# WestConnex

New M5 Solar Access and Overshadowing Report

M5N-HSL-DRT-100-110-TR-1850\_C



Project:

WestConnex New M5

Solar Access and Overshadowing Report

Document Number:

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Client:

CPB Dragados Samsung Joint Venture

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**AERIAL VIEW NORTH WEST OVER CAMPBELL ROAD TOWARDS PRINCES HIGHWAY** (Artists impression only)







# 1 INTRODUCTION

A description of the purpose of report, project details, study area and Ministers conditions of approval relevant for this assessment.

# 1.1 Introduction

The WestConnex New M5 Project is being designed and constructed by the CPB Dragados Samsung Joint Venture (CDS).

WestConnex is one of the largest transformative urban motorway program of works in Australia – linking Sydney's west and south-west with the city, airport and port in a 33km continuous motorway. It will be the trigger for urban revitalisation providing new opportunities for residential and commercial development, making it a more attractive place to live, work and socialise.

# 1.2 Purpose

The Solar Access and Overshadowing Report has been prepared by HASSELL for CDS to satisfy the Ministers Condition of Approval B65 (SSI6788) with respect to overshadowing of residential properties caused by the WestConnex New M5 Project.

This report has been prepared to:

- · Identity potentially affected properties
- Assess the compliance at each potentially affected property, informed by:
- a review of the habitable rooms within structures,
- the size and nature of private open spaces, and
- shadow diagrams in plan and elevation at hourly intervals between 9am and 3pm on June 21; and
- Detail how potential impacts and mitigation measures will be discussed and negotiated with the affected property owners in the event that compliance with this condition is not achieved.



Figure 1-1 - WestConnex regional context map

# 1.3 Ministers Conditions of Approval

An Environmental Impact Statement (EIS) for the Project was submitted on 23 November 2015 for public exhibition and comment. On 4 March 2016, a Submissions Report was prepared in response to submissions received during the EIS exhibition period. The Plan was considered by the Department of Planning and Environment (DP&E) and informed the Minister for Planning, in the projects approval assessment.

On 20 April 2016, planning approval for the WestConnex New M5 project was received from the Minister for Planning. The approval was subject to Conditions of Approval, including clause B65 relating to overshadowing which is specific to this Report.

This Condition of Approval is contained in the following table. Compliance with the Condition is noted, and includes the location in this Plan where each item is addressed.

Condition of approval Reference

### **B65** Overshadowing

Existing residential properties (and approved residential developments) that are affected by overshadowing from the final detailed design of the SSI (including any noise mitigation measures) are to receive a minimum of three hours of direct sunlight in habitable rooms and in at least 50% of the principal private open space area between 9:00 am and 3:00 pm on 21 June.

Such properties must be identified for further consideration by the Proponent in a Solar Access and Overshadowing Report which addresses compliance with these requirements.

The Solar Access and Overshadowing Report must be submitted to the Secretary within 12 months of the SSI approval or prior to the construction of any structures that may cause overshadowing of residential premises, whichever is the sooner and must include:

(a) identification of potentially affected properties;	Section 3 - Overshadowing assessment
(b) assessment of the detailed design's compliance at each property, informed by - (i) a review of the habitable rooms within structures, (ii) the size and nature of private open spaces, and (iii) shadow diagrams in plan and elevation at hourly intervals between 9.00 am and 3.00 pm on 21 June; and	Section 3 - Overshadowing assessment
(c) a consultation plan to detail how potential impacts and mitigation measures will be discussed and negotiated with potentially affected property owners in the event that compliance with this condition is not achieved.	Appendix B - Consultation plan
Where existing residential development currently receives less than the required amount of solar access, existing access to sunlight should not be unreasonably reduced.  Where affected properties include dwellings held under strata or community title, this condition must be interpreted in relation to individual units within those properties.	Section 4 - Summary of issues

**Table 1-1 - Ministers conditions of approval** 









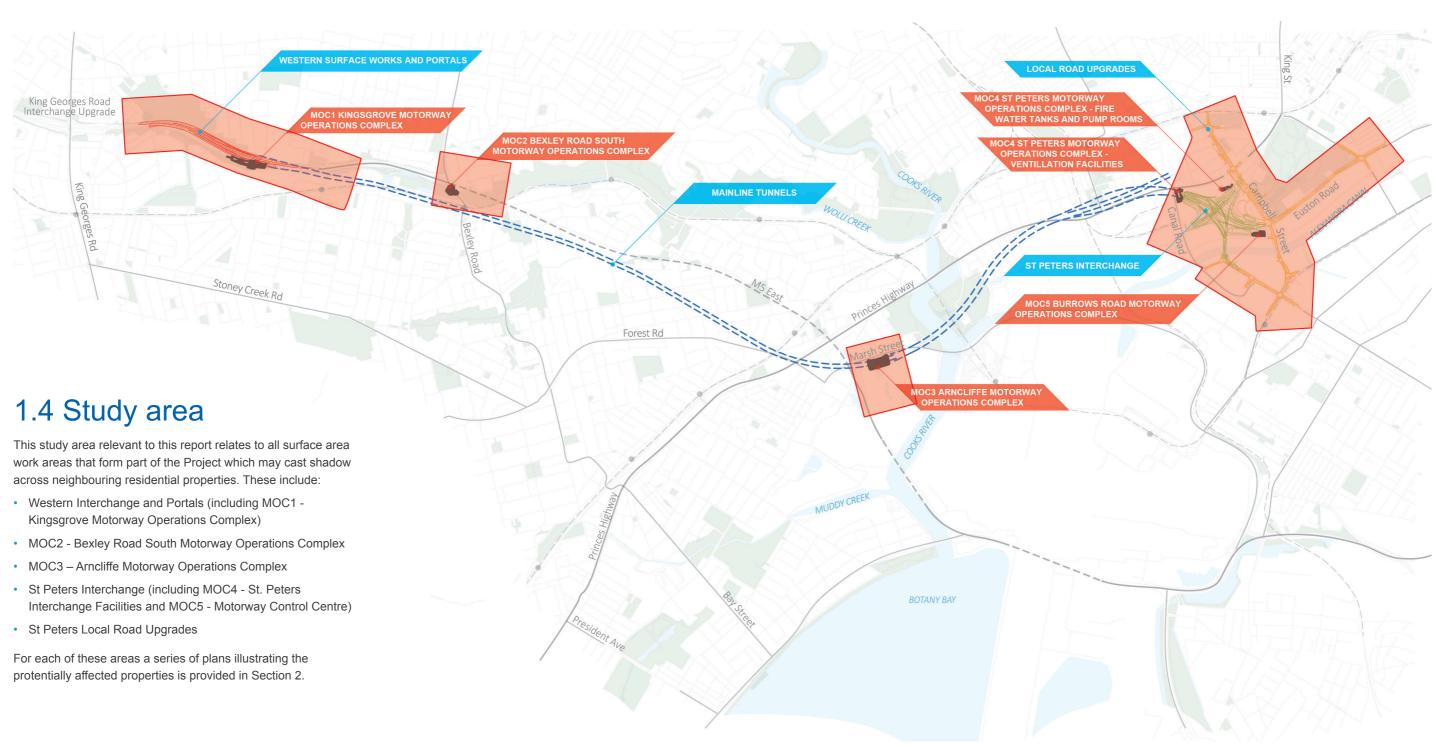


Figure 1-2 - Study area - key plan



VIEW SOUTH EAST OVER CAMPBELL STREET FROM SIMPSON PARK (Artists impression only)





# **2 METHODOLOGY**

A description of the methodology, definitions and assumptions made for the assessment.

# 2.1 Study Methodology

This report has employed best practice methodology for overshadowing and solar access analysis with reference to the methodology employed for the M4 Widening Overshadowing Assessment for continuity across all stages of WestConnex. The following work stages have been undertaken.

# **Desktop Study**

A desktop study was undertaken to identify potentially affected properties affected by overshadowing from the final detailed design of the SSI. A series of plans and tables were constructed indicating Lot Address, DP number and total lot size - refer Table 3-1 in Section 3.2.

In addition, information with respect to approved residential developments was also obtained from adjacent councils for potentially affected properties.

To calculate the duration of overshadowing, a three dimensional (3D) modelling and analysis process was undertaken using specialist software. The following steps were undertaken:

- Conversion of existing 1m contour data to a 3D surface model, to provide accurate existing terrain information.
- Creation of a combined 3D surface model including existing contour data and proposed 3D design surfaces.
- Creation of a 3D model within CAD software with existing and proposed surfaces and SSI elements such as noise walls, retaining walls, changes in landforms, motorway operations facilities and bridges.
- Cumulative and hourly overshadowing modelling on 21st June between 9am and 3pm in plan view using specialist software.
- Preparation of plan shadow figures at hourly intervals and cumulative figures to demonstrate overshadowing extents over potentially affected properties.

- Calculation of overshadowing extent across each lot's Principal Private Open Space (PPOS) using definition shown in Table 2-1.
- Calculation of overshadowing extent across each building footprint.

The desktop review identified the potentially affected properties and categorised them as existing residential properties that comply with the requirements of MCoA B65 (i.e. receives more than the prescribed minimum of 3 hours of sunlight in a habitable room and in at least 50% of PPOS).

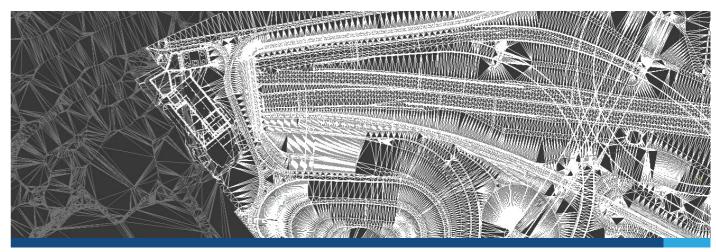


Figure 2-1 - 3D surface contour model



Figure 2-2 - Combined 3D model

# 2.2 Definitions

This report has utilised the following definitions for the analysis of overshadowing impacts on residential properties - refer Table 2-1.

Term	Definition					
Solar access	The amount of direct access to sunlight enjoyed by a building, room or open space.					
Habitable rooms	According to the Building Code of Australia a Habitable Room is:					
	<ul> <li>"A room used for normal domestic activities and</li> </ul>					
	<ul> <li>Includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre, and sunroom, but</li> </ul>					
	<ul> <li>Excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods."</li> </ul>					
Principal private open space (PPOS)	For this assessment, PPOS is "an area within a lot, extending from the rear wall of the residence to the rear boundary fence, that includes terraces, decks, garden beds, turf and paved areas that are usable for general amenity purposes."					
	PPOS excludes driveways, garages, garden sheds and other freestanding structures.					

**Table 2-1 - Definitions** 

# 2.3 Assumptions

The following assumptions were made for the assessment:

- All overshadowing analysis has been run for the winter solstice - 21st June between 9am and 3pm. This is when the sun is lowest in the sky and overshadowing is at its greatest extents.
- The terrain model used for the analysis was based on contours at 1m intervals.
- Existing and proposed noise mitigation measures throughout the Project corridor have been included within the modelling.
- Other built form and natural features within the landscape such as trees and adjacent buildings have not been included within the plan and elevation modelling process.
- An aerial mapping image has been used for the diagrams.
   This imagery is dated December 2014.

# 2.4 Accuracy

The assessment has utilised existing aerial mapping to verify the accuracy of the assessment methodology by comparing the overshadowing visible in an existing aerial photo with a 3D modelled overshadowing assessment undertaken on the same location.

As identified, the impacts of vegetation including trees and other built form are not incorporated in the assessment modelling.









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**AERIAL VIEW NORTH WEST ACROSS ST PETERS INTERCHANGE** 

(Artists impression only)







# **3 OVERSHADOWING ASSESSMENT**

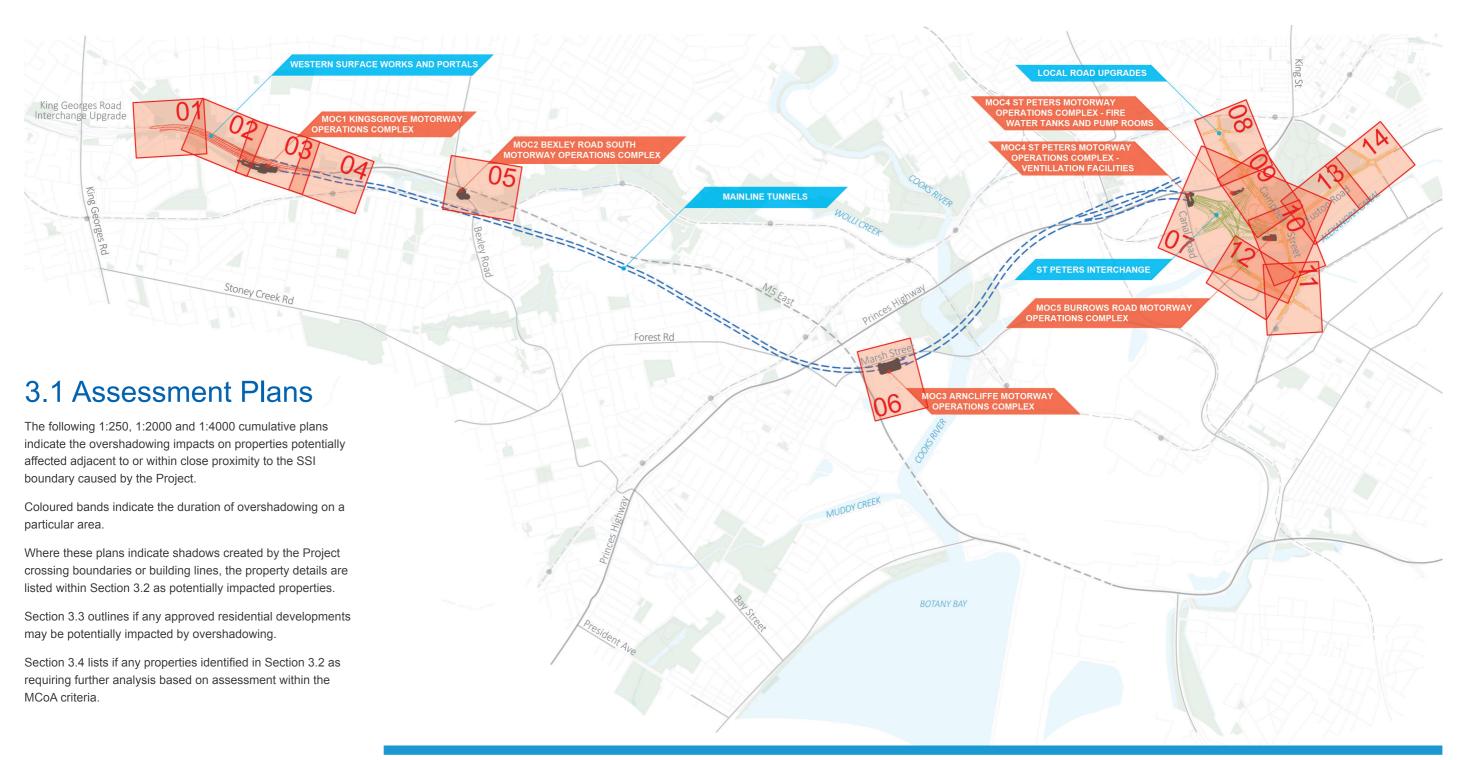


Figure 3-1 - Assessment plans - key plan



Figure 3-2 - Overshadowing Assessment Plan - Sheet 1 of 14 - 1:2000





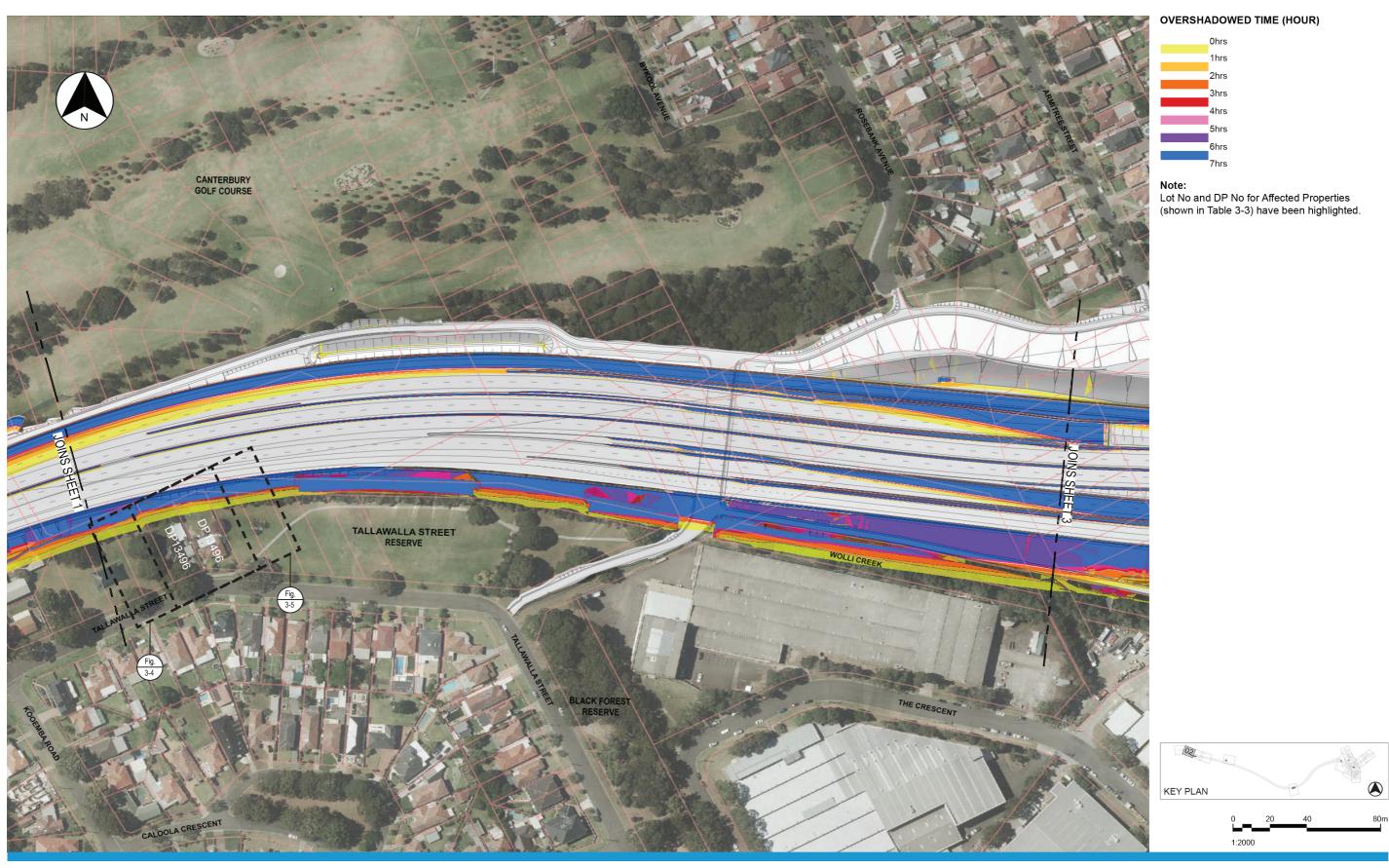


Figure 3-3 - Overshadowing Assessment Plan - Sheet 2 of 14 - 1:2000

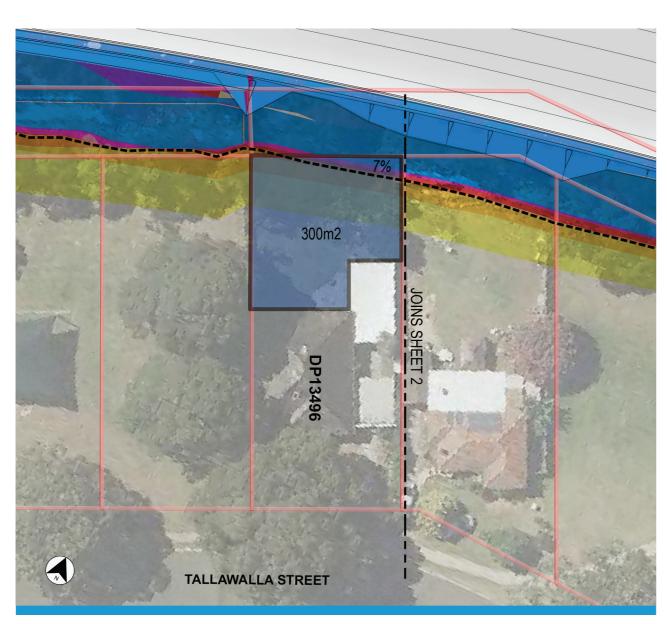
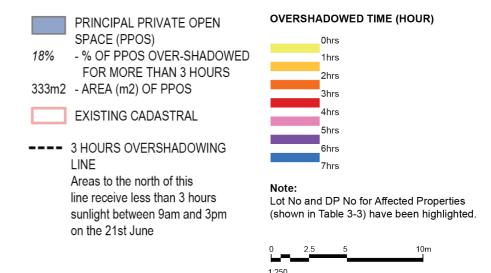


Figure 3-4 - Overshadowing Assessment Plan - Tallawalla Street detail plan - Sheet 1 of 2 - 1:250



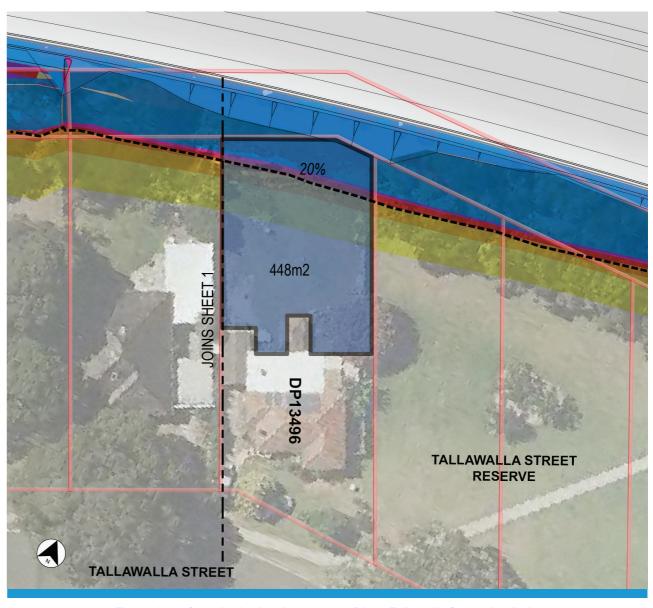


Figure 3-5 - Overshadowing Assessment Plan - Tallawalla Street detail plan - Sheet 2 of 2 - 1:250





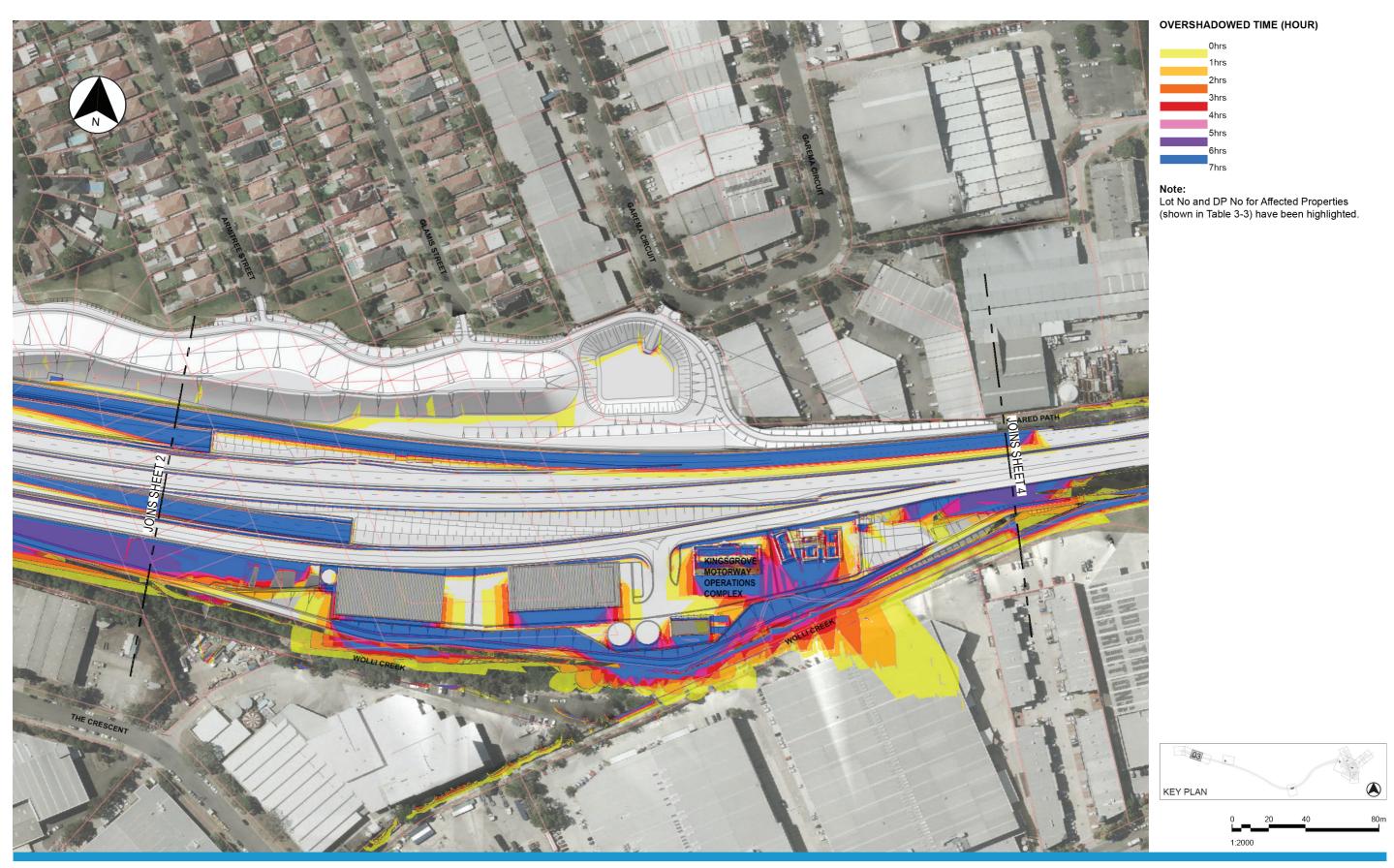


Figure 3-6 - Overshadowing Assessment Plan - Sheet 3 of 14 - 1:2000

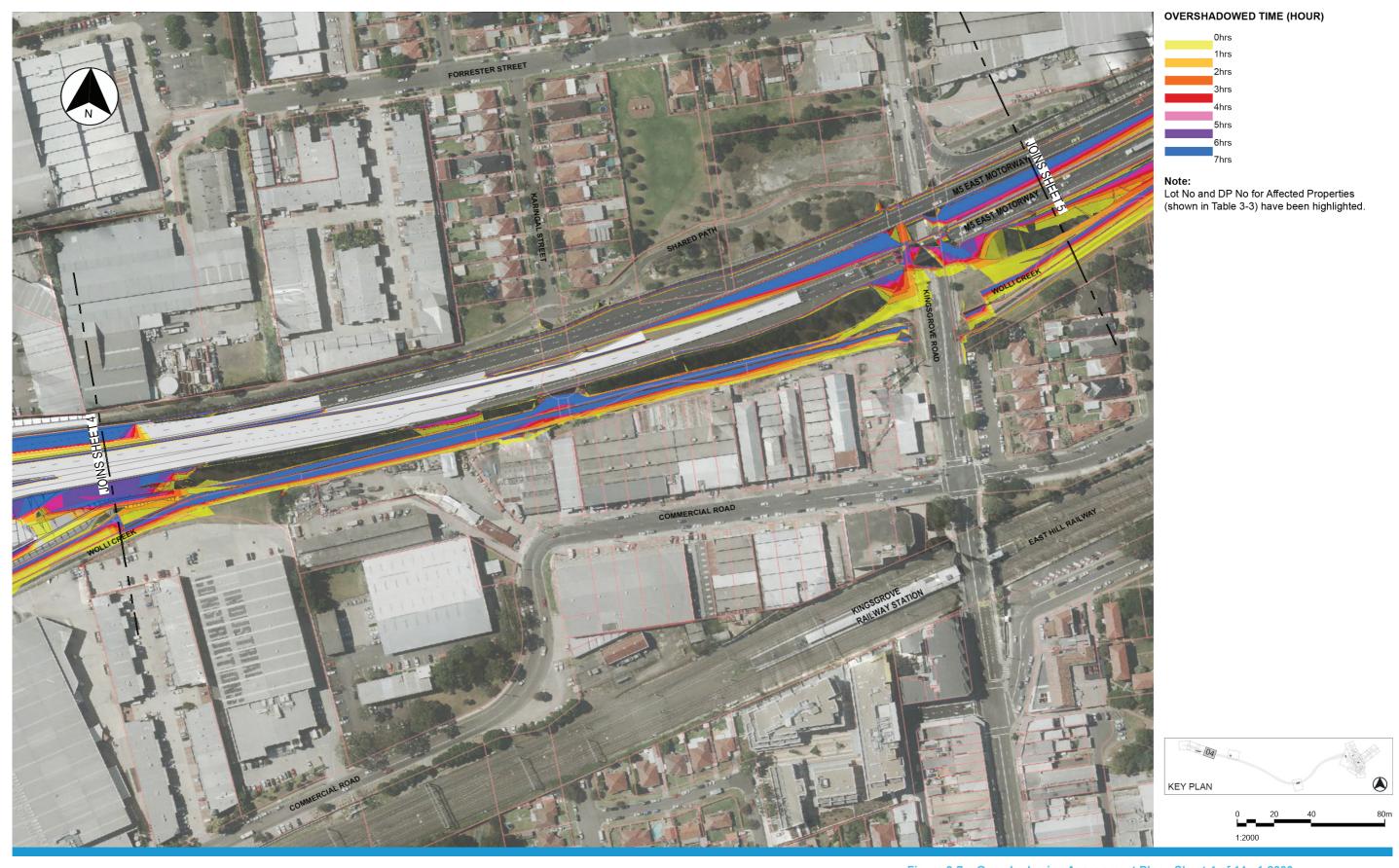


Figure 3-7 - Overshadowing Assessment Plan - Sheet 4 of 14 - 1:2000







Figure 3-8 - Overshadowing Assessment Plan - Sheet 5 of 14 - 1:2000

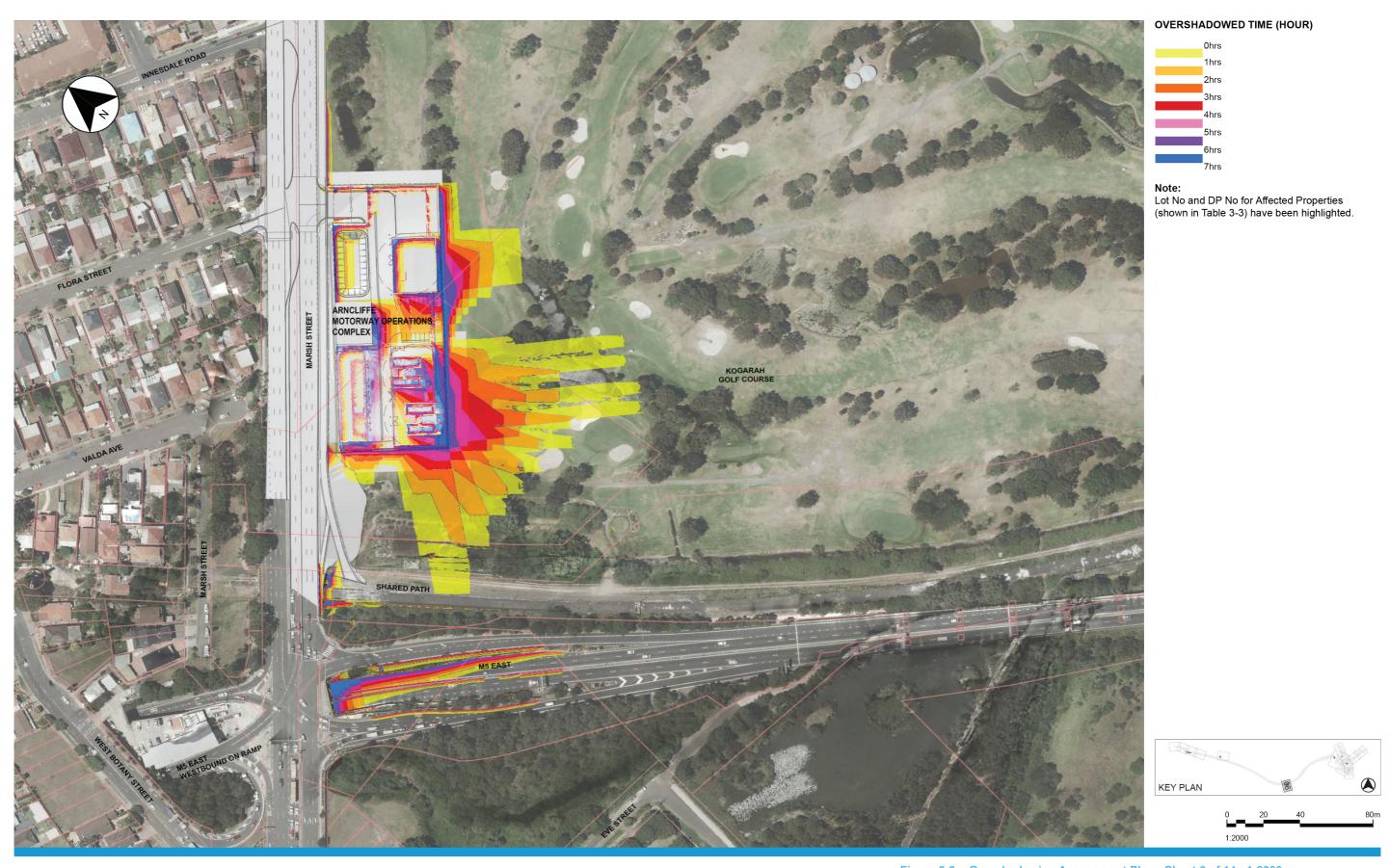


Figure 3-9 - Overshadowing Assessment Plan - Sheet 6 of 14 - 1:2000







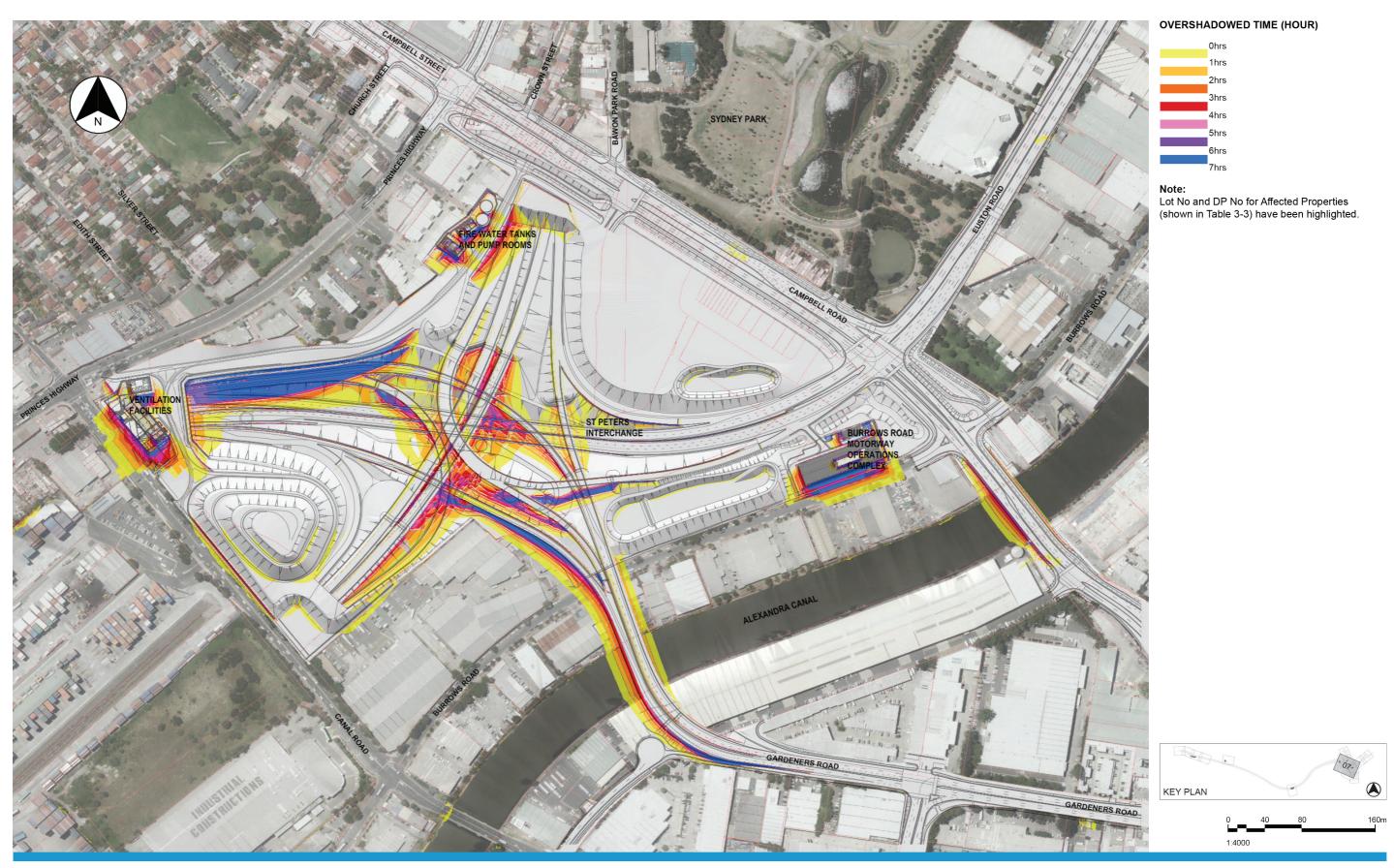


Figure 3-10 - Overshadowing Assessment Plan - Sheet 7 of 14 - 1:4000



Figure 3-11 - Overshadowing Assessment Plan - Sheet 8 of 14 - 1:2000





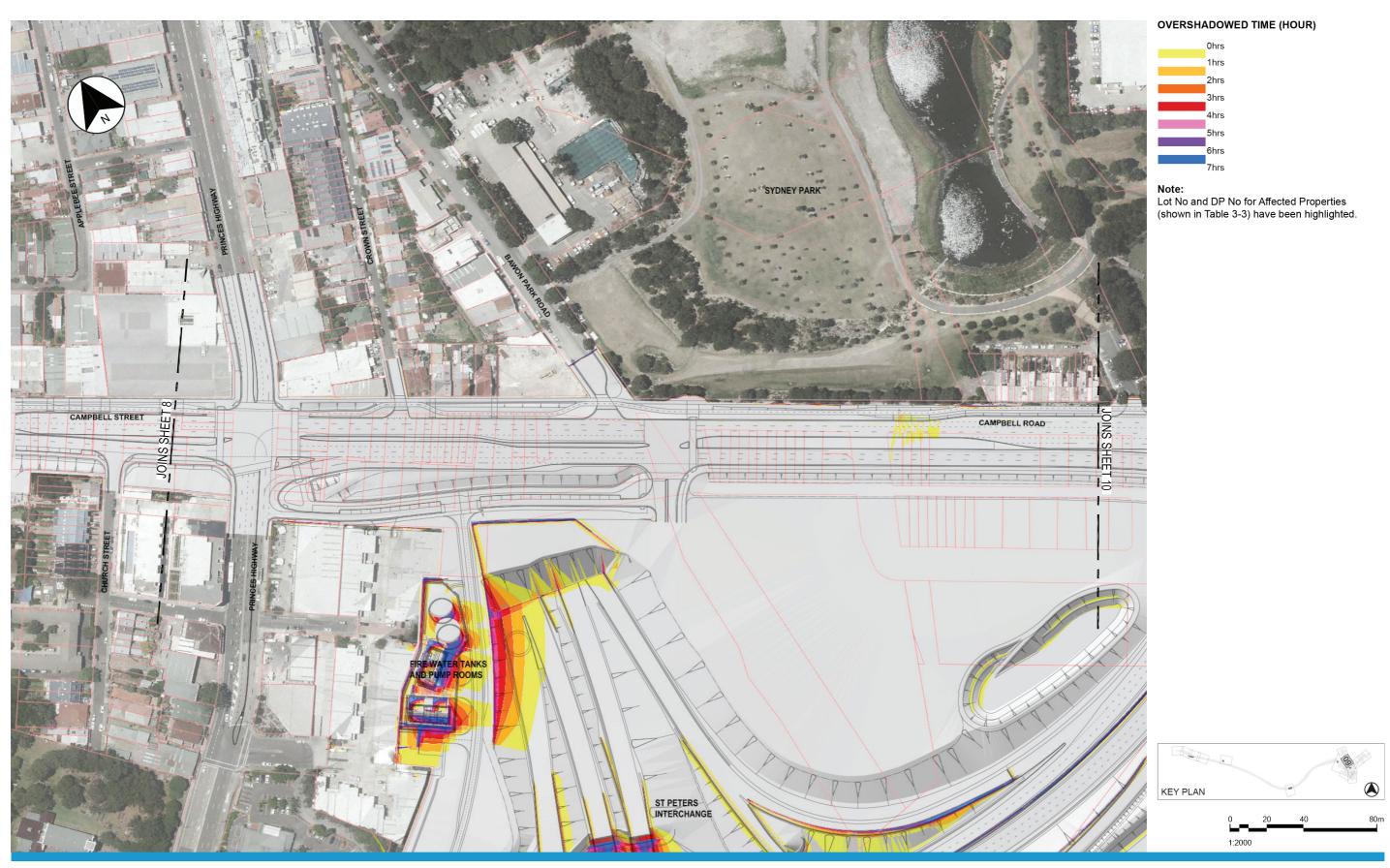


Figure 3-12 - Overshadowing Assessment Plan - Sheet 9 of 14 - 1:2000

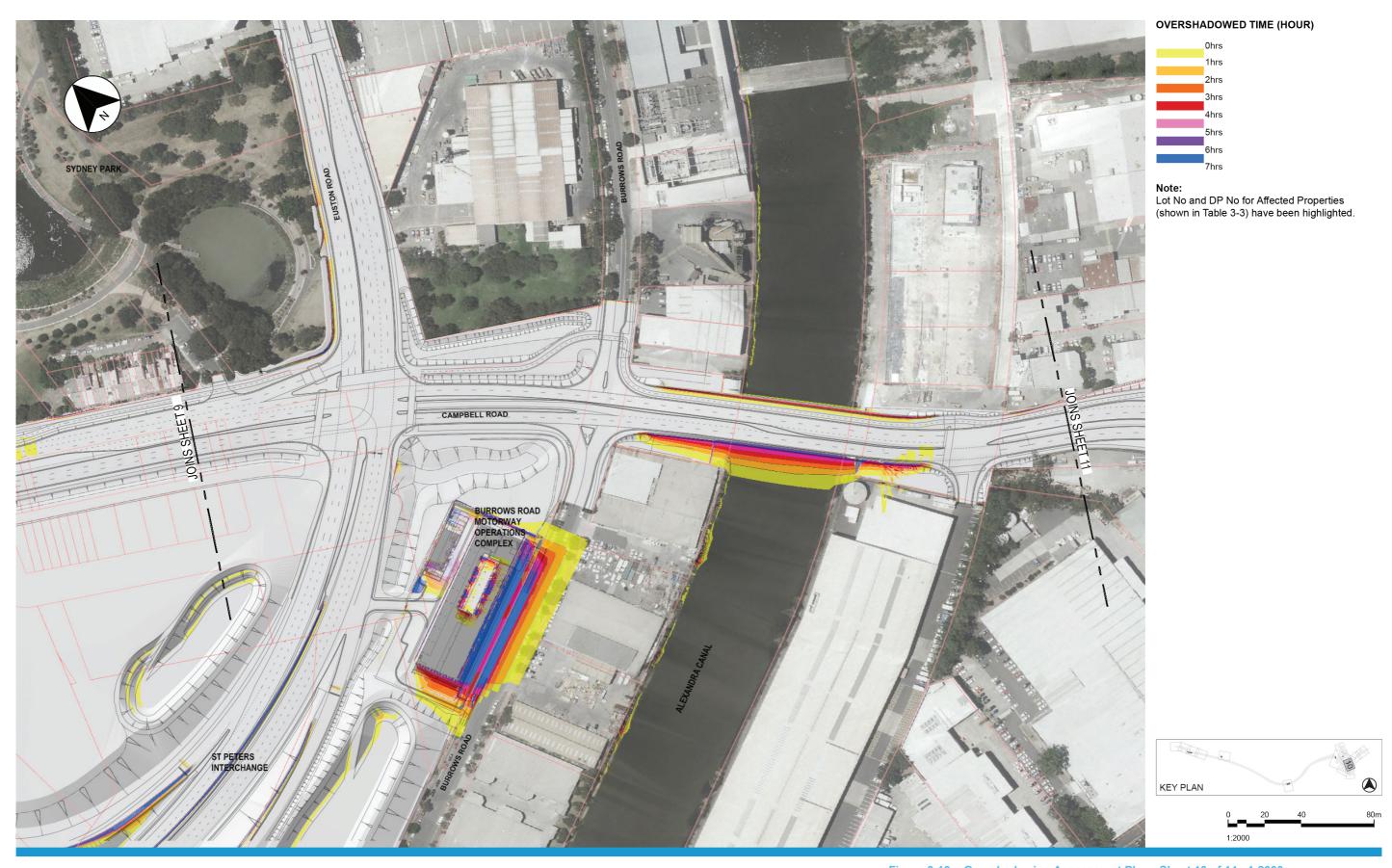


Figure 3-13 - Overshadowing Assessment Plan - Sheet 10 of 14 - 1:2000







Figure 3-14 - Overshadowing Assessment Plan - Sheet 11 of 14 - 1:2000



Figure 3-15 - Overshadowing Assessment Plan - Sheet 12 of 14 - 1:2000









# OVERSHADOWED TIME (HOUR)



Lot No and DP No for Affected Properties (shown in Table 3-3) have been highlighted.

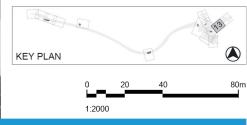


Figure 3-16 - Overshadowing Assessment Plan - Sheet 13 of 14 - 1:2000



Figure 3-17 - Overshadowing Assessment Plan - Sheet 14 of 14 - 1:2000





# 3.2 Potentially affected properties

Based on the cumulative overshadowing plans shown in this section, existing residential properties that are affected by any form of overshadowing across cadastral boundaries are listed in the adjoining Table 3-1.

Each property potentially affected is listed against the below clauses of MCoA B65 and which clause(s) that may be applicable:

- MCoA B65 receive minimum of 3hrs of direct sunlight in habitable rooms between 9am and 3pm on 21 June
- MCoA B65 receive minimum of 3hrs of direct sunlight in at least 50% of the PPOS area.

Section 3.4 of this report further investigates whether the potentially affected properties comply with MCoA B65.

3.3 App	oroved	residential
develo	pments	

CDS contacted the relevant Councils to request information on approved (and relevant) residential developments within close proximity to the Project.

Responses were received from Bayside and Inner West Councils. No response was received from City of Canterbury Bankstown, Georges River or City of Sydney Councils. A search of online DA information was therefore undertaken for these council areas.

Based on the cumulative overshadowing plans and known approved residential developments, there are no current developments identified across the Councils that would be impacted by overshadowing caused by the Project.

		Residen	tial property det	ails	Potential for property to be	affected by overshadowing?		
Unit	House No Street Suburb			Lot No	DP / SP No	Total lot size (m²)	MCoA B65 – receive minimum of 3hrs of direct sunlight in habitable rooms between 9am and 3pm on 21 June	MCoA B65 – receive minimum of 3hrs of direct sunlight in at least 50% of the PPOS area
-	74	Tallawalla Street	Beverly Hills	582	DP13496	790	No	Yes
-	76	Tallawalla Street	Beverly Hills	583	DP13496	873	No	Yes

Table 3-1 - Summary of overshadowing impacts

# 3.4 Assessment of affected properties

Each of the properties identified in Tables 3-1 as requiring further analysis were illustrated with individual Figures 3-4 and 3-5 and assessments are detailed in Table 3-2.

These assessments indicated the area of PPOS used within the calculations (where relevant), building footprints and areas of PPOS that receive less than the minimum of 3hrs of direct sunlight as noted under MCoA B65.

Based on the assessment, these two residential properties comply with MCoA B65 as they do not receive less than the required amount of solar access (3hrs of direct sunlight in at least 50% of the PPOS area) as required.

Residential property details						3hrs of direct sunlight in habitable minim rooms between 9am and 3pm on sunlight			minimum of 3 sunlight in at	MCoA B65 – receive minimum of 3hrs of direct sunlight in at least 50% of the PPOS area		
House No	Street	Suburb	Lot No	DP / SP No	Total lot size (m²)	Area of building footprint overshadowed for more than 3hrs (m²)	% of building footprint overshadowed for more than 3hrs	No. of hours of direct sunlight received (m²)	Area of PPOS over-shadowed for more than 3hrs (m²)	% of PPOS over- shadowed for more than 3hrs	compliance shown in brackets "()"	
74	Tallawalla Street	Beverly Hills	582	DP13496	790	n/a	n/a	n/a	21	7	Yes (Habitable room), Yes (PPOS)	
76	Tallawalla Street	Beverly Hills	583	DP13496	873	n/a	n/a	n/a	88	20	Yes (Habitable room), Yes (PPOS)	

Table 3-2 - Summary of affected properties







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VIEW ON APPROACH TO ST PETERS INTERCHANGE PORTAL WESTBOUND

(Artists impression only)







# **4 SUMMARY OF ISSUES**

# 4.1 Summary

Based on the overshadowing assessment in Sections 3.1 - 3.4 and summary Tables 3-1 and 3-2, there are no existing residential properties or approved residential developments that would receive less than the required amount of solar access as required under MCoA B65.

# 4.2 Campbell Road Landbridge

Based on the assessment by RMS and M5AT, the proposed Campbell Road Landbridge will not overshadow the Campbell Road Terraces, on the worst case day of 21 June, between the hours of 9am and 3pm, due to its location at least 35m to the west of No. 2 Campbell Road, as required under Planning Condition B62(a).

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# WestConnex

**APPENDIX A** 

# **HOURLY SHADOW DIAGRAMS**

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# WestConnex

**APPENDIX B** 

# **CONSULTATION PLAN**

CDS consultation plan.

# Consultation plan

### Introduction

A Solar Access and Overshadowing Report has been developed for the project in accordance with Condition of Approval (CoA B65). The report identifies that compliance with the requirements of CoA B65 will be achieved across the project. CoA B65 also requires a consultation plan to detail how potential impacts and mitigation measures will be discussed and negotiated with potentially affected property owners in the event that compliance with this condition is not achieved. The process outlined in this document will be implemented should any non-compliances be identified for the project.

A non-compliance with CoA B65 will occur in the event that between 9.00 am and 3.00 pm on 21 June:

- a) The property will not receive a minimum of three hours of direct sunlight in habitable rooms, and/or
- b) The property will not receive a minimum of three hours of direct sunlight in at least 50% of the principal private open space area.

# **Consultation Strategy**

Consultation would be undertaken with the following steps where a non-compliance with CoA B65 is identified.

## Step 1: Contact property owner

The following actions will be taken by the project to contact the property owner:

- 1. Letter issued within one month of identifying the non-compliance to property owner that includes the following:
  - Explanation of the project's overshadowing requirements
  - Expected overshadowing impact on the property and provision of website details to access the Solar Access and Overshadowing Report
  - Offer to meet or discuss over the phone the relevant mitigation options
  - Project contact details
- 2. Where no response a follow up door knock would occur after 2 weeks of issue of letter, with calling card left if no response
- 3. Where still no response a subsequent door knock after another 2 weeks.

## Step 2: Offer of mitigation measures

Once contact is made with the property owner, mitigation measures would be offered in accordance with the type of non-compliance that has been identified. Measures would focus on at-receiver treatments and would be dependent on whether the impact is identified to affect habitable rooms or open space areas or both. The project would negotiate specific measures to suit the affected property.

## Step 3: Dispute resolution

Where an agreement cannot be reached, the Escalation and Mediation Processes for community complaints outlined in the Community Communication Strategy would be implemented.















