M|G Planning
URBAN PLANNERS

Mr Jim Betts
Secretary
NSW Department of Planning, Industry and Environment
Locked Bag 5022
PARRAMATTA NSW 2124

Attention: Matthew Rosel

Dear Matthew,

RESPONSE TO SUBMISSIONS – S75W MODIFICATION APPLICATION TO BARANGAROO CONCEPT PLAN MP06-0162 (MOD 11)

This letter has been prepared to provide a Response to Submissions received from the City of Sydney and Transport for NSW regarding the above Section 75W Modification Application to amend the Barangaroo Concept Plan MP06-0162. The Modification Application, submitted by Infrastructure NSW (INSW) to the Department of Planning Industry and Environment (DPIE) on 17 July 2020 seeks approval to:

- expressly permit construction vehicles and non-construction vehicles to use Barton Street; and
- stage the delivery of Hickson Park to align with the current status of the development of the surrounding buildings in Barangaroo South and Central Barangaroo, and to avoid the potential for abortive and reinstatement works.

A summary of the submissions and proposed response is provided below. A supplementary transport assessment has also been prepared by JMT Consulting and is provided at **Attachment 1**.

City of Sydney submission

The City of Sydney raised no objection to the proposed modification on the basis that:

- Barton Street remains a temporary road and will be wholly removed and returned for use as a public park; and

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- All necessary road demolition and landscape works are completed by 2025 which is the date scheduled for completion of Hickson Park.

As noted in the Environmental Assessment Report (EAR) included with the Modification Application, in accordance with Condition B3(5) of the Concept Plan (Modification 8), Barton Street is required to be returned to parkland following completion of Barangaroo Avenue in Central Barangaroo, which is currently anticipated to be in or around 2025. This is shown in the Hickson Park Staging Plans (Staging Plan 7 Drawing No BAR418-SIN-SK-063) attached to the EAR. It is further noted that the timing for the reinstatement of Barton Street to parkland within Hickson Park has been agreed with the Secretary of the DPIE in accordance with Condition B3(5), to allow Barton Street to remain in place until Barangaroo Avenue through Central is complete and operational (See letter from the DPIE to Infrastructure NSW, dated 28 February 2020 and referenced IRF20/851).

Transport for NSW

Transport for NSW (TfNSW) provided a number of comments relating to impacts of the proposal on general traffic and public transport operation along Hickson Road as well as the safety of pedestrians and cyclists along Hickson Road. It also questioned the safety of proposed intersection arrangements. It requested that the following additional information be provided:

- An assessment of traffic impacts of allowing Barton Street for the use of general and construction traffic on the general traffic and public transport operation during the morning and afternoon peak periods (including provision of SIDRA files for TfNSW review);
- A concept plan showing existing and proposed lane arrangements for Hickson Road including at intersections with both Barton Street and Watermans Quay;
- An assessment of the type of intersection priority control required at the Hickson Road/ Barton Street intersection in accordance with *Austroads Guide to Road Design, Part 4*;
- A Stage 2 (Concept Plan) Road Safety Audit for the Hickson Road intersections at Barton Road and Watermans Quay undertaken in accordance with *Austroads Guide to Road Safety Part 6: Managing Road Safety Audits* and *Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits* by an independent TfNSW accredited road safety auditor; and

- Updated design drawings to incorporate safety measures in consultation with TfNSW based on the results of the road safety audit.

In response to the issues raised by TfNSW, a supplementary transport assessment has been prepared by JMT Consulting on behalf of INSW and is included at **Attachment 1**. The key findings of the supplementary transport assessment are as follows:

- **Updated traffic modelling** - Updated traffic modelling was undertaken for the road network morning and afternoon peak periods as requested by TfNSW. The modelling demonstrates that the road network operates in an improved manner with the introduction of Barton Street as a temporary public road. Movements along Hickson Road itself will also continue to operate efficiently with the introduction of Barton Street and therefore existing public transport services will not be impacted by the Concept Plan modification.
- **Proposed lane arrangements and concept plan** - A concept plan indicating the proposed lane arrangements, line-marking details and signage controls was previously prepared by Cardno as part of the Barton Street Temporary Construction Road Review of Environmental Factors (REF) which was determined by INSW in June 2020. A copy of the concept plan is included in Figure 3 of the JMT supplementary transport assessment.
- **Road Safety Audit** - As part of the REF a Road Safety Audit was undertaken by an independent (TfNSW accredited) consultant. The Road Safety Audit:
    - resulted in an amendment to the intersection control at the Barton Street/ Hickson Road intersection from a ‘give-way’ to ‘stop sign’
    - confirmed that appropriate sight distances are provided from the intersection (a minimum of approximately 120m based on Austroads guidance)
    - considered the intersections on Hickson Road at both Barton Street and Watermans Quay.

A copy of the Road Safety Audit is included at Appendix C to the JMT supplementary traffic assessment.

The recommendations of the Road Safety Audit were incorporated in the final design drawings for Barton Street as issued as part of the (now approved) REF submission. No changes are proposed to these approved design drawings associated with the proposed Concept Plan modification.

Conclusion

The information provided in this Response to Submissions demonstrates that the issues raised by the City of Sydney and TfNSW can be appropriately responded to, and that the modification application will not result in any adverse environmental impacts. The proposed modifications to Hickson Park relate only to its staging and are required to maintain public safety and to avoid undertaking works that may subsequently need to be demolished and rebuilt in the future. Similarly, the proposed modification to Barton Street is temporary only and will improve traffic flows in the interim until Barangaroo Avenue is completed and operational within Central Barangaroo.

I trust that this information is sufficient to complete the assessment of the proposed modification request (Mod 11) and given the merits described above and in the Modification Application it is recommended that the application be approved.

Yours sincerely

Nicola Gibson
Director
8 September 2020

Attachment 1

Supplementary Transport Assessment

1 Introduction

JMT Consulting has prepared this supplementary transport assessment on behalf of Infrastructure NSW (INSW) to respond to the feedback received from Transport for NSW (TfNSW) following the exhibition of Modification (MOD 11) to Barangaroo Concept Plan. The full TfNSW submission is provided as Appendix A to this document

2 Response to Transport for NSW Submission

2.1 Transport Assessment

2.1.1 TfNSW recommendation

It is requested that the following information be provided as part of the applicant's response to submissions:

- *An assessment of traffic impacts for allowing Barton Road for the use of general traffic and construction traffic on the general traffic and public transport operation during the morning and afternoon peak periods. Electronic and hard copies of the SIDRA files need to be provided for TfNSW review;*
- *A concept plan that shows the existing and proposed lane arrangements for Hickson Road including at intersections with both Barton Street and Watermans Quay should be provided; and*
- *An assessment of the type of intersection priority control (ie Give Way or Stop signs) required at the Hickson Road / Barton Street intersection based on the sight distance requirements in accordance with Austroads Guide to Road Design, Part 4.*

2.1.2 Response to TfNSW recommendation

Updated traffic modelling

As part of the original transport assessment supporting the modification to the Concept Plan, traffic modelling was undertaken between 6pm-7pm and 10pm-11pm which are reflective of the busiest times of day for vehicles using Barton Street. This modelling confirmed that the Hickson Road / Barton Street intersection is forecast to operate well at Level of Service A during both peak hours and therefore the intersection layout is suitable to accommodate future traffic flows on Barton Street.

In response to the TfNSW recommendation, updated traffic modelling has been undertaken for the road network peak periods, those being:

- 8am – 9am (morning peak hour); and
- 5pm – 6pm (afternoon peak hour).

The modelling once more demonstrates that the road network operates in an improved manner with the introduction of Barton Street as a temporary public road. Without Barton Street in place the Hickson Road / Watermans Quay intersection would operate at Level of Service E during the 8am-9am morning peak period following the opening of the CSHR in late 2020. With Barton Street available for use as a temporary road, the intersection Level of Service improves to 'C' during this same time period. In the afternoon peak hour (5pm – 6pm) the level of service at the Hickson Road / Watermans Quay intersection improves from 'C' to 'B' with the introduction of Barton Street.

The Hickson Road / Barton Street intersection is forecast to operate at Level of Service A during these morning and afternoon peak periods.

Movements along Hickson Road itself will continue to operate efficiently with the introduction of Barton Street and therefore existing public transport services will not be impacted by the proposed modification.

The modelling results are illustrated in Figure 1 and Figure 2 on the following page, with detailed outputs provided as Appendix B of this document.

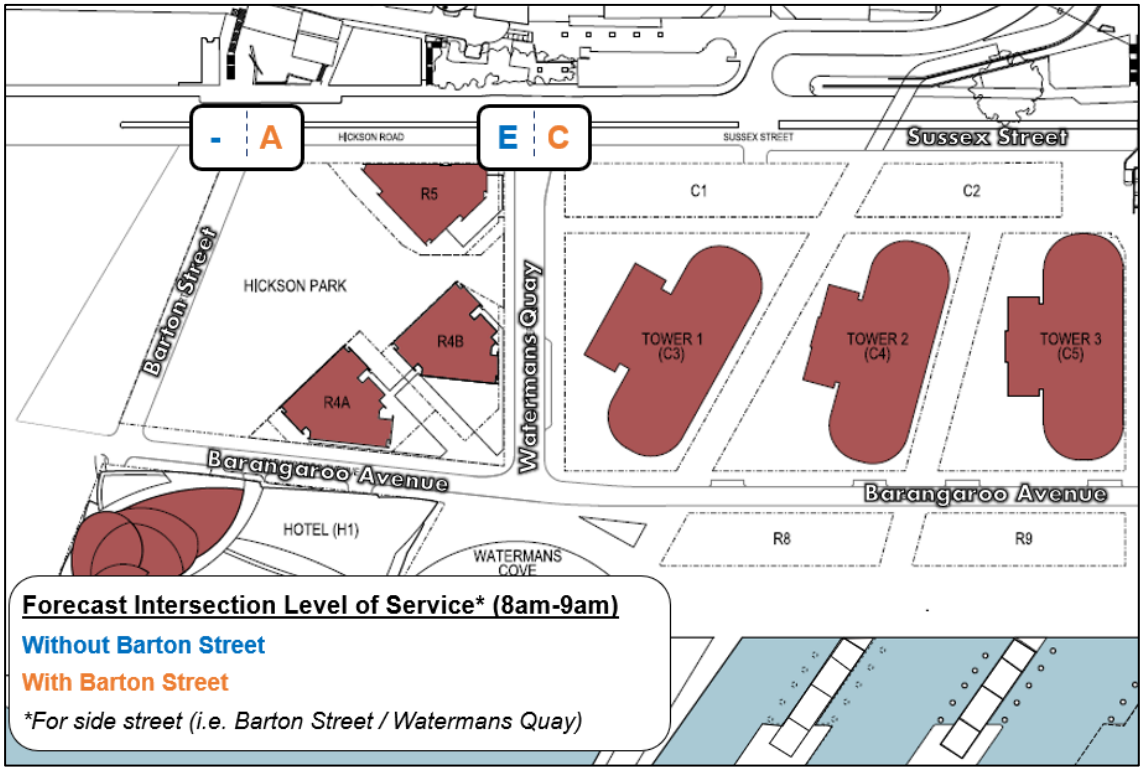

Figure 1 Forecast intersection performance – 8am – 9am

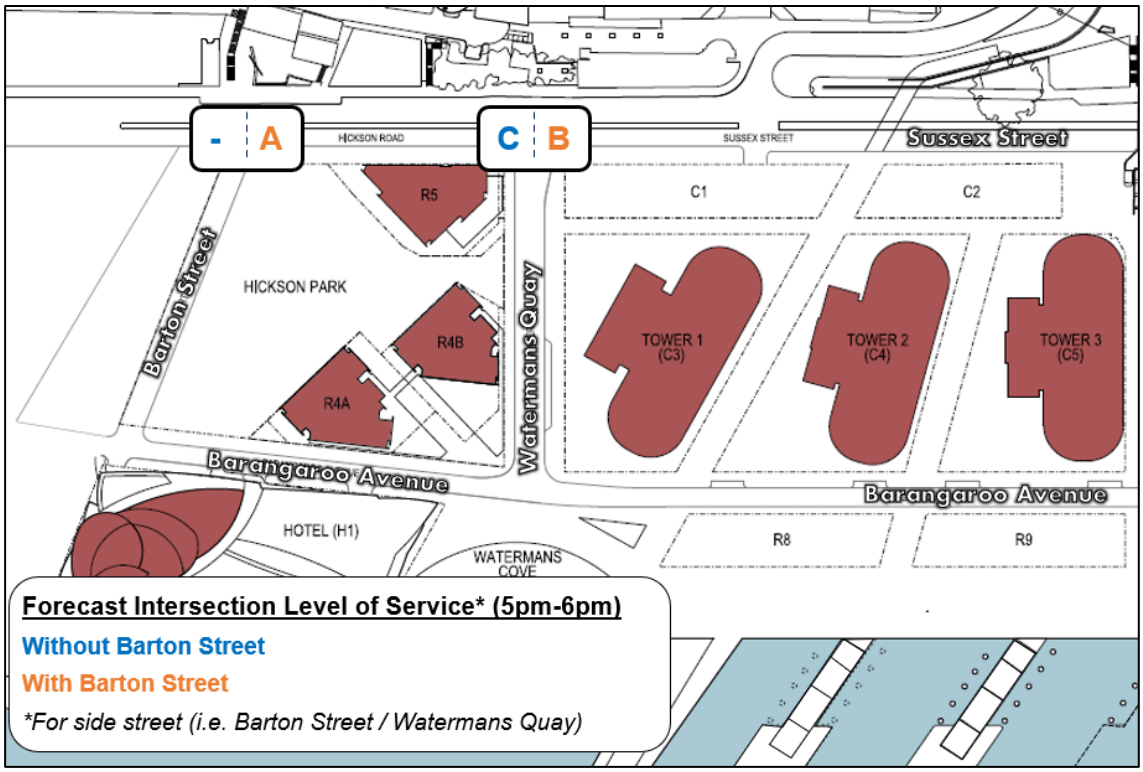

Figure 2 Forecast intersection performance – 5pm – 6pm

Proposed lane arrangements and concept plan

A concept plan indicating the proposed lane arrangements, line-marking details and signage controls was previously prepared by Cardno as part of the Review of Environmental Factors (REF) which was determined by INSW in June 2020. This REF permits the temporary use of Barton Street as a construction only road. While the modification to the concept plan would expressly permit both construction and non-construction vehicles to use Barton Street, the layout and design of the road would remain unchanged from that shown as part of the REF drawings. This concept plan layout is provided in Figure 3 on the following page.

Intersection priority control

As part of the REF submission a Road Safety Audit was undertaken by an independent (TfNSW accredited) consultant which examined the appropriate intersection control at the Barton Street / Hickson Road intersection. Following the recommendations of the Road Safety Audit, the control was amended from being a ‘give-way’ to ‘stop sign’. The Road Safety Audit confirmed that appropriate sight distances are provided from the intersection (a minimum of approximately 120m based on Austroads guidance) which further informed the design.

The full Road Safety Audit is provided in Appendix C of this document.

HICKSON ROAD

LENDLEASE CONSTRUCTION COMPOUND

LENDLEASE CONSTRUCTION COMPOUND

BARANGAROO CENTRAL

HICKSON PARK

HICKSON PARK

BARTON STREET

BARANGAROO AVENUE

R1

R2

R3

PROVIDE RUMBLE BARS. (TYP.)

BB (125m LONG)

BB (152m LONG)

BB (107m LONG)

EASEMENT FOR SEWAGE PUMPING STATION

SCALE 1:250 @B1

0 5 10 15 20 25m

FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Key Plan

Rev.	Item	Revision Description	Date
06		ISSUED FOR INFORMATION	15.05.20
05		ISSUED FOR INFORMATION	20.04.20
04		ISSUED FOR INFORMATION	16.04.20
03		ISSUED FOR INFORMATION	12.02.20
02		ISSUED FOR INFORMATION	31.01.20
01		ISSUED FOR INFORMATION	30.01.20

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Lead Architects

Collaborating Architects

Consultant

Principal: lendlease

Developer	Lend Lease
Project Management & Construction	Lend Lease
Design	Lend Lease

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Millers Point NSW 2000
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Project: BARANGAROO SOUTH

MP

Title: BARTON STREET
LINEMARKING PLAN

Drawn By	Designed	Checked	Approved By	Date
JBC	JBC	AL		JAN'20

Scale: 1:200

Project No.	Site No.	Drawing No.	Revision
161804	BST	50613044-300	06

B1

2.2 Safety Assessment of Proposed Intersection Arrangements

2.2.1 TfNSW recommendation

It is requested that the applicant:

- *Undertakes a Stage 2 (Concept Plan) Road Safety Audit for the Hickson Road intersections at Barton Road and Watermans Quay as part of the applicant's response to submissions. This audit shall be undertaken in accordance with Austroads Guide to Road Safety Part 6: Managing Road Safety Audits and Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits by an independent TfNSW accredited road safety auditor; and*
- *Review the design drawings and amend the drawings to incorporate safety measures in consultation with TfNSW as required, based on the results of the road safety audit.*

2.2.2 Response to TfNSW recommendation

As part of the REF submission to permit the use of Barton Street for construction vehicles, a Concept Design Stage Audit was undertaken by a TfNSW accredited consultant in accordance with 'TNSW Guidelines for Road Safety Audit Practices (2011)' and 'Austroads: Guide to Road Safety Part 6 and Part 6a (2019)'. This audit considered the intersections on Hickson Road at both Barton Street and Watermans Quay, in line with the TfNSW response. The recommendations of the Road Safety Audit were incorporated in the final design drawings for Barton Street as issued as part of the (now approved) REF submission. No changes are proposed to these design drawings associated with the proposed Concept Plan modification.

The full Road Safety Audit is provided in Appendix C of this document.

Appendix A: TfNSW Submission

Mr Matthew Rosel
Key Sites Assessments
Planning & Assessment
Department of Planning, Industry and Environment
4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150

Dear Mr Rosel

Notification of Modification (MOD 11) to Barangaroo Concept Plan (MP 06_0162 MOD 11)

Thank you for your correspondence dated 22 July 2020, requesting Transport for NSW (TfNSW) to review and comment on the above.

Transport Assessment

Comment

The Transport Assessment prepared to support the concept plan does not provide enough information regarding the assessment of the impacts of the proposal on the general traffic, and public transport operation, and safety of pedestrians and cyclists along Hickson Road. Details are provided below:

- Traffic assessment has been undertaken for the development peak only. Any assessment should include development conditions likely to coincide with peak periods that occur on the adjoining road network;
- Information regarding the proposed lane arrangements at the Hickson Road intersections at Barton Street and Watermans Quay have not been included in the documentation; and
- Proposed type of intersection priority control (ie Give Way or Stop signs) at the Hickson Road / Barton Street intersection has also not been stipulated.

Recommendation

It is requested that the following information be provided as part of the applicant's response to submissions:

- An assessment of traffic impacts for allowing Barton Road for the use of general traffic and construction traffic on the general traffic and public transport operation during the morning and afternoon peak periods. Electronic and hard copies of the SIDRA files need to be provided for TfNSW review;
- A concept plan that shows the existing and proposed lane arrangements for Hickson Road including at intersections with both Barton Street and Watermans Quay should be provided; and
- An assessment of the type of intersection priority control (ie Give Way or Stop signs) required at the Hickson Road / Barton Street intersection based on the sight distance requirements in accordance with *Austroads Guide to Road Design, Part 4*.

Safety Assessment of the proposed Intersection Arrangements

Comment

Hickson Road intersections at Barton Street, Watermans Quay and Napoleon Street are located in close proximity to each other, and are proposed to operate with all movements allowed. There are potential safety issues due to this close proximity in particular conflicts between vehicles turning right from Barton Street and vehicles waiting to turn into Watermans Quay from Hickson Road.

In addition, any future traffic signals at Watermans Quay (noted not part of the subject application, although it is mentioned in the traffic assessment documentation) may have adverse safely implications – especially in relation to the well documented “see through” effect of closely spaced traffic control signals.

Recommendation

It is requested that the applicant:

- Undertakes a Stage 2 (Concept Plan) Road Safety Audit for the Hickson Road intersections at Barton Road and Watermans Quay as part of the applicant’s response to submissions. This audit shall be undertaken in accordance *with Austroads Guide to Road Safety Part 6: Managing Road Safety Audits* and *Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits* by an independent TfNSW accredited road safety auditor; and
- Review the design drawings and amend the drawings to incorporate safety measures in consultation with TfNSW as required, based on the results of the road safety audit.

If you require clarification on the above, please don’t hesitate to contact Para Sangar, Senior Transport Planner, Land Use Planning and Development on 0466 024 892.

Yours sincerely

5/8/2020

Mark Ozinga
Principal Manager, Land Use Planning and Development
Customer Strategy and Technology

Objective Reference CD20/06199

Appendix B: Traffic Modelling Outputs

MOVEMENT SUMMARY

Site: 101 [Hickson Road - Watermans Quay (Site Folder: 8am - 9am + CSHR (no Barton Street))]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hickson Road (S)														
1	L2	215	0.0	226	0.0	0.122	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	429	0.0	452	0.0	0.232	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		644	0.0	678	0.0	0.232	1.9	NA	0.0	0.0	0.00	0.19	0.00	57.6
North: Hickson Road (N)														
8	T1	249	0.0	262	0.0	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	49	0.0	52	0.0	0.076	9.3	LOS A	0.3	2.0	0.57	0.78	0.57	50.3
Approach		298	0.0	314	0.0	0.135	1.5	NA	0.3	2.0	0.09	0.13	0.09	58.1
West: Watermans Quay (W)														
10	L2	122	0.0	128	0.0	0.975	58.9	LOS E	16.6	116.1	0.94	2.14	4.73	28.3
12	R2	188	0.0	198	0.0	0.975	74.6	LOS F	16.6	116.1	0.94	2.14	4.73	28.2
Approach		310	0.0	326	0.0	0.975	68.4	LOS E	16.6	116.1	0.94	2.14	4.73	28.2
All Vehicles		1252	0.0	1318	0.0	0.975	18.3	NA	16.6	116.1	0.25	0.66	1.19	45.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Hickson Road - Watermans Quay (Site Folder: 8am - 9am + CSHR (with Barton Street))]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hickson Road (S)														
1	L2	135	0.0	142	0.0	0.077	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	509	0.0	536	0.0	0.275	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		644	0.0	678	0.0	0.275	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.4
North: Hickson Road (N)														
8	T1	315	0.0	332	0.0	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	30	0.0	32	0.0	0.047	9.3	LOS A	0.2	1.2	0.56	0.76	0.56	50.3
Approach		345	0.0	363	0.0	0.171	0.8	NA	0.2	1.2	0.05	0.07	0.05	58.9
West: Watermans Quay (W)														
10	L2	58	0.0	61	0.0	0.727	25.1	LOS B	4.5	31.7	0.89	1.28	1.91	37.6
12	R2	122	0.0	128	0.0	0.727	41.6	LOS C	4.5	31.7	0.89	1.28	1.91	37.5
Approach		180	0.0	189	0.0	0.727	36.3	LOS C	4.5	31.7	0.89	1.28	1.91	37.5
All Vehicles		1169	0.0	1231	0.0	0.727	6.5	NA	4.5	31.7	0.15	0.28	0.31	53.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Hickson Road - Watermans Quay (Site Folder: 5pm - 6pm + CSHR (no Barton Street))]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hickson Road (S)														
1	L2	295	0.0	311	0.0	0.167	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	283	0.0	298	0.0	0.153	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		578	0.0	608	0.0	0.167	2.9	NA	0.0	0.0	0.00	0.29	0.00	56.5
North: Hickson Road (N)														
8	T1	247	0.0	260	0.0	0.134	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	66	0.0	69	0.0	0.092	8.6	LOS A	0.3	2.4	0.54	0.76	0.54	50.8
Approach		313	0.0	329	0.0	0.134	1.8	NA	0.3	2.4	0.11	0.16	0.11	57.7
West: Watermans Quay (W)														
10	L2	112	0.0	118	0.0	0.842	26.1	LOS B	9.5	66.8	0.82	1.54	2.57	38.3
12	R2	208	0.0	219	0.0	0.842	39.0	LOS C	9.5	66.8	0.82	1.54	2.57	38.2
Approach		320	0.0	337	0.0	0.842	34.5	LOS C	9.5	66.8	0.82	1.54	2.57	38.2
All Vehicles		1211	0.0	1275	0.0	0.842	11.0	NA	9.5	66.8	0.25	0.59	0.71	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Hickson Road - Watermans Quay (Site Folder: 5pm - 6pm + CSHR (with Barton Street))]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hickson Road (S)														
1	L2	178	0.0	187	0.0	0.101	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
2	T1	400	0.0	421	0.0	0.216	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		578	0.0	608	0.0	0.216	1.8	NA	0.0	0.0	0.00	0.18	0.00	57.8
North: Hickson Road (N)														
8	T1	327	0.0	344	0.0	0.178	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	39	0.0	41	0.0	0.055	8.6	LOS A	0.2	1.4	0.54	0.74	0.54	50.8
Approach		366	0.0	385	0.0	0.178	1.0	NA	0.2	1.4	0.06	0.08	0.06	58.8
West: Watermans Quay (W)														
10	L2	52	0.0	55	0.0	0.628	18.3	LOS B	3.6	25.5	0.83	1.20	1.52	41.0
12	R2	128	0.0	135	0.0	0.628	32.3	LOS C	3.6	25.5	0.83	1.20	1.52	40.8
Approach		180	0.0	189	0.0	0.628	28.2	LOS B	3.6	25.5	0.83	1.20	1.52	40.9
All Vehicles		1124	0.0	1183	0.0	0.628	5.7	NA	3.6	25.5	0.15	0.31	0.26	54.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Hickson Road - Barton Street (Site Folder: 8am - 9am + CSHR (with Barton Street))]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hickson Road (S)														
1	L2	80	0.0	84	0.0	0.308	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.5
2	T1	486	0.0	512	0.0	0.308	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	59.1
Approach		566	0.0	596	0.0	0.308	0.9	NA	0.0	0.0	0.00	0.08	0.00	58.8
North: Hickson Road (S)														
8	T1	279	0.0	294	0.0	0.171	0.3	LOS A	0.2	1.7	0.10	0.04	0.10	59.2
9	R2	18	0.0	19	0.0	0.171	8.5	LOS A	0.2	1.7	0.10	0.04	0.10	57.0
Approach		297	0.0	313	0.0	0.171	0.8	NA	0.2	1.7	0.10	0.04	0.10	59.0
West: Barton Street (W)														
10	L2	64	0.0	67	0.0	0.254	11.3	LOS A	1.0	6.7	0.62	1.01	0.68	48.8
12	R2	66	0.0	69	0.0	0.254	15.4	LOS B	1.0	6.7	0.62	1.01	0.68	48.4
Approach		130	0.0	137	0.0	0.254	13.4	LOS A	1.0	6.7	0.62	1.01	0.68	48.6
All Vehicles		993	0.0	1045	0.0	0.308	2.5	NA	1.0	6.7	0.11	0.19	0.12	57.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Hickson Road - Barton Street (Site Folder: 5pm - 6pm + CSHR (with Barton Street))]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hickson Road (S)														
1	L2	117	0.0	123	0.0	0.247	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	56.9
2	T1	334	0.0	352	0.0	0.247	0.1	LOS A	0.0	0.0	0.00	0.15	0.00	58.5
Approach		451	0.0	475	0.0	0.247	1.5	NA	0.0	0.0	0.00	0.15	0.00	58.1
North: Hickson Road (S)														
8	T1	286	0.0	301	0.0	0.181	0.3	LOS A	0.3	2.2	0.12	0.06	0.12	59.0
9	R2	27	0.0	28	0.0	0.181	7.6	LOS A	0.3	2.2	0.12	0.06	0.12	56.8
Approach		313	0.0	329	0.0	0.181	1.0	NA	0.3	2.2	0.12	0.06	0.12	58.8
West: Barton Street (W)														
10	L2	60	0.0	63	0.0	0.232	9.8	LOS A	0.8	5.9	0.53	0.96	0.54	49.8
12	R2	80	0.0	84	0.0	0.232	13.2	LOS A	0.8	5.9	0.53	0.96	0.54	49.4
Approach		140	0.0	147	0.0	0.232	11.8	LOS A	0.8	5.9	0.53	0.96	0.54	49.6
All Vehicles		904	0.0	952	0.0	0.247	2.9	NA	0.8	5.9	0.12	0.24	0.13	56.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix C: Road Safety Audit

Barton Road, Barangaroo

Road Safety Audit

Concept Design Stage

15th April 2020

JN20043_Report01 Rev02 - Lendlease Barton

On Behalf of

Lendlease Pty Ltd

604, 11 Chandos St
St Leonards
NSW, 2065

0405 345 124
admin@amwc-rsa.com
www.amwc-rsa.com
ABN 13 619 698 985

NSW RSA Register Details

Final Signoff Date	15/04/2020
Title of Audit	Barton Road, Barangaroo
Location of Audit	Barangaroo
Project Description	The aim of this project is to construct Barton Road from Hickson Road to Watermans Quay in Barangaroo, Sydney
Purpose of Audit	The aim of this Road Safety Audit (RSA) is to assess the concept design in the context of the existing conditions, and the interface between existing conditions, design stages of Hickson Road and proposed design for Barton Road
State of Audit	NSW
Stage of Audit	Concept Design Stage
Client Company	Lendlease Pty Ltd
Client Contact	Adrian Lu
Client Phone	(02) 9024 7046
Client Email	adrian.lu@cardno.com.au
Audit Team Lead	Aaron Walton
Audit Team Member	Jose Villacorta

Table of Contents

1 Project Description

The aim of this project is to construct Barton Road from Hickson Road to Watermans Quay in Barangaroo, Sydney.

The aim of this Road Safety Audit (RSA) is to assess the concept design in the context of the existing conditions, and the interface between existing conditions, design stages of Hickson Road and proposed design for Barton Road.

2 Study Area

The general audit location is shown below.

Source – Cardno

3 Auditable Data

The following data was referenced during the audit:

> Barangaroo South – Barton Street – Concept Design – Civil Works
  - Rev 03 – dated Jan 2020

> PDF file 'OSH Signal_TP_20200312'
  - Rev A – dated 21/02/2020

4 Audit Stage

A Concept Design Stage Audit was carried out during a desktop assessment of concept design plans and subsequent site visit of proposed works during day and night conditions on 17th March 2020. At the time of the site visit weather was overcast and traffic was moderate.

The audit was generally undertaken in accordance with 'TNSW Guidelines for Road Safety Audit Practices (2011)' and 'Austroads: Guide to Road Safety Part 6 and Part 6a (2019)'.

5 Exclusions

At the time of the audit there were no exclusions presented to the audit team.

6 Audit Team

The audit team and client details are shown below.

Table 6-1 Audit Team & Client Details

Role	Name	
Client (Sponsor)	Lendlease Pty Ltd	
Client Contact	Dave Bielawski	Site Manager Remediation
Client Email	david.bielawski@lendlease.com	
Lead Auditor	Aaron Walton	RSA-02-0501 - Level 3 Auditor
Lead Auditor Email	admin@amwc-rsa.com	
Team member	Jose Villacorta	RSA-02-0805 - Level 3 Auditor

7 Audit Program

The audit program details are shown below.

Table 7-1 Audit Program

Activity	**Date**	**Notes**
Opening Meeting	11/03/2020	Aaron Walton, Dave Bielawski
Site Inspection	17/03/2020	Aaron Walton, Jose Villacorta
Draft Report	23/03/2020	RSA Report (DRAFT for comment)
Completion Meeting	14/04/2020	Aaron Walton, Adrian Lu
Final Report	15/04/2020	RSA Report

8 Audit Risk Assessment Technique

For each of the safety issues identified, the level of risk with each has been determined. The tables below are extracted from Austroads: Guide to Road Safety Part 6 and Part 6a (2019) and have been used in the assessment of risk for this audit.

Table 8-1 Incident Frequency

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 8-2 Incident Severity

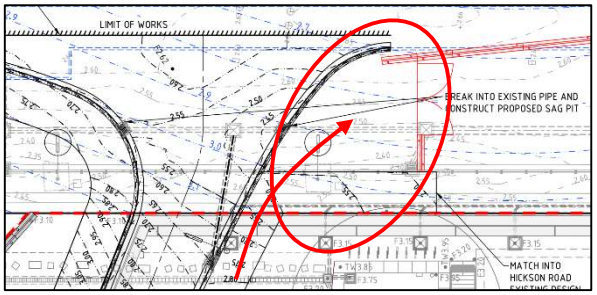
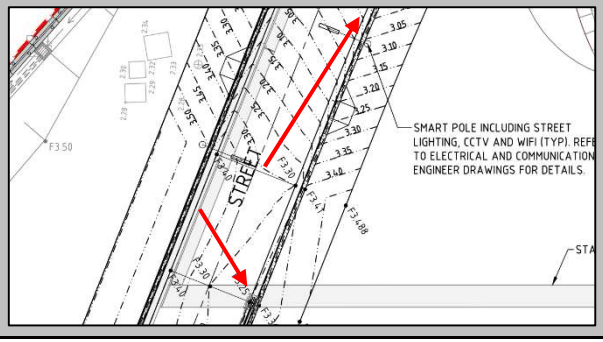
Severity	Description	Examples
Catastrophic	Likely multiple deaths	> High-speed, multi-vehicle crash on freeway. > Car runs into crowded bus stop. > Bus and petrol tanker collide. > Collapse of bridge or tunnel.
Serious	Likely death or serious injury	> High or medium-speed vehicle/vehicle collision. > High or medium-speed collision with a fixed roadside object. > Pedestrian or cyclist struck by a car.
Minor	Likely minor injury	> Some low-speed vehicle collisions. > Cyclist falls from bicycle at low speed. > Left turn rear-end crash in a slip lane.
Limited	Likely trivial injury or property damage only	> Some low-speed vehicle collisions. > Pedestrian walks into object (no head injury). > Car reverses into post.

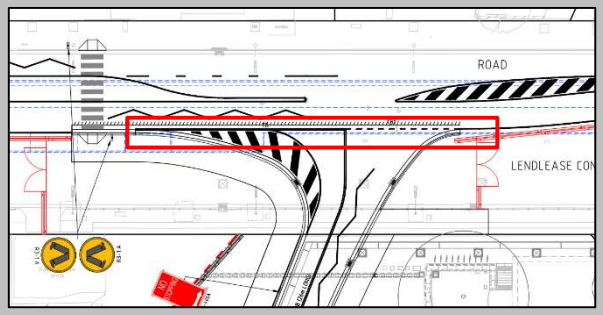
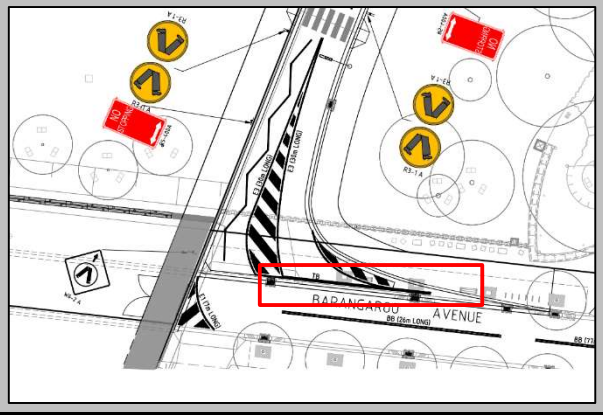
Table 8-3 Resulting Level of Risk Matrix

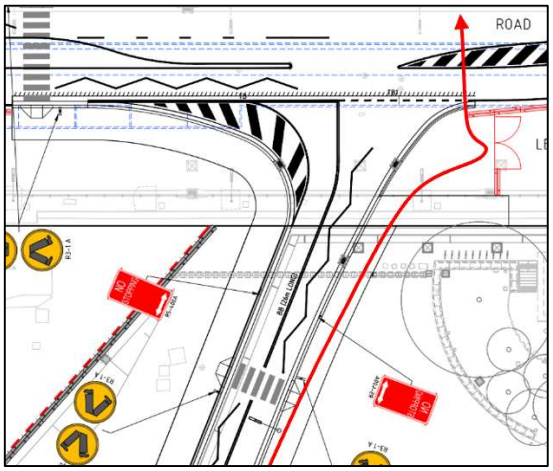
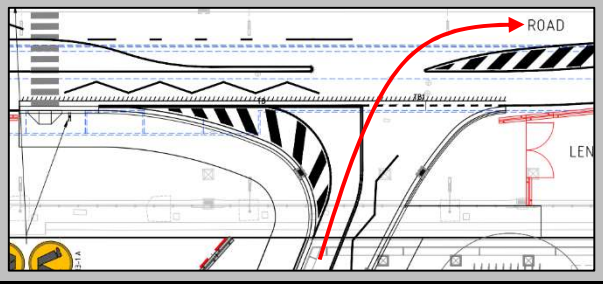
	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

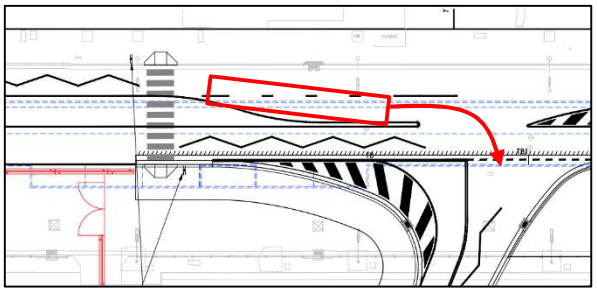
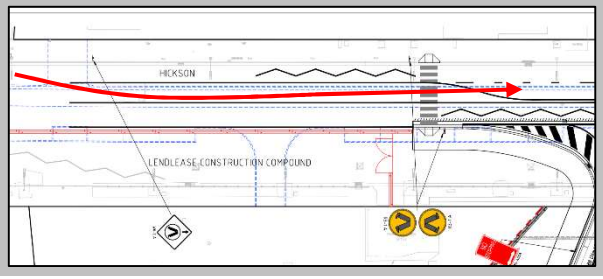
9 Audit Findings

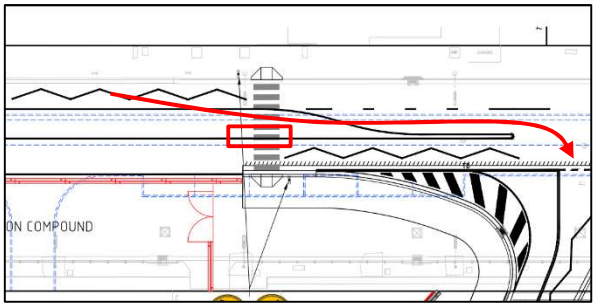
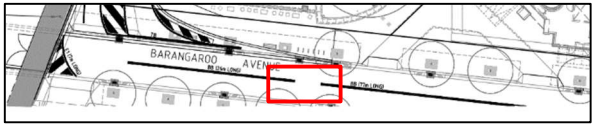
Table 9-1 Audit Findings

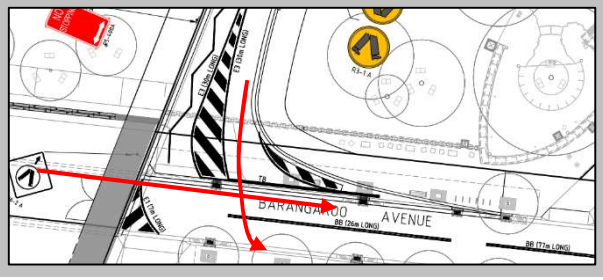
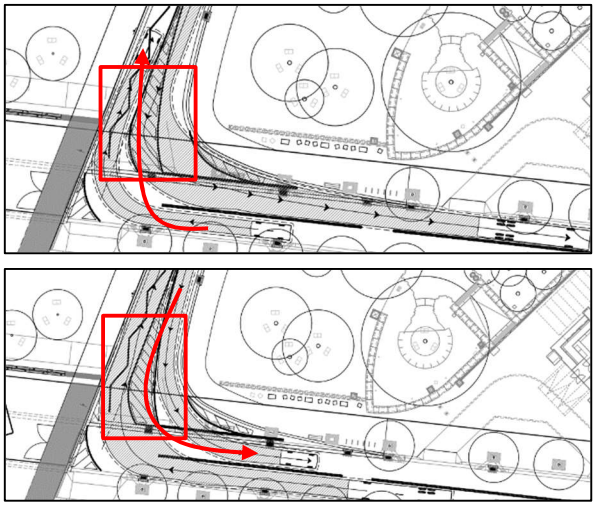
Item Location	Safety Hazard Finding	Frequency	Severity	Level of Risk	Project Manager Response
	Barton Street REF documentation				
1. Drainage Sheet 200	It is unclear to the audit team of the proposed pedestrian path, park and overland water flows that are directed towards the worksite and the access gates. No further assessment has been carried out. 	Note			The design intent of Barton St levels and grading is to be consistent with the remaining OSH public domain road design (SSD7944). The roads will be designed in accordance with normal engineering practice and meeting the requirements of the same relevant Australian Standards and City of Sydney Council Specifications. Flow paths – no clash. Interim measures in the compound.
2. Barton Street Grade Sheet 200	There is no long section provided for Barton Street. It is unclear to the audit team of steep or flat grades. No further assessment has been carried out. 	Note			The design intent of Barton St levels and grading is to be consistent with the remaining OSH public domain road design (SSD7944). The roads will be designed in accordance with normal engineering practice and meeting the requirements of the same relevant Australian Standards and City of Sydney Council Specifications.

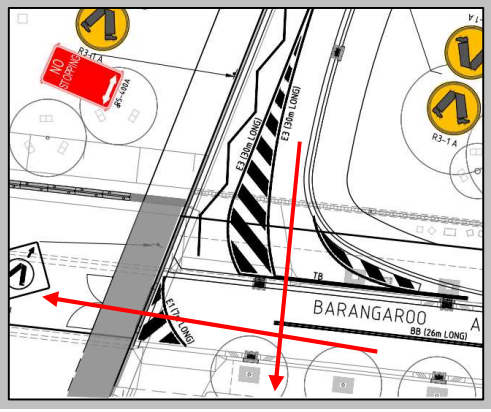
3. Street signage Sheet 300	There are no street signs proposed at intersections. There is a risk of driver confusion that may increase high risk movements such as sudden deceleration, late lane changes or high-speed vehicle turns resulting in rear end or side swipe collisions.	Improbable	Minor	Low	Street signage to added at the two intersections. Refer to revised Barton Street REF drawings.
4. Intersection Control Signage Sheet 300	There are no intersection control signs proposed in conjunction with hold line marking. There is a risk that a motorist may not comprehend the intersection priority and encroach into the intersection or fail to stop and sight oncoming vehicles resulting in side impact collisions. This risk is increased over time as line marking may fade.  	Improbable	Minor	Low	Intersection signage such as stop and T junction added. Refer to revised Barton Street REF drawings.

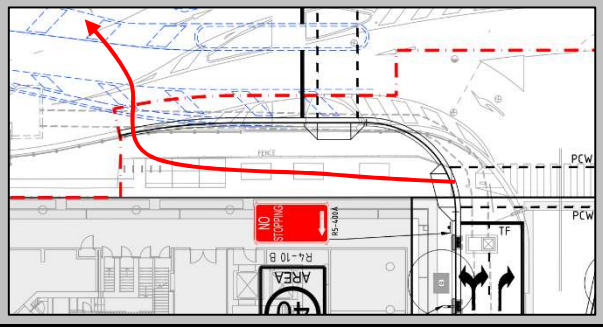
5. Pedestrian-worksite access. Sheet 300	It is unclear to the audit team of proposed pedestrian desire lines, access points and conflicts with worksites and worksite accesses. Of particular concern is the southwest corner of Barton Street where the pedestrian path extends past the pedestrian crossing and to the worksite vehicle access. There is a risk that a pedestrian may access worksite areas resulting in trip/fall injuries; or impacts with worksite vehicles. 	Probable	Serious	Intolerable	Cardno to provide temporary fencing and/or hoarding along edge of footpath to prevent pedestrian access to worksite. Refer to revised Barton Street REF drawings.
6. Intersection alignment Sheet 300 Sheet 800	There is a small radius curve and a short section of straight on approach to the intersection. There is a risk that a vehicle may cut across the centreline resulting in sideswipe collisions. There is a risk that a large vehicle may follow the centreline instead of using the outside median area to make the turn resulting in sideswipe collisions. 	Occasional	Minor	Medium	Rumble bars included on the BB line to warn all vehicles of centreline alignment and ensure vehicles do not cross the centre line. Refer to revised Barton Street REF drawings.

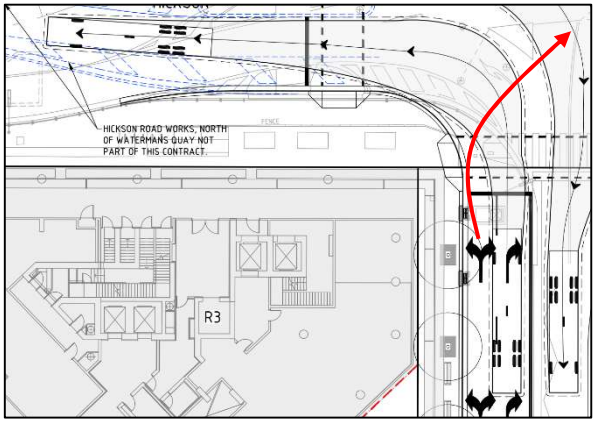
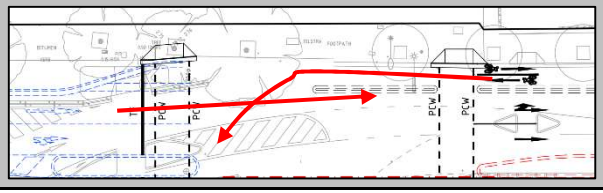
7. Right turn bay Sheet 300 Sheet 800	It is unclear to the audit team if a large vehicle can fully enter and store in the right turn bay without overhanging into the through lane. There is a risk that a following vehicle may impact the rear of an overhanging vehicle. 	Occasional	Minor	Medium	Right turn bay removed. Vehicles will make the right turn from single southbound Hickson Rd lane. Traffic modelling (by JMT consulting) show that there is low traffic volumes and no significant queueing.
8. Painted Median Sheet 300	There is a painted median that is not infilled. There is risk that a motorist may assume the median as a travel lane resulting in sideswipe collisions with adjacent vehicles, head on collision with opposing vehicles, or collisions with pedestrians using the pedestrian crossing. 	Improbable	Serious	Medium	Hickson Road median to be removed given that no right turn bay is required. Refer to revised Barton Street REF drawings.
9. Pedestrian Crossing Sheet 300	There is a pedestrian crossing through a painted median. The median line marking cuts through the pedestrian crossing. There is a risk that there may be confusion as to who has right of way resulting in pedestrian-vehicle collisions. There is a right turn bay adjacent to the pedestrian crossing.	Occasional	Serious	High	Hickson Road median to be removed given that no right turn bay is required. Pedestrian crossing now over 2 lanes. Refer to revised Barton Street REF drawings.

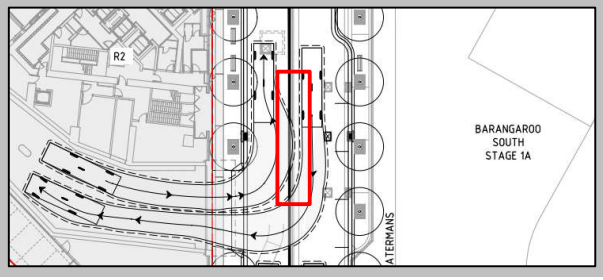
	There is a risk that a vehicle attempting to enter the right turn bay may overhang or block the pedestrian crossing resulting in pedestrians attempting to move between vehicles and pedestrian-vehicle collisions. 				
10. Lighting Sheet 300	There is insufficient lighting provided at pedestrian crossing locations. There is a risk at night that a pedestrian may not be seen by an approaching motorist resulting in pedestrian-vehicle collisions.	Occasional	Serious	High	Lighting is not shown on Cardno's signage and linemarking plans. Lighting design will be in accordance with the city of Sydney council - Sydney-lights-design-code. Design certification will be provided by Aurecon prior to construction commencement.
11. Centre line marking Sheet 300	It is unclear to the audit team of the proposed gap in centre line marking on Barangaroo Avenue. No further assessment has been carried out. 	Note			Centreline gap removed. Refer to revised Barton Street REF drawings.
12. Line Marking Sheet 300	There are pedestrian crossing pavement markings not aligned with kerb ramps or previous plans. No further assessment has been carried out.	Note			Refer to revised Barton Street REF drawings.
13. Additional Turning Paths Sheet 800	There is no Right Turn In shown for Barton Street for large vehicles. There is no restriction provided on vehicles undertaking these movements. No further assessment has been carried out.	Note			Traffic modelling and assessment suggest very low heavy vehicle traffic travelling southbound on Hickson Rd and turning right. No right turn for larger vehicles signage added. Refer to revised Barton Street REF drawings.

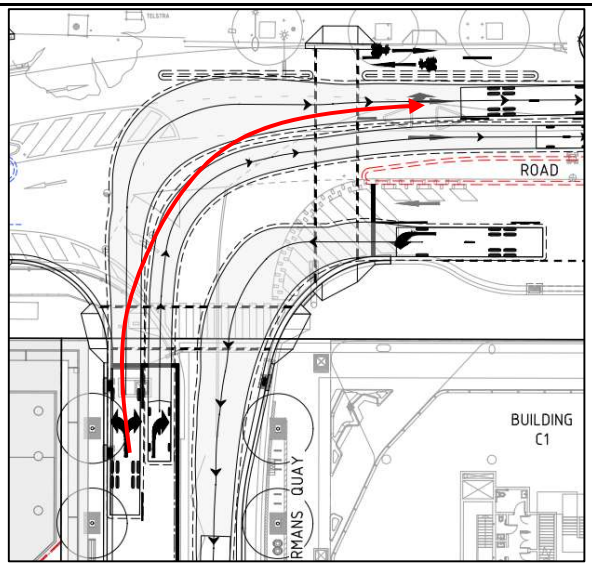
14. Geometry Sheet 801	The proposed geometry of the line marking does not direct vehicles around the curve. The proposed geometry of a curved alignment does not match the intersection priority of a T-intersection as there is no travel direction to give way to. There is a risk that vehicles may enter opposing travel lanes resulting in head on collisions. 	Occasional	Serious	High	Middle Chevron alignment updated to guide vehicles in left turn. Refer to revised Barton Street REF drawings.
15. Centre Median Sheet 801	There is a centre median that is being used as potential swept path area for both directions of travel. There is a risk that concurrent opposing turning vehicles may both enter the centre median resulting in head on or sideswipe collisions. 	Occasional	Minor	Medium	There is insufficient space to widen the intersection to allow two heavy vehicles to pass each other. Heavy construction vehicle movements will be coordinated to ensure a one-way circulation plan, which minimises the probability of two large vehicles driving towards each other. In the low probability of two large vehicles making the turn, there sufficient sight distance at the intersection to allow for large vehicles to suitability give way to oncoming traffic if they are using the central median to make the turn.

16. Curve Delineation Sheet 801	There is insufficient delineation provided to alert approaching vehicle to the upcoming curve. There is a risk that motorist may approach the curve at a high speed with insufficient time to slow of negotiate the curve resulting in run off road incidents or impacts with opposing vehicles. 	Occasional	Serious	High	Left/ Right turn and chevon signage added to warn vehicles of the upcoming 90 degree turn at the intersection. Refer to revised Barton Street REF drawings.
17. Speed Zones Sheet 045	There is no indication of the proposed speed zone at Barton Street during Roadworks, in the interim and in the final arrangements. There is a risk that vehicles may travel at a higher speed than designed for resulting in run off road impacts or pedestrian-vehicle collisions. This risk is increased where it appears to be a requirement to signpost the speed zone of Watermans Quay but Barton Street has been left out.	Improbable	Minor	Low	Speed limit (40km/hr) signage added. Refer to revised Barton Street REF drawings.
One Sydney Harbour – Proposed Public Domain Works (SSD7944)					
18. Additional Turning Paths Sheet 016	There is no Left turn into Watermans Quay for large vehicles. There is no restriction provided on vehicles undertaking these movements. No further assessment has been carried out.	Note			Drawing CD2900019 shows a 12.5m turning left from Barangaroo Ave into Watermans Quay and into the basement ramp with no issues.

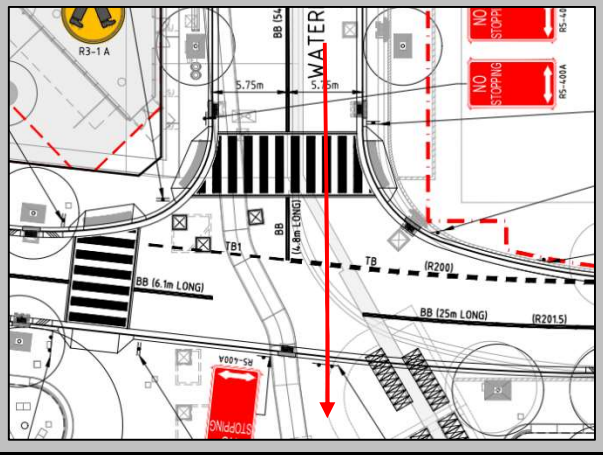
19. Pedestrian Crossing Sheet 045	There are no advanced pavement markings on approach to the pedestrian crossing. It is noted by the audit team that there is sufficient sight distance to the pedestrian crossings and the warrant for advanced pavement markings may not be required, However other pedestrian crossing installations in the Barangaroo local area with sufficient sight distance have had advanced pavement markings installed, providing inconsistency in safety device arrangements. No further assessment has been carried out.	Note			
20. Lighting Sheet 045 Sheet 047	There is insufficient lighting provided at pedestrian crossing locations. There is a risk at night that a pedestrian may not be seen by an approaching motorist resulting in pedestrian-vehicle collisions.	Occasional	Serious	High	Lighting is not shown on Cardno's signage and linemarking plans. Lighting design to be design and certified as compliant to the city of Sydney council - Sydney-lights-design-code. Design certification to be obtained by Aurecon.
21. Pedestrian-worksite access. Sheet 045	It is unclear to the audit team of proposed pedestrian desire lines, access points and conflicts with worksites and worksite accesses. Of particular concern is the northwest corner of Watermans Quay, where the pedestrian path extends past the pedestrian crossing and to the worksite vehicle access. There is a risk that a pedestrian may access worksite areas resulting in trip/fall injuries; or impacts with worksite vehicles. 	Probable	Serious	Intolerable	The design on drawing CD2000045 shows the footpath connection arrangement in the ultimate case. The footpath will tie into the exiting Hickson Road. In this situation, there will a signalised intersection and there will be no construction compound. The signalised intersection is shown in separate documentation and proposed to be constructed prior to the documentation on drawing CD2000045. Interim measures, which includes the consideration of pedestrians and vehicles around the Hickson Road construction compound is considered in separate design documentation.

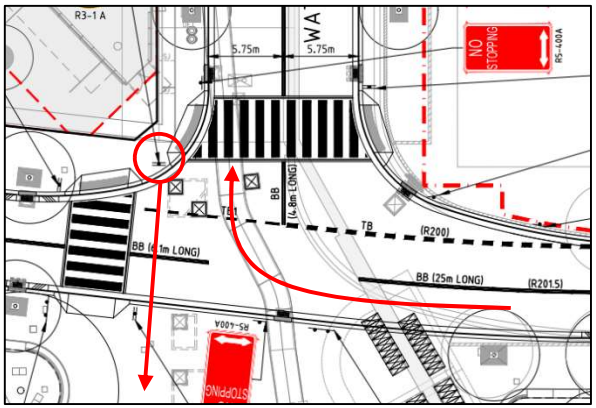
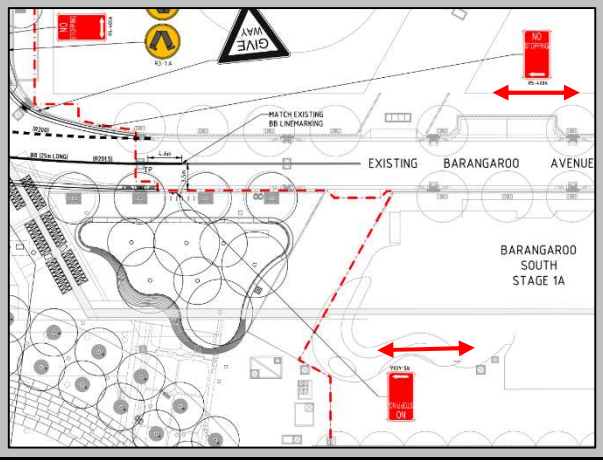
22. Left turn from Right Lane Sheet 015	There is a vehicle shown turning left from the right-hand turn lane. There is a risk that a large vehicle may not make the turn if they were to straddle the 2 lanes, resulting in damage to roadside infrastructure or resulting in movements such as reversing onto pedestrian crossings. There is a risk if a large vehicle is required to be in the right lane to turn left that a small vehicle, motorcyclist or cyclist may be in the left lane and be impacted by the large turning vehicle. 	Improbable	Serious	Medium	There is no additional space available to widen the intersection to allow for buses to turn left from a left lane alone. The turn path analysis has conservatively considered multiple turning scenarios and the bus will able to achieve the turn from various straddled positions. This turning manoeuvre is generally accepted and common practice by heavy vehicles such as buses especially around the Sydney CBD and nearby drivers should generally be understanding (i.e. give way to turning vehicles).
23. Cyclist Line marking and Separation Sheet 015	It is unclear to the audit team to the function and purpose of the proposed cycleway line marking, kerbing and lanes. There is 2-way travel proposed with no northbound termination, directing cyclists into oncoming vehicles. There is no signage provided to alert motorists or cyclists of the proposed arrangement. There is a risk that a through vehicle may impact a cyclist. 	Probable	Serious	Intolerable	Drawings updated to change to one-way cycle way (southbound only) on the eastern side of Hickson Rd. See revised OSH public domain drawings.

24. Turn around areas Sheet 016	There is vehicle access permitted along Barangaroo Avenue in the interim to Barton Street, with arrangements provided for vehicles to turn around. There is no prior warning provided to motorists to the termination of Barangaroo Avenue. The alignment of Barangaroo Avenue provides the expectation of a through road with the removal of the left turn priority to Watermans Quay. There is a risk that the proposed turning arrangements may not be able to be undertaken should multiple vehicles enter a 'no-through' road. There is a risk of vehicle damage, side swipe collisions, roadside infrastructure damage or vehicle-pedestrian collisions.	Probable	Minor	High	No-through road signage will be installed at the intersection of Barangaroo Ave and Watermans Quay and prior advanced warning to highlight the situation of the 150m section of Barangaroo Ave that is a dead-end. Three U-turn and/or 3-point turn options are also provided (OSH porte-cochere, Crown hotel porte-cochere and northern Barangaroo Ave vehicles crossing) to allow for the adequate and safe U-turn. See revised OSH public domain drawings.
25. Lane discipline Sheet 018 Sheet 019	There is a turning path shown crossing the centreline of the road. There is a risk that a turning vehicle may impact a through vehicle. 	Improbable	Minor	Low	Watermans Quay basement driveway width amended to ensure vehicles do not cross the road centreline. See revised OSH public domain drawings.
26. Turning Separation Sheet 015	There is no separation line marking provided for dual right turning vehicles. There is a risk that concurrent turning vehicles may not allow sufficient space for turning resulting in sideswipe collisions.	Occasional	Minor	Medium	Separation line added for dual right turn from Watermans Quay to Hickson Rd. See revised OSH public domain drawings.



27. Intersection Delineation Sheet 047	There is limited visual cues provided to motorists of the proposed T-Intersection. There is a risk that a vehicle may not anticipate the intersection layout and approach the intersection with insufficient time to slow to negotiate the intersection resulting in run off road incidents or impacts with opposing vehicles.	Improbable	Minor	Low	T junction signage added. Bollards and signage provide visual cue to also notify drivers of upcoming T intersection. See revised OSH public domain drawings.



28. Pedestrian Crossing Sheet 047	There is no pedestrian crossing signage provided for a right turning vehicle. There is a risk that a motorist may not anticipate the proximity of the pedestrian crossing resulting in pedestrian-vehicle collision. 	Occasional	Serious	High	Additional pedestrian signage included. See revised OSH public domain drawing.
29. No Stopping Sheet 045	The proposed direction of No Stopping does not match the existing scheme. There is a risk that a vehicle may park in locations which block through traffic increasing attempts to cross into opposing traffic to move around parked vehicles resulting in sideswipe collisions or head on collisions with opposing vehicles 	Probable	Minor	High	Drawings updated to show integration of proposed and existing schemes. See revised OSH public domain drawings.

One Sydney Harbour – Onsite Observations

30. Pedestrian movements On site	On site it was observed that pedestrians were accessing dead end stubs of pedestrian paths and entering vehicle travel lanes. There is a risk that pedestrians entering vehicle travel lanes may result in pedestrian-vehicle collisions. 	Probable	Minor	High	Pedestrian access to be reviewed during construction to mitigate unauthorised crossing. E.g. Barriers/No crossing /Use pedestrian crossing/Wayfinding signage. See image of pedestrian barriers installed to prevent crossing 
31. Vegetation Sheet 045	There is large vegetation on approach to the intersection and pedestrian crossing. There is insufficient sight distance provided to signage or to pedestrians attempting to cross. There is a risk that an approaching motorist may not be aware of the pedestrian crossing or intersection configuration resulting in pedestrian-vehicle collisions or impacts with other vehicles. 	Probable	Serious	Intolerable	This finding does not require any immediate action as pedestrians do not currently cross here. There is adequate sight distance (>80m) once the kerb realignment works are complete and the pedestrian crossing is installed.

32. Vehicle Queuing On site	On site it was observed taxi and ride share vehicles were queueing around corners and across pedestrian crossings. There is a risk that a queued vehicle may block through traffic increasing attempts by other motorists to cross into opposing traffic to move around queued vehicles resulting in sideswipe collisions or head on collisions with opposing vehicles.   	Frequent	Serious	Intolerable	The existing and proposed arrangement shows no stopping along Barangaroo Ave and BB lines which indicates no stopping and no overtaking. Driver behaviour is an enforcement issue outside of design and construction works scope. Finding to be raised to road network manager (iNSW) as responsible authority.

33. Barrier end On site	There is a blunt end of a barrier adjacent to a travel lane. There is a risk that a vehicle may impact a non-frangible object resulting in injury to vehicle occupants. 	Improbable	Serious	Medium	Barrier end to be moved behind tapered barrier. See image of barrier end placed behind tapered kerb. 
34. Pit levels On site	It is unclear to the audit team of the proposed alignment and levels of the road extension, with proposed pits installed at a higher level than the existing road. There is a risk that raised pits and ramped pavement may destabilise a vehicle, in particular motorcyclists, resulting in run off road or fall off bike incidents. 	Probable	Serious	Intolerable	The final design shows the stormwater pit to be adjusted to suitably match the proposed Barangaroo Ave road levels prior to the road being opened for public access. Raised area in driveway access not in existing public roadway path of travel Interim measures have also been made to prevent any pedestrian/ vehicle hazards while that are remains part of a construction site. See image of traffic cones demarking travel path for public traffic, which mitigates the risk. 

10 Formal Statement

We, the undersigned, declare that we have reviewed the site and data listed in this report and identified the safety and operational deficiencies above.

It should be noted that while every effort has been made to identify potential safety hazards, no guarantee could be made that every deficiency has been identified.

A project sponsor is under no obligation to accept the findings outlined in this audit report. This report simply provides the opportunity to review potential safety issues highlighted by the auditors.

This audit will be recorded on the NSW Register of Road Safety Auditors and the project sponsor should expect email notification from the register to confirm the audit has been carried out.

We recommend that points of concern be investigated, and necessary corrective actions undertaken.

Aaron Walton
Level 3 Road Safety Auditor
Team Leader

Jose Villacorta
Level 3 Road Safety Auditor
Team Member