

6 January 2020

Director, Social & Infrastructure Assessments Planning & Assessment Department of Planning, Industry & Environment GPO Box 39 SYDNEY NSW 2001

Dear Sir / Madam,

Canterbury Bankstown Council Submission Exhibition of SSD-9831 (WSU Bankstown City Campus)

Thank you for the opportunity to comment on the State Significant Development Application for the proposed educational establishment (university) at 74 Rickard Road and part 375 Chapel Road, Bankstown.

The attached submission outlines Council's issues following a review of the State Significant Development Application.

If you have any enquiries, you can contact Council officer Kyou Won Rhee on 9707 9489.

Yours sincerely,

Mauricio Tapia Team Leader Strategic Planning



CANTERBURY BANKSTOWN COUNCIL'S SUBMISSION

Issues in response to the State Significant Development Application SSD-9831

74 Rickard Road and part 375 Chapel Road, Bankstown

December 2019





Summary of Key Issues

Issue 1: Statutory Context

1.1 The SSDA must comply with the planning proposal currently under assessment for the site.

Issue 2: Flood Risk Management

- 2.1 The applicant must contribute to an additional culvert at North Terrace. This infrastructure improvement is required to support the planning proposal and SSDA. Without this infrastructure improvement, the flooding issue cannot be resolved.
- 2.2 The SSDA must adequately address the floor levels and evacuation routes.

Issue 3: Transport and Accessibility

- 3.1 The applicant must contribute to public domain works to improve pedestrian connections to public transport and shops. This infrastructure improvement is required to support the planning proposal and SSDA.
- 3.2 The SSDA must provide appropriate bike parking and associated end–of–trip facilities on the site.
- 3.3 The applicant must contribute to any parking infrastructure requirements. This infrastructure improvement is required to support the planning proposal and SSDA.

Issue 4: Built Form and Urban Design

- 4.1 The SSDA must minimise the overshadowing and wind impacts.
- 4.2 The SSDA must minimise the visual bulk impacts.
- 4.3 The SSDA must demonstrate consistency with the Bankstown Complete Streets Transport and Place Plan.
- 4.4 The SSDA must ensure the proposed ground level interface promotes active street frontages and pedestrian weather protection.
- 4.5 The SSDA must demonstrate consistency with the 'Safer by Design' guidelines.

Issue 5: Utilities

5.1 The SSDA must submit detailed information on the capacity of utilities and services.

Issue 6: Contributions

6.1 The SSDA must apply Council's Contributions Plan.

Issue 7: Approval of Uses

7.1 The SSDA must clarify whether the proposed uses are subject to separate approvals.

Issue 8: Construction

8.1 The SSDA must protect the surrounding land and road network during the construction stage.



Introduction

This submission outlines Council's issues in response to the State Significant Development Application SSD–9831 (SSDA).

It is noted that Council is the land owner, and it is important for the Department of Planning, Industry & Environment to address the issues that Council raise if the land is to support the proposal.

This submission is informed by:

- Council's review of the SSDA
- Council's assessment of a planning proposal requesting to increase the building envelope controls for the site. Council resolved to submit a planning proposal to the Department of Planning, Industry & Environment to seek a Gateway Determination.

The following documents are attached to support this submission:

Attachment A	Council Report–Ordinary Meeting of 22 October 2019
Attachment B	Local Planning Panel Report–LPP Meeting of 30 September 2019
Attachment C	Council's Site Flood Assessment Report
Attachment D	Council's Transport and Traffic Peer Review
Attachment E	Council's Bankstown Complete Streets Transport and Place Plan
Attachment F	Council's Urban Design Peer Review
Attachment G	Council's Best Practice Research Report-Open Spaces and Solar
	Amenity Controls
Attachment H	Council's Solar Amenity Study–Case Study: Paul Keating Park



Issue 1: Statutory Context

1.1 The SSDA must comply with the planning proposal currently under assessment for the site.

At the Ordinary Meeting of 22 October 2019, Council considered a planning proposal application requesting to increase the building envelope controls for the site (as provided in Attachment A). Council resolved to submit a planning proposal to the Department of Planning, Industry & Environment to seek a Gateway Determination. According to the Council resolution, Council may as part of the planning proposal:

- (a) Permit a maximum 83 metre building height, subject to consultation with Bankstown Airport and the Commonwealth Department of Infrastructure, Transport, Cities and Regional Development.
- (b) Permit a maximum 8:1 FSR, subject to the proposal satisfying the following solar access and wind impact requirements prior to the exhibition of the planning proposal:
 - (i) Council to amend the LEP with the following solar access control: Development must allow for 4 hours of continuous solar access to a consolidated area of Paul Keating Park between 10am and 3pm on 21 June (inclusive of existing shadow). The size of the consolidated area must be a minimum 50% of the area of Paul Keating Park (not including the footprint of the Council Chambers).
 - (ii) The applicant to undertake further analysis to demonstrate how the proposal would comply with the solar access control, and minimise wind impacts, noting that the proposed 8:1 FSR may need to be reduced to adequately address these issues.

The Department is currently considering whether to issue a Gateway Determination, which would enable Council and the applicant to undertake the additional investigations to resolve the maximum FSR/ building height controls for the site. As the SSDA is reliant on the planning proposal, it is important to complete the planning proposal process prior to the determination of the SSDA if the proposal is to comply with the LEP Amendments.

Recommended amendments to the SSDA:

- The Department of Planning, Industry & Environment must ensure the determination of the planning proposal occurs prior to the determination of the SSDA.
- The Department of Planning, Industry & Environment must ensure the SSDA complies with the LEP Amendments as published on the NSW legislation website.



Issue 2: Flood Risk Management

2.1 The applicant must contribute to an additional culvert at North Terrace. This infrastructure improvement is required to support the planning proposal and SSDA. Without this infrastructure improvement, the flooding issue cannot be resolved.

In relation to existing conditions, the site forms part of the Salt Pan Creek upper catchment and is affected by an overland flow path, stretching from Rickard Road to the open channel at North Terrace. The site is subject to medium and high risk stormwater flooding in a 100 year flood event. This is due to the inadequate capacity of the existing stormwater system and blockages that occur to stormwater pits and culverts, in particular at North Terrace which impacts on the drainage capacity of The Appian Way.

In relation to the proposed conditions, the proposal would block part of the overland flow path, making flood conditions more hazardous between the proposal and the Civic Tower. The maximum water depth would increase in a 100 year flood event and would increase the extent of high risk stormwater flooding.

The SSDA proposes to lower The Appian Way as a possible mitigation measure to minimise the affectation on adjacent properties. While such an approach may reduce a net increase of water surface levels, Council does not support this approach for the following reasons:

- This approach fails to address the relevance of the high risk flood zone along The
 Appian Way. Floodplain management guidelines do not support the intensification of
 land in the high risk flood zone if it is not mitigated adequately.
- This approach does not resolve the increase of water depths, velocities and hydraulic hazards within the floodway as a result of the proposal. The high risk flood zone within The Appian Way would remain present regardless of the proposed lowering of The Appian Way, and would continue to pose a significant safety risk to the university users and surrounding public.
- This approach does not consider the existence of two large culverts in The Appian Way. Sydney Water owns these culverts and are of a significant size. Based on Council's records, the culverts are positioned immediately below the existing road's asphaltic surface. This would deem the proposed lowering of The Appian Way as very difficult to achieve.
- This approach does not consider Council's long term planning and flood mitigation measures to improve existing flooding conditions in the Bankstown CBD and in particular along Rickard Road, The Appian Way and North Terrace.



The mitigation measures include maximising the flow intake into the culverts at Rickard Road together with the capacity amplification of the existing stormwater channel in North Terrace. These improvements have the potential to significantly reduce overland flow depths, velocities and flood risk, thus opening the opportunities for development intensification in this part of the Bankstown CBD. The proposed lowering of The Apian Way would create an undesired effect as it would bypass Council's flood mitigation measures.

• The preservation of road levels in The Apian Way, in particular near the large inlet structure is essential for Council's flood mitigation measures to properly function.

In relation to next steps, Council assessed the flood risks as part of the planning proposal process, consistent with Ministerial Direction 4.3 (Flood Prone Land) and the Salt Pan Creek Catchments Floodplain Risk Management Plan (adopted by the former Bankstown City Council at the Ordinary Meeting of 17 December 2013). The Floodplain Risk Management Plan requires the redevelopment of sites along The Appian Way to maintain or enhance the capacity of existing overland flow paths.

The assessment recommends infrastructure improvements to mitigate the flood impacts as a result of the proposal, namely an additional culvert at North Terrace, which would significantly reduce the flood impacts both on and off the site (as provided in Attachment C). The Local Planning Panel and Council endorsed this recommendation.

The applicant would therefore need to contribute to this infrastructure improvement if the planning proposal and SSDA are to be supported. Council is currently in discussions with the applicant and Bankstown Central in relation to the funding and delivery arrangements for the stormwater infrastructure works.

Recommended amendments to the SSDA:

The applicant to contribute to an additional culvert at North Terrace. This infrastructure improvement is required to support the planning proposal and SSDA. Without this infrastructure improvement, the flooding issue cannot be resolved.



2.2 The SSDA must adequately address floor levels and evacuation routes.

A review of the SSDA raises other issues in relation to flood risk management. These include:

Impact on inlet structure: The SSDA proposes to relocate the northern entry of The Appian Way (at the intersection with Rickard Road), which is adjacent to the inlet structure at the north—west corner of the Civic Tower. Council does not support the proposed relocation of the road as it may have a significant impact on the hydraulic function of the inlet.

<u>Finished floor levels:</u> The SSDA must confirm the finished floor levels based on water surface levels that relate to the acceptable flood mitigation option for the site. The proposed ramping into the basement car park may also be inadequate to prevent ingress of overland flows from the local street catchment.

<u>Flood emergency management:</u> The proposed flood emergency management does not address a number of issues including:

- Responsibilities for the management of the Flood Emergency Response Plan including preparation, maintenance, auditing and implementation.
- Responsibilities, contact personnel, the structure, and mechanisms for the dissemination of flood warnings received from BoM.
- The placement of warning systems (i.e. signage, alarms evacuation flowcharts, maps).
- The proposed evacuation route directs the university users in an easterly direction (along the southern footpath of Rickard Road), right through the area of deepest and fastest overland flow next to the large inlet structure at the Civic Tower. Council does not support this route as it would potentially expose the evacuees to a significant risk of injury and potential loss of life, should they be swept by rapid flows towards the inlet structure grates.

Recommended amendments to the SSDA:

Impact on inlet structure

The SSDA must avoid relocating the northern entry to The Appian Way.

Finished floor levels

The SSDA must confirm the finished floor levels based on water surface levels that relate to the acceptable flood mitigation option for the site



The SSDA should increase the proposed ramping into the basement car park to 150mm (matching the footpath level) or at least 100mm above the 100 year ARI flood level (whichever is higher), should it be confirmed that there is a significant overflow of flood water from Rickard Road over the crest of the driveway between the proposal and the Bankstown Library and Knowledge Centre (BLaKC).

Flood emergency management

- The SSDA must amend the Flood Emergency Response Plan to confirm responsibilities for the management of the plan and the placement of warning systems.
- The SSDA must amend the evacuation route to an area that is less affected by overland flow in order to minimise risks.



Issue 3: Transport and Accessibility

Council assessed the transport and traffic impacts as part of the planning proposal process. To inform the assessment, Council engaged an independent transport consultant to peer review the traffic, transport and parking information submitted by the applicant (as provided in Attachment D).

In principle, the peer review supports the aim to minimise off–street car parking as a way to support more sustainable modes of transport, subject to the implementation of a range of off–site measures to change travel behaviour. The peer review does not consider that the proposed measures on the site alone can achieve the mode share targets.

The peer review recommends that the applicant contribute to certain off—site measures if the proposal is to achieve the mode share targets. The Local Planning Panel and Council endorsed this recommendation.

The applicant would therefore need to contribute to this infrastructure improvement if the planning proposal and SSDA are to be supported. Council is currently in discussions with the applicant in relation to the funding and delivery arrangements of the infrastructure works listed below.

3.1 The applicant must contribute to public domain works to improve pedestrian connections to public transport and shops. This infrastructure improvement is required to support the planning proposal and SSDA.

The peer review highlights the need for high quality pedestrian connections if the proposal is to maximise walking trips and discourage car use to/from the proposed university.

If the proposal is to achieve the mode share targets, the peer review recommends that the applicant contributes to public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road to improve pedestrian connections to public transport and shops. The public domain works would be consistent with the Bankstown Complete Streets Transport and Place Plan (as provided in Attachment E).

Recommended amendments to the SSDA:

The applicant to contribute to public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road to improve pedestrian connections to public transport and shops. This infrastructure improvement is required to support the planning proposal and SSDA.



3.2 The SSDA must provide appropriate bike parking and associated end-of-trip facilities on the site.

The peer review applied the 'NSW Planning for Walking and Cycling Guideline' in relation to the proposed off–street bike parking spaces. The proposed university would generate the need for 153–298 spaces (i.e. 120–133 short–term and 33–65 long term spaces). The proposal would need to provide up to 298 spaces and associated end–of–trip facilities on the site.

The peer review also highlights the need for high quality cycle links if the proposal is to maximise cycle trips and discourage car use to/from the proposed university. If the proposal is to achieve the mode share targets, the peer review recommends that the applicant contributes to improved bike paths in the vicinity of the site.

Recommended amendments to the SSDA:

The SSDA should provide a minimum 153 bike parking spaces and associated end—of—trip facilities on the site.

3.3 The applicant must contribute to any parking infrastructure requirements. This infrastructure improvement is required to support the planning proposal and SSDA.

The peer review notes that Council's DCP does not contain specific car parking rates for tertiary educational establishments. The peer review undertook a comparison with 15 other universities in Sydney and Newcastle. The key findings are:

- People driving to universities can range from 11–75% staff and 5–40 % students.
- Most universities do not provide off-street car parking for students, particularly those located within close proximity to public transport.

Based on the above findings, the peer review provides the following recommendations:

<u>Student parking:</u> In relation to the proposed mode share target of 5% students driving to the proposed university, the peer review estimates the parking demand to equate to 100 car parking spaces assuming there will be 2,000 students on the site at any one time.

While the peer review considers the provision of no on–site student car parking to be acceptable, the peer review indicates the wider area cannot accommodate the 100 space demand as existing parking demand in the area is very high, with limited parking capacity available throughout the day. An option is to apply Council's Planning Agreements Policy to address the shortfall. This would enable Council to use the funds to construct public car



spaces within the Bankstown CBD. The proposal would need to demonstrate how it would address this issue.

<u>Staff parking:</u> In relation to the proposed mode share target of 15% staff driving to the proposed university, the peer review estimates the parking demand to equate to 98 car parking spaces assuming there will be 650 staff on the site at any one time. The proposal to provide 84–94 spaces (subject to final basement design) for staff represents a shortfall of 4–14 spaces. The proposal would need to demonstrate how it would address this issue.

<u>Visitor parking:</u> The peer review recommends that the proposal provides some visitor car parking spaces e.g. 1–2 spaces. The proposal would need to demonstrate how it would address this issue.

<u>Existing car park:</u> The proposal does not replace the existing 63 public car parking spaces to be removed as a result of the proposal. The proposal would need to demonstrate how it would address this issue.

<u>Loading facilities:</u> The peer review recommends that all loading activities associated with the proposal be undertaken on the site. An off–site loading zone on Rickard Road would not be desirable from a traffic capacity perspective.

The proposal should also ensure the loading dock can accommodate medium rigid vehicles that are 8.8 metres long, and the external driveway is wide enough to cater for safe truck movements without conflicting with vehicles travelling to the Bankstown Library and Knowledge Centre (BLaKC). The proposal would need to demonstrate how it would address these issues.

<u>Drop-off / pick-up spaces:</u> The peer review indicates that drop-off / pick-up activity would need to occur at The Appian Way, consistent with the proposal.

Recommended amendments to the SSDA:

- The applicant must provide a detailed response and/or justification for Council's consideration on how the proposal may address the car parking requirements for students, staff and visitors. If the applicant is unable to meet these requirements, Council's Planning Agreements Policy may be applied to address the shortfalls.
- The applicant must provide a detailed response and/or justification for Council's consideration on how the proposal may address the off–street loading space and access requirements.



Issue 4: Built Form and Urban Design

Council assessed the built form and urban design as part of the planning proposal process. To inform the assessment, Council engaged an independent consultant to undertake a peer review of the urban design information submitted by the applicant (Attachment F). Council also reviewed additional overshadowing advice by Council's City Design Unit in relation to the preparation of the Paul Keating Park Masterplan (Attachments G-H), and the State Design Review Panel's comments in relation to the state significant development application.

The urban design advices recommend amendments to the built form, as outlined below. The amendments are required if the planning proposal and SSDA are to demonstrate that the proposed built form is compatible with its surroundings, and enables Paul Keating Park to remain as a high amenity and high performing public space.

4.1 The SSDA must minimise the overshadowing and wind impacts.

Overshadowing impact

A key issue is the location of the proposal directly north of Paul Keating Park (refer to Figure 1). Paul Keating Park serves as the centrepiece of the Civic Precinct; surrounded by significant community buildings and is the location of many social, cultural and performative events and festivals. It is the heart of a centre that is transitioning to a strategic centre with more commercial uses and taller and denser buildings.



Figure 1: Diagram defining Paul Keating Park for the purposes of the review



Council's City Design Unit and Council's Urban Design Peer Review recognise that a proposal complying with the existing controls would cause some overshadowing. However, the extent of the overshadowing is considered reasonable as a consolidated area greater than 50% of the area of Paul Keating Park would continue to receive at least 4 hours of continuous sunlight at the winter solstice.

In relation to the proposed built form, Council adopted the following solar access control at the Ordinary Meeting of 22 October 2019: Development must allow for 4 hours of continuous solar access to a consolidated area of Paul Keating Park between 10am and 3pm on 21 June (inclusive of existing shadow). The size of the consolidated area must be a minimum 50% of the area of Paul Keating Park (not including the footprint of the Council Chambers). The Local Planning Panel endorsed this requirement.

It is important that the solar access control does not place limitations on the preparation of the Paul Keating Park Masterplan, which is currently underway. A control that requires at least 4 hours of solar access would ensure the amenity and useability of park is more than simply satisfactory.

Visual bulk and the successful implementation of the solar access control and relevant objectives in the FSR provision are related, which may prompt a review of the maximum 8:1 FSR. This approach may simultaneously resolve these important issues i.e. the overshadowing of Paul Keating Park and the visual bulk of the proposal.

Wind impact

The proposal indicates that wind conditions for the majority of trafficable outdoor locations within and around the development will be suitable for their intended uses. However, some areas will experience strong winds which will exceed the relevant criteria for comfort and safety, namely at the building corners. A suggested ground level treatment is to include densely foliating evergreen trees alongside the site boundaries at The Appian Way and Paul Keating Park.

Council's Urban Design Peer Review comments that the limited solar access to The Appian Way may constrain tree and vegetation growth to address the wind impacts. The proposal to present the full height of the building to The Appian Way and Rickard Road requires further consideration. The peer review recommends increasing the setback above the podium level to Rickard Road and The Appian Way. The increased setback would potentially reduce the wind impacts on pedestrian amenity in the surrounding streets.



Recommended amendments to the SSDA:

- The SSDA must comply with the following solar access control: Development must allow for 4 hours of continuous solar access to a consolidated area of Paul Keating Park between 10am and 3pm on 21 June (inclusive of existing shadow). The size of the consolidated area must be a minimum 50% of the area of Paul Keating Park (not including the footprint of the Council Chambers).
- The SSDA must incorporate wind impact mitigation measures, namely increased setbacks above the podium levels to Rickard Road and The Appian Way.

4.2 The SSDA must minimise the visual bulk impacts.

In relation to the proposed built form, the urban design advices of Council's Peer Review, Council's City Design Unit and the State Design Review Panel recommend a review of the bulk and density to minimise the visual bulk impacts.

Recommended amendments to the SSDA:

The SSDA must review the bulk and density to minimise the visual bulk impacts.

4.3 The SSDA must demonstrate consistency with the Bankstown Complete Streets Transport and Place Plan.

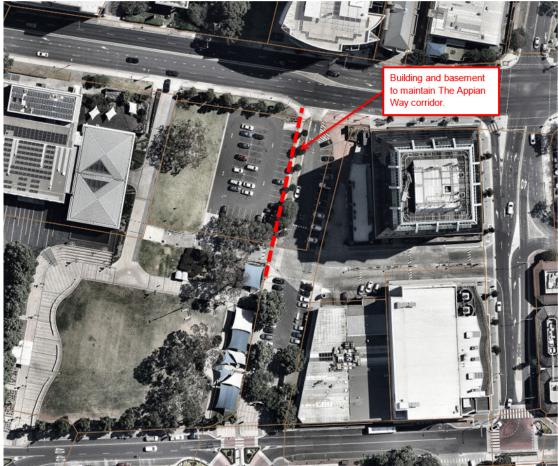
The Bankstown Complete Streets Transport and Place Plan (as provided in Attachment E) identifies The Appian Way corridor as a key 'pedestrian activity spine' linking the university with the railway and metro stations. A key issue is the building and basement footprints are proposed to extend into The Appian Way corridor. Council does not support this proposal for the following reasons:

- The proposal is incompatible with the proposed shared zone layout in The Appian Way, and is likely to leave insufficient deep soil zones to enable substantial street tree planting to occur in this section of the civic spine.
- The proposal impacts on the hydraulic function of the large inlet structure located at the northern end of The Appian Way, and may restrict the footpath width from achieving DDA compliant pedestrian access.
- The proposed street tree alignment and overall landscape design/ material palette have no relationship to The Appian Way corridor, whereas the vision is for a coordinated design from Rickard Road to North Terrace.



The urban design advice recommend redesigning the building and basement footprints to align with the western boundary of The Appian Way corridor (i.e. the western edge of the existing footpath) as indicated in Figure 2.





The proposal must also demonstrate consistency with the public domain works proposed for Rickard Road and Paul Keating Park. For this reason, the submitted landscape design should not form part of development approval. A revised landscape and public domain plan should be submitted to Council for approval to ensure consistency with the Paul Keating Park Master Plan and the Bankstown Complete Streets Transport and Place Plan.



Recommended amendments to the SSDA:

- The SSDA must ensure the building and basement footprints align with the western boundary of The Appian Way corridor.
- The SSDA should include a condition of consent that reads: A landscape and public domain plan is to be approved by Council and shall be consistent with the Paul Keating Park Master Plan and the Bankstown Complete Streets Transport and Place Plan.
- The SSDA must provide a 2.4 metre wide footpath on the western side of the building connecting Rickard Road to Paul Keating Park.

4.4 The SSDA must ensure the proposed ground level interface promotes active street frontages and pedestrian weather protection.

A review of the SSDA raises the following issues:

Active street frontages

- The two corner cafes offer the opportunity for active street frontages, however they fall short of their potential as follows:
 - Both cafes are compromised by the large concrete structural columns which obscure the frontages and interrupt the outdoor dining area.
 - The cafe on the north—east corner is set 1 metre above The Appian Way and is surrounded on both frontages by ramps. There is no space allocated for outdoor dining, resulting in limited interaction and relationship between the inside and outside. The fire booster infrastructure also obstructs the cafe frontage.
 - The cafe on the south—east corner is set 0.74m above the adjoining public space and both frontages are lined with ramps, although an outdoor dining deck and public seating integrated into the stepped levels along the ramps help to create a more active interface. This cafe is setback approximately 10 metres under the colonnade, which would reduce visibility to/from the public space and limit access to natural light.
- The exhibition space on Rickard Road and the theatre at the south—west corner offer the opportunity for visually interesting frontages, however both lack external access to enable activity and connection to the public domain.
- The entries from the south and east are not visually prominent and contain a series of indirect ramps and stairs which impact on the legibility of the building.



- While the technical issues relating to flooding are acknowledged, the ground level frontages are not to the quality expected for the CBD's premier public space or the expected pedestrian volumes.
- The two logo signs that span over two levels in height appear over—scaled. The signage
 on the podium levels (levels 2–3) should be limited to one storey in height to match
 the building proportions.

Pedestrian weather protection

While the use of colonnades provides a form of pedestrian weather protection, the columns are considered to impact on the usability, movement and amenity of these spaces, and obscure the visibility of the active street frontages. The preferred option is to replace the colonnades with cantilevered awnings, which are considered more appropriate in relation to public domain design and wind downdraft amelioration.

Recommended amendments to the SSDA:

The SSDA must provide a safe and engaging environment for pedestrians, namely:

Active street frontages

- Minimise the internal/external level difference.
- Require both cafes to provide outdoor dining to both frontages with nil or minimal setback from the boundary. The outdoor dining should be accessible from the public domain, and no more than 500mm above the public domain level.
- Minimise the extent of blank walls on the ground level, for example with the use of interactive screens, digital art and other creative solutions.
- Relocate the at–grade substation at the north–west corner of the site to the basement level (as originally proposed) to enable active street frontages on Rickard Road.
- Provide the exhibition space on Rickard Road with a direct street opening to enable independent use and potential other future uses.
- Install transparent glass as part of the theatre to make the activity visible from the public domain and to offer passive surveillance to Paul Keating Park.
- Design the entries from the south and east to be more visually prominent, legible and direct.



- Revise the facade detailing of the ground and podium levels (via colour/ framing/ extrusion) to highlight the building entries, the theatre and the exhibition space more prominently.
- Limit the signage on the podium levels to one storey in height.

Pedestrian weather protection

Provide cantilevered awnings rather than the proposed colonnade treatment to provide useable public spaces and exposure of the ground level frontages.

4.5 The SSDA must demonstrate consistency with the 'Safer by Design' guidelines.

A review of the SSDA identifies the need for a Plan of Management to determine the security measures as part of the building design. The Plan should include CCTV internally and externally with a storage capacity of a minimum 28 days.

Recommended amendments to the SSDA:

- The SSDA must prepare and submit a Plan of Management, in consultation with Council, to determine the security measures to be incorporated in the building design. The Plan should include CCTV internally and externally with a storage capacity of a minimum 28 days.
- Any lighting of the premises must be installed in accordance with AS 4282–1997 'Control of the obtrusive effects of outdoor lighting', to avoid annoyance to the occupants of adjoining premises or glare to motorists on nearby roads. The intensity, colour or hours of illumination of the lights must be varied if Council considers there are any adverse effects on the amenity of the area.



Issue 5: Utilities

5.1 The SSDA must submit detailed information on the capacity of utilities and services.

Council's submission to the Planning Secretary's Environmental Assessment Requirements (dated February 2019) requested the submission of an Infrastructure Management Plan and Integrated Water Management Plan. The SSDA does not address these issues.

Recommended amendments to the SSDA:

- The SSDA must prepare and submit an Infrastructure Management Plan, in consultation with Council and the relevant agencies, detailing information on the existing capacity of infrastructure and services; any necessary upgrades or augmentation requirements of the development for the provision of utilities, and any staging of infrastructure.
- The SSDA must prepare and submit an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and nonpotable water and water sensitive urban design.



Issue 6: Contributions

6.1 The SSDA must apply Council's Contributions Plan.

Council's Section 94A Development Contributions Plan applies to the development of the site. The intended outcome is to improve local infrastructure in the Bankstown CBD, in addition to the infrastructure requirements outlined in this submission.

Recommended amendments to the SSDA:

Apply Council's Contributions Plan.



Issue 7: Approval of Uses

7.1 The SSDA must clarify whether the proposed uses are subject to separate approvals.

The SSDA must provide an updated description on the proposed uses of the building and ground level retail tenancies, together with the proposed hours of operation.

The SSDA must also confirm whether the approval of the proposed uses are the subject of this application or separate development applications.

Recommended amendments to the SSDA:

The SSDA must confirm whether the approval of the proposed uses are the subject of this application or separate development applications.



Issue 8: Construction

8.1 The SSDA must protect the surrounding land and road network during the construction stage.

A review of the SSDA raises the following issues:

Acoustic and Vibration Assessment Report

The submitted Acoustic and Vibration Report notes that the construction methodology is not finalised and the report contains general recommendations to manage the construction noise and vibration. The SSDA must submit a detailed construction noise and vibration management plan to Council prior to the commencement of works.

Construction Management Plan

Council does not support the use of The Appian Way and Civic Drive for construction traffic. The reason is The Appian Way and Civic Drive are required to be publicly accessible for pedestrian movement and vehicular movements to enter and service the Civic Tower during the construction stage.

It is also important to protect the structural integrity of the basement car park and stormwater culverts (located below The Appian Way and Civic Drive) from the impacts of heavy trucks during the construction phase.

The Construction Management Plan should also provide detailed information in relation to:

- Hazardous Materials Management Plan
- Environmental Management Plan
- Waste Management Plan
- Dilapidation report for the potential impacts on Council owned assets, including the Bankstown Library and associated driveway, Civic Tower, stormwater culverts and roads.
- Sediment & Erosion Control Plan.

Contamination Risk Management

The excavation protocol must include:

- All excavations must be kept free from the accumulation of water.
- Any soils excavated and disposed of from the site must be analysed and classified by a suitably qualified environmental consultant, in accordance with the NSW EPA guidelines.



• If contamination is found during excavation, the applicant should notify Council and a qualified consultant should complete the assessment.

Recommended amendments to the SSDA:

- The SSDA must submit a detailed Construction Noise and Vibration Management Plan with site specific recommendations to manage the construction noise and vibration.
- The SSDA must avoid using The Appian Way and Civic Drive for construction traffic.
- The SSDA must protect the structural integrity of the basement car park and stormwater culverts (located below The Appian Way and Civic Drive) from the impacts of heavy trucks during the construction phase.
- ➤ The SSDA must submit a detailed Construction Management Plan with the following information:
 - Hazardous Materials Management Plan
 - Environmental Management Plan
 - Waste Management Plan
 - Dilapidation report for the potential impacts on Council owned assets, including the Bankstown Library and associated driveway, Civic Tower, stormwater culverts and roads.
 - Sediment & Erosion Control Plan.
- The SSDA must submit an excavation protocol in relation to contamination risk management, namely:
 - All excavations must be kept free from the accumulation of water.
 - Any soils excavated and disposed of from the site must be analysed and classified by a suitably qualified environmental consultant, in accordance with the NSW EPA guidelines.
 - If contamination is found during excavation, the applicant should notify Council and a qualified consultant should complete the assessment.

Planning Matters - 22 October 2019

ITEM 5.1 Application to Amend Bankstown Local Environmental Plan

2015: 74 Rickard Road and Part 375 Chapel Road,

Bankstown

AUTHOR Planning

PURPOSE AND BACKGROUND

This report considers a planning proposal application to amend the floor space ratio and building height controls for land at 74 Rickard Road and part 375 Chapel Road, Bankstown to facilitate a university.

ISSUE

Council is in receipt of a planning proposal application for the site at 74 Rickard Road and part 375 Chapel Road, Bankstown. The application is requesting to increase the building envelope controls from 4.5:1 FSR / 53 metre building height to 8:1 FSR / 83 metre building height for the purposes of an educational establishment (university).

The Greater Sydney Commission has classified Bankstown as a strategic centre with an emerging health and education precinct. The proposed university is a City shaping infrastructure project that aligns with the Commission's initiative and would inject a significant number and variety of jobs to the Bankstown CBD.

Council's assessment indicates the proposal has strategic merit subject to undertaking further built form analysis to ensure overshadowing and wind impacts meet the required planning rules as outlined in this report.

The Local Planning Panel considered Council's report on 30 September 2019 and endorsed the report's recommendation to proceed to Gateway. The Local Planning Panel's recommendations have informed the recommendations presented to Council in this report.

RECOMMENDATION That -

- The application to amend Bankstown Local Environmental Plan 2015 for the site at 74
 Rickard Road and part 375 Chapel Road, Bankstown proceed to Gateway subject to the
 following:
 - (a) Permit a maximum 83 metre building height, subject to consultation with Bankstown Airport and the Commonwealth Department of Infrastructure, Transport, Cities and Regional Development.
 - (b) Permit a maximum 8:1 FSR, subject to the proposal satisfying the following solar access and wind impact requirements prior to the exhibition of the planning proposal:
 - (i) Council to amend the LEP with the following solar access control: Development must allow for 4 hours of continuous solar access to a

- consolidated area of Paul Keating Park between 10am and 3pm on 21 June (inclusive of existing shadow). The size of the consolidated area must be a minimum 50% of the area of Paul Keating Park (not including the footprint of the Council Chambers).
- (ii) The applicant to undertake further analysis to demonstrate how the proposal would comply with the solar access control, and minimise wind impacts, noting that the proposed 8:1 FSR may need to be reduced to adequately address these issues.
- 2. Subject to the issue of a Gateway Determination, Council exhibit the planning proposal and the matter be reported to Council following the exhibition.
- 3. Council request the applicant to provide a detailed response and/or justification for Council's consideration on the following issues and these supplementary studies be incorporated into the DCP as appropriate:
 - (a) how the proposal may address the need for public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road, to improve pedestrian connections to public transport and shops (the public domain works would be consistent with the Draft Bankstown Complete Streets Transport and Place Plan);
 - (b) how the proposal may address the bike parking requirement and associated end—of—trip facilities on the site;
 - (c) an updated SIDRA traffic model to address the identified gaps for the purposes of consultation with the Roads and Maritime Services;
 - (d) how the proposal may address the car parking requirements for students, staff and visitors (if the applicant is unable to meet these requirements, Council's Planning Agreements Policy may be applied to address the shortfalls);
 - (e) how the proposal may address the on-site loading space requirements; and
 - (f) require active street frontages at The Appian Way, Rickard Road and Paul Keating Park.
- 4. A draft site specific DCP Amendment be prepared and exhibited, and the matter be reported to Council following the exhibition. The DCP would address the relevant site specific planning matters referred to in the Report to the Panel, the Panel minutes and any necessary outcomes from Council's consideration of the above mentioned (item 3) reports and information to be submitted by the applicant.
- 5. The applicant to contribute to an additional culvert at North Terrace. This infrastructure improvement is required to support the proposal.

ATTACHMENTS

- A. Existing Land Zoning, Floor Space Ratio and Building Height Maps
- B. Local Planning Panel-Council Report
- C. Application–Planning Proposal Report (Urbis, dated 18 December 2018)
- D. Application-Urban Design Report (Lyons Architecture, dated 20 December 2018)
- E. Application—Supplementary Planning Information Package (Lyons Architecture, dated 12 August 2019)
- F. Application–Email–Additional Information (Urbis, dated 27 August 2019)

- G. Application–Letter–Additional Information (WSU, dated 30 August 2019)
- H. Application—Transport Management and Accessibility Plan (Arup, dated 17 July 2019)
- I. Application–Academic Plan (WSU, dated September 2019)
- J. Application–Vertical Campus Benchmarks (Lyons Architecture, dated 26 October 2018)
- K. Application—Updated Architectural Design Concept Drawings (Lyons Architecture, dated 12 August 2019)
- L. Application—Aeronautical Impact Assessment (Landrum & Brown Worldwide (Aust) Pty Ltd, dated 26 March 2019)
- M. Application—Shadow Diagrams (Lyons Architecture, dated 25 July 2019)
- N. Application—Survey Plan (RPS, dated 2 August 2018)
- O. Application—Urban Design Review—The Applian Way Alignment (Lyons Architecture, dated 9 July 2019)
- P. Application—The Appian Way Realignment Mark—up (Lyons Architecture, dated 1 August 2019)
- Q. Application–Landscape Concept Plans (Aspect Studios, 13 December 2018)
- R. Application—Pedestrian Wind Environment Study (Windtech, dated 28 May 2019) (Attachment R)
- S. Application–Heritage Impact Statement (Urbis, dated 23 August 2019)
- T. Application–Interior Narrative Concept (Lyons Architecture, dated 1 August 2019)
- U. Application–Document 'Not lazy learning, how informal spaces power students' (Hassell, dated September 2017)
- V. Council–Site Flood Assessment Report
- W. Council-Peer Review of Transport and Traffic
- X. Council-Urban Design Peer Review Report
- Y. Council—Best Practice Research—Open Spaces in City Centres, Solar Amenity Controls (City Design Unit, dated 13 September 2019)
- Z. Council—Solar Amenity Study, Case Study: Paul Keating Park (City Design Unit, dated 16 August 2019)
- AA. Local Planning Panel–Minutes

POLICY IMPACT

The location of the proposed university is consistent with Council's policies, namely the Draft Local Strategic Planning Statement and Draft Bankstown Complete Streets Transport and Place Plan.

Council's Draft Local Strategic Planning Statement classifies Bankstown as a major centre for intensive jobs and commerce, including those relating to education (Metropolitan Direction, page 21). The assessment of the application submitted to Council indicates the proposal would act as a catalyst to achieve this direction and would provide an education focus for this precinct.

The Draft Local Strategic Planning Statement also proposes to improve the public domain in the Bankstown CBD (Evolution 8, page 83). Paul Keating Park and The Appian Way are acknowledged as primary urban spaces in the Bankstown CBD. The assessment identifies the need for the proposal to undertake further analysis to confirm that the overshadowing and wind impacts on these public spaces align with the planning rules set out in this report.

FINANCIAL IMPACT

As Councillors will recall, Council, at its Ordinary Meetings in December 2017 and June 2018 resolved to negotiate a 99 year ground lease with WSU on Council's land at 74 Rickard Road and part 375 Chapel Road, Bankstown, with respect to the project.

In accordance with the Council's Probity Plan, both the property and/or commercial terms are being considered and/or negotiated independent of any planning issues and will be the subject of a separate report, when finalised.

COMMUNITY IMPACT

The proposal represents a major education investment and will transform the energy and experience of Bankstown. According to the application's Planning Proposal Report, the delivery of a proposed university to the Bankstown CBD constitutes a significant public benefit (Attachment C, page 16), together with the following community benefits (Attachment C, page 79):

- The proposal includes public domain improvements adjacent to the site boundaries i.e. Rickard Road and The Appian Way;
- The proposal would have flow—on economic benefits to existing and new commercial and retail businesses that would service the proposed university;
- The proposal would provide increased capacity to conduct and showcase research and teaching relevant to the region;
- The proposal would provide a unique opportunity for local businesses to exchange knowledge and link with other national and international research precincts; and
- There is the potential for partnerships with Council to expand social infrastructure by making spaces within the building publicly accessible.

The proposal also provides opportunities to:

 Establish an educational anchor that would draw the community and local students into career pathways;

- Transform the Bankstown CBD into a place to innovate, with support services for local start—ups, social enterprises and creative industries.
- Grow the night time economy and support local businesses in the Bankstown CBD.
- Attract facilities such as conferencing facilities, restaurants and cafes to support the growth in workers, students and visitors.

Should the proposal proceed to Gateway, this report recommends further discussions with the applicant in relation to the funding and delivery arrangements for supporting infrastructure, namely (but not limited to):

- Water infrastructure to enable the development to adequately deal with flooding constraints;
- Public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road to public transport and shops.

The applicant would need to provide a detailed response and/or justification for Council's consideration prior to the exhibition of the planning proposal.

DETAILED INFORMATION

Site Description

The site is Council owned land (3,678m² in area) and comprises the following properties:

Property Address	Property Description	Existing Zone	Site Area	Land Classification	Existing Uses
74 Rickard Road, Bankstown	Lot 5, DP 777510	B4 Mixed Use	3,329m²	Operational	63 at-grade public car spaces, driveway and lawn
375 Chapel Road (part), Bankstown	Lot 6, DP 777510	B4 Mixed Use	349m²	Operational	Driveway

The site is zoned B4 Mixed Use under Bankstown Local Environmental Plan 2015. Educational establishments (including universities) are permitted in this zone subject to consent. The maximum floor space ratio is 4.5:1 and the maximum building height is 53 metres. The existing Land Zoning, Floor Space Ratio and Building Height Maps are provided in Attachment A. The site is subject to an overland flow path and prescribed airspace restrictions. Vehicle access to the site is from Rickard Road.

Figure 1: Site Map



Proposal Description

In December 2018, the applicant submitted a planning proposal application (RZ-7/2018) to Council to amend Bankstown Local Environmental Plan 2015 as follows:

	Existing Controls	Proposed Controls
Maximum FSR	4.5:1	8:1
Maximum building height	53 metres	83 metres

Based on the updated architectural design concept drawings, the proposed university is to comprise:

Building design	Proposal
Gross floor area	29,270m ²
Number of storeys	19 (refer to Figure 2)
Enrolment number	10,000
Student load capacity of the building	3,400 (estimated 2,000 students at any one time)
Staff load capacity of the building	600–650 (estimated 350–650 staff and 150 visitors at any one time)
Off-street car parking spaces	84–94 (including 4 DDA bays) subject to the final basement design
Off–street bicycle parking spaces	32 (staff)

The application is supported by a range of documents as provided in Attachments C–U.

WESTERN SYDNEY
UNIVERSITY

W

Figure 2: Proposed university viewed from Paul Keating Park

Source: Western Sydney University

Local Planning Panel

Council carried out an assessment of the application and engaged independent specialists to undertake peer reviews of the flooding, traffic, transport and urban design information submitted by the applicant. Council's assessment report is provided in Attachment B and the peer reviews are provided in Attachments V–X.

Council's assessment indicates the proposal has strategic merit to proceed to Gateway subject to:

- The applicant to confirm the delivery of supporting infrastructure. Based on the submitted studies and peer reviews, the infrastructure required to support the proposal includes (but is not limited to):
 - Water infrastructure to enable the development to adequately deal with flooding constraints;
 - Public domain works at The Appian Way (between Rickard Road and The Mall),
 Civic Drive, Jacobs Street and Rickard Road to public transport and shops.

The delivery mechanism would ordinarily involve a planning agreement to legally deliver the public benefits. However, Council is currently in discussions with the applicant and Bankstown Central in regard to the funding and delivery arrangements for stormwater infrastructure works that would have broader benefits to the Bankstown CBD, while reducing the level of flooding on the site.

 The applicant to undertake further analysis to test the overshadowing and wind impacts as a result of the proposal.

A key issue throughout the assessment process has been the need to balance public amenity requirements against the city shaping nature of the proposal. While there is strong strategic planning merit in relation to the strategic context, the compatibility of the proposed building with its surroundings will need to be further addressed prior to the exhibition, with particular respect to overshadowing on Paul Keating Park.

In accordance with the Department of Planning, Industry and Environment's Direction, the Local Planning Panel considered the assessment report and peer reviews on 30 September 2019 to recommend whether the matter should proceed to Gateway. The Panel's recommendations, as provided in Attachment AA, are:

- 1. The application to amend Bankstown Local Environmental Plan 2015 proceed to Gateway subject to the following:
 - (a) Permit a maximum 83 metre building height subject to consultation with Bankstown Airport and the Commonwealth Department of Infrastructure, Transport, Cities and Regional Development.
 - (b) Permit a maximum 8:1 FSR subject to the proposal satisfying the solar access and wind impact requirements as outlined in section 5 of this report.
- 2. The amendments to BLEP2015 consider using Clause 2.5 to create more certainty around the linking FSR and height to the proposed university use.
- 3. Council to complete the Paul Keating Park Masterplan to gain a deeper appreciation of the eventual built outcome of the park (including the provision of active street frontage of The Appian Way, Rickard Road and the Park).
- 4. Council request the applicant to provide the following detailed responses and/or justifications for Council's consideration and any outcomes from these studies be incorporated into the DCP as appropriate. This work and the DCP is to occur prior to exhibition of the planning proposal and DCP (post gateway):
 - (a) how the proposal may address the need for public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road, to improve pedestrian connections to public transport and shops (the public domain works would be consistent with the Draft Bankstown Complete Streets Transport and Place Plan),
 - (b) how the proposal may address the bike parking requirement and associated end-of-trip facilities on the site,
 - (c) an updated SIDRA traffic model to address the identified gaps for the purposes of consultation with the Roads and Maritime Services,

- (d) how the proposal may address the car parking requirements for students, staff and visitors (if the applicant is unable to meet these requirements, Council's Planning Agreements Policy may be applied to address the shortfalls),
- (e) how the proposal may address the on–site loading space requirements, and
- (f) further analysis to demonstrate how the proposal would comply with the proposed solar access control, and minimise wind impacts, noting that the proposed 8:1 FSR may need to be reduced to adequately address these issues (this analysis may also assist in the reduction of visual bulk, which has been raised as design issue).
- 5. Council prepare a draft site specific DCP to be exhibited concurrently with the planning proposal. The DCP would address all the relevant site specific planning matters referred to in the Report to the Panel, these minutes and any necessary outcomes from Council's consideration of the above mentioned (item 4) reports and information to be submitted by the applicant.

In considering the Panel's comments, it is proposed to proceed with the Panel's recommendations with the exception of recommendations (2) and (3).

In relation to recommendation (2), the purpose for clause 2.5 is to enable additional permitted uses for particular land. According to the Department of Planning, Industry and Environment's Practice Note 11–001, wherever possible, land uses should be governed by the Land Use Table, and clause 2.5 should only be used where Council has demonstrated why this cannot be achieved.

Given that the B4 Mixed Use zone on the site currently permits educational establishments and the proposal is not seeking an additional permitted use, the use of clause 2.5 is not necessary in this case. In addition, Council has control over the future use of the land as it is the land owner and will be required to provide land owner's consent for development applications.

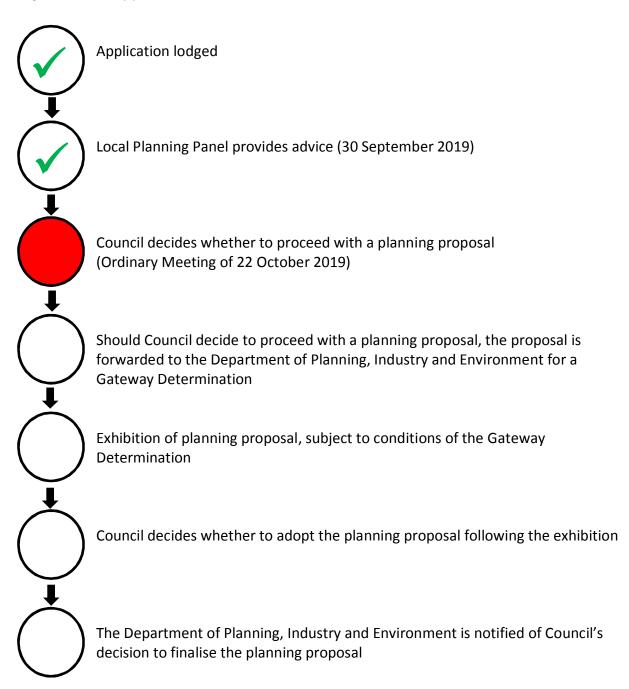
In relation to recommendation (3), the preparation of the Paul Keating Park Masterplan is independent of the planning proposal, and would be subject to separate consideration by Council and exhibition.

Next Steps

Planning Proposal

The next step is to prepare and submit a planning proposal to the Department of Planning, Industry and Environment to seek a Gateway Determination (refer to Figure 3). Following the exhibition of the planning proposal, the matter would be reported to Council.

Figure 3: Gateway process



DCP Amendments

Should the proposal proceed to Gateway, it is proposed to prepare DCP Amendments to support the planning proposal. The DCP Amendments would address the following matters (but is not limited to):

- how the proposal may address the need for public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road, to improve pedestrian connections to public transport and shops (the public domain works would be consistent with the Draft Bankstown Complete Streets Transport and Place Plan);
- how the proposal may address the bike parking requirement and associated end-oftrip facilities on the site;

- an updated SIDRA traffic model to address the identified gaps for the purposes of consultation with the Roads and Maritime Services;
- how the proposal may address the car parking requirements for students, staff and visitors (if the applicant is unable to meet these requirements, Council's Planning Agreements Policy may be applied to address the shortfalls);
- how the proposal may address the on–site loading space requirements;
- require wind mitigation measures;
- require active street frontages at The Appian Way, Rickard Road and Paul Keating Park; and
- demonstrate the link between the FSR and height and the proposed university use.

Following the exhibition of the DCP Amendment, the matter would be reported to Council.

<u>Supporting Infrastructure</u>

Should the proposal proceed to Gateway, it is proposed to discuss with the applicant the funding and delivery arrangements for supporting infrastructure, namely (but not limited to):

- Water infrastructure to enable the development to adequately deal with flooding constraints;
- Public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road to public transport and shops.

The applicant would need to provide a detailed response and/or justification for Council's consideration prior to the exhibition of the planning proposal.

Canterbury Bankstown Local Planning Panel - 30 September 2019

ITEM 1 Planning Proposal: 74 Rickard Road and Part 375 Chapel

Road, Bankstown

AUTHOR Planning

PURPOSE AND BACKGROUND

Council is in receipt of a planning proposal application for the site at 74 Rickard Road and part 375 Chapel Road, Bankstown. The application is requesting to increase the building envelope controls from 4.5:1 FSR / 53 metre building height to 8:1 FSR / 83 metre building height for the purposes of an educational establishment (university).

The Greater Sydney Commission has classified Bankstown as a strategic centre, which aims to locate a university and hospital within the emerging health and education precinct. The proposed university (650 staff and 10,000 students) is a City shaping infrastructure project that aligns with the Commission's initiative and would inject a significant number and variety of jobs to the Bankstown CBD.

A detailed assessment of the application submitted to Council indicates the proposal has strategic merit to proceed to Gateway subject to undertaking further built form analysis to ensure overshadowing and wind impacts meet the required planning rules as outlined in this report.

ISSUE

The Local Planning Panel is requested to recommend whether a planning proposal for the site at 74 Rickard Road and part 375 Chapel Road, Bankstown should proceed to Gateway in accordance with the Local Planning Panels Direction, issued by the Minister for Planning and Public Spaces.

RECOMMENDATION That -

- The application to amend Bankstown Local Environmental Plan 2015 proceed to Gateway subject to the following:
 - (a) Permit a maximum 83 metre building height subject to consultation with Bankstown Airport and the Commonwealth Department of Infrastructure, Transport, Cities and Regional Development.
 - (b) Permit a maximum 8:1 FSR subject to the proposal satisfying the solar access and wind impact requirements as outlined in section 5 of this report.
- 2. The applicant demonstrates how the proposal would comply with the car and bike parking requirements and loading facility requirements as outlined in section 5 of this report. If the applicant is unable to meet these requirements, Council's Planning Agreements Policy may be applied to address the shortfalls.

3.	Council prepare a site specific DCP Amendment as outlined in section 5 of this report,
	and exhibit the DCP Amendment concurrently with the planning proposal.

4. Council request the applicant to update the supporting studies prior to exhibition to reflect the amendments to the planning proposal.

ATTACHMENTS			~ : •		_	
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Nil

POLICY IMPACT

The location of the proposed university is consistent with Council's policies, namely the Draft Local Strategic Planning Statement, Draft Bankstown Complete Streets Transport and Place Plan, and Bankstown CBD Local Area Plan.

Council prepared the Draft Local Strategic Planning Statement to guide the future of the City of Canterbury Bankstown to 2036.

The Draft Local Strategic Planning Statement classifies Bankstown as a major centre for intensive jobs and commerce, including those relating to education (Metropolitan Direction, page 21). The assessment of the application submitted to Council indicates the proposal would act as a catalyst to achieve this direction and would provide an education hub for the community.

The Draft Local Strategic Planning Statement also proposes to improve the public domain (Evolution 8, page 83). Paul Keating Park and The Appian Way are acknowledged as primary urban spaces in the Bankstown CBD. The assessment identifies the need for the proposal to undertake further analysis to confirm that the overshadowing and wind impacts on these public spaces align with the planning rules set out in section 5 of this report.

FINANCIAL IMPACT

Council and the Western Sydney University (applicant) have identified a suitable site for the proposed university, consistent with State and local polices. The site is Council owned land at 74 Rickard Road and part 375 Chapel Road, Bankstown. The applicant is proposing to relocate the existing university at Milperra to this site as part of their 'Western Growth Program'.

At its Ordinary Meeting of 12 December 2017, Council resolved to negotiate lease terms with the applicant, which includes a proposed 99 year ground lease over the Council owned land. At this point, the negotiation of the lease terms is ongoing. This report has been prepared independent of any commercial agreement entered into between Council and the applicant.

Council also prepared a probity plan to clearly separate the commercial negotiation of the lease terms from Council's regulatory function in assessing planning proposals. The probity plan was prepared with regard to the Independent Commission against Corruption (ICAC) guidance material and other legislation requirements to manage the perception risk associated with Council's dual roles, and to certify the assessment and determination process remains transparent and decisions are made in the public interest.

The probity plan notes that it may be desirable, where there is the option, that an external decision body be given responsibility for determining significant applications in which Council has a direct interest. To this extent, the following external decision bodies will consider the current applications associated with the proposed university:

Planning Proposal Application RZ-7/2018

In December 2018, the applicant submitted a planning proposal application to Council to amend the FSR and building height controls for Council owned land at 74 Rickard Road and part 375 Chapel Road, Bankstown. Section 3 of this report outlines the application.

The Department of Planning, Industry and Environment requires Council to forward the planning proposal to the Local Planning Panel for advice prior to Council deciding whether to proceed to Gateway. Should the Department issue a Gateway Determination, Council would exhibit the planning proposal and consider submissions consistent with the Gateway conditions and legislative requirements. The determining authority for this planning proposal is the Department of Planning, Industry and Environment.

State Significant Development Application SSD-9831

In December 2018, the applicant submitted a state significant development application to the Department of Planning, Industry and Environment under State Environmental Planning Policy (State and Regional Development) 2011.

The development application proposes to construct a 19 storey university (8:1 FSR) on the site at 74 Rickard Road and part 375 Chapel Road, Bankstown. The determining authority is the Minister for Planning and Public Spaces. Council's role is limited to providing land owner's consent and providing comments on the development application.

Development Application 697/2019

In September 2019, the applicant submitted a development application to Council, which proposes early works on the site for the proposed university. The early works include demolition, tree removal, bulk excavation, shoring and temporary anchors, services division and alterations to The Appian Road layback at Rickard Road.

As Council is the land owner, this application will be assessed independent of Council. The determining authority is the Sydney South Planning Panel as the development application is council related and has a capital investment value over \$5 million.

COMMUNITY IMPACT

The proposal represents a major education investment and will transform the energy and experience of Bankstown, bringing up to 650 staff and 10,000 students.

The Planning Proposal Report comments that the delivery of a proposed university to the Bankstown CBD constitutes a public benefit (Attachment C, page 16), together with the following community benefits (Attachment C, page 79):

- The proposal includes public domain improvements adjacent to the site boundaries i.e. Rickard Road and The Appian Way;
- The proposal would have flow—on economic benefits to existing and new commercial and retail businesses that would service the proposed university;
- The proposal would provide increased capacity to conduct and showcase research and teaching relevant to the region;
- The proposal would provide a unique opportunity for local businesses to exchange knowledge and link with other national and international research precincts; and

•	There is the potential for partnerships with Council to expand social infrastructure by making spaces within the building publicly accessible.

1. SITE DESCRIPTION

The site is Council owned land (3,678m² in area) and comprises the following properties:

Property	Property	Existing Zone	Site Area	Land	Existing Uses
Address	Description			Classification	
74 Rickard Road, Bankstown	Lot 5, DP 777510	B4 Mixed Use	3,329m²	Operational	63 at-grade public car spaces, driveway and lawn
375 Chapel Road (part), Bankstown	Lot 6, DP 777510	B4 Mixed Use	349m²	Operational	Driveway

The site is zoned B4 Mixed Use under Bankstown Local Environmental Plan 2015. Educational establishments (including universities) are permitted in this zone subject to consent. The maximum floor space ratio is 4.5:1 and the maximum building height is 53 metres. The existing Land Zoning, Floor Space Ratio and Building Height Maps are provided in Attachment A. The site is subject to an overland flow path and prescribed airspace restrictions. Vehicle access to the site is from Rickard Road.

Figure 1: Site Map



2. STRATEGIC CONTEXT

The Greater Sydney Region Plan aims to broaden Sydney's global economic footprint to support net jobs growth of 817,000 to 2036. The major centres, defined as metropolitan and strategic centres, account for 50% (2011) of all Sydney's jobs and play a significant role in providing jobs close to home. Facilitating the growth of metropolitan and strategic centres will be important in growing jobs.

The Greater Sydney Commission is further facilitating this growth by identifying the Bankstown CBD (strategic centre), Bankstown Airport and Bankstown—Lidcombe Hospital as a Collaboration Area (refer to Figure 2).

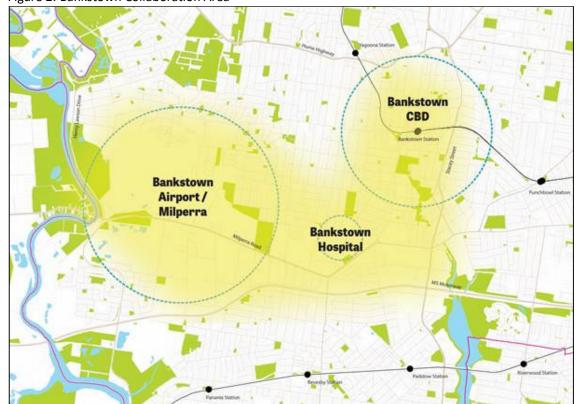


Figure 2: Bankstown Collaboration Area

Source: Greater Sydney Region Plan (GSC, page 20)

The Greater Sydney Commission is currently collaborating with Council and government authorities to finalise the Bankstown Collaboration Area Place Strategy. The intended outcome is to coordinate investment and infrastructure to achieve 25,000 jobs and 25,000 students in the Collaboration Area by 2036.

To date, there are a number of projects that have been committed to, approved or are at preliminary planning stages that signal significant transport, education, health and employment generating development consistent with the Collaboration process. These projects include (refer to Figure 3):

- Western Sydney University Bankstown Campus;
- \$1.3 billion commitment to Bankstown–Lidcombe Hospital redevelopment;
- Complete Streets, a transport and movement plan for the Bankstown CBD;

- Paul Keating Park Masterplan;
- Compass Centre: Planning Proposal approval (25 storeys). DA under assessment;
- Bankstown Sports: New 11 storey commercial office building;
- Bankstown RSL: New club focused on dining with Stage 2 to deliver 200 hotel rooms;
- Road improvements: Stacey Street and Henry Lawson Drive (current and ongoing);
- Bankstown Central: Ongoing masterplan discussions.

Figure 3: Bankstown strategic centre and current projects



Source: South District Plan (GSC, dated March 2018) and Council (dated 2019)

The next step in the Collaboration process is to facilitate the growth of the emerging health and education precinct in the Bankstown CBD. The Greater Sydney Commission recognises Council and the applicant have identified a suitable site for the proposed university at 74 Rickard Road and part 375 Chapel Road. The benefits of this site are:

 The proposed university is located within the emerging health and education precinct, in proximity to the Sydney Metro station, TAFE Campus and Bankstown Library and Knowledge Centre (BLaKC). The desired future character of the emerging health and education precinct is to co-locate health and education facilities in proximity to the Sydney Metro station.

• The proposed new university would form an anchor in the Civic Precinct. The Civic Precinct and Paul Keating Park form the central focus of the Northern CBD Core. The established character is distinctly commercial due to a concentration of major civic and office buildings including the Council Chambers (heritage item), Town Hall, BLaKC, Civic Tower, Bankstown Court House, Compass Centre and Bankstown Central. The precinct is highly accessible to public transport, and as a result, this precinct is characterised by taller buildings and higher densities compared to the other precincts in the Bankstown CBD.

The desired future character is to have Sydney's best local Civic Precinct, serviced by a high quality pedestrian environment and mid-block connections. Redevelopment within the Civic Precinct will enable Council to use the site as a catalyst for future investment in the broader strategic centre, and to demonstrate a high quality sustainable precinct and built form design which Council could use as a demonstration for other parts of the City (Bankstown CBD Local Area Plan, page 32).

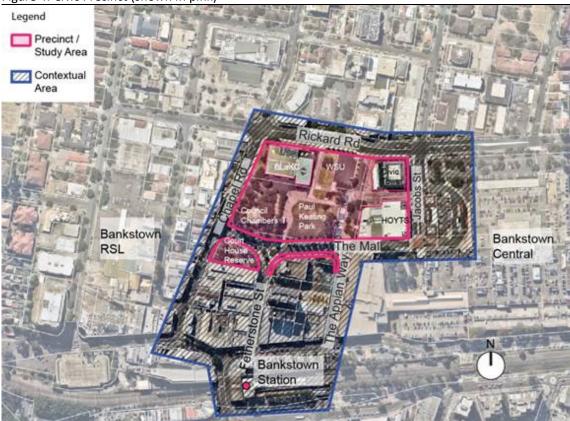


Figure 4: Civic Precinct (shown in pink)

Source: Council (dated 2019)

3. PROPOSAL DESCRIPTION

In December 2018, the applicant submitted a planning proposal application (RZ–7/2018) to Council to amend Bankstown Local Environmental Plan 2015 as follows:

	Existing Controls	Proposed Controls
Maximum FSR	4.5:1	8:1
Maximum building height	53 metres	83 metres

The application includes:

- Planning Proposal Report (Urbis, dated 18 December 2018) (Attachment C)
- Urban Design Report (Lyons Architecture, dated 20 December 2018) (Attachment D)
- Supplementary Planning Information Package (Lyons Architecture, dated 12 August 2019) (Attachment E)
- Email–Additional Information (Urbis, dated 27 August 2019) (Attachment F)
- Letter–Additional Information (WSU, dated 30 August 2019) (Attachment G)
- Transport Management and Accessibility Plan (Arup, dated 17 July 2019) (Attachment
 H)
- Academic Plan (WSU, dated September 2019) (Attachment I)
- Vertical Campus Benchmarks (Lyons Architecture, dated 26 October 2018)
 (Attachment J)
- Updated Architectural Design Concept Drawings (Lyons Architecture, dated 12 August 2019) (Attachment K)
- Aeronautical Impact Assessment (Landrum & Brown Worldwide (Aust) Pty Ltd, dated 26 March 2019) (Attachment L)
- Shadow Diagrams (Lyons Architecture, dated 25 July 2019) (Attachment M)
- Survey Plan (RPS, dated 2 August 2018) (Attachment N)
- Urban Design Review

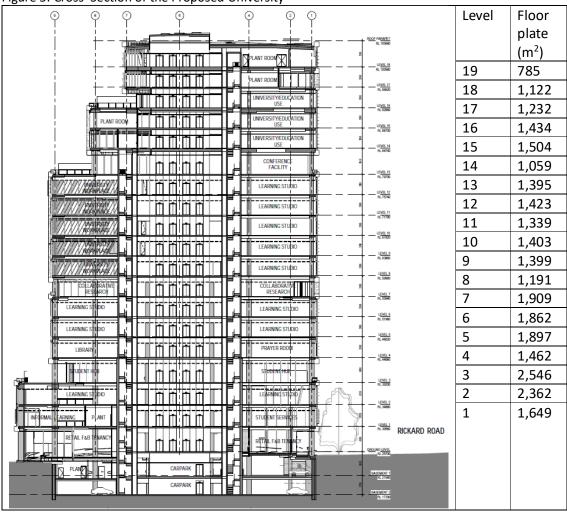
 The Appian Way Alignment (Lyons Architecture, dated 9 July 2019) (Attachment O)
- The Appian Way Realignment Mark—up (Lyons Architecture, dated 1 August 2019)
 (Attachment P)
- Landscape Concept Plans (Aspect Studios, 13 December 2018) (Attachment Q)
- Pedestrian Wind Environment Study (Windtech, dated 28 May 2019) (Attachment R)
- Heritage Impact Statement (Urbis, dated 23 August 2019) (Attachment S)
- Interior Narrative Concept (Lyons Architecture, dated 1 August 2019) (Attachment T)
- Document 'Not lazy learning, how informal spaces power students' (Hassell, dated September 2017) (Attachment U).

Based on the updated architectural design concept drawings, the proposed university is to comprise:

Building design	Proposal	Source
Gross floor area	29,270m ²	Letter (Attachment G)
Building envelope efficiency ratio	84% (not including basement levels)	Letter (Attachment G)

Enrolment number	10,000	Planning Proposal Report (Attachment C)
Student load capacity of the building	3,400 (estimated 2,000 students at any one time)	Email (Attachment F)
Staff load capacity of the building	600–650 (estimated 350–650 staff and 150 visitors at any one time)	Email (Attachment F) and TMAP (Attachment H)
Off–street car parking spaces	84–94 (including 4 DDA bays) subject to the final basement design	TMAP (Attachment H) and Supplementary Planning Information (Attachment E)
Off–street bicycle parking spaces	32 (staff)	TMAP (Attachment H)

Figure 5: Cross-Section of the Proposed University



Source: Updated Architectural Drawings (Attachment K)

According to the Planning Proposal Report (Attachment C, page 41) and additional letter (Attachment G), the proposed floor space and floor plates are required:

 To provide the full scope of facilities and amenities in accordance with the academic plan. The academic plan includes undergraduate programs in teacher education, psychology, arts and humanities, business, accounting, information technology and

- non-clinical health areas. It also includes post-graduate courses in teacher education, arts, humanities, non-clinical nursing and ICT.
- To accommodate teaching and research spaces in collaboration with industry partners. These will be interspersed within the campus.
- To accommodate floor plate sizes that are necessarily larger than the floor plates of ordinary commercial tower forms in the vicinity of the site. The university needs to support larger room sizes and circulation spaces to suit cohorts of students, as well as additional vertical circulation and building services infrastructure.
- To provide capacity for future enrolment growth.

According to the Vertical Campus Benchmarks Report (Attachment J), the proposed floor space and floor plates are comparable with other vertical campuses in Australia to meet the immediate and future needs of the university:

	RMIT, Swanston Academic Building	University of Adelaide, Health/Medical Schools	NeW Space, University of Newcastle	WSU Peter Shergold Building, Parramatta	Silvia Walton, La Trobe University
Storeys	11	13	9	17	5
Floor-to- ceiling height (m)	4–4.8	4.2–4.7	4.2	3.6–4.8	4.1
Gross floor area (m²)	35,000	30,500	14,200	30,500	7,118
Typical floor plate (m²)	2,860	1,775	1,150	2,360	1,215

In relation to the proposed student catchment, the TMAP highlights that many students attending the existing university in Milperra reside within the 2km and 5km catchment of the proposal, commuting from suburbs such as Bankstown, Greenacre, Punchbowl, Yagoona and Condell Park (refer to Figure 6). Over time, the university may attract students residing along the Sydney Metro.

In relation to the proposed staff catchment, the TMAP recommends travel surveys of staff once the university is operational to allow for an accurate catchment area.

Based on the trip origin data, the TMAP (Attachment H, page 39) estimates that 20% of students would walk and cycle to the proposed university, 65% would commute by public transport, 5% would drive in their cars, 5% would travel as car passengers, and 5% other. The TMAP also estimates that 15% of staff would walk and cycle to the proposed university, 62% would commute by public transport, 15% would travel in their cars, 3% would travel as car passengers, and 5% other forms of transport. Staff are more likely to drive than students given greater access to a car, as well as having access to the on–site car parking spaces.

The TMAP proposes public domain improvements adjacent to the site boundaries i.e. Rickard Road and The Appian Way.

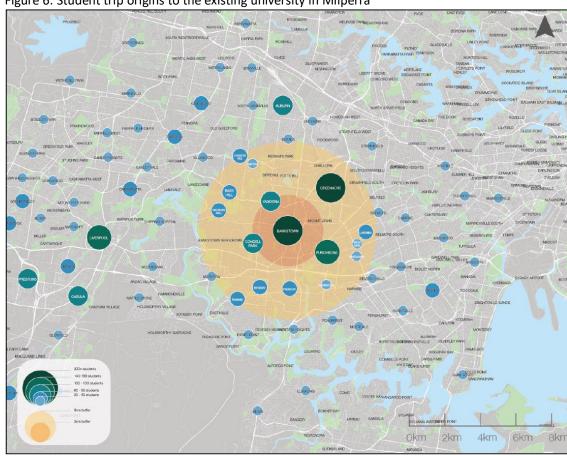


Figure 6: Student trip origins to the existing university in Milperra

Source: TMAP (Attachment H, page 36)

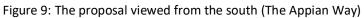


Figure 7: Proposal viewed from the south (The Mall)

Source: Updated Building Views (Lyons Architecture, dated August 2019)



Figure 8: The proposal viewed from the south (Paul Keating Park)





Source: Updated Building Views (Lyons Architecture, dated August 2019)

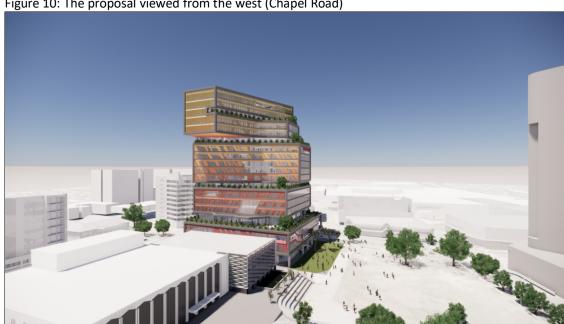


Figure 10: The proposal viewed from the west (Chapel Road)

Source: Updated Building Views (Lyons Architecture, dated August 2019)



Figure 11: The proposal viewed from the north (Rickard Road)

Source: Updated Building Views (Lyons Architecture, dated August 2019)

4. **SUMMARY**

The assessment considered the proposal based on the Department of Planning, Industry and Environment's Strategic Merit Test as outlined in the Department's publication *A Guide to Preparing Local Environmental Plans*. The intended outcome is to determine whether a proposal demonstrates strategic merit to proceed to the Gateway, namely:

- Does the proposal give effect to key policies, including:
 - Greater Sydney Region Plan and South District Plan;
 - State Environmental Planning Policies, namely SEPP (Educational Establishments and Child Care Facilities) 2017 and SEPP (Infrastructure) 2007 (refer to Attachment B);
 - Ministerial Directions, namely 1.1 (Business and Industrial Zones), 2.3 (Heritage Conservation), 3.4 (Integrating Land Use and Transport), 3.5 (Development near Licensed Aerodromes) and 4.3 (Flood Prone Land) (refer to Attachment B);
 - Government Architect NSW's Better Placed Design Policy;
 - Draft Sydenham to Bankstown Urban Renewal Corridor Strategy;
 - Council's Draft Local Strategic Planning Statement;
 - Council's Bankstown CBD Local Area Plan;
 - Council's Draft Bankstown Complete Streets Plan;
 - Department of Planning, Industry and Environment's publications: A Guide to Preparing Local Environmental Plans and A Guide to Preparing Planning Proposals?
- Does the proposal have regard to the existing uses, approved uses and likely future uses of land in the vicinity of the proposed university?
- Does the proposal have regard to the services and infrastructure that are or will be available to meet the demands arising from the proposal and any proposed financial arrangements for infrastructure provision?

To inform the assessment, Council engaged independent consultants to undertake peer reviews of the flooding, traffic, transport and urban design information submitted by the applicant to support the proposal. The key issues are:

- The applicant to confirm the delivery of supporting infrastructure. Based on the submitted studies and peer reviews, the infrastructure required to support the proposal includes (but is not limited to):
 - Water infrastructure to enable the development to adequately deal with flooding constraints;
 - Public domain works at The Appian Way (between Rickard Road and The Mall) to public transport and shops.

The delivery mechanism would ordinarily involve a planning agreement to legally deliver the public benefits. However, Council is currently in discussions with the

applicant and Bankstown Central in regard to the funding and delivery arrangements for stormwater infrastructure works that would have broader benefits to the Bankstown CBD while reducing the level of flooding on the site.

• The applicant to undertake further analysis to test the overshadowing and wind impacts as a result of the proposal. This analysis may also assist in addressing / concept massing visual bulk, which has been raised as an issue by Council's City Design Unit, Council's Peer Review and the State Design Review Panel.

A key issue throughout the assessment process has been the need to balance public amenity requirements against the city shaping nature of the proposal. While there is strong strategic merit in relation to the strategic context, the compatibility of the proposed building with its surroundings will need to be further addressed prior to the exhibition, with particular respect to overshadowing on Paul Keating Park.

It is therefore considered that the proposal has strategic merit to proceed to the Gateway subject to addressing the key issues outlined in section 5 of this report.

5. ASSESSMENT

In August 2016, the Department of Planning, Industry and Environment introduced the Strategic Merit Test to determine whether a proposal should proceed to Gateway as outlined in the Department's publication *A Guide to Preparing Local Environmental Plans*.

The proposal demonstrates strategic merit to proceed to Gateway subject to addressing the likely impacts as a result of the proposal. This is critical to a successful urban outcome for the site and its surroundings. Should the proposal proceed to Gateway, the assessment identifies the following key issues to be addressed prior to exhibition.

5.1 INFRASTRUCTURE REQUIREMENTS TO SUPPORT THE PROPOSAL

5.1.1 Infrastructure requirements to address flood impacts

<u>Proposal:</u> The site is subject to medium risk stormwater flooding with some high risk stormwater flooding in The Appian Way. According to the Planning Proposal Report (Attachment C, page 52), the proposal seeks to protect the building and basement levels without a freeboard or on—site detention. A freeboard is impractical due to site constraints and other design criteria such as providing active street frontages to Rickard Road and The Appian Way. The installation of a rainwater tank will contribute to the detention of the roof run—off.

<u>Assessment:</u> The assessment considered Ministerial Direction 4.3 (Flood Prone Land). The objective is to ensure the proposal is commensurate with flood hazards and includes consideration of the potential flood impacts both on and off the site. To date, the proposal is inconsistent with clause 6 as it seeks to permit an increase in the development of the site.

However, in accordance with clause 9(b), the proposal may be inconsistent only if Council can satisfy the Department of Planning, Industry and Environment that the proposal is in

accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005.

In this case, the relevant plan is the Salt Pan Creek Catchments Floodplain Risk Management Plan (adopted by the former Bankstown City Council at the Ordinary Meeting of 17 December 2013). The Floodplain Risk Management Plan requires the redevelopment of sites along The Appian Way to maintain or enhance the capacity of existing overland flow paths.

Council commissioned a Site Flood Assessment Report (Attachment V) to review the flood impacts as a result of the proposal and the infrastructure that would be required to mitigate the flood impacts.

In relation to existing conditions, the site forms part of the Salt Pan Creek upper catchment and is affected by an overland flow path, stretching from Rickard Road to the open channel at North Terrace. The maximum water depth on the site is 0.61 metres in a 100 year flood event (Attachment V, page 8). This is due to the inadequate capacity of the existing stormwater system and blockages that occur to stormwater pits and culverts, in particular at North Terrace which impacts on the drainage capacity of The Appian Way.

The proposal would block part of the overland flow path, making flood conditions more hazardous between the proposal and the Civic Tower (refer to Figure 13). The maximum water depth would increase from 0.61 metres to 0.87 metres in a 100 year flood event and would increase the extent of high risk stormwater flooding (Attachment V, page 8).

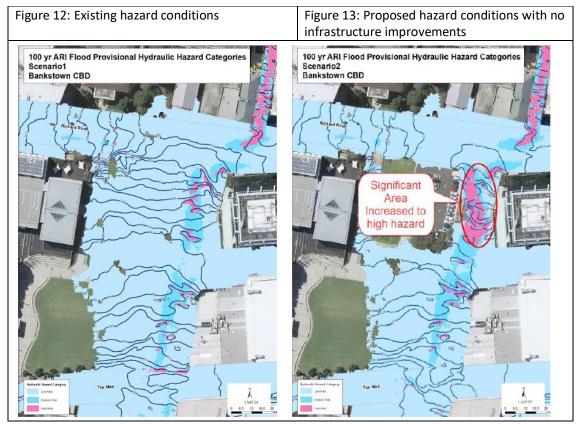
While a freeboard is a common safeguard to minimise risk on the site, it is recommended that further infrastructure works be delivered that would mitigate flooding impacts associated with the building, noting that these works would include broader stormwater infrastructure beyond the site.

The report recommends the following infrastructure improvements to mitigate the flood impacts as a result of the proposal:

Proposal	Peer Review Recommendations
The proposal does not propose infrastructure	Introduce capacity improvements to the
improvements to mitigate the impacts as a	existing stormwater system to manage
result of the proposal.	increased flood water levels as a result of the
	proposal.
The proposal comments that Council should	
request Sydney Water to upgrade the Stacey	This would require an additional culvert at
Street canal and investigate ways to upgrade	North Terrace, which would significantly reduce
the canal along The Appian Way to minimise	the flood impacts both on and off the site (refer
the potential flood impact on the site	to Figure 15). The maximum water depth would
(Attachment C, page 39).	reduce from 0.61 metres to 0.52 metres in a
	100 year flood event and would reduce the
	extent of high and medium risk stormwater
	flooding (Attachment V, page 11).

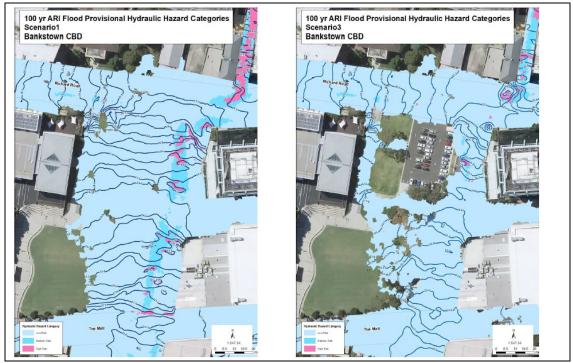
The applicant would therefore need to contribute to this infrastructure improvement if the proposal is to be consistent with Ministerial Direction 4.3 and the Floodplain Risk Management Plan. Council is currently in discussions with the applicant and Bankstown

Central in relation to the funding and delivery arrangements for the stormwater infrastructure works.



Source: WSU Site Flood Assessment Report (Attachment V, page 9)

Figure 14: Existing hazard conditions	Figure 15: Proposed hazard conditions with an
	additional culvert at North Terrace



Source: WSU Site Flood Assessment Report (Attachment V, page 12)

Should the proposal proceed to Gateway, the recommended action prior to exhibition is:

• The applicant to contribute to an additional culvert at North Terrace. This infrastructure improvement is required to support the proposal.

5.1.2 Infrastructure requirements to address transport and traffic impacts

<u>Proposal:</u> The Transport Management and Accessibility Plan (TMAP, Attachment H) states that the proposal would service 2,000 students and 650 staff at any one time. The TMAP aims to provide limited off–street car parking to encourage travel by sustainable modes (public transport, walking and cycling) while mitigating the impacts of the proposal on the surrounding road network.

The TMAP submitted with the application estimates that 20% of students would walk and cycle to the proposed university, 65% would commute by public transport, 5% would drive in their cars, 5% would travel as car passengers, and 5% other. The TMAP also estimates that 15% of staff would walk and cycle to the proposed university, 62% would commute by public transport, 15% would travel in their cars, 3% would travel as car passengers, and 5% other forms of transport. Staff are more likely to drive than students given greater access to a car, as well as having access to the on–site car parking spaces.

The proposal would provide between 84–94 off–street car parking spaces for staff across two basement levels (subject to final basement design) and no student or visitor parking. Other assumptions behind the mode share targets are:

 Based on the trip origin data, most students are expected to live within the walking and cycling catchments of the proposal;

- Experience with the WSU Parramatta Campus shows that students and staff would choose public transport if there is limited parking provision;
- The Sydney Metro will be an attractive travel mode for both staff and students once operational in 2024;
- Changes to the parking policy in Bankstown and new cycling infrastructure as part of the Draft Bankstown Complete Streets Transport and Place Plan should reduce driving and encourage other, more sustainable forms of transport;
- Students are more likely to be dropped—off or car share with other students; and
- It is proposed to undertake travel surveys once the university is operational to review the mode share targets and allow for an accurate baseline mode split.

The peak arrival hour is expected to be between 8am and 9am, with almost 50% of staff and one third of student arriving in that time. In terms of departure times, there is a peak between 5pm and 6pm for staff (45% departing at this time). The peak is less pronounced for students, with departures occurring consistently over a four hour period between 3pm and 7pm.

<u>Assessment:</u> Council engaged an independent transport consultant to peer review the traffic, transport and parking information submitted by the applicant to support the proposal (Attachment W).

In principle, the peer review supports the aim to minimise off–street car parking as a way to support more sustainable modes of transport, subject to the implementation of a range of off–site measures to change travel behaviour. The peer review does not consider that the proposed measures on the site alone can achieve the mode share targets.

The peer review recommends that the applicant contribute to the following off—site measures if the proposal is to achieve the mode share targets:

(a) Pedestrian infrastructure requirements

<u>Proposal:</u> The TMAP (Attachment H) expects the key pedestrian route to be in a north—south direction between the proposal and the Sydney Metro station. Civic Drive is also likely to be a popular pedestrian route towards the bus interchange and Bankstown Central. The crossing opportunities are poor at the intersection of Jacobs Street and Civic Drive, and the TMAP expects that pedestrians will cross further south near The Mall.

In relation to pedestrian infrastructure, the TMAP proposes public domain improvements adjacent to the site boundaries i.e. Rickard Road and The Appian Way. The TMAP relies on Council to improve pedestrian routes to accommodate the anticipated demand.

<u>Assessment:</u> The peer review highlights the need for high quality pedestrian connections if the proposal is to maximise walking trips and discourage car use to/from the proposed university (Attachment W, page 28).

If the proposal is to achieve the mode share targets, the peer review recommends that the applicant contributes to public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road to improve pedestrian connections to public transport and shops. The public domain works would be consistent with the Draft Bankstown Complete Streets Transport and Place Plan.

Should the proposal proceed to Gateway, the recommended actions prior to exhibition are:

- The applicant to provide a detailed response and/or justification for Council's consideration on how the proposal may address the need for public domain works at The Appian Way (between Rickard Road and The Mall), Civic Drive, Jacobs Street and Rickard Road, to improve pedestrian connections to public transport and shops. The public domain works would be consistent with the Draft Bankstown Complete Streets Transport and Place Plan.
- Following the above review, the applicant to update the supporting studies if required.

(b) Cycling infrastructure requirements

<u>Proposal:</u> The TMAP (Attachment H) proposes end of trip facilities and bike parking (32 staff bike parking spaces within the basement and 100 bike parking spaces in the surrounding public domain) to meet the demand for bike parking for the staff and students over the course of the day. The TMAP comments that cycling infrastructure to and throughout Bankstown is limited, and cyclists will need to travel along existing roads with traffic. The TMAP does not propose off–site cycle infrastructure improvements and relies on Council to improve the future bike network to accommodate the anticipated demand.

<u>Assessment:</u> The peer review applied the 'NSW Planning for Walking and Cycling Guideline' in relation to the proposed off–street bike parking spaces. The proposed university would generate the need for 153–298 spaces (i.e. 120–133 short–term and 33–65 long term spaces). The proposal would need to provide up to 298 spaces and associated end–of–trip facilities on the site (Attachment W, page 14).

The peer review also highlights the need for high quality cycle links if the proposal is to maximise cycle trips and discourage car use to/from the proposed university. If the proposal is to achieve the mode share targets, the peer review recommends that the applicant contributes to improved bike paths in the vicinity of the site (Attachment W, page 28).

Should the proposal proceed to Gateway, the recommended actions prior to exhibition are:

- The applicant to provide a detailed response and/or justification for Council's consideration on how the proposal may address the bike parking requirement and associated end—of—trip facilities on the site.
- Following the above review, the applicant to update the supporting studies if required.

(c) Public transport infrastructure requirements

<u>Proposal:</u> The TMAP (Attachment H) comments that there is sufficient capacity on the rail and bus networks to accommodate the anticipated demand. The TMAP does not propose infrastructure improvements in relation to public transport.

<u>Assessment:</u> The peer review (Attachment W) considers existing and future public transport services would adequately serve the proposal.

Should the proposal proceed to Gateway, the recommended action prior to exhibition is:

No action required.

(d) Road infrastructure requirements

<u>Proposal:</u> The TMAP (Attachment H) indicates the intersections will continue to operate with a satisfactory Level of Service, and the impact of the proposal on the surrounding road network is relatively low. While certain movements such as the right–turn from Rickard Road to Chapel Road are at capacity in the existing PM peak, this is not the result of additional development traffic. The TMAP does not propose road infrastructure improvements and relies on Council to improve the future road network to accommodate the anticipated demand.

<u>Assessment:</u> The peer review recommends an update to the SIDRA traffic model to address the following gaps:

- Recalibrate the model to reflect actual conditions (i.e. vehicle queuing).
- Widen the study area to surrounding intersections to assess the wider implications arising from the proposal.

While the peer review indicates that the updated SIDRA traffic model is unlikely to register any noticeable traffic impacts at intersections, the update may affect the traffic modelling results and should be documented accordingly for the purposes of consultation with the Roads and Maritime Services (Attachment W, page 12).

Should the proposal proceed to Gateway, the recommended actions prior to exhibition are:

- The applicant to update the SIDRA traffic model to address the identified gaps for the purposes of consultation with the Roads and Maritime Services.
- Following the above review, the applicant to update the supporting studies if required.

(e) Parking infrastructure requirements

<u>Proposal:</u> The TMAP (Attachment H) proposes the following off–street parking provision:

Proposal	Off-street parking provision
3,400 student load capacity (estimated 2,000 at any one time)	No parking to be provided.
600–650 staff load capacity (estimated 350 staff and 150 visitors / industry partners at any one time)	84–94 (including 4 disability spaces) subject to the final basement design.
Visitors	No parking to be provided.

Removal of existing 63 public car parking spaces on the site	Not replaced.
Loading facilities	3 loading dock bays in the basement and a loading zone at Rickard Road.
Drop-off / pick-up spaces	Drop-off / pick-up spaces at The Appian Way shared zone.
Total gross off–street parking spaces	84–94 car parking spaces + 3 loading bays

The intended outcome is to encourage staff and students to travel by other modes. This is consistent with the aspiration of the Draft Bankstown Complete Streets Transport and Place Plan. Any students or visitors wishing to drive will need to utilise existing off–street public or private car parking spaces within Bankstown. The TMAP suggests that the wider area could accommodate student car parking demand. The TMAP estimates there are 7,500–8,000 spaces including commuter car parks, Bankstown Central and Bankstown Sports Club.

<u>Assessment:</u> The peer review notes that Council's DCP does not contain specific car parking rates for tertiary educational establishments. The peer review undertook a comparison with 15 other universities in Sydney and Newcastle. The key findings are:

- People driving to universities can range from 11–75% staff and 5–40 % students.
- Most universities do not provide off–street car parking for students, particularly those located within close proximity to public transport.

Based on the above findings, the peer review provides the following recommendations:

<u>Student parking:</u> In relation to the proposed mode share target of 5% students driving to the proposed university, the peer review estimates the parking demand to equate to 100 car parking spaces assuming there will be 2,000 students on the site at any one time.

While the peer review considers the provision of no on—site student car parking to be acceptable, the peer review indicates the wider area cannot accommodate the 100 space demand as existing parking demand in the area is very high, with limited parking capacity available throughout the day. An option is to apply Council's Planning Agreements Policy to address the shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD (Attachment W, page 17). The proposal would need to demonstrate how it would address this issue.

<u>Staff parking:</u> In relation to the proposed mode share target of 15% staff driving to the proposed university, the peer review estimates the parking demand to equate to 98 car parking spaces assuming there will be 650 staff on the site at any one time. The proposal to provide 84–94 spaces (subject to final basement design) for staff represents a shortfall of 4–14 spaces (Attachment W, page 30). The proposal would need to demonstrate how it would address this issue.

<u>Visitor parking:</u> The peer review recommends that the proposal provides some visitor car parking spaces e.g. 1–2 spaces (Attachment W, page 28). The proposal would need to demonstrate how it would address this issue.

<u>Existing car park:</u> The proposal does not replace the existing 63 public car parking spaces to be removed as a result of the proposal. The proposal would need to demonstrate how it would address this issue (Attachment W, page 21).

<u>Loading facilities</u>: The peer review recommends that all loading activities associated with the proposal be undertaken on the site. An off–site loading zone on Rickard Road would not be desirable from a traffic capacity perspective (Attachment W, page 19). The proposal would need to demonstrate how it would address this issue.

<u>Drop-off / pick-up spaces:</u> The peer review indicates that drop-off / pick-up activity would need to occur at The Appian Way (Attachment W, page 22), consistent with the proposal.

Should the proposal proceed to Gateway, the recommended actions prior to exhibition are:

- The applicant to provide a detailed response and/or justification for Council's
 consideration on how the proposal may address the car parking requirements for
 students, staff and visitors. If the applicant is unable to meet these requirements,
 Council's Planning Agreements Policy may be applied to address the shortfalls.
- The applicant to provide a detailed response and/or justification for Council's consideration on how the proposal may address the on–site loading space requirements.
- Following the above review, the applicant to update the supporting studies if required.

5.2 COMPATIBILITY OF THE PROPOSED BUILDING ENVELOPE WITH ITS SURROUNDINGS

The proposal may be considered appropriate provided the proposed building envelope can demonstrate compatibility with its surroundings, and ensure that Paul Keating Park remains a high amenity and high performing public space. Compatibility meaning 'capable of existing together in harmony ... where compatibility between a building and its surroundings is desirable, its two major aspects are physical impact and visual impact. In order to test whether a proposal is compatible with its context, two questions should be asked:

- Are the proposal's physical impacts on surrounding development acceptable? The physical impacts include constraints on the development potential of surrounding sites.
- Is the proposal's appearance in harmony with the buildings around it and the character of the street?' (NSW Land & Environment Court, Project Venture Developments v Pittwater Council).

To inform the assessment, Council engaged independent consultants to undertake a peer review of the urban design information submitted by the applicant (Attachment Y). Council also reviewed additional overshadowing advice by Council's City Design Unit in relation to the preparation of the Paul Keating Park Masterplan (Attachment X), and the State Design Review Panel's comments in relation to the state significant development application.

While it is within the scope of the Local Planning Panel and Council to consider the concept drawings to gain a deeper appreciation of what may be delivered on the site, it needs to be

acknowledged that the Department of Planning, Industry and Environment is the determining authority of the state significant development application.

5.2.1 Proposed building height

<u>Proposal:</u> The site is subject to prescribed airspace restrictions due to the proximity to the Bankstown Airport. According to the Aeronautical Impact Assessment Report (Attachment L, page 5), the Obstacle Limitation Surface (OLS) level is 108.1 metres AHD. This means, as a starting point, the proposed building height would need to be below 108.1 metres AHD. The submitted concept design shows the proposed building height at 83 metres (19 storeys). This equates to 106.78 metres AHD, which is compliant with the OLS level.

<u>Assessment:</u> The assessment considered the urban design advices of Council's City Design Unit, Council's Peer Review and the State Design Review Panel. The urban design advices do not raise concern with the proposed building height. The peer review (Attachment Y, page 23) comments that the proposed building height is considered to be appropriate for the following reasons:

- The proposal is compatible with the desire to establish a landmark building in the Civic Precinct; and
- Council adopted a maximum 83 metre building height at 83–99 North Terrace and 62
 The Mall (known as the Compass Centre site and the former library site, respectively),
 which sets a built form character for the Civic Precinct.

In relation to the prescribed airspace restrictions, the proposal is currently inconsistent with clause 4(d) of Ministerial Direction 3.5 (Development near Licensed Aerodromes), which requires Council to obtain permission from the relevant authorities if any structures (including construction cranes) encroach above the Obstacle Limitation Surface. Council referred the application to the relevant authorities (i.e. Bankstown Airport and the Commonwealth Department of Infrastructure, Transport, Cities and Regional Development) in January 2019 and is awaiting a formal response.

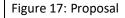
Should the proposal proceed to Gateway, the recommended action prior to exhibition is:

 Permit a maximum 83 metre building height, subject to consultation with Bankstown Airport and the Commonwealth Department of Infrastructure, Transport, Cities and Regional Development.

5.2.2 Proposed FSR

<u>Proposal:</u> According to the Planning Proposal Report (Attachment C, page 43); feedback from Council and the State Design Review Panel is that the building form should reflect the typology of a vertical university campus as opposed to a commercial office building. Three dimensional studies have achieved this via an architecturally distinct built form (refer to Figure 17), while accommodating the university requirements (outlined in section 3 of this report). It is proposed to modify the Floor Space Ratio Map from the current 4.5:1 to 8:1. The public benefit in exchange for the proposed increase is the introduction of a major piece of educational infrastructure in the Bankstown CBD.

Figure 16: Building envelope that complies with the existing controls







Source: Planning Proposal Report (Attachment C, page 43)

<u>Assessment:</u> The assessment considered the urban design advices of Council's City Design Unit, Council's Peer Review and the State Design Review Panel.

Overshadowing impact

A key issue is the location of the proposal directly north of Paul Keating Park (refer to Figure 18). The park serves as the centrepiece of the Civic Precinct; surrounded by significant community buildings and is the location of many social, cultural and performative events and festivals. It is the heart of a centre that is transitioning to a strategic centre with more commercial uses and taller and denser buildings.

Figure 18: Diagram defining Paul Keating Park for the purposes of the review



Source: Urban Design Peer Review (Attachment Z, page 35)

Council's City Design Unit and Council's Peer Review recognise that a proposal complying with the existing controls would cause some overshadowing. However, the extent of the overshadowing is considered reasonable as a consolidated area greater than 50% of the area of Paul Keating Park would continue to receive at least 4 hours of continuous sunlight at the winter solstice.

All three sources of urban design advice recommend a reduction of the bulk and density to minimise the overshadowing, wind and visual bulk impacts. However, the advices vary in the recommended numerical requirements, making it challenging to recommend an appropriate FSR at this point.

Proposed development controls	Council's City Design Unit recommendations	Council's Peer Review recommendations	SDRP recommendations
Building height	83 metres subject to prescribed airspace	83 metres subject to prescribed airspace	83 metres subject to prescribed airspace
	approval.	approval.	approval.
Solar access control	Development must	At least 3 hours direct	In the absence of a
to Paul Keating Park	allow for 4 hours of	sunlight to more than	solar access control
	continuous solar	50% of the total park	for Paul Keating Park
	access to a	area between 10am-	and The Appian Way,
	consolidated area of	2pm at the winter	reference is made to
	Paul Keating Park	solstice.	the City of Sydney's
	between 10am and		'The Drying Green'
	3pm on 21 June	(Source: Review of	solar access control in
	(inclusive of existing	City of Sydney and	the Green Square
	shadow). The size of	North Sydney's DCPs)	Town Centre DCP

the consolidated area	2012 i.e. achieve
must be a minimum	direct sunlight each
50% of the area of	hour between 11am
Paul Keating Park.	and 2pm on June 21
	for at least 50% of the
(Source: Best practice	park.
research of 12 councils	
in Australia and New	
Zealand, Attachment	
X)	

Wind impact

The Pedestrian Wind Environment Study (Attachment R, page 25) indicates that wind conditions for the majority of trafficable outdoor locations within and around the development will be suitable for their intended uses. However, some areas will experience strong winds which will exceed the relevant criteria for comfort and safety, namely at the building corners. A suggested ground level treatment is to include densely foliating evergreen trees alongside the site boundaries at The Appian Way and Paul Keating Park.

The peer review comments that the limited solar access to The Appian Way may constrain tree and vegetation growth to address the wind impacts. The proposal to present the full height of the building to The Appian Way and Rickard Road requires further consideration (Attachment Y, page 48).

The peer review recommends increasing the setback above the podium level to Rickard Road and The Appian Way. The increased setback would potentially reduce the wind impacts on pedestrian amenity in the surrounding streets.

Analysis of the overshadowing and wind impacts

To progress this matter, the starting point is to confirm a solar access control to ensure Paul Keating Park receives appropriate solar access at the winter solstice. At this point, this report proposes to proceed with the solar access control recommended by Council's City Design Unit, to read: Development must allow for 4 hours of continuous solar access to a consolidated area of Paul Keating Park between 10am and 3pm on 21 June (inclusive of existing shadow). The size of the consolidated area must be a minimum 50% of the area of Paul Keating Park (not including the footprint of existing buildings) (Attachment X, page 23).

It is important that the solar access control does not place limitations on the preparation of the Paul Keating Park Masterplan, which is currently underway. A control that requires at least 4 hours of solar access would ensure the amenity and useability of park is more than simply satisfactory.

Visual bulk and the successful implementation of the solar access control and relevant objectives in the FSR provision are related, which may prompt a review of the maximum 8:1 FSR. This approach may simultaneously resolve these important issues i.e. the overshadowing of Paul Keating Park and the visual bulk of the proposal.

Should the proposal proceed to Gateway, the recommended actions prior to exhibition are:

- Council to complete the Paul Keating Park Masterplan to gain a deeper appreciation of the eventual built outcome of the park.
- Council to amend the LEP with the following solar access control: Development must allow for 4 hours of continuous solar access to a consolidated area of Paul Keating Park between 10am and 3pm on 21 June (inclusive of existing shadow). The size of the consolidated area must be a minimum 50% of the area of Paul Keating Park (not including the footprint of existing buildings).
- Council to amend the DCP to require wind impact mitigation measures.
- The applicant to undertake further analysis to demonstrate how the proposal would comply with the solar access control, and minimise wind impacts, noting that the proposed 8:1 FSR may need to be reduced to adequately address these issues. This analysis may also assist in the reduction of visual bulk, which has been raised as a design issue.

5.2.3 Proposed active street frontages

<u>Proposal:</u> According to the Planning Proposal Report (Attachment C, page 15), ground level retail spaces are incorporated at The Appian Way and Rickard Road to activate these frontages. Key entry points are provided at the centre of the Rickard Road and Paul Keating Park frontages, connected by an internal 'University Street'.

<u>Assessment:</u> The peer review supports active street frontages at The Appian Way, Rickard Road and Paul Keating Park as it would provide an engaging environment for pedestrians (Attachment Y, page 54).

Should the proposal proceed to Gateway, the recommended action prior to exhibition is:

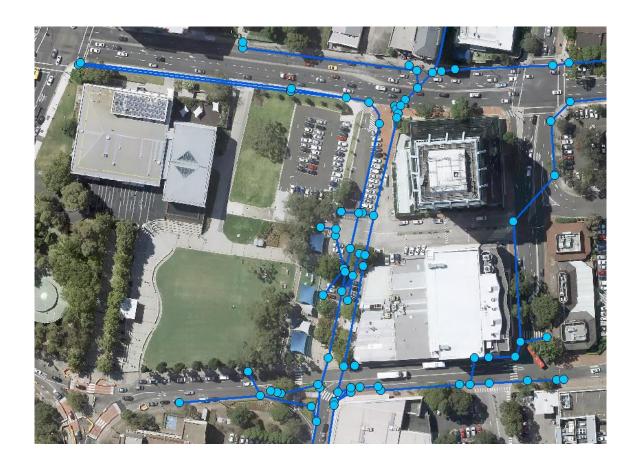
Council to amend the DCP to require active street frontages at The Appian Way,
 Rickard Road and Paul Keating Park.



Bankstown CBD MIKE FLOOD model upgrade

Western Sydney University Site Flood Assessment

Final Report





This report has been prepared under the DHI Business Management System certified by Bureau Veritas to comply with ISO 9001 (Quality Management)





Bankstown CBD MIKE FLOOD model upgrade

Western Sydney University Site Flood Assessment

Final Report

Prepared for Canterbury-Bankstown Council

Represented by Mr Sasha Marosevac



The site for the new WSU campus

Project manager	Stephan Oliver Suter
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Quality supervisor	Keiko Yamagata

Project number	43803243
Approval date	8 May 2019
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Classification	Restricted



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Proposed WSU Development with Drainage Network Upgrades

APPENDIX D – Difference Maps

Water Depth difference between scenarios



1 Introduction

DHI previously developed a detailed MIKE FLOOD model which couples a 2D surface model (MIKE 21 Flexible Mesh) with a 1D storm drainage network (MIKE Urban) for the Bankstown CBD and ran several drainage upgrade option scenarios. MIKE Urban simulates the detailed storm drainage network including various hydraulic structures such as manholes, basins and valves, while MIKE 21 Flexible Mesh simulates the dynamic flows in the 2D domain in various spatial resolutions. MIKE FLOOD enables the dynamic coupling of the two models and simulates flow exchange through inlet structures from the surface to the storm water drainage network.

Discharge outputs from Council's catchment wide TUFLOW study have been applied to the 2D model as surface boundary conditions. The MIKE FLOOD model does not replace the regional model, however, it can simulate flooding and dynamic flow interaction between the ground surface and the pipe network at a finer scale.

A new campus for Western Sydney University (WSU) is planned to be constructed in the Bankstown CBD, between the Council administration building and the library. DHI Water and Environment (DHI) was engaged by Canterbury-Bankstown Council (Council) to provide detailed flood maps, assess the impact of the new campus on surrounding properties and advise relevant hydraulic parameters required for further planning of the campus building and its surrounds.

The objective of this study is to

- Update the previously developed BASE2 model by incorporating the recent road and drainage upgrades at The Mall for current conditions (Scenario1);
- Update the above Scenario1 model by incorporating the WSU campus for future conditions (Scenario2);
- Update the existing OPTION2 DESIGN STAGE model by incorporating the recent upgrade of The Mall and the WSU campus for future conditions (Scenario3):
- Generate 100 year ARI flood maps comprising:
 - Maximum water depth
 - Contours of maximum water level
 - Maximum product of velocity and water depth (VxD)
 - Hazard categories based on velocity and water depth
 - water level difference maps

This report summarises details of each scenario and modifications made to the models.



2 Model Development for Scenario1

Scenario1 represents the current CBD condition as per March 2019. The BASE 2 model developed during the 2017 study was updated with the following changes.

2.1 Intersection of The Mall and The Appian Way

The intersection of The Mall and The Appian Way was updated with a new layout of the triangular pedestrian crossing and a duplication pipe underneath. Although both the duplication pipe and changes to the surface topography were already included in the BASE2 model, a detailed design of the duplication pipe and inlet structures were not available at that time.

Therefore, the MIKE Urban model was updated to incorporate the datils of the modifications to the drainage as per SHEET No.10 of *The_Mall_Works_As_Executed_25-09-2017.pdf*.

This includes:

- 900mm duplication pipe to the west of the crossing
- 8m long 375mm pipe to the east of the crossing

Figure 1 shows the changes made to the 1D model.

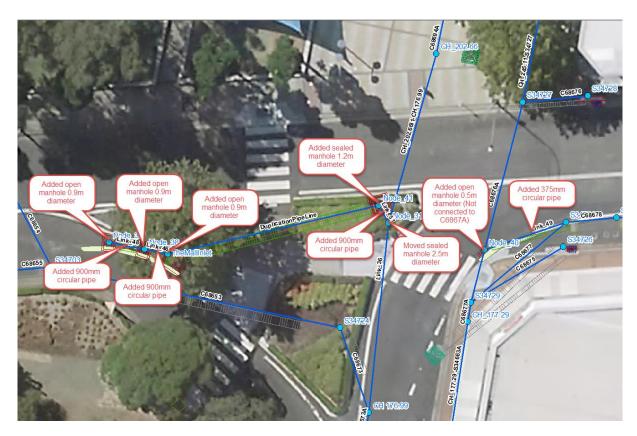


Figure 1 Updates at the intersection of The Mall and The Appian Way

The following inlet structures are incorporated in the MIKE FLOOD model by creating new coupling links to the 2D model or by updating the existing links.



Table 1 Updated/new coupling links

MUID	Length (m)	Length Adjusted (m)	Area (m²) (estimated blockage of 20%)
S34741*	4.8	4.5	0.36
Node_39	1.8	1.5	0.12
Node_38	1.8	1.5	0.12
TheMallInlet	1.8	1.5	0.12
Node_40	1.8	1.5	0.12
Node_36	2.4	2.1	0.17
Node_37	2.4	2.1	0.17

^{*}Represents the combined area of two lintels (A1 and A2)

As per the previous study, effective areas of kerbside inlets were estimated using the following formula: 0.8 of constriction factor is applied, assuming a blockage rate of 20%.

Area = (Design Lintel Length -0.3 m of length deduction for Lintel supports) * 0.1m height * 0.8 of constriction factor

2.2 Intersection of The Mall and Jacobs Street

An updated surface topography at Jacobs Street was already incorporated in the BASE2 model. The MIKE Urban model was updated to incorporate the details of the modifications to the drainage network as per SHEET No.11 of *The_Mall_Works_As_Executed_25-09-2017.pdf*. Updates of the MIKE Urban model are summarised in Figure 2.



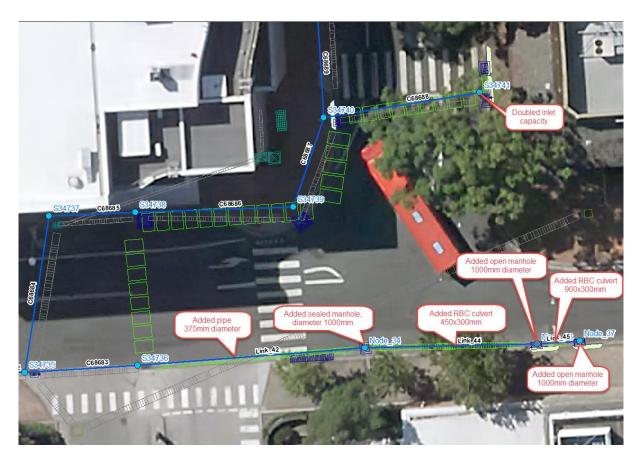


Figure 2 Updates at the Intersection of The Mall and Jacobs Street

2.3 Topography update at the campus site

Initial test runs revealed that the topography in the existing models, which was generated using ALS, did not properly represent the library driveway from Rickard Road. This resulted in a large amount of water flowing through the library driveway towards the underground carpark of the WSU building in the future scenarios. Therefore, for the future scenarios in this study, it was decided to replace the model topography with the surveyed topography around the campus including the library driveway. To be consistent with the future scenarios for result comparison, ground levels were updated at the same location in Scenario1.

Ground elevations were extracted from the *tin survey BONACCI MODIFIED TRIMMED* layer of *WSU_Design_Tin_and_Survey_2019_04_05.dwg* at the element vertices of the existing mesh in the model.

The final mesh elevation is shown in Figure 3, together with the extent of the BONACCI MODIFIED TRIMMED layer.



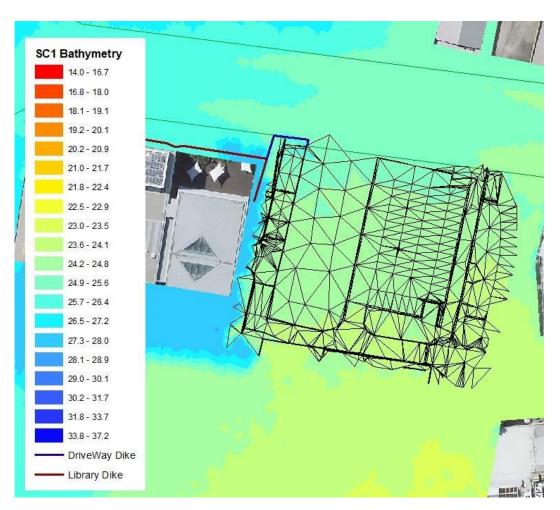


Figure 3 Updated topography for Scenario1

To make sure that the entry level of the driveway is properly represented, a dike structure was implemented in the MIKE 21 model, as shown in Figure 4.

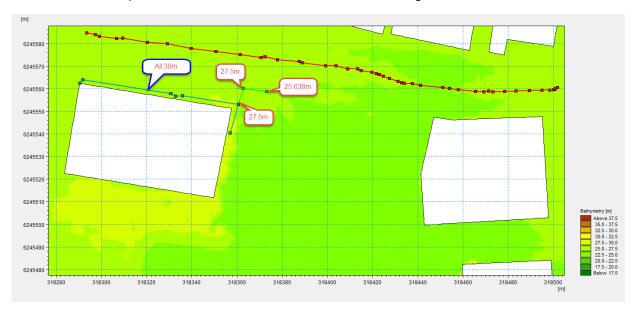


Figure 4 Dike structures representing the library driveway (Scenario1)



3 Model Development for Scenario2

Scenario2 represents the Bankstown CBD with the proposed WSU building. The Scenario2 model was developed by implementing the following changes to the Scenario1 model.

3.1 Topography update for the WSU campus building

The 3D model of the pavement area surrounding the new WSU building was not available for modelling. Therefore, to achieve consistency between scenarios, the same ground surface model was used for Scenario2 as in Scenario1.

The proposed WSU building was incorporated in the mesh using the *tin Design* layer of *WSU_Design_Tin_and_Survey_2019_04_05.dwg*. Elevation of the building was uniformly set to 30m to prevent flooding of the campus building.

Figure 5 shows the updated model topography for Scenario2. The outline of the WSU building is indicated by the red polygons. SC2 Bathymetry 14.0 - 16.7 16.8 - 18.0 18.1 - 19.1 Carpark 19.2 - 20.1 **Entrance** 20.2 - 20.9 21.0 - 21.7 21.8 - 22.4 22.5 - 22.9 23.0 - 23.5 23.6 - 24.1 24.2 - 24.8 24.9 - 25.6 25.7 - 26.4 26.5 - 27.2 27.3 - 28.0 28.1 - 28.9 29.0 - 30.2 30.3 - 31.7 31.8 - 33.7 33.8 - 37.2 DriveWay Dike Library Dike WSU building WSU building

Figure 5 Updated topography for Scenario2



3.2 Library Driveway

The library driveway was updated to include the elevation of the new WSU building platform (Figure 6).

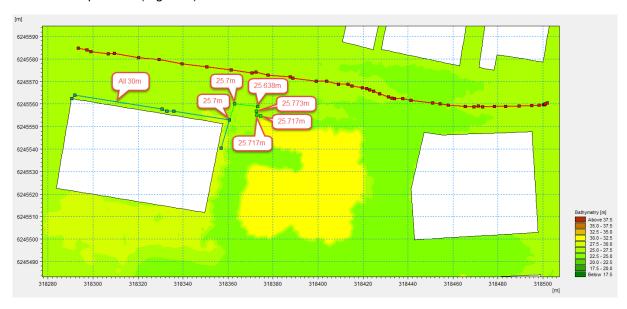


Figure 6 Dike structures representing the library driveway (Scenario2)



4 Model Development for Scenario3

Scenario3 represents the future condition where the proposed WSU building has been constructed and the proposed drainage network upgrades implemented. In the previous study undertaken by DHI in 2017, the proposed drainage network upgrades were simulated as part of the OPTION2 Design model.

These upgrades comprise upgrades of culvert inlet capacity at Rickard Road and French Avenue and culvert duplication at North Terrace.

Using the OPTION2 Design model as a base, the same modifications were made to the Scenario1 and Scenario2 models were applied:

- The drainage updates at the intersection of The Mall and The Appian Way
- The drainage updates at the intersection of The Mall and Jacobs Street
- Mesh topography updates at the campus site and the library driveway using the surveyed ground elevations, as in scenarios 1 and 2
- Mesh topography update to incorporate the proposed WSU building

5 Results

The following 100 year ARI flood maps were produced for each scenario and submitted to Council. These maps are also included in the Appendices.

- Maximum water depth with maximum water level contours
- Hydraulic hazard categories as per Figure L2 in the Floodplain Development Manual (April 2005, Department of Infrastructure, Planning and Natural Resources, New South Wales Government consistent with Council's FRMP)
- Maximum product of velocity and depth (VxD)
- Difference of maximum water levels ('Scenario2 minus Scenario1' and 'Scenario 3 minus Scenario1')

5.1 The impact of the WSU building

Currently (Scenario1), excess storm water from Rickard Road flows towards The Mall through the Council car park where the new campus is planned to be constructed. Under Scenario2 this flow passage becomes largely blocked by the WSU building.

Maximum water depth in The Appian Way between the WSU building site and Council's building generally varies between 0.12 and 0.61m in Scenario1 and 0.03 and 0.87m in Scenario2.

Figure 7 compares the maximum water depths of Scenario1 and Scenario2.

The proposed WSU building results in up to 0.3m higher maximum water depths along Rickard Road near the intersection with The Appian Way and up to 0.59 m in the section of The Appian Way between the new WSU building and the Council administrative building. These locations are marked in red circles in Figure 7. The highest increase of 0.59m is seen approximately half way along the eastern wall of the new WSU building where a part of the structure protrudes into the floodway. This protrusion also appears to have an impact on water depth increase along the western wall of Council's building (up to 0.19m).

Also refer to map D-1 in Appendix D.



Consequently, the hazard category for the section between the new WSU building and the Council administrative building will rise from medium risk to high risk (Figure 8) in the majority of the street section. The maximum velocity-depth product increases from 1.0 to 1.3 at the most affected location at this section.

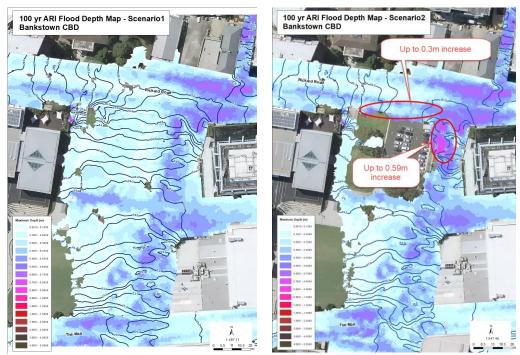


Figure 7 Comparison of maximum water depth under the current condition (left) and the scenario with the new WSU campus constructed (right)

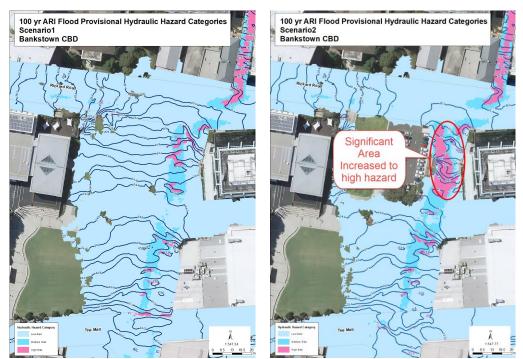


Figure 8 Comparison of hazard categories under the current condition (left) and the scenario with the new WSU campus constructed (right)



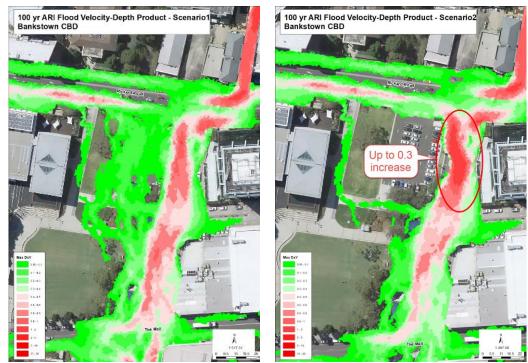


Figure 9 Comparison of maximum velocity-depth product under the current condition (left) and the scenario with the new WSU campus constructed (right)

The simulated water level at Rickard Road near the northern end of the library driveway reaches approximately 25.8mAHD, while the elevation of the driveway entry ramp is 25.7m. Thus, water from the street overtops the ramp and flows along the driveway towards The Mall in the model.

The increase in water depths within the driveway is up to 0.14m, potentially affecting the library carpark.

An entry to the underground carpark of the WSU building also faces this driveway. The simulated water level around the entry to the carpark reaches approximately 24.7m, while the elevation of the carpark entry in the design drawing is 24.64m. This results in water entering into the underground carpark.

5.2 Improvement by the proposed drainage upgrade

Scenario3 incorporating all proposed drainage upgrades reduces flooding significantly. As shown in Figure 10, the maximum water depth is reduced by up to 0.3m at most locations as a result of the drainage upgrade along the eastern and southern walls, compared to the current condition. The impact of the WSU building construction is most significant at the area located at the northern side of the building. The increase of the maximum water depth is 0.05m within Rickard Rd and highest (0.36m) along the building wall. This is partially a result of the lack of the modelling surface grid for the pavement around building which was not available during the study. In real conditions, it is not expected to exceed increases observed within Rickard Rd, should the paved area in front of the building be of the approximately same level as the existing footpath.

A localised increase of up to 0.24m is still present between WSU and Council building as a result of the WSU building protrusion into the floodway, while the increase in the driveway between the WSU building and library is the same as in Scenario2 (up to 0.14m).



Refer to map D-2 in Appendix D.

Water depths along the eastern wall of the WSU building in Scenario3 range between 0.02 and 0.52m, with water surface levels being between 24.2m AHD (south-eastern corner) and 24.8m AHD (north-eastern corner).

The hazard category is lowered from medium risk to low risk at most locations (Figure 11). The maximum velocity-depth product is reduced by 0.2 - 0.8m at the section between the Council building and the new WSU building, compared to the existing condition, as shown in Figure 12.

There is no significant change to the conditions at entry to the building underground car park, compared to Scenario2.

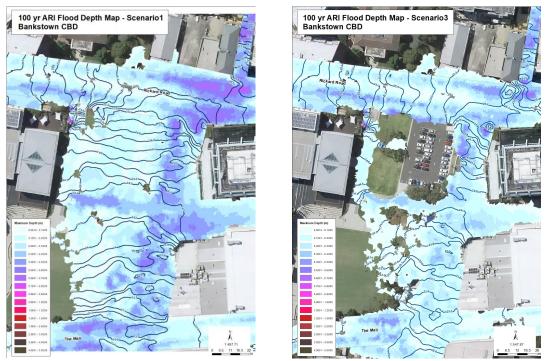


Figure 10 Comparison of maximum water depth between Scenario1 (left) and Scenario3 (right)



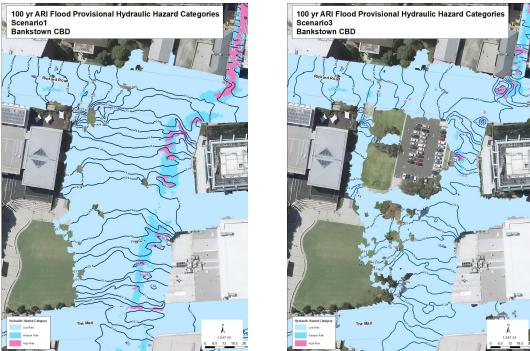


Figure 11 Comparison of hazard categories between Scenario1 (left) and Scenario3 (Right)

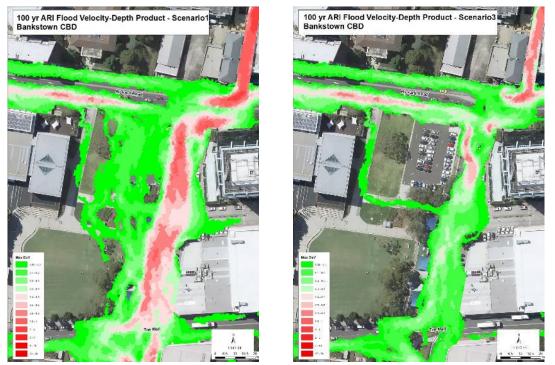


Figure 12 Comparison of velocity-depth product between Scenario1 (left) and Scenario3 (right)



6 Conclusions

The existing MIKE FLOOD model was modified to represent the current condition, the future condition with the WSU campus constructed, and the future condition with the WSU campus and the proposed drainage upgrade implemented.

Construction of the WSU building will worsen flooding conditions at Rickard Rd and in particular the section between the Council administrative building and the WSU campus. However, the proposed drainage upgrade is expected to significantly reduce the impact of the WSU campus on flooding in the surrounding area.



APPENDICES

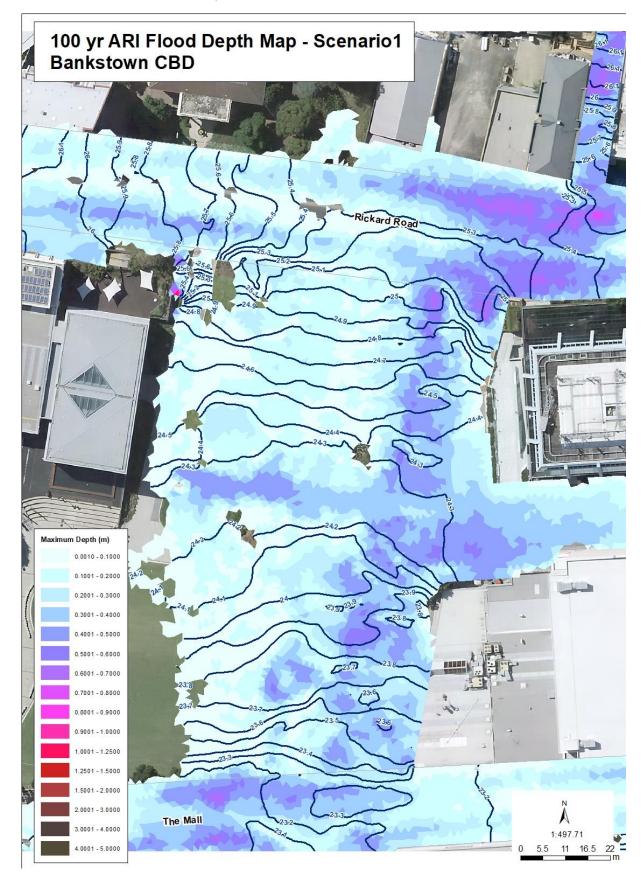


APPENDIX A – Scenario1

Existing Conditions

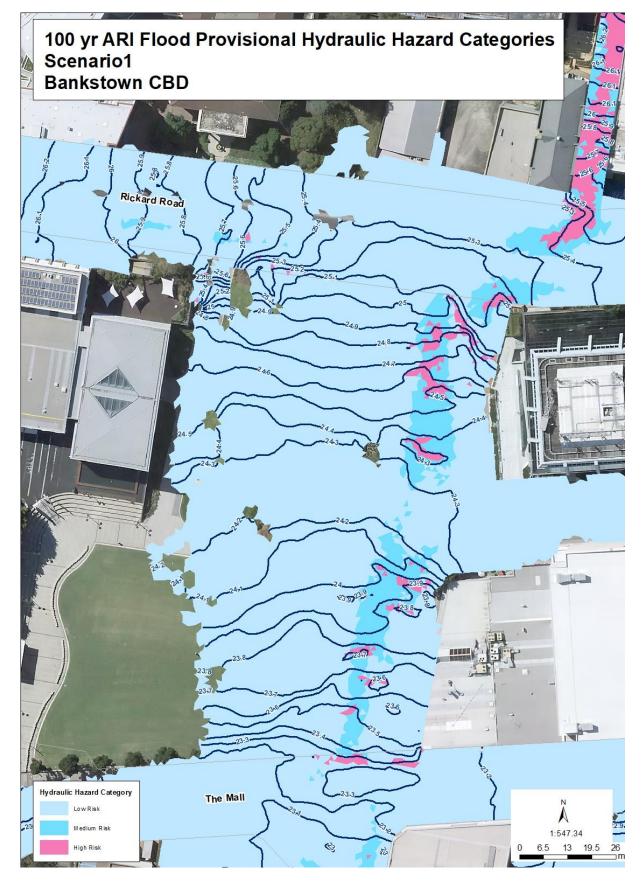


Maximum Water Depth





Maximum Provisional Hydraulic Hazard Categories





Maximum Velocity-Depth Product

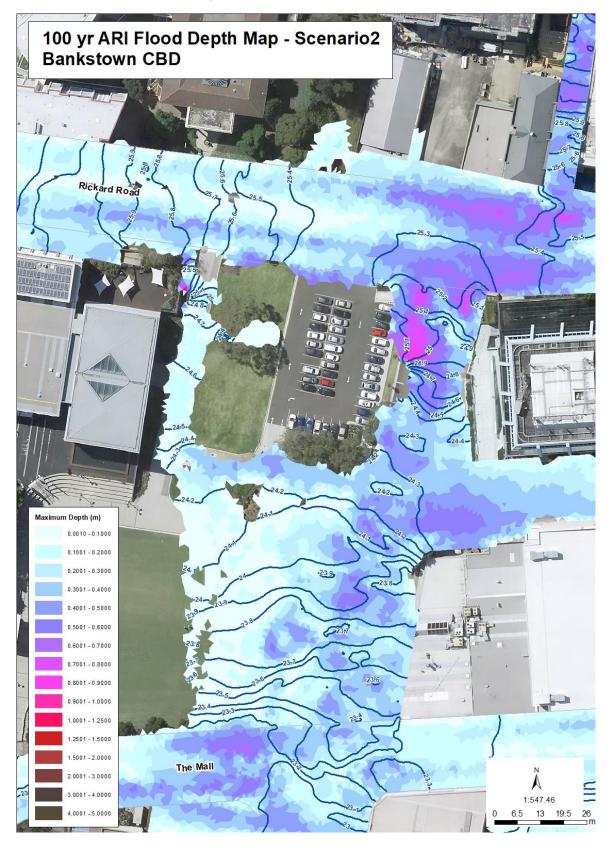




APPENDIX B - Scenario2 Proposed WSU Development

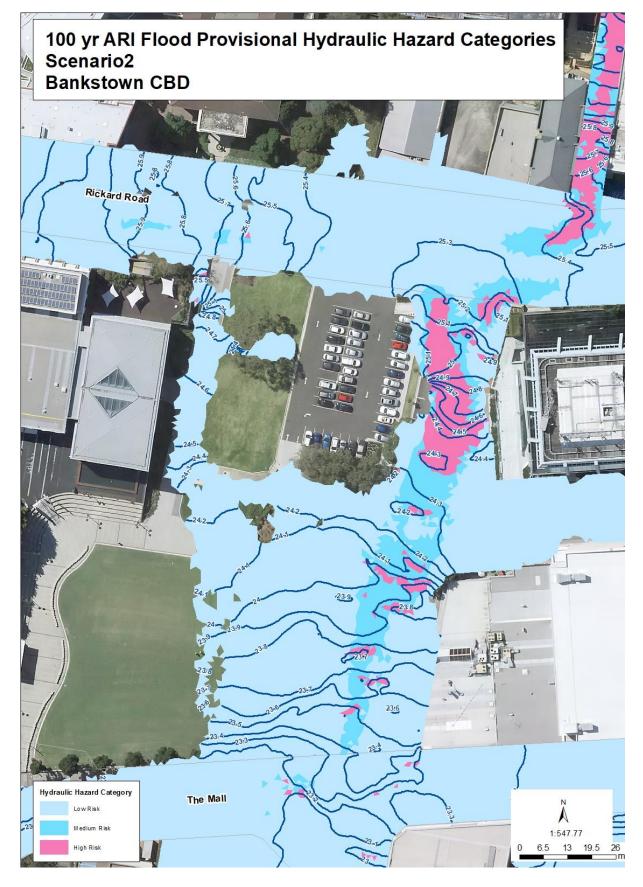


Maximum Water Depth



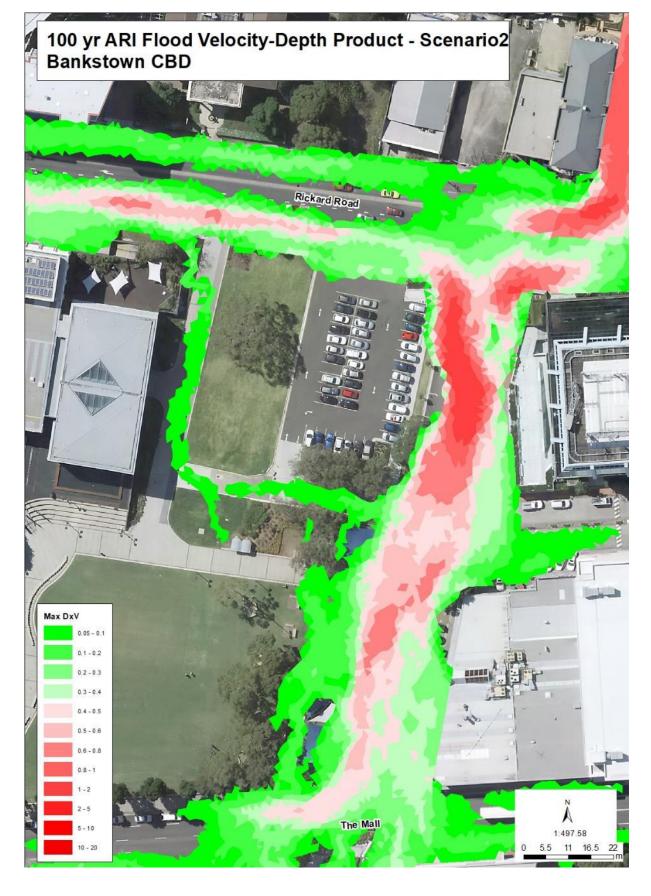


Maximum Provisional Hydraulic Hazard Categories





Maximum Velocity-Depth Product



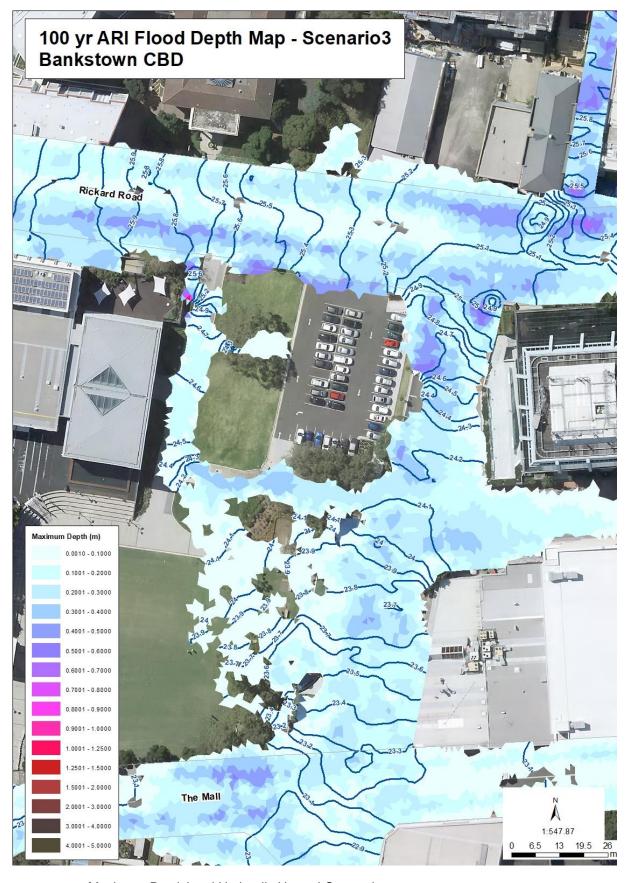


APPENDIX C - Scenario3

Proposed WSU Development with Drainage Network Upgrades

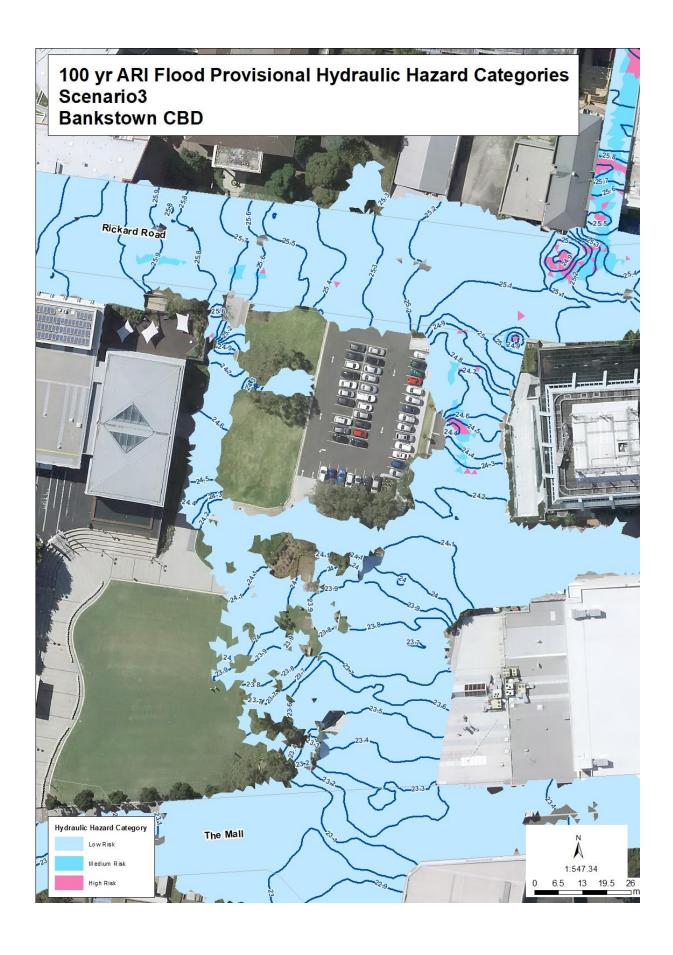


Maximum Water Depth



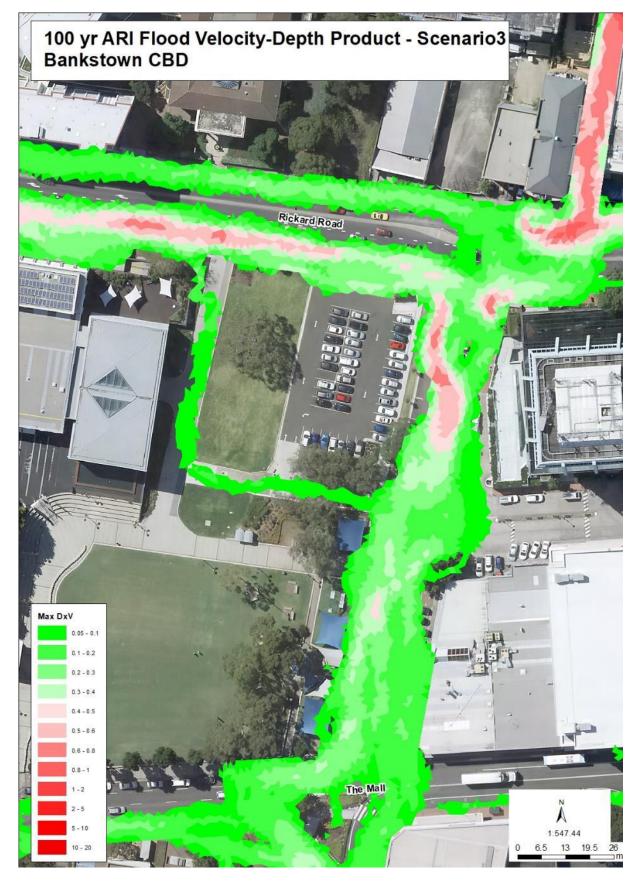
Maximum Provisional Hydraulic Hazard Categories







Maximum Velocity-Depth Product



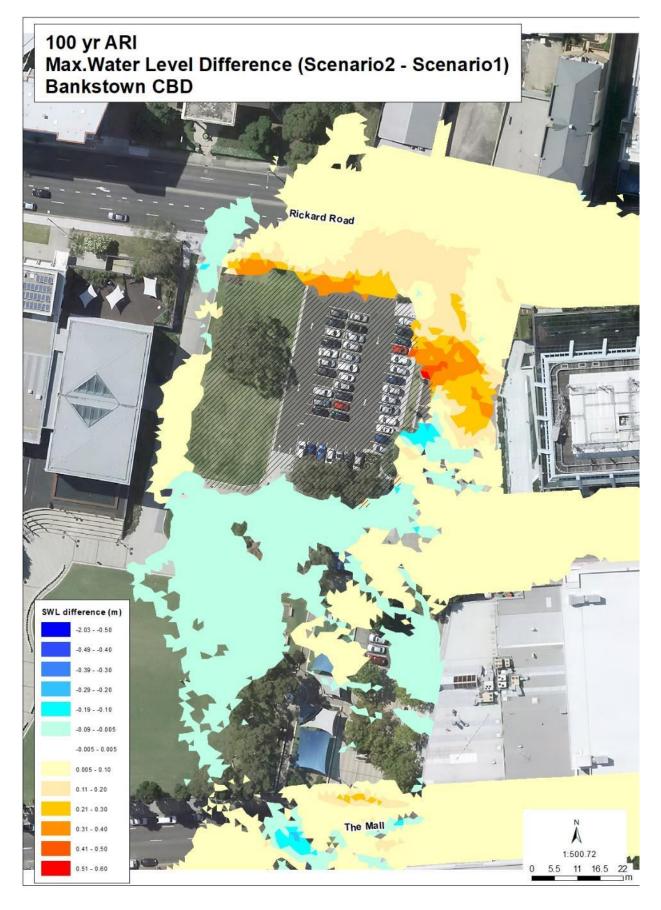


APPENDIX D - Difference Maps

Water Depth difference between scenarios

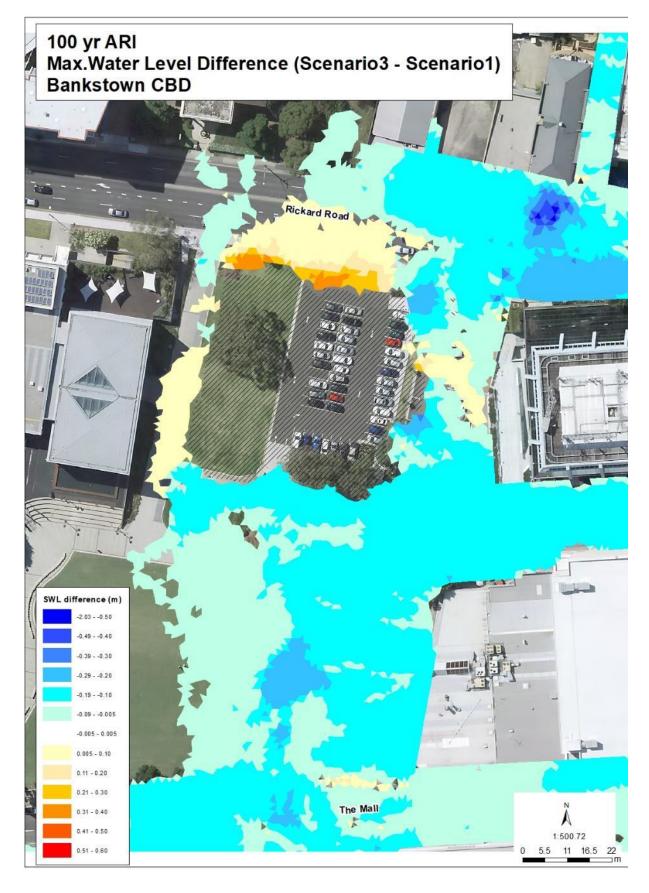


Scenario2 minus Scenario1



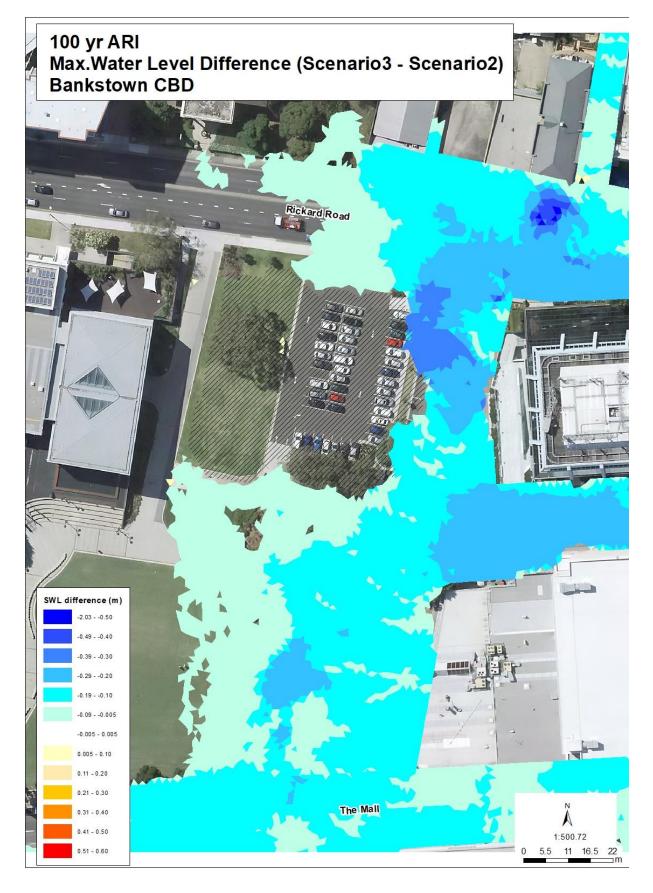


Scenario 3 minus Scenario 1





Scenario 3 minus Scenario 2





WSU Bankstown Campus Proposal Peer Review of Transport and Traffic

Prepared for:

Canterbury-Bankstown City Council

13 September 2019

The Transport Planning Partnership



WSU Bankstown Campus Proposal Peer Review of Transport and Traffic

Client: Canterbury-Bankstown City Council

Version: V03

Date: 13 September 2019

TTPP Reference: 19158

Quality Record

Version	Date	Prepared by	Reviewed by	Approved by	Signature
V01	14/08/19	Charbel Hanna	Jessica Ng	Wayne Johnson	Wayne Johnson
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Executive Summary

On behalf of Canterbury-Bankstown Council (Council), The Transport Planning Partnership (TTPP) has undertaken an independent peer review of the Transport and Accessibility Plan (TMAP) prepared in support of a planning proposal for the Western Sydney University (WSU) Bankstown Campus.

The overall purpose of the TMAP peer review is to advise Council of the following:

- the appropriateness of the methodology and assumptions utilised in the TMAP;
- the implications of the TMAP findings to the surrounding area;
- are the targets for travel demand and mode share as set out in the TMAP realistic and can they be achieved with the measures prescribed in the TMAP;
- if not, what further analysis or measures are required to enable Council to provide an appropriately informed assessment of the planning proposal for the purpose of Gateway approval.

Overall, it is considered that the TMAP prepared for the WSU Bankstown Campus represents a sound and generally adequate response to the transport planning aspects of the WSU planning proposal. The TMAP reflects and is consistent with the aims and objectives of the various regional and local transport policies which seek to encourage and facilitate greater use of sustainable travel modes.

However, a number of deficiencies have been identified that would need to be addressed to ensure a robust assessment of the proposed development. These key areas can be summarised to be:

- Traffic modelling and road network operation
 - Additional traffic modelling is required to fully appreciate the implications of the planning proposal on the surrounding road network.
 - Calibration of models to observed traffic conditions is required to reflect actual conditions (i.e. vehicle queuing).
 - Future scenario modelling required to determine implication of proposal in say +5 or +10 years' time. Currently only existing plus development scenarios have been considered.
- Measures to achieve transport mode share targets
 - Existing mode share for travel to Bankstown is heavily weighted to private motor vehicle.
 - The mode share target of 5 per cent private car (as driver) for travel to / from the WSU Bankstown campus are aggressive and will require a significant change in travel behaviour.



Further consideration of measures to ensure that the TMAP mode share target are realistic is required. This will need to include both on-site and off-site measures.

With regard to mode share targets, TTPP is of the opinion that the 5 per cent mode share to "car as driver" is an appropriate target to be set as it will, if achieved, deliver town centre amenity benefits. However, it is TTPP's opinion that the achievement of the 'aggressive' mode share target cannot be achieved simply by the implementation of on site (WSU Campus) measures.

For example, the provision of limited and restricted on-site parking for the WSU Campus is supported. However, this alone is not considered enough to change driver behaviour to the extent proposed. Off-site changes to on street / off street parking facilities will be required to discourage the dispersal of parking demand off campus to the surrounding network.

As such it is recommended that WSU needs to be part of the planning, solution and contributions for off Campus works and measures. To date this is not considered in the TMAP.



1 Introduction

The Transport Planning Partnership (TTPP) has been engaged by Canterbury-Bankstown Council (Council) to undertake an independent transport and parking review of the Transport Management and Accessibility Plan (TMAP) prepared by Arup (17 July 2019) as part of the WSU Bankstown Campus planning proposal to guide Council's assessment of the application. Council's assessment will be reported to the Local Planning Panel to decide whether the proposal will proceed to Gateway.

1.1 Project Background

The site of the proposed WSU Bankstown campus is located at 74 Rickard Road and 375 Chapel Road, as shown in Figure 1.1.

Figure 1.1: Site Location



The planning proposal seeks to provide a 19-storey University Campus comprising:

- formal academic spaces and informal learning spaces
- workplace spaces for faculty staff



 basement carpark consisting of 3 loading spaces (1 medium waste vehicle and 2 courier vans), 94 car spaces and 32 bicycle spaces.

The project will facilitate the relocation of teaching, research and staff facilities currently located at the WSU Bankstown Campus at Milperra. The WSU Bankstown Campus is expected to service around 2,000 students to accommodate a maximum of 3,400 students (based on information submitted by Urbis on 27 August, 2019) and 650 University / Education space staff, at any one time; allowing for varying lecture times, external meetings, sick leave and holiday leave.

1.2 Project Objectives

TTPP has prepared this peer review to advise the appropriateness of the methodology and assumptions made by Arup in the Transport Management and Accessibility Plan (TMAP) (17 July 2019). TTPP has undertaken the peer review of the TMAP in the context of the following documents:

- Current Bankstown LEP / DCP controls
- Council's Complete Streets project
- State Design Review Panel comments (12 March 2019)
- Arup's Traffic and Parking Report (20 December 2018)
- Arup's Transport Management and Accessibility Plan (17 July 2019)
- Arup's SIDRA models including:
 - Existing conditions
 - Future traffic conditions including the full development of the site and traffic growth.

1.3 Site Inspection

On Monday 8 July 2019, TTPP undertook a site inspection during the afternoon between 11:30am and 12:30pm to observe existing transport conditions surrounding the site.

It is noted that this site visit was carried out during the school holidays. Nevertheless, some key observations identified during this site visit are as follows:

Rickard Road westbound queues on approach to Chapel Road were observed to occasionally extend beyond the existing driveway to the Library for a short period of time, as shown below. This means that it may be difficult for vehicles to exit the driveway onto Rickard Road when queues extend past the driveway during peak periods (which may be worse on a typical day).

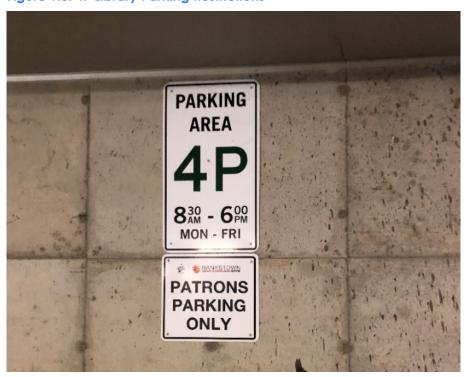


Figure 1.2: Rickard Road Queues



The existing parking restrictions within the existing library car park are restricted to 4P restrictions between 8:30am and 6:00pm Monday to Friday. Parking demand was observed to be high, with limited spare parking capacity. It is expected that staff/students at the proposed WSU site would park within the library car park.

Figure 1.3: 4P Library Parking Restrictions



The site benefits from good pedestrian links to/from Bankstown station. There are also four bicycle rails, accommodating eight spaces, provided within the vicinity of the site on Chapel Road, as well as near Bankstown Station.



Figure 1.4: Existing Bike Rails and Pedestrian Network



The existing site is currently occupied by 43 car parking spaces, which are restricted to 2P parking restrictions. The Appian Way also provides 26 public car parking spaces and 20 Council staff car parking spaces (information provided by Council). These car parking spaces were observed to be in very high demand with limited space parking supply. It is noted that these car parking spaces will be removed as a result of the planning proposal thereby reducing the supply of publicly accessible spaces within the Bankstown town centre by some 69 spaces.

Figure 1.5: The Appian Way





2 Peer Review Findings of TMAP

This section outlines the findings of the peer review in relation to the transport assessment undertaken by Arup for the planning proposal. TTPP also provides recommendations to address the identified deficiencies to enable a more comprehensive and accurate assessment of the planning proposal.

2.1 Bankstown Demographics

Section 2.5 Travel Characteristics

Year 2016 Census data presented in Figure 15 of the TMAP indicates that 83 per cent of trips made by people employed within the selected Bankstown destination zone are carbased (77 per cent as car driver and 6 per cent as car passenger trips). Public transport only accounts for 14 per cent of trips, with the remaining four per cent by walking.

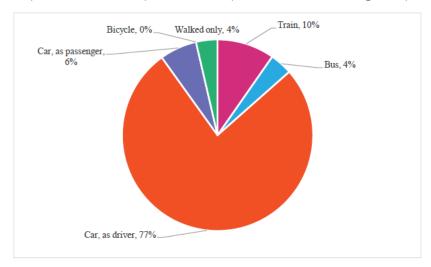


Figure 15 Existing travel to work mode share (DZN 115710002)

- The above data indicates that the Bankstown area is very reliant on car usage, even though the area is serviced by good public transport services, including rail and bus services from Bankstown Station.
- The Sydney Metro between Bankstown and the City will operate from Year 2024 at a peak frequency of 15 trains per hour in both directions (1 every 4 minutes). On this basis, it is expected that there would be some modal shift to train/metro once the Sydney Metro is operational.

2.2 Trip Generation Estimate

Section 5 Traffic Assessment

• Figure 34 of the TMAP indicates that staff at the proposed new Bankstown WSU campus are expected to commute from the following areas based on Year 2016 Census data:



- Bankstown 60 per cent
- Canterbury 10 per cent
- Liverpool 10 per cent
- Merrylands-Guildford 5 per cent
- Hurstville 5 per cent
- Other 10 per cent
- Given that the above locations are based on existing staff working within the Bankstown catchment area (i.e. Census data), TTPP recommends that existing staff travel surveys at the existing WSU Milperra campus be undertaken to understand where staff currently reside and travel to/from the WSU campus.
- The TMAP mode share target for staff by car is 15 per cent. This is 62 per cent less than existing car driver trips based on Year 2016 Census data in the Bankstown destination zone. On this basis, this car driver mode share target for staff is not considered realistic, unless measures are put in place on-site and off-site to disincentive car travel to the site, as well as wide Bankstown area.
- The traffic generation estimates associated with the proposed WSU site has been estimated based on the mode share targets outlined in Table 6. Arup notes that travel surveys will be undertaken once the campus is operational to allow for an accurate baseline mode split to be established.

Table 6 Mode share targets

Mode	University / Education space staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl.drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	100%	100%

- It is recommended that the mode share target for "other" mode share be further clarified as part of the assessment.
- Based on TTPP in-house data collected at various tertiary education facilities such as at UTS, ACU, Meadowbank TAFE (refer to Section 3 for further details), car trips from similar tertiary educational facilities can range from 11 to 75 per cent for staff, and from 5 and 40 per cent for students. The lower percentage of car driver modes are associated with the existing UTS campus, which is located within close proximity to Central Station. UTS is centrally located within the Sydney CBD with limited car parking within the immediate vicinity of the site. Paid car parking is also made available in public car parking areas, but this is generally expensive such that driving to the Sydney CBD is not affordable by car, particularly for students. Therefore, UTS is not considered the best comparison with the proposed WSU Bankstown site.



- The traffic generation estimates using the mode share targets may not be a good representation of future conditions. It is therefore recommended that travel surveys be undertaken to gauge how existing staff and students at the WSU Milperra site currently travel to the site, where they live and whether they will change their mode of travel from car to public transport if the site were to be relocated near Bankstown Station. This would allow for a better benchmark to assess the mode share targets for both staff and students. It is expected that there would be a modal shift away from car with the relocation of the campus due to its proximity to Bankstown Station.
- The estimated overall travel demand (person trips) generated throughout the day is outlined in Table 7. This indicates that it is estimated that a total of 2,001 students would be on-site between 11am and 12pm.

Table 7 BCC person trip arrival and departures

Time		Arrivals		Departures			Accumulation (students only)
	Staff	Students	Total	Staff	Students	Total	Total
Before 7	19	14	33	0	0	0	14
7-8	111	110	221	0	0	0	125
8-9 (AM Peak)	317	828	1145	0	18	18	935
9-10	162	576	737	1	16	17	1494
10-11	22	393	415	0	23	23	1864
11-12	3	197	200	0	60	60	2001
12-13	2	116	118	2	92	95	2025
13-14	2	89	91	3	143	146	1970
14-15	2	52	54	13	183	195	1839
15-16	1	49	49	37	225	262	1663
16-17	1	31	32	176	400	575	1294
17-18 (PM Peak)	1	48	49	294	519	812	823
18-19	0	12	12	92	451	543	384
After 19	4	5	9	29	390	419	0

- Table 8 indicates that the proposal is estimated to generate a total of 89 car driver trips and 51 car passenger (including drop off) trips during the busiest peak hour between 8am and 9am. There will also be a total of 735 persons catching public transport (bus and train/metro) during the busiest peak hour between 8am and 9am.
- During the PM peak between 5pm and 6pm, there would be a total of 70 car driver trips and 35 car passenger (including drop off) trips, with a total of 519 persons catching public transport during the PM peak.



Table 8 Peak hour trips

Mode	Arrivals			Departures		
Mode	Staff	Students	Total	Staff	Students	Total
Walk	32	124	156	29	78	107
Cycle	16	41	57	15	26	41
Car Driver	48	41	89	44	26	70
Car Passenger (incl.drop-off)	10	41	51	9	26	35
Bus	95	273	368	88	171	259
Train/Metro	101	265	367	94	166	260
Other	16	41	57	15	26	41
Total	317	828	1145	294	519	812

Table 9 estimates the vehicular trip generation associated with the BCC car park (94 spaces) will be 53vph in the AM Peak and 49vph in the PM Peak.

Table 9 BCC car park vehicular trip generation

	AM	Peak	PM Peak		
	In	Out	In	Out	
Vehicle trips	48	5	5	44	
Total	53		49		

- The proposed The Appian Way drop off activity is estimated to generate 51 car drop off's in the AM peak (8am-9am) and 35 drop off's in the PM peak (5pm-6pm). Vehicles will access the drop off area from Rickard Road (turning left into the site) and exit via Civic Drive onto Jacobs Street.
- The Appian Way will function as a shared zone. The site criteria for shared zones in TfNSW's policy guideline outlines that a shared zone should have no more than 100 vehicles per hour and no more than 1,000 vehicles per day. Based on the estimated person trips outlined in Table 7, it is expected that there would be up to 51 car drop off trips during the busiest hour between 8am and 9am; or approximately 147 car drop offs during the day. This level of traffic is acceptable for a shared zone.

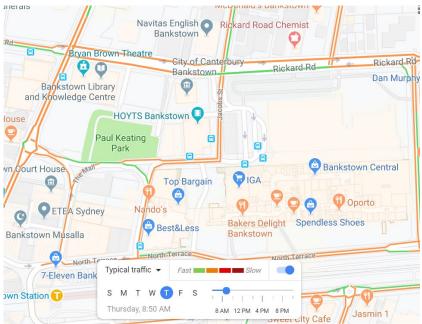
2.3 Road Network Assessment

Section 2.6 Traffic Volumes and Section 5.5.4 Traffic Modelling

- Traffic surveys were undertaken at the two key immediate intersections on Wednesday 5 September 2018 between 7am and 10am and between 3pm and 7pm, as follows:
 - Rickard Road / Chapel Road
 - Rickard Road / Jacobs Street
- Traffic modelling was undertaken using SIDRA 8 modelling software at the above two intersections to assess existing conditions and future traffic conditions (including the full development of the site and traffic growth). A future background growth of 2.5 per cent on Rickard Road in the AM peak has been adopted in the traffic assessment based on future mid-block traffic volumes from the draft Bankstown Complete Streets project.

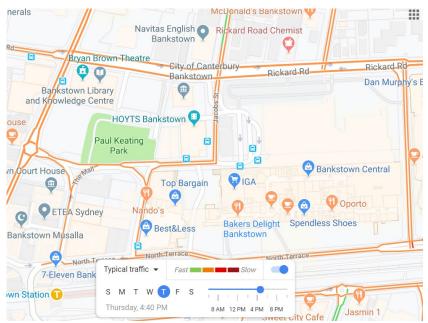


- Based on the modelling outputs, only Year 2018 has been assessed (i.e. no future year scenario). It is recommended that a +5 or +10-year future case scenario be assessed with and without the proposed development.
- The modelling outputs indicate that the average queue on Rickard Road on approach to Chapel Road is 2-3 vehicles in the AM peak and 5-8 vehicles in the PM peak.
- No queue length data is provided. It is recommended that queue length data is collected to assess the validity of the traffic models.
- Analysis of google congestion maps indicate that speeds along Rickard Road are not "free flowing" but with some congestion during the AM and PM peak periods. This data is generally interpreted as traffic queues for practitioners in the absence of queue length data. The orange line denotes that travel speeds are less than the posted speed limit, such that queues are interpreted as half the length of the orange line. Therefore, this suggests that the queue lengths modelled do not match the google congestion map data. See below.



Typical Thursday AM at 8:50am





Typical Thursday PM at 4:40pm

The traffic distribution and assignment of traffic assumes that the majority (80 per cent) of traffic accessing the car park will arrive via Stacey Street and Rickard Road, with the remainder arriving from Jacobs Street and Rickard Road, as shown in Figure 37. Traffic leaving the site has been assumed to be evenly distributed north, west and south at the Rickard Road-Chapel Road intersection.

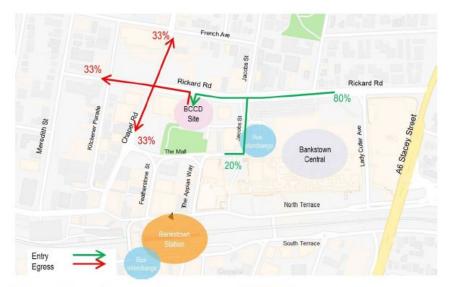


Figure 37 Car park access and egress routes and distribution

• The traffic distribution and assignment of traffic assumes that all drop-off traffic will arrive from Rickard Road (i.e. westbound through at the intersection with Jacob Street), whereas 50 per cent of vehicles will exit the site eastbound and 50 per cent of vehicles will exit the site westbound on Rickard Road, as shown in Figure 38.



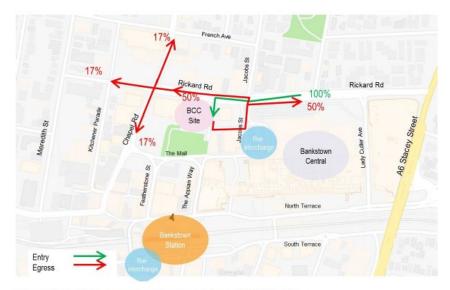
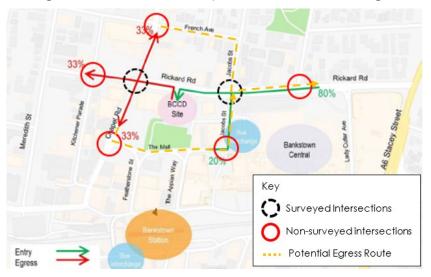


Figure 38 Set-down access and egress routes and distribution

- It is expected that the proposed development would generate some additional traffic onto surrounding intersections, including the following:
 - Chapel Road-The Mall (roundabout)
 - Rickard Road-Kitchener Parade (signalised intersection)
 - French Avenue-Chapel Road (signalised intersection)
 - Rickard Road-Sir Joseph Banks Street (signalised intersection)
 - The Mall-Jacobs Street (priority intersection).

No traffic surveys or modelling has been undertaken at the above intersections. The above intersections are circled red, with the surveyed intersections shown in black in the following figure. It is noted that the intersection impacts at the Rickard Road-Jacobs Street intersection could potentially be exacerbated as a result of motorists (egress) wishing to turn back onto Stacey Street, as shown in orange dashed line below.





Traffic associated with the proposed development is expected to be diluted due to it being distributed to different turning movements and across a number of local intersections. Therefore, any intersection modelling at the above additional intersections is unlikely to register any noticeable traffic impacts based on the anticipated development traffic generated by the proposed development. However, it is recommended that the impacts of the above intersections be assessed and justified accordingly to support the proposed development.

2.4 SIDRA Traffic Models

TTPP has reviewed the SIDRA traffic models provided by Council on 9 July 2019 (SIDRA Ref: WSU Bankstown Network Model). The SIDRA traffic models were based on the traffic surveys undertaken by Arup on Wednesday 5 September 2018 between 7am and 10am and between 3pm and 7pm. A summary of TTPP's comments is provided in Table 2.1.

The severity is rated as follows:

- major requires immediate resolution
- moderate requires clarification/justification or correction
- **minor** should be addressed although may have minor impacts to the results

Table 2.1: SIDRA Model Comments

No.	Comment	Will correction affect the operation of the intersection?	Severity (Major, Medium, Minor)
	Intersection Level		
1	The right turn bay from Rickard Road (east leg) into Jacobs Street (north leg) in the SIDRA model is shorter than the existing. The existing right-turn lane is approximately 70m in length. This right-turn lane has been modelled as 35m.	Yes – but minimal impacts	Major
2	The left turn from Jacobs Street (south leg) into Rickard Road (west leg) in the westbound direction is a give way slip lane. This give way slip lane has been coded as a signalised left turn in the SIDRA model.	Yes – but minimal impacts	Major
3	The peak flow period of 60 minutes has been modelled while the maximum peak flow period is 30 minutes. Peak flow period should reflect the intersection count data and any variation should be justified and documented based on RMS modelling guidelines.	Yes	Major
4	The speed limit on the south approach to the Chapel Road/Rickard Road intersection is 40km/h, while the SIDRA model shows it is coded as 60 km/h.	Unlikely	Major
5	The speed limit of Jacobs Street is incorrect. The speed limit on Jacobs Street is 50km/h and 40 km/h on the north and south approach to the Rickard Road/Jacobs Street intersection respectively.	Unlikely	Major
6	The modelled traffic signals at the intersection of Rickard Road/Chapel Road do not replicate the existing signal phasing configuration (i.e. missing filtered right-turn in the modelled B phase) and phasing sequence.	Yes	Major



No.	Comment	Will correction affect the operation of the intersection?	Severity (Major, Medium, Minor)
	Intersection Level		
7	The modelled traffic signals at the intersection of Rickard Road/Jacobs Street do not replicate the existing signals phasing configuration (i.e. B phase and C phase has been modelled as a split phase, but the traffic control signal plan indicates that these movements run under D phase, which is not a split phase) and phasing sequence.	Yes	Major
8	Pedestrian protection (i.e. 5-7 seconds delay for vehicles turning left) has not been modelled which results in an overestimation of intersection capacity.	Yes	Medium
9	The SIDRA default pedestrian walking speed of 1.3m/s has been used. Pedestrian walking speed should be adjusted to 1.2 m/s based on RMS modelling guidelines.	Unlikely	Medium
10	The default peak flow factor has been changed from 95% to 100%. Any variation should be justified.	Likely – but minimal impacts	Minor
11	The default pedestrian volume of 50 pedestrians/hour has been used for these intersections. It is expected that the actual pedestrian volumes may be higher due to the shopping centre and community services in the vicinity of the study area.	Unlikely	Minor
	Network Level		
1	The timing option for modelling the existing condition should be set as "user given phase time" while it is modelled as "Practical Cycle Time" which is not acceptable.	Yes	Major
2	Modelled AM and PM peak signals phasing configuration is the same as in SCATS but cycle and phases times are different due to adopting "practical cycle time" instead of "user given phase time".	Yes	Major
3	50 seconds cycle time is not the actual cycle time for these intersections during peak periods.	Yes	Major
4	The network peak flow period is set up as 30 minutes while peak flow period is set up as 60 minutes at intersection level which are not consistent.	Yes	Major
5	The proposed WSU Bankstown Campus is located between the two modelled intersections. The model has not included the two existing driveways (i.e. The Appian Way and Library driveway). Motorists entering and exiting Rickard Road will negatively impact traffic movements along Rickard Road. It is recommended that access to the site and The Appian Way access is included in the traffic modelling assessment.	Yes	Medium
6	There is a high midblock flow difference during both AM peak period. In the AM, the midblock flow difference between the two intersection is up to 147 vehicles/hour, while in the PM the difference is up to 12 vehicles/hour under the existing base case.	Yes	Medium
7	The number of lane changes are too high for this small network which results in unrealistic delay calculation	Yes	Medium
8	The modelled queue length is not consistent with the typical queuing condition estimated by Google Maps on the ground during peak periods.	Yes	Medium
9	The modelling results are not a good estimation of the current traffic condition on the ground estimated by Google Maps.	Yes	Medium



In summary, the SIDRA traffic models should be updated and/or justified accordingly. The above changes may affect the traffic modelling results and should be updated and documented accordingly for Council review.

2.5 Sustainable Transport Assessment

- A total of 32 bicycle parking spaces would be provided in the basement, as well as up to 100 spaces within the public domain of the site. It is unclear where the 100 spaces within the public domain of the site will be located. The 32 bicycle parking spaces are proposed to be allocated for staff only, with the other 100 spaces anticipated to be used by staff or students. The DCP does not contain any specific bicycle parking rates for educational tertiary establishments.
- The NSW Planning for Walking and Cycling guideline recommends bicycle parking be provided at a rate of 3-5 per cent, plus 5-10% for full time students for long-term bicycle parking and 5-10 per cent of staff for short-term bicycle parking. On the basis of 650 staff and 2,000 students, this would equate to a total bicycle parking provision of 153-298 spaces (i.e. 120-233 short-term spaces and 33-65 long-term spaces).
- It is unclear from Arup's TMAP whether any end-of-trip facilities will be provided within the site. End of trip facilities such as showers, change rooms and lockers should be provided.
- The provision of 32 on-site bicycle parking spaces, plus 100 spaces within the public domain of the site do not satisfy the recommended bicycle parking rates for tertiary establishments in accordance with the NSW Planning for Walking and Cycling guideline. It is therefore recommended that an area be allocated within the site to provide additional bicycle parking.
- The proposed pedestrian access to the campus is considered acceptable, with key pedestrian access points to the site shown in Figure 27 along the north, east and south portions of the site.



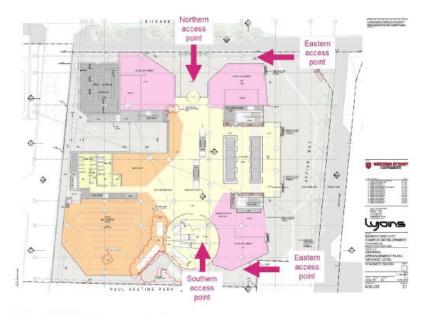


Figure 27 Pedestrian access points

Access to the staff bicycle parking area in the basement (32 spaces) will be provided via the driveway or lifts. The ramp grades are not outlined on the architectural plans, but it is understood that the driveway has been designed to accommodate vehicles up to and including an 8.8m medium rigid vehicle. For an 8.8m medium rigid vehicle, a maximum ramp grade of 1:6.5 (15.4%) is permitted under AS2890.2:2002. Generally, longitudinal gradients on paths for cycling should be as flat as possible.

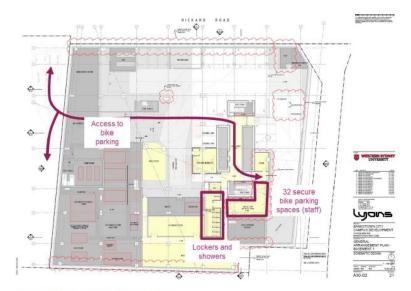


Figure 28 Proposed staff bike parking

■ TTPP notes that many private waste collection contractors use vehicles similar to that of an 8.8m medium rigid vehicle. There are also smaller waste collection service providers such as Vikings that use smaller vehicles, equivalent to a B99 vehicle (i.e. 99th percentile vehicle). In recognition of this, TTPP expects that designing for vehicles up to and including an 8.8m medium rigid vehicle is satisfactory. It would however be subject to



the servicing requirements of the university. This will need to be clarified as part of the future development application for the site.

- Section 6.1 indicates that a comprehensive Green Travel Plan will be prepared for the campus. A number of key measures have been included in the report to support sustainable transport initiatives, including:
 - The appointment of a travel plan co-ordinator to promote the uptake of public transport, walking and cycling by staff and students travelling to and from BCC;
 - Limited provision of on-site parking;
 - The provision of high-quality and secure bike parking and end of trip facilities; and
 - Undertaking travel surveys.
- It is recommended that a green travel plan be required as part of any development consent for the approval, requiring ongoing travel surveys post-occupation to monitor the mode share targets. It may be the case that any future development of the site (e.g. any enrolment capacity increases) is not to progress until the mode share targets have been met for the site. This consent condition has been applied to other universities such as ACU Strathfield campus, that being:
 - "Any future application must demonstrate that the mode share targets within the Green Travel Plan can be consistently complied with" – [2014] NSWLEC 1238
- It is however recommended that a Green Travel Plan be prepared as part of the SSDA submission, with travel surveys undertaken at the existing WSU Milperra campus as a benchmark to justify the mode share targets of the site, with consideration to where staff and students currently travel to/from the existing campus and expected mode shifts due to the new location of the site.

2.6 Parking Assessment

- Council's DCP does not contain any specific car parking rates for tertiary educational establishments.
- The proposal will provide 94 car parking spaces, including four DDA compliant car parking spaces across two basement levels. No parking will be provided for students. Arup notes that this level of car parking provision is similar to the arrangement at the WSU Parramatta City Campus, where 80 parking spaces are provided. Arup notes that the proposal has similar features to the development, including GFA, staff and student population and proximity to public transport.
- Information provided by Council via WSU indicates that there are currently approximately 6,369 enrolled students at the Parramatta City Campus (as of 2018). It is however unclear what the existing staff levels are at the Parramatta City Campus.



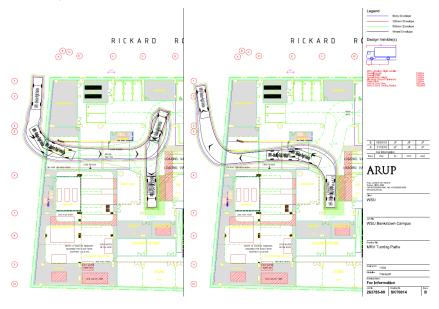
- Notwithstanding this, based on the information provided, car parking is currently provided at the Parramatta City Campus at a rate of approximately 1 space for every 80 enrolled students.
- Based upon a total of 10,000 enrolled students, this could equate to a total car parking requirement of 125 spaces based on the existing car parking provision at the Parramatta City Campus.
- The provision of no on-site student car parking is considered acceptable for the proposed development based on the site's proximity to public transport services.
- Analysis of car parking provisions at other tertiary educational establishments indicate that limited car parking is often provided on-site, which is consistent with the proposed development. It is however recommended that the provision of car sharing facilities be investigated on-site to reduce single-occupancy car trips.
- Based on 650 on-site university / education staff, the provision of 94 spaces means that 14.5 per cent of staff would be able to drive and park at the campus. This is consistent with the staff mode share targets indicated in Table 6. However, as outlined above, TTPP expects that more staff will drive to the school based on 2016 Census data, which indicates that 77 per cent of employees currently travel to the Bankstown area by car.
- Recent information provided by Council suggests that the car parking is being reduced from 94 to 84 car parking spaces. Based on the proposed staff levels of 650 staff on-site at any one time, this means that 13 per cent of staff could drive and park on-site. This is less than the proposed staff mode share target for car driver.
- TTPP is however of the view that the provision of limited car parking is a key measure to manage car parking and travel demand and therefore, this car parking provision is considered reasonable. It is however expected that the proposal would increase the car parking demand in the area, which is already generally near or at capacity.
- It is therefore recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement) to address this car parking shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD. This is further discussed in Section 2.8.
- Changes to car parking restrictions or arrangements, e.g. implementing time restricted paid on-street car parking and ticketed systems within public car parks, may need to be investigated to balance the needs of the community and commuter car parking. An example of this would be the existing library 4P parking restrictions, which is located directly opposite the site. Based on information provided by Council, ticketed and timed car parking restrictions are currently being implemented across the CBD.



2.7 Loading Facilities

Section 4.5 Loading and Servicing

- A loading dock is proposed within the basement to allow for one 8.8m long medium rigid vehicle/waste vehicle and two courier vans. Further clarification on the anticipated servicing demand and frequency of the proposal, including the type of service vehicles expected, is required as part of any future development application for the site to further assess the adequacy of the loading dock.
- TTPP notes that other educational facilities generally design for a 12.5m heavy rigid vehicles (such as at UTS, ACU, Meadowbank TAFE). Therefore, further clarification is required to justify the proposed loading dock provisions. However, it is not unreasonable to restrict service vehicles to an 8.8m medium rigid vehicle or smaller, subject to the provision of management measures (e.g. signage, line marking or a loading dock management plan).
- Swept path analysis undertaken by Arup indicates that an 8.8m long medium rigid vehicle will occupy the full width of the driveway to enter and exit the loading bay, see below. It is however unclear how frequent these movements are expected to occur, but reference to AS2890.2:2002 states that "the full width of the access driveway may be used for both entering and leaving the site" for the occasional service (i.e. less than once per day).



• A loading dock management plan is recommended for the proposed development to ensure all deliveries to the site are appropriately managed throughout the day. The loading dock management plan will need to include measures that specify that deliveries to the site are to be undertaken only during an allocated time slot and booked in advance with the loading dock manager. The loading dock management plan should be prepared in consultation with Council and be conditioned as part of any development approval.



- Section 4.5 indicates that a potential loading zone for two small rigid vehicles could be provided on Rickard Road by repurposing the redundant segment of the deceleration lane.
- Rickard Road is currently restricted with No Parking restrictions on the south side of the road. It is therefore expected that drop-off/pick-up activities associated with the proposed WSU Bankstown Campus may be undertaken within the existing No Parking zones on Rickard Road, which may not be desirable from a traffic capacity perspective (i.e. drop-off/pick-up activities within the kerbside lane will reduce the overall lane capacity on Rickard Road).



Existing No Parking Restrictions on Rickard Road (outside the proposed WSU Bankstown site)

- It is therefore is recommended that the existing No Parking restrictions on Rickard Road along the site frontage be removed and replaced with No Stopping restrictions so no drop off/pick up activities occur on the Rickard Road site frontage.
- The existing deceleration lane is also restricted with No Parking restrictions, which is occasionally used for drop-off/pick-up activities, as shown below.



Existing Deceleration Lane on Rickard Road – Van dropping off patrons



It is unclear how often the existing No Parking zone is used for drop-off/pick-up activities within the deceleration lane, but the provision of a loading zone for two small rigid vehicles will mean that existing drop-off/pick-up activities will not be able to continue occur along this zone. All drop offs may need to be undertaken within The Appian Way, which may not be the desired route choice for most vehicles as vehicles will need to circulate onto Jacobs Street before getting back onto Rickard Road. It is therefore recommended that all loading and unloading activities associated with the site be undertaken on-site within the loading dock.

2.8 Other Issues

- The existing WSU campus at Milperra provides student-discounted car parking, as well as car parking for staff such that existing staff and student behaviours and attitudes would likely prefer to travel by car, as opposed to using sustainable transport measures. Extensive education and consultation should be undertaken to facilitate a modal shift away from car.
- Arup notes that the WSU Bankstown Campus is expected to service around 2,000 students, 650 University / Education space staff at any one time between 8am and 10pm, allowing for varying lecture times, external meetings, sick leave and holiday leave (based on information provided in the Planning Proposal Report prepared by Urbis dated 18 December 2018, page 41). Council should therefore consider implementing a condition of consent to restrict on-site student activity to up to 2,000 students at any one time between 8am and 10pm. Any special events where more than 2,000 students are expected should be also be considered as part of the transport assessment (e.g. during Open Days).
- The following car parking provisions are currently provided (information provided by Council):
 - Civic Tower: 433 car spaces, comprising:
 - Tenants (including Council staff): 303 spaces
 - Public: 130 spaces
 - ▶ BLAKC (Library) 71 spaces
 - Surface car park (WSU site) 43 spaces
 - Appian Way:
 - Public = 26 spaces
 - Council staff = 20 spaces
- The WSU Site and Appian Way car parking spaces (89 spaces) will be removed as part of the planning proposal. Existing on-site observations indicate that the car parking demand in these areas is very high, with limited available parking capacity. Demand will increase the pressure and demand on remaining spaces.



- According to the Draft Bankstown Complete Streets Plan, "when WSU develops existing parking either to be retained on-site or relocated to another car park" (page 133). As the 89 spaces are not proposed to be retained on the site, the loss of the car parking spaces is an infrastructure deficiency. On this basis, the parking shortfall of 89 spaces is considered an infrastructure deficiency.
- It is therefore recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement) to address this car parking shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD.
- The Bankstown Central Shopping Centre is introducing timed parking restrictions (3-hour free parking and payment thereafter) on their site for some 3,200 car parking spaces. It is expected that this would result in increased car parking demand within the local road network.
- The anticipated future changes to car parking in the area are expected to reduce the overall car parking supply in the area.
- One of the key issues identified in Council's Complete Streets study is that "large amount of un-regulated and free parking encourages more driving and congestion, and all-day commuter parking doesn't benefit businesses". A key opportunity identified from this study is to use smart parking technology and introduce more time limits to cater for shoppers and visitors, rather than commuters. This is considered desirable from a sustainable transport perspective to manage car parking demand as the convenience of driving in the area is reduced (i.e. driving becomes unaffordable).

2.9 Summary of Peer Review Findings of TMAP

TTPP has undertaken an independent peer review of the transport assessment undertaken by Arup for the proposed development on behalf of Council. A number of deficiencies have been identified that would need to be addressed to enable a robust assessment to be undertaken. On this basis, the following recommendations are made:

- Travel surveys be undertaken at the existing WSU Milperra Campus to understand existing staff travel behaviours, including where staff currently live and whether they would change their mode of travel from car to public transport if the site were to be relocated near Bankstown Station. This would allow for a better benchmark to assess the mode share targets for staff.
- The traffic generation assessment should be reassessed based on the updated mode share targets based on the above travel surveys.
- The traffic model only assessed Year 2018. The traffic modelling should consider a +5 or +10-year future case scenario with and without the proposed development.
- The traffic modelling did not consider the impacts of the existing two driveways off Rickard Road. It is recommended that access to the site and The Appian Way access is included in the traffic modelling assessment.



- No queue length data has been collected to calibrate the traffic models. It is recommended that queue length data be collected during AM and PM peak periods to assess the validity of the traffic models.
- The traffic modelling assessment should consider a wider study area to assess the wider traffic implications arising from the proposed development.
- The bicycle parking spaces do not satisfy the recommended bicycle parking rates outlined in the NSW Planning for Walking and Cycling guideline. It is therefore recommended that the proposed bicycle parking be reassessed, or an area be allocated within the site to provide additional parking, if required at a future stage (e.g. an outcome from future travel surveys as part of the green travel plan).
- A green travel plan should be required as part of any development consent for the proposed development, including a requirement to undertake regular travel surveys post-occupation to monitor the mode share targets. It may be the case that any future development of the site (e.g. any enrolment capacity increases) is not to progress until the mode share targets have been met for the site.
- The provision of car sharing facilities should be investigated on-site to reduce singleoccupancy car trips.
- A loading dock management plan is required as part of any development consent for the proposed development to ensure all deliveries to the site are appropriately managed throughout the day.
- The parking restrictions on Rickard Road (i.e. existing No Parking restrictions) be reassessed to manage the overall efficiency of the traffic road network following the completion of the proposed development i.e. to ensure drop-off/pick-up activities do not occur on Rickard Road.
- The provision of limited and restricted on-site car parking for the proposal is supported and is considered desirable to manage car use. This is also considered consistent with the future strategic vision of the Bankstown area. However, on-site and off-site changes to parking facilities will be required to discourage the dispersal of parking demand off campus to the surrounding road network.



3 Stage 2 – Assessment of Planning Proposal

This section of the report summaries TTPP's Stage 2 findings in accordance with Council's project requirements.

Item 2.1 – Review the documentation submitted as part of the planning proposal application.

See above peer review comments – refer to Section 2.9.

Item 2.2 – Identify the origin of staff, students and visitors to the university campus based on current trends

The origin of staff, students and visitors to the university campus would be dependent on the education facilities and courses proposed on-site. Generally, staff and students come from an array of different locations to university campuses.

Based on travel surveys undertaken at UTS, staff and students were found to originate from all over NSW and some outside of NSW. Approximately 30 per cent of staff and students were found to travel more than an hour to campus, whereas 45 per cent of staff and students travelled between 30 and 60 minutes. The existing student and staff modal splits for car is 11 and 5 per cent respectively.

Similarly, travel surveys undertaken at the Meadowbank TAFE Campus indicate that the majority of students travel between 5 and 10km, while the majority of staff travel more than 15km. Whilst the site is located directly adjacent to the Meadowbank Station, 75 per cent of staff and 40 per cent of students travel by car.

However, Arup notes that the existing catchment of students attending the existing WSU Milperra campus live within 2 and 5km of the future campus, commuting from Bankstown, Greenacre, Punchbowl, Yagoona and Condell Park. The target modal split for staff and students at the WSU site is 15 and 5 per cent car driver respectively, which closely aligns with the existing UTS mode splits. It is however noted that the existing UTS campus is not considered the best comparison with the WSU Bankstown site at the moment as driving to the Bankstown area is considered more attractive than driving to UTS due to the current availability of car parking. Changes to the Bankstown area will be needed to achieve a similar UTS car driver percentage.

The existing UTS campus is centrally located near Central Station and therefore, is more accessible by public transport compared to the proposed Bankstown WSU campus. On this basis, it is recommended that travel surveys be undertaken at the existing WSU Milperra campus in order to obtain a benchmark to assess whether the target modal splits are reasonable for the site, particularly for staff as existing teaching facilities are proposed to be relocated to the new site.



Item 2.3 – Quantify the anticipated transport demands by all users of the university campus (i.e. staff, students, commercial tenants and visitors).

The anticipated transport demands for the proposed WSU campus are expected to depend on the following factors:

- proximity of the university to a railway station
- proximity of the university to major CBDs
- number of parking spaces provided
- availability of on-street parking within the vicinity of the university
- origin of staff and students at the university campus.

TTPP has conducted studies on universities both within close proximity of a railway station (less than 1km) and further away. The following table has been extracted from a report undertaken by TTPP for the University of Technology Sydney (UTS). UTS is located approximately 950m (walking distance) away from the closest railway station (Central Station) and provides no parking for students (although very limited spaces are reserved for students with disabilities).

Table 3.1: UTS Student and Staff Mode Share

Mode	2018 Online Questionnaire			
Mode	Staff	Students		
Car	10.5%	4.5%		
Rail	47.8%	61.6%		
Bus	22.7%	21.5%		
Walk	10.7%	10.0%		
Cycle	5.8%	1.6%		
Other	2.4% [1]	0.9%		
Total	100%	100%		

^{[1] &}quot;Other" modes for Staff includes usage of multiple transport modes incl. public transport, taxi, uber, bicycle, walking, car

The data presented in Table 3.1 indicates that public transport is the most popular travel mode with 71% of staff and 83% of students travelling to the university via public transport in 2018. Staff choose car and walking as the next popular mode of transport with 10.5% driving or carpooling and 11% walking. Comparatively, 4.5% of students travel by car and 10% walk.

It can be inferred that the proximity of the university to public transport combined with the lack of parking provided (as well as the universities proximity to the CBD) influence staff and student modal splits to the university.



The following data represents the modal splits for students at ACU (Strathfield). It should be noted that the closest railway station to the university is Strathfield Station, located approximately 2km away (about a 25-minute walk), therefore it is expected that car usage would contribute a larger proportion of trips to the university, than if it were situated closer to a railway station.

Table 3.2: ACU Modal Split

Mode	Mode Share (April 2016)	Mode Share (August 2016)
Public Transport	34.8%(*)	39.5%
Car Driver	52.6%	45.1%
Car Passenger	10.3%	13.5%
Motorbike / Scooter	0%	0%
Bicycle	0.6%	0.9%
Walk	1.7%	1.0%
Total	100%	100%

^(*) This figure includes both public transport and the ACU Shuttle Bus

As such, it can be seen from the table above that private car usage contributes approximately half of all trips to/from the university among both surveyed dates.

As the proposed Western Sydney University is situated some 450m (walking distance) from the Bankstown Railway Line with frequent services, it is expected that many students would opt to make public transport their primary mode of transportation to the university. It should also be noted that the Bankstown Line is to be upgraded to metro standards in the near future (2024), with more frequent services and shorter travel times.

A similar tertiary education facility in terms of its proximity to public transport services would be the Meadowbank TAFE site, which is located directly adjacent to the Meadowbank Station. A summary of existing mode splits for staff and students at Meadowbank TAFE is shown in Table 3.3.



Table 3.3: Meadowbank TAFE Student and Staff Mode Share

Mada	Existing Mode Splits				
Mode	Staff	Students			
Car Driver	75%	40%			
Car Passenger	1%	1%			
Dropped Off	0%	3%			
Bus*	0%	4%			
Train*	19%	42%			
Ferry	0%	1%			
Motorcycle	1%	1%			
Cycle	1%	0%			
Walk	3%	8%			
Total	100%	100%			

^{*} Trips made by 'Bus then Train' have been included in 'Train' trips. Similarly, trips made by 'Train then Bus' have been included in 'Bus' trips.

The above indicates that 75 per cent of staff and 40 per cent of students travel to the site as a car driver. This represents a very high car driver rate for staff even though the site is located directly adjacent to public transport facilities (i.e. Meadowbank Station). Comparably, 2016 Census data indicates that 43 per cent of employees in the Meadowbank-Melrose Park area travel by car. It is however noted that Meadowbank TAFE currently provides 585 car parking spaces on-site for staff and students.

Similarly, the existing Macquarie University Campus is located within 200m from Macquarie University Station. This campus is much bigger than the proposed WSU campus and caters for some 48,000 enrolled students. Nevertheless, travel surveys undertaken in 2014 indicate that 30 per cent of staff and students drive to the campus alone, as shown in Figure 3.1. This campus currently provides approximately 4,500 parking spaces on campus available to staff, students and visitors.



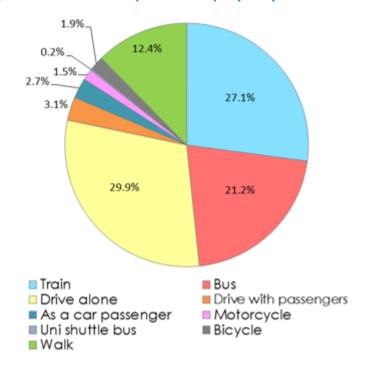


Figure 3.1: Overall Transport Mode Split (2014)

On this basis, a car driver mode target of 15 per cent is considered a bit low for staff when compared to the other universities and TAFE sites and the existing high car usage in the Bankstown area based on existing 2016 Census data.

It is noted that a modal shift of between 3 and 5 per cent is typically considered to be a significant achievement (based on knowledge of local and internal GTPs, and as stated by experts in Land Environment Court proceedings). However, noting the public transport and pedestrian/cycle improvements in the Bankstown area, it is anticipated that a greater modal shift can be achieved in the coming years.

Further, based on the limited car parking availability in the area, it is not expected that students will be able to park within the vicinity of the proposed WSU Bankstown site such that students would ultimately be discouraged from driving to the site and therefore choose more sustainable modes of travel to/from the site, such as public transport.



Item 2.4 – Quantify the anticipated off–street parking demands by all users of the university campus.

Based on the mode share targets of the site, it is expected that 15 per cent of staff and 5 per cent of students would travel to the site as a car driver. Assuming there will be 600 staff and 2,000 students on-site at any one time (based on information provided in Arup's report), this would equate to a car parking demand of 90 staff and 100 student car parking spaces (i.e. a total of 190 car parking spaces). This does not include the car parking demand generated by any visitors at the site

Generally, most universities provide a level of visitor car parking, which are managed by the university campus through a booking system. It may be the case that the planning proposal consider the provision of some visitor car parking spaces (e.g. 1-2 spaces).

Section 5.9.2 suggests that the student car parking demand of 100 spaces would be accommodated in the Bankstown CBD. It is however noted that the existing car parking demand in the area is already very high, with limited spare parking capacity available throughout the day. In addition to this, all parking spaces are generally restricted, and 89 spaces would be removed due to the planning proposal (i.e. WSU site and The Appian Way).

It is therefore important to promote sustainable transport and provide high quality pedestrian and bicycle cycleways and public transport connections to discourage car use to/from the site. Council's Complete Streets project is expected to improve existing pedestrian and cycleways in the Bankstown area. It is therefore recommended that the Applicant consider entering an agreement with Council to contribute to the proposed off-site works, as part of Council's Complete Streets projects, to ensure a well-established network is created to/from the proposed WSU Bankstown Campus.

A comprehensive green travel plan should also be prepared and submitted to Council to outline the proposed measures to manage car parking and encourage sustainable transport to/from the site, as opposed to car use.

Item 2.5 – Identify examples of university campuses' parking provisions near railway stations (national) which may assist to guide Council's assessment of the application.

A summary of some university parking provisions is provided in Table 3.4.

Table 3.4: University Parking Provision Examples

University	Closest Railway Station	Distance from Railway Station	Parking Provisions (Students)	Parking Provisions (Staff)	Number of Students enrolled at Campus
University of Newcastle – Sydney Campus	Martin Place Station	85m	0	Not specified	939
Western Sydney University – Sydney Campus	Museum Station	120m	Not specified but limited parking	Not specified, staff required to contact	-



University	Closest Railway Station	Distance from Railway Station	Parking Provisions (Students)	Parking Provisions (Staff)	Number of Students enrolled at Campus
				University to organise parking arrangements	
WSU – Sydney Olympic Park Campus	Sydney Olympic Park	150m	0	Not specified, staff required to contact University to organise parking arrangements	-
Macquarie University	Macquarie University Station (Metro)	200m	4,500 for staff,	students and visitors	48,000
University of Wollongong – South Western Sydney Campus	Liverpool Station	290m	Not specified but very likely to be 0	Not specified	-
Southern Cross University – Sydney Campus	Central Station	<400m	0	Not specified	-
University of New England – Parramatta Campus	Parramatta Station	400m	Not specified but very likely to be 0	Not Specified	-
University of Western Sydney – Parramatta, 169 Macquarie Street Campus	Parramatta Station	<550m	0	80, staff required to contact University to organise parking arrangements	-
University of Sydney	Redfern Station	700m	~2,380, includes students, staff, visitors and service vehicle spaces		-
Australian Catholic University – North Sydney Campus	North Sydney Station	700m	0 but very limited facilities provided for students with disabilities	Not specified but very limited	-
Western Sydney University – Liverpool Campus	Liverpool Station	700m	58	Not specified, staff required to contact University to organise parking arrangements	-
University of Wollongong – Southern Sydney Campus	Loftus Station	700m	Hundreds of spaces but number not specified	Not specified	-
University of Newcastle	Warabrook Station	750m	Thousands of spaces, with free parking as well	Not specified but plentiful	26,652
University of Western Sydney – Parramatta South Campus	Rydalmere Station	<850m	~800	-	-
University of Technology Sydney	Central Station	900m	0 but very limited facilities for students with disabilities	Not specified but very limited	39,074



University	Closest Railway Station	Distance from Railway Station	Parking Provisions (Students)	Parking Provisions (Staff)	Number of Students enrolled at Campus
Western Sydney University – Bankstown Campus (Proposed)	Bankstown Station	450m	0	~90	Expected to be around 10,000

Based on the above, it is clear that the most universities do not provide any on-site car parking for students, particularly those located within close proximity to public transport services. The exception to this is at Macquarie University, which is located within close proximity to Macquarie University Station and provides some 4,500 car parking spaces.

On this basis, TTPP considers the provision of no on-site car parking for students acceptable, particularly based on the site's proximity to public transport services.

Arup's mode share targets for staff and students at the site are outlined in Table 3.5.

Table 3.5: Arup Mode Share Targets

Mode	University / Education Staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl. drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	100%	100%

Arup's report notes that there would be up to 650 staff on-site at any one time. On this basis, a total of 98 car parking spaces would be required to satisfy the 15 per cent car driver mode share target of the site. It is also recommended that an additional 1-2 car parking spaces be provided for visitor use (99-100 spaces in total).

TTPP understands that 84 car parking spaces are currently proposed on the site (reduced from 94 spaces). This represents a shortfall of 14 staff car parking spaces. In recognition of this, TTPP recommends that car share spaces be provided in lieu of staff car parking spaces to encourage carpooling and car share to/from the site. It is expected that one car share could be provided in lieu of say three to 12 car parking spaces.

However, it is expected that these car share facilities would be shared with the public, which may not be desirable from a security perspective for the site. On this basis, the Proponent could also consider installing off-site car share locations, subject to consultation with Council and relevant car share operations (e.g. GoGet).



Notwithstanding this, to address the parking shortfall, it is recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement). This would enable Council to use the funds to construct public car spaces within the Bankstown CBD. This option would address the parking shortfalls on-site, rather than the option to provide car share facilities on-site, which may not be desirable for the reasons explained above.



4 Stage 3 – Preliminary Findings

This section of the report summaries TTPP's Stage 3 findings in accordance with Council's project requirements.

Item 3.1 Prepare a set of principles to guide the transport and parking requirements, taking into consideration the Region and District Plans' actions to transform the Bankstown CBD into a strategic centre / health and education precinct.

A summary actions/aims of key policy framework documents and how the site is aligned with these aims is provided in Table 4.1.

Table 4.1: Summary of Key Policy Direction

Key Aims/Objectives/Goals The Planning Proposal Greater Sydney Region Plan The key premise of the Greater Sydney Region Plan is to The planning proposal is considered consistent with the establish three cities where most residents live within 30 Greater Sydney Region Plan by introducing minutes of their jobs, education and health facilities, educational facilities (i.e. the WSU Bankstown university services and great places. campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, Bankstown forms part of the Eastern Harbour City (with including the future Sydney Metro between Sydenham some parts of Bankstown located within the Central and Bankstown. River City). The Eastern Harbour City has significant rail projects underway to increase its global competitiveness, boost business-to-business connections and attract skilled workers with faster commuting times. The Harbour CBD will extend its capabilities with an emerging Innovation Corridor on its western edge comprising universities, a major teaching hospital, international innovation companies and fast-growing start-ups. Key directions for the area include: Infrastructure and collaboration – further collaboration to address planning complexities and identify ways to support growth at the Australian Nuclear Science and Technology Organisation innovation precinct and the Bankstown Airport and Milperra industrial area. Liveability – growth in the area will bring urban renewal with increased infrastructure and services, open spaces and public spaces. Sympathetic infill development will focus on improved local connections. **Productivity** – investments in transport and services, job growth and business activity to support innovation and global competitiveness. Sustainability – improve access to foreshores, waterways and the coasts for recreational, tourism, cultural events and water-based South District Plan The South District Plan is part of the Eastern Harbour The planning proposal is considered consistent with the City. Its vision will be achieved by: South District Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the



	Kara Alma (Ohlandhan (Onda	The Blooming Boom and
_	Key Aims/Objectives/Goals	The Planning Proposal
•	Supporting the growth of the ANSTO innovation precinct, health and education precincts, Bankstown Airport-Milperra industrial area and the District's strategic centres	Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
•	Retaining industrial and urban services land and freight routes	
•	Optimising on the District's locational advantage of being close to Sydney Airport, Port Botany, the Illawarra and Port Kembla	
•	Building on the District's connections to Parramatta, and in the longer term to Liverpool and Western Sydney Airport	
•	Sustaining vibrant public places, walking and cycling, and cultural, artistic and tourism assets	
•	Matching growth and infrastructure, including social infrastructure	
•	Protecting and enhancing natural assets including waterways and beaches, bushland and scenic and cultural landscapes	
•	Providing innovation in providing recreational and open spaces, and increased urban tree canopy	
•	Transitioning to a low-carbon, high efficiency District through precinct-scale initiatives.	
Some k	ey relevant action plans are outlined below.	
Action 6. Maximise the utility of existing infrastructure assets and consider strategies to influence behaviour changes to reduce the demand for new infrastructure, including supporting the development of adaptive and flexible regulations to allow decentralised utilities.		The planning proposal site benefits from its proximity to good public transport services and a well-established pedestrian network. On this basis, it is recommended that a Green Travel Plan be prepared and submitted to Council to outline proposed measures to manage car parking and influence travel behaviours by encouraging sustainable transport to/from the site.
Action 10b. Deliver healthy, safe and inclusive places for people of all ages and abilities that support active, resilient and socially connected communities by prioritising opportunities for people to walk, cycle and use public transport.		The planning proposal delivers healthy, safe and inclusive places for staff and students at the proposed WSU campus.
		The planning proposal site is centrally located within the Bankstown CBD area, surrounded by good library and park facilities and public transport services.
Action 19a, b & d. In Collaboration Areas, Planned Precincts and planning for centres, investigate opportunities for precinct-based provision of adaptable car parking and infrastructure in lieu of private provision of car parking, ensure parking availability takes into account the level of access by public transport and incorporate facilities to encourage the use of carsharing, electric and hybrid vehicles including car charging stations.		It is recommended that a Green Travel Plan be prepared and submitted to Council to outline proposed measures to manage car parking and influence travel behaviours by encouraging sustainable transport to/from the site, including to encourage the use of car-sharing, electric and hybrid vehicles.
Action 50a. Prioritise infrastructure investments, particularly those focused on access to the transport network, which enhance walkability within two kilometres of a metropolitan or strategic centre or 10 minutes walking distance of a local centre.		The planning proposal site benefits from its proximity to good public transport services and a well-established pedestrian network.
		The planning proposal is considered consistent with the South District Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.



Key Aims/Objectives/Goals	The Planning Proposal
Prioritising parking spaces for car sharing and carpooling can support more efficient use of road space and help reduce emissions.	It is recommended that a Green Travel Plan be prepared and submitted to Council to outline proposed measures to manage car parking and influence travel behaviours by encouraging sustainable transport to/from the site, including to maximise car sharing and carpooling to the site.
Bankstown CBD Local Area Plan	
The Local Area Plan sets out the vision for the Bankstown CBD to ensure adequate land, infrastructure, facilities and open space are available. The site is located within the Northern CBD Core. This precinct is highlight accessible to the railway station and bus interchange. The Plan outlines that the Bankstown CBD will require more dwellings, jobs and infrastructure to meet the needs of the growing Bankstown population.	The planning proposal is considered consistent with the Bankstown CBD Local Area Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
Bankstown Complete Streets	
Connect regional links, provide additional end of trip facilities at the new Metro station as well as the future Western Sydney University students.	The planning proposal is considered consistent with the Bankstown Complete Streets by introducing educational facilities (i.e. the WSU Bankstown campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
Use Smart Parking technology to use existing parking spaces more efficiently and introduce time limits to cater for shoppers and visitors rather than commuters.	The proposed changes to parking in the Bankstown CBD area are expected to influence future travel behaviours to/from the area by making parking less attractive and more costly for commuter trips, including staff and students from the proposed WSU Bankstown campus.

In summary, the following sets of principles to guide the transport and parking requirements of the planning proposal should be adopted:

- minimising the provision of car parking to promote more sustainable modes of transport;
 this would also be expected to reduce the anticipated traffic being generated by the site
- improving pedestrian and cycle links to/from the site, as well as connections within the site, should be considered to maximise walking and cycle trips
- providing a green travel plan to outline travel demand management strategies to manage car use and reduce car trips to/from the site, particularly single-occupancy trips, and to maximise car sharing and carpooling to the site
- participating and contributing in local area plans to ensure offsite works and/or measures assist achieve the proposed mode share targets for the site, such as the provision of time restricted on-street car parking and future pedestrian and cycle network improvements within the immediate vicinity of the site.



Item 3.2 Based on the principles, summarise the preliminary findings in relation to:

a) Quantify the impacts the anticipated demands will have on existing infrastructure including (but not limited to) the adequacy and capacity of the existing local road, public transport, cycle and footpath networks within the vicinity of the site. Council recently completed traffic modelling as part of the Bankstown Complete Streets project.

Local Road

Vehicle access to the site will be restricted to left in and left out via the existing driveway on Rickard Road. Rickard Road provides good connectivity to the wider road network, with good access to Stacey Street and Hume Highway.

The existing and proposed future local road network is shown in Figure 4.1 and Figure 4.2 respectively.

MASTER PLAN

EXISTING

| High Traffic Volume | Neighbourhood Street | Shared Zone | Pedestrian Only | Transil Street (Bus Only) | Memoral Street (Bus Only) | Memoral Street (Bus Only) | Memoral Street (Bus Only) | Public Parking Station |
| Neigh Porting Station | Neighbourhood Street | Neighbourh

Figure 4.1: Existing Road Network

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Existing (Page 108)



PROPOSED

Ring Road

Neighbourhood Street

Shared Zone

Ring Boad

Neighbourhood Street

Shared Zone

Ring Road

Neighbourhood Street

Ring Road

Ri

Figure 4.2: Future Proposed Road Network

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Proposed (Page 109)

The proposed traffic network changes are shown in Figure 4.3. In addition to this, new signal upgrades are proposed at the Rickard Road-Chapel Street and Rickard Road-Jacobs Street signalised intersections as part of the Bankstown Complete Street projects to support Ring Road and bus movements.



Figure 4.3: Proposed Traffic Network Changes



Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Traffic Network Changes (Page 129)

As indicated in Section 2.9, additional traffic analysis will need to be undertaken to enable a robust assessment to be undertaken. This additional traffic analysis will need to be undertaken prior to determine whether the existing and proposed future local road network is acceptable to serve the proposal.

<u>Public Transport</u>

Bankstown is well connected to its neighbouring suburbs by frequent bus services. The following bus services run between and/or through Greenacre, Punchbowl, Yagoona, Condell Park and Bankstown via Padstow, Revesby and Panania (which are the anticipated catchment areas for students):

- 905 Fairfield to Bankstown
- 907 Parramatta to Bankstown
- 925 East Hills to Lidcombe via Bankstown
- 939 Greenacre to Bankstown
- 940 Hurstville to Bankstown via Riverwood
- 941 Hurstville to Bankstown via Greenacre
- 944 Mortdale to Bankstown via Peakhurst Heights



- 945 Mortdale to Bankstown via Hurstville
- 946 Roselands to Bankstown via Lakemba & Greenacre
- M90 Liverpool to Burwood (most common bus service used to commute to the existing WSU Milperra campus, also runs through the Bankstown Interchange).

Future metro services will operate ever four minutes during peak periods, with each metro train having a capacity for 1,100 passengers. In addition to this, train services will continue to operate regularly during peak times between Lidcombe and Liverpool.

On this basis, existing and future public transport is considered acceptable to serve the proposal.

The future public transport network is shown in Figure 4.4.

Relocated bus stop and layover **Future Public Transport Network** Rickard Rd Potential new bus station Bankstown Central North-South Connecting Bus Morth Terrace

South Terrace I Northern Bus Services Southern Bus Services Other Bus Services +++(T) 444444 Relocated ■ ■ Eliminated Bus Routing bus lavover Relocated Lavover Space Existing Open Space enfield Pde Maintained bus stop MHH H++(T) Primary School 8 not to scale Bus Only

Figure 4.4: Future Proposed Public Transport Network

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Public Transport Network (Page 125)

Cycle and Footpath Networks

The existing pedestrian network is exceptional within the immediate vicinity of the site and provides good pedestrian connectivity to/from key attractions in the area (e.g. Bankstown Station and Bankstown Central). Students walking to Bankstown Central will however need to travel to the centre via the car park.



As part of the Bankstown Complete Streets project, The Appian Way is proposed to be transformed with new pedestrian and cyclist links between the proposed WSU Bankstown campus and railway station.

The existing and proposed future pedestrian network is shown in Figure 4.5 and Figure 4.6 respectively,

WALKING NETWORK Heath St Carmen St Space (CBD) Footpaths: 6.33 Ha Laneways/Arcades 0.10 Ha Beinkstewn Pedestrian Study Area Transport Study Area Important Regional Link Primary Walking Nodes Highest Walking Volumes Arcades/Internal Links Pedestrian Laneways Future Links Green Links not to scale R

Figure 4.5: Existing Walking Network

Source: Council Draft Complete Streets Appendix A Transport and Place Analysis dated June 2018, Walking Network (Page 53)



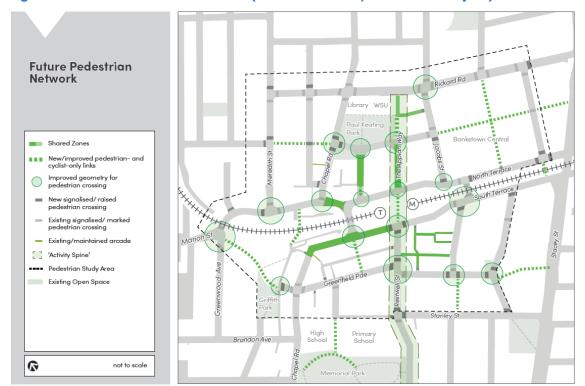


Figure 4.6: Future Pedestrian Network (Bankstown Complete Streets Project)

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Pedestrian Network (Page 111)

Similarly, new cycle links are proposed as part of the Bankstown Complete Streets project to connect missing cycle links in the regional system to facilitate green grid connections through the Bankstown CBD, including good cycle connections to/from the proposed WSU Bankstown campus. The future cycle network is shown in Figure 4.7.



Future Bike
Network

Regional Link
to Parramenta

Regional Link
to Parramenta

Regional Link
to Base Hill

Regional Link
to Parramenta

Regional Link
to Surface

Regional Link
to S

Figure 4.7: Future Cycle Network (Bankstown Complete Streets Project)

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Bike Network (Page 121)

TTPP is of the view that the proposed future local pedestrian and cycle network within the immediate vicinity of the site is acceptable to adequately serve the proposal, subject to the proposed off-site works to promote sustainable transport and provide high quality pedestrian and bicycle cycleways and public transport connections.

<u>Anticipated Future Demand</u>

The Arup study provides the following mode share targets, outlined in Table 4.2.

Table 4.2: Arup Mode Share Targets

Mode	University / Education Staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl. drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	100%	100%



The above mode share targets may be reasonable as a long-term mode share target for the site. It is expected that staff modes by car would initially be higher than the mode share target based upon existing travel behaviour in the local area from Census data. However, it is not unreasonable to expect a mode shift away from car following the completion of future public transport and network upgrades in the area (i.e. Sydney Metro and Bankstown Complete Streets projects).

On this basis, based on the future mode share targets of the planning proposal, the anticipated demand on the surrounding network generated by the proposal is shown in Table 4.3.

Table 4.3: Anticipated Total Demand on Network

Mode	University / Education Staff (650)	Students (2,000)	Total
Walk	65	300	365
Cycle	32	100	132
Car Driver	97	100	197
Car Passenger (incl. drop- off)	20	100	120
Bus	195	660	855
Train/Metro	208	640	848
Other	33	100	133
Total	650	2,000	2,650

The above anticipated demand on the network would generally be distributed throughout the day, with the majority of staff trips occurring during typical AM (8am-9am) and PM (5pm-6pm) peak periods.

Analysis undertaken by Arup indicates that no bus capacity issues were noted in the AM peak period, with most services having 'many seats available'. During the PM peak, only the M91 service (towards Parramatta) had 'standing room only', with all other services having 'many seats' or 'few seats' available. In recognition of this and the anticipated additional public transport services following the completion of the Sydney Metro, TTPP expects that the planning proposal could be appropriately accommodated in the surrounding road network, subject to the additional traffic analysis outlined in Section 2.9.

Bankstown Complete Streets project – traffic modelling

b) Identify supporting traffic, transport and public domain infrastructure improvements, which the proposal may need to provide to manage the likely effects of the proposal. Public domain improvements must align with the Bankstown Complete Streets project.

The proposed public domain improvements suggested in the Bankstown Complete Streets project will provide improved connectivity to/from the proposed WSU Bankstown campus.



c) Identification of any other transport or parking issues which may assist Council's assessment of the planning proposal application

One of the key issues with the planning proposal would be the management of car parking, particularly as limited staff car parking and no student car parking will be provided on-site. On this basis, TTPP recommends the provision of a green travel plan.



5 Conclusion

TTPP has undertaken an independent peer review of the transport assessment undertaken by Arup for the proposed development on behalf of Council.

Stage 2 and Peer Review Findings

A number of deficiencies of the TMAP have been identified that would need to be addressed to enable a robust assessment to be undertaken. On this basis, the following recommendations are made:

- Travel surveys be undertaken at the existing WSU Milperra Campus to understand existing staff travel behaviours, including where staff currently live and whether they would change their mode of travel from car to public transport if the site were to be relocated near Bankstown Station. This would allow for a better benchmark to assess the mode share targets for staff.
- The traffic generation assessment should be reassessed based on the updated mode share targets based on the above travel surveys.
- The traffic model only assessed Year 2018. The traffic modelling should consider a +5 or +10-year future case scenario with and without the proposed development.
- The traffic modelling did not consider the impacts of the existing two driveways off Rickard Road. It is recommended that access to the site and The Appian Way access is included in the traffic modelling assessment.
- No queue length data has been collected to calibrate the traffic models. It is recommended that queue length data be collected during AM and PM peak periods to assess the validity of the traffic models.
- The traffic modelling assessment should consider a wider study area to assess the wider traffic implications arising from the proposed development.
- The bicycle parking spaces do not satisfy the recommended bicycle parking rates outlined in the NSW Planning for Walking and Cycling guideline. It is therefore recommended that the proposed bicycle parking be reassessed, or an area be allocated within the site to provide additional parking.
- A green travel plan should be required as part of any development consent for the proposed development, including a requirement to undertake regular travel surveys post-occupation to monitor the mode share targets. It may be the case that any future development of the site (e.g. any enrolment capacity increases) is not to progress until the mode share targets have been met for the site.
- The provision of car sharing facilities should be investigated on-site to reduce singleoccupancy car trips.



- A loading dock management plan is required as part of any development consent for the proposed development to ensure all deliveries to the site are appropriately managed throughout the day.
- The parking restrictions on Rickard Road (i.e. existing No Parking restrictions) be reassessed to manage the overall efficiency of the traffic road network following the completion of the proposed development – i.e. to ensure drop-off/pick-up activities do not occur on Rickard Road during peak periods.
- The provision of limited and restricted on-site car parking for the proposal is supported and is considered desirable to manage car use. This is also considered consistent with the future strategic vision of the Bankstown area. However, on-site and off-site changes to parking facilities will be required to discourage the dispersal of parking demand off campus to the surrounding road network.

Stage 2 Summary

Arup's mode share targets for staff and students at the site are outlined in Table 5.1.

Table 5.1: Arup Mode Share Targets

Mode	University / Education Staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl. drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	100%	100%

Arup's report notes that there would be up to 650 staff on-site at any one time. On this basis, a total of 98 car parking spaces would be required to satisfy the 15 per cent car driver mode share target of the site. It is also recommended that an additional 1-2 car parking spaces be provided for visitor use (99-100 spaces in total).

TTPP understands that 84 car parking spaces are currently proposed on the site (reduced from 94 spaces). This represents a shortfall of 14 staff car parking spaces. In recognition of this, TTPP recommends that car share spaces be provided in lieu of staff car parking spaces to encourage carpooling and car share to/from the site. It is expected that one car share could be provided in lieu of say three to 12 car parking spaces.

However, it is expected that these car share facilities would be shared with the public, which may not be desirable from a security perspective for the site. On this basis, the Proponent could also consider installing off-site car share locations, subject to consultation with Council and relevant car share operations (e.g. GoGet).



Stage 3 Summary

The planning proposal is considered consistent with the strategic direction of the area by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.

However, the following sets of principles to guide the transport and parking requirements of the planning proposal should be adopted:

- minimising the provision of car parking to promote more sustainable modes of transport;
 this would also be expected to reduce the anticipated traffic being generated by the site
- improving pedestrian and cycle links to/from the site, as well as connections within the site, should be considered to maximise walking and cycle trips
- providing a green travel plan to outline travel demand management strategies to manage car use and reduce car trips to/from the site, particularly single-occupancy trips, and to maximise car sharing and carpooling to the site
- participating and contributing in local area plans to ensure offsite works and/or measures assist achieve the proposed mode share targets for the site, such as the provision of time restricted on-street car parking and future pedestrian and cycle network improvements within the immediate vicinity of the site.

Recommended Off-Site Works

A summary of the recommended off-site works is as follows:

- According to the Draft Bankstown Complete Streets Plan, "when WSU develops existing parking either to be retained on-site or relocated to another car park" (page 133). As the 89 spaces are not proposed to be retained on the site, the loss of the car parking spaces is an infrastructure deficiency. It is therefore recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement) to address this car parking shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD.
- It is important to promote sustainable transport and provide high quality pedestrian and bicycle cycleways and public transport connections to discourage car use to/from the site. It is therefore recommended that the Applicant consider entering an agreement with Council to contribute to the proposed off-site works, as part of Council's Complete Streets projects, to ensure a well-established network is created to/from the proposed WSU Bankstown Campus.

The Transport Planning Partnership Suite 402 Level 4, 22 Atchison Street St Leonards NSW 2065

> P.O. Box 237 St Leonards NSW 1590

> > 02 8437 7800

info@ttpp.net.au

www.ttpp.net.au



DETAILED ACTION PLAN





destinations



Safe & Strong

A proud inclusive community that unites, celebrates and cares

Safe & Strong documents are guided by the Social Inclusion Lead Strategy. Supporting Plans, Action Plans and Policies cover such themes as being a child friendly City, children's services, community safety and crime prevention, inclusiveness, community services, universal access, reconciliation, ageing, community harmony and youth.



Clean & Green

A clean and sustainable city with healthy waterways and natural areas

Clean & Green documents are guided by the Environmental Sustainability Lead Strategy. Supporting Plans, Action Plans and Policies cover such themes as managing our catchments and waterways, natural resources, hazards and risks, emergency management, biodiversity and corporate sustainability.



Prosperous & Innovative

A smart and evolving city with exciting opportunities for investment and creativity

Prosperous & Innovative documents are guided by the Prosperity and Innovation Lead Strategy. Supporting Plans, Action Plans and Policies cover such themes as revitalising our centres, employment, investment, being SMART and creative, and providing opportunities for cultural and economic growth.



Moving & Integrated

An accessible city with great local destinations and many options to get there

Moving & Integrated documents are guided by the Transport Lead Strategy. Supporting Plans, Action Plans and Policies cover such themes as accessibility, pedestrian and cycling networks, pedestrian and road safety, transport hubs, and asset management.



Healthy & Active

A motivated city that nurtures healthy minds and bodies

Healthy & Active documents are guided by the Health and Recreation Lead Strategy. Supporting Plans, Action Plans and Policies cover such themes lifelong learning, active and healthy lifestyles, and providing quality sport and recreation infrastructure.



Liveable & Distinctive

A well designed, attractive city which preserves the identity and character of local villages

Liveable & Distinctive documents are guided by the Liveable City Lead Strategy. Supporting Plans, Action Plans and Policies cover such themes as preserving the character and personality of centres, heritage, affordable housing, and well managed development.



Leading & Engaged

A well- governed city with brave and future focused leaders who listen

Leading & Engaged documents are guided by Council's Lead Resourcing Strategies. Supporting Plans, Action Plans and Policies cover such themes as open government, managing assets, improving services, long term funding, operational excellence, monitoring performance, being a good employer, civic leadership, and engaging, educating and communicating with our community.

Strategic Planning Framework Summary

The Strategic Planning Framework (SPF) maps out the role of all current and future Council strategies and plans that work to deliver the vision for the City. The framework works from the highest level of strategic direction in the Community Strategic Plan through to more detailed plans that will eventually drive works projects and programs on the ground. The framework is comprised of the following levels:

The **COMMUNITY STRATEGIC PLAN (CSP)** is our highest level plan and translates the community's desired outcomes for the city into key destinations. The CSP includes community suggested actions which can be tested in the development of all other plans.

LEAD STRATEGIES are Council's response to the CSP and provide high level strategic direction on key challenges facing the City. They are informed by a sound evidence base that considers key trends and an understanding of the implications of key issues and opportunities on the City. SUPPORTING PLANS break down broad theme areas discussed in LEAD STRATEGIES into smaller themes providing high level actions.

SUPPORTING PLANS identify broad works projects and programs required to deliver on these actions. Supporting plans include indicative costing and resourcing requirements and delivery timeframes.

DETAILED ACTION PLANS take actions from SUPPORTING PLANS and identify specific works projects and programs required to deliver on these actions. Detailed action plans include detailed costing and resourcing requirements and delivery timeframes.

GUIDELINES, POLICIES AND CODES provide detailed information, rules for activities or guidance for specific works on Council or other lands.

Good cities know that streets move people, not just cars. Great cities know that streets are also places to linger and enjoy.

- Brent Todarian, noted urbanist, former Vancouver Chief Planner

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Appendices

- A. Transport and Place Analysis
- B. Workshop Summaries
- C. Traffic Modelling
- D. Cost Estimates



INTRODUCTION





01

PURPOSE OF THIS PROJECT

An integrated transport and streetscape plan

Over the coming 20 years, Bankstown is planned to more than double the amount of jobs, students and residents. A new high frequency Metro, a new Western Sydney University campus and new hospital are planned. To support this transformation, Council needs an integrated transport and streetscape plan to ensure the city centre is both an accessible and appealing destination.

People and Place

The Bankstown Complete Streets Project is consistent with strategic documents at the national, state and local level. These documents acknowledge the function of streets as places, establish objectives for well-designed centres, and promote a balanced transport system which prioritises active travel.



- UN Habitat III The New Urban Agenda (2017)
- UN The 2030
 Agenda for
 Sustainable
 Development (2015)



- Places for People An Urban Protocol for Australian Cities (2011)
- Smart Cities Plan
 (2016)
- Road Safety
 Strategy 2011–2020







- A Metropolis of Three Cities – Greater Sydney Region Plan (2017)
- South District Plan (2018)

Bankstown Complete Streets







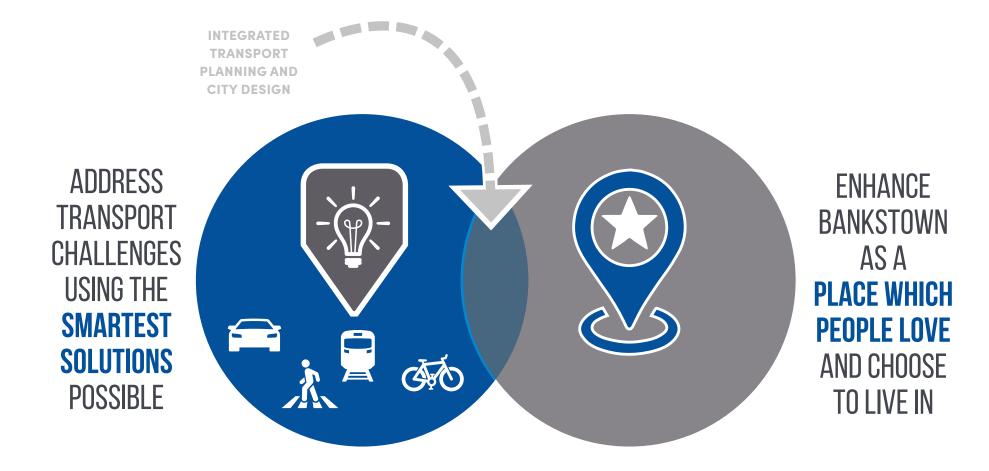
- CBCity 2028 Community Strategic Plan (2018) and seven key directions:
 - Safe & Strong
 - Clean & Green
 - Prosperous & Innovative
 - Moving & Integrated
 - Healthy & Active
 - Liveable & Distinctive
 - Leading & Engaged

- CBCity Transport Strategy (prepared through 2019)
- Bankstown
 Complete Streets

A holistic approach is required

Council requires a holistic city design and transport framework to provide the vision, strategies and concepts for movement systems in the Bankstown CBD. This will ensure that as the CBD develops, priority is given towards a more liveable, safer and more attractive public domain that supports all modes of transport. The Bankstown Complete Streets Project provides this vision, supported by a Master Plan with street typologies and concept designs to improve pedestrian safety and amenity.

01 WHAT IS COMPLETE STREETS



Bankstown Complete Streets

SLOWER, SAFER STREETS



SAFER FOR PEDESTRIANS, CYCLISTS AND MOTORISTS

BETTER FOR BUSINESS



MORE PEDESTRIAN ACTIVITY AND IMPROVED CITY IMAGE BENEFITS BUSINESSES

BETTER ACCESS



BETTER ACCESS AND WAYFINDING TO KEY
DESTINATIONS AND PARKING

GREENER



MORE TREES AND SHADE, COOLER STREETS, REDUCED CARBON EMISSIONS

MORE ATTRACTIVE



HIGH QUALITY FOOTPATHS, FURNITURE AND LANDSCAPING THROUGHOUT THE CBD

HEALTHIER

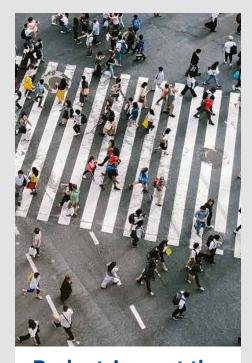


MORE ACTIVE TRANSPORT, REDUCED OBESITY, IMPROVED MENTAL HEALTH

O1 KEY RECOMMENDATIONS

Bankstown CBD is a desirable destination to live, work and visit, famous for its cultural diversity and walkable streets bustling with life. Whether by foot, bike, bus, train or car it is easy to get into and around the city centre safely and conveniently. Bankstown is a leader in smart design and is a celebrated example of town centre transformation that has retained its distinctive qualities.





Pedestrians at the top of transport hierarchy followed by cyclists and

public transport

Improved streetscapes

slower, safer, greener for a more attractive destination city









Key activity zones

key streets prioritise activity over traffic

Improved bus service

simpler bus routes and a new better integrated bus station







Ring road convenient access to the

CBD edges

Smart parking not more

technology to use our infrastructure more effectively







REPORT STRUCTURE

WHERE BANKSTOWN IS NOW

WHERE BANKSTOWN WANTS TO BE BY 2036

CRITERIA TO **GUIDE CHANGE**

STRATEGIES FOR **GETTING THERE**

ANALYSIS

ISSUES+OPPORTUNITIES REPORT

VISIONING BOOKLET

TRAFFIC + TRANSPORT **MODEL REPORT**

VISION

A DESIRABLE DESTINATION TO LIVE, WORK AND VISIT, FAMOUS FOR ITS CULTURAL DIVERSITY **AND WALKABLE STREETS BUSTLING WITH LIFE.**



PRINCIPLES

























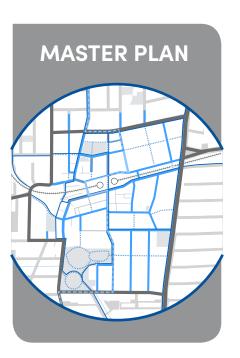


STRATEGIES

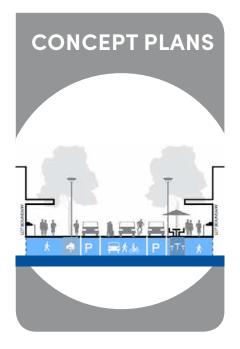
- **RING ROAD**
- PARKING RELOCATION
- **SMART TECHNOLOGY**
- TRANSIT INTERCHANGE
- **SLOW SPEED**
- STREET AMENITY
- STREET ACTIVITY
- **CONNECTED CYCLING**
- **CULTURAL TRAIL**
- ACTIVITY SPINE



THE FUTURE STREET NETWORK



DETAILED STREET DESIGNS



A PLAN TO IMPLEMENT COMPLETE STREETS



It is now generally accepted that city life and regard for people in city space must have a key role in the planning of cities.

- Jan Gehl, Cities for People



STRATEGIC CONTEXT





02 **WELCOME TO BANKSTOWN**

Thriving, dynamic and real

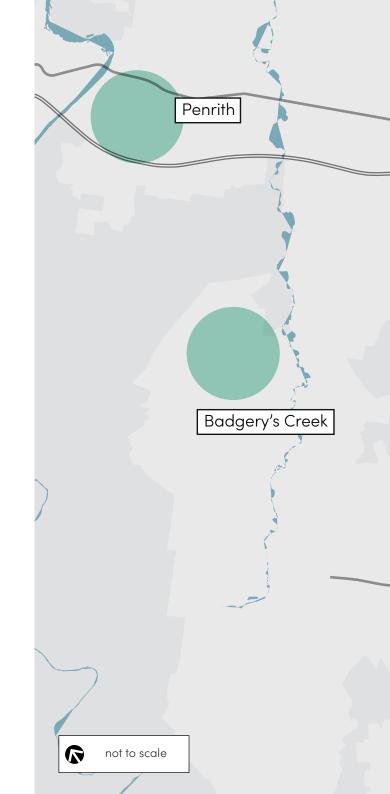
Bankstown began as a colonial farming community, with a population of just 20,000 people in 1920. Over time the city has emerged as a vibrant centre for commerce and exchange, and is now home to more than 360,000 people.

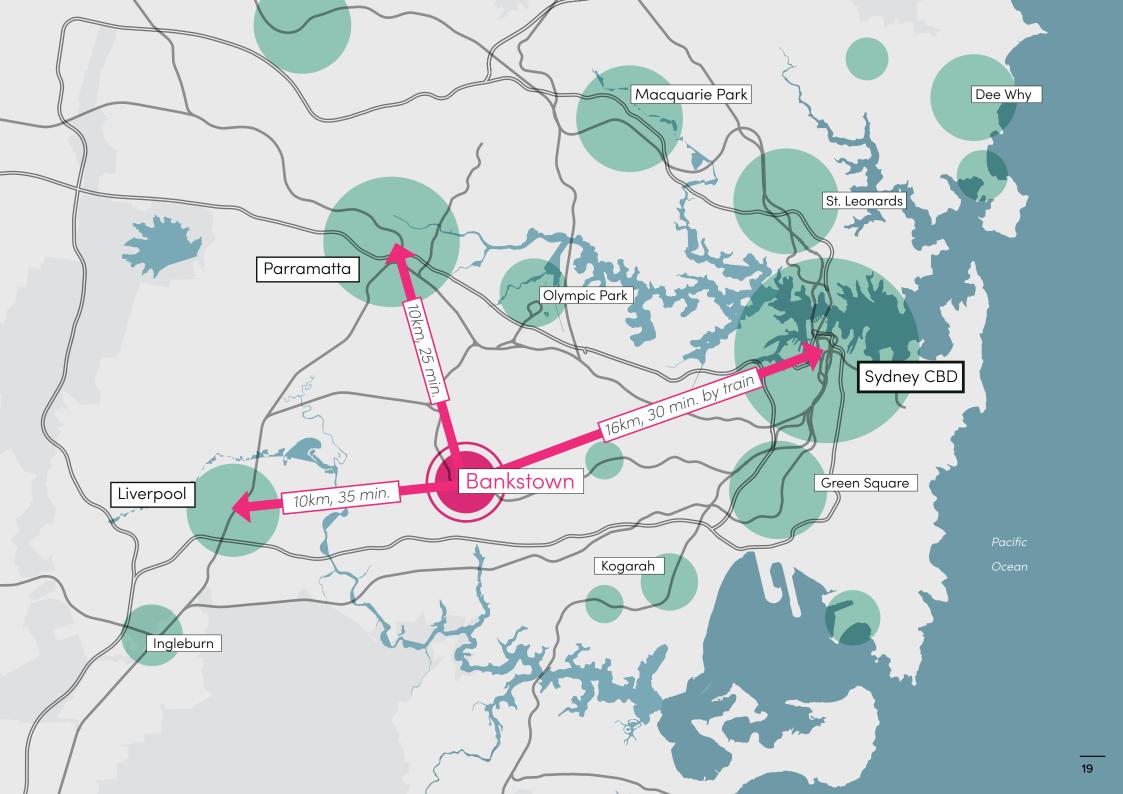
Bankstown is recognised as a Strategic Centre and Health and Education Precinct in the Greater Sydney Region Plan. It is also set to grow as recognised in the Sydenham to Bankstown Urban Renewal Corridor Strategy, catalysed by the new Sydney Metro South West line.

Bankstown Railway Interchange forms the heart of the CBD, and is one of Sydney's busiest stations with around 18,000 trips made through the station everyday. Local and regional bus routes, taxi services, and commuter parking can all be accessed from the interchange, and the nearby Bankstown City Plaza and Saigon Place are often seen filled with pedestrian activity.

People are drawn to Bankstown from all walks of life, and this diversity gives the city its unique identity. Over 80 languages are spoken from more than 100 countries, and the city's great attractors such as eateries, civic spaces and shopping destinations reflect this multicultural community. The city has a growing economy with more than 31,000 businesses already.

As Bankstown faces anticipated growth, a key challenge for the city will be to celebrate its great identity while accommodating more people, more jobs, and more homes. Growth puts pressure on an already constrained transport system, with inefficient and outdated streets. The opportunity exists to balance these demands and move towards an integrated transport system which focuses on people movement and solidifies Bankstown as a premiere, unique, people-focused destination.





A CITY OF GREAT PLACES

Great Eat Streets







- Saigon Place
- City Plaza
- Chapel Road

Civic Attractors





- Bankstown Library •
- City Hall
- Paul Keating Park



- Schools
- Clubs such as Sports, RSL, Polish and others
- Arts Centre

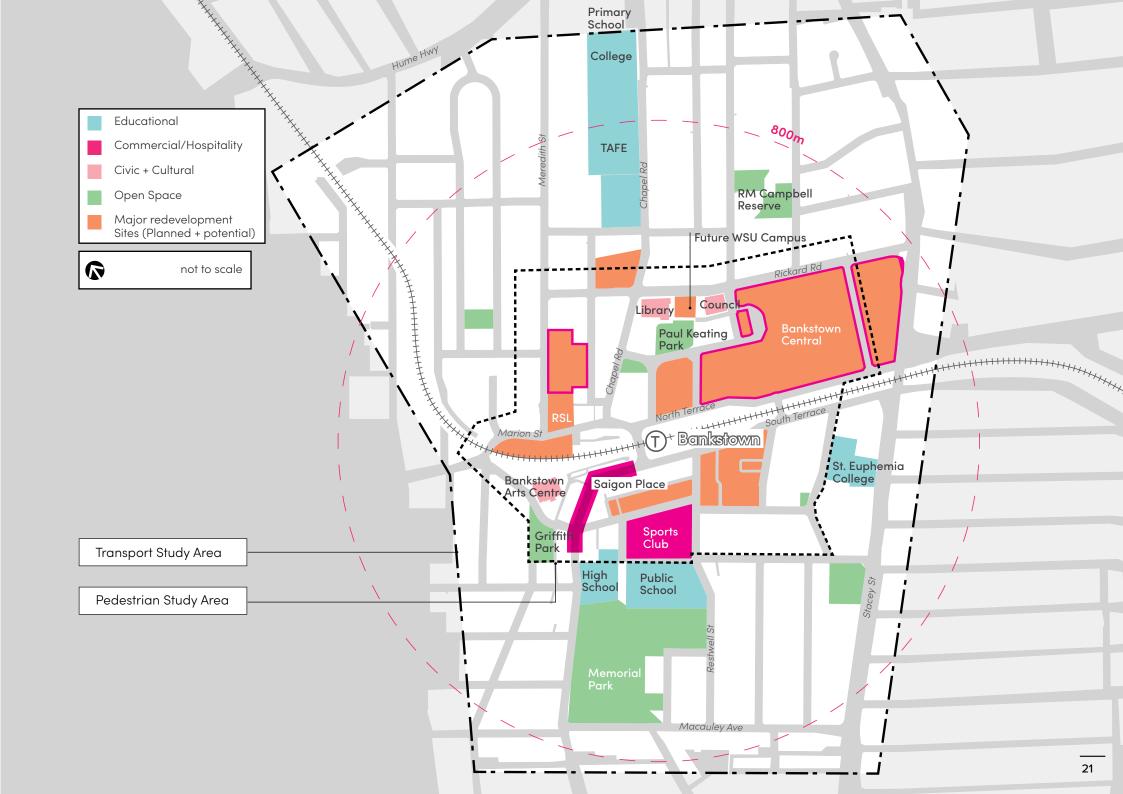


Local Services



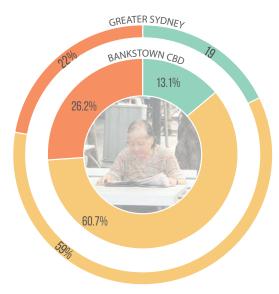


- Fresh food
- Retail, pubs
- Health providers
- Doctor's Surgeries
- Supermarkets
- Post Office



02

A CITY OF DIVERSE PEOPLE



Population Age Adult

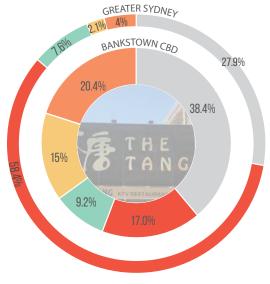
60.7% vs 59%

Bankstown Greater Sydney

Children (0-17 Years)

Adult (18-59 Years)

Retirement Age (60+ Years)



Language at Home

Non-English

73.9% vs 35.8%

Bankstown Greater Sydney

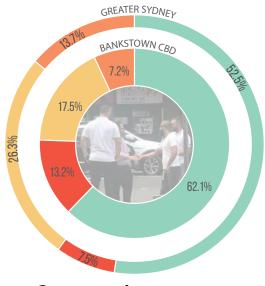
Arabic

Vietnamese

Chinese (Mandarin and Cantonese)

English only

Other Languages



Occupation

Professionals

17.5%

VS

26.3%

Bankstown

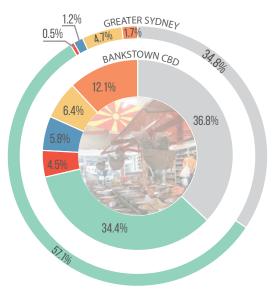
Greater Sydney

Manager

Professionals

Labourers

Other Occupations



Birth Place Total Overseas

55.8% vs 36.7%

Bankstown Greater Sydney

Vietnam

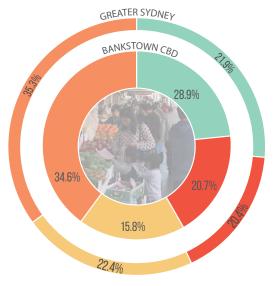
China

Lebanon

Pakistan

Australia

Other Countries



Households Single

0.7% vs 20.4

Bankstown

Greater Sydney

Couple with children

Couple without children

Single

Other Households



The people of Bankstown are genuine, diverse and passionate. The area is vibrant and full of potential.

Community member,
 Bankstown Complete Streets
 Online Survey, Mar 2018

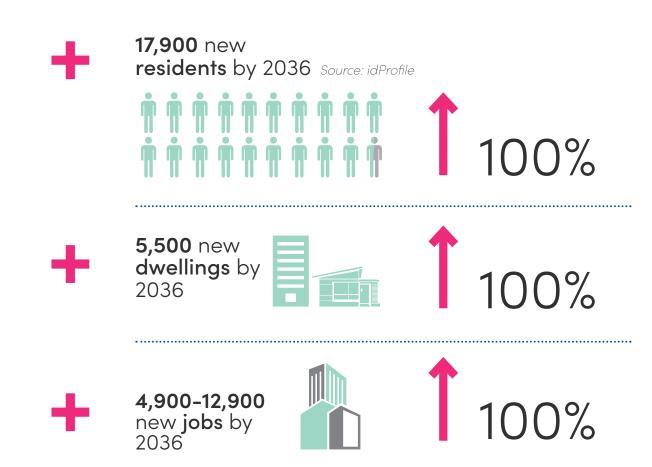
02 **A CITY TRANSFORMING**

By 2036, Bankstown will have significantly more residents, jobs and trains connecting to Greater Sydney

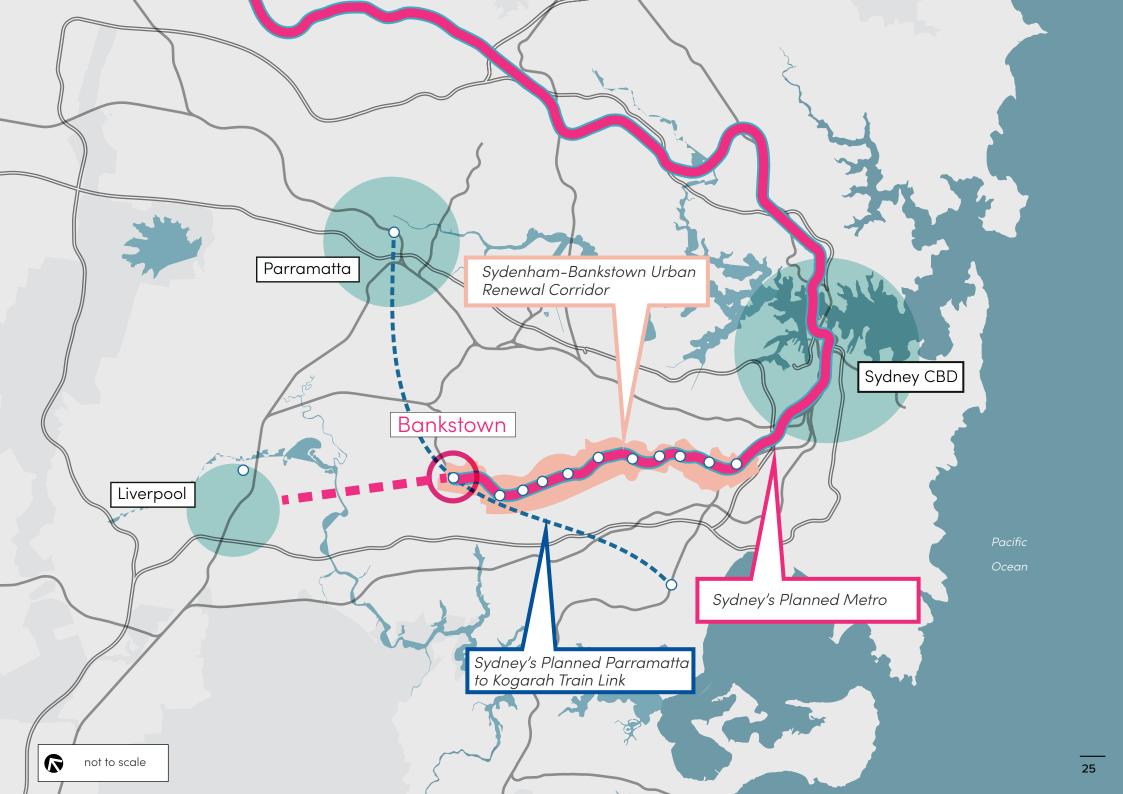
The State Government is set to increase housing and jobs along the Sydenham to Bankstown corridor, and this renewal would be supported with a higher frequency Metro train service.

Sydney Metro proposes changes to the function of the Bankstown Transit interchange, including:

- Introduction of a secondary concourse;
- Modification of southern and northern plazas to create new station entries;
- No change to arrangements of bus stops, with new service potential.



*Source (Employment): Greater Sydney 2056: South District Plan (GSC, 2018. p66);



02 HOW WILL THE CITY TRANSFORM?



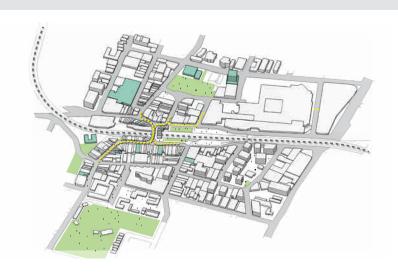
Growth puts a strain on existing streets, open spaces, social systems and community infrastructure.

How can the streets and public domain work best for everyone so Bankstown can accommodate growth and become an even greater place?

By linking the city's destinations such as the new Metro, university, parks, shops and cultural facilities, Complete Streets will facilitate the transformation of Bankstown as a 'destination city' by 2036.

BANKSTOWN TODAY

DESTINATION BANKSTOWN 2036





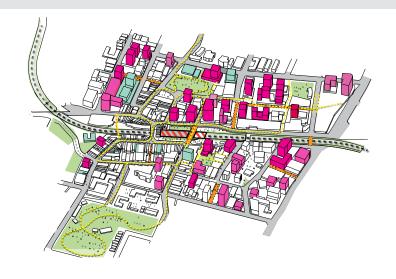
CBD Area



Jobs (CBD + environs)*



Residents (CBD + environs)**





CBD Area

+ University (10,000 students)



Jobs (CBD + environs)

+ High Frequency Metro





Residents (CBD + environs)

+ Redevelopment of key sites

02

'BUSINESS AS USUAL' THREATENS FUTURE PROSPERITY

What We Know About the City's Future Change

We know Bankstown CBD is on a path towards significant transformation unlike any other place in Sydney. This is an opportunity to ensure the CBD becomes an even more people-friendly place. As part of developing this strategy, an analysis of current traffic and congestion pressures on the CBD was undertaken by utilising a microsimulation traffic model. This provided an understanding of the current key issues and to provide a platform to test various future strategies.

The project team collected traffic counts, video and travel time survey data throughout the CBD. A traffic model was then built that highlighted where congestion hot-spots were and forecast future congestion by simply allowing growth to occur but with minimum traffic, transport or street design interventions. The future model is a 'business as usual' approach to change, where no

Complete Streets improvements are implemented but planned development and road upgrades to Hume Highway and Stacey Street are included. What the model tells us, and what the images portray on page 27, is that approaching future change through a 'business as usual' approach brings significant congestion, whilst adding no 'place value' or enhancements to Bankstown.

A Congested or Prosperous Future?

'Business as usual' threatens Bankstown's opportunity to become one of Sydney's preeminent destinations with increased jobs closer to home. By 2036, all streets could become congested, with vehicles moving at slow speeds and resulting in an ineffective network from a movement perspective.

A Complete Streets approach to this transformation will allow future congestion to be managed. By 2036, this will mean that there will be

minimal congestion along the ring road and bus routes, in order to provide efficient access to the edge of the CBD and minimise delays.

However, congestion can also serve Bankstown in a positive way, and slower vehicular speeds (no more than 40km/hr) on the streets within the CBD will be promoted, in order to provide a safe and pedestrian-friendly environment. Ultimately, this improved street design will result in better transport service, amenity, safety and will attract more visitors. It will ensure that Bankstown's streets serve both a 'movement' and 'place' function.

BUSINESS AS USUAL APPROACH TO FUTURE TRANSFORMATION BRINGS INCREASED TRAFFIC AND CONGESTION, WITH NO ADDED PLACE VALUE

0-15km/h15-30km/h30-40km/h>40km/h

'Business As Usual' approach tested for traffic model outcomes:

- Reduced Amenity;
- Convoluted Bus System;
- No Safe Cycle Ways;
- Reduced Safety;
- Discourages visitation / No Destination Focus;
- Unappealing for businesses/ residents;
- Congestion along ring road and bus routes (undesirable);
- Congestion along inner CBD streets (desirable); and
- Doesn't Achieve Strategic Potential.

CONGESTION TODAY



CONGESTION 2036 - BUSINESS AS USUAL (minimum system changes)





ISSUES + OPPORTUNITES





03

SNAPSHOT OF THE STREETS TODAY

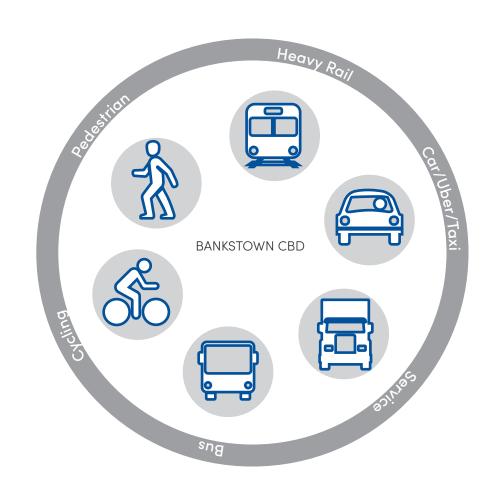
Modal and People Systems

The Bankstown CBD public domain area is a true workhorse, handling 6 modes including pedestrians, cyclists, heavy rail, buses, service vehicles, and cars.

Within the public domain area, the CBD's streets occupy 16.32Ha of space, which accounts for 26% of the CBD area (62Ha in total). These streets can be divided into space for cars and buses, and space for pedestrians.

Car/bus space includes carriageways and service lanes, and occupies 9.89Ha, or 61% of the CBD streets. Pedestrian space includes footpaths, laneways and arcades where people walk, adjacent to shops and amenity zones with cafe seating, bins and lighting. This pedestrian space occupies 6.43Ha, or 39% of the CBD streets.

In addition, public parking stations and private parking stations occupy 2.96Ha and 5.45Ha respectively, and 2.42Ha is dedicated to rail.



Pedestrian Space

Footpaths, Laneways

6.43Ha

39%

Car/Bus Space

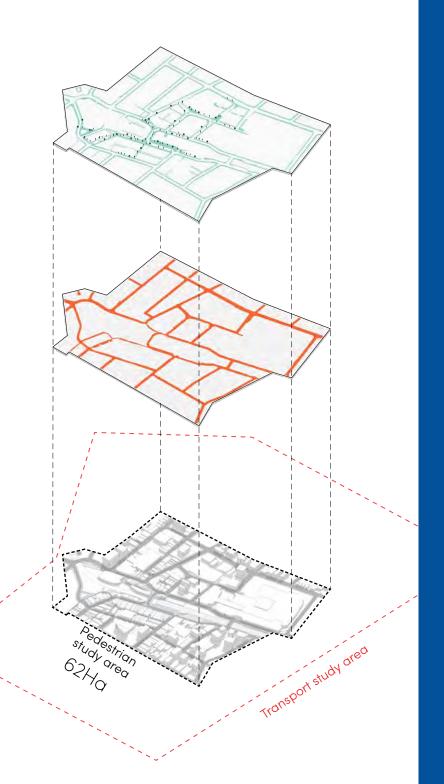
Carriageways, service lanes

9.89Ha

61%

CBD Streets

16.32Ha



Streets are important for moving people and goods between places, but are also important places for people and street life, enhancing social and economic participation.

- South District Plan, Greater Sydney Commission, Mar 2018

03 USER GROUPS

Who They Are



Pedestrians

People of all ages, abilities and backgrounds using the streets to walk and sit.

- over 14,000 people/day outside Station entrance
- 6.43ha footpaths and laneways



Motorists

People driving personal motor vehicles including cars and motorbikes.

- 6,800 vehicles entering the CBD in AM peak hour
- 6.82 Ha Road carriageways



Cyclists

People using bicycles, cycle-rickshaws and cargo bikes to move around.

- 67 cyclists/hour*
- Oha cycling infrastructure



Freight operators & service providers

People driving vehicles that move goods or conduct critical city services.

• 0.75 Ha Service Lanes



Public transport users

People using collective transport such as rail and bus services in Bankstown.

- 18,000 train users/day
- 2.42 Ha rail Infrastructure
- 6.82 Ha Road carriageways
- 0.52 Ha Bus terminals



People doing business

People operating stalls and commercial storefronts which activate the street.

- 10,886 public life activities**
- 6.33ha footpaths
- 0.25ha social spaces/plazas

*CYCLING COUNTS WERE CONDUCTED BY GTA IN MAY 2018 ON ONE WEEKDAY PEAK PERIOD (6AM-9AM) AND ONE SATURDAY PEAK PERIOD (11AM-2PM).

**PUBLIC LIFE ACTIVITIES OBSERVED IN 15 LOCATIONS ON THE HOUR, EVERY HOUR, FROM 6AM UNTIL 10PM. AVERAGE ACROSS FOUR DAYS.

Bankstown Complete Streets

How many people benefit from equal space allocated to different uses in the street







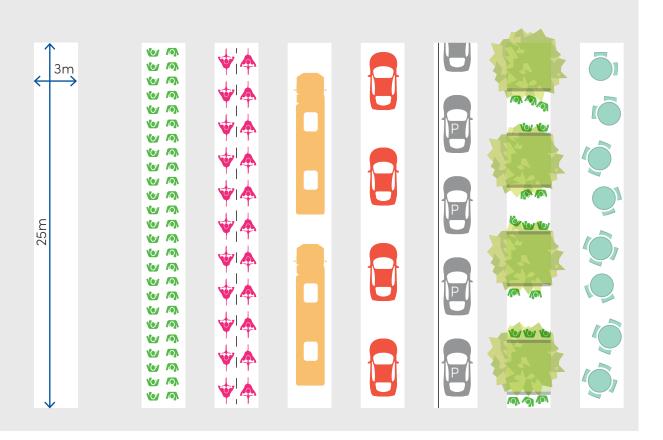








How Each Uses the Same Amount of Street Space



Different users, different demands

Bankstown CBD caters to a spectrum of street users, each of whom have a different spatial requirement for movement and activities. Whether walking, cycling, riding public transit, driving, or sitting and interacting in the public domain, dramatically changes the productivity of street space. As the number of people in Bankstown grows, the challenge will be to cater to these different users while encouraging activities which are more spatially efficient.

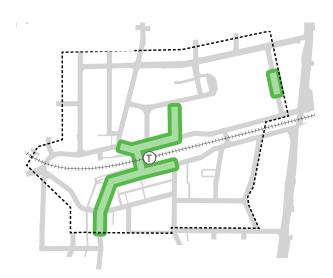
03 STREET NETWORK

Public Transport Service

T B

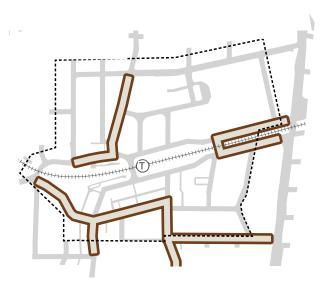
Bankstown is served by the T3 train line which connects it to Sydney CBD and other centres. The major bus routes run North-South and provide connectivity to surrounding residential areas.

Where People Are Walking

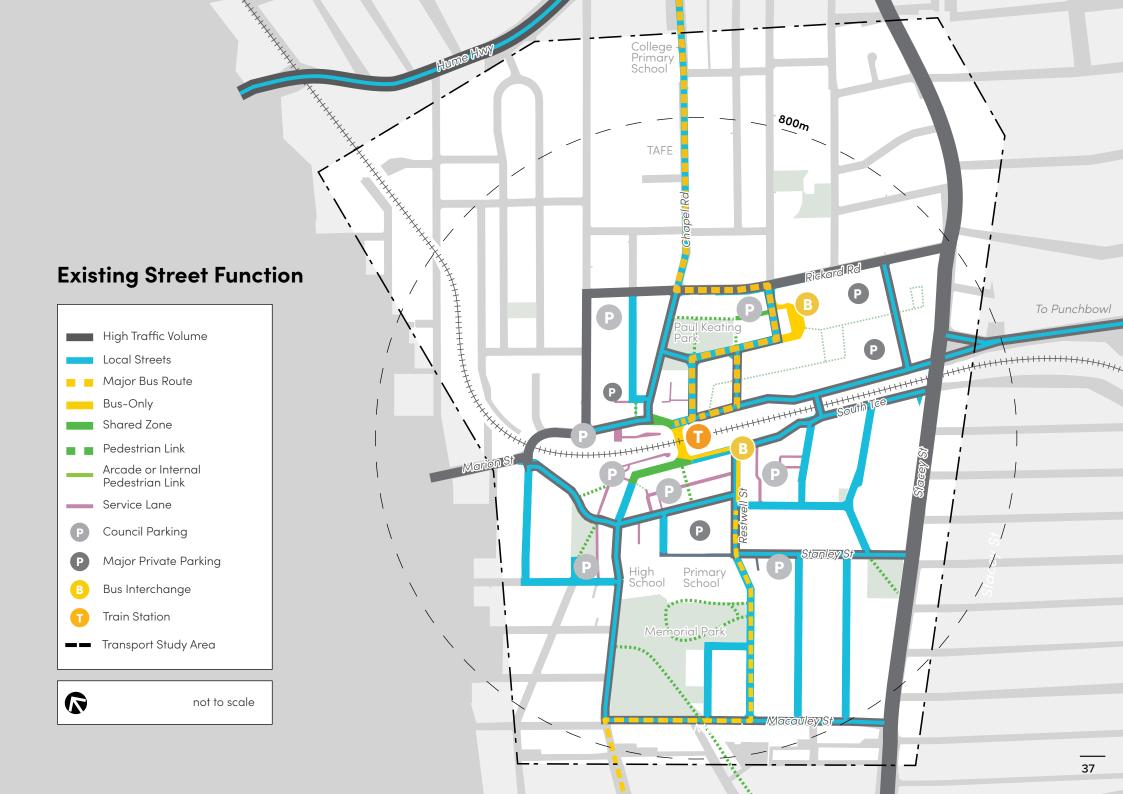


The CBD core attracts the highest pedestrian volumes, with more than 13,000 people recorded daily along Saigon Place and more than 14,000 outside of the station.

CBD's Congested Streets



A number of street connections within the ring road experience the most congestion; namely the eastern end of South and North Tce, Greenfield Pde, Chapel Rd North, Olympic Pde, and Stanley St.



03 CITY QUALITY PP



Bankstown Already Has High Quality Streets







72%

of measured streets have 'limited fundamentals' to make a great street and intervention is needed

(For complete analysis, see Appendix A)

85%

of people think the footpath quality should be improved*

85%

of people think there should be more street trees* 73%

of people think the streets should be made more attractive*

...But Others Need More Interest









* survey respondents who answered 'very important' or of 'medium importance'

O3 SAFETY &

KEY ISSUE Car accidents involving pedestrians and cyclists are too high



between 2006 - 2016 there were

182 PEDESTRIAN/
CYCLIST ACCIDENTS

of people think pedestrian safety needs to be improved*

* survey respondents who answered 'ver' important' or of 'medium importance'

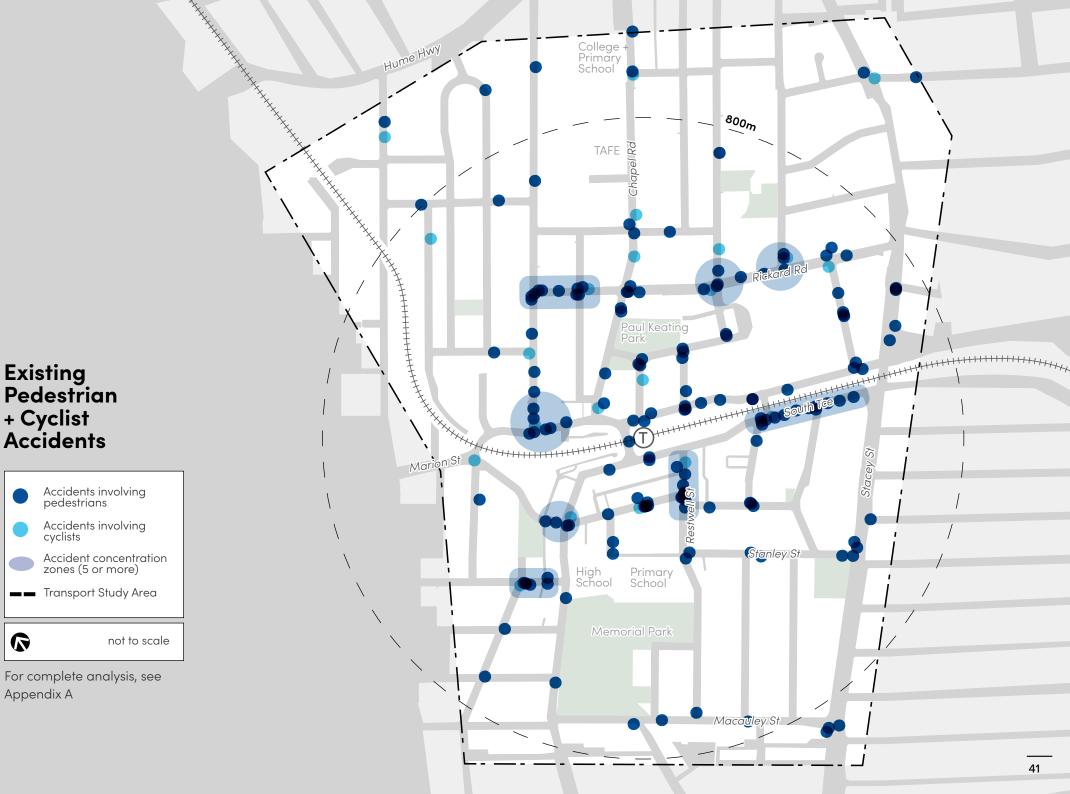


KEY OPPORTUNITY

Connect pedestrian desire lines and slow traffic speeds by ensuring key accident concentration zones and all intersections are redesigned with pedestrian and cyclist priority features

DID YOU KNOW... Speed is the single most important factor in the safety of a street, and is directly proportional to the stopping distance required and risk of pedestrian fatality in cases of conflict.

Source: Global Street Design Guide, NACTO



Existing

+ Cyclist Accidents

Appendix A

PEDESTRIAN TRAFFIC 🎊



KEY ISSUE Uneven amenity and patronage across the centre



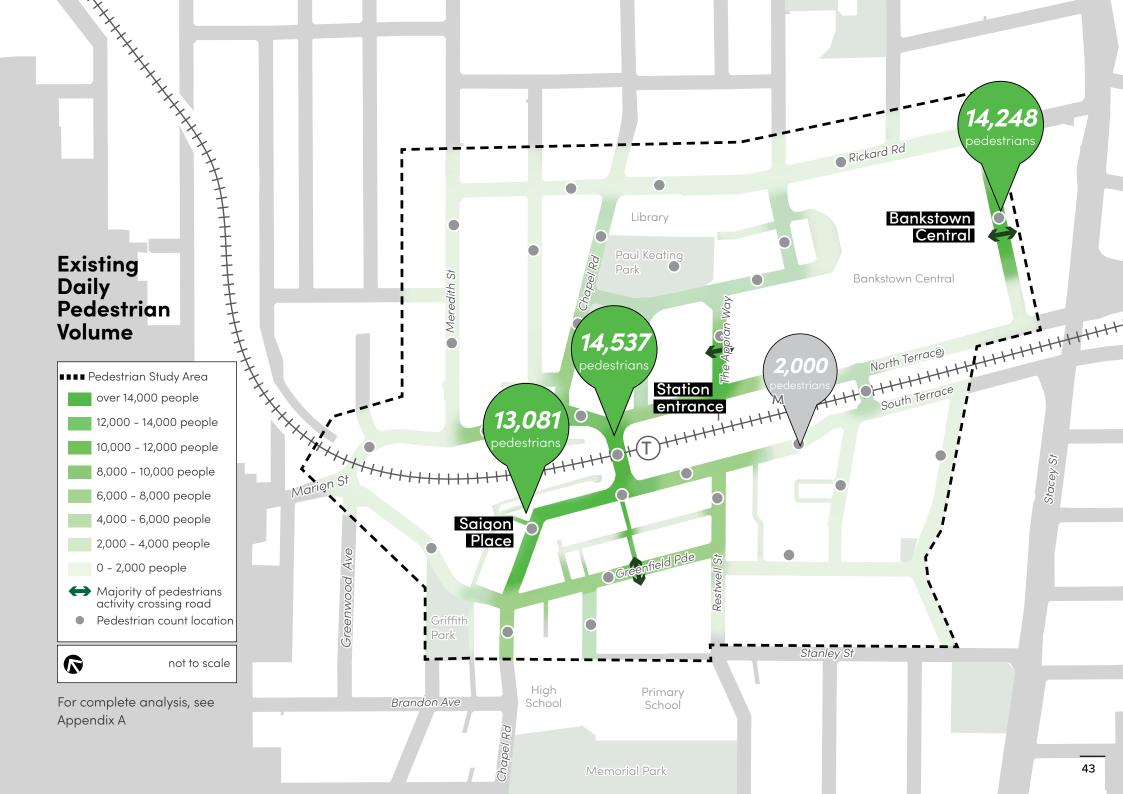
there are 14,500 DAILY WALKERS outside the train station

1,500 on Rickard Road



KEY OPPORTUNITY

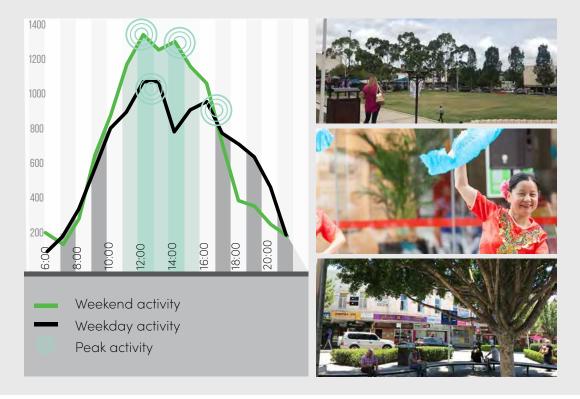
To help promote local business and safety, expand the number of streets that have high pedestrian activity with outdoor dining, wide footpaths, shady street trees and event spaces.



O3 PEDESTRIAN ACTIVITY

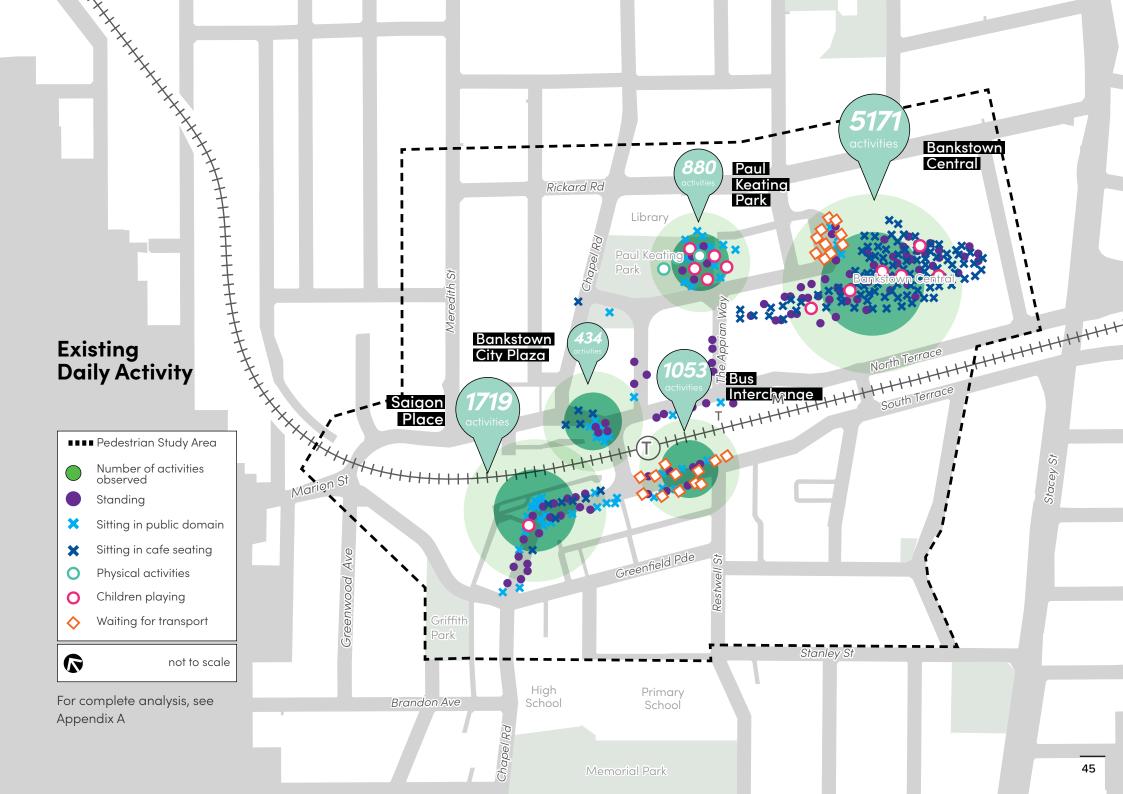


KEY ISSUE Activity is located in isolated, nodes and higher on the weekend than weekdays



KEY OPPORTUNITY

Improve flexibility of existing activity nodes, expand outdoor dining areas, improve mix of uses in new developments and programme spaces throughout week, not just weekends



O3 CYCLING

KEY ISSUE Regional links aren't connected and 0 dedicated cycle lanes in the CBD



there are

Dedicated cycle lanes

67 Cyclists per hour



KEY OPPORTUNITY

Connect regional links, provide additional end of trip facilities at the new Metro station as well as the future Western Sydney University students.

Cycling offers more than a **\$21 net benefit** to the Australian economy every
time a person cycles 20 minutes to work and
back.

Source: Policy Statement by Deputy Prime Minister Anthony Albanese, 2013



03

PUBLIC TRANSPORT 🚇 🖵





KEY ISSUE Buses navigate quirky geometry to service 2 interchanges / layover areas



there 18,000 DAILY RAIL USERS and 15,000 DAILY BUS USERS

BUSES move across City
/HOUR Plaza Bridge





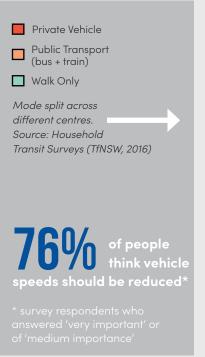
KEY OPPORTUNITY

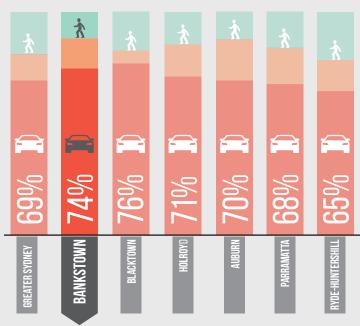
With 30% more bus passengers expected by 2036, a more efficient service is desirable. Improve efficiency of or eliminate duplicated services, stream-line bus operations to improve service times.



03 TRAFFIC

KEY ISSUE Above average car use than regional peers; rat running through CBD



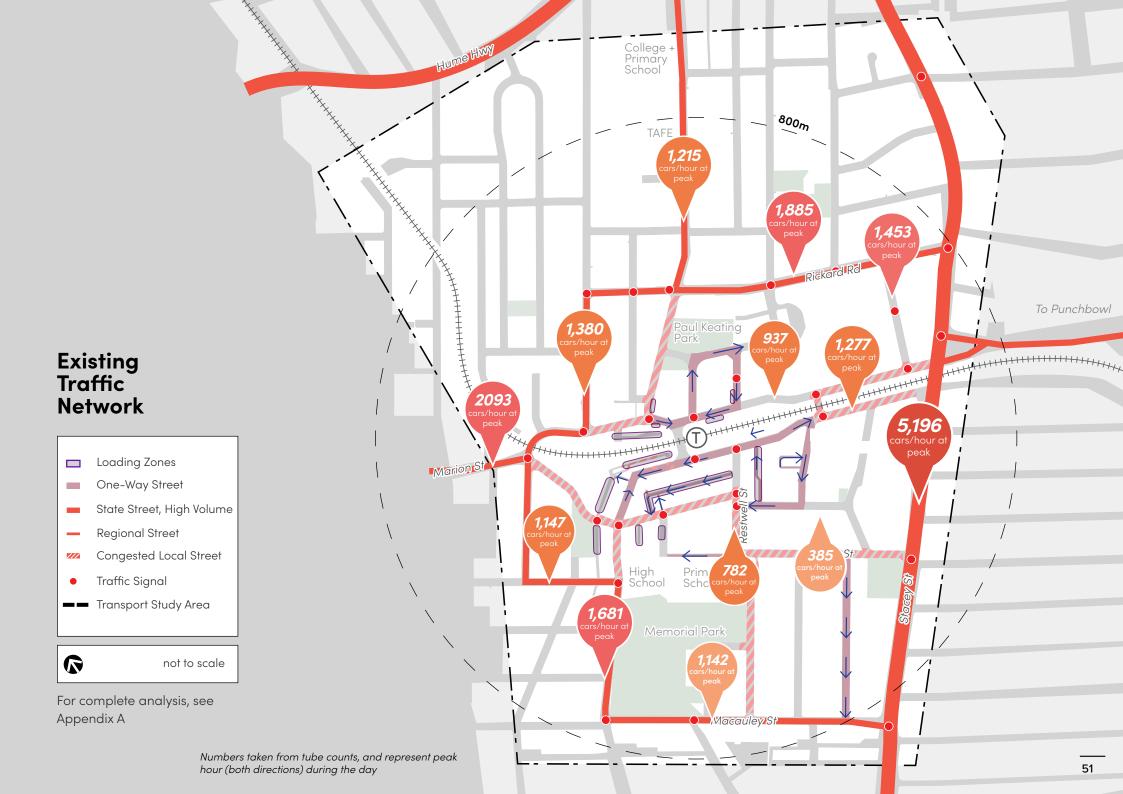


KEY OPPORTUNITY

Promote existing regional and state streets as a ring road to carry future traffic volume increases; reconsider one-way streets in the CBD to redirect traffic and avoid rat running behaviour.

DID YOU KNOW: **19% of** local households don't own vehicles

Source: Profile.id



PARKING (2014)

KEY ISSUE Large amount of un-regulated and free parking encourages more driving and congestion, and all-day commuter parking doesn't benefit the businesses.



in 2016–17, **\$ 1.0N** the City lost

in revenue in carpark

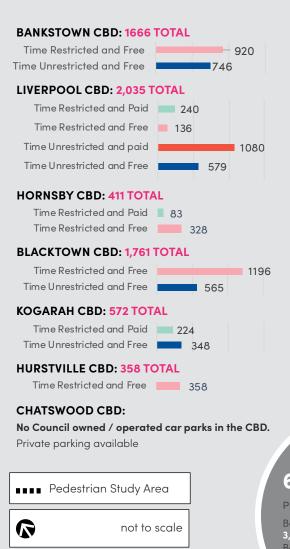
of Council parking is free and <mark>50% has no</mark> time restriction



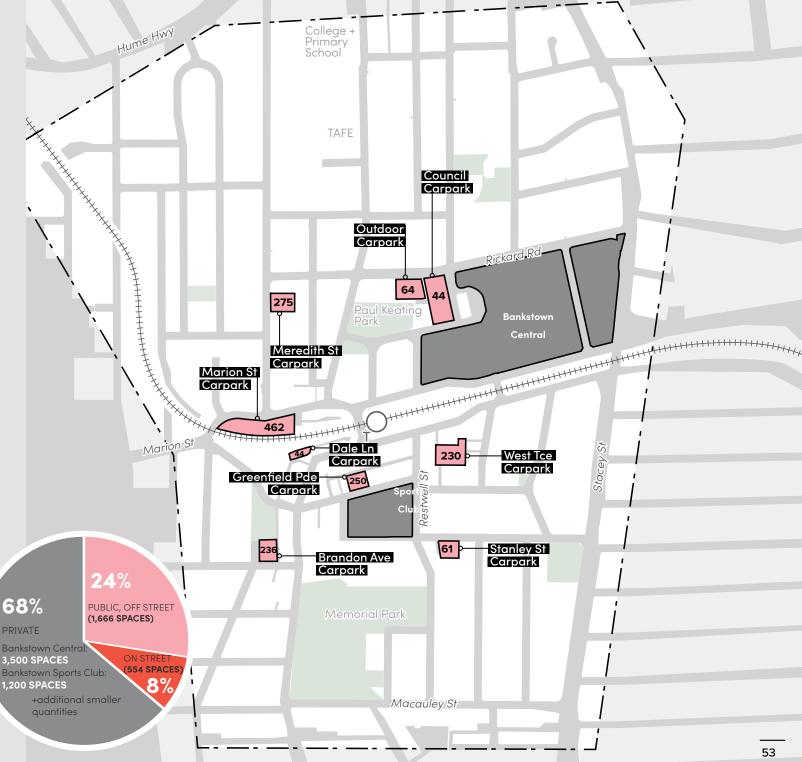
KEY OPPORTUNITY

Use Smart Parking technology to use existing parking spaces more efficiently and introduce more time limits to cater for shoppers and visitors rather than commuters.

Council off-street parking comparison



For complete analysis, see Appendix A



03

MOBILITY TECHNOLOGIES



KEY ISSUE New transport technologies are coming and can take-off quickly

The CBD currently has...

- GOGET OR CAR NEXT DOOR PODS
- PUBLIC ELECTRIC CAR CHARGING STATIONS
- REAL-TIME PARKING/ WAYFINDING INFORMATION
- ON-DEMAND BUS TO NEARBY HOSPITAL



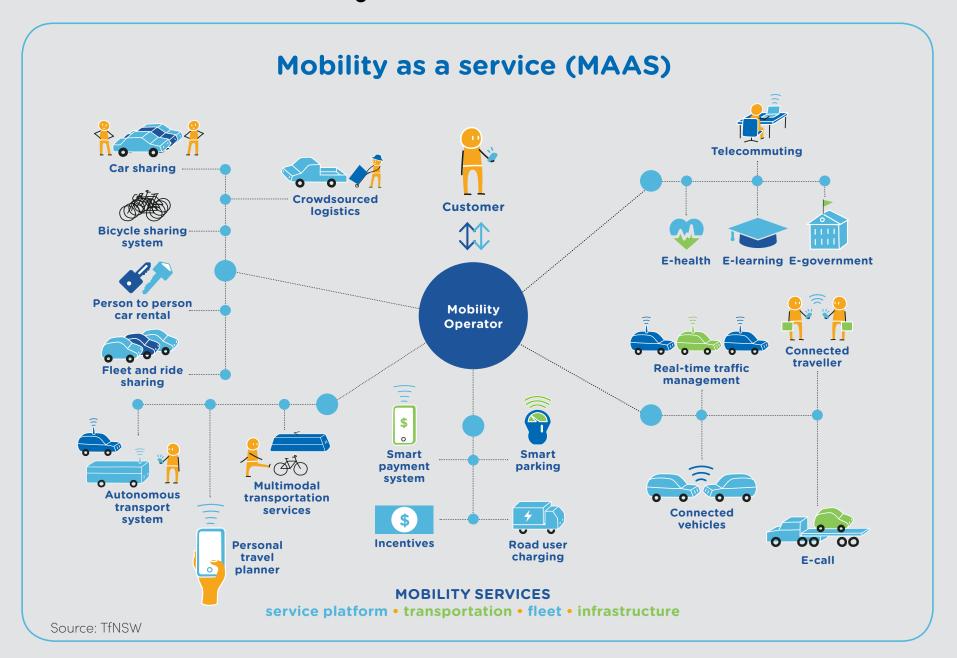




KEY OPPORTUNITY

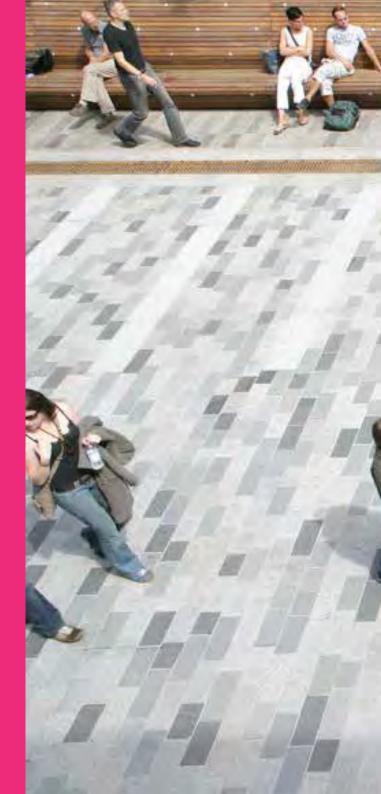
Smart technologies can make it easier to get around, find parking and make better use of existing infrastructure.

Future Potential Decision Making Structure



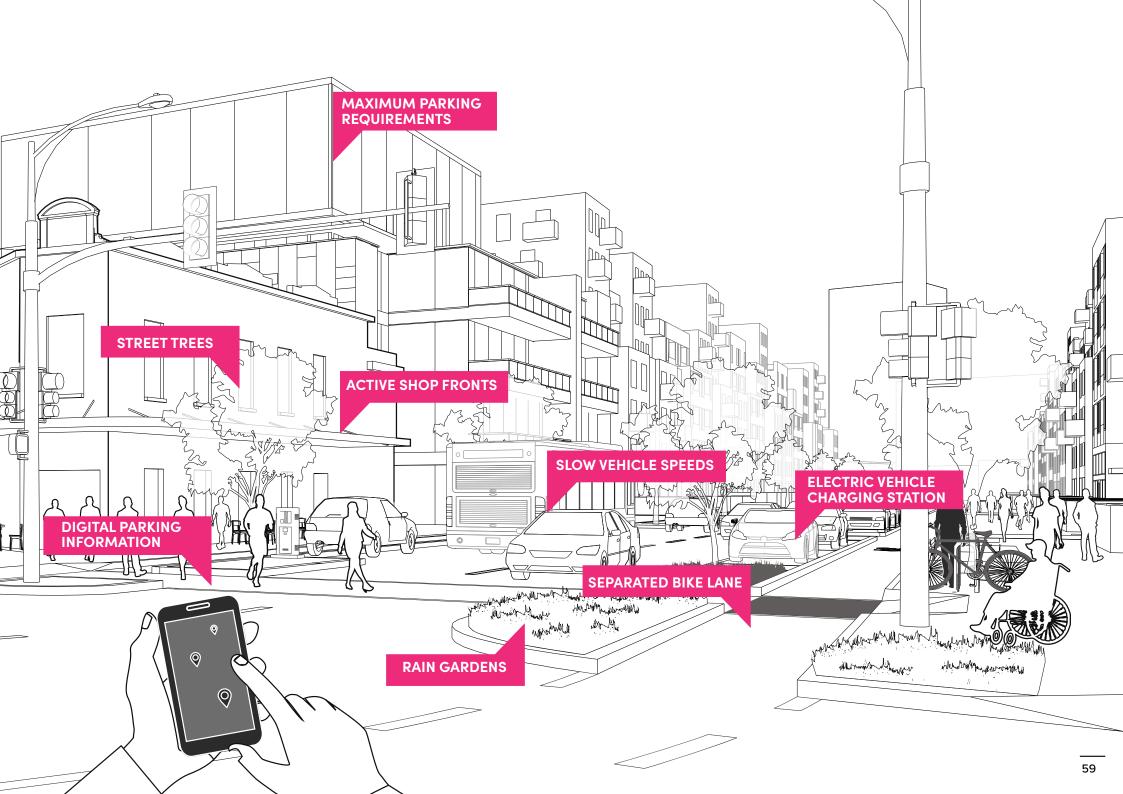


INTRODUCING COMPLETE STREETS









04 **KEY IDEAS**

complete streets DESIGN FOR ALL USERS



CONSIDER THE NEEDS OF ALL AGES, BACKGROUNDS AND ABILITIES

Car-free streets allow children and adults alike to play safely in Tirana, Albania, a city which also allows young people to take part in decision making

complete streets DESIGN FOR ALL MODES



INTEGRATE ALL ACTIVE, PUBLIC AND PRIVATE TRANSPORT OPTIONS

The car-dominated Ninth Avenue, NYC was transformed from 4 to 3 lanes with dedicated turn bays, shorter pedestrian crossings, and protected bicycle facilities

complete streets DESIGN FOR ALL FUNCTIONS



PLAN FOR STAYING, MOVING, SOCIALISING, EXPLORING AND MORE

Underutilised parking bays were given new life as a community corner with landscaping, lighting and public art at Mary Street Piazza, Perth

complete streets PRIORITISE PEOPLE



ENSURE SAFETY, SPACE AND RIGHT-OF-WAY FOR PEOPLE FIRST

A bus rerouting strategy in Downtown

Buenos Aires allowed 100 blocks to become pedestrian-priority zones, with increased street trading and night-time activity

HIGHEST PRIORITY













single occupant car

BEST PRACTICE MODAL HIERARCHY, NACTO

04 **KEY BENEFITS**

SAFER STREETS



SAFER FOR PEDESTRIANS, CYCLISTS AND MOTORISTS

5%

risk of pedestrian deaths on 32km/h streets

compared to:

45% on 48km/h streets

85% on 64km/h streets

SOURCE: UK DEPT OF TRANSPORT

BETTER ACCESS



BETTER ACCESS AND WAYFINDING TO KEY
DESTINATIONS AND PARKING

Improvements to New Road in Brighton as a shared space street resulted in:

62% more pedestrians and

200% more lingering activities

SOURCE: GEHLPEOPLE.COM

MORE ATTRACTIVE



HIGH QUALITY FOOTPATHS, FURNITURE AND LANDSCAPING THROUGHOUT THE CBD

Expanding the iconic Union Square North with a pedestrian plaza and simplified intersection resulted in:

49% fewer commercial vacancies and

of users prefer the new configuration

SOURCE: NYCDOT: 'MEASURING THE STREET'

BETTER FOR BUSINESS



MORE PEDESTRIAN ACTIVITY AND IMPROVED CITY IMAGE BENEFITS BUSINESSES

Pedestrians spend as much as

65%

more than drivers

and

Cycling and walking are estimated to provide up to **\$11.80 return** per \$1 invested.

SOURCE: 'CITIES ALIVE: TOWARDS A WALKING WORLD', ARUP

GREENER



MORE TREES AND SHADE, COOLER STREETS, REDUCED CARBON EMISSIONS

Improved trees, transit and cycling/walking infrastructure in Portland resulted in:

12.5% per capita CO2 reductions

as well as annual carbon savings of \$28-70Million and cooler temperatures under trees by 11-25 °C

SOURCE: SMART GROWTH AMERICA

HEALTHIER



MORE ACTIVE TRANSPORT, REDUCED OBESITY, IMPROVED MENTAL HEALTH

15 mins of walking per day reduces risk of:

mental health issues and early death by 45%

and childhood obesity by 50%

SOURCE: EUROPEAN SOCIETY OF CARDIOLOGY, 2016 AND UNIVERSITY OF BRISTOL. 2007

STREET GEOMETRY

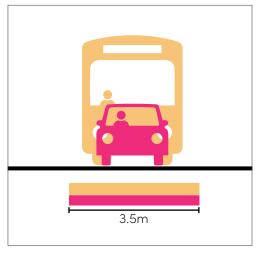
A key component of Complete Streets is rebalancing the design of the street for all users. To do this, the road lanes in the CBD should be the minimum required width which has the effect of slowing traffic speeds and the surplus space converted to wider paths, landscape zones and narrower crossings.

Corners should be designed with the minimum kerb radius possible to slow the speed of turning vehicles, provide more space for pedestrians and reduce the width of crossings. This can be achieved with kerb bulb-outs which extend the kerb and footpath width and provide space for landscaping, rain gardens and street furniture.

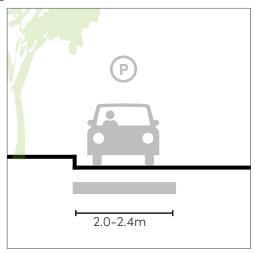
A target of 3-6m has been applied to kerb radii in the CBD, whilst ensuring that larger vehicles are able to maneuver where necessary. Slip lanes should not be used in CBD environments as they permit higher speed turning and pose a higher risk to pedestrian safety.

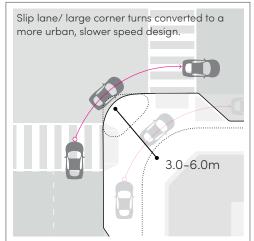
Recommended minimum lane widths

Source: National Association of City Transport Officials (2016) 'Global Street Design Guide'



3.0m



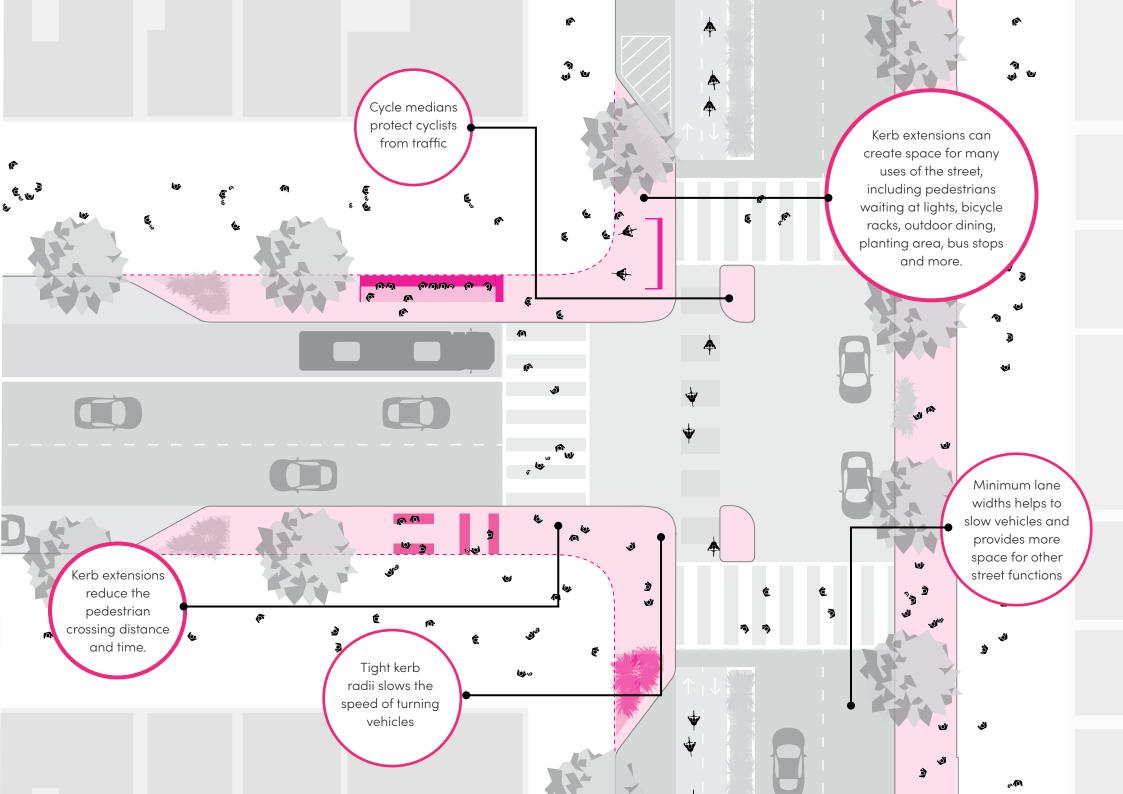


Mixed traffic lanes

Standard traffic lanes

On-street parking lanes

Kerb radii

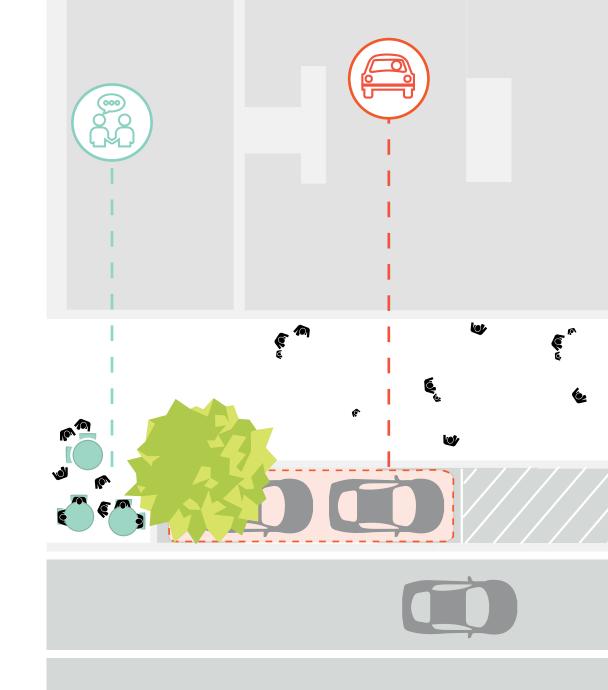


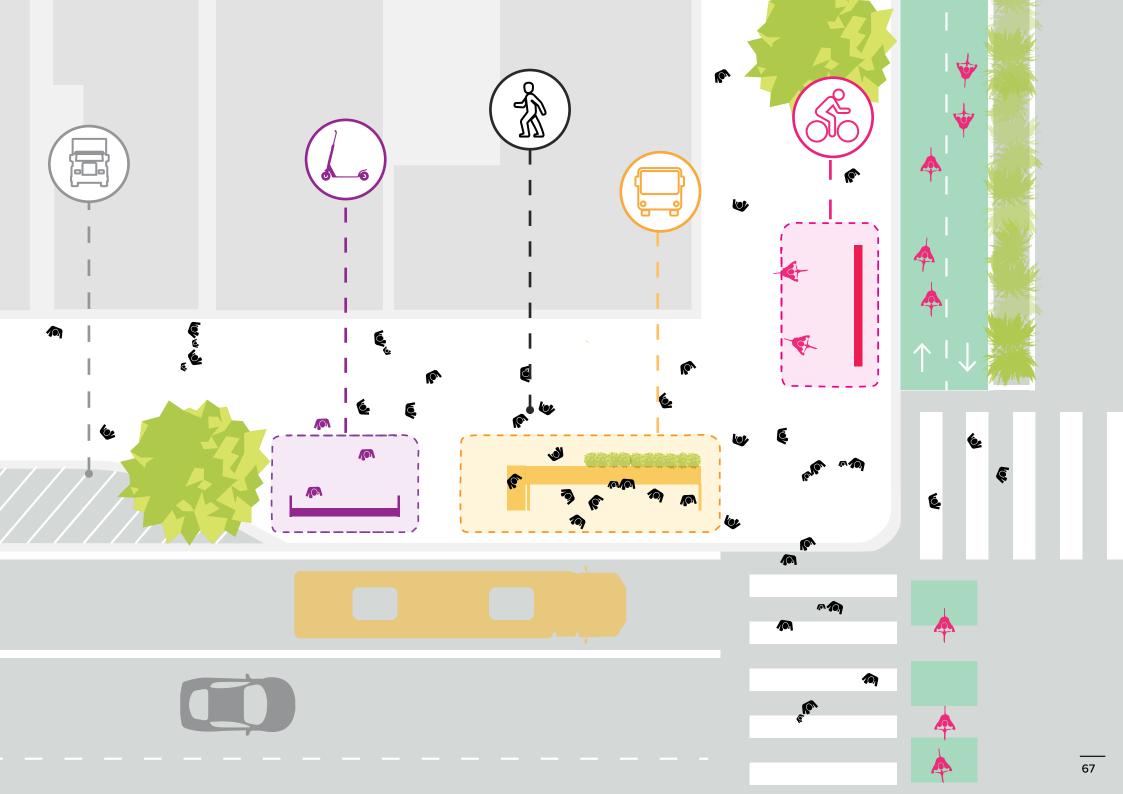
04 **AT THE KERB**

The kerbside has always been a place for walking and lingering. However, in modern city centres the demand for kerb space has dramatically increased from many different users and activities. These uses include regular parking spaces, drop-off/pick up by ride services, bus stops, loading zones, car-share spaces, scooter and bike share spaces, electric vehicle charging, outdoor dining, public seating, trees and landscaping, signage, bins and lighting.

With so much pressure put on the kerb in cities, its design and future flexibility is critical to a successful complete streets network. That means ensuring it can be shared and be utilised for a variety of functions and for multiple modes and user groups.

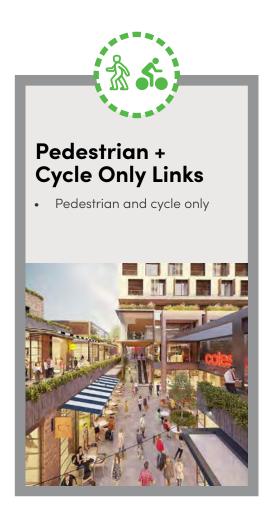
In the next 5 years, demand for kerb space will only increase. With eScooters and autonomous vehicles coming to city streets soon, implementing future-focused kerb design today is critical.





04 STREET TYPOLOGIES

The following street typologies demonstrate the principles of Complete Streets in different contexts. These street types are used in the Master Plan in Chapter 6 and provide a guide for the Concept Designs in Chapter 7.





Shared Zones

- Flexible with pedestrian focus
- Traffic calming and safe design
- 10km/hr design speed





Transit Streets

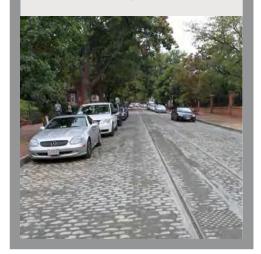
- Bus and pedestrian priority
- Major bus routes





Neighbourhood Streets

- Serves local residents
- Local bus routes
- 30km/hr design speed





Neighbourhood Street + Cycle Lanes

- Serves local trips and bicycle trips
- 30km/hr design speed





Ring Road

- Primarily serves 'movement' function
- Entry gateways to the CBD

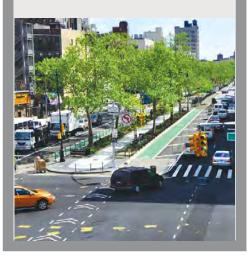




Diagram espouses principles of street typology and is not considered a final design for any specific street Laneway activation/outdoor dining Through zone for cyclists Space for kid play, particularly for residential areas

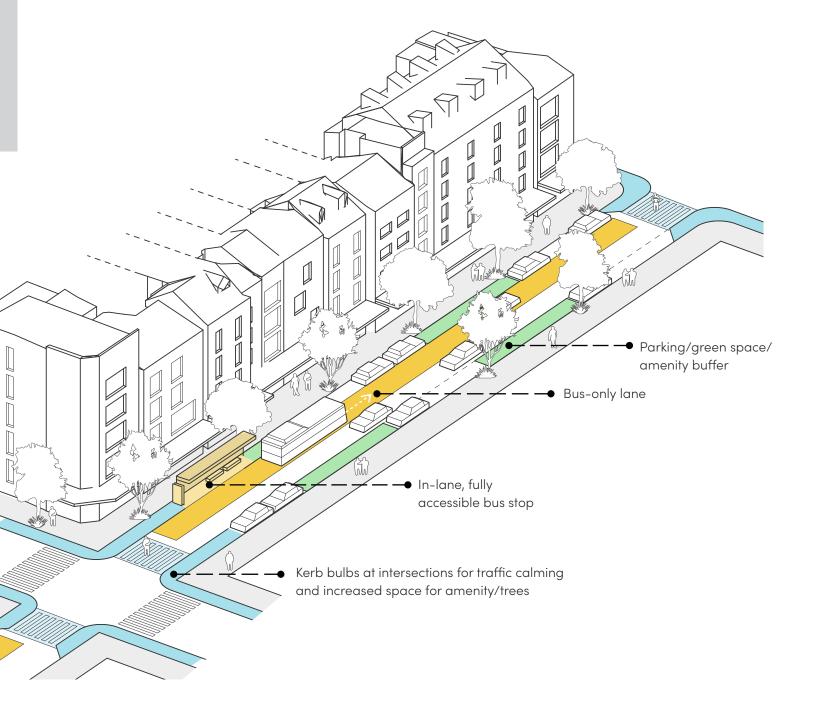


SHARED ZONE CONCEPT Diagram espouses principles of street typology and is not considered a final design for any specific street Flexible parking / removed for events Chicane for traffic calming → No kerb for seamless transition and materiality and to minimise segregation of modes Vehicles permitted zone; 10km/hr speed



TRANSIT STREET CONCEPT

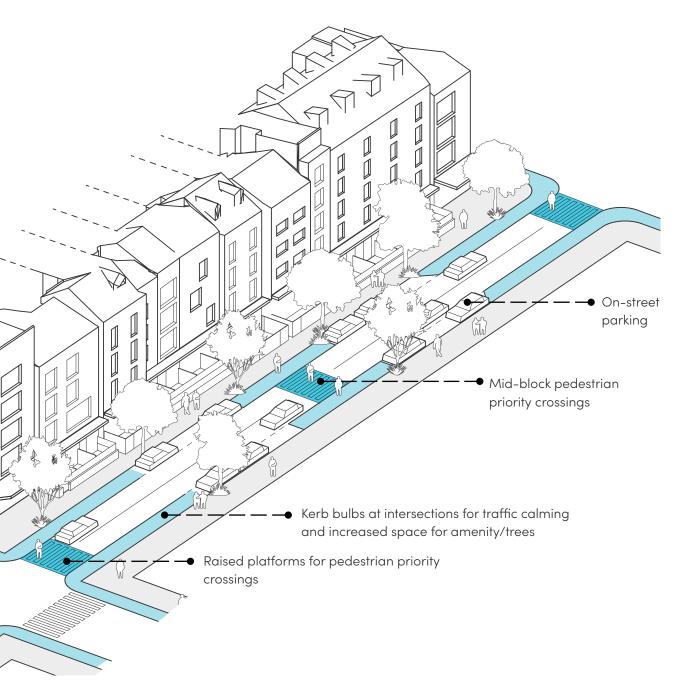
Diagram espouses principles of street typology and is not considered a final design for any specific street

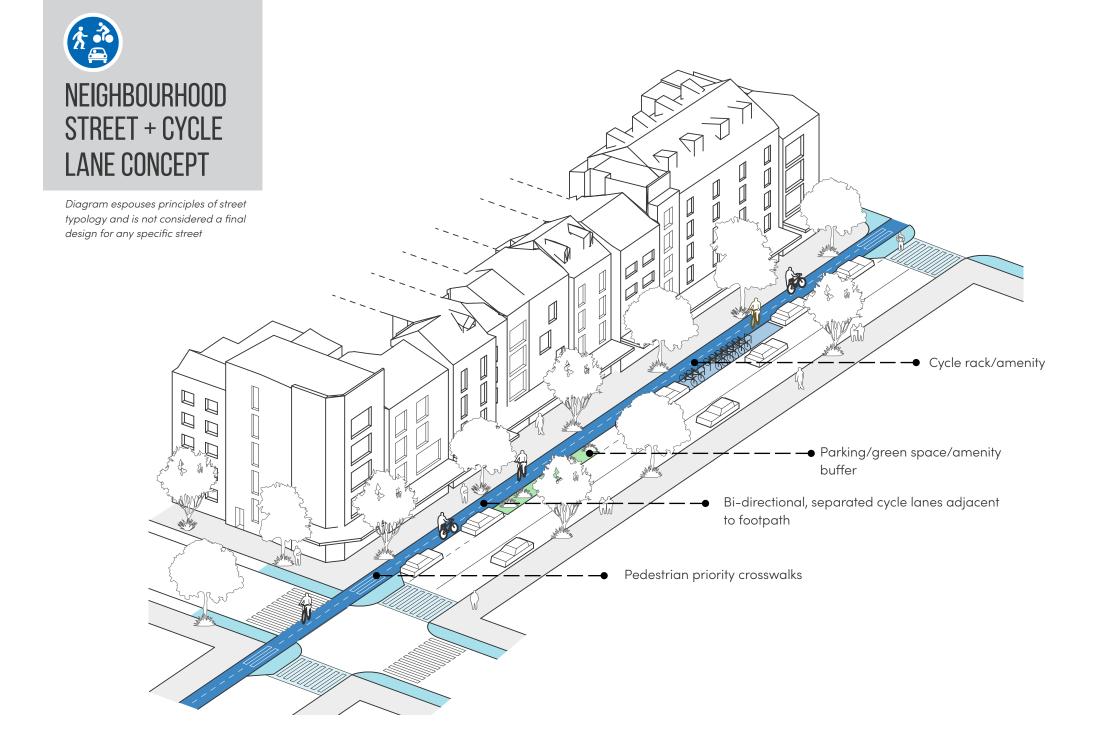




NEIGHBOURHOOD STREET CONCEPT

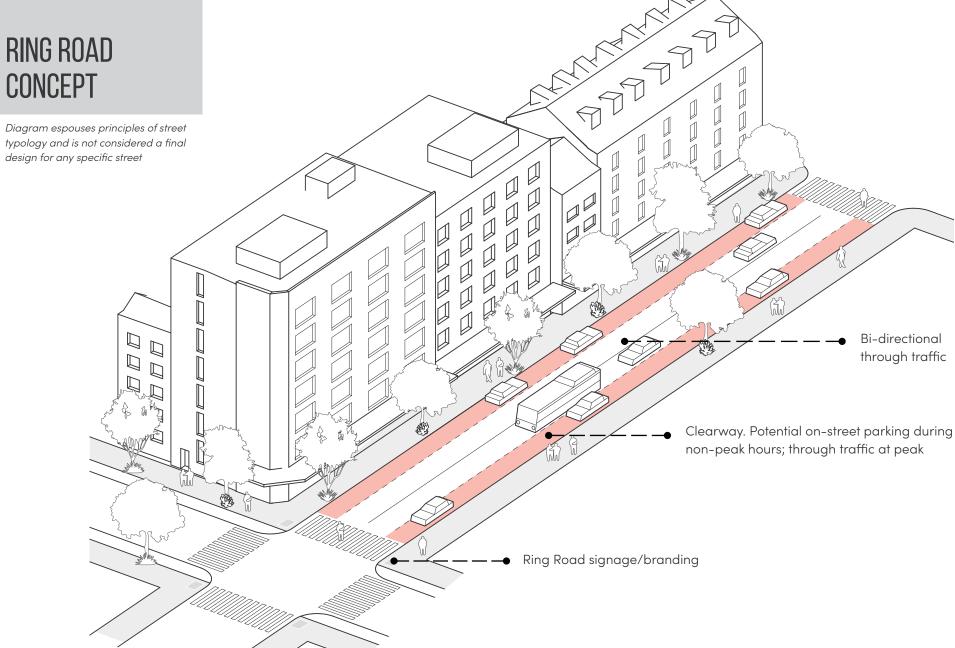
Diagram espouses principles of street typology and is not considered a final design for any specific street







RING ROAD **CONCEPT**





VISION, PRINCIPLES + STRATEGIES

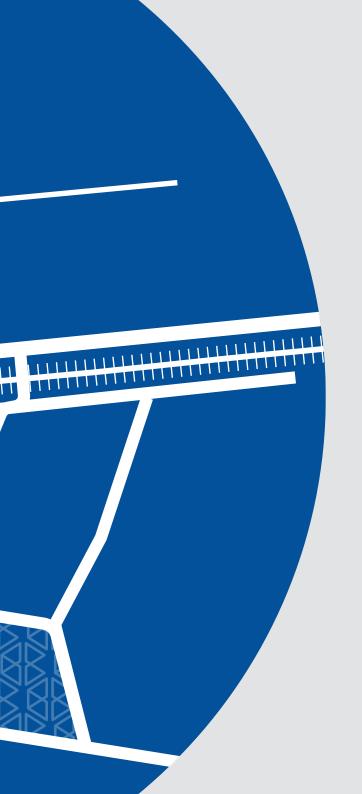




05

VISION HUI URE





BANKSTOWN CBD IS A **DESIRABLE DESTINATION**TO LIVE, WORK AND VISIT, FAMOUS FOR ITS CULTURAL
DIVERSITY AND WALKABLE STREETS
BUSTLING WITH LIFE.

WHETHER BY FOOT, BIKE, BUS, TRAIN OR CAR IT IS EASY TO GET INTO AND AROUND THE CITY CENTRE SAFELY AND CONVENIENTLY.

BANKSTOWN IS A LEADER IN SMART DESIGN AND IS A CELEBRATED EXAMPLE OF TOWN CENTRE TRANSFORMATION THAT HAS RETAINED ITS DISTINCTIVE QUALITIES.

The key aspirations guide sustainable growth and set targets in order to achieve the vision.

100% OF CBD FOOTPATH PAVEMENTS UPGRADED TO COMPLY WITH THE STANDARDS

set out in the Public Domain Technical Manual by 2036.

10% REDUCTION IN BUS SERVICE DELAYS

to get people to where they need to be faster.

MORE CONNECTED BIKE LANES THROUGH THE CBD

to facilitate healthier, active transport trips.

60% OF TOTAL TRIPS BY CAR, DOWN FROM 74% TODAY

based on Vancouver's similar success in the last 20 years of achieving 50% split between car travel and sustainable transit. Bankstown aims to go from 74% of trips completed by car now to 60% by 2036.

This will help to manage future congestion and provide more pedestrian amenity.

ZERO TRAFFIC DEATHS

through adoption of narrow lane widths, and design for 30km/h to improve pedestrian and cyclist safety.

+50% STREET TREE CANOPY

through urban greenery, which creates shade, cooling people and streets on hot summer days.
Urban tree canopy is championed in GANSW's
'Greener Places.'

30% MORE SPACE FOR PEOPLE

within the existing street network, more space can be utilised in more efficient ways for outdoor dining, lingering, amenity and activity in the streets.

O5 GUIDING PRINCIPLES FOR EFFECTIVE CHANGE

The following 12 principles reflect the desired outcomes of the local community, workshops with Council, local businesses and stakeholders and transport officials.

Together, they guide all strategies, the Master Plan, Concept Designs and future actions within the remaining sections of this document. They are an important set of criteria to ensure future decisions align to achieve the vision and aspirations of Complete Streets.



Integrated transport planning + city design



People First



Vibrant + Great for Business



Efficient

Adopt an approach where transport decisions also enhance the image, livability, street life, safety and walkability of the CBD.



Prioritise pedestrians first, then cyclists, then public transport, then service vehicles, then private vehicles, in order to enhance mobility and ensure a balanced transport system.



Design streets to enhance commerce in Bankstown and maximise street life both day and night.



Utilise street space as efficiently as possible to optimise space for other functions such as footpaths, outdoor dining and landscaping.





Safe Streets

Green



Smart + Future Focused



Equitable

Ensure streets are safe for all users through slow design speed, traffic calming, safe crossings and separated lanes.



Promote sustainable low-energy transport modes and incorporate trees, landscaping and water-sensitive drainage.



Design streets which are flexible and adaptive to technological change.



Accommodate all ages, abilities, genders and incomes.





Design Excellence



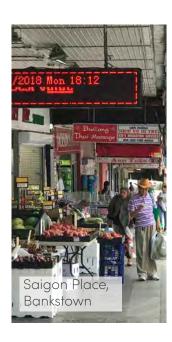




Promote high-quality streets and open spaces which enhance the identity of Bankstown.



Celebrate the diversity and cultural identity of Bankstown's residents and businesses.



Address congestion by reducing unnecessary vehicle trips and improving the attraction of all transport modes.



Ensure streets and open spaces are well-kept and are pleasant places to experience.



05 STRATEGIES

10 Strategies, Guided by the 12 Principles

The following pages summarise the 10 strategies to implement a Complete Streets vision for Bankstown. Each strategy addresses key issues and opportunities currently facing the streets of Bankstown which were identified in Chapter 3.

Each strategy includes 'inspiration' best practice imagery to illustrate how it could be realised in Bankstown. The strategies build to form a cohesive Master Plan that promote outcomes from both a place and movement perspective.

- RING ROAD STRATEGY
- PARKING RELOCATION STRATEGY
- SMART TECHNOLOGY STRATEGY
- TRANSIT INTERCHANGE STRATEGY
- SLOW SPEED STRATEGY
- **STREET AMENITY** STRATEGY
- STREET ACTIVITY STRATEGY
- CONNECTED CYCLING STRATEGY
- **CULTURAL TRAIL** STRATEGY
- ACTIVITY SPINE STRATEGY

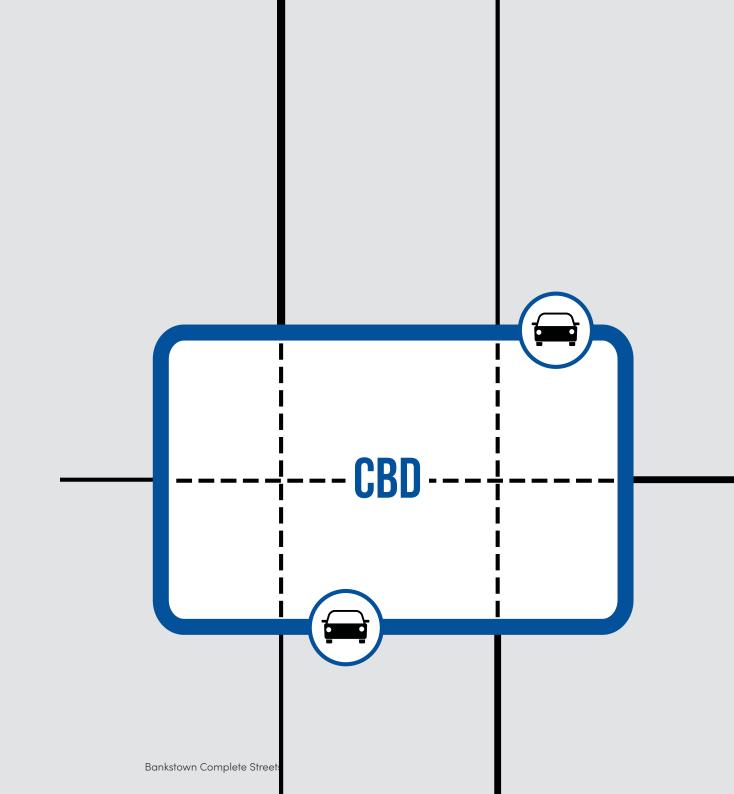
Bankstown Complete Streets

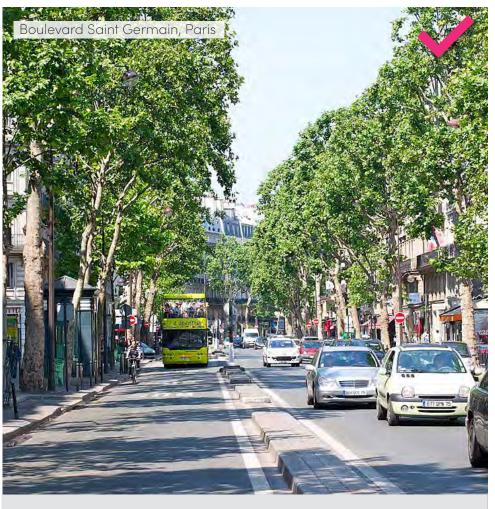
Integrated planning + design	People first	Vibrant + great for business	Efficient	Safe streets	Green	Smart + future focused	Equitable	Design excellence	Culturally proud	Evidence- based decision making	Clean and Maintained
(3)			0				1				
1	2	3	4	5	6	7	8	9	10	11	12

05 STRATEGY A

STRATEGY

Enhance ring road for good access to edges and reduce traffic through CBD.





"A Boulevard, Not a Traffic Sewer"



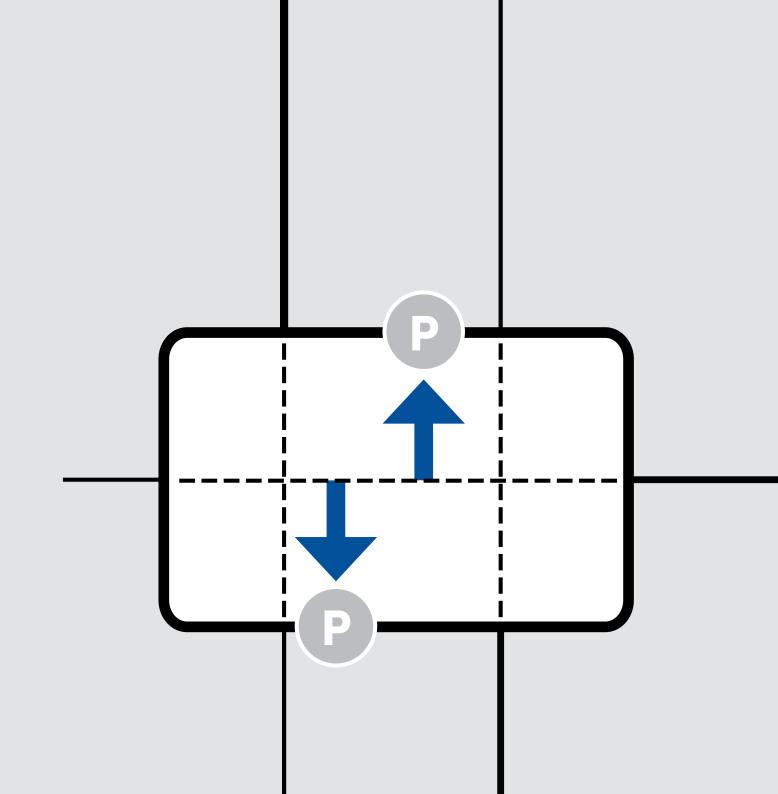


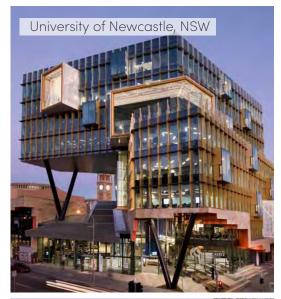
- Excessive traffic passing through the CBD increases congestion and noise, reduces the quality of place and impacts pedestrian safety.
- The creation of a free-flowing ring road around the edge of the CBD provides convenient access to the edges while reducing traffic pressure on inner CBD streets.
- Traffic modelling shows 20-30% of traffic could be shifted from the inner CBD streets to the ring road without impacting average speed (compared to 'business as usual').
- Shifting traffic to the ring road would enable the inner CBD streets to be re-designed as more appealing high activity zones.

05 STRATEGY B

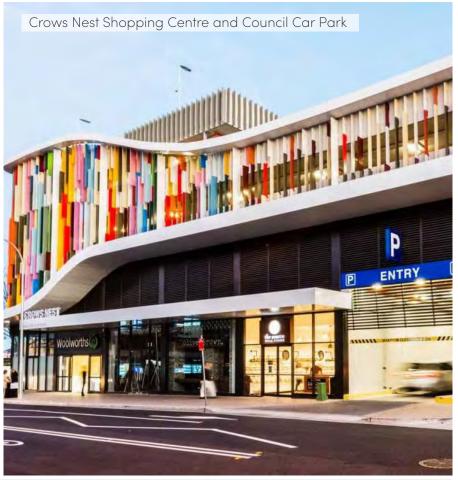
STRATEGY

Relocate public parking stations to the edge of the CBD along the ring road.









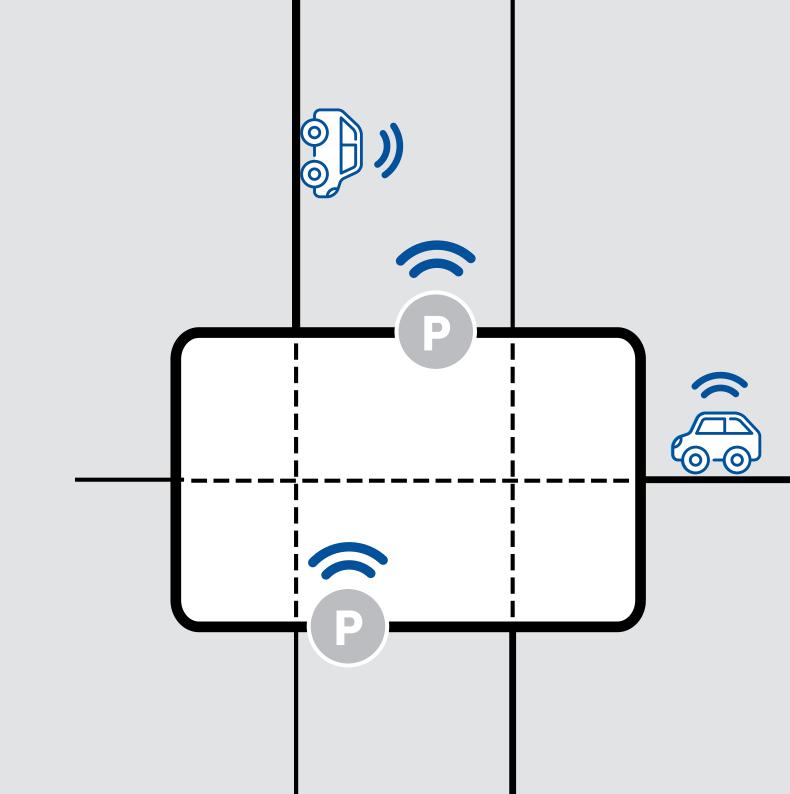
"Greenfield Parade + West Terrace Carparks are at the end of their lifespan and need to be redeveloped"

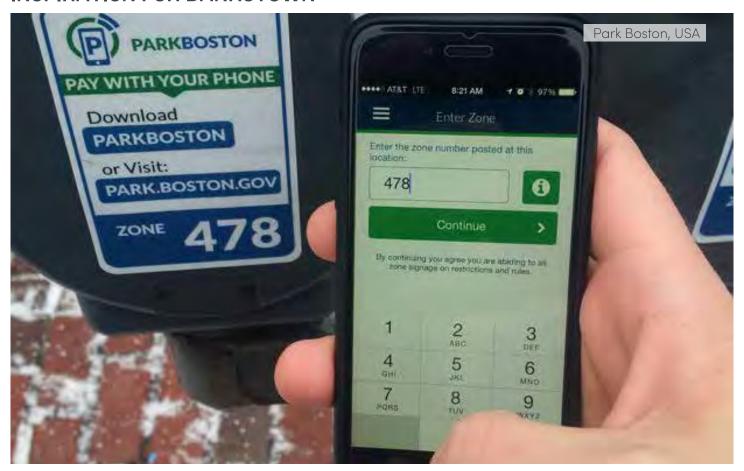
- Parking brings traffic into the CBD which reduces amenity of the streets.
- Parking would be more easily accessed from the ring road.
- Unrestricted parking in many places promotes commuters to park in prime CBD location carparks and reduces parking available to shoppers and visitors to the CBD.
- Off-street parking complexes are an inefficient use of prime CBD land in their current format, with no employment/commercial uses, no street level activity and unattractive design.
- Car-parks dominate the inner CBD area, occupying 15% of the quirky 'village' area. Relocating public parking spaces of Greenfield Parade and West Terrace carparks to the ring road (eg. Marion St) brings the opportunity to redevelop those sites to higher and better uses befitting the centre.

05 STRATEGY C



Use smart technology to make parking more efficient and easy to find. Introduce more time restrictions to cater for shoppers over commuters. No net increase in public parking.





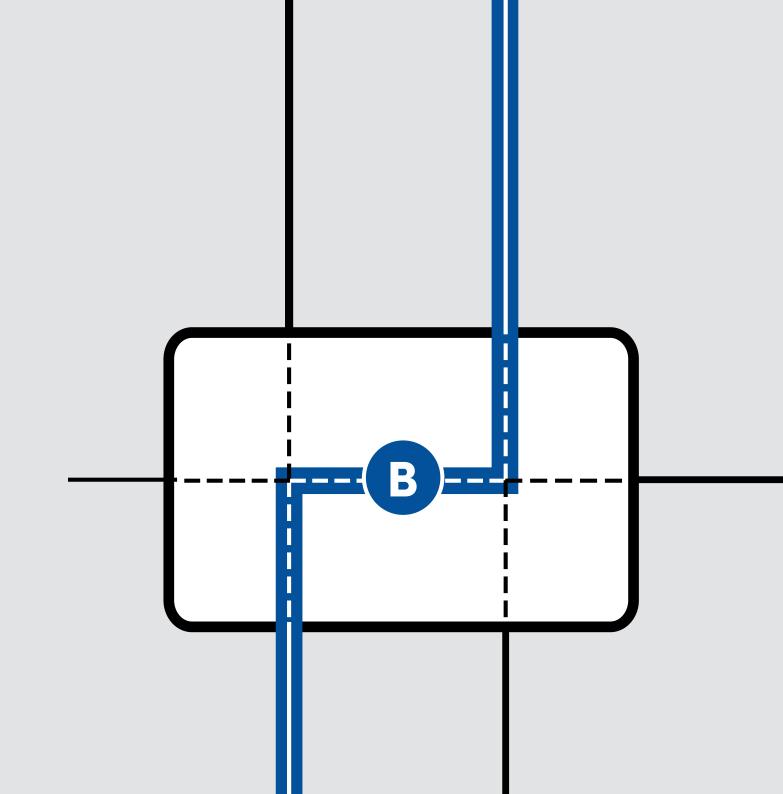
Smart Parking meters in Boston have made it easier to find available car bays, simplify payment and enable users to check remaining time via smartphone. It also provides useful data for the City to better manage and enforce parking. (Source: IPS Group).

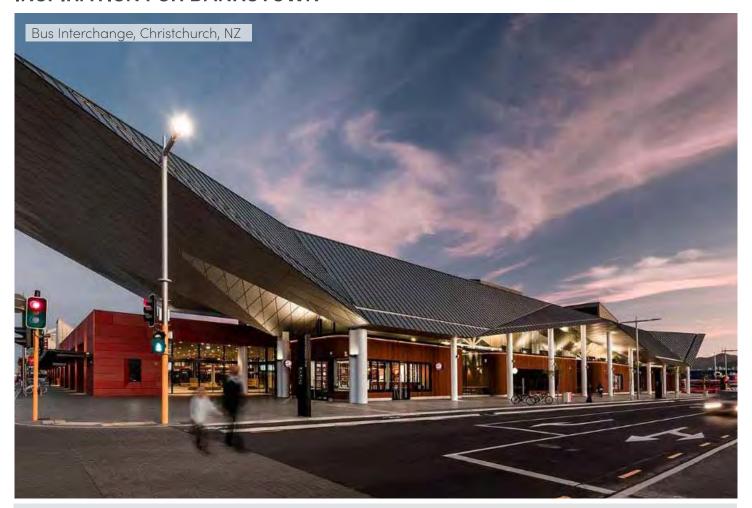
- Council provides 100% unpaid and 50% unrestricted parking spaces, much more than most other Councils (refer to p.51).
- A large proportion of unrestricted parking spaces are occupied all-day, suggesting a significant proportion of commuter parking in Bankstown CBD. Opportunity to enforce time limits to encourage greater turnover for shoppers and visitors.
- Parking demand differs depending on the side of the rail station.
- Technologies such as car-sharing, ride services, real-time digital signage and apps to find and pay for parking exist now and are proven to be effective in managing parking.
- Opportunity to introduce more paid parking to address expenses (Bankstown's carparks generated \$59K revenue in 2016/7 but \$1.56M expenses in the same period).
- Growing need for electric vehicle charging infrastructure in carparks

05 STRATEGY D

STRATEGY

Simplify bus routes and better integrate station and layover space.





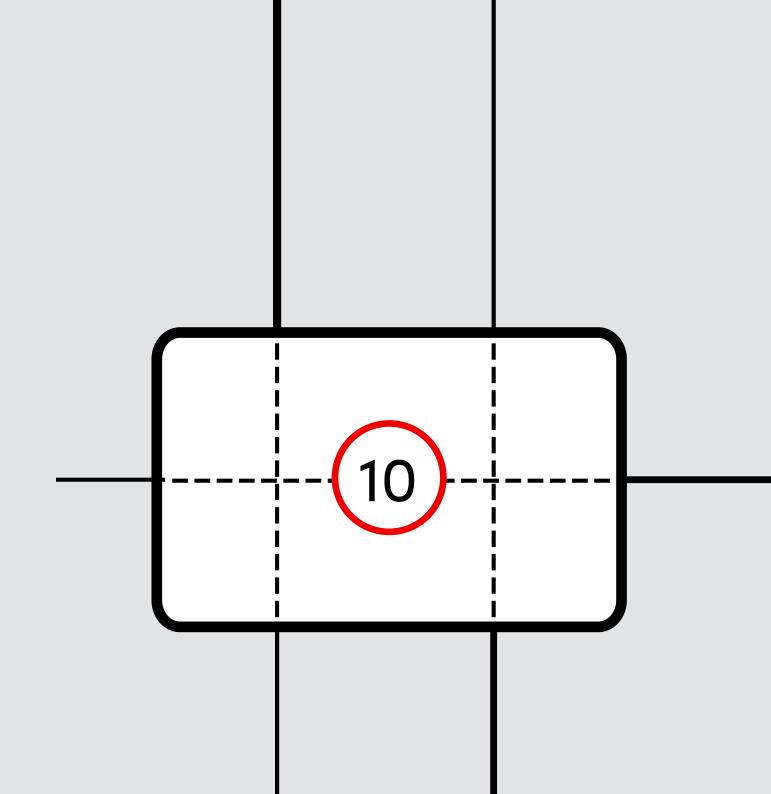
Amalgamated Interchange + Improved Connection to Rail

- Two large and inefficient interchanges create heavy bus traffic through CBD core (1 bus/min across plaza bridge). Two interchanges are not warranted for size of city centre.
- On many streets, streetscape barriers (walls, fences) have been erected to limit interactions of pedestrians and buses/heavy vehicles. These affect pedestrian desire lines in negative ways.
- Swept path provisions to enable buses to negotiate the multiple turns required through the centre dominate many intersections, constraining pedestrian movement and pooling space
- Bus layover inefficient use of land
- Bus routes terminating at both terminals create operational inefficiencies
- Bus use as mode of travel to access train station projected to increase, whilst many people also use buses to access Bankstown as a destination.

05 STRATEGY E



Slower, safer CBD streets.

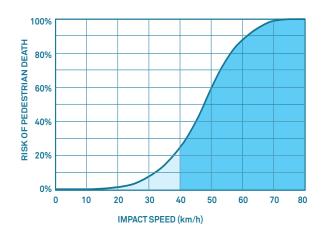








Speed is the most important factor in the safety of a street, and is directly related to risk of pedestrian fatality in cases of conflict.



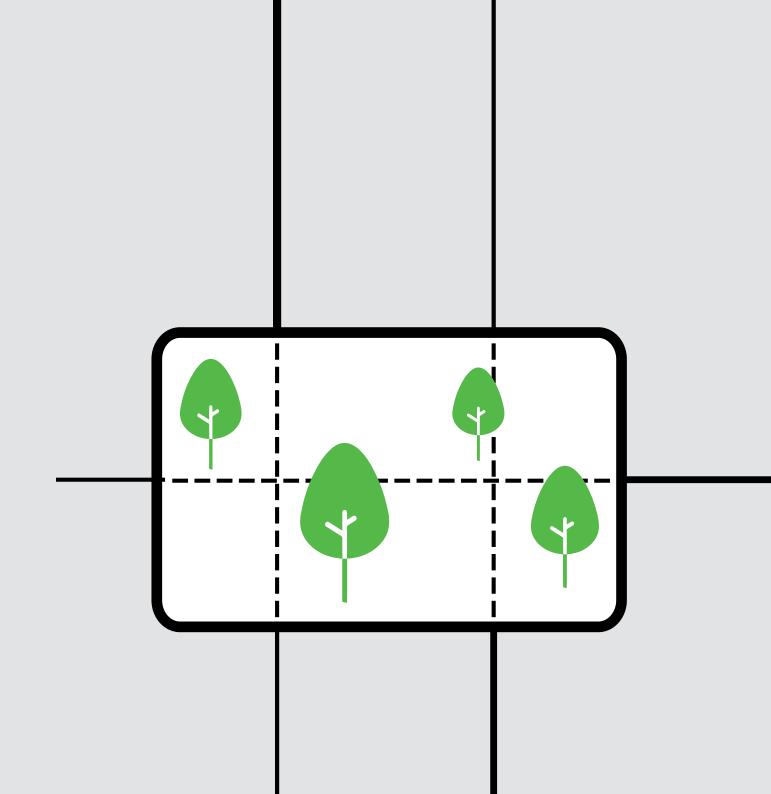


- Speed is the most important factor in the safety of a street and pedestrian safety will be paramount to the success of the CBD as a thriving destination.
- Most of the CBD is signposted 40km/ hr yet the street design enables higher speeds.
- Recent studies (including the 2018 report from the OECD's International Transport Forum) recommend a speed limit of 30km/hr in urban areas with high pedestrian activity and this is currently being pursued in cities such as Melbourne, Perth, Auckland, London and Madrid.
- As well as speed limits, the design of the street affects the actual speed - including lane width, corner radius, trees, parking and pedestrian activity.

05 STRATEGY F



High amenity CBD streets.







Pedestrian Priority



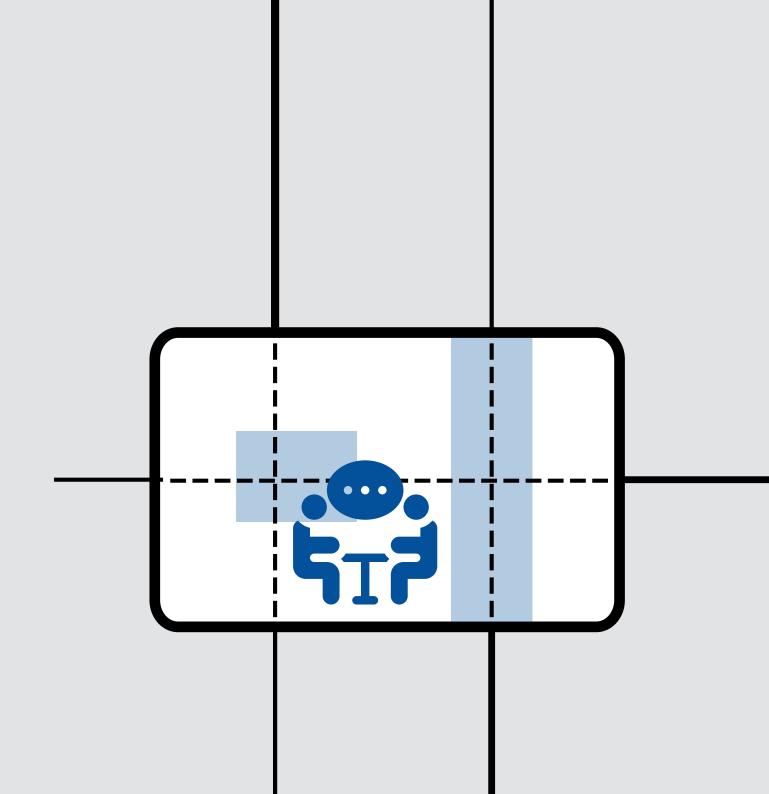
Streetscape Elements

- Global research suggests that pedestrians spend 65% more in a place than drivers, particularly when there is high amenity (Peters, 2016).
- Bankstown CBD displays varying pedestrian amenity: Saigon Place generally is pedestrian friendly with active streets but 72% of streets in Bankstown were found to have limited amenity.
- Opportunity to provide wider paths, more outdoor dining and more street trees on many streets by reallocating space from overly-wide road lanes and corners.

05 STRATEGY G

STRATEGY

Focus areas for outdoor dining, the night time economy and events.









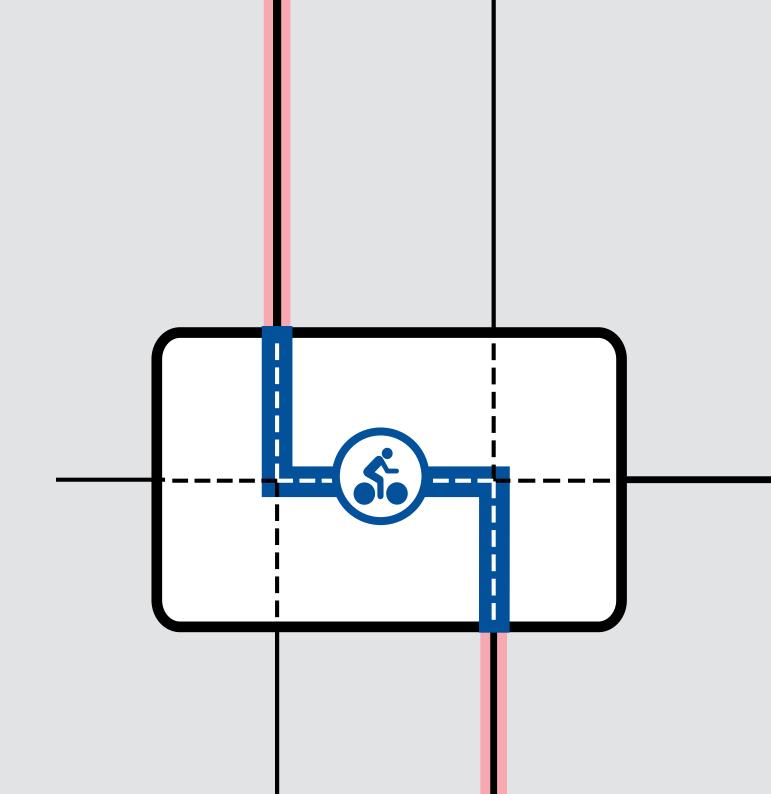
Flexible, Shared Streets and New Open Spaces which make room for outdoor activities

- Research suggests if a destination is safe, clean, and relaxed visitors will remain 300% longer and spend more money. Net income for local businesses increase by 42%. (Hack, 2013).
- Retail sales can increase by 172% when you improve the pedestrian environment (Peters, 2016).
- In Bankstown, weekend activity is higher than weekday activity.
 South Terrace is the 2nd busiest pedestrian area in the CBD, yet the footpaths are not wide enough for outdoor dining.
- If best practice lane widths (NACTO recommended widths) were applied to existing streets, with no change to parking or traffic, 0.78Ha of underutilised space is discovered, which could be put into utility for outdoor dining and amenity.

05 STRATEGY H



Connect regional cycling links through the CBD.







Separated Cycle Tracks





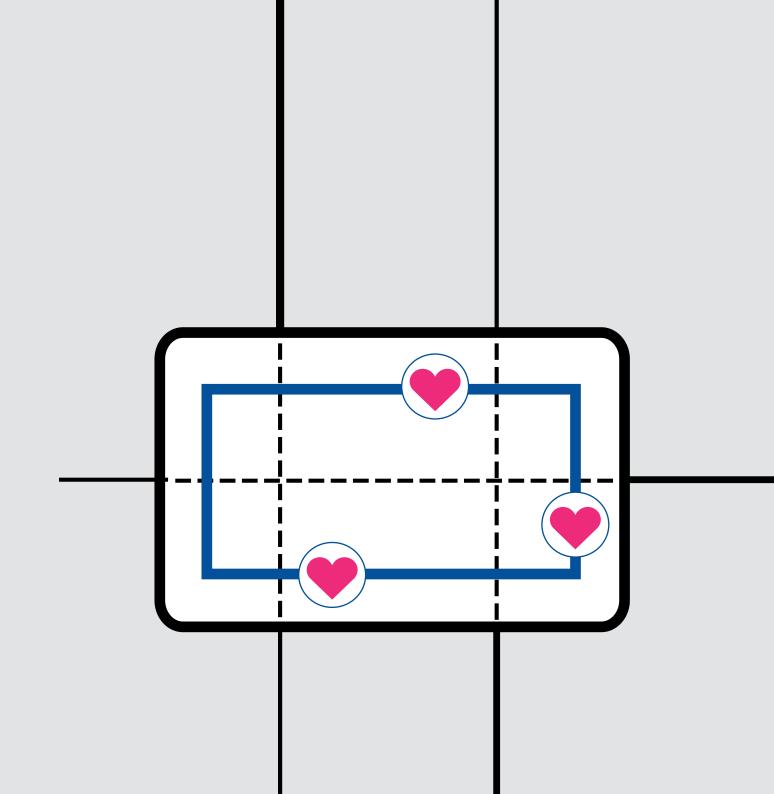
Shared Space Links

- Currently there is minimal cycling infrastructure in the CBD and zero dedicated lanes.
- There are key cyclist desire lines on Olympic Parade, Marion Street, William Street, Greenfield Parade and South Terrace.
- Opportunity for extension of the bicycle network, with creation of dedicated links along desire lines.
- Opportunity to deliver part of the Green Grid Priority Corridor as set out in the South District Plan.
- Safety concerns for cyclists who are forced to share the road with cars, particularly along CBD edge roads such as Rickard Road.
- Low confidence cyclists generally need protected infrastructure to feel safe.

05 STRATEGY I

STRATEGY

Connect cultural destinations with an identity-focussed Cultural Trail.





"Connects Cultural Destinations"







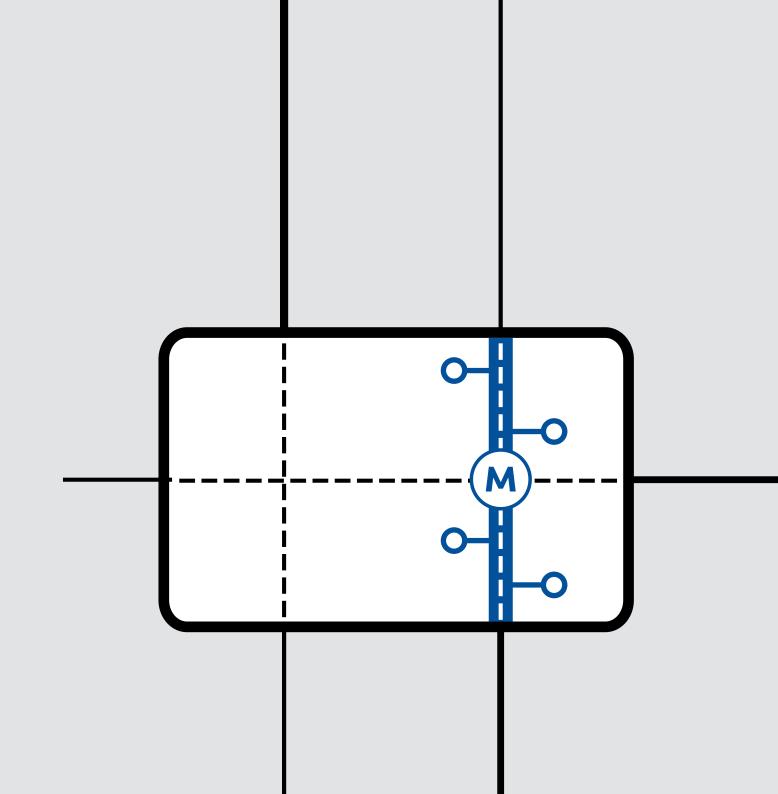


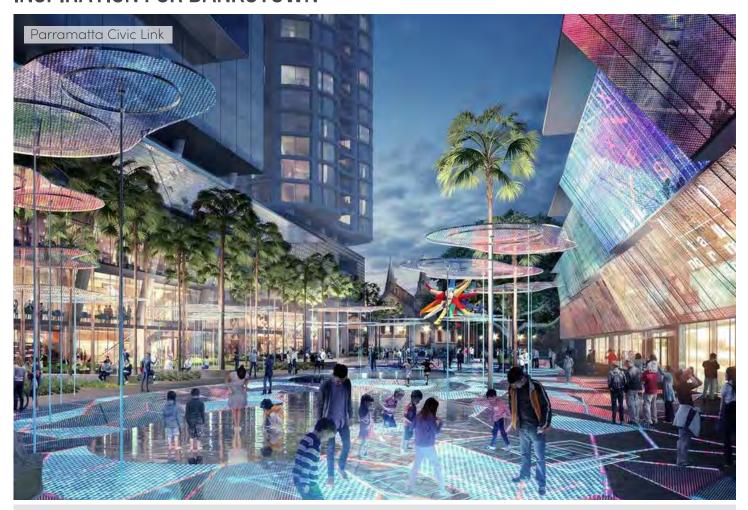
- Diverse and multi-cultural people make up Bankstown's population, which is a source of pride for the City and should be celebrated and promoted.
- The cultural gems in Bankstown are isolated, difficult to find and poorly connected.
- Whilst the City has a strong graphic brand identity, signage fabric lacks co-ordination, with a mix of styles.
- Directional information markers are lacking in the north of the CBD.
- The CBD would benefit from a clear structure of pedestrian access and open space, supported by functional and legible wayfinding.

05 STRATEGY J



Create pedestrian priority 'Activity Spine' linking key destinations with transport.





"A Pedestrian Priority Street Linking Civic Destinations"

- Currently poor connection between north and south of CBD due to barrier created by rail line.
- Opportunity to connect the Appian Way and Restwell St to link the library, future university, shopping centre, bus station, train/ Metro station, schools and major parklands.
- New Metro station design provides opportunity to connect north and south sides of rail line with at-grade pedestrian link.
- Future WSU Campus is directly north of the future Metro station and The Appian Way will likely see increase of pedestrian volumes between the two destinations (8,000 - 10,000 students per day).



COMPLETE STREET MASTER PLAN





06 MASTER PLAN

EXISTING

High Traffic Volume

Neighbourhood Street

Shared Zone

Pedestrian Only

Transit Street (Bus Only)

Major Bus Route

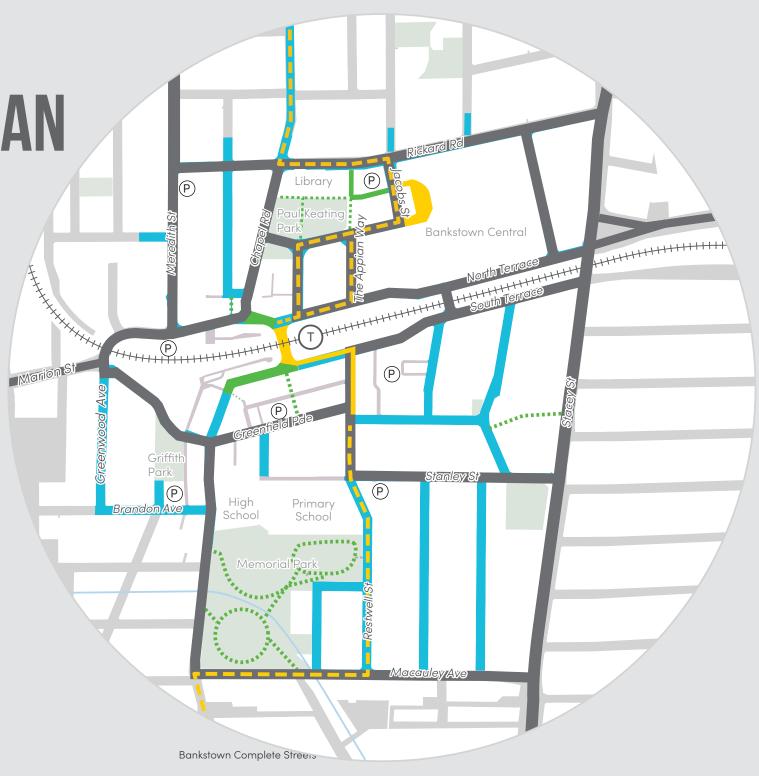
Bike Path / Shared Path

Laneway

(P) Public Parking Station



not to scale



MASTER PLAN

PROPOSED



Neighbourhood Street

Shared Zone

Pedestrian Only

Transit Street (Bus Only)

Major Bus Route

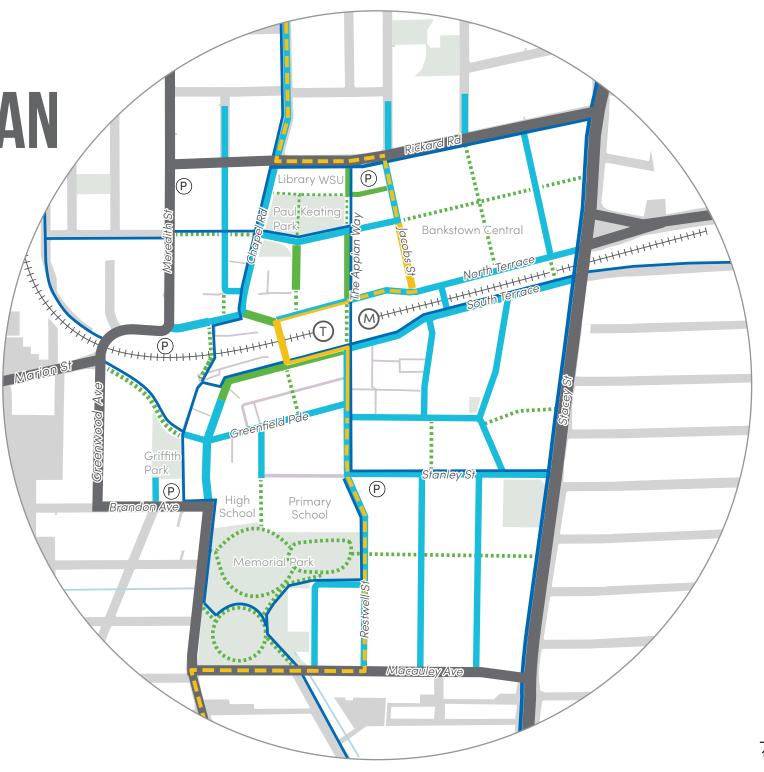
Bike Path / Shared Path

Laneway

(P) Public Parking Station



not to scale



06 **PEDESTRIAN**





Key Enhancements

- Enhanced pedestrian priority along streets and at intersections where pedestrian foot traffic is already high.
- Improved pedestrian amenity and new open spaces where pedestrian foot traffic is expected to be high (i.e.: between the future Metro Station and WSU Campus).
- Appian Way, Fetherstone Street, Saigon Place and City Plaza north become pedestrian priority shared spaces. These streets can be closed down to car traffic for events or festivals.
- Mid-block pedestrian- and cyclist-only links and new arcades facilitated by key future development sites (i.e: Bankstown Central redevelopment).

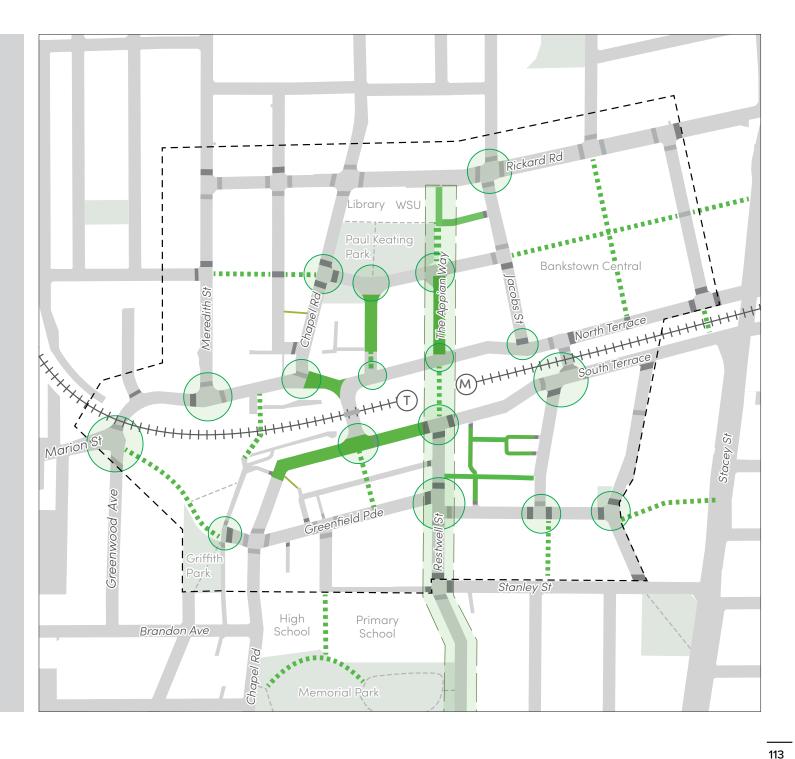
	BY THE NUMBERS
+55%	Improved Intersections for Pedestrians 17 improved intersections
+30%	Pedestrian Connectivity 18 new connections
+2Ha	Of usable public space 34% of CBD now 'public', up from 30%
+30%	Pedestrian Priority Space 74,536m² of space, up from 57,236m²
+60%	New Signalised Pedestrian Crossings 31 new crossings

Future Pedestrian Network

- Shared Zones
- ■ New/improved pedestrian- and cyclist-only links
- Improved geometry for pedestrian crossing
- New signalised/ raised pedestrian crossing
- Existing signalised/ marked pedestrian crossing
- Existing/maintained arcade
- 'Activity Spine'
- --- Pedestrian Study Area
- Existing Open Space



not to scale



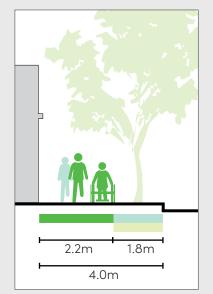
06 PEDESTRIAN



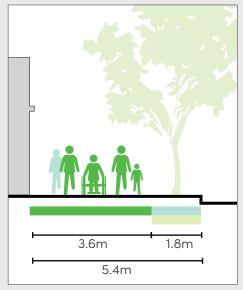


Basic Street Geometry Recommendations for Pedestrians and People Doing Business (recommended minimum widths)

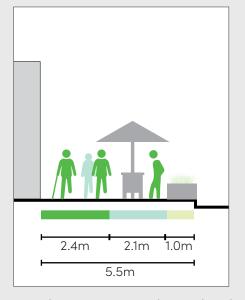
Source: National Association of City Transport Officials (2016) 'Global Street Design Guide'



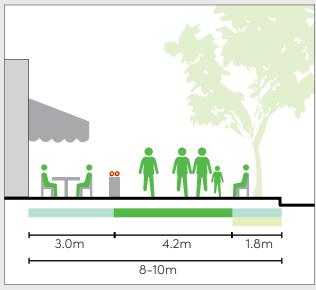
Typical Street



High Pedestrian Activity Street



Outdoor Dining and Retail Hub Streets



These configurations could be applied to Lady Cutler Avenue and City Plaza South



06 **PEDESTRIAN**





Streetscape Enhancements

A number of critical elements influence the pedestrian experience in Bankstown. These include, but are not limited to: connectivity, pedestrian ease of movement, activation, comfort, safety and accessibility. When these influences are synthesised they can provide a holistic understanding of the total environment that is being provided in Bankstown.

As part of the streetscape analysis, which can be found in its entirety in Appendix A, we studied footpath widths. As the image shows on the right, 3 generalised functions should be accommodated along a great footpath: service zone (benches, rubbish bins), free zone (movement through) and transition zone (to allow for movement in and out of shops). Depending on the street character, these widths can vary, but for purposes of this project we aimed to deliver a free zone width of 2.4m minimum. Where this isn't possible within existing right of way, we have recommended new setbacks, as shown on p116.



Recommended Setbacks and Active Frontages

Frontage or setback recommendations help to achieve appropriate 'free zone' footpath widths and 100% positive streetscape rating

+84%

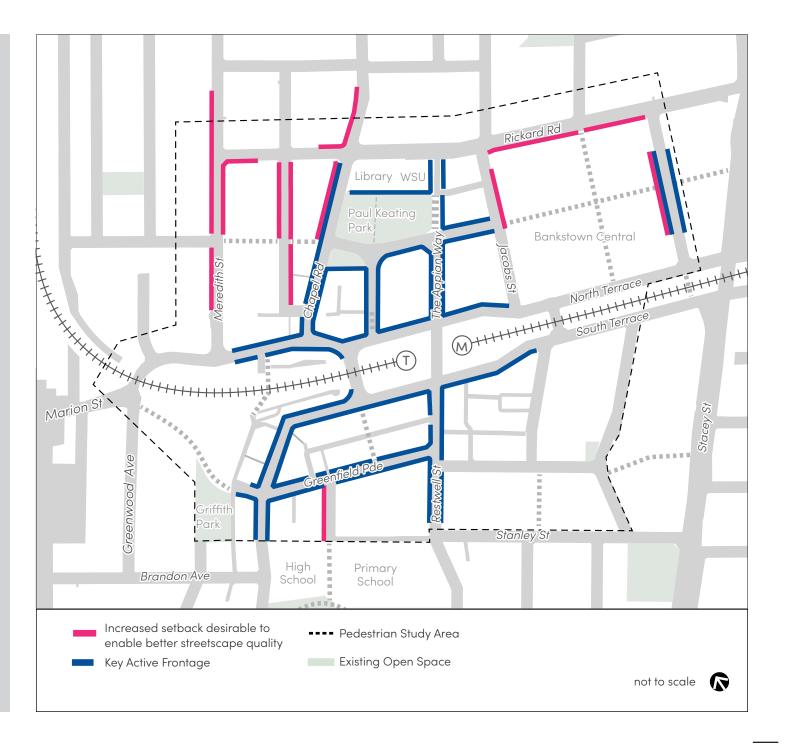
more trees in the streets

1,127 trees, up from 613

100%

of streetscape meets 'positive' rating

75% meets such a criteria now



06 STREET ACTIVITY A





Key Enhancements

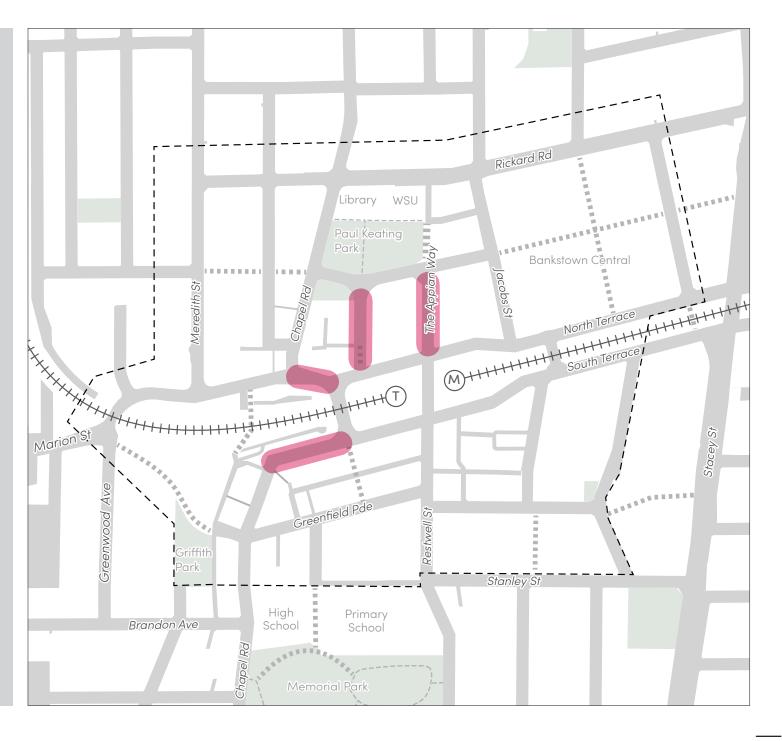
- Expanded opportunities for outdoor dining to enhance street activity in the CBD.
- Council to provide infrastructure in Priority outdoor dining areas as part of streetscape works.
- Major night time activity hubs including the RSL, Sports Club, Shopping Centre and University Campus connected via safe and active streets.
- Shared zones supplied with three phase power to support street events.



Future Street Activity

- Priority outdoor dining areas (Infrastructure provided by Council. Outdoor dining permitted in other areas subject to Council approval)
- --- Pedestrian Study Area
- Existing Open Space

not to scale



06 WEATHER PROTECTION 500000





Key Enhancements

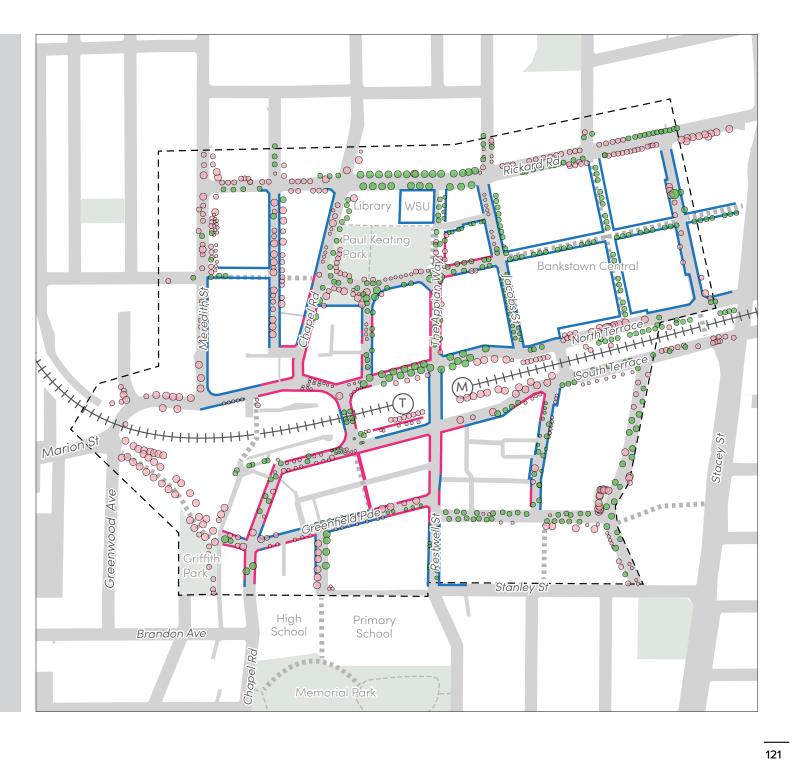
- Mature trees retained where possible, particularly those which contribute to streetscape character (such as along Olympic Pde and Kitchener Pde).
- Proposed trees provide continuity of ecological corridors, contribute to urban tree canopy, and provide visual interest or speed calming measures.
- Awnings proposed along all major active frontages, to provide continuous pedestrian routes protected from sun and rain, and to compliment existing awnings.



Future Weather Protection

- Existing Awnings
- Proposed Awnings
- Existing Trees Retained
- Proposed Trees
- Pedestrian Study Area
- Existing Open Space

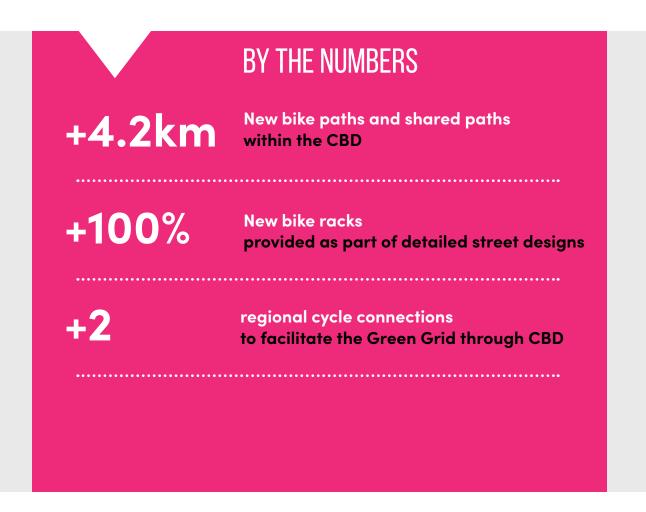




O6 CYCLING

Key Enhancements

- Connects missing cycle links in regional system to facilitate green grid connections through Bankstown CBD.
- Legibly connects TAFE, the future UWS site, and primary and high schools with the future Metro station and existing Sydney Train station.
- CBD features fully separated bike paths along Chapel Road and The Mall to the north of the station and Dale Parade, Restwell Street and South Terrace south of the station.
- Shared zones can accommodate cyclists.

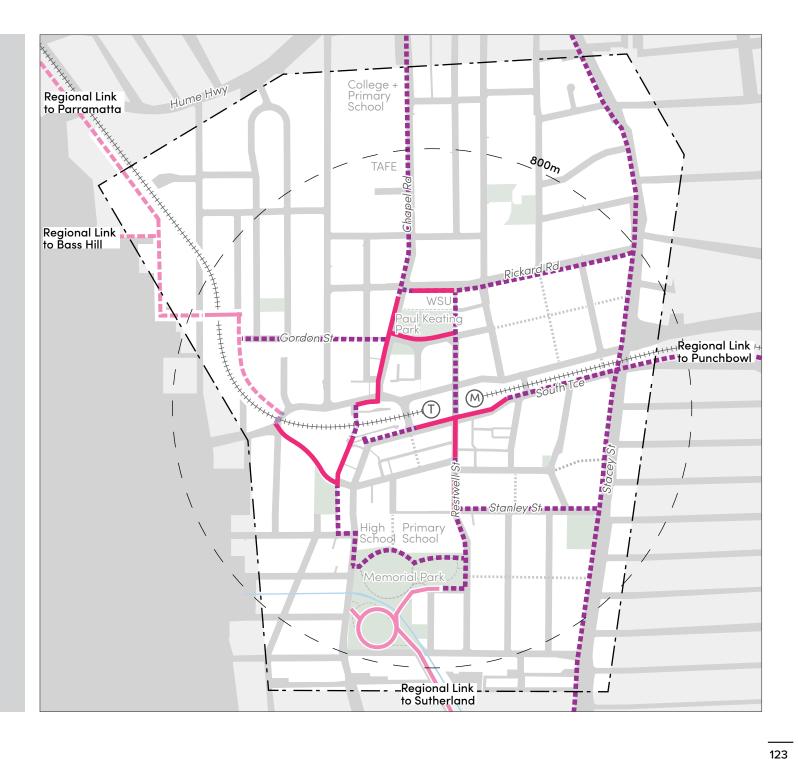


Future Bike Network

- ■ Existing on-street bike route
- Existing Shared Path
- New Separated Bike Path
- ■ New Shared Path
- --- Transport Study Area
- Existing Open Space



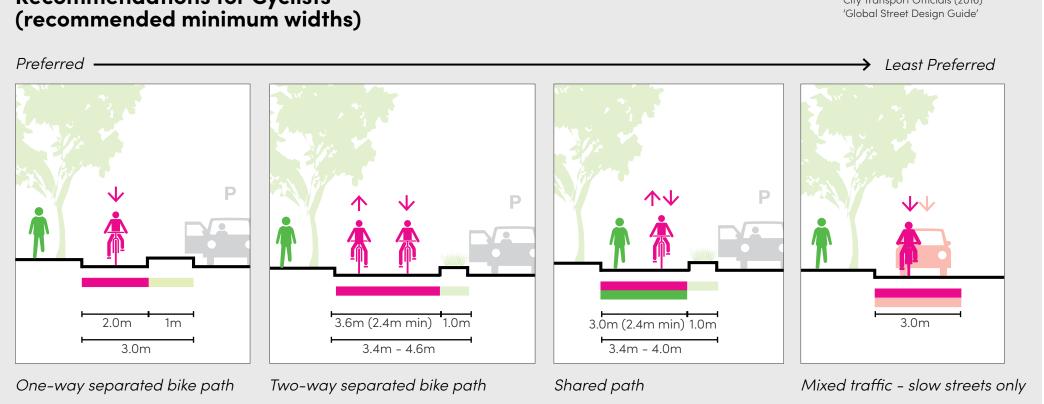
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06 CYCLING

Basic Street Geometry Recommendations for Cyclists (recommended minimum widths)

Source: National Association of City Transport Officials (2016) 'Global Street Design Guide'





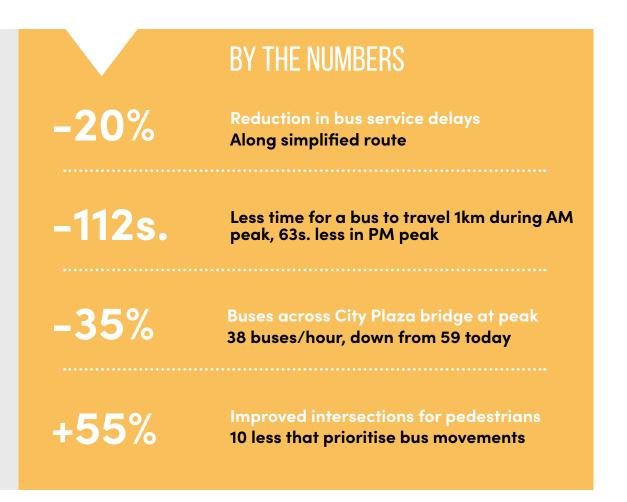
Key Enhancements

Buses:

- Simplified north-south bus services along one route.
- Amalgamated bus interchange (currently 2) on the north side
 of the future Metro station. This location allows service to be
 integrated with the future Metro and service key destinations,
 including the future WSU campus, Bankstown Central and Saigon
 Place.
- The new bus interchange includes layover space and allows for the removal of existing layover space south of the railway.
- Significant bus stop maintained at Bankstown Plaza south. Less bus movements across the bridge (due to amalgamated bus interchange) allows for smaller stop and widened footpaths for outdoor dining.

Rail:

- Station extended east for new Metro platforms.
- New direct at-grade connection across rail corridor between the Metro and train platforms (in line with The Appian Way and Restwell St).
- Upgrades to public space outside station.

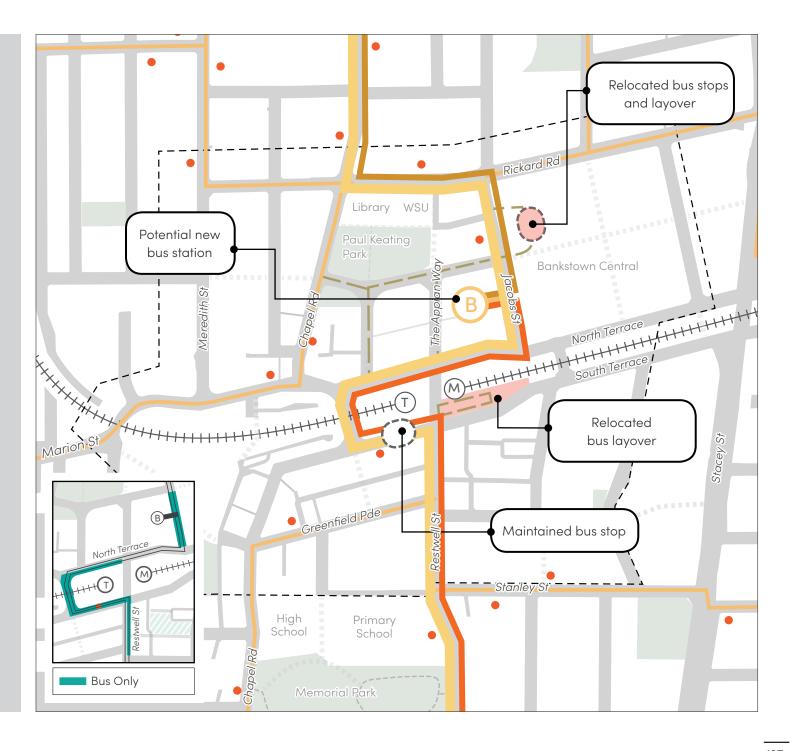


Bankstown Complete Streets

Future Public Transport Network

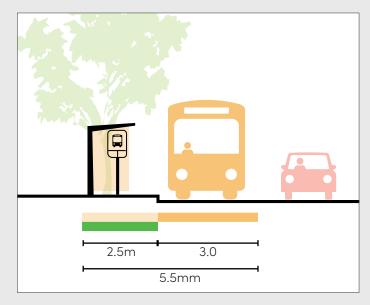
- Bus stop
- North-South Connecting Bus Services
- Northern Bus Services
- Southern Bus Services
- Other Bus Services
- Eliminated Bus Routing
- Relocated Layover Space
- --- Pedestrian Study Area
- Existing Open Space



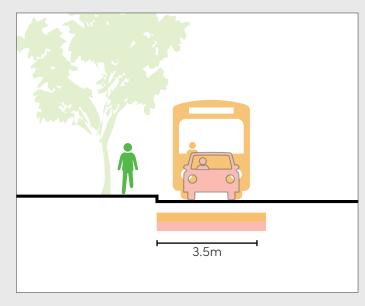


Basic Street Geometry Recommendations for Transport Users (recommended minimum widths)

Source: NSW Transport State
Transit Bus Infrastructure Guide



Kerb lane as a parking lane



Bus-only and mixed traffic lanes



06 TRAFFIC

Key Enhancements

- Ring road to provide good access to the edge of CBD with clearways during peak hours to maximise capacity. The Ring Road will also help prioritise walking/cycling/public transport use within the CBD.
- Traffic calming on all CBD streets. Pedestrian priority design to avoid rat-running.
- Predominately two-way street system for improved safety and accessibility.
- The Mall, Fetherstone St and The Appian Way converted to two-way streets.
- Northern end of Dale Parade converted into a one-way street.

	BY THE NUMBERS
+30%	additional traffic on the ring road without impact to journey times through use of clearways and intersection improvements
-16%	vehicular movements on CBD streets in PM peak, 6% reduction in AM peak
30 km/h	Average vehicular speeds in CBD industry standard for 'safe' speed
-2%	vehicle travel speed on ring road minimal impact on level of service (LOS)
+0	Additional traffic lanes needed to accommodate future traffic

Future Traffic Network Changes

- Ring Road, 2 lanes each direction at peak (new clearways) and 3 lanes in each direction on Stacey St
- Existing two-way streets, no change
- Existing one way streets, no change
- One-way to two-way conversion
- Two-way to one-way conversion
- ■■■ New or enhanced Shared Zone
- Vehicles not permitted, existing
- William Vehicles not permitted, new
- --- Transport Study Area
- Existing Open Space



not to scale



06 INTERSECTIONS

Key Enhancements

- Additional right turn lane from Meredith St northbound into Rickard Rd eastbound to encourage Ring Road use.
 - Southbound Meredith St reduced to one lane at signals.
 - Signal phasing updated to support Ring Road.
- Additional right turn lane from Chapel Rd southbound into Rickard Rd westbound to encourage Ring Road use.
 - Southbound Chapel Rd reduced to one lane at signals to discourage through-traffic.
 - · Signal phasing updated to support Ring Road.
- Signal phasing updated to support Ring Road and bus movements.
- 4 Potential carpark access consolidation (subject to redevelopment of centre).
 - Signal phasing updated to support Ring Road.
- Pedestrian crossings added to all sides of intersection.
 - · Signal phasing updated to support Ring Road.
- Pedestrian crossing widened to cater for high volumes.
 - Intersection reduced to one traffic lane each direction to discourage through traffic.
- Signal phasing updated to reduce pedestrian wait time.
- Pedestrian crossings added to all sides of intersection.
- Right turn lane from Marion St westbound into Meredith St northbound removed to discourage through-traffic.
 - Signal phasing updated to support Ring Road.
- Fetherstone St closed to traffic at North Tce.
 - Signals reconfigured as signalised pedestrian crossing.

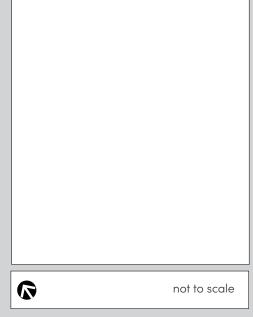
- 10 Reduced to one bus lane each direction.
 - Signal phasing updated for reduced pedestrian wait times.
- Alignment of lanes reconfigured to suit new Restwell St design.
 - Fourth leg to bus terminus removed (subject to relocation of bus terminus)
 - Signal phasing updated include phase for bike lane and reduced pedestrian wait times.
- 12 Northbound Chapel Rd reduced to one lane.
 - Signal phasing updated.
- 13 Signal phasing updated to support Ring Road.
- 14 Signal phasing updated to support Ring Road.
- 15 Kitchener Pde (north) re-opened.
 - Signal phasing updated to support Ring Road.
- Intersection upgraded as part of Stacey Street widening by RMS
- New signalised intersection to manage bus/ pedestrian conflicts, includes pedestrian crossings on all sides of intersection.
- New signalised intersection to manage the forecast increased pedestrian movements associated with the Metro station and new university, includes pedestrian crossings on all sides.
- New signalised intersection to manage bus access in and out of Jacobs St extension, includes pedestrian crossings on all sides.

- One turn lane removed from South Tce westbound and eastbound into North Tce (via rail underpass) to discourgae through-traffic.
 - Pedestrian priority crossing converted to fully signalised pedestrian crossing.
- 21 Olympic Pde closed to traffic at Greenwood Ave.
 - Signal phasing updated to support Ring Road and increase through capacity with closure of Olympic Pde.
- Olympic Pde closed to traffic at Dale Pde and signlas reconfigured.
- One turn lane on Raymond St westbound and Restwell St northbound removed to discourage through-traffic.
 - Pedestrian priority crossing and slip lane converted to signalised crossing.
 - Signal phasing updated to include phase for bike lane.
- New signalised intersection to support reliable flow on the Ring Road.
- New signalised intersection provided to provide safer pedestrian access to schools and Memorial Park and cater for new bike lane and shared paths on Restwell St and Stanley St.
- Intersection upgraded as part of Stacey Street widening by RMS.
- Intersection upgraded as part of Stacey Street widening by RMS.

2 Bankstown Complete Streets

Future Intersection Changes

- New signalised intersection/major change
- Signalised intersection upgraded
- --- Transport Study Area
- Existing Open Space



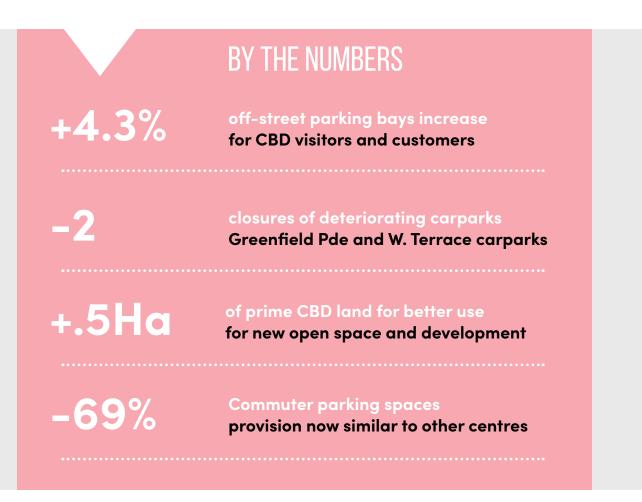


OFF-STREET PARKING



Key Enhancements

- Introduce smart parking technology to make it easier and more efficient to access parking.
- Aim to access all major car parks directly from the Ring Road.
- No net increase of public parking in the CBD. Council
 carparks were originally built to support older
 developments that did not have on-site parking for
 customers, however modern developments provide large
 amounts of parking on-site and the reliance on council
 carparks will decrease. Limiting parking is also a key
 strategy to reducing congestion.
- Restrict at least 80% of parking spaces to less than 4hrs to cater for shoppers and visitors rather than commuters.
- Close Greenfield Parade and West Terrace car parks and relocate to an expanded Marion St car park which has better access from the Ring Road.
- Undertake studies to determine optimal redevelopment plans for Marion St, Greenfield Parade, West Terrace and Brandon Avenue car parks.



Bankstown Complete Streets

Future Off-Street Public Parking

Ring Road

Public Parking Stations Maintained as is

Public Parking Stations Relocated

--- Pedestrian Study Area

Existing Open Space

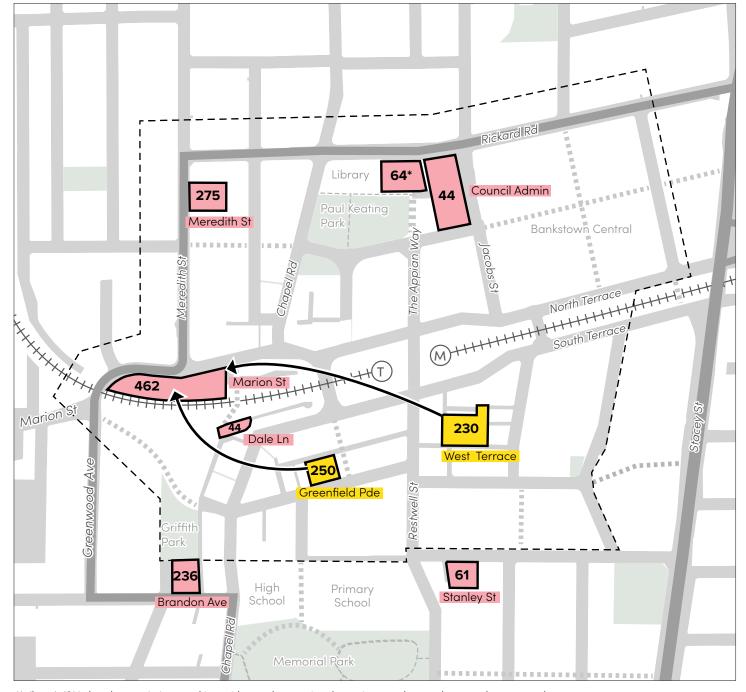
Off-street parking for shoppers /visitors (time restricted)

Now - 920 spaces (55%) Proposed - 1333 spaces (80%)

Off-street parking for commuters (unrestricted time)

Now - 746 spaces (45%) Proposed - 333 spaces (20%)

not to scale



*When WSU develops existing parking either to be retained on-site or relocated to another carpark

06 ON-STREET PARKING



Key Enhancements

- Maintain or introduce timed parking restrictions to all streets within the CBD.
- 15 minute timed parking restrictions where high turnover supports local business trade.
- 1 2 hour timed parking restrictions further from transport interchanges and along residential streets.
- Cross Street and East Terrace now has 2 hour timed restrictions.
- Significant gains in on-street parking along West Terrace, The Mall, North Terrace and South Terrace.
- In total, loss of approximately 28 onstreet spaces throughout the CBD, largely to accommodate the improved amenity upgrades. These could potentially be offset by reconfiguring street parking on surrounding streets.

	BY THE NUMBERS
O streets	Unrestricted parking in the Study Area Minimum 2-hour time restriction
-4%	reduced on-street spaces 24 spaces
530	maintained on-street spaces down from 554 spaces
+84%	More trees in the streets along the kerb 1,127 trees, up from 613 (approximate)
100%	of streets now have quality streetscape rating loss of parking spaces provided space to increase tree canopy/amenity

Future On-Street Parking

- Clearway in peak hours
- Unrestricted parking
- 2 hour parking
- 1 hour parking
- 30 minute parking
- 15 minute parking
- Pick-up/drop off zone
- --- Transport Study Area
- Existing Open Space



not to scale



PARKING MANAGEMENT



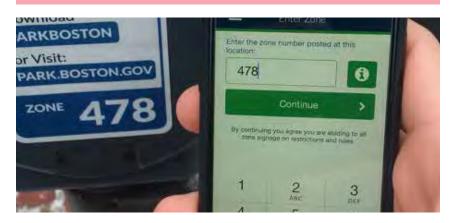
CAR SHARING



PROVIDE SPACE IN THE STREET FOR CAR
SHARING TO REDUCE DEMAND

Providing on-street or off-street spaces for mobility sharing services provides Bankstown the opportunity to manage car volume and space demand in the CBD. In fact, **research shows** (source: GoGet) **that for every 1 GoGet provided on the street can replace demand for 10 private cars** elsewhere.

SMART TECHNOLOGY



PROVIDE REALTIME PARKING
AVAILABILITY VIA MOBILE APP

App technology already exists to allow Council to provide real time parking availability for both on-street and off-street parking. Such an app could also allow users to pay for parking on their mobile device, notify when the time limit is nearly expired and also be used for enforcement and infringements. Council can supply open transport and parking data to enable third party app development.

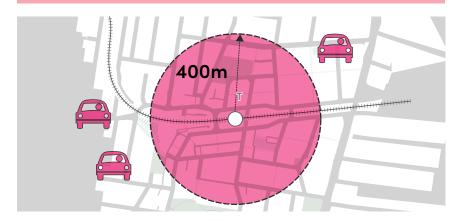
favouring short stays to **SUPPORT BUSINESSES**



DISCOURAGE PARK AND RIDE, ENCOURAGE QUICK TURNOVER

Community and business groups indicate that not enough (short-term) parking is available in the CBD. It is proposed that **at least 80% of parking spaces become restricted to 4hrs or less**. This supports visitors and shoppers who contribute to economic viability of the CBD and discourages park and ride activities. Consider park and ride facilities outside the CBD.

private development PARKING MAXIMUMS



DISCOURAGE OVERLY GENEROUS PARKING PROVISION IN CBD PRIVATE DEVELOPMENT

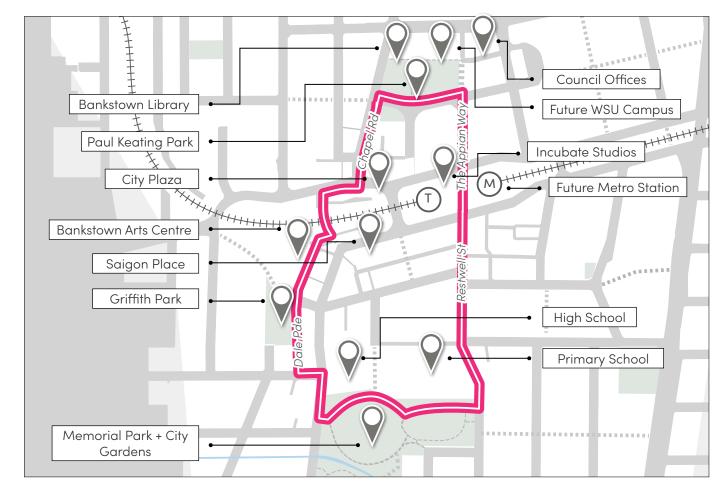
Parking in the CBD generates traffic and providing more parking spaces in the CBD will result in more trips on the CBD road network. In line with what other city centres are doing, and due to the excellent alternative transport services in Bankstown, it is recommended to introduce maximum parking caps for developments within 400m of the station to attract car-free households and/or those who will utilise bus and transport services.

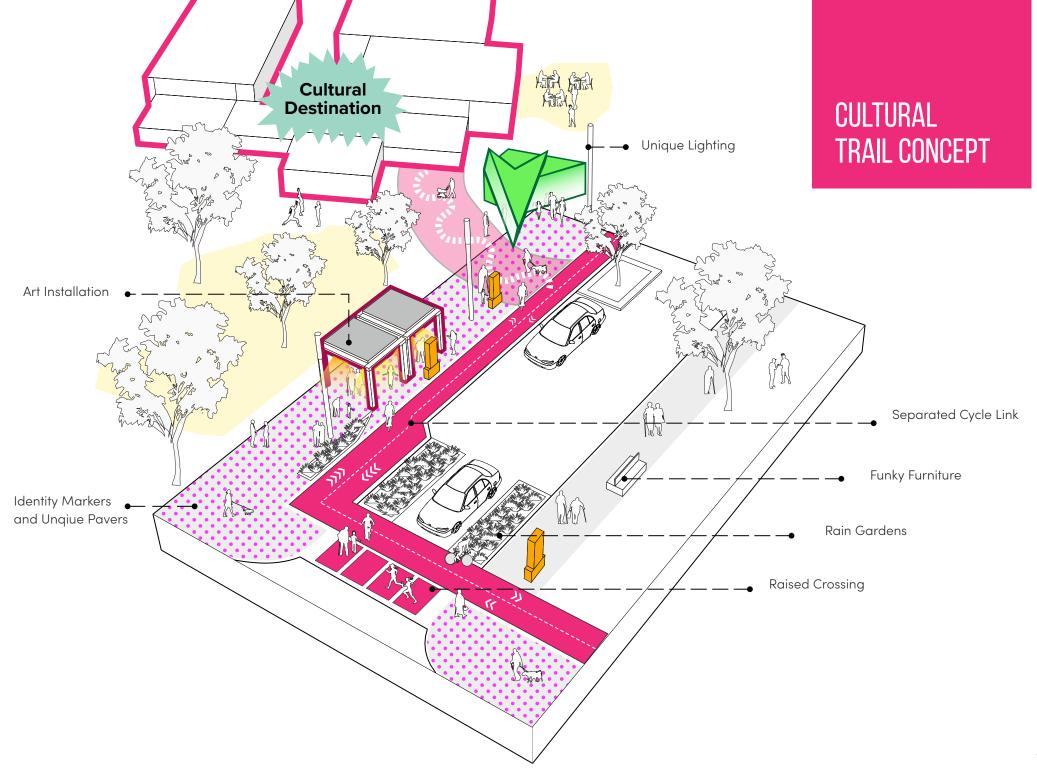
06 CULTURAL TRAIL

Multi-Modal Cultural Trail

Embedded in the Master Plan is a 'cultural trail' that links cultural destinations in the CBD. The trail can include special differentiators to help users and visitors with wayfinding to different destinations. Techniques include: materiality, unique lighting, signage, art installations, embellished plantings and identity markers. These features can be utilised on the cycle paths and adjacent footpath and become an iconic multimodal destination unto itself. The multi-modal cultural trail can not only encourage sustainable travel and stormwater management, but can also celebrate and connect Bankstown's unique cultural identity.





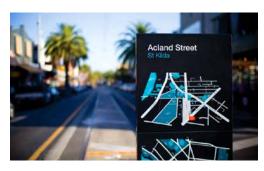


HOW MIGHT THE CULTURAL TRAIL EXPRESS THE CHARACTER OF BANKSTOWN?



Wayfinding

Build off Bankstown's existing strong branding to create a consistent and eyecatching family of signage





Furniture

Benches, tables and other objects can offer creative expression, as well as comfort and amenity to all









Materiality

Bright colours, playful symbols and tactile surfaces bring the trail to life





Lighting

Lighting not only improves safety at night, but can be part of art installations and enhance the trail identity





Public art

Murals, sculptures, lighting and other forms of public art can act as 'pause points' along the trail, engaging local artists and expressing local themes













Rain gardens, vegetation buffers, street planting and landforms can all offer visual delight and adopt creative forms





Multi-modal design

Embraced alongside through cycleinfrastructure are accessfriendly paths for all footpath users, efficient links, and clear signage





The Cultural Trail has changed our city. The impact is significant and will continue for years ahead.

- Indianapolis Mayor Greg Ballard, July 2015

In Indianapolis, property value within one block of their Cultural Trail increased 148% in the last 10 years.

06 POLICY RECOMMENDATIONS

To support the physical street and transport upgrades, the following are required:

- Adopt Bankstown Complete Streets and the transport and streetscape design Master Plan.
- Update S94 contributions plan to include Complete Street recommendations and enforce in all DAs.
- Update Capital works program and budgets to implement Complete Streets.
- Prepare an updated Public Domain Technical Manual
- Prepare a Street Design Manual that includes a process and assessment criteria for detailed design to ensure that the vision and principles in the concepts are maintained (Council item 10.4 April 2018).

- Update the DCP with recommended setback/ road widenings, mid-block connections, awnings, and reduced parking standards (no minimum and add maximums within CBD).
- Establish a Transport Working Group to coordinate and implement more strategic decisions and designs than Traffic Committee.
- Undertake detailed investigations into smart parking technology for all Council parking (on and off street) including realtime monitoring, digital wayfinding signs and apps, supplying open data to third parties and also smart speed bumps (Council item 10.6 May 2018).
- Work with TfNSW to deliver an Active
 Transport Program (there are 9 schools +
 Tafe + Uni within 1km of CBD) including safety measures, information, and supervision etc.

- Work with TfNSW to gain approval for amended bus routes, bus stops and a new consolidated station and bus layover.
- Develop policy position on providing dedicated spaces for car sharing, ride services, EV charging and AVs including locations, design and fees.
- Become signatory to the Shared Mobility Principles www.sharedmobilityprinciples.org.





CONCEPT DESIGN





07 **CONCEPT DESIGN**

Complete Streets Concept Designs

This chapter outlines concept designs for the CBD streets based on the Master Plan and strategies outlined in the previous chapters.

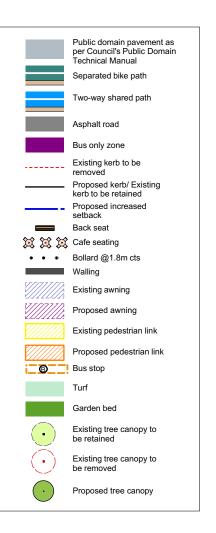
The concepts illustrate the long term opportunities for enhancement of the CBD and provide a guide for the detailed design of each street.

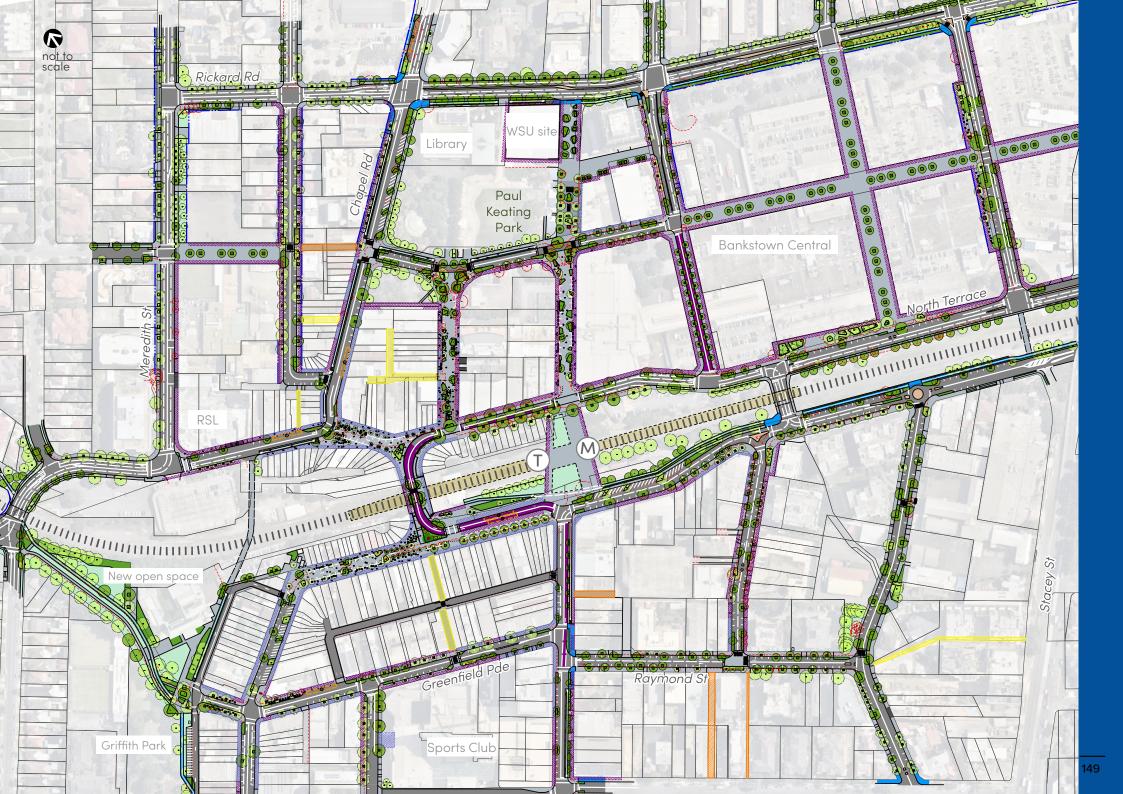
These concepts are based on high level base information and are indicative only in their resolution. Detailed site survey and analysis will be applicable to each to take the concepts to the next level of design.

Each street is shown in further detail on the following pages (each name is linked to the corresponding page):

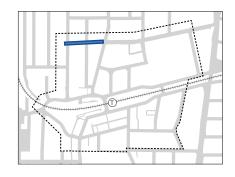
Rickard Rd West (p.150)
Rickard Rd Central (p.152)
Rickard Rd East (p.154)
Meredith Street (p.158)
Kitchener Parade (p.162)
Chapel North Road (p.166)
The Mall (p.172)
Fetherstone Street (p.176)
The Appian Way (p.180)
Jacobs Street (p.186)
Lady Cutler Avenue (p.190)
City Plaza North (p.194)
City Plaza Central (p.198)
Marion Street West (p.200)
North Terrace West (p.206)

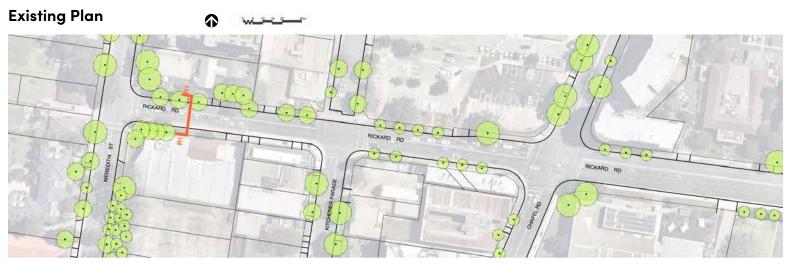
North Terrace East (p.208)
Bankstown City Plaza South (p.212)
South Terrace (p.218)
Chapel Road South (p.224)
Greenfield Parade (p.228)
Raymond Street (p.232)
West Terrace (p.236)
East Terrace / Cross Street (p.240)
Olympic Parade (p.244)
Dale Parade (p.248)
Mona Street (p.252)
Stewart Lane (p.256)
Restwell Street (p.260)





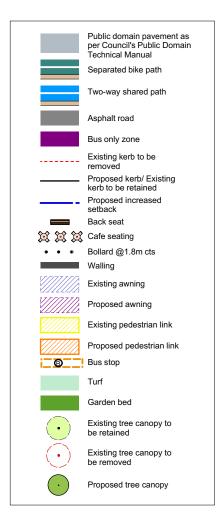
RICKARD ROAD WEST





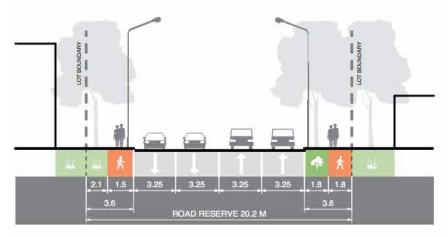
Proposed Plan



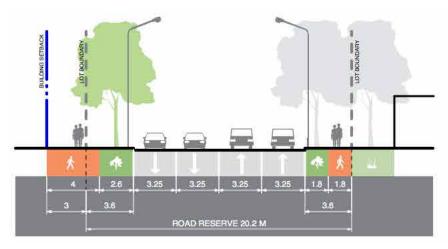


RICKARD ROAD WEST

Existing Section



Proposed Section



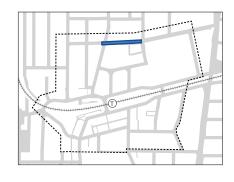
Future Street Character

Part of the ring road providing good access to the edges of the CBD and carparks and providing an attractive tree-lined gateway to the CBD.

Key Changes

- Provide additional right turn lane on Chapel St southbound into Rickard Rd.
- Provide additional right turn lane on Meredith St northbound into Rickard Rd.
- Provide additional street trees and underplanting to create a distinct continuous tree-lined ring road and gateway to the CBD.
- Increase building setbacks to provide wider footpaths and tree planting zones.
- Underground powerlines to enable full tree canopy growth.
- Upgrade footpath paving as per PDTM.
- Re-open Kitchener Parade north as part of adjoining redevelopment.

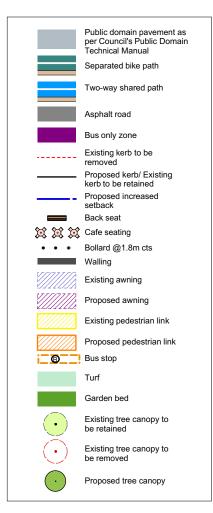
RICKARD ROAD CENTRAL





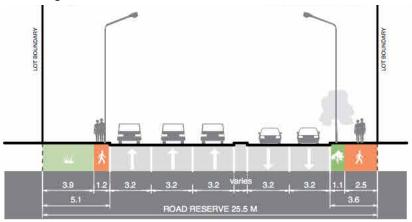
Proposed Plan



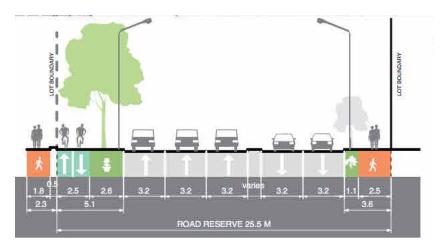


RICKARD ROAD CENTRAL

Existing Section



Proposed Section



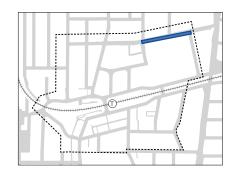
Future Street Character

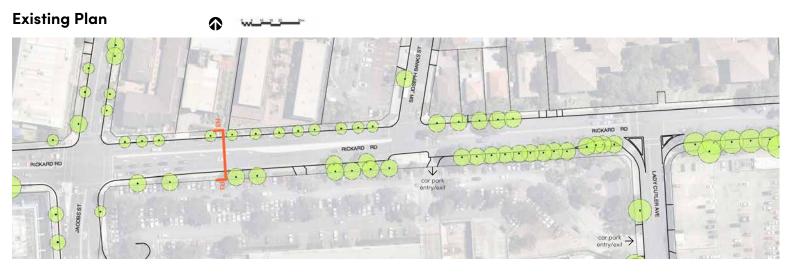
Part of the ring road providing good access to the edges of the CBD and carparks and providing an attractive tree-lined gateway to the CBD.

Key Changes

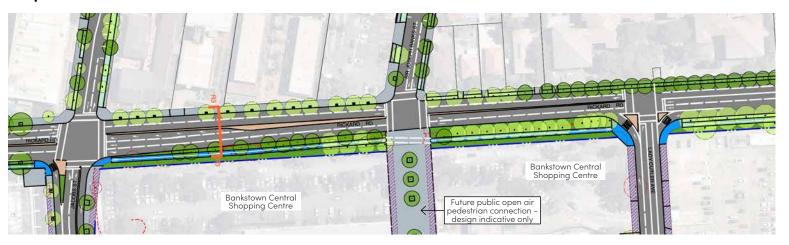
- Provide additional street trees and underplanting to create a distinct continuous tree-lined ring road and gateway to the CBD.
- Provide a two-way shared path along the south side.
- Underground powerlines to enable full tree canopy growth.
- Upgrade footpath paving as per PDTM.

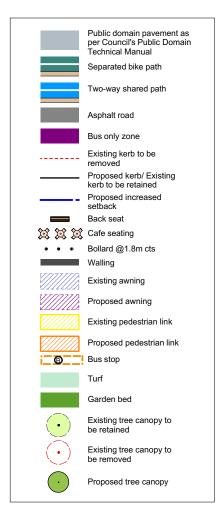
RICKARD ROAD EAST





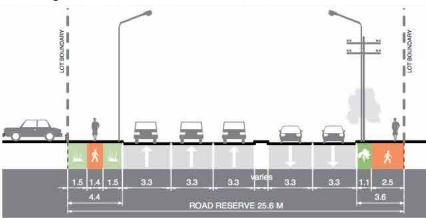
Proposed Plan



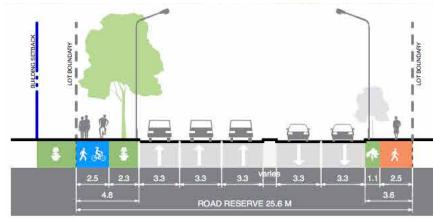


RICKARD ROAD EAST

Existing Section



Proposed Section



Note - existing street parking retained outside clearway times

Future Street Character

Part of the ring road providing good access to the edges of the CBD and carparks and providing an attractive tree-lined gateway to the CBD.

Key Changes

- Provide additional street trees and underplanting to create a distinct continuous tree-lined ring road and gateway to the CBD.
- Provide a two-way shared path along the south side.
- Underground powerlines to enable full tree canopy growth.
- Upgrade footpath paving as per PDTM.

07 RICKARD ROAD

Existing View (looking East)



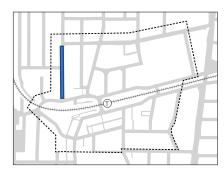
Bankstown Complete Streets

RICKARD ROAD

Proposed View (looking East)

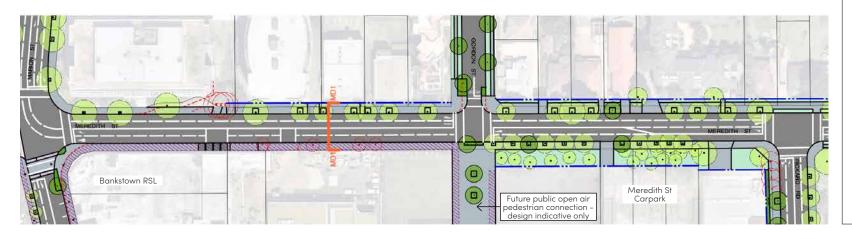


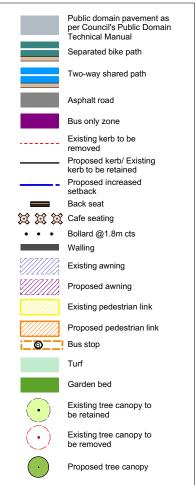
MEREDITH STREET





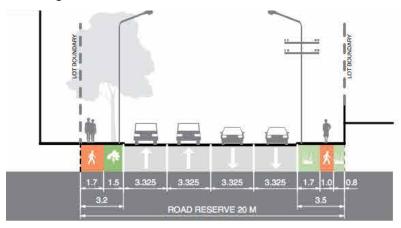
Proposed Plan



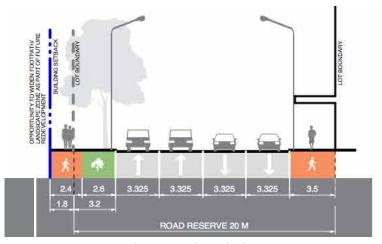


MEREDITH STREET

Existing Section



Proposed Section



Note - existing street parking retained outside clearway times

Future Street Character

Part of the ring road providing good access to the edges of the CBD and carparks and providing an attractive tree-lined gateway to the CBD.

Key Changes

- Signalise intersection with Gordon Street to improve east-west connection.
- Increase building setbacks to enable wider footpaths and tree planting zone.
- Provide additional street trees and underplanting to create a distinct continuous tree-lined ring road and gateway to the CBD.
- Underground powerlines to enable full tree canopy growth.
- Remove slip lane to building on the corner of Meredith/ Marion St.
- Upgrade footpath paving as per PDTM.

07 MEREDITH STREET

Existing View (looking South)



Bankstown Complete Streets

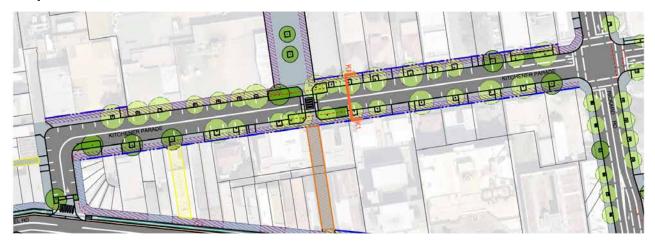
MEREDITH STREET

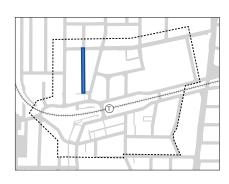
Proposed View (looking South)

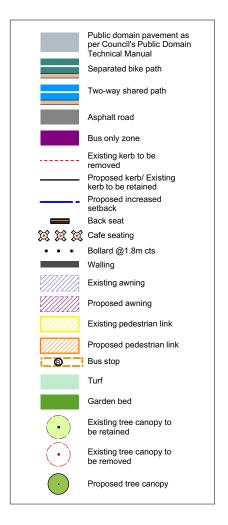


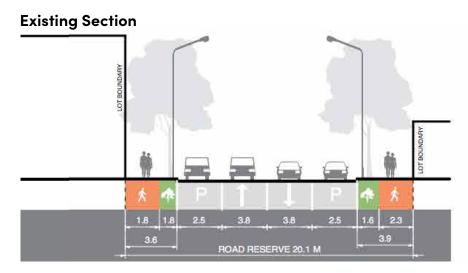


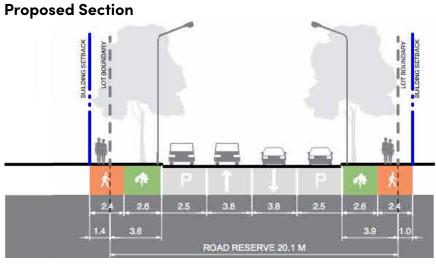












Future Street Character

A tree-lined pedestrian friendly street supporting high density mixed use development.

- Maintain existing street trees.
- Mandate mid-block pedestrian connection between Kitchener Pde and Chapel Rd.
- Increase building setbacks to enable wider footpaths and tree planting zone.
- Provide a raised pedestrian crossing aligned with new mid-block pedestrian connections.
- Upgrade footpath paving as per PDTM.
- Net loss of 2 on-street spaces (from 52 to 50).

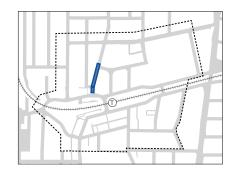
Existing View (looking South)

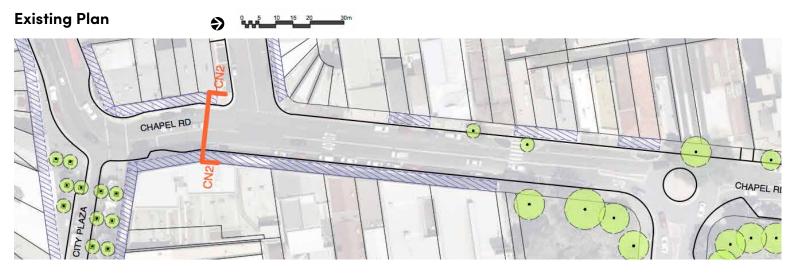


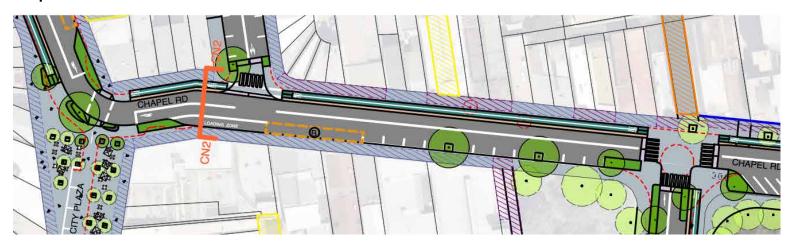
Proposed View (looking South)

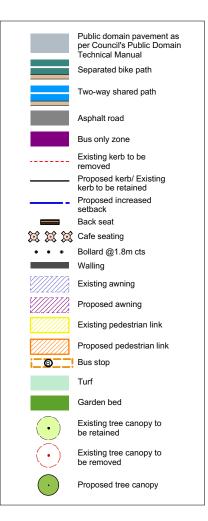


O7 CHAPEL ROAD (A)



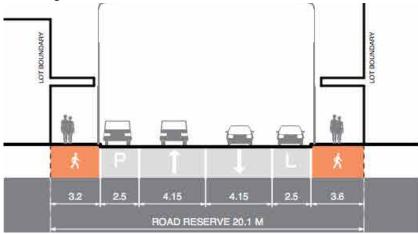




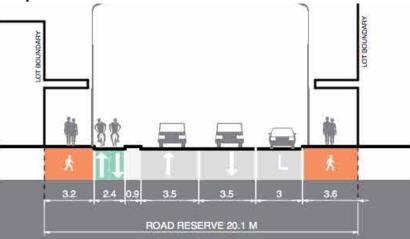


CHAPEL ROAD (A)

Existing Section



Proposed Section

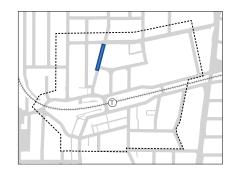


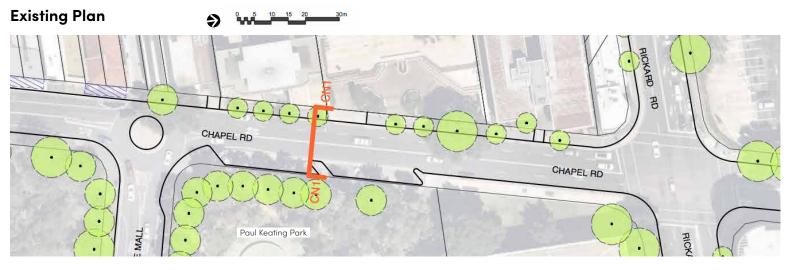
Future Street Character

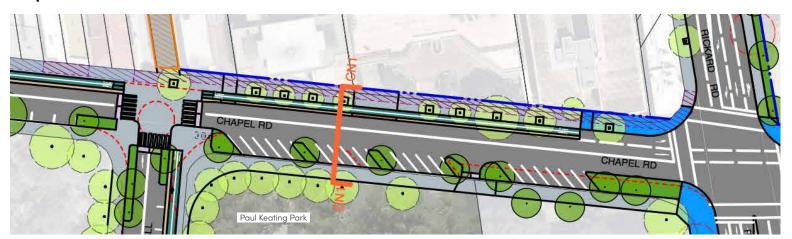
An active commercial street providing an important pedestrian and cyclist connection from the rail station and CBD to Tafe and schools further north.

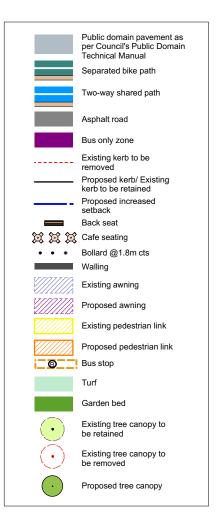
- Provide a two-way separated bike lane within existing parking lane.
- Replace roundabout at The Mall with raised pedestrian crossing.
- Existing bus stop on Marion St relocated to Chapel Rd.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Net loss of 9 on-street parking bays (from 23 to 14).

O7 CHAPEL ROAD (B)



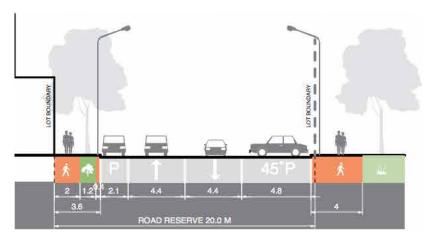




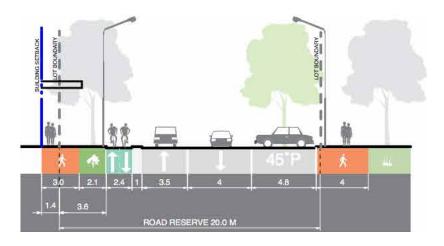


CHAPEL ROAD (B)

Existing Section



Proposed Section



Future Street Character

An active commercial street providing an important pedestrian and cyclist connection from the rail station and CBD to Tafe and schools further north.

- Provide a two-way separated bike lane within existing parking lane.
- Replace roundabout at The Mall with raised pedestrian crossing.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Net loss of 10 on-street parking bays (from 32 to 22).

O7 CHAPEL ROAD

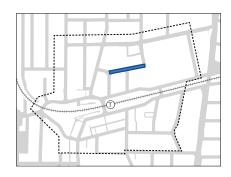
Existing View (looking South)



CHAPEL ROAD

Proposed View (looking South)

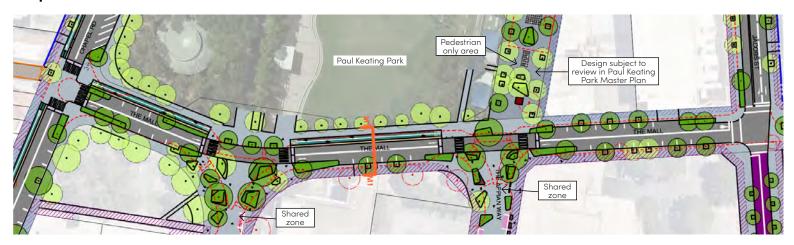


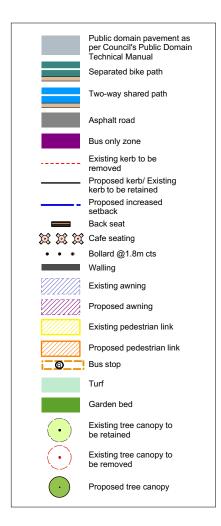


Existing Plan

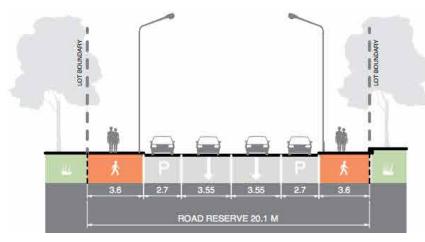




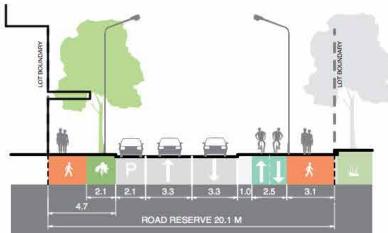




Existing Section



Proposed Section



Future Street Character

A slow speed green street providing a key east-west pedestrian/ cycle route to/from the civic precinct and accommodating key pedestrian crossings with raised threshold crossings.

- Buses re-routed off The Mall, Fetherstone St and The Appian Way.
- Convert to two-way for the full length.
- Replace roundabout at The Mall with raised pedestrian crossing.
- Simplified raised pedestrian crossings at intersections with The Appian Way and Fetherstone St.
- Provide a two-way separated bike lane on northern side.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Net loss of 2 x on-street parking spaces (from 30 to 28).

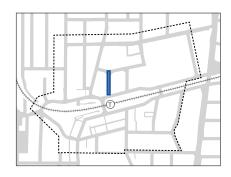
Existing View (looking East)



Proposed View (looking East)

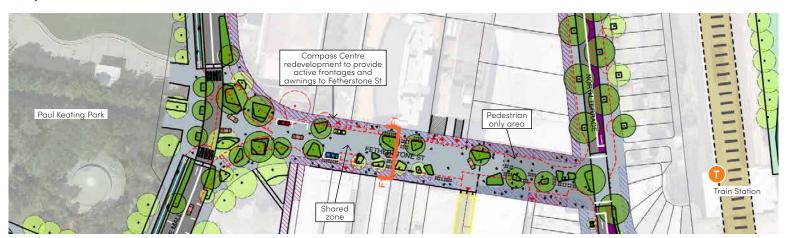


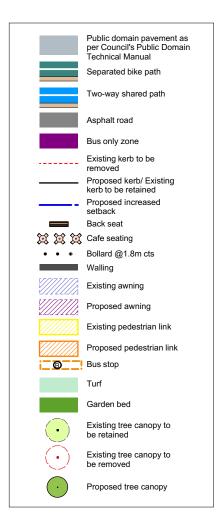
FETHERSTONE STREET



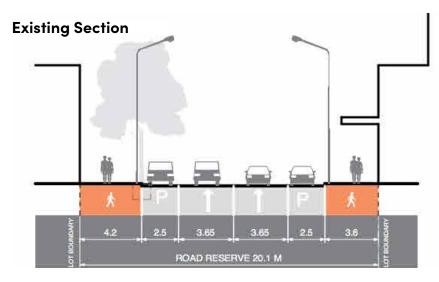
Existing Plan



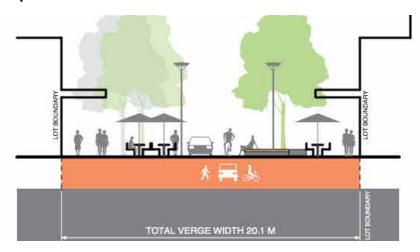




FETHERSTONE STREET



Proposed Section



Future Street Character

Part of the street becomes an urban plaza and the remainder becomes a pedestrian-focused shared zone creating a new vibrant destination in the CBD linking the rail station to the civic precinct.

- Converted from a busy one-way street to a two-way shared space with 10km/hr for high pedestrian volumes.
- Buses re-routed off The Appian Way, Fetherstone St and The Mall.
- Southern end near rail station converted to a new urban plaza.
- All access to driveways/ laneways retained, and access to loading docks retained with removable bollards.
- Intersection with North Tce remains signalised but no turn into Fetherstone St and longer pedestrian phases.
- Pave street level with the footpath.
- Provide additional street trees for enhanced amenity and traffic claming.
- Provide additional seating.
- Provide three-phase power for street events.
- Net loss of 15 on-street parking bays (from 17 to 2).

07

FETHERSTONE STREET

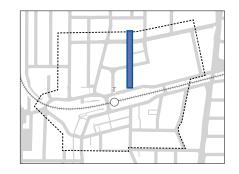
Existing View (looking North)



FETHERSTONE STREET

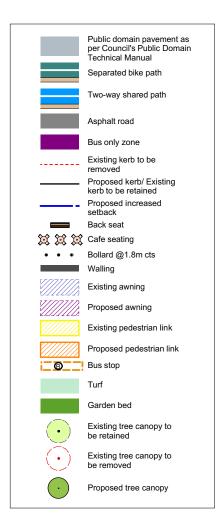
Proposed View (looking North)

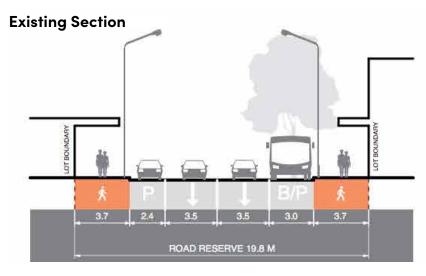




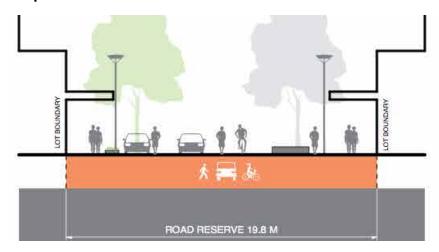








Proposed Section



Future Street Character

A key 'activity spine' that links the civic precinct and the new university to the rail and bus interchange and south to schools and parks. A shared zone environment prioritises pedestrian movement and encourages street life and retail activity.

- Convert from busy one-way street to a two-way 10km/hr shared zone.
- Buses re-routed off The Appian Way, Fetherstone St and The Mall.
- Intersection with North Tce signalised.
- Additional street trees for enhanced amenity and traffic calming.
- Pave street level with the footpath.
- Provide additional seating areas.
- Provide three-phase power for street events.
- Retain and upgrade existing shared zone and pedestrian space north of The Mall.
- Net loss of 8 on-street parking bays (from 16 to 8).

Existing View (looking North)



Bankstown Complete Streets

Proposed View (looking North)



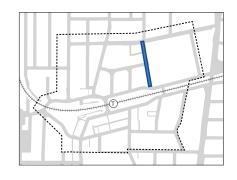
Existing View (looking South)

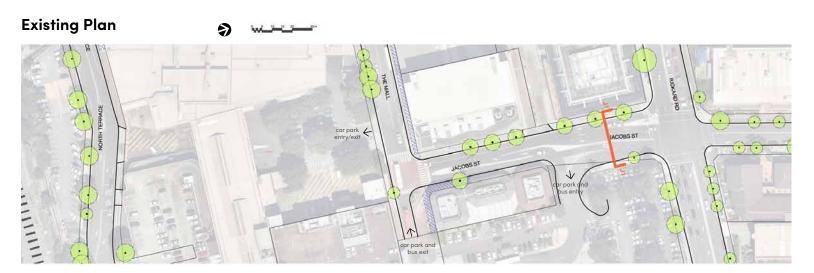


Proposed View (looking South)

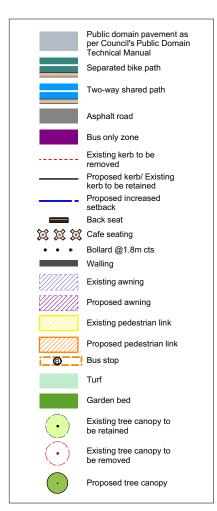


07 JACOBS STREET



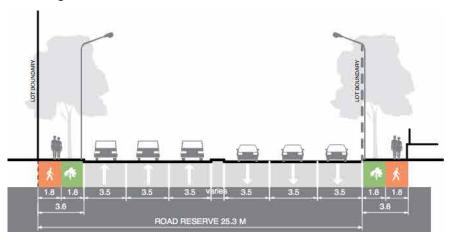




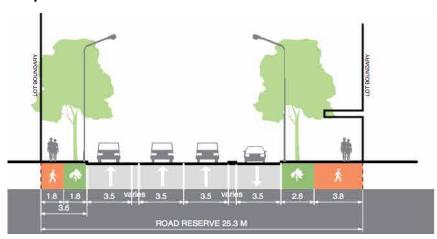


JACOBS STREET

Existing Section



Proposed Section



Future Street Character

A key public transport route through the CBD and to the rail interchange and also a high amenity pedestrian connection with wide footpaths, street trees and active frontages.

- Existing bus station/layover and carpark entry relocated as part of shopping centre redevelopment.
- Jacobs Street extended to North Terrace as part of shopping centre redevelopment.
- Intersection with The Mall converted to signalised crossing.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Net loss of 2 x on-street parking spaces (from 2 to 0).

O7 JACOBS STREET

Existing View (looking South)



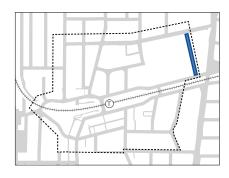
JACOBS STREET

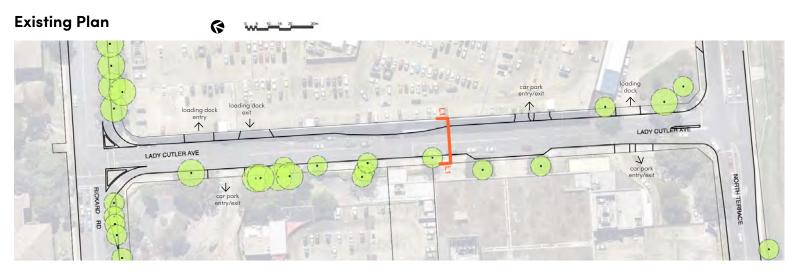
Proposed View (looking South)

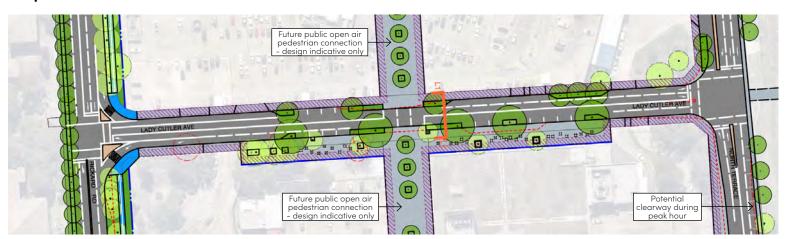


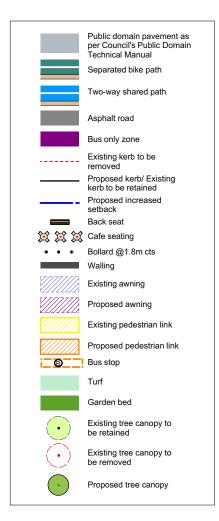
07

LADY CUTLER AVENUE



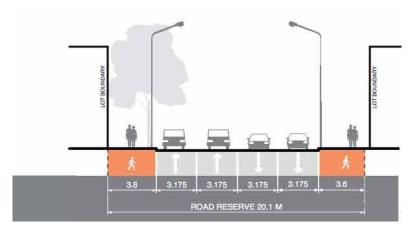




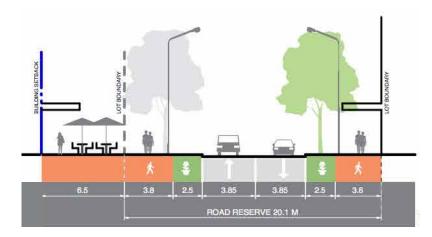


LADY CUTLER AVENUE

Existing Section



Proposed Section



Future Street Character

An attractive and comfortable pedestrian environment suitable for outdoor dining and an important street accessing car parking and loading docks associated with the shopping centre.

- Maintain existing car park and loading dock access (may be reviewed as part of the shopping centre redevelopment).
- Reduce to one lane in each direction in middle to discourage throughtraffic.
- Widen footpaths and introduce setbacks to provide space for alfresco dining and landscape.
- Widen mid-block pedestrian crossing and increase go time for pedestrians.
- Provide pedestrian crossings at signalised intersections with North Tce and Rickard Rd.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Net increase of 11 on-street parking spaces (from 5 to 16).

07 **LADY CUTLER AVENUE**

Existing View (looking South)



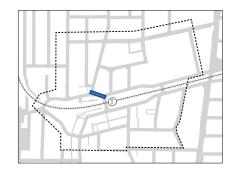
LADY CUTLER AVENUE

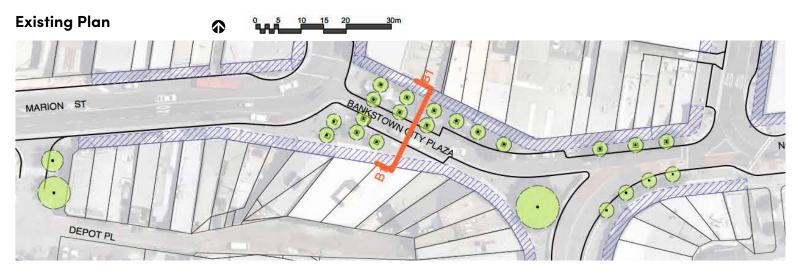
Proposed View (looking South)

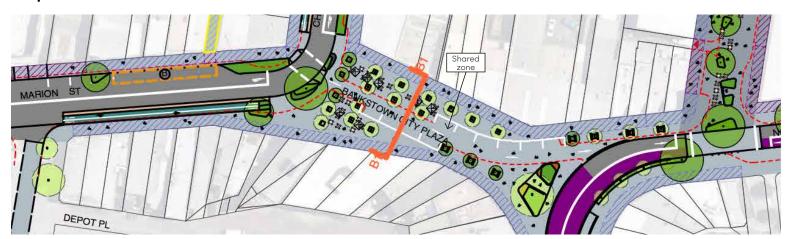


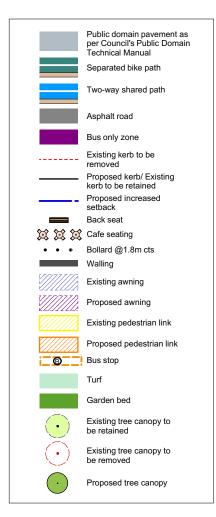
07

BANKSTOWN CITY PLAZA NORTH

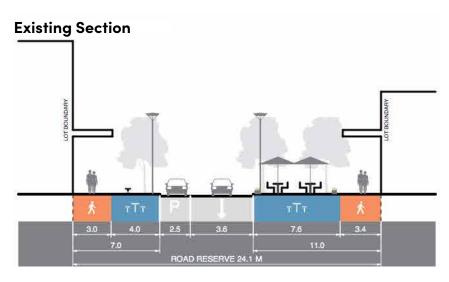




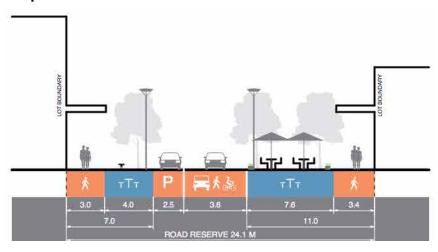




BANKSTOWN CITY PLAZA NORTH



Proposed Section



Future Street Character

Maintained and enhanced as a slow speed, high amenity and high activity zone for outdoor dining and retail.

- Formalise as a 10km/hr one-way shared space.
- Pave street level with the footpath.
- No change to street parking.

07

BANKSTOWN CITY PLAZA NORTH

Existing View (looking East)



Bankstown Complete Streets

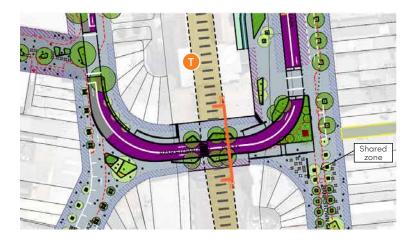
BANKSTOWN CITY PLAZA NORTH

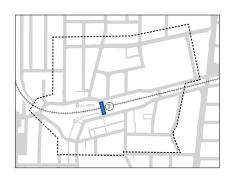
Proposed View (looking East)

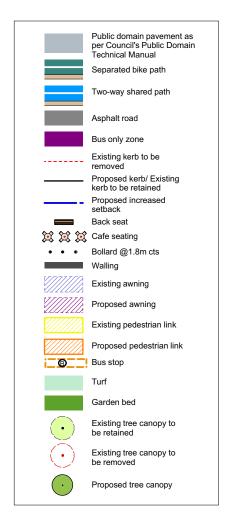


BANKSTOWN CITY PLAZA CENTRAL



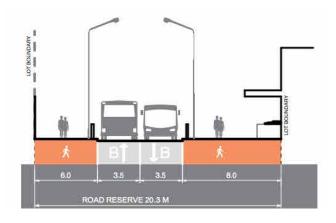




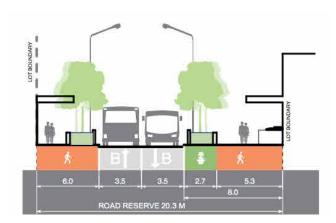


BANKSTOWN CITY PLAZA CENTRAL

Existing Section



Proposed Section



Future Street Character

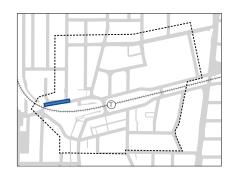
A key pedestrian arrival space from the station and a key pedestrian and bus connection between the north and south sides of the rail line.

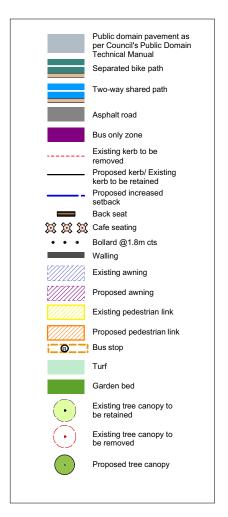
- Investigate raised planter beds in the wide footpath area to soften the landscape.
- Investigate shade trees or shade structures over the public domain and pedestrian crossing with potential for illumination at night.
- Investigate alternative barrier treatments to the bus lane to improve amenity including landscape/ artistic elements.

MARION STREET WEST (A)



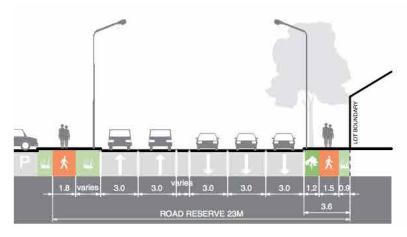




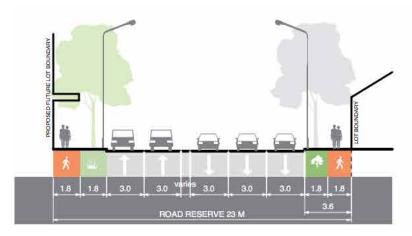


MARION STREET WEST (A)

Existing Section



Proposed Section

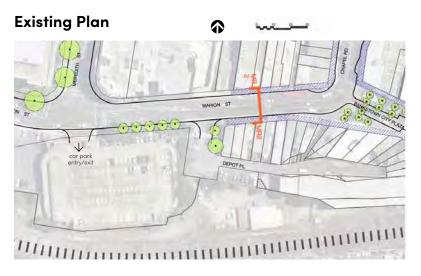


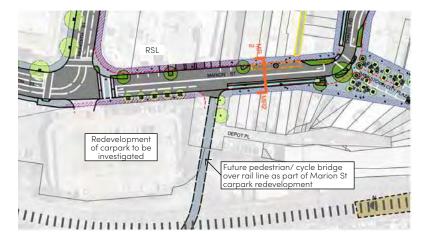
Future Street Character

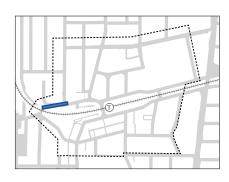
Part of the ring road providing good access to the edges of the CBD and carparks and providing an attractive tree-lined gateway to the CBD.

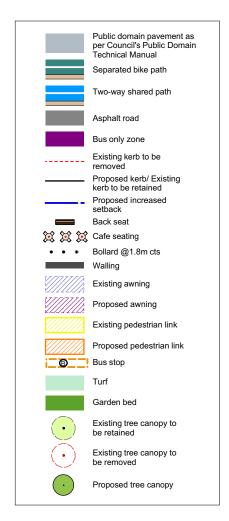
- Current road layout retained to perform high traffic ring road function.
- Marion St/ Greenwood Ave intersection phasing improved with more capacity with closure of Olympic Pde.
- Existing turn lane from Marion St eastbound into Olympic Pde converted to right turn lane into Greenwood Ave.
- New landscape strip with additional tree planting on south side.
- Kerb bulb-out at Marion St/ Meredith St intersection to reinforce transition from ring road to traffic calmed CBD street.
- Upgrade footpath paving as per PDTM.
- Partial road reserve closure to consolidate the Marion St car park into a single lot.
- Investigate future Marion St car park redevelopment options (underground/ multi-storey and integration of commercial floorspace).
- Investigate pedestrian/ cyclist overbridge and/or or tunnel across rail line as part of car park redevelopment.

MARION STREET WEST (B)

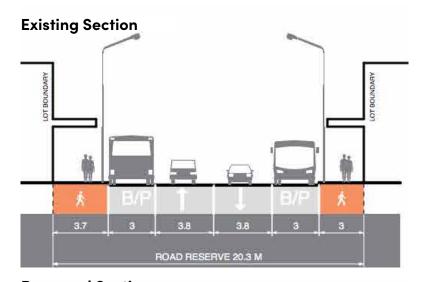








MARION STREET WEST (B)



Proposed Section ABYONTOGLAD 3.3 2.4 1.0 3.5 3.5 3.0 3.6 ROAD RESERVE 20.3 M

Future Street Character

A traffic-calmed commercial street and part of the new north-south bike route through the CBD.

- Provide kerb bulb-out at Marion St/ Meredith St intersection to reinforce transition from ring road to traffic-calmed commercial street.
- Remove right turn lane from Marion St westbound into Meredith St to reduce through traffic via Chapel St.
- Provide additional street trees for enhanced amenity and traffic calming.
- Provide a two-way separated bike lane linking Chapel St bike lane to future pedestrian/ cyclist overbridge.
- Existing bus stop on Marion St relocated to Chapel Rd.
- Upgrade footpath paving as per PDTM.
- Investigate future Marion St car park redevelopment options (underground/ multi-storey and integration of commercial floorspace).
- Net loss of 1 on-street parking space (from 6 to 5).

07 MARION STREET

Existing View (looking East)



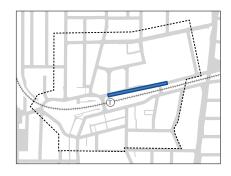
Bankstown Complete Streets

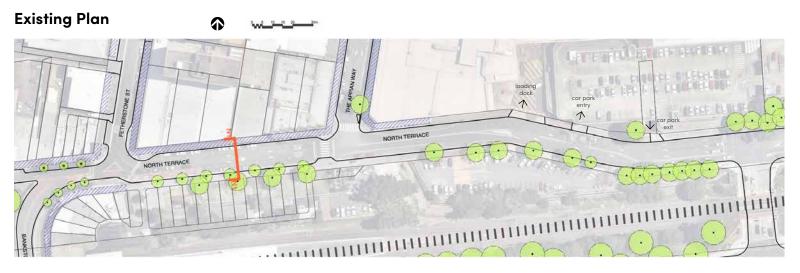
MARION STREET

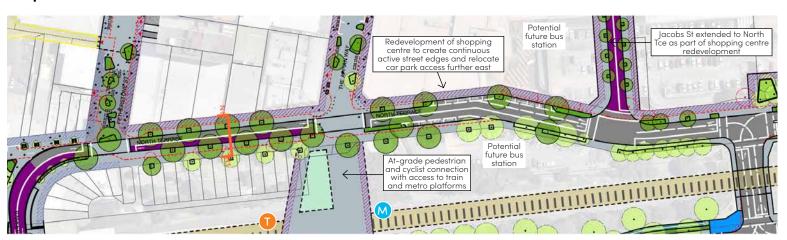
Proposed View (looking East)

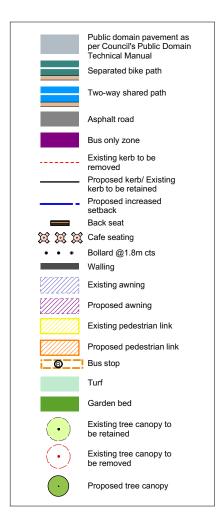


NORTH TERRACE WEST



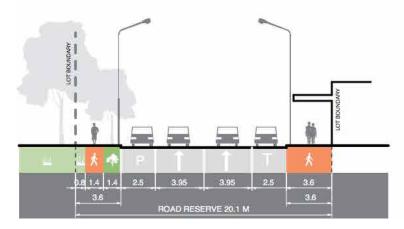




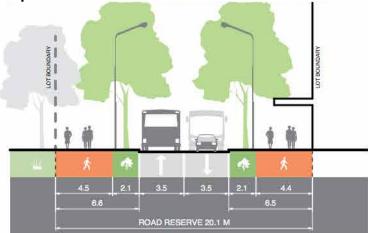


NORTH TERRACE WEST

Existing Section



Proposed Section

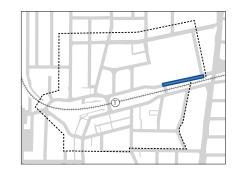


Future Street Character

A key pedestrian arrival space from the rail station into the CBD and a key bus route through the CBD.

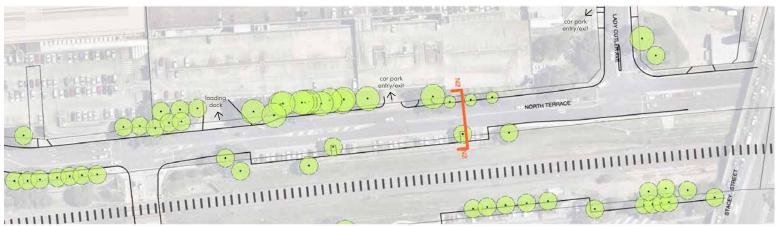
- Buses re-routed from Fetherstone St and The Appian Way to Jacobs St.
- Bus-only lane west of The Appian Way.
- Intersection with Fetherstone St remains signalised but no turn into Fetherstone St from North Tce and longer pedestrian phases (note: removable bollards for loading access).
- Signalise intersection of North Tce/ The Appian Way.
- Extend Jacobs St to North Tce as bus-only street and signalise intersection.
- Shopping Centre car park entry and loading zones relocated east of Jacobs St as part of redevelopment.
- Taxi and pick-up/ drop-off zones relocated east of The Appian Way.
- New bus station located near northern entry to Train/ Metro station.
- Footpaths widened both sides and paving upgraded as per PDTM.
- Provide additional street trees to create high amenity outside the rail station.
- Net loss of 10 on-street parking spaces (from 25 to 15).

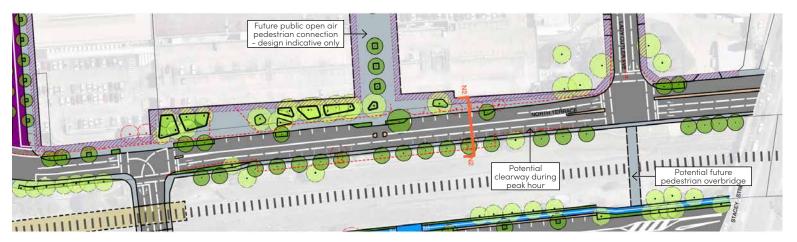
NORTH TERRACE EAST

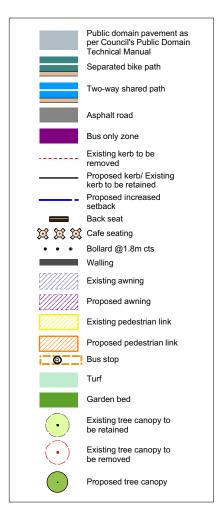


Existing Plan



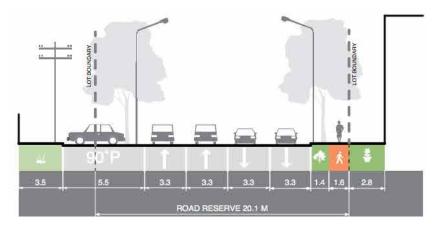




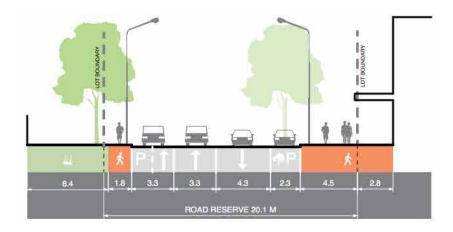


NORTH TERRACE EAST

Existing Section



Proposed Section



Future Street Character

A tree-lined pedestrian friendly mixed-use street with active frontages to the redeveloped shopping centre.

- Reduce lane widths and change from perpendicular parking one side to parallel parking both sides.
- Provide pedestrian crossings to all legs of signals at Lady Cutler Ave.
- Provide a continuous footpath on the south side of street.
- Underground powerlines to enable full tree canopy growth.
- Provide additional street trees for enhanced amenity and traffic calming.
- Footpath paving upgraded as per PDTM.
- Investigate potential pedestrian overbridge to provide shopping centre access to high density residential area on south side of rail line.
- Parking along southern side to be clearway during peak hour to provide
 2 lanes westbound.
- Net loss of 4 on-street parking spaces (from 39 to 35)

07 NORTH TERRACE

Existing View (looking West)

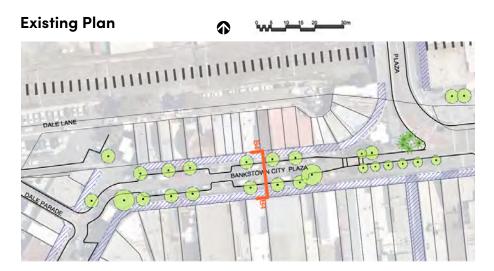


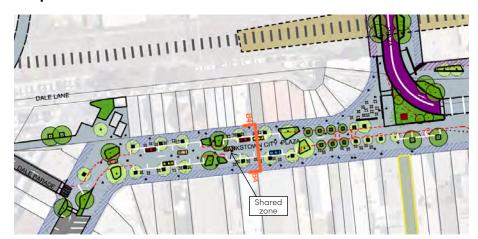
NORTH TERRACE

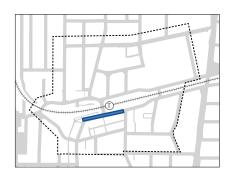
Proposed View (looking West)

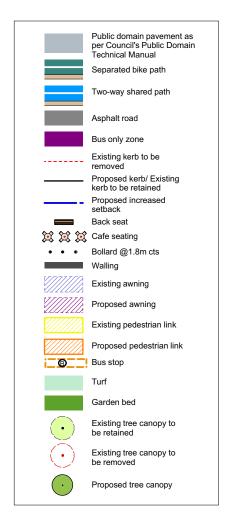


BANKSTOWN CITY PLAZA SOUTH (A)



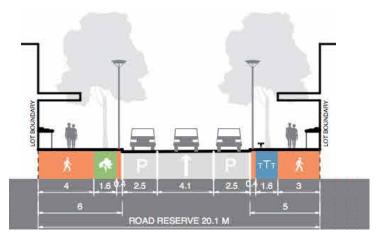




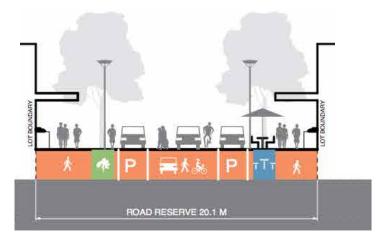


BANKSTOWN CITY PLAZA SOUTH (A)

Existing Section



Proposed Section

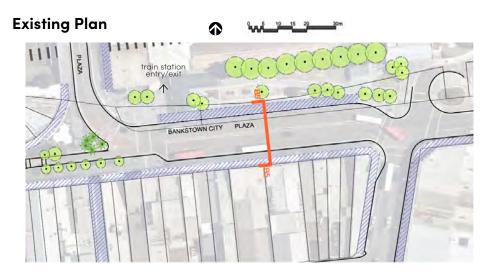


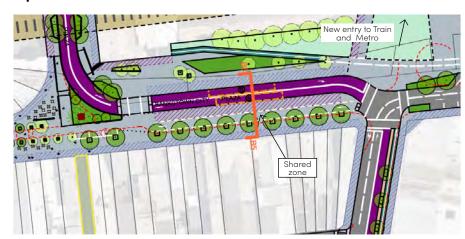
Future Street Character

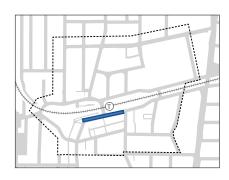
The unique character of Saigon Place is conserved while pedestrian priority is enhanced through a raised shared zone linking both sides of the street.

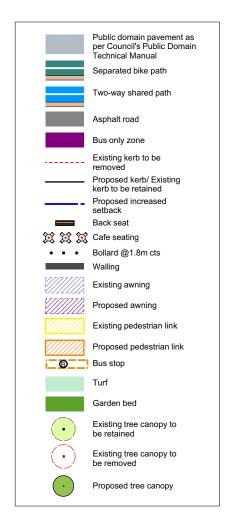
- Minimal change to the street as it is one of the most active and loved streets in Bankstown.
- Maintain the existing 10km/h one-way 'shared space'.
- In line with shared space design principles, pave the street the same level and paving style as the footpath as per PDTM, and extend the shared space treatment all the way to Restwell St.
- No change to street parking.
- Remove pedestrian crossing and fence/ barriers to enable better pedestrian priority movement.
- Continue to allow sections of footpath to be used for a mix of dining and sale of goods.
- Retain and upgrade the public pedestrian laneway from Bankstown City Plaza to Greenfield Parade and transfer ownership to Council (currently owned by Bankstown Sports Club).
- Increase of 1 x on-street spaces along City Plaza South (increased from 21 to 22).

BANKSTOWN CITY PLAZA SOUTH (B)



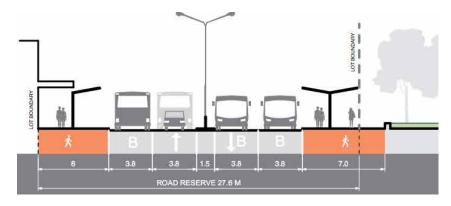




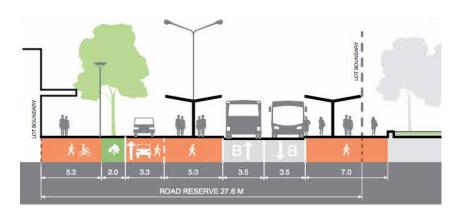


BANKSTOWN CITY PLAZA SOUTH (B)

Existing Section



Proposed Section



Future Street Character

Adjoining the railway, bus stops are reconfigured to improve pedestrian access, improve functionality of retail frontages and enable avenue street tree canopy.

- Separate westbound lane into a dedicated bus lane and a separate 10km/h shared zone for vehicles.
- Relocate bus stops on south side to central island to create more usable space in front of businesses (eg. outdoor dining).
- Provide additional street trees on south side.
- Longer pedestrian phase at signals.
- No changes to parking numbers.

BANKSTOWN CITY PLAZA SOUTH

Existing View (looking East)

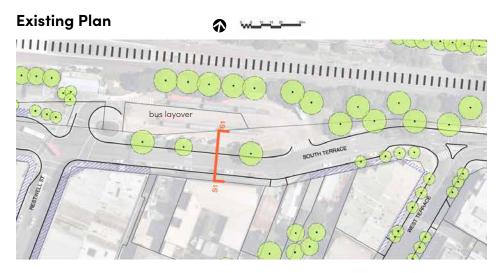


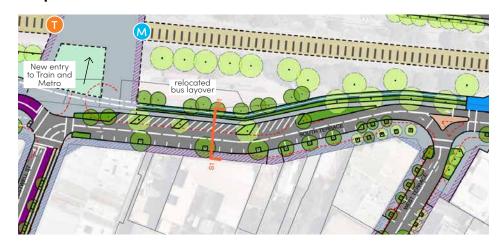
BANKSTOWN CITY PLAZA SOUTH

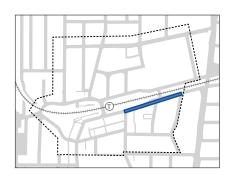
Proposed View (looking East)

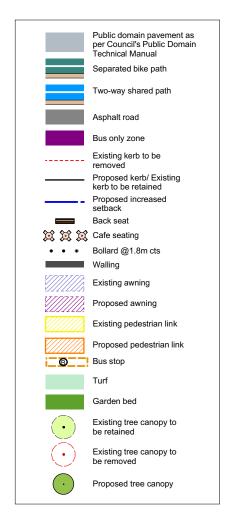


07 SOUTH TERRACE (A)



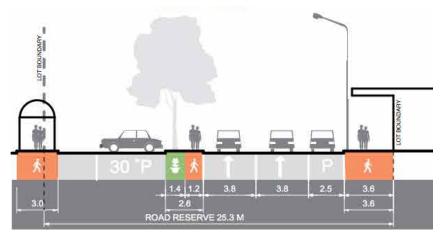




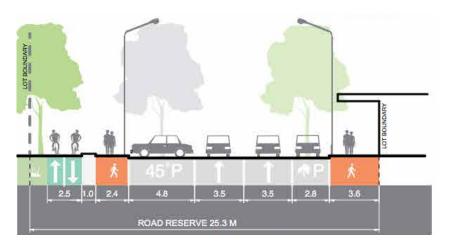


SOUTH TERRACE (A)

Existing Section



Proposed Section

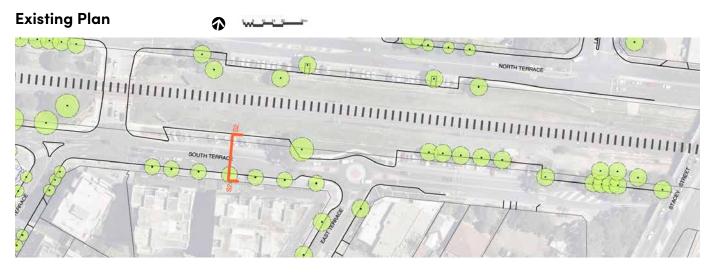


Future Street Character

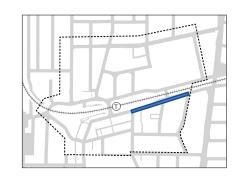
A tree lined mixed-use street providing a key link from the bus and rail interchange and commercial heart east to the high density residential areas and beyond and part of the east-west cycle route and Green Grid.

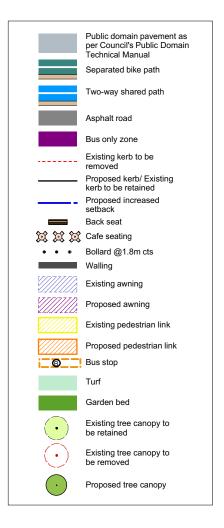
- Existing bus layover relocated.
- Provide a two-way separated bike path along rail corridor.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Modified intersection with West Tce.
- Angled street parking on north side of street to provide drop-off/ pickup near station and slow traffic
- Net increase of 24 on-street parking bays (from 18 to 42).

07 SOUTH TERRACE (B)



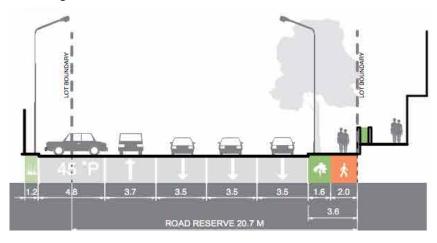




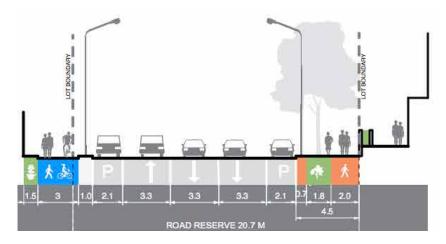


SOUTH TERRACE (B)

Existing Section



Proposed Section



Future Street Character

A tree lined mixed-use street providing a key link from the bus and rail interchange and commercial heart east to the high density residential areas and beyond and part of the east-west cycle route and Green Grid.

- Provide a two-way shared bike path along rail corridor.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrad footpath paving as per PDTM.
- Modified intersection with West Tce.
- Parallel on-street parking provided on both sides of the street.
- Net loss of 8 on-street parking bays (from 49 to 41).

07 SOUTH TERRACE

Existing View (looking East)



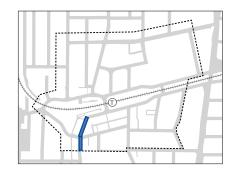
Bankstown Complete Streets

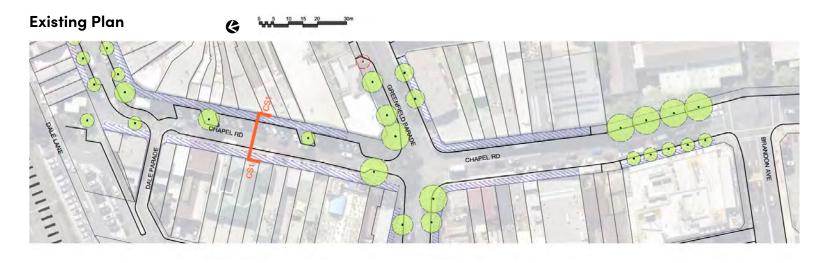
SOUTH TERRACE

Proposed View (looking East)

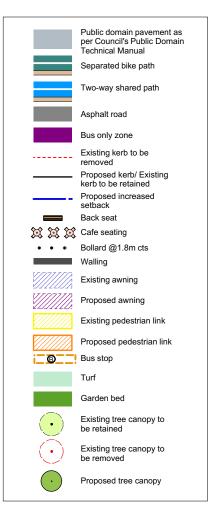


O7 CHAPEL ROAD SOUTH



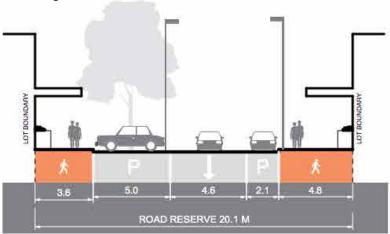




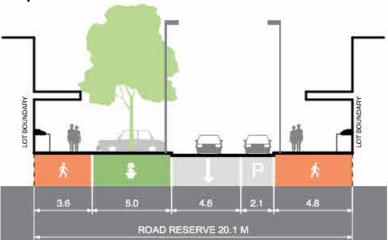


CHAPEL ROAD SOUTH

Existing Section



Proposed Section



Future Street Character

Maintains the existing character of Saigon Place as a slow speed, high pedestrian activity area with footpath trading and outdoor dining.

- Maintain existing character and function of street.
- Maintain existing street parking and footpath trading/dining.
- Provide additional street trees in between car bays for enhanced amenity and traffic calming.
- Net loss of 1 on-street parking space (from 49 to 48).

O7 CHAPEL ROAD SOUTH

Existing View (looking North)



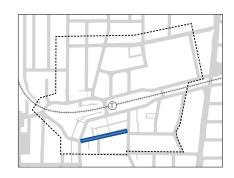
Bankstown Complete Streets

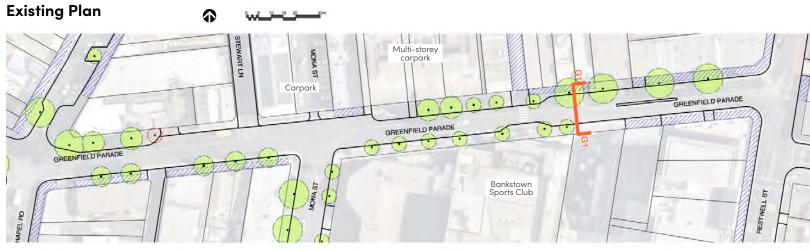
CHAPEL ROAD SOUTH

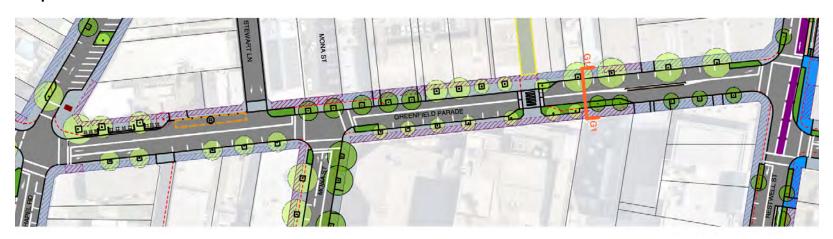
Proposed View (looking North)

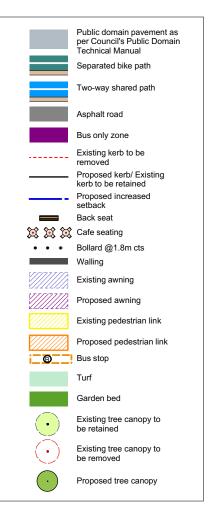


GREENFIELD PARADE



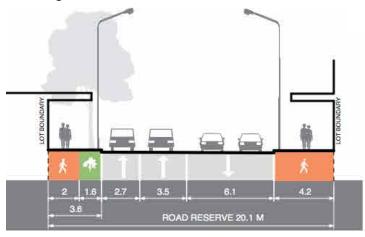




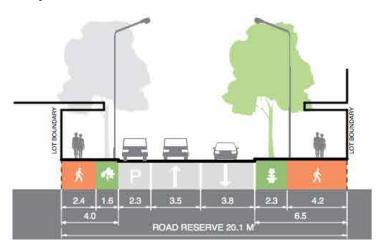


GREENFIELD PARADE

Existing Section



Proposed Section



Future Street Character

A thriving commercial street with high pedestrian movement, outdoor dining opportunities, and significant tree canopy and landscape character.

- Relocate Greenfield Parade multi-storey and at-grade carparks to Marion St to reduce traffic in CBD and make parking more accessible from ring road.
- Provide kerb bulb-outs at Mona St and Restwell St to reduce pedestrian crossing width and reduce signal delays.
- Convert pedestrian crossing at Bankstown Sports Club to a raised crossing.
- Provide paved threshold to continue footpath across Stewart Lane.
- Provide additional street tree planting for enhanced amenity.
- Retain and upgrade the public pedestrian laneway from Bankstown City Plaza to Greenfield Parade and transfer ownership to Council (currently owned by Bankstown Sports Club).
- Net increase of 3 on-street parking spaces (from 21 to 24).

07 GREENFIELD PARADE

Existing View (looking West)



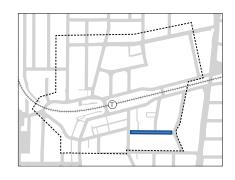
Bankstown Complete Streets

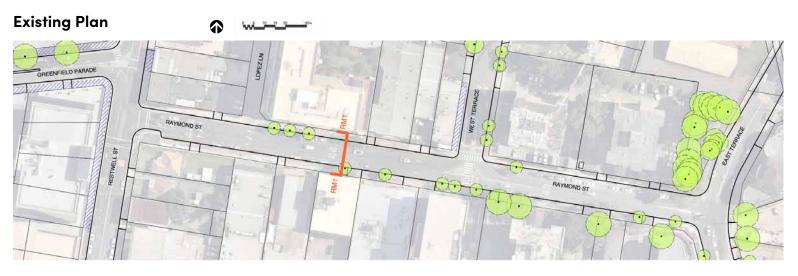
GREENFIELD PARADE

Proposed View (looking West)

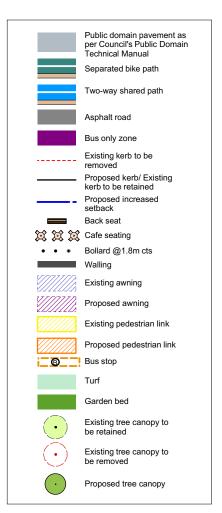


RAYMOND STREET



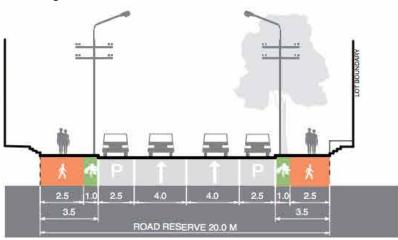




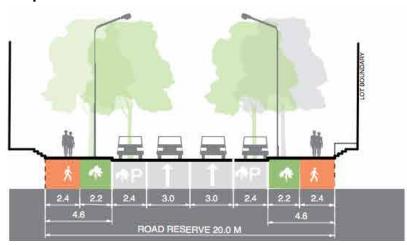


RAYMOND STREET

Existing Section



Proposed Section



Future Street Character

A pedestrian-friendly tree-lined neighbourhood street providing an east-west link between the commercial and residential areas of the CBD.

- Maintain two-way at east end and one-way at west end and maintain driveway accesses.
- Provide kerb bulb-outs at intersections with Restwell St, West Tce and East Tce to create narrower pedestrian crossings and slower turn movements.
- Change pedestrian crossings at West Tce to raised crossings for slowing traffic.
- Reduce to one right turn lane into Restwell Street to discourage through traffic.
- Underground powerlines to enable full tree canopy growth.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving.
- Upgrade park on corner of Raymond/ East Tce to have more usable space.
- Investigate converting the existing private mid-block footpath between Raymond St and Stanley St (in line with West Tce) to a public path, or mandate a new public pedestrian connection as part of future redevelopment.
- Net increase of 8 on-street car bays (from 35 to 43).

07 RAYMOND STREET

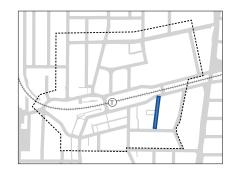
Existing View (looking West)

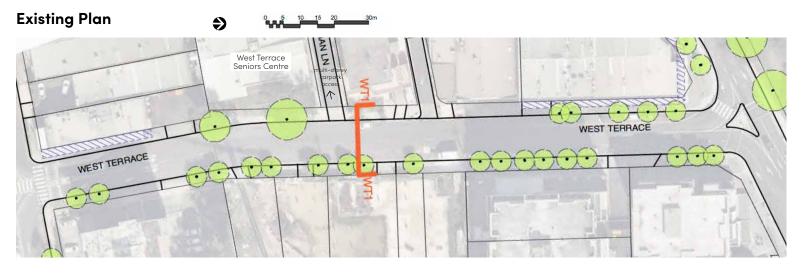


RAYMOND STREET

Proposed View (looking West)

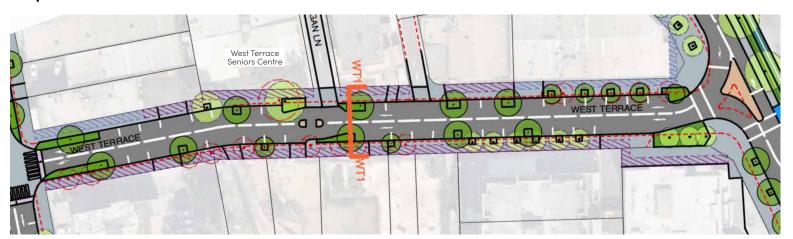


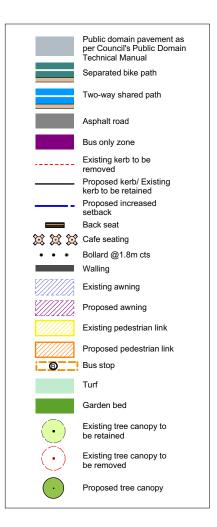




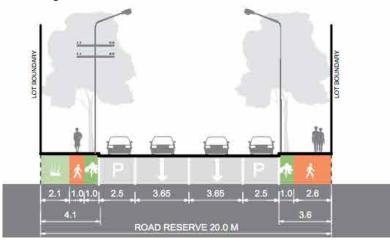
Proposed Plan

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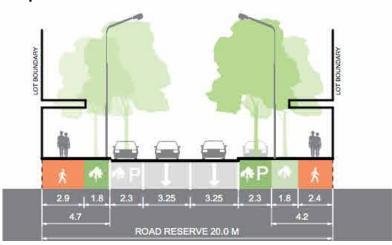




Existing Section



Proposed Section



Future Street Character

A pedestrian-friendly tree-lined neighbourhood street supporting high density residential development.

- Relocate West Terrace carpark to Marion St to reduce traffic in CBD and make parking more accessible from ring road.
- Provide kerb bulb-outs at intersections with South Tce and Raymond St to reduce pedestrian crossing distance and slow turning vehicles.
- Widen footpath on both sides and upgrade footpath paving as per PDTM.
- Provide additional street trees for enhanced amenity and traffic calming.
- Underground powerlines to enable full tree canopy growth.
- Net loss of 3 on-street car bays (from 32 to 29).

Existing View (looking South)

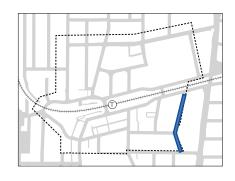


Proposed View (looking West)



07

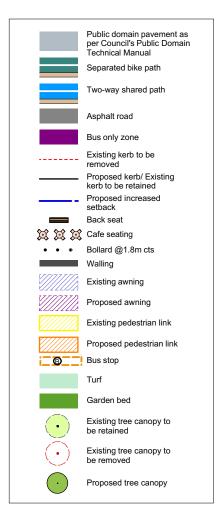
EAST TERRACE / CROSS STREET





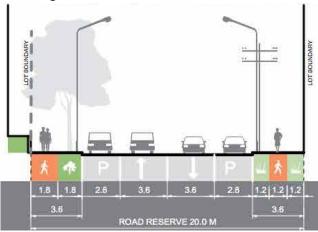
Proposed Plan



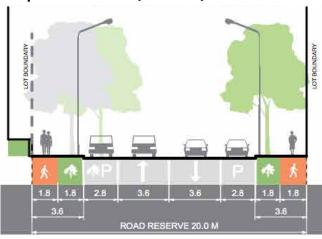


EAST TERRACE/CROSS STREET

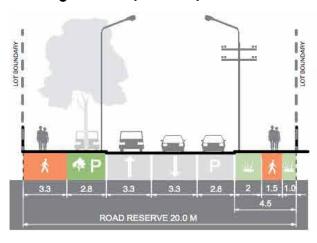
Existing Section (Cross St)



Proposed Section (Cross St)



Existing Section (East Tce)



Proposed Section (East Tce)



Future Street Character

A pedestrian-friendly tree-lined neighbourhood street supporting school students and high density residential development.

- Raised pedestrian crossing near intersection with Raymond St.
- Pedestrian refuge island at intersection with Stanley St.
- Provide additional street trees for enhanced amenity and traffic calming.
- Underground power lines to enable full tree canopy growth.
- Upgrade footpath paving as per PDTM.
- Upgrade existing mid-block pedestrian connection to Stacey Street with clearer signage and footpath upgrades.
- Upgrade park on corner of Raymond St/ East Tce to have more usable space.
- East Tce net loss of 2 on-street parking bays (from 35 to 33).
- Cross Street net loss of 11 on-street parking bays (from 26 to 15).

07

EAST TERRACE / CROSS STREET

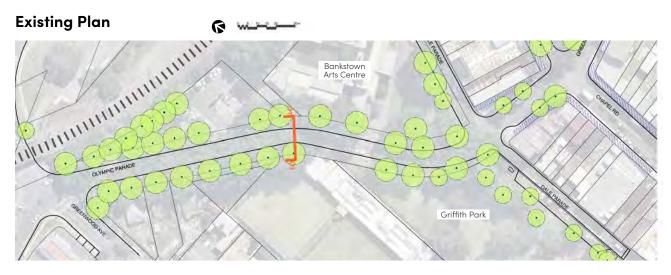
Existing View (looking South)



EAST TERRACE/CROSS STREET

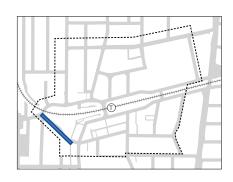
Proposed View (looking South)

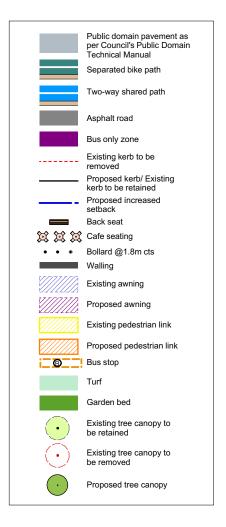


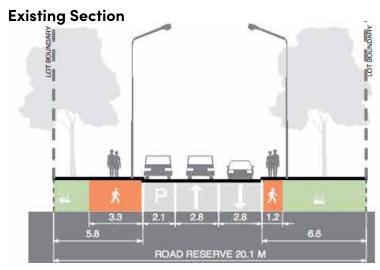


Proposed Plan

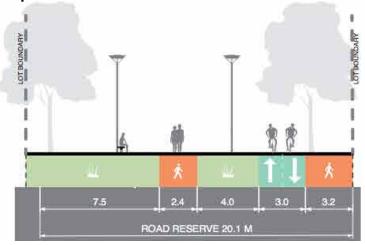








Proposed Section



Future Street Character

An active pedestrian and cycle corridor which celebrates the generous mature trees and becomes part of an enlarged Griffith Park green space.

- Closed to vehicles between Marion St and Dale Parade to reduce eastwest through traffic and encourage use of ring road to access car parks.
- Retain all existing trees.
- Provide a two-way separated bike path connecting to existing regional network.
- Relocate Arts Centre car park and expand open space in this location.
- Design of entire area to be reviewed as part of Griffith Park Master Plan (includes Bankstown Arts Centre, Griffith Park, Bowling Club, Olympic Parade, Dale Parade and Brandon Avenue carpark).
- Loss of 10 on-street car parking bays (from 10 to 0).

Existing View (looking West)



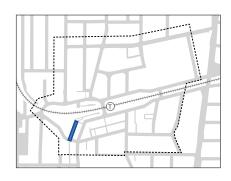
Proposed View (looking West)

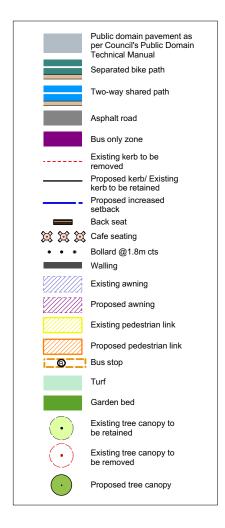




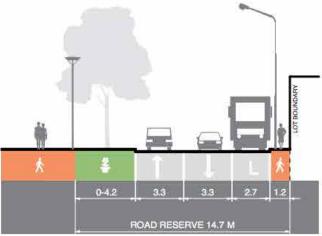
Proposed Plan



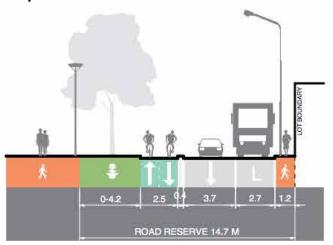




Existing Section



Proposed Section



Future Street Character

A one-way service lane for the commercial properties and a key part of the north-south bike route through the CBD.

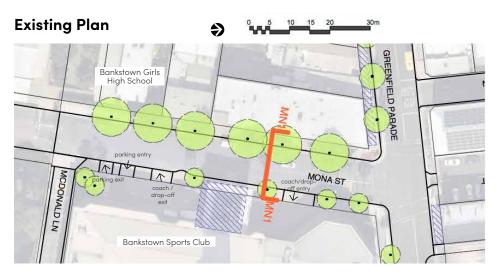
- Convert the two-way section of Dale Parade north of Olympic Pde to one-way southbound.
- Retain all existing trees, street parking and loading bays.
- Provide a separated two-way bike path from Olympic Parade to the rail line.
- Provide a shared path from Olympic Parade to Brandon Avenue.
- Convert the existing raised threshold at the south end of Dale Pde into a formal pedestrian crossing.
- Design of entire area to be reviewed as part of Griffith Park Master Plan (includes Bankstown Arts Centre, Griffith Park, Bowling Club, Olympic Parade, Dale Parade and Brandon Avenue carpark).

Existing View (looking South)

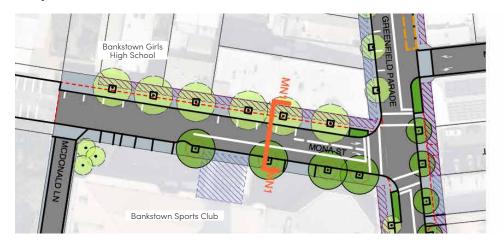


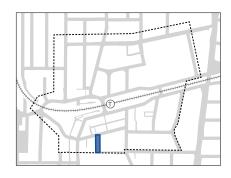
Proposed View (looking South)

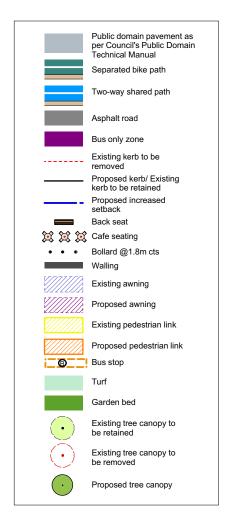


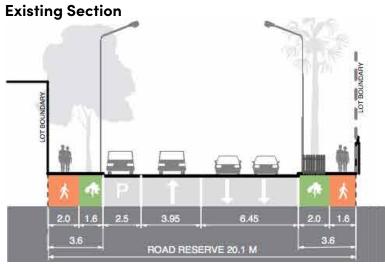


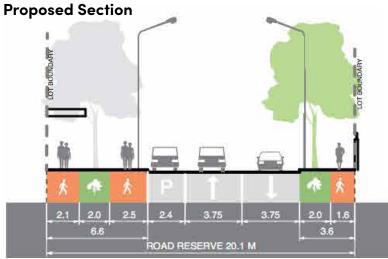
Proposed Plan











Future Street Character

An important vehicle and pedestrian access street to the Sports Club, High School and Public School.

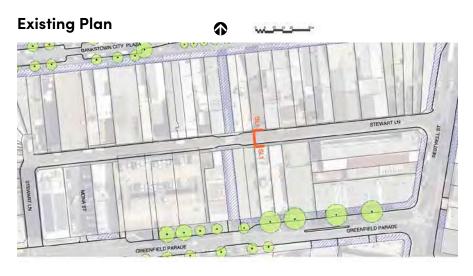
- Widen footpath on western side to cater for school students and upgrade paving as per PDTM.
- Provide kerb bulb-outs at Greenfield Pde intersection to reduce crossing distance.
- Replace palm trees with species as per PDTM.
- Investigate creating public pedestrian access from Mona Street to Bankstown City Gardens/ Memorial Park through school carpark.
- Net increase of 3 on-street parking (from 5 to 8).

Existing View (looking South)



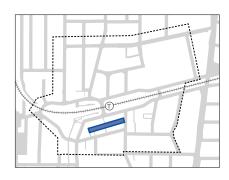
Proposed View (looking South)

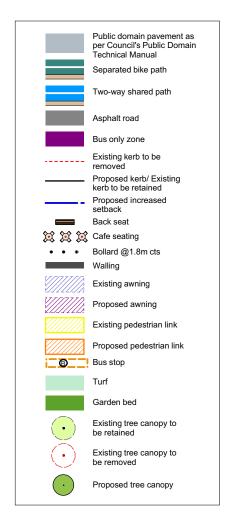


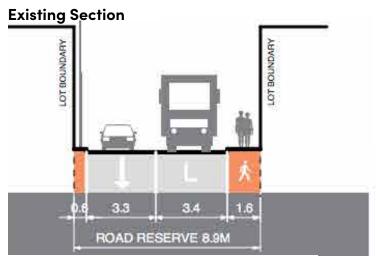


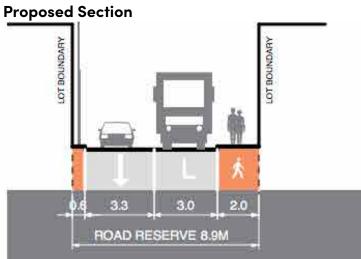
Proposed Plan











Future Street Character

A one-way service lane to commercial properties with opportunity for activation at the mid-block pedestrian connection.

- Retain existing access and loading bays (10).
- Widen footpath on southern side (and eastern side of the Greenfield Pde entry) to 2m and upgrade footpath paving as per PDTM.
- Convert the existing mid-block pedestrian crossing to a raised crossing and add landscape amenity.
- Provide raised pedestrian crossings at intersections with Restwell St and Greenfield Pde.
- Investigate creative lighting or artworks to enhance amenity and safety of laneway.
- Mandate passive surveillance of laneway in any new developments.
- Retain and upgrade the public pedestrian laneway from Bankstown City Plaza to Greenfield Parade and transfer ownership to Council (currently owned by Bankstown Sports Club).

Existing View (looking East)

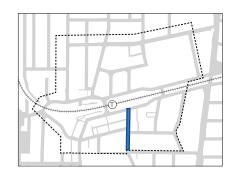


Proposed View (looking East)



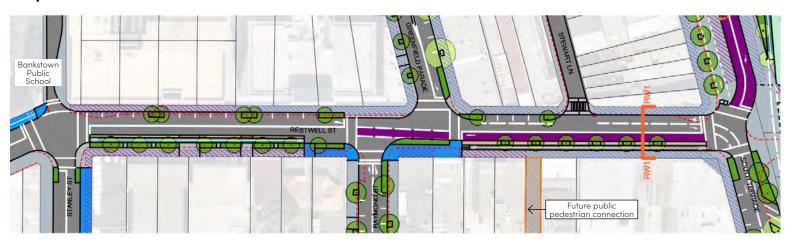
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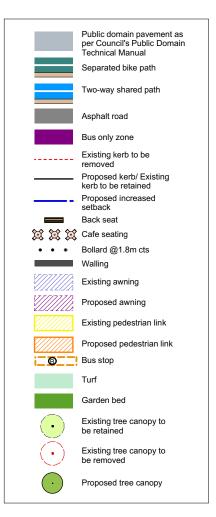
RESTWELL STREET





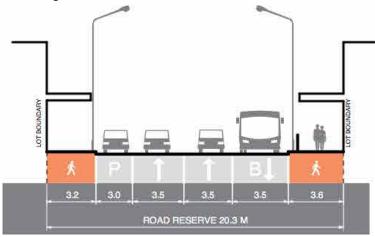
Proposed Plan



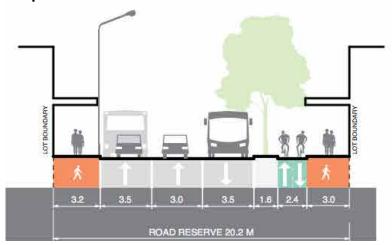


RESTWELL STREET

Existing Section



Proposed Section



Future Street Character

A commercial street that is part of the 'activity spine' linking parks and schools in the south to the rail line and civic precinct in the north and also an important part of the bike route and bus route through the CBD.

- Maintain existing southbound bus lane and two northbound lanes.
- Provide two-way separated bike path.
- Signalise intersection with Stanley St and modify intersection with Raymond St/ Greenfield Pde.
- Provide kerb bulb-outs at intersections with Raymond St, Greenfield Pde
 + South Tce.
- Underground powerlines south of Raymond St to enable full tree canopy growth.
- Provide additional street trees for enhanced amenity and traffic calming.
- Upgrade footpath paving as per PDTM.
- Mandate public mid-block pedestrian connection from Restwell St to West Tce as part of future redevelopment.
- Net loss of 7 on-street spaces (from 23 to 16).

07 **RESTWELL STREET**

Existing View (looking South)



RESTWELL STREET

Proposed View (looking South)





ACTION PLAN

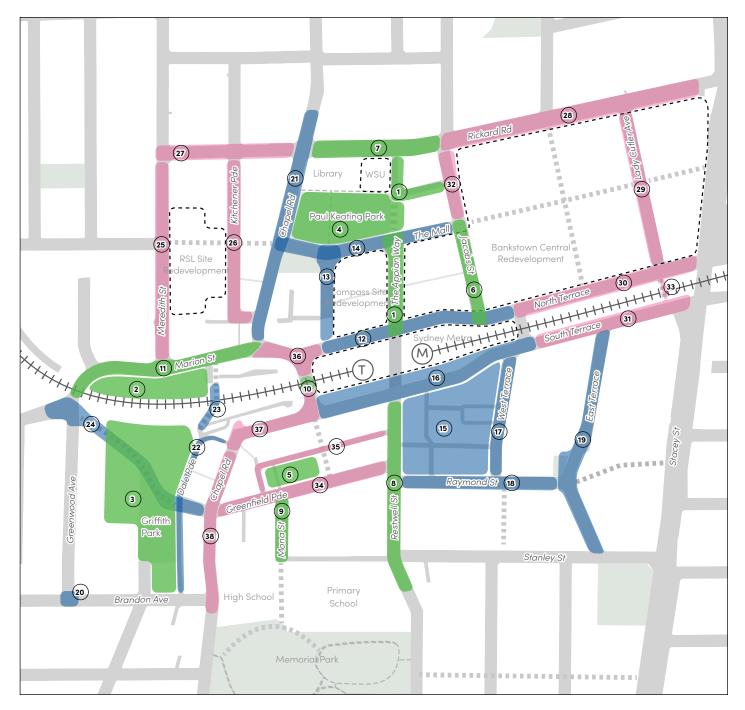




08 **ACTION PLAN**

The Action Plan is a prioritised list of all the recommendations set out in this report and is envisaged to be implemented progressively over the next 20 years. The plan opposite depicts the capital works projects.

- Approximate order of priority
- High Priority
- Medium Priority
- Low Priority
- Other Major Projects



High Priority								
Order of Priority	Action	Dependencies / Timing	Page Ref	Responsible Department				
Operational			•					
а	Adopt Bankstown Complete Streets vision, principles, strategies and action plan.		78, 82	City Design				
b	Become signatory to the Shared Mobility	Principles.	144	City Design				
С	Adopt revised Public Domain Technical Manual and Street Design Manual.		144	City Design, Roads, Parks, Development				
d	Review the recommended street setbacks, through-site links and reduced parking provision in the CBD and incorporate into DCP.		117, 136	City Design, Spatial Planning				
е	Introduce smart parking technology to Council off-street parking stations and reduce provision of all day parking.		138	Digital Innovation, Roads				
f	Work with TfNSW to implement an active travel program with primary schools, high schools and tertiary education providers.		116	Roads, Community Services				
g	Provide dedicated on-street car-share spaces in the CBD.		138	Roads				
h	Work with TfNSW to implement clearways on full length of ring road at peak hours.		130	Roads				
Capital Works			1					
1	The Appian Way	Prior to completion of WSU and Sydney Metro in order to cater for the increased pedestrian movement. Buses re-routed on Fetherstone St (2-way) until Jacobs St extension complete. Requires temporary change to intersections of Fetherstone at The Mall and North Tce to cater for 2-way traffic.	180	Roads, Works, City Design (+ WSU + Vicinity + Compass site)				
2	Marion Street carpark redevelopment	Prior to closure of Greenfield Parade to transfer the parking spaces. Includes integration of smart parking technology.	134	City Design, Works, Property, Spatial Planning				
3	Griffith Park Master Plan (includes Brandon Ave carpark review)	Implementation may be staged.	134	City Design, Parks, Works, Property				
4	Paul Keating Park Master Plan	Implementation may be staged.	N/A	City Design, Parks, Works				
5	Greenfield Parade carpark closure and sale.	Parking spaces relocated to Marion Street carpark.	134	City Design, Works, Property, Spatial Planning				

6	Jacobs St extension (The Mall to North	As part of Bankstown Central redevelopment (western end).	186	Roads, Works, City Design +
	Tce – bus only access)	Can't become operational until North Terrace converted to		TfNSW, Vicinity
		2-way.		
7	Rickard Road (Jacobs St – Chapel Rd)	As part of WSU development to cater for increased pedestrians	152	Roads, Works, City Design +
		and cyclists.		WSU
8	Restwell Street (South Tce – Ross St)	Completed when Metro opens to cater for increased pedestrians	260	Roads, Works, City Design
		and cyclists.		
9	Mona Street		252	Roads, Works, City Design
10	Existing rail overbridge (Bankstown City		198	Roads, Works, City Design +
	Plaza central)			Sydney Trains
11	Marion Street		200	Roads, Works, City Design

Medium Priority						
Order of Priority	Action	Dependencies / Timing	Page Ref	Responsible Department		
Operational			•			
i	Introduce smart parking to on-street park	ing, further reduce provision of all-day parking.	138	Roads, Digital Innovation		
Capital Works						
12	North Terrace (Jacobs St – Fetherstone St)	When Jacobs St extension complete.	206	Roads, Works, City Design		
13	Fetherstone St plaza / shared zone	When North Tce complete and buses re-routed to Jacobs St extension.	176	Roads, Works, City Design		
14	The Mall (Chapel Rd – Jacobs St)	When Fetherstone St complete.	172	Roads, Works, City Design		
15	West Terrace Master Plan and closure of carpark	Parking spaces relocated to Marion Street carpark.		City Design, Parks, Works, Spatial Planning, Property		
16	South Terrace (bus overbridge – West Tce)	When southern bus layover relocated.	214, 218	Roads, Works, City Design + TfNSW.		
17	West Terrace	When West Terrace Council sites redeveloped.	268	Roads, Works, City Design, Property		
18	Raymond Street	When West Terrace Council sites redeveloped.	232	Roads, Works, City Design, Property		
19	East Terrace and Cross Street		240	Roads, Works, City Design		
20	Brandon Ave / Greenwood Ave signals		132	Roads, Works		
21	Chapel Road (Marion St – Rickard Rd)		166	Roads, Works, City Design		

22	Dale Parade	As part of Griffith Park redevelopment.	248	Roads, Works, City Design	
23	Pedestrian / cyclist rail overbridge	As part of Marion St carpark redevelopment.	200	Roads, Works, City Design,	
				Property + Sydney Trains	
24	Olympic Parade	As part of Griffith Park redevelopment.	244	Roads, Works, City Design,	
				Property	

Order of Priority	Action	Dependencies / Timing	Page Ref	Responsible Department
25	Meredith St	When mid-block connection from Kitchener Pde to Chapel Rd delivered and/or demand warrants it.	158	Roads, Works, City Design
26	Kitchener Parade	When mid-block connection from Kitchener Pde to Chapel Rd delivered.	162	Roads, Works, City Design
27	Rickard Road (Chapel Rd – Meredith St)	When Aldi site redevelops and/or demand warrants it.	150	Roads, Works, City Design
28	Rickard Road (Stacey St – Jacobs St)	As part of Bankstown Central redevelopment.	154	Roads, Works, City Design + Vicinity
29	Lady Cutler Avenue	As part of Bankstown Central redevelopment (eastern end).	190	Roads, Works, City Design + Vicinity
30	North Terrace (Stacey St – Jacobs St)	As part of Bankstown Central redevelopment.	208	Roads, Works, City Design + Vicinity
31	South Terrace (West Tce – Stacey St)	When east-west bike route alignment confirmed.	220	Roads, Works, City Design
32	Jacobs Street (Rickard Rd – The Mall)	As part of Bankstown Central redevelopment.	186	Roads, Works, City Design + Vicinity
33	Pedestrian rail overbridge (near Lady Cutler Ave)	As part of Bankstown Central redevelopment.	208	Roads, Works, City Design + Vicinity, Sydney Metro
34	Greenfield Parade	As part of redevelopment of properties on Greenfield Pde.	228	Roads, Works, City Design + Bankstown Sports Club
35	Stewart Lane	As part of redevelopment of properties on Greenfield Pde.	256	Roads, Works, City Design + Bankstown Sports Club
36	Bankstown City Plaza (north)		194	Roads, Works, City Design
37	Bankstown City Plaza (south) / Chapel Road (south) ie. Saigon Place		212	Roads, Works, City Design
38	Chapel Road (south)		224	Roads, Works, City Design

08 **FUNDING OPTIONS**

Value Capture

Value captures provides a means to capture a portion of property value uplift that results from public investment in a given area, such as a new Metro service, and utilise those funds to improve the local area in ways that can be shared by all, such as Complete Streets. There have been numerous international and local studies which have demonstrated the effectiveness of value capture. Capturing the increase of value that comes with the new Metro service can be a means to fund Complete Streets works.

The principle of Value Capture is contingent on Council completing a Master Plan that significantly increases the development potential within the city centre. If this occurs, the opportunity exists to capture up to 50% of uplift (additional yield excluding Affordable Housing contributions), with Councils such as City of Sydney, City of Parramatta, Inner West Council and North Sydney Council setting similar precedents.

A Voluntary Planning Agreement (VPA) and Special Infrastructure Contribution (SIC) Levy are two potential mechanisms to implement Value Capture in Bankstown.

It is important to examine how various parties will benefit from Complete Streets and how costs can be shared equitably.



Bankstown Complete Streets

Voluntary Planning Agreement (VPA)

Voluntary Planning Agreements (VPAs) are an existing and widely used mechanism in NSW and can be negotiated for all new development applications in the CBD, either financial or in-kind works, applied as a condition of development. Appropriate incentives, such as development bonuses, can also be included as part of the agreement.

In the case of high demand inner-city redevelopment sites, the levy imposed can be over and above Council's normal regime for infrastructure charges (i.e. a standard Section 94A Levy).

Public works improvements funded through VPA mechanisms should be adjacent to the redevelopment area and staged appropriately with the development of the site. In this instance, a VPA is particularly beneficial to the developer as it increases the value of the real estate by delivering public amenity linked to the project delivered.

As part of Council's Development Control Plan, the current VPA requires a contribution of \$32.801.12/ car space as part of a new development. While the contribution is considerable, it is much less than the standard rate for car space construction (approximately \$60-85,000 across developments in Sydney). In the event of a shortfall, there is the potential that Council's Capital Works fund will have to cover the deficit. Furthermore, the limitation of this VPA contribution is its nexus to parking, which has the potential to be at odds with the principles of Complete Streets.

Special Infrastructure Levy (SIC)

The SIC levy is implemented by the State Government under the EP&A Act and helps provide funding towards the cost of infrastructure that enables and supports growth. Typical SIC Rates (per dwelling) can range from \$15,000 to \$35,000.

A SIC Levy must be linked to state infrastructure contributions, and as such, is likely unprecedented in the context of a Complete Streets Context. It could be applied to projects explicitly linked to the Metro, and roads controlled by RMS.

The Department of Planning & Environment could review and update Special Infrastructure Contribution (SIC) Levy system to improve commitment to specific infrastructure projects such as Complete Streets works or and / or new open spaces.

This is particularly considering that place-based infrastructure improves productivity and the federal government's Return-on-Investment (ROI).

08 **FUNDING OPTIONS**

RMS Active Walking and Cycling Funding

The NSW Government is committed to working with councils to make walking and cycling a more convenient, safer and enjoyable transport option that benefits everyone. The Active Transport (Walking and Cycling) Program is focused on improving connectivity for customers who choose to walk and cycle to major centres and public transport interchanges.

It includes five programs; two for walking (the Walking Communities Council Partnership Program, and Walking Communities Capital Program) and three for cycling (the Connecting Centres Council Partnership Program, the Priority Cycleways Program, and the Cycling Towns Program).

The following categories offer potential funding and would apply to Complete Streets

- infrastructure projects
- non-infrastructure projects
- projects in metropolitan areas
- development projects (inclusive of planning and design stages)
- implementation and construction projects
- evaluation projects.

If successful, funding for these proposals can take place for up to four years which allows longer-term projects to take place. Up to 100% funding of project costs can be obtained, depending upon the funding program.

Safer Roads Program

The Safer Roads Program is a partnership between the Centre for Road Safety and Roads and Maritime Services to deliver safer roads infrastructure throughout NSW.

The program identifies roads and roadsides with a higher risk or incidence of high-severity crashes, or crashes involving vulnerable road users. This is part of the 'Towards Zero' campaign.

In 2018–19, the program will carry out 180 road safety infrastructure upgrade projects throughout the state to the value of \$70.9 million, as part of a total program spend of \$713 million over 10 years. One such project is a Grant to Council to install targeted pedestrian safety improvements at a crossing point on Greenfield Parade, within the 'Liveable and Safe Urban Communities' Program.

Office of Open Space and Parklands Funding

As announced in April 2018, the NSW Government have committed \$290 million for more green and open spaces as part of the Open Spaces and Greener Sydney package.

This includes the 'Everyone Can Play' Grant Program which supports councils to renew, renovate and build inclusive playgrounds. In 2018–19, \$4 million in funding was allocated for the Everyone Can Play program.

It also includes the 'Five Million Trees' Grant Program which supports local councils in Greater Sydney to enhance urban tree canopy by co-funding tree planting projects in public spaces such as streets, parks and plazas. \$6 million of funding was available in 2018–19, and thirty-two projects were awarded funding totaling \$5,378,407 across 20 councils in Greater Sydney.

The 'Five Million Trees' Grant Program is part of the Climate Fund, which allows councils to apply for grants to plant trees, put up shade clothes and install water-misting systems in public places. The NSW Government is investing a total of \$1.4 billion between 2017 and 2022 through this fund.

Smart Cities Plan Funding

Committed by the Australian Government in 2016, the Smart Cities Plan sets out the Government's vision for productive and liveable cities that encourage innovation, support growth and create jobs.

As part of this Plan, The \$50 million competitive Smart Cities and Suburbs Program was announced, which supported projects that apply innovative technology-based solutions to urban challenges. Amongst the successful projects benefiting from the funding, were a City Sensor Network Project, Urban

Irrigation Project, Community Park Project, and Smart Parking Projects – all of which are relevant to Complete Streets. While the most recent applications for this program closed on 2 July 2018, similar Smart Cities Funding should be pursued, where available

08 **FUNDING OPTIONS**

Local Government Act

Consider the possibility of alternate legislation to fund Complete Streets infrastructure. Under the NSW EP&A Act, developer Cash In Lieu contributions for parking must be spent on parking infrastructure. Council has currently accumulated approximately \$1.5M in this manner which is allocated to be spent on carpark redevelopment.

In cases where this legislation is not working towards the broader goal of Complete Streets (i.e promoting car-based travel behaviours), the opportunity exists to break the nexus of developer Cash In Lieu contributions from the EP&A Act, to the Local Government Act.

This change in legislation provides
Council with the flexibility to shift
Cash In Lieu contributions over time.
As travel behaviour moves towards
public transport and demand for
parking goes down, developer
contributions could be shifted
to a broader Complete Streets
infrastructure fund and other types of
infrastructure.

CBD Special Rate

Council may create a geographic boundary for urban renewal and apply to IPART for a special rate variation to partially fund infrastructure.

This rate variation will be applied to all properties in the study area based on benefits resulting from the Complete Streets project, such as improved amenity, accessibility, and visitation appeal.

This was applied recently by Coffs Harbour City Council, who recently approved a CBD Special Business Rate to allow for the completion of a City Centre works program which was developed around strategies identified in their City Centre Master Plan A similar special rate (suggested between 1 - 3% more) could be applied to the Bankstown CBD for 10 years and if deemed a success, could be extended an additional 10 years or until Complete Streets works is finalised.

It should be noted that a rate variation would not create an altogether significant increase and should be combined with other funding options.

Section 94 Contributions

A standard one-off levy applied to all new developments in the CBD, applied through a Section 94 Contribution Plan.

Council have recently reviewed existing Section 94 Contribution schemes to create a nexus between Complete Streets infrastructure and new development. However, it should be understood that one of the limitations of Section 94 Contributions is that levies collected apply across the whole LGA and may not all be directed to infrastructure works in the CBD.

As part of this process a review of redundant infrastructure (e.g. car centric infrastructure), parking minimums, residential caps and indexing is recommended.

Parking Levy, Paid Parking & Sale of Carparks

Parking levies typically involve an annual fee on the owners of carparks within a designated area (such as the CBD Study Area).

Furthermore, Council could utilise funds from the sale or redevelopment of parking stations for Complete Streets implementation.

Council could also introduce some areas with paid parking for Complete Streets implementation. All Council-managed parking is currently free and exploring a paid parking strategy is one of the most significant opportunities to change the function of the Bankstown CBD. Some positive effects of a paid parking approach include:

- Pricing and time restrictions provide certainty for when a time limit has expired, encouraging motorists to return to their vehicles. This will increase time self-enforcement as a measure to increase turnover, critical for the success of local businesses.
- Often, 'medium stay' parking can be difficult to enforce with time restriction alone due to 'shunting; where drivers will move their vehicles in order to remain within the restrictions
- Revenue contribution to maintaining parking infrastructure.
- Pricing can bring about behavioural change. It can serve as a disincentive to drive and an incentive to use other transport modes including active travel.

Whilst paid parking can be utilised as a 'tool' for Council to manage parking resources, it's suitability should be considered for different streets. Ensuring the following criteria is considered can assist in the placement / installation of ticket machines:

- Ensure the demand is sufficient to justify the costs of the ticket machines/other payment infrastructure
- Restrictions in the surrounding streets will ensure ticket machines will be used and not encourage motorists to park in less restricted or unrestricted areas.
- Parking generated by local businesses be contained within the Centre.

08

WHERE TO START? TRIAL PERIOD

Demonstration Projects

Before implementing permanent infrastructure into the CBD streets, certain streets in the CBD could be used to demonstrate, test and measure key streetscape improvements. Streets which have high pedestrian volume but low streetscape amenity, and are set to undergo dramatic change in the coming years, should be selected. Testing future outcomes through demonstration projects can be a powerful way to get the community and CBD users excited about what is to come while opening a dialogue about potential benefits of Complete Streets.

Lighter, Quicker, Cheaper

Many of the most effective demonstration projects are lighter, quicker, and cheaper than traditional approaches to improving cities. The success of such projects across the world is proof that expensive and labor-intensive initiatives aren't the only ways to go about change.

The benefits of temporary projects have proven to bring life to previously unused spaces, break down resistance to change, generate public interest, bring together stakeholders and more.

Outlined in the images to the right are initial ideas that have worked well in other global locations that could be implemented on one or more streets in Bankstown. Such projects can be implemented while long-range projects move forward in the background.

Test, Measure and Repeat

One of the best advantages of light, quick and cheap projects is the ability to create and test a project immediately, with direct community involvement. During the trial, Council can collect data on pedestrian behaviour and desires that can be used to inform future decision making.













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Western Sydney University - Bankstown Campus Proposal

Prepared for City of Bankstown Canterbury

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Quality Assurance.

Revisions

Rev	Issued	Details	Prepared By	Reviewed By	Project Principal
[01]	[23 August 2019]	Draft report issued for council review	YX	ОН	ОН
[02]	[27 August 2019]	Draft report issued for council review	YX	ОН	ОН
[03]	[06 September 2019]	Final Draft report issued for council review	YX	ОН	ОН
[04]	[09 September 2019]	Final Report issued for council record	YX	ОН	ОН
[05]	[18 September 2019]	Final Report	ΥX	ОН	ОН

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Executive Summary

Purpose of Review

An Urban Design Review has been undertaken for the City of Canterbury Bankstown for the Western Sydney University (WSU) Bankstown Campus Proposal. This report summarises the key findings and recommendations to guide Council's assessment of the application.

This report provides urban design analysis and ensuing discussion around key components of the Campus Proposal including:

- The site and its immediate urban context.
- Analysis of how the planning proposal responds to the context in an urban design sense.
- Analysis of the shadowing impacts of the building, and the resulting solar access to the adjacent public realm.
- Analysis of the visual bulk and form at street level; and the ground level interface with the surrounding urban environment.

A 3D scenario modelling and testing process was undertaken, to include:

- Scenario 1 LEP Base Case model (maximum LEP allowed building envelope)
- Scenario 02 WSU proposed built form of 14 storeys
- **Scenario 03** WSU proposed built form of 19 storeys

The 3D testing was used to inform solar studies, visual impacts and the public domain interface review.

To inform our considerations, a number of benchmark investigations were undertaken, particularly around the relevant precedents of the vertical campus and the solar access controls from other municipalities.

All the preliminary findings and the benchmark investigation were workshopped and tested with Council prior to conclusion and recommendations being finalised.

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Key Findings

The WSU Proposal as a Vertical Campus will provide new employment, education, community and social opportunities, and will make an important contribution in establishing the desired future character of the area

Building Height, Bulk and Scale

- The development typology is for a large vertical campus building that utilises a majority of the subject site. The design is considered appropriate from a built form and massing point of view (subject to further detailed comments below).
- The full height of the proposal borders The Appian Way, where the proposal forms a gateway landmark. It further visually responds to the newly approved mixed use development located immediately to the south of Paul Keating Park, referred to as the Compass Site.
- At 83m in height, it is a tall building for the city centre precinct, and significantly taller than the current LEP approved height limit of 53m.
- Taking into account the site location and dimensions, and the design response to existing site constraints, including flood level and flight path height restrictions, the increase in height is considered appropriate and can be supported for the following reasons:
 - The desire to establish a landmark building for the city centre, at an appropriate location within the Civic Precinct,

- The requirements of a university campus building to incorporate a critical mass of useable building space, and resulting floor plate sizes (refer further detail below)
- The surrounding tall buildings adjoining the site such as the Council Building, and the similar maximum height for the recently approved 'Compass Site' building which has set a preferred character of built form and height for the Civic Precinct.
- The building articulation and design response in terms of scale and built form, especially when taking into account the strategic context of the area.
- It is considered a high-quality response to the scale and form of the surrounding built environment and will sit comfortably within the future character of the Civic Precinct.
- The above points notwithstanding, the proposal for the built form has a potential impact on the Paul Keating Park to the south of the site in terms of overshadowing. This is discussed in more detail below.

Floor Plate Size

 The proposed floor plate sizes are justified in the proposal as being required to viably incorporate the various

- functional uses of a vertical campus. The precedent studies of similar vertical campus developments provides a wide variation of building, floorplate and area sizes, (due to varied site conditions and urban environments and constraints) making direct comparisons challenging.
- On balance, the proposed floor plate sizes are broadly consistent with those found in the precedents, and as such can be supported.

Floor Space Ratio (FSR)

- FSR is one control used to define the size of a building and control the intensity of development on a parcel of land.
- As the main factor of FSR, the gross floor area (GFA) needs to reflect the functional requirements of the University, and also need to be accommodated within the proposed built form, i.e. the height and bulk (Refer further detail below)
- The original proposed maximum FSR of 8:1 (December 2018) and revised maximum FSR of 8.1:1 (3 September 2019) exceeds the existing LEP control of 4.5:1.
- of WSU's proposal, we recommend that a reduction be considered to the upper cantilevered portion of the building, to align with the articulation of the building below. In doing this, the total GFA will be reduced, with the consequential reduction on the proposed FSR.

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Key Findings

Building Setbacks

- The street-level and towerpodium setbacks of the proposal are generally considered appropriate in terms of the articulation of the building design, and the site interfaces with the surrounding urban environment.
- The proposed setbacks contribute to maximising the solar access to the immediate public domain.
- The proposed setbacks up to Level 13 provide visual articulation and relief for the built form when viewed at street level and also on key view lines within the city centre, and as such are considered appropriate.
- However, the articulation and building setbacks above this to Levels 14-18 present challenges to both overshadowing and visual bulk and can be supported with amendments (outlined in detail below)

Overshadowing

 The overshadowing challenges presented through development of a tall, urban building directly north of a key civic and public park have been considered in detail within the proposal and analysed accordingly.

Solar Access Study - Paul Keating Park

- The precedent studies of appropriate solar controls for overshadowing public open space in highly urbanised or town centre environments provide guidance that the following solar control is considered appropriate and supported for this site:
 - The proposal must retain 3 hours of solar access between the hours of 10am - 2pm, for at least 50% of the open space area, measured at the winter solstice.
- The analysis reinforces the fact that overshadowing to the Park is unavoidable if any tall, urban development (such as the WSU Proposal) is proposed on the site.
- The Proposal does provide increased overshadowing to the Park across the day when compared to the existing situation of the undeveloped site.
- The Proposal does provide increased overshadowing to the Park across the day when compared to the existing LEP approved building envelope.
- The difference of additional overshadowing to the Park between the three modelled scenarios is limited, largely due to the building articulation incorporated in the proposed built form,
- The additional height and orientation of the upper-most section of the building imposes

- only very limited further solar impacts on the Park.
- The amount of additional overshadowing is considered appropriate when measured against our recommended solar controls.
- The Proposal can further reduce the additional shadow impacts onto the public realm of Paul Keating Park through a reconsideration of the form and orientation of the upper levels of the building to further mitigate impacts on the public domain and overall park experience.
- The solar access studies outlined in this report, provide further detailed analysis of the relative shadows, and impacts for each of the three development scenarios modelled - Refer Section 5.0.5 for more detail.

Solar Access Study - The Appian Way

- The precedent studies of appropriate solar controls for overshadowing of local streets (which is partly developed as open space) in highly urbanised or town centre environments do not provide clear guidance nor an applicable precedent for The Appian Way.
- As such, the solar access study has focused on the two key criteria for analysing and mitigating overshadowing to The Appian Way, being:
 - Ensuring good solar access is retained to the public open space component of The Appian Way (to the southern end)

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Key Findings

- Ensuring, where
 possible, good solar
 access is retained to
 the outdoor dining
 and shop-fronts to
 the east side of The
 Appian Way, south of
 the east-west access
 street), noting that
 outdoor dining in this
 area is currently covered
 by awnings which
 themselves limit solar
 penetration.
- The Appian Way is defined as a key 'activity spine' with future characters of eat street, street life, retail and night-time activities. Most activities tend to happen in the later part of the day currently. Therefore overshadowing to The Appian Way becomes less of a concern in comparison with the Paul Keating Park.
- The Proposal does provide increased overshadowing to the The Appian Way across the day when compared to the existing situation of the undeveloped site.
- The Proposal does provide increased overshadowing to the The Appian Way across the day when compared to the existing LEP approved building envelope.
- All three scenarios provide better outcomes of the solar access to The Appian Way on Equinox than on Winter Solstice.
- All three scenarios achieve 5
 hours of direct sunlight to more
 than half of the retail facade,
 and at least 3 hours of direct
 sunlight to more than 50% of The
 Appian Way between 9am4pm on Equinox.
- All three scenarios therefore satisfy our recommended solar controls.

Visual Impacts

- The Proposal outlines a desire
 to create an architectural
 character for the building
 which visually represents a
 'tertiary education' institution
 and is distinctly different from
 what might be considered a
 commercial building. This desire
 is considered appropriate and is
 supported.
- The architectural form of the building is visually striking, with a podium, tapered midsection, and an angled cantilevered top section hanging over large voids in some areas.
- The tapered and chamfered sections also serve to mitigate some of the overshadowing and visual challenges, an appropriate response which is supported.
- When viewed from certain street-level vantage points, the cantilevered upper sections of the built form however presents a jutting and prominent visual form and bulk high up in both the viewers eye-line, and the skyline. This has a visual impact from street level, and as such it considered to be one of the less supported elements of the built form for this reason.
- The built form is supported with minor mitigation of these upper level overhanging elevates through selected reductions in the size, angle and articulation of the upper levels.

Public Domain Interfaces

- The Proposal includes street frontage activation and a setback at the ground level along Rickard Road, The Appian Way, and Paul Keating Park, which are considered appropriate.
- The nature and impact of vehicle circulation within The Appian Way from neighbouring properties is not clear from proposal and should be considered further.
- The nature and impact of the intrusion of the 'research and industry pop-up space' into the setback zone along Rickard Road is not clear. This provides the potential to interrupt or affect pedestrian movements and should be considered further.

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Executive Summary

Built Form Control Recommendations

Building Height

 The maximum building height of 83m is supported on the site.

Visual Bulk:

When viewed from most street-level vantage points, the top cantilevered section presents a significant and unnecessary visual form and bulk very high up in both the viewers eyeline and the skyline.

- 2. It is recommended that if the proposal is to be approved with the maximum height of 83m, the upper sections of the building (i.e. visual impacts occurring from Levels 14-18) be mitigated through reductions in the floorplate size, building angle and level articulations.
- Introducing a setback above podium level to Rickard Road and The Appian Way would potentially reduce the stark form at this corner and could be more visually consistent with the surrounding built form, as well as further mitigate potential wind impacts.

Building Setbacks

It is recommended that the following building setbacks be considered:

- 4. South Paul Keating Park: As per WSU Proposal.
- East The Appian Way: As per WSU Proposal; Or alternatively introducing a setback above podium level for a more articulated built form at the corner of The Appian Way and Rickard Road;
- 6. North Rickard Road: 3m wide continuous Ground Level setback with the intrusive space removed; Or alternatively introduce a setback above podium level for a more articulated built form at the corner of The Appian Way and Rickard Road;
- West BLAKC Driveway:
 1.5m wide continuous Ground Level setback for pedestrian movement; Above Podium setback as per WSU Proposal.

Solar Controls to Paul Keating Park

8. It is recommended that the Proposal achieves at least 3 hours direct sunlight (each hour) to more than 50% of the total Paul Keating Park area, between 10am - 2pm on the Winter Solstice.

Solar Controls to The Appian Way

- 9. It is recommended that further consideration be given to the nature of solar access objectives and the level of relevant policy control over solar access to The Appian Way. In particular its dual role as both a working street reserve (vehicle access and parking) and a public space to the south means that the typical public open space solar controls are not considered entirely appropriate.
- 10. It's therefore recommended to use the equinox solar access for The Appian Way, i.e. achieve 5 hours of direct sunlight to more than half of the shop-fronts, and at least 3 hours of direct sunlight to more than 50% of The Appian Way between 9am-4pm on Equinox.

FSR

- 11. It is recommended that an increase in the FSR for the site from the existing 4.5:1 FSR to 8:1 be considered.
- 12. To mitigate the visual bulk of WSU's proposal, we recommend that a reduction be considered to the upper cantilevered portion of the building, to align with the articulation of the building below. In doing this, the total GFA will be reduced, with the consequential reduction on the proposed FSR.

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Public Domain Recommendations

Ground Level Setbacks

It is recommend the following ground level setbacks for the WSU Proposal:

- South -Paul Keating Park: As per WSU proposal.
- 2. East The Appian Way: As per WSU proposal.
- North Rickard Road: 3m wide continuous Ground Level setback with the intrusive space removed.
- 4. West BLAKC Driveway: 1.5m wide continuous Ground Level setback for pedestrian movement through.

Ground Level Transition

- It is recommended that each entry level to WSU building should correspond to the relevant existing ground level, taking into account all flooding mitigation requirements.
- 6. Any ground level difference between internal and external areas of the WSU Proposal should be addressed through the implementation of ramps, steps and lift services, so as to offer smooth and equitable access for all users and visitors.

Street Frontage Activation

- 7. It is recommended that a variety of functional spaces should be programmed at the ground level so as to encourage street life and retail activity. The provision of active street frontages enables a safe, comfortable and engaging environment for pedestrians.
- 8. All ground level activation spaces should be well illuminated, consider Crime Prevention Through Environmental Design (CPTED) principles, and establish a consistent visual amenity across the precinct.

Weather Protection

- It is recommended that a street level awning be provided along The Appian Way and a colonnade space be provided alongside Rickard Road and Paul Keating Park.
- 10. Tree planting should also be provided along The Appian Way frontage and Paul Keating Park interface, where people interact, gather together and/or linger. These elements provide necessary shading for pedestrians during summer and protection from wind and rain in winter.
- 11. It is noted that part of The Appian Way may be impacted for solar access in winter and appropriate tree species will need to be considered.

Deep Soil Landscape Zone

12. Deep soil zones are essential for trees and vegetation planting and storm water management purposes. It is recommended that an adequate deep soil landscape zone be provided along The Appian Way frontage. Paul Keating Park to the south of the site can provide additional areas for deep soil planting within the Park to encourage urban tree canopy cover.

Shared Zone

- 13. It is recommended that a well-designed feature paving should be applied to the dedicated shared zone along The Appian Way to clearly define the different modal functions. The paving will serves as informal zones helping to separate users of The Appian Way (pedestrians, people congregating, and vehicles).
- 14. Ensuring that the shared zone is designed to pedestrian orientated experience will assist in controlling vehicle speeds and help mitigate pedestrian vehicle conflicts.

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Introduction

1 Purpose of Review

Engagement

Tract has been engaged by the City of Canterbury Bankstown to undertake an urban design peer review of the Western Sydney University's (WSU) Bankstown Campus Proposal for a new multistorey campus building at the corner of Rickard Road and The Appian Way. The primary purpose of this peer review is to provide recommendations to guide Council in the assessment of the development application.

Purpose & Assessment

The WSU Campus Proposal presents a significant opportunity to contribute to the heart of Bankstown in terms of the economic opportunity and vibrant activation to the site, and the surrounding city centre.

Given the WSU Campus Proposal's location at an important street junction between Rickard Road and The Appian Way, and next to the public open space of Paul Keating Park, it is important to review the Proposal's design merits and assess the appropriateness of its built form elements for the locality.

This report provides urban design analysis and ensuing discussion around key urban design components of the WSU Campus Proposal including:

- The proposal site and surrounding local urban context.
- Analysis of how the proposal's design responds to its local context in terms of the final urban design outcomes.

- Analysis of overshadowing impacts resulting from the building, and solar access impacts to the public realm.
- Analysis of the building's visual bulk and form from the street level, and its ground-level interfaces with the surrounding urban environment.

In conclusion, this report provides a variety of essential recommendations to inform the planning and design controls that will apply to the site (and surrounds) to ensure that a well-designed outcome is achieved for the Proposal.

Limitations

It is important to acknowledge that this review and its assessment incorporates urban design analysis only, and should be read as such. It assesses urban design components of the Proposal (such as the overall built form, solar access, and landscape architectural components) solely on the extent that they inform, shape or impact the planning and design controls for Council.

This report is not intended as a full architectural design assessment of the proposal, nor a discussion and review of the intrinsic design merits of the building per se.

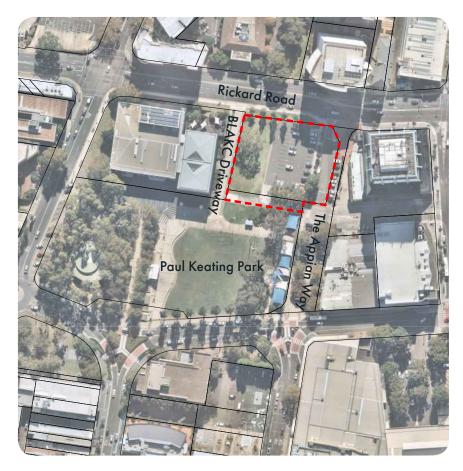


Figure 1. Site Plan (Source: Tract 2019)

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2 Approach of Review

This report is based around a clear and logical design review process, commencing with site visits and detailed discussions with Council officers, with the proponent and their architectural design team. The approach is informed by a comprehensive understanding of the WSU Proposal to ascertain the key design drivers, assumptions and challenges.

The review includes a desktop review of documentation associated with the Planning Proposal along with any applicable strategic directions and urban studies applicable to the site and the desired future character such as the "Bankstown Complete Streets Project". The review also includes a detailed consideration of the relevant local planning controls established in Council's current Local Environmental Plan (LEP) and Development Control Plan (DCP).

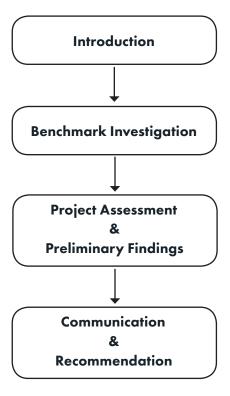
A 3D scenario modelling and testing process was undertaken, to include:

- Scenario 1 LEP Base Case model (maximum LEP allowed building envelope)
- **Scenario 02** WSU proposed built form of 14 storeys
- Scenario 03 WSU proposed built form of 19 storeys

Comparison analysis was then undertaken between the three scenarios to inform solar analysis, assess visual impacts, and review the public domain interfaces.

Desktop precedent investigations were also undertaken, particularly around the relevant vertical campus precedents, and the solar access controls from other municipalities.

The key findings have been workshopped and tested prior to the preparation of the recommendations. being finalised.



In preparing this report, the following documentation has been reviewed:

- Planning Proposal Western Sydney University Bankstown City Campus and Appendix, by Urbis (18 December 2018).
- Western Sydney University Bankstown City Campus Urban Design Report, by Lyons (20 December 2018).
- Bankstown Local Environmental Plan 2015 and Bankstown Development Control Plan 2015.
- Bankstown CBD MIKE FLOOD Model

- Upgrade Western Sydney University Site Flood Assessment, by DHI Water & Environment (8 May 2019).
- WSU Bankstown City Campus
 Development Aeronautical Impact
 Assessment, by Landrum & Brown
 Worldwide (Aust) (26 March 2019).
- WSU Pedestrian Wind Environment Study Bankstown City Campus Development, by Windtech (May 28 2019).
- WSU Bankstown City Campus Heritage Impact Statement, by Urbis (8 July 2019).
- WSU Bankstown City Campus
 Transport Management and
 Accessibility Plan (Rev B), by Arup (17
 July 2019).
- State Design Review Panel SDRP Session 26 (2nd Review) & SDRP Session 32 (3rd Review) Formal Comments (21 March 2019 & 18 June 2019).
- Bankstown Draft Complete Streets: CBD Transport and Place Plan, by City of Canterbury Bankstown (April 2019).
- Best Practice Research Open Spaces in City Centres, by City of Canterbury Bankstown (16 August 2019).
- Open Spaces In City Centres Solar Amenity Study, Case Study: Paul Keating Park, by City of Canterbury Bankstown (16 August 2019).
- Government Architect NSW's 'Better Placed' Design Policy (2017).
- Western Sydney University Bankstown City Campus Supplementary Planning Information Package and Appendix, by Lyons (12 August 2019).
- Bankstown CBD Campus: Bulk and Scale Justification, by Western Sydney University (30 August 2019).
- Schematic Design Phase Interior Narrative Concept, by HDR (1 August 2019).
- Not Lazing, Learning, by Hassell (September 2017)

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Context

3 Urban Environment

Bankstown is a suburb approximately 16 kilometres southwest of the Sydney CBD. Bankstown serves as a major district centre providing extensive civic, retail, and commercial destinations within a relatively compact CBD precinct. The CBD's location is situated next to the Bankstown train station and features an urban fabric comprising a mixture of medium and highdensity buildings.

The surrounding development character includes lower ground retail mixed with commercial and/or residential on the upper levels, larger ageing commercial office towers, and more recent contemporary development and civic buildings to the north of the station established around Paul Keating Park.

Site Context

The WSU Campus Proposal site is currently functioning as an atgrade grassed car park that fronts Rickard Road to the north and The Appian Way to the east. It is located between the Bankstown Library and Arts Centre and the City of Canterbury Bankstown offices building to the east, and Paul Keating Park to the south.

Paul Keating Park (The Park) is recognised as a major civic open space within the city centre, with direct axial views and connections to many key destinations, including the Bankstown Train Station. Paul Keating Park hosts a variety of daily interactions and many community and cultural and events and activities.

Open Space Context

A park masterplan for the Paul Keating Park is currently underway which will establish the future vision, uses and layout of the park. The Park's existing layout includes a civic pathway and stairs orientated at the axis of Fetherstone Street, and a significantly sized flat grassed area used for sports, recreational activities and events to the east. At the eastern edge of the park, adjacent to The Appian Way, is a shaded playground and communal seating areas.

The Park is an important open space that supports much of the recreational activity that occurs within central Bankstown. In terms of community activity and use, the grassed area and stairs are used for informal gatherings, social activities, and general enjoyment of the natural elements. School students and youth use the lawn and the adjacent playground for general play. A variety of community activities and local gatherings are often held at the paved and pathway areas.

Currently the Park has a high level of solar amenity, with the open green lawn areas receiving a good amount of solar coverage that is unaffected by overshadowing for the majority of the day. The Park receives some shadowing from the Council office building to the north-east in the morning, and minor overshadowing from the Bankstown Library Building to its north-west in the afternoon.



Figure 2. Paul Keating Park - Overhead (Source: City of Canterbury Bankstown)

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Public Realm Context

Given the open, undeveloped nature of the subject site directly to its north, the Park is mostly unaffected by shadowing through the main part of the day. Any current overshadowing that occurs has not affected any of the landscaped, vegetation or lawn areas within the Park from growing. The large distribution of solar access allows community activities and events to take place in the park daily and year-round.

75 The Mall (The Appian Way) is located to the east of the subject site, aligned north south to connect Rickard Road to 75 The Mall. In its current state, it does not allow vehicle connection through to The Mall, and incorporates a number of on-street carparks accessible from Rickard Road and from Jacobs Street to the east.

The southern section of The Appian Way is closed to traffic and features public realm space including paved areas with mature trees, seating, and public art connecting shopfronts on the eastern side of The Appian Way into Paul Keating Park. The Appian Way currently receives reasonably good solar access, with significant shadowing caused by the Council building to the southern end of the street reserve in the morning. Shopfronts to the eastern side of The Appian Way cast some limited shadows on public realm spaces in the morning.

Any development of the subject site with significant building height has the potential to create amenity and overshadowing impacts to The Appian Way in a similar way to the Park.

Development Considerations

Any development proposed for the subject site is likely to create additional overshadowing and public realm amenity considerations which will need to be balanced in the consideration and assessment of this strategic development site. Understanding the visual, and amenity impacts caused by the Proposal will be critical to maintaining an equilibrium between development of the subject site, and retention of adequate open space, amenity, and community aspects of the Park.

Similarly, how the Proposal influences the public realm locally from the street-level and as viewed from a wider precinct perspective is a crucial requirement to be considered.



Figure 3. Paul Keating Park - Ground Level (Source: City of Canterbury Bankstown)

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Proposal Summary

4 Summary of Planning Proposal and DRP Revision

WSU Planning Proposal

Lyons Architect has prepared an architectural design and urban design study for the WSU Bankstown Campus. The Proposal's urban design study is to inform the proposed amendments to the maximum building height and floor space ratio (FSR) standards under the Bankstown LEP 2015 pertaining to the existing site at 74 Rickard Road and part 375 Chapel Street, Bansktown.

The proposed development, as interpreted in 'Western Sydney University Bankstown City Campus Urban Design Report' by Lyons (20 December 2018) (Referred as Lyons Report, December 2018), is a stand-alone Vertical Campus facility, which offers the following:

- 19 storeys above ground to accommodate academic and non-academic spaces;
- 2 storeys of basement parking, and 4 drop-off parking spaces at grade on The Appian Way, plus 2 small rigid van loading bays on Rickard Road;
- Varied building floor plate sizes from ground level to roof top reflecting the building setbacks and articulations. Refer Lyons' list on right;
- Proposed GFA of 29,266sqm to meet the functional and NLA requirement of 26,200sqm as defined by the University;
- Proposed building height of 83.05m with the peak of roof proposed RL 106.780 AHD;
- Proposed FSR of 8:1.

WSU Planning Proposal - DRP Revision

As of 3 September 2019, Tract has been informed from the 'Bankstown CBD Campus: Bulk and Scale Justification' statement by Western Sydney University (30 August 2019) that the GFA and NLA has been slightly increased to include a GFA of 29,270sqm and NLA of 26,622sqm.

The revised WSU Proposal design (including amendments to GFA and NLA) has been developed through a design review panel (DRP) chaired by the NSW Architect. The revised plans have been justified on the basis that a vertical campus requires larger floor plates than other commercial tower developments to accommodate larger room sizes, improved building services access, circulation spaces, and distribute social spaces for students.

COUNCIL	_ GFA AR	REA SCHEDULE
LEVEL		AREA
LEVEL 18		785 m²
LEVEL 17		1122 m²
LEVEL 16		1232 m²
LEVEL 15		1434 m²
LEVEL 14		1504 m²
LEVEL 13		1059 m²
LEVEL 12		1395 m²
LEVEL 11		1423 m²
LEVEL 10		1339 m²
LEVEL 9		1403 m²
LEVEL 8		1399 m²
LEVEL 7		1191 m²
LEVEL 6		1909 m²
LEVEL 5		1862 m²
LEVEL 4		1897 m²
LEVEL 3		1462 m²
LEVEL 2		2546 m²
LEVEL 1		2362 m²
GROUND LEVEL		1649 m²
BASEMENT 1		160 m²
Grand total		29132 m²

Figure 4. GFA Schedule (Source: F 190814
Updated Draft Architectural Drawings,
Western Sydney University Bankstown
City Campus Supplementary Planning
Information Package, by Lyons, 12 August

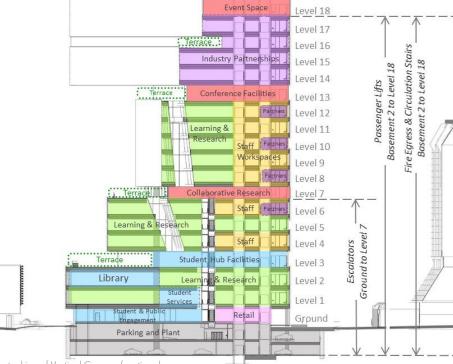


Figure 5. Section Diagram showing indicative stacking of Vertical Campus functional zones

(Source: WSU Bankstown City Campus Urban Design Report, by Lyons, 20 December 2018)

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Project Assessment

Assessment Overview

In order to undertake any design assessment, it is critical to understand the design principles that underpin a proposed development scheme.

For the WSU Bankstown Campus Proposal, the relevant design principles are identified within Section 5 of Lyons Report (December 2018). In addition to these proposed principles, we consider that the proposal should also be assessed in relation to the additional design principles from our independent point of view, including:

DP-AD01 to DP-AD05

When combined, these principles are a logical, considered and robust base for the development proposal.

Our project assessment focused on the following two aspects in response to the purpose of review mentioned in Section 1 of this report, being:

- Bulk and Scale; and
- Public Domain Interface.

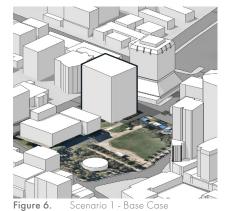
5 Bulk and Scale

To assess the bulk and scale of WSU's proposed built form, a review of the **building size** was undertaken, including the building floor plate sizes, the building height and the setbacks. This included a desktop review on the relevant sections of Lyons Report (December 2018).

The review has further tested the solar access and visual impacts of the following three scenarios to understand how variations of the proposed built form may impact upon the public domain;

- Scenario 01 LEP Base Case, which reflects the maximum building envelope following the current Bankstown LEP and DCP controls, includina:
 - Building height: 53m
 - FSR: 4.5 : 1
 - Council GFA: 16,550 sqm
 - Building setbacks: compatible with the surrounding context and desired character of the precinct, i.e.
 - Rickard Road street setback: 3m
 - The Appian Way street

- setback: alignment with the full width of The Appian Way
- BLAKC driveway setback: 12m
- Paul Keating Park setback: 10m
- 2. **Scenario 02** WSU proposed built form of 14 storeys excluding Level 14 -18 (i.e. non-academic spaces). This scenario has a similar height which roughly aligned with the existing Council building on the east.
- 3. **Scenario 03** WSU proposed built form of 19 storeys including Level 14 -18 (i.e. non-academic spaces)



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(Source: Tract 2019)

Tract



Figure 7. Scenario 2 - WSU's proposed built form of 14 storeys excluding Level 14 -18 (Source: Tract 2019)



Figure 8. Scenario 3 - WSU's proposed built form of 19 storeys including Level

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Bulk and Scale Design Principles

Lyons' Design Principles:

- DP01 Building size considered in relation to the current and future context of the site.
- DP02 Preserve open space along The Appian Way alignment.
- DP03 Optimise solar access to a diversity of public spaces at Paul Keating Park and The Appian Way throughout the year.
- DP04 The building form shall reflect the typology of a Vertical Campus.
- DP05 Align the lower building form with the adjacent Bankstown Library and Knowledge Hub.

Additional Design Principles:

 DP-AD01 - Minimise the visual impacts to the surrounding context, especially the views from the immediate public domain, e.g. Paul Keating Park, The Appian Way and Rickard Road.

5.0.1 Vertical Campus Precedents

The assessment of relevant precedents includes an independent investigation of four contemporary vertical campus projects to benchmark similar high-level scale of building and floorplate areas against the proposed WSU site development.

This investigation was undertaken to understand the scale of the WSU building, its component uses and resulting floorplates in comparison with other national 'current best practice' vertical campus examples. Understandably, this is a desktop study and intended for high-level comparison only, to inform the Urban Design Review.

There are several clear limitations to this information including, but not limited to:

- Limited to publicly available information only for each site and proposal.
- In most cases, floorplate and building size areas were not readily available, and in some instances have been approximated either from indicative plans or site aerial studies.
- Many of these projects are still in the proposal or development stage, and as such as subject to change, refinement and alteration.

With the above limitations in mind, these examples are nonetheless relevant to inform the context of the WSU Proposal's bulk and scale, and the appropriateness of the design to its proposed function.

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Vertical Campus Precedents

The vertical campus precedents analysed and independently benchmarked include:

- Victoria University Vertical Campus - Melbourne CBD.
- 2. New Space, University of Newcastle Newcastle.
- 3. Carlton Connect Melbourne.
- **4.** University of Technology Sydney Broadway Sydney.

A summary of each campus and the corresponding design, function, and approximate GFA is provided for reference and review.

Victoria University Vertical Campus - Melbourne CBD

The proposed new Victoria University (VU) CBD vertical campus comprises around 43,300sqm floor area over 32 levels.

It creates the opportunity for the university to consolidate many existing CBD facilities into a contemporary campus building that becomes the major component of its vision for a VU City Queen Campus.

The 24,000-square-metre City West Precinct will provide space for students from VU's Polytechnic campus, as well as its Business School, College of Law and Justice, and College of Health and Biomedicine. It will also house research facilities and the VU College.

The new vertical campus will also include approximately 10 upper levels of academic and support offices and workspaces, and a provision and need for flexibility of floor layout within. The proposed faculty and office levels provide functionality and a "future-proofing" of the building. The floorplate area for the building is approximately 1,800sqm average.

Jackson Architecture has described the project as "a modern and evolutionary way of delivering a high density campus on a city site footprint".

The floorplate area for an average/typical is approximately 1,800 sqm average, and the tower is reasonably uniform in the size of its floorplates as it rises above street level (podium and ground-level areas are potentially varied and harder to discern at this point).

The typical average Floorplate GFA approx. 1,800 sqm



Figure 9. VU Tower Concept - 364-370 & 372-378 Little Lonsdale Street, Melbourne Victoria (Source: Jackson Architecture)



Figure 10. VU Tower Public Domain Concept
- 364-370 & 372-378 Little
Lonsdale Street, Melbourne Victoria
(Source: Jackson Architecture)

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2. NeW Space, University of Newcastle

NeW Space is a \$95 million landmark education precinct in the heart of Newcastle's CBD, comprising a 10 storey vertical campus-style building.

The total building floorspace is in the order of 16,000 - 17,000 sqm GFA (approximate without having access to the exact floor areas) over 10 storeys, accommodating 2,340 people.

The building comprises:

- 2,316 sqm of teaching space.
- 2,390 sqm of learning/social space.
- 4,370 sqm of office space.

NeW Space is the heart of the Universities' City campus, offering University-supported activities across all faculties including:

- Administrative learning and research spaces.
- Digital library services and information commons.
- Social spaces.
- Work-integrated learning.
- Facilities for industry, professional and community engagement.

"The contemporary teaching spaces reflect new ways of learning that focus on collaboration and group work, as well as harnessing technology. Standard lecture theatres have been replaced with flexible working spaces and booth seating." (Source: Lyons Architects)

The customised teaching spaces are located on the first three levels. Levels 4 to 8 feature smaller teaching spaces, and staff areas, and throughout the balance of the building social spaces and facilities support engagement with industry, business and the community.

The floorplate area for lower 'podium' levels 1 and 2 is approximately 2,850 sqm average. The floorplate area for upper levels 3-8 is approximately 1,800 sqm average - noting there are a number of floors with cantilevered floorplates similar in articulation and nature to the proposed WSU Building.



Figure 12. NeW Space, Hunter St & Auckland Street, Newcastle NSW 2300 -Civic Interface (Source: Ivans)



Figure 13. NeW Space, Hunter St & Auckland Street, Newcastle NSW 2300 -Aerial Overview (Source: Lyons)



Ground Floor Floorplate GFA approx. 2,850 sqm



8th Floor Floorplate GFA approx. 1,800 sqm

Figure 11. NeW Space - Ground Floor and 8th Floor Floorplate Plans (Source: Lyons)

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3. Carlton Connect Initiative - Melbourne

"The vision for the CCI is to establish Australia's leading campus-centred, multi-disciplinary innovation precinct where industry, government, entrepreneurs and researchers colocate and collaborate to enhance Australia's innovation, productivity and sustainability agendas." (Source: Urbis).

The site area is 8,362 sqm, and the proposal includes 75,821 sqm GFA (64,102 sqm above ground).

The proposal is for a building of 12 storeys incorporating:

- 50,000 sqm of offices, labs, coworking and event spaces.
- A new central open space of 1,300sqm.
- 3,000 direct jobs including 2,500 jobs in the commercial and scientific industry.

An important element of the evolution of Carlton Connect has been its response to changing trends in vertical campus design including:

- A design incorporating fewer floors, with better connectivity to foster collaboration.
- Larger floorplates with fewer visual and physical barriers to make the learning and collaboration spaces more effective
- Built form articulation that responds to the context and demonstrates sustainability initiatives.

- Inclusion of multiple access points and a hierarchy of laneways to promote activity and permeability.
- Incorporation of a central open space occulus for the enjoyment of the public and future occupants and visitors to the CCI.
- A people-centric ground plane (around 30% of the site coverage) that provides atgrade connections between surrounding streets, the laneways and the occulus space.

A comparison between the CC floorplate sizes and the proposed WSU floorplates is less effective or informative given the infill nature of the development. However, the size of larger, better-connected floorplates is instructive for this peer review of the WSU Proposal and its design.

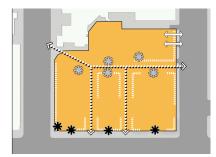


Figure 14. Carlton Connect Development Plan
- Urban Design Principles
(Source: Architectus 2014)



Figure 15. CCI Development Plan - Building Massing (Source: Architectus 2014)



Figure 16. CCI Carlton Victoria - Building Render (Source: BVN)



Figure 17. CCI Carlton Victoria - Building Uses (Source: BVN)

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4. UTS Broadway - Sydney

The proposed 17 storey city-based vertical campus for University of Technology Sydney (UTS) in Sydney is an example of a highly constrained development that is significant in both size and its creation as a visual landmark.

The project brief identifies the site as an opportunity to create a new campus heart for the very dense urban campus of UTS which is spread over several city blocks.

The new floor space will accommodate a range of educational and ancillary educational uses, such as:

- Library and services.
- Research offices.
- Teaching spaces.
- Informal learning spaces.
- Student Centre.
- Student Union spaces.
- Food and beverage outlets.
- Academic (including faculty space).

The lower levels consist of a podium, overlooking Broadway to the south and Alumni Green to the north, housing the bulk of the social, student-focused areas, learning commons, collaborative classrooms, general teaching spaces and a Student Services hub. The floorplate area for the podium is approximately 3,050 sqm average.

The upper levels take the form of a tower that twists and rotates as it climbs, in response to the surrounding building and site geometries. The floorplate area for the upper levels reflects approximately 1,500 sqm average.

"The new development will also provide the opportunity to move CBO1 into the realm of 21stC learning and enable a much greater integration of the major student focussed areas with not only the university as a whole but also the broader community."

(Source: FJMT Architects)

Ground Floor Floorplate GFA approx. 3,050 sqm

Upper Floor Floorplate GFA approx. 1,500 sqm



Figure 18. UTS Broadway Entry Point Diagram (Source: FJMT 2016)



Figure 19. UTS Broadway Building Construction (Source: UTS)



Figure 20. UTS Broadway Render (Source: FJMT 2016)

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5.0.2 Building Floor Plate Size Review (DP01, DP04)

The proposed building areas will accommodate the required learning, research, working spaces and supporting facilities for the campus's future population of student, staff, industry partners, tenants and public users.

Section 6.2 of Lyons Report (December 2018) outlines the WSU Proposal as having a GFA of 29,266 sqm and a Net Lettable Area (NLA) of 26,200 sqm. The GFA is identified as addressing all the functional and NLA requirements specified during the design process.

A review of the architectural plans indicates that the GFA for each level varies as the building is articulated - ranging from 811 sqm at the Top level, to 2,544 sqm for Level 2. The typical floor plate size is approximately 1,900 sqm for Level 4 to Level 6, and approximately 1,400 sqm for Level 8 to Level 15.

We note that the GFA and NLA has been slightly increased from the December 2018 proposal, as updated in the 'Bankstown CBD Campus: Bulk and Scale Justification' statement by Western Sydney University (30 August 2019).

Four vertical campus precedents have been identified within Lyons Report (December 2018), which find the typical floor NLA ranging from 1,150 sqm to 2,860 sqm, which aligns with each of the WSU Proposal's floor plates.

The review of vertical campus precedents identifies that the typical floor plate sizes vary significantly depending on the location of the site, its context, and each organisation's functional specifications.

The size and nature of floorplates are typically highly responsive to the context of the proposed development - i.e. they are often informed or shaped by the physical limitations of the site allocated for the vertical campus building.

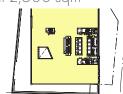
WSU Bankstown site is one of the more physically limited vertical campus sites in terms of the site's dimensions, size and orientation.

The proposed floor plate sizes are justified in the proposal as being required to viably incorporate the various functional uses of a vertical campus. The precedent studies of similar vertical campus developments provide a wide variation of building, floorplate and area sizes, (due to varied site conditions and urban environments and constraints) making direct comparisons challenging.

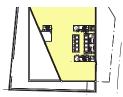
On balance, the proposed floor plate sizes are broadly consistent with those found in the precedents, and as such can be supported.



L1-2 GFA average at 2,500 sqm



L4-6 GFA average at 1,900 sam



L8-15 GFA average

at 1,400 sqm

Figure 21. WSU's Typical Floor Plate (Source: F 190814 Updated Draft Architectural Drawings, Western Sydney University Bankstown City Campus Supplementary Planning Information Package, by Lyons, 12 August 2019)

NLA 2,860 sqm





NLA 1,150 sqm

Figure 22. Precedents' Typical Floor Plate
(Source: WSU Bankstown City
Campus Urban Design Report, by
Lyons, 20 December 2018)

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5.0.3 Building Height Review (DP01)

Building height is a critical issue for a site as high-profile, visible and central to the Bankstown Civic Precinct, as the subject site is.

Section 6.3 of the Lyons Report (December 2018) indicates that the WSU Proposal's building height is 83.05m, with the peak of the roof proposed at RL 106.780 AHD. It lists a number of design constraints and objectives, from which the proposed height was derived. These design constraints and objectives reflect the existing site conditions, such as local flood level and flight path height restrictions, and meeting educational and development objectives expected from a modern vertical campus typology.

The building height has also been examined from a strategic context, whereby there is a desire by the Council to facilitate high quality development outcomes within the Civic Precinct to support the growth and development of the Bankstown CBD. This is reflected within the City of Bankstown Canterbury LEP 2015 and Bankstown CBD Local Area Plan (September 2011) which identifies the Northern CBD Core and the Civic Precinct as a strategic position for the concentration of higher densities and modern office tower buildings. The existing planning controls support these

strategic objectives through the provision of a building height limit of 53m and an FSR of 4.5:1, sited generally around Paul Keating Park.

It is understood that currently there are some commercial sites within the Northern CBD Core precinct undergoing a phase of urban renewal and redevelopment in anticipation of the new Bankstown Metro Station. An example of which is the large scale mixed use development located to the south of Paul Keating Park (referred to as the Compass Site) which was approved by Council in 2018 with the maximum building height of 83m.

The proposed development of the subject site is for a large vertical campus building that utilises a majority of the subject site. It, like the Compass Site, is proposed at 83m in height. It is a tall building for the city centre precinct, and significantly taller than the current LEP approved height limit of 53m.

The design is considered appropriate from a built form and massing point of view (subject to further detailed analysis around shadow impacts and other amenity impacts examined in this report).

The proposal for the built form does have the potential to impact on the Paul Keating Park to the south of the site in terms of overshadowing (Refer 5.0.5 for further analysis).

Taking into account the site location and dimensions, and the design response to existing site constraints, including flood level and flight path height restrictions, the increase in height is considered appropriate and can be supported for the following reasons:

- The desire to establish a landmark building for the city centre, at an appropriate location within the Civic Precinct,
- The requirements of a university campus building to incorporate a critical mass of useable building space, and resulting floor plate sizes.
- The surrounding tall buildings adjoining the site such as the Council Building, and the similar maximum height for recently approved 'Compass Site' building which set a character of built form height for the Civic Precinct.
- The building articulation and design response in terms of scale and built form, especially when taking into account the strategic context of the area.
- It is considered a highquality response to the scale and form of the surrounding built environment and would sit comfortably within the future character of the Civic Precinct.

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Building Setback Review (DP02, DP053, DP05, DP-AD01)

Section 7 of the Lyons' Report outlines the design process through a series of 'Massing Strategy' diagrams that outline how the Proposal's final built form was generated.

It is recognised that this proposed built form design incorporates the following setbacks on each of the east, south and west sides.

- A 9m setback to the eastern boundary with a minor building intrusion into The Appian Way alignment. There is some complexity to the eastern interfaces as the land title extends into The Appian Way as illustrated in Figure 23. However, the proposal generally maintains a clear and open view along The Appian Way Addresses Design Principle DPO2.
- The upper portion of the proposed tower is rotated and setback approximately 6.5m-14.8m on the southern side. The proposal's stepping form at Levels 3 & 7-13, which reduces the bulk facing the Park, provides a relatively slender profile. (These setbacks also assist with the minimisation of overshadowing to the public domain, as outlined in Section 5.0 of this report) Addresses Design Principles DPO3, DP-ADO1.

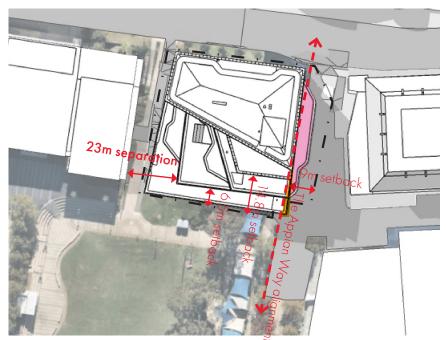


Figure 23. Building Setback - Plan Diagram (Source: Tract 2019)

Minor building intrusion

Ground level awning intrusion

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 The tower above the podium (Level 3-13) is setback by at least 23m on the west from the Bankstown Library and Knowledge Hub - Addresses Design Principle DPO5. However, Levels 14-18 are cantilivered toward the west and become visually prominent when viewed from the surrounding public domain.

The street-level and tower-podium setbacks of the proposal are generally considered appropriate in terms of the articulation of the building design, and the site interfaces with the surrounding urban environment.

The proposed setbacks contribute to maximising the solar access to the immediate public domain.

The proposed setbacks up to Level 13 provide visual articulation and relief for the built form when viewed at street level and also on key view lines within the city centre, and as such are considered appropriate.

However, the articulation and building setbacks above this to Levels 14-18 present challenges to both overshadowing and visual bulk and can be supported with amendments (outlined in "Design Implications" on page 49 of this report).

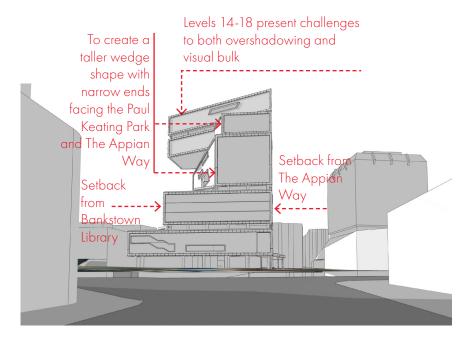


Figure 24. Building Setback - The Appian Way Street View (Source: Tract 2019)

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Bulk and Scale

Key Findings:

Based on the review of the bulk and scale of the Proposal (including the building floor plate size, building height and building setbacks) and having regard to the comparison of precedents, in assessing the proposal we find:

Floor Plate Size

- The proposed floor plate sizes are justified in the proposal as being required to viably incorporate the various functional uses of a vertical campus. The precedent studies of similar vertical campus developments provides a wide variation of building, floorplate and area sizes, (due to varied site conditions and urban environments and constraints) making direct comparisons challenging.
- On balance, the proposed floor plate sizes are broadly consistent with those found in the precedents, and as such are supported.

Floor Space Ratio (FSR)

- The Proposal is subject to a Floor space ratio (FSR) of 4.5:1 under the Bankstown LEP 2015, however the proposed FSR of 8.1:1 (3 September 2019) exceeds the existing LEP control.
- The increased FSR is considered appropriate for the site, in light of the other considerations outlined here in terms of building height, contextual response, and overshadowing mitigation.

Building Height:

- WSU's proposal responds to the existing site constraints and future context, and proposes a similar
 maximum height as the newly approved Compass Site proposal. The development typology is for
 a large vertical campus building that utilises a majority of the subject site. At 83m in height, it is a tall
 building for the city centre precinct, and significantly taller than the current LEP approved height limit of
 53m
- The design is considered appropriate from a built form and massing point of view (subject to further detailed analysis around shadow impacts and other amenity impacts examined in this report).
- The proposal for the built form does have the potential to impact on the Paul Keating Park to the south of the site in terms of overshadowing (Refer 5.0.5 for further analysis).

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- Taking into account the site location and dimensions, and the design response to existing site constraints, including flood level and flight path height restrictions, the increase in height is considered appropriate and can be supported for the following reasons:
 - The desire to establish a landmark building for the city centre, at an appropriate location within the Civic Precinct.
 - The requirements of a university campus building to incorporate a critical mass of useable building space, and resulting floor plate sizes.
 - The surrounding tall buildings adjoining the site such as the Council Building, and the similar maximum height for recently approved 'Compass Site' building which set a character of built form height for the Civic Precinct.
 - The building articulation and design response in terms of scale and built form, especially when taking into account the strategic context of the area.
 - It is considered a high-quality response to the scale and form of the surrounding built environment and would sit comfortably within the future character of the Civic Precinct.
- On balance, the proposed building height is appropriate for the city centre environment, and the central location within the Civic Precinct, and as such can be supported.

Building Setback:

- The street-level and tower-podium setbacks of the proposal are generally considered appropriate in terms of the articulation of the building design, and the site interfaces with the surrounding urban environment.
- The proposed setbacks contribute to maximising the solar access to the immediate public domain.
- The proposed setbacks up to Level 13 provide visual articulation and relief for the built form when viewed at street level and also on key view lines within the city centre, and as such are considered appropriate.
- However, the articulation and building setbacks above this to Levels 14-18 present challenges to both overshadowing and visual bulk and can be supported with design refinements as set out in "Design Implications" on page 49 of this report.

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Solar Access Review

5.0.4 Solar Access Controls Precedents

Tract has investigated various NSW local government planning controls for protecting solar access within the public domain. Reviewing these planning controls assist in understanding how local governments can condition appropriate levels of solar access and protect the public domain from adverse solar impacts caused from high density development in urban environments.

The investigated controls include:

- Green Square Town Centre DCP 2012.
- Harold Park DCP 2011.
- Sydney DCP 2012.
- North Sydney CBD Public Domain Strategy (2018).
- North Sydney LEP 2013.
- North Sydney DCP 2013.
- North Sydney Centre Capacity and Land Use Strategy (2017).

We have investigated the solar access provisions within City of Sydney (Green Square, Harold Park, and the Ashmore Precinct) and North Sydney DCP's on the basis that these controls, similar to the Bankstown CBD, are expected to balance development within a dense urban CBD (or urban renewal) environments and provide positive public domain outcomes.

City of Sydney - Green Square Town Centre DCP 2012

GSTC 3.1.1 The Drying Green

Provisions

- (1) A park of a minimum size of 5,500sqm is to be provided in the location identified in Figure 3.1: Public open space and is to:
- (k) achieve direct sunlight each hour between 11am and 2pm for at least 50% of the park.

GSTC 3.1.2 Neilson Square

Provisions

- (1) A neighbourhood plaza, Neilson Square, of a minimum size of 1,559sqm (including the Transit Corridor) is to be provided in the location identified in Figure 3.1: Public open space and is to:
- (j) achieve direct sunlight each hour between 12 midday and 2pm for at least 50% of a 4m wide strip along the full length of the southern edge.



Figure 25. Green Square Town Centre DCP 2012 - Figure 3.1: Public Open Space (Source: Green Square Town Centre DCP 2012, City of Sydney)

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GSTC 3.1.3 Green Square plaza

Provisions

(1) A plaza of a minimum size of 6,257sqm (including the Transit Corridor), is to be provided in the location identified in Figure 3.1: Public open space and is to:

(m) excluding shadows cast by community buildings in site 20, achieve direct sunlight each hour between 12 midday and 2pm on 21 June for at least 50% of a 4m wide strip along the full length of the southern edge of the Green Square plaza; and

(n) excluding shadows cast by community buildings in site 20, achieve consolidated areas of direct sunlight each hour between 12 midday and 2pm on 21 June generally consistent with the location and size indicated in Figure 3.2: Direct sunlight to Green Square plaza.

GSTC 6.10.1 Daylight access

Provisions

(1) Living rooms and private open spaces for at least 70% of apartments in a development are to receive a minimum of two hours direct sunlight between 9 am and 3 pm in mid winter.

GSTC 6.10.2 Sun access

Provisions

(1) Development sites and neighbouring dwellings adjacent to the Town Centre are to achieve a minimum of 2 hours direct sunlight between 9am and 3pm on 21 June onto at least 1sqm of living room

windows and at least 50% of the required minimum amount of private open space (50% of 16sqm).

Where this standard is not currently achieved then the total reduction in direct sunlight should not be more than 10%.

(2) The development application is to include hourly diagrams in plan and elevation that show the shadow impact of the proposal.

GSTC 12.4.3 Design of play areas

Provisions

(1) Indoor play areas are to have access to sunlight, natural ventilation and views to the outdoors, have

convenient access between indoor and outdoor areas, and enable clear lines of sight to allow for staff supervision from other areas of the child care centre.

(2) Outdoor areas are to be located away from areas where objects can be dropped down onto play areas, with at least 4 hours of solar access to 50% of the required outdoor area, away from main entrances, car parking areas and vehicle circulation areas, away from existing noise and environmental pollution sources, and away from the living/bedroom windows of surrounding dwellings in predominantly residential areas.





Note: the plan is to scale and the area in orange should be in direct sunlight.

Figure 26. Green Square Town Centre DCP 2012 - Figure 3.2: Direct Sunlight to Green Square Plaza (Source: Green Square Town Centre DCP 2012, City of Sydney)

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City of Sydney - Harold Park DCP (2011)

3.2 Public Domain

Provisions

- (6) All publicly accessible open space is to be designed to maximise the amenity of users by ensuring:
 - (a) 50% of publicly accessible open space is to receive at least four hours direct sunlight between 9am and 3pm on 21 June.
 - (b) shade from strong sun is available between September and March, for at least 20% of the area used for passive recreation; and
 - (c) protection from strong winds is provided to any space that is open to winds from the south.

5.7 Sun access

Objectives

- (a) Ensure new developments do not result in a deterioration of direct sunlight access to public spaces and neighbouring properties; and
- (b) Establish standards for daylight and direct sunlight access in new developments, particularly living areas and open space.

Provisions

- (1) Development must result in:
- (a) neighbouring developments receiving whichever is the lesser of:
- i) at least three hours of direct sunlight to 50% of the primary private open space and into living rooms between 9am and 3pm on 21 June; or
- ii) the existing levels of direct sunlight between 9am and 3pm on 21 June;
- (b) proposed apartments receiving a minimum of two hours of direct sunlight between 9am and 3pm on 21 June onto at least 1m2 of living room windows and to at least 50% of the required minimum area of private open space; and
- (c) 30% of required common open space receiving at least two hours of direct sunlight between 9am and 3pm on 21 June; and
- (2) The development application is to include solar diagrams that, as a minimum, demonstrate compliance with the above provision and include plans and elevations showing the shadows of the proposal at each hour between 9am and 3pm on 21 June.

City of Sydney - Sydney DCP 2012

3.1.4 Public open space

Provisions

- (3) In relation to parks (i.e. non-linear public open space):
- (a) 50% of the total area is to receive sunlight for 4 hours from 9am to 3pm on 21 June;
- (b) protection from direct sun is to be available on 21 December for a minimum of 20% of the area used for passive recreation; and
- (c) protection from strong winds is to be provided, where practicable
- 3.2.1 Improving the public domain

Provisions

- 3.2.1.1 Sunlight to publicly accessible spaces
- (1) Overshadowing effects of new buildings on publicly accessible open space are to be minimised between the hours of 9am to 3pm on 21 June.
- (2) Shadow diagrams are to be submitted with the development application and indicate the existing condition and proposed shadows at 9am, 12 noon and 2pm on 14 April and 21 June. If required, the consent authority may request additional detail to assess the overshadowing impacts.

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<u>Section 5.5 Ashmore</u> <u>Neighbourhood – 5.5.4.1 Solar</u> <u>access</u>

Provisions

(1) New development must ensure that it provides a minimum of three hours of direct sunlight between 11am and 2pm on 21 June to the public square (within the Sydney Park Village development) in the southwest corner of Coulson Street and Mitchell Road.

(2) A minimum of 60% of the total area of McPherson Park is to have direct solar access between 10am and 2pm at the winter solstice.



Figure 28. Sydney DCP 2012 - Figure 5.119: Ashmore Open Space and Setbacks (Source: Sydney DCP 2012, City of Sydney)

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North Sydney LEP 2013

Clause 6.3 Building heights and massing

- 2. Development consent must not be granted for the erection of a building on land to which this Division applies if:
- a. the development would result in a net increase in overshadowing between 12pm and 2pm from the March equinox to the September equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as "Special Area" on the North Sydney Centre Map, or
- b. the development would result in a net increase in overshadowing between 10am and 2pm from the March equinox to the September equinox (inclusive) of the Don Bank Museum, or
- c. the site area of the development is less than 1,000 square metres and any building resulting from the development would have a building height greater than 45 metres.

North Sydney DCP 2013

S2 Commercial & Mixed Use Development

2.3.7 Solar Access

- P1 Developments within the North Sydney Centre must comply with the height and overshadowing requirements contained within cl.4.3, and cl.6.4 of the NSLEP 2013.
- P2 Developments located outside of the North Sydney Centre should be designed and sited such that solar access at the winter solstice

- (21st June) provides a minimum of 3 hours between the hours of 9:00am and 3:00pm to:
- a. Any solar panels;
- b. The windows of main internal living areas;
- c. Principal private open space areas; and
- d. Any communal open space areas.
- P4 New development should not overshadow existing or proposed public open spaces located outside of the North Sydney Centre between 11:30am and 2:30pm
- <u>S8 Outdoor Dining and Display of</u> <u>Goods on the Footpath</u>

8.4.3 Solar Access

Objectives

O1 To provide a comfortable environment within which to enjoy outdoor dining or shopping.

Provisions

- P1 Solar access to nearby open spaces, outdoor dining areas or residential areas, is not to be obstructed, particularly between the hours of 12 noon and 2.00pm.
- P2 Locate outdoor dining areas that have good solar access and daylight.
- S3-9 Area Character Statements
 St Leonards / Crows Nest
 Planning Area

Solar access

P13 Development to the north of Atchison Street and east of Mitchell Street is restricted in height and massing to maintain and improve existing solar access on June 21 between 12pm and 3pm to the open space area at the south end of Mitchell Street.

P14 Development should not increase overshadowing of the existing or proposed public open space area at Hume Street Park bounded by Pole Lane, Oxley Street, Clarke Street and Hume Street between the hours of 9am – 3pm.

North Sydney Capacity and Land Use Strategy (2017)

Future Capacity Analysis 2016

The following filters were applied in creating the base case:

- b. Height of buildings determined by "prohibition" on overshadowing or any dwelling outside the North Sydney Centre (between 9am and 3pm in mid-winter)
- c. "Special Area" shadow impact controls (12pm-2pm, 10am-2pm or Don Bank Museum) on 20 March, 21 June and 23 September

Special Areas Objectives

- Minimise overshadowing or, and loss of solar access to important areas of outdoor space in North Sydney Centre, particularly in mid-winter
- Promote a scale and massing that provides for pedestrian comfort in relation to protection from the weather, solar access, human scale and visual dominance; and
- Retain the openness and sunny aspect of the centre

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Key Findings:

Based on our investigation of other council's controls, it is found that:

- Winter solstice has been used in the most scenarios and locations for the solar access control;
- Equinox has also been used, especially in a high density urban environment, e.g. North Sydney Centre;
- The time frame between **9am 3pm** appears the most common in the solar controls, however **10am-2pm**, 11am-2pm and 12pm-2pm are also used in response to different situations.
- Minimum **50%** of the **total area** of the park or publicly accessible open space is to receive direct sunlight.
- A minimum of four hours of direct sunlight to the park or publicly accessible open space between 9am-3pm, or three hours between 10am-2pm at high density area, e.g. Green Square Town Centre, are required to be achieved.
- Solar access exemptions for buildings may apply in certain instances whereby the development proposed is for a community building and/or considered by Council as a strategic site (see Green Square Town Centre DCP 2012 GTSC 3.1.3 Green Square Plaza Clause (1)(m).

The comparative review of other municipal indicators creates two key directions:

- Achieve 4 hours of direct sunlight to minimum 50% of the total area of the public park between 9am and 3pm on winter solstice; or
- Achieve 3 hours of direct sunlight to minimum 50% of the total area of the public park between 10am and 2pm on winter solstice in highly urbanised areas.

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Solar Access Review

One of the primary issues and concerns for Council in assessing the WSU Proposal is related to the subject site's location directly north of Paul Keating Park. Paul Keating Park serves as the key public park and open space within the Bankstown CBD. As such, any overshadowing caused by a new building on the site has the potential to adversely affect the park and impact its function as an important local open space. Accordingly, this is a primary focus for this urban design peer review.

Individual solar studies were undertaken for each of the three development scenarios outlined previously. These studies produced a range of shadow diagrams to be analysed on the extent of the shadowing impacts on the public domain areas:

- Paul Keating Park (the Park).
- The Appian Way.

Important assumptions underpinning the solar access analysis and shadow diagrams include:

- 1. Given the studies are particularly focused on understanding and retaining high quality solar access to the Paul Keating Park, the definition of where the 'park' begins and ends is particularly important. The Paul Keating Park area we have used for the solar study is defined in green in the adjacent Figure 29. This area has been defined on the basis of the following:
 - The most common recognition of the Park incorporates all public land south of the proposed site and the Bankstown Library and Knowledge Centre/

- Bryan Brown Theatre bounded by The Appian Way, The Mall and Chapel Road. This would include the former Council Chambers Building and the heavily landscaped and vegetated surrounds within the 'park'. The total park area to be assessed is 12,450 sqm.
- Further, the solar study is used to assist our understanding of the solar impacts on the immediate public domain surrounding WSU Proposal site. The broader extent of the public domain that is included, the better comprehension of the issues and opportunities could be achieved.
- 2. Given the future use and function of The Appian Way, it is important to understand the solar impacts on The Appian Way, which should include the existing road between the Mall to the south and Rickard Road to the north; and the footpath and retail facades on the eastern side of The Appian Way toward the southern end. The study area of The Appian Way is defined and highlighted in purple in the adjacent Figure 29, with the retail facades and the adjacent footpath at southern end highlighted in yellow.
- 3. These shadow diagrams incorporate two critical times of the year the Equinox of September 22nd, and Winter Solstice of June 21st. These are widely accepted and adopted standards for planning and design controls related to solar access. They represent

- a 'reasonable' indication of standard overshadowing impacts (Equinox), and the maximum overshadowing caused during the shortest day in winter (Winter Solstice). While the Winter Solstice shadows provides an important indication of the maximum shadows to be used to inform design decisions, it is also recognised that mitigating all of the Winter Solstice shadowing is very difficult (and often impossible) in high density urban environments. Therefore Equinox is used for an alternative assessment.
- 4. Shadow diagrams were produced at one hour intervals between 10am and 3pm (or 10am-2pm inclusive) for Paul Keating Park, and between 9am and 4pm (or 9am-3pm inclusive) for The Appian Way. Many typical LEP controls use 9am 3pm as their standard shadow assessments. However, we recognise that it is important to analyse the Park and The Appian Way separately and under different time frames due to their different nature of uses.
 - We focused between 10am-3pm for the Park as that is the time period of the day when people mostly and/or actively use the park.
 - We have included an extra hour assessment at 3pm-4pm for The Appian Way as it specifically relates to solar access to shops and retail tenancies on the eastern side of The Appian Way where people/students congregate for their afternoon tea break.

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Methodology

The solar study has been undertaken based on a combined 3D model, which comprises:

- Project context model in Sketchup, provided by Council on 4th July 2019. Building footprints and heights of existing buildings, cadastral boundary information, along with topographical data (from 1.0m contours) provided in Council's 3D model: and
- 3D models of three different WSU Campus scenarios:
 - Scenario 03 The latest 3D model in CAD of the proposed WSU building, provided by Lyons Architects on 2nd August 2019 that was incorporated into Council's Sketchup 3D context model. The site boundary for the WSU 3D model received was at RLO.0 and was correctly and accurately aligned with Council's cadastre.
 - Scenario 02 The latest 3D model in CAD of the proposed WSU building, provided by Lyons Architects on 2nd August 2019, with top 5 levels, i.e. Level 14-18, removed.
 - Scenario 1 A 'base case' scenario created under with the current Bankstown LEP and DCP controls as listed in Section 5 of this report.

A series of overshadowing diagrams were produced using the 3D model to generate shadows for the hours between 9am and 4pm on June 21st (Winter Solstice).



Figure 29. Plan Diagram Defining the Public Domain (Source: Tract 2019)

The software settings for shadowing reflect the location as being 'Sydney' and then adjusted to Bankstown's Latitude of 33.918 degrees south and Longitude of 151.035 degrees east.

These combined overshadowing impact diagrams incorporate outputs from the 3D model to illustrate the level of solar impacts caused by built forms across the day. Each of the diagrams in the following pages only presents the shadows within the study areas, which include the shadow of existing built form and the shadow of the three scenarios in different colours and patterns.

We have separated the shadow diagrams into two timeframes for clarity and simplicity of visual assessment. The two timeframes for the Park are 10am-12pm and 12pm-2pm; and the two time frames for The Appian Way are 9am-11am and 12pm-4pm, as the shadow patterns shift to the east from 12pm onwards.

The overshadowed areas were measured in CAD and calculated and input into a table as a way to compare directly each of the overshadowing outcomes and inform the key considerations and recommendations for the Proposal. Existing trees have been shown in the analysis for the purpose of context, but the overshadowing impact of these existing trees has not been included in the overshadowing calculations.

With any shadow diagrams there are limitations as to their accuracy due to shortcomings of 3D modelling and the simplicity of the shadow-casting. Specifically, the extent of shadows are indicated at ground level (i.e not where they impact building or vertical surfaces). These limitations are standard for assessment of shadows and do not diminish the conclusions that can be drawn from the shadow study.

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5.0.5 Summary of Solar Impacts - Paul Keating Park

TIME @ WINTER	IMPACT IN SCENARIO 1	IMPACT IN SCENARIO 2	IMPACT IN SCENARIO 3
SOLSTICE	Base Case	WSU 14-Storey Built Form	WSU 19-Storey Built Form
10am	54% of the total Park area will receive direct sunlight with 44% on the west side of the park and 10% on the east side of the park	46% of the total Park area will receive direct sunlight with 41% on the west side of the park and 5% on the east side of the park	40% of the total Park area will receive direct sunlight with 35% on the west side of the park and 5% on the east side of the park
11am	65% of the total Park area will receive direct sunlight with 63% on the west side of the park and 2% on the east side of the park	61% of the total Park area will receive direct sunlight with 61% on the west side of the park	55% of the total Park area will receive direct sunlight with 55% on the west side of the park
12pm	72% of the Park will receive direct sunlight	72% of the Park will receive direct sunlight	68% of the Park will receive direct sunlight
1pm	80% of the Park will receive direct sunlight	77% of the Park will receive direct sunlight	76% of the Park will receive direct sunlight
2pm	81% of the Park will receive direct sunlight	77% of the Park will receive direct sunlight	77% of the Park will receive direct sunlight
Зрт	69% of the Park will receive direct sunlight	66% of the Park will receive direct sunlight	66% of the Park will receive direct sunlight
Approx Total Hours of Direct Sun > 50% of the Total Park Area	5 Hours	4 Hours	4 Hours

Source: Areas of direct sunlight are calculated from shadow diagrams, which are generated by Sketchup 3D model (Tract 2019).

At 10am, more than half of the total Park area receives direct sunlight for Scenario 1, whilst more than half of the total Park area is overshadowed for both Scenarion 2 and Scenario 3 due to the additional height and bulk of the proposed built form.

From 11am, the shadows begin to be reduced for each of the three scenarios, with direct solar access increased to more than 55% across the Park area. Scenario 1 performs better than Scenario 2 & 3 by achieving 65%.

Between 10am-11am, the Park areas receiving direct sunlight are not consistent due to the shadow movement. The percentage listed above represents the total park area in sun.

Between 12pm-3pm, all three scenarios could achieve a good result, i.e. more than 66% of the Park area receiving the direct sun.

Summary

- All three scenarios achieve at least **3 hours** direct sunlight to more than **50%** of the **total** Park area, between **10am 2pm** on Winter Solstice.
- Compared with Scenario 2 and 3, Scenario 1 achieves one more hour direct sunlight to more than 50% of the total Park area at 10am due to its reduced building height and bulk.

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Winter Solstice [10am-12pm, 21st June]





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5.0.6 Summary of Solar Impacts - The Appian Way (Winter Solstice)

TIME @ WINTER SOLSTICE	IMPACT IN SCENARIO 1 Base Case	IMPACT IN SCENARIO 2 WSU 14-Storey Built Form	IMPACT IN SCENARIO 3 WSU 19-Storey Built Form
9am	16% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenarios cast shadow on the Appian Way.	16% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenarios cast shadow on the Appian Way.	16% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenarios cast shadow on the Appian Way.
10am	40% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	40% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	40% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.
11am	87 % of the Appian Way & 100% retail facade will receive direct sunlight.	82% of the Appian Way & 100% retail facade will receive direct sunlight.	82% of the Appian Way & 100% retail facadewill receive direct sunlight.
12pm	42% of the Appian Way & 100% retail facade will receive direct sunlight.	24% of the Appian Way & 38% retail facade will receive direct sunlight.	23% of the Appian Way & 38% retail facade will receive direct sunlight.
1pm	13% of the Appian Way & 0% retail facade will receive direct sunlight.	15% of the Appian Way & 0% retail facade will receive direct sunlight.	13% of the Appian Way & 0% retail facade will receive direct sunlight.
2pm	30% of the Appian Way & 15% retail facade will receive direct sunlight.	33% of the Appian Way & 42% retail facade will receive direct sunlight.	33% of the Appian Way & 42% retail facade will receive direct sunlight.
3pm	43% of the Appian Way & 60% retail facade will receive direct sunlight.	38% of the Appian Way & 53% retail facade will receive direct sunlight.	38% of the Appian Way & 53% retail facade will receive direct sunlight.
4pm	20% of the Appian Way & 36% retail facade will receive direct sunlight.	20% of the Appian Way & 36% retail facade will receive direct sunlight.	20% of the Appian Way & 36% retail facade will receive direct sunlight.
Approx Total Hours of Direct Sun	Less than 1 Hour to more than 50% of The Appian Way; More than 1 Hour to more than 50% of retail facade.	Less than 1 Hour to more than 50% of The Appian Way; More than 1 Hour to more than 50% of retail facade.	Less than 1 Hour to more than 50% of The Appian Way; More than 1 Hour to more than 50% of retail facade.

Source: Areas of direct sunlight are calculated from shadow diagrams, which are generated by Sketchup 3D model.

At 9am, most of the Appian Way and 100% retail facade are overshadowed by the existing surrounding built form. There are no additional solar impacts caused from any of the proposed scenario built forms.

From 10am solar access to the Appian Way increases with retail facade still in shadow. At 11am, the least shadows cast on the Appian Way. More than 80% of the Appian Way and 100% retail facade receive direct sun, with slightly better performance from Scenario 1.

At 12pm, the shadows on the Appian Way start to increase. Again Scenario 1 performs better than the other two scenarios.

At 1pm, the overshadowed area reach the maximum for all three scenarios. Then the shadows start to clear up from 2pm onward. There is not much difference among the three scenarios.

Summary

- All three scenarios indicate reduced solar access for The Appian Way during the Winter Solstice.
- The peak hour of receiving most direct sun to the Appian Way happens at 11am-12pm for all three scenarios. Then the Appian Way is largely overshadowed at 12pm-2pm, when most people come out for lunch break.
- The Appian Way starts to receive more sun after 2pm around the southern end. About 30% of the Appian Way and more than half of the retail facade receive direct afternoon sun at 3pm, when people would like to enjoy the afternoon-tea break.

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Winter Solstice [9am-11am, 21st June]



Winter Solstice [12pm-4pm, 21st June]

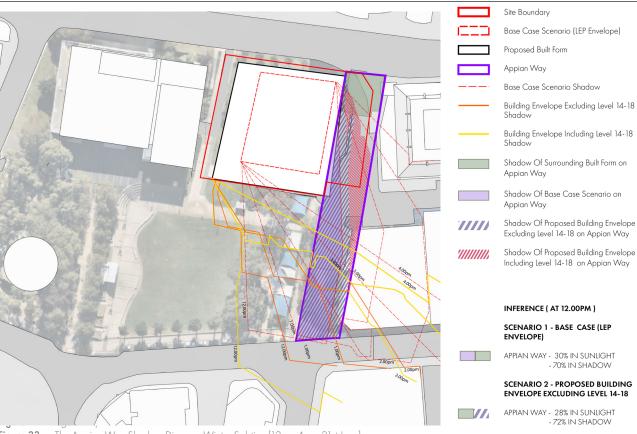


Figure 33. The Appian Way Shadow Diagram Winter Solstice [12pm-4pm, 21st June]

Tract

SCENARIO 3 - PROPOSED BUILDING ENVELOPE INCLUDING LEVEL 14-18 APPIAN WAY - 28% IN SUNLIGHT

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5.0.7 Summary of Solar Impacts - The Appian Way (Equinox)

TIME @ EQUINOX	IMPACT IN SCENARIO 1 Base Case	IMPACT IN SCENARIO 2 WSU 14-Storey Built Form	IMPACT IN SCENARIO 3 WSU 19-Storey Built Form
9am	47% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	47% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	47% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.
10am	80% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	80% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	80% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.
11am	100 % of the Appian Way & 100% retail facade will receive direct sunlight.	100% of the Appian Way & 100% retail facade will receive direct sunlight.	100% of the Appian Way & 100% retail facade will receive direct sunlight.
12pm	86% of the Appian Way & 100% retail facade will receive direct sunlight.	68% of the Appian Way & 100% retail facade will receive direct sunlight.	58% of the Appian Way & 100% retail facade will receive direct sunlight.
1pm	53% of the Appian Way & 85% retail facade will receive direct sunlight.	44% of the Appian Way & 74% retail facade will receive direct sunlight.	43% of the Appian Way & 74% retail facade will receive direct sunlight.
2pm	50% of the Appian Way & 90% retail facade will receive direct sunlight.	49% of the Appian Way & 90% retail facade will receive direct sunlight.	49% of the Appian Way & 90% retail facade will receive direct sunlight.
Зрт	56% of the Appian Way & 100% retail facade will receive direct sunlight.	51% of the Appian Way & 100% retail facade will receive direct sunlight.	51% of the Appian Way & 100% retail facade will receive direct sunlight.
4pm	62% of the Appian Way & 100% retail facade will receive direct sunlight.	54% of the Appian Way & 100% retail facade will receive direct sunlight.	54% of the Appian Way & 100% retail facade will receive direct sunlight.
Approx Total Hours of Direct Sun	6 Hours to more than 50% of The Appian Way; 5 Hours to more than 50% of retail facade.	3 Hours to more than 50% of The Appian Way; 5 Hours to more than 50% of retail facade.	3 Hours to more than 50% of The Appian Way; 5 Hours to more than 50% of retail facade.

Source: Areas of direct sunlight are calculated from shadow diagrams, which are generated by Sketchup 3D model.

At 9am, less than half of the Appian Way and no retail facade receives direct sun. There is no solar impacts from the built forms of the three scenarios.

Between 10am-12pm, all three scenarios achieve 2 hours of direct sunlight to more than 50% of The Appian Way and the full length of the retail facade.

Between 12pm - 4pm, all three scenarios achieve direct sunlight to approximately 50% of The Appian Way. All three scenarios provide good solar access to more than 70% of the retail facade at the southern end of The Appian Way.

Summary

- All three scenarios provide better outcomes of the solar access to The Appian Way on Equinox than on Winter Solstice.
- All three scenarios achieve 5
 hours of direct sunlight to more
 than half of the retail facade,
 and at least 3 hours of direct
 sunlight to more than 50% of The
 Appian Way between 9am4pm on Equinox.

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Equinox [9am-11am, 22nd September]



Equinox [12pm-4pm, 22nd September]



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Key Findings:

Paul Keating Park

- Paul Keating Park is an urban park located in the centre of Bankstown CBD rather than a traditional
 neighbourhood park. Having regard to the proposed and expected development surrounding the area,
 the Park is considered to be located in a highly urbanised area. It is considered reasonable to adopt
 3 hours of sunlight between 10am to 2pm as the relevant benchmark identified in the Key Findings of
 Section 5.0.4 within this report.
- All three scenarios achieve at least 3 hours direct sunlight to more than 50% of the total Park area, between 10am 2pm on Winter Solstice, and only Scenario 3 falls 6% below the benchmark that would otherwise apply to a traditional neighbourhood park, i.e. 4 hours direct sunlight to more than 50% of the total Park area, between 10am 2pm on Winter Solstice.
- Accordingly, all three scenarios are considered acceptable.

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Key Findings:

The Appian Way

- The Appian Way is defined as a key 'activity spine' with future characters of eat street, street life, retail and nighttime activities. Most activities tend to happen in mid to late afternoon. Therefore overshadowing to The Appian Way becomes less of a concern in comparison with the Paul Keating Park.
- All three scenarios provide better outcomes of the solar access to The Appian Way on Equinox than on Winter Solstice.
- All three scenarios achieve 5 hours of direct sunlight to more than half of the retail facade, and at least 3 hours of direct sunlight to more than 50% of The Appian Way between 9am-4pm on Equinox.

Figure 2. Figure Caption

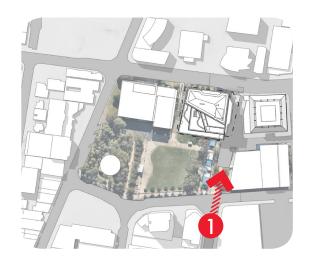
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5.0.8 Visual Bulk Review

The proposed scale and position of the proposal will have prominence on the skyline of Bankstown's civic precinct, and the visual impact of this must be carefully considered.

Four view points have been selected to test the visual impacts to the immediate public domain around the site.

Each view compares three scenarios, including the Base Case, WSU's proposed built form of 14 storeys excluding Level 14-18 and WSU's proposed built form of 19 storeys including Level 14-18. This allows for the significance of any additional height beyond the existing planning controls to be established.



This viewpoint along The Appian Way demonstrates the visual impact of the proposal's stepping form at Levels 3, 7 & 13, which reduces the bulk facing the Park and provides a relatively slender profile.

Levels 14-18 are visually prominent from this perspective, due to the angle of the cantilever.

The full height of the proposal borders The Appian Way, and this view presents an opportunity for the building to form a gateway landmark along this vista. Scenario 2 is more consistent with the height of the existing surrounding built form context, while Scenario 3 is taller.



Scenario 1: Base

Scenario 2: Excluding L14-18

Scenario 3: Including L14-18

Similarly, from the Park the highlighted levels 14-18 are prominent due to the orientation of this section of the floorplate. Whilst the stepping of the form provides the opportunity for variation in the profile, it is less evident when viewed from these southern perspectives, and the mass of the building does not appear reduced.

The visual bulk of the upper levels are accentuated by the cantilevered top section, and reduction of this impact should be considered.

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View 1 north from The Appian Way

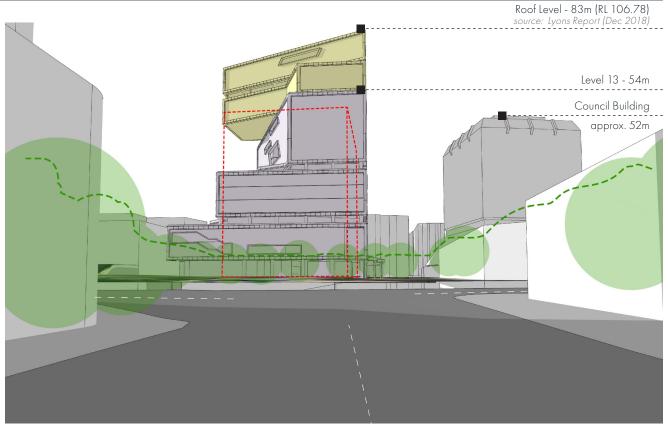


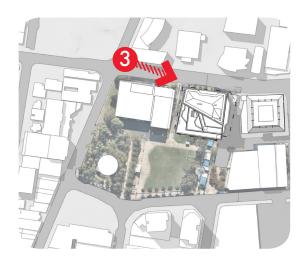
Figure 36. View 1 north from The Appian Way (Source: Tract 2019)

View 2 from south of Paul Keating Park



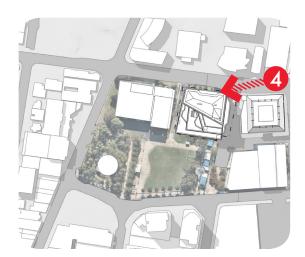
Figure 37. View 2 from south of Paul Keating Park (Source: Tract 2019)

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View 3 along Rickard Road presents a comparatively slender visual profile, due to the orientation of Levels 14-18 from this perspective.

There is no stepping back of the form facing Rickard Road, as evident on the adjacent existing buildings. Therefore the height of the building from Rickard Road is urbanised and immediately apparent. The profile of the building is visually varied in form and provides visual interest on the west elevation facing this viewpoint, which is supported.



Whilst the facade is treated to provide visual interest, the stepping is not visible from the west, and the building's bulk appears large and solid.

The articulation of the facade appears to line up with the Council building from this approach, which is supported.

If feasible, a podium setback from Rickard Road to align with the Council building may assist in reducing some of the visual impacts from the building's height.

Scenario 1: Base

Scenario 2: Excluding L14-18

Scenario 3: Including L14-18

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View 3 east along Rickard Road

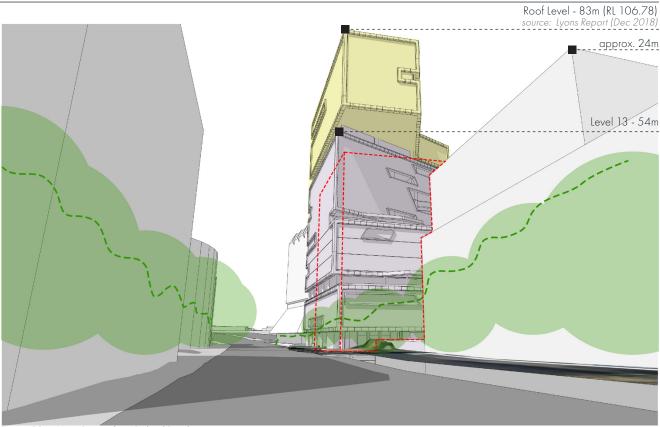


Figure 38. View 3 east along Rickard Road (Source: Tract 2019)

View 4 west along Rickard Road

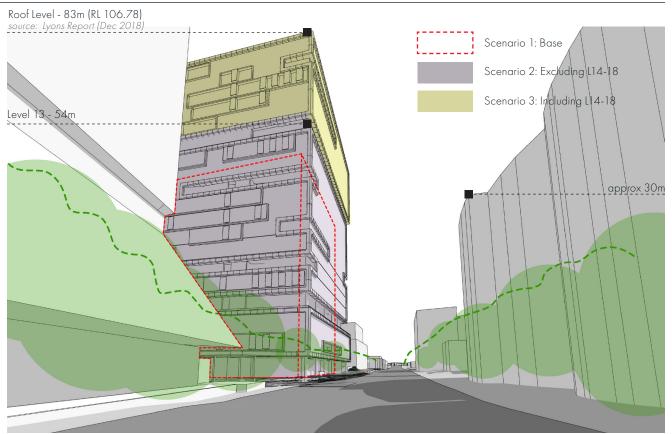


Figure 39. View 4 west along Rickard Road (*Source: Tract 2019*)

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Key Findings:

We note that the proposed vertical campus will occupy a prominent position on the future skyline of Bankstown's civic precinct. There is an opportunity for the design, and the detailed articulation of the facade, to positively impact on the surrounding urban environment, creating a landmark gateway along The Appian Way and from Paul Keating Park. The Proposal outlines a desire to create an architectural character for the building which visually represents a 'tertiary education' institution and is distinctly different from what might be considefred a commercial building. This desire is considered appropriate and is supported.

It is noted that the height and scale of the building exceeds the existing planning envelope and the size of the existing built context. To summarise our findings on the visual impact of the proposed:

- The architectural form of the building is visually striking, with a podium, tapered midsection, and an angled cantilevered top section hanging over large voids in some areas.
- The tapered and chamfered sections also serve to mitigate some of the overshadowing and visual challenges, an appropriate which is supported
- The angle and size of the cantilevered upper floors of the proposal in Scenario 3 (Levels 14-18) has an obvious visual impact on the skyline in Views 1 and 2 from the south (from The Appian Way & Paul Keating Park). When viewed from certain street-level vantage points, these cantilevered upper sections of the built form present a jutting and prominent visual form and bulk high up in both the viewers eye-line, and the skyline. This has a visual impact from street level, and as such it considered to be one of the less supported elements of the built form for this reason.
- Scenario 2, which removes this top section, is generally keeping with the existing heights of the surrounding built form, as viewed from these points.
- Whilst the form is stepping and varied towards the south, which is supported, the building presents its full height to The Appian Way and Rickard Road which requires further consideration. Whilst the Wind Tech Study suggests using vegetation, screens and awnings to mitigate the wind impacts on the surrounding public domain, a setback above podium level to Rickard Road and The Appian Way may further reduce the wind implications for pedestrian amenity on the surrounding streets.
- The built form could be supported with minor mitigation of these upper level overhanging reduced in the size, angle and articulation, as shown in Fig. 40 & 41. With this potential refinement, the visual impact of the proposal can be supported.

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Design Implications

Given the analysis of the building height, building setbacks and visual bulk challenges within the proposal, the following is a brief summary of potential deisgn implications and refinements. To mitigate the visual bulk of WSU's proposal, i.e. Scenario 3, we recommend that a reduction be considered to the upper cantilevered portion of the building, to align with the articulation of the building below.

In doing this, the total GFA will be reduced, with the consequential reduction on the proposed FSR.

Without undertaking a comprehensive architectural planning review, the GFA/FSR advised will be estimated and indicative.

By approximate measurement, the Gross Building Area (GBA) of the removed top section is 450sqm per level. The total GBA of 5 levels (Levels 14-18) is 2,250sqm. Based on the rule of thumb for architectural design, if we assume the GFA (commercial) = 85% of GBA, then the reduced GFA is approx. 1,900sqm. The total GFA will be reduced from 29,266sqm to 27,366sqm. The FSR is consequentially reduced to 7.4:1.

These overall refinements are highlevel and subject to design detail and investigation, and are provided to give further urban design direction for the Proposal.

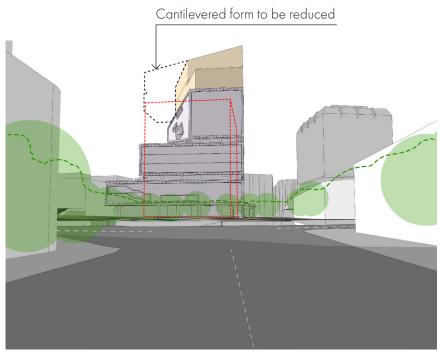


Figure 40. Design Alternative from The Appian Way (Source: Tract 2019)

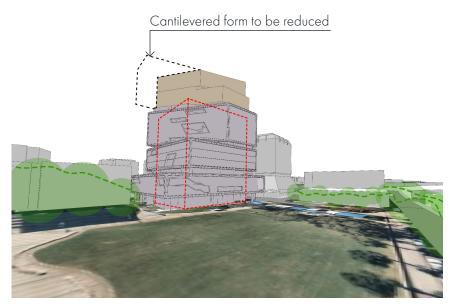


Figure 41. Design Alternative from south of Paul Keating Park (Source: Tract 2019)

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6 Public Domain Interface

Public Domain Interface Design Principles

Lyons' Design Principles:

- DP02 Preserve open space along the The Appian Way alignment.
- DPO7 A variety of active ground level interfaces will address The Appian Way, Paul Keating Park, BLAKC Driveway and Rickard Road:
 - Highly connected Ground level pedestrian environment;
 - Retail spaces supporting The Appian Way Eat Street.

Additional Design Principles:

- **DP-AD02 -** Enhance pedestrian priority along The Appian Way.
- DP-AD03 Improve pedestrian amenity along The Appian Way and Rickard Road:
 - Ensure pedestrian ease of movement by providing continuous movement through;
 - Weather protection for pedestrian.
- DP-AD04 Enhance visual connectivity at ground level.
- DP-AD05 Provide ground level activation and improve street safety along The Appian Way, Rickard Road and Paul Keating Park.

Assessment Overview

For this secondary review task, we focused on the ground level interfaces, which address The Appian Way, Paul Keating Park, Rickard Road and BLAKC Driveway.

The urban design principles listed to the left were used to assess all the four interfaces

We further refer to *Bankstown Draft Complete Streets, Apr. 2019,* which establishes the use and the characters, the design principles and guidelines for the future streets of Bankstown.

6.0.1 The Appian Way

Bankstown Draft Complete Streets (April 2019) defines The Appian Way as a key 'activity spine' that links the Civic Precinct and WSU to the train station and bus interchange, with a shared zone environment which prioritises pedestrian movement and encourages street life and retail activity.

Pedestrian Priority (DP02, DP-AD02)

- A linear landscape park is proposed along The Appian Way frontage, which is dedicated as a shared pedestrian zone to promote pedestrian priority.
- However, the existing vehicle circulation from neighbouring properties plus the proposed pick-up/drop-off traffic at the northern end of The Appian Way may cause interruptions to pedestrian movements.

 Feature paving which defines different function zones between walking, staying and slow speed driving, are applied to The Appian Way. It helps to raise people's awareness of the speed control and pedestrian movement zones.

Pedestrian Connectivity (DP07, DP-DA04)

- The proposed entries along
 The Appian Way correspond
 to the existing ground level.
 The proposal provides smooth
 and equal access for all
 users between WSU and its
 immediate public domain via
 ramps, steps and lift.
- Visual connectivity between WSU and The Appian Way public domain is enabled through the WSU entrances and ground-level glazing facade.

Pedestrian Amenity (DP02, DP-DA03)

- A continuous pedestrian movement is proposed along The Appian Way frontage between WSU and the linear park for pedestrian ease of movement.
- A glazed awning is proposed at ground level along The Appian Way frontage, which provides the weather protection for pedestrians benefit. It also helps to mitigate the wind impact at street level as recommended by Pedestrian Wind Environment Study, by Windtech (May

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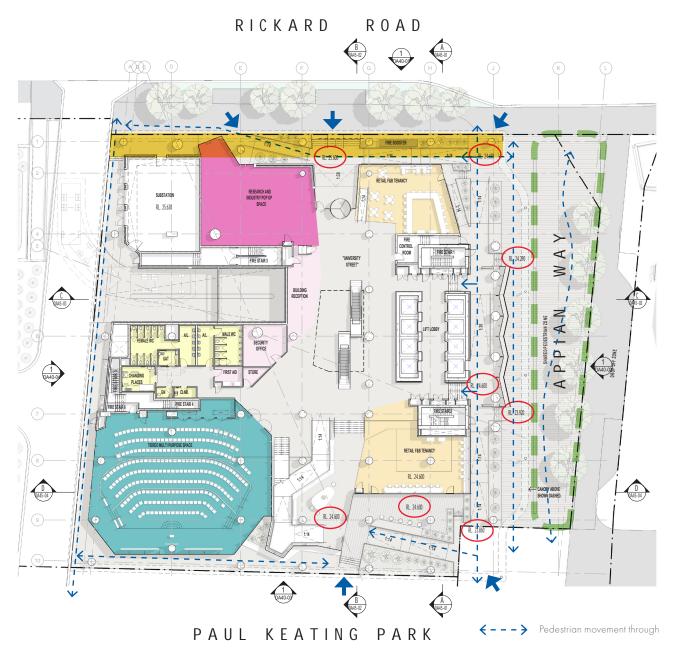


Figure 42. Lyons Updated Ground Level Plan
(Source: Lyons Updated Draft Architectural Drawings 5 (F 190814))

2019).

 Deep soil zone and tree planting are proposed along The Appian Way frontage, which would contribute to the urban tree canopy and provide shades and visual interest for pedestrian, as well as reduce wind impact. However, the limited solar access to The Appian Way may constrain tree and vegetation growth. Consideration needs to be given to the selection of tree species which will prosper in shades.

Ground Level Activation (DP07, DP-DA04)

- Ground level retail spaces and main entry lobby along The Appian Way provide street activation opportunities.
- Street furniture, bench seating and cafe seating along The Appian Way frontage encourage the uses by



Ground level setback for pedestrian movement through, suggested by Bankstown Draft Complete Streets, Apr. 2010



Linear landscape park

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pedestrian and retail patrons.

6.0.2 Paul Keating Park

Pedestrian Connectivity (DP07, DP-DA04)

- The major pedestrian flows will arrive from Bankstown train station on the south via The Appian Way. Apart from The Appian Way entry lobby, there are two ground-level entries to WSU proposed along the Paul Keating Park interface. One is located at the south-east corner of the building, while the other is located toward the middle of the southern interface. Both entries correspond to the existing ground level. The level difference between internal and external are picked up by a series of ramps and steps, which offer smooth and equal access
- Visual connectivity between WSU and the Paul Keating Park is enabled through the WSU entrances and ground level glazing facade.

for all users. Refer to figure 43.

Pedestrian Amenity (DP-DA03)

 A ground-level colonnade is proposed along the Paul Keating Park interface to provide weather protection for the pedestrians and other users.

Ground Level Activation (DP-DA04)

 Different functional spaces are programmed at the ground level alongside the Paul Keating Park interface. These include a multi purpose hall, entry lobby and retail spaces. These functional spaces provide great opportunities for activation and vibrancy on the ground level and provide passive surveillance to the Park.

In general, the design approach for the Paul Keating Park ground level interface is considered appropriate.

6.0.3 Rickard Road

Pedestrian Amenity (DP-DA03)

- There is a setback proposed at ground level on north side of WSU along Rickard Road, which provides the sense of alignment to both Council building on the east and the Bankstown Library and Knowledge Hub on the west.
- A series of ramps and steps are accommodated within the setback zone, which pick up the level difference between internal and external. This offers smooth and equitable access for all users. Refer to figure 45.
- A space intrudes into the setback zone, which interrupts the undercovered pedestrian movement through. It also conflicts with the design guidance of "2.3m wide pedestrian movement through within Lot Boundary" as suggested in Bankstown Draft Complete Streets (April 2019). Refer to figure 44 and 45.
- Reconfiguration of the 'research and industry pop-up space' is required to avoid the front
 setback interference.

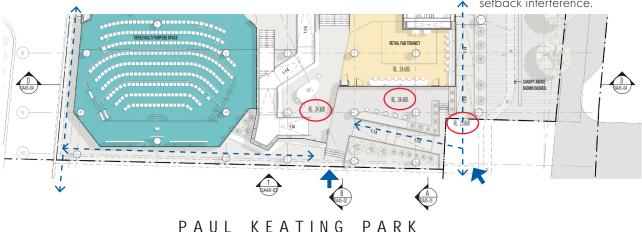


Figure 43. Lyons' Updated Ground Level Plan - Paul Keating Park Interface (Source: Lyons Updated Draft Architectural Drawings 5 (F 190814))

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Ground Level Activation (DP-DA04)

 Different functional spaces are programmed at ground level along Rickard Road, including university research and industry pop-up spaces, entry lobby and retail. These spaces provide additional opportunities for ground level activation and provide passive surveillance to Rickard Road.

6.0.4 BLAKC Driveway

BLAKC Driveway is treated more as a service lane than a pedestrian link.

WSU's proposal provides a linear setback to encourage greater pedestrian movement through this area.

There is limited street level activation along this interface given the proposed building functions, except the southern end where the multi purpose hall wrapped around the south west corner.

The proposed approach is supported given the nature of BLAKC Driveway.

RICKARD ROAD CENTRAL

Proposed Section

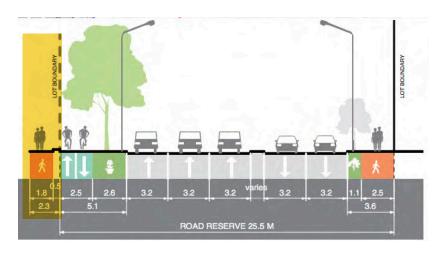


Figure 44. Ground level setback for pedestrian movement suggested by Bankstown Draft
Complete Streets (April 2019) (Source: Bankstown Draft Complete Streets (April 2019)
- Section 7 Concept Design)

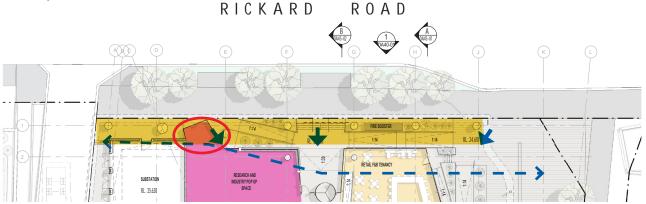


Figure 45. Lyons' Updated Ground Level Plan - Rickard Road Interface (Source: Lyons Updated Draft Architectural Drawings 5 (F 190814))

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Public Domain Interface

Key Findings:

The Appian Way

- The WSU Proposal has responded effectively to the desired future character of The Appian Way as a key 'activity spine', addressing most of the design principles identified at the beginning of this section. These principles focus on supporting pedestrian priority, pedestrian connectivity and pedestrian amenity, as well as providing positive ground-level activation to encourage street life and retail activity.
- The existing vehicle circulation from neighbouring properties, when combined with the proposed pickup and drop-off traffic at the northern end of The Appian Way, may interrupt and impede pedestrian movements. The nature and impact of vehicle circulation within The Appian Way from neighbouring properties is not clear from the proposal and should be considered further.
- Feature paving which defines different function zones between walking, staying and slow speed driving and raises people's awareness of the speed control and pedestrian movement, is recommended to mitigate traffic impacts.

Paul Keating Park

- The Proposal's southern interface at the ground-level alongside Paul Keating Park has addressed most of the design principles identified at the beginning of this section.
- These principles focus on ensuring that the Proposal supports pedestrian connectivity, stimulates visual interest and orientation, provides pedestrian amenity, and activates the ground-level.
- The general outcome appears to be an active, safe, comfortable and engaging environment for the pedestrian and open space user.
- As such the interface treatments to the Park is generally supported.

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Rickard Road

- The Proposal includes street frontage activation and a setback at the ground level along Rickard Road. A series of ramps and steps have been accommodated within the setback zone to offer smooth and equal access for all WSU users and visitors. These approaches are considered appropriate.
- The nature and impact of the intrusion of the 'research and industry pop-up space' into the setback zone along Rickard Road is not clear. This provides the potential to interrupt or affect pedestrian movements and should be considered further. This design element also conflicts with the design guidance for a '2.3m wide pedestrian movement through within Lot Boundary' as suggested in Bankstown Draft Complete Streets (April 2019). Reconfiguration of the 'research and industry pop-up space' is required to avoid the front setback interference.

BLAKC Driveway

• It is recognised that while the BLAKC Driveway proposes a linear setback for pedestrian movements, it appears to be treated primarily as a service lane rather than a pedestrian link. As such, this interface will likely not include much opportunity for street level activation.

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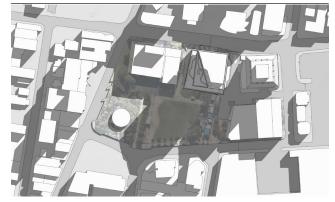
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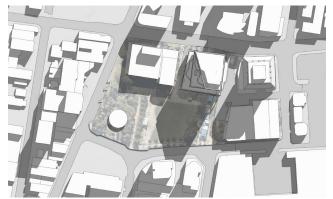
Appendix A Shadow Diagrams

Winter Solstice [21st June]

WSU Proposal -14 Storeys-Excluding Level 14-18



9 AM



10 AM



11 AM



12 PM

WSU Proposal -19 Storeys - Including Level 14-18



9 AM



10 AM



11 AM

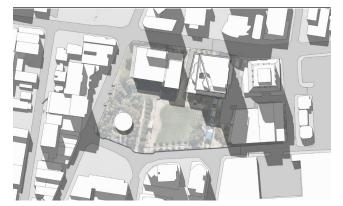


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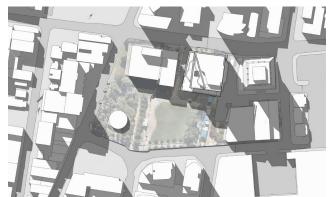
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Winter Solstice [21st June]

WSU Proposal -14 Storeys-Excluding Level 14-18



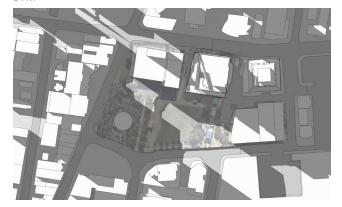
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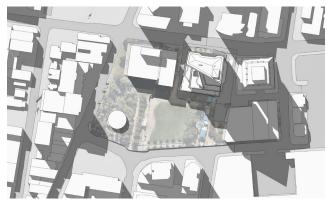


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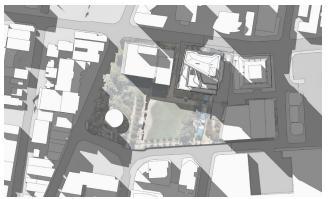
WSU Proposal -19 Storeys - Including Level 14-18



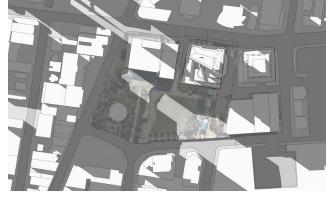
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Equinox [22nd September]

WSU Proposal -14 Storeys-Excluding Level 14-18



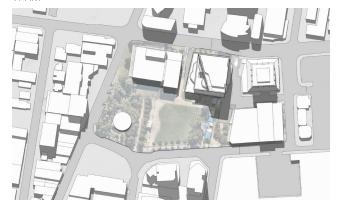
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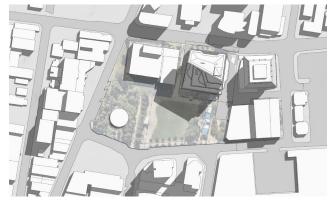


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WSU Proposal -19 Storeys - Including Level 14-18



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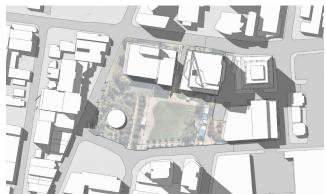
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Equinox [22nd September]

WSU Proposal -14 Storeys-Excluding Level 14-18



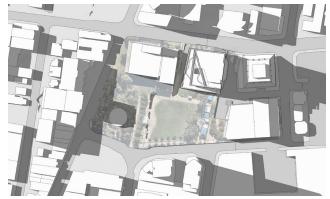




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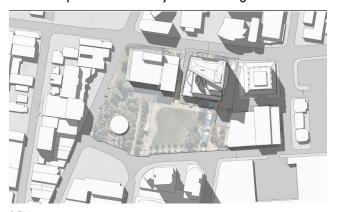


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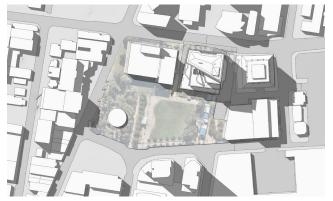


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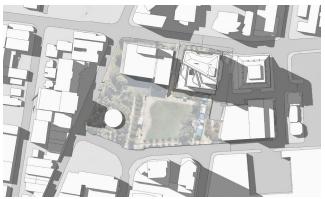
WSU Proposal -19 Storeys - Including Level 14-18



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Best Practice Research Open Spaces in City Centres Solar Amenity Controls



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Executive Summary

Executive Summary

CBCity is on a journey to reshaping the role and character of its centres, establishing Bankstown and Campsie as key strategic centres in Sydney and facilitating sensible growth in other local centres. With increasing urban densities, it is crucial that the quality, quantity and amenity of the public open spaces in the City centres are protected and enhanced to create places where people want to be and where nature can thrive. A key consideration for achieving sustainable and liveable places, is the provision of open spaces that receive sufficient sunlight throughout the year to support people's wellbeing, turf and plant growth. To achieve this goal, it is important to develop an evidence-based sun protection control framework for open spaces to guide the sustainable growth of our city centres. Such policy framework has not yet been developed by CBCity.

This research, therefore, has been conducted to identify best practice solar amenity controls for open spaces in city centres, providing analysis, evidence and recommendations to inform CBCity's policy framework and the decision-making process. The chapter on Solar Amenity Controls analyses and evaluates a range of controls for maintaining sunlight to main parks in city centres and on urban renewal areas that have been adopted by different Councils in Australia and New Zealand. The chapter on Nature, Health and People's Wellbeing provides a brief overview of key research 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 report concludes that sunlight control is **best measured on the winter solstice**. Best practice policies have a clear objective, an easy to follow metric and **allow for 4 to 5 hours of uninterrupted sunlight** on the winter solstice to either a minimum of 50 percent of the total park area or for 100% of the active zones of the park (containing turf surfaces and soft landscaping). **These controls allow sensible development to occur on lots near parks while maintaining adequate standards of amenity to the parks**, thus achieving a balanced approach between public benefit, amenity, development and urban densification. The controls evaluated as 'poor' in this research require less than 4 hours of uninterrupted sunlight (generally 2 hours only) on the winter solstice, or 1 hour of uninterrupted sunlight within a period of 4 hours on the winter solstice, or they protect sunlight in equinoxes or summer solstice.

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 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.

For these reasons, it is recommended that the following steps be undertaken:

- 1. Adopt a solar amenity policy for Paul Keating Park and Bankstown Court House Reserve.
- 2. Develop an evidence-based sun protection control framework for open spaces to guide the sustainable growth of CBCity's centres.
- 3. Expand evidence-based research on solar amenity controls to pedestrian streets, other important streets, urban plazas, etc. to ensure sun protection on other key open spaces in the City centres.

These matters are further discussed in Recommendations on Pages 23 and 24



Solar Amenity Controls

7

Methodology

The methodology for the research on solar amenity controls can be understood in three steps:

1. Literature Review & Data Collection

CBCity has reviewed a range of solar amenity controls for parks in city centres and urban renewal areas of comparable scale to CBCity's existing and future context, both locally and internationally. 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. As such, controls from the City of Sydney, the City of Melbourne, Auckland City Council, Burwood Council, North Sydney Council, Willoughby City Council, Gold Coast City Council, Parramatta Council and Brisbane City Council were deemed relevant.

2. Data Analysis & Comparative Analysis

The controls for the above-mentioned Councils were further analysed to narrow down to the most relevant controls for the CBCity's context. The analysis of each control is presented in mapping and table format, providing a brief summary and an assessment of the pros and cons for each control. Subsequently, CBCity conducted interviews with key council staff in planning and urban design departments to better understand the background, rationale and objectives for the controls and to gather information about their own views, expectations and levels of satisfaction with the controls. Councils with solar amenity controls between equinoxes as opposed to winter solstice were asked for the reasoning behind the decision to adopt such controls. These interviews provided a greater insight into other council's objectives and priorities for their green open spaces and assisted the evaluation and comparison of each control to inform the recommendations in this report. A summary of the interviews is provided on the following pages alongside a table and aerial image for each control. The images were sourced from Nearmaps. Measurement of areas are approximate.

A comparative table for all the controls considered in the literature review and data collection can be found on page 16, providing a clear way to compare the success and relevance of each control.

3. Evaluation

Each control has been evaluated and rated as either 'best practice', 'adequate' or 'poor' in accordance with the following definitions:

Controls identified as **'best practice'** require a minimum of 4 or 5 hours of uninterrupted sunlight on the winter solstice (21 June) for at least 50% of the total park area or for 100% of the active zones of the park (containing turf surfaces and soft landscaping). This is because:

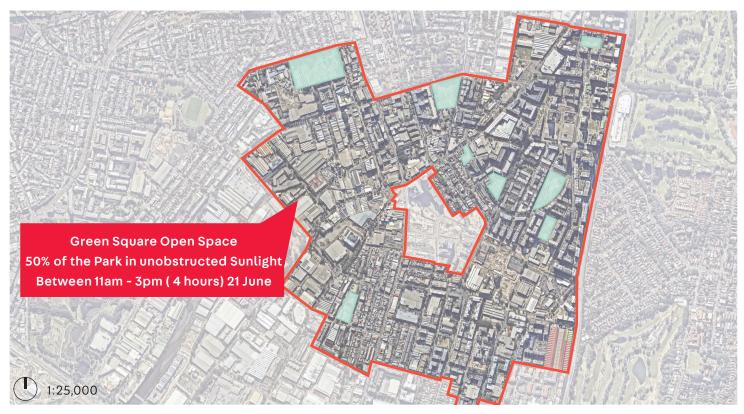
- most councils adopting such controls were satisfied with the amenity of the parks as a result of the controls:
- common knowledge and research on the effects of sunlight on nature and ecosystems indicate that 4 hours of uninterrupted sunlight in winter is the absolute minimum (5 to 6 hours is the recommended amount) required to support the healthy growth of turf, flowering plants and trees, to reduce turf and plant maintenance and to allow greater plant diversity (discussed further on page 18);
- research on the effects of sunlight and nature on people's wellbeing indicate that exposure to natural environments improves people's physical, mental and social wellbeing. Without adequate sunlight, natural environments cannot thrive in higher density urban areas. Also, moderate exposure to sunlight improves people's mental and physical health (discussed further on page 19); and
- the control allows sensible development to occur on lots near parks while maintaining adequate standards of amenity to the parks, thus achieving a balanced approach between public benefit, amenity, development and urban intensification. It puts people, nature and spaces first, then buildings and developments.



Controls identified as 'adequate' were put in place to prohibit any additional overshadowing on parks on the winter solstice. These are regarded as retroactive controls because higher density developments near the parks were permitted before solar amenity controls were put in place, creating overshadowing impact on the parks. They are considered adequate as it maintains existing sunlight conditions, but are not necessarily best practice or based on evidence as many of the parks receive only 3 hours of sunlight on the winter solstice. 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.

Controls identified as 'poor' require less than 4 hours of uninterrupted sunlight (generally 2 hours only) on the winter solstice, or 1 hour of uninterrupted sunlight for a period of 4 hours on the winter solstice, or protect sunlight on equinoxes or summer solstice. They are deemed poor for the CBCity context as it would significantly impact adversely on the City's natural environment and people's wellbeing and behaviour in parks. These controls are also contrary to the findings regarding the effects of sunlight on nature and ecosystems and the effects of sunlight and nature on people's wellbeing. Many of these controls were developed to allow urban intensification, but adversely impacted the amenity of the public domain. These controls put buildings and developments first, before successful spaces.

City Of Sydney



South Sydney DCP 1997 - Green Square Open Space (excludes Town Centre)

Policy	South Sydney DCP 1997 - Part G: Urban Design - Special Precinct 9: 3.1.2 Open Space
Objective	To ensure the design of open space is of a high quality (safe, diverse, visually attractive, environmentally sustainable, accessible, relatively easy to manage), provides a variety of uses and allows flexibility of uses over time according to community needs
Control	"For non-linear public open space areas, 50% of the total area of the park should be in sunlight between 11am and 3pm [4 hours], in mid-winter."
Pros	 The control for 4 hours of uninterrupted sunlight in midwinter Was determined through evidence-based research and is an easy to measure metric Reduces requirement for turf replacement, allows for flowering plants to survive through winter and allows the proper growth of a great variety of tree species Promotes health and wellbeing of users and allows for adequate thermal gain for solar panels
Cons	 Ideally, a greater percentage of the area of the park should receive sunlight for a longer period of time during winter
Conclusion	Best Practice Adequate Poor

What does City of Sydney have to say?

Summary of interview with Urban Design Coordinator at City of Sydney

- The Drying Green solar access control is a compromised solution and will provide inadequate solar access to the park. It is a weakened version of the original solar access control adopted in the South Sydney DCP 1997 Part G: Urban Design Special Precinct, as summarised in the 'Green Square Open Space Table.' The Drying Green control has never been used again in other locations within the CoS LGA.
- CoS owns land adjacent to the park and has decided not to develop the land to its maximum building height and FSR controls, partly so as to increase solar access to the Drying Green.
- CoS has found that in many high density environments, heavily utilised turf needs replacing
 every year if it doesn't receive four hours of direct sunlight in midwinter. To successfully
 replace turf the area should be out of use for up to 3 months. The Drying Green solar access
 control does not require four hours of direct sunlight and hence the turf may need to be
 replaced annually and parts of the park would have to be closed for several months each
 year.
- Four hours of direct sunlight in midwinter is required to grow many species of trees. The Drying Green solar access control does not require four hours of direct sunlight to any part of the park, and hence the selection of trees that could be planted is limited.
- As of June 2019, The Drying Green and the developments surrounding the park are not complete, so post-construction evaluation has not yet been undertaken.
- CoS suggested that the South Sydney DCP 1997 solar control is a much better control.
 However, it does not provide certainty and can result in inequitable development
 outcomes. They recommended the solar control be enforced through sun access planes.
 Defining street wall heights and sun access planes is very effective in ensuring equitable
 development outcomes, but care must be taken to ensure that the space will achieve
 reasonable sunlight (Street wall heights need to be tested).
- Hyde Park is a large park surrounded by buildings with well-defined street walls and
 maximum permissible sun access planes. The method of sun access planes is effective for
 ensuring no additional overshadowing to the park. However, this is a site specific control
 that works with large parks and is not necessarily transferable to other public spaces.



The Drying Green, Green Square Town Centre

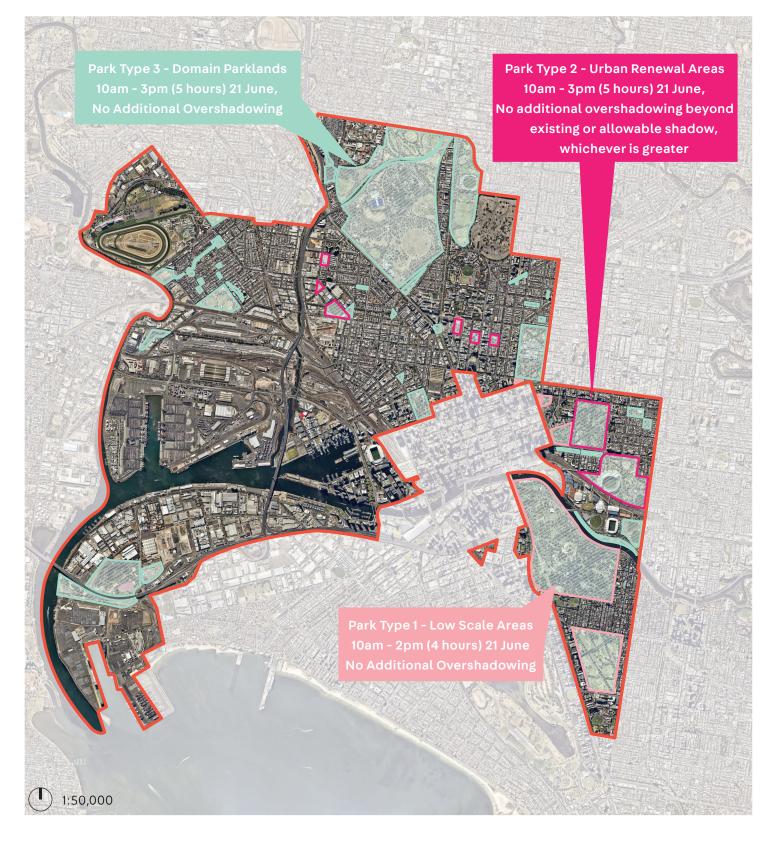
Policy	Green Square Town Centre DCP 2012 - GSTC 3.1.1 The Drying Green
Objective	Provide a primary green space in the town centre that provides primarily soft landscaping and deep soil planting.
Control	Achieve direct sunlight each hour between 11am and 2pm on June 21 for at least 50% of the park.
Pros	Easy to measure
Cons	 The control is a weakened version of the South Sydney DCP 1997. The control requires 50% of the park to receive sunlight for each hour, rather than 4 hours of uninterrupted sunlight to 50% of the park.
	• Driven by development rather than providing amenity for people & nature.
	Replacement of turf is required often
	 Spindly & sparse tree growth and less flowering plants
	 Impact on people's wellbeing and thermal comfort in winter
Conclusion	Best Practice Adequate Poor



Hyde Park

Policy	CoS LEP 2012 Clause 6.17 & 6.18 & Sun Access Protection Map 'SAP_015', 'SAP_014'
Objective	Ensure no additional overshadowing.
Control	Sun Access Plane Maps with Height Limits for Adjacent Buildings
Pros	Clear metric for complianceEnsures no additional overshadowing
Cons	 The control is retroactive as development was previously allowed, which created overshadowing. A site specific method of controlling sunlight access means that this method may not be applicable to other sites
Conclusion	Best Practice Adequate Poor

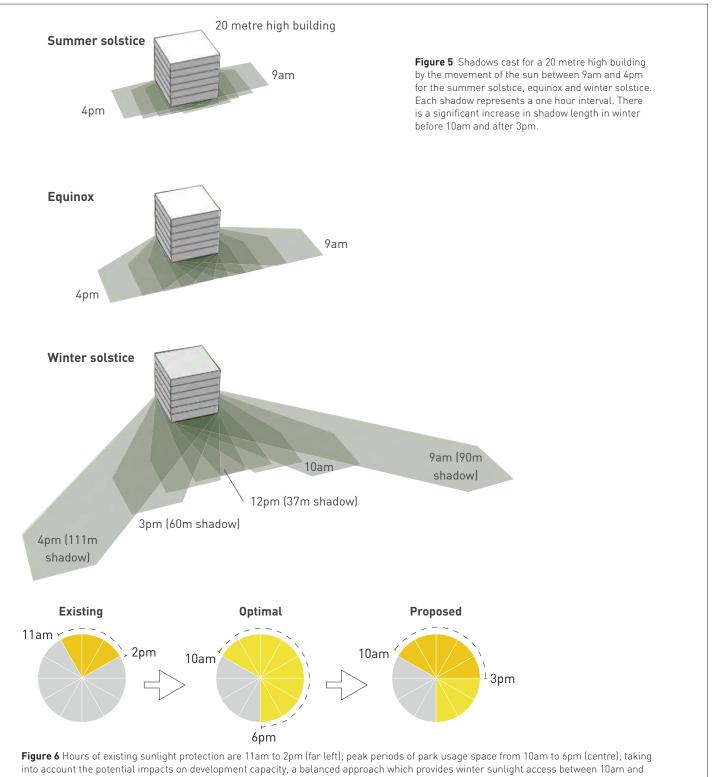
Melbourne City Council



Outer Melbourne City Public Spaces

Policy	Melbourne Planning Scheme Amendment C278 - currently on public exhibition
Objective	To future proof solar amenity in public spaces to ensure a variety of activities can occur throughout the day for all user groups in mid-winter
Control	Mandatory Compliance (most of Melbourne's planning scheme is discretionary) Park Type 1 - Low Scale Areas: 10am - 2pm (4 hours) no additional overshadowing This control has been defined by the existing development: "The orientation of existing street grids has a direct effect on the amount of sunlight reaching each park throughout the day After 2pm, the shadows from significant buildings in Southbank begin to fall across these parks." Park Type 2 - Urban Renewal Areas: 10am - 3pm (5 hours) no additional overshadowing beyond existing shadow or allowable shadow, whichever is greater. Allowable shadow is shadow that would be created if a street wall was built to the current development controls. Park Type 3 - Domain Parklands: 10am - 3pm (5 hours) no additional overshadowing
Pros	 Protects sun access to parks in urban renewal areas - people & nature come first A 5 hour control is the optimal amount of sun needed to grow turf and is better than the absolute minimum of 4 hours that has become the status quo in many areas. A site specific control that ensures amenity can be achieved Allows for many different park users and activities throughout the day Ensures turf, plants & trees get sun in winter, protecting the current levels of amenity Mandatory control ensures compliance Park type 2 accounts for development controls so as to not limit development in these areas
Cons	Currently on public exhibition so control has not yet been finalised
Conclusion	Best Practice Adequate Poor

Diagram to explain 'balanced' approach for solar amenity in Melbourne. Excerpt from 'Sunlight access to public parks modeling analysis report' prepared by Hoddle & Co for City of Melbourne February 2018.



What does Melbourne Council have to say?

Summary of interview with Head of Urban Strategy at Melbourne City Council

- Melbourne Planning Scheme differs from controls in NSW as the controls within the Scheme can be mandatory or discretionary; the majority of the controls are discretionary. Non-compliance with mandatory controls are grounds for refusal of a development. A development that is non-compliant with a discretionary control is assessed against the objectives of the control and is not necessarily grounds for refusal.
- The current controls for solar amenity in public parks outside the city centre are discretionary, with no overshadowing on the Spring Equinox. The control effectively provides no protection for solar access in winter and supports inequity of access to sunlight as mandatory controls are not evenly distributed across the municipality.
- A review of all 157 open spaces and parks in the municipality was undertaken by Hoddle & Co. The study found that the 133 parks in low rise areas will be naturally protected as development controls will not cause overshadowing. However of the 24 parks in growth areas, 14 are vulnerable to overshadowing from future development.
- The study provided several recommendations to the council including, introducing solar amenity protection over the Winter Solstice, a 'flat' control to protect solar amenity in all parks to 'future proof' the amenity from development & creation of park types to ensure development is not limited.
- The proposed C278 amendment will be mandatory in order to future proof solar access to all public parks outside the city centre. This includes several Urban Renewal Areas; current low density areas that will become much denser in the near future.
- Council originally aimed to protect overshadowing between 9am-6pm as it was understood through community consultation that user groups are most active in these times. However, modeling showed that at 9am and 4pm on 21 June the shadows cast by buildings were very long, effectively already overshadowing many parks (as demonstrated in the diagram to the left).
- Protection between 10am and 3pm (5 hours) was decided upon as it was the maximum protection the council could provide without limiting all development. Park Type 1 has a 4 hour protection due to development already overshadowing the park after 2pm.
- The C278 amendment is currently on public exhibition. Depending on the outcomes of the public exhibition, the control could be adopted as is or be amended prior to adoption.

Auckland City Council



Albert Park

Policy	City Centre Master plan p148, Planning Map 4, Central Area District Plan - 14.2A Public Open Space - Concept Plans, Appendix 11 CADP
Objective	Protect the admission of sunlight during the times the park is most intensively used.
Control	Sunlight must reach each zone at specified times and period of the year Limiting building heights nearby, defined by these planes
Pros	 Ensures a minimum of 4 hours of uninterrupted sunlight all year on the active high-use portion of the park with high percentage of turf and flowering growth Ensures a minimum of 3 hours of uninterrupted sunlight all year on the second most active portion of the park with high percentage of turf and plant growth This ensures that 40% of the park receive at least 4 hours of sun all year and 56% of the park receive at least 3 hours on sun all year over
Cons	 Requires greater complexity of analysis across the four areas and differing times of year to demonstrate compliance 3 hours of uninterrupted sunlight on the second most active portion of the park may not be sufficient for plants and turf to thrive in winter
Conclusion	Best Practice Adequate Poor

What does Auckland City Council have to say?

Summary of interview with Principal Planner at Auckland City Council

- The controls were developed in the 1980s prior to much of the taller development that has occurred in Auckland. These controls have defined much of the built form in Auckland and are now considered sacrosanct; they are deeply embedded in the city centre's planning framework.
- Surveys were undertaken to understand how the public used the parks and squares. The periods of use during the year differ for each park or square. Some parks and squares have year-round use and therefore justify protection. Others tend to be used more at specific times of the year. The solar access controls may correlate with their greatest use OR they were already in the shadow of buildings when the rules were first developed and it wasn't viable to protect sunlight admission.
- Solar controls in mid-winter can place significant constraints on development potential particularly on sites to the north. This factor is worth considering when developing solar amenity controls. The Albert Park controls have defined much of Auckland's built form; many building roofs are shaped by the height planes.
 Regardless, the city considers these controls very successful in spite of significant development pressure and have no plans to amend them.

Burwood Council



Burwood Park

·	
Policy	Burwood DCP 2013
Objective	To ensure that there is adequate solar access to Burwood Park
Control	Development must not cast shadows over Burwood Park between 10.00am and 2.00pm (4 hours) on 21 June
Pros	 Ensures more than 4 hours of sunlight all year on nearly 100% of the total area of the park Sunlight access allows for good tree & plant growth and less frequent replacement of turf.
Cons	 May limit urban intensification surrounding the park because the control applies to the whole park Potential for the control to be weakened through review of controls due to the projected uplift of the Parramatta Road Urban Design Strategy.
Conclusion	Best Practice Adequate Poor

What does Burwood Council have to say?

Summary of interview with Group Manager of Strategic Planning at Burwood Council

- Burwood has been named as a strategic centre as part of the Parramatta Road
 Urban Design Strategy. Council is currently reviewing the potential impacts &
 appropriateness of uplift in city centre alongside Strathfield Council and City of
 Canada Bay Council.
- The review shows that there is potential for devastating impacts of overshadowing to the public spaces in the city centre including Burwood Park.
- Burwood Council is currently reviewing its Local Strategic Planning Statement and is hoping to protect and expand its solar amenity policy across key public spaces.
- Council wishes to maintain at least 4 hours of uninterrupted sunlight in winter on its public open spaces.

Willoughby City Council



Chatswood Oval & CBD Public Spaces

Policy	'Chatswood CBD Planning and Urban Design Strategy to 2036' Adopted 2018	
Objective	Ensuring adequate solar access depending on the type of open space during lunch hours	
Control	Active Spaces: No additional overshadowing 11am - 2pm (3 hours) 21 June to Oval Passive Spaces: No additional overshadowing 12pm - 2pm (2 hours) 21 June to Other spaces Controlled by a height plane map	
Pros	• Limits overshadowing to active spaces without limiting the balanced development potential	
Cons	 Limits overshadowing to active spaces without limiting the balanced development potential Currently the oval does not get 4 hours of uninterrupted sunlight in winter. The 3hrs control was not based on best practice. The control is retroactive as development near the park was previously allowed, which created overshadowing impact. The 3hrs controls derived from the current sunlight condition of the park Control derived from scenarios for development potential rather than the best outcome for the park, nature and people 2 hours of sunlight in midwinter for passive open spaces is not enough to ensure good solar amenity for people and is not adequate to ensure enough sun for turf, flowers and proper tree growth 	
Conclusion	Active Spaces Best Practice Adequate Poor Passive Spaces Best Practice Adequate Poor	

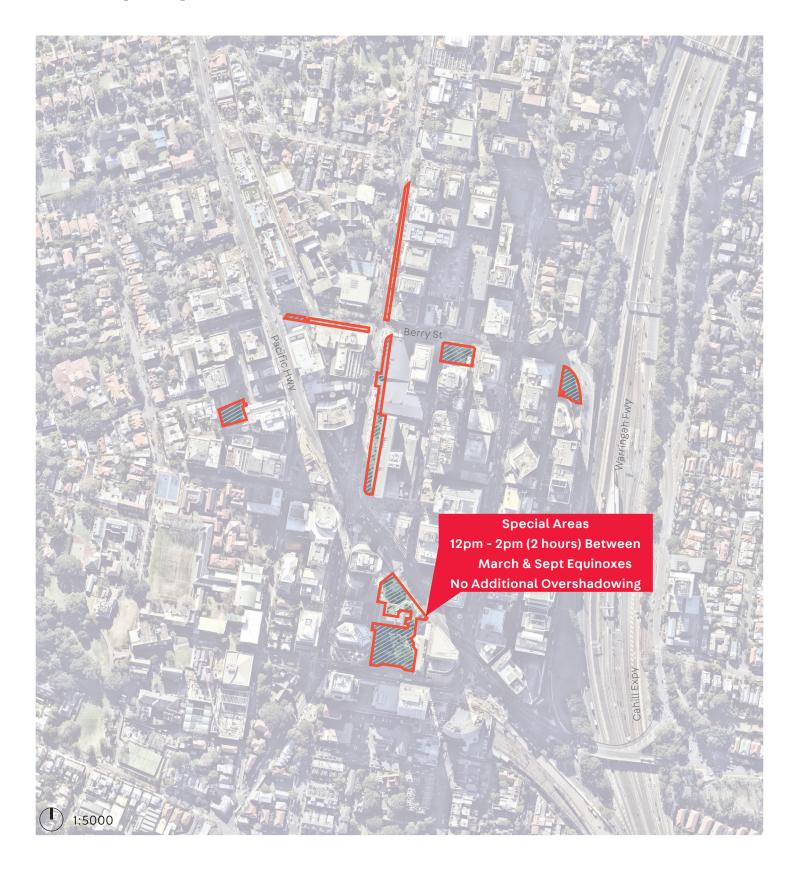
What does Willoughby Council have to say?

Summary of interview with Strategic Planner at Willoughby City Council

- In 2016, Architectus was engaged to prepare the Chatswood CBD Planning and Urban Design Strategy, which establishes the framework to guide all future private and public development in the Centre over the next 20 years. The strategy contains three scenarios for development: [1] no changes to current building height and FSR controls; [2] high-growth model; and [3] balanced-growth model. The testing of sun access on public parks in the CBD was done for each scenario. The Balanced option was adopted by Council and released as a strategy
- Architectus' Planning and Urban Design Strategy makes recommendations for sun access controls.

 The aim of sun access controls is to ensure [1] three hours of sunlight in midwinter on high-use/active open spaces during lunch time; and [2] two hours of sunlight in midwinter on lower-use/passive open spaces during lunch time. The oval is a high-use active space which has local and regional importance
- The sun access control is enforced through building height plane controls

North Sydney Council



Any Space Zoned RE1 Or Identified As Special Area*

Policy	North Sydney LEP 2013 - Clause 3.3.2, 4.6, DCP 2013 - 2.3.7 Solar Access
Objective	Preserving and creating solar amenity in the city centre for thermal comfort
Control	No Additional Overshadowing, 12pm-2pm (2 hours) between March - Sept Equinoxes
Pros	Clear metric
Cons	 Driven by development rather than providing amenity for people & nature. The solar amenity control in NLEP 2013 has been reviewed as part of the North Sydney Centre Capacity and Land Use Strategy. It was concluded that special provisions beyond the NLEP 2013 overshadowing controls and the Apartment Design Guide were considered an unreasonable constraint to development within a growing central business district. Not enough sunlight (only 2 hours) on public spaces will impact flora and fauna, as well as people's wellbeing and behaviour. A retroactive control as urban intensification was permitted in the past, creating overshadowing impact on the parks
Conclusion	Best Practice Adequate Poor

What does North Sydney Council have to say?

Summary of interview with Executive Strategic Planner at North Sydney Council

- Overshadowing controls under NSLEP 2013 relate to developments located within the North Sydney Centre only. They have been in force since 2003.
- The majority of the open spaces in the Centre are in private ownership. Due to the density of developments within the Centre, it is important that any existing amenity is not further eroded. This is why the overshadowing controls cannot be varied under Clause 4.6 of Council's LEP.
- Consideration may be made in the future to expand this style of control to other areas such as St Leonards and Crows Nest.
- The overshadowing control applies on winter solstice through to the equinoxes when solar access is most sought after for thermal comfort.
- The majority of the parks/plazas in the Centre contain high levels of impermeable surfaces, so maintenance of turf & planting is not an issue.
- The new public domain strategy seeks to create new publicly accessible open space. The solar amenity to these new spaces will be addressed as part of any new planning proposal.

Overview of Research

This Best Practice Research reviewed 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.
 - Best Practice Adequate Poor

Adequate

Best Practice

• 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. These controls are evaluated as 'adequate' in the context of CBCity's CBDs and urban renewal areas. However, are not relevant to main parks in CBCity's main centres that receive more than 4 hours of sunlight in winter.

- 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.
- o 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.

Best Practice Adequate Poo

Nature, Health & People's Wellbeing

The Effects of Sunlight on Nature & Eco-Systems

Evidence and expert knowledge demonstrate a link between the amount of sunlight and the durability and development of turf surfaces, flowering plants and tree growth. CBCity's experts in landscape architecture and arboriculture, City of Sydney Urban Design Coordinator and several articles prepared by experts in the field confirm the following facts:

- 1. Turf requires 5 to 6 hours of daily sunlight throughout the year to thrive
 - 4 hours of daily sunlight throughout the year is the absolute minimum required for turf surfaces to thrive
 - Grasses in low-light areas that receive less that 4 hours of daily sunlight are more sensitive to maintenance.
 Replacement of turf surfaces become more frequent less than 1 year depending on the usability of the park and access is restricted during the 6-8 week establishment period of replaces turf surfaces. Turf surfaces require special care to minimise damage from mowing
 - The most shade tolerant grasses still require at least 4 hours of sunlight to survive

2. Without a minimum of 4 hours of daily sunlight throughout the year, plant diversity is limited²

- Flowering plants do not grow in low-sun conditions. Many native flowering plants in Eastern Australia require at least 4 hours of sunlight in winter
- Plant diversity is limited in areas receiving less than 4 hours of daily sunlight throughout the year, inhibiting the survival of many full-sun and partial-sun plants
- On areas receiving less than 3 hours of daily sunlight, only full-shaded plants can be planted, which then cannot tolerate the full sun of the summer months
- The absolute minimum sunlight required for most shade-tolerant plants is 3 hours of indirect sunlight
- Seasonal flowering of already established flowering plants and trees in parks can be adversely impacted by overshadowing of new high-density developments, thus limiting the source of nectar for nectar-eating fauna

3. Trees naturally grow towards light, which is called phototropism

- With a lack of sunlight, trees grow tall rather than wide meaning they are spindly and sparse. This provides limited canopy cover, foliage and flowers. This rapid growth rate weakens the trunk of the tree and increases the distance between nodes and branches making them vulnerable to structural weakness and damage during windy weather events³
- An additional effect of phototropism in areas with a lack of sunlight is asymmetrical, irregular tree growth. This effect is less than desirable in main urban parks in the CBCity centres

- 4. Without proper sunlight, moss grows on natural paving materials creating slippery surfaces.⁴
 - Shaded areas are conducive to moss growth on hard landscaped surfaces as a result of lack of vegetation or damp soils due to poor drainage or regular water runoff. Excessive moss growth on hard landscaping is a potential slip hazard and will require increased maintenance to mitigate the hazards
 - Impact of reduced access to sunlight during the winter months will result in the replacement of turf areas with increased paved spaces and reduced quality and quantity of the tree canopy. This not only creates colder, harder, wetter landscapes in winter it also produces hotter, dryer, more exposed spaces in summer with an escalation in the urban heat effect, making these spaces unusable for many months of the year.



¹ https://www.bioadvanced.com/articles/lawn-care-how-grow-grass-shade

² http://www.mountainnursery.com.au/australian-native-flowers

³ https://homeguides.sfgate.com/plants-dont-enough-light-grow-tall-spindly-71340.html

⁴ https://www.greenwaybiotech.com/blogs/news/the-real-reason-why-moss-keeps-growing-in-your-garden-and-what-you-can-do-about-it

The Effects of Sunlight & Nature on People's Wellbeing

Research findings indicate that exposure to natural environments improves people's wellbeing. Without adequate sunlight, natural environments cannot thrive.

- 1. Exposure to Natural Environments improves Physical, Mental and Social Wellbeing.
 - Research shows that city dwellers have a 20% higher chance of suffering anxiety and an almost 40% greater likelihood of developing depression then city dwellers that are exposed to natural environments.
 - Exposure to nature can reduce symptoms of stress, mental fatigue and increase concentration. Daily doses of urban nature deliver benefits of improved physical, mental and social wellbeing.
 - Research indicates that providing walkable spaces, community space and greenspace are all part of ensuring the urban environment gives benefits to people.
- 2. Biodiversity and functioning ecosystems are vital to achieving the benefits of green spaces.2
 - "Biodiversity has been linked with human wellbeing.. Biodiversity is also integral to the healthy functioning of an ecosystem. Human wellbeing is contingent on ecosystem functioning the air we breathe, the food we eat, the water we drink all require functioning ecological integrity" "... biodiversity and ecosystem function is critical to human health and wellbeing."
- 3. Children have been found to be more creative during playtime after exposure to nature. 3
 - "..there was significantly more play and more creative play in high-vegetation spaces."
 - "all children could benefit from nearby outdoor spaces that are attractive and supportive of developmentally important behaviours."
 - children in inner neighbourhoods exposed to leafy green spaces demonstrated higher attention levels and greater self-discipline
- 4. Different types of green spaces have differing effects on wellbeing.4
 - "..research has also found that people in urban areas who live closest to the greatest amount of 'green spaces' are significantly less likely to suffer poor mental health."
 - "Many urban parks and green spaces particularly in residential areas are unimaginative, repetitive and lack basic elements to evoke these references to nature. Nor do they encourage walking or enjoying the natural elements for any length of time."
 - "Successful parks and urban green spaces encourage us to linger, to rest, to walk for longer. That, in turn, provides the time to maximise restorative mental benefits."
- 1 https://theconversation.com/why-daily-doses-of-nature-in-the-city-matter-for-people-and-the-planet-106918
- $2\quad Taylor, L.\ \&\ Hochuli, D.F.\ Urban\ Ecosystem\ (2015)\ 18:\ 747.\ https://doi.org/10.1007/s11252-014-0427-3$
- 3 Growing Up in the Inner City: Green Spaces as Places to Grow. Environment and Behavior, Vol. 30 No. 1, January 1996 p3 27
- 4 https://theconversation.com/green-for-wellbeing-science-tells-us-how-to-design-urban-spaces-that-heal-us-82437

- 5. Even just viewing green space through a window for 40 seconds can have an uplifting impact to wellbeing.5
 - "A micro-break viewing a green, but not concrete roof city scene, sustains attention.... Participants (of the study) who briefly viewed the green roof made significantly lower omission errors, and showed more consistency responding to the task compared to participants who viewed the concrete roof."
- 6. Contact with nature mitigates mental fatigue and may reduce anxiety and aggression.
 - "there is an increasing recognition that deprivation of human populations from natural environments can have detrimental psychological, perhaps even physiological, effects, depressing the spirits and leading to increasingly manic, criminally dishonest and violent behaviour." 7

Research findings indicate that exposure to sunlight improves people's wellbeing.

- 1. The health benefits of sunlight exposure extends beyond curing Vitamin D deficiency.8
 - Exposure to sunlight assists the body's cellular defense mechanisms, lowering inflammation and risk of autoimmune diseases such as Lupus, MS and Type 1 diabetes
 - Minimal levels of UVA assists in regulating circadian rhythms
 - UVA has also been shown to lower blood pressure, increase blood flow and heart rate, all of which are beneficial to the heart and blood vessels.
 - "a moderate degree of UV exposure is necessary for the production of Vitamin D which is essential for bone health. Additionally, evidence emerges that low Vitamin D levels are likely to be associated with other chronic diseases. Thus, public health policy on ultraviolet radiation needs to aim at preventing the disease burden associated both with excessive and with insufficient UV exposure." 9
- 2. Sunlight also has mental health benefits as exposure increases serotonin levels. Lack of sunlight exposure is associated with depression such as Seasonal Affective Disorder. 10 11

⁵ https://www.sciencedirect.com/science/article/abs/pii/S0272494415000328

⁶ Aggression and violence in the inner city: Effects of Environment via Mental Fatigue. Environment and Behavior, Vol. 33 No. 4, July 2001 p543-571

⁷ Social housing and green space: a case study in Inner London. Elizabeth O'Brien. Forestry, Vol. 79, No. 5, 2006

⁸ https://theconversation.com/secret-to-health-benefits-of-sunshine-is-more-than-vitamin-d-34543

⁹ Solar ultraviolet radiation: global burden of disease from solar ultraviolet radiation / Robyn Lucas ... [et al.]; editors, Annette Prüss-Üstün ... [et al.].

⁽WHO Environmental burden of disease series ; no. 13.)

¹⁰ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2290997/

¹¹ Benefits of Sunlight: A Bright Spot for Human Health, M. Nathaniel Mead. Environmental Health Perspective. 2008 Apr; 116(4): A160-A167

Conclusions

Conclusions

The research on solar amenity controls has highlighted that sunlight control is best measured on the winter solstice, as benchmarking solar access on the darkest day of the year ensures sun exposure all year round. Best practice policies have a clear objective, an easy to follow metric and allow for 4 to 5 hours of uninterrupted sunlight on the winter solstice to either a minimum of 50 percent of the total park area or for 100% of the active zones of the park (containing turf surfaces and soft landscaping). These controls allow sensible development to occur on lots near parks while maintaining adequate standards of amenity to the parks, thus achieving a balanced approach between public benefit, amenity, development and urban densification.

The controls evaluated as adequate in this research were put in place to prohibit any additional overshadowing on parks on the winter solstice. These are regarded as retroactive controls because higher density developments near the parks were permitted before solar amenity controls were put in place, creating overshadowing impact on the parks. They are considered adequate as it maintains existing sunlight conditions, but are not necessarily best practice or based on evidence as many of the parks receive only 3 hours of sunlight on the winter solstice. 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.

The controls evaluated as 'poor' require less than 4 hours of uninterrupted sunlight (generally 2 hours only) on the winter solstice, or 1 hour of uninterrupted sunlight for a period of 4 hours on the winter solstice, or they protect sunlight on equinoxes or summer solstice only. They are deemed poor for the CBCity context as it would significantly impact adversely on the City's natural environment and people's wellbeing and behaviour in parks. Many of these controls were developed to allow urban densification, but adversely impacted the amenity of the public domain.

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 to thrive, while flowering plants and trees need at least 4 hours 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.



Recommendations

Recommendations

It is recommended that the following steps be undertaken:

1. Adopt 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.

2. Develop an evidence-based sun protection control framework for open spaces to guide the sustainable growth of CBCity's centres, including a modelling analysis of sunlight access to public parks similar to the report developed by Hoddle & Co for City of Melbourne.

Three options for solar amenity controls should be considered and the interim should be used as a guide for development assessment:

Option One: Influenced by the City of Melbourne

Park types that ensure no additional overshadowing between 10am-3pm to maximise winter solstice sun access, providing at least 5 hours of solar amenity in most parks. A flat control across most parks would future proof the solar amenity of parks within the municipality from development. City of Melbourne control allows for planned urban renewal precincts with similar densities to that of CBCity and acknowledges parks that do not currently achieve the 5 hours of similar amenity. Such control should be subject to modelling analysis and consideration of clear and detailed objectives.

Option Two: Influenced by the City of Sydney's South Sydney DCP 1997

50 percent of the total area of the park to receive uninterrupted sunlight between 10am and 2pm (4 hours) on the winter solstice (21 June). The wording must ensure sufficient solar access to the active/landscaped/turfed areas of a park. Clear and detailed objectives to also be developed.

Option Three: Influenced by Auckland City Council's controls for Albert Park

This can only be used on specific cases where park infrastructure, soft and hard landscaping and tree canopy will not undergo significant changes in the near future. The control divides up the park into a number of zones in accordance with the level and type of soft and hard landscaping, tree coverage, uses, park infrastructure, etc. These controls allow for sun access all year round for the most active/landscaped/turfed areas of the park, providing a minimum of 4 hours of uninterrupted sunlight on the winter solstice to 100% of the area. Forested areas with existing mature trees already overshadowing the ground would require less sun access control, while areas of turf are more diverse in their use and plant species and have a greater requirement of sunlight. This control could enable specific areas of the park to achieve 4 to 5 hours of uninterrupted sunlight in winter, but acknowledges that not every space may need the same level of solar amenity or may not currently achieve this benchmark. Clear and detailed objectives to also be developed.

In the interim, these three options should be used as a guide for development assessment.

Recommendations

Other factors that affect the solar access controls and the priority and importance of the solar access controls to be considered are:

- Size and type of open space (regional parks, playing fields, local parks, active/ passive areas, playgrounds, urban plazas, nature corridors, linear parks, pocket parks etc)
- Site context
- Availability of open space in the area (or lack of)

For example, Paul Keating Park is a key active open space for the Bankstown CBD. 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 undersupply of open spaces. This elevates the importance of amenity and solar access for Paul Keating Park, whereas a lower order park or plaza with a lower population catchment may require different levels of amenity and solar access.

3. Expand evidence-based research on solar amenity controls to pedestrian streets, other important streets, urban plazas, etc. to ensure adequate sun protection on other key open spaces in the City centres.





OPEN SPACES IN CITY CENTRES Solar Amenity Study

Case Study: Paul Keating Park

Final - 23 September 2019



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Executive Summary

Case Study: Paul Keating Park - Overshadowing Analysis

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

Case Study: Paul Keating Park - Overshadowing Analysis

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

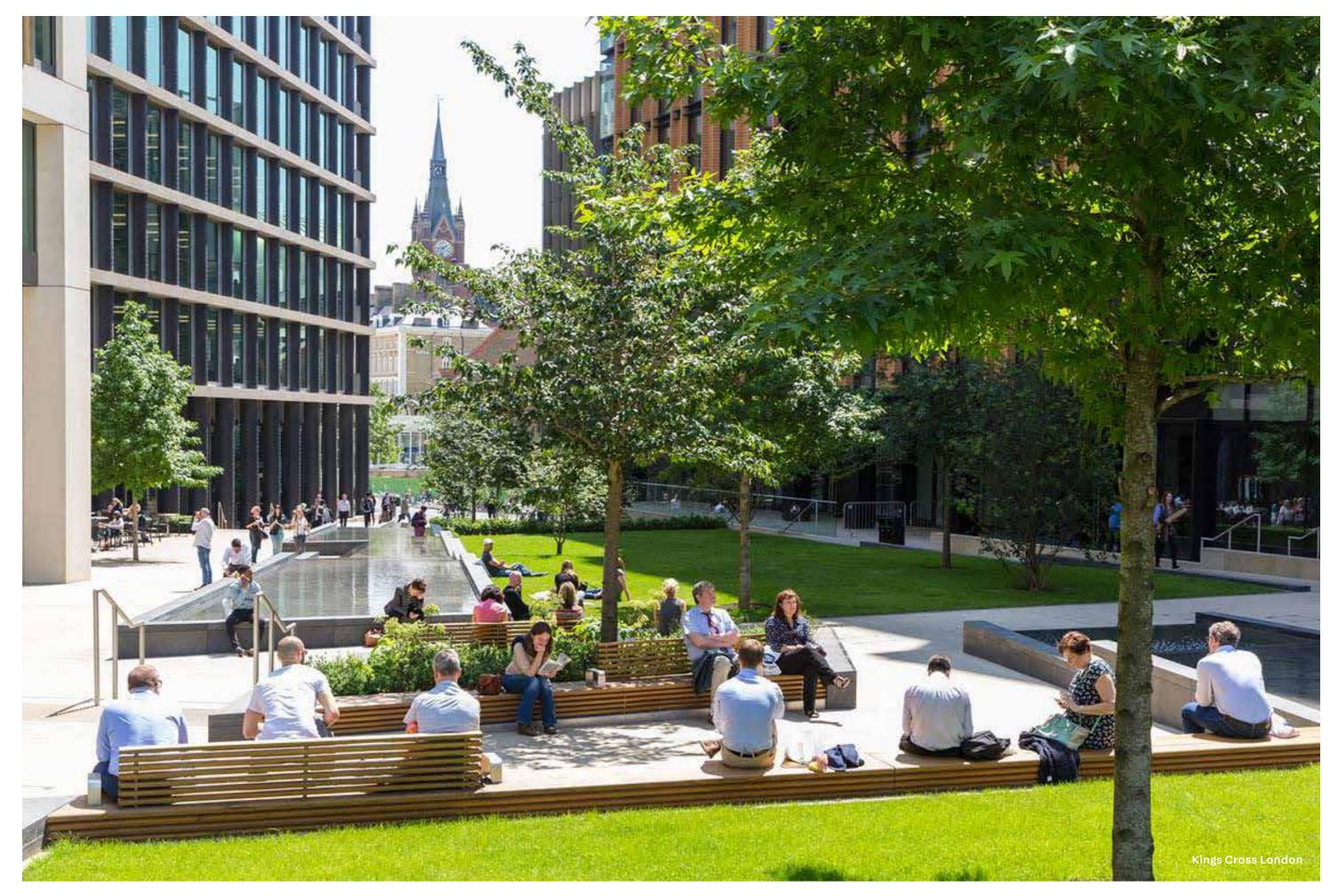
- Development must allow for 4 hours of continuous solar access to minimum 50 percent of the area of Paul Keating Park between 10.00 am and 3.00 pm on 21 June (inclusive of existing shadow). The area of Paul Keating Park is defined as the property at 375 Chapel Road (DP777510 parcel n°6), exclusive of 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:



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)



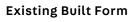
Scenario 4:
BLEP 2015 Complying Built Form with Proposed WSU Building

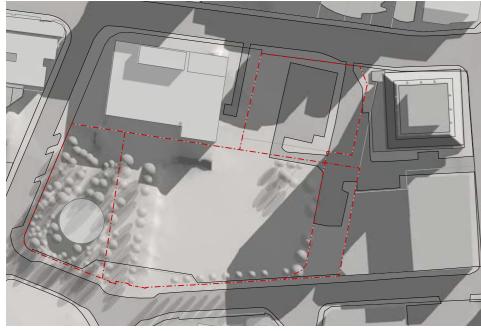


9 am

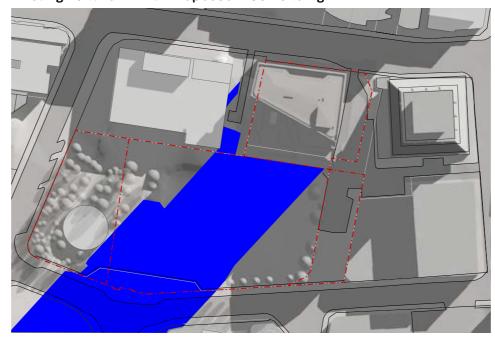
Solar Access (21st June / Winter Solstice)

Existing Condition:

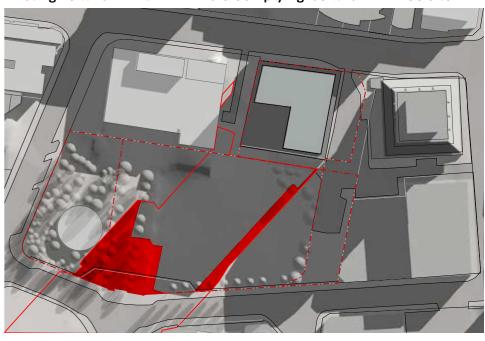




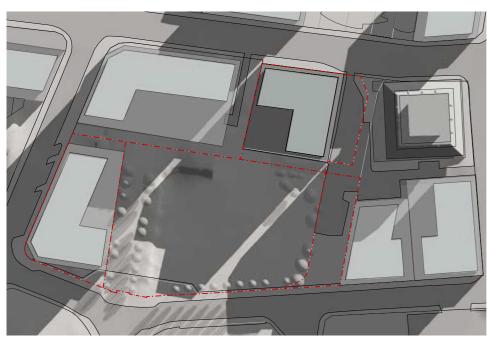
Scenario 1:
Existing Built Form with Proposed WSU Building



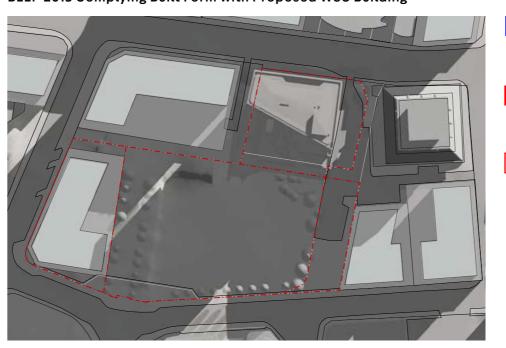
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



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

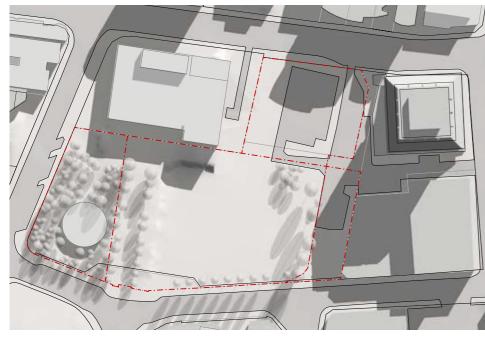
Approximately 13.9 % additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

10am

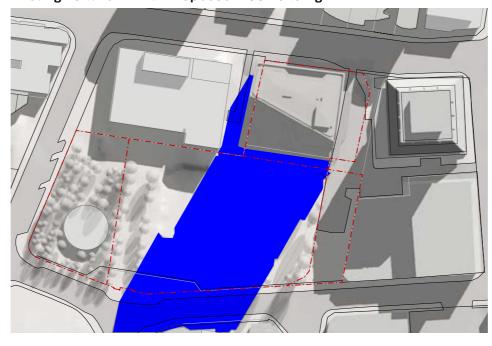
Solar Access (21st June / Winter Solstice)

Existing Condition:

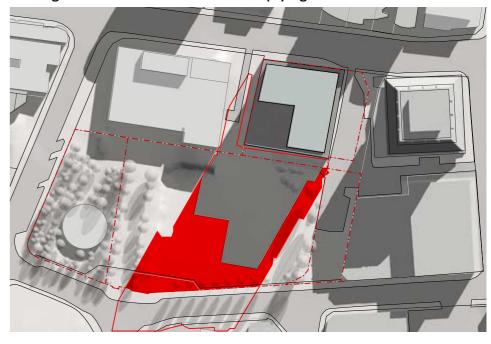
Existing Built Form



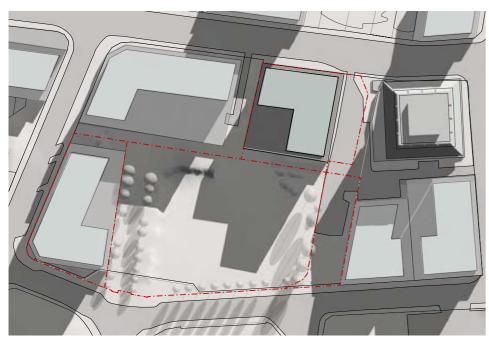
Scenario 1: Existing Built Form with Proposed WSU Building



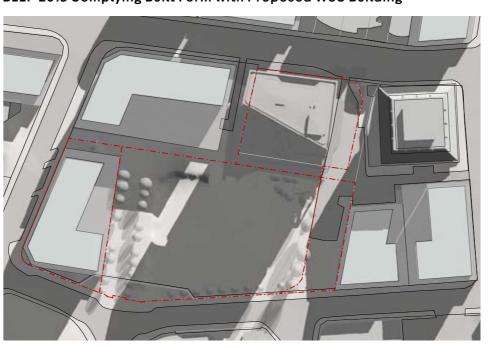
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



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



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



Key

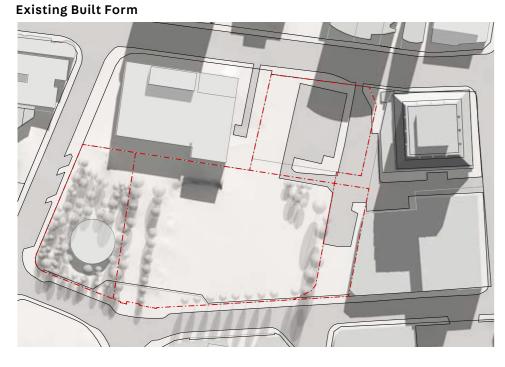
Additional overshadowing from proposed WSU building in relation to the existing conditions of the park

Approximately 20.6 % additional overshadowing on the park 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:



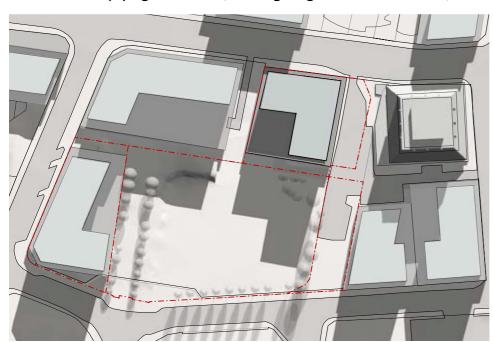
Scenario 1: Existing Built Form with Proposed WSU Building



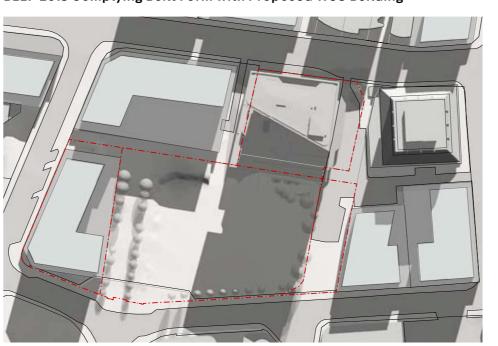
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



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



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



Key

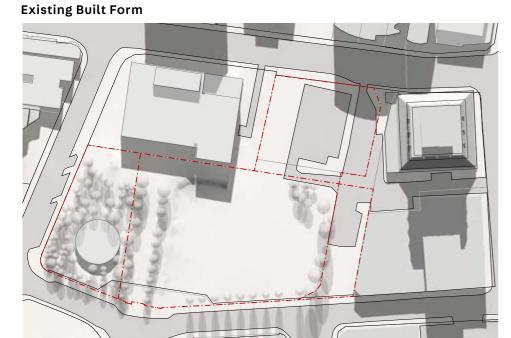
Additional overshadowing from proposed WSU building in relation to the existing conditions of the park

Approximately 17.4% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

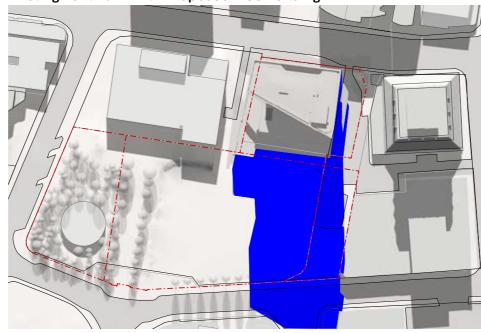
12pm

Solar Access (21st June / Winter Solstice)

Existing Condition:



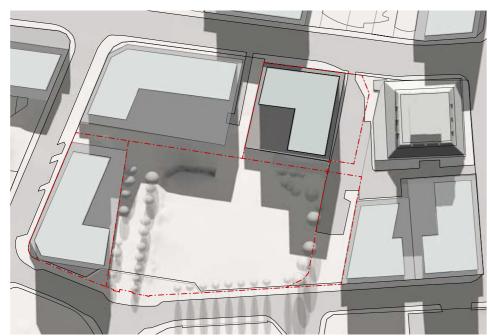
Scenario 1: Existing Built Form with Proposed WSU Building



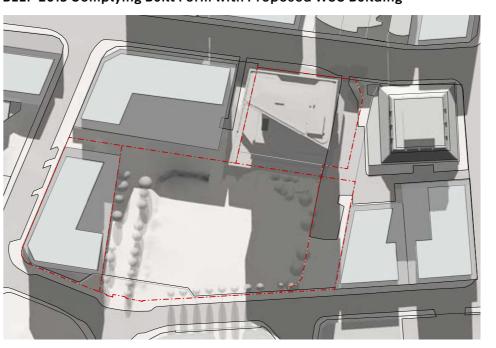
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



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



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



Key

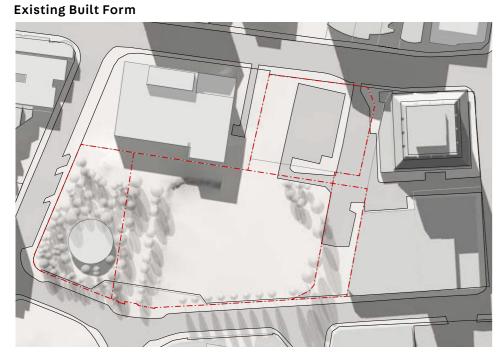
Additional overshadowing from proposed WSU building in relation to the existing conditions of the park

Approximately 15.9% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

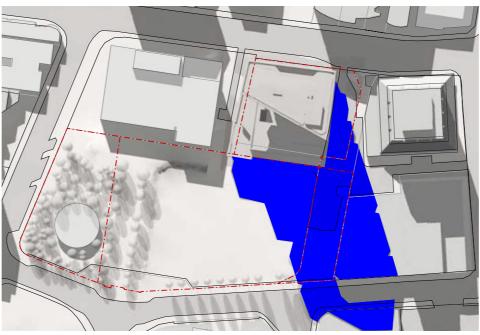
1pm

Solar Access (21st June / Winter Solstice)

Existing Condition:

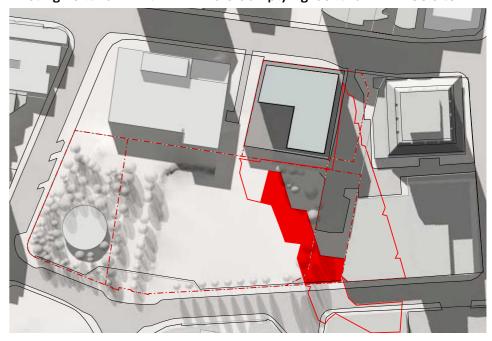


Scenario 1:
Existing Built Form with Proposed WSU Building

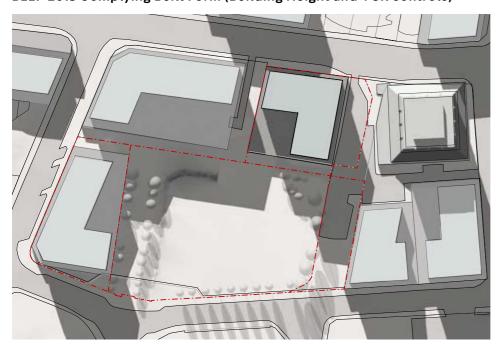


Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site

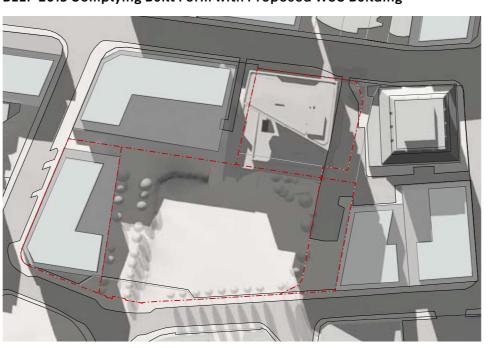
17



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

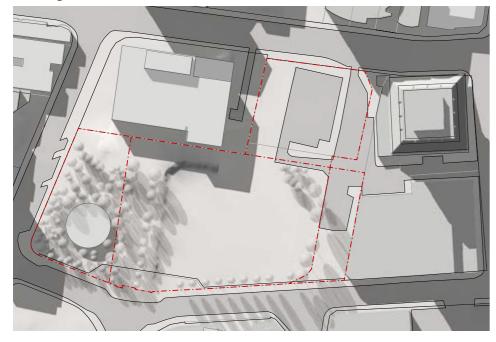
Approximately 10.1% additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

2pm

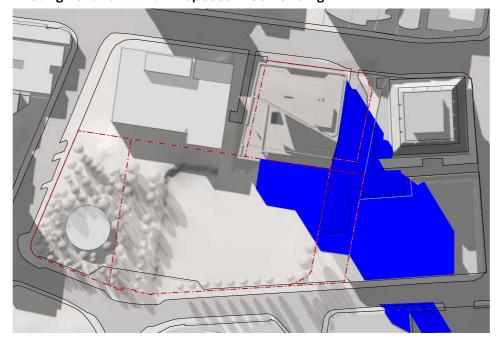
Solar Access (21st June / Winter Solstice)

Existing Condition:

Existing Built Form



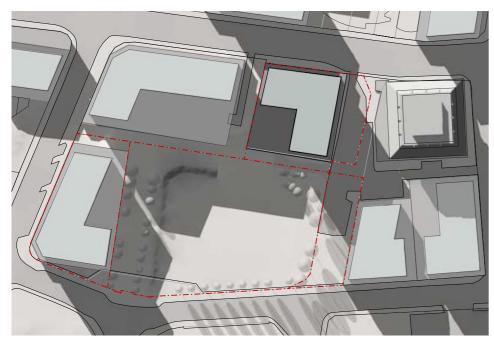
Scenario 1: Existing Built Form with Proposed WSU Building



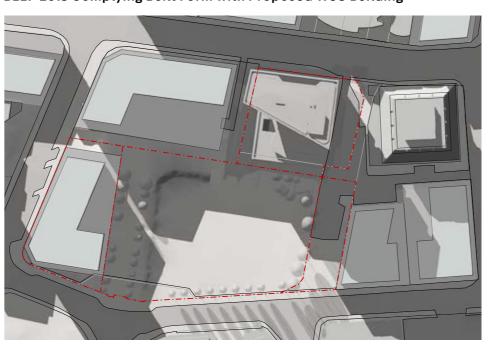
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



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



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



Key

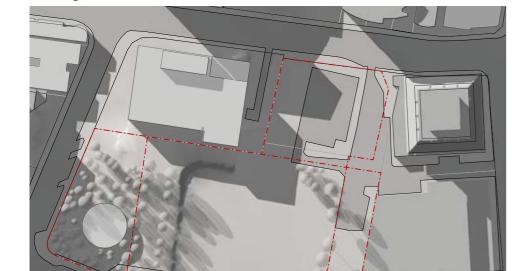
Additional overshadowing from proposed WSU building in relation to the existing conditions of the park

Approximately 9.1 % additional overshadowing on the park caused by the proposed WSU building in comparison to a BLEP 2015 complying development on site

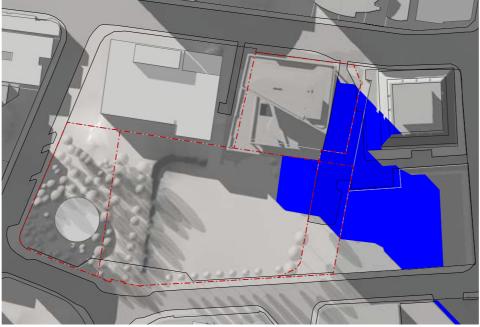
3 pm

Solar Access (21st June / Winter Solstice)

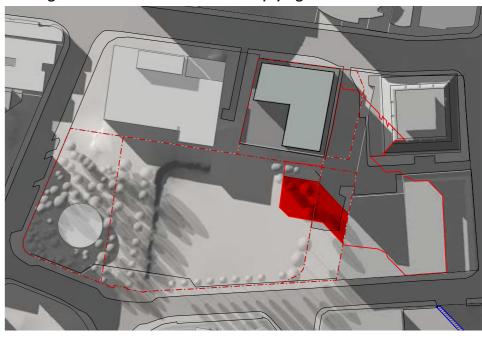
Existing Condition: Existing Built Form



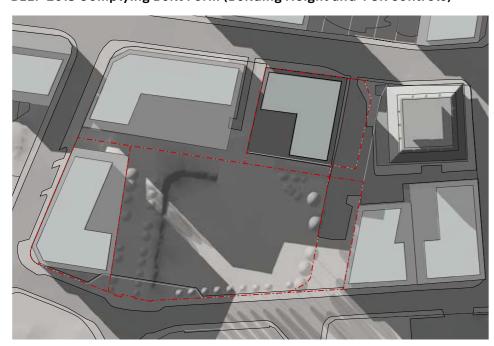
Scenario 1:
Existing Built Form with Proposed WSU Building



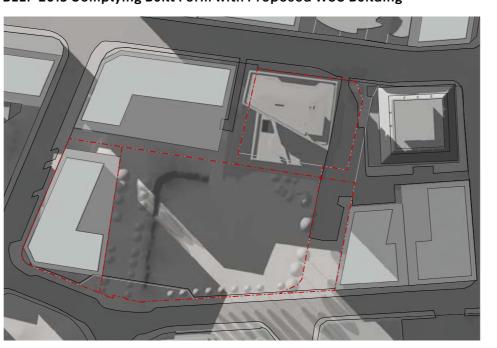
Scenario 2:
Existing Built Form with BLEP 2015 Complying built form in WSU site



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

Cumulative Overshadowing Impact 11am-3pm



Existing Condition (existing built form)

3D Axonometric

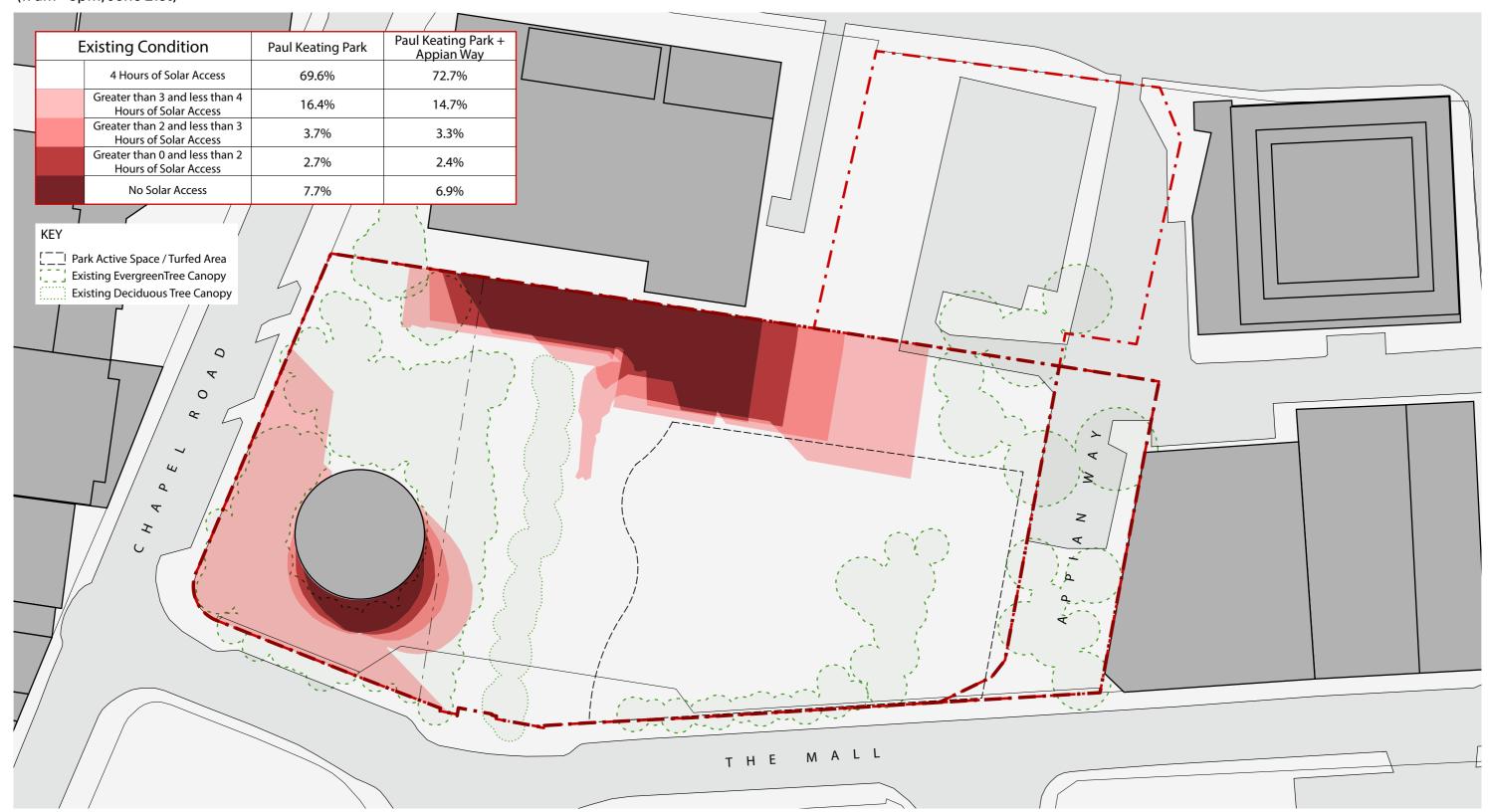


Concluding Observations

- 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

- The WSU proposal creates significant additional overshadowing impact in relation to the existing built form around the Park.
- 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.

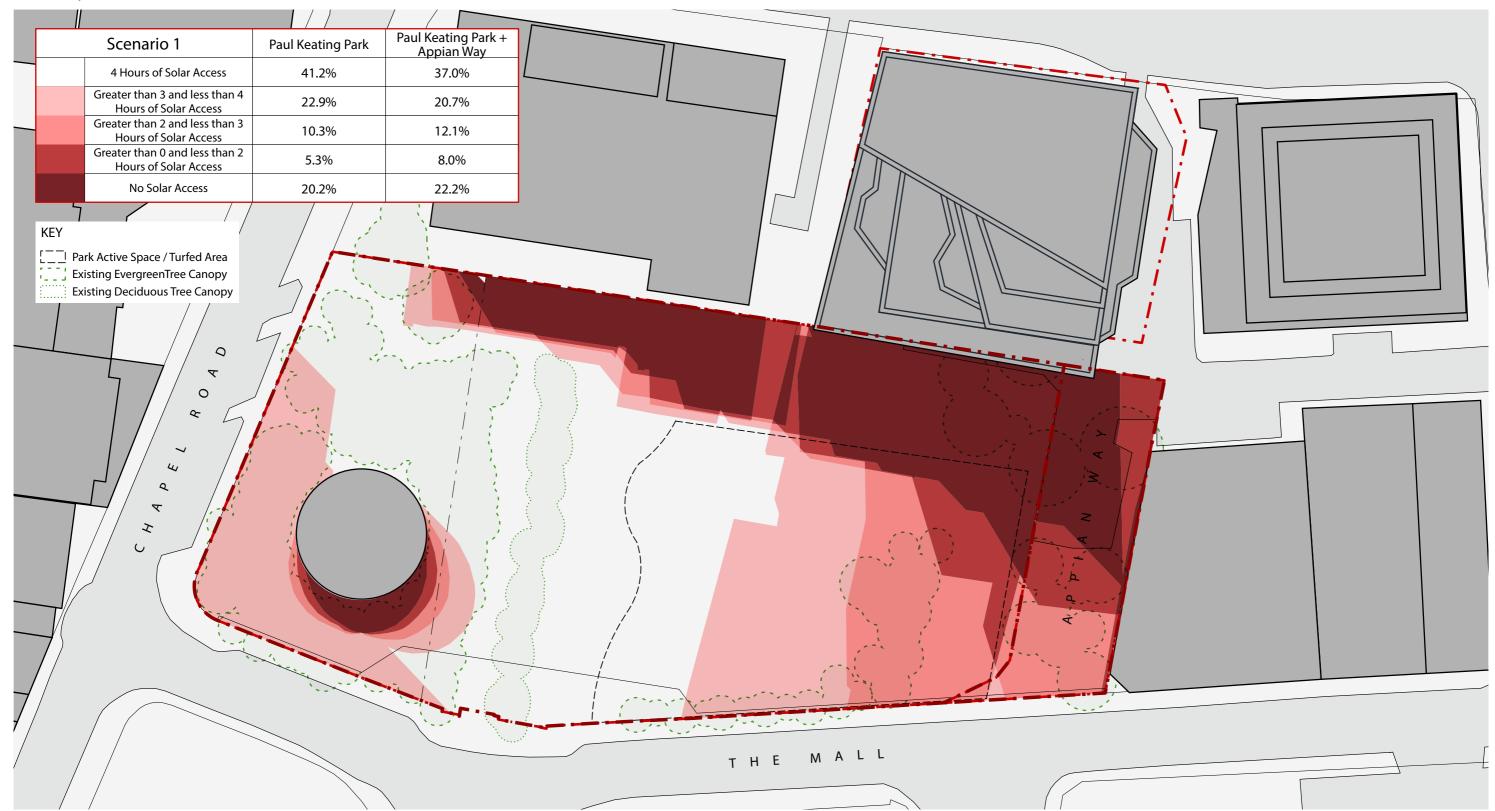
Primary Points for Improvement

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

- 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

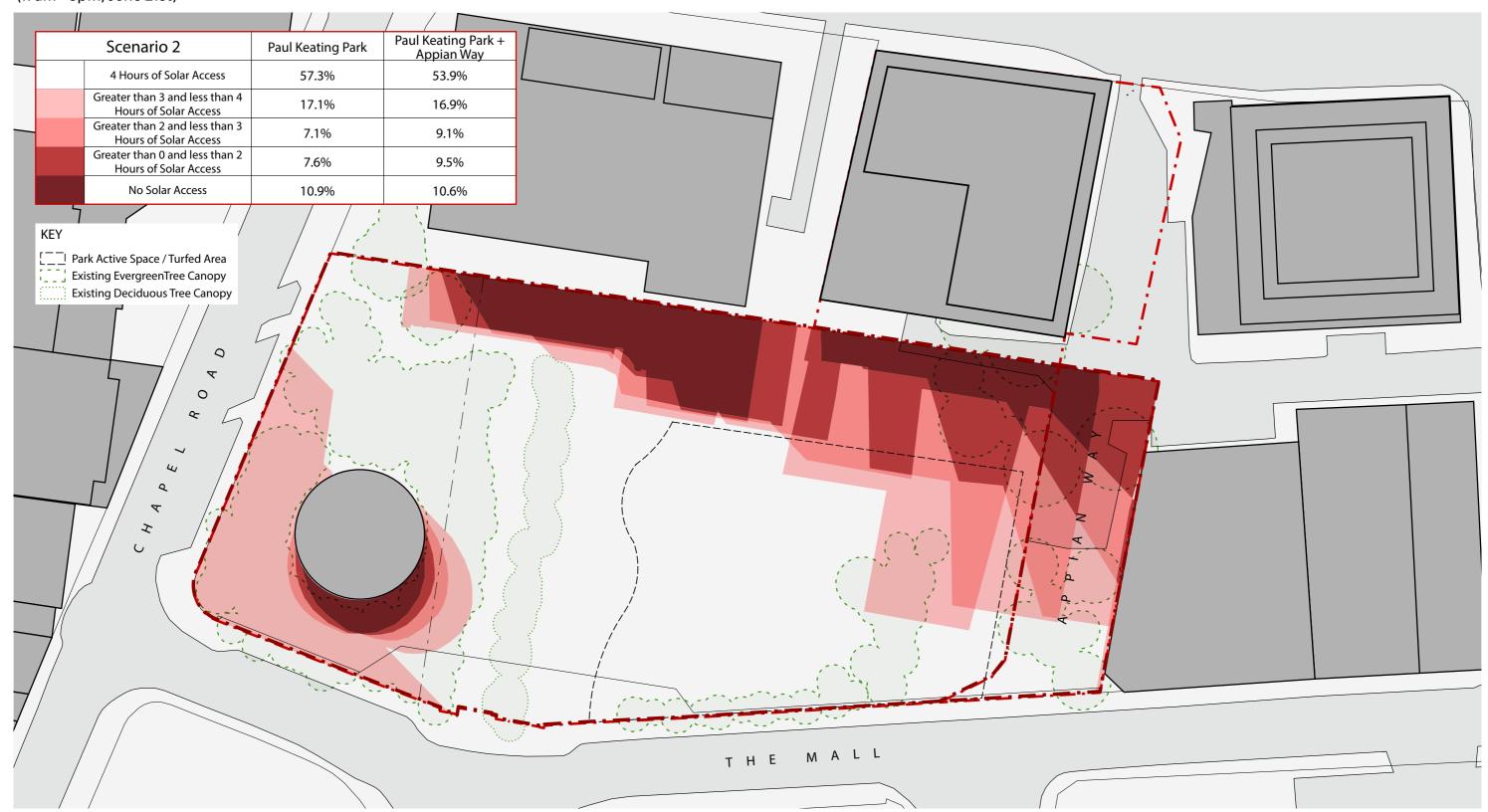
- Scenario 2 is the second-best solar access outcome for the Park with approximately 57% of the Park area receiving 4 hours of direct sunlight on the Winter Solstice.
- 2. Grass lawn area of Paul Keating Park is not as significantly impacted by additional overshadowing when compared with Scenarios 1, 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

 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.

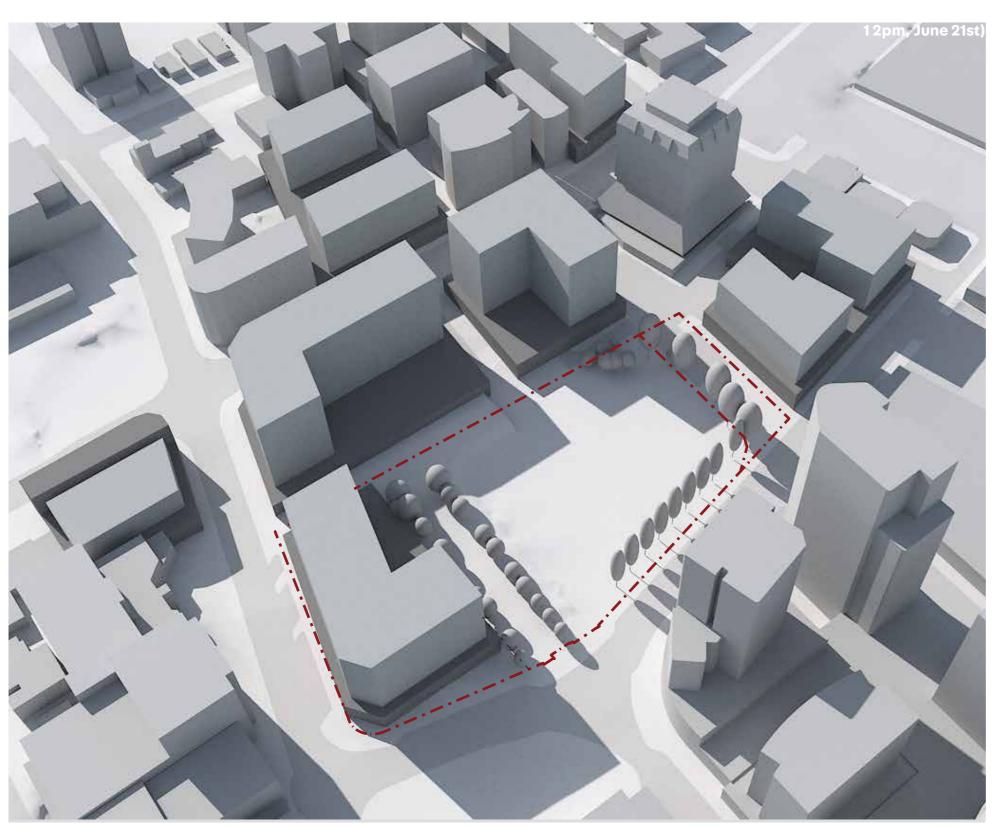
Cumulative Overshadowing Impact

(11 am - 3pm, June 21st)



Scenario 3: BLEP 2015 Complying Built Form

3D Axonometric



Concluding Observations

- Paul Keating Park is severely impacted by the current BLEP 2015 zoning, building height and FSR controls.
- 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.

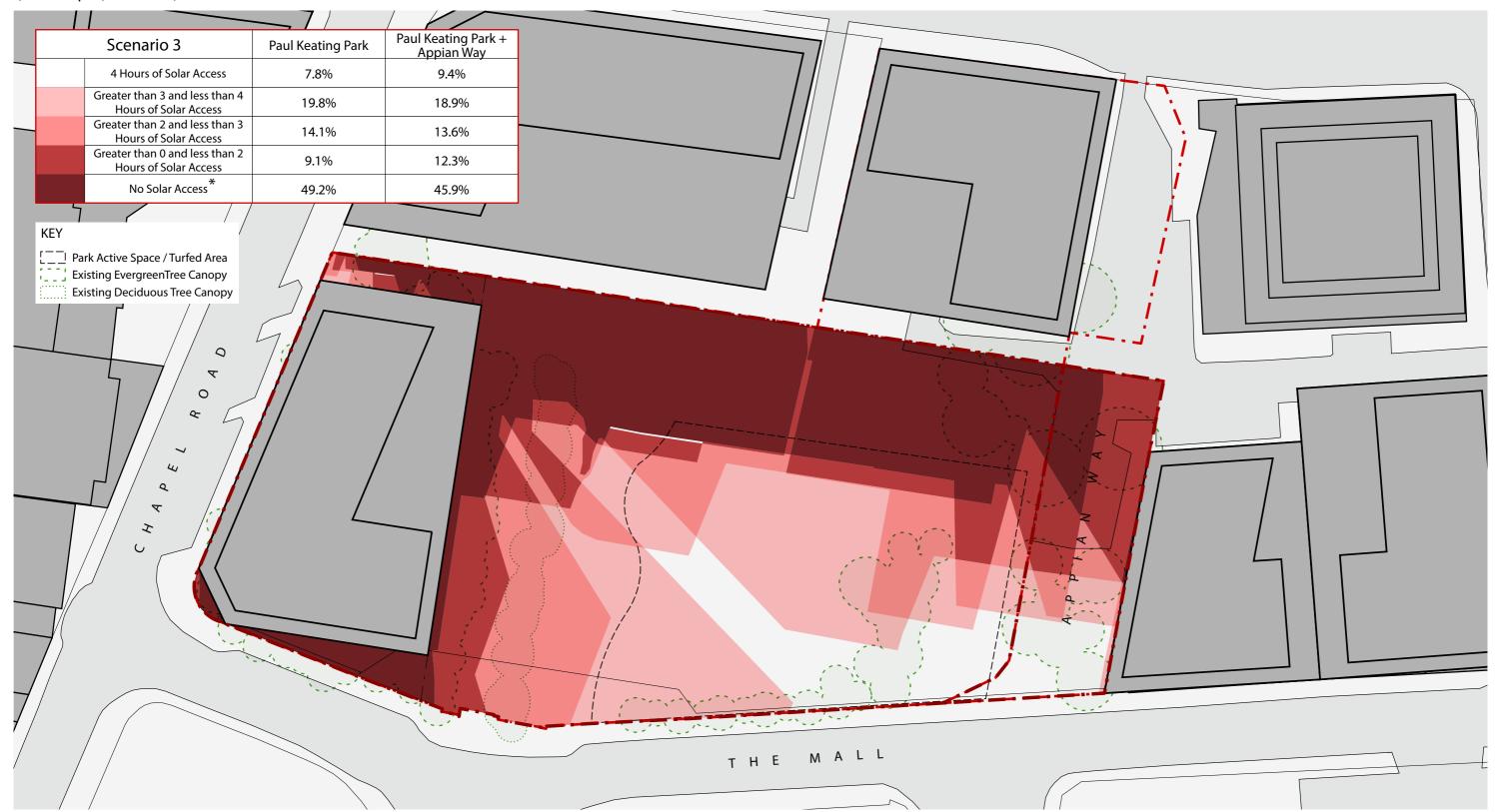
Primary Points for Improvement

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

- 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.

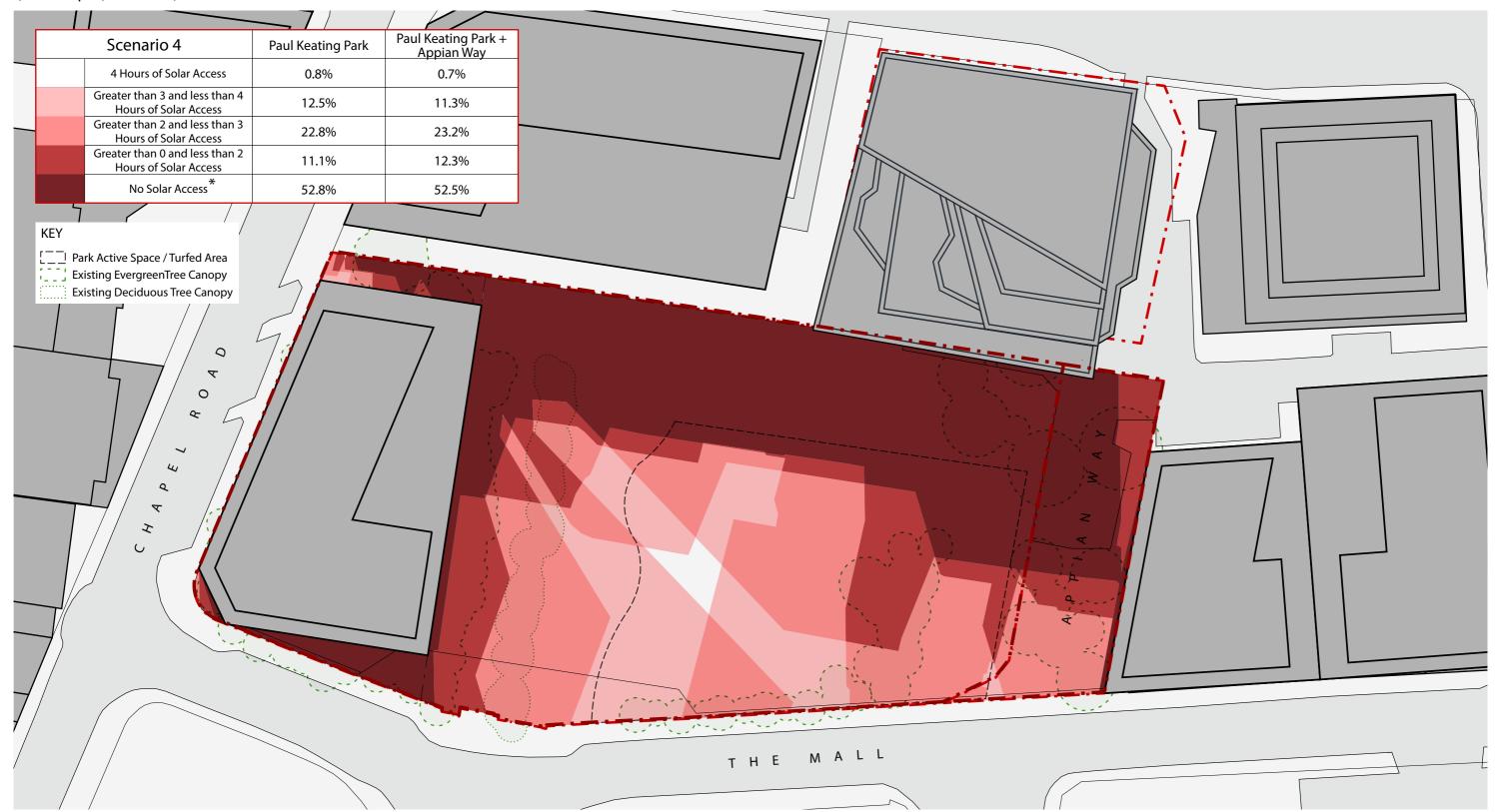
Primary Points for Improvement

- 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

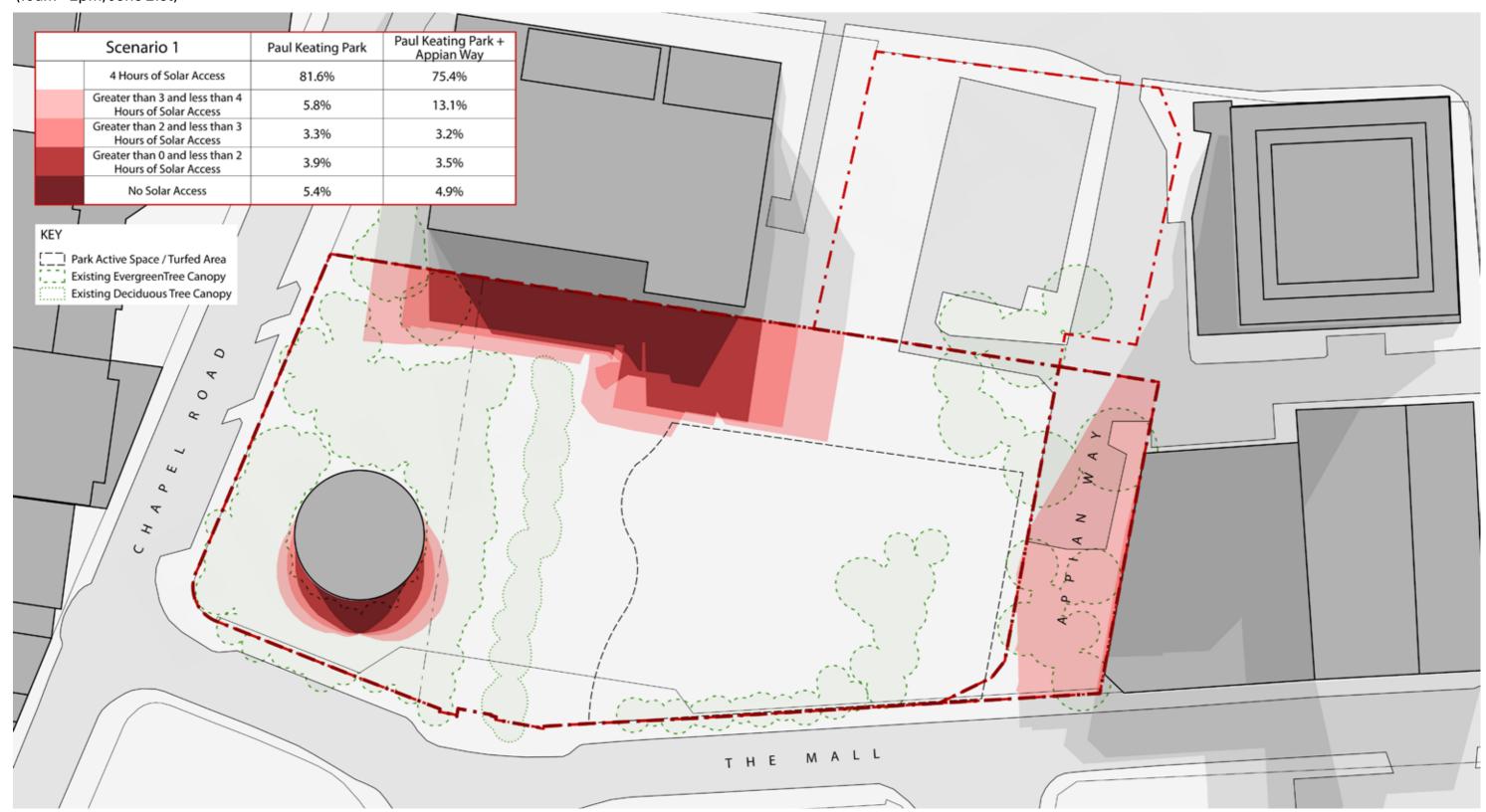
It is recommended that:

- 1. 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.
- 3. 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.
- 4. 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.
- 5. 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.

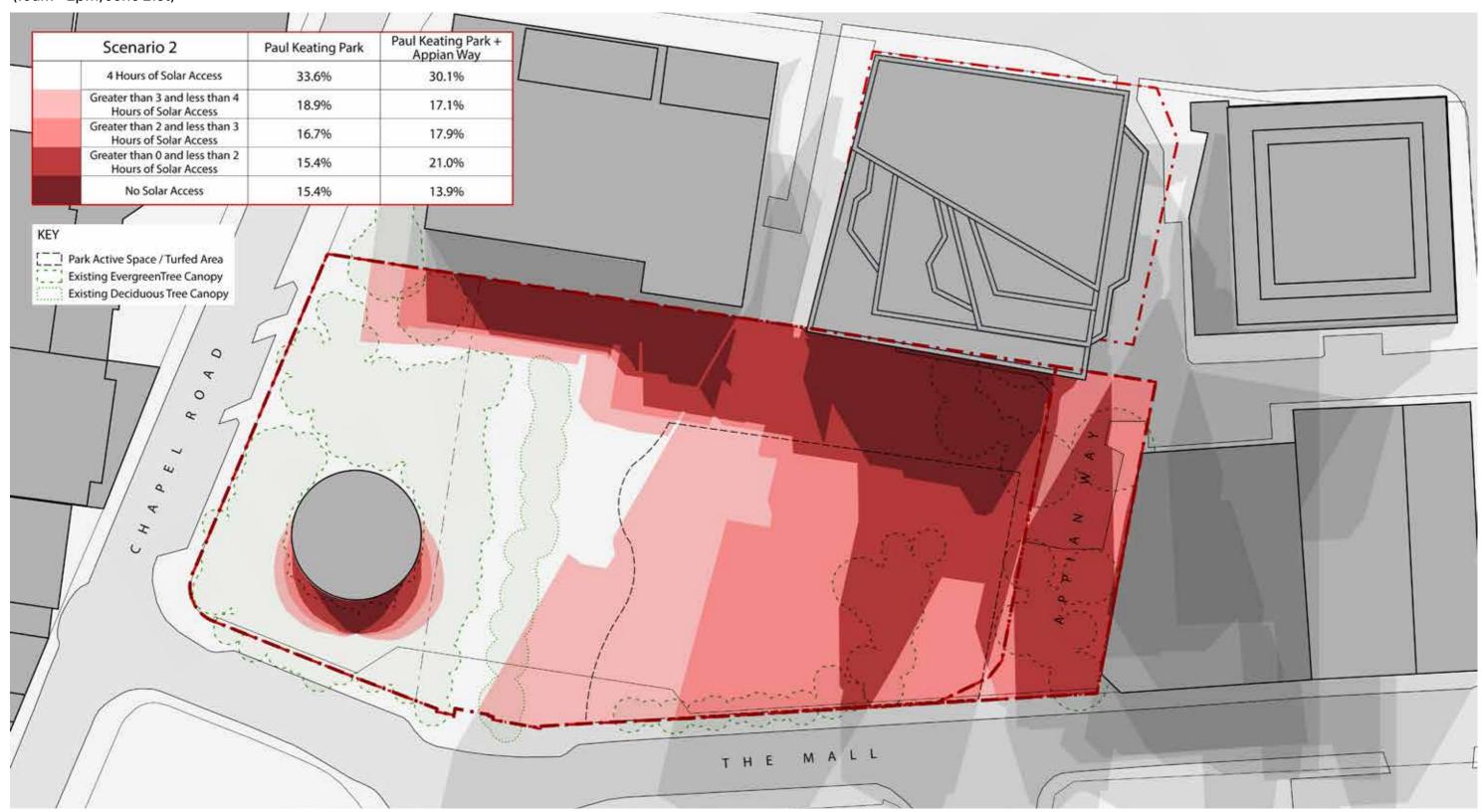
Appendix

Cumulative Overshadowing Impact - 10am to 2pm

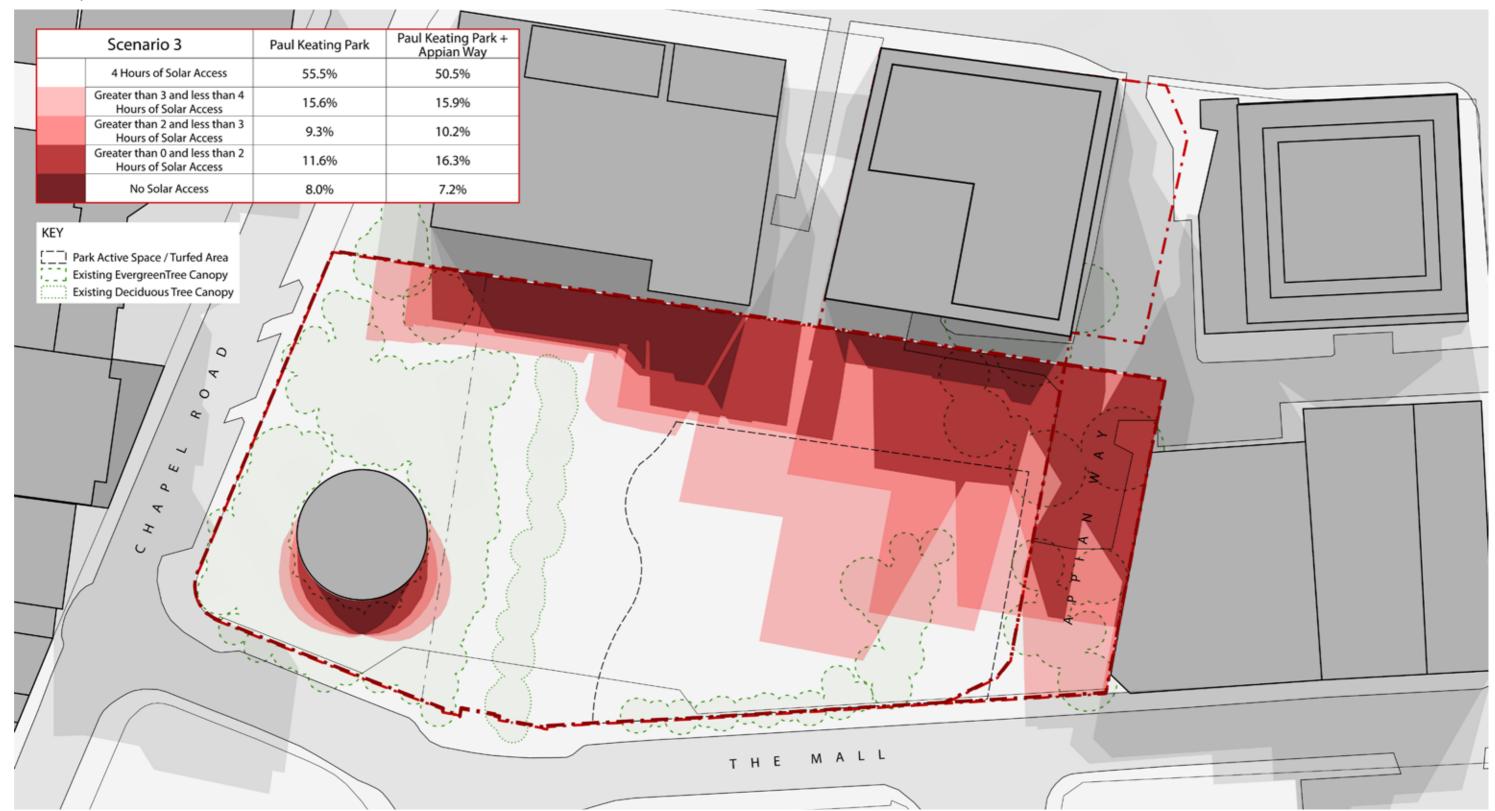
Existing Built Form (current condition)



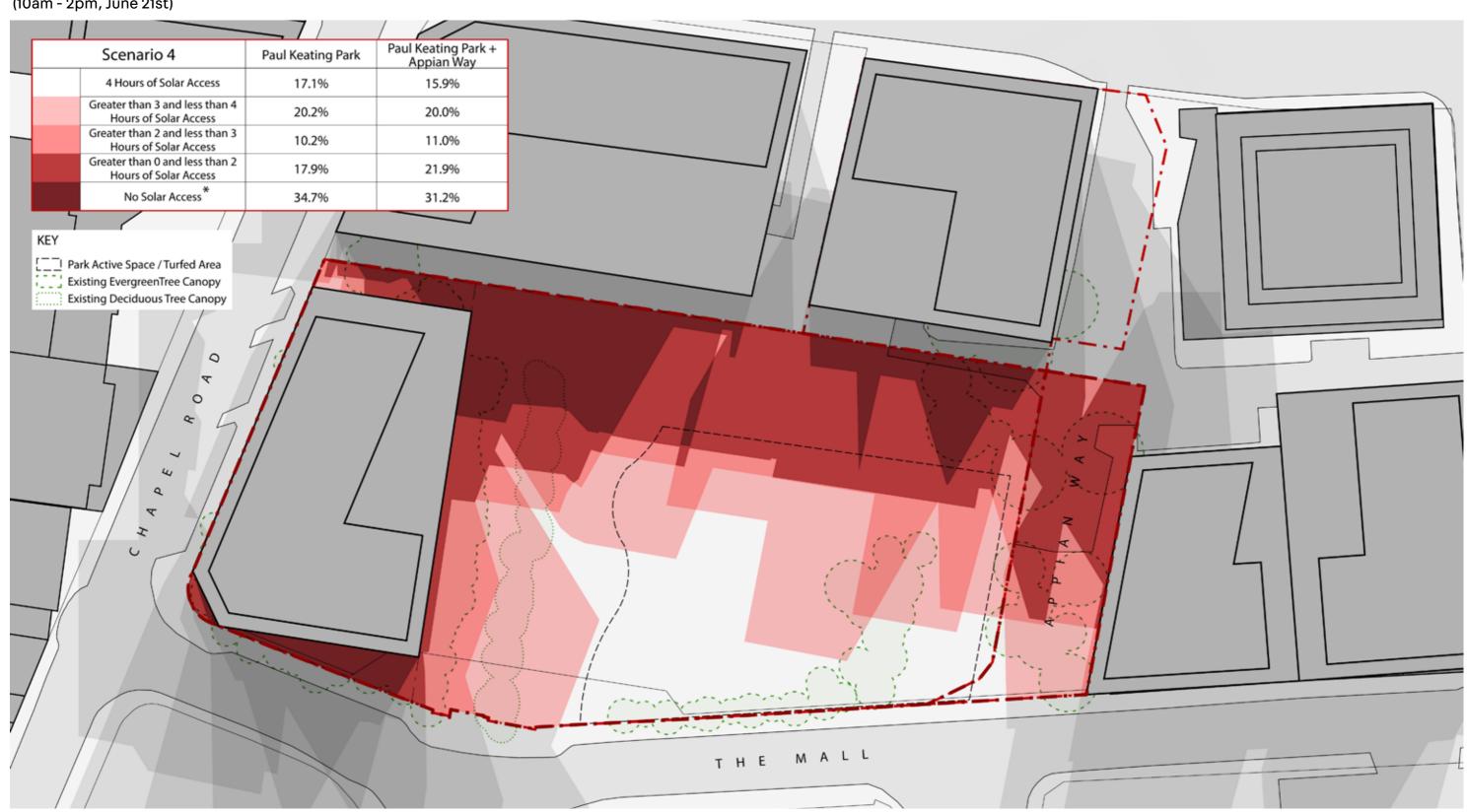
Existing Built Form with Proposed WSU Building



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



BLEP 2015 Complying Built Form



BLEP 2015 Complying Built Form with proposed WSU Building

