveys undertaken by Parsons Brinckerhoff (PB) at industrial estates in Erskine Park and Eastern Creek, which contain comparable retail / commercial components, as well as light industrial land uses (Analysis of warehouse traffic surveys (Parsons Brinckerhoff, January 2016 (ref:	Whilst the industrial estates mentioned may include comparable uses, the Parsons Brinckerhoff (PB) document does not indicate the specific survey locations, nor which uses were operable at the time of the surveys. As such, we cannot be confident that the survey data recorded traffic data



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>2189293E-ITP-MEMSURVEYS-Updated)).</p> <p>As such, the traffic generation rates included consideration of the land uses of the freight village (refer to Appendix B of the MPE Stage 2 Operational Traffic and Transport Impact Assessment (OTTIA), Appendix K of the MPE Stage 2 EIS).</p>	<p>associated with such ancillary uses.</p> <p>This submission item is therefore not considered to be addressed, absent further details being supplied.</p>
Cumulative traffic impacts	It is not clear whether the proponent considered the cumulative impacts associated with other planned and approved developments within the Precinct.	<p>It is acknowledged that there are a number of other Development Applications (DAs) within the Moorebank Precinct, within and immediately adjacent to the MPE site, including:</p> <ul style="list-style-type: none"> • DA 1079-2016: Display suite - The construction and operation of a display suite, including café, signage and parking for 24 cars; • DA 1264-2015 (as modified): Buildings 53 and 54 (Cluster 1) - The alteration of existing warehouses for a future end-user; • DA 352-2016 and DA 984-2016: Buildings 49-52 (Cluster 2) – The alteration of existing warehouses for a future end-user. Note that DA 352-2016 was for the construction of the development, and DA 984-2016 is for the use of the development; • DA 557-2016: Building 82 – Alterations and additions to an existing building and change of use to a warehouse and distribution centre; • DA subject to determination – Building 7 	<p>This submission item should be considered further once the cumulative assessment of traffic impacts is completed.</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>and 68 – The alteration of existing warehouses for a future end-user.</p> <p>DA 1079-2016: Display suite <u>Response</u> Separately include mitigation measures that consider the impact of the individual projects and other projects likely to operate reflective of the available information at the time of preparation. As a result, both the MPE Stage 2 and MPW Stage 2 Proposals provided adequate and suitable cumulative traffic impact assessments with associated mitigation measures (including upgrades and road network improvements), which would facilitate the traffic to be generated by these proposals.</p> <p>The Moorebank Precinct model would provide further assessment and consideration of the cumulative traffic impact reflective of both the information in the MPE Concept Plan Approval and MPW Concept Approval and other potential development proposed for the Moorebank Precinct.</p> <p>As a detailed cumulative traffic impact assessment and associated mitigation measures were previously provided for the purposes of the MPE and MPW Concept Plan Approvals and periodically for the staged applications, the Moorebank Precinct model is not considered to be required to</p>	



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>process the MPE Stage 2 and MPW Stage 2 Proposals. In particular, the Moorebank Precinct model includes elements which albeit relevant to the 'Full + additional build' were already assessed as part of previous MPE and MPW Concept Plan Approvals.</p> <p>Further information relating to these cumulative assessments is provided in the table attached to Appendix K of this RtS.</p>	
SIDRA Modelling	SIDRA traffic modelling undertaken for MPE Stage 2 was not consistent with the modelling undertaken for the MPW Stage 2 development application and should be updated accordingly.	<p>In response to issues raised by Liverpool City Council in its submission on the MPW Concept Modification (refer to Appendix B of the MPW Concept Plan Modification Supplementary Response to Submissions Report), the SIDRA analysis undertaken as part of the MPW Stage 2 Proposal was revised in accordance with RMS Traffic Modelling Guidelines (version 1.0, February 2013). The updated results were included in the MPW Stage 2 Revised Construction Traffic Impact Assessment (revised CTIA) (refer to Appendix C of the MPW Stage 2 Response to Submissions Report).</p> <p>As part of the MPE Stage 2 Response to Submissions Report, the SIDRA analysis included in the EIS construction traffic impact assessment (CTIA) was revised (refer to Appendix K of the MPE Stage 2 EIS), consistent with the updates made to the MPW Stage 2 SIDRA analysis. The revised SIDRA</p>	<p>We were unable to confirm if this item was addressed for the following reasons:</p> <ul style="list-style-type: none"> • SIDRA input information was not provided; • SIDRA model files were not supplied; and • SIDRA analysis output tables were not provided. <p>This submission item is not considered to be addressed.</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>results are included in Section 7.1 of the RtS, and the revised SIDRA traffic movement diagrams are included in Appendix C of the RtS.</p> <p>As a result, the SIDRA modelling and analysis undertaken for the MPW Stage 2 and MPE Stage 2 Proposals are consistent.</p>	
Intersection LoS	<p>The submitted documentation suggests the Level of Service (LoS) of intersections was predicted to perform better for the “with development” scenarios than the “without development” scenarios. It is not clear how this was derived and is counterintuitive. Which road upgrades were included, along with traffic signal phasing and operations priority to achieve this outcome?</p>	<p>The “without development” scenario assessed in the MPE Stage 2 operational traffic and transport impact assessment (Appendix K of the MPE Stage 2 EIS) comprised the existing road network, with consideration of committed / planned road network upgrades by the State government on the wider road network.</p> <p>The “with development” scenarios included in the assessment of operational traffic impacts as part of the MPE Stage 2 EIS included network upgrades which are recommended to minimise the impacts of background traffic growth and traffic from the cumulative operation of the Proposal with the MPE Stage 1 Project and the MPE Stage 2 Proposal. The proposed network upgrades and the indicative timing for these upgrades are described in more detail in Section 7 and Appendix K of the MPE Stage 2 EIS.</p> <p>Network improvements are required to mitigate the impacts of the cumulative operational scenario (i.e. the concurrent operation of the Proposal with the MPE Stage 1 Project and the MPW Stage 2</p>	<p>Our interpretation of the Proposal EIS, Appendix K, Section 1.11 is that the “Do-Minimum” works would be the same in 2019 and 2029.</p> <p>However, the Arcadis response suggested that may not be correct (i.e. the “Do-Minimum” works in 2019 and 2029 are different).</p> <p>It is not clear which network upgrades were recommended to minimise the impacts of background traffic growth.</p> <p>In any case, it is considered highly unlikely that intersections will perform better with the addition of Proposal traffic.</p> <p>This submission item was not adequately addressed.</p> <p>Further information on the assumed upgrades and assessment with and</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>Proposal) at key intersections within the study area, and these are either directly as a result of the cumulative development scenario, or to cater for background traffic growth.</p> <p>As these upgrades are not directly a result of the Proposal, they were nominated as assumed network upgrades and adopted to complete the modelling for the operational traffic and transport impact assessment (refer to Section 7.6 and Appendix K of the MPE Stage 2 EIS, and section 7.1 of the RtS for more information).</p> <p>As a result of considering the proposed network upgrades in line with the development scenario, there are some resulting improvements to intersection performance with the operation of the Proposal.</p>	without such assumed upgrades is required.
Traffic signal improvements	<p>It is not clear what changes were proposed to “improve signals” operation within the submitted traffic modelling.</p> <p>RMS will not support reducing green time on arterial approaches to an intersection.</p>	<p>“Improve signals” refers to adjustments to signal phasing and times to improve the intersection performance, based on the proposed intersection upgrades and layouts.</p> <p>The traffic signal green times for the major traffic movements at some intersections (i.e. on arterial roads) (refer to Section 7.2.5 of the MPE Stage 2 EIS) were:</p> <ul style="list-style-type: none"> Decreased due to the change of road layouts (i.e. more lanes provided for road upgrades); Increased due to the more green time required for particular movements or the 	<p>We are unable to confirm if this item was addressed for the following reasons:</p> <ul style="list-style-type: none"> Changes to intersection configurations were not clearly identified SIDRA input information was not provided; and SIDRA analysis summaries were not provided. <p>The statement, “the overall intersection performance was generally improved</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>change of signal phase plans.</p> <p>The overall intersection performance was generally improved for traffic operation, mostly without ‘compromising’ the major traffic movements (i.e. on arterial roads).</p>	<p>for traffic operation, mostly without ‘compromising’ the major traffic movements (i.e. on arterial roads),” is vague.</p> <p>This submission item was not adequately addressed.</p> <p>Further information on the assumed upgrades, including changes to signal phasing and timing is required.</p>
M5 Weave	It is not clear whether the SIDRA modelling has accounted for the M5 weave issues, and should be clarified by the proponent’s traffic consultant.	<p>The SIDRA analysis undertaken for the assessment of construction traffic impacts of the MPW Stage 2 and MPE Stage 2 Proposals (refer to Appendix M of the MPW Stage 2 EIS and Appendix L of the MPE Stage 2 EIS) did not account for the M5 weave issues as the SIDRA software package was not appropriate to be used for investigation of highway weaving.</p> <p>The modelling for weaving is normally undertaken using microsimulation modelling which simulates “the movement of individual vehicles based on car-following, lane changing and gap acceptance algorithms that are updated several times every second.” (Roads and Maritime Services Traffic Modelling Guidelines, 2013).</p> <p>In the assessment of the operational traffic impacts of the MPW Stage 2 and MPE Stage 2 Proposals (refer to Section 7.1 and Appendix C of</p>	<p>We did not receive any microsimulation modelling, nor any SIDRA analyses that assessed the weave.</p> <p>A weave analysis in accordance with Austroads requirements may be appropriate, absent any alternative method, so long as all inputs and assumptions are clearly set out.</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>the RtS and Appendix K of the EIS and Section 7.1 of the RtS), AIMSUN modelling undertaken included consideration of the weaving of vehicles on the M5 Motorway due to the inclusion of microsimulation pockets within the model.</p> <p>AIMSUN modelling conducted for the Proposal considered the potential vehicular conflict and delays associated with weaving and merging of traffic at the M5 interchange. In assessing weaving impacts, the AIMSUN model examines driver behaviour, vehicle acceleration and deceleration characteristics and the road geometry. It was noted in the OTTIA prepared for Proposal, that this weaving issue is not something that is directly related to the presence of the project and is a broader existing road network issue affected by background traffic growth.</p>	
Construction and operational site access	Details of the proposed accesses for the construction and operational stages were not provided. It is not clear whether the accesses comply with relevant Australian Standards (i.e. vehicle swept paths, geometry, sight lines, pedestrian safety, aisle widths, etc.).	<p><u>Construction site accesses</u></p> <p>Access to and egress from the MPE Stage 2 site during construction of the Proposal would be via the existing DSNDN northern access, to the north of the MPE Stage 1 Project. At the completion of construction, this access point would transition to the main operational entry point for vehicles accessing and egressing the MPE Stage 2 site's warehouse and distribution facilities (refer to Section 4.3.8 of the MPE Stage 2 EIS). The construction site access for the Proposal will be subject to detailed design development. As part of detailed design, the relevant Australian Standards</p>	<p>This submission item was not adequately addressed.</p> <p>The Road Safety Audit should be provided, including the proposed responses to deficiencies identified by the audit.</p> <p>Vehicle swept paths, sight line assessments, aisle widths, and pedestrian treatments are required, overlaid on scale drawings.</p>



Aspect	Issue	Arcadis/Proponent Response	Comment
		<p>relating to site access will be considered, including Austroads design guides and Roads and Maritime's supplements to Austroads guides.</p> <p><u>Operational site accesses</u> Access to and egress from the MPE Stage 2 site during operation of the Proposal would be via the existing DSNDC northern access, to the north of the MPE Stage 1 Project. As part of the MPE Stage 2 RtS, Revised Stormwater and Drainage Design Drawings were included at Appendix E, include a swept path analysis of the MPE Stage 2 operational site access.</p> <p>A road safety audit was also carried out for MPE Stage 2, which considered pedestrian safety and sight lines and can be made available at TfNSW's request.</p> <p>The geometry, aisle widths and further information pertaining to the operational layout of the MPE Stage 2 site access will be considered as part of further detailed design development and will consider the relevant Australian Standards relating to site access will be considered, including Austroads design guides and RMS's supplements to Austroads guides.</p>	



4.0 SEARs Review

We undertook a review of the Proposal information provided to date and the Secretary's Environmental Assessment Requirements (SEARs) related to traffic and transport, and identified whether we consider each to be appropriately addressed.

A summary of our review is provided in **Table 4.1**.

Table 4.1 Traffic and Transport SEARs – Review

Ref No. / SEARs	Comments / Considered to be Addressed
4. Traffic and Transport	
A Traffic Impact Assessment that assesses intersection and road network impacts, including impacts on Cambridge Avenue. The traffic assessment shall:	
a) take into account the RMS Guide to Traffic Generating Developments	<p>The Operational Traffic and Transport Impact Assessment (OTTIA) noted that parking is proposed to be provided in accordance with the guide.</p> <p>The OTTIA did not use the traffic generation rates included in the guide to estimate Proposal traffic generation. However, the information relied upon to estimate the warehouse component of the Proposal traffic generation is considered to be acceptable.</p> <p>However, it is noted that the traffic generation estimates do not appear to consider the proposed retail, commercial and light industrial uses on the site. The traffic generation of these uses should be identified considering the requirements of the RMS guide.</p> <p>We do not believe this SEAR has been appropriately addressed.</p>
b) undertake a realistic and justified range of peak hour generation scenarios (to be determined in consultation with TfNSW, RMS and Liverpool City Council) including	The peak hour generation scenarios are not considered acceptable, noting the assessed traffic generation



Ref No. / SEARs	Comments / Considered to be Addressed
<p>assumptions about heavy vehicle movements and the percentage of deliveries by railway and road</p>	<p>estimates do not appear to consider the proposed retail, commercial and light industrial uses on the site.</p> <p>Whilst reporting indicates that consultation was undertaken with TfNSW, RMS, and Liverpool City Council, no meeting minutes, presentations, etc. from such meetings were included. It is therefore unclear if the assessment is consistent with the outcomes of consultation.</p> <p>We are unsure if this SEAR has been appropriately addressed.</p>
<p>c) undertake detailed model analysis to confirm network operation and identify intersection upgrade requirements</p>	<p>The following intersections were identified as requiring upgrades as part of the Proposal:</p> <ul style="list-style-type: none"> • Moorebank Avenue/MPE Stage 2; • Moorebank Avenue/MPE Stage 1 northern access; • Moorebank Avenue/MPE Stage 1 central access; • Moorebank Avenue/MPE Stage 1 southern emergency access. <p>In addition, the Proposal would include upgrades to approximately 1.4km of Moorebank Avenue. These upgrades would include modifications to lane configurations, including widening, and vertical alignment adjustment.</p> <p>Additional intersections which would operate at an unsatisfactory level of service were also identified. These intersections include:</p> <ul style="list-style-type: none"> • Moorebank Avenue / Anzac Road; • M5 Motorway / Moorebank Avenue; • M5 Motorway / Hume Highway;



Ref No. / SEARs	Comments / Considered to be Addressed
	<ul style="list-style-type: none"> Moorebank Avenue / Newbridge Road; Moorebank Avenue / Heathcote Road; and M5 Motorway / Heathcote Road. <p>No upgrades are proposed as part of the Proposal at these intersections.</p> <p>However, the traffic analysis documented did not clearly identify that Proposal traffic does not bring about the need or contribute in part towards upgrades at these intersections.</p> <p>We do not believe this SEAR has been adequately addressed.</p>
<p>d) consider the constructability constraints of proposed upgrade(s) at key intersections, such as vehicle sweep paths, geometry and sight lines</p>	<p>No vehicle swept paths were included in the assessment documents.</p> <p>A preliminary Moorebank Avenue upgrade plan was included, however the plan was not at an appropriate scale to enable proposed works to be clearly identified or assessed.</p> <p>It is unclear whether the road upgrades could be accommodated within the construction area identified and if the upgrades are likely to be feasible.</p> <p>No sight line reviews were documented, although a Road Safety Audit was noted (though not supplied).</p> <p>We do not believe this SEAR has been adequately addressed.</p>
<p>e) include a draft Construction Traffic Management Plan</p>	<p>A draft Construction Traffic Management Plan was prepared.</p>



Ref No. / SEARs	Comments / Considered to be Addressed
	<p>However, it is important to note that beyond the cover page, the draft Construction Traffic Management Plan is no different to the Preliminary Operational Traffic Management Plan. It is not clear if this is the result of drafting error.</p> <p>Construction and operational traffic impacts can be significantly different and therefore should be assessed separately, addressed and managed.</p> <p>We believe an updated draft Construction Traffic Management Plan should be prepared, addressing the management of construction impacts.</p> <p>We do not believe this SEAR has been adequately addressed.</p>
f) Assess Construction Traffic impacts, which may include a draft Construction Traffic Management Plan including	We do not believe this SEAR has been adequately addressed as outlined below.
i. the identification of haulage routes and the nature of existing traffic on these routes	Haulage routes and the nature of existing traffic on these routes were identified.
ii. an assessment of construction traffic volumes (including spoil haulage/delivery of materials and equipment to the road corridor and ancillary facilities)	An assessment of construction traffic volumes was undertaken. However, it is unclear how construction traffic volumes were identified.
iii. potential impacts to the regional and local road network (including safety and level of service) and potential disruption to existing public transport services and access to properties and businesses	<p>Reporting indicates that access to properties and businesses will be maintained.</p> <p>Discussion in relation to Moorebank Avenue works impacting public transport is vague. It is unclear how Proposal construction will affect public transport.</p> <p>Further details are required.</p>



Ref No. / SEARs	Comments / Considered to be Addressed
g) Assess Operational Traffic and Transport impacts to the local and regional road network including:	We do not believe this SEAR has been adequately addressed as outlined below.
<ul style="list-style-type: none"> i. changes to local road connectivity and impacts on local traffic arrangements, road capacity and safety ii. traffic capacity of the road network and its ability to cater for predicted future growth 	<p>The following intersections were identified as requiring upgrades as part of the Proposal:</p> <ul style="list-style-type: none"> • Moorebank Avenue/MPE Stage 2; • Moorebank Avenue/MPE Stage 1 northern access; and • Moorebank Avenue/MPE Stage 1 central access <p>Moorebank Avenue/MPE Stage 1 southern emergency access.</p> <p>In addition, the Proposal would include upgrades to approximately 1.4km of Moorebank Avenue. These upgrades would include modifications to lane configurations, including widening, and vertical alignment adjustment.</p> <p>Additional intersections which would operate at an unsatisfactory level of service were also identified. These intersections include:</p> <ul style="list-style-type: none"> • Moorebank Avenue / Anzac Road; • M5 Motorway / Moorebank Avenue; • M5 Motorway / Hume Highway; • Moorebank Avenue / Newbridge Road; • Moorebank Avenue / Heathcote Road; and • M5 Motorway / Heathcote Road. <p>No upgrades are proposed as part of the Proposal at these intersections.</p> <p>However, the traffic analysis documented does not clearly</p>



Ref No. / SEARs	Comments / Considered to be Addressed
	identify that Proposal traffic does not bring about the need for upgrades at these intersections. It is likely the Proposal would impact these intersections and consideration should be given to conditioning reasonable works or contributions absent any further analyses being provided.
h) provide details of site accesses, internal roads and vehicular parking required as a result of the development	Details were provided in relation to site accesses, internal roads and vehicular parking required as a result of the development. We believe this SEAR has been adequately addressed.
i) provide an updated Traffic Management and Accessibility Plan for the operation of the facility including:	We do not believe this SEAR was adequately addressed as outlined below.
i. measures to prevent heavy vehicles accessing residential streets to maintain the residential amenity of the local community	Some measures which may prevent heavy vehicles accessing residential streets were identified. However it is unclear how these are proposed to be implemented, monitored and enforced.
ii. details of public transport services and cyclist facilities	Existing public transport services were identified. Proposed public transport services were not identified. Proposed cyclist facilities were identified.
iii. details of driver code of conduct	It was identified that a driver code of conduct will be prepared. However, no details were provided.

Although we do not believe that all traffic and transport related SEARs were addressed, we believe that appropriate conditions may be able to be identified to enable the approval of the current Proposal application. Potential conditions are identified in the following section.



5.0 Summary & Recommendations

Cambray Consulting Pty Ltd was engaged by the New South Wales Department of Planning and Environment (DPE) to undertake an independent review of the traffic and transport documentation prepared as part of a development application for the Moorebank Precinct East (MPE) – Stage 2 Proposal (Proposal).

Our review of the documentation prepared by Arcadis on behalf of the applicant, Sydney Intermodal Terminal Alliance (SIMTA) identified a number of traffic and transport issues which we do not believe were appropriately addressed.

A summary of what we believe are the key outstanding traffic and transport issues is as follows:

- Insufficient traffic analysis information was provided to identify if the analysis is likely to be representative of future road network performance;
- It is unclear how the Proposal will affect the operation of the following intersections surrounding the Proposal site:
 - Moorebank Avenue / Anzac Road;
 - M5 Motorway / Moorebank Avenue;
 - M5 Motorway / Hume Highway;
 - Moorebank Avenue / Newbridge Road;
 - Moorebank Avenue / Heathcote Road; and
 - M5 Motorway / Heathcote Road.
- It is unclear how the Proposal should offset its operational impacts at the abovementioned intersections;
- It is unclear if the Public and Active Transport infrastructure likely to be required to support the Proposal can be accommodated; and
- The Preliminary Construction Traffic Management Plan (PCTMP) is no different to the Preliminary Operational Traffic Management Plan (POTMP). A PCTMP addressing the management of construction specific impacts should be prepared.



5.1 Preliminary Application Approval Conditions

Based on our review, we have suggested a number of preliminary traffic and transport related conditions which could be incorporated as part of any approval of the development application. We understand that there are ongoing negotiations between the proponent, TfNSW and RMS and DP&E which may amend or supersede some of these suggested conditions.

Recommended conditions are outlined in **Table 5.1**.

Table 5.1 Recommended Traffic & Transport Conditions

Ref	Condition
T1	<p>Moorebank Avenue Four (4) Laning</p> <p>Widen Moorebank Avenue to four (4) lanes from the M5 interchange intersection to 400 metres south of the MPE Stage 2 Site Access intersection, including any widening works required at existing intersections as set out below, or necessary to meet the other conditions:</p> <ul style="list-style-type: none"> • All traffic lanes including turning lanes are to be 3.5m (minimum) wide; • A 6.0m wide median is to be provided on Moorebank Avenue to facilitate right turn lanes and allow for future signalisation of intersections; • 3.0m wide sealed shoulders / cycle lanes are to be provided along the full length of the works (full depth pavement); • A 6.5m (minimum) wide verge is to be provided on both sides of Moorebank Avenue; • A 2.5m (minimum) wide shared pedestrian and cyclist footpath is to be provided along the eastern side of Moorebank Avenue; • On the southern Moorebank Avenue / DJLU intersection leg, construct channelised right turn deceleration lane, configured as follows: <ul style="list-style-type: none"> ○ A 3.5m (minimum) wide lane; ○ A deceleration length of at least 60m; ○ A taper of at least 20m; <p>Associated with the above, modify the existing signal phasing to the satisfaction of RMS;</p> <ul style="list-style-type: none"> • Construct four (4) indented southbound bus stops on Moorebank Avenue with shelters and signage at locations to be agreed by TfNSW, but generally located as follows (unless otherwise agreed): <ul style="list-style-type: none"> ○ North of Anzac Avenue; ○ South of Anzac Avenue; ○ North of the MPE Stage 2 Access intersection; ○ South of the MPE Stage 2 Access intersection; and • Construct four (4) indented northbound bus stops on Moorebank Avenue with shelters and signage at locations to be agreed by TfNSW, but generally located as follows (unless otherwise agreed): <ul style="list-style-type: none"> ○ North of Anzac Avenue; ○ South of Anzac Avenue; ○ North of the MPE Stage 2 Access intersection; and



Ref	Condition
	<ul style="list-style-type: none"> ○ South of the MPE Stage 2 Access intersection.
T2	<p><u>Moorebank Avenue Regrading, Widening & Channelisation</u> Regrade and widen Moorebank Avenue between the southern end of the four-lane section conditioned above and Cambridge Avenue, excluding the East Hills Rail overpass. These works are to include:</p> <ul style="list-style-type: none"> • One (1) 3.5m (minimum) wide northbound traffic lane; • One (1) 3.5m (minimum) wide southbound traffic lane; and • 3.0m wide sealed shoulders / cycle lanes are to be provided on the northbound and southbound carriageways (full depth pavement).
T3	<p><u>Cambridge Avenue Regrading, Widening & Channelisation</u> Regrade and widen Cambridge Avenue between Moorebank Avenue and the Georges River low level crossing. These works are to include:</p> <ul style="list-style-type: none"> • One (1) 3.5m (minimum) wide northbound traffic lane; • One (1) 3.5m (minimum) wide southbound traffic lane; and • 3.0 m wide sealed shoulders / cycle lanes are to be provided along the full length of the works (full depth pavement).
T4	<p><u>MPE Stage 2 Site Access / Moorebank Avenue Intersection</u> Construct an all-movements signalised intersection to include:</p> <ul style="list-style-type: none"> • Two southbound through lanes each 3.5 m (minimum) wide; • Two northbound through lanes each 3.5m (minimum) wide; • A 2.5m wide raised median adjacent to the northbound right turn lane; • A 6m wide raised median north of the intersection; • 3.0 m wide sealed shoulders / cycle lanes on the northbound and southbound carriageways, through the intersection (full depth pavement); • A northbound channelised right turn deceleration lane, configured as follows: <ul style="list-style-type: none"> ○ A 3.5m (minimum) wide lane; ○ A deceleration length of at least 60m; ○ A taper of at least 20m; • A southbound, high entry angle, channelised left turn treatment configured as follows: <ul style="list-style-type: none"> ○ A 3.5m (minimum) wide lane; ○ A raised traffic island configured to allow 26m long B-Double vehicles to turn left into the Site Access road without impinging on the adjacent through traffic lanes; ○ A deceleration length of at least 60m; ○ A taper of at least 20m; • Two westbound right turn lanes, configured as follows: <ul style="list-style-type: none"> ○ 3.5m (minimum) wide; ○ At least 50m long; ○ One lane to include a taper of at least 15m; • One westbound left turn lane, configured as follows:



Ref	Condition
	<ul style="list-style-type: none"> ○ 3.5m (minimum) wide; ○ At least 30m long; ○ Includes a taper of at least 15m; and ● Provide signalised pedestrian crossings on the eastern and southern intersection legs.
T5	<p><u>Moorebank Avenue / Anzac Avenue Intersection</u></p> <p>Upgrade the existing all-movements, signalised intersection to include:</p> <ul style="list-style-type: none"> ● Two northbound through lanes each 3.5m (minimum) wide; ● Two southbound through lanes each 3.5m (minimum) wide; ● One northbound right turn lane, configured as follows: <ul style="list-style-type: none"> ○ 3.5m (minimum) wide; ○ At least 80m long; ○ A taper of at least 20m; ● A 2.5m wide raised median adjacent to the right turn lane; ● A 6m wide raised median north of the intersection; ● 3.0 m wide sealed shoulders / cycle lanes on the northbound and southbound carriageways, through the intersection (full depth pavement); ● Two westbound (Anzac Road leg) right turn lanes, configured as follows: <ul style="list-style-type: none"> ○ 3.5m (minimum) wide; ○ At least 80m long; ○ One lane to include a taper of at least 15m; ● A westbound (Anzac Road leg) high entry angle, channelised left turn treatment, configured as follows: <ul style="list-style-type: none"> ○ A 3.5m (minimum) wide lane; ○ A raised traffic island configured to allow 26m long B-Double vehicles to turn left into Moorebank Avenue without impinging on the adjacent through traffic lanes; ○ A deceleration length of at least 60m; ○ A taper of at least 15m; ● Maintain / reinstate signalised pedestrian crossings across all three legs of the intersection
T6	<p><u>Moorebank Avenue / M5 Interchange Intersection</u></p> <p>Upgrade the current all-movements signalised interchange to include:</p> <ul style="list-style-type: none"> ● An additional northbound left turn lane, configured as follows: <ul style="list-style-type: none"> ○ 3.5m (minimum) wide; ○ At least 80m long; ○ Includes a taper of at least 20m; ● An additional eastbound left turn lane, configured as follows: <ul style="list-style-type: none"> ○ 3.5m (minimum) wide; ○ At least 140m long; ○ Includes a taper of at least 20m;



Ref	Condition
	<ul style="list-style-type: none"> An additional westbound right turn lane, configured as follows: <ul style="list-style-type: none"> 3.5m (minimum) wide; At least 120m long; Includes a taper of at least 20m; An extension to the inner southbound right turn lane, configured as follows: <ul style="list-style-type: none"> At least as wide as the existing lane; At least 40m long; Includes a taper of at least 20m;and Signalisation of the pedestrian crossing across the westbound left turn lanes.
T7	<p><u>M5 Motorway / Hume Highway</u></p> <p>Pay a contribution to RMS towards the upgrade of this intersection. The contribution is to be identified based on the whole of precinct (Moorebank Precinct East and Moorebank Precinct West) traffic impact analysis being completed in conjunction with TfNSW, RMS and various precinct stakeholders.</p>
T8	<p><u>Moorebank Avenue / Newbridge Road</u></p> <p>Pay a contribution to RMS towards the upgrade of this intersection. The contribution is to be identified based on the whole of precinct (Moorebank Precinct East and Moorebank Precinct West) traffic impact analysis being completed in conjunction with TfNSW, RMS and various precinct stakeholders.</p>
T9	<p><u>Moorebank Avenue / Heathcote Road</u></p> <p>Pay a contribution to RMS towards the upgrade of this intersection. The contribution is to be identified based on the whole of precinct (Moorebank Precinct East and Moorebank Precinct West) traffic impact analysis being completed in conjunction with TfNSW, RMS and various precinct stakeholders.</p>
T10	<p><u>M5 Motorway / Heathcote Road</u></p> <p>Pay a contribution to RMS towards the upgrade of this intersection. The contribution is to be identified based on the whole of precinct (Moorebank Precinct East and Moorebank Precinct West) traffic impact analysis being completed in conjunction with TfNSW, RMS and various precinct stakeholders.</p>
T11	<p><u>Cambridge Avenue / Glenfield Road</u></p> <p>Pay a contribution to RMS towards the upgrade of this intersection. The contribution is to be identified based on the whole of precinct (Moorebank Precinct East and Moorebank Precinct West) traffic impact analysis being completed in conjunction with TfNSW, RMS and various precinct stakeholders.</p>
T12	<p><u>Cambridge Avenue / Canterbury Road</u></p> <p>Pay a contribution to RMS towards the upgrade of this intersection. The contribution is to be identified based on the whole of precinct (Moorebank Precinct East and Moorebank Precinct West) traffic impact analysis being completed in conjunction with TfNSW, RMS and various precinct stakeholders.</p>
T1 to T12	<p>Notes</p> <p>The following notes apply to the transport network upgrade conditions T1 to T12:</p> <ul style="list-style-type: none"> All external road works are to be completed to the satisfaction of Roads and Maritime Services (RMS) and Transport for NSW (TfNSW) prior to the commencement of any use on the subject land; The developer is to secure any and all additional land required to achieve the cross sectional and intersection upgrades identified at its own cost;



Ref	Condition
	<ul style="list-style-type: none"> • The works are to include all associated kerb and channelling and drainage and shall be undertaken to the satisfaction of RMS and all other relevant approval authorities; • The works are to include all associated landscaping works and shall be undertaken to the satisfaction of RMS and TfNSW; • The developer shall be responsible for all works and public utility adjustment / relocation works, including that work required by the various public utility authorities and/or their agents; • The submitted designs shall be in accordance with Austroads Guide to Road Design in association with relevant RMS and TfNSW supplements. The certified copies of the civil design plans shall be submitted to RMS and/or TfNSW for consideration and approval prior to the release of a Construction Certificate and commencement of road works; • The works shall be designed to meet RMS requirements, and endorsed by a suitably qualified practitioner. The design requirements shall be in accordance with Austroads and other Australian Codes of Practice. The certified copies of the civil design plans shall be submitted to RMS for consideration and approval prior to the release of the Construction Certificate by the Principal Certifying Authority and commencement of road works; • Any modification to traffic lights will require consent from Roads and Maritime under Section 87 of the Roads Act, 1993. Proposed traffic control light modifications shall be designed to meet RMS requirements. The Traffic Control Signal (TCS) plans shall be drawn by a suitably qualified person and endorsed by a suitably qualified practitioner; • All works / regulatory signposting associated with the proposed development are to be approved by RMS; • The developer will be required to enter into a Works Authorisation Deed (WAD) for the works. Please note that the WAD will need to be executed prior to RMS assessment of the detailed civil design plans; • The works are to be designed and delivered at no cost to TfNSW or RMS; and • A Road Occupancy Licence is to be obtained from RMS for any works that may impact on traffic flows on Moorebank Avenue or the adjoining state road network during construction.
T13	The layout of the proposed car parking areas associated with the subject development (including, driveways, grades, turn paths, sight distance requirements in relation to landscaping and/or fencing, aisle widths, aisle lengths, and parking bay dimensions) should be in accordance with AS 2890.1-2004, AS2890.6-2009 and AS2890.2-2002 for heavy vehicle usage.
T14	The swept path of the largest vehicle (including garbage trucks, building maintenance vehicles and removalists) entering and exiting the subject site, as well as manoeuvrability through the site, shall be in accordance with Austroads. In this regard, a plan shall be submitted to Council for approval, which shows that the proposed development complies with this requirement.
T15	All vehicles are to enter and leave the site in a forward direction.
T16	All vehicle queues are to be wholly contained on site.



Ref	Condition
T17	An overall Construction Traffic Management Plan (CTMP) detailing construction programming, vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to Council and Roads and Maritime for approval prior to commencing any site works or external road or other civil works. The applicant is to assume that construction traffic impacts are to be minimised during weekday peak periods. Detailed individual Construction Traffic Management Plans will then be required for each specific package of works (both on-site and external) and must be approved by RMS prior to commencement.
T18	A pre-construction condition survey of all haul roads to be used shall be conducted prior to the commencement of any construction activity to the satisfaction of RMS and TfNSW. All road, shoulder and services damage shall be rectified and returned to a condition equal to or superior to that identified in the pre-construction condition survey.
T19	All demolition and construction vehicles are to be contained wholly within the site and vehicles must enter the site before stopping. A construction zone will not be permitted on Moorebank Avenue.
T20	<p>The following requirements apply to any temporary modifications required to the transport network during construction:</p> <ul style="list-style-type: none"> • The developer is to secure any and all additional land required to undertake works requirements at its own cost; • The developer shall be responsible for all works and public utility adjustment / relocation works, including that work required by the various public utility authorities and/or their agents; • The submitted designs shall be in accordance with Austroads Guide to Road Design in association with relevant RMS and TfNSW supplements. The certified copies of the civil design plans shall be submitted to RMS and/or TfNSW for consideration and approval prior to commencement of works; • The works shall be designed to meet RMS requirements, and endorsed by a suitably qualified practitioner. The design requirements shall be in accordance with Austroads and other Australian Codes of Practice. The certified copies of the civil design plans shall be submitted to RMS for consideration and approval prior to the commencement of road works; • Any modification to traffic lights will require consent from Roads and Maritime under Section 87 of the Roads Act, 1993. Proposed traffic control light modifications shall be designed to meet RMS requirements. The Traffic Control Signal (TCS) plans shall be drawn by a suitably qualified person and endorsed by a suitably qualified practitioner; • All works / regulatory signposting associated with the works are to be approved by RMS; • The works are to be designed and delivered at no cost to TfNSW or RMS; and • A Road Occupancy Licence is to be obtained from RMS for any works that may impact on traffic flows on Moorebank Avenue or the adjoining state road network during construction.



5.2 Recommendation

In light of the above, we suggest that the development could be approved with conditions along the lines set out in **Table 5.1**, absent any further analyses being provided.

Please do not hesitate to contact the undersigned on 07 3221 3503 if you have any queries regarding the above.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Andrew Douglas'.

Andrew Douglas

Director | Cambray Consulting Pty Ltd
BECivil (Hons) | MSc (Env Man)
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