



Croydon Station Easy Access Upgrade Ecological Impact Assessment

FINAL REPORT

Prepared for Transport for NSW

17 September 2015

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Document information

Report to: Transport for NSW

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Biosis project no.: 19161/B2

File name: 19161. CroydonStationImpact
Assessment.FNL01.20150917.docx

Citation: Biosis (2015) Croydon Station Easy Access Upgrade: Ecological
Impact Assessment. Report for Transport for NSW. Authors: J.Murray &
B.Wilson, Biosis Pty Ltd, Newcastle. Project no. 19161/B2

Document control

Version	Internal reviewer	Date issued
Draft version 03	Jane Murray	26/08/2015
Final Report	Jane Murray	17/09/2015

Acknowledgements

Biosis acknowledges the contribution of the following people and organisations in undertaking this study:

- Client: Transport for NSW
- Office of Environment and Heritage for access to the NSW Wildlife Atlas

The following Biosis staff were involved in this project:

- Stefan Rose, Ashleigh Pritchard, Jane Murray, Brian Wilson

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Summary

Biosis Pty Ltd was commissioned by Transport for NSW (TfNSW) to undertake an ecological impact assessment of the area around the Croydon Station potentially impacted by the proposed Croydon Station Easy Access Upgrade (the proposal).

The assessment has been carried out in two stages. Stage 1 assesses and reports on the existing environment of the study area and Stage 2 assesses and reports on the impact of the proposal on the flora and fauna values of the study area. The current report presents the results of both Stage 1 and Stage 2.

Ecological values

Key ecological values identified within the study area include:

- Groups of planted trees; isolated trees; patches of exotic vegetation and environmental weeds; and patches of vegetation containing a mix of indigenous trees and self-sown environmental weed tree species. The patches of mixed vegetation are located inside the rail corridor to the west of the Meta Street road bridge and contain elements of the natural vegetation including Rough-barked Apple *Angophora floribunda* trees and a Sydney Green Wattle *Acacia decurrens*.
- No trees with hollows were found within the study area, however, when flowering, the Rough-barked Apples mostly on the northern side of the rail corridor and the Bottlebrushes *Callistemon* sp. on the southern side of the rail corridor, may provide a small amount of potential foraging habitat, for nectivorous birds.
- A large heritage listed Date Palm *Phoenix* sp. on platform 1/2 and the larger Rough-barked Apples on the northern side of the rail corridor provide a small amount of potential foraging habitat for the threatened Grey-headed Flying-fox *Pteropus poliocephalus*.
- The densely weed infested area and disused staircase, inside the rail corridor adjacent to Hennessy Street could potentially be used by the inner western Sydney endangered population of Long-nosed Bandicoots *Perameles nasuta* as a dispersal corridor or shelter habitat, but due to the abundance of environmental weeds and lack of grassy areas, this area is unlikely to provide any foraging habitat or have a resident population.
- Only a very small amount of potential foraging habitat for two (Grey-headed Flying-fox and Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*) of the 32 threatened fauna species or populations known or predicted to occur within five kilometres of the study area, is present.
- 40 trees within the study area meet the definition of Medium tree and five trees meet the definition of Small young tree in the TfNSW Vegetation Offset Guide.

Government legislation and policy

An assessment of the proposal against key biodiversity legislation and policy is provided and summarised below.

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)	Potential for one threatened fauna species (Grey-headed Flying-fox) to occur within the study area.	Since no loss of habitat for this species is proposed, a Significant Impact Criteria assessment is not required.	Inspection of study area found no direct evidence of any threatened flora, fauna or ecological communities (biota) or listed migratory species, known as matters of National Environmental Significance, within the study area. A small amount of potential foraging habitat for the Grey-headed Flying-fox (a group of Rough-barked Apples and the large Date Palm) is present within the study area.
	Potential for two threatened fauna species (Grey-headed Flying-fox and Eastern Bentwing-bat) to occur within the study area. Potential for one threatened population (Long-nosed Bandicoot) to occur within the study area.	Since no loss of habitat for these species is proposed, Assessments of Significance/7-part tests are not required.	Inspection of study area found no evidence of any threatened species, population or ecological community within the study area. A small amount of potential foraging habitat for the Grey-headed Flying-fox and potential habitat for Eastern Bentwing-bats is present within the study area. The weed infested area adjacent to Hennessy Street was not accessible during these investigations. There are currently no records west of Croydon, of the Inner Western Sydney population of the Long-nosed Bandicoot, but this area could potentially provide a dispersal corridor.
Fisheries Management Act 1994	None	None	No aquatic habitat present.
Environmental Planning & Assessment Act 1979	Potential for three threatened fauna species listed under the Threatened Species	Assessments of Significance/7-part test (section 5A of the EP&A	Inspection of study area found no evidence of any threatened species or threatened ecological

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
	<p>Conservation Act, to occur within the study area. Likely presence of protected fauna species.</p> <p>Potential for the weed infested patch of vegetation adjacent to Hennessy Street to provide a future dispersal corridor for one endangered population.</p>	Act) are not required.	<p>community within the study area.</p> <p>Despite a small amount of potential foraging habitat for the Grey-headed Flying-fox, potential habitat for Eastern Bentwing-bats and a potential dispersal corridor for the Inner Western Sydney population of the Long-nosed Bandicoot, the proposal is not likely to adversely impact these species.</p>
	Potential for protected fauna species (any native fauna species) to occur within the study area.	<p>No formal approval required.</p> <p>The potential for impacts on protected fauna is discussed in this impact assessment report.</p>	A few protected fauna species are known to occur and it is likely that other protected fauna species occur, such as reptiles, but impacts will be negligible.
National Parks & Wildlife Act 1974	Potential for protected fauna species (any native species) to occur within the study area.	<p>No formal approval required.</p> <p>The potential for impacts on protected species is discussed in this impact assessment report.</p>	A few protected fauna species such as birds are known to occur and it is likely that other protected fauna species occur, such as reptiles, but impacts will be negligible.
Noxious Weeds Act 1993	Noxious weeds could potentially occur within the study area.	None. Weed management in accordance with the class of weed is required for each of the six noxious weed species.	Six noxious weed species were identified within the study area.
State Environmental Planning Policy No. 44	Koala habitat	None	No Koala feed tree species present and the potential clearing area is less than one hectare, so no provisions of SEPP 44 apply.
TfNSW Vegetation Offset Guide	No native vegetation detected within the study area. Groups of trees and individual trees do occur within the study area.	<p>No formal approval required.</p> <p>Compliance with TfNSW Vegetation Offset Guide (TfNSW 2013) will be required.</p>	Inspection of the study area found no native vegetation but 12 individual trees are proposed for removal, requiring offsetting with a minimum of 38 trees, preferably locally indigenous species.
TfNSW Weed	Both Noxious and	No formal approval	Weed infested area adjacent to

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
Management and Disposal Guide	environmental weeds are present and will be impacted.	required. Compliance with TfNSW Weed Management and Disposal Guide (2015) will be required.	Hennessy Street will be partly removed.
TfNSW Vegetation Management (Protection and Removal) Guideline	Groups of trees and individual trees do occur within the study area.	No formal approval required. Compliance with TfNSW Vegetation Management (Protection and Removal) Guideline (TfNSW 2015) will be required.	Ten individual trees may need protection from construction impacts.

Note: Guidance provided in this report does not constitute legal advice.

Recommendations

The primary measures to reduce potential impacts on ecological values from works within any site are to avoid, minimise, mitigate and offset in that order, any removal of native vegetation and habitat. However within the Croydon Station study area, no native vegetation communities are present, no critical habitat is present and no threatened species were detected.

Weed management, in accordance with the TfNSW Weed Management & Disposal Guide, should be adopted during clearing operations within the weed infested area adjacent to Hennessy Street.

It is recommended that a fauna ecologist attend the site when the vegetation adjacent to Hennessy Street is removed in order to rescue any displaced fauna and assess the potential for this area to provide a future dispersal corridor for the endangered Inner Western Sydney Long-nosed Bandicoot population.

For those 38 trees expected to be provided as a minimum offset, in accordance with the TfNSW Vegetation Offsets Guide (2013), we recommend that Rough-barked Apples be used and that these trees be located within the area adjacent to Hennessy Street proposed for landscaping. If possible, continue landscaping under the new elevated concourse in this area and under the Meta Street road bridge. Groundcover vegetation including Mat Rush *Lomandra longifolia* should be used in order to stabilise the soil and provide ground cover habitat for fauna.

1. Introduction

1.1 Background

Biosis Pty Ltd was commissioned by TfNSW to undertake an ecological impact assessment of the proposed Easy Access Upgrade works at Croydon Station.

The ecological impact assessment has been prepared for the proposal as part of the Review of Environmental Factors (REF) for the Croydon Station Easy Access Upgrade. The purpose of the study is to assess and report on the impacts to the environment and provide discussion of the best strategies to mitigate any identified impacts.

The assessment has been carried out in two stages. Stage 1 assesses and reports on the existing environment of the study area and Stage 2 assesses and reports on the impact of the proposal on the flora and fauna values of the study area. The current report presents the results of both Stage 1 and Stage 2.

1.2 Location of the study area

The study area is located around Croydon Station, which is situated between Hennessy Street and Young Street in the north and Paisley Road in the south, in the residential suburb of Croydon (Figure 1 and Figure 2). The study area includes any vegetated areas within the rail corridor and some vegetation on footpaths and isolated trees that could potentially be impacted by the proposal. From aerial photographs, the vegetation comprises gardens and landscaped areas outside the rail corridor fencing and areas of garden and unmanaged vegetation inside the fencing to be investigated during the site inspection.

The study area is within the:

- Sydney Basin Bioregion.
- Ashfield and Burwood Local Government Areas (LGA).

For this Ecological Impact Assessment report:

- 'Local area' is the area within a five kilometre radius of the study area.
- 'Study area' is the area considered during surveys and impact assessment.
- 'Subject site' is the area directly impacted by the Croydon Station Easy Access Upgrade proposal.

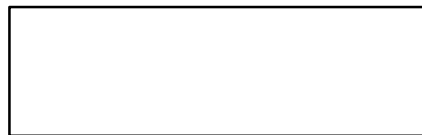


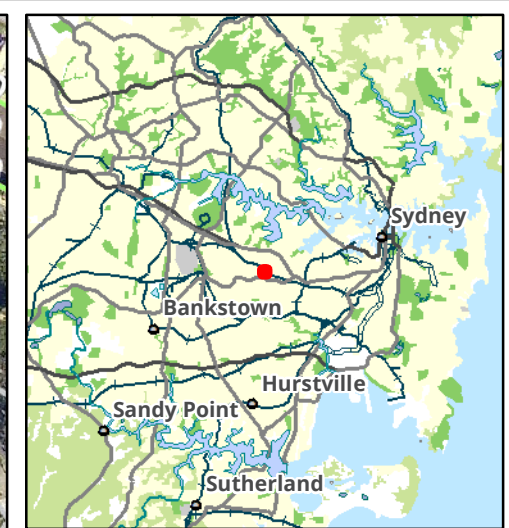
Legend
 Study area

Acknowledgement: Topo (c) NSW Land and Planning Information (2011);
 Overview (c) State of NSW (c.2003)

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Figure 1: Location of the study area, Croydon Station, NSW





Legend
 Study area

Figure 2: Croydon Station Easy Access Upgrade Study Area

0 10 20 30 40 50
 Metres
 Scale: 1:1,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 56

 Biosis Pty Ltd
 Ballarat, Brisbane, Canberra, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Acknowledgements: Imagery (c) Nearmap 2014; Basemap (c) NSW LPI

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1.3 Proposed Croydon Station Easy Access Upgrade works

The key features of the Proposal are summarised as follows:

- Replacement of the existing station footbridge with a new raised and wider pedestrian bridge that would extend north to a new station entrance at Hennessy Street.
- Installation of new stairs and three lifts to provide access to the station platforms.
- New canopies installed at both station entrances and along the new pedestrian bridge, stairs, lift landings and platforms.
- New station operations building at concourse level of the Paisley Road station entrance.
- Widening of a section of the Paisley Road footpath and upgrade of the Paisley Road station entry plaza.
- Provision of two accessible parking spaces and up to three kiss and ride spaces in Paisley Road.
- Installation of new undercover bicycle racks installed on both sides of the station.
- Ancillary works including platform resurfacing/regrading, services diversion and/or relocation, station power supply upgrade (including new substation), minor drainage works, adjustments to lighting, new ticketing facilities including additional Opal card readers, modifications to station communication and security systems with new infrastructure (including CCTV cameras and Passenger Information Displays) and wayfinding signage.

2. Methods

2.1 Literature and database review

In order to provide a context for the study area, information about flora and fauna from within five kilometres of the study area (the 'local area') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- BioNet Atlas of NSW Wildlife. New South Wales, Office of Environment and Heritage (OEH) for threatened biota listed under the TSC Act.
- NSW Threatened Species Information (OEH).
- PlantNET (The Royal Botanic Gardens and Domain Trust 2014).
- Protected Matters Search Tool of the Australian Government Department of the Environment (DoE) for matters protected by the EPBC Act.

Other sources of biodiversity information:

- Relevant vegetation mapping, including:
 - OEH Six Viewer portal for NSW vegetation mapping datum.
 - Vegetation Mapping of the Cumberland Plain (NPWS, 2002).

The following reports were also reviewed:

- Croydon Working Papers 1 and 2 prepared for Cardno (Biosis 2013).

2.2 Site investigation

Biosis' Senior Ecologist, Brian Wilson, completed a site inspection, flora assessment and fauna assessment over a 3 hour period on 13 November 2014.

2.2.1 Flora assessment

The flora assessment for the current report was undertaken by inspecting all vegetated areas within the study area from the closest access point. For vegetation within the rail corridor, the inspection was usually only able to be carried out through a fence or from an adjacent platform.

A list of flora species was compiled for the study area. Records of any threatened flora species will be submitted to OEH for incorporation into the Atlas of NSW Wildlife.

The general condition of native vegetation was observed as well as the effects of current seasonal conditions. Notes were made on specific issues such as noxious and environmental weed infestations, evidence of management works, roadside impacts such as rubbish dumping and routine maintenance works and the regeneration capacity of the vegetation.

For all trees, the species and its condition were recorded and estimates of height and diameter at breast height (DBH) were made.

2.2.2 Fauna assessment

The study area was investigated for the current report to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna opportunistically observed during the assessment were noted. This included direct observation, searching for evidence of fauna presence such as nests, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the study area and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the study area over time.

Fauna records will be submitted to OEH for incorporation into the Atlas of NSW Wildlife.

2.2.3 Permits and Licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by the OEH under the *National Parks and Wildlife Act* (SL100758). Fauna survey was conducted under approval 11/355 from the NSW Animal Care and Ethics Committee.

2.3 Limitations

Database searches, and associated conclusions on the likelihood of species to occur within the study area, are reliant upon external data sources and information managed by third parties.

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy, seasonal conditions, migration and breeding behaviours of some fauna. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The current site flora and fauna assessment was conducted in spring, which is an optimal time for survey.

The site inspection was only permissible by TfNSW within the publicly assessable areas around the study area, so some observations had to be made from a distance. It is possible that small individual plants of some species and small fauna species could have been missed, particularly within densely vegetated areas.

2.4 Legislation and policy

The implications for the proposal were assessed in relation to key biodiversity legislation and policy including:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).
- *Environmental Planning and Assessment Act 1979* (EP&A Act), including where relevant:
 - State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)
- *Threatened Species Conservation Act 1995* (TSC Act).
- *Fisheries Management Act 1994* (FM Act).
- *National Parks & Wildlife Act 1974* (NP&W Act).
- *Noxious Weeds Act 1993* (NW Act).
- Transport for NSW Vegetation Offset Guide 2013.

2.5 Mapping

TfNSW supplied a study area boundary overlaid onto an aerial image, in the Brief for this assessment.

The locations of trees and other ecological features mapped in this report are based on site inspection carried out by Biosis ecologists on 13 November 2014, some earlier preliminary site inspections carried out by Biosis for Cardno Pty Ltd on behalf of TfNSW and aerial photo interpretation.

3. Results

3.1 Database and document review

A list of threatened flora species recorded or predicted to occur in the local area, along with an assessment of the likelihood of the species occurring within the Croydon Station study area is provided in Appendix 1.

None of the 27 threatened flora species previously recorded or predicted to occur in the local area, is considered likely to occur within the study area due to the long history of urban and commercial usage of the land around the Croydon Station.

A list of the 23 Threatened Ecological Communities (TEC) previously recorded or predicted to occur in the local area, is provided in Appendix 1.

A list of threatened fauna species recorded or predicted to occur in the local area, along with an assessment of the likelihood of the species occurring within the Croydon Station study area is provided in Appendix 2.

Three of the 32 threatened fauna species previously recorded or predicted to occur in the local area, are considered to have a moderate likelihood of occurring within the study area.

A list of the 56 migratory fauna species (EPBC Act) recorded or predicted to occur in the local area, is provided in Appendix 2.

3.2 Site assessment

The ecological values of the study area are described below and mapped in Figure 3. Photographs of those parts of the study area referred to below are presented in Appendix 3.

3.2.1 Vegetation communities

From the database search, 23 TEC have been recorded or are predicted to occur within the local area.

However, based on pre-European regional vegetation mapping of the Sydney area (Benson & Howell, 1990) the Burwood and Ashfield LGAs were mostly Sydney Turpentine-Ironbark Forest (STIF) which is a listed ecological community under both the TSC Act and the Commonwealth EPBC Act.

Based on the *Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area* (OEH 2013) only mixes of native and exotic vegetation are mapped within the local area and no vegetation is mapped within the Croydon Station study area.

The long history of urbanisation in the Croydon area means that remnants of native vegetation communities are now very scarce. Some individual elements may remain of native vegetation communities even in highly disturbed sites, usually as isolated trees, shrubs or groundcover species or as very small patches of vegetation in relatively inaccessible or undisturbed areas.

From the site inspection within the Croydon Station study area, most parts exhibit a long history of disturbance and consequently exotic vegetation is common, comprising specific plantings, landscaping treatments, and invasion by environmental weeds and garden plants.

Two flora species detected within the study area are considered to be remnant elements of STIF. Rough-barked Apple and Sydney Green Wattle were both present within the vegetation inside the rail corridor

adjacent to Young Street. While Sweet Pittosporum *Pittosporum undulatum*, a listed species for STIF, was also detected within the study area, this species is an invasive native species and not considered to be a remnant element of STIF.

3.2.2 Description of vegetated areas within the study area

Platforms

The Croydon Station platforms have some trees, shrubs and other vegetation present. This vegetation occurs within discrete garden beds on each platform. The most prominent trees are a large Date Palm *Phoenix* sp. (tree 23) around 12 metres in height and 30 centimetres DBH, which may have heritage significance (OEH, 2014), located on platform 1/2 (Plate 1) and a group of three Chinese Tallow Trees *Triadica sebiferum* (trees 24-26) around eight metres in height and 30 centimetres DBH at the eastern end of platform 1/2 (Plate 2). The shrubs located elsewhere on the platforms are exotic species.

North side of the rail corridor

East of the road bridge and inside the rail corridor, there is a corridor of very dense vegetation comprising garden plants and environmental weeds. While access to this area was not permitted, common species observed included; Montpellier Broom *Genista monspessulana*, Virginia Creeper *Parthenocissus quinquefolia*, Camphor Laurel *Cinnamomum camphora* (tree 5), Oleander *Nerium oleander* (tree 6), Silky Oak *Grevillea robusta* (tree 7), Lantana *Lantana camara*, Small-leaved Privet *Ligustrum sinense*, Large-leaved Privet *Ligustrum lucidum*, Cofton Weed *Ageratina adenophora*, Cobblers Pegs *Bidens pilosa*, Sweet Pittosporum (tree 8), Fleabane *Conyza* sp., Blackberry *Rubus fluiticosis* agg., Green Cestrum *Cestrum parqui*, Red Trumpet Vine *Campsis radicans* and a She-oak *Allocasuarina* sp. (tree 9).

Outside the rail corridor at the eastern end of Hennessy Street a row of four Olive Trees *Olea europaea* (trees 1-4) have been planted. These are four metres in height and between 15 and 30 centimetres DBH.

West of the road bridge and inside the rail corridor, there is another corridor of vegetation dominated by trees. There is a mix of moderate sized indigenous trees, non-local native trees and exotic trees in this area, all around eight metres in height. Indigenous trees comprise Rough-barked Apples and a Sydney Green Wattle *Acacia decurrens* (tree 39), non-local native trees comprise Brush Box and White Cedar *Melia azedarach* and exotic trees comprise Camphor Laurel. The Rough-barked Apples (trees 32-38) range from around 20 centimetres DBH to over 30 centimetres DBH, the one White Cedar (tree 31), two of the Brush Boxes (trees 27-28) and two of the Camphor Laurels (trees 29-30) are all around 30-40 centimetres DBH. Under these trees are some smaller trees of the same species plus Montpellier Broom, Large-leaved Privet, Lantana and African Olive *Olea europaea* subsp. *cuspidata*.

This vegetation extends partway down the embankment towards the rail lines, but it was only permissible to inspect this area from the rail corridor fence adjacent to Young Street. It is possible that other indigenous and exotic species are present.

South side of the rail corridor

On the southern side of the rail corridor most of the vegetation is planted trees and garden plants.

Along the southern embankment east of the road bridge and inside the rail corridor fence, a prostrate conifer has been used to cover a bare soil area above platform 5 and extensive garden planting comprising six Oleanders, Coastal Rosemary *Westringia* sp., Teatrees *Leptospermum* sp., Bottlebrushes *Callistemon* sp.,

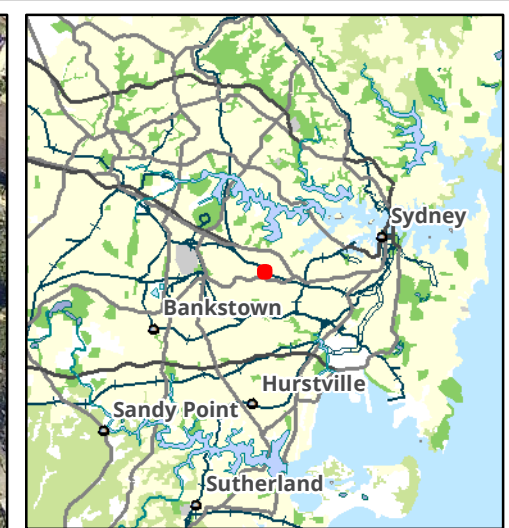
Christmas Bush *Ceratopetalum gummiferum*, Azaleas, Tuckeroo *Cupaniopsis anacardioides* and Grevilleas *Grevillea* 'Robyn Gordon'. Grasses such as Bearded Oats *Avena barbata* are also present here.

Outside the fence along Paisley Road a row of 10 Plane Trees *Platanus X acerifolia* (trees 13-22) around eight metres in height and less than 30 centimetres DBH, have been planted. Close to the station entrance a large Plane Tree (tree 10), approximately 10 metres in height and 50 centimetres DBH and two Bottlebrushes (trees 11-12) eight metres in height and 20 centimetres DBH plus garden beds containing low hedges of Box *Buxus* sp, and Murraya *Murraya paniculata* are present.

West of the road bridge and inside the rail corridor there is a variety of environmental weeds on the lower embankment including Crofton Weed but along the top there are a few Rough-barked Apples (trees 41-42).

Garden areas containing Bottlebrushes (trees 44-45), one Sweet Pittosporum, one large Brush Box (tree 40) around eight metres in height and 40 centimetres DBH, a Mugga Ironbark *Eucalyptus sideroxylon* (tree 43) and a small Date Palm *Phoenix* sp. are present outside the fence. Star Jasmine *Trachelospermum jasminoides* is growing on the fence.

Figure 3 and Figure 4 show the locations of patches of vegetation and locations of individual trees respectively, within the study area.




Legend

- Study area
- Vegetation patches

Figure 3: Vegetation types within Croydon Station Easy Access Upgrade study area

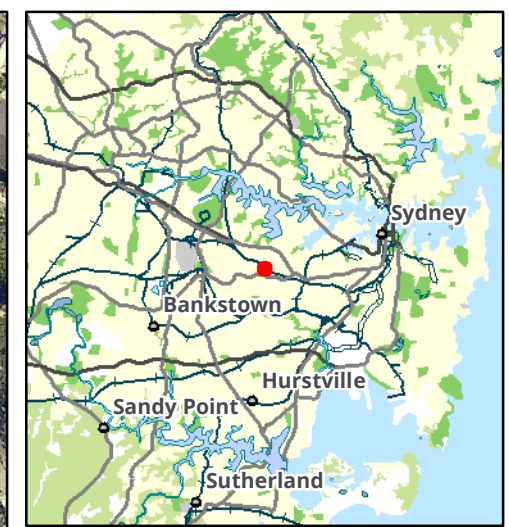
0 10 20 30 40 50
Metres
Scale: 1:1,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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Acknowledgements: Imagery (c) Nearmap 2014; Basemap (c) NSW LPI


Matter: 19161
Date: 20 August 2015,
Checked by: BW, Drawn by: LDM, Last edited by: Iharley
Location: P:\19100s\19161\mapping\19161_E3_Veg



- Legend**
- Study area
 - Vegetation patches

Figure 4: Trees located within the Crofton Station Easy Access Upgrade study area

0 10 20 30 40 50
Metres
Scale: 1:1,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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Matter: 19161
Date: 20 August 2015,
Checked by: BW, Drawn by: LDM, Last edited by: lharley
Location: P:\19100s\19161\mapping\19161_F4_Trees

3.2.3 Description of fauna habitat within the study area

Few fauna species were observed during the site inspection in November 2014 and little fauna habitat is present within the study area.

While no patches of intact native vegetation are present, some larger, mature trees and shrubs with fauna habitat value are present within the study area. These mostly comprise the Rough-barked Apples, Brush Boxes and White Cedar on the north side of the rail corridor and Bottlebrushes, the Mugga Ironbark and Blackwood on the south side of the rail corridor. These may provide foraging resources for nectivorous birds and flying foxes (including Grey-headed Flying-fox) during flowering periods. The large Date Palm on station 1/2 may provide nectar when flowering, and if it is a female tree, fruit for flying-foxes.

The current steps and concourse do not appear to contain suitable cracks or holes that could be used by fauna species such as birds and micro-bats, including the threatened Eastern Bentwing-bat. However, a disused staircase has been retained inside the rail corridor near the intersection of Meta Street and Hennessy Street and this is surrounded by dense growth of garden plants and environmental weeds. This staircase could potentially have suitable cracks and hollows for birds and micro-bats, but could not be accessed. The adjoining corridor of dense vegetation could potentially be providing cover and foraging resources for common fauna such as reptiles and introduced fauna such as rats, mice and birds.

The inner western Sydney population of the Long-nosed Bandicoot, listed as an endangered population under the TSC Act, occurs within the local area (approximately 3-4 kilometres to the south-east of Croydon Station). This population is reliant on sheltering spaces under buildings and foraging areas comprising gardens, parks and lawns.

Long-nosed Bandicoots have been recorded within the rail corridor near Lewisham, but that is a different rail corridor (T3) to the corridor on which Croydon Station occurs (T2). There is a small possibility that the Long-nosed Bandicoot could occur within the disused part of the rail corridor within the study area along the northern side where there is dense vegetation cover, although there is little access to grassy foraging habitat and poor connectivity along the rail corridor to the known population due to several major roads, such as Frederick Street. At best, the rail corridor could provide a dispersal corridor for the nearby Long-nosed Bandicoot population.

Due to the limited habitat available and poor connectivity to other areas of habitat, overall fauna diversity is expected to be low. While no fauna species were observed during the site inspection in 2014, Biosis detected Red Wattlebirds and Noisy Miners in flowering bottlebrushes near the station entrance in 2013 (Biosis, 2013). Some threatened micro-bat species may forage for insects while flying over the study area, but no suitable roosting resources such as hollow-bearing trees or culverts were observed within the study area.

3.2.4 Condition of the vegetation and presence of weeds

The vegetation and fauna habitat throughout the majority of the study area has been modified by a long history of disturbances which have resulted in clearance of native vegetation and replacement by exotic trees and by infestation by noxious and environmental weeds in the ground, shrub and tree layers. Some parts of the study area have been treated as a garden or landscape area with a monoculture or as regularly spaced plantings (south side footpath area along Paisley Road and various other parts of the study area).

Very dense environmental weed infestation is present inside the rail corridor along Hennessy Street, which is also difficult to access.

A large number of common environmental weed species were recorded within the study area, Montpellier Broom being the most abundant. The potential for spread of any of these species during the construction period should be ameliorated by implementation of a weed management protocol.

At least six noxious weeds, that are declared by NSW Department of Primary Industries under the *Noxious Weeds Act 1993* (NW Act) for the Burwood Local Control Area (LCA) and/or the Ashfield LCA, were recorded within the study area. They are Montpellier Broom, Lantana, Blackberry, Green Cestrum, Large-leaved Privet and Small-leaved Privet, all of which were detected inside the rail corridor along the northern side of the rail corridor. Additional species of noxious weeds may be present within the densely infested areas.

Noxious weeds as well as weeds of national significance (WoNS) recorded within the study area, that are declared under the NW Act in the Burwood or Ashfield LCAs together with the legal requirements for their control are listed in Table 1.

Table 1: Declared Noxious Weeds and their legal control requirements

Scientific Name	Common Name	Class	Legal Requirements
<i>Cestrum parqui</i>	Green Cestrum	3	The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed.
<i>Lantana camara</i>	Lantana	4, WoNS	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.
<i>Ligustrum sinense</i>	Small-leaved Privet	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.
<i>Ligustrum lucidum</i>	Large-leaved Privet	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.
<i>Genista monspessulana</i>	Montpellier Broom	3, WoNS	The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly distributed.
<i>Rubus fruticosus aggregate</i>	Blackberry	4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.

Notes

Further explanations of the relevant control classes and classifications are as follows:

Class 3 – Regionally Controlled Weeds: Plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.

Class 4 – Locally Controlled Weeds: Plants that pose a potentially serious threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. The local control authority is Holroyd City Council or Parramatta City Council.

Class 5 – Notifiable Weeds: Plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State. There are no requirements to control existing plants of Class 5 weeds. However, the weeds are "notifiable" and a range of restrictions on their sale and movement exists.

WoNS – Weeds of National Significance

3.2.5 Tree Assessment

The study area contains trees considered likely to be remnants of the natural vegetation of the Croydon area, trees that have been planted, and trees that are invasive species likely to be self sown.

Photographs showing all individual trees, or groups of trees, are presented in Appendix 3. Figure 4 shows the location of all trees within the study area.

Appendix 3 lists all trees and the following parameters:

- Common name.
- Scientific name.
- Diameter at breast height (DBH).
- Approximate height.
- Approximate DBH.
- Tree Protection Zone radius (TPZ) - includes primary and critical root zone
- Structural Root Zone radius (SRZ).
- Landscape Significance Rating.
- Safe Useful Life Expectancy (SULE).
- Expected impact from the proposal.
- Tree type (based on TfNSW Vegetation Offset Guide 9TP-ST-149/2.0).
- Relevant comments.

In addition, with reference to the TfNSW Vegetation Offset Guide, removal of any trees in Appendix 3 for the Croydon Station Easy Access Upgrade would require offsetting in the form of replacement trees of locally indigenous species at the ratios presented in Table 5-2 of the TfNSW Vegetation Guide.

3.3 Threatened species

3.3.1 EPBC Act & TSC Act listed species

Lists of threatened species recorded or predicted to occur within five kilometres of the study area are provided in Appendix 1 (flora) and Appendix 2 (fauna). An assessment of the likelihood of these species occurring in the study area and an indication of where they may occur within the study area (i.e. which habitats or features of relevance to the species) is included. A summary of those species recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 2 and Table 3.

Table 2: EPBC Act listed threatened species with potential to occur in the study area

Species name	Section of the study area providing habitat
Grey-headed Flying-fox	Potential nocturnal foraging habitat during flowering period of the Date Palm on station platform 1-2, and if it is a female tree, during the fruiting period. The larger Rough-barked Apples trees inside the rail corridor adjacent to Young Street, may also provide a small amount of foraging habitat during the flowering period.

Table 3: TSC Act listed threatened species with potential to occur in the study area

Species name	Section of the study area providing habitat
Grey-headed Flying-fox	Potential nocturnal foraging habitat during flowering period of the Date Palm on station platform 1/2, and if it is a female tree, during the fruiting period.
Long-nosed Bandicoot	The dense vegetation inside the rail corridor along the northern side of the rail corridor could potentially be used by this species as a dispersal corridor or shelter habitat, but due to the abundance of environmental weeds and lack of grassy areas, it is unlikely to provide any foraging habitat.
Eastern Bentwing-bat	Potential overhead foraging habitat throughout the study area and the underside of the unused steps in the northern part of the rail corridor could potentially provide roosting habitat.

3.4 Threatened ecological communities

No threatened ecological communities, listed under either the NSW TSC Act or the Commonwealth EPBC Act, occur within the study area.

4. Potential Ecological Impacts

A plan of the major elements of the proposal is presented in Figure 5.

It is expected that all impacts will occur during the construction phase and no additional impacts will occur during the operational phase of the proposal.

4.1 Impacts on vegetation and trees

The proposed works will not impact any of the remnant elements of native vegetation identified within the Croydon Station Easy Access Upgrade study area. Nor will the works impact on medium trees inside or outside the rail corridor adjacent to Young Street or the vegetation adjacent to Paisley Road west of the Meta Street road bridge.

The impacts have been confined to that part of the Croydon Station Easy Access Upgrade study area east of the Meta Street road bridge. All the vegetation to be impacted comprises planted trees or environmental weeds and invasive non-local native tree species. Figure 6 shows those areas of vegetation to be impacted by the proposal.

The western end of a large patch of environmental weeds on a steep embankment adjacent to the disused staircase near Hennessy Street, will be removed to permit the construction of a new pedestrian bridge and canopy. This area contains trees 5 – 9 which are the invasive non-local native species; Silky Oak, Sweet Pittosporum and a She-oak, plus the exotic species Oleander and Camphor Laurel. Following the completion of construction and restoration works, this area will be landscaped. These works are likely to improve this area by removal of numerous weed species and where possible inclusion of appropriate native species in areas to be landscaped.

Along Paisley Road, tree 10, a large Plane Tree, will need to have a limb removed, the Box and Murraya hedges will be removed and trees 11 and 12, both large Bottlebrushes, will be removed.

At least two of the 10 Plane Trees (trees 13 – 22) along the north side footpath of Paisley Road will be removed to allow the erection and operation of a crane. The rest may be retained, but the lower limbs, up to three metres from the ground, will be removed in order to allow construction plant / vehicles to use the kerb side parking lane.

Inside the rail corridor adjacent to Paisley Road, the patches of Christmas Bush, Azaleas, Bottlebrushes, Grevilleas and Tuckeroos east of the station building will be removed, but the Oleanders, Teatrees and Bottlebrushes west of the station building will be retained.

On the platforms, all planted trees (trees 24-26) and shrubs east of the Meta Street road bridge will be removed except for the large Date Palm (tree 23). The existing shrubs on platforms west of the Meta Street road bridge may be removed as part of the landscaping plan.

Of the 45 trees recorded within the study area, only five small young trees and seven medium trees, as defined in the Guide, would be removed, comprising:

- Trees 5, 6, 7, 8, 9 (inaccessible, but assumed to be small young trees).
- Trees 11 and 12 (medium trees).
- Trees 20 and 22 (medium trees).

- Trees 24, 25, 26 (medium trees).

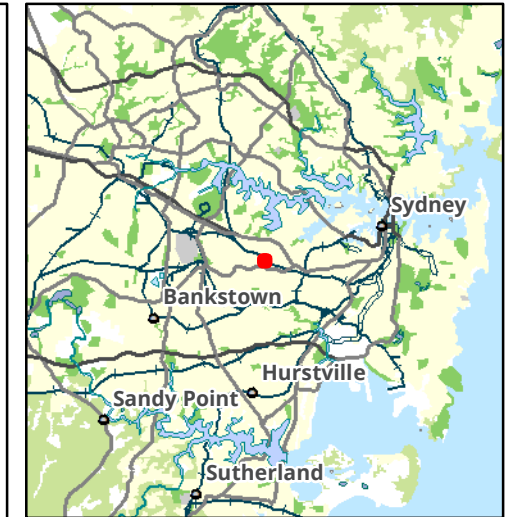
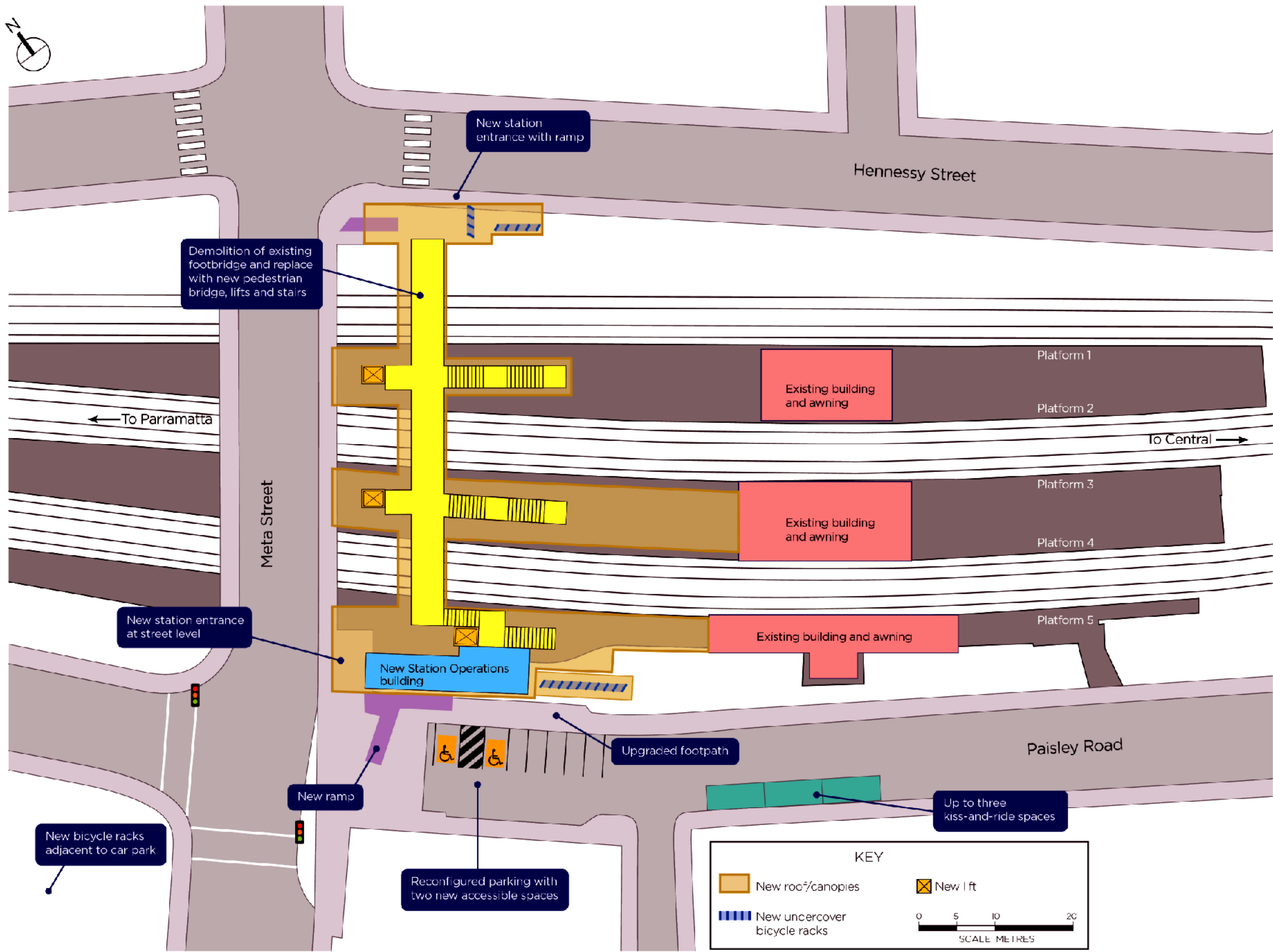
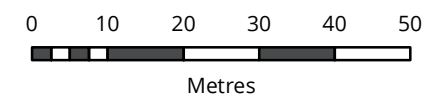


Figure 5: Croydon Station Easy Access Upgrade proposal



Coordinate System: GDA 1994 MGA Zone 56

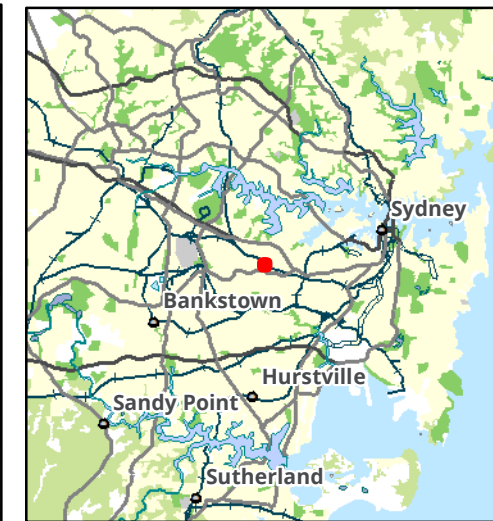


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KEY

New roof/canopies	New lift
New undercover bicycle racks	

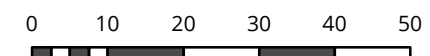
0 5 10 20
SCALE: METRES



Legend

- Study area
- Vegetation patches
- PW - Permanent Works

Figure 6: Proposed Vegetation Impacts



Scale: 1:1,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



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Matter: 19161
Date: 10 September 2015,
Checked by: BW, Drawn by: LH, Last edited by: Iharley
Location: P:\19100s\19161\Mapping\19161_C_F6_VegetImpacts

In accordance with the Guide, this loss of trees would require an offset of a minimum of 38 locally indigenous trees.

Retained trees 10 and 13-20 will need to have limbs removed. These trees could potentially be subject to indirect impacts associated with adjacent construction activities.

The large Date Palm (tree 23) could also be subject to indirect impacts associated with adjacent construction activities.

Protective measures in accordance with the TfNSW Vegetation Management (Protection and Removal) Guideline (TfNSW 2015) should permit these trees to achieve their Safe Useful Life Expectancy (SULE).

4.2 Impacts on fauna

With the removal of only 12 trees (seven medium and five small) in total and most of those providing little or no fauna habitat values, the impacts on nectivorous fauna will be slight. No impacts on potential foraging resources for the threatened species Grey-headed Flying-fox are expected.

The removal of a section of the inaccessible weed infested land within the rail corridor adjacent to Hennessy Street could have a very minor impact on foraging and nesting habitat for some common bird species and habitat for some common fauna such as skinks, but few birds were observed around the study area during the site inspection.

There is a remote possibility that this densely vegetated area could provide cover for dispersing Long-nosed Bandicoots from the inner western Sydney Endangered Population, but there are no existing records close to Croydon and no existing records west of Croydon, suggesting that this potential dispersal corridor is not in current use. Since the proposed concourse will be elevated at this location, there may be the possibility to improve the fauna habitat values of this area by the use of local native plants in any landscaping and to provide a continuous vegetated corridor under the concourse and under the Meta Street road bridge, suitable as a future dispersal corridor for this species.

While it is possible that micro-bats could roost within crevices and holes under the disused stairs, this could not be confirmed, since the structure was not accessible during the site assessment. If roosting is occurring, there may be a short term displacement during the construction period. Micro-bats typically have several roosts within their range, so if any displacement does occur, it is not likely to adversely affect any micro-bats. Since the stairs are to be retained, roosting may resume following completion of construction.

5. Biodiversity Legislation and Government Policy

This section provides an assessment of the potential impacts on threatened biota, migratory species and their habitats against key biodiversity legislation and government policy.

Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

5.1 Commonwealth

5.1.1 Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Matters of NES potentially relevant to the proposal are summarised in Table 4. This table includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 4: Assessment of the proposal against the EPBC Act

Matter of NES	Proposal specifics	Assessment against Guidelines
Threatened biota	39 threatened species (21 flora and 18 fauna) and 11 TEC have been recorded or predicted to occur in the search area. The likelihood of these species occurring in the study area is assessed in Appendix 1 (flora) and Appendix 2 (fauna).	None of the Threatened Ecological Communities listed under the EPBC Act is present within the study area. Only one of these species (Grey-headed Flying-fox) is likely to occur. No habitat for this species will be impacted.
Migratory species	56 migratory species have been recorded or predicted to occur in the search area (Appendix A2.2).	None of these species is likely to utilise the study area.
Wetlands of international importance (Ramsar sites).	The study area does not drain directly into a Ramsar site.	

Biosis does not believe that referral of the proposal to the Commonwealth DoE pursuant to the EPBC Act will be warranted since no habitat for any Matters of National Environmental Significance will be impacted.

However, TfNSW may choose to refer the proposed action to the Australian Government Minister for the Environment to determine whether the action requires approval under the EPBC Act.

5.2 State

5.2.1 Threatened Species Conservation Act 1995

The TSC Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened biota; key threatening processes; and critical habitat for threatened biota.

No threatened biota was detected within the study area, however the group of Rough-barked Apples, mostly located on the northern side of the rail corridor and possibly the Date Palm on platform 1/2, provide a small amount of potential foraging habitat for the threatened species Grey-headed Flying-fox. No potential foraging habitat for the Grey-headed Flying-fox will be impacted by the proposal.

Habitat critical to the survival of an endangered or critically endangered species, population or ecological community can be identified under the TSC Act and listed on the Register of Critical Habitat kept by the OEH. The study area does not contain declared 'critical habitat'.

Potentially relevant Key Threatening Processes also require consideration and assessment in the Assessment of Significance/7-part test. There are currently 37 key threatening processes listed under the TSC Act. None of the listed key threatening processes are relevant to the proposal.

5.2.2 Environmental Planning and Assessment Act 1979

The EP&A Act was enacted to encourage the proper consideration and management of impacts of proposed development or land-use changes on the environment (both natural and built) and the community. The Act is administered by the NSW Department of Planning and Environment.

Sections of the EP&A Act of primary relevance to the natural environment relate to threatened biota listed under the TSC Act and to protected species listed under the NP&W Act. No threatened biota is likely to be impacted and only minor impacts to protected fauna are likely to occur from the proposal.

5.2.2.1 Assessment of Significance (Section 5A)

Section 5A of the EP&A Act requires proponents and consent authorities to consider if a development will have a significant effect on threatened species, populations or communities listed under the TSC Act and FM Act. Section 5A (and Section 9A of the TSC Act) outlines seven factors that must be taken into account in an Assessment of Significance/7-part test. Where any Assessment of Significance determines that a development will result in a significant effect to a threatened species, population or community a Species Impact Statement (SIS) is required.

Of the 27 threatened flora species and 32 threatened fauna species listed under the TSC Act and previously recorded within the search area, three fauna species are considered to have some potential to occur within the study area.

Table 5, Table 6, Table 7 and Table 8 summarise the potential for the proposed development to have a significant effect on the threatened biota deemed to have a medium or greater likelihood of occurrence within the study area (refer to Section 3.3.1) and determines the need for an Assessment of Significance under Part 5A of the EP&A Act.

Table 5: Potential for impacts on threatened flora species listed on the TSC Act

Name	EPBC Act	TSC Act	FM Act	Habitat Values within study area	Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation of limiting habitat?	Impact Assessment Required?
None present	-	-	-	-	-	-	-	-

Table 6: Potential for impacts on threatened fauna species listed on the TSC Act

Name	EPBC Act	TSC Act	FM Act	Habitat Values within study area	Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation of limiting habitat?	Impact Assessment Required?
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	V	V	-	May forage on larger Rough-barked Apple trees and the Date Palm during flowering periods	No	No	No	No
Eastern Bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	-	V	-	May forage for insects while flying over the study area	No	No	No	No

Table 7: Potential for impacts on threatened populations listed on the TSC Act

Name	EPBC Act	TSC Act	FM Act	Habitat Values within study area	Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation of limiting habitat?	Impact Assessment Required?
Long-nosed Bandicoot <i>Parameles nasuta</i>	-	E2	-	May potentially disperse along the densely vegetated northern side of the rail corridor, but no records exist west of Croydon. Habitat within the study area would not sustain any local population.	No	No	No	No

Table 8: Potential for impacts on threatened ecological communities listed on the TSC Act

Name	EPBC Act	TSC Act	FM Act	Habitat Values within study area	Adversely affect stages of the lifecycle of the species?	Loss or disturbance of limiting foraging or breeding resources?	Fragmentation of limiting habitat?	Impact Assessment Required?
None present	-	-	-	-	-	-	-	-

Notes to tables 5-8:

EPBC Act:	TSC Act:
E - Endangered	E1 – Endangered (Part 1, Schedule 1)
V - Vulnerable	E4A – Critically Endangered (Part 4, Schedule 1a)
	V – Vulnerable (Part 1, Schedule 2)

5.2.3 National Parks & Wildlife Act 1974

Section 111 of the Environmental Planning & Assessment Act requires impacts on Protected Fauna (species not listed in Schedule 11 of the NP&W Act) and Protected Flora (species listed in Schedule 13 of the NP&W Act) to be taken into consideration.

Native fauna species comprising mostly birds were observed within the study area and a range of other native fauna, such as small skinks, are likely to occur within the study area at least on occasion. Since all native vertebrate fauna species in NSW are protected fauna, some minor loss of protected fauna such as small skinks could occur from the proposal as a result of removal of garden areas and the section of the densely vegetated environmental weed area adjacent to Hennessy Street. This loss is negligible and no further action under this legislation is required. However, it is recommended that an ecologist attend the site when this vegetation is removed to rescue any displaced fauna (see Recommendations section).

5.2.4 Noxious Weeds Act 1993

The NW Act was enacted to provide for the identification, classification and control of noxious weeds. Plants declared as noxious weeds are currently listed under Weed Control Order No. 28 Declaring Certain Plants to be Noxious Weeds published in the New South Wales Government Gazette No. 97 (Department of Premier and Cabinet 2011).

Six weed species, listed as noxious within the Burwood or Ashfield Control Areas, were identified within the study area (Small-leaved Privet, Large-leaved Privet, Green Cestrum, Blackberry, Montpellier Broom and Lantana) so specific measures will be required for the proposal to manage noxious weeds during the vegetation removal within the densely vegetated environmental weed area adjacent to Hennessy Street in accordance with the NW Act and in compliance with the TfNSW Weed Management and Disposal Guide (3TP-SD-110/2.0).

5.2.5 State Environmental Planning Policies (Part 3 Division 2)

State Environmental Planning Policies (SEPPs) outline policy objectives relevant to state wide issues. SEPPs potentially relevant to the study area are:

SEPP No. 44 Koala Habitat Protection

SEPP 44 applies to areas of native vegetation greater than one hectare and in local government areas listed in Schedule 1 to the SEPP. No Koala feed tree species, as listed under SEPP No. 44, occur within the study area. Since the vegetated area within the study area is far less than one hectare, and no Koala feed tree species are present, SEPP 44 does not apply to this proposal.

5.3 Transport for NSW Policies & Guidelines

5.3.1 Transport for NSW Vegetation Offset Guide 9TP-ST-149/2.0

Since removal of trees within the study area is proposed, the *Offsets for Individual trees or groups of trees* provisions of this Guide, will need to be addressed.

Five trees within the study area, meeting the definition of small young tree in Table 5-2 in the Guide, are proposed for removal (trees 5, 6, 7, 8 and 9).

Seven trees within the study area, meeting the definition of medium tree in Table 5-2 in the Guide, are proposed for removal (trees 11, 12, 21, 22, 24, 25, and 26).

A minimum of two locally indigenous trees will need to be planted in order to offset each small tree to be removed and four locally indigenous trees will need to be planted in order to offset each medium tree to be removed.

The precise number of trees to be planted, appropriate species and suitable locations for tree planting cannot be determined until further information on the landscaping for the proposal is known.

5.3.2 Vegetation Management (Protection and Removal) Guideline 9TP-SD-111/2.0

Since construction works close to trees 10, 13-20 and 23 are proposed, tree protection measures in accordance with this guideline will need to be adopted.

5.3.3 Weed Management and Disposal Guide 3TP-SD-110/2.0

Since removal of part of a large patch of environmental weeds and noxious weeds adjacent to Hennessy Street is proposed, adoption of the weed management practices in the guide, including specific disposal, control and later, prevention measures, will be required.

6. Implications and recommendations

This section identifies the potential implications of the proposal on the ecological values of the study area and includes recommendations to assist TfNSW to minimise impacts on biodiversity. Table 9 lists the ecological features within the study area, the implications of the proposal and recommended mitigation measures.

Table 9: Potential implications and recommendations to minimise ecological impacts

Ecological feature	Implications of development	Recommendations
Native vegetation and other vegetation including trees	No native vegetation is present. No threatened flora species, population or ecological community is present.	No action required.
	The permanent removal of narrow strips and small patches of vegetation comprising planted garden areas in order to construct various new facilities.	See recommendations in Weeds section below.
	The removal of a section of a densely weed infested area within the rail corridor adjacent to Hennessy Street.	See recommendations in Weeds section below. Use locally indigenous groundcover plants such as Mat Rush at high planting densities to provide ground cover habitat for fauna species.
	Most trees within the study area meet the TfNSW <i>medium tree</i> definition in the Vegetation Offsets Guide.	Offsets for 7 medium and 5 small trees in accordance with TfNSW Vegetation Offsets Guide will apply. Protect retained trees from indirect impacts during construction by erection of protective fencing in accordance with TfNSW Vegetation Management (Protection and Removal) Guideline. Seek advice from arborist if excavation near these trees exposes large roots. Remove any existing and avoid any future impervious paving within Tree Protection Zone for trees 23, 10 and 13-20, where possible.
Hollow-bearing trees and other fauna habitat	No hollow-bearing trees present. Large Date Palm and large Rough-barked Apples provide a small amount of potential foraging habitat for Grey-headed Flying-foxes.	While no removal of these trees is proposed, include Rough-barked Apples and other locally indigenous trees with good nectar production in any replanting/tree offsets.

Ecological feature	Implications of development	Recommendations
	<p>The removal of a section of a densely weed infested area within the rail corridor adjacent to Hennessy Street which may provide a dispersal corridor for the Inner Western Sydney population of the Long-nosed Bandicoot, which is a listed Endangered Population under the TSC Act.</p>	<p>See recommendations in Weeds section below.</p> <p>Since impacts on this area are proposed, supplementary surveys within this currently inaccessible area are recommended to investigate if there is any evidence of current use by fauna including the Long-nosed Bandicoot and if the area could provide a future dispersal corridor for this species.</p> <p>Ecologist to be present during clearing operations to rescue any displaced fauna.</p>
<p>Weeds</p>	<p>Numerous environmental weeds and six noxious weed species identified within the study area.</p> <p>Degradation of habitat quality within and adjacent to the impact areas due to proliferation and spread of environmental weeds could occur.</p>	<p>Prepare and adopt a weed management strategy in accordance with TfNSW Weed Management & Disposal Guide prior to any earthworks, as part of a general vegetation management strategy. Rather than just landscaping the area where construction impacts are proposed, it is recommended that the whole weed infested area be cleared and appropriately landscaped to both eliminate the current source of weed seed, to stabilise the steep embankment and to create a vegetated corridor potentially suitable as a future dispersal corridor for the endangered Inner Western Sydney Long-nosed Bandicoot population.</p>

7. Conclusions

The design of the proposed Croydon Station Easy Access Upgrade has responded to the constraints identified in the Stage 1 Existing Environment Report and will have a very low impact on the flora and fauna values within the study area.

Only 12 trees will be removed and they are invasive native species, exotic species or planted trees. In accordance with the TfNSW Vegetation Offsets Guide, these trees will be offset by the establishment of a minimum of 38 replacement locally indigenous trees.

Some minor lopping of nine planted exotic trees will be required. It is not expected that this lopping will destabilise these trees.

These nine trees and a large Date Palm on Platform 1/2 will need to be protected during the construction phase of the works and it is recommended that the existing impervious paving within the tree protection zone of these trees be replaced with a pervious layer.

The proposal has the potential to improve the ecological values of the weed infested area within the rail corridor adjacent to Hennessy Street through appropriate landscaping with suitable native species.

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Appendices

Appendix 1: Flora Results

Notes to tables:

EPBC Act:	TSC Act:
E - Endangered	E1 – Endangered (Part 1, Schedule 1)
V - Vulnerable	V – Vulnerable (Part 1, Schedule 2)
	<p>Noxious weed status:</p> <p>N3 Regionally controlled weeds (Class 3)</p> <p>N4 Locally controlled weeds (Class 4)</p> <p>N5 Notifiable weeds (Class 5)</p> <p>W Weed of National Significance (WoNS)</p> <p>*exotic species</p>

A1.1 Threatened flora species

The following table includes a list of the threatened flora species that have potential to occur within the study area. The list of species is sourced from the BioNet Atlas of NSW Wildlife and the Protected Matters Search Tool (DoE; accessed on 3.11.14 – Appendix 4).

The habitat descriptions are compiled primarily from OEH Threatened Species Information:

<http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/>

with additional information from Harden (1990, 1992, 1993, 2002); PlantNet <http://plantnet.rbgsyd.nsw.gov.au>; OEH Atlas of NSW Wildlife, Final Determinations for listed species and other sources as cited.

Notes to table:

EPBC Act:	TSC Act:
E - Endangered	E1 – Endangered (Part 1, Schedule 1)
V - Vulnerable	V – Vulnerable (Part 1, Schedule 2)

Table 10: Threatened flora recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
<i>Acacia bynoeana</i>	Bynoe's Wattle	VU	E1	1913	negligible	No suitable habitat present	<p><i>Acacia bynoeana</i> is found in central eastern NSW, in the following catchment regions – Hawkesbury/Nepean, Hunter/Central Rivers, Southern Rivers, and Sydney Metropolitan. More specifically it is found from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. It has recently been found in the Colymea and Parma Creek areas west of Nowra.</p> <p>It seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and recently burnt patches.</p> <p>It grows in sandy clay soils often containing ironstone gravels. Main vegetation types include heath or dry sclerophyll forest on sandy soils.</p> <p>Associated overstorey species include <i>Corymbia gummifera</i>, <i>Corymbia maculata</i>, <i>Eucalyptus parramattensis</i>, <i>Banksia serrata</i> and <i>Angophora bakeri</i>. Flowering period is mainly summer.</p>
<i>Acacia prominens</i>	Gosford Wattle		E2	1895	negligible	No suitable habitat present	<p>Occurs at a few sites along the railway line at Penshurst, at Carss Bush Park, Carss Park and there is an unconfirmed siting at Oatley Park, Oatley. Grows in open situations on clayey or sandy soils.</p> <p>Flowers from July to September and pods are produced in September-October.</p>

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
<i>Acacia pubescens</i>	Downy Wattle	VU	V	2008/#	negligible	No suitable habitat present	<i>Acacia pubescens</i> is found in Sydney Metropolitan, and Hawkesbury/Nepean Catchment Management Region, with concentrated populations around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravelly soils, often with ironstone. The species occurs in open woodland and forest, in a variety of plant communities, including Cooks River/ Castlereagh Ironbark Forest, Shale/ Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October. The pods mature in October to December.
<i>Acacia terminalis</i> subsp. <i>terminalis</i>	Sunshine Wattle	EN	E1	#	negligible	No suitable habitat present	Occurs in the Sydney Metropolitan Catchment Authority Region. It has very limited distribution between Botany Bay to the northern foreshore of Port Jackson.
<i>Allocasuarina glareicola</i>		EN	E1	#	negligible	No suitable habitat present	Found in the Hawkesbury/Nepean and Sydney Metropolitan Catchment Authority Regions. Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Grows in Castlereagh woodland on lateritic soil. Also

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							found in Dry Sclerophyll forest/Woodland. Associated species include <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> . Common associated understorey species include <i>Melaleuca nodosa</i> , <i>Hakea dactyloides</i> , <i>Hakea sericea</i> , <i>Dillwynia tenuifolia</i> , <i>Micromyrtus minutiflora</i> , <i>Acacia elongata</i> , <i>Acacia brownei</i> , <i>Themeda australis</i> and <i>Xanthorrhoea minor</i> .
<i>Bothriochloa biloba</i>	Lobed Bluegrass	VU		1930	negligible	No suitable habitat present	Found in woodland on nutrient poor soils. This species has a strong preference for heavier textured soils and has previously been recorded on volcanic soils. Restricted levels of grazing and growth of <i>Aristida ramosa</i> have been found to cause reduction and exclusion of this species.
<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	VU	E1	#	negligible	No suitable habitat present	<i>Caladenia tessellata</i> is found in the following Catchment Management Regions Sydney Metropolitan, Southern Rivers, Hawkesbury/Nepean, and Hunter/Central Rivers. Currently known from three disjunct areas: Braidwood on southern tablelands, Ulladulla on the south coast and three populations in Wyong area on the Central Coast. It is generally found in grassy, dry sclerophyll forests/woodland, particularly those associated with clay loam, or sandy soils. However, there is one population at Braidwood in lowland on stony soil. This species only grows in very

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							dense shrubbery in coastal areas.
<i>Callistemon linearifolius</i>	Netted Bottle Brush		V	2008	negligible	No suitable habitat present	Occurs chiefly from Georges River to the Hawkesbury River where it grows in dry sclerophyll forest, open forest, scrubland or woodland on sandstone. Found in damp places, usually in gullies (Robinson, 1994)
<i>Cryptostylis hunteriana</i>	Leafless Tongue Orchid	VU	V	#	negligible	No suitable habitat present	This species typically grows in swamp-heath on sandy soils chiefly in coastal districts but has also been recorded on steep bare hillsides. Within the Central Coast bioregion, this species has been recorded within Coastal Plains Smooth-barked Apple Woodland and Coastal Plains Scribbly Gum Woodland. This species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by <i>Eucalyptus sclerophylla</i> , <i>E. sieberi</i> , <i>Corymbia gummifera</i> and <i>Allocasuarina littoralis</i> ; appears to prefer open areas in the understorey of this community and is often found in association with the <i>Cryptostylus subulata</i> . It occurs in the following Catchment Management Regions Hawkesbury/Nepean, Hunter/Central Rivers, Northern Rivers and Southern Rivers.
<i>Darwinia biflora</i>		VU	V	#	negligible	No suitable habitat present	Occurs in the following Catchment Management Authority Regions - Hawkesbury/Nepean and Sydney

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							Metropolitan. Is found on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone. Most sites are on the Lucas Heights Soil Landscape where this intergrades with either the Gynea or the Hawkesbury Soil Landscapes. Vegetation communities include: Sydney Coastal Dry Sclerophyll Forest and Sydney Coastal Heaths. Associated overstorey species include <i>Eucalyptus haemastoma</i> , <i>Corymbia gummifera</i> and/or <i>E. squamosa</i> . Prefers moist shallow depressions. Flowering occurs throughout the year but is concentrated in autumn, with mature fruits being produced from May to August.
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	VU	V	2006	negligible	Outside natural distribution of species	This species is widely planted as an urban street tree and in gardens but is quite rare in the wild. It is confined to the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield, largely on private property. Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite.
<i>Genoplesium baueri</i>	Bauer's Midge Orchid		V	#	negligible	No suitable habitat present	This terrestrial orchid species grows in open sclerophyll forest or moss gardens on sandstone. Typically the habitat is a drier heathy forest. The species has been recorded from locations between Ulladulla and Port Stephens. About half the records were made before 1960 with most of the older records being from Sydney

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							suburbs including Asquith, Cowan, Gladesville, Longueville and Wahroonga. No collections have been made from those sites in recent years. Currently the species is known from just over 200 plants across 13 sites.
<i>Hypsela sessiliflora</i>		E	E1	1951	negligible	No suitable habitat present	Grows in damp areas on the Cumberland Plain. Currently known from only two adjacent sites on a single private property at Erskine Park in the Penrith LGA. Previous sightings are all from western Sydney, at Homebush and at Agnes Banks. May be an early successional species that benefits from some disturbance. Possibly out competed when overgrown by some species such as <i>Cyndon dactylon</i> .
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	VU	V	#	negligible	No suitable habitat present	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Catchment regions include: Hunter/Central Rivers, Hawkesbury/Nepean, Southern Rivers, and Northern River Catchments. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.
<i>Melaleuca deanei</i>	Deane's Paperbark	VU	V	1912	negligible	No suitable habitat present	<i>Melaleuca deanei</i> occurs in Catchment Management Regions Hawkesbury/Nepean, Southern Rivers, and

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							Sydney Metropolitan. Distinctly it occurs in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. The species grows in wet heath on sandstone and Dry Sclerophyll Forests.
<i>Pelargonium sp. Striatellum</i> (G.W.Carr 10345)	Omeo Stork's Bill	EN		#	negligible	No suitable habitat present	<i>Pelargonium sp. Striatellum</i> (G.W.Carr 10345) is a tufted perennial herb. It has a basal leaf rosette and leafy flowering stems which grow to 15 cm tall, with fleshy and often extensively branched rhizomes giving rise to individual plants (ramets) in clonal colonies. The species is known to occur in habitat usually located just above the high water level of irregularly inundated or ephemeral lakes. During dry periods, the species is known to colonise exposed lake beds. <i>Pelargonium sp. Striatellum</i> (G.W.Carr 10345) occurs within the South Eastern Highlands and South East Corner IBRA Bioregions and the Hawkesbury-Nepean, Murrumbidgee, Southern Rivers and North East Natural Resource Management Regions.
<i>Persoonia hirsuta</i>	Hairy Geebung	EN	E1	1898	negligible	No suitable habitat present	Occurs from Gosford to Royal NP and in the Putty district from Hill Top to Glen Davis where it grows in woodland to dry sclerophyll forest on sandstone or rarely on shale. Two subspecies are recognised, <i>P.</i>

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							<i>hirsuta ssp. hirsuta</i> (Gosford to Berowra and Manly to Royal NP) and <i>P. hirsuta ssp. evoluta</i> (Blue Mountains, Woronora Plateau and Southern Highlands). Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone and shale-sandstone transition areas.
<i>Pimelea curviflora var. curviflora</i>		VU	V	1907/#	negligible	No suitable habitat present	<p>Occurring in Hawkesbury/Nepean and Sydney Metropolitan Catchment Authority Areas. Confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. Occurs on lateritic soils and shale-sandstone transition soils on ridge tops in woodland. Associated with Dry Sclerophyll forests and Coastal valley grassy woodlands.</p> <p>Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots.</p>
<i>Pimelea spicata</i>	Spiked Rice-flower	EN	E1	#	Negligible	No suitable habitat present	Once widespread on the Cumberland Plain, <i>Pimelea spicata</i> occurs in two disjunct areas, the Cumberland Plain and the Illawarra. Catchment areas are Hawkesbury/Nepean, Southern Rivers, and Sydney Metropolitan Catchment.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							<p>In western Sydney, <i>P. spicata</i> occurs on an undulating topography of substrates derived from Wianamatta Shale in areas supporting, or that previously supported, the Cumberland Plain Woodland Vegetation Community. Associated species include: <i>Eucalyptus moluccana</i>, <i>E. tereticornis</i>, <i>E. crebra</i>, <i>Bursaria spinosa</i>, and <i>Themeda australis</i>.</p> <p>In the Illawarra region, <i>P. spicata</i> is found in open woodland and also in coastal grassland communities with emergent shrubs. Dominant species within the woodland habitat include <i>Eucalyptus tereticornis</i>, <i>E. eugenioides</i>, <i>Themeda australis</i>, and <i>Lomandra longifolia</i>.</p> <p>In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a more well developed shrub and grass understorey.</p>
<i>Pomaderris prunifolia</i>	Plum-leaf Pomaderris		E2	1898	negligible	No suitable habitat present	<p>Known from only three sites within the listed local government areas, at Rydalmere, within Rookwood Cemetery and at The Crest of Bankstown. At Rydalmere it occurs along a road reserve near a creek, among grass species on sandstone. At Rookwood Cemetery it occurs in a small gully of degraded Cooks River / Castlereagh Ironbark Forest on shale soil.</p>
<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	EN	E1	#	negligible	No suitable habitat present	<p>Restricted to western Sydney between Freemans Reach in the north and Picton in the south (Hawkesbury/Nepean and Sydney Metropolitan</p>

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							<p>Catchment).</p> <p>Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where <i>Pterostylis saxicola</i> occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils.</p> <p>All species of <i>Pterostylis</i> are deciduous and die back to fleshy, rounded underground tuberoles. .</p>
<i>Streblus pendulinus</i>	Whalebone Tree	EN		#	negligible	No suitable habitat present	The species is found in warmer rainforests, chiefly along watercourses. The altitudinal range is from near sea level to 800 m above sea level. The species grows in well developed rainforest, gallery forest and drier, more seasonal rainforest).
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	VU	E1	1987/#	negligible	No suitable habitat present	Subtropical and littoral rainforest on sandy soils or stabilised dunes near the sea. Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. The species occurs in the following Catchment Authority Regions - Hunter/Central Rivers, Hawkesbury/Nepean, Sydney

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							Metropolitan, and Southern Rivers.
<i>Tetradthea juncea</i>	Black-eyed Susan	VU	V	1905	negligible	No suitable habitat present	<p><i>Tetradthea juncea</i> occurs in the Hunter/Central Rivers catchment. Specifically to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock.</p> <p>It generally prefers well-drained sites and occurs on ridges, although it has also been found on upper slopes, mid-slopes and occasionally in gullies.</p> <p>Vegetation types associated with <i>Tetradthea juncea</i> include sandy or swampy heath, and dry sclerophyll forests. Most populations occur in woodland on poor nutrient sandy soils with good drainage and low moisture levels.</p> <p>The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape.</p> <p>Typically found in dense understorey of grasses and canopy species including <i>Angophora costata</i>, <i>Corymbia gummifera</i>, <i>Eucalyptus haemastoma</i> and <i>E. capitellata</i>. Flowers mostly July to Dec.</p>
<i>Thesium australe</i>	Austral Toadflax	VU	V	#	negligible	No suitable habitat present	<p>Found in very small to large populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. <i>Thesium australe</i> is a root parasite that takes water and some nutrient from</p>

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							other plants, especially Kangaroo Grass. It is often found in damp sites in association with <i>Themeda australe</i> , but also found on other grass species at inland sites. Occurs on clay soils in grassy woodlands or coastal headlands.
<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell		E2	2010	negligible	No suitable habitat present	Grows in forest, woodland and grassland, chiefly in coastal and tablelands districts south from Sydney and the Blue Mountains, west along the Murray River to Mathoura. This listing covers 13 known sites, two of which are in northern Sydney on the Hawkesbury soil landscape with the remainder in inner-western Sydney on the Villawood soil landscape (Rookwood, Chullora, Bass Hill, Bankstown, Georges Hall, Campsie, South Granville and Greenacre). Found in damp, disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. In Hornsby LGA it occurs in or adjacent to sandstone gully forest. In Western Sydney it is found in remnants of Cooks River/ Castlereagh Ironbark Forest.
<i>Wilsonia backhousei</i>	Narrow-leafed Wilsonia		V	1965	negligible	No suitable habitat present	In NSW <i>Wilsonia backhousei</i> is found in the Southern Rivers and Sydney Metropolitan Catchment Area, specifically on the coast between Mimosa Rocks National Park and Wamberal north of Sydney (Nelson's Lake, Potato Point, Sussex Inlet, Wowly Gully and

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat Description
							Parramatta).

Table 11: Threatened Ecological Communities recorded or predicted to occur within five kilometres of the study area

Threatened Ecological Community Name	TSC Act	EPBC Act
<i>Blue Gum High Forest in the Sydney Basin Bioregion</i>	E4B	CE
<i>Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion</i>	V2	
<i>Castlereagh Swamp Woodland Community</i>	E3	
<i>Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	V
<i>Coastal Upland Swamp in the Sydney Basin Bioregion</i>	E3	E
<i>Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion</i>	E3	
<i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	E4B	CE
<i>Duffys Forest Ecological Community in the Sydney Basin Bioregion</i>	E3	
<i>Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion</i>	E3	E
<i>Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	
<i>Hygrocybeae Community of Lane Cove Bushland Park in the Sydney Basin Bioregion</i>	E4B	
<i>Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	CE
<i>Moist Shale Woodland in the Sydney Basin Bioregion</i>	E3	CE
<i>River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	
<i>Shale gravel Transition Forest in the Sydney Basin Bioregion</i>	E3	CE
<i>Shale/Sandstone Transition Forest</i>	E3	E
<i>Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion</i>	E3	

Threatened Ecological Community Name	TSC Act	EPBC Act
<i>Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	
<i>Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	
<i>Sydney Freshwater Wetlands in the Sydney Basin Bioregion</i>	E3	
<i>Sydney Turpentine-Ironbark Forest</i>	E3	CE
<i>Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions</i>	E3	
<i>Western Sydney Dry Rainforest in the Sydney Basin Bioregion</i>	E3	CE

Appendix 2: Fauna Results

Below is a list of significant fauna species recorded or predicted to occur within five km of the study area.

Notes to tables:

EPBC Act:	TSC Act:
EX - Extinct	C1 – critically endangered
CR - Critically Endangered	E1 – endangered (Part 1, Schedule 1)
EN – Endangered	E2 – endangered (Part 2, Schedule 1)
VU - Vulnerable	E4 – presumed extinct (Part 4, Schedule 1)
CD - Conservation dependent	V1 – vulnerable (Part 1, Schedule 2)
* - introduced species	

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A2.1 Threatened fauna species

The following table includes a list of the significant fauna species that have potential to occur within the study area. The list of species is sourced from the Atlas of NSW Wildlife, and the Protected Matters Search Tool (DoE; accessed on 3.11.2014 – Appendix 4).

The most recent record relates to:

- # species predicted to occur by the DoE database (not recorded on other databases)
- ## species predicted to occur based on natural distributional range and suitable habitat despite lack of records in the databases searched
- Year recorded on databases listed above

The following references have been consulted to compile the habitat descriptions above: Australian Museum Fact Sheets; Barrett et al. 2003; Churchill, 1998; Clayton et al., 2006; Cogger, 1995; OEH Threatened Species Profiles; Morcombe, 2000; Strahan, 1995.

Table 12: Threatened birds recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	E1	#	negligible	No suitable habitat present	The Australasian Bittern is distributed across south-eastern Australia. Often found in terrestrial and estuarine wetlands, generally where there is permanent water with tall, dense vegetation including <i>Typha spp.</i> and <i>Eleocharis spp.</i> Typically this bird forages at night on frogs, fish and invertebrates, and remains inconspicuous during the day. The breeding season extends from October to January with nests being built amongst dense vegetation on a flattened platform of reeds.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Burhinus grallarius</i>	Bush Stone-curlew		E1	2008	negligible	No suitable habitat present	Lightly timbered open forest and woodland, or partly cleared farmland with remnants of woodland, with a ground cover of short sparse grass and few or no shrubs where fallen branches and leaf litter are present.
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	EN	E1	#	negligible	No suitable habitat present	Found in coastal woodlands, dense scrub and heathlands, particularly where it borders taller woodlands.
<i>Diomedea exulans antipodensis</i>	Antipodean Albatross	VU	V	#	negligible	No suitable habitat present	A marine pelagic species rarely visiting Australia.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Epthianura albifrons</i>	White-fronted Chat		V, E2	1992	negligible	No suitable habitat present	<p>Sydney Metropolitan CMA: The White-fronted Chat occupies foothills and lowlands below 1000 m above sea level. In NSW it occurs mostly in the southern half of the state, occurring in damp open habitats along the coast, and near waterways in the western part of the state.</p> <p>The White-fronted Chat is found in damp open habitats, particularly wetlands containing saltmarsh areas that are bordered by open grasslands or lightly timbered lands. Along the coastline, they are found in estuarine and marshy grounds with vegetation less than one metre tall. The species is also observed in open grasslands and sometimes in low shrubs bordering wetland areas. Inland, the species is often observed in open grassy plains, saltlakes and salt pans that are along the margins of rivers and waterways.</p> <p>An Endangered Population occurs in the Sydney Metropolitan CMA area, at Newington Nature Reserve near Homebush and at Towra Point Nature Reserve.</p>

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Eudyptula minor</i>	Little Penguin		E2	2009	negligible	No suitable habitat present	The Manly endangered population of Little Penguin is the only known breeding population on the mainland in NSW. A range of nest sites are utilised by the penguins at Manly including under rocks on the foreshore, under seaside houses and structures, such as stairs, in wood piles and under overhanging vegetation including lantana and under coral tree roots. Male penguins start returning to the colony in May/June to find or reconstruct a suitable burrow for nesting and to attract females.
<i>Falco subniger</i>	Black Falcon		V	1990	negligible	No suitable habitat present	Mainly occur in woodlands and open country where can hunt. Often associated with swamps, rivers and wetlands. Nest in tall trees along watercourses.
<i>Haematopus longirostris</i>	Pied Oystercatcher		E1	2013	negligible	No suitable habitat present	An intertidal forager found on undisturbed sandy beaches and spits, tidal mudflats and estuaries. Its food supply (beach macroinvertebrates) has been negatively affected by human impacts. The Pied Oystercatcher is restricted to the littoral zone of beaches and estuaries, nesting on the ground above the tideline. Occasionally the Pied Oystercatcher is found in paddocks near the coast.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Hieraaetus morphnoides</i>	Little Eagle		V	1986	negligible	No suitable habitat present	The Little Eagle is most abundant in lightly timbered areas with open areas nearby providing an abundance of prey species. It has often been recorded foraging in grasslands, crops, treeless dune fields, and recently logged areas. The Little Eagle nests in tall living trees within farmland, woodland and forests.
<i>Lathamus discolor</i>	Swift Parrot	EN	E1	#	negligible	No suitable habitat present	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects. The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> . Commonly used lerp infested trees include Grey Box <i>E. microcarpa</i> , Grey Box <i>E. moluccana</i> and Blackbutt <i>E. pilularis</i> . This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo		V	2012	negligible	No suitable habitat present	Found mainly in semi-arid and arid regions, in dry woodlands, particularly mallee - casuarina assemblages. They breed in the hollows of large trees, often near watercourse.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Neophema pulchella</i>	Turquoise Parrot		V	2005	negligible	No suitable habitat present	Occurs in open woodlands and eucalypt forests with a ground cover of grasses and understorey of low shrubs. Generally found in the foothills of the Great Divide, including steep rocky ridges and gullies. Nest in hollow-bearing trees, either dead or alive; also in hollows in tree stumps. Prefer to breed in open grassy forests and woodlands, and gullies that are moist.
<i>Petroica phoenicea</i>	Flame Robin		V	1969	negligible	No suitable habitat present	Flame Robins are found in a broad coastal band from southern Queensland to just west of the South Australian border. The species is also found in Tasmania. The preferred habitat in summer includes moist eucalyptus forests and open woodlands, whilst in winter, prefers open woodlands and farmlands. It is considered migratory. The Flame Robin breeds from about August to January.
<i>Polytelis alexandrae</i>	Princess Parrot	VU		2008	negligible	Outside known natural distribution. No suitable habitat present	The Princess Parrot inhabits sand dunes and sand flats in the arid zone of western and central Australia. It occurs in open savanna woodlands and shrublands that usually consist of scattered stands of <i>Eucalyptus</i> (including <i>E. gongylocarpa</i> , <i>E. chippendalei</i> and mallee species), <i>Casuarina</i> or <i>Allocasuarina</i> trees; an understorey of shrubs such as <i>Acacia</i> (especially <i>A. aneura</i>), <i>Cassia</i> , <i>Eremophila</i> , <i>Grevillea</i> , <i>Hakea</i> and <i>Senna</i> ; and a ground cover dominated by <i>Triodia</i> species

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Ptilinopus superbus</i>	Superb Fruit-Dove		V	1996	negligible	No suitable habitat present	The Superb Fruit Dove's NSW distribution ranges from northern NSW to as far south as Moruya. It is found in rainforests, closed forests (including mesophyll vine forests) and sometimes in eucalypt and acacia woodlands where there are fruit-bearing trees. It forages in the canopy of fruiting trees such as figs and palms. Nests are constructed high in the canopy throughout September to January.
<i>Sternula nereis nereis</i>	Fairy Tern	VU		#	negligible	No suitable habitat present	The Fairy Tern nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. This species will also frequent embayments, estuarine habitats, wetlands and mainland coastlines.
<i>Tyto novaehollandiae</i>	Masked Owl		V	1985	negligible	No suitable habitat present	The Masked Owl may be found across a diverse range of wooded habitat that provide tall or dense mature trees with hollows suitable for nesting and roosting. It has mostly been recorded in open forests and woodlands adjacent to cleared lands. They nest in hollows, in trunks and in near vertical spouts or large trees, usually living but sometimes dead. The nest hollows are usually located within dense forests or woodlands. Masked Owls prey upon hollow-dependent arboreal marsupials, but terrestrial mammals make up the largest proportion of the diet. It has a large home range of between 500 and 1000ha.

Table 13: Threatened mammals recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	VU	V	#	low	No suitable habitat present	Occurs from the Queensland border to Ulladulla, with largest numbers from the sandstone escarpment country in the Sydney Basin and Hunter Valley. Primarily found in dry sclerophyll forests and woodlands, but also found in rainforest fringes and subalpine woodlands. Forages on small, flying insects below the forest canopy. Roosts in colonies of between three and 80 in caves, Fairy Martin nests and mines, and beneath rock overhangs, but usually less than 10 individuals. Likely that it hibernates during the cooler months. The only known existing maternity roost is in a sandstone cave near Coonabarabran.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	EN	V	#	negligible	No suitable habitat present	Occurs along the east coast of Australia and the Great Dividing Range. Uses a range of habitats including sclerophyll forests and woodlands, coastal heathlands and rainforests. Occasional sightings have been made in open country, grazing lands, rocky outcrops and other treeless areas. Habitat requirements include suitable den sites, including hollow logs, rock crevices and caves, an abundance of food and an area of intact vegetation in which to forage. Seventy per cent of the diet is medium-sized mammals, and also feeds on invertebrates, reptiles and birds. Individuals require large areas of relatively intact vegetation through which to forage.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Dasyurus viverrinus</i>	Eastern Quoll		E1	1863	negligible	No suitable habitat present	This species occurs in a variety of habitats including scrub, heathland, cultivated land and dry sclerophyll forest (Strahan 1995; NPWS 1999). Den sites can consist of a number of chambers in range of structures from underground burrows, hollow logs, rock piles and hay sheds. The Eastern Quoll is a solitary feeder with males often travelling over a kilometre in a night to forage (Strahan 1995). Females restrict their movements to a few hundred metres around their dens.
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	EN	E1	#	negligible	No suitable habitat present	This species prefers sandy soils with scrubby vegetation and/or areas with low ground cover that are burnt from time to time. A mosaic of post fire vegetation is important for this species.
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat		V	2007	moderate	May roost under the road bridge of derelict concourse	Occurs from Victoria to Queensland, on both sides of the Great Dividing Range. Forms large maternity roosts (up to 100,000 individuals) in caves and mines in spring and summer. Individuals may fly several hundred kilometres to their wintering sites, where they roost in caves, culverts, buildings, and bridges. They occur in a broad range of habitats including rainforest, wet and dry sclerophyll forest, paperbark forest and open grasslands.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Perameles nasuta</i>	Long-nosed Bandicoot		E2	2013	Low-moderate	Marginally suitable habitat present. Recent records in local area.	The Long-nosed Bandicoot (inner west population) is found within the LGAs of Marrickville and Canada Bay and may extend into the surrounding LGAs of Canterbury, Ashfield and Leichardt. Individuals mostly shelter under older houses and buildings, and forage for invertebrates, plant roots, and hypogean fungi in parklands and back-yards. The population is threatened by collision with vehicles; predation by dogs, cats and foxes; renovation of old buildings preventing access to nest sites; removal of vegetation; and is at risk of extinction due to local fluctuations in mortality and fecundity.
<i>Phascolarctos cinereus</i>	Koala	VU	V	#	negligible	No suitable habitat present	Pittwater LGA and Hawks nest: In NSW the Koala mainly occurs on the central and north coasts with some populations in the western region. Koalas feed almost exclusively on eucalypt foliage, and their preferences vary regionally. Primary feed trees include <i>Eucalyptus robusta</i> , <i>E. tereticornis</i> , <i>E. punctata</i> , <i>E. haemostoma</i> and <i>E. signata</i> . They are solitary with varying home ranges. In high quality habitat home ranges may be 1-2ha and overlap, while in semi-arid country they are usually discrete and around 100ha.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	VU		#	negligible	No suitable habitat present	The New Holland Mouse currently has a disjunct, fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. The home range of the New Holland Mouse can range from 0.44ha to 1.4ha. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The species is nocturnal and omnivorous, feeding on seeds, insects, leaves, flowers and fungi, and is therefore likely to play an important role in seed dispersal and fungal spore dispersal.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	V	2011	moderate	The Date Palm on the platform and other trees within the study area may provide a small amount of foraging habitat. Recent local records.	Occurs along the NSW coast, extending further inland in the north. This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Roosts in large colonies (camps), commonly in dense riparian vegetation. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.

Table 14: Threatened reptiles recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	VU	E1	#	negligible	No suitable habitat present	Mainly occurs in association with communities occurring on Triassic sandstone within the Sydney Basin. Typically found among exposed sandstone outcrops with vegetation types ranging from woodland to heath. Within these habitats they generally use rock crevices and exfoliating rock during the cooler months and tree hollows during summer.

Table 15: Threatened frogs recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	VU	V	#	negligible	No suitable habitat present	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone formations. Known from wet and dry forests and montane woodland in the southern part range. Individuals can be found around sandy creek banks or foraging along ridge-tops during or directly after heavy rain. Males often call from burrows located in sandy banks next to water.
<i>Litoria aurea</i>	Green and Golden Bell Frog	VU	E1	2013	negligible	No suitable habitat present	Most existing locations for the species occur as small, coastal, or near coastal populations, with records occurring between south of Grafton and northern VIC. The species is found in marshes, dams and stream sides, particularly those containing bullrushes or spikerushes. Preferred habitat contains water bodies that are unshaded, are free of predatory fish, have a grassy area nearby and have diurnal sheltering sites nearby such as vegetation or rocks, although the species has also been recorded from highly disturbed areas including disused industrial sites, brick pits, landfill areas and cleared land.

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Mixophyes balbus</i>	Stuttering Frog	VU	E1	#	negligible	No suitable habitat present	This species is usually associated with mountain streams, wet mountain forests and rainforests. It rarely moves very far from the banks of permanent forest streams, although it will forage on nearby forest floors. Eggs are deposited in leaf litter on the banks of streams and are washed into the water during heavy rains.

Table 16: Threatened fish recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	EPBC Act	TSC Act	Most Recent Record	Likelihood of Occurrence	Rationale for Likelihood	Habitat_description
<i>Carcharodon carcharias</i>	Great white shark	CE		#	negligible	No suitable habitat present	Marine and estuarine habitats
<i>Epinephelus daemeli</i>	Black cod	VU		#	negligible	No suitable habitat present	Aquatic habitat

A2.2 Migratory species (EPBC Act listed)

Includes records from the following sources:

- BioNet Atlas of NSW Wildlife (refer to Section 2.1).
- DoE Protected Matters Search (accessed on 3.11.2014 - Appendix 4).

Table 17: Migratory bird species recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	Most Recent Record
<i>Actitis hypoleucos</i>	Common Sandpiper	1988
<i>Anthochaera phrygia</i>	Regent Honeyeater	1898/#
<i>Ardea ibis</i>	Cattle Egret	2012
<i>Ardea modesta</i>	Eastern Great Egret	2012
<i>Arenaria interpres</i>	Ruddy Turnstone	1994
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	2012
<i>Calidris canutus</i>	Red Knot	2011
<i>Calidris ferruginea</i>	Curlew Sandpiper	2011
<i>Calidris melanotos</i>	Pectoral Sandpiper	2008
<i>Calidris ruficollis</i>	Red-necked Stint	2009
<i>Charadrius bicinctus</i>	Double-banded Plover	2010
<i>Charadrius leschenaultii</i>	Greater Sand-plover	1991
<i>Diomedea epomophora epomophora</i>	Southern Royal Albatross	#
<i>Diomedea epomophora sanfordi</i>	Northern Royal Albatross	#
<i>Diomedea exulans (sensu lato)</i>	Wandering Albatross	#
<i>Diomedea exulans exulans</i>	Tristan Albatross	#
<i>Diomedea exulans gibsoni</i>	Gibson's Albatross	#
<i>Gallinago hardwickii</i>	Latham's Snipe	2012
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	2001
<i>Hydroprogne caspia</i>	Caspian Tern	2007
<i>Limosa lapponica</i>	Bar-tailed Godwit	2013
<i>Limosa limosa</i>	Black-tailed Godwit	2009
<i>Macronectes giganteus</i>	Southern Giant Petrel	#
<i>Macronectes halli</i>	Northern Giant-Petrel	#
<i>Monarcha melanopsis</i>	Black-faced Monarch	2003

Scientific Name	Common Name	Most Recent Record
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	2012
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	#
<i>Numenius madagascariensis</i>	Eastern Curlew	1984
<i>Numenius minutus</i>	Little Curlew	1958
<i>Numenius phaeopus</i>	Whimbrel	1991
<i>Pandion cristatus</i>	Osprey	2005
<i>Philomachus pugnax</i>	Ruff	1991
<i>Plegadis falcinellus</i>	Glossy Ibis	2013
<i>Pluvialis fulva</i>	Pacific Golden Plover	2013
<i>Pluvialis squatarola</i>	Grey Plover	2004
<i>Rhipidura rufifrons</i>	Rufous Fantail	2001
<i>Rostratula australis</i>	Australian Painted Snipe	#
<i>Sterna hirundo</i>	Common Tern	2002
<i>Sternula albifrons</i>	Little Tern	1997
<i>Thalassarche bulleri</i>	Buller's Albatross	#
<i>Thalassarche cauta cauta</i>	Shy Albatross	#
<i>Thalassarche cauta salvini</i>	Salvin's Albatross	#
<i>Thalassarche cauta steadi</i>	White-capped Albatross	#
<i>Thalassarche eremita</i>	Chatham Albatross	#
<i>Thalassarche melanophris</i>	Black-browed Albatross	#
<i>Thalassarche melanophris impavida</i>	Campbell Albatross	#
<i>Tringa brevipes</i>	Grey-tailed Tattler	1995
<i>Tringa glareola</i>	Wood Sandpiper	2007
<i>Tringa nebularia</i>	Common Greenshank	2004
<i>Tringa stagnatilis</i>	Marsh Sandpiper	2007
<i>Xenus cinereus</i>	Terek Sandpiper	2010

denotes species predicted to occur by the DoE database (not recorded on other databases)

Table 18: Migratory reptile species recorded or predicted to occur within five kilometres of the study area

Scientific Name	Common Name	Most Recent Record
<i>Caretta caretta</i>	Loggerhead Turtle	#
<i>Chelonia mydas</i>	Green Turtle	#
<i>Dermochelys coriacea</i>	Leathery Turtle	#
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	#
<i>Natator depressus</i>	Flatback Turtle	#

denotes species predicted to occur by the DoE database (not recorded on other databases)

Appendix 3: Tree Schedule

Table 19: Tree Schedule for the Croydon Station Easy Access Upgrade study area

Tree no.	Common name	Scientific name	Approx. height (m)	DBH (cm)	Tree Protection zone (TPZ) radius from centre of trunk (m)	Structural root zone (SRZ) radius from centre of trunk (m)	Significance Rating	SULE	Impact of the Proposal	Tree Type	Comments
1-4	Olive (x4)	<i>Olea europaea</i>	4	15-30	3.6	2.25	Medium	2	Nil	Medium	Exotic species planted on footpath
5-9	Camphor Laurel, Oleander, Silky Oak, Sweet Pittosporum, She-oak	<i>Cinnamomum camphora</i> , <i>Nerium oleander</i> , <i>Grevillea robusta</i> , <i>Pittosporum undulatum</i> , <i>Allocasuarina</i> sp.	4	N. A	N.A.	N.A.	Low	4	Removal	Small?	Dense inaccessible area of environmental weeds with a few emergent small trees. All trees are invasive species likely to be self sown. Some are non-local native species.
10	Plane Tree	<i>Platanus X acerifolia</i>	10	50	6	2.75	Medium	2	Lopping	Medium	Exotic shade tree species. Planted tree
11-12	Bottlebrushes (x2)	<i>Callistemon</i> sp.	8	20	2.4	2.0	Low-Medium	3	Removal	Medium	Planted native trees
13-22	Plane Trees (x10)	<i>Platanus X acerifolia</i>	8	<30	3.6	2.25	Medium	2	Removal of at least two at	Medium	Exotic shade tree species planted along footpath.

Tree no.	Common name	Scientific name	Approx. height (m)	DBH (cm)	Tree Protection zone (TPZ) radius from centre of trunk (m)	Structural root zone (SRZ) radius from centre of trunk (m)	Significance Rating	SULE	Impact of the Proposal	Tree Type	Comments
									the eastern end of the row. For the rest, removal of all branches <3 metres above ground.		
23	Date Palm	<i>Phoenix sp.</i>	8	30	3	N.A.	High	2	Retention	Medium	Located on platform 1/2. Part of Croydon Station heritage listing. Existing paving over TPZ.
24-26	Chinese Tallow Tree (x3)	<i>Triadica sebifera</i>	8	30	3.6	2.25	Low	2	Removal	Medium	Located on platform 1/2. Existing paving over TPZ
27-28	Brush Box (x2)	<i>Lophostemon confertus</i>	8	40	4.8	2.5	Low-Medium	2	Nil	Medium	Non-local native. Planted or self sown.

Tree no.	Common name	Scientific name	Approx. height (m)	DBH (cm)	Tree Protection zone (TPZ) radius from centre of trunk (m)	Structural root zone (SRZ) radius from centre of trunk (m)	Significance Rating	SULE	Impact of the Proposal	Tree Type	Comments
29-30	Camphor Laurel (x2)	<i>Cinnamomum camphora</i>	6	40	4.8	2.5	Low	2	Nil	Medium	Exotic invasive species
31	White Cedar	<i>Melia azedarach</i>	6	40	4.8	2.5	Low-Medium	3	Nil	Medium	Non-local native invasive species
32	Rough-barked Apple	<i>Angophora floribunda</i>	8	40	4.8	2.5	Medium-High	1	Nil	Medium	Local native species
33-38	Rough-barked Apple (x 6)	<i>Angophora floribunda</i>	6	20	2.4	2.0	Medium-High	1	Nil	Medium	Local native species
39	Sydney Green Wattle	<i>Acacia decurrens</i>	6	15	2	1.5	Medium	3	Nil	Medium	Local native species
40	Brush Box	<i>Lophostemon confertus</i>	8	40	4.8	2.5	Low-Medium	2	Nil	Medium	Non-local native. Outside fence
41-42	Rough-barked Apple (x2)	<i>Angophora floribunda</i>	6	20	2.4	2.0	Medium-High	1	Nil	Medium	Inside fence. Local native species.
43	Mugga Ironbark	<i>Eucalyptus sideroxylon</i>	8	20	2.4	2.0	Medium	1	Nil	Medium	
44-45	Bottlebrush (x2)	<i>Callistemon sp.</i>	4	20	2.4	2.0	Low-Medium	3	Nil	Medium	Outside fence. Native species.

Notes:

Tree is defined as: *a long lived woody perennial plant greater than (or usually greater than) three metres in height with one or relatively few main stems or trunks* (AS 4970 – 2009 - Protection of trees on development sites)

TPZ and **SRZ** as defined in AS 4970 – 2009 - Protection of trees on development sites (TPZ includes both Critical Root Zone and Structural Root Zone)

N.A. indicates that the formulas and graphs in AS 4970 – 2009 cannot be adopted to determine SRZ for this tree type

Landscape Significance

The assessment of the landscape significance of a tree is an inherently subjective process.

The landscape significance process adopted in this report takes into account the following factors:

- Whether the tree is in sound condition
- Whether the tree has a SULE of greater than 15 years
- Whether the tree is well developed and typically formed for its species
- Whether the tree is one of the larger and more aesthetically valuable in the locality
- Whether the removal of the tree will transform the landscape
- Whether the removal of the tree will diminish historical or cultural values

A tree may be identified as one of three categories of landscape significance: high, medium or low.

SULE Category Description

1 Long, life span greater than 40 years

2 Medium, life span from 15 to 40 years

3 Short, life span from 5 to 15 years

4 Remove, should be removed within 5 years

5 Small, Young or regularly pruned, trees that can be readily moved or replaced

Unstable, Showing imminent signs of structural failure, unstable in the ground, significant trunk damage rendering the tree structurally hazardous

Tree Type based on TfNSW Vegetation Offset Guide 9TP-ST-149/2.0

Appendix 4: Plates

PLATFORMS



Plate 1 Heritage Listed Date Palm on platform 1/2 (tree 23)



Plate 2 Chinese Tallow Trees in garden at eastern end of platform 1/2 (trees 24 – 26)



Plate 3 Garden bed containing exotic shrub east end of platform 3/4



Plate 4 Trimmed exotic shrubs at west end of platform 5



Plate 5 Small garden beds with exotic shrubs west end of platforms 1/2 and platforms 3/4 and showing vegetation on top of embankment along Young Street in distance (trees 27 - 39)

NORTHERN SIDE OF RAIL CORRIDOR



Plate 6 Planted Olive Trees outside rail corridor along Hennessy Street (trees 1 – 4)



Plate 7 Environmental weeds growing through the rail corridor along Hennessy Street



Plate 8 Dense environmental weed growth within rail corridor along Hennessy Street



Plate 9 Disused steps overgrown with environmental weeds adjacent to Hennessy Street (trees 5 - 9)



Plate 10 Brush Boxes, Camphor Laurels and Rough-barked Apples inside rail corridor adjacent to Young Street (trees 27 - 39)



Plate 11 Brush Boxes, Camphor Laurels, Rough-barked Apples and Sydney Green Wattle inside rail corridor adjacent to Young Street near Meta Street road bridge (trees 27 - 39)

SOUTHERN SIDE OF RAIL CORRIDOR



Plate 12 Row of 10 planted Plane trees along Paisley Road near platform 5 (trees 13 – 22)



Plate 13 Large Plane Tree, adjacent Bottlebrushes and hedges near entrance to Croydon Station (trees 10 – 12)



Plate 14 Embankment above platform 5 with prostrate conifer and garden areas above



Plate 15 Planted trees along Paisley Road west of Meta Street road bridge (trees 40 – 45)