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28 April 2017

Our Ref: 2017/207603
File No: S112830

Mr Ken Reynolds
Project Director
Sydney Motorway Corporation
PO Box 6120
Alexandria NSW 2015

By email: info@newm5.com.au

Dear Mr Reynolds,

Draft Urban Design and Landscape Plan

Please find attached the City's comments on the WestConnex New M5 draft Urban Design and Landscape Plan.

The City objects to WestConnex. It is an outdated transport solution that will not contribute to Sydney's future economic growth and liveability. Traffic modelling presented in the Updated Strategic Business Case shows that sections of the motorway will be heavily congested within 10 years of opening. Traffic flowing to and from the motorway will overwhelm local roads leading to increased inner city congestion and a flawed program of road widening.

The City is disappointed that this substantial documentation was available for review for less than 4 weeks and that the consultation period included the Easter, Anzac Day and the school holidays. This has constrained the City's ability to thoroughly review the documentation.

The City has noted a number of deficiencies in the documentation, in particular a lack of detail in the implementation and delivery of the Urban Design and Landscape Plan. It is essential the delivery of the draft UDLP is addressed comprehensively to provide certainty to the community that the project will go some way to mitigating its considerable detrimental impacts.

Should you wish to speak with a Council officer about the City's comments, please contact Bryony Cooper, Executive Manager City Access and Transport on 9265 7703 or at bcooper@cityofsydney.nsw.gov.au

Yours sincerely

Monica Barone
Chief Executive Officer

CITY OF SYDNEY
SUBMISSION ON THE DRAFT URBAN DESIGN AND LANDSCAPE PLAN
WESTCONNEX (RELEASED 4 APRIL 2017)

Executive Summary

The City of Sydney (the City) welcomes the opportunity to comment on the draft Urban Design and Landscape Plan (draft UDLP). The WestConnex New M5 proposed works will have significant negative impacts on the environment and local communities at and around St Peters with substantial numbers of vehicles exiting the New M5 tunnels at St Peters onto the City's local road network. This will increase congestion levels around St Peters, with flow on effects to the wider road network which will have negative economic impacts for both the City and Greater Sydney region.

The City acknowledges that WestConnex has consulted with the City during the preparation of the draft UDLP, however, a number of the City's recommendations have not yet been incorporated into the plans. WestConnex has failed to incorporate within the draft UDLP:

- The City's proposed Sydney Park impact mitigation proposal which sets out the requirements for addressing the extensive impacts to Sydney Park's eastern edge, including new and adjusted entries, retaining walls, boundary landscape planting, building adjustments and relocated park infrastructure.

- Feedback provided on the St Peters Recreation Area. In particular, the mix of facilities, the inclusion of a large detention basin ('basin 1' on page 84) that would sterilize a significant portion of the site and the need to address future implementation and delivery of the recreation area.

- Feedback provided on the Alexandra Canal crossing at Campbell Road, particularly in relation to public amenity and safety of the culvert and the lack of pedestrian and bike connectivity with Campbell Road.

The draft UDLP includes a number of proposals which directly and negatively impact Sydney Park, the surrounding environs and local residential and business communities. The draft UDLP fails to fully consider or adequately mitigate for these substantial impacts.

Inappropriate design

Discussion of the urban design context in the UDLP is insufficient. In particular the urban character of inner Sydney is not described and therefore many elements of the draft UDLP are inappropriately designed. Amongst the City's primary concerns is a clear need for universal access advice to be sought in relation to compliance with the Disability Discrimination Act.

Pedestrian safety is not addressed

Community safety and amenity is not adequately considered in relation to pedestrian safety. There is no 'safe by design' analysis of the proposed works included in the UDLP. The design work compromises pedestrian safety by poor placement of footpaths adjacent to traffic lanes and lack of tree planted verges.

Inadequate consideration for environment and heritage

Heritage values are not discussed in the design objectives and principles and there is no evidence of any reference to heritage values in any part of the plan.
The existing vegetation within Sydney Park is not accurately recorded. The City recommends WestConnex refers to 'Nearmap', for example, for recent satellite images of the area in order to gain a more accurate idea of existing vegetation in Sydney Park.

No integration of the Pedestrian and Cycle Implementation Strategy

The City is concerned that generally on the streets outside the motorway, pedestrian and bike riders are given a lower priority to car users. The design of these streets has been approached as though they are rural roads or roads in greenfield areas of the city. They are not. The streets in the City of Sydney area are used by pedestrians and cyclists and the numbers of these vulnerable users is increasing. A range of changes are required to prioritise the values of pedestrians and cyclists.

The draft UDLP consultation and submission period of less than one month during a holiday period is inadequate given the draft UDLP's importance and impact. The City called for an extension to the exhibition period, none of which were granted. Releasing such a substantial document over the Easter and Anzac Day public holidays and school holidays means the community has had limited time to consider the document. The exhibition of the draft UDLP is the first opportunity for the public to view the updated plan and formally make submissions. The City is concerned that as a consequence, the consultation process is highly compromised, as is the City's ability to respond fully within the short timeframe provided.

The City has made a series of recommendations to mitigate the substantial impacts it has identified. It is vital that the community and local government's views are taken fully into account and incorporated into a revised UDLP. The City requests a reissue the UDLP following the completion of consultation with the relevant councils and the community.

The City awaits the next iteration of the UDLP and the opportunity to comment further. For ease of reference and in addition to the following comments on the draft UDLP, attached are the City's earlier submissions on the:

- Appendix A: WestConnex Stage 2 New M5 Detailed Design Package.
- Appendix B: Sydney Park Impact Mitigation Plan.
- Appendix C: St Peters Recreation Area.
- Appendix D: WestConnex New M5 and St Peters Interchange Environmental Impact Study (EIS) – Review of Biodiversity Assessment Report (Biodiversity Assessment Report) prepared for the City Marrickville Council and included in the City's submission on the EIS.
- Appendix E: Species list.

The City's submission follows the headings set out in the draft UDLP.

The City is available to discuss its submission. Please contact Bryony Cooper, Executive Manager City Access and Transport on 9246 7703 or by email at BCooper@cityofsydney.nsw.gov.au in the first instance.

1.0 INTRODUCTION

Section 1.5 Minister for Planning Conditions of Approval

1.5.1 Minister for Planning Conditions of Approval at P.04
B61 Urban Design and Landscape Plan
Prior to commencement of permanent built surface works and/or landscaping, or as otherwise agreed by the Secretary, a UDLP must be prepared.

The UDLP must be prepared by a suitably qualified and experienced person(s), ín consultation with the relevant council(s) and community, Heritage Council of NSW (or delegate), and the UDRP (condition 860). The UDLP must be approved by the Secretary. The UDLP must present an integrated urban and landscape design for the SSI, and must include, but not be limited to:

(a) identification of design objectives, principles and standards based on –
(¡) local environmental and heritage values

- The Design Objectives and Principles are **not based on local environmental accents and features.** They are generic and project centred. Some elements, particularly the landscape elements have been derived from local design accents, but these are not described in the principles. The built elements make no reference to local design features and this contributes to their dissonance and incongruity in the various local contexts.

RECOMMENDATION
Include objectives, principles and standards in the final UDLP based on local design features. Redesign the built elements where they adjoin local streets based on their integration into the local character rather than generic design principles.

- Heritage values are **not discussed** in the design objectives and principles and there is no evidence of any reference to heritage values in any part of the plan. In particular Condition *B35* states that *How the items are reused in the project is to be detailed in the Urban Design and Landscape Plan required by condition B61.* This is missing from the UDLP.

RECOMMENDATION
The final UDLP must include objectives, principles and standards based on heritage values and detail how items are reused in the project in the UDLP. These elements of the UDLP must be subject to further community consultation.

(a) identification of design objectives, principles and standards based on –
(ii) urban design context

- Discussion of the urban design context in the UDLP is insufficient. In particular the urban character of inner Sydney is not described and therefore many elements of the draft UDLP are inappropriately designed. This includes buildings with inappropriate settings e.g. the Motorway Control Centres and inappropriate landscape areas that provide no opportunity for recreation e.g. the landscape area north of Campbell Road between Euston and Burrows roads.

RECOMMENDATION
Redesign buildings and landscape areas to be appropriate to the urban design context.

(a) identification of design objectives, principles and standards based on –
(iii) sustainable design and maintenance

(a) identification of design objectives, principles and standards based on –
(iv) community safety, amenity and privacy, including 'safer by design' principles where relevant

- Community safety and amenity is **not adequately considered** in relation to pedestrian safety. See response to (vi) below.

- No 'safe by design' analysis of the proposed works is included in the UDLP. In particular the accessible areas surrounding the St. Peter's intersection may be unsafe; an independent review of these areas in particular is required.

RECOMMENDATION
Include an independent safety review of the accessible areas around the St Peters interchange and a general review of pedestrian safety particularly where footpaths are located alongside fast moving traffic. Consider reducing posted traffic speed limits and providing tree planted verges alongside streets outside the motorway to increase pedestrian safety. Include the recommendations of this review in the final UDLP.

(a) identification of design objectives, principles and standards based on –
(v) relevant design standards and guideline

- No discussion that outlines the relevant parts of these documents and how the principles and directions contained in them have been applied in the UDLP. This has resulted in design work that compromises pedestrian safety by poor placement of footpaths adjacent to traffic lanes and lack of tree planted verges.

RECOMMENDATION
Include an analysis and review of relevant standards in particular how they ensure pedestrian comfort and safety.

(a) identification of design objectives, principles and standards based on –
(vi) prioritising the visual amenity and values of adjoining receivers over the road user experience

- There are no principles that reference priority to adjoining receivers, particularly pedestrian users. Generally on the streets outside the motorway, pedestrian and bike riders are given a lower priority to car users. The design of these streets has been approached as though they are rural roads or roads in greenfield areas of the city. They are not. The streets in the City of Sydney area are used by pedestrians and cyclists and the numbers of these vulnerable users is increasing.

- To prioritise the values of pedestrians and cyclists the following changes are required to the streets outside the motorway:
    - traffic speed limits reduced to 50km/hr and the roadway designed accordingly

with narrower lanes
- intersections with single stage pedestrian crossings and tighter kerb radii
- continuous verges with tree plantings alongside the kerbs
- footpaths set behind the tree planted verges
- footpaths continuous across private driveway entries with these entries secondary to the footpaths
- cycle paths with continuity and separated, wherever possible, from footpaths (not abutting)
- widened waiting areas for cyclists at crossings

RECOMMENDATION
Redesign the streets outside the motorway for lower speeds – 50 km/hr, with narrower lanes, tighter radii, continuous roadside verges with tree plantings, single stage pedestrian crossings, continuous footpaths and where possible separated cycle ways with cycle storage areas at intersections.

(b) landscaping and building design opportunities to mitigate the visual impacts of road infrastructure and operational fixed facilities (including the ventilation facilities, emergency smoke extraction outlet, the Motorway Operations Complex, noise walls etc.);

(c) details on the location of existing vegetation and proposed landscaping (ìncluding use of endemic and advanced tree species where practicable). Details of species to be replanted/revegetated must be provided, including their appropriateness to the area and habitat for threatened species. Where feasible and reasonable, top soil and vegetation to be removed must be reused;

- The existing vegetation within Sydney Park is not accurately recorded. The City recommends WestConnex refers to 'Nearmap', for example, for recent satellite images of the area in order to gain a more accurate idea of existing vegetation in Sydney Park. The City notes that WestConnex has already cleared much of the urban/exotic vegetation that existed at the landfill site.

- The City considers the appropriateness of the species suggested for revegetation is inadequate because there is limited diversity and ability to provide habitat for species (including threatened species and of local conservation significance) as detailed in the City's Biodiversity Assessment Report.

RECOMMENDATION
Refer to the Biodiversity Assessment Report. Fully integrate the consideration of the habitat and urban ecology principles.

(d) a description of disturbed areas (including compounds) and details of the strategies to progressively rehabilitate, regenerate and/ or revegetate these areas;

- In the City's view this is an inadequate plan that fails to provide sufficient detail on how WestConnex will effectively revegetate and regenerate these areas in line with local

RECOMMENDATION
Refer to the the recommendations contained in the Biodiversity Assessment Report. Consideration of the habitat and urban ecology principles needs to be fully integrated into the UDLP.

environmental values and urban ecology objectives.

(e) a description of the SSI design features, including the graphics such as sections, perspective views and sketches for key elements of the SSI;

(f) information on the reuse of heritage items and materials (condition B34 and B35);

- No information on the reuse of heritage items and materials is contained within the UDLP. The separation of heritage consideration undermines the UDLP and further removes the local context from its implementation. The UDLP is flawed in its lack of consideration of heritage values.

RECOMMENDATION
Include information on the reuse of heritage items and materials. Fully integrate the consideration of heritage principles throughout the UDLP.

(g) detail controlled and safe public access to an example of an exposed section(s) of the former St Peters Brickpit Geological Site, unless demonstrated to be impracticable for safety reasons;

- No information on the reuse of this requirement is contained within the draft UDLP.

RECOMMENDATION
Include detail of controlled and safe public access to an example of an exposed section(s) of the former St Peters Brickpit Geological Site in the UDLP.

(h) an assessment of the location, design and impacts of operational lighting associated with the SSI and measures proposed to minimise lighting impacts;

- The locations and types of lighting are not included in the UDLP.

RECOMMENDATION
Include the locations and types of lighting in the UDLP.

(i) details of where and how recommendations from the UDRP have been incorporated into the plan;

- The details of where and how recommendations from the UDRP have **not been** incorporated into the plan.

RECOMMENDATION
Include details of where and how recommendations from the UDRP have been incorporated into the plan.

(j) the Pedestrian and Cycle Implementation Strategy (condition B51);

- The Pedestrian and Cycle Implementation Strategy is **not integrated** into the draft UDLP. The City received a preliminary presentation of the Pedestrian and Cycle Implementation Strategy and looks forward to receiving an updated UDLP which is integrated with the Pedestrian and Cycle Implementation Strategy.

RECOMMENDATION
Include the Pedestrian and Cycle Implementation Strategy in the UDLP.

(k) the sub-plans identified in conditions B62(a)-(f);

(l) the timing for implementation of access, landscaping and open space initiatives;

(m) monitoring and maintenance procedures for the built elements, rehabilitated vegetation and landscaping (including weed control) including performance indicators, responsibilities, timing and duration and contingencies where rehabilitation of vegetation and landscaping measures fail; and

(n) evidence of consultation with the relevant councils and the community on the proposed urban design and landscape measures, prior to finalisation of the Plan.

- Evidence of consultation with the relevant councils and the community on the proposed urban design and landscape measures have **not been** incorporated into the plan.

RECOMMENDATION
Resubmit the UDLP with evidence of consultation with the relevant councils and the community on the proposed urban design and landscape measures.

The UDLP must be implemented within one year of operation unless otherwise required by these conditions.

<u>B62 The Urban Design and Landscape Plan must include the following sub-plans:</u>
(a) Campbell Road Crossing Sub-plan to assist in the management of access, land use, community amenity and open space impacts associated with the SSI. The Plan must be prepared and approved by the Secretary within twelve months of the date of this approval, unless otherwise agreed by the Secretary. The Plan must be prepared in consultation with the relevant councils and the UDRP, and must address the matters raised during consultation.

- The sub-plan is in an early draft form. There are pages of illustrations without text or cross referencing. The city has been consulted in relation to these drawings and the consultation is on-going.

RECOMMENDATION
Reissue the UDLP following the completion of consultation with the relevant councils.

The Plan must identify and facilitate the construction and establishment of a new land bridge over Campbell Road that is connected to, and contiguous with, the southern end of the existing Sydney Park and the proposed open space area (including active recreation facilities) to the north of the St Peters Interchange. The land bridge is to be designed to satisfy the following objectives -

(i) to enrich and enhance the functionality, integration, recreational value and quality of Sydney Park,

- The City requests exploration of a connection north to the Sydney Park circuit to serve the main active transport link to the land bridge.
- The integration of the land bridge into Sydney Park to the north is critical. The current proposal needs to be strengthened to be more generous, accessible and legible.
- There is an opportunity to create a better link to the north. This alternative link could utilise the established Sydney Park network between wetlands 2 and 4 to more naturally feed into the N-S route. This dispersal of bike riders to both sides of wetland 4 is advantageous, as the number of cyclists accessing the park from Campbell Street via the Harber St car park is also expected to increase. The northern link could be developed to herald and integrate the land bridge more strongly into the main park.
- We accept this route may require minor re-configuration of the proposed City Farm at its SE boundary. We request the design studies include this consideration in their development of this access option, and show a reconfiguration in the footprint of the farming area to demonstrate no net loss of farming area, most likely by extending length of cropping lines up slope from (west of) the path alignment.
- The link from the land bridge to the circuit in the east could then be developed as a smaller scale, pedestrian connection.

(ii) to provide a high quality park that is landscaped and provides a continuous flow of open space over Campbell Road,
(iii) to create a new public open space, passive recreation area and garden for the community,
(iv) to address the severance created by an expanded Campbell Road and to enhance connectivity between existing and proposed open space that enhances the efficiency and resilience of the southern portion of Sydney Park and the new active recreation areas, and
(v) to improve and contribute to the quality and safety of the pedestrian and cyclist environment, including consistency with the Pedestrian and Cycleway Network Review required by condition B50.

The following parameters are to be incorporated and complied with in the design and delivery of the land bridge-
(i) be designed to minimise the amenity impacts on adjacent residential development (including visual and acoustic privacy and overshadowing impacts),

- A safety and crime prevention review is required.
- The anti-throw/safety screen should support landscaping or be highly transparent and of a high design quality, integrated within the overall design for the bridge.
- Abutments should be contained and form part of the architectural design (ie not left open as nothing will grow).
- No road signs should be attached to the bridge.
- No advertising should be allowed.

(ii) be located at least 35 metres to the west of No. 2 Campbell Road,

(iii) be of a width that addresses the objectives of this Plan but be no less than 20 metres (at any point), as measured parallel to Campbell Road,
(iv) provide high quality access, including the integration of cycling and pedestrian facilities offering continuous paths of travel, over Campbell Road, including consistency with the Pedestrian and Cycleway Network Review (condition 850),

- See the comments on (i) above.
- universal access advice should be sought in relation to compliance with the Disability Discrimination Act.

(v) considers the provision of pedestrian or cycle access along Campbell Road,
(vi) be of a depth to facilitate the planting across the width and depth of the bridge of a diverse range of vegetation (including species design and maturity) consistent with existing and proposed Sydney Park plantings, and

- The landscape of the land bridge should exploit particular views of the park, motorway or surrounding areas. Places to step off the main path to pause should be added to encourage use and to reduce the need for a wider path.
- Varied techniques to create areas of 1000mm soil depth for planting on the land bridge should be explored that do not result in a continuous walled/containerised planting character

(vii) the provision of high quality design and durable park infrastructure, furniture and lighting that meets the relevant council's requirements.

The Plan must be consistent with and integrate with the requirements of the UDLP (condition B6l) and the St Peters Interchange Recreational Area Sub-plan (condition B62(b)).

This Plan must be fully implemented within four years of the commencement of operations, or as otherwise agreed by the Secretary.
(b) St Peters Interchange Recreational Area Sub-plan to maximise the amount of open space available for the provision of active recreation areas and multifunctional and adaptable active recreation support facilities on the St Peters interchange site (located to the south of Campbell Road). The Plan must be prepared and approved by the Secretary within 12 months of the date of this approval, unless otherwise agreed by the Secretary.

The Plan must be prepared by an experienced and qualified person(s) in the design and provision of active recreation facilities and in consultation with the relevant councils (including adjoining councils) and the community. The Plan must detail the construction, timing and responsibility for the delivery of active recreation facilities (including, but not limited to, sporting fields) and take into account the following considerations -
(¡) maximising the availability of active recreational open space,

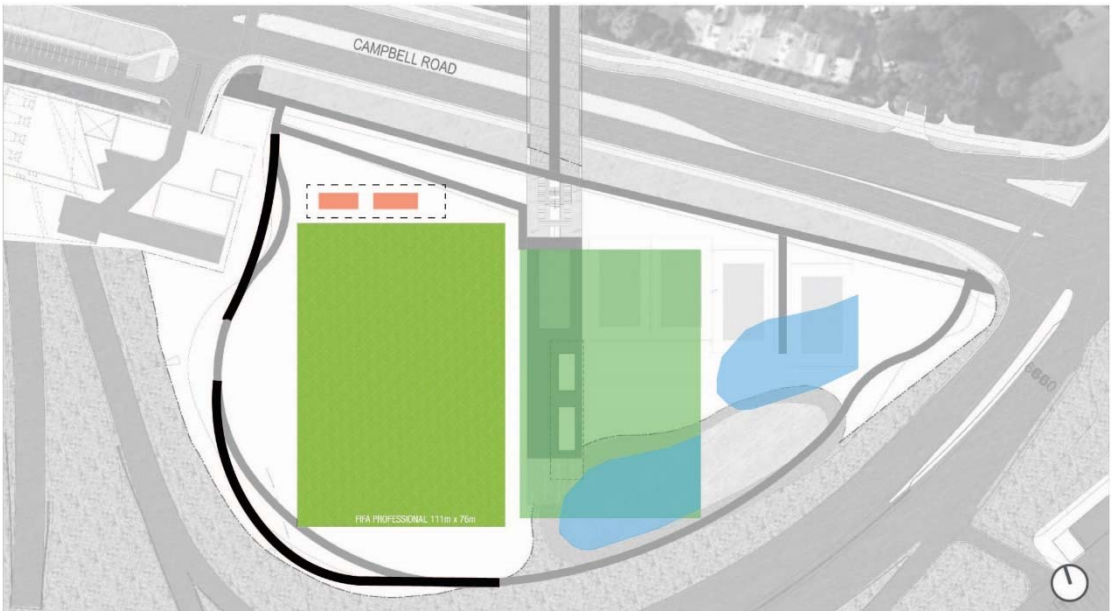
- The sub-plan is in an early draft form. There are pages of illustrations without text or cross referencing. The City has been consulted in relation to these drawings and the consultation is on-going.

RECOMMENDATION
Reissue the UDLP following the completion of consultation with the relevant councils.

(ii) all relevant policies, guidelines and plans,
(iii) the type of facilities to be provided taking into account the current and future local community recreation preferences and needs,

- The City requests the design be amended to achieve a two field configuration, developed with appropriate lighting and fencing provisioned with a synthetic playing surface to maximise community utilisation, incorporating the supporting amenities described below.

1. The spatial investigations reveal the potential of this site to sustain two fields:
   a. Compact 98m long x 66m wide (approx. 6500m2)
   b. FIFA Professional 111m long x 76m wide (approx. 8500m2)



Adapted from McGregor Coxall/CHROFI

2. This potential relies on:
   - the reconfiguration of detention requirements to the eastern end of the site and/or the conversion of some/all detention capacity into sub-surface storage.
   - the fields being in close proximity, with proposed supporting amenities relocated from current position. There is an opportunity for supporting amenities to be integrated with the Campbell Street Berm and/or land bridge termination/viewing deck.

3. The approximate scale of supporting amenities is provided below:
   - Change Rooms, including accessible toilet+shower (30-32m2 each for home and away)
   - Public Toilets (M+F with communal wash basin) + accessible (25m2 + 7 m2)
   - Maintenance and Store (30-35 m2 per field)
   - Café/Kiosk/Office (35 m2)

(iv) the future use and rationalisation of Albert Street to improve the provision and servicing of open space, including consideration of alternate property access and shared zone treatments,
(v) provision of safe and efficient pedestrian and cyclist access connectivity, including integration with the Pedestrian and Cycleway Network Review (condition 850), and

(vi) integration with Sydney Park Plan of Management.

- Further consultation is required to formulate this.

The Plan must be consistent, and integrate, with the requirements of the UDLP and the Sydney Park Enhancement Sub-plan.

Within four years of the commencement of operations, unless otherwise agreed by the Secretary, the Proponent must implement the sub-plan including providing a flat grassed area to be able to be converted into sporting fields and car parking (should a demand be demonstrated).

- The St Peters Interchange Recreational Area Sub-plan states that it must 'detail the construction, timing and responsibility for the delivery of active recreation facilities…' This detail is not included in the draft Sub-plan however it is fundamental to ensuring community confidence in the delivery of the facilities. The City has repeatedly requested the WestConnex project to confirm that the capital expenditure required is included in the project budget.

(c) a Campbell Street Green Link Sub-plan

(d) a M5 Linear Park Enhancement Sub-plan

(e) an Alexandra Canal Sub-plan which details the design and integration of the bridges over the Alexandra Canal, including a Heritage Impact Assessment addressing any heritage impacts to the canal and its setting taking into account future and current accessibility plans for the Canal and the heritage sensitivity of the setting as set out in the Alexandra Canal Heritage Conservation Plan.

- No Alexandria Canal sub plan is included in the draft UDLP

RECOMMENDATION Include the Alexandria Canal sub plan in the UDLP.

B63 Tree Removals and Plantings
The project is required to retain as many trees as possible and provide a net increase in the number of replacement trees. The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) prior to removing any trees on the periphery and/or outside the construction footprint as identified in the figures in Section 6 of the document referred to in condition A2(b), including any tree(s) removed along Euston Road. The Tree Report may be prepared for the entire SSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the SSI on trees and vegetation within and adjacent to the construction footprint.

- It would be useful for the final UDLP to identify where trees have been retained through redesign efforts following the Minister for Planning Conditions of Approval.

Section 1.6 Revised Environmental Management Measures

1.6.1 Revised Environmental Management Measures at P.09
OpV10 – P.10

- The City supports a reduction in speed limits to maximise tree plantings along local roads (in particular Campbell Road and Euston Road).

NAH07 – P.10
The work required in relation to the Rudders Bond Store is incomplete.

RECOMMENDATION
Reissue the UDLP for further comment. Include all the work required to meet the conditions of approval for the Rudders Bond Store in the UDLP.

Section 1.9 Urban Design Review Panel

While the City welcomes the opportunity to be part of the Urban Design Review Panel it is noted that the City has only been invited to, and attended, meetings held on 22 December 2016 and 21 March 2017.

2.0 GENERAL

Section 2.2 Urban Design Philosophy

The City supports the sentiment in this section, however the City questions the extent to which all road users are considered in relation to the application of the philosophy and principles identified. It is clear that through the St Peters Interchange and along formerly local roads, including Euston Road and Campbell Road, traffic will be overwhelmingly dominant. As per the Minister for Planning's Condition of Approval B47. The City requests the consideration of reduced speed limits, reduced numbers of turning lanes and increased kerbside planting as a means of reducing the overall dominance of road traffic in this locale.

In the preliminary draft of works proposed for the St Peters Intersection sub plan will help build the local community. Elsewhere the UDLP is antithetical to enhancing the form, function and character of and liveability of Sydney.

This is particularly evident in the design of the roads beyond the motorway particularly Euston Road and Campbell Road. These areas are **not** sensitively integrated into the built and natural environments and do **not** help build the local community. The design philosophy here has been to destroy the maximum amount of existing public parkland in order to maximise the benefit to the vehicle users. Other road users particularly pedestrians are adversely affected. The design of these roads ultimately decreases the safety of pedestrians and traffic will be overwhelmingly dominant.

If the philosophy stated is followed these roads would have reduced speed limits, reduced numbers of turning lanes and increased kerbside planting as a means of reducing the overall dominance of road traffic in this locale.

Section 2.3 Urban Design Objectives and Principles

The final UDLP should include specific examples of how each objective has been achieved. Currently the draft UDLP lacks the necessary specificity about how the urban design objectives have been met, given the objectives appear disconnected from the reality of how road users and the general public will experience the WestConnex New M5.

In particular the level of demolition of residential properties in St Peters and the blighting of the remaining terraces along Campbell Road is directly at odds with Objective 4 (urban renewal and liveability) which aims for 'high levels of urban amenity and liveability'.

Section 2.4 Overview of Urban Design Proposal

St Peters Local Road Upgrades at P.28

- The image presented of Campbell Road is misleading; the perspective shown does not include the land bridge which is conditioned within the approval of the New M5. The image also demonstrates the unacceptable loss of amenity to the Campbell Road terraces. These residential properties will front a nine lane road with a complete loss of on-street parking which local residents have utilised for decades.

3.0 URBAN DESIGN CONCEPT

Section 3.4 St Peters Interchange (including MOC4 and MOC5)

The City is concerned that there is little acknowledgement here and elsewhere in the draft UDLP of the City's recommendations contained within the Biodiversity Assessment Report. The City considers the general design to be very limited with regards to habitat/biodiversity needs, with a heavy reliance on planting trees within the St Peters interchange, as is the reference to Urban Ecology.

In addition, while the Sydney Park Plan of Management 2014 is referenced in the draft UDLP, this is not linked adequately to the site analysis.

The City requests that the following key recommendations outlined in the Biodiversity Assessment Report be incorporated into the UDLP:

- The species to be planted should be selected to create/enhance habitat for priority/target species, and should be based on specialist ecological advice - refer to the attached vegetation community lists attached as Appendix Di, Dii and Diii.
- Incorporate dense reed beds and sedges and potentially bio retention swales to maximise the habitat value of stormwater detention basins, whilst also maximising their effectiveness in treating road run-off.
- Incorporate fine mesh structures if feasible over stormwater inlets to prevent access by the Mosquito Fish (*Gambusia holbrooki*), which preys on tadpoles.
- Re-establish vegetation representative of the endangered ESBS community, which was also widespread in the locality prior to development, in sunny areas around the interchange (potentially adjoining but set back from the above wetland areas).
- Establish shade-tolerant/rainforest vegetation in shaded areas around the interchange to provide habitat for small, migratory rainforest species.
- Incorporate scuppers in the design of new bridges to provide roosting habitat for microbats.
- Site landscaping incorporating appropriate soils/other growing media such as crushed sandstone, and maximising locally native shrubs, grasses and groundcover species that will provide similar habitat to the dense weeds removed (i.e. not just trees, and preferably incorporating tree-free areas to discourage aggressive species such as the Noisy Miner).
- The species to be planted should be selected to create/enhance habitat for priority/target species, and should be based on specialist ecological advice.
- Fauna underpasses for frogs and reptiles should be established in new culverts or similar, incorporating rocks and thick grasses/sedges at each end. The number of underpasses should be maximised to the extent feasible, due to the imitations the interchange will place on the movement of these and other less mobile fauna species.
- Culverts or other drainage structures should be left ungated to allow access for roosting microbats.
- Feed trees for the Grey-headed Flying-fox should be incorporated into site landscaping to replace those that will be removed around Sydney Park. While some diversity provided, it is still quite limited.
- Landscape plans should be developed with specialist ecological advice, with reference to the City's Urban Ecology Strategic Action Plan and Bush Restoration Management Plan.

In addition, the City has concerns around canal transition. As noted in the Biodiversity Assessment Report, the need to address the presence of the endangered Coastal Saltmarsh community species and efforts to mitigate its removal/damage and subsequent renewal/enhancement was clearly articulated – '*Construct habitat for the endangered Coastal Saltmarsh community along Alexandra Canal as part of landscaping adjacent to the new bridges, in consultation/collaboration with Sydney Water*'.

The 'Canal transition' landscaping at P.94 (Campbell Road) and P.351 identifies mass tree, mass planting and turf planting to "create a sense of arrival" which is at odds with the City's desire to protect, renew and enhance the saltmarsh species along the canal. If trees are required at this site, it is recommended they are back from the canal in order to improve the canal edge for saltmarsh expansion. Additionally the City recommends tree species that are associated with saltmarsh communities, for example Swamp Oak floodplain forest (refer to Appendices Ei-iii).

Design approach at P.54

The design approach privileges the fleeting temporal experience of the motorist above those who live, work and recreate in the local area and all other considerations. The approach is not comprehensive and neglects potentially more rewarding results that provide greater enrichment to the community as whole.

The neglected considerations include:

- Consideration of the safety of pedestrian users in and around the intersection – the proposal creates a series of spaces that whilst open to use is isolated; in other projects such spaces would be eliminated.
- Consideration of the productive value of urban land – along the Princes Highway and Campbell Road in several places 'green volume' (sic) has been created when other productive uses or usable recreational parks would be more appropriate; this approach is wasteful and should be eliminated.
- New buildings and roadways are spread out, set back and isolated – alternatively concentrating these facilities would enable more productive land uses and create more usable public parks with specific recreational purposes
- The landscape all areas including the inaccessible area of the expressway can be designed to supported habitat for native animals and revegetate complete indigenous plant communities.

Heritage issues at P.54

- It is not acceptable to essentially defer the reuse of the State Heritage Listed Rudders Bond Store items to the final UDLP, effectively negating consultation on proposals.

Vegetation Programme at P.57

- The draft UDLP draws on the existing planting theme within Sydney Park, however the legend appears to introduce new and/or different planting themes into Sydney Park (including in areas where there is already substantial plantings).
- The Programme therefore needs to differentiate between what is new and what is proposed, compared to what is existing so that any potential modifications to Sydney Park can be identified, particularly in areas not impacted by WestConnex, and remedied.
- The draft UDLP also fails to take into account the City Farm area and existing park infrastructure/use patterns. The City does not support extended mass planting approach taken within the park – refer to the City's Sydney Park Mitigation Plan (Mitigation Plan) for the City's position in relation to planting, relocated barbeque area and edge conditions.

Access and Circulation Strategy at P.58

- All cycleways, footpaths and shared paths must be provided to a high quality, maximising amenity, safety and direct routes, particularly at road crossings. The City notes that if it will be maintaining these assets in the future this will be with reference to the City's guidelines.
- The Access and Circulation Strategy needs to reflect the Mitigation Plan. Accessible pedestrian links with Euston Road need to be re-established, with new entries also required to cater for new pedestrian access points at signalised intersections (see Mitigation Plan). The primary cycle route needs to be through the park rather than along Euston Road.

Figure 3.22 at P.58

- The "connectivity to the existing network" (p28) is diminished by the Campbell connection stopping at Unwins Bridge Road, a block short of the Marrickville bike network on Lord Street. To achieve real connectivity, it should continue to Lord Street across the rail bridge which is a recognisable constraint to people cycling.
- The draft UDLP indicates the WestConnex works include the extension of the Bourke Road cycle path from Gardeners Road to Church Street. There is a need to resolve apparent conflicts within the draft UDLP which shows the 'limit of works' at Gardeners Road. The cycleway must be connected to Church Street in line with previous commitments by WestConnex.
- The draft UDLP appears to omit the existing shared path on the northern side of Gardeners Road and this needs to be acknowledged on plans and retained.
- The UDLP must also show the bike crossing on Euston Road, across Sydney Park Road and into Huntley closure (to connect to the regional route on Belmont Street).

Public Open Space Strategy at P.59

- Figure 3.23 clearly shows the paucity of available open space that it is proposed will be provided within the St Peters Interchange locale, despite previous government promises for more open space. The City requests that these promises be upheld.
- Further, the draft UDLP seems to imply that the open water retention basins within the interchange will be of a similar quality and appearance as the Sydney Park wetlands. This is not the case and the images are misleading. Water retention should be contained using sub surface storage, maximising the available open space as required in the MCA.
- In the images Sydney Park is over vegetated and the draft UDLP fails to take into account the City Farm area and other existing park infrastructure.

Water Strategy at P.60

- Refer to comments above.

Urban Forest Strategy at P.61

- New plantings along Euston Road should be identified and included as part of the local road widening. Although this has been included in the draft UDLP under the Street Tree Strategy it is not included here.
- Street trees should be replaced along Euston Road (refer Mitigation Plan).
- The Urban Forest Strategy refers to the opportunity to achieve a tree canopy at the interchange, however the City has a number of concerns that the area's habitat and biodiversity needs are being overlooked. The vegetation programme is heavily focused on trees with little mention of ground and mid storey vegetation which is a key component of any 'urban forest', and vital to support the region's biodiversity and habitat needs. The City notes that this is outlined as one of Westconnex' landscape objectives, for example at P.54 under 'Design Approach' and Figure 3.26, at P.68.

Street Tree Strategy - Figure 3.26 at P.62

- The Street Tree Strategy needs to be amended to change the following species of trees:

    - *Melaleuca species* (Boulevard and verge) – the City requests that this be changed to another native species, as the *Melaleuca Quinquinervia* is susceptible to 'Myrtle Rust' and is now very hard to obtain, accordingly the City asks that a different genus be used. It is suggested a large Eucalypt or Angophora species with proven performance in this area be used instead. Note: the City will be reducing the level of *Melaleuca* plantings in future revisions of its Street Tree Master Plan.
    - *Eucalyptus racemosa* – this is not a species the City plants and should not be used in Barwon Park Road
    - *Lophostemon* – amend with reference to Barwon Park Road as per the City's Street Tree Master Plan.

Site memory at P.63

- The presence of Eastern Suburbs Banksia Scrub is missing from this section and must be included.

Path Treatments at P.64

- The City requests that the park treatments match and conform to existing Sydney Park path treatments (concrete paths with brick edging) and hierarchy. This will assist with reading the new open space areas as part of the broader park landscape.
- The City requests that all paths within Sydney Park are appropriately engineered for longevity, preferably concrete reinforced slab.

Figure 3.32 to 3.35 at P.64 to P.67

Path treatments would have a stronger relationship with Sydney Park to the north if the principal pathway (shared path type 2) was distinguished with a concrete pavement in preference to asphalt.

St Peters Interchange Concept Plan at P.69

- The Motorway Control Centres should be combined into a single facility with any parking provided underground in basement areas. This would increase the available publically accessible open space.
- Site water retention should be contained in sub surface storage, again maximising the available publically accessible open space.
- The City seeks clarification as to why the legend reference 08 is to a pedestrian only path up the spiral given that the Sydney Olympic Park spiral is popular with riders? The figure also conflicts with two further references in the document to a 'spiral shared path'.

Figures 3.44 – 3.50 at P.73 to P.78

- The City questions the scale and detail shown on the figures. The apparent figures show narrow and isolated pedestrian paths, bounded by dense planting - all pedestrian paths must be at least 3m wide, consistent with other shared paths and should be subject to CPTED assessments. Elsewhere, trees overhang motorway infrastructure.
- The plantings within the interchange should be reviewed to ensure they are realistic, taking into full consideration the expected growing conditions around a dense motorway environment in order not to create unrealistic public expectations of the 'urban forest' outcomes and the ability to achieve this.

Section 3.7 St Peters Local Road Upgrades

Existing Conditions at P.79

- The City questions the accuracy of the statements made including the assertion that Campbell Street / Campbell Road is bounded by low density residential. This is not the case.
- Sydney Park is acknowledged as 'a regionally significant open space' yet the project has failed to protect the park edges and comprehensively address this issue in the draft UDLP. For a description of the works required to ameliorate these issues, refer to the Mitigation Plan.

Design Approach at P.79

- The City questions the urban design vision presented. In particular, statements around the need for 'visual relief' for motorists are redundant as St Peters is an interchange and the only vehicles using the interchange and local roads are entering or leaving tunnels – there is no need for additional 'visual relief'. Similarly there is no need to make St Peters a 'landmark' to aide legibility. There is no opportunity for urban renewal; the level of residential demolition and blighting removes any future opportunity.
- The City welcomes the inclusion of the objective to incorporate large street tree plantings along Euston Road and requests that this detail be included in the final UDLP.
- The impact on the Campbell Road terraces is unacceptable and at odds with the stated design approach. The terraces are identified under 'Heritage Issues' and 'Sensitive Receivers' but these impacts are not addressed or mitigated in any way.
- The design approach refers to achieving an urban design vision that will 'link and extend the existing bicycle and pedestrian path systems into the adjacent areas...'. It also states that 'The design incorporates a series of footpaths, shared paths and cycleway that will increase connectivity for pedestrians and cyclists'.
- To ensure this vision is realised, Campbell Street must be connected to the Marrickville (now Inner West) bike network at Lord and Darley Streets by completing the connection across Bedwin Bridge.

Access and Circulation Strategy at P.82

- A cycle and pedestrian connection linking the extended Campbell Road to the Alexandra Canal shared path is required and must be shown as integral to the works.

Public open space strategy at P.83 / Green Link strategy, Minister for Planning's Condition of Approval B B62 (c) at P.86

- The Campbell Street 'green link' seeks to create an active transport connection (walking and cycling) between open spaces within a united and strongly green landscape corridor. A challenge for the design is the fact that the walking and cycling will be primarily on the northside, whereas the residual green space is primarily on the southside. The current design of the northside of the street does not achieve a continuity of character and landscape amenity for the walkers and riders. This needs to be strengthened.

Local Road Upgrades – Campbell Street / Campbell Road precinct strategy at P.87

- As per the City's earlier feedback on this issue, the street trees should be plated at the kerb edge, not closer to the property.

Parkland Edge at P. 87

- Refer to Mitigation Plan. Edge conditions will necessarily vary along the edge of local roads (low retaining wall, batters) as they are dependent on the immediate condition of the edge and should be designed to retain park trees and maximise usable park space and planting opportunities. Street trees to be located behind kerb along Euston Road.

Only a footpath is required, rather than shared path (in order to preserve sufficient space for trees)

- Figure 3.59 on page 87 shows how the poor location of trees and light poles, set too far back from the kerb, exposes pedestrians and bike riders to the street in all depicted conditions and exaggerates the scale of the road infrastructure. Trees and light poles should be kerbside, reducing the scale of the carriageway and creating a protected landscape corridor in which riding and walking can occur. This is a basic tenet of urban streetscape design and correcting this flaw will greatly improve the urban fit of the project in these local streets. Speed limits should be reduced to support this outcome.

Figure 3.63 at P.89 to Figure 3.68 at P.94

- The streetscape design should achieve a stronger green character to the north side where most of the walkers and riders will be. The overall scale of the road needs to be ameliorated through a strong tree planting design. The character and amenity of this route between parks must be improved to achieve the intent of a park-to-park recreation function. The key opportunities to improve this are:

    - Kerbside tree planting in a green verge to provide buffer between the road carriageway and pedestrians and bike riders.
    - Adjustment of lane configurations to allow greater exploitation of the central median planting opportunity to further break down the scale of the corridor and impart a landscape character across the section. As a strategy, additional lane provision that may only be required in the future should be preserved as the planted median and only adjusted later, if required
    - Significantly scaled trees through the selection of species, the sourcing of healthy stock and the investment in appropriate ground preparation for root establishment.

- Within the City's boundary, the linear park areas to the south have little recreation function in themselves, and have a smaller transit function than the more constrained road related areas on the northside. In light of this, more effort should be directed to making these parklands successful landscapes in terms of both scenic amenity and ecological complexity. The trees in turf depicted in the Campbell Road sub plan (p36), for example falls short of this. Ecological complexity could be achieved whilst maintaining strong visual sightlines where needed.

Figure 3.64 at P.90

- Hutchison Street intersection should be raised and set back, preferably 6m to create a bend out.

Figure 3.66 at P.92

- This drawing is incomplete as it does not show the land bridge or the St Peters intersection recreational area.
- Footpaths should be placed behind tree planted verges.
- The City recommends that the drawing be resubmitted with revised footpath and verge treatment.

Figure 3.67 at P.93

- A pedestrian crossing on the southern arm of the Campbell Road / Euston Road intersection must be provided in line with RMS guidelines and to ensure safety. Failure to provide for this crossing combined with a multi-stage crossing alternative will lead to non-compliant crossing behaviour, increasing the risk of serious accidents.

- The crossing arrangements on Burrows Road south should be replaced with a single stage crossing. The refuge island should be removed.
- There should be raised parallel bike and pedestrian crossings.
- The bicycle path north of Campbell Road lacks separation as it approaches and crosses Euston Road. This is inconvenient and unsafe. A redesign to provide a continuous separated path through the intersection is required.
- The pedestrian and bicycle path north of Campbell Road between Euston Road and Burrows Road deviates unnecessarily as it approaches and crosses Burrows Road. This is inconvenient and will encourage non-compliance at the crossing and is therefore not safe.
- The landscaped area north of Campbell Road between Euston Road and Burrows Road has no recreational purpose or function and is therefore wasteful in the inner city context. The cost of its maintenance is not balanced by the provision of a useful recreational space. The area requires redesign as a useful recreational space or should be disposed of for redevelopment.
- The City recommends that the:

    - design be refined to include more convenient and safer footpath and bicycle paths.
    - landscaped area north of Campbell Road between Euston Road and Burrows Road be redesigned as a useful recreational space or disposed of for redevelopment.

Figure 3.68 at P.94

- The draft UDLP is missing the important connection between the Campbell Road bridge cycleway and Alexandra Canal cycleway underneath (east side) and. WestConnex and RMS have previously committed to providing this connection and it must be included in the plans.
- The City is also concerned that there is no indication of the provision for a future link to the west side canal path. This is an important network feature that will help to increase connectivity.
- The retaining wall indicated in red is within the 10m setback. It must not interfere with the canal path on either side.
- The character established by the median planting to the west in Campbell Road should be continued in the eastern median.
- The draft UDLP fails to incorporate the City's feedback provided previously on the Alexandra Canal crossing at Campbell Road, particularly in relation to public amenity and safety of the culvert and the lack of pedestrian and bike connectivity with Campbell Road.
- The City recommends that:

    - The design be amended to include bicycle and foot paths linking to the future bicycle and footpaths along Alexandria Canal
    - Tree planting be added in the median to the east of the drawing.

Figure 3.7 at P. 95

- A very wide central median is shown on Campbell Road - its purpose it unclear. It should be reduced.

Local Road Upgrades – Euston Road Precinct Strategy at P. 98

- As per the City's earlier feedback on this issue, the street trees should be plated at the kerb edge, not closer to the property.

- The draft UDLP fails to incorporate the Sydney Park Mitigation Works required to address the extensive impacts to the Park's eastern edge, including new and adjusted entries, retaining walls, boundary landscape planting building adjustments and relocated park infrastructure.

Figures 3.79 to 3.83 at P.99 to P.103

- The City has earlier provided comments to WestConnex on Euston Road. WestConnex has confirmed that they intend to amend the concept plans for Euston Road to reflect the City's recommendations and the City awaits the amended plans and the opportunity to provide further comments.

Figure 3.81 at P.101

- All mid-block signals need to include bike lanterns.

Figure 3.82 and 3.84 at P.102 and P.104

- The left turn from Euston Road into Sydney Park Road should be incorporated into the intersection. The slip lane and island must be removed and a single stage pedestrian crossing provided to reach the Huntley closure and access the regional route at Belmont.
- The design of Sydney Park Road, including this intersection, should reflect the King Street Gateway design and the future downgrading of Sydney Park Road to a local street.
- Euston Road will not be a shared path, as it:
    - Is not a critical requirement to the City's cycling strategy
    - Duplicates an alternative and more amenable provision in Sydney Park which connects more directly to Mitchell Street.
    - Forces the City to accept a rejection of the street trees that are required to ameliorate the impact of an eight lane carriageway.
- Accordingly, in addition to the statement that the Sydney Park mitigation works have not been incorporated, the City notes that the shared path route diagrams included in the exhibition, for example at P.82, incorrectly depict Euston Road as a shared path route.
- The draft UDLP fails to incorporate the amendments to the Euston Road design that are required to mitigate the impacts on Sydney Park and ameliorate the scale of the road including:
    - Relocating the mid-block to meet park desire lines
    - Single phase crossings for pedestrian accessibility
    - Reduced no of lanes to provide landscape buffer to park edge
    - Inclusion for generous kerbside street trees
- Note that all four legs of Sydney Park Road / Euston Road intersection should have shared lanterns to allow families and children to ride to the park.

Figure 3.83 at P.103

- The impact on the unit developments at 93-103 and 125 Euston Road is unacceptable. This figure clearly demonstrates the poorly considered road widths which fail to 'tie-in' with Euston Road north of Maddox Street.

Figure 3.84 at P.104

- The road design is not coordinated with the changes to Sydney Park Road required as part of the King Street Gateway project. This requires fewer lanes and additional tree planting.

- The City recommends the drawings be amended:

    - So they are coordinated with the changes to Sydney Park Road required as part of the King Street Gateway project.
    - To include fewer lanes and additional tree planting.

Figure 3.86 at P.105

- In addition to urban fit issues, for accessibility purposes, light poles should not be located adjacent to the property line, in the accessible path of travel as depicted on page 105. These should be closely aligned with street tree planting, which should be offset from the kerb, not the property.

Figure 3.90 at P.107

- No bicycle path or footpath is shown linking to future bicycle paths and footpaths along Alexandra Canal.
- Footpaths are incorrectly shown interrupted by private driveways.
- The reference to gravel paving road treatment at the new Campbell Road Bridge needs further explanation. The City also requires clarification about ownership and maintenance of the bridge.
- The verge is incorrectly placed against the private property instead of between the footpath and roadway. The verges lack tree planting.
- The City recommends the drawings be amended to:

    - Include bicycle and footpaths connections to the future bicycle and footpaths along Alexandra Canal.
    - Show footpaths as continuous and separated from the roadway by tree planted verges.

Figure 3.91 at P.108

- The existing shared path on the north side of Gardeners Road needs to be shown.
- Footpaths are incorrectly shown interrupted by private driveways.
- The verge is incorrectly placed against the private property instead of between the footpath and roadway. The verges lack tree planting.
- The City recommends the drawings be amended to:

    - Include footpaths as continuous and separated from the roadway by tree planted verges.

Figure 3.92 at P.109

- The City requests confirmation that the cycleway crossing and bike lanterns are included.
- Footpaths are incorrectly shown interrupted by private driveways.
- The verge is incorrectly placed against the private property instead of between the footpath and roadway. The verges lack tree planting.
- The City recommends the drawings be amended to:

    - Include footpaths as continuous and separated from the roadway by tree planted verges.

Figure 3.93 at P.110

- Footpaths are incorrectly shown interrupted by private driveways.

- The verge is incorrectly placed against the private property instead of between the footpath and roadway. The verges lack tree planting.
- The City recommends the drawings be amended to:
    - Include footpaths as continuous and separated from the roadway by tree planted verges.

Figure 3.94 at P.111

- Bourke Street in Figure 3.94 is actually Bourke Road. The 'Bourke Road' label is misleading as it sits in the Campbell Street /Road intersection. The City supports the single stage intersection crossings on all intersection legs. All crossings at this intersection must include bike lanterns.
- The City requests that a shared path be created in the new Bunnings extension area to allow for people biking to Bunnings.
- The City also requests that the swept path kerb line be changed, eastbound to northbound, to protect the emerging cycleway.
- This intersection needs to be developed in greater detail to confirm its adequacy. The spatial allocations for both cyclists and pedestrians looks marginal and the management of the interaction between these two modes is unclear.

Figure 3.95 at P.112

- 'Limit of works' is indicated near Gardeners Road. It is the City's understanding that the separated cycleway along Bourke Road will be continued to Church Street.
- Footpaths are incorrectly shown interrupted by private driveways.
- The verge is incorrectly placed against the private property instead of between the footpath and roadway. The verges lack tree planting in some areas.
- The City recommends the drawings be revised to include footpaths as continuous and separated from the roadway by tree planted verges throughout.

Figure 3.97 at P.113

- The existing shared path on the northern (left) side is missing.

6.0 TUNNEL SERVICES BUILDINGS

Section 6.7 MOC5 Burrows Road Motorway Operations Complex

The design is for a suburban, not urban, context and it is inappropriate to its context and requires redesign.

The City recommends that the complex be redesigned to accord with its context by:
- Setting the trees in the verge between the kerb and the footpath on Burrrows Road;
- Forming the frontage with building elements not a fence;
- Providing a clearly visible pedestrian entry separated from the vehicle entry; and,
- Increasing transparency between the interior and the street.

Figure 6.54 at P.256
- The bike storage room should include racks.

7.0 BRIDGES

Section 7.4 St Peters Interchange

Figure 7.19 at P.255

- The figure incorrectly shows a 'future' shared path along the east side of Alexandra Canal. The path already exists alongside the canal wall, not set back as shown. The figure should correctly show the existing path and incorporate this in the design.
- The west side of the figure does not reference the future shared path alongside Alexandra Canal and enshrined in state government documents (such as the Alexandra Canal Masterplan 2001 and in Council DCPs)
- The lack of pedestrian and bike connection with the canal side corridor noted at Campbell Road crossing is also evident at Gardeners Road canal crossing where safe and accessible links to Gardeners Road and to Venice Street (east side) and Burrows Road (west side) should be established.

Section 7.4 St Peters Local Roads

Figure 7.22 at P.258

- The figure only shows box culverts with no measurements, for example width or head height, no splayed walls and no information on lighting. As previously stated the City requires a higher quality design.
- It is not accurate to refer to the 'future' shared path given its delivery is concurrent with WestConnex construction and is already in the planning phase. It should therefore be shown as existing or concurrent
- The City is concerned that there is no connection shown between the Campbell Road cycleway and the Alexandra Canal cycleway. It is imperative that this important link is included.
- As noted earlier, the culvert design is unacceptable. The Campbell Road Bridge should extend over the canal side active transport corridor, rather than the current culvert provision.
- At the Gardeners Road Bridge the depiction of the future eastern shared path in a sunken ditch is problematic and suggests a lack of head clearance in the design. This undermines the visual permeability of the corridor, and creates potential sightline safety issues. It also raises the question of flood vulnerability. The west side clearance is improved, although critical dimensions are not provided.
- The draft UDLP fails to incorporate the feedback provided previously on the Alexandra Canal crossing at Campbell Road, particularly in relation to public amenity and safety of the culvert and the lack of pedestrian and bike interchange with Campbell Road.
- There is no provision shown for a future connection with the canal path on the north/western side of the bridge. It is important that the draft UDLP show how the link will be achieved in the future.
- This section and plan shows clearly the opportunity to establish an interchange with the Alexandra Canal future pathways, Campbell Street, Burrows Road etc.

Figure 7.23 at P.259

- The image appears to show a 2m footpath plus a 3m cycleway across the bridge, which is inconsistent with the text on P.257 which refers to a 3m shared path. This must be clarified. In accordance with state government policy the path should be separated.

8.0 RETAINING WALLS

Section 8.7 St Peters Local Road Upgrades

The draft UDLP refers to a range of retaining wall types throughout the St Peters Local Roads area. The City seeks clarification about:

- Ownership and maintenance of the new retaining walls.
- Design life noting a 100-year design life ensures low future maintenance.
- The recycled brick to be used for the retaining wall construction and/or cladding may not be suitable to ensure a 100-year design life with low future maintenance.

Figure 8.36 at P.299

- The extent of soils for these raised planters needs further investigation and information from the WestConnex nominated specialised soils scientist (Sydney Environmental and Soil Laboratory) to ensure that the trees and plants are able to mature into quality healthy trees.

10.0 LANDSCAPE DESIGN

There are numerous references to works being carried out to RMS specifications, however it is not clear what these specifications are. The works should as a minimum be in accordance with the relevant Australian Standard e.g. AS2303 for tree supply, and this document should advise if there are any departures from this expected level of quality.

The City also wishes to emphasise that Sydney Park is a notifiable site. Accordingly, any works must give consideration to environmental/contamination conditions in the park, particularly from landfill gas which has had recent exceedances. Any environmental monitoring requirements or infrastructure (bore holes, capping etc.) must be retained or reinstated.

The City will need further information from the City's soils scientist to confirm that the trees and plants will be growing in sufficient soils (in terms of both volume and quality) as set out in the draft UDLP to allow the specified plants and trees to thrive on the site. This is particularly vital in Sydney Park where a capping layer is required which hinders large tree growth. There are many examples of failed or poor landscape outcomes resulting from similar works (such as the Eastern Distributor).

Planting strategy and plant selection at P.314

- Habitat planting is required with the aim of creating wildlife corridors. This links to the City's Urban Ecology Strategic Action Plan and Bush Restoration Management Plan.
- In terms of remediation it must be fit for use as publically accessible open space. Clearance from the site auditor required.

Section 10.8 St Peters Local Road Upgrades

Landscape planting typologies - Figure 10.29 at P.340

- This set of plans depicts parallel parking. Elsewhere in the document it is shown as 90 degree parking. Given the limited parking in the precinct and the potential use of the St Peters Recreation Area for group sports recreation, the additional parking provided through a more compact format would be valuable.

Landscape Works at P.348

- Reference is made to offsets for tree location based on road speed. The City notes this is not applied now, with many street trees (and light poles) installed along roads of 60km per hour. If offsets are required alongside roads with a 60km/h limit then road speed limits should be reduced to provide for planting appropriate to the urban setting and adjacent park, residential and commercial land uses.
- The approach to offsets is also inconsistent as demonstrated by the the very narrow footpath retained alongside the western kerb of Euston Road between Sydney Park Road and Maddox Street. This suggests offsets are not critical.

Vines and accent planting at P.355
Bio-retention area planting / Shrub Planting / Turf areas at P.356

- The City considers the ground and mid storey species palette list is very limited and contains a mix of non-indigenous plants. The City is not persuaded that this will provide good biodiversity or habitat outcomes.
- The City recommends increasing diversity by including a minimum of 40 locally indigenous mid storey shrub species and 20 locally indigenous grass, vine and groundcover species targeting habitat outcomes in addition to the identified species that are hardy and resilient to these landscapes.

- The attached species list (appendices Ei-iii) includes:
    - o those species which work well in new landscapes
    - o original vegetation communities within the local area
    - o communities with species that may suit the site e.g. littoral rainforest to provide habitat for small, migratory rainforest species.

Figure 10.49 at P.359

- The tree planting spaces need to be increased, as many of the 'group plantings' are too close and will fail. For example *Syncarpia* are large canopy trees and need greater spacing than 3 to 4 metres as shown (it should be 10m). Similarly with the *Tuckeroo* which require 10m centres as a minimum.

12.0 OPERATIONAL LIGHTING

Section 12.1 Street Lighting

The City requires that street lighting meet the relevant Australian Standards as ascribed in the City's Street Lighting Code. In addition, for shared paths and separated cycleways, the City requires that lighting meet the P2 standard.

CAMPBELL STREET GREEN LINK SUB-PLAN

P.1 Typo "additional on street parking between St Peters and Church Streets" - latter should be Florence.

Green Link must connect to Marrickville (now Inner West) bike network on Lord/Darley, over Bedwin Bridge.

P.10 Shows the 'realignment and widening of Bedwin Road...'. Accordingly, Bedwin Road must include bike access, with at least a 3m shared path, to connect up to the Inner West's bike network as stipulated in the 'design approach'.

P.15 Must link over Bedwin Road all the way to Lord/Darley.

P.28/43 'Limit of works' excluding Bedwin Road conflicts with the information on P.10.

P.45 Hutchison intersection should "bend out" (using some of the excess central median space) for 6m or RMS may not approve the design, based on our experience. Needs 'Give Way' markings and signs for cars and continuation of cycleway markings across intersection.

P.47 The sub-plan does not appear to reflect the King Street Gateway proposal and should.
The N/E kerb needs to be reconfigured to continue cycleway, along with a separator all the way to the intersection. The Swept path for southbound left turners can use the other three lanes to turn into.

P.48 Crown Street needs 'Give Way' markings and signage for cars

P.49 Barwon Park Road needs 'Give Way' markings and signage for cars

P.51 Harber Street needs 'Give Way' markings and signage for cars

The City is not persuaded that Euston Road needs a two stage crossing and seeks confirmation that bike lanterns are included.

P.52 Burrows Road crossing needs parallel bike crossing on raised platform and give way markings and signage.

Appendix A: Submission on the Detailed Design Package

CITY OF SYDNEY

Submission on the Detailed Design Package

WestConnex Stage 2 New M5 works surrounding the St Peters Interchange including Campbell Road and Euston Road

city of villages

City of Sydney Submission on the Detailed Design Package WestConnex Stage 2 New M5 works surrounding the St Peters Interchange including Campbell Road and Euston Road

20 January 2017

Introduction

This submission relates to drawing packages transmitted on 15 December 2016:

- M5N-AJV-DPK-700-300-RD-7005 (7.10.2016)
- M5N-AJV-DPK-700-300-RD-7000/7020/7085 (18.11.2016)
- M5N-HSL-DPK-700-800-UD-7400 (9.9.2016)
- RW-700-01 TO RW-700-06 (14.10.16)

The City of Sydney has reviewed the WestConnex Stage 2 New M5 Substantial Detailed Design Package (the Design Package). A Summary of the City's review is:

- the design is not consistent with the WestConnex New M5 consent conditions
- it is unclear and poorly drafted
- the design lacks the quality required to ensure consistency with the creation of new streets in the City of Sydney
- a further review of the next iteration of the Design Package following changes to the documents is required before it is finalised.

If the City's recommendations are not incorporated into the Design Package, there will be significant negative impacts on the amenity value of Sydney Park. The City is developing a mitigation plan that responds to the current Design Package that sets out the scale of mitigation measures the City would be seeking if the current Design Package were to be adopted.

Conditions of consent

The City notes that the detailed design is **not consistent** with the following WestConnex New M5 consent conditions:

- **B.47** *To improve pedestrian and cycle accessibility, road lane widths, associated medians and intersection geometry are to be minimised, where feasible and reasonable, without compromising safety.*
    - To satisfy this condition a range of measures are required including and not restricted to: reducing lane widths; deleting medians; revising intersection geometry; and locating verges between the footpaths and roadway

- **B.63** *The SSI must be designed to retain as many trees as possible… consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services*
    - To satisfy this condition a range of measures are required including and not restricted to: reducing lane widths; deleting medians; and revising intersection geometry

- **B.44** *… facilitate integration of …. the King Street Gateway Project…*
    - To satisfy this condition the number of lanes in Sydney Park Road needs to be reduced to account for the reduced number of lanes in Sydney Park Road west of Mitchell Road.

- **B. 50** *The Proponent must undertake a Pedestrian and Cycleway Network Review. ... The Review must be undertaken in consultation with the relevant councils and address*

the matters raised during consultation. The Review must identify (and consider) … (b) pedestrian and cycle impacts associated with the project

- We have provided a sketch of the City's preferred future arrangement of the Cycle Network to be integrated into the detail design. In addition in several areas the detailed design of cycle paths requires redesign to be considered safe and convenient.

- **B. 28** *A Water Quality Plan and Monitoring Program must … be developed in consultation … relevant councils, and must include, … Water Sensitive Urban Design measures*

  The Water Sensitive Urban Design measures shown are not clear.

Next steps

Following a **substantial revision** of the Design Package, the City notes that this work **must be reviewed** by the WestConnex New M5 Urban Design Review Panel.

In addition, and consistent with the requirement that WestConnex consult with the City, the City recommends a workshop be held with City of Sydney staff and the project's design consultant as the most efficient way to discuss our required revisions.

Set out below are the City's initial comments; further comments will be provided in relation to vertical design, sections and details as the review of the Design Packages continues.

The commentary applies to all packages of information. Also refer to Table 1 to cross reference these comments in relation to specific parts of the network and intersections.

Note: no comment or recommendation in this submission is to be interpreted as allowing ANY encroachment into the lands of Sydney Park prior to the WestConnex project or removal of trees in or adjoining Sydney Park.

Any requirement to widen roads around Sydney Park is to be to the opposite side of the park.

List of Requirements

Requirement 1.
Improve safety for all road users by implementing a self-explaining road environment with narrower lane widths (kerbside traffic lanes at 3.5m width and other traffic lanes at 3m)

> WestConnex New M5 Consent Condition B.47 To improve pedestrian and cycle accessibility, road lane widths, associated medians and intersection geometry are to be minimised, where feasible and reasonable, without compromising safety.

Explanation

Better design will create a self-explaining 60km/hr environment using narrower traffic lanes than proposed. In the locations around Sydney Park and on Gardener's Road use narrower traffic lanes.

Adopt kerbside traffic lanes at 3.5m width and other traffic lanes at 3m. This is consistent with some areas proposed on Campbell Road (See RD-7052 Section 4 CH 950).

> Note: This is a moderate proposal. There are numerous locations on State Roads where narrower traffic lanes have been used. Use of narrower traffic lanes will tend to reduce vehicle speeds and increase road safety.

Requirement 2.
Increase pedestrian amenity and safety

> Consistent with WestConnex New M5 Consent Condition B. 50 The Proponent must undertake a Pedestrian and Cycleway Network Review. ... The Review must be undertaken in consultation with the relevant councils and address the matters raised during consultation. The Review must identify (and consider) … (b) pedestrian and cycle impacts associated with the project

Explanation

Requirement 2.1
Implement 1.5m wide kerbside verges to increase safety and amenity for cyclists and pedestrians and to accommodate signage, street furniture and trees.

Kerbside verges provide a safety and amenity buffer for pedestrians and cyclists from kerbside traffic lanes. They create locations for traffic signage, lighting and kerb ramps without impacting on clear footpath widths.

The minimum protected footpath width is to be 2m. Where a kerbside verge is not provided the footpath width is to increase to 3.5m.

Typical sections are shown at Figure 1 and 2 below.

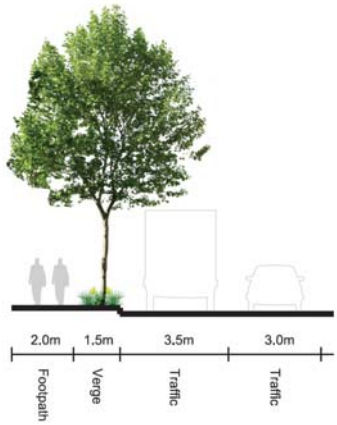


Figure 1. Typical footpath and verge arrangement

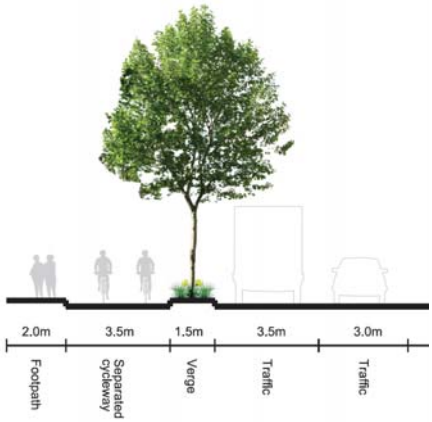


Figure 2. Typical footpath, separated bi-directional cycleway and verge arrangement

> Note: projection of wing mirrors is limited to 250mm (or 230mm) beyond the 2.5m maximum body dimension of the vehicle (TfNSW, Vehicle standards information 2012, REV 5).

The footpath is to be aligned to the outer edge of the road reservation against the property line. Small areas of planted verge are not be created between the footpath and the property line. Extra space for planting is to be consolidated with the kerbside verge.

Requirement 2.2
Provide street trees in all kerbside verges and underground overhead power etc.

Kerbside street trees provide a safety and amenity buffer for pedestrians and cyclists from kerbside traffic lanes including from wing mirror strikes.

Kerbside street trees moderate traffic speeds increasing safety for all road users.

Designing to allow an adequate verge width and appropriate street tree location and species is important to avoid wing mirror strikes and limb drop.

Where the kerbside verge is not sufficiently wide for a street tree, diverse amenity planting is to be provided as a buffer between the footpath and the kerbside traffic lane.

> Note: All overhead power etc. is to be undergrounded to avoid conflict with trees.

Requirement 2.3
Tighten kerb geometry at intersections

Reduce kerb radii to improve safety at intersections. Smaller kerb radii reduce pedestrian crossing distances, vehicle turning speeds and increase pedestrian visibility at intersections.

Where a single turning lane is turning to more than one receiving lane the design vehicle swept path is to assume turning to the centre receiving lane and low turning speed to define tighter kerb geometry.

Requirement 2.4
Improve pedestrian crossing alignment and waiting areas

The design of pedestrian crossings should be improved and coordinated with tightening of kerb geometry.

Crossings should be designed to allow adequate space for pedestrians to wait for green on one leg while pedestrians (and cyclists) pass with safe buffer distance on the other leg.

Kerb ramps must be located to closely align with the footpath in the direction of travel and minimise crossing distance. Kerb ramps and pedestrian crossing zones should be widened in some areas so that pedestrians can choose between a more direct path and a shorter crossing distance.

Pedestrian footpaths must be direct. Footpaths must not meander or divert pedestrians from taking a direct route to their destination particularly to intersection crossing points.

Requirement 2.5
Continue footpaths across all vehicular entries to private land

Footpaths and cycle ways must be continuous across vehicular entry points to private land. Kerbs should not return, creating pedestrian crossing points. Continuous footpaths clearly communicate that pedestrians have right of way creating a safer environment for more vulnerable road users.

Driveways are to be constructed with the same surface treatment as adjacent footpaths

Requirement 2.6
Add pedestrian crossings

Where intersections are signalised all legs of the intersection must have pedestrian crossing facilities.

A pedestrian crossing at Campbell Street must be provided at the intersection with Burrows Road.

Add central Euston Road mid-block signalised crossings to align with major entry point to Sydney Park. Refer to *Sydney Park Impact Mitigation Plan* for detailed discussion.

Requirement 2.7
Design signalised pedestrian crossings to allow crossing in a single phase/movement

Remove pedestrian crossing islands at intersections (except at Campbell and Princes; and Campbell and Euston).

Slip lanes encourage vehicles to take turns at higher speeds in spite of pedestrian crossing arrangements which create a significant safety risk for pedestrians.

Requiring pedestrians to wait to cross on an island is uncomfortable, feels unsafe and requires a two stage crossing which creates delay and reduced pedestrian level of service.

Ensure signalised crossings have adequate green time so as not to require two stage crossing with refuge on a median.

Requirement 2.8
Design minor intersections with raised marked pedestrian crossings and footpath continuations

Increase pedestrian priority and safety at minor intersections by designing them with raised marked pedestrian crossings or footpath continuations.

Requirement 2.9
Show street furniture including seats, bus shelters and bubblers

Provide pedestrian amenities and space for them on streets including seats, bus shelters and bubblers. Consult closely with the City of Sydney to determine locations and use the City of Sydney furniture suite.

Requirement 2.10
Implement Water Sensitive Urban Design measures and diverse planting

> Consistent with the WestConnex New M5 consent condition Water Quality Plan and Monitoring Program B. 28 A Water Quality Plan and Monitoring Program must … be developed in consultation … relevant councils, and must include, … Water Sensitive Urban Design measures

Water Sensitive Urban Design measures should be included in the street design package, consult closely with the City of Sydney in relation to type, location and design.

Replace all turf within the road reservations with diverse amenity and habitat planting.

The detailed planting plan is to be resolved in accordance with the Urban Ecology Strategic Action Plan and the biodiversity targets outlined for Sydney Park in consultation with the City's Urban Ecology Coordinator. This will ensure that the planting schedule outlines appropriate species and a well-considered planting approach. For example, in relation to how plants are planted i.e. diversity per m^2 and numbers per m^2.

The following comments relate to species selection and planting density:

- Trees: keep to 75L sizing and ensure that they are consistent with the street tree master plan
- Remove Casuarina glauca as it suckers and suppresses grow under it.
- Shrubs: Remove Allocasuarina torulosa, Allocasurina littoralis, Elaeocarpus reticulatus, Melaleuca hypericifolia. More diversity is required. A minimum of 20 additional locally native species are required to meet biodiversity outcomes.
- Native grasses: Remove Lomandra hystrix and Pennisetum alopecuroides. Minimum grass diversity is to include minimum 12 species of locally native grasses.
- Vines and accent planting: Remove Dietes bicolor and Ficus pumila 'minima'. More diversity is to be provided with a focus on locally native species.

- Bioretention area planting: a minimum of 9 species is required. Remove Shoenoplectus validus (requires wet soils – not suitable for bioretention planting). Increase planting to 10 plants/m^2. Where the depth of the filter media is sufficient include shrubs.

Requirement 3.
Provide cycleway network continuity and safety

Consistent with the WestConnex New M5 consent condition B. 50 The Proponent must undertake a Pedestrian and Cycleway Network Revíew.

Explanation

Requirement 3.1
Provide missing links to the cycleway network

Provide cycle facilities as shown on Figure 3.

Figure 3. Cycleway network map

The network is to be provided as follows at a minimum:

Campbell Rd
North side bi-directional separated cycleway width 3.5m with minimum 1.0m buffer.

Princes Hwy/King Street
East side bi-directional separated cycleway width 3.5m with minimum 1.0m buffer.

Alexandria Canal
East and West sides shared path cycleway width 4.0-4.5m clear (see note below) with 2.7m vertical clearance.

Gardeners Rd
Minimum provision shared path on north side width 4.0m clear and minimum 1.0m buffer.
Preferred north side separated bi-directional cycleway 3.5m with minimum 1.0m buffer.

Maddox St
North side bi-directional separated cycleway width 2.4m with minimum 0.4-1.0m buffer.

Requirement 3.2
Provide cycle and pedestrian access to and along the Alexandria Canal

Provide shared cycle and pedestrian access along both sides of the Alexandria canal, and safe and comfortable access to the canal from nearby streets and new bridges.

Provide canal access under both bridges with a minimum width of 4.0m clear open to the canal, or 4.5m if it is enclosed on both sides, and a minimum height of 2.7m clear of all obstructions including lighting and signage that must be provided.

4.0m wide direct (straight) shared path access to the canal is to be provided from the north side of the extension of Campbell Road on east and west sides of the bridge, and from the north side of the extension of Gardeners Road and over the new bridge there and from Burrows Road adjacent to it.

Requirement 3.3
Provide separated cycleway continuity at intersections

Design intersections affecting the separated cycleway network in accordance with *NSW Bicycle Guidelines* (pp42-) including bend-ins/outs where appropriate.

Include sufficient pedestrian waiting space at intersections between lights and cycleway.

Requirement 4. Improve the design quality of streets

Explanation

Requirement 4.1
Provide a central median including substantial street tree planting along the full length of the extended Campbell Street

Provide a 3.0m-5.0m wide central median and substantial street tree planting for the full length of Campbell Street utilising excess land on the south side of the existing road reservation (refer to Figure 4).

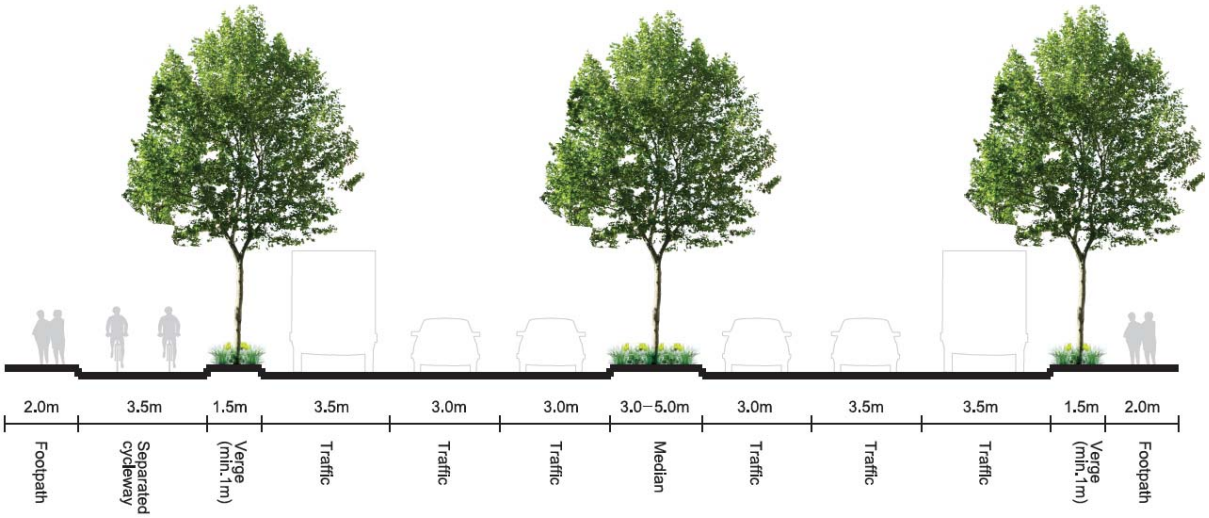


Figure 4. Campbell Road Cross Section

Requirement 4.2
Provide retaining walls not batters and avoid level changes within footpaths

Where retaining is required (particularly at Sydney Park) use retaining walls to minimise disruption to existing trees and maximise usable space.

Avoid the need to have level changes within footpaths.

Requirement 4.3
Provide a tree planting species overlay that increases canopy cover and provides shade for pedestrians and reduces the urban heat island effect

Provide substantial street trees that will provide shade to pedestrians and shade the road surface.

Requirement 5.
Use urban land efficiently for transport, useful open space and productive uses

> Consistent with the WestConnex New M5 consent condition B. 61 Prior to commencement of permanent built surface works and/or landscaping, …an Urban Design and Landscape Plan (UDLP) must be prepared … ín consultation with the relevant council

Explanation

Requirement 5.1
Develop excess land (particularly along the full length of Campbell Street, especially between Euston and Burrows Roads) for productive purposes

Land not required for road and associated pedestrian and cycle infrastructure and street trees must accommodate either community facilities, extend existing parks or be offered for sale.

This land is valuable and must not be used for low quality landscape zones with little productive value.

Design areas used for swales to minimise their footprint while achieving water quality targets.

Requirement 5.2
Remove minor parallel local parking streets

Additional parking is not required within the walking catchment of St Peters station. Remove the parallel local streets and associated parking (REF 7104 and 7106).

Requirement 6.
Reduce the kerb to kerb dimension of Euston Road adjacent to Sydney Park and return excess space to the park and reduce tree loss

> Consistent with the WestConnex New M5 consent conditions
> B.47 To improve pedestrian and cycle accessibility, road lane widths, associated medians and intersection geometry are to be minimised, where feasible and reasonable, without compromising safety, and
> B.63 The SSI must be designed to retain as many trees as possible… consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services

Explanation

Euston Road is shown with wide traffic lanes, a moderately wide median and a central reservation for future right turn lanes.

Drawing M5N-AJV-DWG-700-300-RD-8051 Section 2 shows a dimension of the six lanes at 25m kerb to kerb. Footpaths are shown at 3m and 3.5m giving an overall road reservation of 31.5m

Reservation for future right turn lanes to roadways not currently planned are not required. The five properties on the east side of Euston Road do not require northbound entry from Euston Road or northbound exit. The limited traffic they generate can circulate out via Burrows Road via a left in left out arrangement.

A better design is to create a self-explaining 60km/hr environment with kerbside traffic lanes at 3.5m and other traffic lanes at 3m and a 0.5m centre (median) barrier for a total width of 19.5m kerb to kerb. The footpaths are to be designed at 2m wide with a 1.5m kerbside verge on both sides of the road including lighting, street trees, road signage etc. clear of the footpath.

This arrangement is shown at Figure 5.

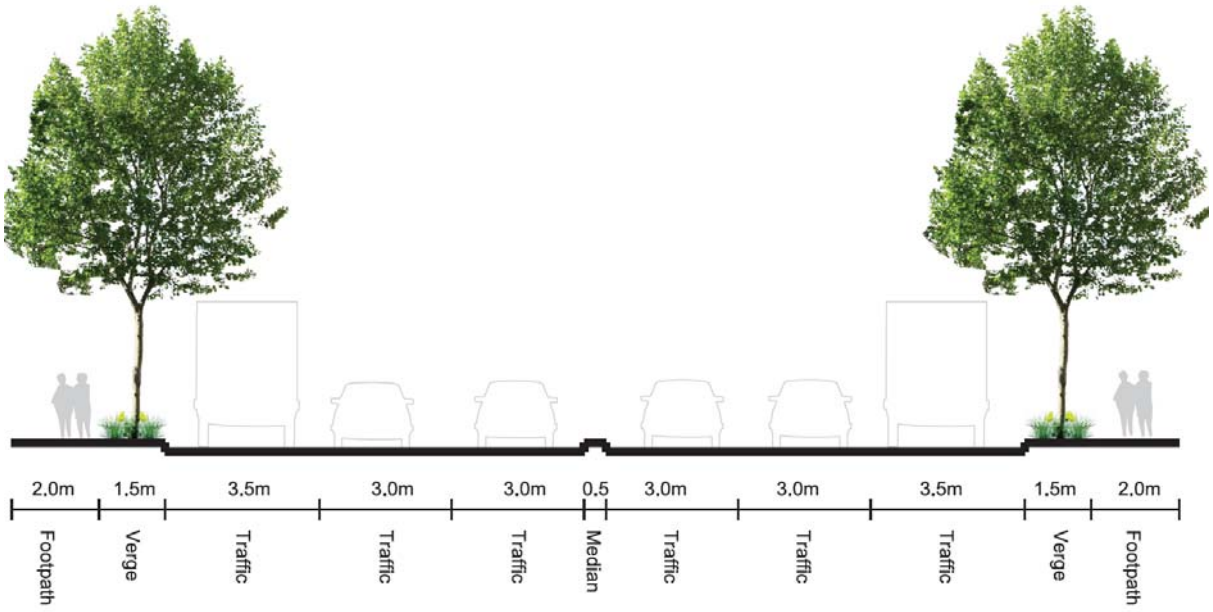


Figure 5. Euston Road Cross Section

This will result in a total road reservation of 26.5m or **a reduction of 5m** (4m at intersections). This land must be returned to Sydney Park.

Requirement 7.
Reduce the width and number of traffic lanes on Sydney Park Road and Huntley Street consistent with the directions of the King Street Gateway project

> Consistent with the WestConnex New M5 consent condition B.44 Consultation with the relevant council(s) must be undertaken during detailed design of the SSI to facilitate integration of …. the King Street Gateway Project…

See Figure 6. for lane configuration.

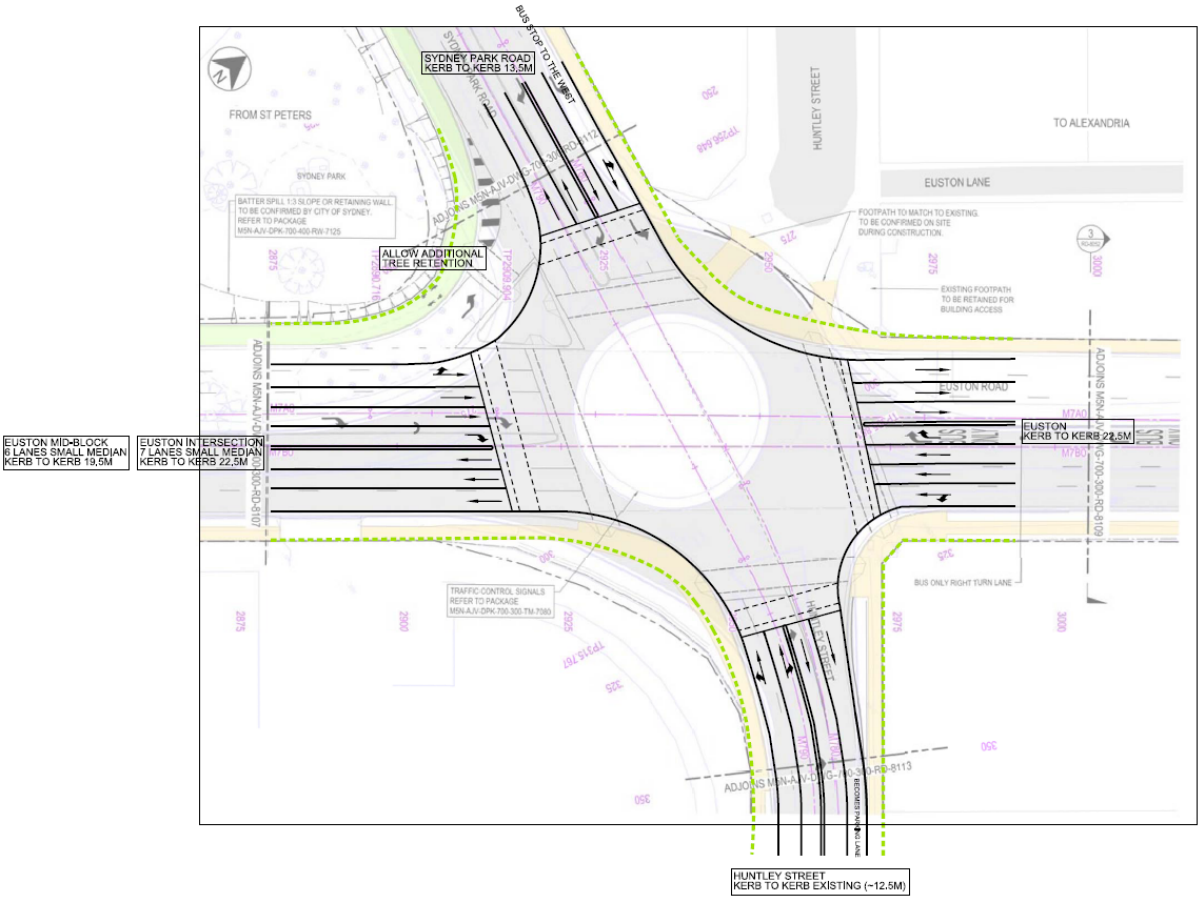


Figure 6. Euston and Sydney Park Roads intersection arrangement

Requirement 8.
Improve the pedestrian and cyclist facility design at the intersection of Bourke and Campbell Streets

Explanation

Improve footpath and cycleway alignments and reduce conflict points at the intersection of Bourke and Campbell roads. Detailed consultation with the City is required to improve the arrangement of this intersection.

Implement bi-directional separated cycleway on the north side of Campbell Road (including on the bridge) with buffer west of the Bourke Road intersection.

Ensure that the Bourke Road cycleway remains separated to and at the intersection. The fully separated Bourke Road cycleway is to be consistently located between the footpath and the kerbside traffic lane (including through the intersection), not as shown on the south side.

Pedestrian crossings are to be widened so that footpaths align with the crossing.

A better design would include large feature trees (eg. fig) centred in the NE and NW triangles with under storey amenity planting. Kerbside verges and street trees are to be provided on all approaches on all sides.

Provide median street trees on Campbell.

Allow 3.0m wide clear shared pedestrian and cycle access to the canal (on the north side of Campbell Road is preferred).

Requirement 9.
Make changes relating to specific sheets in the UD drawing series

7105-7
- Provide a 1.2m wide footpath on the southern side of Campbell Road as a refuge for breakdowns

7105-8
- Provide an offset double row of trees on both sides of Campbell Road. On the north side the trees are to be either side of the cycleway (ie. In the expanded kerbside verge and in the swale between cycleway and footpath)

7109
- Improvements to the verge, cycleway and footpath at the NE corner of the intersection are to be achieved by narrowing traffic lanes and moving the intersection south so as not to affect Sydney Park.

7110-12
- Show 3.0m wide straight shared path access to the canal on north side of Campbell Road
- Show 4.5m wide shared path on both sides of the canal
- Design planting either side of Campbell Road to CPTED principles (keep large plants back from shared paths to and along the canal)
- Show separated bi-directional cycleway on north side of Campbell Road

7206-7
- Check retaining wall to Sydney Park Restoration Plan

7208
- Design NE footpath in consultation with the City

7208-10
- Euston Road north of Sydney Park Road - reduce lane widths and create kerbside verges with street trees both sides
- Move 2.0m min footpaths to property boundary and consolidate verges to kerbside
- (7211 and 7212 similar for Sydney Park Road unless putting space into Sydney Park will save existing trees in which case consolidate extra space into Sydney Park)
- (7213 similar for Huntley Street both sides)

7301, 7316
- Create safe pedestrian/cyclist crossing of Gardeners Road
- Treat access to private land as a driveway crossing of footpath
- Allow 3.0m wide clear shared pedestrian and cycle access to the canal on the north side of Gardeners Road
- Allow pedestrian and cycle facility on the bridge and ramps and stairs to access the west side of the canal and to Burrows Road
- Provide additional detail on the operation of the swale
- Provide level 2.0m clear width footpaths to both sides of Venice Street
- Dispose of excess land for productive purposes

7301, 7308
- Provide level 2.0m clear width footpaths to both sides of Venice Street at property boundary
- Provide level kerbside verges with street tree planting

7301-7
- Provide a 4.0m clear width shared path on the north side of Gardeners Road
- Narrow traffic lanes to provide kerbside verges and street trees both sides
- Align the footpath to the property boundary and consolidate planting to the kerbside verge

7303
- Delete slip lane and align footpath directly to pedestrian crossing

7305
- Remove centre medians and put space into footpath and kerbside verges
- Widen pedestrian crossings to align with path of travel

7309
- Consolidate verges kerbside and provide street trees

7311
- Refer to detailed comment 8

7312, 7315
- Footpaths are to be continuous across the adjacent access points to private properties – may need to be marked with a zebra crossing to reinforce pedestrian priority
- Implement kerbside verges and street trees

7313-14
- Implement kerbside verge and street trees and footpath to be level – may require retaining at the property boundary

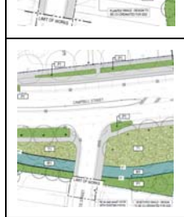
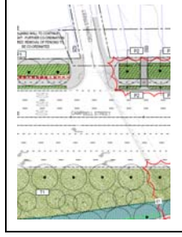
7314
- Move Bourke Street centre line east to allow kerbside street tree planting on the east side of Bourke Street

7315
- Implement kerbside verge and street trees – note this is the arrangement further north this design will not tie in

Attachment - Table 1:

Comments relating to intersections and typical street conditions
(sheet references relate to drawing package M5N-HSL-DPK-700-800-UD-7400 Rev 9.9.2016)

Table 1. Comments relating to intersections and typical street conditions (sheet references relate to drawing package M5N-HSL-DPK-700-800-UD-7400 Rev 9.9.2016)

Urban design drawings SMC/Westconnex dated 9/9/16 (north varies)	*Typical section/ Intersection*	*Comment*																	*Additional comments*
		1 Lane widths	*2.1 Kerbside verge & footpath*	*2.2 Kerbside street trees*	*2.3 Kerb geometry*	*2.4 Footpath alignments*	*2.5 Continuous footpaths (private Ind)*	*2.6 Add Ped Crossings*	*2.7 Single phase crossing*	*2.8 Minor intersection*	*2.9 Street Furniture*	*2.10 WSUD*	*3.1 Cycleway network and widths*	*3.2 Alexandria Canal*	*3.3 Cycleway intersection design*	*4.1 Central median*	*4.2 Retaining walls*	*5.1 Excess land*	*5.2 Parking streets*	
	Typical condition Campbell St between Princes Hwy and May St	X	X	X							X	X	X			X	X	X	X	Ensure no level changes within footpath Street trees between parallel parking bays Increase the width of kerbside verge
	Intersection of Campbell St and May St (REF 7102)	X	X	X	X				X		X	X	X		X	X		X		Dispose of excess land at NE and SW
	Intersection of Campbell St and Brown St and Campbell St and Hutchinson St (REF 7103)	X	X	X	X					X Hutch's on	X	X	X		X	X		X		Continuous footpath on Hutchinson St
	Intersection of Campbell St and Florence St (REF 7103)	X		X	X			X		X	X	X				X		X		Add kerb ramps to allow pedestrians to cross Campbell
	Intersection of Campbell St and St Peters St and Church St (REF 7104)	X		X	X	X		X		X Church	X	X	X		X	X	X	X	X	Add ped crossing to west leg Reduce St Peters to single lane each way
	Intersection of Campbell St and Princes Highway incl Albert St (REF 7105)	X	X	X	X					X Albert	X	X	X		X	X		X		
	Typical condition Campbell Rd between Princes Hwy and Gardeners Rd	X	X	X							X	X	X			X		X		
	Intersection of Campbell St and Crown St (REF 7106)	X	X	X		X				X	X	X	X		X	X		X		

Urban design drawings SMC/Westconnex dated 9/9/16 (north varies)	*Typical section/ Intersection*	*Comment*																	*Additional comments*
		1 Lane widths	*2.1 Kerbside verge & footpath*	*2.2 Kerbside street trees*	*2.3 Kerb geometry*	*2.4 Footpath alignments*	*2.5 Continuous footpaths (private Ind)*	*2.6 Add Ped Crossings*	*2.7 Single phase crossing*	*2.8 Minor intersection*	*2.9 Street Furniture*	*2.10 WSUD*	*3.1 Cycleway network and widths*	*3.2 Alexandria Canal*	*3.3 Cycleway intersection design*	*4.1 Central median*	*4.2 Retaining walls*	*5.1 Excess land*	*5.2 Parking streets*	
	Intersections of Campbell St Barwon Park Rd and Unnamed St (REF 7107)	X	X	X	X	X		X	X	X Unnamed	X	X	X		X	X		X		Support half closure of Barwon Park Road Remove median from unnamed street Add pedestrian crossing to western leg TCS plan not received
	Intersection of Campbell St and Euston Rd and Harber St (REF 7109)	X	X	X	X					X Harber	X	X	X		X	X		X		Pedestrian safety is a concern due to the width of the crossings Inconsistent drawings: • ED-7109 shows 2 medians while UD-7109 is shows 1 median on Campbell Street to the east of Euston Road • ED-7109 indicates missing leg at the intersection while UD-7109 shows all the four legs TCS plan not received
	Intersection of Campbell St and Burrows Rd (REF 7110)	X	X	X	X	X		X E+W legs	X		X	X	X	X access	X	X		X		Inconsistent drawings Provide access to canal Delete islands Signalise to allow vehicles N-S If the intersection is signalised the pedestrian crossings (not shown here) are too close to the signals
	Intersection of Campbell St (bridge) and Alexandria Canal (REF 7111)	X									X	X	X	X clearances						Allow access clearances under the bridge at and to the canal Provide separated cycleway and buffer on north side of bridge
	Intersection of Campbell St and unnamed street (REF 7112)	X	X	X	X		X	X east leg			X	X	X	X access	X	X	X	X		Provide access to canal Ensure walls are designed to allow access to the canal Provide missing leg on intersection
	Mid-block crossing of Euston Rd (REF 7202)	X	X	X		X			X		X	X	X			X refer to #6		X		Align crossing to park entry Delete median Provide single phase crossing Return excess land to park Delete fencing
	Typical mid-block Euston Rd	X	X	X				X mid-block	X		X	X	X			X refer to #6		X		**Refer to detailed comment 6** Delete future turn lane Reduce median Reduce lane widths Return excess land to park Introduce additional mid-block crossing to align with major park entry Delete fencing

Urban design drawings SMC/Westconnex dated 9/9/16 (north varies)	*Typical section/ Intersection*	*Comment*																	*Additional comments*
		1 Lane widths	*2.1 Kerbside verge & footpath*	*2.2 Kerbside street trees*	*2.3 Kerb geometry*	*2.4 Footpath alignments*	*2.5 Continuous footpaths (private Ind)*	*2.6 Add Ped Crossings*	*2.7 Single phase crossing*	*2.8 Minor intersection*	*2.9 Street Furniture*	*2.10 WSUD*	*3.1 Cycleway network and widths*	*3.2 Alexandria Canal*	*3.3 Cycleway intersection design*	*4.1 Central median*	*4.2 Retaining walls*	*5.1 Excess land*	*5.2 Parking streets*	
	Mid-block crossing of Euston Rd (REF 7206)	X	X	X		X			X		X	X	X			X refer to #6		X		Align crossing to park entry Delete median Provide single phase crossing Return excess land to park Delete fencing
	Intersection of Euston Rd and Sydney Park Rd (REF 7208)	X	X	X	X						X	X	X			X refer to #6	X	X		**Refer to detailed comment 7** and Fig 6. Return excess land to park Use retaining walls at Sydney Park to retain trees
	Intersection of Euston Rd and Maddox St (REF 7210)	X	X	X	X						X	X	X		X					
	Intersection of Sydney Park Rd and Mitchell Rd (REF 7211)	X	X	X							X	X				X		X		2 lanes only Delete median
	Gardeners Rd eastern bridge approach and Venice St (REF 7301)	X	X	X	X		X north side	X			X	X	X	X				X		Allow pedestrian crossing of Gardeners Rd Provide access to both sides of the canal via the bridge
	Intersection of Gardeners Rd and Kent Rd (REF 7303)	X	X	X	X	X			X		X	X	X		X	X note				Remove median to increase space for shared path
	Intersection of Gardeners Rd and Bourke Rd (REF 7305)	X	X	X	X						X	X	X		X	X note				Remove median to increase space for shared path
	Intersection of Ricketty St and Venice St (REF 7308)	X	X	X	X					X	X	X								

Urban design drawings SMC/Westconnex dated 9/9/16 (north varies)	*Typical section/ Intersection*	*Comment*																	*Additional comments*
		1 Lane widths	*2.1 Kerbside verge & footpath*	*2.2 Kerbside street trees*	*2.3 Kerb geometry*	*2.4 Footpath alignments*	*2.5 Continuous footpaths (private Ind)*	*2.6 Add Ped Crossings*	*2.7 Single phase crossing*	*2.8 Minor intersection*	*2.9 Street Furniture*	*2.10 WSUD*	*3.1 Cycleway network and widths*	*3.2 Alexandria Canal*	*3.3 Cycleway intersection design*	*4.1 Central median*	*4.2 Retaining walls*	*5.1 Excess land*	*5.2 Parking streets*	
	Intersection of Campbell Rd and unnamed street (REF 7310)	X	X	X	X		X	X east leg		X	X	X	X	X access	X	X		X		
	Intersection of Campbell Rd and Bourke Rd (REF 7311)	X	X	X	X						X	X	X		X	X Bourke				**Refer to comment 8**
	Bunnings access to Campbell Rd (REF 7312)	X	X	X		X	X				X	X								Provide continuous footpath across access to private land
	Private property access to Bourke St (REF 7315)	X	X	X	X		X				X	X								Provide continuous footpath across access to private land
	Gardeners Rd bridge over Alexandria Canal (REF 7316)										X	X	X	X						Allow access clearances both sides of canal Bridge to allow access to west side of canal

Appendix B: Sydney Park Impact Mitigation Plan

SYDNEY PARK IMPACT MITIGATION PLAN

CONCEPT DESIGN REPORT

ISSUE B
20TH JANUARY 2017
PREPARED FOR: CITY OF SYDNEY
BY: TURF DESIGN STUDIO & ENVIRONMENTAL PARTNERSHIP

CONTENTS

SUMMARY

Sydney Park is a major open space resource for a rapidly transforming inner-city population, incorporating active facilities, recreation settings, ecological areas, water treatment wetlands and extensive walking routes in approximately 44 hectares of rolling parklands.

The impacts of the current WestConnex proposal on the park are significant and will require design adjustments and restoration strategies to mitigate these impacts. Concept proposals for these works are illustrated in the following plans.

The strategies are summarised on the following page.

STRATEGIES

ACCESS

ISSUE	RESPONSE
Pedestrian cross-movement at Euston Road will be formalised with signalised crossings, changing the location and intensity of movements.	New park connections to cater for these changed patterns of use are proposed, furnished with seating, lighting and landscape.
No crossing provision at Euston Road is located proximate to the main through-site park link, adjacent the event space	An additional mid-block signalised crossing is proposed.
Entries nodes are truncated, and a significant level change introduced in many areas.	Each entry is reconfigured to provide direct and accessible points of access, using a consistent and established Sydney Park design language for materials and elements.
Shared path provision is currently proposed along Euston Road and Sydney Park Road, constraining street tree planting opportunity and possibly impacting park trees along Sydney Park Road in addition.	Footpaths for these streets are prescribed for pedestrian use only and narrowed (approx. 1.5m) and a planting zone established for street trees and understorey. Bike riders are directed by shared path on Campbell St into Sydney Park at Herber St carpark, with direct connection to Mitchell Street north of the park, an established cycle route.

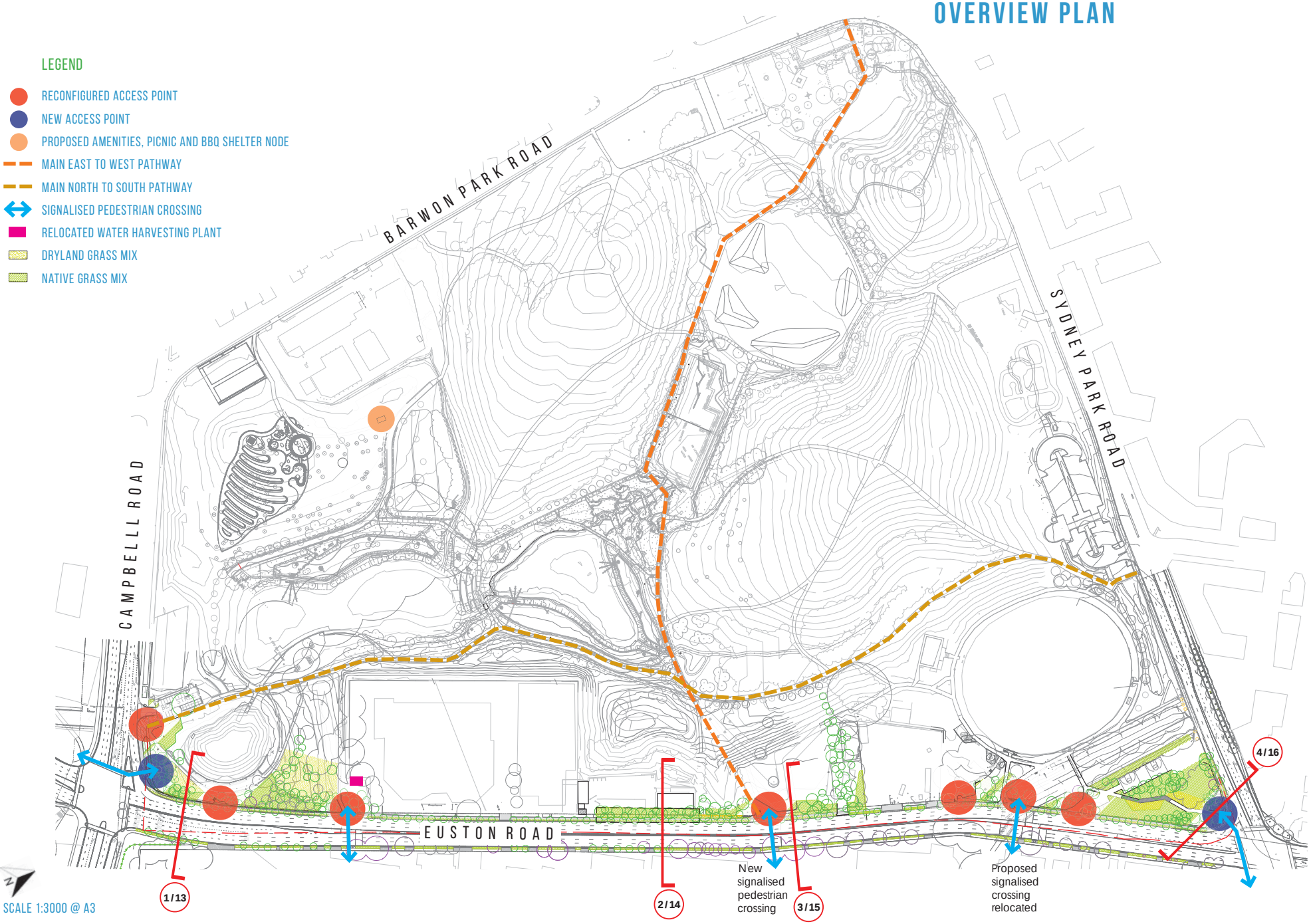
LANDSCAPE

ISSUE	RESPONSE
Extensive loss of urban forest along park edge and Euston Road reserve, impacting park and street character.	Replacement kerbside street tree planting scheme along the frontage of the park in accordance with Street tree master plan. Street trees retained to eastern side of Euston Road wherever possible and otherwise replace with new trees in accordance with street tree master plan Where space permits, infill tree planting within the park to strengthen park edge character and filter views to traffic.
Park trees are at risk due to proximity to level change at road reserve edge.	Retaining walls reduce impact and increase opportunity for soil volumes and trees retention.
Loss of habitat plantings and visual impacts of views opened up to widened street from park.	A new grassland understorey with scattered mid-storey under existing and new trees buffer and frame the park edge. Mass planted understorey will limit access to top of retaining walls. Understorey extended to Euston Road nature strip to mitigate impact of retaining walls on character and unify park street address.

BUILDING & STRUCTURES

ISSUE	RESPONSE
The pumphouse, a Single storey utility structure, previously screened by park landscape is exposed.	Facade upgrade works required.
Reconfiguration of the Metromix Concrete Plant may create amenity and visual impacts on the park.	Mitigation to be determined once reconfiguration proposal defined.
Loss of Community store at Euston Road car park.	Equivalent provision for community storage to be relocated to Barwon Park Road / Sydney Park Depot.
Stone Masons Depot exposed to the elements and prominent in the public domain.	New facade required with good quality presentation to the street, with works to ensure remaining portion of the building is compliant and safe.
Stone Masons yard previously screened by building exposed to public domain and unsecured.	Stone Masons yard to be screened and fenced
Overseas Disaster Resources building now directly adjacent street frontage.	Street facing carport to be removed and make good existing, area replaced with continuation of edge landscape, screen and fencing.
Picnic setting, including shelters and BBQs, each of wetland 5 exposed to major road intersection.	Two new picnic shelters and BBQs located further into park, in the vicinity of the City Farm precinct
Combined Amenities and Water Treatment Plant building Demolished.	New amenities building in accordance with current Sydney Park standard amenities provided at City Farm Precinct New Water Treatment Plant building located near existing services connection points.
Utility services supplied from Euston Road, including power to the Event Space and power and water at Wetland 5 will be disrupted	All services, including these examples, to be restored to new alignments.

OVERVIEW PLAN



SCALE 1:3000 @ A3

KEY PLAN

LEGEND

- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

DETAILED PLAN

SYDNEY PARK & EUSTON ROAD INTERSECTION

Flexible carparking area retained and re-utilised for multi-use courts to activate area and provide passive surveillance for new access path

Driveway entry into park regraded and access to bridge reconfigured

Retaining wall located along Sydney Park road to retain trees and soil volume

Graded boardwalk utilised to protect root zones of existing trees along access path

WCX retaining wall along Euston Road extended into driveway to retain existing trees and continue park design language

Screening and understorey planting to improve amenity

New entrance point at pedestrian crossing to direct pedestrians into the park rather than along side traffic heavy roadside

SCALE 1:400 @ A3

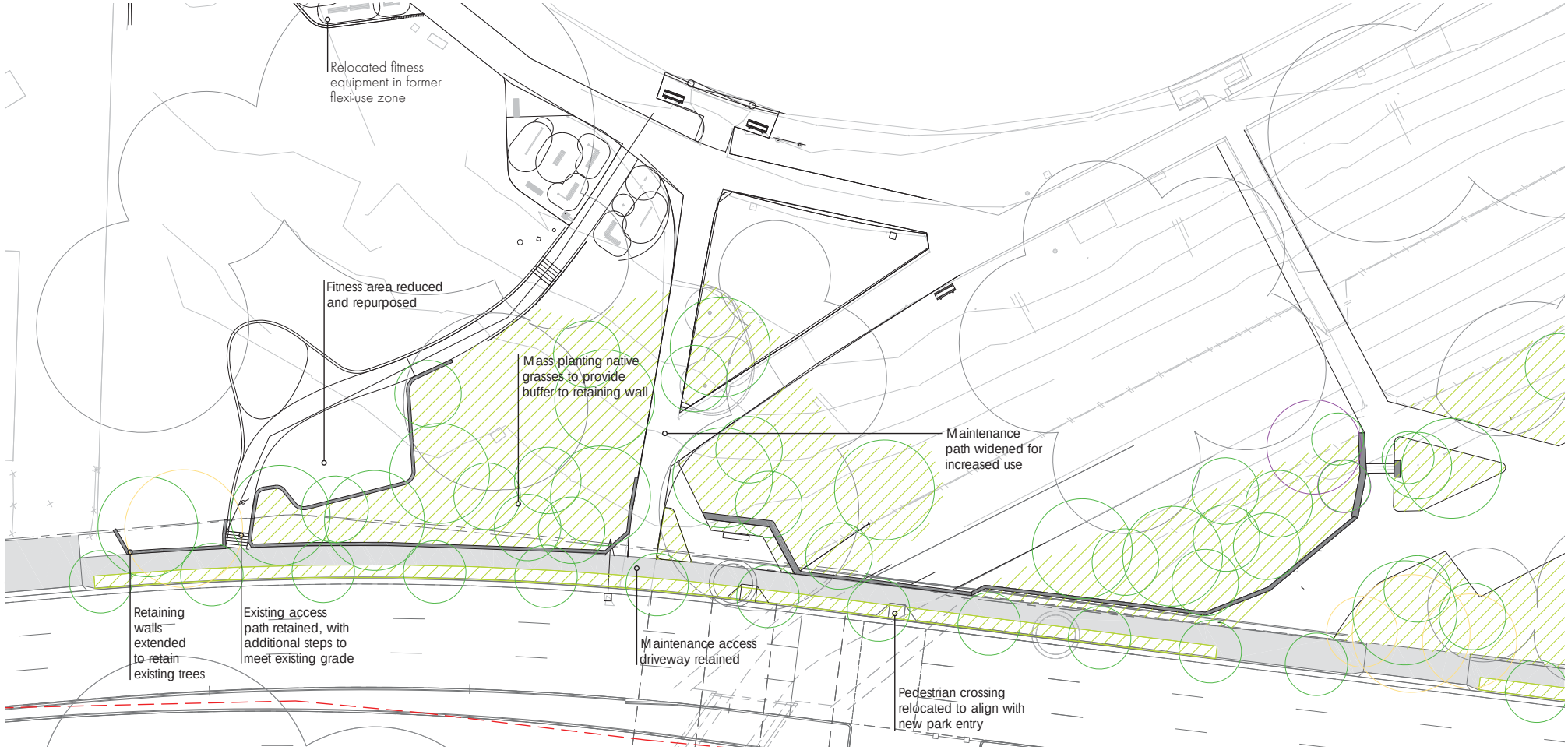
KEY PLAN

LEGEND

- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

DETAILED PLANS

EUSTON RD: FITNESS AREA- MUNNI CHANNEL



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SCALE 1:400 @ A3

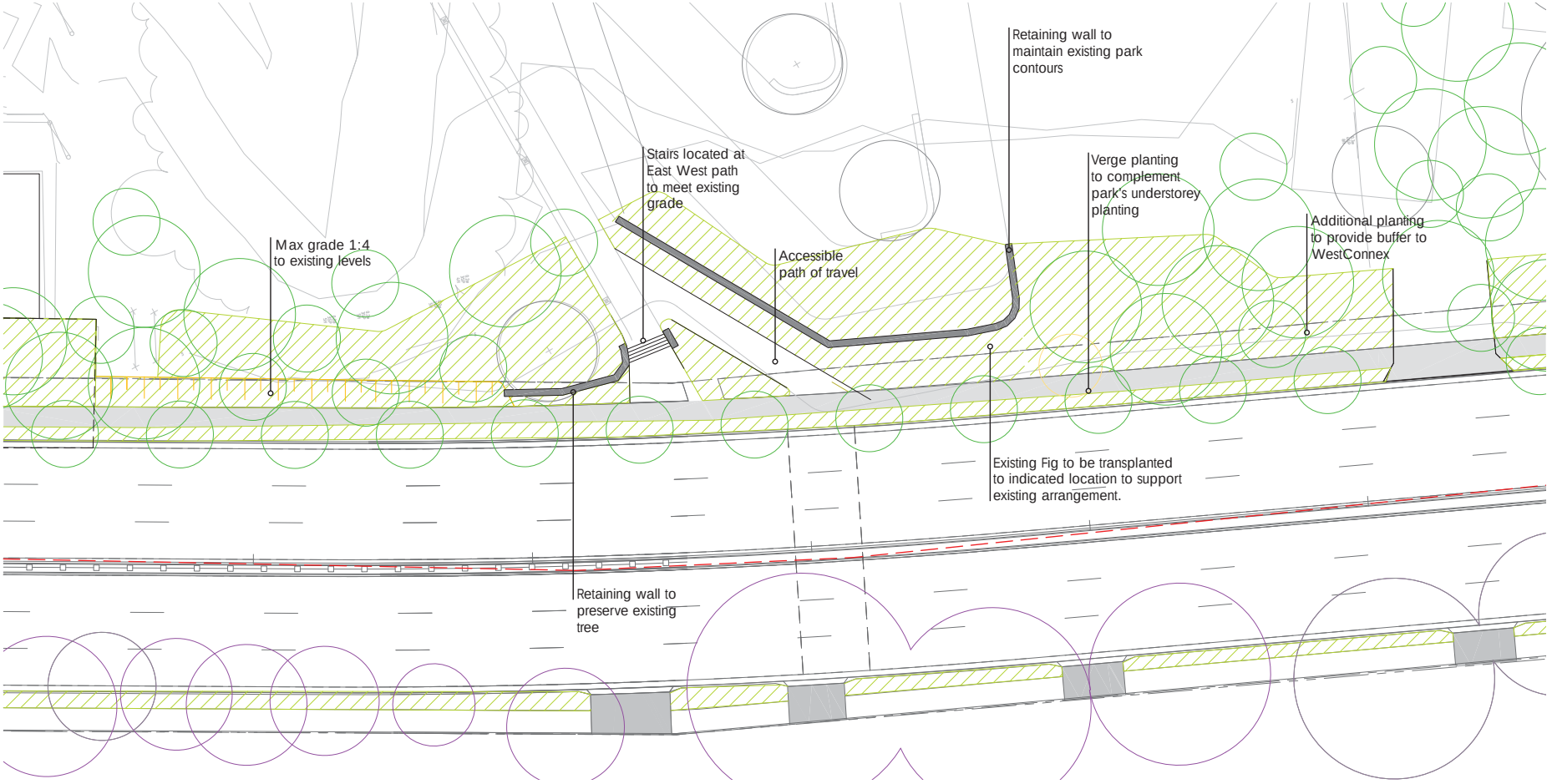
KEY PLAN

LEGEND

- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

DETAILED PLANS

EUSTON RD: EVENT SPACE



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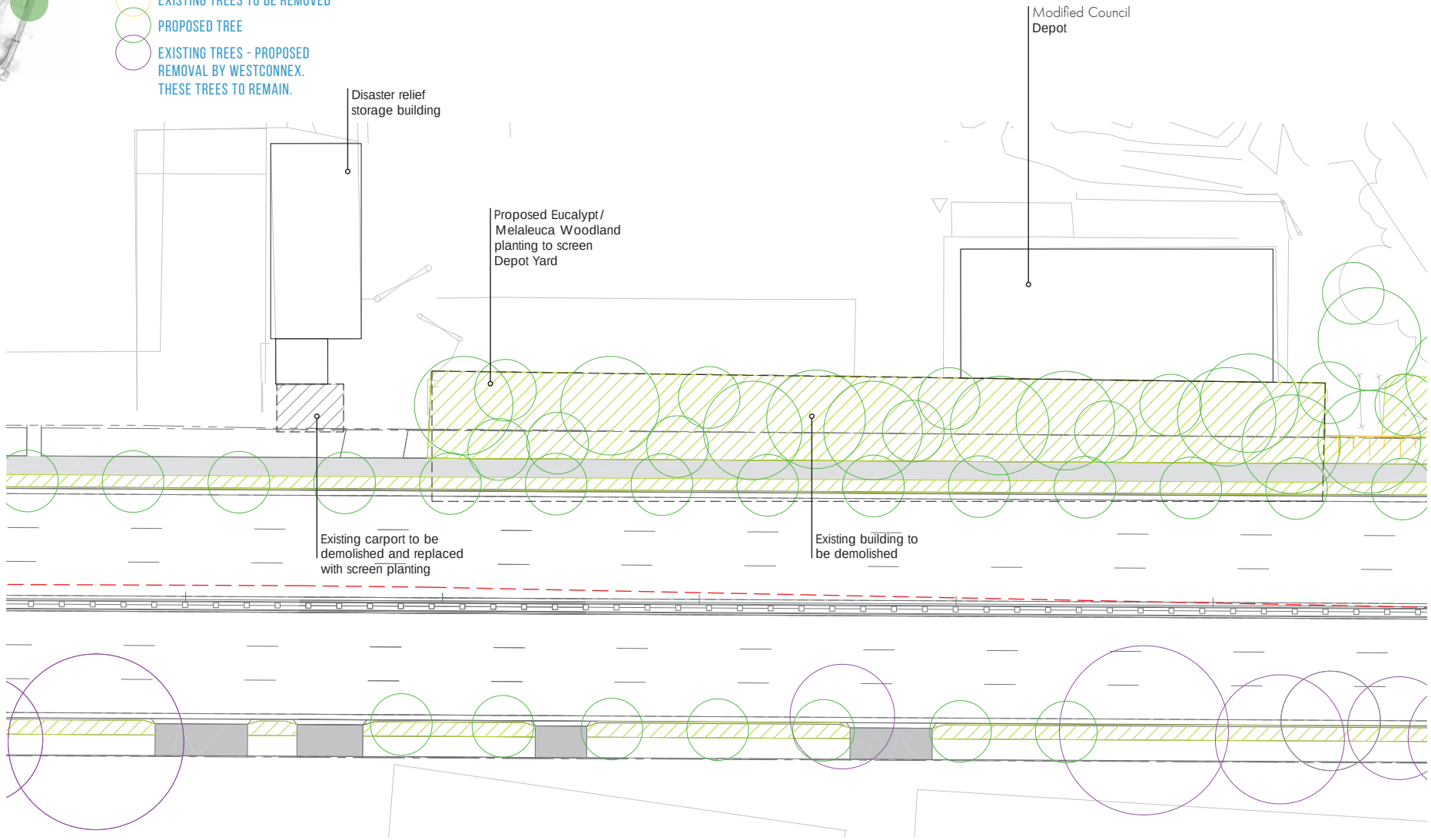
KEY PLAN

LEGEND

- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

DETAILED PLANS

EUSTON RD: STONE DEPOT



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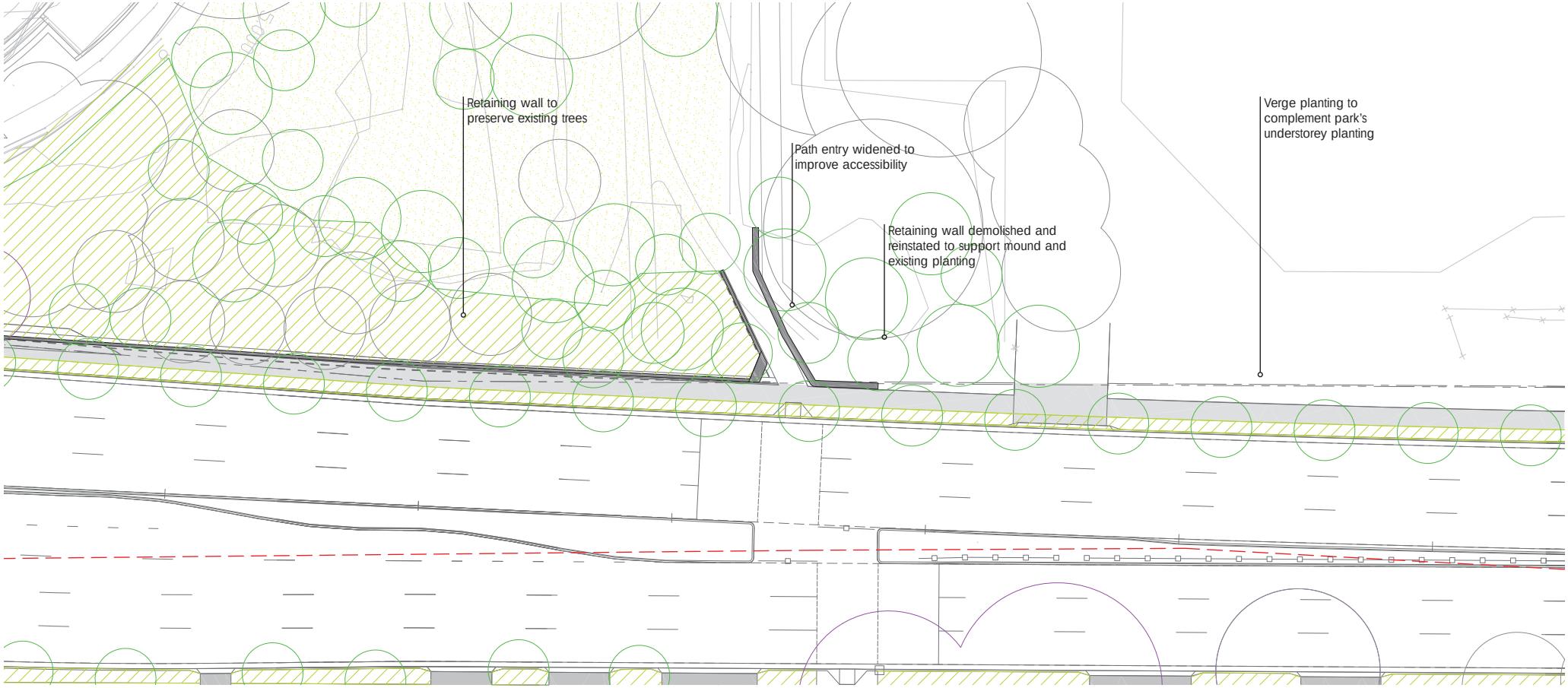
KEY PLAN

LEGEND

- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

DETAILED PLANS

EUSTON RD: NORTH OF WETLAND 5



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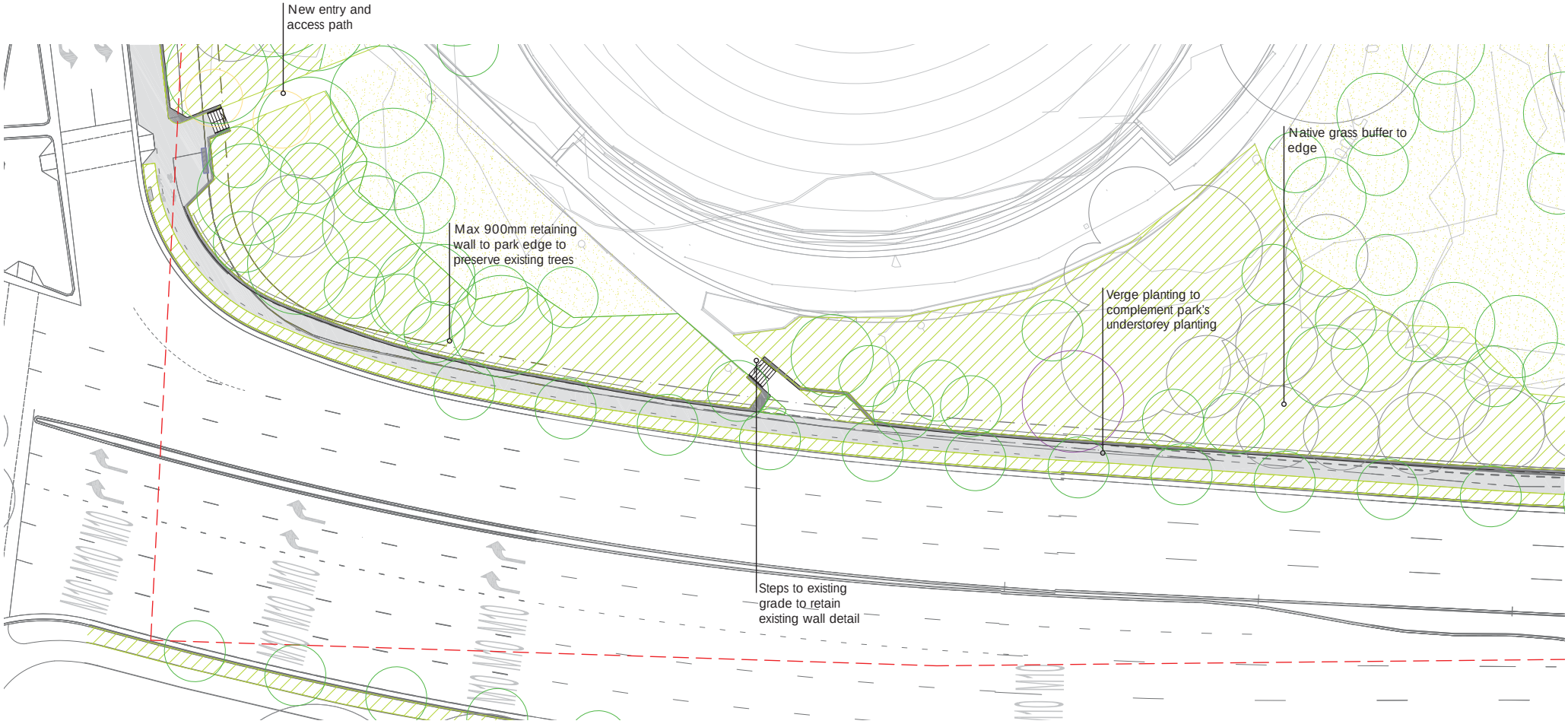
KEY PLAN

LEGEND

- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

DETAILED PLANS
WETLAND 5 PRECINCT



N

SCALE 1:400 @ A3

KEY PLAN

DETAILED PLANS

CAMPBELL AND HARBER STREET INTERSECTION

LEGEND

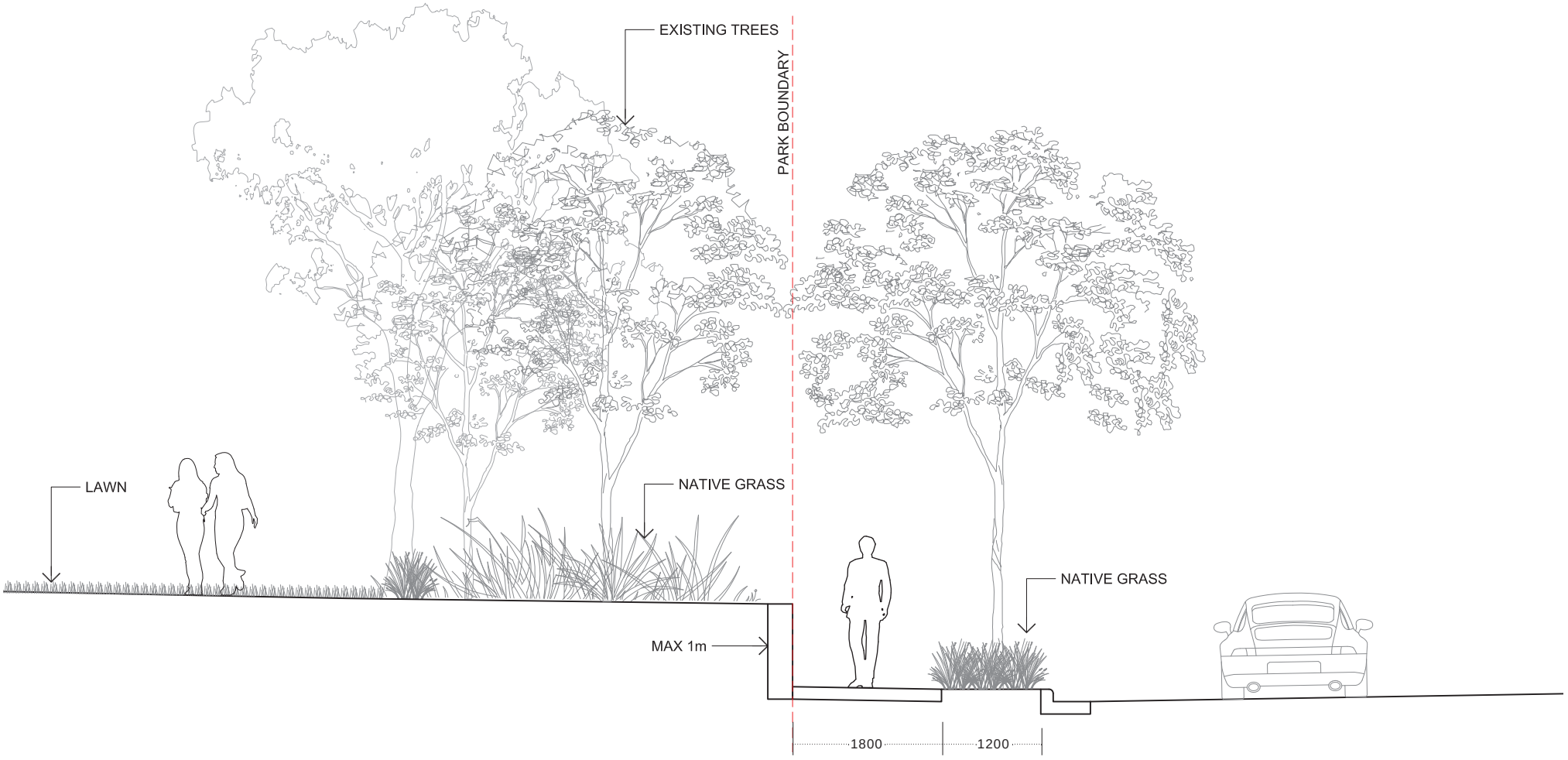
- DRYLAND GRASS LAWN
- NATIVE GRASS MIX
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- PROPOSED TREE
- EXISTING TREES - PROPOSED REMOVAL BY WESTCONNEX. THESE TREES TO REMAIN.

SCALE 1:400 @ A3

KEY PLAN

SECTIONS

SECTION 1



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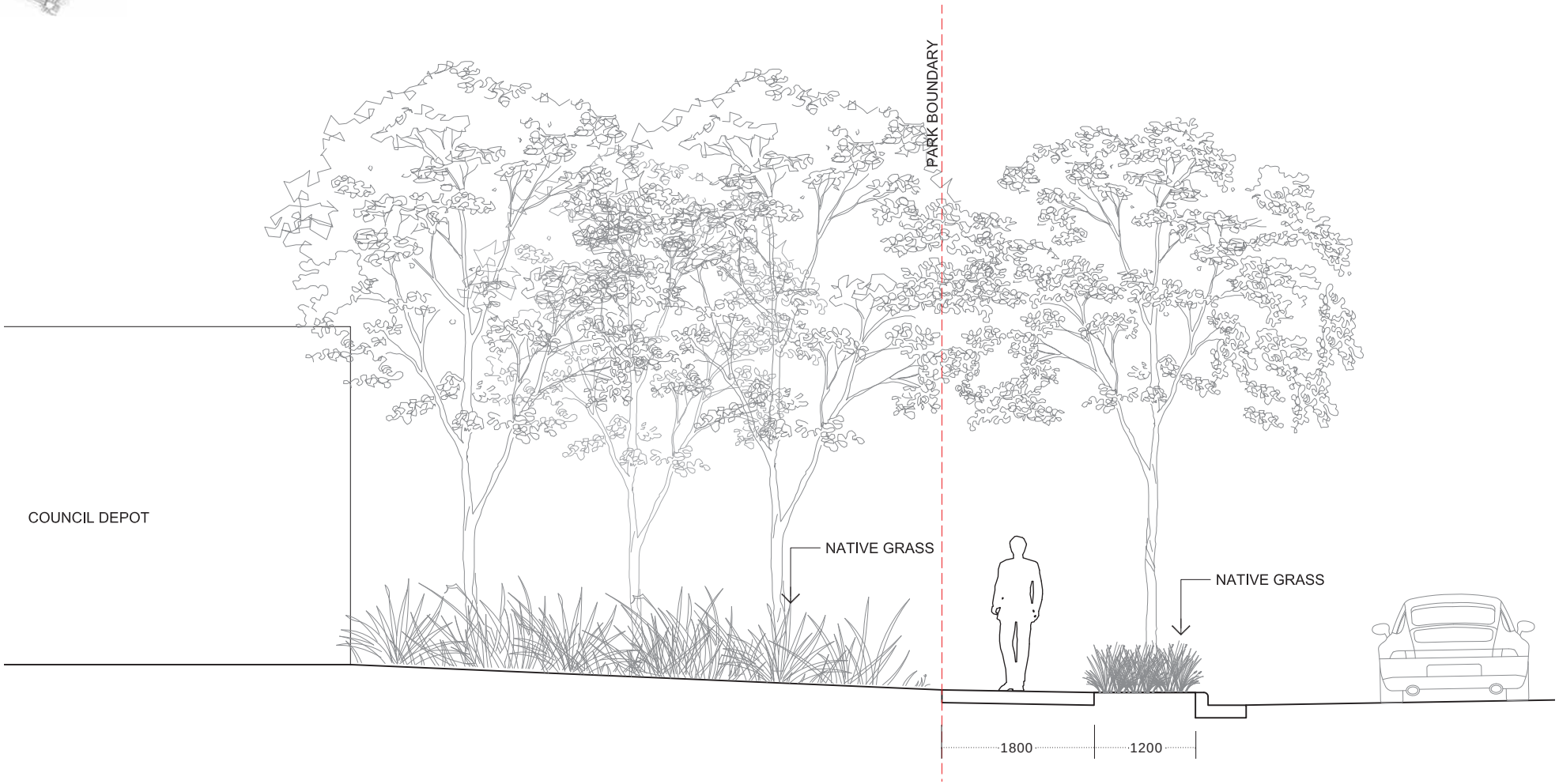
KEY PLAN

SECTIONS
SECTION 2



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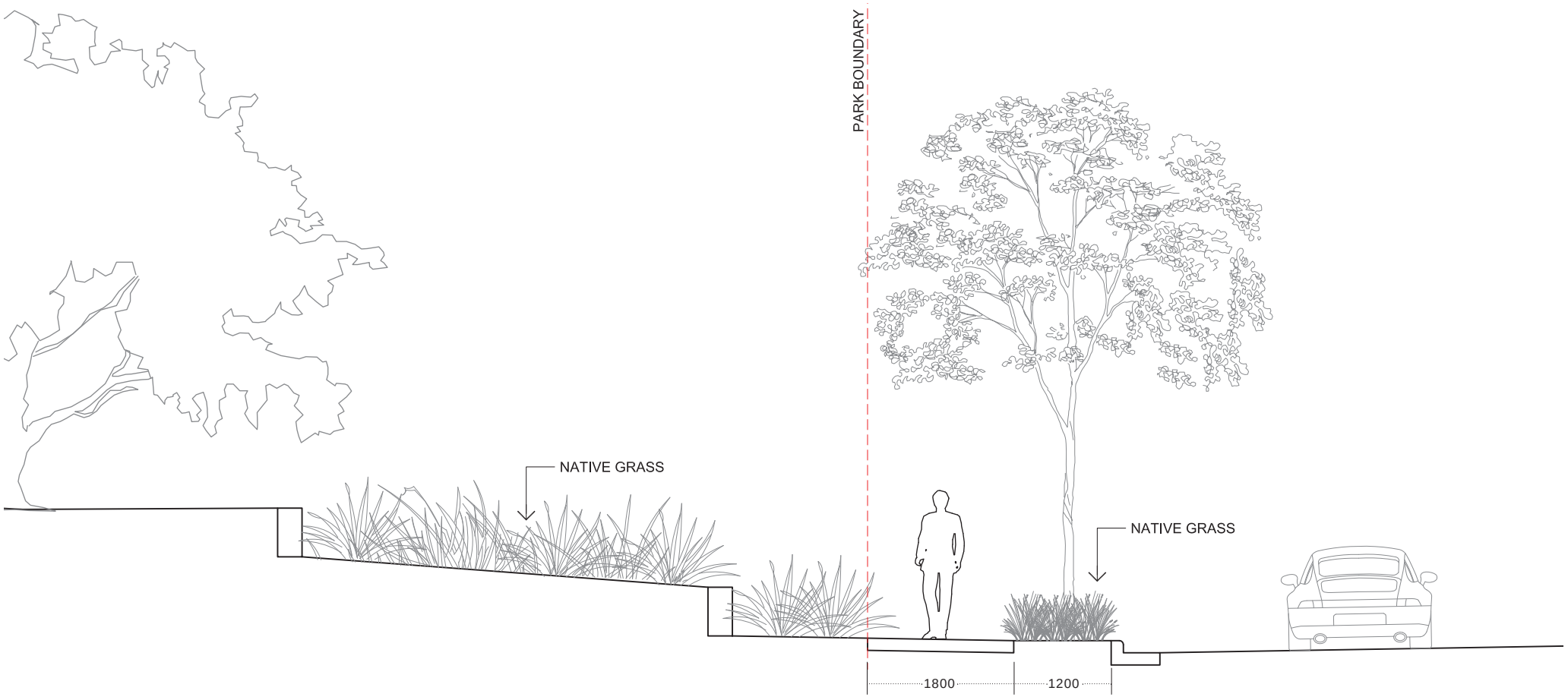
KEY PLAN

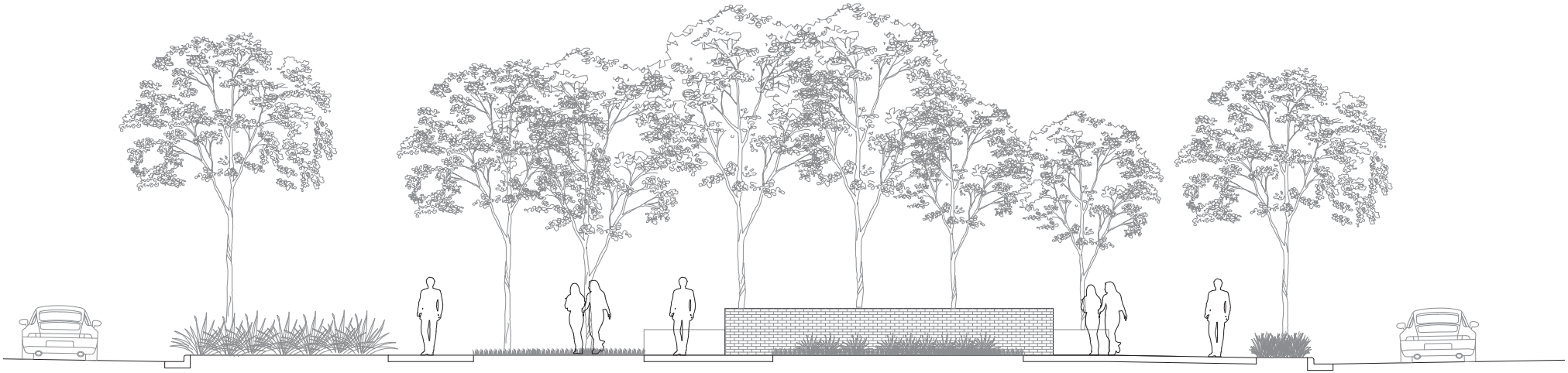
SECTIONS
SECTION 3



SCALE 1:50 @ A3

KEY PLAN

SECTIONS
SECTION 4



SCALE 1:100 @ A3

MATERIALS PALETTE

Consistent use of the established palette of materials for Sydney Park will assist to preserve the park's overall character and identity through change.

Typical treatments include:

- Low concrete retaining walls with brick details at nodes;
- Furnished entry nodes inviting use and rest points;
- Brick edged paths with integrated lighting;
- Boardwalks to protect established trees; and
- Generous stairs with access aides.

PLANTING PALETTE



Native Grass Palette



Tree Canopy Palette

A diverse planting palette, with a focus on locally native and complex reconstructed ecologies characterises Sydney Park

Typical palettes for the restoration plan include:

- Eucalypt Woodland with mid-storey
- Complex Grasslands
- Eastern Suburbs Banksia Scrub
- Paperbark Forest

BUILDING AND STRUCTURES

LEGEND

1 COMMUNITY STORE

Single storey brick building, tile roof

Total demolition required by WCX

Restoration Plan: equivalent provision for community storage to be relocated to Barwon Park Road / Sydney Park Depot

2 PUMPHOUSE

Single storey utility structure

WCX alignment increases the prominance of this building previously screened by park landscape.

Restoration Plan: facade upgrade works required (see No.7)

3 METROMIX CONCRETE PLANT

WCX alignment reduces site area.

Reconfiguration of this site may create amenity and visual impacts on the park which will need to be assessed and may require mitigation

4 STONE MASONS DEPOT

Existing attached industrial storage warehouse

WCX works require the demolition of the adjoining building, exposing to the weather and the public domain what is currently an internal wall.

Restoration Plan: new facade required. New facade will have a prominent presence to the public domain which requires a good quality presentation to the street. Demolition of the adjoining building will trigger a requirement for a

BCA review to ensure that the remaining portion of the building is compliant and safe. Stone Masons yard to be screened and fenced

5 OVERSEAS DISASTER RESOURCES BUILDING

Street facing carport to be removed, as this is now street frontage.

Restoration Plan: minor building works to make good and landscaping

6 2 X PICNIC SHELTERS, WITH BBQS, ON OPPOSITE SIDES OF THE WETLAND

WCX works compromise these structures by exposing them to major roadway.

Restoration Plan: provide 2 new picnic shelters and BBQs located further into park, in the vicinity of the City Farm precinct

7 AMENITIES/WATER TREATMENT PLANT BUILDING

Single storey brick, iron roof. Amenities built circa 1980's, Water Plant 2015

Total demolition required by WCX

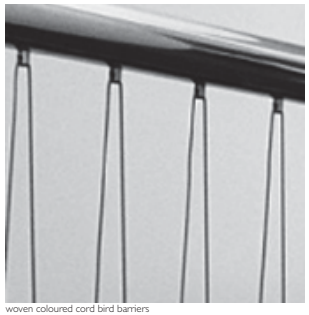
Restoration Plan: New amenities building (to follow Sydney Park new standard amenities design) relocate to near City Farm, making use of existing pathways.

New Water Treatment Plant building (notional 4m x 8m footprint tbc) relocate to near existing services connection points, facade treatment similar to No.2

BUILDING PRECEDENTS

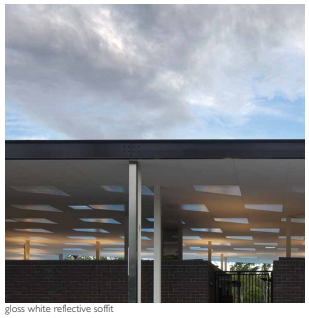

concrete slab + swale planting

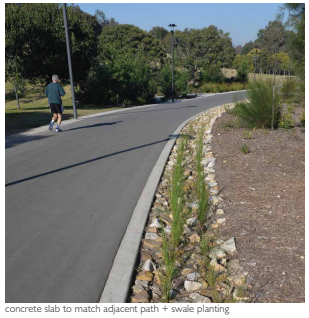

translucent roof sheet over basin zone


woven coloured cord bird barriers

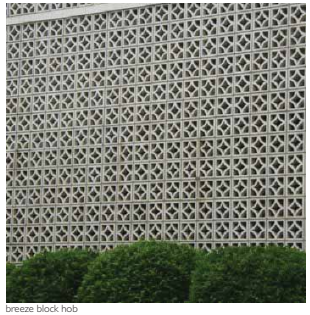

external tiled walls - white veritcal format

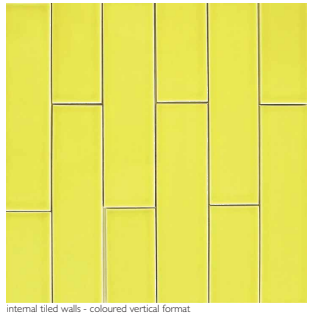

off form concrete basin


gloss white reflective soffit


concrete slab to match adjacent path + swale planting


translucent roof sheet over basin zone


breeze block hob


internal tiled walls - coloured vertical format

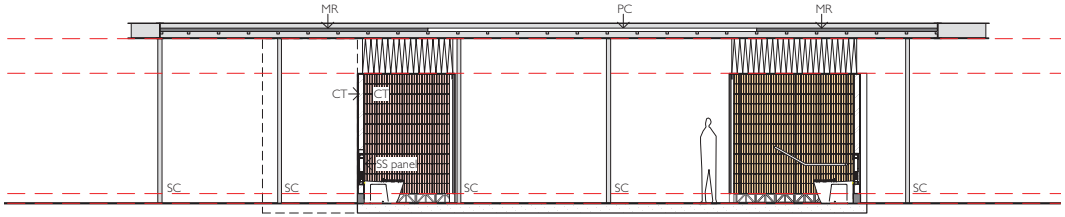

off form conrete basin - FREESTANDING ACCESSIBLE


steel structire - white paint finish

Materials Palette

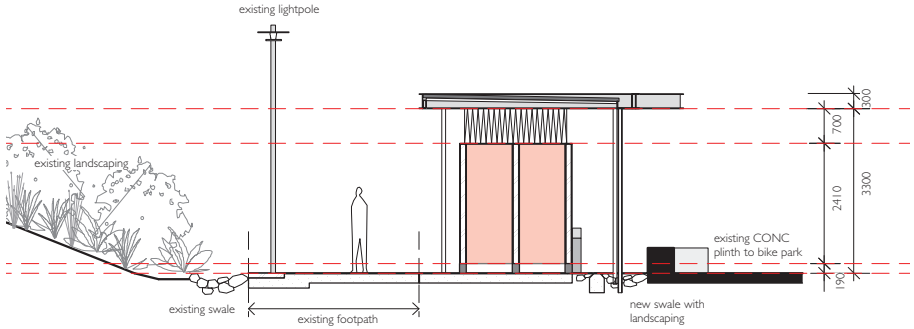
Image and text source: City of Sydney

PROPOSED AMENITIES BUILDING



Long Section

Scale 1:100



Short Section

Scale 1:100

Image and text source: Aileen Sage Architects

Appendix Ci: St Peters Interchange recreational plan initial comments to RMS

Appendix Cii: St Peters Interchange recreational plan supplementary comments

St Peters Interchange Recreational Area Sub-Plan
Comments from City of Sydney

Introduction

Condition B61 requires than an Urban Design and Landscape Plan must be prepared and include a sub-plan for a St Peters Interchange Recreational Area. Condition B62 (b) requires, inter alia, that the recreational area sub-plan maximise the amount of open space available for the provision of active recreation areas and multifunctional and adaptable active recreation support facilities on the St Peters interchange site. In addition, the sub-plan must be consistent with, and integrate with, the requirements of the Urban Design and Landscape Plan and the Sydney Park Enhancement sub-plan.

The City's detailed comments on the concept design of the St Peters Interchange Recreational Area Sub-plan, as outlined at the presentation by SMC and RMS on 27 February 2017, assume that the Proponent will meet Condition B62 (b) and, following the commencement of operations, implement the sub-plan. The City's detailed comments are set out below:

Overall

1. St Peters Recreation Area should be developed to broadly extend the character and amenity of Sydney Park to create a strong combined identity for these linked open spaces.
2. The St Peters Recreation Area should have an established formal sports program, set within a strong framework of ecologically rich plantings and walking routes. In this way, the sports facilities are a destination within the larger parkland.
3. Whilst there is potential for a water body to be developed in a way that contributes identity, amenity and function to the park, alternative residual lands created through the WestConnnex development should be investigated for the water body location (such as the south corner of Campbell/Euston) in order to maximise the recreation program of the Area.
4. Remediation of the Recreation Area, as a result of previous uses, needs to be undertaken to a standard that makes the site suitable for use, able to support and sustain the infrastructure associated with a highly developed park.

Structured Recreation Program

5. The City values the potential for this site to increase provision of formal sports courts and fields. The City would place a somewhat higher priority on field development over court development, should two fields be feasible.
6. The City does not consider the creation of a BMX facility priority for this location.
7. The City believes that the size and orientation of fields and courts could be improved and requests different configurations be comparatively assessed for the site.
8. Sports Fields and configurations sizes (including overruns but excluding perimeter maintenance access outside fence) to be tested in the site plan are:
    a. Compact 98m long x 66m wide (approx. 6500m2)
       Example - Future Gunyama Park
    b. FIFA Professional 111m long x 76m wide (approx. 8500m2)
       Example - Lambert Park, Leichhardt
    c. Rugby league 122m long x 76m wide (approx. 9200m2)
       Example - Moore Park All Weather Field

d. Two Field option - (in lieu of courts), with at least one field meeting the size requirements above, should also be explored

9. Sports Court sizes and configurations to be tested in the site plan, based on each court being approximately 22600mm x 37600mm (reference Perry Park outdoor courts, see **attached** document 'Ground Stage 1') are:
   a. A three court configuration
   b. A four court configuration

   Note the spatial efficiencies if the courts share overrun space, like the paired example in the Ground Stage 1 document

10. Ancillary to the use of these fields/courts:
    a. Built facilities are to include: change rooms (home and away), toilets, maintenance and sports supplies and equipment storage, café/take away, first aid room, management room. Will also require vehicle access
    b. Complementary facilities are to include: spectator seating with shade, some low key family provision, picnic tables and small children's play area

Unstructured Recreation Program

11. The site should provide for less structured recreation, principally through a perimeter circuit path linked to all entries and major destinations, and to the bridge, to enable a variety of recreation circuits for walking and cycling
12. A 3.4m path width for main routes (entry, perimeter and central spine) in the recreation area would typically accord with detail 7 in the **attached** 'Landscape Details' document
13. Complementing this function, the primary path network should be furnished with incidental infrastructure, such as rest spots, water provision, exercise stations, skate-able moments, interpretive information and possibly, additional secondary/tertiary trails that divert off the circuit and can be explored by bike/on foot.

Park Character

14. Cohesion with Sydney Park can be achieved through a design empathetic to that of Sydney Park with its characteristic topography, hydrology, planting, structures and materials.
    a. For example, path networks should adopt layout principles evident in Sydney Park, in terms of junctions and entries, and response to landform. Maintenance swept paths should be integrated without resorting to overly formal "plaza" junctions. The paths combine concrete and recycled brick to reflect a signature character for Sydney Park.
15. The water body, if retained on the site, should be developed for multiple use. Steep sided detention basins that cannot retain water or sustain edge ecologies because of their hydraulic fluctuation may have limited environmental and recreation amenity. The water body must be developed to be an environmental, ecological and recreation amenity.
16. At the finer scale, opportunities to integrate water sensitive design into the entirety of the Area should be explored. Daylighting drainage and integrating bio-retention will strengthen character and contribute environmental and ecological benefits.
17. Materials, construction detailing etc. should be durable, long lasting and minimise maintenance requirements
18. The City is keen for all opportunities to be explored for the appropriate reuse of available heritage items within its parks and facilities. To that end, the use of elements from the former Rudders Bond structure in the development of the Area should be considered.

Access and Safety

19. The area is isolated and generally concealed from view. Safety and crime prevention advice should be sought as part of the design process, including an assessment of how the embankments affect the safety of this area.
20. Universal access advice should inform the design of the Area, and the path network and park facilities need to be accessible.
21. A pedestrian crossing to the recreation area from the corner of Euston and Campbell roads is required (it does not appear to be shown).
22. Pedestrian crossings are also required on the south west side of the Euston and Campbell roads intersection.
23. The City requires a 12t loading for the land bridge. This loading would be to service trees and pedestrian lights on the land bridge as well as to allow for access of small fleet, mowing equipment and garbage trucks on a regular basis to the new park. **Attached** is the City's 'Parks Maintenance, Vehicle Access Schedule for Parks'.
24. An emergency vehicle access path to serve all fields, courts and facilities is required.
25. The crossing from the car parking to the recreation area should be narrowed.
26. It is unclear what access restrictions would be imposed on the water body, should it be retained for maintenance and use.

Land Bridge

27. Generally the design and location is supported although the City does not support an entry from the end of the land bridge to the City Farm.
28. An accessible route linking the northern end of the bridge to the central circulation path of Sydney Park is required. Similarly, an accessible link at the southern end of the bridge connecting to the path network of the Area is required. As noted above, universal access advice should be sought in relation to the DDA.
29. The 20 metre width requirement should relate to the landscaped area of the bridge; the horizontal parapet extensions should be beyond the required width.
30. As noted above, the City requires a 12t loading for the land bridge to service trees and pedestrian lights on the land bridge.
31. As noted above, a safety and crime prevention review is required.
32. The anti-throw/safety screen should support landscaping or be highly transparent and of a high design quality, integrated within the overall design for the bridge.
33. Location should be checked to minimise tree loss.
34. Abutments should be contained and form part of the architectural design (ie not left open as nothing will grow).
35. No road signs should be attached to the bridge.
36. No advertising should be allowed.
37. The landscape of the land bridge should exploit particular views of the park, motorway or surrounding areas. Places to step off the main path to pause should be added to encourage use and to reduce the need for a wider path.
38. Varied techniques to create areas of 1000mm soil depth for planting on the land bridge should be explored that do not result in a continuous walled/containerised planting character.

St Peters Interchange Recreational Area Sub-Plan Supplementary Comments from City of Sydney

Introduction

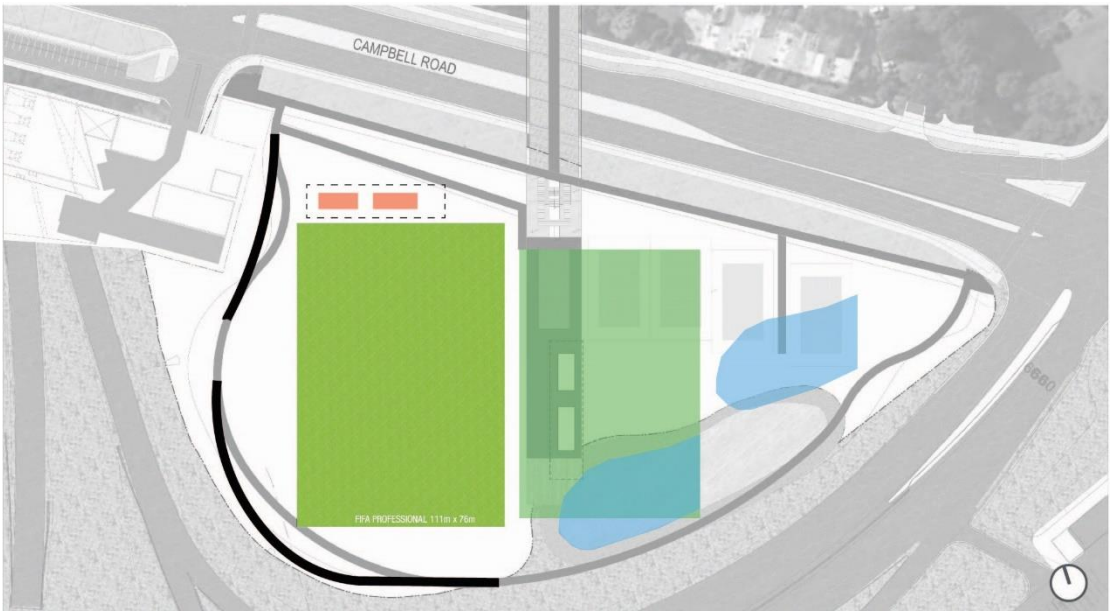
These are the City of Sydney's additional comments arising from the presentation at the UDRP meeting held on 21 March 2017.

The City also wishes to reiterate the need to simultaneously develop an implementation and delivery strategy as required in the conditions. Condition B62 b) states that '*The plan must detail the construction, timing and responsibility for the delivery of active recreation facilities (including, but not limited to, sporting fields)'*.

Structured Recreation Program

The City requests the design be amended to achieve a two field configuration, developed with appropriate lighting and fencing provisioned with a synthetic playing surface to maximise community utilisation, incorporating the supporting amenities described below.

1. The spatial investigations reveal the potential of this site to sustain two fields:
   a. Compact 98m long x 66m wide (approx. 6500m2)
   b. FIFA Professional 111m long x 76m wide (approx. 8500m2)



Adapted from McGregor Coxall/CHROFI

2. This potential relies on:
   - the reconfiguration of detention requirements to the eastern end of the site and/or the conversion of some/all detention capacity into sub-surface storage.
   - the fields being in close proximity, with proposed supporting amenities relocated from current position. There is an opportunity for supporting amenities to be

integrated with the Campbell Street Berm and/or land bridge termination/viewing deck.

3. The approximate scale of supporting amenities is provided below:
   - Change Rooms, including accessible toilet+shower (30-32m2 each for home and away)
   - Public Toilets (M+F with communal wash basin) + accessible (25m2 + 7 m2)
   - Maintenance and Store (30-35 m2 per field)
   - Café/Kiosk/Office (35 m2)

Access and Safety

The City requests exploration of a connection north to the Sydney Park circuit to serve the main active transport link to the land bridge.

4. The integration of the land bridge into Sydney Park to the north is critical. The current proposal needs to be strengthened to be more generous, accessible and legible.

5. There is an opportunity to create a better link to the north. This alternative link could utilise the established Sydney Park network between wetlands 2 and 4 to more naturally feed into the N-S route. This dispersal of bike riders to both sides of wetland 4 is advantageous, as the number of cyclists accessing the park from Campbell Street via the Harber St carpark is also expected to increase. The northern link could be developed to herald and integrate the land bridge more strongly into the main park.

6. We accept this route may require minor re-configuration of the proposed City Farm at its SE boundary. We request the design studies include this consideration in their development of this access option, and show a reconfiguration in the footprint of the farming area to demonstrate no net loss of farming area, most likely by extending length of cropping lines up slope from (west of) the path alignment.

7. The link from the land bridge to the circuit in the east could then be developed as a smaller scale, pedestrian connection.

8. The City also reiterates the need for a pedestrian crossing on the southern leg of the Euston / Campbell / WestConnex intersection. This is seen as essential given the access arrangements into the recreation area and the grade of Campbell Road in comparison to this area.

9. The City is comfortable with the car parking currently provided and its location. On site access should be limited to maintenance, emergency and service vehicles.

Land Bridge

10. The City notes that the latest revision has addressed our comment relating to the 20 metre width requirement needing to relate to the landscaped area of the bridge and that the horizontal parapet extensions should be beyond the required width.

Appendix D: WestConnex New M5 and St Peters Interchange EIS – Review of Biodiversity Assessment Report prepared for the City and Marrickville Council

New M5 and St Peters Interchange Environmental Impact Statement – Review of Biodiversity Assessment

Report prepared for
the City of Sydney and Marrickville Councils
December 2015

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EXECUTIVE SUMMARY

The City of Sydney and Marrickville Councils commissioned a review of the Biodiversity Assessment Report (BAR) prepared by Eco Logical Australia Pty Ltd for the proposed new M5, including the St Peters interchange, due to concerns about the impact of the project on biodiversity in these two local government areas (LGAs). The following sections present an overview of the issues identified during the review .

Validity of the biodiversity assessment

The BAR was required to be prepared in accordance with the SEARs issued for the project, one of which specifies that it must be undertaken in accordance with the NSW Office of Environment and Heritage's (OEH) Framework for Biodiversity Assessment (FBA), including further consideration of impacts on species, populations and ecological communities identified by the OEH.

The following issues are of concern in relation to the SEAR requirements, and how the FBA was applied in preparation of the BAR:

- The BAR focuses on threatened species, populations and ecological communities, as does the FBA. However, the introductory SEAR statement and *Threatened Species Conservation Act 1995* definition of biodiversity values suggests more consideration should have been given to biodiversity more generally, including species and sites of local conservation significance within the City of Sydney and Marrickville Council LGAs, and the numerous initiatives that have been implemented to conserve and enhance habitat for/at them.
- No consideration was given to ecological reports and data held by the City of Sydney or Marrickville Councils in preparation of the BAR, including each Council's respective biodiversity strategies and recent records of threatened and migratory species, despite sections of the FBA that state such information can or should be considered.
- Important habitat features, including local wetlands and native vegetation in Sydney Park, Tempe Reserve, and Tempe Lands, were not mapped or otherwise identified in the BAR, despite requirements in the FBA for such features to be mapped. Although outside of the development footprint, some local wetlands and native vegetation are immediately adjacent to it and could be impacted. Identification of habitat features such as these through mapping would assist in identifying impacts and ensuring they are mitigated.
- It is not clear whether some of the above native vegetation should have been identified as Plant Community Types (PCTs) in accordance with the FBA as it appears to have been dismissed as 'urban exotic and native' without being carefully considered.
- The list of candidate 'species credit species' in the BAR does not include several such species that have recently been recorded in the vicinity, and/or for which suitable habitat (as described on the OEH Threatened Species Profile Database) is present within the development footprint, particularly at the Alexandria Landfill site where clearing has already commenced, and adjoining industrial and vacant land. These include the Eastern Bent-wing Bat, (possibly) the Southern Myotis, and the endangered inner west population of the Long-nosed Bandicoot. It appears these species have been incorrectly excluded from further consideration in application of the FBA, and that they should have been addressed further in the BAR in accordance with the requirements of Sections 6-12 of the FBA.
- The Long-nosed Bandicoot population was also identified by the OEH as requiring further consideration in accordance with Section 9.2 of the FBA, but no further consideration was given, despite the SEARs stating that specific surveys were required.
- The discussion of impacts to biodiversity values and proposed mitigation in the BAR is considered insufficiently detailed, and cumulative impacts to biodiversity are not mentioned despite being a requirement of the FBA.

Threatened species, populations and communities in the City of Sydney and Marrickville LGAs

The threatened Eastern Bent-wing Bat and (possibly) the Southern Myotis, the endangered Long-nosed Bandicoot population, the endangered Coastal Saltmarsh community, and migratory species including the Great Egret, Cattle Egret, Sharp-tailed Sandpiper, Latham's Snipe and Rufous Fantail have all recently been

recorded in the City of Sydney and/or Marrickville LGAs, but as noted above were not identified or adequately considered in the BAR, despite potential for the project to impact upon them.

Relationship to Council initiatives

The initiatives that have been implemented by the City of Sydney and Marrickville Councils and their respective community members to conserve and enhance habitats to promote biodiversity were not identified or otherwise considered in preparation of the BAR. These initiatives are guided by the City of Sydney's Urban Ecology Strategic Action Plan (UESAP) and Marrickville Council's Biodiversity Strategy 2011-2021 (BS) and Biodiversity Action Plan 2011-2015 (BAP). These documents outline 'priority' or 'target' species of local conservation significance in each LGA, along with 'priority' habitat sites and actual or potential habitat linkages/connectivity between them, as well as between sites in adjoining LGAs.

Priority/target species identified in both LGAs include:

- frogs such as the threatened Green and Golden Bell Frog (GGBF) (which is addressed in the BAR), Dwarf Eastern Tree Frog and Peron's Tree Frog;
- reptiles such as the Eastern Blue-tongue, Bar-sided Skink and Eastern Water Skink;
- small birds such as the Superb Fairy Wren, New Holland Honeyeater, Red-browed Finch, Grey Fantail, Silvereye and rainforest migrants including the Rufous Fantail and Spectacled Monarch;
- freshwater wetland birds such as the Australasian Reed Warbler, Black-fronted Dotterel, Black-winged Stilt, Buff-banded Rail and Royal Spoonbill;
- microbats including Gould's Wattled Bat and the threatened species previously mentioned;
- the Long-nosed Bandicoot; and
- the threatened Grey-headed Flying-fox (which is addressed in the BAR).

Despite comprising highly modified and/or constructed habitats, priority sites in the LGAs provide important habitat for the priority/target fauna species in this highly urbanised context, and include:

- Sydney Park, where at least 62 native fauna species have been recorded since 2010, including priority species such as the Superb Fairy Wren, New Holland Honeyeater, White-plumed Honeyeater, Australasian Reed Warbler, Rufous Fantail, Black-winged Stilt, Black-fronted Dotterel, Royal Spoonbill, Eastern Blue-tongue and Dwarf Eastern Tree Frog.
- Tempe Reserve, incorporating Tempe Lands, and the lower stretch of Alexandra Canal. 93 native bird species recorded have been recorded at this site in the past four years, including target species such as the Yellow Thornbill, White-browed Scrub Wren, Yellow-faced Honeyeater, White-plumed Honeyeater, White-naped Honeyeater, Spotted Pardalote, Brown Gerygone, Red-browed Finch, Silvereye, Superb Fairy-wren, Golden Whistler, Grey Fantail, and Australasian Reed Warbler. An additional eight target reptile and frog species have been recorded at this site, and there have been two recent confirmed records of the Short-beaked Echidna.

The dense weeds, mature trees, rock crevices, sandstone boulders, piles of debris and other ground-level features at the Alexandria Landfill site are also of habitat value for priority species. The landfill contributes to local habitat connectivity between Sydney Park and Tempe Reserve and other sites on the Cooks River. The banks of Alexandra Canal are also important with regard to local habitat connectivity, with the UESAP, BS and BAP all recognising their potential for future habitat enhancement.

The City of Sydney and Marrickville Councils are both members of the Cooks River Alliance, a partnership of Councils working together with communities for a healthy Cooks River catchment. There have been substantial efforts through the alliance to improve water quality and re-establish native vegetation along the river to promote biodiversity and restore local and regional habitat connectivity.

While not necessarily required by the FBA, it is disappointing that there is no recognition of any of the above in the BAR, despite the development footprint for the St Peters interchange and local road upgrades extending from Alexandra Canal across the Alexandria Landfill and into Sydney Park, with a construction compound and

other works immediately adjacent to the park's habitats, and the location of Tempe Lands, Tempe Reserve and the Cooks River along the alignment of the proposed M5 tunnel.

Impacts on threatened and other priority/target species and priority sites

While the potential impacts of the project are discussed in general terms in the BAR, it does not describe or address in detail all of the potential impacts of the project on the above species and sites during construction and operation, and as mentioned impacts to some threatened species are unknown. A more comprehensive discussion of all impacts, including site-specific details, should be included in the BAR.

Cumulative impacts of the project on biodiversity

This project is likely to exacerbate the reductions in biodiversity values that have resulted from past development in the City of Sydney, Marrickville and surrounding LGAs, and there are likely to be further cumulative impacts from numerous current and proposed future developments in the area. Potential cumulative impacts to biodiversity are not identified or discussed in the BAR, despite being a requirement of the FBA as previously mentioned.

Recommendations for further assessment and mitigation measures to reduce impacts to biodiversity

Further assessment

It is considered that further assessment is necessary in relation to:

- threatened species, populations and communities, in accordance with Sections 6-12 of the FBA;
- priority/target species and priority sites in both the City of Sydney and Marrickville LGAs; and
- similar species/sites that may be impacted in other LGAs.

Further assessment should also be undertaken in relation to any changes to the project that arise during the detailed design phase.

Mitigation measures

The mitigation measures outlined in the BAR are not considered adequate in terms of ensuring minimisation of impacts to biodiversity values in the City of Sydney and Marrickville LGAs. The fact that impacts to threatened species, populations and communities and to priority/target species were not specified in the BAR suggests these species etc may be overlooked in the Flora and Fauna Management Plan (FFMP) that is to be prepared for the project, particularly since application of the RMS Biodiversity Guidelines, which as described in the BAR will form the basis of the FFMP, is partly reliant on information in the environmental assessment documents.

More detailed measures are therefore recommended for addition to the BAR and FFMP along with/instead of others already specified, as well any additional mitigation measures identified through the recommended further assessment, and any identified for similar species/sites in other LGAs.

Opportunities for habitat creation/restoration

The BAR does not recognise or discuss any of the opportunities presented by the development to create new habitats through site landscaping etc. While this might not be considered a particular requirement of the FBA, such opportunities have the potential to compensate for some of the adverse impacts and should therefore be documented.

While the Urban Design report and Landscape and Visual Impact Assessment prepared for the EIS identify some opportunities in this regard, there are many more possibilities that should be explored and developed with reference to the City of Sydney's UESAP and Marrickville Council's BS and BAP, and in consultation with the City of Sydney's Urban Ecology Coordinator and Marrickville Council's Team Leader, Biodiversity.

1. INTRODUCTION

This report is based on a review of the Biodiversity Assessment Report (BAR) prepared by Eco Logical Australia Pty Ltd (ELA) as part of the Environmental Impact Statement (EIS) for the proposed new M5 roadworks. This review was commissioned by the City of Sydney and Marrickville Council due to concerns about the impacts of the proposed development on biodiversity, particularly given significant efforts in recent years by both councils and community members to conserve and enhance it in these highly urbanised local government areas (LGAs). The review, and this report, therefore focuses on issues impacting on these two LGAs.

2. METHODOLOGY

The methodology employed in undertaking the review involved the following:

- Meetings with the City's Urban Ecology Coordinator and Acting Team Leader, Biodiversity at Marrickville Council, to discuss the scope of work and particular areas of concern in each LGA. These meetings also provided an opportunity for the council representatives to provide all relevant documents and data, and to discuss and agree on the format of this report.
- A thorough review of all relevant documents, including:
  - the Secretary of the NSW Department of Planning and Environment's Environmental Assessment Requirements (SEARs) for the EIS relating to the BAR;
  - the Framework for Biodiversity Assessment (FBA) prepared by the NSW Office of Environment and Heritage (OEH);
  - the BAR;
  - the Urban Design and Landscape and Visual Impact Assessment reports prepared for the EIS;
  - Biodiversity Guidelines: Protecting and Managing Biodiversity on Roads and Traffic Authority projects (hereafter referred to as RMS Biodiversity Guidelines);
  - the City of Sydney's Urban Ecology Strategic Action Plan;
  - Marrickville Council's Biodiversity Strategy 2011-2021;
  - Marrickville Council's Biodiversity Action Plan 2011-2015;
  - biodiversity-related data held by both Councils; and
  - other relevant documents provided by both councils.
- Preparation of this draft report following the review, with a view to it being incorporated with the broader submissions of both Councils. The report provides commentary on:
  - the validity of the biodiversity assessment;
  - impacts on threatened and priority species and priority sites, with particular consideration for Sydney Park, Tempe Lands, Tempe Reserve and Alexandra Canal and nearby sites with known or potential habitat for threatened/priority species;
  - cumulative impacts of the project on biodiversity;
  - recommendations for further assessment and mitigation measures to reduce impacts to biodiversity; and
  - identification of opportunities to restore/create habitat features through the project.

Upon receipt, comments from the City of Sydney and Marrickville Council on a draft were incorporated into this final report.

3. COMMENTARY ON THE BIODIVERSITY ASSESSMENT

3.1 Validity of the Biodiversity Assessment Report

The BAR was required to be prepared in accordance with the SEARs issued for the biodiversity impact assessment, one of which specifies that it must be undertaken in accordance with the FBA, including further consideration of impacts on species, populations and ecological communities identified by the OEH.

However, the following issues are of concern in relation to the SEAR requirements, and how the FBA was applied in preparation of the BAR:

- The SEARs state that the BAR should be 'An assessment of the potential ecological impacts of the proposal', and FBA Section 2.1.1.3 states the FBA must be used by a proponent to assess all biodiversity values on the development site for a Major Project. The FBA states that the definition of 'biodiversity values' is the same as that under the NSW *Threatened Species Conservation Act 1995* (TSC Act), i.e. it 'includes the composition, structure and function of ecosystems, and includes (but is not limited to) threatened species, populations and ecological communities, and their habitats.' It is furthermore noted that the EIS states that one of the objectives of the project is to 'Minimise impacts on natural systems including biodiversity'.
  Comment: The BAR focuses on threatened species, populations and ecological communities, as does the FBA. However, the SEAR statement, TSC Act definition of biodiversity values and stated objective of the project suggests more consideration should have been given to biodiversity more generally. There are species and sites that are considered to be of local conservation significance within the City of Sydney and Marrickville Council areas, and numerous initiatives have been implemented to conserve and enhance habitat for/at them (refer Sections 3.2 and 3.3 of this report), but these have not been identified in the BAR.

- FBA Section 2.2.2.1 states that when preparing a BAR, an assessor is generally required to make use of databases maintained by the OEH. Section 2.2.2.4 however states that 'Local data may be used if the consent authority, in consultation with OEH, is of the opinion that it more accurately reflects local environmental conditions than the data in the databases.'
- **Comment**: No consideration was given to local data held by the City of Sydney or Marrickville Councils. It is not clear why this was the case. Threatened species records held by both Councils are discussed in Section 3.2 of this report, as well as records of migratory species listed under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

- FBA Section 4.1.1.2 requires that both the Site Map and Location Map in the BAR should show local wetlands and the extent of native vegetation in the outer assessment circle or the buffer area surrounding the development footprint.
  Comment: The wetlands and the majority of fringing native vegetation in Sydney Park, and scattered plants of the endangered Coastal Saltmarsh community along Alexandra Canal are not indicated on these or any other maps in the BAR. Similarly, native vegetation including Coastal Saltmarsh and Grey Mangroves at Tempe Reserve are not indicated on any maps, despite being within the outer assessment circle. Finally, the wetlands and native vegetation at Tempe Lands are not indicated on any other maps. Although this site is outside of the outer assessment circle, it is close to the tunnel alignment, suggesting it could be impacted and therefore should have been included.

- FBA Section 4.1.1.12 states that 'Any other important and local wetlands that are adjacent to or downstream from the development site and within the outer assessment circle must be identified and shown on the Location Map.
  Comment: Local wetlands in Sydney Park, immediately adjacent to the development site, and Tempe Lands are not shown on any maps.

- FBA Section 5.2.1.1 requires the assessor to identify and map the distribution of plant community types (PCTs) on a development site according to the NSW PCT classification as described in the VIS Classification database.
  Comment: It is not clear whether the vegetation at Sydney Park, Tempe Reserve and Tempe Lands should have been identified as PCTs, despite having been planted (with the exception of Grey Mangroves). It appears this vegetation was dismissed as 'urban exotic and native', without being carefully considered, as illustrated by the fact that no vegetation at all was mapped in Sydney Park on Figure 9 of the BAR, or in Tempe Reserve on Figure 8. It is understood this vegetation is not within the development footprint, but in the case of Sydney Park it is immediately adjacent to it, and as mentioned above, Tempe Reserve is within the outer assessment circle and Tempe Lands, although outside of the outer assessment circle, could be impacted. It is considered that identifying the vegetation at these sites through mapping would assist in identifying impacts and ensuring they are mitigated.

- FBA Section 5.2.1.3 states that the assessor should review any existing data and information that is currently available on native vegetation relevant to the development site and land in the outer assessment circle, including existing maps of native vegetation in the area such as those held by a local government authority, or existing data or information in ecological reports, soil surveys or previous native vegetation surveys that are relevant to the development site.
  Comment: Both the City of Sydney and Marrickville Council have prepared biodiversity strategies including vegetation mapping relevant to the study area, as discussed further in Section 3.3, but neither these or associated reports or data were reviewed for or otherwise referenced in the BAR.

- FBA Section 6.1.1.2 states that 'An assessor may use more appropriate local data instead of data from the Threatened Species Profile Database (TSPD) for the purpose of obtaining the information required at Paragraph 6.1.1.1, if: (a) in the opinion of the assessor, the local data more accurately reflects the local environmental conditions of the development site, and (b) the Secretary of DP&E, in consultation with the Chief Executive of OEH, approves the use of that data as more appropriate local data.
  Comment: As mentioned previously, no local data held by the City of Sydney or Marrickville Councils was sourced or otherwise considered in preparation of the BAR. Recent records of threatened species held by both Councils that are relevant to the development are discussed further in Section 3.2 of this report.

- FBA Section 6.5 outlines the steps that must be followed in relation to identifying 'species credit species' on a development site. FBA Section 6.5.1.2 states "Using data from the TSPD, the assessor must identify a threatened species as a candidate species for the development site if: (a) the species is identified as a species credit species in the TSPD, and (b) the geographic distribution of the species is known or predicted to include the IBRA subregion in which the development site is located, and (c) the development site contains habitat features or components associated with the species, as identified in the TSPD, OR (d) past surveys undertaken at the development site indicate that the species is present."
  Comment: It is unclear how the list of candidate species credit species (Table 15 of the BAR) was generated. The list does not include several species credit species (as identified on the TSPD) that have been recorded in the vicinity of the development site in recent surveys, and/or for which suitable habitat (as described on the TSPD) is present on the development site. These include the Eastern Bent-wing Bat and (possibly) Southern Myotis, and the endangered inner west population of the Long-nosed Bandicoot (refer Section 3.2 for more detail). All of these species are listed in Appendix A of the BAR as having been identified for consideration in relation to the development from database searches, along with statements that there is no suitable habitat present within the development site. This is incorrect as, according to the information provided on the TPSD, there is suitable habitat for all of them, particularly at the Alexandria Landfill and adjoining industrial sites, where clearing has already commenced. The TSPD states that the Long-nosed Bandicoot population occurs within 'Highly disturbed areas with no or limited native vegetation', and that the Southern Myotis is also associated with this type of habitat. Furthermore, the Southern Myotis and other microbats are known to roost in buildings, under bridges, and/or in stormwater drains. It appears that these species have been incorrectly excluded from further consideration in application of the FBA, and that they should have been addressed further in the BAR in accordance with the requirements of Sections 6-12 of the FBA. The Long-nosed Bandicoot population was also identified by the OEH as requiring further consideration in accordance with Section 9.2 of the FBA, but no further consideration was given, despite the SEARs stating that specific surveys were required for the species that OEH identified. Table 25 of the BAR states that the Long-nosed Bandicoot population does not occur within the development site, but this cannot be known since no surveys were undertaken.

- FBA Section 8 requires the BAR to include an assessment of the direct and indirect impacts of the project on biodiversity values, and to document the measures that will be implemented to avoid and minimise these impacts, including cumulative impacts (Section 8.3.1.8 (c)).
  Comment: It is felt that the discussion of impacts to biodiversity values and proposed mitigation in the BAR is insufficiently detailed, and cumulative impacts to biodiversity are not discussed at all. It is felt that more detail should be provided, including site-specific information relating to Sydney Park, Alexandra Canal, Tempe Reserve, Tempe Lands and the Cooks River (as discussed further in Sections 3.4, 3.5, 3.6 and 3.7 of this report), including of course in relation to any further assessment undertaken for the threatened species and population mentioned above.

3.2 Threatened species, populations and communities in the City of Sydney and Marrickville LGAs

The BAR discusses impacts to the threatened Green and Golden Bell Frog and Grey-headed Flying-fox, but as mentioned in Section 3.1, threatened microbats, the endangered population of the Long-nosed Bandicoot in inner western Sydney, the endangered Coastal Saltmarsh community, and a number of migratory species listed under the EPBC Act, were not identified or adequately considered in the BAR. This is despite confirmed recent records of:

- the threatened Eastern Bent-wing Bat (plus unconfirmed records of the threatened Southern Myotis) at Sydney Park adjacent to the proposed St Peters interchange, as well as at Tempe Lands, Tempe Reserve and elsewhere along the Cooks River in the Marrickville LGA, and the presence of suitable roosting habitat for these and other threatened microbats within the proposed development footprint – particularly the roof and/or wall cavities of many of the industrial buildings that are to be demolished for the works, the mature trees that will be removed, the bridge over Alexandra Canal that is to be demolished, and potentially any stormwater channels that are to be demolished.
- the Long-nosed Bandicoot at Alexandria, and suitable habitat present for this species within the weed-infested Alexandria Landfill site, which is to be cleared for the St Peters interchange (with clearing already commenced), as well as possibly adjoining industrial sites that will also be developed for the interchange;
- scattered Coastal Saltmarsh plants occurring along Alexandra Canal, potentially in the vicinity of the bridge/s that require demolition and the proposed new bridges, and a patch of Coastal Saltmarsh at Tempe Reserve; and
- migratory species at Sydney Park, including the Great Egret, Cattle Egret, Sharp-tailed Sandpiper, Latham's Snipe, and Rufous Fantail, the latter of which also potentially occurs periodically in association with the weed infestations on the Alexandria Landfill site.

3.3 Relationship to Council initiatives

Both the City of Sydney and Marrickville Councils and their respective community members have implemented numerous initiatives in recent years to conserve and enhance habitats to promote biodiversity to the extent possible in these highly urbanised areas. These initiatives are guided by:

- the City of Sydney's Urban Ecology Strategic Action Plan (UESAP);
- Marrickville Council's Biodiversity Strategy 2011-2021 (BS); and
- Marrickville Council's Biodiversity Action Plan 2011-2015 (BAP).

These documents outline the 'priority' or 'target' species for conservation in each LGA, along with 'priority' sites for biodiversity conservation and actual or potential habitat linkages/connectivity between them, as well as between sites in adjoining LGAs. As mentioned in Section 3.1, these and other ecological reports and data held by both Councils were not reviewed or otherwise considered in preparation of the BAR.

Biodiversity has obviously drastically reduced from its original state within both LGAs. Many of the species present today have adapted well to urbanisation and are abundant and widespread. However, a number of other species that have declined in urban areas generally are still present in small numbers in both LGAs. Most of these species are dependent on particular habitat features that are limited within both LGAs and many other urban areas, such as dense shrubby vegetation, tree hollows, rock crevices, ground-level features such as sandstone boulders and logs, and freshwater wetlands. These species have been identified as 'priority' species in the City of Sydney's UESAP, and 'target' species in Marrickville's BS & BAP, and include:

- frogs such as the threatened Green and Golden Bell Frog (GGBF), a small population of which occurs at Rosebery, the Dwarf Eastern Tree Frog and Peron's Tree Frog;
- reptiles such as the Eastern Blue-tongue, Bar-sided Skink and Eastern Water Skink;
- small birds such as the Superb Fairy Wren, New Holland Honeyeater, Red-browed Finch, Grey Fantail, Silvereye and rainforest migrants including the Rufous Fantail and Spectacled Monarch;
- freshwater wetland birds such as the Australasian Reed Warbler, Black-fronted Dotterel, Black-winged Stilt, Buff-banded Rail and Royal Spoonbill;
- microbats including Gould's Wattled Bat and the threatened species previously mentioned;

- the Long-nosed Bandicoot; and
- the threatened Grey-headed Flying-fox.

While the majority of these are not threatened and are common in large bushland areas around Sydney, they are considered to be of local conservation significance. There have been significant efforts to protect and enhance habitats for them, particularly at priority sites, and to enhance connectivity between these sites.

One of the priority sites identified by the City of Sydney's UESAP is Sydney Park (refer Appendix A for site photos). At least 62 native fauna species have been recorded at the park since 2010, including priority species such as the Superb Fairy Wren, New Holland Honeyeater, White-plumed Honeyeater, Australasian Reed Warbler, Rufous Fantail, Black-winged Stilt, Black-fronted Dotterel, Royal Spoonbill, Eastern Blue-tongue and Dwarf Eastern Tree Frog. Its habitats include:

- constructed freshwater wetlands at which there have been significant habitat enhancement works undertaken in recent years, with the most recent works completed as part of a stormwater harvesting scheme earlier in 2015;
- bush restoration sites established and maintained in accordance with a Bush Restoration Management Plan (BRMP) by:
  - the City of Sydney, including small patches planted with species characteristic of the endangered Eastern Suburbs Banksia Scrub (ESBS) and Sydney Turpentine Ironbark Forest (STIF) communities, both of which are thought to have originally occurred in the area prior to development; and
  - Conservation Volunteers Australia (CVA) and a local community group known as 'I HEART Sydney Park', through which hundreds of inner city residents have volunteered their time over the past two years to restore, maintain and gradually expand small pockets of native vegetation that also incorporate other habitat features; and
- substantial ground-level habitat features such as sandstone boulders and logs.

The dense weeds, mature trees, rock crevices, sandstone boulders, piles of debris and other ground-level features at the Alexandria Landfill (refer Appendix A for site photos), which straddles the border of the City of Sydney and Marrickville LGAs adjacent to Sydney Park, is also of habitat value for priority species, particularly small birds and reptiles, and as mentioned in Section 3.1, potentially microbats and the Long-nosed Bandicoot. The landfill contributes to local habitat connectivity between Sydney Park and Tempe Reserve and other sites on the Cooks River in the Marrickville LGA.

The banks of Alexandra Canal are also important with regard to local habitat connectivity, with the UESAP, BS and BAP all recognising their potential for future habitat enhancement.

Tempe Reserve, incorporating Tempe Lands, and the lower stretch of Alexandra Canal (refer Appendix A for site photos) are identified as the highest priority sites in the Marrickville LGA according to the BS and BAP, and comprise part of a designated wildlife corridor in the Marrickville Local Environmental Plan 2010. Monthly bird surveys have been undertaken at Tempe Reserve and Tempe Lands for over four years by a committed group of community members, the 'Tempe Birdos', with a total of 93 native bird species recorded, including target species such as (in the last two years) the Yellow Thornbill, White-browed Scrub Wren, Yellow-faced Honeyeater, White-plumed Honeyeater, White-naped Honeyeater, Spotted Pardalote, Brown Gerygone, Red-browed Finch, Silvereye, Superb Fairy-wren, Golden Whistler, Grey Fantail, and Australasian Reed Warbler. An additional eight target reptile and frog species have been recorded at this site, and there have been two recent confirmed records of the Short-beaked Echidna. The habitats of this priority site include:

- constructed freshwater wetlands at Tempe Lands, which form a loose chain with those in Sydney Park to the north, and to freshwater wetlands in the Rockdale LGA to the south;
- a large patch of Coastal Saltmarsh adjoining the Cooks River in Tempe Reserve, constructed in 2005-2006 and now considered representative of the endangered ecological community;
- patches of Grey Mangroves and Coastal Saltmarsh along the Cooks River adjoining Tempe Reserve;
- large garden beds planted with species characteristic of the endangered Swamp Oak Floodplain Forest and STIF communities, and sandstone heath; and
- the Cooks River Valley Garden, established to demonstrate local native species of the area.

The City of Sydney and Marrickville Councils are also both members of the Cooks River Alliance, a partnership of eight Councils who are working together with their communities for a healthy Cooks River catchment. There have been substantial efforts through the alliance to improve water quality and re-establish native vegetation along the river to promote biodiversity and restore local and regional habitat connectivity.

While not necessarily required by the FBA, it is nevertheless disappointing to note that there is no recognition of any of the above in the BAR, despite the development footprint for the St Peters interchange and local road upgrades extending from Alexandra Canal across the Alexandria Landfill and into Sydney Park, with a construction compound and other works immediately adjacent to two of the park's wetlands and bush restoration sites, and the location of Tempe Lands, Tempe Reserve and the Cooks River along the alignment of the proposed M5 tunnel.

Although not directly referred to in the BAR, these priority sites have apparently been dismissed as 'urban native and exotic' vegetation, but the reality is that despite being modified environments they provide important habitat for fauna species in this highly urbanised context, as demonstrated by the priority/targeted species that have been recorded at them. The project should not detract from efforts to conserve and enhance their habitat values.

3.4 Impacts on threatened and priority/target species and priority sites

While the potential impacts of the project are discussed in general terms in the BAR, it does not describe or address in detail all of the potential impacts of the project on the above species and each site during construction and operation. These include:

- Mortality of fauna during clearing of dense weeds, mature trees, sandstone boulders and other rocks and ground-level features, particularly at:
  - the Alexandria Landfill and surrounding industrial and vacant sites (which as previously mentioned provide suitable habitat for threatened microbats, the endangered Long-nosed Bandicoot population, small birds, Eastern Blue-tongues and other lizards – and as previously noted, clearing has already commenced at the landfill site);
  - the site of the construction compound in Sydney Park, along Campbell Rd (where sandstone boulders are likely to shelter Eastern Blue-tongues and other lizards as well as frogs).
- Reduction in habitat extent and local habitat connectivity as a result of the above clearing, plus reduced potential for future enhancement of this connectivity between Sydney Park and Tempe Lands, Tempe Reserve and other sites on the Cooks River.
- Damage to/removal of vegetation in bush restoration sites in Sydney Park, including adjacent to the Sydney Park construction compound, and a small patch planted with species characteristic of the endangered STIF community adjacent to Euston Road.
- Noise, dust, light, shade and other visual disturbance to the Sydney Park wetlands, including bioretention swales, and Sydney Park bush restoration sites, to Alexandra Canal, and potentially to Tempe Lands wetlands and Tempe Reserve during both construction and operation, with resultant decrease in habitat value.
- Potential removal/disturbance to endangered Coastal Saltmarsh and its habitat along Alexandra Canal during demolition of the existing bridge and construction of new bridges.
- Sedimentation and pollution of the Sydney Park wetlands, Alexandra Canal, the Cooks River, and potentially Tempe Lands wetlands, reducing water quality and potentially including severe contamination, with adverse impacts to aquatic habitats as a result of:
  - earthworks, and particularly excavation of contaminated soils at Alexandra Landfill and Sydney Park (it is assumed that excavation will be required for the proposed construction compound at the latter due to the current slope of land at this site);
  - storage of spoil at the Alexandra Landfill site;
  - demolition of existing bridges and new bridge construction across Alexandra Canal; and
  - construction and/or earthworks that may affect Tempe Lands wetlands (note while no surface works are proposed in the vicinity of these wetlands, it is unclear whether stormwater flows will be impacted).

- Alteration of hydrological regimes to the Sydney Park wetlands, Alexandra Canal, the Cooks River, and potentially Tempe Lands wetlands through increased surface run-off and dewatering and discharge of groundwater with potential impacts to aquatic habitats, bioretention swales and fringing vegetation at Sydney Park and Tempe Lands, as well as aquatic habitats in, and Coastal Saltmarsh and Grey Mangroves adjoining, the Cooks River and Alexandra Canal. The BAR does not clearly describe the proposed stormwater detention mechanisms or where surface flows will be directed (for example, it is not clear whether there will be changes to current flows from Campbell Road to the Sydney Park wetlands), and it is noted that Sections 6.3.5, 6.3.6 and 6.4.7 of the BAR, which relate to hydrology, aquatic habitat and disturbance to waterways are not completely consistent with each other.

It is considered that the nature and ; extent of a number of the above potential impacts, particularly those with potential to affect threatened microbats and the endangered Long-nosed Bandicoot population, are unknown due to the perceived shortcomings in application of the FBA outlined in Section 3.1.

3.5 Cumulative impacts of the project on biodiversity

This project is likely to exacerbate the reductions in biodiversity values discussed in Section 3.3 of this report that have resulted from past developments in the City of Sydney, Marrickville and surrounding LGAs, and there are likely to be further cumulative impacts from the following current and proposed future developments in the area:

- numerous large-scale, high-rise residential and mixed use developments in the locality, for example at Green Square, Alexandria, and Wolli Creek;
- additional WestConnex roadworks such as the M4-M5 Link – Haberfield to St Peters and the Sydney Gateway;
- other roadworks such as the widening of Marsh St in Arncliffe for the Airport West Precinct;
- the Sydney Metro – Sydenham to Bankstown rail corridor development; and
- numerous residential developments along the light rail corridor.

Potential cumulative impacts to biodiversity are not identified or discussed in the BAR, although they are very briefly, but not comprehensively, addressed in Chapter 27 of the EIS. They include:

- further decreases in habitat extent and quality, and local habitat connectivity, with associated declines in species diversity;
- ongoing disturbance to the Sydney Park wetlands and bush restoration sites, particularly as a result of the construction compound that will remain adjacent to the park on Campbell Rd for the construction of the M4-M5 Link;
- further increases in traffic, noise, dust, light, shade and other visual disturbance;
- further potential for impacts to water quality, hydrology etc of the Sydney Park and Tempe Lands wetlands, Alexandra Canal and Cooks River;
- increased pressure on open space for recreational use from increased residential development removing existing habitat, including existing bush regeneration sites, and/or potential habitat;
- increased disturbance to existing habitats from increased human activity; and
- increased predation and other disturbance from pets as a result of the above.

It is noted that the project will also directly impact on the endangered GGBF. Although impacts to this species will occur outside of the City of Sydney and Marrickville LGAs, and are addressed in detail in the BAR, both Councils are nevertheless concerned, particularly given the cumulative impact of this project in relation to past developments that have also adversely affected the habitats of this species, including not just the existing M5 but a development that resulted in destruction of habitat at Rosebery in the City of Sydney LGA, where the population is consequently restricted to a small residential backyard on private property and is at high risk of extinction.

It is further noted that the project will directly impact the vulnerable GHFF, through removal of approximately 10.8 hectares of potential foraging habitat, including an estimated 200 GHFF feed trees in or adjacent to Sydney Park, in addition to the removal of a substantial number of trees for other stages of the WestConnex

project, and for the many other developments in this and other parts of Sydney. Both the City of Sydney and Marrickville Councils are concerned about the cumulative impacts of these developments on the GHFF, which are not acknowledged in the BAR.

Conversely to the potential for cumulative adverse impacts to biodiversity, if appropriate, site-specific mitigation measures are applied and opportunities for habitat creation/restoration are realised through site landscaping and other measures (such as those outlined in Section 3.6), there is potential for impacts associated with this project to be reduced, and for it to over time to contribute somewhat to biodiversity values through enhancement of habitats and connectivity in the area.

3.6 Recommendations for further assessment and mitigation measures to reduce impacts to biodiversity

3.6.1 Further assessment

As mentioned in Section 3.4, the nature of actual or potential impacts to threatened species, populations and communities that will result from the development are unknown due to the perceived shortcomings in application of the FBA outlined in Section 3.1. Further assessment is therefore considered necessary in accordance with Sections 6-12 of the FBA, with the BAR updated based on the results.

As also outlined in Section 3.4, impacts to other priority/target species and priority sites in both LGAs have not been specifically identified or assessed; the BAR should be updated with this information as well.

Further assessment is also recommended in relation to similar species/sites that may be impacted in other LGAs.

Further assessment should also be undertaken in relation to any changes to the project that arise during the detailed design phase.

3.6.2 Mitigation measures

The mitigation measures outlined in the BAR are quite general and are not considered adequate in terms of ensuring minimisation of impacts to the biodiversity values of the City of Sydney and Marrickville LGAs that have been highlighted in this report, along with similar biodiversity values that may occur in other affected LGAs.

The BAR states that ecological impacts will be mitigated through adherence to the RMS Biodiversity Guidelines, and that it is anticipated that requirements will be incorporated into a Flora and Fauna Management Plan (FFMP), to be implemented during construction and operation. However, the fact that many of the impacts described in Section 3.4 were not identified in the BAR suggests they may be overlooked in the FFMP, particularly since the RMS Guidelines specify that the environmental assessment documents should be referred to as a guide when applying them, but also because the RMS Guidelines appear to focus mainly on bushland areas and naturally-occurring habitat features, which presents a risk that habitats in highly urbanised areas may be overlooked.

It is also of concern that clearance has commenced at the Alexandria Landfill, as previously mentioned, and it is not clear whether an FFMP is being implemented in relation to the works that are currently taking place.

The more detailed measures outlined below are therefore recommended for addition to the BAR and FFMP along with/instead of others already specified, as well any additional mitigation measures identified through the further assessment recommended in Section 3.5.1, and any identified for similar species/sites in other LGAs and/or by the Cooks River Alliance:

- The development footprint should be clearly delineated prior to clearance of vegetation and other habitat features to ensure clearance is kept to the absolute minimum necessary, particularly at and around:
  - The proposed St Peters interchange site

  - the Sydney Park construction compound
- Removal of dense weed infestations and other vegetation at the Alexandria Landfill site should cease until the results of further assessment recommended in Section 3.5.1 are obtained, or at the very least weed removal should be undertaken in gradual stages, with complete removal delayed as much as possible.
- Building demolition works at the Alexandria Landfill site and surrounding industrial sites, and clearance of hollow-bearing trees should also be delayed until the results of further assessment recommended in Section 3.5.1 are obtained, or at the very least should be timed to avoid the breeding season of microbat species.
- The trunks and branches of large trees that are removed should be stored and re-used in site landscaping, for example as ground level habitat features and/or as stags in the water at Tempe Lands and/or Sydney Park wetlands.
- Where possible, tree hollows that are removed should be stored and re-used by attaching them to trees that remain.
- Clearance of sandstone boulders and other ground-level habitat features at Alexandria Landfill and Sydney Park (sandstone boulders along Campbell Road), as well as mature trees in this vicinity should be undertaken carefully and supervised by an ecologist, with any animals found to be relocated to suitable habitat in Sydney Park and/or an alternate location such as Tempe Lands (subject to appropriate licences under the *National Parks and Wildlife Act 1974*).
- Sandstone boulders and other ground-level habitat features should be stored and re-used in site landscaping.
- Frog and reptile exclusion fencing (shadecloth or similar) should be attached to construction site fencing to prevent access by frogs and reptiles at the Sydney Park construction compound and elsewhere around the St Peters interchange site during construction.
- Site landscaping incorporating appropriate soils/other growing media such as crushed sandstone, and maximising locally native shrubs, grasses and groundcover species that will provide similar habitat to the dense weeds removed (i.e. not just trees, and preferably incorporating tree-free areas to discourage aggressive species such as the Noisy Miner) should be commenced as soon as possible, prior to or immediately after each stage of weed removal, to maximise the time available for it to develop some value as replacement habitat.
- Dense infill planting of shrubs, grasses and groundcover species should also be undertaken as soon as possible to further develop habitats at Sydney Park, Tempe Lands and Tempe Reserve, to compensate for those removed at the Alexandria Landfill site.
- The species to be planted should be selected to create/enhance habitat for priority/target species, and should based on specialist ecological advice.
- Vegetation should be fenced after planting and subject to intensive, specialist bush regeneration maintenance practices, including watering, weeding, and infill planting to replace plant failures etc, to both ensure its establishment and maximise its habitat value.
- Regular watering should be undertaken suppress dust in the vicinity of Sydney Park, Alexandria Canal, Tempe Reserve, and Tempe Lands.
- Appropriate, site-specific measures to prevent sedimentation and pollution of the Sydney Park wetlands, Alexandra Canal, Tempe Lands wetlands and the Cooks River should be incorporated during both construction and operation, including in relation to earthworks, storage of spoil, and bridge demolition and construction, to prevent any adverse impacts to water quality.
- Appropriate, site-specific measures should be incorporated to prevent flow of contaminants to the above habitats from landfill excavated at Alexandria Landfill and Sydney Park, during construction and operation.
- Appropriate, site-specific measures should be incorporated to minimise both release of contaminants that may be accumulated in instream sediments, and instream turbidity during demolition and construction of bridges across Alexandria Canal.
- Appropriate, site-specific measures (appropriate drainage structures, stormwater detention basins etc) should be incorporated to ensure maintenance of appropriate hydrological regimes at the Sydney Park wetlands, Tempe Lands wetlands, Alexandra Canal and the Cooks River.
- Stormwater drainage should not exacerbate, but rather should be designed to resolve existing problems associated with drainage carrying gross pollutants and high sediment loads from Campbell Road to the bioretention swale at Wetland 4 in Sydney Park.

- Appropriate measures should be incorporated to ensure groundwater is treated to an appropriate standard before discharge to Alexandra Canal and the Cooks River, and to ensure that discharge volumes do not adversely impact the hydrology/geomorphology of these receiving waters.
- Low sodium and/or directional lighting should be used to avoid light spill into the Sydney Park wetlands and other habitats in Sydney Park and around the St Peters interchange, and Tempe Reserve and Tempe Lands if impacted, during both construction and operation, including at all construction compounds.
- Noise barriers, batters and/or other physical barriers (preferably vegetated) should be incorporated adjacent to Sydney Park and Alexandra Canal, including at construction compounds and in relation to cycleways and pedestrian paths, and Tempe Lands and Tempe Reserve if impacted, to minimise noise as well as visual disturbance from vehicle, personnel movements etc, and to prevent/reduce access by fauna during both construction and operation.
- The Sydney Park construction compound should be designed and situated to ensure that access for volunteers to the adjoining bush restoration site is not restricted and their safety not compromised.
- The on-ramp to the shared cycleway/pedestrian bridge across Campbell Road should be realigned to avoid disturbance to the bioretention swale at Wetland 4, and the adjoining bush restoration site. It would be preferable for this on-ramp to be located away from these habitat areas.
- Fauna underpasses for frogs and reptiles should be established in new culverts or similar, incorporating rocks and thick grasses/sedges at each end. The number of underpasses should be maximised to the extent feasible, due to the imitations the interchange will place on the movement of these and other less mobile fauna species.
- Culverts or other drainage structures should be left ungated to allow access for roosting microbats.
- One or more fauna overpasses incorporating dense native shrubs should be established for birds, potentially as part of cycleway/pedestrian bridges. Such overpasses should provide continuous connectivity to other habitat areas in Sydney Park and other site landscaping that has been designed to provide habitat,
- Feed trees for the Grey-headed Flying-fox should be incorporated into site landscaping to replace those that will be removed around Sydney Park.
- Landscape plans should be developed with specialist ecological advice, with reference to the City of Sydney's UESAP and Marrickville Council's BS and BAP, and in consultation with the City of Sydney's Urban Ecology Coordinator and Marrickville Council's Team Leader, Biodiversity.
- All mitigation measures should be included in the Flora and Fauna Management Plan (FFMP) for the project, including specific details of the affected species and sites to/at which the RMS guidelines will be applied.
- The FFMP should be expanded to incorporate opportunities for habitat creation/restoration, as discussed in Section 3.5.3.
- The draft FFMP should be provided to all stakeholders for review and comment prior to finalisation.
- Any changes to the nature/extent of surface works that arise during the detailed design phase should be subject to further assessment, and the FFMP updated with additional mitigation measures if necessary.

3.5.3 Opportunities for habitat creation/restoration

Finally, the BAR does not recognise or discuss any of the opportunities presented by the development to create substantial new habitats through landscaping etc in and around the proposed open space adjoining the St Peters interchange and along Alexandra Canal. While this might not be considered a particular requirement of the FBA, such opportunities would compensate for some of the adverse impacts of the project to biodiversity and should therefore be explored.

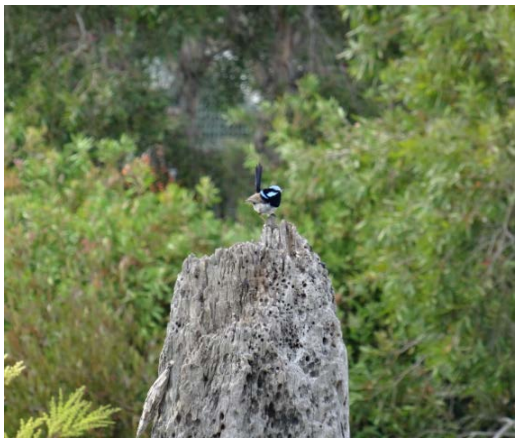
It is noted that the Urban Design report and Landscape and Visual Impact Assessment prepared for the EIS identify some opportunities in this regard, but these focus mainly on establishing heavily treed areas which are unlikely to support many of the priority/target species, but rather to encourage the species that are well-adapted to urban environments and that are very common as a result. Additionally, Appendix L of the Volume 2E Urban Design Report Part 8 indicates a very limited and inappropriate landscape concept plan for the St Peters Interchange. A species list is to be created in consultation with ecologists and the City's Urban Ecology Coordinator, to largely focus on Eastern Suburbs Banksia Scrub (ESBS) species so as to enhance and maximize habitat potential for priority and target species. Bioretention plantings should also consist of a diversity of locally native grasses, sedges and reeds and not the species identified for mass plantings in the concept.

There are many more possibilities and it is considered that these should be incorporated into the BAR, and/or the Urban Design report and Landscape and Visual Assessment, and further developed with reference to the City of Sydney's UESAP and Marrickville Council's BS and BAP, and in consultation with the City of Sydney's Urban Ecology Coordinator and Marrickville Council's Team Leader, Biodiversity. They include the potential to:

- Incorporate dense reed beds and sedges and potentially bioretention swales to maximise the habitat value of stormwater detention basins, whilst also maximising their effectiveness in treating road run-off.
- Incorporate additional ponds if feasible to maximise freshwater wetland habitat.
- Incorporate fine mesh structures if feasible over stormwater inlets to prevent access by the Mosquito Fish (*Gambusia holbrooki*), which preys on tadpoles.
- Incorporate fences around stormwater detention basins/other ponds, to restrict access by dogs and people.
- Create habitat for the endangered GGBF through the above ponds/wetlands as part of offsetting impacts to this species at Arncliffe (in addition to the mitigation described for the GGBF in the BAR), to which tadpoles from the captive breeding program described in the BAR could potentially be released. As mentioned in Section 3.6, a large GGBF population once occurred at Rosebery, but as a result of past development the population is now restricted to one residential backyard and is at high risk of extinction. Creation of habitat at St Peters could be a means of restoring a population to this locality and assisting to ensure the conservation of the Cooks River Key Population.
- Re-establish vegetation representative of the endangered ESBS community, which was also widespread in the locality prior to development, in sunny areas around the interchange (potentially adjoining but set back from the above wetland areas) (refer Appendix B).
- Establish shade-tolerant/rainforest vegetation in shaded areas around the interchange to provide habitat for small, migratory rainforest species.
- Create new habitat features for reptiles, such as dry-pack sandstone retaining walls.
- Incorporate scuppers in the design of new bridges to provide roosting habitat for microbats.
- Create a substantial fauna overpass vegetated with shrubs, grasses and groundcovers across part/all of the interchange that would also contribute to additional open space (refer Appendix B for an example), and could potentially link to Alexandria Canal where there are likely to be future opportunities to enhance connectivity to Tempe Reserve and other sites along the Cooks River.
- Implement large scale offset native habitat planting at Tempe Reserve.
- Construct habitat for the endangered Coastal Saltmarsh community along Alexandra Canal as part of landscaping adjacent to the new bridges, in consultation/collaboration with Sydney Water, who are currently doing this at the mouth of the canal in Tempe Reserve.
- Install sections of trunks from trees that have been removed in Alexandra Canal and/or the Cooks River, as snags with cut-in habitat boxes.
- Engage community volunteers in planting associated with site landscaping, and in subsequent maintenance.
- Provide funds for a combined Council monitoring initiative (over 5-10 years) to monitor changes to biodiversity over time as a result of the project.
- Provide funds, or a pathway to funds, to offset ongoing ecological impacts that are highlighted by monitoring.
- Establish a community native plant nursery, seed orchard and Community Environmental Education Centre at Tempe Reserve/elsewhere.

Bioretention swale vegetated with native species at Wetland 4 in Sydney Park. The wetland provides habitat for a range of small birds, freshwater wetland birds, reptiles, frogs and microbats. The construction compound in Sydney Park will be immediately adjacent to this important habitat.

Additional bioretention swales at Wetland 4 – recently constructed as part of a stormwater harvesting scheme, they incorporate native vegetation and other habitat features.

Sydney Park's wetlands provide habitat for priority species including the migratory Latham's Snipe and the Superb Fairy Wren (photographed on December 15, 2015 when a total of three snipe were recorded in a brief inspection).

Bush restoration site (vegetated area at right), maintained by community volunteers, immediately adjacent to the construction compound site in Sydney Park.

Sandstone boulders at the Sydney Park construction compound site provide habitat for reptiles and frogs

Wetland 5 at Sydney Park, located near the corner of Campbell Road and Euston Road, immediately adjoining proposed roadworks. Although difficult to see, Black-winged Stilts are foraging in the shallows.

Vegetation characteristic of the endangered Sydney Turpentine Ironbark Forest, recently planted at Sydney Park and incorporating other habitat features, is situated within a few metres of the proposed roadworks on Euston Road.

One of three wetlands at Tempe Lands which provide important habitat for small birds, freshwater wetland birds, reptiles, frogs, and microbats, with two recent records of the Short-beaked Echidna. The alignment of the new M5 tunnel is close to this site**.**

Endangered Coastal Saltmarsh at Tempe Reserve, adjoining the Cooks River near the alignment of the new M5 tunnel.

Native vegetation at Tempe Reserve, including Grey Mangroves at left, in the intertidal zone on the Cooks River

Current Sydney Water works to create habitat for endangered Coastal Saltmarsh near the mouth of Alexandra Canal. There is potential for similar works associated with the new bridges over the canal.

Dense infestations of Lantana and other weeds with mature canopy trees at the Alexandria Landfill site provide important habitat for small birds, and possibly microbats and the endangered inner west Long-nosed Bandicoot population. Rocky features provide habitat for reptiles.

Further illustration of the dense weed infestations at the Alexandria Landfill site.


Buildings such as this that are within the development footprint of the St Peters interchange may provide roost sites for microbats, potentially including threatened species. Construction materials and debris in the adjoining yard provide habitat for reptiles such as the Eastern Blue-tongue.

Further illustration of potential reptile habitat within the footprint of the St Peters interchange: a vacant site with piles of sandstone blocks, polypipe and other construction materials.

Eastern Suburbs Banksia Scrub vegetation, which provides excellent habitat for a range of priority/target species and could be incorporated into landscaping around the St Peters interchange

Example of vegetated fauna overpasses in northern NSW. While overpasses of this extent may not be feasible at St Peters, smaller versions could potentially be incorporated with proposed cycle/pedestrian bridges.

Appendix Ei: Sydney Reconstructed Bushland

Appendix Eii: Eastern Suburbs Banksia Scrub

Appendix Eiii: Sydney Turpentine Ironbark Forest

Appendix Eiv: Coastal Freshwater Reedland

Appendix Ev: Coastal Escarpment Littoral Rainforest

Appendix Evi: Swamp Oak Floodplain Forest

RECOMMENDED NATIVE SPECIES FOR INFILL PLANTING
Species useful to create habitat/understorey planting
Planting guide: 8 plants per m2
Ratio: 1 shrub, 7 mix of grasses, groundcovers, sedges. (Vine every 4th m2)
Diversity is key

	Scientific name	Common name	Height
Shrubs/ small trees	*Acacia decurrens*	Black wattle	6 to 10m
	Acacia falcata	Sickle wattle	5m
	Acacia implexa	Hickory wattle	15m
	Acacia longifolia	Sydney Golden Wattle	6 to 8m
	Acacia linifolia	White wattle	2 to 4m
	Acacia parramattensis	Parramatta wattle	2 to 15m
	Acacia suaveolens	Sweet wattle	3m
	Baeckea linifolia	Weeping Baeckea	2m
	Banksia ericifolia	Heath-leaved Banksia	2 to 5m
	Banksia integrifolia	Coast Banksia	6m
	Banksia spinulosa	Hairpin Banksia	1 to 3m
	Banksia serrata	Old Man Banksia	15m
	Breynia oblongifolia	Coffee Bush	2 to 3m
	Bursaria spinosa	Blackthorn	3 to 4m
	Callicoma serratifolia	Black Wattle	6 to 10m
	Callistemon citrinus	Crimson Bottlebrush	1 to 3m
	Correa alba	White Correa	1.5m
	Correa reflexa	Common Correa	1m
	Dodonaea triquetra	Large-leaf Hop-bush	2m
	Eupomatia laurina	Native Guava	3 to 5m
	Goodenia hederacea	Forest Goodenia	1m
	Goodenia ovata	Hop Goodenia	1 to 1.5m
	Grevillea sericea	Pink Spider Flower	2m
	Grevillea speciosa	Red Spider Flower	3m
	Grevillea juniperina	Juniper-leaf Grevillea	1 to 3m
	Hakea dactyloides	Finger Hakea	2 to 4m
	Hakea sericea	Silky Hakea	3m
	Hakea teretifolia	Needlebush	1m
	Indigofera australis	Austral Indigo	2m
	Kunzea ambigua	Tick Bush	2 to 4m
	Leptospermum laevigatum	Coast Teatree	6m
	Leptospermum polygalifolium	Tantoon	2.5m
	Leptospermum squarrosum	Peach Blossom Teatree	2.5m
	Leptospermum trinervium	Flaky-barked Teatree	2 to 6m
	Melaleuca ericifolia	Swamp Paperbark	6 - 12m
	Melaleuca linariifolia	Flax-leaved Paperbark	8m
	Melaleuca nodosa	Prickly-leaved Paperbark	1.5 to 3m
	Melaleuca styphelioides	Prickly-leaved Teatree	8 to 10m
	Melaleuca thymifolia	Honey Myrtle	1m
	Monotoca elliptica	Tree Broom Heath	3m
	Ozothamnus diosmifolius	Rice Flower	2m
	Viminaria juncea	Native Broom/Golden Spray	2.5 to 5m
	Westringia fruiticosa	Coastal Rosemary	2m
Grasses	*Aristida vagans*	Threeawn Speargrass	
	Austrodanthonia tenuior	Blue Wallabygrass	
	Austrostipa pubescens	Spear grass	
	Austrostipa ramossisma	Native Princess Spear Grass	
	Cymbopogon refractus	Barbed Wire Grass	
	Dianella caerulea	Blue-flax Lily	
	Dianella revoluta	Black-anther Flax-lily	
	Dichelachne crinita	Longhair Plumegrass	

	Dichelachne micrantha	Shorthair Plumegrass
	Entolasia marginata	Bordered Panic
	Imperata cylindrica	Blady Grass
	Lomandra filiformis	Wattle Mat-rush
	Lomandra longifolia	Spiny-head Mat-rush
	Microlaena stipoides	Weeping Grass
	Oplismenus aemulus	Australian Bastket Grass
	Oplismenus imbecillis	Pademelon Grass
	Poa affinis	Poa
	Themeda australis	Kangaroo Grass
Sedges	*Carex appressa*	Tall Sedge
	Carex inversa	Common Sedge
	Gahnia aspera	Rough Saw-sedge
	Gahnia sieberiana	Red-fruit Saw-sedge
	Ficinia nodosa	Knobby Club Rush
	Juncus continuus	Pithy Rush
	Juncus usitatus	Common Rush
Groundcovers	*Centella asiatica*	Asiatic Pennywort
	Dichondra repens	Kidney Weed
	Hydrocotyle peduncularis	Small Pennywort
	Plectranthus parviflorus	Cockspur Flower
	Pratia purpurascens	Whiteroot
	Viola hederacea	Ivy-leaf Violet
	Wahlenbergia gracilis	Australian Bluebell
Vines	*Cissus antarctica*	Water Vine/Kangaroo Vine
	Cissus hypoglauca	Jungle Grape
	Clematis glycinoides	Headache Vine
	Eustrephus latifolius	Wombat Berry
	Glycine clandestina	Twining Glycine
	Glycine microphylla	Small-leaf Glycine
	Hardenbergia violacea	False Sarsaparilla
	Hibbertia scandens	Climbing Guinea Vine
	Kennedia rubicunda	Dusky Coral Pea
	Pandorea pandorana	Wonga Wonga Vine

EASTERN SUBURBS BANKSIA SCRUB

	Scientific name	Common name
Shrubs	***Acacia longifolia***	Sydney Golden Wattle
	Acacia suaveolens	Sweet Wattle
	Acacia terminalis	Sunshine Wattle
	Acacia ulicifolia	Prickly Moses
	Allocasuarina distyla	Scrub She-oak
	Aotus ericoides	Common Aotus
	Astroloma pinifolium	Pine Heath
	Baeckea imbricata (s)	Heath Myrtle
	Banksia aemula	Wallum Banksia
	Banksia ericifolia (s)	Heath-leaved Banksia
	Banksia marginata	Silver Banksia
	Banksia serrata	Old Man Banksia
	Bauera rubioides (s)	River Rose
	Boronia ledifolia	Showy Boronia
	Bossiaea heterophylla	Variable Bossiaea
	Bossiaea scolopendria	Plant Plant
	Callistemon citrinus (s)	Crimson Bottlebrush
	Conospermum taxifolium	Variable Smoke-bush
	Correa reflexa	Common Correa/Native Fuschia
	Darwinia fascicularis	n/a
	Darwinia leptantha	n/a
	Dillwynia retorta	Eggs and Bacon
	Epacris longiflora	Fuchsia Heath
	Epacris microphylla	Coast Coral Heath
	Epacris obtusifolia	Blunt-leaf Heath
	Eriostemon australasius	Pink Wax Flower
	Gompholobium grandiflorum	Large Wedge Pea
	Grevillea sphacelata	Grey Spider Flower
	Grevillea speciosa	Red S[pider Flower
	Hakea teretifolia (s)	Needlebush
	Hibbertia fasciculata	Bundled Guinea Flower
	Isopogon anemonifolius	Broad-leaf Drumsticks
	Kunzea ambigua	Tick Bush
	Lambertia formosa	Mountain Devil
	Lasiopetalum ferrugineum	Rusty Velvet Bush
	Leucopogon ericoides	Pink Beard heath
	Leptospermum juniperinum (s)	Prickly Tea-tree
	Leptospermum laevigatum	Coast Teatree
	Melaleuca armillaris	Bracelet Honey-myrtle
	Melaleuca ericifolia (s)	Swamp Paperbark
	Melaleuca nodosa	Prickly-leaved Paperbark
	Melaleuca squamea (s)	Swamp Honey-myrtle
	Micrantheum ericoides	n/a
	Monotoca elliptica	Tree Broom-heath
	Monotoca scoparia	Prickly Brrom-heath
	Persoonia lanceolata	Lance-leaf Geebung
	Persoonia levis	Broad-leaved Geebung
	Philotheca salsolifolia	n/a
	Pimelea linifolia	Queen of the Bush
	Platysace lanceolata	Shrubby Platysace
	Platysace linearifolia	Carrot Tops
	Ricinocarpos pinifolius	Wedding Bush
	Styphelia viridis	Green Five-corners
	Viminaria juncea (s)	Golden Spray/Native Broom

	Woollsia pungens	Woollsia
	Xanthorrhoea media	Grass Tree
Grasses	***Austrostipa pubescens***	n/a
	Dichelachne crinita	Long-hair Plume-grass
	Entolasia stricta	Wiry Panic
	Eragrostis brownii	Brown's Lovegrass
	Hemarthria uncinata (s)	Matgrass
	Isachne globosa (s)	Swamp Millet
Herbs	*Actinotus minor*	Lesser Flannel Flower
	Actinotus helianthi	Flannel Flower
	Boronia parviflora (s)	Swamp Boronia
	Dampiera stricta	Wallum Dampiera
	Gonocarpus teucrioides	Raspwort
	Dianella revoluta	Blue-flax Lily
	Isotoma fluviatilis (s)	Swamp Isotome
	Patersonia glabrata	Leafy Purple-flag
	Pomax umbellata	Pomax
	Viola hederacea (s)	Ivy-leaf Violet
	Villarsia exalata (s)	Running Marsh-flower
	Xanthorrhoea resinifera	Grass Tree
	Xanthosia pilosa	Woolly Xanthosia
Sedges/Rushes	*Caustis pentandra*	Thick Twist Rush
	Cyathochaeta diandra	Sheath Rush
	Eleocharis sphacelata (s)	Tall Spike-rush
	Gahnia sieberiana (s)	Red-fruit Saw-sedge
	Haemodorum planifolium	Blood Root
	Hypolaena fastigata	Bundled Rope Bush
	Lepidosperma laterale	Variable Sword-sedge
	Leptocarpus tenax (s)	Slender Twine-rush
	Lepyrodia scariosa	Chaffy Scale-rush
	Lomandra glauca	Pale Mat-rush
	Lomandra longifolia	Spiny-head Mat-rush
	Philydrum lanuginosum (s)	Woolly Waterlily/Frogmouth
	Chordifex (Restio) fastigiatus	Upright Chord-rush
	Schoenus ericetorum	Heath Bog-rush
Vines/climbers	*Billardiera scandens*	Hairy Apple Berry
	Hardenbergia violacea	Native Sarsaparilla
	Hibbertia scandens	Climbing Guinea Flower
Ferns	*Pteridium esculentum*	Common Bracken

(s) indicates species most suitable for 'swamp' ie damp conditions but some of these may do ok in drie

er conditions too

SYDNEY TURPENTINE IRONBARK FOREST

	Scientific name	Common name
Trees	*Angophora costata*	Smooth-barked Apple
	Angophora floribunda	Dwarf Apple
	Allocasuarina torulosa	Swamp She-oak
	Eucalyptus punctata	Grey Gum
	Eucalyptus pilularis	Blackbutt
	Eucalyptus paniculata	Grey Ironbark
	Eucalyptus eugenioides	Thin-leaved Stringybark
	Eucalyptus globoidea	White Stringybark
	Eucalyptus resinifera	Red Mahogany
	Syncarpia glomulifera	Turpentine
	Exocarpos cupressiformis	Native Cherry
Shrubs	***Acacia decurrens***	Black wattle
	Acacia falcata	Sickle Wattle
	Acacia floribunda	Gossamer Wattle
	Acacia implexa	Hickory Wattle/Lightwood
	Acacia longifolia	Long-leaved Wattle
	Acacia parramattensis	Parramatta wattle
	Breynia oblongifolia	Coffee bush
	Bursaria spinosa	Blackthorn
	Clerodendrum tomentosum	Hairy Clerodendrum/Downy Chance Tree
	Desmodium rhytidophyllum	n/a
	Dodonaea triquetra	Large-leaf Hop Bush
	Einadia hastata	Berry Saltbush/Saloop
	Glochidion ferdinandi	Cheese Tree
	Goodenia hederacea	Forest Goodenia
	Hakea sericea	Silky Hakea
	Kunzea ambigua	Tick Bush
	Leucopogon juniperinus	Prickly Beard-heath
	Maytenus silvestris	Narrow-leaved Orangebark
	Myrsine variabilis	Muttonwood
	Notelaea longifolia	Large Mock-olive
	Omalanthus populifolius	Bleeding Heart
	Ozothamnus diosmifolius	Rice Flower
	Persoonia linearis	Narrow-leaved Geebung
	Pittosporum revolutum	Yellow Pittosporum
	Polyscias sambucifolia	Elderberry Panax
	Zieria smithii	Sandfly Zieria
Herbs	*Centella asiatica*	Asiatic Pennywort
	Dianella caerulea	Blue-flax Lily
	Dichondra repens	Kidney Weed
	Hibbertia aspera	Rough Guinea Flower
	Hydrocotyle peduncularis	Pennywort
	Pratia purpurascens	Whiteroot
	Pseuderanthemum variabile	Pastel Flower
	Veronica plebeia	Trailing Speedwell
	Wahlenbergia gracilis	Sprawling Bluebell
Grasses	*Aristida vagans*	Threeawn Speargrass
	Cymbopogon refractus	Barbed Wire Grass
	Echinopogon species	Forest Hedgehog Grass
	Entolasia marginata	Bordered panic
	Entolasia stricta	Wiry Panic
	Imperata cylindrica	Blady Grass
	Microlaena stipoides	Weeping Grass
	Oplismenus aemulus	Australian Basket Grass

	Oplismenus imbecillis	Creeping Beard Grass
	Poa affinis	n/a
	Paspalidium distans	Spreading Panic-grass
	Rytidosperma tenuius	Short-awn Wallaby Grass
	Themeda australis	Kangaroo Grass
Sedges/ rushes	*Carex inversa*	Common/Knob Sedge
	Cyperus gracilis	Slender Flat-sedge
	Gahnia aspera	Rough Saw-sedge
	Lomandra filiformis	Wattle Mat Rush
	Lomandra longifolia	Spiny-head Mat-rush
Ferns	*Adiantum aethiopicum*	Common Maidenhair Fern
	Cheilanthes sieberi	Mulga/Rock Fern
	Doodia aspera	Prickly Rasp Fern
Vines/ climbers	*Billardiera scandens*	Hairy Apple Berry
	Clematis glycinoides	Headache Vine
	Commelina cyanea	Native Wandering Jew
	Eustrephus latifolius	Wombat Berry
	Glycine clandestina	Twining Glycine
	Glycine microphylla	Small-leaf Glycine
	Hardenbergia violacea	Native Sarsaparilla
	Kennedia rubicunda	Dusky Coral Pea
	Pandorea pandorana	Wonga Wonga Vine

COASTAL FRESHWATER REEDLAND

	Scientific name	Common name
Trees	*Casuarina glauca*	Swamp Oak
	Melaleuca decora	Paper Bark
	Melaleuca ericifolia	Swamp Paperbark
	Melaleuca linariifolia	Flax-leaved Paperbark
Tall rushes	*Typha orientalis*	Bulrush
	Phragmites australis	Common Reed
	Bolboschoenus fluviatilis	Tall Club-sedge
	Eleocharis sphacelata	Tall Spike Rush
Sedges, small rushes, grasses & herbs	*Baumea juncea*	Bare Twig Rush
	Carex appressa	Tall Sedge
	Philydrum lanuginosum	Woolly Waterlily
	Isachne globosa	Swamp Millet
	Juncus krausii	Sea Rush
	Juncus continuus	Pithy Rush
Herbs, ferns	*Blechnum indicum*	Bungwall
	Gleichenia dicarpa	Pouched Coral Fern
	Hypolepis muelleri	Ground Fern
	Hemarthria uncinata	Mat Grass
	Hydrocotyle verticillata	Shield Pennywort
	Juncus planifolius	Broad-leaf Rush
	Parsonsia straminea	Monkey Vine

COASTAL ESCARPMENT LITTORAL RAINFOREST

	Scientific name	Common name
Small trees/shrubs	*Backhousia myrtifolia*	Grey Myrtle
	Breynia oblongifolia	Coffee bush
	Cyathea australis	Rough Tree Fern
	Endiandra sieberi	Corkwood
	Eupomatia laurina	Native Guava
	Glochidion ferdinandi	Cheese Tree
	Homalanthus populifolius	Bleeding Heart
	Myrsine variabilis	Muttonwood
	Notelaea longifolia	Large mock-olive
	Pittosporum undulatum	Sweet pittosporum
	Synoum glandulosum	Scented rosewood
Grasses/herbs	*Dianella caerulea*	Blue Flax Lily
	Entolasia marginata	Bordered Panic
	Macrozamia communis	Burrawang
	Microlaena stipoides	Weeping grass
	Oplismenus imbecillis	Creeping Beard Grass
	Plectranthus parviflorus	Cockspur flower
	Poa affinis	n/a
	Pseuderanthemum variabile	Pastel Flower
	Viola hederacea	Ivy-leaf Violet
Ferns	*Adiantum aethiopicum*	Common Maidenhair Fern
	Adiantum hispidulum	Rough Maidenhair Fern
	Blechnum cartilagineum	Gristle Fern
	Calochlaena dubia	Common Ground-fern
	Doodia aspera	Prickly Rasp Fern
Vines/climbers	*Cissus hypoglauca*	Water Vine
	Eustrephus latifolius	Wombat Berry
	Geitonoplesium cymosum	Scrambling Lily
	Glycine clandestina	Twining Glycine
	Marsdenia rostrata	Milk Vine
	Morinda jasminoides	Sweet Morinda
	Pandorea pandorana	Wonga Wonga Vine
	Passiflora herbertiana	Native Passionfruit
	Smilax australis	Lawyer Vine
	Smilax glyciphylla	Sweet Sarsaparilla

SWAMP OAK FLOODPLAIN FOREST

Trees	*Alphitonia excelsa*	Red Ash
	Casuarina glauca	Swamp Oak
	Cupaniopsis anacardioides	Tuckeroo
	Lophostemon suaveolens	Swamp Turpentine
	Melaleuca ericifolia	Swamp ericifolia
	Melaleuca quinquenervia	Broad leaved Paperbark
	Melaleuca styphelioides	Prickly-leaved Tea Tree
Shrubs	*Acmena smithii*	Lilly Pilly
	Callistemon salignus	Sweet Willow Bottlebrush
	Glochidion ferdinandi	Cheese Tree
	Glochidion sumatranum	Umbrella Cheese Tree
	Melaleuca alternifolia	Narrow-leaved paperbark
	Myoporum acuminatum	Boobialla
Herbs	*Alternanthera denticulata*	Lesser Joyweed
	Centella asiatica	Indian Pennywort
	Commelina cyanea	Commelina
	Dianella caerulea	Blue Flax Lily
	Enydra fluctuans	An Enydra
	Lobelia anceps	Angled Lobelia
	Persicaria decipiens	Slender Knotweed
	Persicaria strigosa	Prickly Smartweed
	Selliera radicans	Swamp Weed
	Viola banksii	A Violet
Grasses	*Cynodon dactylon*	Sand Couch
	Entolasia marginata	Bordered Panic
	Imperata cylindrica var. *major*	Blady Grass
	Lomandra longifolia	Ribbon Grass
	Oplismenus imbecillis	Basket Grass
Sedges/ rushes	*Baumea juncea*	Bare Twig Rush
	Carex appressa	Tall Sedge
	Crinum pedunculatum	Swamp lily
	Gahnia clarkei	Tall Saw-sedge
	Isolepis inundata	Swamp Club-sedge
	Juncus kraussii subsp. *australiensis*	Sea Rush
	Juncus planifolius	A Rush
	Juncus usitatus	Common Rush
	Maundia triglochinoides	Water Ribbons
	Phragmites australis	Common Reed
Ferns	*Blechnum indicum*	Swamp Water-fern
	Hypolepis muelleri	Harsh Ground Fern
Vines/ climbers	*Flagellaria indica*	Whip Vine
	Geitonoplesium cymosum	Scrambling Lily

Parsonsia straminea	Common Silkpod
Smilax australis	Lawyer Vine
Stephania japonica var. *discolor*	Snake Vine