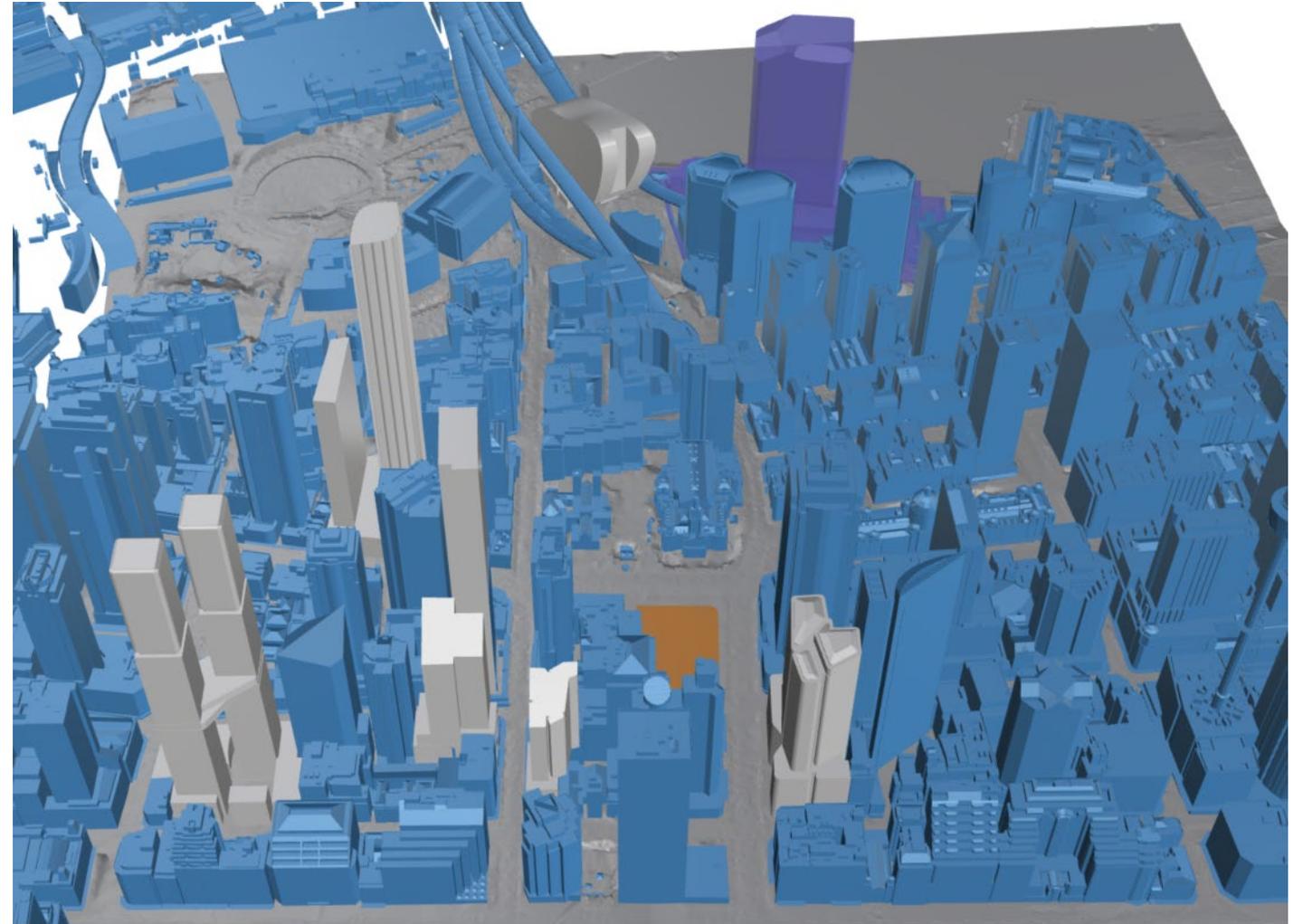


Attachment C

Overshadowing Assessment

-  - Future Town Hall Square
-  - AAM Group Context Model
-  - Approved Envelope as per Appendix H - Stage 1 DA Approved Envelope Drawings
-  - City of Sydney Approved Envelopes
 - Pitt Street South OSD
 - Pitt Street North OSD
 - Greenland Centre
 - Castlereagh Residences
 - 505 George St
 - 525 George St
 - 338 Pitt Street
 - The Ribbon / W Hotel



City of Sydney Physical Model

-  - Existing Development
-  - * Pending Approval (not included in our digital model)
- ** Harbourside has been approved but not included in these studies.
-  - Under Construction
-  - Development Approval



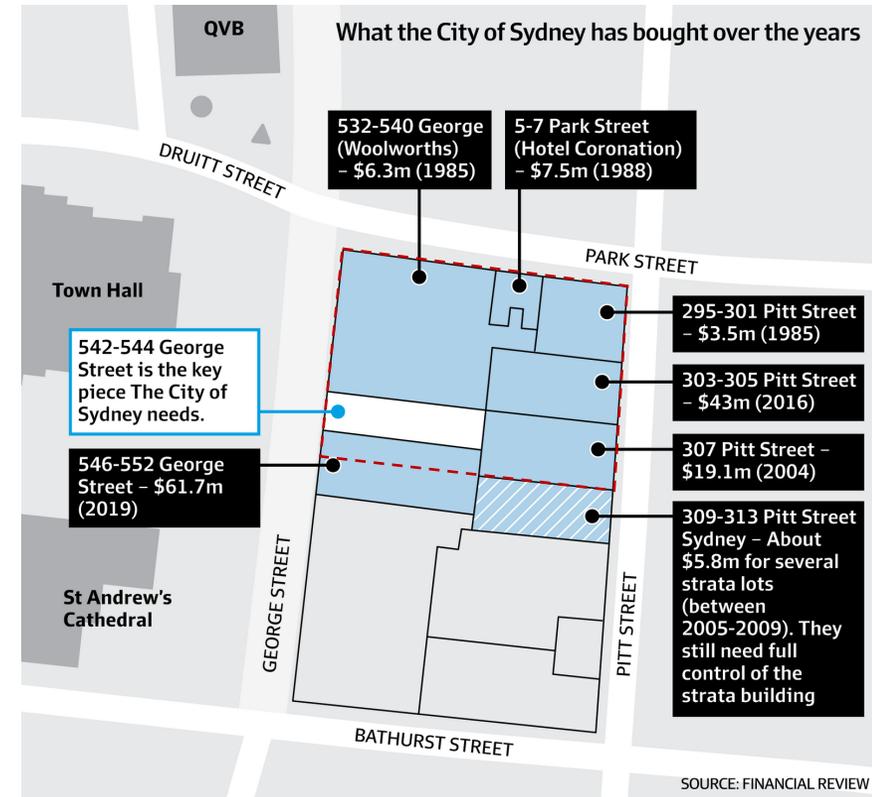
- (t) Sydney Sq and Tumbalong Park Amenity
 - The proposal should not impose any additional overshadowing of Sydney Square or Tumbalong Park and the Children's playground
- (u) Town Hall Square
 - no additional overshadowing of the future THS before 4:00 pm at any time throughout the year
 - no overshadowing the future THS after 4:00 pm beyond the maximum overshadowing impact of a tower in northern location, being:
 - maximum 48 days throughout the year
 - maximum 30 minutes on the peak day
 - maximum 2.46 hours annual average overshadowing
 - maximum 0.8% overshadowing increase on the peak day.
- (v) Cockle Bay waterfront overshadowing.
 - No additional overshadowing by the tower to the Cockle Bay promenade during the draft CSPA control time of 11am – 3pm on 21 June (mid winter).
- (w) Residential Solar Access
 - Maintain ADG compliance of open space and living space of downstream residential buildings
 - The proposal shall not impact access for 222 Sussex St (Astoria Tower) at any time on the 21 June (mid winter)
 - Overshadowing impacts for the remainder of the year (summer, autumn and spring) to the apartments within the western elevation of the Astoria Tower shall, as minimum, be consistent with the impacts assessed with the shadow studies submitted with the concept approval. In addition, within the parameters set by the building envelope and the concept approval, the design of the development shall endeavour to improve upon the impacts assessed with the shadow studies.
- Crescent Garden: The Department considers the reduction of sunlight to Crescent Garden is acceptable as:
 - the Eastern portion of the park (approximately 40%) retains more than 1.5 hours of sunlight in mid-winter.

Town Hall Square Testing Area

- The surface area from the previous shadows studies done by FJMT for the approved envelope has been overlayed with the project's Sydney Lot Boundaries (Sourced by UDP – GIS Data). There is no detailed information as to what is the exact extent of Town Hall Square
-
- Testing will be done annually, on a 2.5 sqm grid every 15 minutes.
 - That will give the periods in days that the proposed scheme is overshadowing.
 - Once that is achieved, the analysis will be done on a 1 sqm grid every 5 minutes interval.
 - This will give us the maximum period of overshadowing on the peak day, including the areas and % of increase.



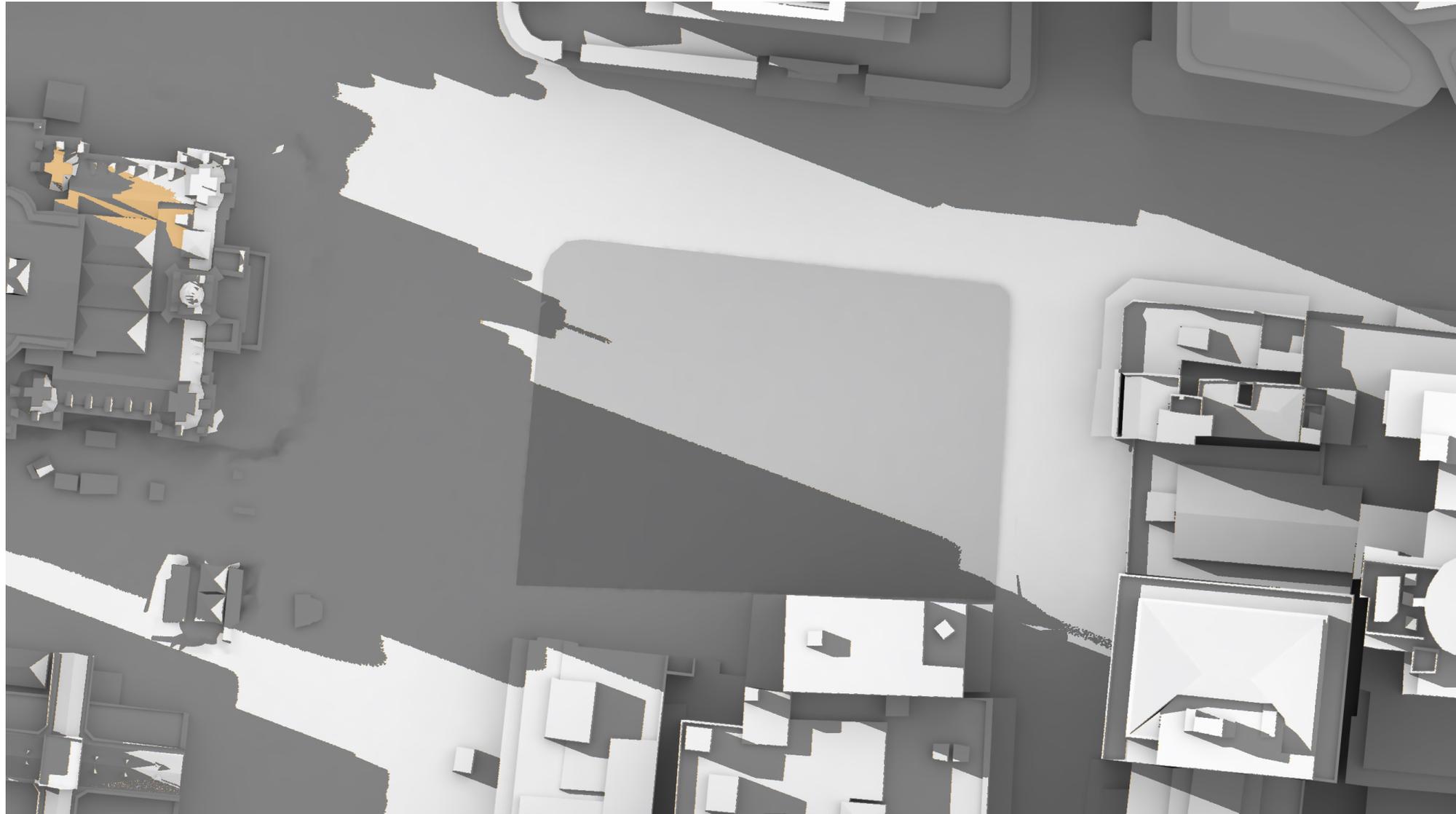
- - - - Fjmt – Town Hall Sq Boundary
- - - Sydney Lot Boundary
- Town Hall Square



SSDA 7684 – Condition B1 - (u) Town Hall Square Overshadowing Results – Update 2 m Screen

SSDA 7684 - Condition B1 (u) Future Town Hall Square			
	SSDA Control	Proposal	Complies
Maximum Days of Overshadowing through out the year after 16:00	48	45 (25 March to 15 April / 28 August to 19 September)	
Maximum Hours of Annual Average Overshadowing	2.46 hours	1.64 hours	
Maximum Overshadowing increase on the Peak Day	0.80%	0.59%	
Maximum time of Overshadowing on Peak Day	30 minutes	7 September – 30 minutes from 16:04 to 16:33	

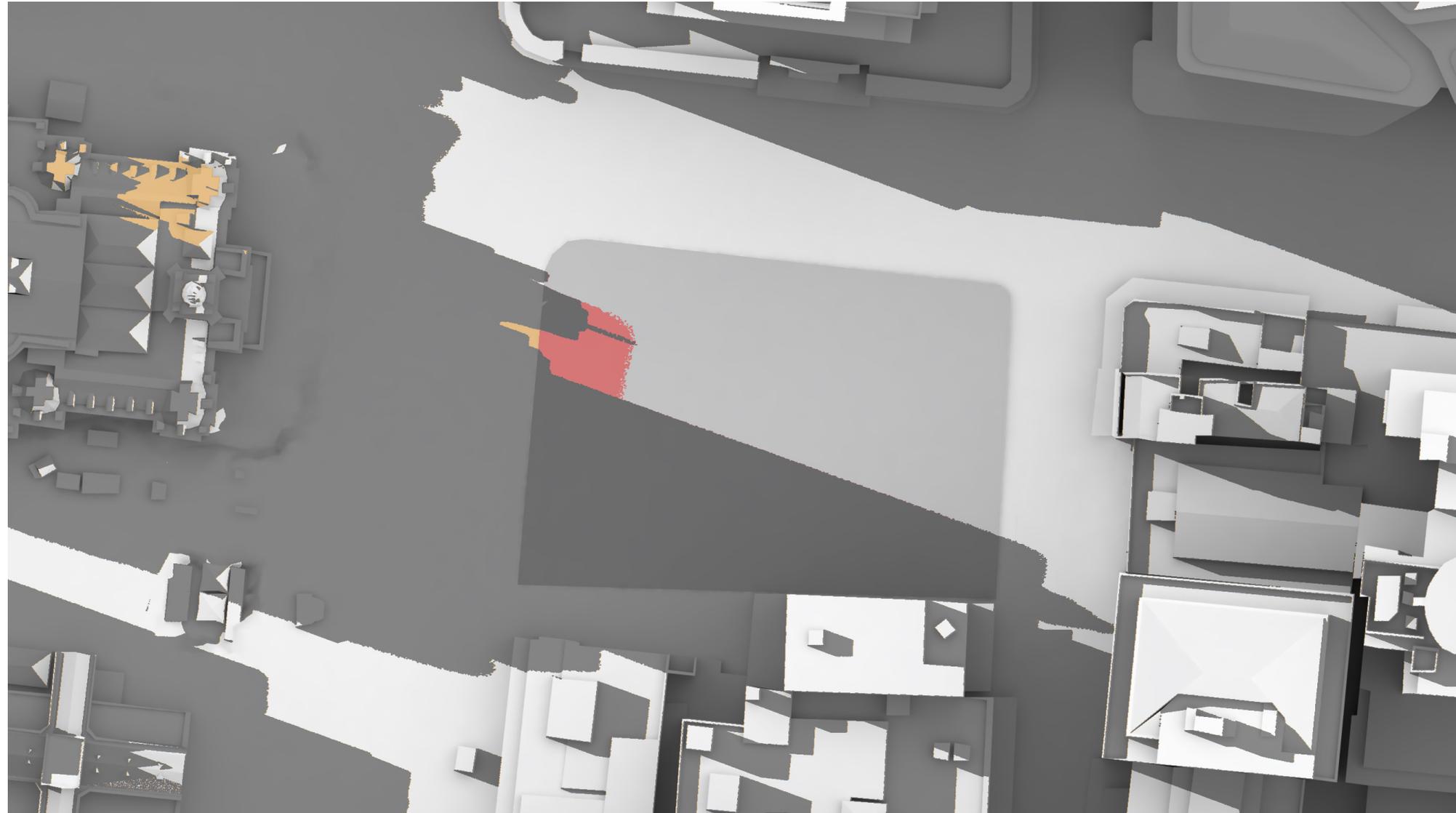
SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:00



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

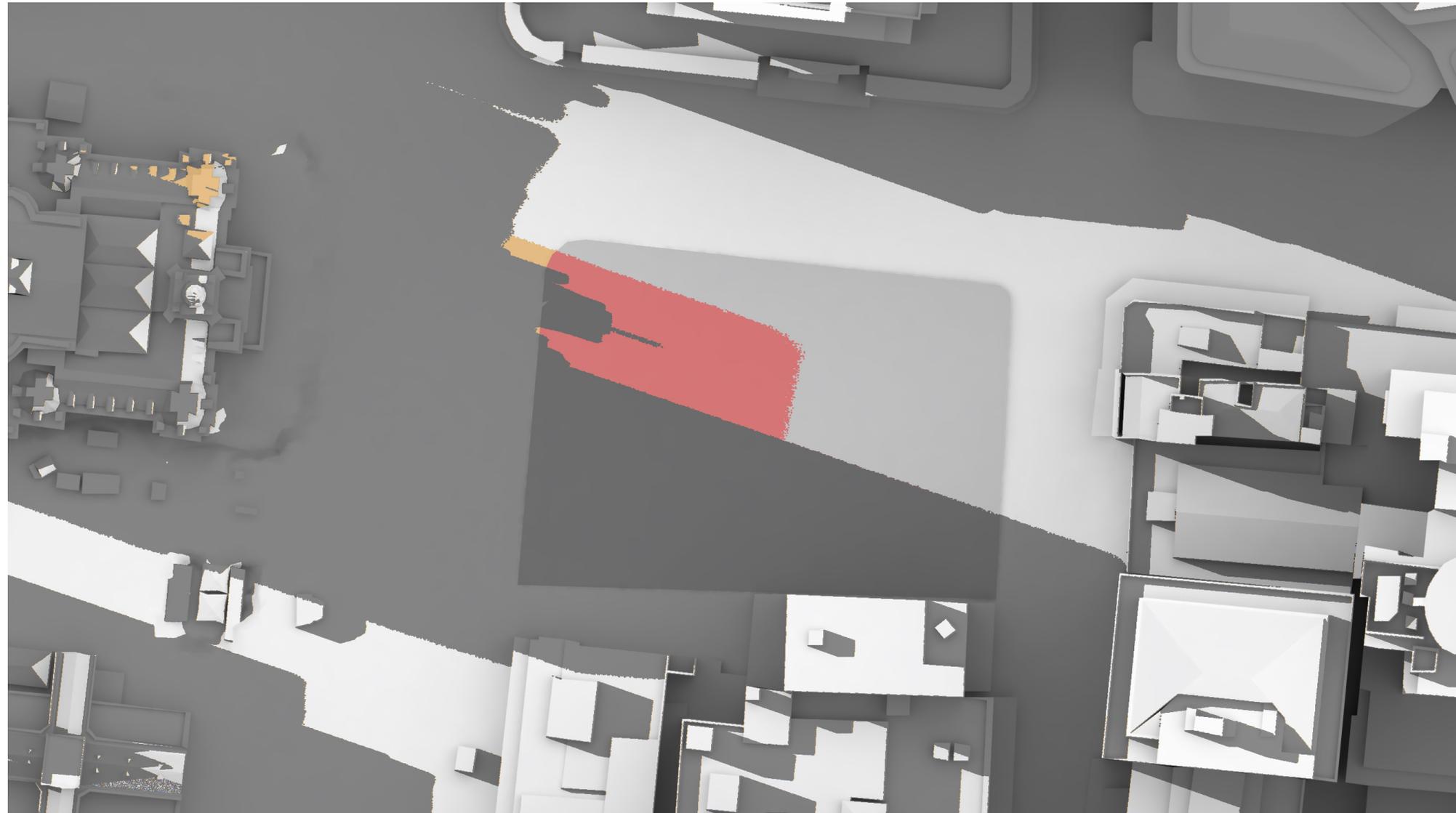
SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:05



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

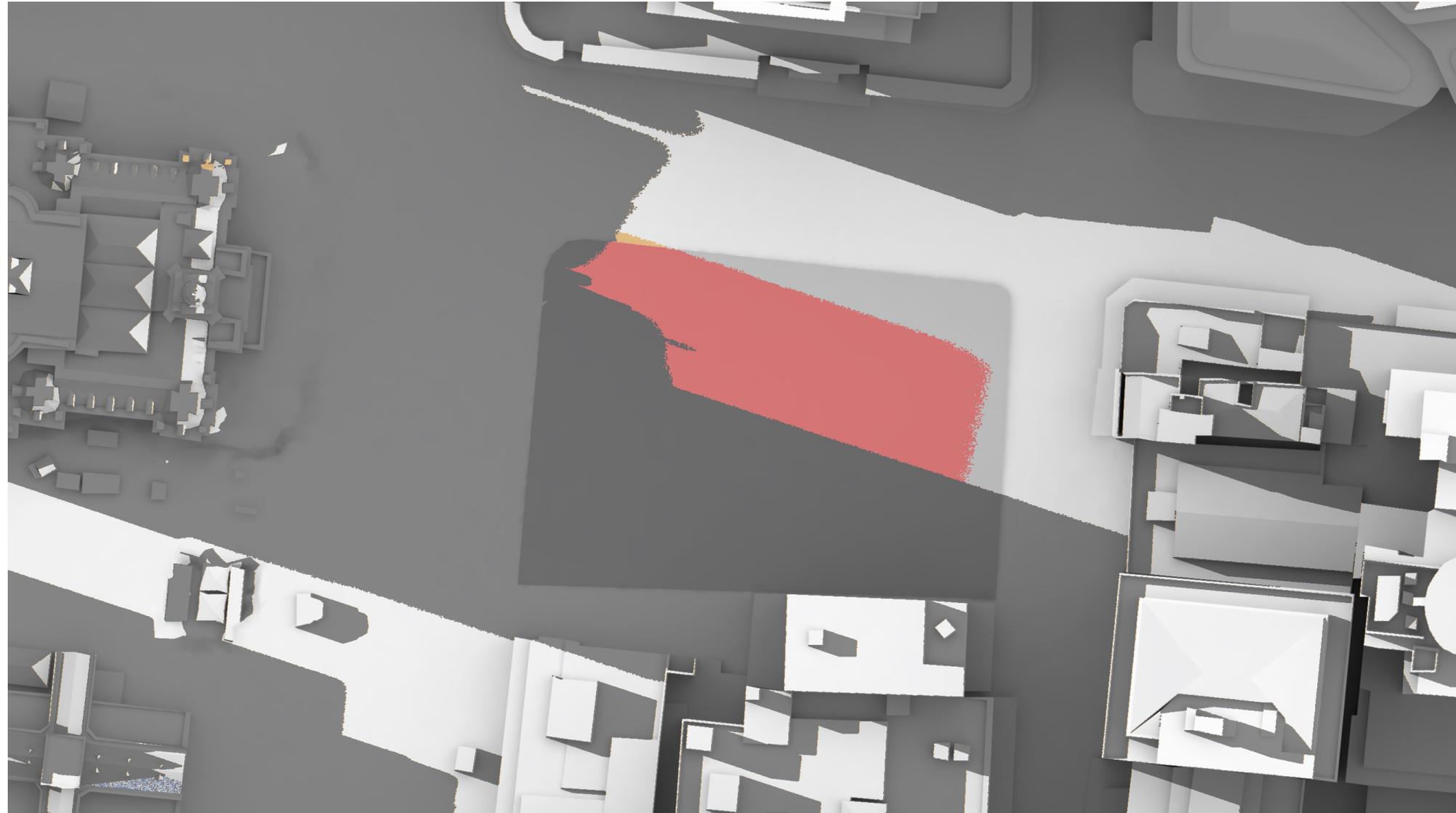
SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:10



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

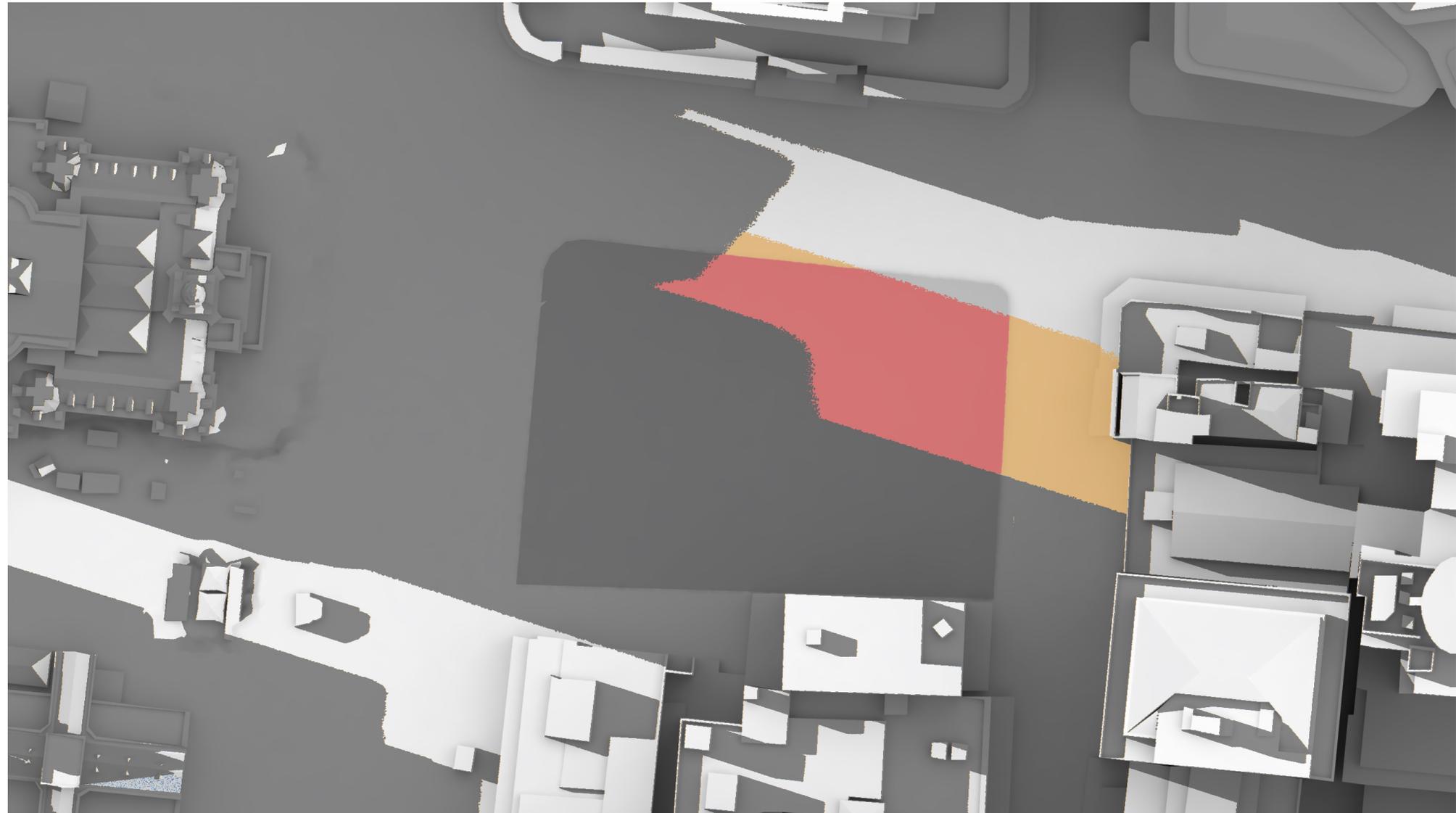
SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:15



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

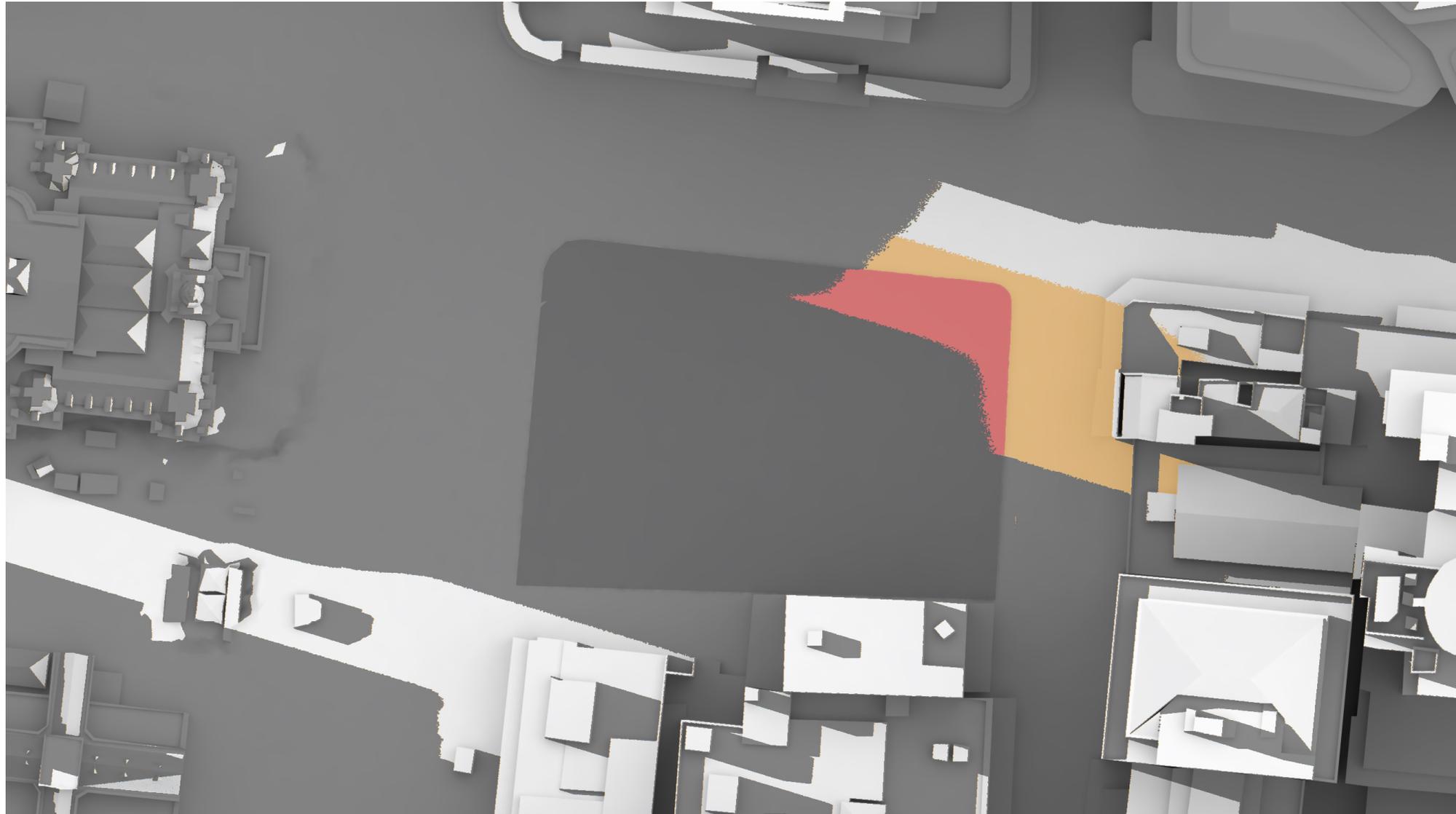
SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:20



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:25



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:30



 - Additional Overshadowing

 - Additional Overshadowing inside Town Hall Square

SSDA 7684 – Condition B1 - (u) Town Hall Square
7 September Additional Overshadowing – 16:35



 - Additional Overshadowing

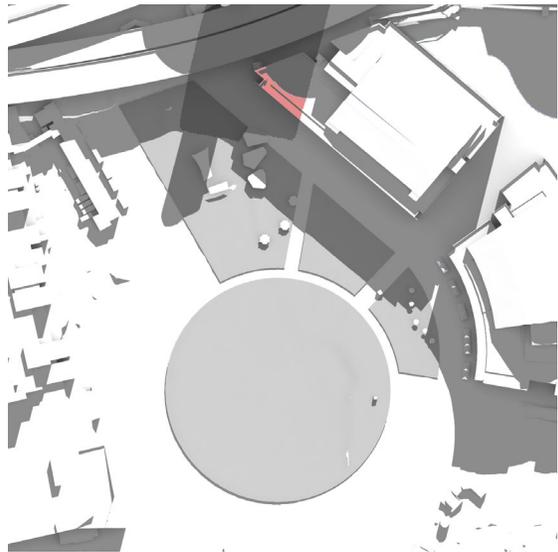
 - Additional Overshadowing inside Town Hall Square

SSDA 7684 – Condition B1 - (t) Sydney Square and Tumbalong Park

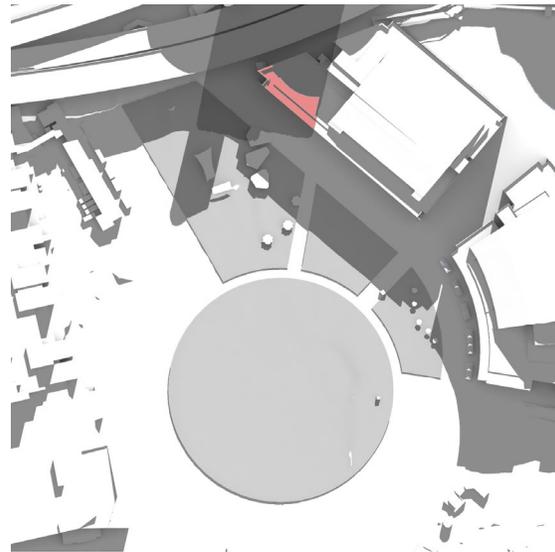
21 June Shadow Study

The Proposed Building Mass does not impose any additional overshadowing of Tumbalong Park and the Children's playground throughout the year including the period of control stated in the draft CSPS (i.e. 14th of April to the 31st of August between 11am to 4pm).

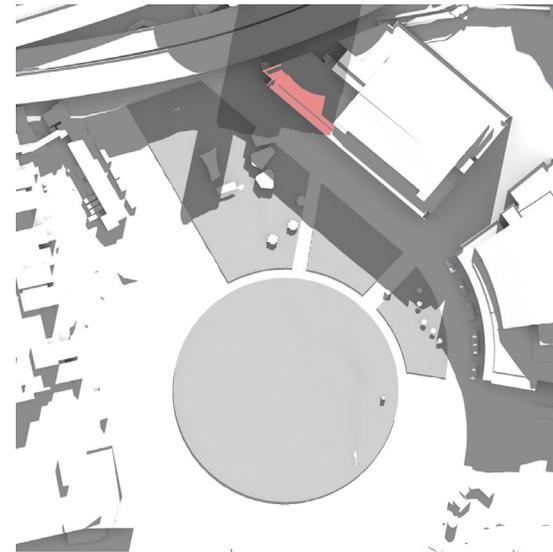
The images below demonstrate how the Proposed Building does not overshadow the Tumbalong Park or the Children's Playground on the 21st of June (worst day of overshadowing).



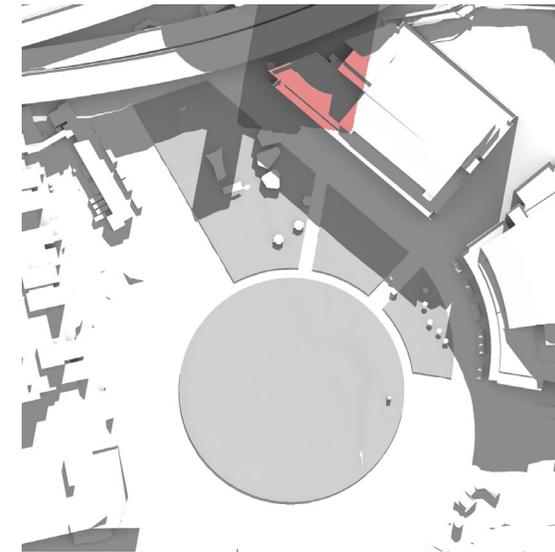
11:00



11:05



11:10



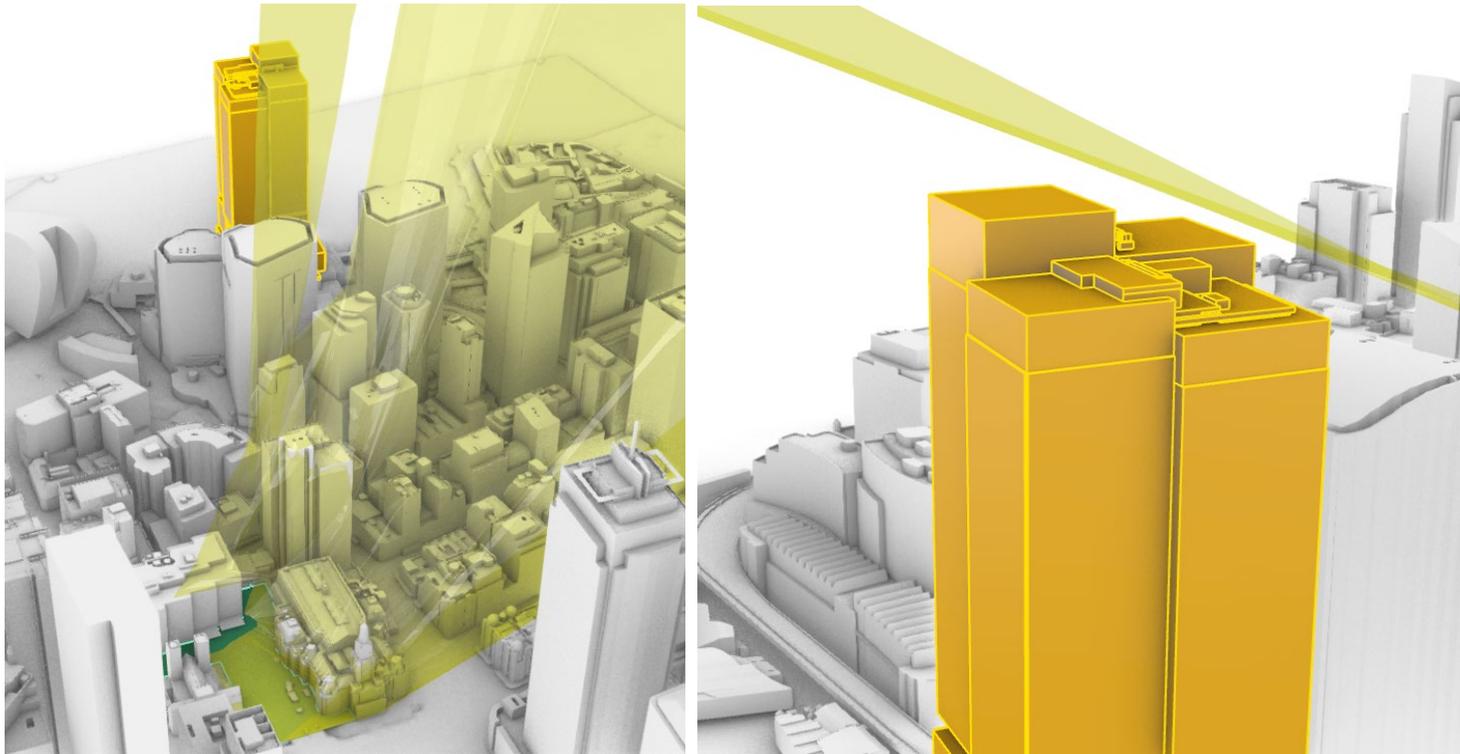
11:15

 - Additional Overshadowing

SSDA 7684 – Condition B1 - (t) Sydney Square and Tumbalong Park

The Proposed Building Mass does not impose any additional overshadowing of Sydney Square throughout the year including the period of control stated in the draft CSPS (i.e. 14th of April to the 31st of August between 11am to 4pm)

The Proposed Building Mass sits below the *No Additional Overshadowing Solar Access Plane* from Sydney Square.



 - No Additional Overshadowing Solar Access Plane – Sydney Square



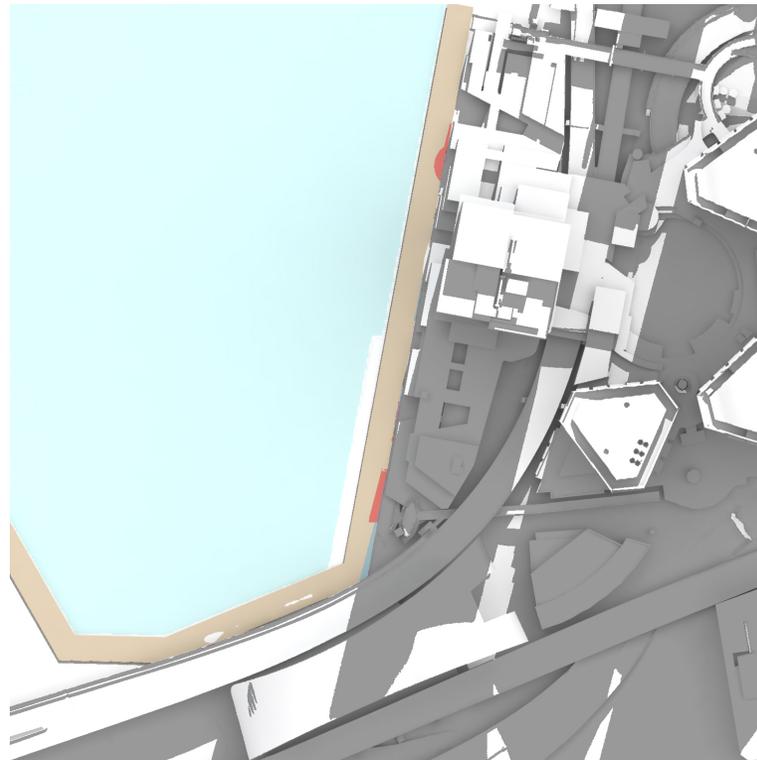
SSDA 7684 – Condition B1 - (v) Cockle Bay waterfront overshadowing

No additional overshadowing by the tower to the cockle bay promenade during the draft CSPS control time of 11am – 3pm on 21 June (mid winter).

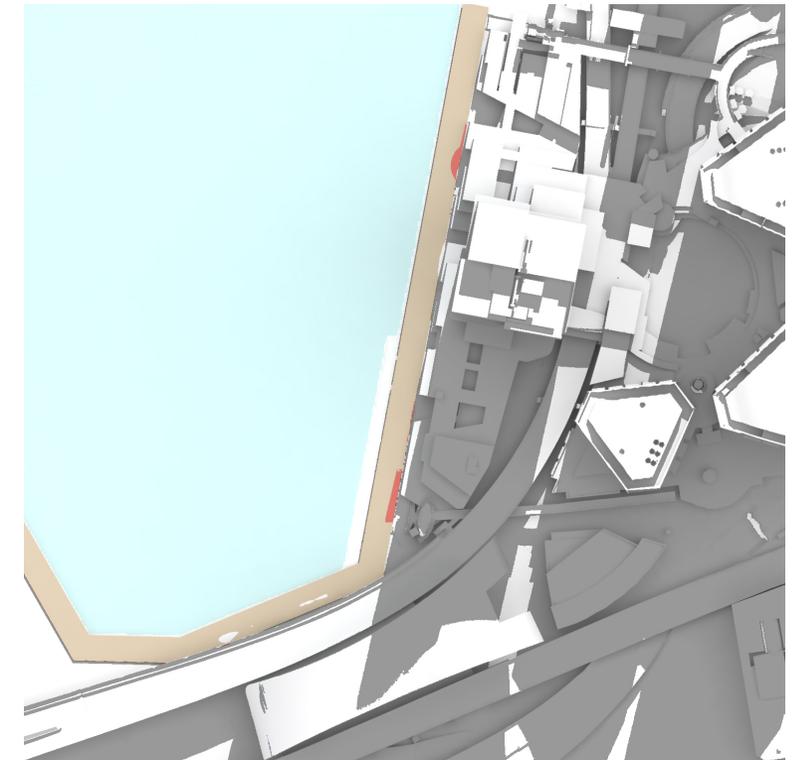
The Proposed Building Mass does not generate any additional tower overshadowing to the 11.6m promenade zone on the 21st of June between 11am to 3pm.

The table and images below illustrate how the Proposed Building Mass has further reduced the overshadowing produced by the current condition of the existing Cockle Bay Wharf.

Additional Overshadowing Promenade - 21 June		
Time	Current Condition of Existing Cockle Bay Wharf (sqm)	Future Condition of Proposed Building Mass (sqm)
11:00	140.07	27.83
11:05	120.05	0



11:00



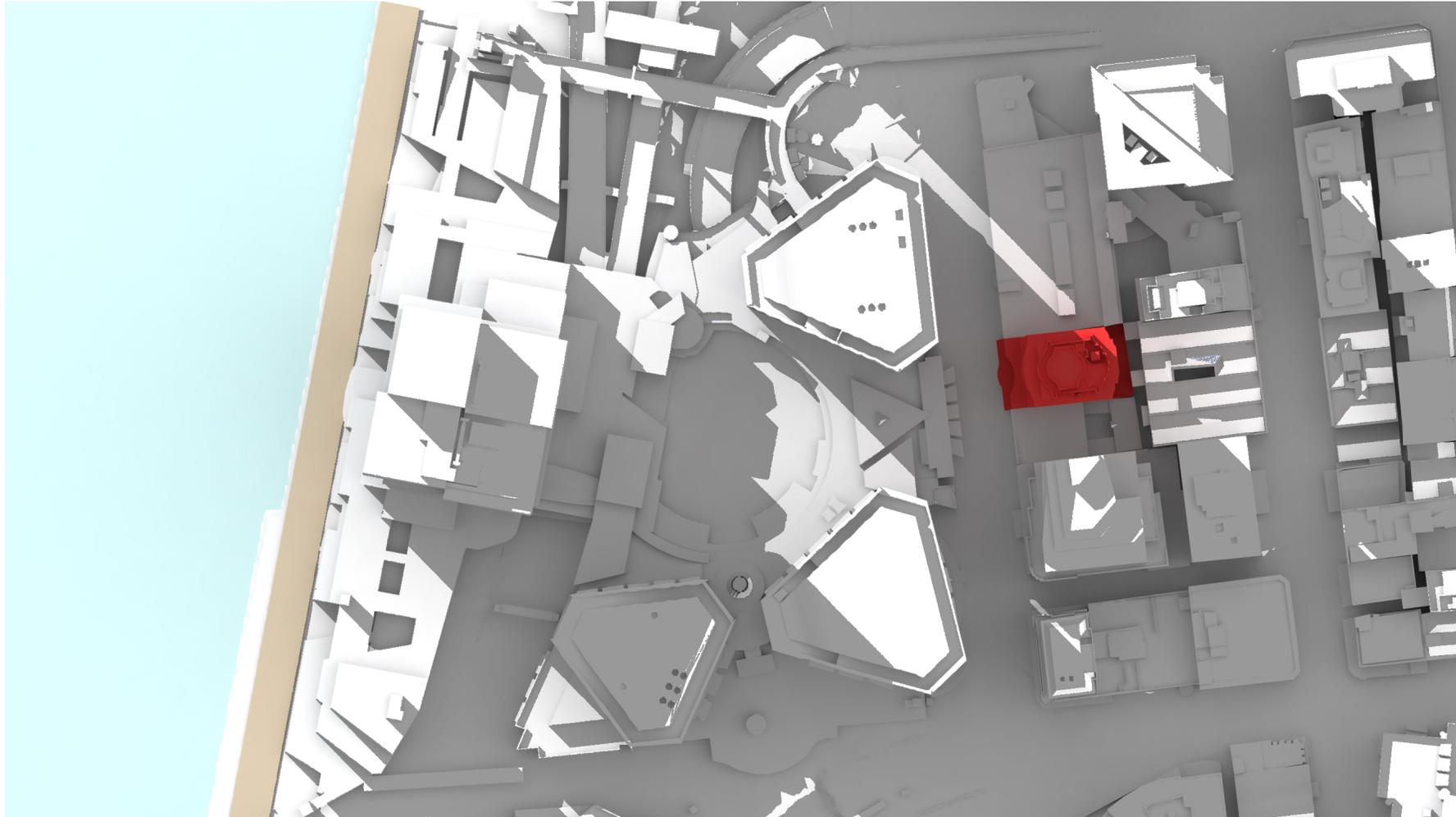
11:05

- Current Condition of Overshadowing of Cockle Bay Wharf
- Future Condition of Proposed Building Mass

SSDA 7684 – Condition B1 – (w) Residential Solar Access

ADG Solar Access Compliance

The Proposed Building Mass does not impact solar access for 222 Sussex Street (Astoria Tower) at any time on the 21st June (mid winter). The image below illustrated how the Astoria Tower already has no access to direct sunlight on the 21 June.



Shadow at 15:00 on June 21st

 - Astoria Building

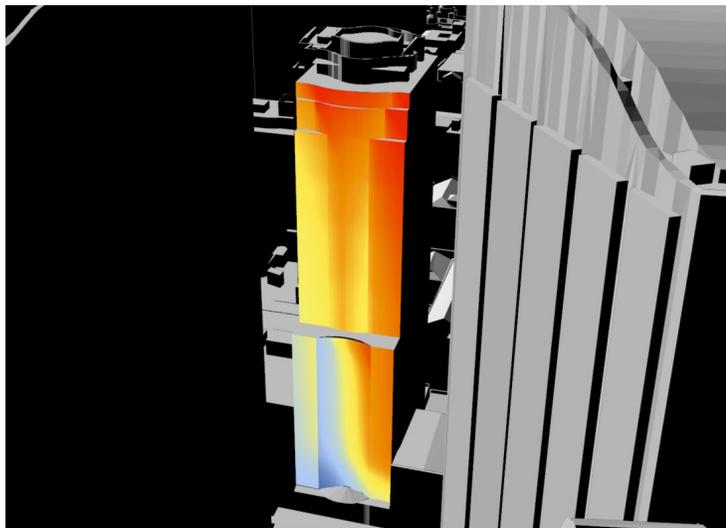
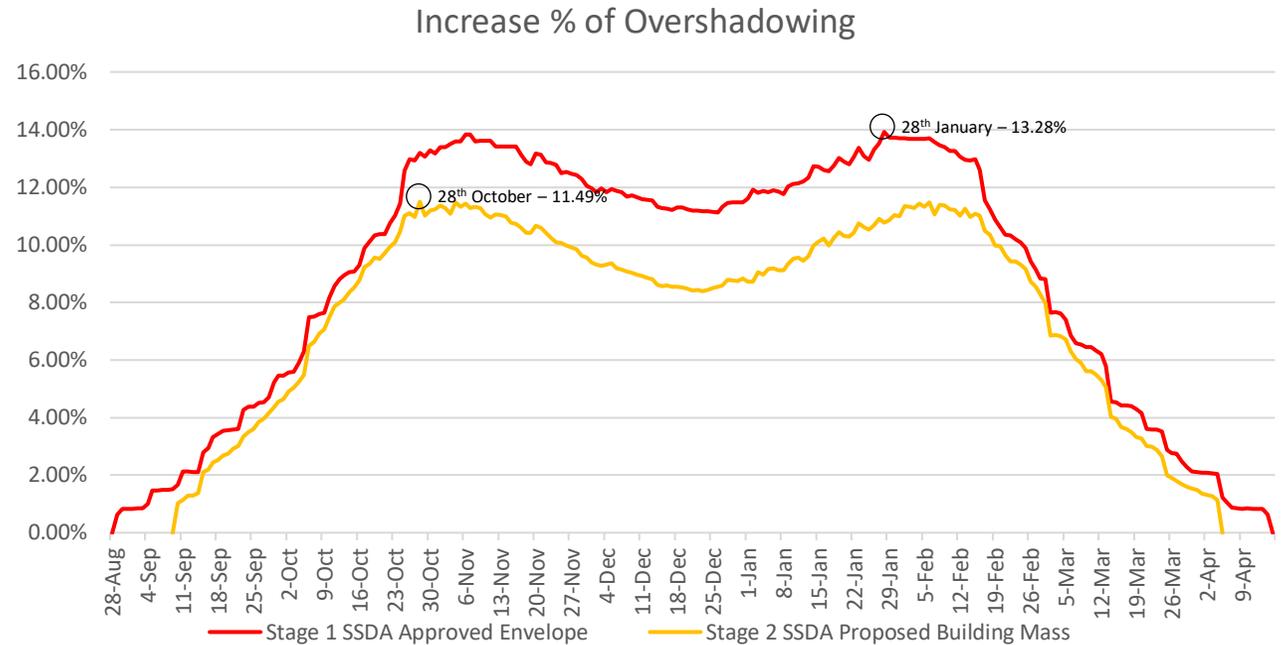
SSDA 7684 – Condition B1 – (w) Residential Solar Access

Improvement of overshadowing outside Winter Period.

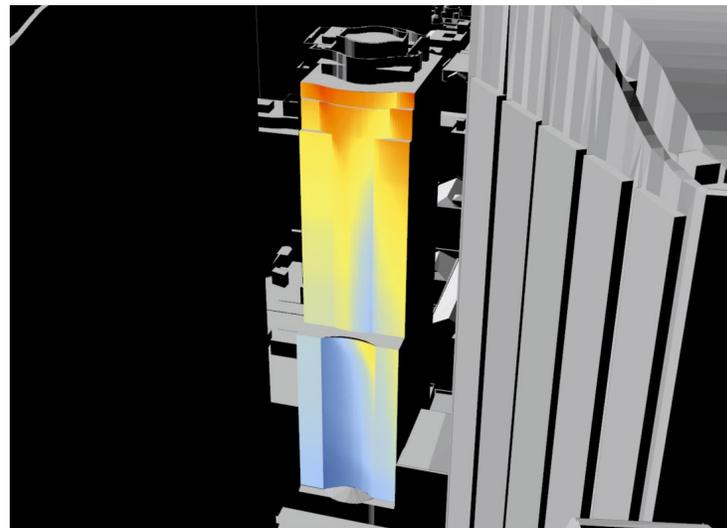
The Proposed Building Mass improves solar access to the Astoria Tower outside mid winter by reducing the extent of overshadowing through the year in comparison to the Approved Envelope. The Approved Envelope will result in overshadowing of 229 days while the Proposed Building Mass will result in overshadowing of 207 days, starting on the 10th of September to the 4th of April.

The worst day of overshadowing caused by the Approved Envelope is on the 28th of January with an average overshadowing increase of 13.28%. On the most affected day of overshadowing caused by the Proposed Building Mass, 28th of October, there is an average overshadowing increase of only 11.49% which is an improvement of 13% on the additional overshadowing caused previously by the Approved Envelope.

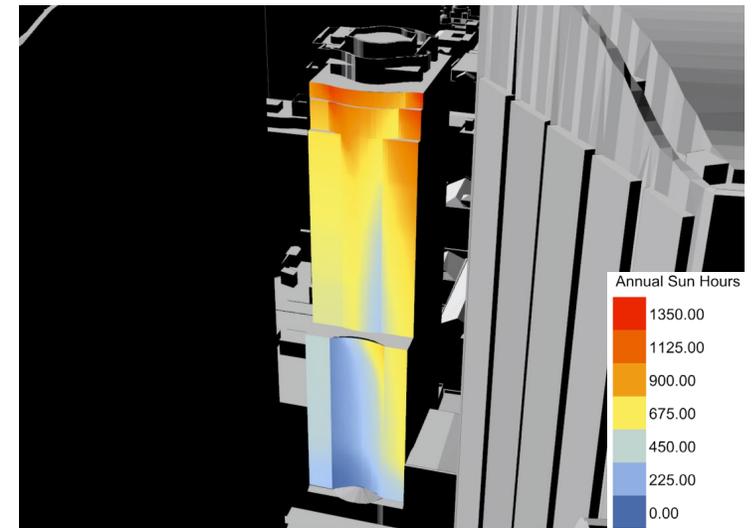
On the 28th of January, (the worst day of overshadowing from the Approved Envelope) the western façade receives sun from 11:30 to 15:10 which is an increase of 40 minutes of solar access increase. On the 28th of October, (the worst day of overshadowing from the Proposed Building Mass) the western façade receives sun from 11:30 to 15:10. Which is an increase of 40 minutes of solar access in comparison to the previous worst day.



Stage 1 SSDA - Existing Condition



Stage 1 SSDA - Approved Envelope



Stage 2 SSDA - Proposed Building Mass