

OPEN SPACES IN CITY CENTRES

Solar Amenity Study

Case Study: Paul Keating Park

Final - 23 September 2019



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Executive Summary

Executive Summary

In the next 20 years, the quality of Bankstown’s public spaces will be integral to the success of the regional centre. Bankstown CBD will undergo transformational change with significant new development and infrastructure planned. Under the South District Plan, the residential population and employment in the CBD is set to double by 2036. Bankstown Health and Education Precinct and Bankstown Airport and Milperra Industrial Area are identified as a Collaboration Area. Major redevelopments such as Bankstown RSL Club, Bankstown Sports Club, the Compass Centre, as well as numerous apartment developments are changing the urban landscape of the CBD, bringing more residents and retail experiences. The potential Western Sydney University Bankstown campus (WSU) proposed to be located adjacent to Bankstown Learning and Knowledge Centre (BLaKC) at 74 Rickard Road is forecast to bring 5,000-8,000 students to the CBD each day. The proposed Sydney Metro anticipates improved accessibility to the CBD destination. These transformational initiatives will change the demand for public open spaces and communal spaces and how existing spaces are utilised in the CBD in the future.

Paul Keating Park (the Park) is at the forefront of these changes. The Park is Bankstown’s premier public space. It serves and will continue to serve a large and growing population of residents, visitors, workers and students. The area surrounding the park has been identified as having an under-supply of open spaces, which elevates the importance of amenity and solar access for Paul Keating Park. The Park is the centrepiece of Bankstown’s Civic Precinct, which is located in the heart of the northern CBD. The Civic Precinct includes the award winning BLaKC designed by FJMT Architects, the Council Civic Tower, the Council Chambers, Thurlow Fisher House (69 The Mall), the HOYTS cinema, Bankstown Court House Reserve, and, potentially, the future WSU.

CBCity is currently undertaking a concept masterplan for the Park to inform future public domain capital works to ensure that this civic area delivers the best outcome for the community and is aligned with broader strategic planning of the Bankstown CBD. The masterplan takes a design-led approach to create great places where people want to be. It will put the public domain and the overall user experience at the forefront of investigations and recommendations.

This Solar Amenity Study uses Paul Keating Park as a case study to test the impacts of potential surrounding developments on the amenity of the Park. This case study is to be read in conjunction with the ‘*Best Practice Research Open Spaces in City Centres: Solar Amenity Controls*’ (the Research) as the testing of solar amenity impact on Paul Keating Park is based on the findings of the Research. An overview of the Research findings is provided on Page 7.

Scenarios

This Case Study analyses sunlight exposure of the Park on the winter solstice using a 3D model. Five different schemes have been analysed as follows:

- **Existing Condition (Existing Built Form):** assesses the current sunlight exposure of the Park based on the existing built form around the Park.

- **Scenario 1:** assesses sunlight exposure of the Park based on the existing built form around the Park with the proposed WSU building at 74 Rickard Road.
- **Scenario 2:** is based on the existing built form around the Park with a complying development on the potential WSU site in accordance with Zoning, Building Height and FSR standards in the Bankstown Local Environmental Plan 2015 (BLEP 2015).
- **Scenario 3:** tests sunlight exposure on the Park should all lots surrounding the Park are developed to the maximum development potential permissible under BLEP 2015. The Park is located at 375 Chapel Road (DP777510 parcel n°6). The eastern portion of the Park is zoned RE1 - Public Recreation in BLEP 2015. The western portion is zoned B4 – Mixed Use, has a Maximum Height of Building of 53m, Maximum Floor Space Ratio (FSR) equal to 4.5:1 and contains a local heritage item known as the Council Chambers. Scenario 3 assumes that the portion of the Park zoned Mixed Use would be redeveloped to its permissible height and FSR standards, which are incompatible with the heritage significance of the Council Chambers. The heritage significance of the item would be significantly impacted under current controls, reason why Scenario 3 does not take into account the heritage-listed item as part of this development scenario. Recommendations to address this issue are discussed further in this document.
- **Scenario 4:** tests sunlight exposure on the Park should the surrounding lots are developed to the maximum development potential permitted under BLEP 2015 and the proposed WSU building to understand the potential cumulative impact on the Park. Similarly to Scenario 3, Scenario 4 does not take into account the heritage-listed item as part of this development scenario.

Conclusions

The report concludes that the good amenity of the park is derived from its natural features. These natural features are reliant on solar access for plant and tree health and for people’s wellbeing. In its current state, more than 69 percent of the area of the Park receive sunlight on the Winter Solstice for more than 4 hours continuously between 11am and 3pm. The lawn area is generally unaffected by overshadowing. Scenarios 1, 3 and 4 create an adverse overshadowing impact on the Park and do not achieve a minimum of 4 hours of continuous solar access to a minimum 50 percent of the area of Paul Keating Park on the Winter Solstice, as recommended in Council’s Best Practice Research.

The report recommends that [1] the proposed Western Sydney University building be amended to reduce building bulk and FSR to comply with the solar amenity control proposed in Council’s Best Practice Research (objectives, provisions and policy implementation); and [2] a design-led place-based approach be undertaken to identify appropriate built form for the sites surrounding the Park as part of Bankstown Structure Plan to inform amendments to the LEP and DCP.

Best Practice Research Overview

Best Practice Research Overview

Council has researched best practice solar amenity controls for open spaces in city centres to inform CBCity’s policy framework and the decision-making process. Council’s *Best Practice Research Open Spaces in City Centres: Solar Amenity Controls* assessed twenty one solar amenity controls across twelve councils nationally and internationally, including Auckland City Council, Brisbane City Council, Burwood Council, City of Gold Coast, City of Parramatta, City of Sydney, City of Copenhagen, City of London, New York City Council, Melbourne City Council, North Sydney Council and Willoughby Council.

Planning policies for cities such as London, New York and Copenhagen were investigated, however it became apparent that due to the different climates, latitudes and planning systems in these cities, they were not comparable to CBCity and the NSW Planning System.

Key research findings from local councils in Australia and New Zealand are summarized below.

- **Six out of seventeen controls (35%) require a minimum of 4 to 5 hours continuous sunlight to at least 50 percent of the area of the park on the winter solstice.** These controls have been adopted for all city centre parks and open spaces by Melbourne City Council, all parks and open spaces in urban renewal areas by Melbourne City Council, Burwood Park by Burwood Council, Albert Park by Auckland City Council, Green Square by City of Sydney except Green Square Town Centre and Harold Park by City of Sydney. These open spaces are similar in purpose or size to a central CBD city park, such as Paul Keating Park. The strategic planning departments of these councils stated that their research shows the control provides adequate solar amenity for key parks in city centres or urban renewal areas. These controls are evaluated as ‘best practice’ in the context of CBCity’s CBDs and urban renewal areas and are recommended for adoption.
- **Two out of seventeen controls (12%) require a minimum of 3 to 3.5 hours continuous sunlight to at least 50 percent of the area of the park on the winter solstice.** These controls have been adopted for Myers Parks by Auckland City Council and Chatswood Oval by Willoughby Council. **The controls are retroactive and derived from the current sunlight condition of the parks** as high-density developments near the parks were previously allowed, which created overshadowing impact on the parks, and limited the ability to protect sunlight for more than 3 to 3.5hrs. They were put in place to prohibit any additional overshadowing on parks on the winter solstice. These controls are evaluated as ‘adequate’ in the context of CBCity’s CBDs and urban renewal areas. However, they are not relevant to main parks in CBCity’s main centres that receive more than 4 hours of sunlight in winter, such as Paul Keating Park. Controls that prohibit any additional overshadowing on parks are not deemed appropriate for many parks in CBCity centres not yet subject to urban renewal and densification. This is because many parks receive sunlight in winter in excess of 6 hours for 80% to 100% of the total park area. Therefore, maintaining current sunlight conditions to some of these parks would inhibit the development potential of surrounding lots on key strategic centres, thus hindering economic prosperity of our centres.
- **Seven out of seventeen controls (40%) require a minimum of 2 hours continuous sunlight to at least 50 percent of the area of the park on the winter solstice.** These controls have been adopted for city squares by Brisbane Council, a pedestrian street (Emily Place) by Auckland City Council, open spaces zoned RE 1

or identified as Special Areas by North Sydney Council, small pocket parks or plazas in the city centre by Willoughby City Council and Jubilee Park, Lancer Barracks and Parramatta Square by Parramatta Council. **It is important to note that the majority of these open spaces are either privately owned (the case of North Sydney), or are small public plazas or pedestrian streets, except Jubilee Park. These open spaces are not comparable to a main CBD city park, such as Paul Keating Park** and the controls do not provide an acceptable level of sunlight protection for main parks in winter. These control are evaluated as poor in the context of CBCity’s CBDs and urban renewal areas and are not recommended for adoption.

- **Only one out of seventeen controls (0.5%) allows for moving shadow each hour for three hours on the winter solstice** (Drying Green by City of Sydney), while the other sixteen controls require continuous sunlight to reach the park on the winter solstice. **The City of Sydney urban design team is not satisfied with this control and has not adopted the same control anywhere else.** The ‘moving shadow control’ has been justified as adequate by some individuals in the development and consulting industries on the basis that people can move around, chasing the sun in the park. This argument, however, disregards the fact that [1] moving shadow does not provide enough sun in winter for nature to thrive; [2] fixed public furniture that is in shade is not well-used by people in winter; [3] people having picnics and larger groups are less likely to move to follow the sun as it is a nuisance having to move around frequently to enjoy the sun in a public space; and [4] moving shadow further limits the area of the park that receives adequate sunlight in winter, thus limiting the number of people that can enjoy a spot in the sun in winter. The control is evaluated as poor in the context of CBCity’s CBDs and urban renewal areas and is not recommended for adoption.
- **Only one out of seventeen controls (0.5%) protects solar amenity on the Equinox and summer months** (Aoeta Square by Auckland City Council). The other sixteen controls protect solar amenity on the winter solstice or all year round. **Aoeta Square is not comparable to a central CBD city park, such as Paul Keating Park, and does not provide adequate solar amenity for parks in winter.** The control is evaluated as poor in the context of CBCity’s CBDs and urban renewal areas and is not recommended for adoption. The controls evaluated as ‘poor’ for the CBCity context would significantly impact adversely on the City’s natural environment and people’s wellbeing and behaviour in parks.

Best Practice Research Overview

The Research also provides a brief overview of key findings that link the amount of sunlight with the durability and development of turf surfaces, flowering plants and tree growth, as well as research findings on the human health benefits of sunlight and natural environment exposure.

The **research on sunlight and nature** has revealed several key insights into solar amenity to open spaces in city centres. The research on the effects of sunlight on nature and ecosystems shows that maximising uninterrupted sun exposure in winter is critical as turf requires at least 5 hours of sunlight in winter to thrive, while flowering plants and trees need at least 4 hours of sunlight in winter to grow properly. The effects of not enough sun include constant replacement of turf, undesirable phototropism of trees and plants, moss and lichen growth and a lack of plant diversity. These facts have been corroborated by Council’s experts in landscape architecture and arboriculture, City of Sydney Urban Design Coordinator and several articles prepared by experts in the field.

The **research on the effects of nature and sunlight on people’s wellbeing** indicate that exposure to natural environments improves people’s physical, mental and social wellbeing. Children are more creative after exposure to nature. Contact with nature mitigates individuals’ anxiety, mental fatigue and aggression and improves concentration. Additionally, moderate exposure to sunlight improves people’s mental and physical health. Lack of sunlight in public spaces can affect sight-impaired individuals, reduces opportunities for outdoor socialisation, and open spaces become barren and dull.

The Research recommends the adoption of a solar amenity policy for Paul Keating Park and Bankstown Court House Reserve as follows:

Objectives

- To achieve a comfortable and enjoyable public realm.
- To ensure new buildings and works allow sunlight access to public spaces as specified in the provisions.
- To ensure that overshadowing from new buildings or works does not result in adverse impact on the existing and future use, quality and amenity of the public spaces.
- To protect, and where possible increase the level of sunlight to the public spaces during the times of the year as specified in the provisions.
- To protect the natural landscaping, including trees, plants and lawn or turf surfaces in the public spaces.
- To protect the cultural or social significance of the public spaces.

Provisions

- Development must allow for 4 hours of continuous solar access to minimum 50 percent of the area of Paul Keating Park between 10.00 am and 3.00 pm on 21 June (inclusive of existing shadow). The area of Paul Keating Park is defined as the property at 375 Chapel Road (DP777510 parcel n°6), exclusive of the footprint of the Council Chambers Building.
- Development must not cast additional shadow on the Bankstown Court House Reserve between 10.00 am and 2.00 pm on 21 June for at least 50 percent of the total park area.

Policy Implementation

In considering the impact of additional overshadowing, the responsible authority will assess whether the additional overshadowing adversely affects the use, quality and amenity of the public space. The following matters will be considered as appropriate:

- The area of additional overshadowing relative to the area of remaining sunlit space compared to the total area of the public space;
- Any adverse impact on the cultural or social significance of the public space;
- Any adverse impact on the natural landscaping, including trees, plants and lawn or turf surfaces in the public space;
- Whether the additional overshadowing compromises the existing and future use, quality and amenity of the public space.

Shadow diagrams must be submitted with the development application and indicate the existing condition and proposed shadows between the hours of 9am and 3pm on 21 June at 10-minute intervals. The analysis must clearly illustrate existing overshadowing cast by existing buildings on and around the public spaces. If required, the consent authority may request additional detail to assess the overshadowing impacts.



Sun Access Analysis

Methodology

The overshadowing diagrams presented in this chapter were produced using a 3D model. CBCity does not yet have a city-wide 3D model. The 3D model for this case study was generated using the cadastre and 1.0m contour intervals obtained from Council’s Land Information department. The terrain is accurate, using a 1.0m interpolation to create the terrain in 3D. Building footprints of existing buildings were traced from Council’s aerial images. As such, they are not as accurate as building footprints created from PSMA as a shapefile. Likewise, the building heights for existing buildings shown in the Existing Condition and Scenarios 1 and 2 are estimates only, except from the Council’s administration building and BLaKC, whose building heights are consistent with surveyed drawings sourced from Council’s database. Measures have been taken to ensure that contours, cadastre, roads and kerbs in the 3D model are accurate.

The location of footpaths, amenities and trees at Paul Keating Park were sourced from Council’s survey drawings in AutoCAD and are accurate. The height of the trees and width of canopies in the survey appeared inaccurate, therefore assessment of images and site inspections were carried out to improve accuracy as much as possible.

The latest 3D model for the proposed WSU building received on 7 August from Lyons Architects was incorporated into the 3D model for this project and are shown in Scenarios 1 and 4. The site boundary for the WSU 3D model provided by Lyons Architects was at 0.0 RL and it aligned correctly and accurately with Council’s cadastre.

The 3D model for Scenarios 3 and 4 include building envelopes for the potential uplift on lots 432-438 Chapel Road, 67-69, 74 and 80 Rickard Road, 2 Jacobs Street, 61-63 and 69A The Mall and Council heritage-listed Chamber’s site on Chapel Road North, which are based on the building height and FSR controls in the BLEP 2015. Building envelopes were not prepared for the lots near the park that have reached their development potential in accordance with the BLEP 2015 or that are located in areas that would not cause overshadowing impact to the park. The 3D model for Scenario 2 includes building envelopes for a complying development at 74 Rickard Road (The WSU site). BLEP 2015 complying building envelopes were created in accordance with the following:

Review of the Existing BLEP 2015 Planning Controls for the sites surrounding the park

- B4 – Mixed Use
- Maximum Height of Building – 53m
- Floor Space Ratio – 4.5:1

Building Separation originated from the DoPE Apartment Design Guide 2015

- 12m Building Separation on Ground Floor if appropriate to maintain links through to Paul Keating Park.
- 18 - 24m Separation for Tower Volumes (assumption that detail design can locate non-habitable spaces adjacent to habitable spaces for heights above 25m in some circumstances)
- 3m Tower Setback from Street Wall above the Podium.

Building Efficiency of 85% (Assumption an average of 15% of Building GFA is Services, Circulation or Exterior Wall)

- Commercial Storey height of 4m / Residential Storey height of 3.1m

- Residential volume depth of 22m to allow central corridor and dual aspect apartments
- Minimum Tower Floor plate area of 1,000m2
- Where towers are shown, these have been located to the western and eastern-most corners, to maximise solar access to Paul Keating Park

These complying building envelopes were modeled in 3D and located in a geo-referenced site model.

The overshadowing diagrams for the Existing Condition and Scenarios 1 to 4 were rendered using the 3D model in the 3DS Max software for each hour between 9am and 3pm in June 21st (Winter Solstice). This software has a built in Daylight system that is accurate to the real world. The location was set as Sydney and then adjusted to Bankstown’s Latitude 33.918 S degrees and Longitude 151.035 E degrees.

The cumulative overshadowing impact analysis for the Existing Condition and Scenarios 1 to 4 derived from the overshadowing renders produced in 3DS Max. These hourly renders were traced in AutoCAD for each scenario, the areas overlaid and a scaled cumulative image created to illustrate the solar impact between 11am and 3pm (analysis between 10am and 2pm is also provided in Appendix 1). These areas were calculated and inputted into a spreadsheet to directly compare the outcomes for each scenario in a rating-scale of: ‘4 hours of solar access’, ‘greater than 3 and less than 4 hours of sunlight’, greater than 2 and less than 3 hours of sunlight’, greater than 0 and less than 2 hours of sunlight’ and no sunlight. Existing trees are shown in the analysis for information purpose, but the overshadowing impact of existing trees were not included in the calculations. The area of Paul Keating Park is defined as the property at 375 Chapel Road (DP777510 parcel n°6), exclusive of the footprint of the Council Chambers Building.

There is a degree of inaccuracy in the calculations of the cumulative overshadowing impact as the analysis was limited to 1-hour intervals. Solar analysis with shorter intervals and/or Grasshopper and Rhino software packages would reduce inaccuracy of the results.

3D model

Axonometric View - 21st of June 12 pm

Existing Condition:
Existing Built Form



Scenario 1:
Existing Built Form with Proposed WSU Building



Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



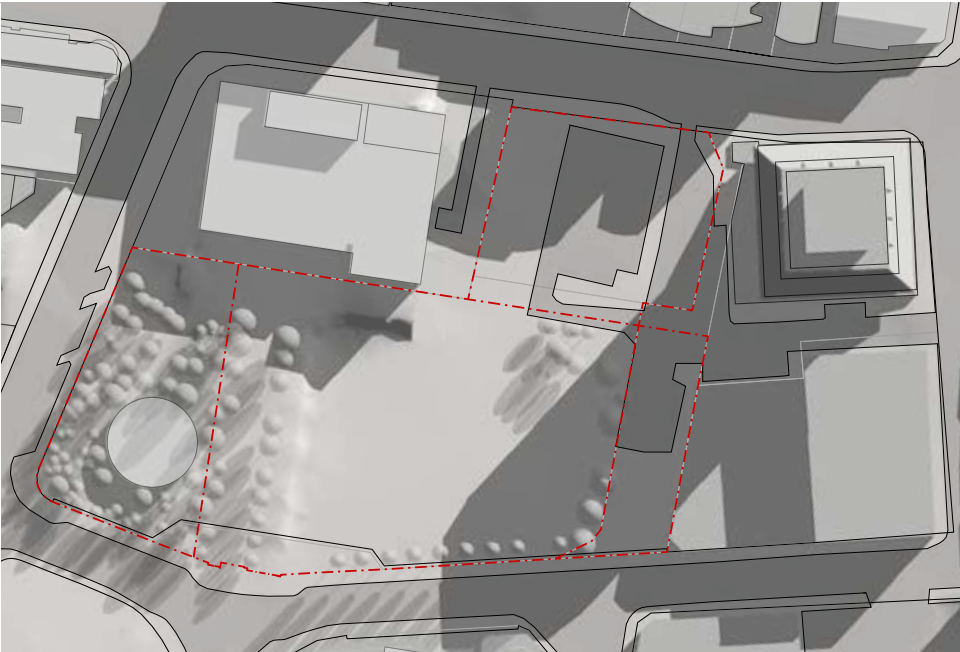
Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



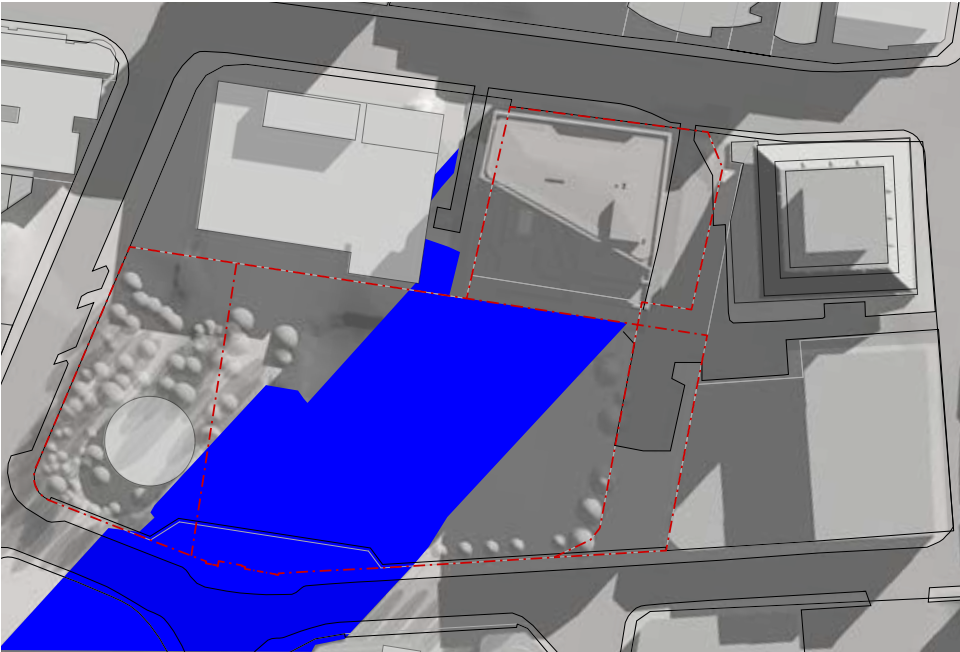
9 am

Solar Access (21st June / Winter Solstice)

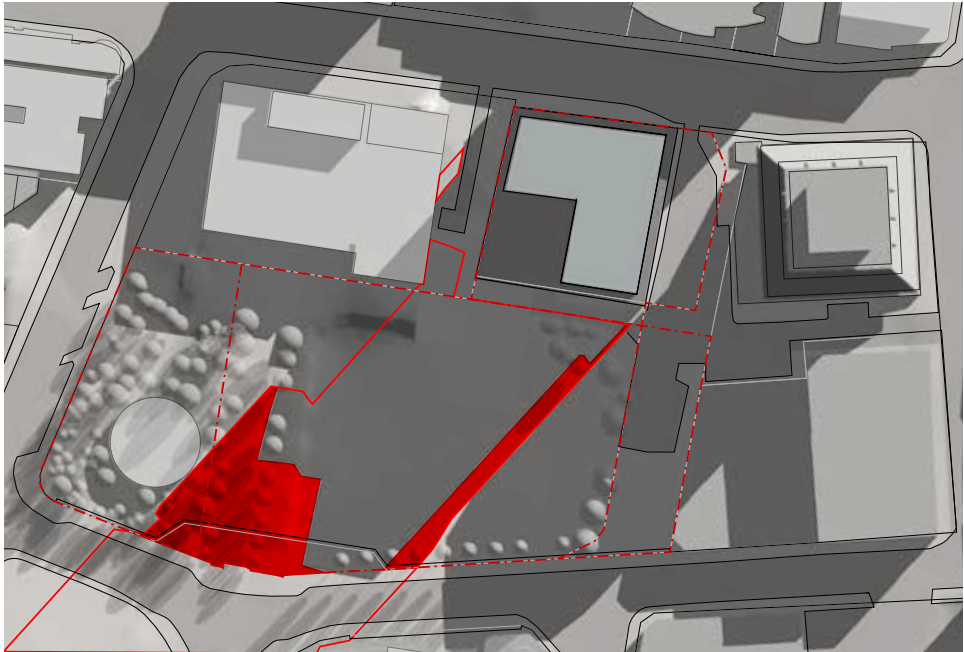
Existing Condition:
Existing Built Form



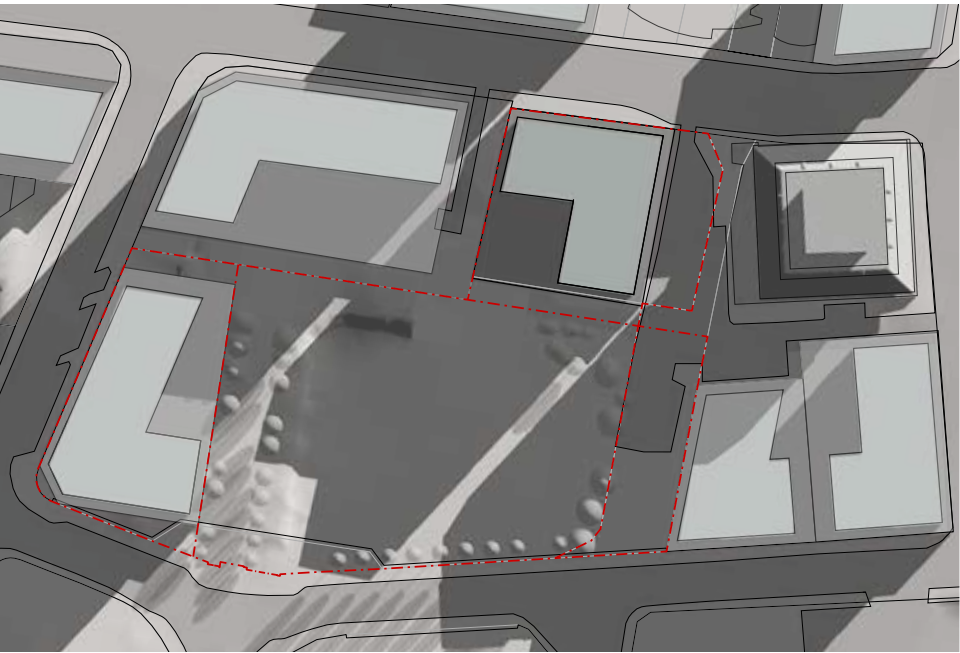
Scenario 1:
Existing Built Form with Proposed WSU Building



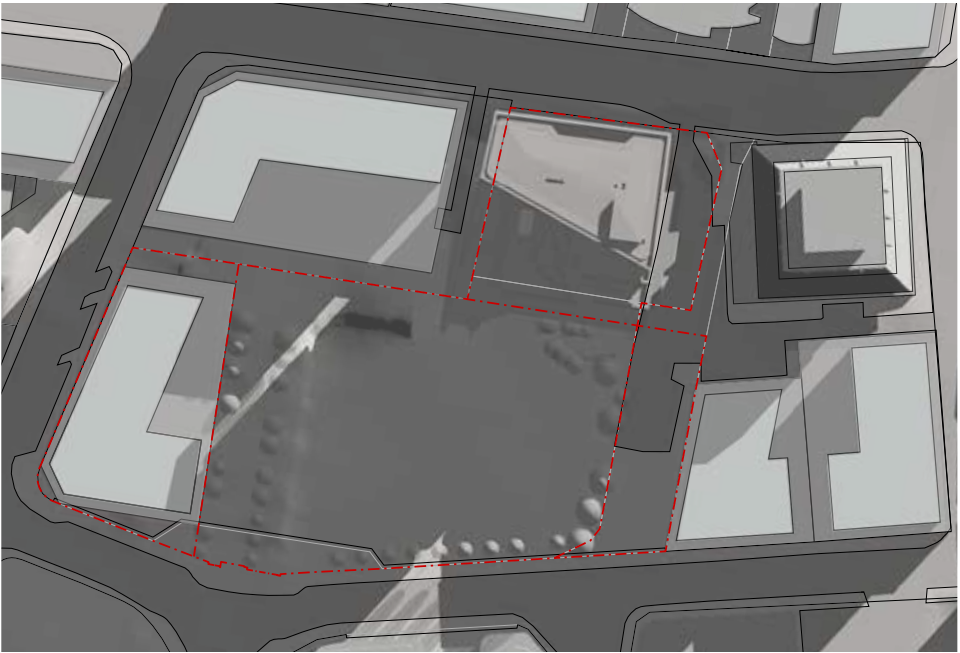
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



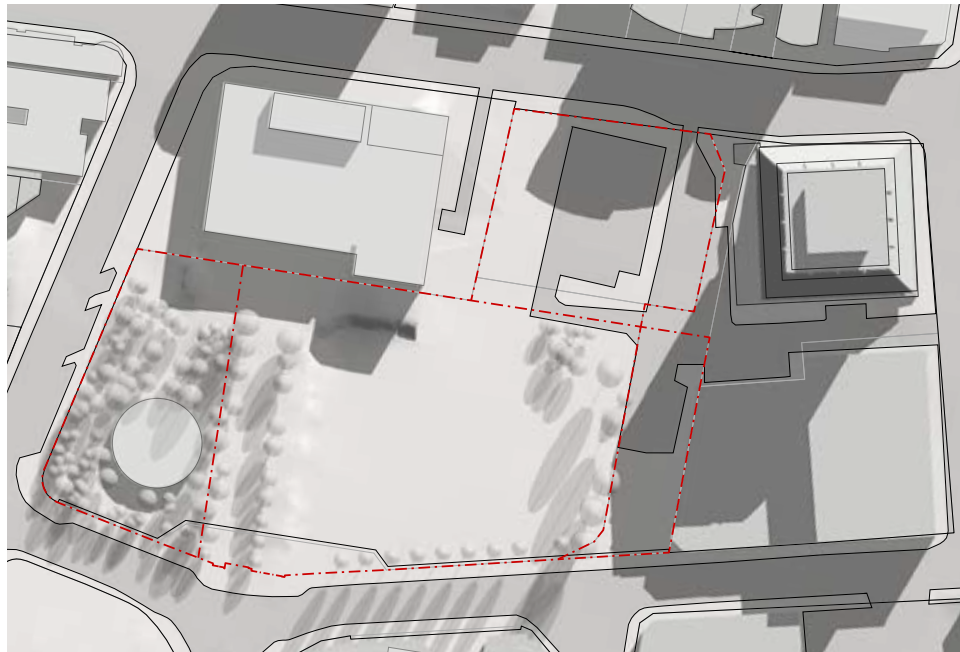
Key

-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 13.9 % additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

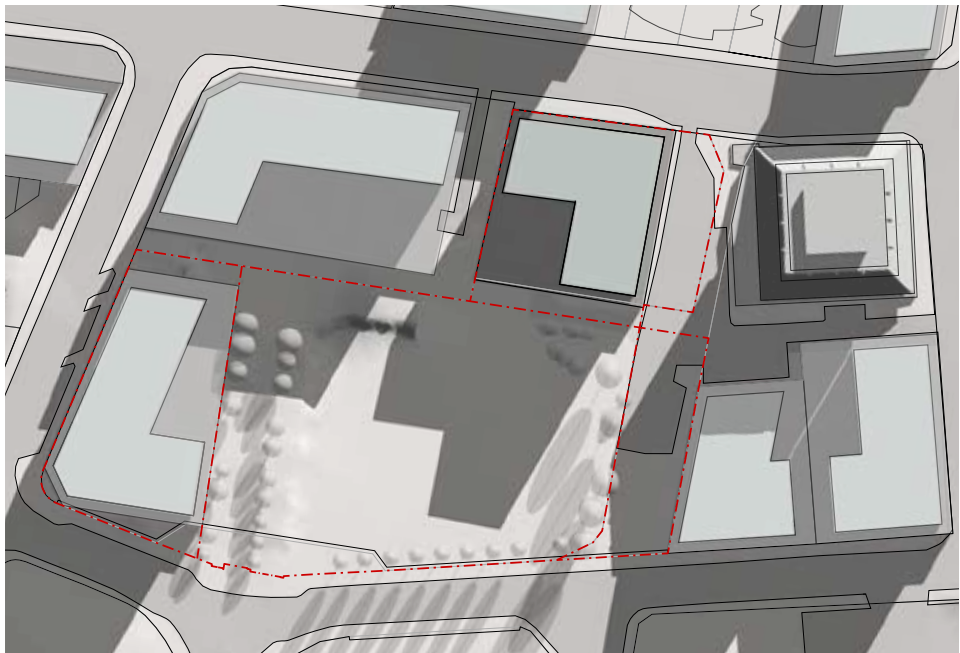
10am

Solar Access (21st June / Winter Solstice)

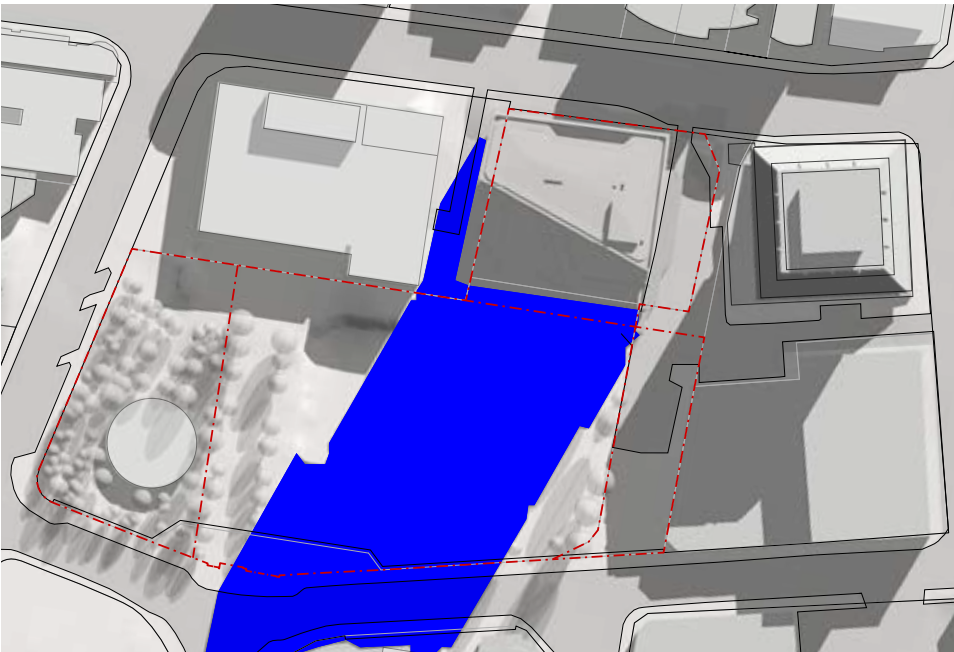
Existing Condition:
Existing Built Form



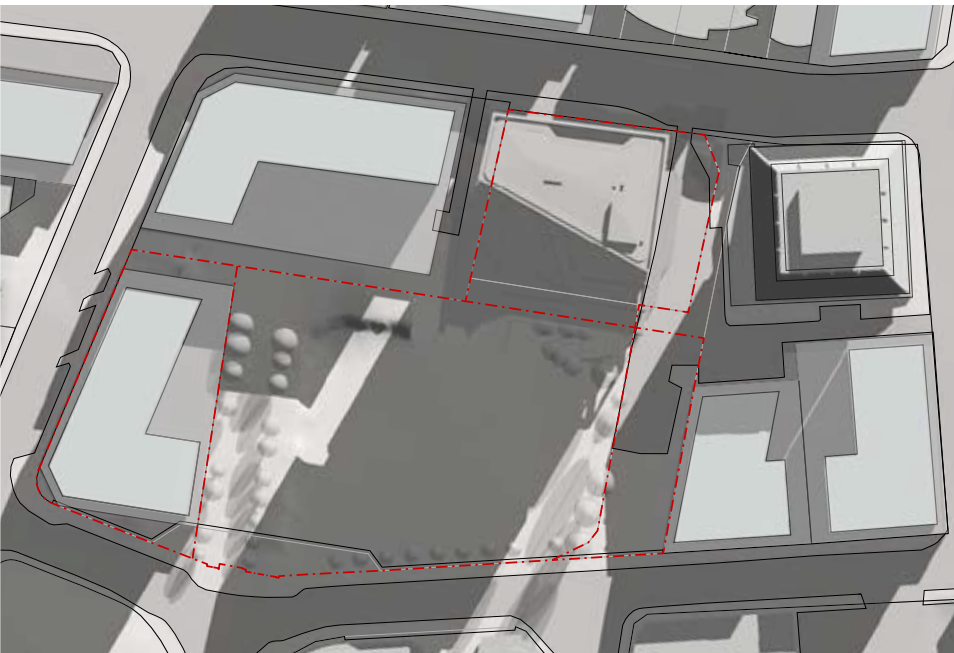
Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



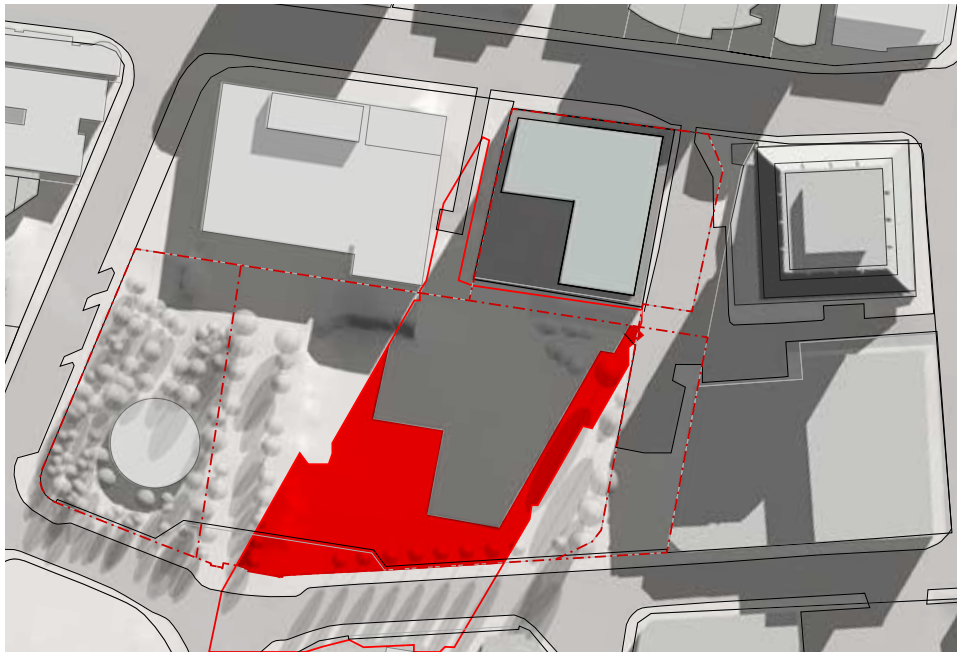
Scenario 1:
Existing Built Form with Proposed WSU Building



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



Key

-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 20.6 % additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

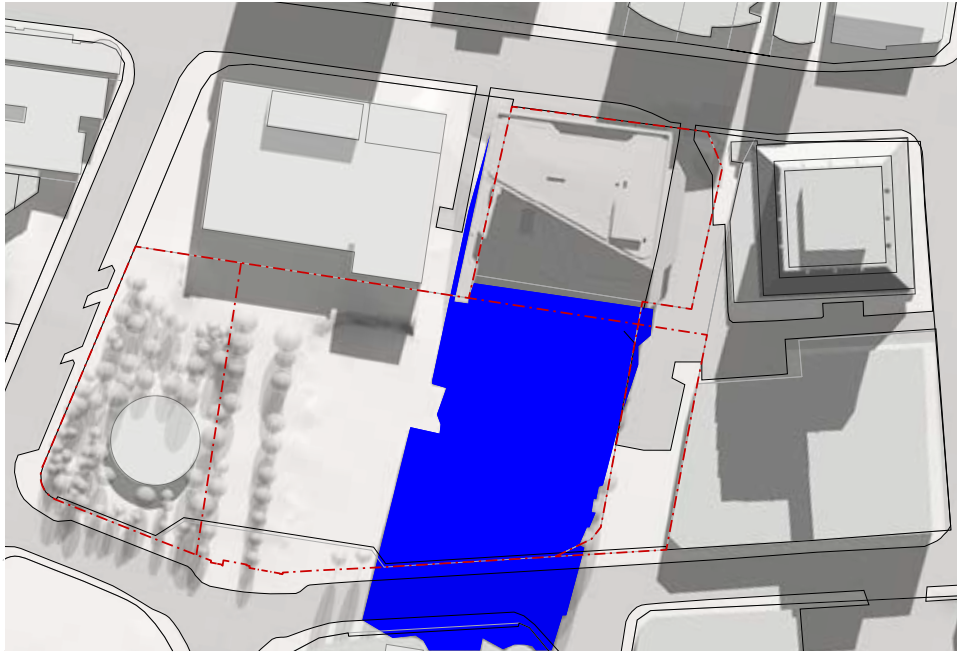
11am

Solar Access (21st June / Winter Solstice)

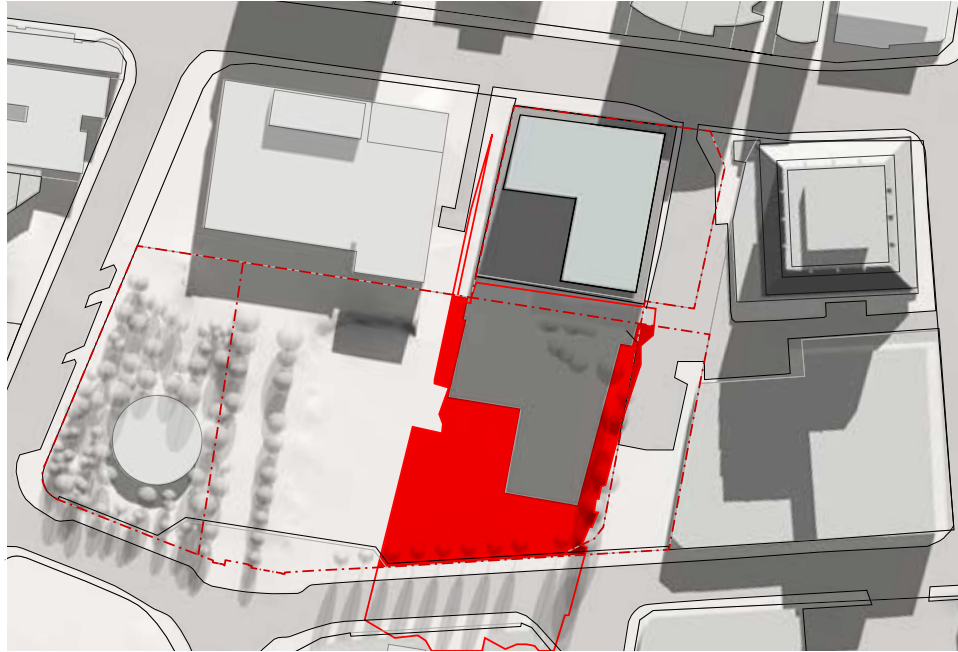
Existing Condition:
Existing Built Form



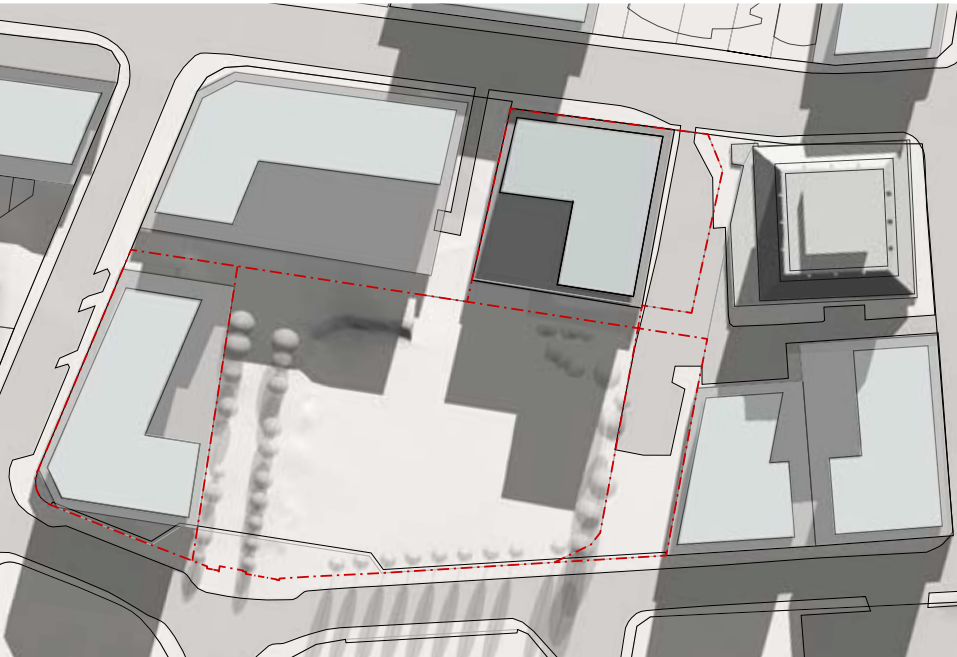
Scenario 1:
Existing Built Form with Proposed WSU Building



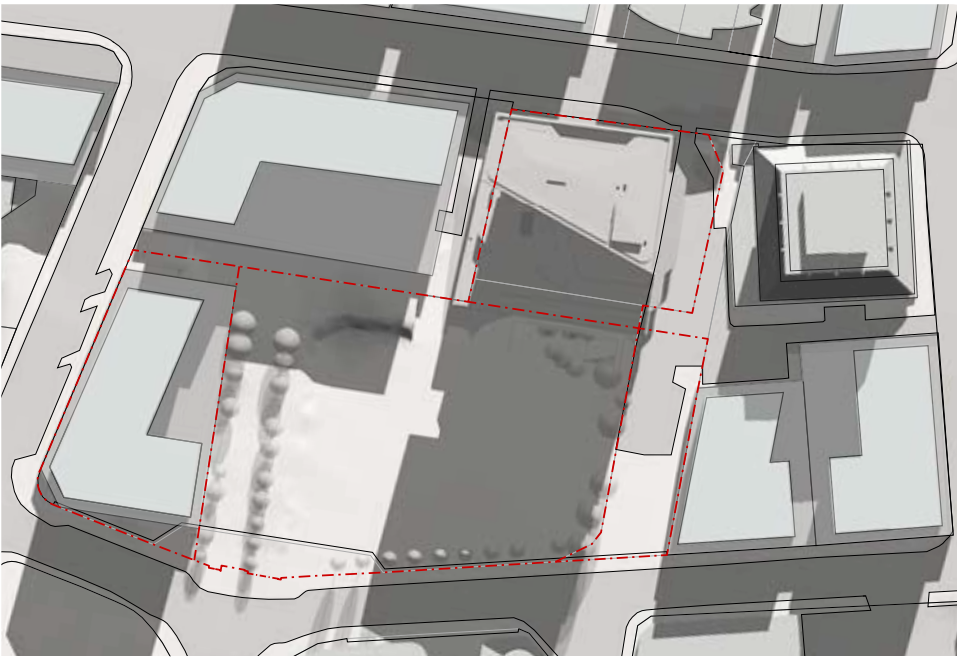
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



Key

-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 17.4% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

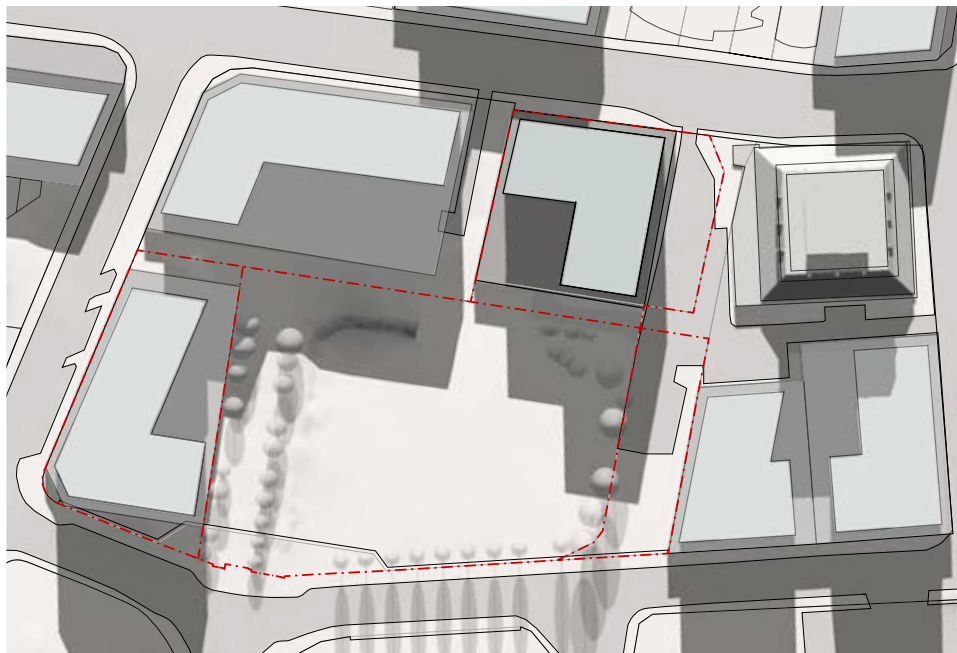
12pm

Solar Access (21st June / Winter Solstice)

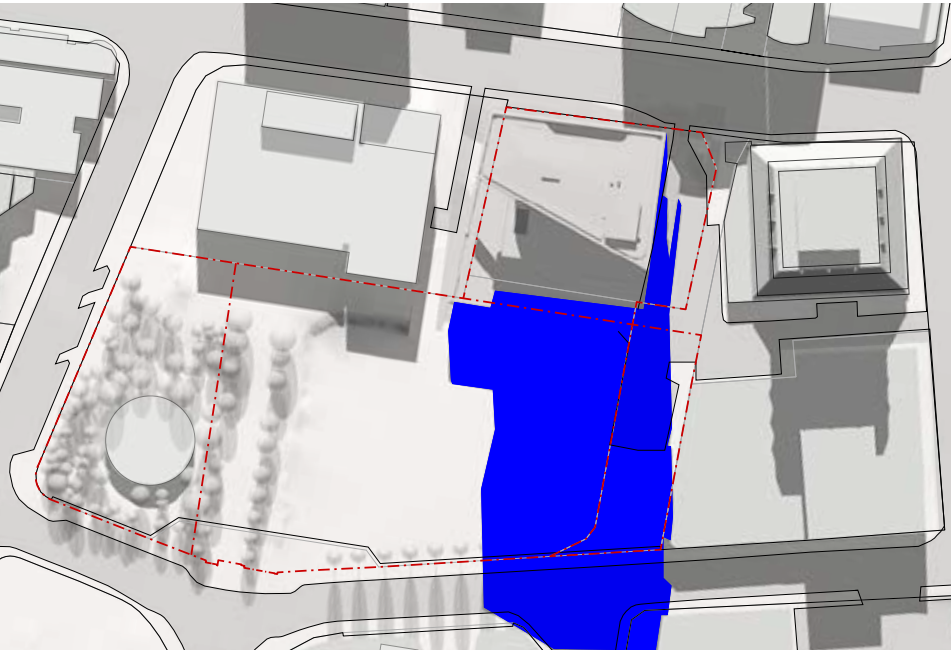
Existing Condition:
Existing Built Form



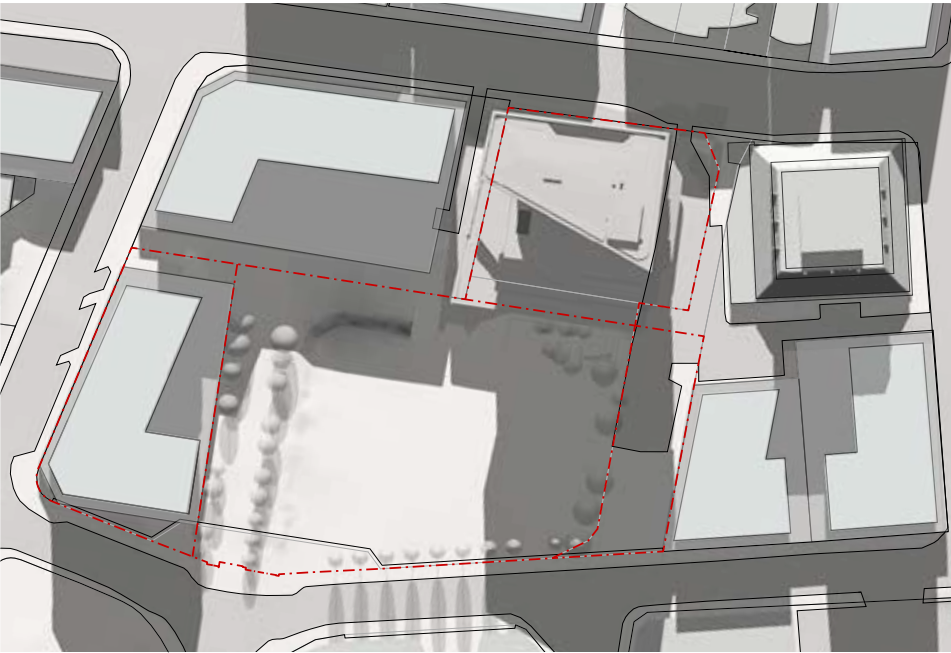
Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



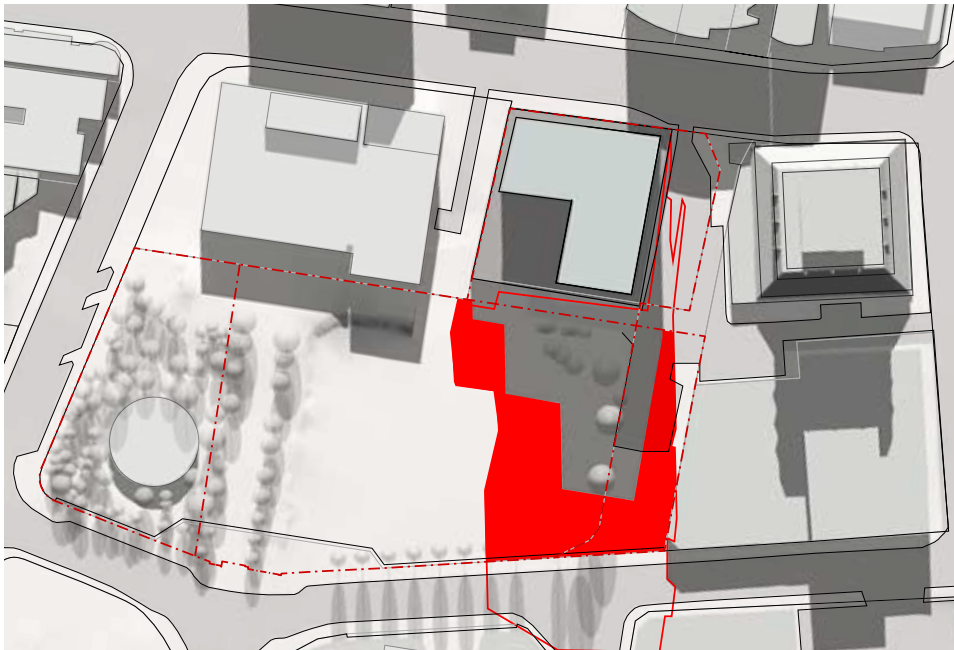
Scenario 1:
Existing Built Form with Proposed WSU Building



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



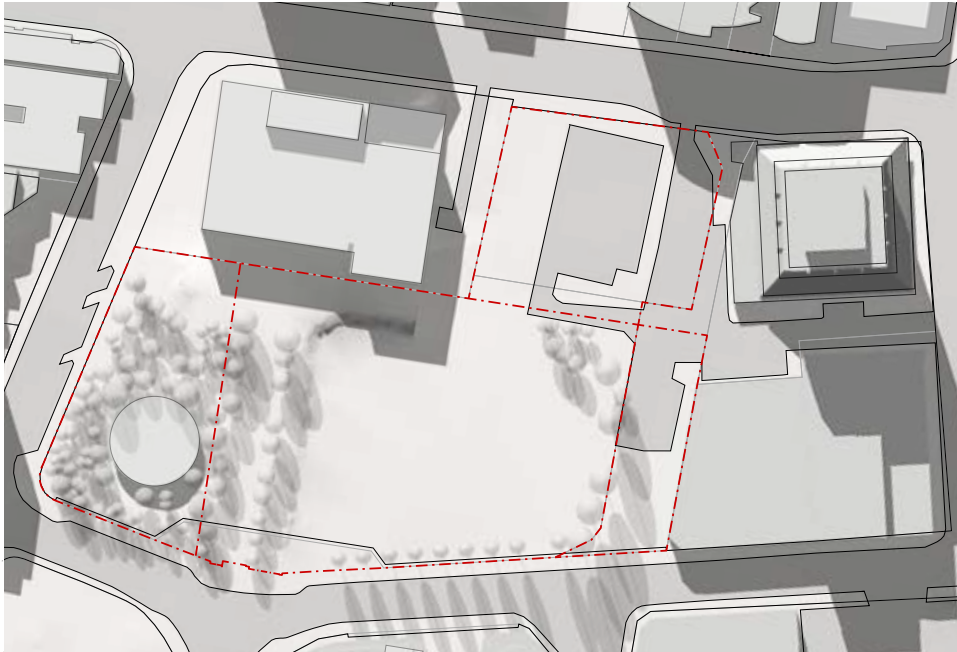
Key

-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 15.9% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

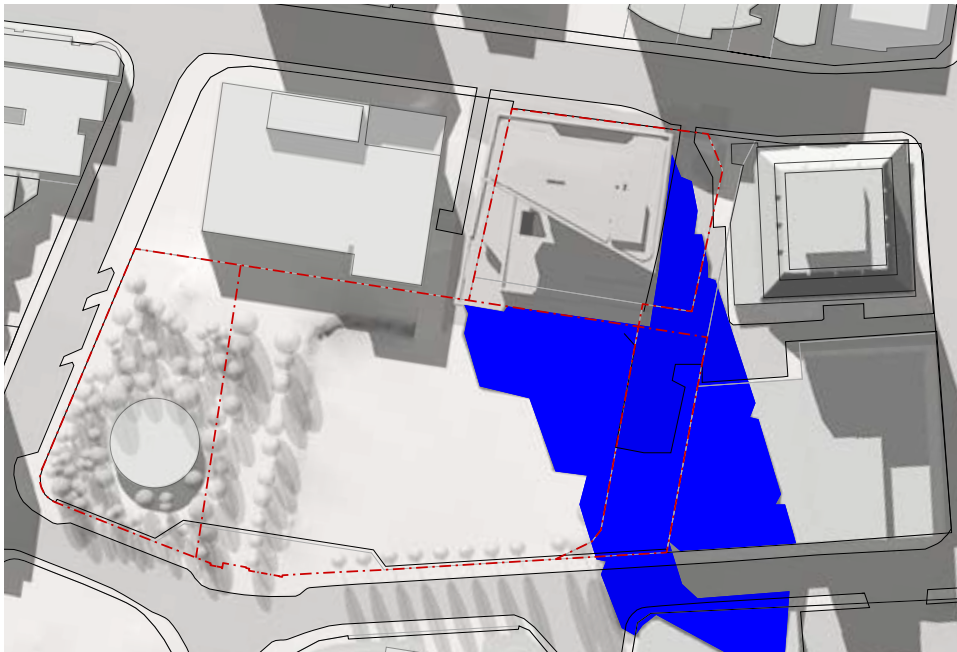
1pm

Solar Access (21st June / Winter Solstice)

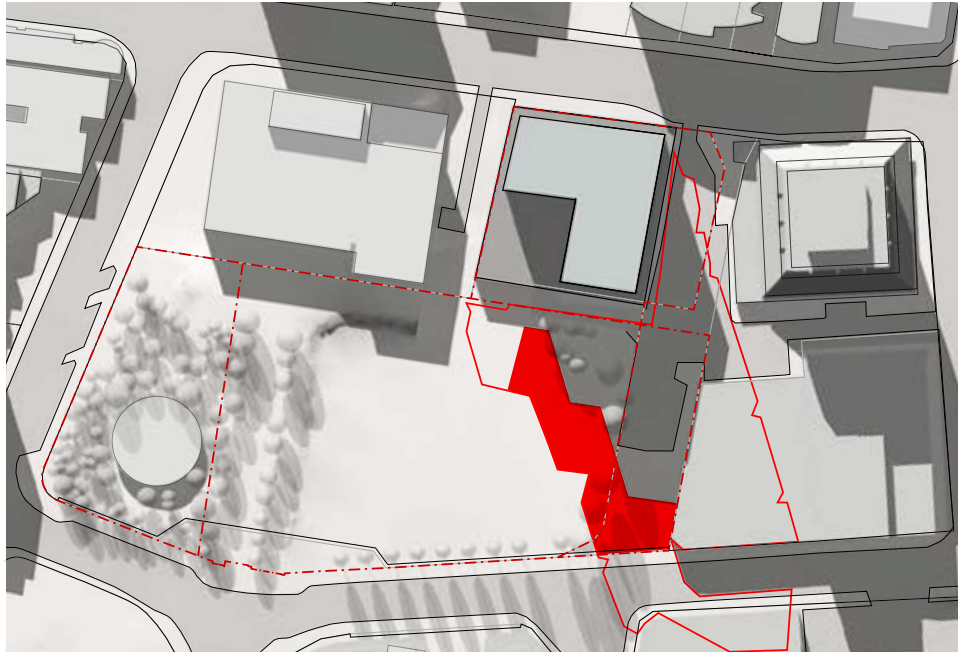
Existing Condition:
Existing Built Form



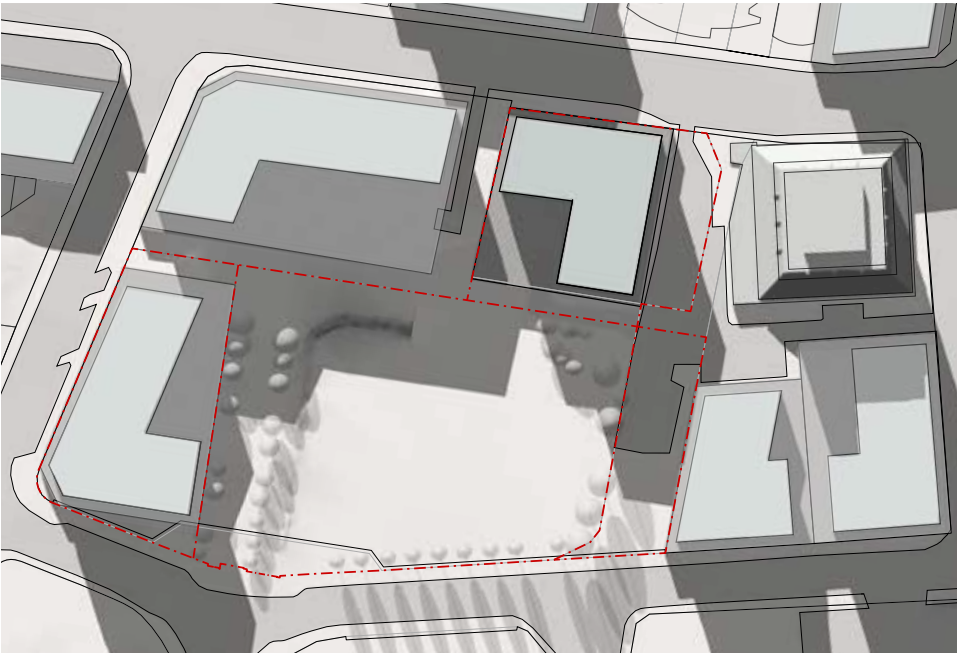
Scenario 1:
Existing Built Form with Proposed WSU Building



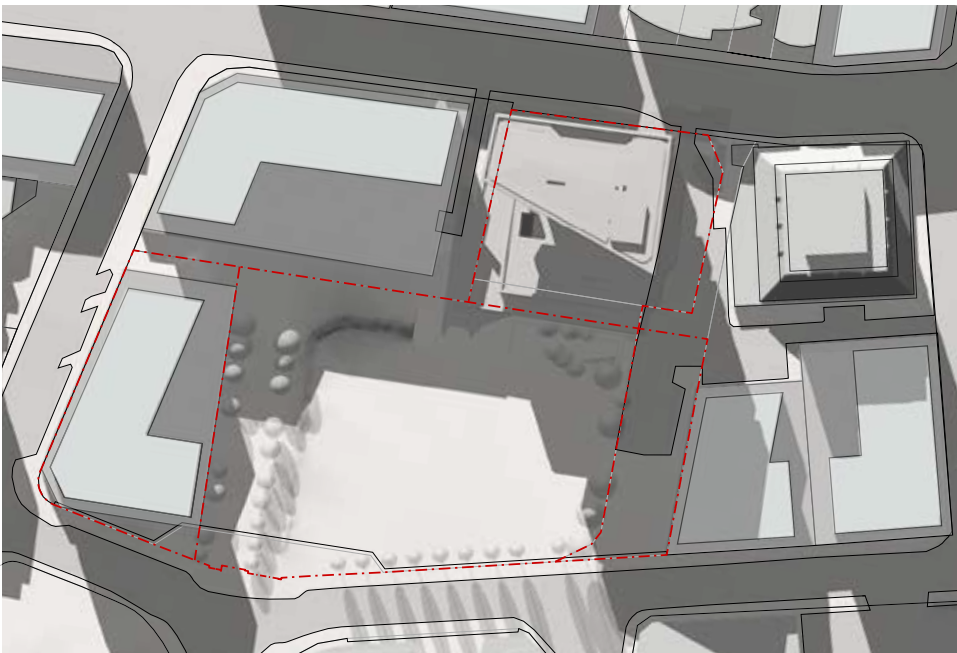
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



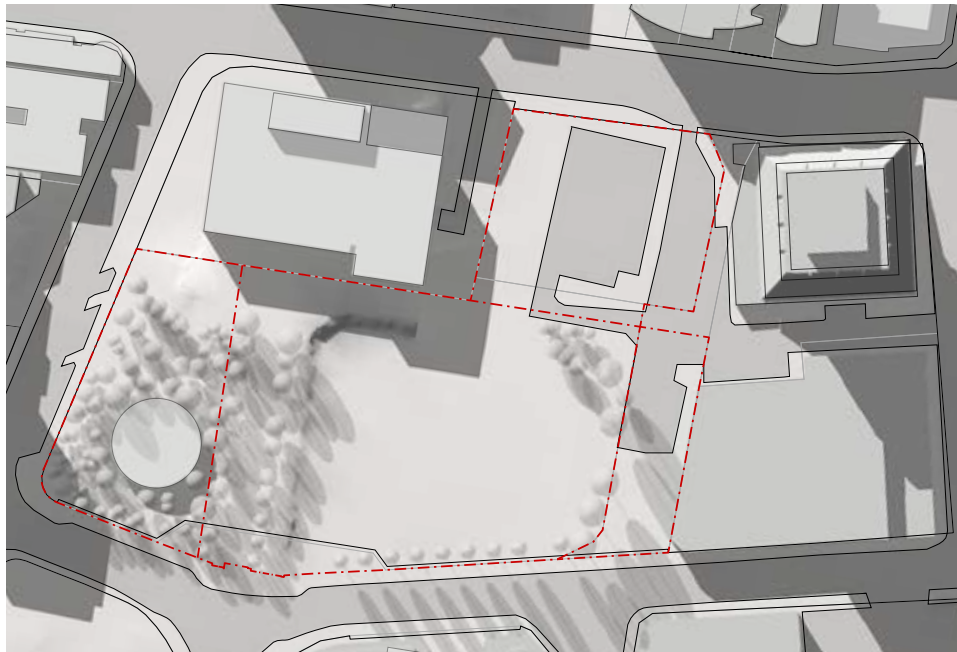
Key

-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 10.1% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

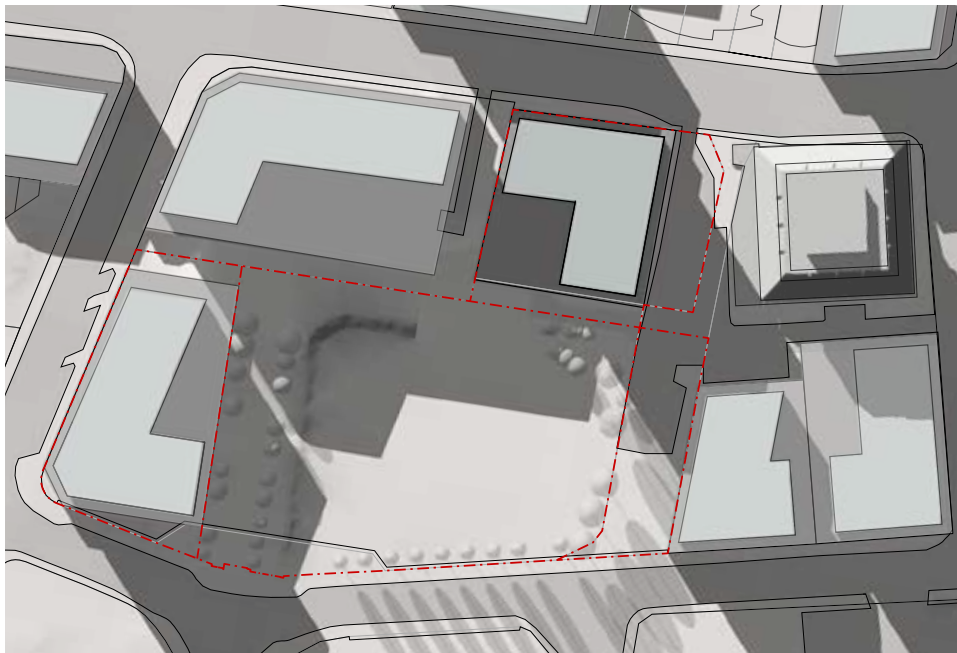
2pm

Solar Access (21st June / Winter Solstice)

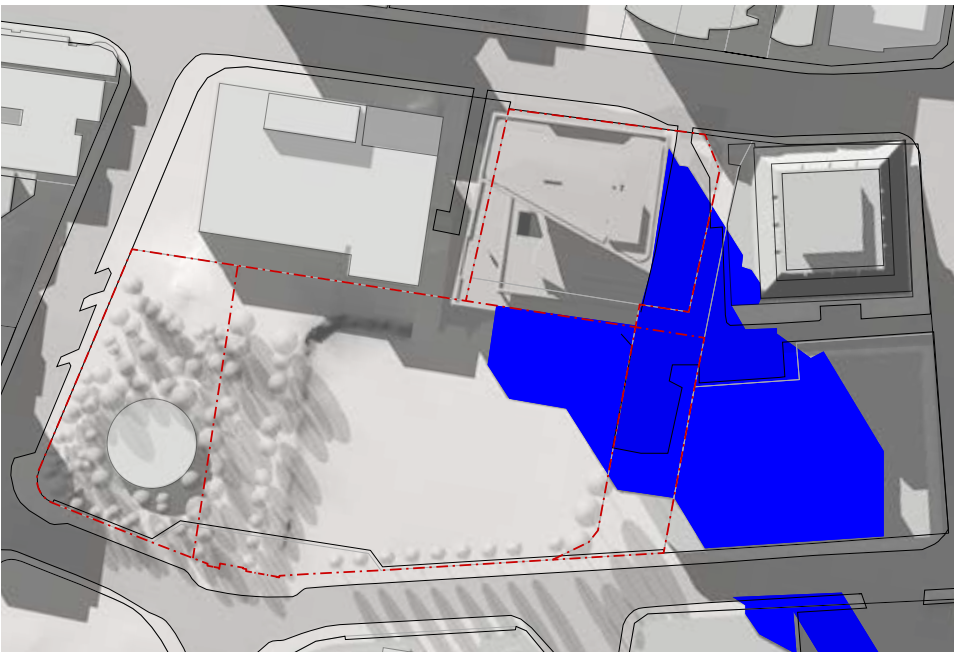
Existing Condition:
Existing Built Form



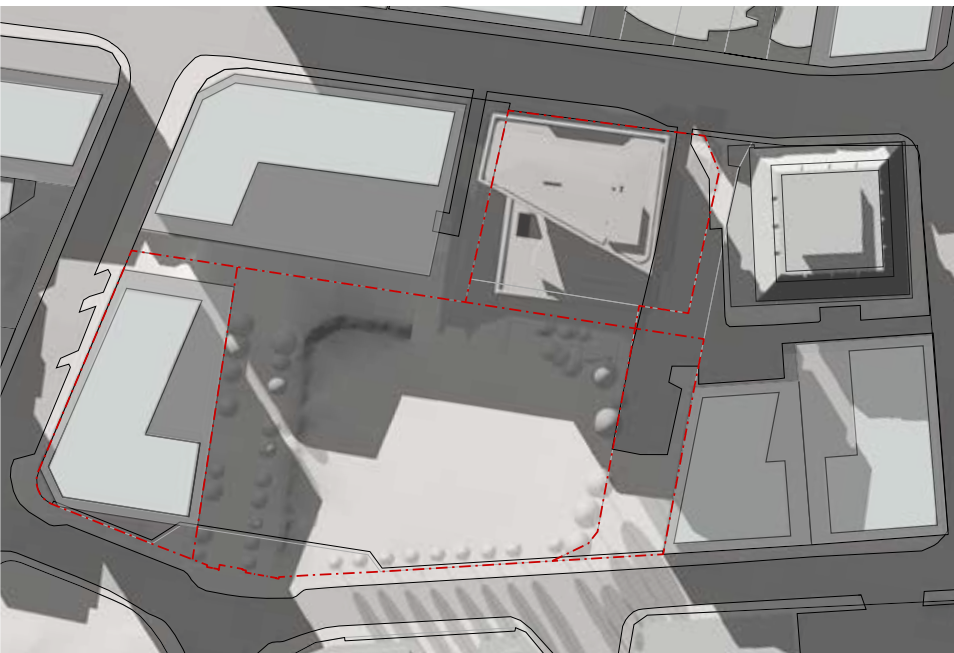
Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



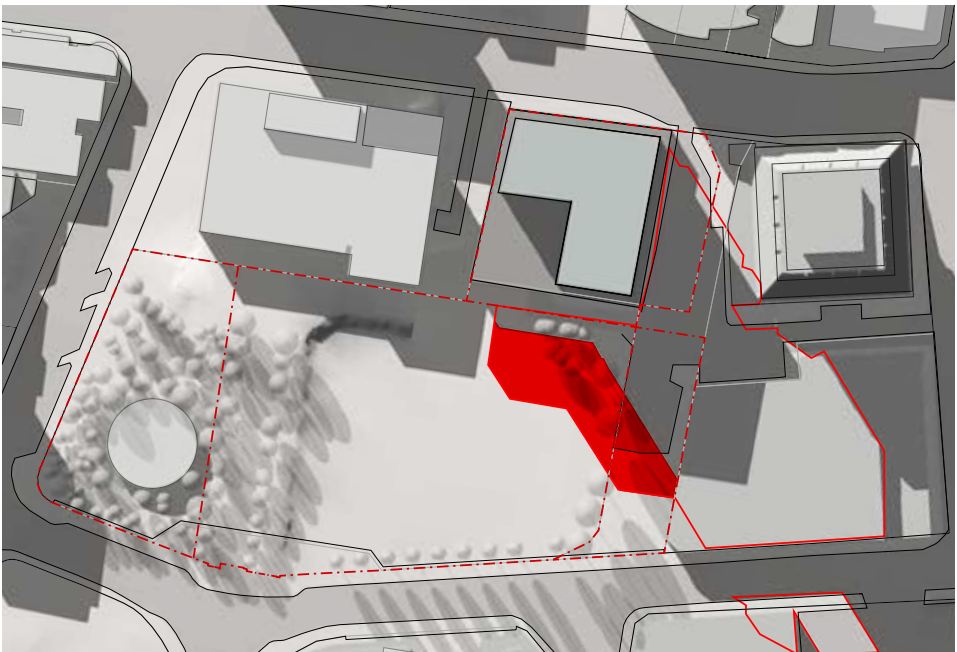
Scenario 1:
Existing Built Form with Proposed WSU Building



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



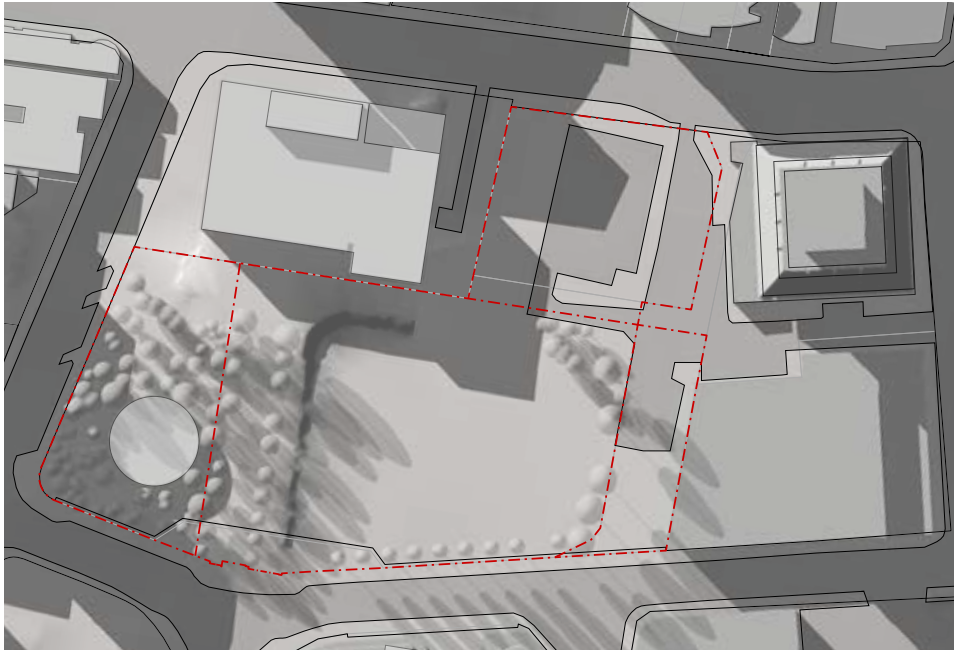
Key

-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 9.1 % additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

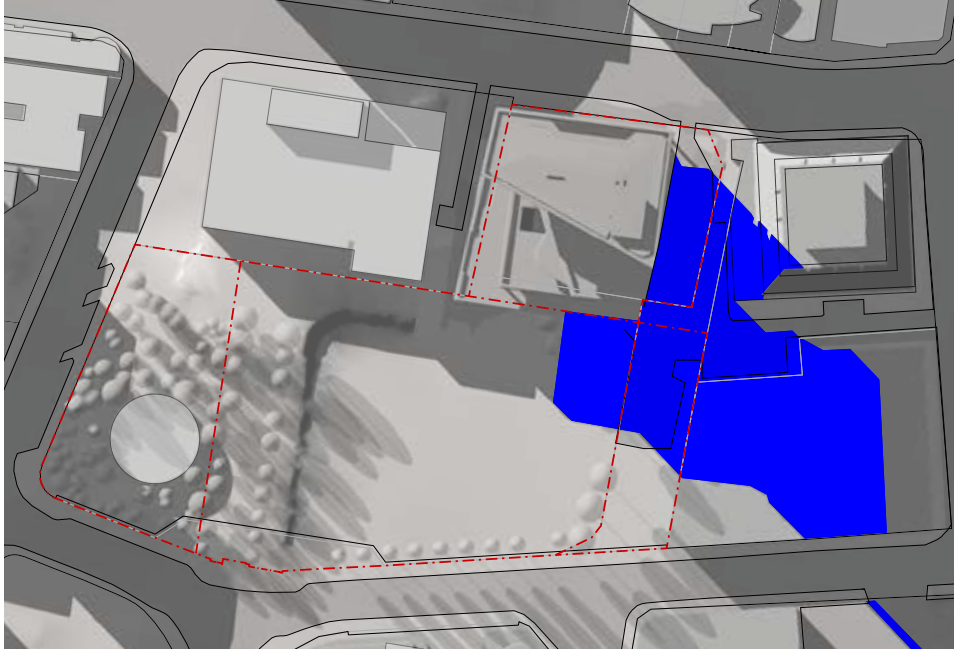
3 pm

Solar Access (21st June / Winter Solstice)

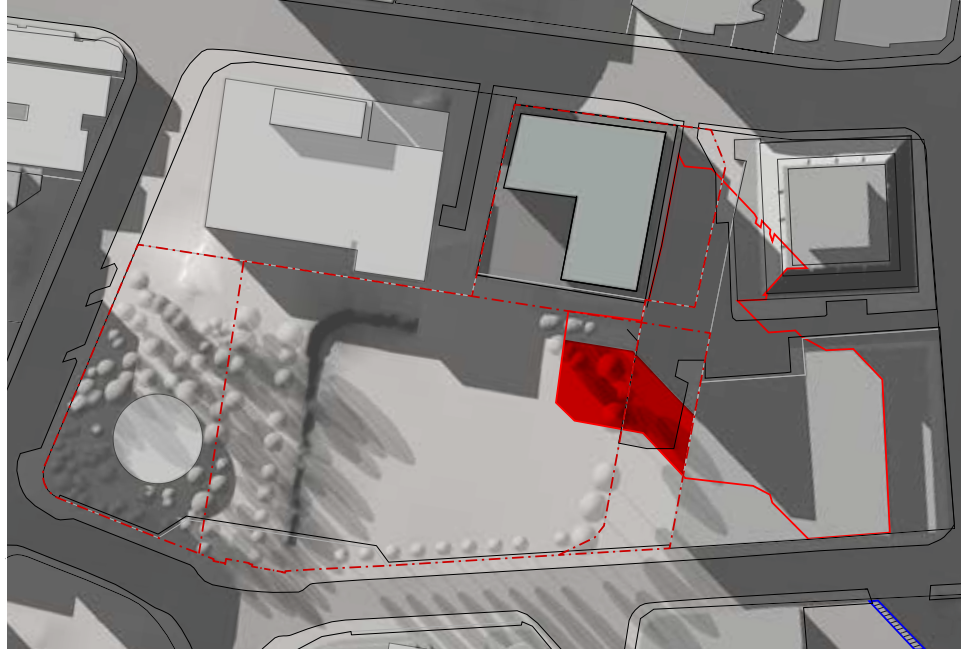
Existing Condition:
Existing Built Form



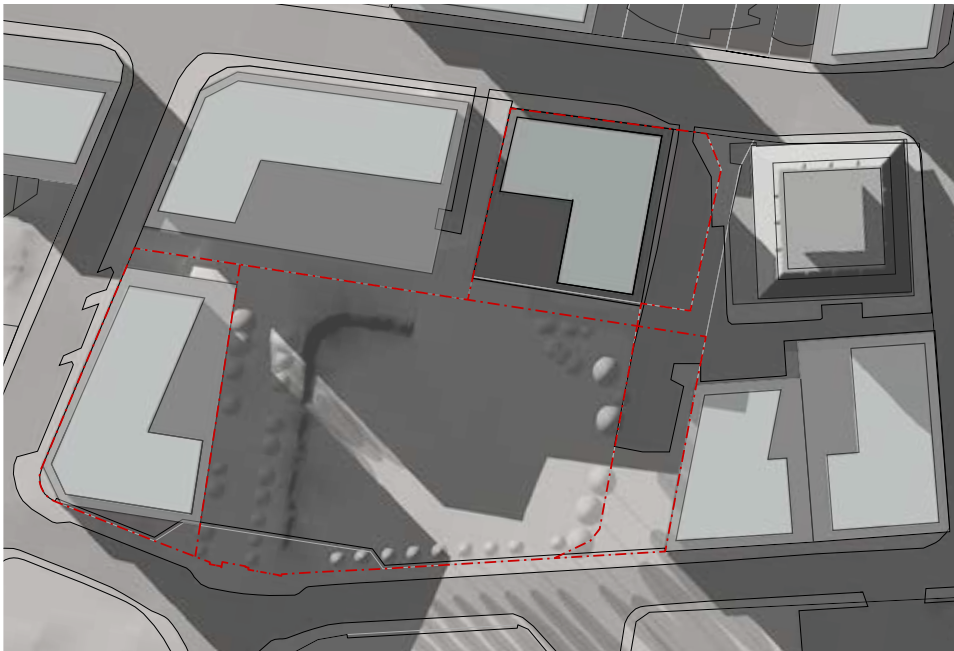
Scenario 1:
Existing Built Form with Proposed WSU Building



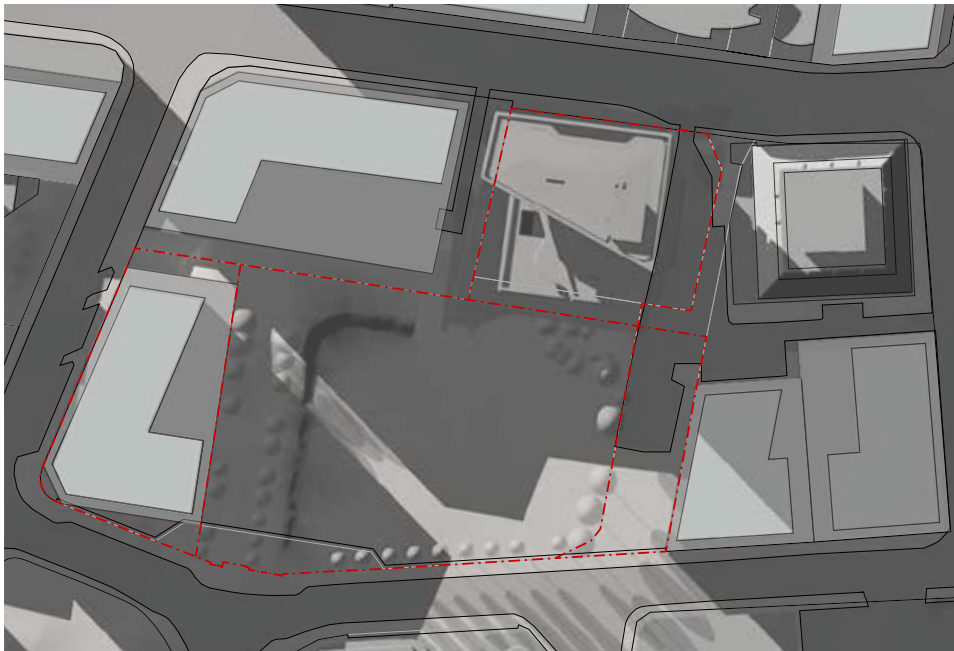
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



Scenario 3:
BLEP 2015 Complying Built Form (Building Height and FSR controls)



Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building



Key

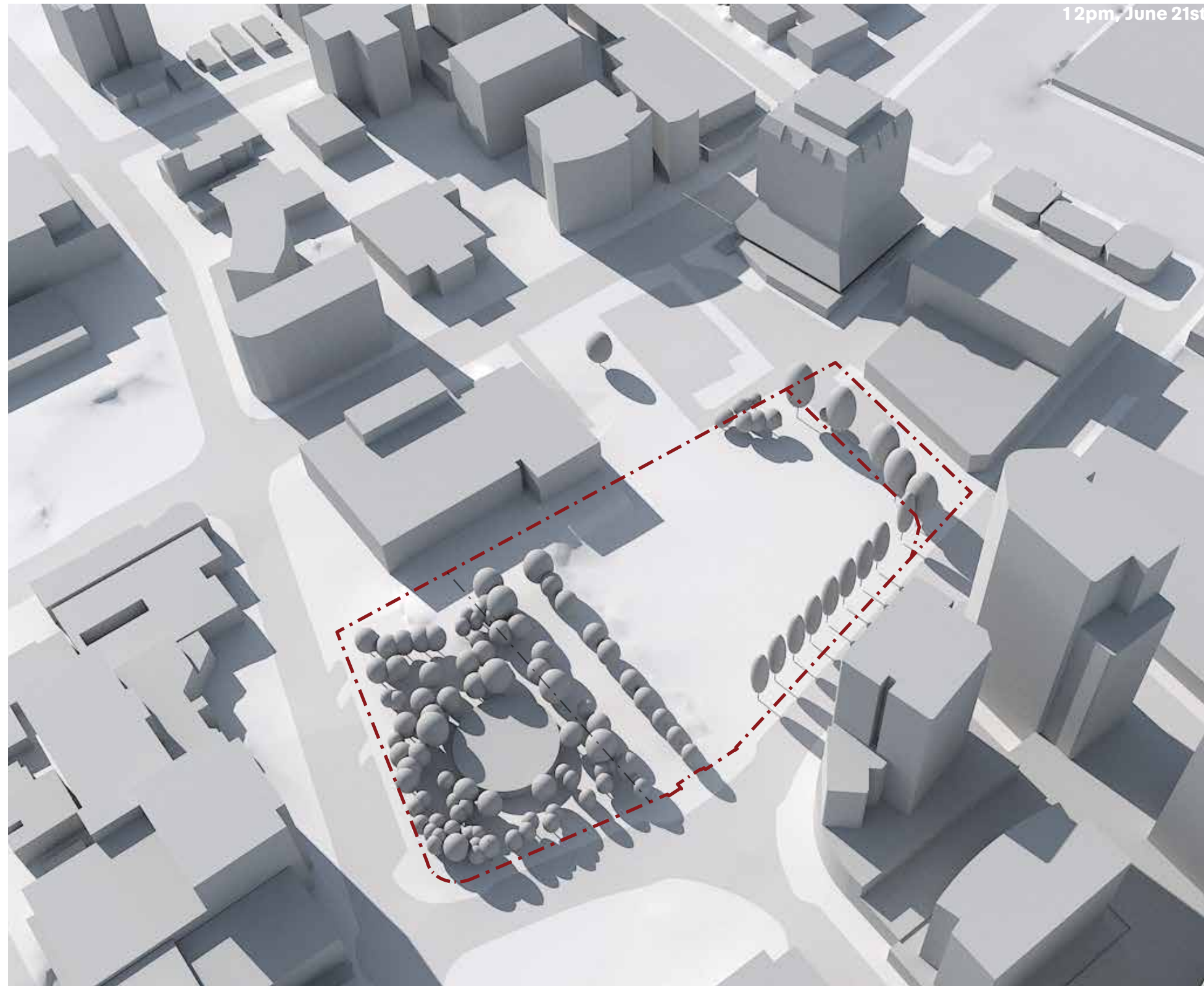
-  Additional overshadowing from proposed WSU building in relation to the existing conditions of the park
-  Approximately 6.9% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site
-  Additional overshadowing outside the park area caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

**Cumulative
Overshadowing
Impact 11am-3pm**



Existing Condition (existing built form)

3D Axonometric

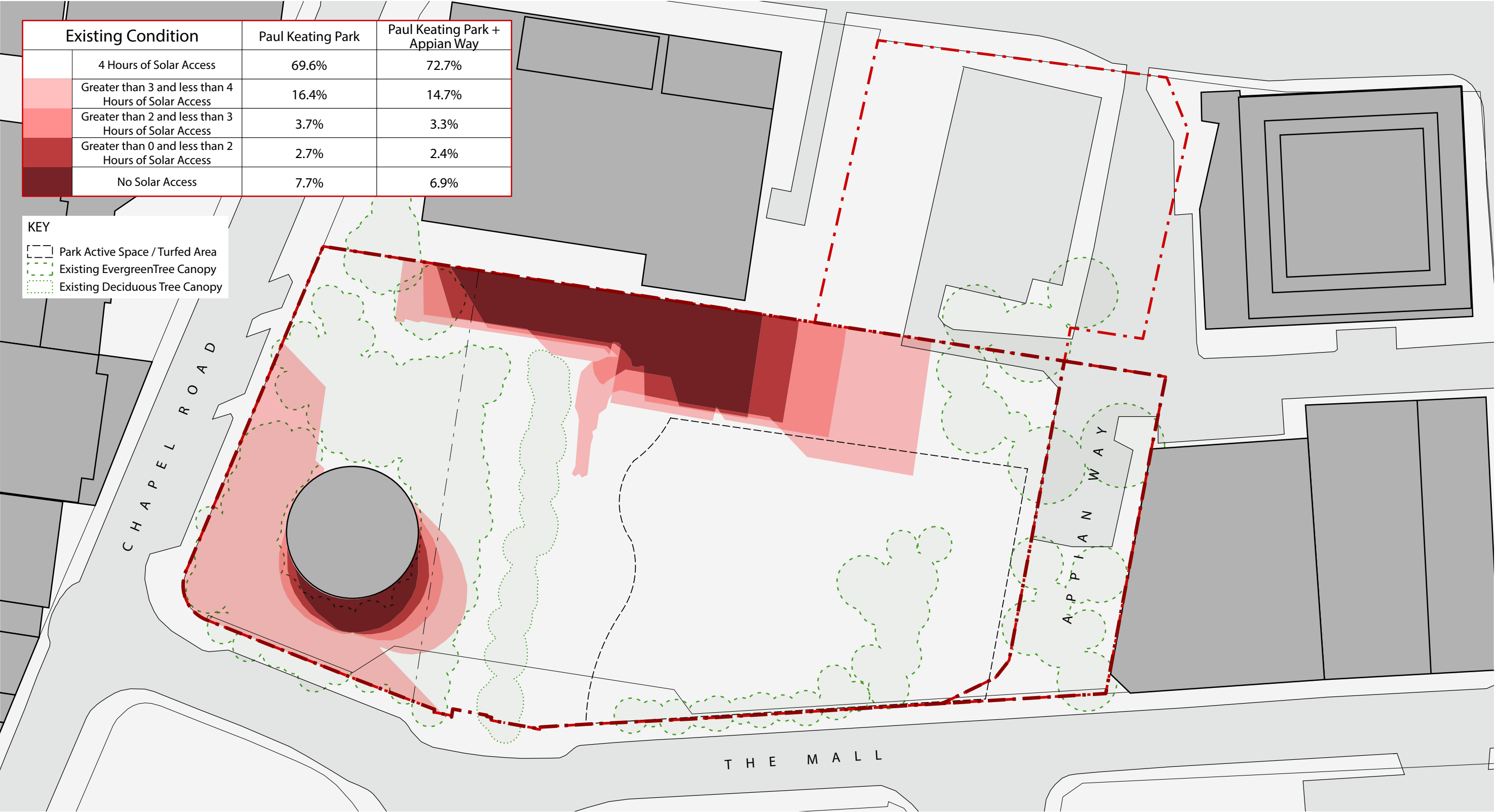


Concluding Observations

1. The Existing Condition provides the best solar access outcome for the Park, with more than 69% of the Park area receiving 4 hours of continuous sunlight on the Winter Solstice.
2. Built form immediately to the North of the Park has a building height of approximately 15m above the RL of the Park, limiting the overall overshadowing impact on Paul Keating Park on the winter solstice.
3. Less than 3% of the grass lawn area of the Park is impacted by existing building overshadowing between 11am and 3pm on the Winter Solstice, making it the ideal condition for people's wellbeing in the park in winter and for the health of turf, flowering plants, full-sun plants and tree growth.

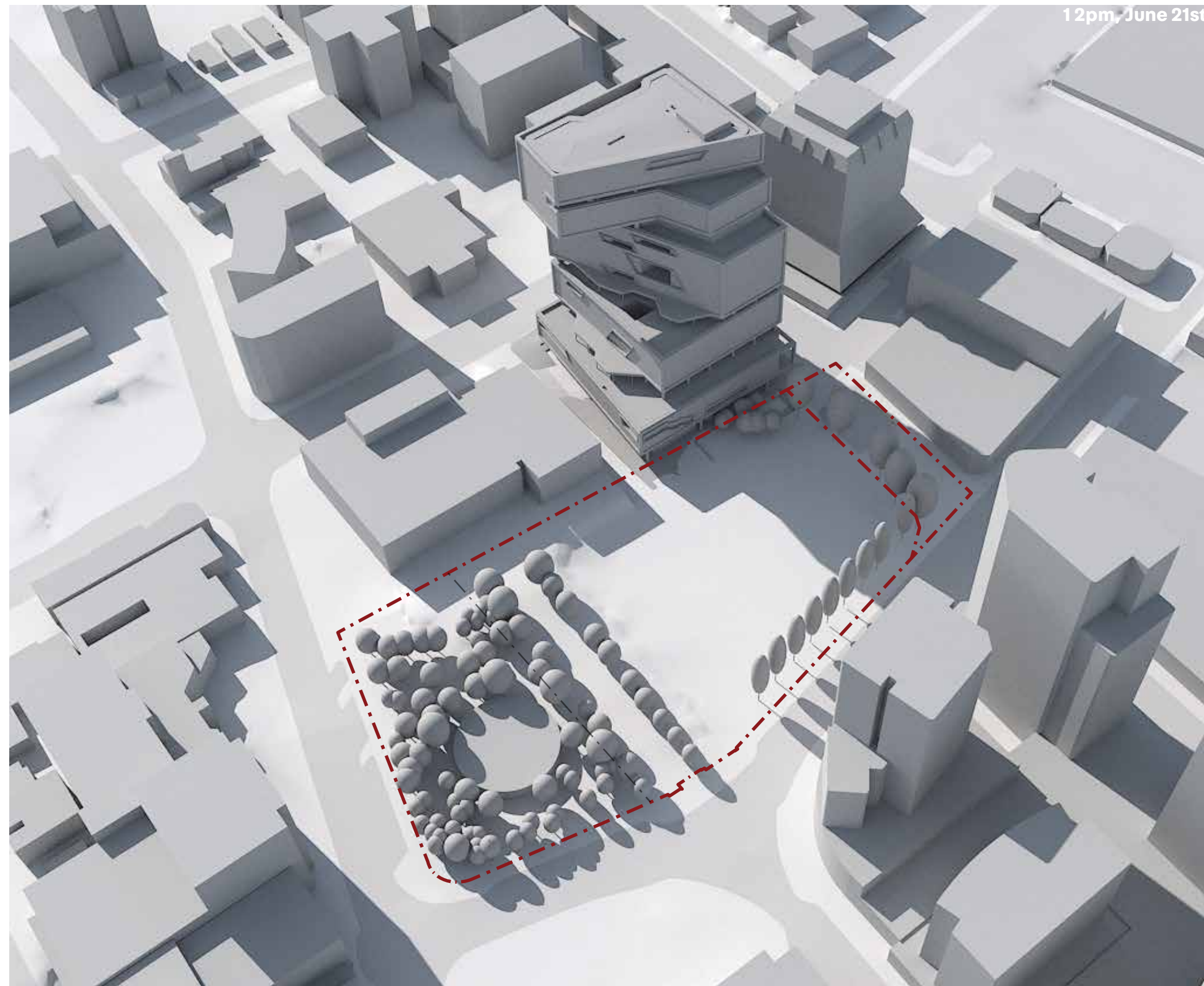
Cumulative Overshadowing Impact

(11 am - 3pm, June 21st)



Scenario 1: Existing Built Form with Proposed WSU Building

3D Axonometric



Concluding Observations

1. The WSU proposal creates significant additional overshadowing impact in relation to the existing built form around the Park.
2. The WSU proposal creates significant additional overshadowing impact in relation to a complying development on the subject site under BLEP 2015.
3. In Scenario 1, 41% of the Paul Keating Park area receives 4 hours of continuous sunlight on the Winter Solstice. The majority of this area is on the hard-stand where the Council Chambers is located, and is already overshadowed by existing surrounding trees (evergreen and deciduous).
4. 70% of the existing grass turf area of the Park would be impacted by the overshadowing from the WSU proposal.

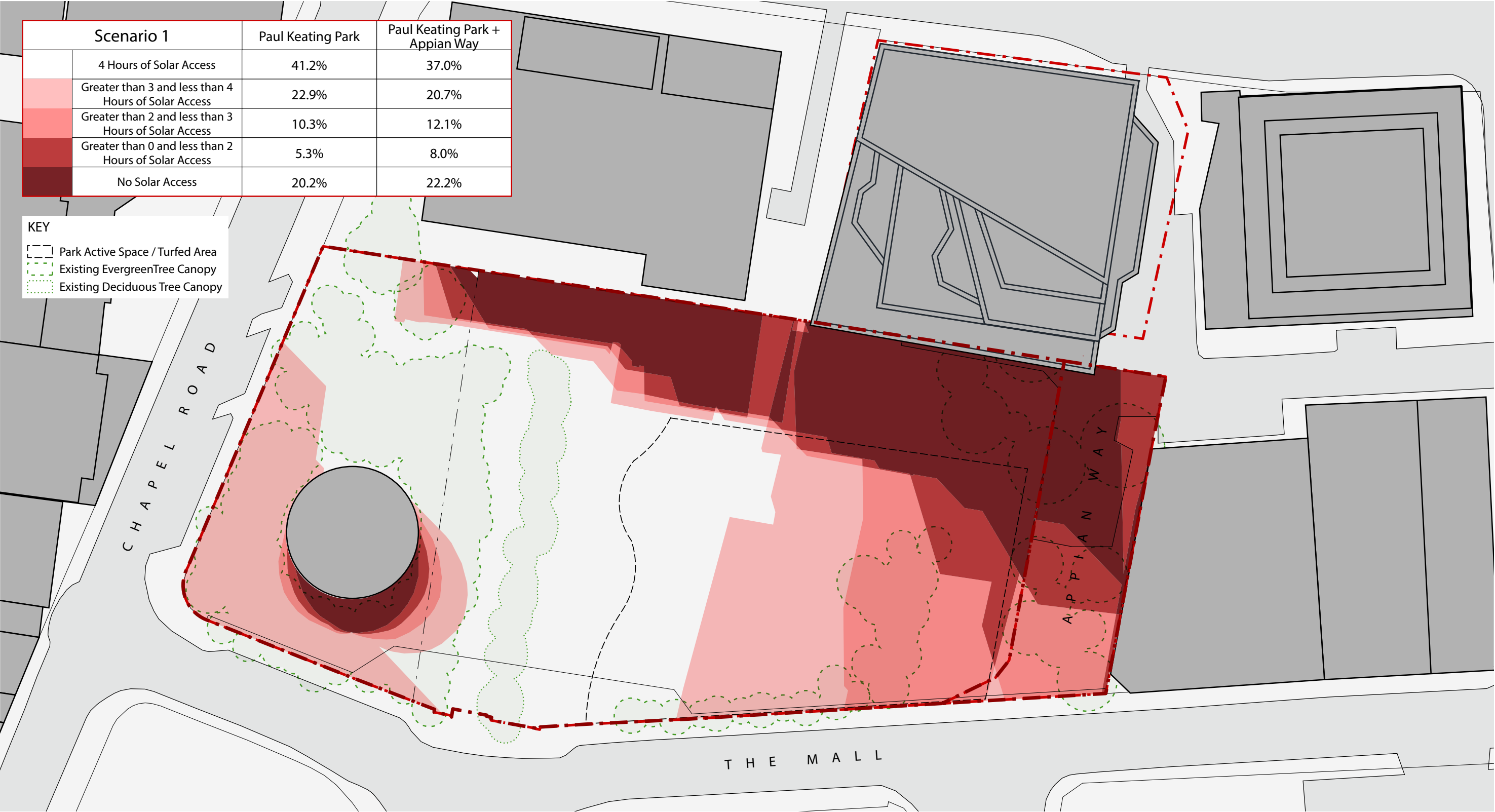
Primary Points for Improvement

It is recommended the WSU proposal be amended to reduce building bulk and FSR to:

1. Achieve a minimum of 4 hours of continuous solar access to minimum 50 percent of the area of Paul Keating Park between 10.00am and 3.00 pm on 21 June (analysis to include shadows cast by existing buildings). The area of Paul Keating Park is defined as the property at 375 Chapel Road (DP777510 parcel n°6), exclusive of the footprint of the Council Chambers Building.
2. Achieve a minimum of 4 hours of continuous solar access on the Winter Solstice to a greater percentage of the existing turf area (ideally 50 percent).

Cumulative Overshadowing Impact

(11 am - 3pm, June 21st)



Scenario 2: Existing Built Form with BLEP 2015 Complying Build Form on WSU site

3D Axonometric



Concluding Observations

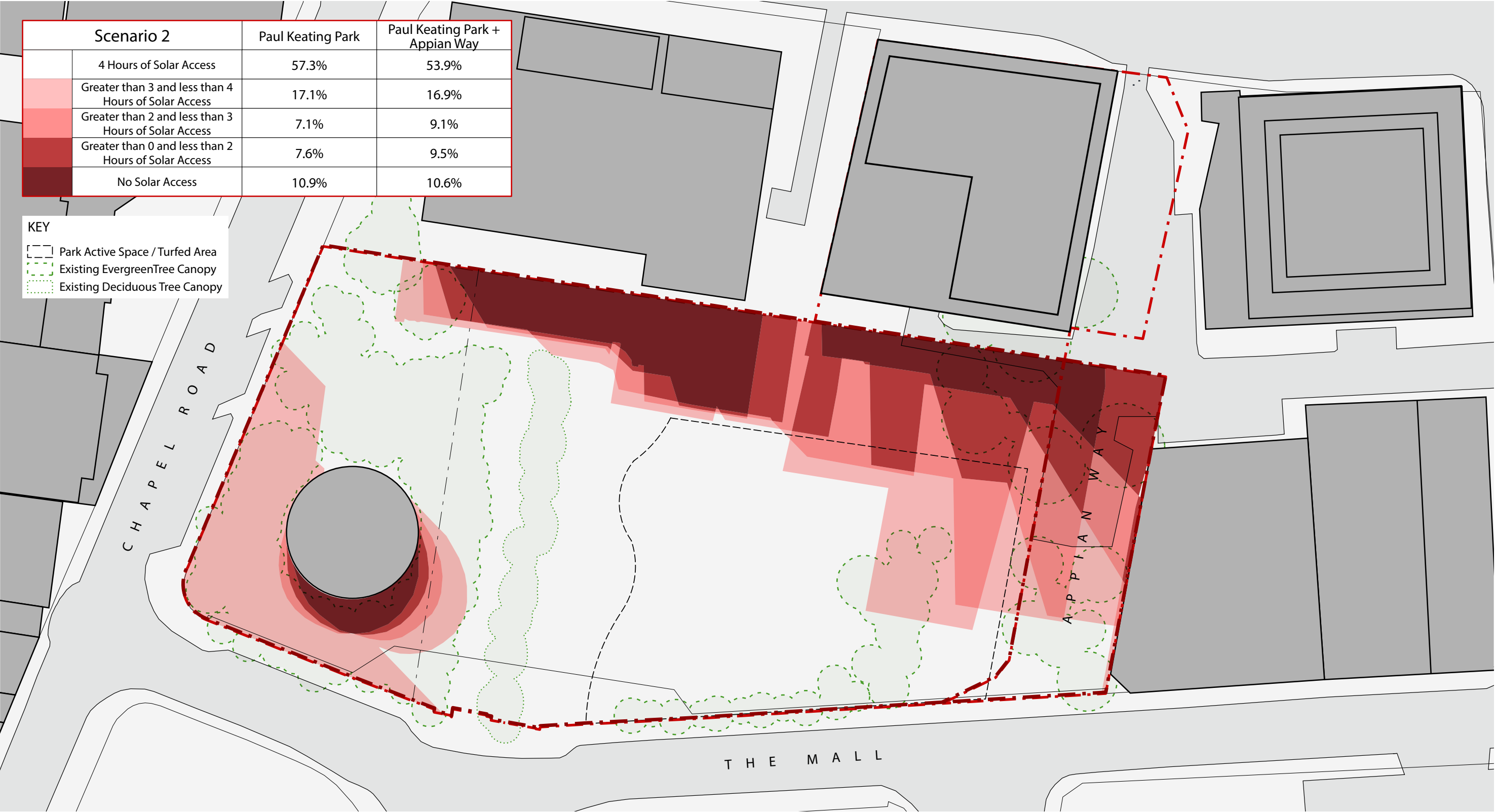
1. Scenario 2 is the second-best solar access outcome for the Park with approximately 57% of the Park area receiving 4 hours of direct sunlight on the Winter Solstice.
2. Grass lawn area of Paul Keating Park is not as significantly impacted by additional overshadowing when compared with Scenarios 1, 3 and 4, with more than 75% of the grass area receiving 4 hours of solar access.
3. Appian Way is already impacted by the CBCity Council Building in the morning. A complying development on the proposed Western Sydney University site further impacts on the solar amenity of Appian Way. The Northern portion of Appian Way would be impacted, receiving less than 2 hours of solar access. The southern portion of Appian Way would be less impacted, receiving between 2 and 4 hours of direct solar access during 11am-3pm in June 21st.
4. Scenario 2 meets the criteria for best practice solar amenity controls as identified in Council's Research, which means that a complying development on the proposed WSU site would fulfill Council's proposed solar amenity controls provided that surrounding developments were not developed to the permissible building height and FSR controls.

Primary Points for Improvement

1. Undertake a design-led place-based approach to identify appropriate built form for the sites surrounding the Park to inform amendments to the LEP and DCP.

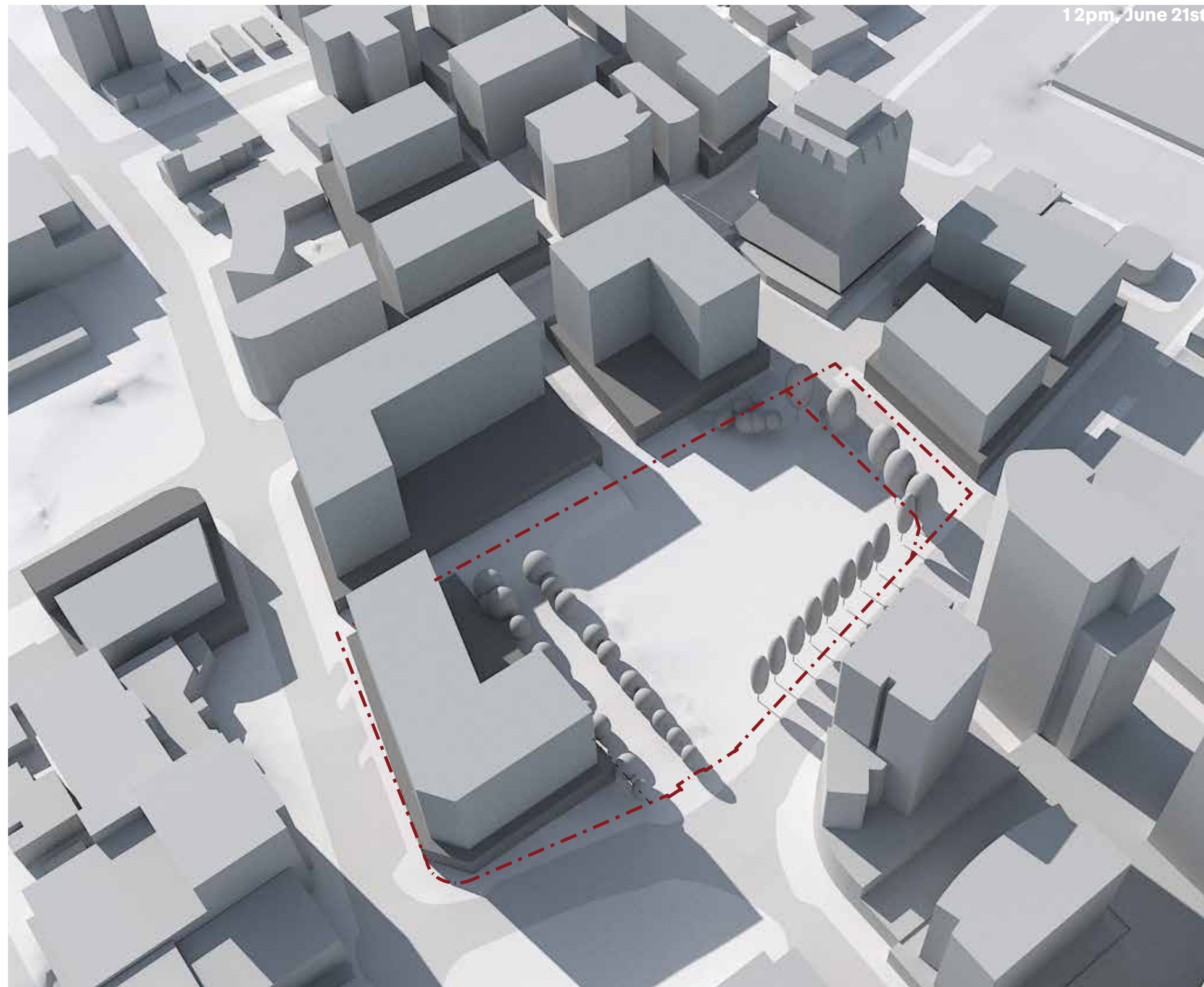
Cumulative Overshadowing Impact

(11 am - 3pm, June 21st)



Scenario 3: BLEP 2015 Complying Built Form

3D Axonometric



Concluding Observations

1. Paul Keating Park is severely impacted by the current BLEP 2015 zoning, building height and FSR controls.
2. Scenario 3 is the second worst solar access outcome for the Park with approximately 58% of the park area receiving less than 2 hours of direct sunlight and only 7% of the park area receiving 4 hours of sunlight on the winter solstice.
3. Only 21% of the grass lawn area would get the required 4 hours of solar access.
4. Appian Way would be considerably impacted by the existing CBCity Council Building and by complying developments on the sites surrounding the Park. The northern portion of Appian way would receive less than 2 hours of solar access. The southern portion would be less impacted, receiving between 2 and 4 hours of direct solar access during 11am-3pm in June 21st.

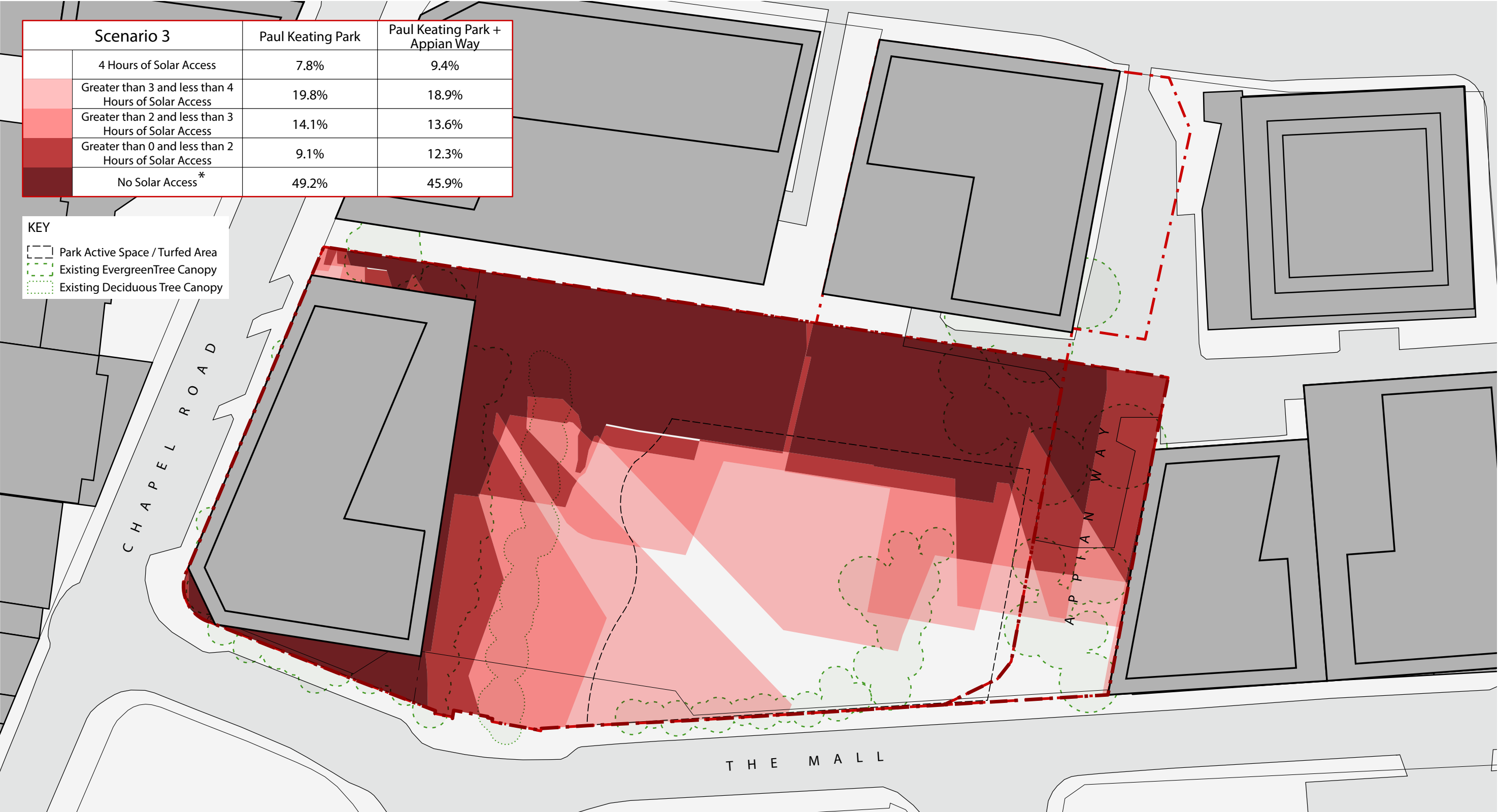
Primary Points for Improvement

5. A design-led place-based approach is required to reconsider the built form and land use around the Park, while protecting solar amenity to Paul Keating Park and the heritage significance of the Council Chambers.

* the calculation for 'no solar access' includes the building footprint of a BLEP 2015 complying development on the civic site (Council Chambers)

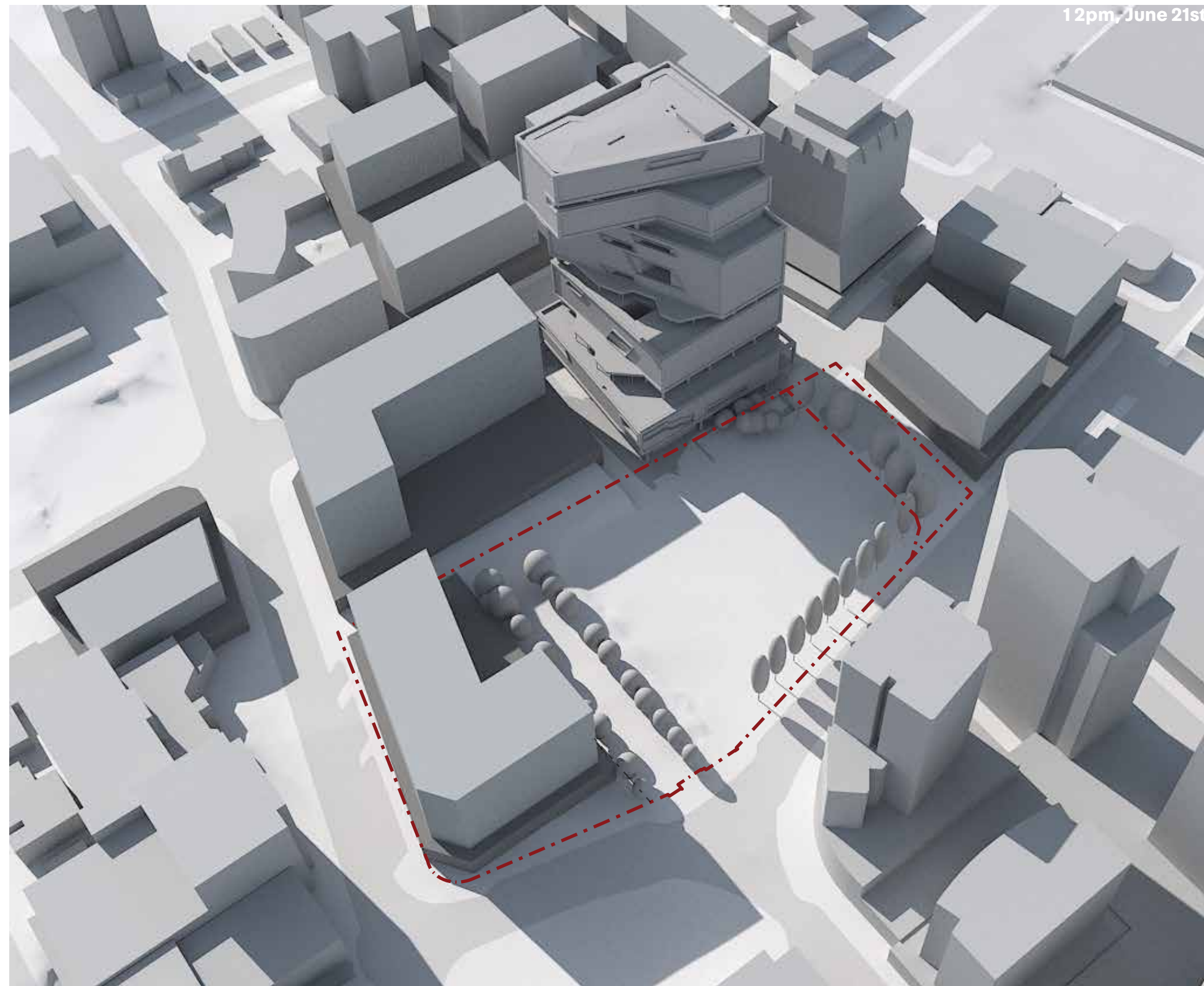
Cumulative Overshadowing Impact

(11 am - 3pm, June 21st)



Scenario 4: BLEP 2015 Complying Built Form with Proposed WSU Building

3D Axonometric



Concluding Observations

1. Scenario 4 creates the worst solar access outcome for the Park with 62% of the Park area receiving less than 2 hours of direct solar access, and less than 1% of the whole park area receiving 4 hours of continuous sunlight on the Winter Solstice.
2. The grass lawn area of the Park would be severely impacted. Turf surfaces, flowering plants and full-sun plants would not survive as less than 3% of the lawn area would receive the minimum of 4 hours of solar access. The quality and amenity of the Park would be significantly reduced.
3. The northern portion of Appian Way would not receive any sunlight, while the southern portion would receive between 2 to 3 hours of direct Solar Access.

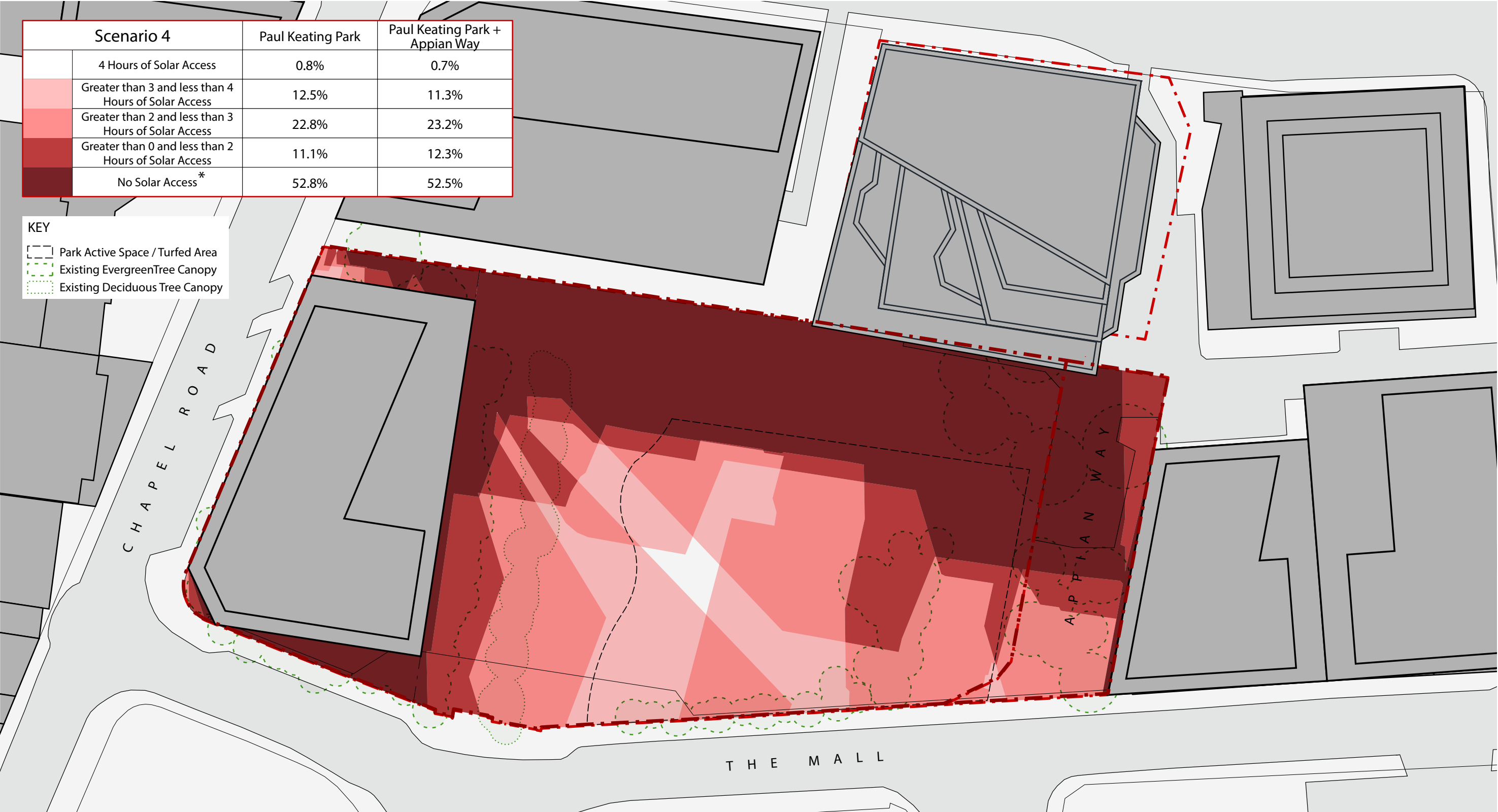
Primary Points for Improvement

1. It is recommended the WSU proposal be amended to reduce building bulk and FSR to comply with the solar amenity control proposed in Council's Research, as described on Page 8 of this document.
2. It is recommended that a design-led place-based approach be undertaken to reconsider built form and land use of the sites surrounding the Park, while protecting solar amenity to Paul Keating Park and the heritage significance of the Council Chambers to inform amendments to the LEP and DCP.

* the calculation includes the building footprint of a BLEP 2015 complying development on the civic site (Council Chambers)

Cumulative Overshadowing Impact

(11 am - 3pm, June 21st)



Conclusions & Recommendations

Conclusions

Paul Keating Park is the centrepiece of the Bankstown Civic Precinct; surrounded by significant community buildings and is the location of many social, cultural and performative events and festivals. A masterplan for the Park is currently underway, which will set the vision and preferred design concept to inform future public domain capital works to ensure that this civic area delivers the best outcome for the community and is aligned with broader strategic directions for the Bankstown CBD.

The Park has a large, sun-drenched expanse of lawn that is used for sports, recreational activities and events. The success of the Park is due to its location, the variable ground plane, the variety of surfaces and the natural landscaped features. People eat lunch on the stairs and on the lawn area, school kids play on the lawn and people do Tai-Chi on the paved areas. These natural features are reliant on solar access for plant and tree health and for people’s wellbeing. In its current state, more than 69 percent of the area of the Park receive sunlight on the Winter Solstice for more than 4 hours continuously between 11am and 3pm. The lawn area is generally unaffected by overshadowing.

As seen from the analysis, Scenarios 1, 3 and 4 create an adverse overshadowing impact on the Park and do not achieve a minimum of 4 hours of continuous solar access to a minimum 50 percent of the area of Paul Keating Park on the Winter Solstice, as recommended in Council’s Best Practice Research.

In Scenario 1, 41 percent of the Paul Keating Park area receive 4 hours of continuous sunlight on the Winter Solstice. The majority of this area is on the hard-stand where the Council Chambers is located, and is already overshadowed by existing surrounding trees (evergreen and deciduous).

Scenario 2 is the second-best solar access outcome for the Park with approximately 57% of the Park area receiving 4 hours of direct sunlight on the Winter Solstice.

Scenario 3 is the second worst solar access outcome for the Park with approximately 58% of the park area receiving less than 2 hours of direct sunlight and only 7% of the park area receiving 4 hours of sunlight on the Winter Solstice.

Scenario 4 creates the worst solar access outcome for the Park with 62% of the Park area receiving less than 2 hours of direct solar access, and less than 1% of the whole park area receiving 4 hours of continuous sunlight on the Winter Solstice.

Recommendations & Next Steps

It is recommended that:

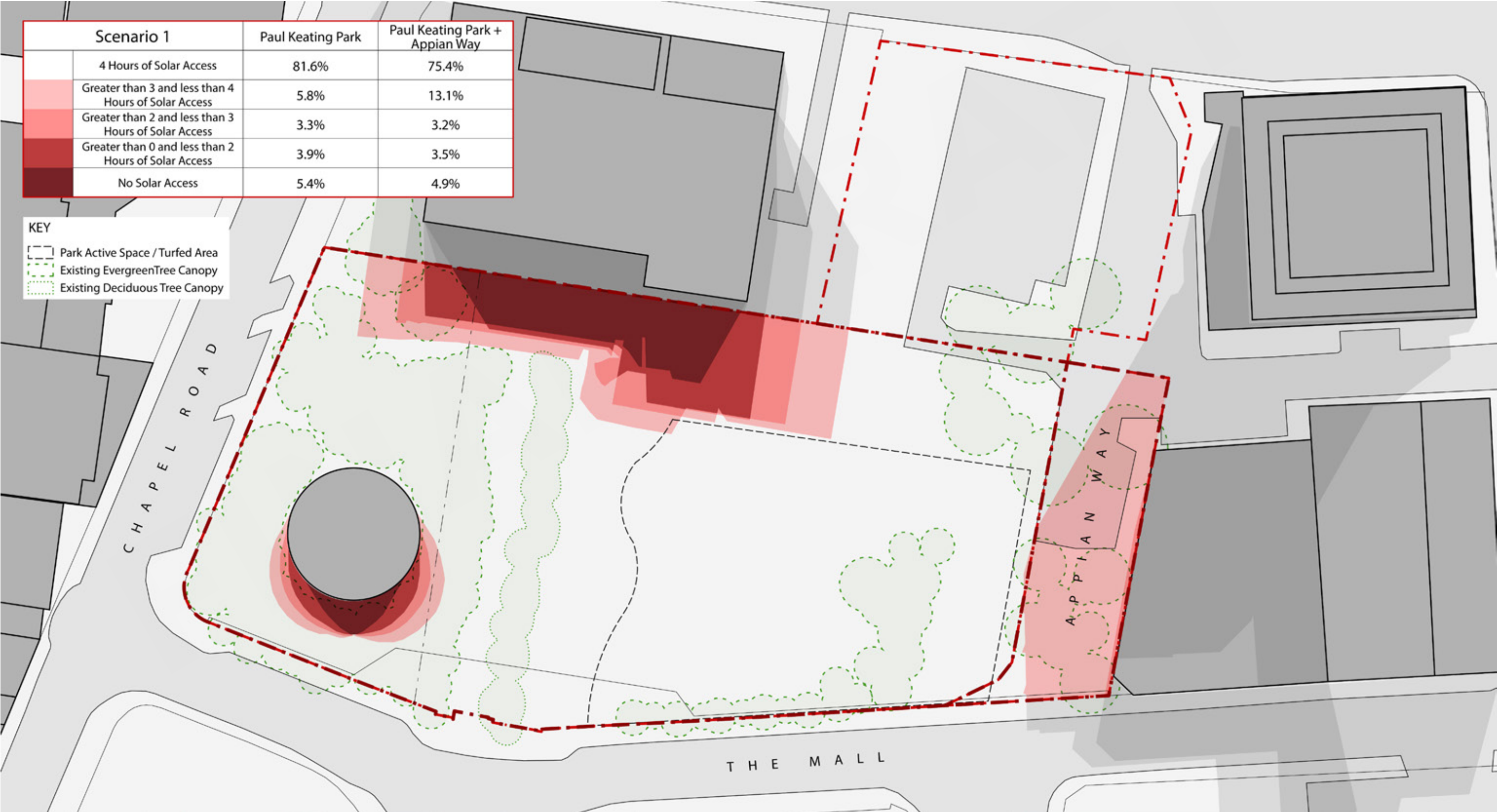
- Solar amenity to Paul Keating Park be maintained and protected. As recommended in Council’s *Best Practice Research Open Spaces in City Centres: Solar Amenity Controls*, developments must allow for 4 hours of continuous solar access to minimum 50 percent of the area of Paul Keating Park between 10.00 am and 3.00 pm on 21 June (inclusive of existing shadow). The area of Paul Keating Park is defined as the property at 375 Chapel Road (DP777510 parcel n°6), exclusive of the footprint of the Council Chambers Building. Additionally, developments must not cast additional shadow on the Bankstown Court House Reserve between 10.00 am and 2.00 pm on 21 June for at least 50 percent of the total park area.**
- The proposed Western Sydney University building be amended to reduce building bulk and FSR to comply with the solar amenity control proposed in Council’s Best Practice Research (objectives, provisions and policy implementation), as described above and on Page 8 of this document.**
- The existing Bankstown LEP 2015 Zoning, Height of Building and FSR controls for the site containing the Council Chambers be reviewed. A design-led and site-specific approach is to be undertaken to determine appropriate building height and FSR for the Council Chambers ensuring that the heritage significance of the site is preserved and enhanced.**
- The existing Bankstown LEP 2015 Height of Building and FSR controls for the site containing BLaKC be reviewed. A design-led and site-specific approach is to be undertaken to determine appropriate building height and FSR for the BLaKC site.**
- Council to potentially refine the solar access analysis for the five scenarios by using Rhino / Grasshopper applications to algorithmically analyse the solar amenity and to produce high-resolution analysis over shorter time intervals or refine the analysis with the same methodology of this study, but using shorter time intervals. This would improve the accuracy of the study and help produce more defined areas of solar amenity.**

Appendix

Cumulative Overshadowing Impact - 10am to 2pm

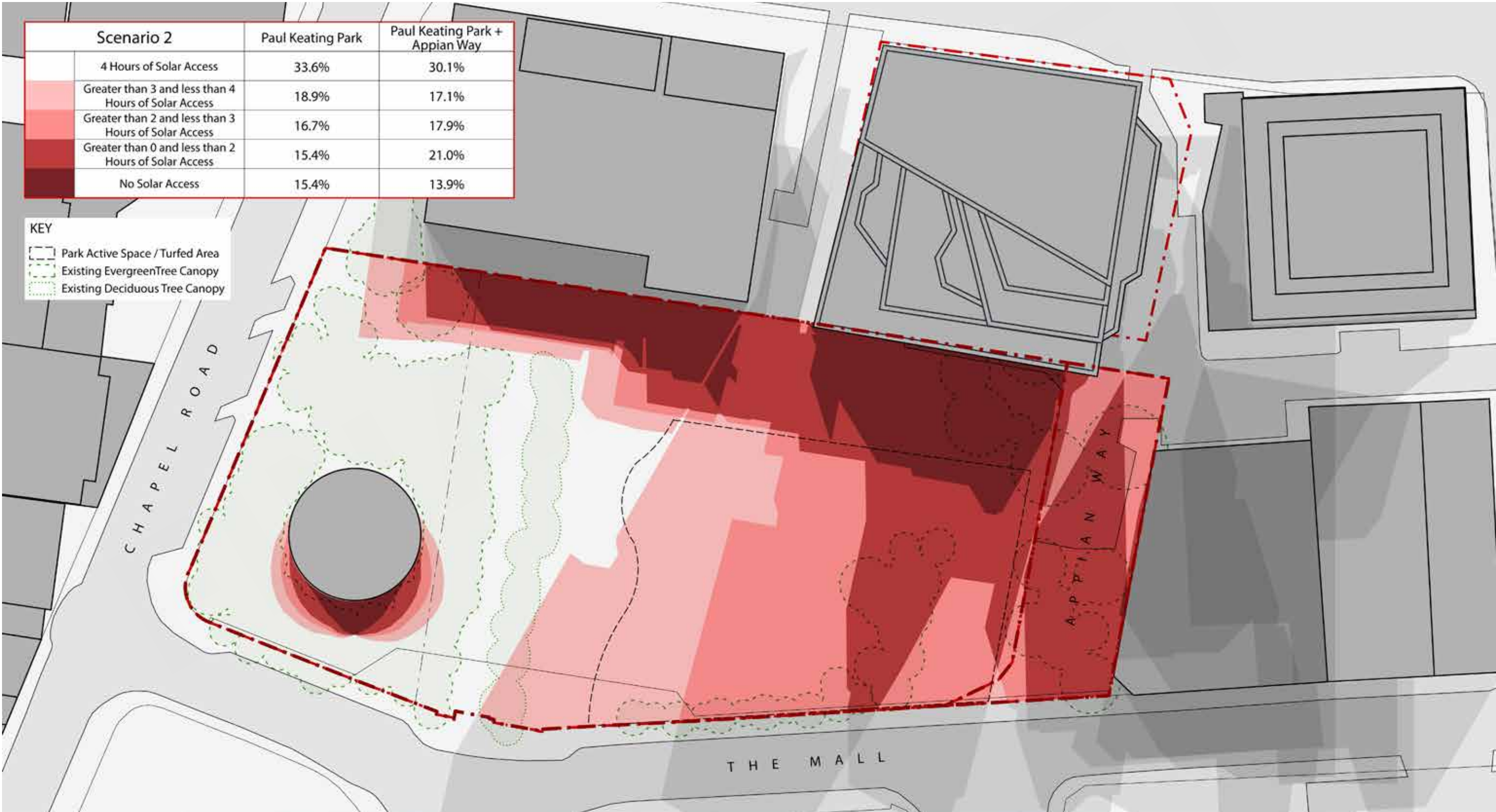
Existing Built Form (current condition)

(10am - 2pm, June 21st)



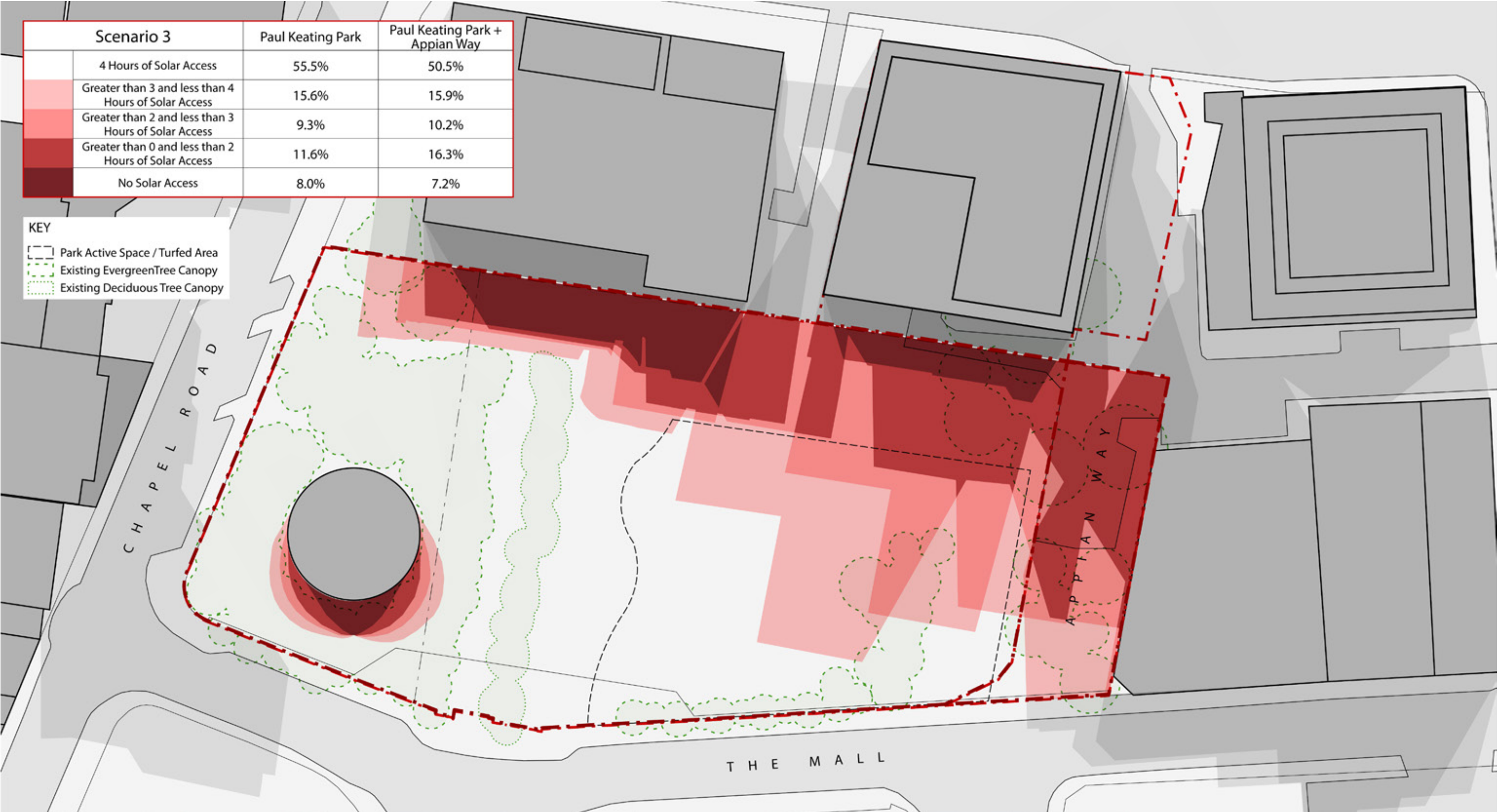
Existing Built Form with Proposed WSU Building

(10am - 2pm, June 21st)



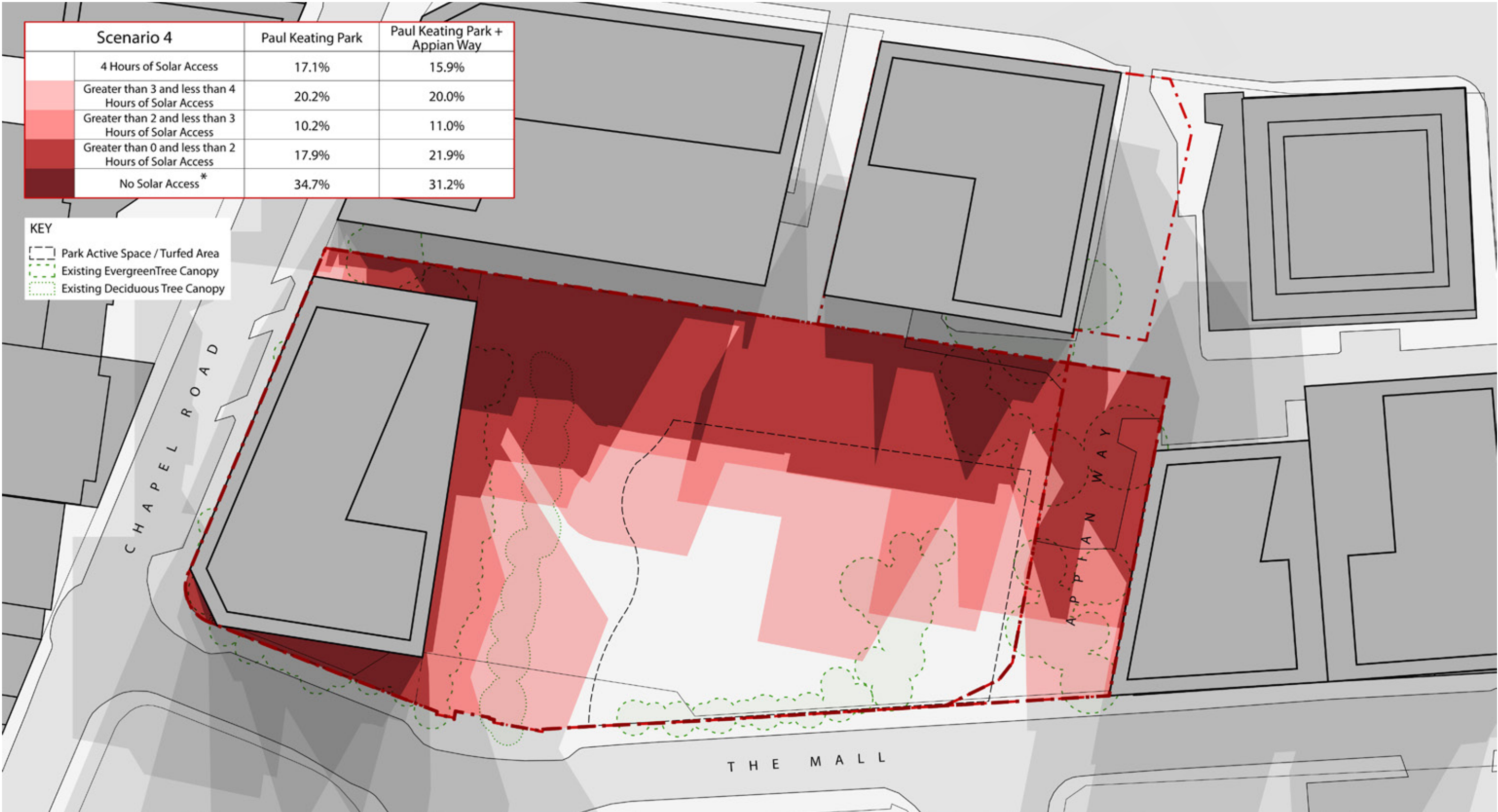
Existing Built Form with BLEP 2015 Complying Built Form on WSU Site

(10am - 2pm, June 21st)



BLEP 2015 Complying Built Form

(10am - 2pm, June 21st)



BLEP 2015 Complying Built Form with proposed WSU Building

(10am - 2pm, June 21st)

