Appendix D

Revised noise and vibration impact assessment

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3 February 2010

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Dear Adam

Proposed modifications to Rosehill Recycled Water Scheme – revised noise and vibration impact assessment

Parsons Brinckerhoff (PB) has been commissioned by Jemena Asset Management (Jemena) to provide assessment of potential noise impacts associated with the proposed modifications to the Rosehill Recycled Water Scheme.

This noise impact assessment has been prepared supplementary to the *Rosehill Recycled Water Scheme Environmental Assessment* (PB, January 2009).

1. Background

An assessment of potential construction and operational noise and vibration impacts for the proposed scheme was undertaken as part of the project EA (*Rosehill Recycled Water Scheme – Noise and Vibration Impact Assessment*, NVIA, PB September 2008).

Project approval for the proposed recycled water scheme was granted in June 2009 (Application 07_0121) with relevant conditions:

- Condition 2.1 *Vibration Impacts* requires the project to meet requirements of *Department of Environment and Climate Change Assessing Vibration: A Technical Guideline* (DECC, February 2006) during the construction phase.
- Condition 2.2 *Construction Noise* of the Project Approval requires construction works associated with the project that would generate noise audible at nearest sensitive receivers and at any residential receiver to be undertaken during core construction hours of 7 am-6 pm Monday to Friday, 7 am-1 pm Saturdays and at no time on Sundays or Public Holidays.
- Construction works may be undertaken outside of the day time core hours between 6 pm-10 pm (evening) and 10 pm-7 am (night time) Monday to Friday where the required construction activities are detailed in an approved Construction Noise and Vibration Management Plan (CNVMP).

Maximum allowable noise contributions at nearest receiver locations have not been specified in the Project Approval, it is expected the management of construction noise will be required to meet the requirements of *Department of Environment, Climate Change and Water* (former DECC) *Interim Construction Noise Guidelines* (DECCW, ICNG 2009).

Condition 2.5 *Operational Noise* of the Project Approval provides a maximum allowable noise contribution of 40 dB(A) $L_{Aeq, 15min}$ at the most affected residential receiver applicable under wind speeds up to 3 metres per second (m/s) (measured at 10 metres (m) above ground level, and temperature inversion conditions of up to 3°C/100m.

2. Proposed project modifications

Modification 1 – Fairfield Park to Woodville route

Approximately 1.5 km of the recycled water pipeline along Gordon Street, The Horsley Drive and Tangerine Street would be relocated to Landon Street. Consistent with the original pipeline construction program the proposed modified pipeline route would require the application of the following construction techniques:

- Landon Street – open trench construction from the intersection Normanby Street to the end of Landon Street including, horizontal directional drilling (HDD) under The Horsley Drive and Prospect and Burns Creeks and cased thrust bore under Vine Street. Open trench construction would also occur in for approximately 300 metres within Fairfield Park.

The proposed modification requires a revised assessment of potential construction noise and vibration impacts at nearest potentially affected residential and sensitive receivers. The proposed modified recycled water pipeline route is detailed in the modification Environmental Assessment as Figure 2-3 and Figure 2-4.

Modification 2 – Transformers at the Fairfield water recycling plant

The approved Fairfield water recycling plant (RWTP) and North Street, Fairfield included two 1500 kVA and one 500 kVA transformers. It is now proposed to upgrade the transformer configuration to three 1500 kVA transformers.

A revised operational noise impact assessment for the proposed three 1500 kVa transformer configuration during concurrent RWTP operation is to be prepared. As required, operational noise management and mitigation measures shall be recommended to achieve compliance with the maximum allowable noise contribution of 40 dB(A) $L_{Aeq, 15min}$ at nearest residential receivers.

3. Scope

The scope of work for this study was to prepare an assessment of potential construction and operational noise impacts associated with the proposed project modifications.

Where feasible, reference has been made to the predicted construction and operational noise impacts determined for the project NVIA.

Limitations to the scope of works and this assessment are as per the noise and vibration impact assessment undertaken for the project EA.

4. Construction noise impact assessment (Modification 1)

4.1.1 Nearest potential noise affected receivers

Nearest residential receivers are located within 12 – 20 metres of the proposed pipeline alignment on Langdon Street. No noise sensitive (education institutions, places of worship etc.) or commercial receivers have been identified within 100 metres of the alignment modification.

4.1.2 Adopted construction noise goals

In accordance with the ICNG, adopting a day time background noise level of 44 dB(A) L_{A90} determined during the NVIA baseline noise monitoring at Elizabeth Street a day time construction noise goal of 54 dB(A) $L_{Aeq,\ 15min}$ has been adopted. Construction works outside of standard construction hours of 7 am – 6 pm are not expected on the modified route.

4.1.3 Predicted construction noise impacts

It has been assumed the proposed modification would require no variation in methodology for trenching, pipe bore, HDD and thrust bore construction works assessed in the NVIA. Detailed in Table 4-1, predicted worst case construction noise impacts for the modified pipeline alignment at nearest receiver locations have been adopted from the NVIA and are indicative of peak noise generating works.

Pipe bridge construction works were not assessed in the NVIA, predictive point to point calculations have been undertaken for nearest potentially affected receivers where anticipated plant are in concurrent operation during dominant noise generating construction works for bridge foundations.

- 20T excavator of sound power level (SWL) 108 dB(A)
- Rotation pier auger 86 dB(A).

It has been assumed the pipe bridge would be prefabricated off site and installed by crane, foundation construction works represent assessment of potential worst case noise impacts.

Table 4-1 Predicted day time construction noise impacts for proposed modified pipeline route

Location	Construction work	Distance to nearest receiver, (m)	Construction $L_{Aeq,\ 15min}$ noise level, dB(A)	
			Predicted	Compliance
Construction day time noise goal 54 dB(A) $L_{Aeq,\ 15min}$				
Landon Street	trenching	12-20	67-63	No +13
The Horsley Drive	HDD	20	54	Yes
Prospect Creek and Burns Creek	HDD	20	54	Yes
Vine Street	thrust bore	125	31	Yes

Note all noise levels in dB(A) to nearest dB(A)

L_{Aeq} = Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound

HDD = Horizontal directional drilling

Predicted worst case noise impacts of 63-67 dB(A) $L_{Aeq,\ 15min}$ during trenching construction works on Landon Street are potentially up to 13 dB(A) in exceedance of the adopted 54dB(A) $L_{A1eq,\ 15min}$ construction noise goal. Compliance is expected to be achieved where nearest receivers are location at a minimum separation distance of 60 metres from work locations.

Reductions to worst case noise impacts would occur where construction works progress along the alignment and fewer plant are in concurrent operation.

Predicted noise impacts at nearest receivers of 54 dB(A) for HDD and 31 dB(A) thrust bore construction works are expected to be compliant with the adopted construction noise goal.

Where compliance with adopted construction nose goal is achieved at nearest residential receivers compliance with commercial noise goal is expected at nearest commercial land uses. To reduce anticipated construction noise impacts and minimise potential for annoyance at the residential receivers, noise management and mitigation measures are recommended in Section 6.

Consistent with the NVIA and minimum source to receiver separation distances of 12-20 metres, potential vibration levels from the proposed works are not expected to result in exceedance of perceptible and structural vibration criteria in the *Department of Environment and Climate Change and Water (formerly DECC) Environmental Noise Management Assessing Vibration: a technical guideline* (2006).

5. Operational noise impact assessment (Modification 2)

5.1.1 Nearest potential noise affected receivers

Nearest receivers to the proposed RWTP at Fairfield are located to the north on North Street approximately 70-140 metres from the site and to the west on Railway Parade approximately 85 metres from the site.

5.1.2 Adopted operational noise goals

Assessment of potential operational noise impacts has adopted guidance from the NSW *Industrial Noise Policy* (NSW INP, 2000). A project specific operational noise goal of 40 dB(A) $L_{Aeq,\ 15\ min}$ has been adopted from the Project Approval.

5.1.3 Predicted RWTP operation noise impacts

Based on the uniform local topography and the separation distance between the proposed transformers and nearest receivers predicted operational noise impacts have been determined through the noise propagation relationship:

Note: SPL received = sound pressure level at receiver; SWL source = source sound power level for transformers

A 1500 kVa transformer source sound power level of 76.5 dB(A) has been adopted from information supplied by Jemena. The location of the proposed transformers and nearest receiver locations has been detailed in enclosed Figure A.

Detailed in Table 5-1, predicted operational noise impacts for the proposed transformer configuration have been determined adopting predicted RWTP noise impacts from the NVIA. A worst case operational scenario of the three transformers in concurrent operation has been assessed.

Considerate of potential noise propagation attenuation from the intervening 4.8 ML (mega litre) recycled water storage tank (6 metres in height), a maximum 10 dB(A) reduction to predicted transformer noise impacts has been included at North Street receivers.

It has been assumed no potential annoying tonal or low frequency source noise characteristics, as defined in the NSW INP, are present in the transformer source noise emissions.

Table 5-1 Operational noise impacts for 1500 kVa transformer and RWTP

Receiver	Distance (m)	Noise impacts $L_{Aeq,15min}$ dB(A)			
		3 x 1500 kVa transformers	RWTP	Cumulative transformers & RWTP	Noise goal compliance
Operational noise goal 40 dB(A) $L_{Aeq, 15min}$					
2 North Street	70	26	36	36.5	Yes
6 North Street	75	25.5	35.5	36	Yes
8 North Street	85	24.5	35	35.5	Yes
10 North Street	140	20	30	30.5	Yes
1 Lyndon Street	150	19.5	29.5	30	Yes
Railway Parade	85	34.5	44.5	45	No + 5

Note all noise levels in dB(A) to nearest 0.5 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level. Steady sound level containing same amount of acoustic energy as the corresponding time-varying sound for a 15 minute assessment period.

The operation of the three 1500 kVa transformers is predicted to result in received noise impacts of 19.5-34.5 dB(A) $L_{Aeq, 15min}$ at nearest receivers.

Transformer operations are compliant with the adopted 40 dB(A) $L_{Aeq, 15min}$ operational noise goal at all receivers.

Where the transformers are in concurrent operation with the RWTP, received noise impacts of 30.5-45 dB(A) $L_{Aeq, 15min}$ are predicted at nearest receivers. The operation of the three transformers potentially increases cumulative transformer and RWTP noise impacts by up to 0.5 dB(A). The transformers would not be expected to be audible above dominant RWTP operations at nearest receivers.

Compliance with the adopted 40 dB(A) $L_{Aeq, 15min}$ noise goal is predicted at all receivers on North Street and Lyndon Street. A potential peak operational noise goal exceedance of 5 dB(A) is predicted at nearest receivers on Railway Parade.

6. Recommended noise management and mitigation measures

6.1 Construction works

Predicted noise impacts for the modified construction works are predicted to potentially exceed an adopted day time noise goal of 54 dB(A) $L_{Aeq, 15min}$ at nearest noise sensitive residential receivers by up to 13 dB(A) during trenching works. Compliance with the adopted criteria is expected at all receivers and land uses during proposed HDD and thrust core construction works.

Consistent with the detailed construction noise impact assessment undertaken as part of the EA, a series of pre-construction and construction phase measures and management practices designed to

mitigate and reduce noise levels are detailed in the NVIA. Measures include the development of a CNVMP to address noise levels associated with the construction works, maximising offset distance between noise generating plant and sensitive receivers and avoiding simultaneous operation of dominant noise generating plant.

Compliance with the adopted noise design goals is the desired outcome. Where it is identified that the required noise criteria would not be met, all reasonable and feasible measures would be undertaken to reduce the noise emissions.

6.2 RTWP and transformer operations

Consistent with the assessment of RWTP operations in the NVIA, to achieve compliance with an adopted 40 dB(A) noise design goal at nearest receivers on Railway Parade, detailed in the NVIA it is proposed to house the RWTP water pumps in a solid wall and roof steel structure. No noise management or mitigation measures for the transformers are required.

Where RWTP operational noise impacts are reduced by up to 5 dB(A) at Railway Parade full compliance with the adopted noise goal is predicted at all receivers during concurrent transformer and RWTP operations.

During the detailed design phase transformer SWLs and the presence or otherwise of potential annoying source noise characteristics should be confirmed.

7. Conclusion

The assessment of the modified construction program has determined proposed trenching and pipe bridge works to potentially exceed an adopted day time construction noise goal at nearest residences. Compliance would be achieved at residential receivers located greater than 60 metres from the works. Compliance at all receivers and land uses is predicted during HDD and thrust boring works.

Compliance with an adopted noise goal of 40 dB(A) $L_{Aeq,15min}$ is predicted to be achieved at all receivers for transformer operations. No noise management or mitigation measures for the transformers are required.

During concurrent transformer and RWTP operation, noise goal compliance is achieved at nearest receivers at North Street and Lyndon Street. A potential 5 dB(A) noise goal exceedance is predicted at nearest receivers on Railway Parade indicative of dominant RWTP water pump operations.

Recommended construction and operational noise management and mitigation measures consistent with the NVIA should be adopted during the detailed design phase to reduce noise impact potential. Measures include the development of a CNVMP for construction works and solid façade housing for the RWTP water pumps.

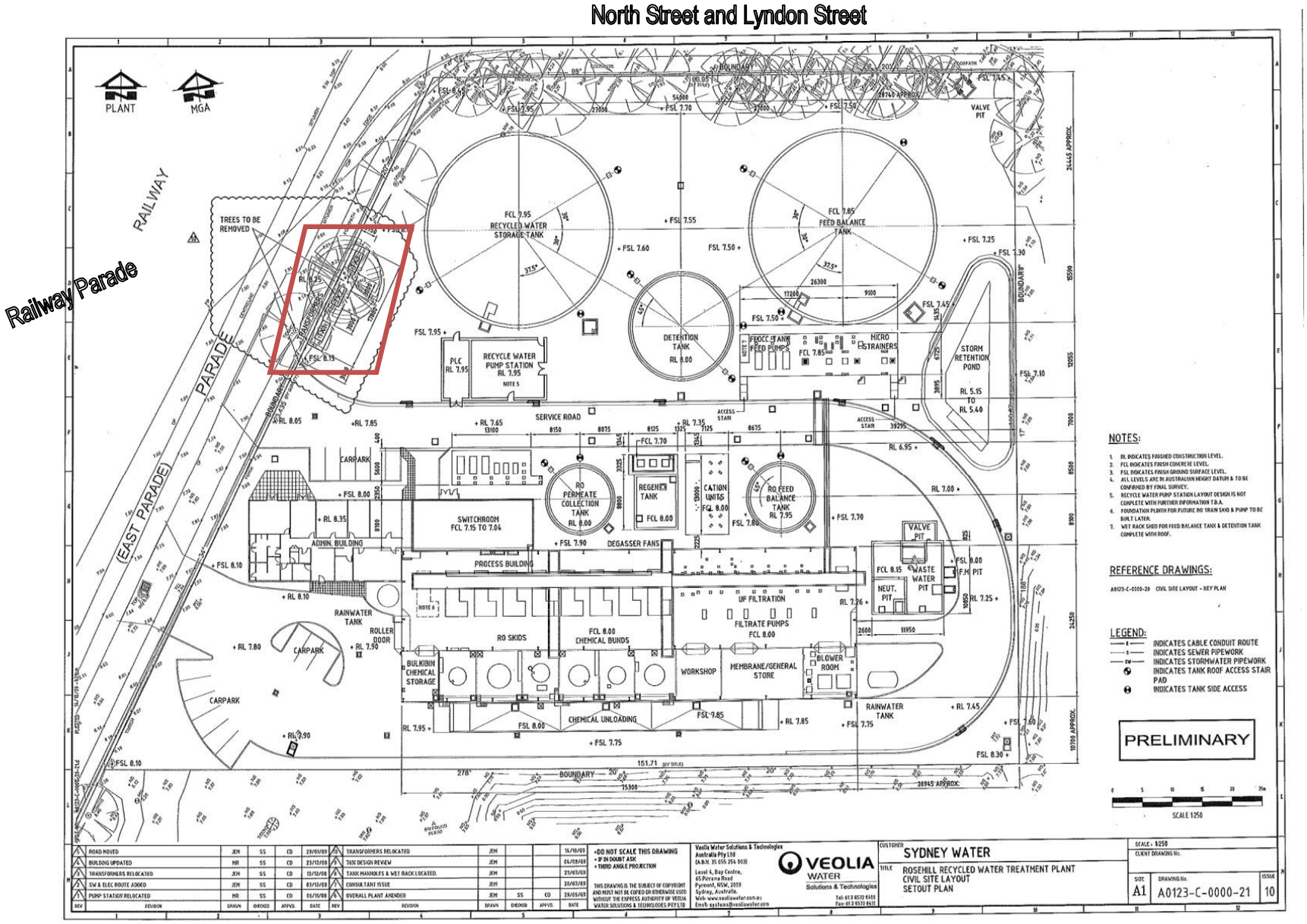
Yours sincerely,

Steven Walker

Senior Environmental Acoustician
Parsons Brinckerhoff Australia Pty Limited

Enclosed Figure A – proposed transformers at the RWTP and surrounding environment

Figure A **Proposed revised transformer configuration**



Appendix E

Revised biodiversity impact assessment

MEMO

Date:	3 February 2010
To:	Adam Littman
Copy:	
From:	Lukas Clews
Job no:	2117094A
Subject:	**Ecological impacts of the modifications to the Rosehill recycled water scheme**

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1. Introduction

The potential terrestrial biodiversity impacts associated with the development of a recycled water scheme between Fairfield and Camellia in Western Sydney (the Proposal) was previously undertaken and the results presented in a technical paper attached to the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007).

This technical paper examined the terrestrial flora and fauna assemblages and their habitats within the proposal area and determined the biological impacts of the Proposal's construction and operation. It summarised the proposed mitigation measures as well as the assessments of significance required under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A detailed description of the overall Rosehill recycled water scheme project was provided in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007). The proposal was approved by the Minister for Planning in June 2009; however, Jemena Asset Management (Jemena) have since proposed a series of six modifications to the approved proposal. This memo discusses the potential ecological impacts of the modifications to the Rosehill Recycled Water Scheme as proposed by Jemena.

The proposed modifications to the proposal that may possibly have impacts on biodiversity are as follows:

- Modification 1 - Fairfield Park to Woodville Road route modification:
  - This modification would involve the deviation of approximately 1.16 kilometres (km) of the recycled water pipeline along Landon Street from Fairfield Park to Normanby Street Fairfield.
  - Proposed construction methods such as thrust boring and horizontal directional drilling would be adopted for the watercourse and major road crossings to minimise disturbance.

- Modification 4 – Water recycling plant sewer connection line:
  - As described in the Environmental Assessment, the waste stream from the water recycling plant will be discharged into a sewer main. The waste will be discharged under a trade waste agreement that has been negotiated between Sydney Water and Veolia.
  - The land affected by the connection line is a mixture of landscaped lawn featuring exotic grass species and a section of vegetation approximately 3.0 metres (m) wide beside an internal access road in the site of the Fairfield Storm Sewage Treatment Plant. This section of vegetation features planted *Casuarina glauca* and significant weed infestation.
- Modification 5 - Woodville Reservoir (Barbers Road) Modification:
  - The approved project application proposed a single storage tank with a total height of approximately 8 m and a diameter of 16.0 m. This modification aims to allow for a reduction in the number of trees removed and to modify the size of the approved tank to a diameter of 12.8 m and a height of 12.0 m.

This technical memo examines the terrestrial flora and fauna assemblages and their habitats within the areas proposed for the modifications and determines the biological impacts of the proposal's construction and operation. It also summarises proposed mitigation measures.

2. Methodology

A site inspection of the modified route was carried out on 21 October 2009. This survey sought primarily to identify the flora and fauna species in the study area and to assess the extent and condition of vegetation communities and habitats, especially for Threatened species.

2.1 Flora survey and ground truthing of vegetation communities

The survey was largely based on describing the structure and composition (dominant species) of native vegetation communities within the modified pipeline route using the random meander technique. The random meander technique is a variation of the transect type survey and was completed in accordance with the technique described by Cropper (1993), whereby the recorder walks in a haphazard manner throughout the study area recording all species observed, boundaries between various vegetation communities, and vegetation condition. Planted vegetation was not surveyed.

Vegetation within the locality has been mapped at a broad scale in the *Final Native Vegetation Mapping of the Cumberland Plain, Western Sydney* (NSW National Parks and Wildlife Service 2002c). This map was generated through field surveys, aerial photographic interpretation, and statistical modelling. This mapping was ground truthed to verify the extant community type and conservation significance of remnant vegetation within the study area.

2.2 Vegetation community condition

Conservation significance classes provide an indication of the relative importance of the remnant vegetation on the Cumberland Plain in contributing to biodiversity outcomes such as maintaining connectivity. The conservation significance assessment classes, as described in the *Final Native Vegetation Mapping of the Cumberland Plain, Western Sydney* (NSW National Parks and Wildlife Service 2002c) are as follows:

- **Core habitat:** Areas that constitute the backbone of viable conservation, including all remnants of 10 hectares or more of the mapped vegetation category with canopy cover greater than 10 per cent
- **Support for core habitat:** Areas that provide a range of support values to the Core Habitat, including increasing remnant size, buffering from edge effects, and providing corridor connections. The focus is to identify priority areas for conservation and restoration in order to enhance the biodiversity values in the region
- **Urban remnant trees (critically endangered communities)**: Areas of the critically endangered ecological communities[1] identified that remain as remnant trees in an urban landscape (mapped as Canopy Cover less than 10 per cent (Urban Areas))
- **Other remnant vegetation:** All native vegetation that does not fall within the above conservation significance classes.

The conservation significance mapping does not itself create any constraints to use of the land — this is determined by the listing of Threatened ecological communities under the TSC Act and/or the EPBC Act.

2.3 Fauna survey

The presence of fauna species in the study area was determined primarily through consideration of suitable habitats. Consequently, it is assumed that Threatened species are present if the habitat features necessary for completion of their life cycles are located in the study area.

A general fauna habitat features traverse was undertaken through the study area. The objective of this traverse was to identify additional species and their habitats. During the traverse, opportunistic recordings of species were made through incidental sightings, aural recognition of calls, and observing indirect evidence of species' presence, such as scats, feathers, hair, tracks, diggings, feeding signs, and burrows.

[1] Critically endangered ecological communities referred to in relation to the conservation significance classes are communities identified by the *Final Native Vegetation Mapping of the Cumberland Plain, Western Sydney* NSW National Parks and Wildlife Service 2002c, *Final Native Vegetation Mapping of the Cumberland Plain, Western Sydney*, NSW National Parks and Wildlife Service, Hurstville. and do not necessarily correspond with communities listed as critically endangered under the *Threatened Species Conservation Act 1995* of *Environmental Protection and Biodiversity Conservation Act 1999*.

2.4 Fauna habitat condition

Fauna habitats in the study area were assessed by examining characteristics such as the structure and floristics of the canopy, understorey and ground cover vegetation, the structure and composition of the litter layer, and other habitat attributes important for feeding, roosting and breeding. The following criteria were used to evaluate habitat values:

- **Good:** A full range of fauna habitat components are usually present (e.g. old growth trees, fallen timber, feeding and roosting resources) and habitat linkages to other remnant ecosystems in the landscape are intact.
- **Moderate:** Some fauna habitat components are missing (for example, old-growth trees and fallen timber), although linkages with other remnant habitats in the landscape are usually intact, but sometimes degraded.
- **Poor:** Many fauna habitat elements in low quality remnants have been lost, including old growth trees (for example, due to past timber harvesting or land clearing) and fallen timber, and tree canopies are often highly fragmented. Habitat linkages with other remnant ecosystems in the landscape have usually been severely compromised by extensive clearing in the past.

2.5 Comparison of proposals

The likely significance of impacts to biodiversity arising from the modifications to the approved proposal was largely determined through consideration of impacts associated with the original design (as assessed in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007)) and comparison of the original proposal to the proposed modifications.

2.6 Limitations

Varying degrees of non-uniformity of flora and fauna habitats are encountered during surveys. Hence, no sampling technique can totally eliminate the possibility that a species is present in the study area (e.g. species of plant present in the seed bank). The conclusions in this report are based upon data acquired for the study area and the environmental field surveys and are, therefore, merely indicative of the condition of the study area at the time of survey, including the presence or otherwise of species. Also, it should be recognised that conditions, including the presence of Threatened species, can change with time.

Where the survey was undertaken outside of the optimal time for detecting a species or failed to detect a species, a precautionary approach was taken and it was assumed that the species was present if suitable habitat was observed.

3. Modification 1 - Fairfield Park to Normanby Street

Modification 1 represents a significant diversion from the original route. In the approved proposal, the pipeline route traverses an area of bushland at Fairfield Park considered to be part of the Endangered Ecological Community River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (River-flat Eucalypt Forest). The modified route now avoids this area and the open trench construction will follow an internal access road past the Fairfield Leisure Centre to Vine Street. This modification avoids the removal of 0.3 ha of River-flat Eucalypt Forest. This section of the route does not impact any native vegetation; however, is adjacent to a stand of planted native and exotic species (refer Photographs 1 and 2 in Attachment A).

Modification 1 crosses Vine Street where thrust boring will be utilised. No native vegetation exists in the receiving and launch areas for the drilling rig.

Modification 1 then follows an existing track and crosses part of Makepeace Oval (open trench construction) (refer Photograph 3 in Attachment A) and traverses Prospect Creek and Burns Creek to Landon Street (refer Photograph 4 and 5 in Attachment A). This area contains a stand of River-flat Eucalypt Forest dominated by *Eucalyptus tereticornis* with a mid-storey dominated by *Melaleuca styphelioides*. The ground cover was highly disturbed and dominated by *Tradescantia fluminensis*. This area has been highly disturbed in the past (refer Photograph 12 in Attachment B). This community was considered to be in poor condition but is support for core habitat (Tozer 2003) for this community as it increases remnant size and forms part of the riparian corridor of Prospect Creek and Burns Creek. In this area, the modified route will utilise Horizontal Directional Drilling (HDD) to install the pipeline underneath Prospect Creek and Burns Creek. As such, disturbance will be restricted to receiving and launch areas which will be established for the drilling rig in areas devoid of native vegetation at Makepeace Oval and at Landon Street.

Modification 1 along Landon Street is restricted to the roadway and does not impact on any native biodiversity. Modification 1 then joins a previously approved pipeline route along Normanby Street.

Minimal fauna or suitable fauna habitats were recorded during the survey in the area of Modification 1. The native species that were recorded were bird species that are recognised as being adaptable to and tolerant of modified urban landscapes such as the Pied Currawong, Welcome Swallow, Australian Raven, Crested Pigeon, Rainbow Lorikeet, and Noisy Miner. Exotic birds including the Red-whiskered Bulbul, Common Myna, and Spotted Turtle-dove were also common.

4. Modification 4 – Water recycling plant sewer connection line

Modification 4 consists of a sewer connection (brine line) from the Fairfield Water Recycling Plant south to the Sydney Water Sewage Treatment Plant (STP).

The pipeline exits the Fairfield Water Recycling Plant in the south east corner to meet the internal access road (Symons Street) that the pipeline then follows south to the STP. The modified proposal in this area is adjacent to a patch of regrowth vegetation representative of the River-flat Eucalypt Forest Endangered Ecological Community; however, the area of the trench is cleared of all vegetation.

The pipeline follows Symons Street to the STP (refer Photograph 6, 7, and 8 in Attachment A). This section will require clearing of a strip of vegetation approximately 3.0 metres wide alongside Symons Road to accommodate installation of the pipeline through open trench construction. This vegetation was dominated by a canopy of *Casuarina glauca* with *Eucalyptus tereticornis* and *Corymbia citriodora* also common. The understorey was characterised by a dense infestation of woody weeds including *Lantana camara* and *Ligustrum lucidum*. The groundcover was dominated by exotic grasses including *Ehrharta erecta* and *E. longiflora*. Exotic climbers such as *Asparagus asparagoides* and *Cardiospermum grandiflorum* were also present (refer Photograph 9 in Attachment A). It is likely that this vegetation was planted as historic aerial photographs from 1943 (refer Photograph 14 in Attachment B) show that the area of the pipeline route was devoid of vegetation and subject to earthworks which are likely to have altered the soil profile and soil stored seedbank. Furthermore, species non endemic to NSW (e.g. *C. citriodora*) are present in the canopy of this community and are likely the result of planting. Consequently, vegetation in this area is unlikely to be considered an Endangered ecological community.

As for Modification 1, minimal fauna or suitable fauna habitats were recorded during the survey in the area of Modification 4. The native species that were recorded were bird species that are recognised as being adaptable to and tolerant of modified urban landscapes such as the Superb Fairy-wren, Welcome Swallow, Australian Raven, Crested Pigeon, and Noisy Miner.

5. Modification 5 – Woodville Reservoir (Barbers Road)

Modification 5 involves an increase in height and reduction in diameter of the approved Woodville Reservoir water storage tank at the Woodville Public Golf Course at Barbers Road.

Vegetation within the area of Modification 5 consists of scattered *Casuarina glauca* and *Ficus macrophylla* with a mown exotic understorey (refer Photograph 10 in Attachment A) that are most likely the result of planting that occurred during construction of the Golf Course. Historic aerial photographs from 1943 show that the area was devoid of vegetation (refer Photograph 16 in Attachment B). Modification 5 will result in less tree removal than the original proposal.

This area provided minimal fauna habitats and as such, minimal fauna was recorded during the survey. The native species that were recorded were bird species that are recognised as being adaptable to and tolerant of modified urban landscapes such as the Australian Raven, Crested Pigeon, and Noisy Miner.

6. Threatened species and populations

The Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) previously identified Threatened species and populations that had been recorded in the locality. A review of the Threatened species records for the locality found the following (refer Attachment C):

- thirty-three species of plant listed under the TSC Act and/or the EPBC Act
- one population listed under the TSC Act
- forty-nine species of animal listed under the TSC Act and/or the EPBC Act.

Of the Threatened plant species, suitable habitat was identified in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) for two species within the study area — *Acacia pubescens* and *Pimelea spicata.* Suitable habitat was also identified for the Threatened *Marsdenia viridiflora* spp *viridiflora* population. Potential habitat for these species was considered to occur within the patches of River-flat Eucalypt Forest and Shale Gravel Transition Forest near Taylor Street, in Fairfield Park, and within the Long Street Recreation Area. Significance assessments for Threatened flora species conducted in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) are considered to be applicable to the modified proposal as these species were not recorded in the modified route and the impacts of the modified routes on habitat are decreased.

The only Threatened species recorded in the study area during the surveys conducted for the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) were microchiropteran bat species. The three Threatened species recorded were — Eastern False Pipistrelle, Greater Broad-nosed Bat, and Large-footed Myotis (possible identification to species level only). Additionally, nine Threatened species of animal were considered likely to occur in the study area based on the presence of suitable habitat, including seven species of microbat (including the three species recorded during the field survey), Green and Golden Bell Frog and Cumberland Plain Land Snail. Significance assessments for Threatened fauna species conducted in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) are considered to be applicable to the modified proposal as these species were not recorded in the modified route and the impacts of the modified routes on habitat are decreased.

One additional Threatened fauna species, the Little Lorikeet (listed as Vulnerable under the TSC Act after completion the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007)), is considered to have a moderate likelihood of occurrence based on the presence of suitable habitat. Consequently, a significance assessment has been prepared for the Little Lorikeet as suggested in the Department of Environment and Conservation/ Department of Primary Industries draft *Guidelines for Threatened Species Assessment* (Department of Environment and Conservation 2005a) (refer Attachment D).

7. Threatened ecological communities

The Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) identified the following Threatened Ecological Communities listed under the TSC Act as present within the study area:

- River-Flat Eucalypt Forest
- Cumberland Plain Woodland
- Shale Gravel Transition Forest
- Castlereagh Swamp Woodland.

Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest were the only Threatened Ecological Communities recorded in the study area listed under the EPBC Act.

The modified proposal crosses areas of vegetation that are consistent with the final determination for River-flat Eucalypt Forest under the TSC Act at the junction of Prospect Creek and Burns Creek (refer Photographs 4 and 5).

8. Migratory species

In the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007), twenty Migratory species were predicted to occur in the locality, of these twenty species, eleven were listed Threatened species under the TSC Act and/or EPBC Act (refer Attachment C). A review of Migratory species records from the locality did not result in any additional species.

Fourteen Migratory species were considered to have the potential to frequent the study area (refer Attachment C). other Migratory species — Regent Honeyeater, Rufous Fantail and White Throated Needletail — were considered to have some potential to frequent the woodland habitats in the study area either during migration or as part of large feeding ranges. Migratory species are protected under international agreements to which Australia is a signatory and are considered to be 'Matters of National Environmental Significance' protected under the EPBC Act.

While Migratory species of bird may use the area, the study area would not be classed as an 'important habitat' as defined under the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of the Environment and Heritage 2006), in that the study area does not contain:

- habitat used by a Migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species

- habitat used by a Migratory species that is at the limit of the species range
- habitat in an area where the species is declining.

Migratory species are not considered any further in this report.

9. Summary of proposed modifications with biodiversity impacts

A summary table is presented below outlining the impacts of the proposed modifications (refer Table 9-1).

Table 9-1 Summary of impacts

	Modification 1	Modification 4	Modification 5
Vegetation clearing	None (avoids 0.3 ha marked for clearing in the original design)	Approximately 390 m^2 (3 m X 130 m strip)	None
Impact on Threatened fauna	Unlikely	None	None
Impact on Threatened flora	Unlikely	None	None
Impact on Threatened ecological communities	Indirect impacts relating to weed spread into adjacent EEC	Indirect impacts relating to weed spread into adjacent EEC	None

Note: * = the previous route required the removal of 0.3 ha of River-Flat Eucalypt Forest. The modified route avoids clearing of native vegetation.

10. Assessment of significance of impacts

Projects assessed under Part 3A of the EP&A Act require assessments of significance against the heads of consideration detailed in the draft *Guidelines for Threatened Species Assessment* (Department of Environment and Conservation 2005c), indicating the significance of the impacts relative to the conservation importance of the habitat, and individuals and populations likely to be affected. Impacts are considered of greater significance if:

- areas of high conservation value are affected
- individual animals and/or plants and/or subpopulations that are likely to be affected by a proposal play an important role in maintaining the long-term viability of the species, population or ecological community
- habitat features that are likely to be affected play an important role in maintaining the long-term viability of the species, population or ecological community
- impacts are likely to be long-term in duration
- impacts are likely to be permanent and irreversible.

The significance assessments completed for the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) were considered to still be applicable in the context of the modified proposal as the route does not involve an increase in vegetation removal or removal of preferred habitats for Threatened species.

One additional Threatened fauna species, the Little Lorikeet (listed as Vulnerable under the TSC Act) was considered to have a moderate likelihood of occurrence within the study area based on the presence of suitable habitats. This species was listed on the TSC Act after the original proposal had been approved. A significance assessment was conducted for this species according to the heads of consideration detailed in the draft *Guidelines for Threatened Species Assessment* (Department of Environment and Conservation 2005c), and it was determined that no significant impact would occur to this species as a result of the modified proposal (refer Attachment D).

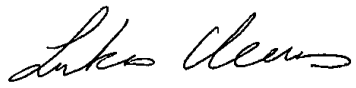
11. Conclusions

The modifications to the Rosehill Recycled Water Scheme are located in a highly disturbed landscape. The majority of the modifications proposed would traverse roads, exiting pipeline easements, and residential and industrial areas that lack native vegetation or important fauna habitat features. In these areas, the proposed pipeline would be laid under existing roads or within existing pipeline easements avoiding areas of native vegetation.

The modifications to the proposal do not require clearing of native vegetation that comprise Threatened ecological communities or vegetation that provides habitat for Threatened flora or fauna species. The area of the River-flat Eucalypt Forest to be removed has decreased as a result of the modifications which is a beneficial impact.

No Threatened species are likely to become extinct as a result of the modified proposal. Mitigation measures have been included in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) to reduce the potential for impacts on Threatened species and these are still considered to be applicable in the context of the modifications. Impacts on local populations of a species, population or ecological community have been reduced through route selection and proposed use of trenchless pipe laying techniques. Mitigation measures were also recommended in the Rosehill Recycled Water Scheme Environmental Assessment (Parsons Brinckerhoff 2007) to avoid and minimise impacts on local biodiversity. These are considered to still be applicable in the context of the proposed modifications. No Matters of National Environmental Significance were identified in the study area that would be directly affected by the modified proposal.

Yours sincerely,



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13. Attachment A - Photographs of the proposed modification areas

Modification 1 - Fairfield Park to Normanby Street route modification

Photograph 1: A view north along the modified route along the internal road through Fairfield Park

Photograph 2: A view west along the modified route along the internal road adjacent to the pool

Photograph 3: A view to the south west along the modified route at the edge of Makepeace Oval

Photograph 4: A view to the north east along the modified route towards a stand of River-flat Eucalypt Forest where horizontal directional drilling will occur under Prospect Creek (note that no removal of vegetation will be required in this area)

Photograph 5: A view to the north east over Prospect Creek along the modified alignment showing an area of River-flat Eucalypt Forest

Modification 4 - Water recycling plant sewer connection line

Photograph 6: A view to the north west showing the cleared area where the modified route exits the Fairfield Water Recycling Plant

Photograph 7: A view to the south along the modified route where it follows Symons Road to the STP

Photograph 8: A view to the south along modified route adjacent to the internal road at the STP (note the *Casuarina glauca* are likely to have been planted in this area)

Photograph 9: The heavily weed infested understorey in the modified route at the STP

13.1 Modification 5 - Woodville Reservoir (Barbers Road)

Photograph 10: The location of the reservoir at the Golf Course

Attachment B - Aerial photographs of the proposed modification areas

Modification 1 - Fairfield Park to Normanby Street

Photograph 11: Aerial view of Fairfield Park and Prospect Creek in 2008

Photograph 12:Aerial view of Fairfield Park and Prospect Creek in 1943

Modification 4 - Water recycling plant sewer connection line

Photograph 13: Aerial view of the STP in 2008

Photograph 14: Aerial view of the STP in 1943

Modification 5 - Woodville Reservoir (Barbers Road)

Photograph 15: Aerial view of the Woodville Reservoir site in 2008

Photograph 16: Aerial view of the Woodville Reservoir site in 1943

Attachment B photos Source: Department of Lands (2006)

Attachment C – Revised likelihood of occurrence of Threatened species within the locality

Table C-1 Threatened species of plant previously recorded or predicted to occur in the locality

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Asclepiadaceae	*Cynanchum elegans*	E1	E	3Ei	Occurs from the Gloucester district to the Wollongong area and inland to Mt Dangar where it grows in rainforest gullies, scrub and scree slopes (Harden 1992). This species typically occurs at the ecotone between dry subtropical forest/woodland communities (James 1997; NSW National Parks and Wildlife Service 2002a).	Low. There is no rainforest, scrub or scree slopes associated with the vegetation communities remaining in the study area and therefore no potential habitat for this species.
	Marsdenia viridiflora ssp. *viridiflora* (Threatened population)	E2			Occurs in subcoastal and southern Queensland but rarely in NSW with a disjunct occurrence near Sydney. It occurs as scattered plants in remnant woodland and scrub (Harden 2002; NSW Scientific Committee 2000b).	Moderate. Although degraded, the patches of remnant vegetation in on the eastern side of Prospect Creek in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Campanulaceae	*Wahlenbergia multicaulis*	E2			Occurs in coastal and tableland districts south from Sydney and the Blue Mountains west along the Murray River to Mathoura where it grows in a variety of habitats including forest, woodland, grassland (Harden 1992), forest, scrub and the edges of watercourses and wetlands. It is a coloniser and typically occurs in damp, disturbed sites (NSW Scientific Committee 2003b). In Western Sydney most sites are closely aligned with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone (laterite). However, the sites in Hornsby LGA are on the 'Hawkesbury' soil landscape (Department of Environment and Climate Change 2007b).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Casuarinaceae	*Allocasuarina glareicola*	E1	E		Restricted to the Sydney basin where it occurs north east of Penrith in or near Castlereagh State Forest. Grows on lateritic soil in open forest (Harden 2000).	Low. The study area is situated on Tertiary alluvium and is not situated on lateritic soils.
Convolvulaceae	*Wilsonia backhousei*	V			Occurs chiefly in the Sydney district but also common at Jervis Bay (Harden 2000). A salt tolerant species, it is found in intertidal saltmarshes and sometimes on seacliffs (NSW Scientific Committee 2000c).	Low. The Mangrove / Saltmarsh Complex along Duck River provides potential habitat for this species however habitat not within footprint and will not be directly or indirectly impacted.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Dilleniaceae	*Hibbertia* sp. Bankstown		CE		Endemic to New South Wales and is currently known to occur in only one population at Bankstown Airport in Sydney's southern suburbs, in the Bankstown local government area. The species is not known from any conservation reserves. The population comprises fewer than 50 individuals.	Low. The study area is within the Fairfield LGA. This species is only known from the Bankstown Airport in the Bankstown LGA.
Epacridaceae	*Epacris purpurascens* var. *purpurascens*	V		2K	Occurs in Gosford and Sydney districts where it grows in sclerophyll forest, scrub and swamps on sandstone (Harden 1992), usually in transitional areas where there is a shale influence (NSW National Parks and Wildlife Service 2002b).	Low . The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Epacridaceae	*Leucopogon exolasius*	V	V	2V	Restricted chiefly to the Woronora and Grose Rivers and Stokes Creek, Sydney catchments and the Royal National Park. One old record from the Grose River. Grows in woodland on sandstone (Royal Botanic Gardens 2004).	Low. The geology in the study area is dominated by Wianamatta shale and tertiary alluvium and therefore lacks suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Fabaceae (Faboideae)	*Dillwynia tenuifolia*	V	V	2Vi	Occurs on the Cumberland Plain from the Blue Mountains to Howes Valley area where it grows in dry sclerophyll woodland on sandstone, shale or laterite (Harden 2002). Specifically, occurs within Castlereagh woodlands, particularly in shale gravel transition forest. Associated species include *Eucalyptus fibrosa*, *E. sclerophylla*, *Melaleuca decora, Daviesia ulicifolia, Dillwynia juniperina* and *Allocasuarina littoralis* (James 1997).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Fabaceae (Faboideae)	*Pultenaea parviflora*	E1	V	2E	Restricted to the Cumberland Plain where it grows in dry sclerophyll forest on Wianamatta shale, laterite or alluvium (Harden 2002). Locally abundant within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. Also occurs in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland (James 1997; NSW National Parks and Wildlife Service 2002d).	Low potential habitat for this species may have previously occurred in the Shale Gravel Transition Forest that formerly occurred between the Taylor Street to the Fairfield RWTP, however this remnant is highly modified and lacked a native understorey (currently mown) in which the species may have formerly occurred. The other vegetation communities in the study area are likely to be too poorly drained (too moist) to provide potential habitat for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Fabaceae (Faboideae)	*Pultenaea pedunculata*	E1			Restricted to Wianamatta Shales of the Cumberland Plain from Bankstown to Liverpool and on the South Coast in the Southeast Corner Bioregion at Bournda. Grows on a variety of soils in dry sclerophyll forest and disturbed sites (Harden, 1991; NSW Scientific Committee, 1999).	Low. The only vegetation within the study area that occurs on suitable soils is the Shale Plains Woodland which is restricted to a small, highly modified patch on North Street at the Fairfield RWTP. This patch is highly modified and lacked a native understorey in which the species may have formerly occurred.
Fabaceae (Mimosoideae)	*Acacia bynoeana*	E1	V	3V	Occurs south of Dora Creek-Morisset area to Berrima and the Illawarra region and west to the Blue Mountains. It grows mainly in heath and dry sclerophyll forest on sandy soils (Harden 2002). Seems to prefer open, sometimes disturbed sites such as trail margins and recently burnt areas. Typically occurs in association with *Corymbia gummifera, Eucalyptus haemastoma, E. gummifera, E. parramattensis, E. sclerophylla, Banksia serrata* and *Angophora bakeri* (NSW National Parks and Wildlife Service 1999a).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Fabaceae (Mimosoideae)	*Acacia pubescens*	V	V	3Va	Restricted to the Sydney Region from Bilpin to the Georges River and also at Woodford where it usually grows in open sclerophyll forest and woodland on Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Typically it occurs at the intergrade between shales and sandstones in gravely soils often with ironstones (Harden 2002; NSW National Parks and Wildlife Service 2003a).	Low. The species was recorded in the study area within the Sydney Water pipeline lands between Barbers Rd and the Woodville Public Golf Course in Old Guildford. Suitable habitat for this species also occurs in the study area in the non-riparian habitats in Fairfield Park, the Long Street Recreation Area and the between the Taylor Street to the Fairfield RWTP. The surveys were however undertaken during the peak flowering period when the species is prominent and no other populations are considered likely to occur in the study area.
Myrtaceae	*Callistemon linearifolius*	V		2Ri	Occurs chiefly from Georges 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 (Fairley & Moore 2002; Harden 2002; Robinson 1994). Within the Sydney region, recent records are limited to the Hornsby Plateau area near the Hawkesbury River (NSW Scientific Committee 1999a).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Myrtaceae	*Darwinia biflora*	V	V	2Va	Occurs from Cheltenham to Hawkesbury River where it grows in heath on sandstone or in the understorey of woodland on shale-capped sandstone ridges (Harden 2002).	Low. The study area is located to the south of the known distribution of this species. In addition, the geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Myrtaceae	*Eucalyptus camfieldii*	V	V	2Vi	Occurs from Tomago to the Royal National Park where it grows in coastal shrub heath in sandy soils on sandstone (Harden 2002).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Myrtaceae	*Eucalyptus nicholii*	V	V	3V	Occurs from Niangala to Glenn Innes where it grows in grassy sclerophyll woodland on shallow relatively infertile soils on shales and slates, mainly on granite (Harden, 1991; DLWC, 2001). Endemic on the NSW Northern Tablelands, of limited occurrence, particularly in the area from Walcha to Glen Innes; often on porphyry or granite (Brooker and Kleinig 1999).	Low. This species is likely to exist as street tree or garden plantings within the locality.
Myrtaceae	*Leptospermum deanei*	V	V	2V	Only occurs near the watershed of Lane Cove River where it grows on forested slopes (Harden 2002) or lower hill slopes or near creeks on sandy alluvial soil or sand over sandstone.	Low. The study area is in the watershed of Lane Cove River and the geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Myrtaceae	*Melaleuca deanei*	V	V	3R	Occurs in coastal districts, including western Sydney (e.g. Baulkham Hills, Liverpool shires) from Berowra to Nowra where it grows in wet heath on sandstone and shallow/skeletal soils near streams or perched swamps (Harden 2002; James 1997).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Myrtaceae	*Syzygium paniculatum*	V	V	3Ri	Occurs between Buladelah and St Georges Basin where it grows in subtropical and littoral rainforest on sandy soils or stabilized dunes near the sea (Harden 2002).	Low. There is no rainforest associated with the vegetation communities remaining in the study area and therefore no potential habitat for this species
Orchidaceae	*Caladenia tessellata*	E1	V	3V	Occurs south of Swansea where it grows on clay loam or sandy soils (Harden 1993). Prefers low open forest with a heathy or sometimes grassy understorey (Bishop 2000). Within NSW, currently known from two disjunct areas; one population near Braidwood on the Southern Tablelands and three populations in the Wyong area on the Central Coast. Previously known also from Sydney and South Coast areas (NSW Scientific Committee 2002a).	Low. Presumed extinct within western Sydney.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Orchidaceae	*Cryptostylis hunteriana*	V	V	3V	Occurs south from the Gibraltar Range, chiefly in coastal districts but also extends on to tablelands. Grows in swamp-heath and drier forest on sandy soils on granite & sandstone. Occurs in small, localised colonies most often on the flat plains close to the coast but also known from some mountainous areas growing in moist depressions and swampy habitats (Harden 1993; NSW National Parks and Wildlife Service 1999i).	Low. Although the species does not appear to have well defined habitat preferences and is known from a range of communities, it is not associated with any of the vegetation communities that occur in the study area.
Orchidaceae	*Diuris aequalis*	E1	V	3V	Occurs chiefly in the ranges and tablelands from Braidwood to Kanangra and Liverpool where it grows among grass in sclerophyll forest (Harden 1993). It typically occurs on gentle slopes, in gravely clay-loam soil within montane eucalypt forest with a grass or heath understorey (Bishop 2000). Three small populations are known to occur within Kanangra Boyd National Park, other populations are restricted to remnant vegetation within roadsides and agricultural lands (NSW Scientific Committee 2002b).	Low. The geology in the study area is dominated by tertiary alluvium and there is a lack of soil types that have developed *in situ* such as would occur in the gentle slopes in which the species is known to occur. In addition, the study area is north of the known distribution range of the species.
Orchidaceae	*Genoplesium baueri*	V		3R	Grows in sparse sclerophyll forest and moss gardens over sandstone; from the Hunter Valley to Nowra district (Royal Botanic Gardens 2004).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Orchidaceae	*Pterostylis saxicola*	E1	E		Known now only from Freemans Reach to Picton district. Grows in Sydney Sandstone Gully Forest in shallow or skeletal soils over sandstone shelves, often near streams (Department of Environment and Climate Change 2007b; Harden 1993; James 1997).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species. In addition, the study area is not within the known distribution range of the species.
Orchidaceae	*Thelymitra* sp. Kangaloon		CE		The Kangaloon Sun-orchid occurs in NSW and is known from three locations near Robertson in the Southern Highlands. The Kangaloon Sun-orchid has an estimated area of occupancy of 10 km. The three localities are Butler's Swamp, Stockyard Swamp, and Wildes Meadow Swamp and are all located above what is known as the Kangaloon Aquifer (Department of the Environment Water Heritage and the Arts 2009)	Low. The study area is not located in the Southern Highlands.
Poaceae	*Bothriochloa biloba*		V	3V	Has a widespread distribution and grows in woodland on poorer soils (Harden 1993). Occurs on basaltic hills and grassland on drainage slopes on a variety of soils in association with *Eucalyptus punctata*, *E. albens, E. camaldulensis E. tereticornis, E. populnea* ssp *bimbil* and *Angophora floribunda* (Department of Environment and Conservation 2005d).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Poaceae	*Deyeuxia appressa*	E1	E	2E	Known only from two pre-1942 records in the Sydney area off the Georges River, south of Bankstown and Killara, near Hornsby (Department of Environment and Climate Change 2007b). Records are from wet habitats (Harden 1993; Sharp & Simon 2002), however given the species hasn't been seen in over 60 years, almost nothing is known of the species' habitat and ecology .	Low. Given the species hasn't been seen in over 60 years it is presumed unlikely to occur in the study area.
Proteaceae	*Grevillea parviflora* ssp. *parviflora*	V	V		Mainly known from the Prospect area (but now extinct there) and lower Georges River to Camden, Appin and Cordeaux Dam areas, with a disjunct populations near Putty, Cessnock and Cooranbong. Grows in heath or shrubby woodland in sandy or light clay soils usually over thin shales (Harden 2002; NSW Scientific Committee 1998a).	Low. No heath was identified in the study area. Also presumed to be extinct within the study area.
Proteaceae	*Persoonia nutans*	E1	E	2Ei	Confined to the Cumberland Plain where it grows in Castlereagh Scribbly Gum Woodlands and Agnes Banks Woodlands (Harden 2002; James 1997; NSW National Parks and Wildlife Service 2001c).	Low. The associated vegetation communities do not occur within the study area.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
	Persoonia hirsuta	E1	E	3Ki	Occurs in central coast and central tableland districts where it grows in woodland to dry sclerophyll forest on sandstone (Harden 2002) and rarely shale (NSW Scientific Committee 1998b). Often occurs in areas with clay influence, in the ecotone between shale and sandstone (James 1997).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Rhamnaceae	*Pomaderris brunnea*	V	V	2V	Confined to the Colo and Upper Nepean Rivers where it grows in open forest (Harden 2000); in western Sydney (Camden to Picton area) known from sandy alluvium on levee and creek banks (James 1997).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
	Pomaderris prunifolia var. *prunifolia*				Occurs on rocky slopes, often along creeks (Harden 2000). Within Parramatta, Auburn, Strathfield and Bankstown Local Government Areas, the only recent record of this species is from Rydalmere, where only 3 plants occur (NSW Scientific Committee 1999b).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks rocky slopes that provide suitable habitats for this species.

Family Name	Scientific Name	Conservation status			Preferred habitat	Likelihood of occurrence within the study area
		TSC Act[1]	EPBC Act[2]	ROTAP[3]		
Thymelaeaceae	*Pimelea curviflora var. curviflora*	V	V		Confined to coastal areas around Sydney where it grows on sandstone and laterite soils. It is found between South Maroota, Cowan, Narrabeen, Allambie Heights, Northmead and Kellyville, but its former range extended south to the Parramatta River and Port Jackson region including Five Dock, Bellevue Hill and Manly. Usually occurs in woodland in the transition between shale and sandstone, often on Lucas Heights soil landscape (Harden 2000; James 1997; James et al. 1999; NSW Scientific Committee 1998c).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.
Thymelaeaceae	*Pimelea spicata*	E1	E	3Ei	This species occurs in two disjunct areas: in coastal districts from Lansdowne to Shellharbour, and in Cumberland Plain Woodland inland to Penrith. In western Sydney it grows on Wianamatta Shales in Greybox - Ironbark Woodland with Bursaria spinosa and Themeda australis. In the Illawarra, it occurs on well structured clay soils in grassland or open woodland (Harden 2000; James 1997; NSW National Parks and Wildlife Service 2000).	Moderate. Although degraded, the patches of remnant vegetation in on the eastern side of Prospect Creek in Fairfield Park, within the Long Street Recreation Area between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.
Tremandraceae	*Tetratheca glandulosa*	V	V	2V	Occurs from Mangrove Mountain to the Blue Mountains where it grows in sandy or rocky heath or scrub (Harden 1992).	Low. The geology in the study area is dominated by tertiary alluvium and therefore lacks suitable habitats for this species.

1. V= Vulnerable, E1 = Endangered; E2= Endangered Population, E4 = Extinct (Threatened Species Conservation Act 1995);
2. V = Vulnerable, E = Endangered (Environment Protection and Biodiversity, X = Extinct Conservation Act 1999)
3. ROTAP (Rare or Threatened Australian Plants, Briggs and Leigh 1996) is a conservation rating for Australian plants. Codes are:
   - 1 Species only known from one collection
   - 2 Species with a geographic range of less than 100km in Australia
   - 3 Species with a geographic range of more than 100km in Australia
   - X Species presumed extinct; no new collections for at least 50 years
   - E Endangered species at risk of disappearing from the wild state if present land use and other causal factors continue to operate
   - V Vulnerable species at risk of long-term disappearance through continued depletion.
   - R Rare, but not currently considered to be endangered.
   - K Poorly known species that are suspected to be threatened.
   - C Known to be represented within a conserved area.
   - a At least 1,000 plants are known to occur within a conservation reserve(s).
   - i Less than 1,000 plants are known to occur within a conservation reserve(s).
   - - The reserved population size is unknown.
   - t The total known population is reserved.
   - + The species has a natural occurrence overseas.
4. Likelihood of occurrence assessment (see table below)

Likelihood	Description
Low	Species considered to have a **low likelihood of occurrence** include species not recorded during the field surveys that fit one or more of the following criteria: Have not been recorded previously in the study area and surrounds and for which the study area is beyond the current distribution range. Use specific habitat types or resources that are not present in the study area. Are considered locally extinct. Are a non-cryptic perennial flora species that were specifically targeted by surveys.
Moderate	Species considered to have a **moderate likelihood of occurrence** include species not recorded during the field surveys that fit one or more of the following criteria: Have infrequently been recorded previously in the study area and surrounds. Use habitat types or resources that are present in the study area, although generally in a poor or modified condition. Are unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically during variable seasons or migration. Are cryptic flowering flora species that were not seasonally targeted by surveys.
High	Species considered to have a **high likelihood of occurrence** include species recorded during the field surveys or species not recorded that fit one or more of the following criteria: Have frequently been recorded previously in the study area and surrounds. Use habitat types or resources that are present in the study area that are abundant and/or in good condition within the study area. Are known or likely to maintain resident populations surrounding the study area. Are known or likely to visit the site during regular seasonal movements or migration.

Table C-2 Threatened species of animal previously recorded or predicted to occur in the locality

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Mammals				
Eastern Pygmy-possum (*Cercartetus nanus*)	V		Found in a range of habitats from rainforest through sclerophyll forest to tree heath. It feeds largely on the nectar and pollen of banksias, eucalypts and bottlebrushes and sometimes soft fruits. It nests in very small tree holes, between the wood and bark of a tree, abandoned birds nests and shredded bark in the fork of trees (Turner & Ward 1995).	Low. Remnant vegetation in the study area lacks the diversity of flowering species to provide year-round feed resources.
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V	Occurs in moderately wooded habitats and roosts in caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. Thought to forage below the forest canopy for small flying insects (Churchill 1998).	Moderate. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.
Spotted-tailed Quoll (*Dasyurus maculatus*)	V	E	In NSW, Spotted-tailed Quoll occurs on both sides of the Great Dividing Range and north-east NSW represents a national stronghold (NSW National Parks and Wildlife Service 1999i). Occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees. Feeds on a variety of prey including birds, terrestrial and arboreal mammals, small macropods, reptiles and arthropods (NSW National Parks and Wildlife Service 1999g, 1999i).	Low. Remnant habitats within the study area are highly fragmented and too modified to sustain a local population of Spotted-tailed Quoll. The study area is also isolated from large areas of forest where the species is likely to occur.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Eastern Quoll (*Dasyurus viverrinus*)	E1		Found in a variety of habitats including dry sclerophyll forest, scrub, heathland and cultivated land. Lives in dens which consist of several chambers including underground burrows, hollow logs, rock piles and hay sheds (Strahan 1995).	Low. This species is considered extinct on mainland Australia.
Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)	V		Usually roosts in tree hollows in higher rainfall forests. Sometimes found in caves (Jenolan area) and abandoned buildings. Forages within the canopy of dry sclerophyll forest. It prefers wet habitats where trees are more than 20 metres high (Churchill 1998).	High. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species. This species was located in the study area in previous surveys.
Eastern Bent-wing Bat (*Miniopterus schreibersii*)	V		Usually found in well timbered valleys where it forages on small insects above the canopy. Roosts in caves, old mines, stormwater channels and sometimes buildings and often return to a particular nursery cave each year (Churchill 1998).	Moderate. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.
Eastern Freetail-bat (*Mormopterus norfolkensis*)	V		Thought to live in sclerophyll forest and woodland. Small colonies have been found in tree hollows or under loose bark. It feeds on insects above the forest canopy or in clearings at the forest edge (Churchill 1998).	Moderate. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Large-footed Myotis (*Myotis adversus*)	V		Colonies occur in caves, mines, tunnels, under bridges and buildings. Colonies always occur close to bodies of water where this species feeds on aquatic insects (Churchill 1998).	High. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species. Possible call recorded Fairfield Park during previous surveys.
Yellow-bellied Glider (*Petaurus australis*)	V		Restricted to tall, mature eucalypt forest in high rainfall areas of temperate to sub-tropical eastern Australia. Feeds on nectar, pollen, the sap of eucalypts and sometimes insects. Preferred habitats are productive, tall open sclerophyll forests where mature trees provide shelter and nesting hollows and year round food resources are available from a mixture of eucalypt species (NSW National Parks and Wildlife Service 1999j, 2003e).	Low. No suitable habitat exists in the study area for this species.
Squirrel Glider (*Petaurus norfolcensis*)	V		Found in dry sclerophyll forest and woodland but not found in dense coastal ranges. Nests in hollows and feeds on gum of acacias, eucalypt sap and invertebrates (NSW National Parks and Wildlife Service 1999h).	Low. No suitable habitat exists in the study area for this species.
Brush-tailed Rock-wallaby (*Petrogale penicillata*)	E1	V	Occurs in inland and sub-coastal south eastern Australia where it inhabits rock slopes. It has a preference for rocks which receive sunlight for a considerable part of the day. Windblown caves, rock cracks or tumbled boulders are used for shelter. Occur in small groups or "colonies" each usually separated by hundreds of metres (NSW National Parks and Wildlife Service 2003b).	Low. There are no rock slopes within the study area. Presumed to be extinct within the locality.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Koala (*Phascolarctos cinereus*)	V		Found in sclerophyll forest. Throughout New South Wales, Koalas have been observed to feed on the leaves of approximately 70 species of eucalypt and 30 non-eucalypt species. However, in any one area, Koalas will feed almost exclusively on a small number of preferred species. The preferred tree species vary widely on a regional and local basis. (NSW National Parks and Wildlife Service 1999f, 2003d).	Low. Remnant habitats within the study area are highly fragmented and too modified to sustain a local population of Koala. The study area is also isolated from large areas of forest where the species is likely to occur.
Long-nosed Potoroo (*Potorous tridactylus*)	V	V	Disjunct distribution along coastal south-east Australia from near Gladstone in Queensland, to south-west Victoria and in Tasmania. Found from sea level up to 1500 metres in altitude generally in areas with rainfall greater than 760 millimetres. In NSW, it is found throughout coastal and subcoastal areas. Occurs in a range of habitats: coastal forest and woodland with a moderately dense heathy understorey, dense coastal scrubs or heath, wet and dry sclerophyll forest and sub-tropical, warm temperate and cool temperate rainforest of the eastern slopes and highlands. Often associated with gullies and forest ecotones. Open areas are used for foraging while areas of dense groundcover or understorey provide areas for shelter and protection from predators. Relatively thick ground cover is a major habitat requirement and it seems to prefer areas with light sandy soils. Feeds at dusk on roots, tubers, fungi, insects and their larvae and other soft bodied animals in the soil. Moves up and down slope as food resources become seasonally available (Johnston 1995; NSW National Parks and Wildlife Service 1999i).	Low. Remnant habitats within the study area are highly fragmented and too modified to sustain a local population of Long-nosed Potoroo. The study area is also isolated from large areas of forest where the species is likely to occur.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Grey-headed Flying-fox (*Pteropus poliocephalus*)	V	V	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species. Feeds on the flowers and nectar of eucalypts and native fruits including lilly pillies. It roosts in the branches of large trees in forests or mangroves (Churchill 1998; NSW National Parks and Wildlife Service 2001b).	Moderate. likely to forage within the remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP. No roost sites known from within the study area.
Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*)	V		Occurs in eucalypt forest where it feeds above the canopy and in mallee or open country where it feeds closer to the ground. Generally a solitary species but sometimes found in colonies of up to 10. It roosts in tree hollows. Thought to be a migratory species (Churchill 1998).	Moderate. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	V		The preferred hunting areas of this species include tree-lined creeks and the ecotone of woodlands and cleared paddocks but it may also forage in rainforest. Typically, it forages at a height of 3-6 metres but may fly as low as one metre above the surface of a creek. It feeds on beetles, other large, slow-flying insects and small vertebrates. It generally roosts in tree hollows but has also been found in the roof spaces of old buildings (Churchill 1998).	High. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species. Possible call recorded Fairfield Park during previous surveys.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Birds				
Australasian Bittern (*Botaurus poiciloptilus*)	V		Occurs in shallow, vegetated freshwater or brackish swamps. Requires permanent wetlands with tall dense vegetation, particularly bulrushes and spikerushes. When breeding, pairs are found in areas with a mixture of tall and short sedges but will also feed in more open territory. (Garnett & Crowley 2000; NSW National Parks and Wildlife Service 2002e).	Low. Prospect Creek within the Long Street Recreation Area and Fairfield Park may provide marginal habitat. These sites however are likely to be too small disturbed and subject to predation from domestic cats and dogs to support viable populations of Australasian Bittern. In addition these habitats are not within footprint and will not be directly or indirectly impacted.
Bush Stone-curlew (*Burhinus grallarius*)	E1		Require sparsely grassed, lightly timbered, open forest of woodland. In southern Australia they often occur where there is a well structured litter layer and fallen timber debris. Feed on a range of invertebrates and small vertebrates, as well as seeds and shoots (NSW National Parks and Wildlife Service 1999c, 2003c).	Low. Remnant habitats within the study area are highly fragmented and lack the well structured litter layer and fallen timber debris preferred by this species.
Great Knot (*Calidris tenuirostris*)	V	M	Generally a coastal species found on tidal mudflats and sandy ocean shores. A migratory species visiting Australian waters between September and March (Pizzey & Knight 1997).	Low. May occur in the mangrove woodland and associated mudflats in Duck River however habitat not within footprint and will not be directly or indirectly impacted.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	V		Occurs in wetter forests and woodland from sea level to an altitude over 2000 metres, timbered foothills and valleys, coastal scrubs, farmlands and suburban gardens (Pizzey & Knight 1997).	Moderate. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide marginal habitat for the species.
Glossy Black-Cockatoo (*Calyptorhynchus lathami*)	V		Occurs in eucalypt woodland and forest with Casuarina/Allocasuarina spp. Characteristically inhabits forests on sites with low soil nutrient status, reflecting the distribution of key Allocasuarina species. The drier forest types with intact and less rugged landscapes are preferred by the species. Nests in tree hollows (Garnett & Crowley 2000; NSW National Parks and Wildlife Service 1999e).	Low. Dependant on stands of Allocasuarina / Casuarina for feed which are largely absent from the study area.
Little Lorikeet (*Glossopsitta pusilla*)	V		The Little Lorikeet is found in forests, woodland, treed areas along watercourses and roads. Forages mainly on flowers, nectar and fruit. Found along coastal east Australia from Cape York in Queensland down east coast and round to South Australia. Uncommon in southern Victoria (Higgins 1999).	Moderate. May utilise the forest habitats along Prospect Creek and treed areas at Fairfield Park.
Greater Sand Plover (*Charadrius leschenaultia*)	V	M	Entirely coastal in NSW foraging on intertidal sand and mudflats in estuaries, and roosting during high tide on sand beaches or rocky shores. A migratory species it is found in New South Wales generally during the summer months (Pizzey & Knight 1997).	Low. May occur in the mangrove woodland and associated mudflats in Duck River however habitat not within footprint and will not be directly or indirectly impacted.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Black Bittern (*Ixobrychus flavicollis*)	V		Usually found in dense vegetation in and fringing streams, swamps, tidal creeks and mudflats, particularly amongst swamp she-oaks and mangroves. Feeds on aquatic fauna along streams, in estuaries and beside billabongs and pools. Breeding occurs in summer in secluded places in densely vegetated wetlands. It nests in trees that overhang the water (Garnett & Crowley 2000; NSW National Parks and Wildlife Service 2002e).	Low. May occur in the mangrove woodland and associated mudflats in Duck River however habitat not within footprint and will not be directly or indirectly impacted.
Swift Parrot (*Lathamus discolor*)	E1	E	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, over-wintering, particularly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. Until recently it was believed that in New South Wales, swift parrots forage mostly in the western slopes region along the inland slopes of the Great Dividing Range but are patchily distributed along the north and south coasts including the Sydney region, but new evidence indicates that the forests on the coastal plains from southern to northern NSW are also extremely important. In mainland Australia is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference for sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering Acacia pycnantha, is indicated. Sites used vary from year to year. (Garnett & Crowley 2000),(Swift Parrot Recovery Team 2001).	Moderate. May frequent the site for foraging during migration.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Broad-billed Sandpiper (*Limicola falcinellus*)	V	M	A migratory species that breeds in the northern hemisphere between June and August. Individuals feed both on exposed mudflats and while wading in water (NSW National Parks and Wildlife Service 1999b).	Low. May occur in the mangrove woodland and associated mudflats in Duck River however habitat not within footprint and will not be directly or indirectly impacted.
Black-tailed Godwit (*Limosa limosa*)	V	M	A coastal species found on tidal mudflats, swamps, shallow river margins and sewage farms. Also found inland on larger shallow fresh or brackish waters. A migratory species visiting Australia between September and May (Pizzey & Knight 1997).	Low. May occur in the mangrove woodland and associated mudflats in Duck River however habitat not within footprint and will not be directly or indirectly impacted.
Black-chinned Honeyeater (*Melithreptus gularis gularis*)	V		Found in dry eucalypt woodland particularly those containing ironbark and box. Occurs within areas of annual rainfall between 400-700 mm. Feed on insects, nectar and lerps (Garnett & Crowley 2000).	Low. Remaining vegetation in the study area is dominated by riparian eucalypt woodland.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Orange-bellied Parrot (*Neophema chrysogaster*)	E1	CE, M	Orange-bellied Parrot breeds in the south-west of Tasmania and migrates in autumn to spend the winter on the mainland coast of south-eastern South Australia and southern Victoria. Typical winter habitat is saltmarsh and strandline/foredune vegetation communities either on coastlines or coastal lagoons. Spits and islands are favoured but they will turn up anywhere within these coastal regions. The species can be found foraging in weedy areas associated with these coastal habitats or even in totally modified landscapes such as pastures, seed crops and golf courses. Diet mainly comprises seeds and fruits of sedges and salt-tolerant coastal and saltmarsh plants. Occasionally, flowers and stems are eaten. Orange-bellied Parrots are known to forage among flocks of Blue-winged Parrots (Higgins 1999). It is expected that NSW habitats may be being more frequently utilised than observations suggest (Department of Environment and Conservation 2005e).	Low. Study area is north of the normal range of the mainland migration of the Orange-bellied Parrot.
Barking Owl (*Ninox connivens*)	V		Occurs in dry sclerophyll woodland. In the south west it is often associated with riparian vegetation while in the south east it generally occurs on forest edges. It nests in large hollows in live eucalypts, often near open country. It feeds on insects in the non-breeding season and on birds and mammals in the breeding season (Garnett & Crowley 2000).	Moderate. The remnant vegetation in Fairfield Park, the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide habitat for Barking Owl.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Powerful Owl (*Ninox strenua*)	V		A sedentary species with a home range of approximately 1000 hectares it occurs within open eucalypt, casuarina or callitris pine forest and woodland. It often roosts in denser vegetation including rainforest of exotic pine plantations. Generally feeds on medium-sized mammals such as possums and gliders but will also eat birds, flying-foxes, rats and insects. Prey are generally hollow dwelling and require a shrub layer and owls are more often found in areas with more old trees and hollows than average stands (Garnett & Crowley 2000).	Moderate. The remnant vegetation in the study area is too fragmented and lacks the density of hollow bearing trees or stags in which to breed or to support populations of the Powerful Owl's preferred preys (hollow dwelling mammals).
Osprey (*Pandion haliaetus*)	V	M	Generally a coastal species, occurring in estuaries, bays, inlets, islands and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Sometimes ascends larger rivers to far inland. Builds nests high in tree, on pylon or on ground on islands. Feeds on fish (Pizzey & Knight 1997).	Low. May occur in the mangrove woodland along Duck River however habitat not within footprint and will not be directly or indirectly impacted.
Superb Parrot (*Polytelis swainsonii*)	V	V	Mainly found in the Riverina where they nest in loose colonies in riparian woodland on River Red Gum. On the inland slopes, Superb Parrots both forage and feed within box woodland, mostly nesting in dead trees (Garnett & Crowley 2000).	Low. Study area not within the usual range of this species which is generally restricted to the western side of the Great Dividing Range.
Superb Fruit-Dove (*Ptilinopus superbus*)	V		Occurs in rainforests and fringes, scrubs, mangroves and wooded stream-margins, lantana thickets, isolated figs, pittosporums, lilly pillies and blackberries (Pizzey & Knight 1997).	Low. May utilise mangroves in duck River as foraging habitat however habitat not within footprint and will not be directly or indirectly impacted.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Painted Snipe (*Rostratula benghalensis*)	E1	VM	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as *Eucalyptus camaldulensis* (River Red Gum), *E. populnea* (Poplar Box) or shrubs such as *Muehlenbeckia florulenta* (Lignum) or *Sarcocornia quinqueflora* (Samphire). Feeds at the water's edge and on mudlflats on seeds and invertebrates, including insects, worms, molluscs and crustaceans. Males incubate eggs in a shallow scrape nest (Garnett & Crowley 2000).	Low. May occur in the mangrove woodland along Duck River or in the dammed section of Prospect Creek in the Long Street Recreation Area however habitat not within footprint and will not be directly or indirectly impacted.
Diamond Firetail (*Stagonopleura guttata*)	V		Occurs in a range of eucalypt dominated communities with a grassy understorey including woodland, forest and mallee. Most populations occur on the inland slopes of the dividing range. Feed on seeds, mostly of grasses (Garnett & Crowley 2000).	Low. The remnant vegetation communities in the study area lack the abundance and diversity of grasses preferred by Diamond Firetail (groundcovers in the study area are generally dominated by *Pennisetum clandestinum* or *Einadia* sp.).
Little Tern (*Sterna albifrons*)	E1	M	A coastal species found along the coast of New South Wales. They nest between the high tide mark and shore vegetation on undisturbed and unvegetated sites near estuaries and adjacent freshwater lakes. They feed on fish taken from inshore waters (Garnett & Crowley 2000).	Low. May occur in the mangrove woodland and associated mudflats in Duck River however habitat not within footprint and will not be directly or indirectly impacted.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Freckled Duck (*Stictonetta naevosa*)	V	M	In most years this species appear to be nomadic between ephemeral inland wetlands. In dry years they congregate on permanent wetlands while in wet years they breed prolifically and disperse widely, generally towards the coast. In inland eastern Australia, they generally occur in brackish to hyposaline wetlands that are densely vegetated with Lignum (*Muehlenbeckia cunninghamii*) within which they build their nests (Garnett & Crowley 2000).	Low. The study area lacks suitable large wetlands preferred by the Freckled Duck. Generally more common inland.
Grass Owl (*Tyto capensis*)	V		Typically found in tussock-grasslands but also occur in heathland, swamps, coastal dunes, tree-lined creeks, treeless plains, grassy gaps between trees and crops. Nest on the ground generally under tussocks. They generally feed on rodents but will also eat insects (Pizzey & Knight 1997).	Low. The study area is too fragmented to provide suitable ground nesting sites.
Regent Honeyeater (*Xanthomyza phrygia*)	E1	EM	Occurs mostly in box-ironbark forests and woodland and prefers the wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with *Casuarina cunninghamiana* and *Amyema cambagei* are important for feeding and breeding. Important food trees include *Eucalyptus sideroxylon* (Mugga Ironbark), *E. albens* (White Box) , *E. melliodora* (Yellow Box) and *E. leucoxylon* (Yellow Gum) (Garnett & Crowley 2000).	Low. May frequent the site for foraging during migration.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Great Egret (*Ardea alba*)		M	Great Egrets occur throughout most of the world. They are common throughout Australia, with the exception of the most arid areas. Great Egrets prefer shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Great Egrets can be seen alone or in small flocks, often with other egret species, and roost at night in groups. In Australia, the breeding season of the Great Egret is normally October to December in the south and March to May in the north. This species breeds in colonies, and often in association with cormorants, ibises and other egrets (Australian Museum 2003).	Moderate. May occur along Prospect Creek, particularly in the dammed section in the Long Street Recreation Area, however habitat not within footprint and will not be directly or indirectly impacted.
Cattle Egret (*Ardea ibis*)		M	Subspecies *Ardea ibis coromanda* is found across the Indian subcontinent and Asia as far north as Korea and Japan, and in South-east Asia, Papua New Guinea and Australia (McKilligan 2005).	Moderate. May occur along Prospect Creek, particularly in the dammed section in the Long Street Recreation Area.
Latham's Snipe (*Gallinago hardwickii*)		M	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed (Garnett & Crowley 2000).	Moderate. May occur in the mangrove woodland and associated mudflats in Duck River.
White-bellied Sea-Eagle (*Haliaeetus leucogaster*)		M	Occurs in coastal areas including islands, estuaries, inlets, large rivers, inland lakes and reservoirs. Builds a huge nest of sticks in tall trees near water, on the ground on islands or on remote coastal cliffs (Pizzey & Knight 1997).	Moderate May forage in the Duck River.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
White-throated Needletail (*Hirundapus caudacutus*)		M	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April (Pizzey & Knight 1997).	Moderate. May frequent the remnant vegetation in Fairfield Park, the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP. However, study area not important habitat for the species.
Rainbow Bee-eater (*Merops ornatus*)		M	Usually occur in open or lightly timbered areas, often near water. Breed in open areas with friable, often sandy soil, good visibility, convenient perches and often near wetlands. Nests in embankments including creeks, rivers and sand dunes. Insectivorous, most foraging is aerial, in clearings (Higgins 1999).	Low. Habitat in the study area likely to be too fragmented and modified for Rainbow Bee-eater.
Black-faced Monarch (*Monarcha melanopsis*)		M	Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating (Pizzey & Knight 1997).	Moderate. May frequent the remnant vegetation in Fairfield Park, the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP. However, study area not important habitat for the species.
Satin Flycatcher (*Myiagra cyanoleuca*)		M	Occurs in heavily vegetated gullies, in forests and taller woodlands. During migration it is found in coastal forests, woodlands, mangroves, trees in open country and gardens (Pizzey & Knight 1997).	Low. Habitat in the study area likely to be too fragmented and modified for Rainbow Satin Flycatcher.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Pacific Golden Plover (*Pluvialis fulva*)		M	Prefers sandy, muddy or rocky shores, estuaries and lagoons, reefs, saltmarsh, and or short grass in paddocks and crops. The species is usually coastal, including offshore islands; rarely far inland. Often observed on beaches and mudflats, sand flats and occasionally rock shelves, or where these substrates intermingle; harbours, estuaries and lagoons (Marchant & Higgins 1993).	Moderate. May occur in the mangrove woodland and associated mudflats in Duck River.
Rufous Fantail (*Rhipidura rufifrons*)		M	Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Pizzey & Knight 1997).	Moderate. May frequent the remnant vegetation in Fairfield Park, the Long Street Recreation Area, between Taylor Street to the Fairfield RWTP or the mangrove woodland along Duck River. However, study area not important habitat for the species.
Reptiles				
Broad-headed Snake (*Hoplocephalus bungaroides*)	E1	V	A nocturnal species that 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 flat exfoliating rock on exposed cliff edges during the cooler months and tree hollows during summer (Webb, J.K. & Shine 1994; Webb, J.K & Shine 1998).	Low. Geology in the study area is dominated by shale and alluvium and there are no areas of sandstone outcrops to provide the habitats with flat exfoliating rock.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Amphibians				
Giant Burrowing Frog (*Heleioporus australiacus*)	V	V	Appears to exist as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin, from Wollemi National Park in the north and extending south to Jervis Bay; and a southern population occurring in disjunct pockets from about Narooma south into eastern Victoria. In the northern population there is a marked preference for sandstone ridgetop habitat and broader upland valleys. The vegetation is typically woodland, open woodland and heath and may be associated with 'hanging swamp' seepage lines and where small pools form from the collected water (Cogger 2000; NSW National Parks and Wildlife Service 2001a).	Low. Geology in the study area is dominated by shale and alluvium and there are no areas of sandstone geology to provide the vegetation association or landforms (hanging swamps) preferred by Giant Burrowing Frog.
Green and Golden Bell Frog (*Litoria aurea*)	E1	V	Various types of habitat utilised has been documented. For breeding utilises a wide range of waterbodies, including both natural and man-made structures, such as marshes, dams and stream sides, and ephemeral locations that are more often dry than wet. Is found in various small pockets of habitat in otherwise developed areas and has the tendency of often turning up in highly disturbed sites. (Department of Environment and Conservation 2004a, 2005b) .	Moderate. Known to occur in modified habitats and Prospect Creek in Long Street recreation is the most likely location in the study area where Green and Golden Bell Frog may occur, particularly the dammed section of the creek dominated by rushes with grassed edges. Potential to also occur in Prospect Creek in Fairfield Park, however the section of the creek within the study area is likely to be too deep and shaded by riparian vegetation. Although less likely, the species may also occur in the unnamed drainage line between Taylor Street to the Fairfield RWTP.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Heath Frog (*Litoria littlejohni*)	V	V	Distributed along the eastern slopes of the Great Dividing Range from Watagan State Forest near Wyong, south to Buchan in north-eastern Victoria. It appears to be restricted to sandstone woodland and heath communities at mid to high altitude. It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer. It is not known from coastal habitats (NSW Scientific Committee 2000a).	Low. Geology in the study area is dominated by shale and alluvium and there are no areas of sandstone geology to provide the vegetation association preferred by the Heath Frog.
Southern Bell Frog (*Litoria raniformis*)	E1	V	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks (Department of Environment and Climate Change 2007b).	Low. None of the preferred vegetation types occur in the study area. In addition, the riparian habitats in the study area are too highly modified and degraded to support this disturbance sensitive species.
Stuttering Frog (*Mixophyes balbus*)	E1	V	Terrestrial species, found in rainforest, Antarctic beech forest or wet sclerophyll forest. The species depends on freshwater streams and riparian vegetation for breeding and habitation. No records are known from riparian habitat that has been disturbed (Cogger 2000; NSW Scientific Committee 2003a).	Low. None of the preferred vegetation types occur in the study area. In addition, the riparian habitats in the study area are too highly modified and degraded to support this disturbance sensitive species.

Common Name	TSC Act[1]	EPBC Act[2]	Habitat	Likelihood of occurrence within the study area
Giant Barred Frog (*Mixophyes iteratus*)	E1	E	Terrestrial species which occurs in rainforests, antarctic beech or wet sclerophyll forests. Feeds on insects and smaller frogs (Cogger 2000). The species is associated with permanent flowing drainages, from shallow rocky rainforest streams to slow-moving rivers in lowland open forest. It is not known to utilise still water areas (NSW Scientific Committee 1999c). More prevalent at lower altitudes and in larger streams than its congeners, although has been recorded up to 1000 metres asl. (NSW National Parks and Wildlife Service 1999i).	Low. None of the preferred vegetation types occur in the study area. In addition, the riparian habitats in the study area are too highly modified and degraded to support this disturbance sensitive species.
Red-crowned Toadlet (*Pseudophryne australis*)	V		Occurs within 160 km of Sydney where it is restricted to Hawkesbury Sandstone. It breeds in deep grass and debris adjacent to ephemeral drainage lines. When not breeding individuals are found scattered on sandstone ridges under rocks and logs (Cogger 2000).	Low. Geology in the study area is dominated by shale and alluvium and there are no areas of sandstone geology to provide the habitat preferred by the Heath Frog.
Invertebrates				
Cumberland Plain Land Snail (*Meridolum corneovirens*)	E1		Restricted to the Cumberland Plain and Castlereagh Woodlands of Western Sydney and also along the fringes of River Flat Forest, especially where it meets Cumberland Plain Woodland. It is typically found under logs and other debris, amongst leaf litter and bark around bases of trees. It is also sometimes found under grass clumps and where possible it will burrow into loose soil (NSW National Parks and Wildlife Service 1999d).	Moderate. Remnant vegetation in Fairfield Park, within the Long Street Recreation Area and between Taylor Street to the Fairfield RWTP may provide suitable habitat for the species.

1. V= Vulnerable, E1 = Endangered; E2= Endangered Population, E4 = Extinct (*Threatened Species Conservation Act 1995*).
2. V = Vulnerable, E = Endangered, CE = Critically endangered, M = Migratory (*Environment Protection and Biodiversity, X = Extinct Conservation Act 1999*).
3. Likelihood of occurrence assessment (see table below).

Likelihood	Description
Low	Species considered to have a **low likelihood of occurrence** include species not recorded during the field surveys that fit one or more of the following criteria: Have not been recorded previously in the study area and surrounds and for which the study area is beyond the current distribution range. Use specific habitat types or resources that are not present in the study area. Are considered locally extinct.
Moderate	Species considered to have a **moderate likelihood of occurrence** include species not recorded during the field surveys that fit one or more of the following criteria: Have infrequently been recorded previously in the study area and surrounds. Use habitat types or resources that are present in the study area, although generally in a poor or modified condition. Are unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically during variable seasons or migration.
High	Species considered to have a **high likelihood of occurrence** include species recorded during the field surveys or species not recorded that fit one or more of the following criteria: Have frequently been recorded previously in the study area and surrounds. Use habitat types or resources that are present in the study area that are abundant and/or in good condition within the study area. Are known or likely to maintain resident populations surrounding the study area. Are known or likely to visit the site during regular seasonal movements or migration.

Attachment D - Assessment of significance for the Little Lorikeet (*Glossopsitta pusilla*)

For Threatened biodiversity listed under the *Threatened Species Conservation Act 1995* (TSC Act), this attachment details the heads of consideration for Threatened species assessment as suggested in the Department of Environment and Conservation / Department of Primary Industries draft *Guidelines for Threatened Species Assessment* (Department of Environment and Conservation 2005a). The guidelines present methods to consider the impacts on biodiversity of projects assessed under Part 3A of *the Environmental Planning and Assessment Act 1979,* including presenting heads of consideration for determining the significance of impacts.

Species description

The Little Lorikeet is listed as Vulnerable under the TSC Act. No Little Lorikeets were recorded in the study area. However, eucalypt forest habitats associated with Prospect Creek and Burns Creek and remnant trees in Fairfield Park provide potential habitat for the Little Lorikeet in the study area.

The Little Lorikeet is found in forests, woodland, treed areas along watercourses and roads. This species forages mainly on flowers, nectar and fruit. The Little Lorikeet is found along coastal east Australia from Cape York in Queensland down east coast and round to South Australia (Higgins 1999).

Heads of consideration for assessing potential impacts to the Little Lorikeet under the *Environmental Planning and Assessment Act 1979*

How is the proposal likely to affect the habitat of a Threatened species, population or ecological community?

The proposal is unlikely to directly impact the Little Lorikeet. The construction footprint largely avoids areas of suitable habitat for this species and impacts to the higher quality suitable habitat in Fairfield Park, Prospect Creek, and Burns Creek have been be minimised through the use of Horizontal Directional Drilling.

Horizontal Direction Drilling is trenchless pipe laying technique that will avoid direct impacts to the riparian vegetation that provides suitable habitat for the Little Lorikeet. Horizontal direction drilling however requires launch and receiving pads that are clear of vegetation. At all sites where this method is proposed however, there are suitable previously cleared locations for placement of the drilling plant that will not affect vegetation that is considered to be Little Lorikeet habitat. No habitat for the Little Lorikeet will be removed by the modifications made to the proposal.

How is the proposal likely to affect current disturbance regimes?

The areas of suitable habitat for the Little Lorikeet in the study area are heavily modified as a result of past and ongoing land uses in the locality. These disturbances to potential Little Lorikeet habitat include land clearing for agriculture and urban and industrial development in the Fairfield Local Government Area. Natural disturbance regimes have consequently been altered. As the modified proposal does not involve any additional vegetation removal, it is unlikely to affect the disturbance regime any further.

How is the proposal likely to affect habitat connectivity?

Natural habitats in locality are highly modified as a result of past land uses, however some landscape connectivity of potential Little Lorikeet habitat in the study area is relatively intact as a result of the riparian habitats remaining along drainage lines such as Prospect Creek and Burns Creek. In such a heavily disturbed environment, these forested riparian corridors are important habitats.

The modified proposal is unlikely to affect habitat connectivity for the Little Lorikeet in the study area. The modified proposal will not create a barrier to dispersal for the Little Lorikeet, as no further clearing of native vegetation is required in the modified proposal.

How is the proposal likely to affect critical habitat?

Critical habitat refers to those areas of land listed in the Register of Critical Habitat kept by the Director-General of Department of Environment and Climate Change (Department of Environment and Climate Change 2007a). Critical habitat is the whole or any part or parts of an area or areas of land comprising the habitat of an endangered species, an endangered population or an endangered ecological community that is critical to the survival of the species, population or ecological community (Department of Environment and Conservation 2004b).

There is currently no critical habitat listed for the Little Lorikeet under the TSC Act.

Conclusion

The proposed modification to the approved proposal is unlikely to impact the Little Lorikeet. No Little Lorikeets were recorded in the study area and impacts to the areas of higher quality suitable habitat have been avoided through the route selection process and through the use of Horizontal Directional Drilling. As such, the modified proposal is unlikely affect current disturbance regimes, habitat connectivity, or critical habitat. Consequently, the proposal is unlikely to result in a significant impact to the Little Lorikeet such that it would threaten their long term survival in the locality.

Appendix F

Owners Consents

Your Reference:
Our Reference: F2007/01298
Contact: Paul Burne
Telephone: 9806 5036
Fax: 9806 5913

Mr Ken Taylor
Department of Planning
email:ken.taylor@planning.nsw.gov.au

24 December 2009

Dear Mr Taylor

Rosehill Recycled Water Scheme - Modifcation of Proposed Elevated Reservoir Woodville Golf course - Lot 1 DP 986628

I refer to your letter of 27 August to Jemena Asset Management Pty Ltd giving approval as land owner to the subject modification application which is to increase the height of the proposed reservoir from 12.5 to 15 metres.

Please be advised that no objection is made by Council, as the body having care, control and management of the subject land, to the lodgement of the subject application. However having regard to tree protection and minimisation of the impact of the development on the course it is suggested that consideration be given to including the following conditions is any approval:

1. Re-design the access road to ensure the protection of the two existing fig trees. The road is to be no less then 2m from the trunk of the fig trees. As the road is under the drip line of the figs it should be made with an impervious material and should be constructed to minimise excavation.
2. The boundary fencing should be located around existing trees i.e. existing site trees should not be removed for the erection of the fence.
3. The 15 Casuarina trees that are to be removed need to be replaced with 30 additional trees to be planted within the Council reserve around the site.

Yours sincerely

Paul Burne
Property Program Manager

G:\Paul Burne\Woodville Road Golf Course\alinta proposal for water tank F2007_01298\letters of support\letter dated 24 December 2009 offering no objection to the modification application.doc

Your Reference:
Our Reference: F2007/01298
Contact: Paul Burne
Telephone: 9806 5036
Fax: 9806 5913

Mr Ken Taylor
Department of Planning
email:ken.taylor@planning.nsw.gov.au

4 January 2010

Dear Mr Taylor

Rosehill Recycled Water Scheme - Modifcation of Proposed Elevated Reservoir Woodville Golf course - Lot 1 DP 986628

I refer to my letter of 24 December 2009 and note that I have inadvertently misquoted the proposed height to which the reservoir is proposed to be modified. The proposed modified height is 12 metres as indicated on Parsons Brinckerhoff plan RRW – 02 drawing number 02445 Rev D and I confirm that no objection is made by Council, as the body having care, control and management of the subject land, to the lodgement of the subject application.

My previously suggested conditions to any approval still apply.

Yours sincerely

Paul Burne
Property Program Manager

Shell Refining Australia Pty Limited
Gate 5 Durham Street
Rosehill 2142
New South Wales
Australia
Tel (02) – 9897 8082
Internet http://www.shell.com.au

Mr John Fisher
Environmental Engineer
Alinta Asset Management Pty Ltd
PO Box 6507
Silverwater 2128

RE: Rosehill Recycled Water Scheme – Consent to lodge Environmental Assessment (Application Number: 07_0121)

Dear Mr Fisher,

Shell Refining (Australia) Pty Ltd (Shell) acknowledges the Alinta proposal to seek consent for the Rosehill Recycled Water Scheme from the NSW Minister for Planning under Part 3A of the NSW *Environmental Planning & Assessment Act 1979*. Furthermore, Shell acknowledges that the Alinta proposal includes the construction of two surface reservoirs, a pumping station and pipelines in Lot 1 in DP 109739.

Shell, as the owner of the lot described above, hereby grants Alinta consent to lodge the Environmental Assessment with the NSW Department of Planning for the Rosehill Recycled Water Scheme (Application Number 07_0121) affecting that lot, subject to the following conditions:

1. Shell's consent to this Part 3A application does not commit Shell to providing the subject land to Alinta either by sale, lease or other method of disposition.

2. Shell's consent does not prejudice existing negotiations between the parties and is subject to Shell and Alinta reaching mutually acceptable terms for the lease of the subject land.

3. In the event that Shell has other requirements for the subject land that may be inconsistent with Alinta's project requirements (eg an easement), then Alinta will bear that risk.

Please feel free to call myself on 02 9897 8082 should you wish to discuss the matter further.

Yours sincerely

David Johnston

General Manager Clyde Refinery & Gore Bay Terminal.