Part Seven

FLORA AND FAUNA

7.1 Introduction

In order to ascertain the potential impact of the proposed Project on the flora and fauna of the Site and its surroundings, Aquila Ecological Surveys has prepared a report titled *Flora and Fauna Assessment. Proposed Materials Recycling Facility. Lot 6 D.P. 1065574 Newbridge Road, Moorebank* (**the AES Report**) a copy of which is at **Appendix 9**.

The aims of the AES Report are to:

- Describe the terrestrial fauna and flora of the Site.
- Determine the ecological impacts of the proposal particularly in relation to threatened species, populations or ecological communities, or their habitats.
- Determine whether the Site is "potential" or "core" koala habitat with regard to State Environmental Planning Policy No.44 (Koala Habitat Protection).
- Determine impacts in relation to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

7.2 Methodology

7.2.1 Literature Review

Prior to undertaking the field survey, a review of literature relevant to the Site and the wider local area and region was undertaken. Documents and databases reviewed included:

- Vegetation mapping of the Cumberland Plain and subsequent updating of vegetation community descriptions.
- Regional vegetation mapping and description.
- The Western Sydney Urban Bushland Biodiversity Survey.
- Point records of the Atlas of NSW Wildlife.
- The Liverpool City Council's Biodiversity Strategy.

7.2.2 Field Survey

Fieldwork was undertaken on 18 April 2002. The Site was revisited on 22 February 2010 to check the accuracy of notes made at that time and to determine whether there had been any significant changes to the site's ecological characteristics.

7.2.3 Vegetation

The vegetation of the Site is described based on the dominant tree species and the height and cover of the tree layer following Specht (1970). Plants not readily identified in the field were collected for identification using standard texts. Checks were made against the Schedules 1 and 2 of the Threatened Species Conservation Act, Briggs & Leigh (1995) and James *et al* (1999) for species of conservation significance.

7.2.4 Fauna

The vegetation community descriptions were used to describe the different fauna habitats which occur at the Site. The habitat surrounding the Site was also investigated to gain an appreciation of the relative importance of the habitat that occurs on the Site.

Notes were made of specific sources of native fauna food and shelter, such as dense shrubs, flowering trees, tree hollows and rock outcrops. The presence, or lack, of particular fauna habitat requirements was noted to enable predictions of species that would be likely to utilise the Site.

A search was made for indirect evidence of mammal presence such as droppings, burrows, tracks, diggings and bones. Habitat types and the degree of disturbance were assessed to enable predictions of mammal species presence.

A reptile search was undertaken throughout the Site which involved looking under rocks, bark, fallen timber and leaf litter, with particular attention given to rock outcrop areas. Debris found near moist habitats was checked for the presence of frogs and the types of moist habitats present were noted to allow predictions of frog species likely to occur.

A search was undertaken for the threatened Cumberland Land Snail (*Meridolum corneovirens*) by looking under debris and around the bases of trees.

In regard to threatened species, a precautionary approach has been taken i.e. if there are proximate records of the species and suitable habitat present it is assumed that the species inhabits the Site at least on an occasional basis.

7.3 The Existing Environment

7.3.1 Flora

Vegetation Description

The distribution of the vegetation communities on the Site is illustrated in **Figure 7-1**.

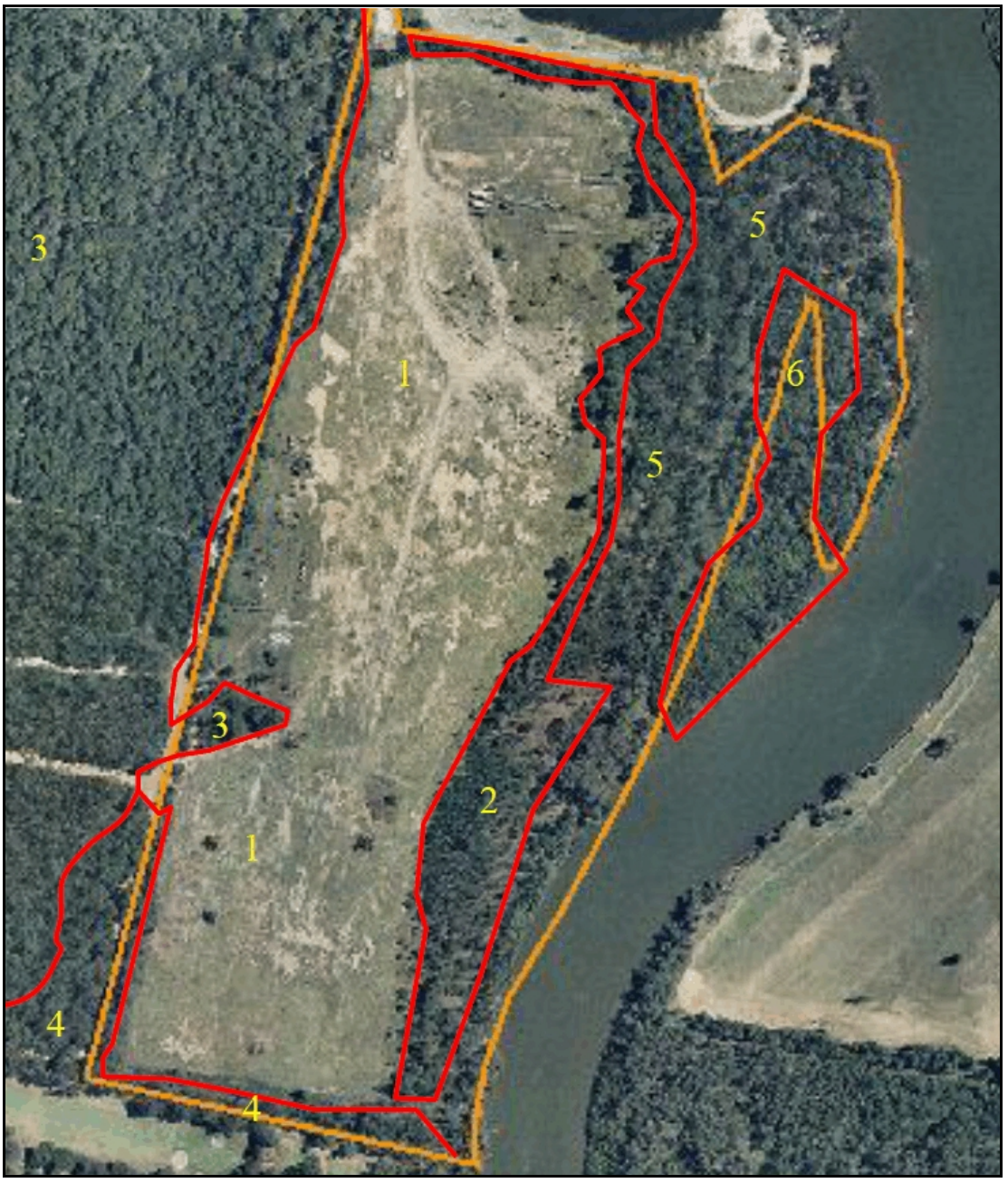

Figure 7-1: Vegetation of the Site. 1 refers to Cleared Area, 2 to Wattle Scrub, 3 to Ironbark Open Forest, 4 to Woolybutt - Blue Box Open Forest, 5 to Cabbage Gum Open Forest and 6 to Swamp Oak Woodland.

Cleared Area

Most of the Site is already cleared and covered with a significant depth of fill. Vegetation which has colonised the fill is mostly introduced grasses and weeds such as Kikuyu (*Pennisetum clandestinum*), Paspalum (*Paspalum dilatatum*), Couch (*Cynodon dactylon*) and Cudweed (*Conyza sp.*).

Wattle Scrub

The batter slope east of the cleared area is vegetated with Green Wattle (*Acacia decurrens*) to 6 metres with occasional Swamp Oak (*Casuarina glauca*) and a dense under storey of introduced shrub and groundcover species.

Ironbark Open Forest

To the west of the Site, on land owned by Boral, is an extensive stand of open forest dominated by Mugga (*Eucalyptus sideroxylon*), Broad-leaved Ironbark (*E.fibrosa*), Forest Red Gum (*E.tereticornis*) and Woolybutt (*E.longifolia*) with an under storey of Paperbarks (*Melaleuca decora & M.nodosa*). A small area of this forest protrudes onto the subject site about 250 metres north of the south-west boundary. In this location there are large Muggas and Forest Red Gum with a Paperbark under storey and grassy groundcover of Three-awn Spear Grass (*Aristida vagans*) and Weeping Meadow Grass (*Microlaena stipoides*). A Parramatta Red Gum (*E.parramattensis*) is also present.

Woolybutt - Blue Box Open Forest

This community occurs along the southern boundary and extends about 100 metres north along the western boundary. It is composed of Woolybutt, Blue Box (*Eucalyptus baueriana*) and Narrow-leaved Ironbark (*E.crebra*) to 25 metres tall with a small tree layer to 12 metres of Melaleuca decora. The groundcover is dominated by Blackberry (*Rubus ulmifolius*) and Balloon Vine (*Cardiospermum grandiflorum*) to 2 metres.

Cabbage Gum Open Forest

For a distance of about 50 metres east of the Wattle Scrub is an alluvial bench vegetated with open forest dominated by Cabbage Gum (*Eucalyptus amplifolia*) to 22 metres tall along with Grey Box (*E.moluccana*) and Forest Red Gum. There is a small tree layer of Green Wattle (*Acacia decurrens*), Cherry Ballart (*Exocarpus cupressiformis*), Melaleuca decora, M.styphelioides and Swamp Oak (*Casuarina glauca*).

There is a sparse, discontinuous shrub layer of Blackthorn (*Bursaria spinosa*) to 2 metres tall. The groundcover includes a variety of native grasses and herbs including Weeping Meadow Grass, Basket Grass (*Oplismenus imbecillis*), Entolasia marginata and Scurvy Weed (*Commelina cyanea*).

Weed infestation is moderate to high with African Love Grass (*Eragrostis curvula*), Florists Smilax (*Asparagus asparagoides*), Morning Glory (*Ipomoea indica*) and Balloon Vine (*Cardiospermum grandiflorum*) being common to abundant.

This community also covers the levee bank immediately adjacent to the Georges River.

Swamp Oak Woodland

Between the Cabbage Gum Open Forest and the river is a swampy, saline depression which is vegetated with a stand of Swamp Oak to 18 metres tall above Sea Rush (*Juncus krausii*) and Native Reed (*Phragmites australis*). Other saltmarsh plants, such as Austral Seablite (*Suaeda australis*) and Sea Celery (*Apium prostratum*), are also present.

Conservation Significance of the Vegetation

The Woolybutt - Blue Box Open Forest and Ironbark Open Forest are examples of Castlereagh Ironbark Forest. Castlereagh Ironbark Forest is an endangered ecological community listed on the TSC Act as Cooks River-Castlereagh Ironbark Forest.

The Cabbage Gum Open Forest is an example of Alluvial Woodland. Alluvial Woodland is a component of the TSC Act-listed endangered ecological community Riverflat eucalypt Forest on Coastal Floodplains.

Swamp Oak Woodland is also part of the Alluvial Woodland, however, due to the dominance of Swamp Oak, it is part of the TSC Act-listed endangered ecological community Swamp Oak floodplain forest.

Threatened Flora Species

No threatened flora species were detected at the Site. In relation to those threatened species listed in Table 1 (of the AES Report), none are considered likely to be present in the soil seedbank as most of the Site is heavily modified and what remains intact is small in area.

7.3.2 Fauna

Fauna Habitat

As most of the Site is cleared and heavily modified, it is only able to support a narrow range of fauna species. These are mostly birds which are either introduced or native species adapted to open habitats.

The woodland and open forest habitats which surround the Site have a number of features which favour habitation by a range of fauna species. These are:

- Hollows and cavities in some of the large trees, which could be used by insectivorous bats, arboreal marsupials, and a wide range of birds.

- Patches of dense under storey vegetation which provide protective cover for small birds.

- Large trees providing roosting area for birds of prey. During the field survey a Peregrine Falcon (*Falco peregrinus*) was detected in one of the Muggas in the Ironbark Forest and a White-bellied Sea-eagle (*Haliaeetus leucogaster*) in a Cabbage Gum in the River-flat Forest.

- Depressions in the Cabbage Gum Open Forest which may fill with rainwater and form small, ephemeral ponds suitable for habitat by some frog species. The Mosquito Fish (*Gambusia affinis*) was detected in local freshwater ponds, precluding the likelihood of the threatened Green and Golden Bell occurring.

Threatened Fauna

No threatened fauna species were detected during the field survey.

It is likely that a number of those forest and woodland-dependent species listed in Table 2 (of the AES Report) would occur in the adjoining forest and woodland, however, as the proposed development is confined to already cleared areas of the Site, it is unlikely to have any impact on such habitats or their component species.

The Green and Golden Bell Frog may be located in the area of the Site.

7.4. Impacts of the Proposed Development

7.4.1 Environmental Planning and Assessment Act 1979

Developments assessed under Part 3A of the Environmental Planning and Assessment Act 1979 are exempt from the provisions of the Threatened Species Conservation Act. i.e. there is no requirement to undertake seven-part tests to determine whether a proposed development would have a significant effect on threatened species, populations or communities, or their habitat.

Instead, draft guidelines for threatened species assessment have been prepared by the then DEC. The objective of the assessment process is to provide information to enable decision makers to ensure that developments deliver the following environmental outcomes:

- Maintain or improve biodiversity values (i.e. there is no net impact on threatened species or native vegetation).

- Conserve biological diversity and promote ecologically sustainable development.

- Protect areas of high conservation value (including areas of critical habitat).

- Prevent the extinction of threatened species.

- Protect the long-term viability of local populations of a species, population or ecological community.

- Protect aspects of the environment which are matters of national environmental significance.

The proposed development would be confined to already cleared or modified areas of the Site. The only vegetation removal would along the access road where some small Swamp Oaks, Cabbage Gums and Melaleucas which have established along the disturbed edges, therefore, it is considered that the required environmental outcomes would be achieved.

Access from Brickmakers Drive would require the construction of an access road through an area of intact native vegetation characterised by a canopy of Cabbage Gum, Swamp Oak and *Melaleuca decora* above Saw Sedge (*Gahnia clarkei*) and Cumbungi (*Typha orientalis*). It is therefore part of the TSC Act-listed endangered ecological community River-flat eucalypt forest on coastal floodplains, however, as part of the Liverpool City Council Strategy for the development of the Boral Moorebank Precinct, Council has determined that this section of the Precinct is that preferred for access to Brickmakers Drive by landowners to the east. This has been designed in close consultation with the then DEC. Therefore, the impacts of any access over that section Council owned land has been assessed in the strategic planning for the area and, indeed, in the approval of development applications which utilise this section of the Council land.

Green and Golden Bell Frog

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The local population of the Green and Golden Bell Frog ( ) is considered to be the population covered by the management plan for the Georges River Green and Golden Bell Frog Key Population. The known GGBF population on the lower Georges River occurs in several locations, including in the vicinity of the wetlands at Hammondville, at Holsworthy and East Hills, and along Prospect Creek and Orphan School Creek. The Site is located between records of the species in New Brighton Golf Course (1993) and Bankstown Golf Course (1964 and 1980).

It is considered unlikely that the local population permanently inhabits the Site. Therefore, it is considered that the local population would not be placed at risk of extinction should the proposed development proceed.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

As the Green and Golden Bell Frog is listed as an endangered species, no populations of

the species are eligible for listing as endangered.

(c) in the case of a critically endangered or endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The Green and Golden Bell Frog is a threatened species, not an endangered ecological community.

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed,

The proposed action would not affect any known or potential habitat of the species.

(ii) and whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action,

Possible corridors for movement of the species occurs either side of the Site. To the east, is Cabbage Gum Open forest adjacent to the Georges River which includes ponding areas. To the west, is the former Boral property which is well vegetated providing protective cover. The proposed action would be undertaken on already cleared land and would not affect the functioning of these corridors either directly or indirectly.

(iii) and the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Very little habitat would be removed by the proposed action. It is considered that the habitat to be removed is not important to the long-term survival of the species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

The Site does not contain, nor is it in proximity to, any area of critical habitat.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

A recovery plan has been prepared for the Georges River Key population of the species, the duration of which was mid-2008 to mid-2011.

The three objectives of the Georges River Green and Golden Bell Frog Management Plan were:

1. To maintain the GGBF population and its outliers;

2. Where possible enhance existing GGBF habitat and thus measures of population viability; and

3. To increase connectivity within and between sub-populations.

It is considered that the proposed development is consistent with the objectives of the plan.

Opportunities arise from landscaping of the Site to improve habitat for the species.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The Georges River Green and Golden Bell Frog Management Plan mentions a number Listed Key Threatening Processes which affect the local population of this species.

They are "Predation by the Plague Minnow (*Gambusia holbrooki*)," "High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition", "Predation by the European Red Fox *Vulpes vulpes* (Linnaeus 1758)", "Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands" and "Anthropogenic Climate Change" and (inter alia) "Clearing of native vegetation".

Apart from Anthropogenic Climate Change, which almost every development contributes to, it is considered unlikely that the proposed action would result in the operation of, or increase the impact of, these key threatening processes.

Furthermore, the management plan lists specific developments which are a threat to the Georges River population of the species. The proposed development is not amongst those mentioned even though the original application predates the management plan.

7-part test Conclusion

On the basis of the above discussion, it is considered unlikely that the proposed action would have a significant effect on the Green and Golden Bell Frog, or its habitat. Therefore, a Species Impact Statement need not accompany the development application.

7.4.2 State Environmental Planning Policy No.44 - Koala Habitat Protection

SEPP 44 aims to encourage the proper conservation and management of areas of natural vegetation which provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

Schedule 1 of this policy lists the local government areas affected by it. Liverpool Local Government Area is included in Schedule 1. Under Part 2, Clause 7 of the SEPP, an assessment of the proposed development was undertaken to ascertain its suitability as Koala habitat. The procedures involved in such an assessment are outlined in SEPP 44 - Koala Habitat Protection.

Step 1 - Is the land potential Koala habitat? - No

Under the definitions in the policy, "Potential koala habitat" means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

Forest Red Gum is the only tree species on the Site which is listed in Schedule 2 of the SEPP. It constitutes less than 15% of the trees occurring on the land, therefore, under the SEPP, the there is no need to proceed to Step 2 to determine whether the land is "core koala habitat" i.e. an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population. Regardless of the "15% rule", no evidence of a resident population of the species was found on the Site.

The Proposal may proceed without a plan of management being prepared for the Koala.

7.4.3 Environment Protection and Biodiversity Conservation Act

Green and Golden Bell Frog

The Green and Golden Bell Frog is listed as vulnerable on the EPBC Act. As such, it is a Matter of National Environment Significance and there is a requirement to assess impacts on the species with regard to the Significant Impact Guidelines which accompany the Act.

Under these guidelines, an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population of a species;*

It is considered unlikely that the local population inhabits the area proposed for development.

Some potential habitat occurs within the Cabbage Gum Open Forest to the east which has some ponding areas. The proposed action would not diminish the potential for this area to provide habitat for the species. Therefore, the proposed action is unlikely to lead to a long term decrease in the size of the population.

- *reduce the area of occupancy of an important population;*

The area proposed for the action is not a confirmed area of occupancy of the species nor is it likely to be habitat for the species. Therefore, the area of occupancy of the population would not be reduced

- *fragment an existing important population into two or more populations;*

A possible corridor of movement for the species occurs through forested land adjacent to the Georges River and in former Boral property to the west. The proposed action would not interfere with the functionality of either of these corridors which maintain possible links between individuals which occur to the south and north of the Site.

- *adversely affect habitat critical to the survival of a species;*

It is considered unlikely that the Site is critical to the survival of the species.

- *disrupt the breeding cycle of an important population;*

It is considered unlikely that the proposed action would disrupt the population's breeding cycle. There is very limited pond habitat on the Site and, apart from regularly slashed grass, little or no protective cover.

- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;*

It is considered unlikely that the proposed action would modify, destroy, remove or isolate or decrease the availability or quality of any habitat. The species is unlikely to decline as a result of the proposal.

- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;*

The invasive Plague Minnow is a threat to the Green and Golden Bell Frog. The species is already present in potential habitat in the Cabbage Gum Open Forest area of the Site which would remain unaffected by the proposal.

- *introduce disease that may cause the species to decline;*

The Green and Golden Bell Frog is susceptible to the *Chytrid* fungus. It is unlikely that the proposed action would result in introduction of this disease into the population.

- *or interfere substantially with the recovery of the species.*

Given its location within already heavily modified land, and the scope and extent of the proposed action, it is considered that it would not interfere with the recovery of this species.

EPBC Act Conclusion

The significant impact guidelines for this particular species (Australian Government 2009b) state that "there is a possibility of a significant impact on the green and golden bell frog, and a referral under the *EPBC Act* should be considered, if the action results in:

1. The removal or degradation of aquatic or ephemeral habitat either where the green and golden bell frog has been recorded since 1995 or habitat which has been assessed as being suitable according to these guidelines. This can include impacts from chytrid, (and) Gambusia originating off-site;

2. The removal or degradation of terrestrial habitat within 200 metres of habitat identified in threshold 1; and

3. breaking the continuity of vegetation fringing ephemeral or permanent waterways or other vegetated corridors linking habitats meeting the criteria in threshold 1.

The guidelines also state that these thresholds are not considered prescriptive and significant impact judgements must be made on a case-by-case basis and with consideration for the context of the action.

It is considered that there would be no removal of potential habitat nor disruption to any potential corridors for movement adjacent to the area proposed for the action. Therefore, referral to the Federal Minister for the Environment to determine whether the proposal is a controlled action is considered unnecessary.

White-bellied Sea-eagle

The White-bellied Sea-eagle was detected in habitat adjacent to the area proposed for the action. The species is listed as migratory on the *EPBC Act*. As such, it is a Matter of National Environment Significance and there is a requirement to assess impacts on the species with regard to the Significant Impact Guidelines which accompany the Act (Australian Government 2009a).

Under these guidelines, an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- *substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles; or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;*

The White-bellied Sea-eagle was detected during the site survey in the Cabbage Gum Open Forest adjacent to the area proposed for the action. As the area proposed for the action is largely cleared, it is unlikely to be inhabited by the species. It is unclear whether

habitat adjacent to the Site along the Georges River is "important habitat" for the White-bellied Sea-eagle.

In the short-term, repulsion species may avoid this habitat area due to noise associated with site activity, however, as the species is already apparently accustomed to human activity, as evidenced by its habitation of the busy Georges River, it is considered likely that it would return to previously occupied habitat adjacent to the Site. Therefore, it is unlikely that substantial modification, destruction or isolation of habitat would occur.

- *result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or*

The proposed action is unlikely to result in further introduction of invasive species into the White-bellied Sea-eagle's habitat.

- *seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species*.

No evidence of breeding (e.g. large stick nests) was observed in the Cabbage Gum Open Forest during the site survey. Whilst there may be some short-term disruption to resting (roosting) and possibly feeding behaviour as a result of the proposed action, it is considered unlikely that this would seriously disrupt the lifecycle of the White-bellied Sea-eagle.

It is considered unlikely that the proposed action would have a significant impact on the White-bellied Sea-eagle. Therefore, referral to the Federal Minister for the Environment to determine whether the proposal is a controlled action is considered unnecessary.

7.5 Environmental Management Measures and Safeguards

To minimise the likelihood of the proposed development having any impacts on those State and Commonwealth listed endangered ecological communities which adjoin the Site (and associated fauna habitats), the following measures are recommended:

- erection and maintenance of sediment control fences along the eastern edge of the previous landfill area.
- vegetating the batters of the disturbed area of the Site with locally occurring native plant species.
- continued suppression of weeds in the previous landfill area.

Part Eight

VISUAL IMPACT ASSESSMENT

8.1 Introduction

In order to ascertain the potential impact of the proposed Project on the visual environment of the locality, Richard Lamb & Associates has prepared a report titled *Materials Recycling Facility. Lot 6, DP 1065574, Newbridge Road, Moorebank. Visual Impact Assessment* (**the Lamb Report**) a copy of which is at **Appendix 12**.

8.2 Methodology

The methodology used in the assessment has been developed by Richard Lamb & Associates over several years and uses relevant aspects of methods accepted in landscape assessment. The assessment of visual impacts is a field which requires a degree of subjective judgment and cannot be made fully objective.

It is necessary to limit the subjectivity of the work by adopting a systematic, explicit and comprehensive approach with the aim of separating aspects which can be more objective, for example the physical setting, visual character, visibility and visual qualities of a proposal, from more subjective elements, such as matters of personal taste and emotion.

The methodology utilised consists of the steps described below.

1. Identification and description of the existing visual character of the land within which the proposal would be seen.

2. Analysis and evaluation of the potential future visibility of and visual accessibility of the proposal.

3. Assessment of the residual visual impacts of the proposal, if any, and any necessary mitigation measures which are the subject of commitments to environmental management programs for which conditions of consent would be required.

A viewpoint analysis was conducted to assess the visual impacts which may be experienced which consisted of visiting the Site and the locality and assessing the likely impact on views from selected locations. The locations were selected to represent all of the types of viewers' experience of the development which would exist in the immediate area. The main types of viewing locations and areas were visited and photographed. At each viewing place, a series of observations and assessments were made. A variety of locations were also visited to ascertain the extent of the visual catchment and the characteristics of the views. **Figure 8-1** shows viewing locations assessed. The

photograph for each viewing location are appended to the Lamb Report.

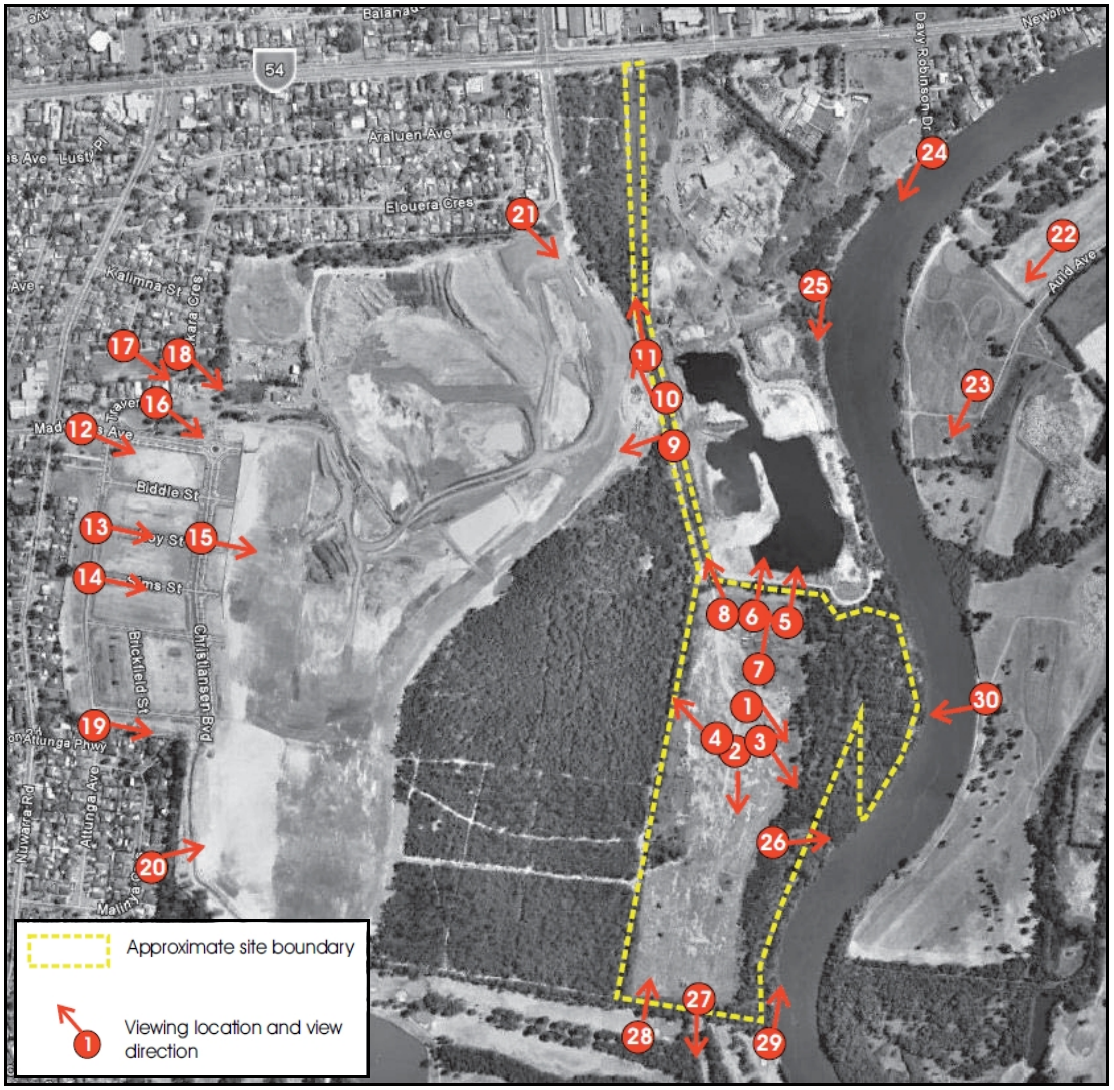

Figure 8-1: Viewing locations assessed

8.3 The Existing Environment

A roughly rectangular part of the Site has been filled in the past and is of an open and predominantly grassy visual character.

The northern, western and southern margins of the filled area approximately follow the Site boundaries.

An irregularly shaped edge exists between the filled portion of the Site and the eastern boundary beyond which is the Georges River.

The north eastern portion of the Site is naturally vegetated.

Between the eastern boundary and the Georges River is also a naturally vegetated area.

The Site is effectively invisible from the Georges River and the reserve land between it and the Site as a result of the screening effect of riparian vegetation.

The land along the eastern boundary of the Site is covered with indigenous riparian vegetation consisting of mangrove forest, swamp forest with Allocasuarina and paperbark along the river bank and open woodland further away from the river bank. The vegetation along the Georges River provides a dense screen such that the Site and its future use are not visible from the waterway.

At the northern end of the Site, the vegetation is thickest and covers a large area between the waterway and the part of the Site where Materials Recycling Facility is proposed.

To the south of the Site, is the New Brighton Golf Course which also adjoins the former Boral Brickworks Site, now the newly developing Georges Fair residential development. The vegetation along the southern boundary of the Site, adjacent to the north eastern end of New Brighton Golf Club, is relatively open consisting mainly of mature trees on the boundary between the two.

Views from the golf course into the Site are restricted to a greater extent by an embankment between 1.5 metres and 2.5 metres high inside the boundary on the Site, however, there are some limited viewing opportunities into the interior of the southern part of the Site, where natural and cultural vegetation on both the golf course and the Site forms a more open screen. This area has been identified as environmentally significant land and is a potential wildlife corridor linking the riparian vegetation on the river and the native woodland and forest reserves to the east of the Site. Future growth of vegetation in the corridor would lead to greater and potentially total screening of the view into the Site.

To the west of the Site, is an extensive area of naturally vegetated land, which appears to be re-growth intermixed with areas of more mature vegetation. It is criss-crossed by a series of tracks in a rectilinear pattern. The predominant character is of natural flood plain and lower slopes forest and woodland. The tracks do not detract from this quality. On the boundaries in particular, it is clear that this vegetation is re-establishing a more mature vegetation structure with open to dense areas of sapling and small tree regrowth of the dominant species. It appears likely that clearing and burning in the past have reduced both the density and height of the predominant vegetation form, however, there is also variation in the typical height of the predominant communities, with the flood plain type being of generally lower canopy height with some emergent taller trees and the lower slopes forest being generally taller, but more even in height.

The former Boral site has undergone transformation from a brick pit and industrial landscape to the partly constructed stage of residential development. The land slopes generally downward from west to east, with a cross fall from the north western corner. The highest part of the land is adjacent to Nuwarra Road. The land generally has an aspect to the east. The proposed amendments to the final landform indicate an RL of approximately 26 metres at Nuwarra Road, falling in a south easterly direction to

approximately RL 6 metres inside the embankment of the Brickmakers Drive.

The land surface on which the proposed development would exist is not visible from any existing residential location outside the Site because of the topographic relationships which exist between them and the Site, the screening effects of vegetation both on the margins of the Site and in reserve land between the sites and the effect of the link road embankment at the eastern edge of the developing Georges Fair residential development.

8.4 Impacts of the Proposed Development

Visibility from existing residential areas

There is no visibility of the interior of the Site from the residential area to the west of Georges Fair, from Newbridge Road and from any reserves. Distant views in the direction of the Site are available but views into the Site are not available.

The Site is below the visual horizon of trees which are part of the extensive buffer area of reserve land on and between the Boral (George Fair) site and the Site. The proposed development on the Site would not be visible from these areas.

Visibility from Georges Fair

There are no views into the Site from the newly developing residential area on the former Boral site or the curved section of Brickmakers Drive which passes close to the existing access handle to the Site. The view from this section of Brickmakers Drive is confined by dense vegetation along the western and northern boundaries of the Site.

The proposed development on the Site would not be visible from these areas.

By comparison, in the main orientation of views eastward from parts of Georges Fair, for example from areas to the north of Hoy Street, the Benedict Sand and Gravel Quarry and recycling site is prominent in the views because of the presence of the upper parts of some of the stockpiles and machinery which can be seen above and beyond the dense vegetation.

The height of vegetation between the former Boral site (developing Georges Fair) and the Site which can screen visibility of the development proposed was surveyed in November 2003 and showed that, relative to the adjacent vegetation, the recycling crusher sheds and stockpiles with a maximum height of 10 metres would be considerably below the screening vegetation canopy height.

Surveyed sections of 2003 (appended to the Lamb Report) show the effect of the vegetation and height controls on two locations on the former Boral site which are still representative of the 'worst case' effect on views when development is completed.

The subsequently constructed predominantly single and two storeys development in

Georges Fair has further blocked any significant viewing opportunity in the direction of the Site and this effect will further increase as the construction of residences continues in this new locality.

Georges Fair also has some public domain areas on roads at approximately RL 22 metres. View lines from these would be similarly affected by the presence of intervening vegetation between the viewer and the Site and also by the residences already constructed and to be constructed in the future in the foreground of the views.

It is reasonable to conclude in assessing visibility from existing external residential locations that none of the structures on the Site, the stockpiles of materials proposed, or the activity associated with use of the Site would be likely to be visible.

Visibility from Benedict Sand and Gravel quarry and recycling site

There is visibility predominantly of the foliage of the vegetation on the margins of the Site from most parts of the Benedict Sand and Gravel Quarry and recycling site.

The Benedict site has been rezoned for potential residential development on part of that site under Liverpool LEP 2008 and is subject to Liverpool Development Control Plan 2008, Part 2.10, Development in Moorebank East. Figure 2, Street Network, of this part of the Development Control Plan shows that the residential development on the Benedict Site would be located in the northwest sector and would be separated from the Site by a large area of private recreation space.

The Benedict site would be likely to be filled and levelled and could provide some views toward the Site once the potential residential development is constructed in future.

Views from potential residential streets and residences located in the majority of the Benedict site would be blocked by intervening residential development in the foreground within this Site itself.

There would not be any significant visibility of parts of the proposed development including any structures or stock piles from the access road to the Benedict site because of the blocking effect of future development on this site and existing and likely future vegetation.

Further buffer planting appropriate to enhancing the existing screening effect along the northern boundary of the Site would assist in reducing any unreasonable visibility from this future residential area.

Visibility from Georges River

Thick riparian vegetation on the riverbank screens the Site from the waterway. Views from the waterway are at an upward viewing angle, which lessens the possible visibility of any structures which might be glimpsed through the vegetation.

There may be glimpses toward the most northerly part of the Site from part of the river

to its north, across the existing dredge pond in the south eastern area of the Benedict Sand and Gravel quarry and recycling site. The Development Control Plan for this site shows the pond to be intended for future private recreation and it is likely that this use would be associated with further vegetation which would increase the existing screening effect.

Visibility from public reserves, parks and golf courses

There are limited and heavily screened views into the south of the Site from the New Brighton Golf Course and no significant views from along the river's edge within Riverlands Golf Course and adjacent land to the north, on the east side of Georges River.

Davy Robinson Reserve is located north-northeast of the Site. There are no views into the Site from the reserve. The proposed development would not be visible from here.

Informal access is possible from Davy Robinson Reserve to significantly degraded reserve land further to the south adjacent to the Benedict Sand and Gravel quarry and recycling site. There would be no view of the proposed development from this reserve.

Vale of Ah Reserve on the eastern bank of the Georges River has no views into the Site due to the screening effects of riparian vegetation. The proposed development would not be visible from here.

There is informal access to the river across the adjacent private land by tracks from the Vale of Ah Reserve. Despite providing the closest view in terms of distance across the river, there is no visibility of the Site or future development because of riparian vegetation in this view line.

There is no formal public access to the river from the Riverlands Golf Club. There is substantial riparian vegetation which screens the Site from any part of the golf course.

Malinya Park has limited views across the Georges Fair site towards the Site. Any future views towards the Site would be dominated by housing in the foreground. There would be no views of the proposed development.

Paine Park located on Elouera Crescent is screened from views towards the Site by an earth mound on the Georges Fair site and mature trees in the park and on the Georges Fair site. Future residential development would screen or eliminate views in the direction of the Site.

8.5 Residual Impacts

The residual visual impacts of the proposal on the surrounding areas are limited. The general lack of visibility of the proposal from most viewpoints means that there are few issues requiring any mitigation measures.

Providing that the overall heights of any structures are controlled as proposed, and that

other activities do not have high visibility to the public domain, there are no residual visual impacts of concern.

The only residual issues are those of visibility into the Site from very limited view locations and directions, the potential visibility of equipment on the Site on occasions which might add to the visibility of items otherwise subject to height controls, and truck traffic.

Visibility of activities and equipment

The proposed ground levels for the Site are a maximum RL 5.7 metres. The range of tree heights on the western boundary above that level have ranges of 12.2-16.9 metres and 12.9-20 metres. In the buffer area formed by vegetation in the reserve land between a potential viewer and the western boundary of the Site, there are many other trees in the tallest class range. The ranges of heights above are therefore very conservative and the average canopy height would be likely to be greater.

No building, equipment or stockpile would be visible on the Site from viewing locations in the public domain or residential areas to the west or north west.

At times an excavator is required to grade the stockpiles and there may be the potential that part of the excavator may be visible above the tree line. This would be only when the stockpiles were graded to maximum height. Based on the assumptions above, it would still be unlikely that there would be any visibility of this activity. The tree line height is between 2.2 metres and 10 metres higher than the maximum stockpile height, the average being toward the high end of the range. At the worst, a part of a machine could be visible, seen in a gap between taller trees, for a short period, if the stockpile on which it was working was in a view line providing a view. This would also have to be a view line in which there were no other trees between the viewer and the margin of the Site. On balance, there would be very little likelihood of visibility, but if there was it would be minimal and of short duration.

The final matter of residual impact, which has a visual impact component, is traffic, specifically, the visibility of and character of vehicles entering and leaving the Site. Vehicles travelling within the access road, would travel parallel to a section of Brickmakers Drive for a short distance and be visible from that road.

Vehicles on the access road travelling to or from the Site would be indistinguishable from other traffic on Brickmakers Drive, other than during the act of entering or leaving the access road. While the latter is evidence of the activity for which the application is being made, the nature and character of the use would not be unique and the visibility of vehicles is not considered to be determinative.

8.6 Mitigation Measures

Buffer planting of appropriate indigenous native trees of various sizes appropriate to the

screening effect, selected from the riparian and forest vegetation adjacent to the Site and planted along the northern boundary of the Site adjacent to the constructed mound, would in the fullness of time reduce or eliminate the residual visibility of the development.

The proposed buffer planting along the northern boundary on the foot of the mound, in the car park, and between the proposed car park and the Benedict Sand and Gravel quarry and recycling site would help to mitigate any visual impact issues from the viewpoint on the river to the north east. This planting would also have the effect of reducing or eliminating any view of the proposal in views from Brickmakers Drive.

Part Nine

WATER QUALITY IMPACT ASSESSMENT

9.1 Introduction

In order to ascertain the potential impact of the proposed Project on the stormwater drainage system, Evans & Peck has prepared a report titled *Materials Recycling Yard. Newbridge Road, Moorebank. Water Management and Pollution Control Assessment.* (**the Evans & Peck Report**) a copy of which is at **Appendix 7**.

9.2 Methodology

An existing Development Consent (No.1417/2005) for bulk earthworks at the Site has been approved by Liverpool City Council. The approval includes all necessary bulk earthworks for the proposed use of the Site as a Materials Recycling Facility including establishing a land level above the 100 year ARI flood level. This part of the Environmental Assessment addresses the issues which arise from the works relating to the development of the Site as a Materials Recycling Facility following completion of the approved earthworks.

The approved bulk earthworks for the Site have been taken into account in developing the operational drainage strategy for this Project. The operational working area of the Site would be protected from flooding in a 100 year ARI flood by means of approved site levels, the surrounding mounds which were approved as part of the bulk earthworks consent, and a low bund at the southern end of the section of the Site where the Materials Recycling Facility is to be established. The low bund would serve to exclude the 100 year ARI flood. This exclusion of floodwaters is an approved aspect of the bulk earthworks consent. The approved bulk earthworks would also enable the Site to be contoured to direct overland flow to various low points or collection sumps from where the water would be pumped to holding tanks for reuse.

9.3 The Existing Environment

9.3.1 Water Quality

The reach of the Georges River adjacent to the Site is a transition zone between the upper freshwater and lower estuarine (salty) water of the River. It is used for a number of water based activities including water skiing, boating and fishing. Public health and safety is an issue of high importance in this catchment along with environmental and aesthetic values.

The water quality in this section of the Georges River is affected by both the level of development in the surrounding catchment and the degree of tidal flushing. Three STPs occasionally discharge effluent to the River during wet weather, however, this has been reduced during recent upgrades under the Sydney Water SewerFix program.

The influence of tidal flushing has a positive effect on water quality and faecal coniform levels usually return to levels acceptable for swimming within three days after a heavy rain event.

The *Georges River Data Compilation and Estuary Processes Study* (prepared by SMEC for the Georges River Combined Councils Committee, February 2010) summarises and interprets water quality for the Georges River, including a reach of the river at Milperra, which is adjacent to the Site. The report draws on data collected by Bankstown Council between 1997 and 2009. The report also references water quality data collected between 1973 and 1992 by Chipping Norton Lake Authority. A summary of the study's findings are presented in **Table 9-1**.

Table 9-1: Water Quality Data for Georges River at Milperra

	DO (%)	pH	Turbibity (NTU)	Faecal Coliform (cfu/100mL)
ANZECC default guidelines (lower limit)	80	6.50	6	150
Percentage of water quality results beneath the ANZECC default guideline lower limit	67%	8%	44%	43%
ANZECC default guideline (upper limit)	110	8.00	50	1000
Percentage of water quality results above ANZECC default guideline upper limit	8%	18%	20%	33%
Total % outside ANZECC Guideline Limits	**76%**	**26%**	**65%**	**33%**

The findings show that water quality in this section of the River does not comply with the ANZECC default criteria for freshwater ecosystems up to 75% of the time for dissolved oxygen, 26% for pH, 64% for turbidity and over 76% of the time for faecal coliforms. These results indicate the water quality is generally poor.

9.3.2 Flooding

A flood study prepared for Development Application No.1417/2005 examined flood levels in the vicinity of the Site and the effect of the proposed earthworks on flood levels. **Table 9-2**, which has been extracted from the Flood Study, shows flood levels in the

vicinity of the Site at the locations marked on **Figure 9-1**.

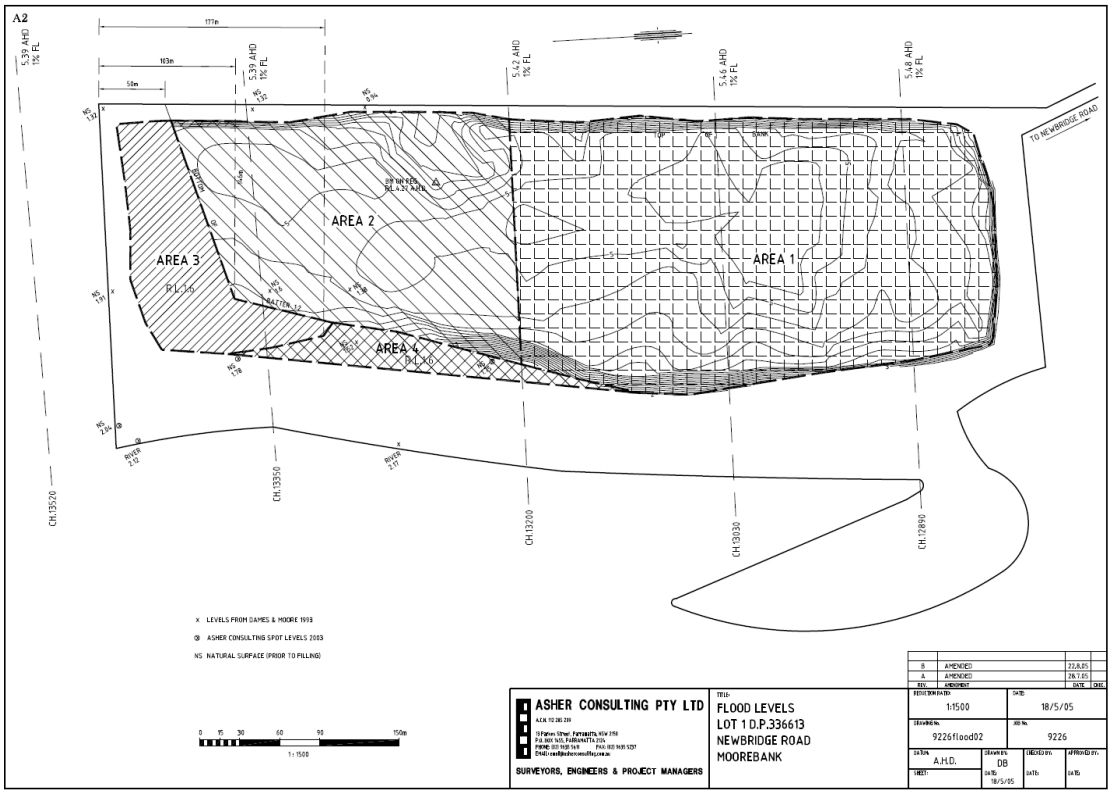

Figure 9-1: Georges River Flood Levels at the Site

Table 9-2: 100 year ARI Georges River Flood levels

Cross Section Chainage Location (m)	100 year ARI Flood Level (m AHD)
12,620	5.56
12,890	5.48
13,030	5.45
13,200	5.42
13,350	5.39
13,520	5.35
13.820	5.26

The data in **Table 9-2** show that in a 100 year ARI flood there is a gradient from about 5.49m AHD at the northern boundary of the Site to 5.39m AHD at the southern boundary. Additional flood data have been obtained from the Manly Hydraulics Laboratory which maintains a continuous water level gauge at Milperra Bridge (operational since 1980). **Figure 9-2** shows the flood frequency curve for Milperra Bridge derived from a composite of the historic record and the 20, 50 and 100 year ARI flood level data derived

from the hydraulic model study prepared by PWD (1991). The flood levels shown in **Figure 9-2** have been taken into account during the design of the access road between Brickmakers Drive and the Site, and in the preparation of a Site flood evacuation plan.

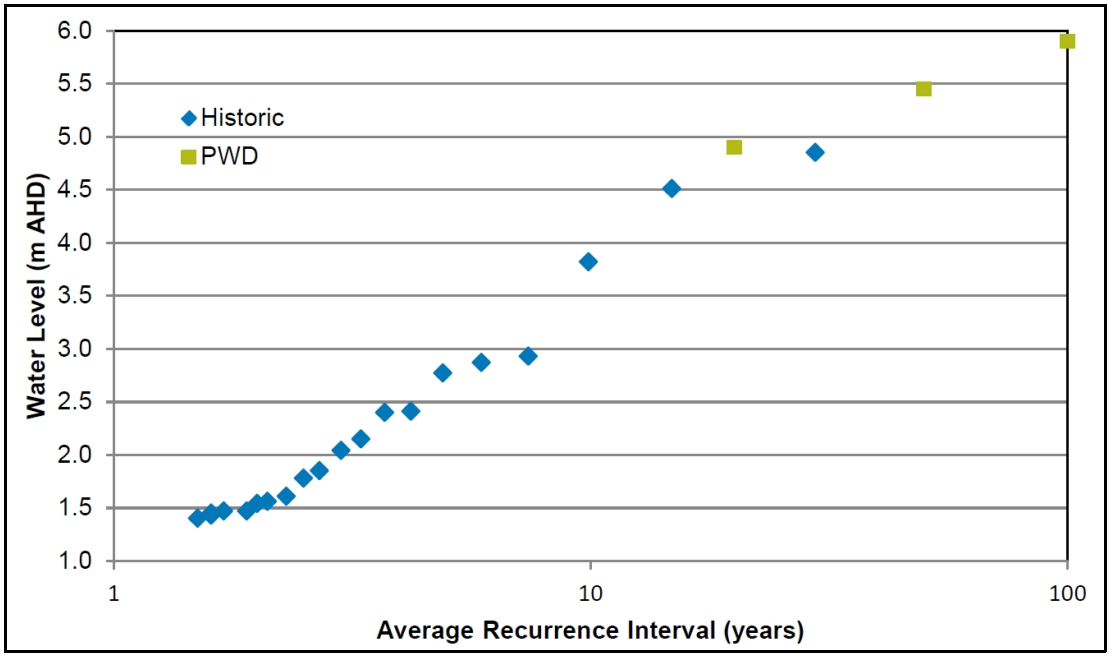

Figure 9-2: Flood Frequency Curve at Milperra Bridge

The Site levels, perimeter mound and a low protective bund at the southern end of Area 1, have been established during design to ensure the Site is flood free in a 100 year ARI flood.

As demonstrated in the flood analysis that supported Development Application No.1417/2005, the approved earthworks, including exclusion of the 100 year ARI flood from Area 1, would result in no net loss of flood storage and would have no effect on flood levels in the Georges River.

9.3.3 Site Drainage

The existing site contains a raised area with a gentle ridge from north to south through the centre of the Site. Runoff flows generally east or west off the raised area of the Site, entering depressions which run along the eastern and western sides of the raised area. The depression on the eastern side is formed by the raised area and a natural "levee" adjacent to the Georges River. The depressions convey flow to drains which run along the north and south boundaries of the Site. These drains convey flow to the Georges River.

Once the approved bulk earthworks are complete and the Site is developed, runoff from the operational area would be collected in sumps with overflow being directed to the

existing depressions on the east and west sides of the operational area. The runoff from the developed site would, therefore, maintain the existing runoff direction and the locations of inflow to the Georges River. Runoff from non-operational areas would flow directly to the depressions and be conveyed to the Georges River.

9.4 Impacts of the Proposed Development

9.4.1 Impact on the Georges River

Pollutants which could potentially originate from the Materials Recycling Facility include suspended solids in site runoff, and oil, fuel or chemicals used on the Site.

All runoff from the operational area of the Site is captured in sumps. The sump design would prevent the escape of oils and fuels from the Site. The sumps also give the Site operator the opportunity to respond to any spills by preventing such spills flowing immediately off site. As such, the principal pollutant of concern to the Georges River is suspended solids.

The background water quality in the Georges River is poor, with turbidity outside the ANZECC range 65% of the time. Ninety one percent (91%) of the suspended solid load within runoff from the operational area would be captured on the Site. As a result, it is not envisaged that the proposed development would have any adverse impact on water quality in the Georges River.

9.4.2 Erosion and Sediment Control

Temporary erosion and sediment controls would be implemented prior to the construction of the facilities which comprise the water management system. A combination of localised controls including silt fencing and temporary sediment basins, etc would be used.

Following project approval, a detailed Erosion and Sediment Control Plan would be prepared in accordance with the requirements of *Managing Urban Stormwater: Soils & Construction* (Landcom, 2004).

9.4.3 Waste Water

Wastewater would be held in a storage tank and periodically pumped out by a licensed contractor. The tank would be protected from flooding in a 100 year ARI flood event by having all inlets and outlets sealed and any openings located above the 100 year ARI

flood level. These measures would minimise the potential for any wastewater pollution from the wastewater holding system.

The design and operation of the storage tank would be in accordance with Liverpool City Council's on-site sewage management requirements. Liverpool City Council would be given the opportunity to conduct inspections in line with its obligations under the Local Government Act.

Part Ten

TRAFFIC IMPACT ASSESSMENT

10.1 Introduction

In order to ascertain the potential impact of the proposed Project on the local traffic network, Lyle Marshall & Associates Pty Ltd has prepared a report titled *Traffic Report for Construction and Operation of a Materials Recycling Facility on Lot 6, DP 1065574, Newbridge Road, Moorebank.* (**the Marshall Report**) a copy of which is at **Appendix 14**.

10.2 Methodology

Automatic tube counts over a period of 7 days were made in Nuwarra Road south of Junction Road and in Governor Macquarie Drive north of Balanada Avenue in February 2011 and in Brickmakers Drive north of Maddecks Avenue in October 2012. The average weekday ADT volumes are shown on Figure 2 of the Marshall Report, an extract from which is at **Figure 10-1**.

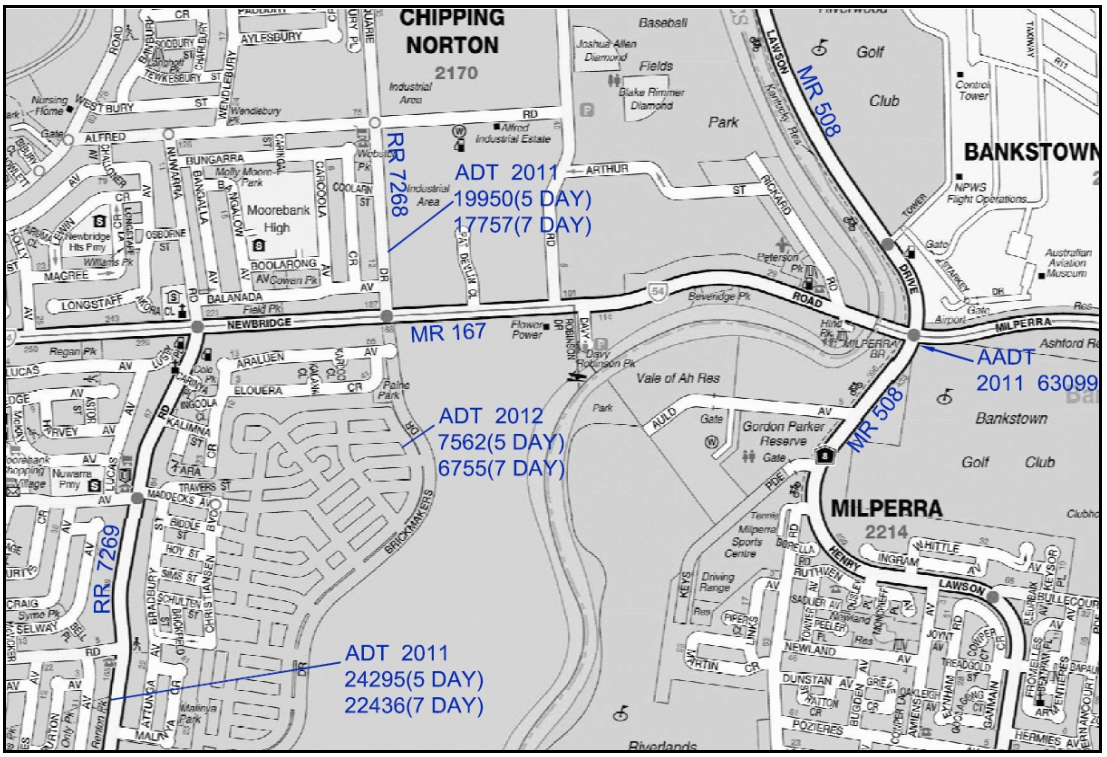

Figure 10-1: Road Network and ADT volumes

10.3 The Existing Environment

The bidirectional weekday average hourly volumes of light and heavy vehicles in Nuwarra Road, Governor Macquarie Drive and Brickmakers Drive are contained in Tables A, B and C respectively in Appendix D of the Marshall Report.

Analysis of the data indicates an annual average compound reduction of 0.1% in Newbridge Road between 2002 and 2011. The 24/7 ADT Count in Nuwarra Road south of Junction Road in February 2011, indicates zero growth in Nuwarra Road between 2002 and 2011.

Intersection traffic volume counts were made from 7:00 am - 9:00 am, 12 noon to 2:00 pm and 4:00 pm to 6:00 pm at Nuwarra Road / Maddecks Avenue and Brickmakers Drive / Christiansen Boulevarde intersections on Monday 5 November 2012. The turning volumes at these intersections are shown in Figures 3A and 3B of the Marshall report for the am and pm peak hours respectively and are reproduced as **Figure 10-2** and **10-3** below.

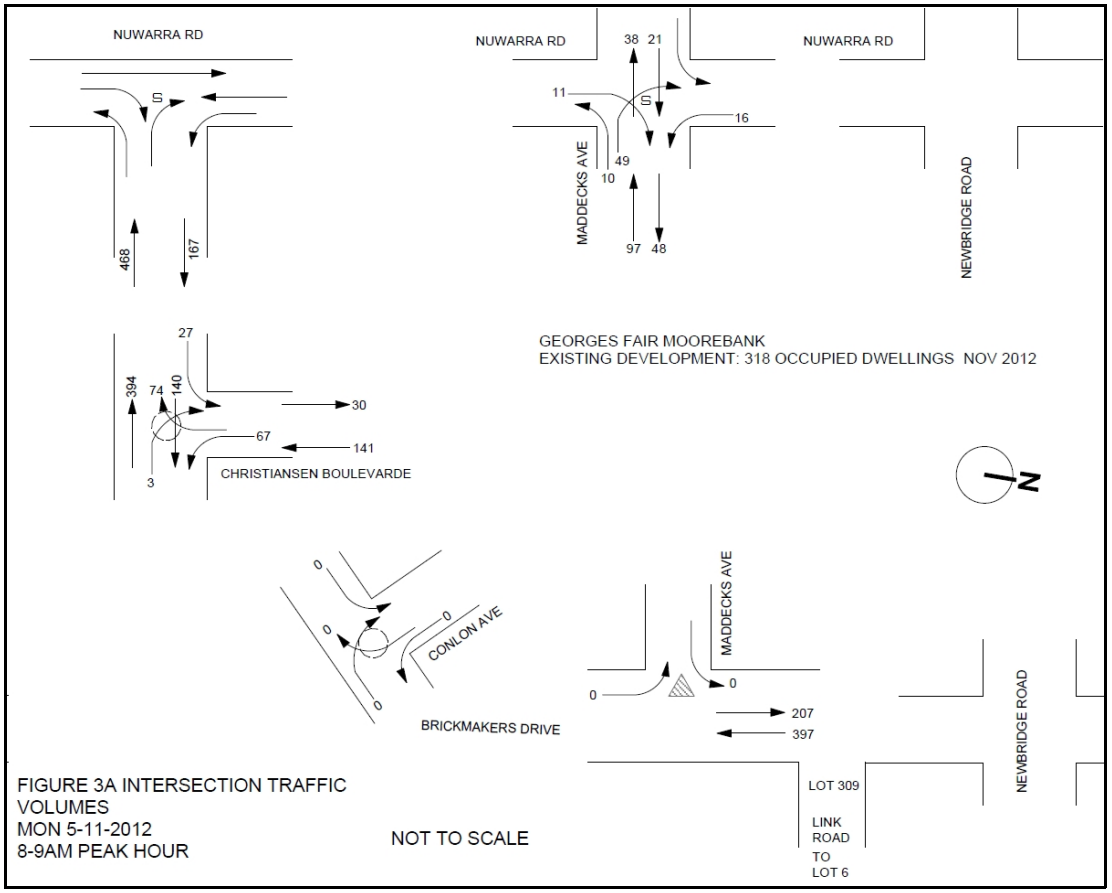

Figure 10-2: Intersection traffic volumes Monday 5 November 2012 in the 8:00 am to 9:00 am peak hours (refer to Figure 3A of the Marshall Report).

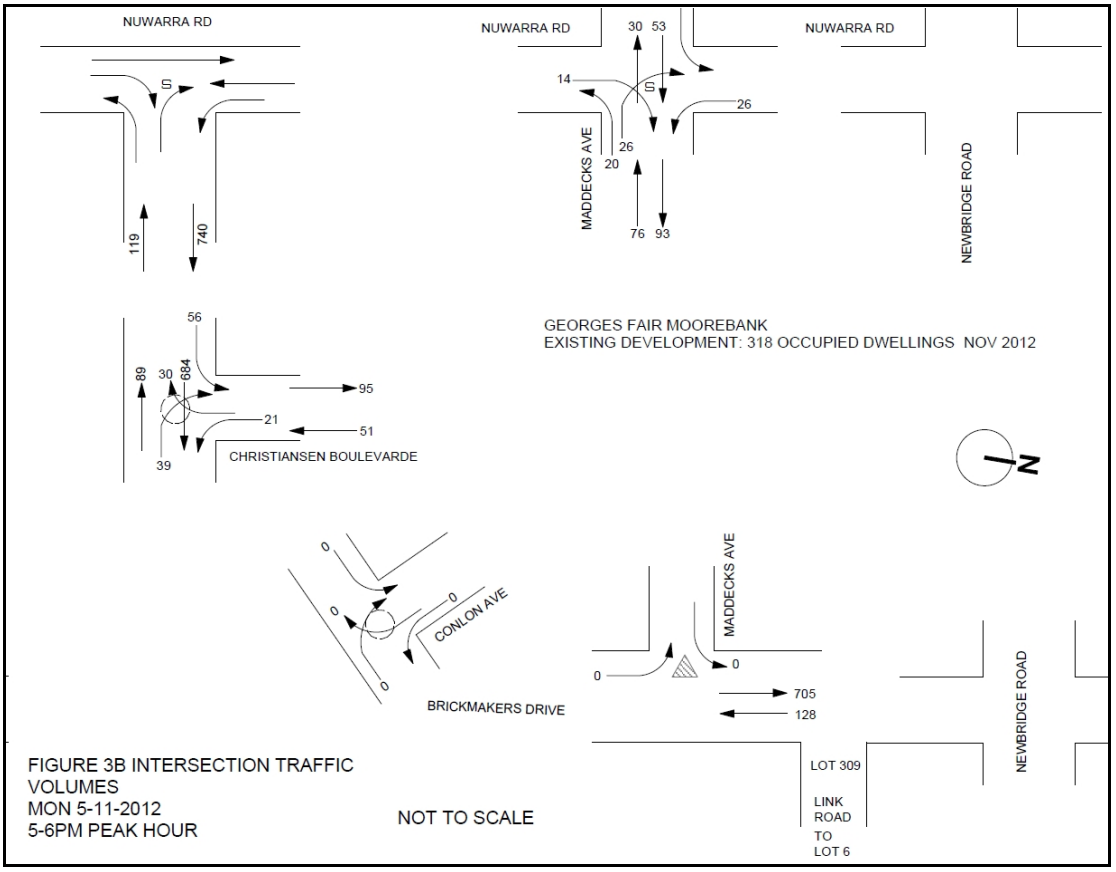

Figure 10-3: Intersection traffic volumes Monday 5 November 2012 in the 5:00 pm to 6:00 pm peak hours (refer to Figure 3B of the Marshall Report).

The existing access to the Site is via a gravel road from Newbridge Road. The access crossing is on the southern side of Newbridge Road some 120 metres east of Governor Macquarie Drive. The access road is located in the access handle and is 10.064 metres wide. The pavement width varies but is approximately 5 metres wide. The access handle from Newbridge Road to the main body of the Site is approximately 876 metres in length.

10.3.1 Traffic Generation by the Georges Fair Residential Subdivision

A survey was made of vacant lots, dwellings under construction, completed unoccupied dwellings and occupied dwellings on 5 November 2012. The survey findings are summarised in **Table 10-1**. Dwellings with access to Nuwarra Road are not included.

Table 10-1: Status of Georges Fair Residential Development, November 2012

Vacant Lots	Dwellings under construction	Dwellings completed unoccupied	Occupied dwellings
19	67	36	318

The only vehicular access to the existing development was to Brickmakers Drive at Christiansen Boulevarde and to Nuwarra Road at Maddecks Avenue. The access from Conlons Avenue to Brickmakers Drive was not open to traffic and the Maddecks Avenue road connection to Brickmakers Drive was not constructed.

The estimated traffic generation by the existing 318 occupied dwellings from the intersection traffic movements is shown in **Table 10-2**.

Table 10-2: Peak Hour Traffic Generation from the Georges Fair Residential Development

Peak Hour	Traffic Volume		Total	Trips/Dwelling
	In	Out		
8:00 am - 9:00 am	78	238	316	0.994
5:00 pm - 6:00 pm	188	127	315	0.991

10.3.2 Future Traffic Volumes in Brickmakers Drive in 2021

In 2021, the road network in Georges Fair will have been completed and the Conlon Avenue and Maddecks Avenue links to Brickmakers Drive will be in operation.

The traffic generation in the am and pm peak hours at full development of the 967 residential lots having driveways to the internal subdivision roads has been estimated based upon the traffic generated by the 318 occupied dwellings in November 2012.

The estimated traffic generation at full development in 2021 is as shown in **Table 10-3**.

Table 10-3: Peak Hour Traffic Generation at Full Development of Georges Fair

Peak Hour	Use	No. Dwellings	Year 2021 Traffic Movements	
			In	Out
8:00 am - 9:00 am	Residential	967	237	723
5:00 pm - 6:00 pm	Residential	967	571	386

The intersection at the link road to the Site and Brickmakers Drive has been analysed under Give Way sign control in Brickmakers Drive for future 2021 peak hour volumes in the am and pm peak hours and volumes (pcu's) as shown in **Figure 10-4**.

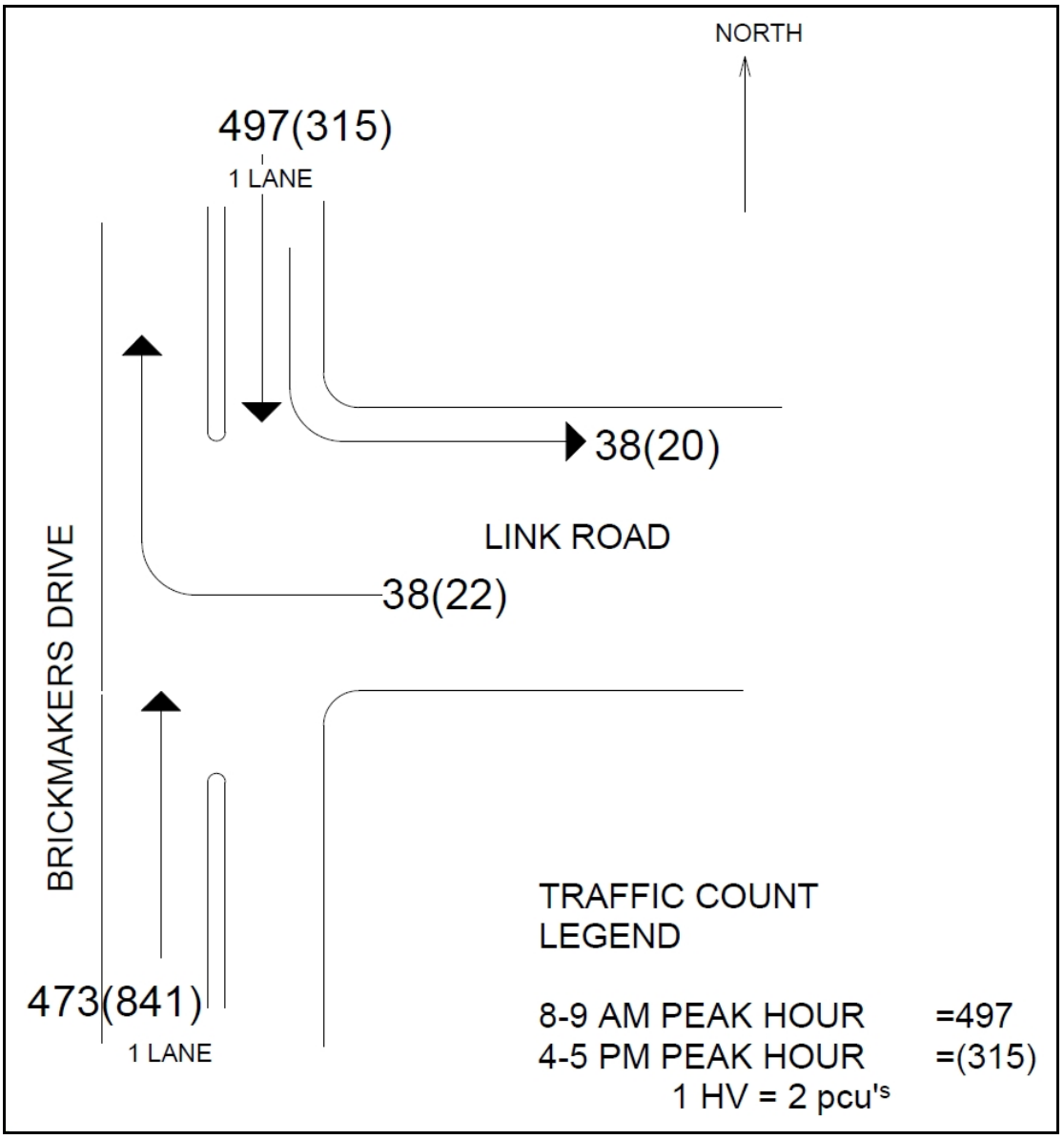

Figure 10-4: Estimated Peak Hour (PCU's) Volumes at Brickmakers Drive/Link Road Intersection

10.4 Impacts of the Proposed Development

The 18 metre wide Lot 309 between Brickmakers Drive and the access handle to the Site is wide enough to permit two 15 metre long tri-axle semi trailers to pass each other on the 90 degree bends.

The 6 metre kerb return would prevent trucks from turning left into Brickmakers Drive to exit to Nuwarra Road. In addition, a "No Left Turn" sign would be erected to ban this movement. It is an offence to disregard a regulatory sign.

10.4.1 Increase in Heavy Vehicle Movements on Road Network

Brickmakers Drive

The increase in heavy vehicle movements due to trucks travelling to and from the Site would be from 7:00 am to 5:00 pm Monday to Saturday and be restricted to 300 metres of road south of Newbridge Road. In this section there are 8 existing dwellings and this will increase by 1 when Stage 5E of Georges Fair is developed.

The existing 2-way light and heavy vehicles from the count in October 2012 are shown together with the estimate of heavy vehicles generated by Moorebank Recyclers for each hour from 7:00 am to 5:00 pm in Table 6.2 of the Marshall Report, a copy of which is at **Table 10-4**.

Table 10-4: Brickmakers Drive Bi-Directional Traffic Volumes (MR refers to traffic from Concrete Recyclers)

HOUR	Weekday Monday to Friday				SATURDAY			
	Existing		MR		Existing		MR	
	Light Vehs.	Heavy Vehs	Heavy Vehs	TOTAL Heavy Vehs	Light Vehs	Heavy Vehs	Heavy Vehs	TOTAL Heavy Vehs.
7 – 8.00am	585.6	34.4	28.5	62.9	207	7	28.5	35.5
8 – 9.00am	571.4	32.6	37.6	70.2	252	15	37.6	52.6
9 – 10.00am	280.2	27.8	38.4	66.2	302	16	38.4	54.4
10 – 11.00am	195.2	24.2	38.4	62.6	378	14	38.4	52.4
11 – 12.00pm	203.6	27.4	38.5	65.9	419	15	38.5	53.4
12 – 1.00pm	245.2	27.2	33.6	60.8	393	8	33.6	41.6
1 – 2.00pm	276.8	27.8	33.6	61.4	372	4	33.6	37.6
2 – 3.00pm	433	38.8	33.6	72.4	411	7	33.6	40.6
3 – 4.00pm	700.4	35.6	20.9	56.5	362	3	20.9	23.9
4 – 5.00pm	735.2	28.0	20.9	48.9	399	5	20.9	25.9

The general conclusions from **Table 10-4** are:

- The additional heavy vehicles generated by Concrete Recyclers do not reduce the Level of Service in any hour.
- On weekdays, the addition of Concrete Recyclers trucks increases the number of heavy vehicle from about 1 in 2 minutes to 1 per minute.
- On weekdays, the percentage of total heavy vehicles to total vehicles ranges from a minimum of 6.2% from 4:00 pm - 5:00 pm to a maximum of 24.3% from 10:00 am - 11:00 am.
- The total number of heavy vehicles during each hour on Saturday is lower than

weekdays. The percentage of heavy vehicles to total vehicles ranges from a minimum of 6.1% from 4:00 am - 5:00 pm to a maximum of 17.3% from 8:00 am - 9:00 am.

Nuwarra Road

The existing 2-way light and heavy vehicles from the count in February 2011 are shown together with estimate of heavy vehicles generated by Concrete Recyclers (MR) for each hour from 7:00 am to 5:00 pm Monday to Saturday in Table 6.2.2 of the Marshall Report, a copy of which is at **Table 10-5**.

Table 10-5: Nuwarra Road North of Brickmakers Drive

HOUR	Weekday Monday to Friday				SATURDAY			
	Existing		MR		Existing		MR	
	Light Vehs.	Heavy Vehs	Heavy Vehs	TOTAL Heavy Vehs	Light Vehs	Heavy Vehs	Heavy Vehs	TOTAL Heavy Vehs.
7 – 8.00am	1428	134.6	5.7	140.3	603	54	5.7	59.7
8 – 9.00am	1357.8	163.4	7.52	170.92	937	48	7.52	55.52
9 – 10.00am	1166.6	155.6	7.68	163.28	1169	67	7.68	74.68
10 – 11.00am	947	160.2	7.68	167.88	1304	51	7.68	58.68
11 – 12.00pm	993	179	7.68	186.68	1415	70	7.68	77.68
12 – 1.00pm	1020.6	174.4	6.72	181.12	1490	70	6.72	76.72
1 – 2.00pm	1058	164.4	6.72	171.12	1322	85	6.72	91.72
2 – 3.00pm	1323	163.4	6.72	170.12	1296	84	6.72	90.72
3 – 4.00pm	1701	146	4.18	150.18	1328	50	4.18	54.18
4 – 5.00pm	1858	102.8	4.18	106.98	1252	40	4.18	44.18

From **Table 10-5** it is concluded:

- The percentage of heavy vehicles per hour in 2011 between 7:00 am and 5:00 pm on weekdays ranged from a minimum of 5.2% between 4:00 am and 5:00 pm to a maximum of 15.3% between 11:00 am and 12:00 pm.

- The additional heavy vehicles generated by Concrete Recyclers and distributed to Nuwarra Road would increase the percentage of heavy vehicles to the total traffic on weekdays from 5.2% to 5.4% between 4:00 am and 5:00 pm and from 15.3% to 15.8% between 11:00 am and 12:00 pm.

  The increases are too small to change the Level of Service in Nuwarra Road.

- The percentage of heavy vehicles on Saturday in 2011 between 7:00 am and 5:00 pm ranged from a minimum of 3.1% between 4:00 and 5:00 pm to a maximum of 8.2% between 7:00 am and 8:00 am.

- The additional heavy vehicles generated by Concrete Recyclers and distributed

to Nuwarra Road on Saturday would increase the percentage of heavy vehicles from 3.1% to 3.4% between 4:00 am and 5:00 pm and from 8.2% to 9.0% between 7:00 am and 8:00 am. There would be no change to the Level of Service in Nuwarra Road.

Newbridge Road

In 2012, the eastbound AADT was 38055 and the westbound AADT was 25044. The AADT in both directions was 63099 vpd and 2.8 times the ADT of 22436 in Nuwarra Road.

Based upon the directional distribution of 55% of heavy vehicles generated by Concrete Recyclers to Newbridge Road east of Brickmakers Drive, the additional heavy vehicles between 7:00 am and 5:00 pm are estimated to be 89.1 in both directions. If the existing percentage of heavy vehicles during this period is 12% of total traffic, and total traffic is 59% of the AADT, then the existing number of heavy vehicle movements (both directions) is in the order of 4467. The Concrete Recyclers trucks amount to about a 4% increase in heavy vehicle movements.

10.4.2 Performance of Link Road / Brickmakers Drive Intersection

The intersection of the Link Road with Brickmakers Drive has been modelled as a tee intersection for 2021 am and pm peak hour traffic volumes under Give Way sign control and traffic signal control. The tee intersection kerb return design does not allow access to the residential area to the west and south to prevent trucks from passing these residential areas.

The Level of Service and Degree of Saturation shows that this intersection would provide satisfactory performance under traffic signal control.

10.4.3 Increase in Equivalent Standard Axle Loading (ESA's) on External Road Pavements

The estimated (ESA's) due to the passage of Concrete Recyclers trucks over a 20 year design period has been calculated in Brickmakers Drive between the Link Road and Newbridge Road (300 metres), Nuwarra Road, and three sections of Newbridge Road.

The pavement in Brickmakers Drive has been designed for 8.57×10^6 ESA's. The pavement in Nuwarra Road and Newbridge Road would have been designed for very heavy traffic loading exceeding 10^7 ESA's.

Brickmakers Drive

The estimated traffic loading in Brickmakers Drive including Concrete Recyclers trucks over 20 years is 3.455 x 10^6 ESA's compared with the pavement design of 8.57 x 10^6 ESA's. The risk of poor structural performance is therefore low.

The life of a dense graded asphalt wearing surface is in the range of 8 to 20 years.

Nuwarra Road

The increase in ESA's due to the Concrete Recyclers trucks is 6.7% in the northbound direction and 6.5% in the southbound direction.

The impact of the additional heavy vehicles on the structural life of the road pavement and the asphalt wearing surface is low enough to be ignored.

Newbridge Road

There is insufficient data to estimate the current and future traffic loading on the most heavily trafficked lane of this busy 6 lane arterial main road. It is considered that the impacts of the additional heavy vehicles would be lower than Nuwarra Road because the vehicles have 3 lanes to travel on, compared with a single lane in Nuwarra Road.

Part Eleven

BUSHFIRE IMPACT ASSESSMENT

11.1 Introduction

In order to ascertain the potential for the proposed Project to be impacted by bushfire, Advanced Bushfire Performance Solutions has prepared a report titled *Bushfire Assessment Report. Lot 6 DP 1065574, Newbridge Road, Moorebank NSW* (**the ABPS Report**) a copy of which is at **Appendix 13**.

11.2 Methodology

On 1 August 2002, the NSW Government enacted amendments to the Environmental Planning and Assessment Act 1979 and the Rural Fires Act 1997 to enhance bushfire protection through the development assessment process. The amendments:

- Introduced Bushfire Prone Land Maps as a 'trigger' for the application of bushfire legislation and the application of Building Code of Australia standards.
- Mandated Rural Fire Service concurrence for development applications subject to section 100B of the Rural Fires Act (Subdivisions and Special Fire Protection Purposes).
- Required compliance with the provisions of *Planning for Bush Fire Protection 2006*.

An application to develop the land may be subject to section 79BA of the Environmental Planning and Assessment Act 1979 and must comply with *Planning for Bush Fire Protection 2006* (**PBP 2006**).

PBP 2006 requires that all development applications be accompanied by a Bushfire Assessment Report which demonstrates compliance with the aims and objectives of the guidelines (PBP 2006, Appendix 4 A4.1).

The ABPS Report has assessed the proposed development in terms of the requirements of PBP 2006.

11.3 The Existing Environment

The Site is within bushfire prone land on the Liverpool LGA Bush Fire Prone Land Map and is identified as Buffer Zone. The Site, when developed, would be within 100 metres

of Category 1 Vegetation to the east and west (**Figure 11-1**).

- Category 1 vegetation is generally heavily wooded native vegetation.
- Category 2 vegetation is generally remnant vegetation, riparian corridors and rainforest.
- Buffer Zone is land in proximity to the most significant impacts of bushfire (within 100 metres of Category 1 or within 30 metres of Category 2).

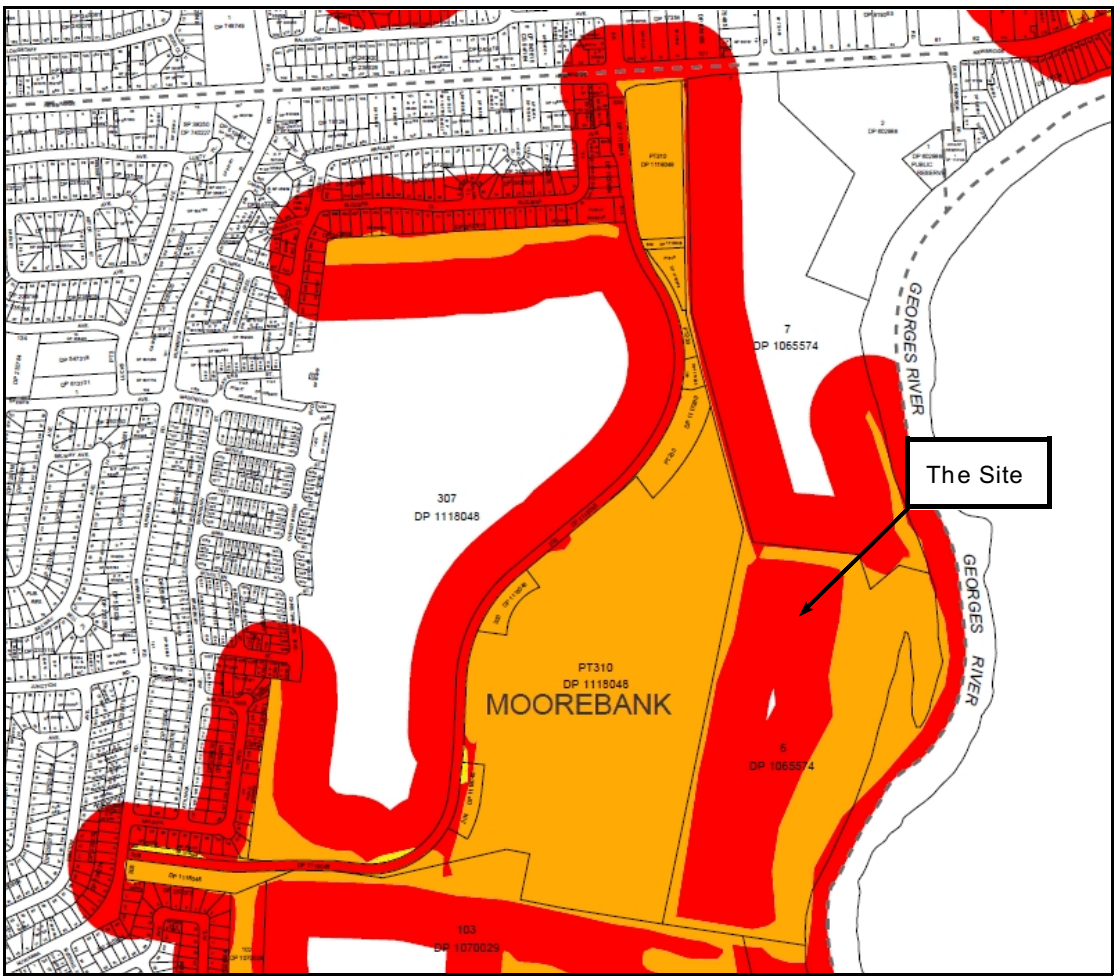

Figure 11-1 Extract from the Liverpool City Council Bushfire Prone Land Map showing the Site and surrounding areas.

The aim of PBP 2006 is to use the development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, on-site amenity, and protection of the environment. More specifically, the objectives are to:

- afford occupants of any building adequate protection from exposure to a bushfire;

- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
- ensure that safe operational access and egress for emergency service personnel and residents is available;
- provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and
- ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bushfire fighting).

11.4 Assessment

11.4.1 Vegetation

The bushfire hazard vegetation for the area is predominantly located to the east and west of the Site.

The vegetation to the east adjoining the Georges River is Alluvial Woodland, which is now called River-Flat Eucalypt Forest on Coastal Floodplain. It is a variety of Sydney Coastal River Flat Forest. It grows along minor watercourses and on flat areas next to riparian forest. This area also supports a small stand of mangroves.

The vegetation to the west contains a mosaic of floodplain forest communities including Alluvial Woodland, Castlereagh Swamp Woodland and Cooks River Castlereagh Ironbark Forest.

Vegetation should be classified as described in **Table 11-1** for the purposes of assessment using the methodology detailed in PBP 2006 and AS3959-2009.

Table 11-1: Vegetation assessment for each aspect

Aspect	Formation	Surface Fuel (t/ha)	Overall Fuel (t/ha)	Height (m)
North	Managed quarry			
East	Forest	25	35	-
South	Managed golf course			
West	Forest	25	35	-

11.4.2 Slope

Slope is a significant factor in determining bushfire behaviour. The slope influences the rate of preheating. A fire moving up a steep slope will direct the greater quantity of heat directly into the preceding vegetation with the convective air currents. This means the fuel will combust faster and with a greater intensity, whereas a fire moving down a slope will lose a great deal of heat to the atmosphere and subsequently burn slower and with a lesser intensity.

The predominant slope is measured over a distance of up to 140 metres from the building envelope and is taken as the slope which will most influence the bushfire behaviour rather than a simple average.

PBP 2006 provides five (5) classes of slope to simplify assessment.

The Site is located on floodplains on the western bank of the Georges River. Aside from minor depressions, the Site and adjoining hazards to the east and west are essentially on flat terrain.

Slope should be classified as described in **Table 11-2** for the purposes of assessment using the methodology detailed in PBP 2006.

Table 11-2: Slope influencing bushfire behaviour on the Site

Aspect	Description	Distance Measured (m)	Angle	Class
East	Cross slope	100	0°	0°
West	Cross slope	100	0°	0°

11.4.3 Fire Danger Index

Fire Danger Index is also known as Forest Fire Danger Index and is a bushfire behaviour factor derived from environmental conditions, particular to a weather region in NSW. It rates the credible worst case scenario conditions assumed for a 1:50 year bushfire event.

Table A2.3 of PBP 2006 provides a list of regions and local government areas.

Liverpool LGA falls within Region 4 - Greater Sydney Region (100).

11.4.4 Setback

The setback is the actual distance provided by the development between the building line and the bushfire hazard vegetation. Setback may also describe the limits of maintainable space about the development (defendable space).

No setbacks have been determined as the location of structures are not defined at the time of this assessment.

11.4.5 Asset Protection Zone

The asset protection zone is a bushfire fuel and vegetation structure managed space between the assets of the development and the unmanaged bushfire hazard vegetation or native bushland.

- It provides a safe space for fire fighters to conduct bushfire mitigation measures in the defence of a dwelling or other asset.
- It reduces the intensity of radiant heat impacting on the dwelling or asset.
- It reduces the turbulence of convection driven winds in the vicinity of the dwelling.
- It reduces ember viability limiting impact of ember attack on the dwelling or asset.
- It permits the dispersal of smoke which may otherwise severely impact on occupants health.

Asset Protection Zones may be increased to reduce the intensity of Radiant Heat Flux impacting on the dwelling or asset to achieve lower construction levels under AS3959.

PBP 2006 provides an assessment methodology to determine the appropriate asset protection zone dimensions to complement specific construction standards in AS3959-2009, however, as commercial developments are outside the scope of AS3959-2009, and the relevant standards for commercial buildings generally provide a higher level of performance than standards for residential buildings, the methodology in PBP 2006 can not be applied to this development.

11.4.6 Construction

The Building Code of Australia (**BCA**) calls up AS3959-2009 to prescribe construction standards for class 1, 2 and 3 buildings, parts of class 4 buildings, and some class 10

structures on designated bushfire prone land.

These construction levels are based on increasing levels of protection to mitigate the increased level of bushfire attack and the various forms of bushfire impact (smoke, wind, ember, heat, flame).

AS3959-2009 does not address construction standards for commercial buildings.

11.4.7 Water and Services

Access to sufficient water supplies may be critical for the effective defence of a property during a bushfire event. Consideration should be given to the distances between hydrants or tanks and the building or asset to be protected.

PBP 2006 (Table 4.2) provides a specification for onsite water storage capacities where reticulated water is unavailable or unreliable.

The proposal includes the installation of 4 x 250,000 L stormwater storage tanks. It is expected that these tanks will not be storing any water for bushfire suppression purposes.

The Site is situated adjacent to the Georges River and properties to the north and south contain large dams.

The Site is serviced by reticulated mains water supplies which will be extended into the Site to provide water onsite.

Hydrants were identified along the road reserve to the north of the lot on Newbridge Road (near the Site entry driveway). No hydrants are within the required 70 metres described in PBP 2006.

PBP 2006 states that hydrant location, size and pressure should comply with AS2419.1-2005 or a test report should be provided. Sydney Water will not provide a guarantee that standard pressures will be available. No particular deficiencies are apparent in the supply.

The following measures will be employed for bushfire fighting purposes:

1. Two onsite water storage tanks will be provided, each with a maintained capacity of 5000 L. One shall be located near the weighbridge offices and another near the staff lunch rooms and workshop.

2. Where an on-site water supply is provided, a suitable connection for firefighting purposes will be made available and located within the inner protection area (IPA) and away from the building. An Rural Fire Service standard 65mm metal Storz outlet with a gate or ball valve will be provided. The gate or ball valve, pipes and tank penetration are adequate for full 50mm inner diameter water flow

through the Storz fitting and are metal rather than plastic.

3. Exposed, above ground tanks will be manufactured of concrete or metal and raised tanks will have their stands protected.

4. A Pump will be provided to supply water for fire suppression activities and be a minimum 5hp or 3kW (petrol or diesel powered).

5. Pumps for the water tank will be adequately shielded from potential bush fire threat.

6. All above ground water and gas service pipes/outlets/fittings external to the building will be metal, including and up to any taps.

7. Electrical transmission lines will be located underground.

8. Overhead electrical transmission lines will be installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas, and no part of a tree is to be closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia.

9. Reticulated or bottled gas will be installed and maintained in accordance with Australian Standard AS/NZS 1596:2002: 'The storage and handling of LP gas' and the requirements of relevant authorities. Gas cylinders kept close to the building shall have release valves directed away from the building and be located at least 2 metres away from any combustible material. Connections to and from gas cylinders are to be metal.

11.4.8 Access

Roads to new developments should facilitate rapid and safe access for fire fighters and emergency services vehicles and should also permit evacuation of the residential population without obstructing the passage of emergency services vehicles.

Sections 4.1.3(1-3) and 4.2.7 of PBP 2006 detail the requirements for safe access. The existing public access road meets the specifications of PBP 2006. There is no foreseen impediment to access by a Category 1 tanker on this road.

The proposed access road will be designed to cater for heavy transport vehicles (> 20t) and, as such, would meet any and all requirements for Category 1 Tankers. Access to the Site will be off Brickmakers Drive.

11.5 Conclusion

The proposed development is required to meet the aims and objectives of PBP 2006 without necessarily complying with any of the specific planning provisions in the guideline.

The Site is large and will accommodate suitable asset protection zones and defendable spaces for any buildings which may be occupied (office, staff rooms, store, workshop etc.). The National Construction Code 2011 will require high construction standards that should exceed the performance targets of AS3959-2009. Where vulnerabilities are identified then AS3959-2009 can be used as a guide to direct appropriate protection measures or construction solutions.

The access to the Site will be designed to cater for heavy vehicles which will meet all the requirements for a Category 1 Tanker to safely access and egress the Site.

The site should continue to be maintained in its current fuel free state to ensure that Asset Protection Zone maintenance levels are achieved for the life of the development.

The Site is serviced by reticulated mains water but the distance to hydrants require the provision of an onsite water storage tank to ensure an available supply. Two separate 5000 L tanks will be provided near occupied buildings.

These measures will ensure compliance with the aims and objectives as required by PBP 2006 for commercial development.

Part Twelve

HAZARD AND RISK ASSESSMENT

12.1 Introduction

The proposed Materials Recycling Facility has a number of potentially hazardous operations including fuelling of plant and equipment, potentially contaminated run-off and equipment fires. These operations have the potential to impact offsite or cause bushfire at the adjacent properties.

12.2 Methodology

Reference has been had to the methodology described in *Hazardous Industry Planning Advisory Paper No.6, Hazard Analysis Guidelines* prepared by the then Department of Urban Affairs and Planning.

The approach considered the proposal in the context of its location, the quantity and type of dangerous goods likely to be stored and used, and safety management.

State Environmental Planning Policy No.33 - Hazardous and Offensive Development (**SEPP 33**) was also considered which aims, among other things:

> *(d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account; and*
>
> *(e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact.*

12.3 Assessment

As detailed in **Part 3.3.2** of this Environmental Assessment, the proposed development is not a "Hazardous Industry", "Potentially Hazardous Industry" or "Hazardous Storage Establishment" as defined in SEPP 33 as it would not pose a significant risk in relation to the locality to human health, life or property, or to the biophysical environment.

The proposed development is, however, "Potentially Offensive Industry".

Notwithstanding, the following assessment is provided.

12.3.1 Hazard Analysis

The following potential hazards would exist on the Site as part of the proposed development:

- the storage and handling of dangerous goods.
- contaminated runoff.
- refuelling of plant and equipment.
- contaminated material deliveries.

12.3.1.1 Dangerous Goods Storage and Handling

Materials stored and handled at the proposed development include:

- Mobile plant would be used at the proposed development including front end loaders and diesel powered shredders and screens. Diesel is to be stored in a 10,000 L purpose designed storage tank with appropriate bunding.

The site processes waste materials which could contain contaminants. Rainwater impacting the Site could become contaminated by the materials stored in the open areas of the Site.

Rainwater runoff could, therefore, cause damage to the biophysical environment adjacent to the proposed development. Release of potentially contaminated water could result in impact to these sensitive areas.

In addition, contaminants such as bottles, cans, drums, cylinders of dangerous goods could enter the Site mixed with waste materials. These materials could be released during processing (i.e. crushing and screening), resulting in contaminated materials release, flammable liquid ignition and fire and flammable gas ignition and explosion.

12.3.1.2 Storage of Diesel

Diesel fuel would be stored in a purpose built 10,000 L tank which would comply with the requirements of the relevant Australian Standard.

In the event of a fuel leak, the fuel would be contained within the bund around the tank. The bund would contain any spills and prevent any release offsite, hence, there would be no impact offsite from such an incident. Notwithstanding the bund around the tank, it would be necessary to clean up any spill, hence, a spill kit would be provided adjacent

to the diesel storage area.

In the event of a release of diesel, there is a potential for the liquid to ignite, resulting in a fire. Local fire fighting may be required to contain the fire in the vicinity of the tank or to extinguish the fire itself. A dry powder type fire extinguisher would be installed adjacent to the diesel tank storage area.

In summary, there would be no impact offsite as a result of the storage of diesel fuel at the facility.

12.3.1.3 Contaminated Runoff

There is potential for leachate being produced from crushed materials. To determine the impact of any such leachate, samples of crushed materials typically produced by Concrete Recyclers were tested by SESL Australia for PAH_S and pH_Sol in their NATA registered laboratory. The results of that testing are shown in **Table 12-1** below.

Table 12-1: Results of Leachate Testing

Sample No.	Material	Test Type	Total PAH_S mg/L	Final pH
1	20mm Hardroad (Crushed Asphalt)	PAH_S	.004	6.7
4	DG B20:Sandstone, 50:50 Composite (Sandstone/Concrete)	pH_Sol	_	11.1
5	20mm Hardroad: Sandstone, 50:50 Composite Asphalt/Sandstone	PAH_S	.005	5.7

Based upon the analysis undertake by SESL Australian, the following conclusions were drawn:

1. Materials in Tests 1 and 5 showed very little leachability and would not pose any significant runoff contamination issues, and

2. Results from Test No.4 showed that the material was highly alkaline.

Management measures

As indicated in **Part 9.4.1** of this Environmental Assessment, pollutants which could potentially originate from the Materials Recycling Facility include suspended solids in site runoff, and oil, fuel or chemicals used on the Site.

All runoff from the operational area of the Site is captured in sumps. The sump design would prevent the escape of oils and fuels from the Site. The sumps also give the Site operator the opportunity to respond to any spills by preventing such spills flowing immediately off site. As such, the principal pollutant of concern to the Georges River is suspended solids.

The background water quality in the Georges River is poor, with turbidity outside the ANZECC range 65% of the time. Ninety one percent (91%) of the suspended solid load within runoff from the operational area would be captured on the Site. As a result, it is not envisaged that the proposed development would have any adverse impact on water quality in the Georges River. Full details are contained in **Appendix 7** of this Environmental Assessment.

12.3.1.4 Refuelling of Plant and Equipment

The proposed development would operate with a number of internal combustion engine powered components (e.g. front end loaders, shredders etc). This equipment would require periodical refuelling.

During the refuelling operation, there is a potential for fuel leaks and spills to occur from split or failed hoses, overfill of the truck/equipment or tanker/vehicle tank failure. Whilst the likelihood of these incidents would be low, heat radiation impact offsite could occur if the incident eventuated, therefore, there is potential for the adjacent bushland to be ignited resulting in a bushfire. A dedicated refuelling procedure would be established for mobile plant, and when such plant is refuelled, it would be performed at least 12 metres from the boundary.

12.3.1.5 Contaminated Materials Delivery

The waste to be received at the Site would be limited to that which the EPA Licence for the Site would permit and would include VENM / ENM (sandstone and sand) and bricks, concrete and asphalt.

Apart from visual inspections of waste as it arrives at the Site, it is a requirement of the EPA that all material leaving the Site complies with the POEO (Waste) Regulation 2005 - General Exemption Under Part 6, Clause 51 and 51A *The Recovered Aggregate Exemption 2010* or *The Excavated Natural Material Exemption 2008*. These exemptions detail both the processes which must be adhered to and the chemical testing program required to allow the material leaving the Site to be applied to land. These exemptions would be utilised and complied with as part of the operation of the proposed facility.

Little waste would be generated in the operation of the proposed development. The proposed development has been designed such that the vast majority of materials delivered to the Site are recycled. Approximately 0.1% of the material delivered to the

Site is material which cannot be recycled. Material is either:

- processed on Site for reuse,
- placed in a bin in the case of waste metal and wood, and transported off site for recycling, or
- in the case of general waste, stored in an appropriate waste bin for either recycling or transportation off site for disposal at landfill.

12.4 Environmental Safeguards

Based on the analysis conducted, a number of recommendations are made to ensure the proposed development meets the requirements of the SEPP 33, including:

Spill Kit A spill kit would be installed in the storage shed and adjacent to the fuel storage tank and personnel at the Site would be trained in spill cleanup and use of the spill kit.

Fire Extinguishers In the event of a diesel spill, ignition and fire, the spill would be limited in area and, hence, fire magnitude would be relatively small. To ensure fire growth potential is minimised, first attack fire fighting would be applied using fire extinguishers utilising a dry powder fire extinguisher be installed in the storage shed and adjacent to the diesel fuel storage tank. Staff at the Site would be trained in the use of first attack fire fighting equipment.

Refuelling Location In the event of a fuel spill during refuelling of vehicles and mobile plant at the Site, there is a potential for ignition and fire. Heat radiation from such fires could impact adjacent bushland resulting in bushfire. A dedicated refuelling procedure would be established for mobile plant, and when such plant is refuelled, it would be performed at least 12 metres from the Site boundary.

Part Thirteen

DRAFT STATEMENT OF COMMITMENTS

13.1 Introduction

The Director-General's Requirements stipulate that the Environmental Assessment must contain:

> *A draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures.*

This part of the Environmental Assessment provides a draft Statement of Commitments which describes the management measures which Concrete Recyclers is prepared to implement with regard to the environmental management of the Site, and the mitigation and monitoring of potential environmental impacts associated with the operation of the proposed Materials Recycling Facility.

Concrete Recyclers is committed to the following objectives:

- To provide a long term, fully licensed Materials Recycling Facility capable of recycling waste from the building and construction industry.
- To protect the health of site workers and the general public, and ensure business viability by compliance with relevant legislation, standards and regulating authorities.
- To ensure site operations do not significantly impact on potential environmental receptors and comply with the following environmental legislation:
  - the *Environmental Planning and Assessment Act 1979*, and
  - the *Protection of the Environment Operations Act 1997*.
- To ensure that new technologies are implemented in relation to resource recovery and environmental management of the Materials Recycling Facility throughout its life.
- To encourage and facilitate community participation in the recycling of building and construction waste.
- To protect the surrounding environment through the implementation and management of environmental controls and contingency measures.
- To operate the Materials Recycling Facility in a manner which is sympathetic to the amenity of the area in which it is located.

13.2 General Commitments

1. The Project will be undertaken in accordance with the Project Application and the Environmental Assessment prepared by Nexus Environmental Planning Pty Ltd, including accompanying appendices.

2. The Project will be undertaken in accordance with the following drawings prepared by Lyle Marshall and Associates Pty Ltd:

   - Drawings 5018-06-04B to 06B

   - Drawings 5018-06-07A to 22A

3. The Project will be conducted and operated in accordance with this Statement of Commitments.

4. Concrete Recyclers will develop a program of informing the NSW Department of Planning and Infrastructure, the NSW Office of Environment and Heritage, and Liverpool City Council of construction staging and operation of the Materials Recycling Facility throughout the development process.

5. Concrete Recyclers will obtain the necessary approvals and permits to undertake both construction and operation of the Materials Recycling Facility.

6. A copy of the approved and certified plans, specifications and documents, including conditions of approval will be kept on the Site at all times.

7. All building works will be carried out in accordance with the Building Code of Australia.

13.3 Environmental Management Plan

An Environmental Management Plan (**EMP**) will be developed for both the construction and operation stages of the Materials Recycling Facility.

The key principles of the EMP will be to provide:

- An environmental management tool for the construction and operation of the proposed Materials Recycling Facility.

- A means of identifying baselines for monitoring the impact of the Materials Recycling Facility.

- An outline of reporting requirements associated with the Materials Recycling Facility.

- The processes for interaction between Concrete Recyclers and the relevant government authorities.

- The means by which compliance with the Director-General's requirements and the requirements of the Environmental Protection Licence will be achieved.

The EMP will contain sub-sections which will provide details of the management of the Materials Recycling Facility to minimise potential impacts discussed in the Environmental Assessment. Sub-sections of the EMP will include:

- Induction and Training.

- An Erosion and Sediment Control Plan which will cover both establishment and operation of the Materials Recycling Facility.

- A Construction and Operational Noise Management Plan which will detail measures to minimise acoustic impact during establishment and operation of the facility.

- An Air Quality Management Plan which will detail measures to be employed to minimise air quality impacts during both establishment and operation of the facility.

- A Waste Management Plan.

- A Stormwater Management Plan.

- A Traffic Management Plan.

- A Bushfire Control Plan

- A Complaints Management Plan.

- Hazard Reduction.

Following are drafts of the relevant sections of the EMP, refinement of which will be undertaken following receipt of consent for the proposed development.

TITLE	EMP 1 - INDUCTION AND TRAINING
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To ensure all persons working on the site are aware of their environmental obligations, site environmental issues and control measures, as well as roles and responsibilities.
Procedures	1. Environmental induction for all employees and contractors before starting work. Induction to cover the following issues: (i) requirements of the EMP; (ii) specific environmental issues on the site and control measures; (iii) roles and responsibilities for environmental management, and (iv) environmental incident procedures. 2. Retraining sessions within one month of changes to relevant sections of the EMP. 3. Retraining sessions within one month to persons identified by *Complaints Register* as not conforming to procedures. 4. All truck drivers entering the site for the first time to be provided with the *Site Induction for Drivers* form.
Monitoring	Status of inductions to be checked monthly.
Reporting	Record of all inductions and retraining, including name and date provided, to be retained on site.
Responsible Person	Environmental Officer responsible for ensuring all persons working on the site are properly inducted and retraining provided as required.
Information/References	Insert relevant EMPs and Policies.

TITLE	EMP 2 - EROSION AND SEDIMENT CONTROL
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To minimise and manage erosion and sedimentation on the site and ensure that sediment laden runoff is not discharged from the site.
Procedures	1. Construct all internal access tracks as per Appendix 7 of the Environmental Assessment and relevant EPA requirements. 2. Divert runoff to sediment basins, sediment traps and catch ponds as a primary means of sediment trapping before water is discharged to main tank storage. 3. Inspect drainage and sediment controls monthly and conduct maintenance as required to ensure effectiveness. Where erosion is observed to be occurring, implement rehabilitation/stabilisation measures. 4. Implement and maintain silt fence. Fence to be maintained along boundary.
Monitoring	Monthly inspection of all drainage and sediment controls on site, including water storage, pumps and pipes.
Reporting	As required by Conditions/Licence.
Responsible Person	Environmental Officer or person(s) authorised by Environmental Officer.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 3 - NOISE MANAGEMENT PLAN
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To ensure that construction and operation noise complies with EPA regulations. To minimise impact of noise on surrounding residents. To ensure employees are not subject to noise levels above those specified in the OH&S legislation.
Procedures	1. Consult with the industrial facility on the northern boundary in relation to higher noise levels near the boundary during the establishment phase of the development. 2. Minimise works near the northern boundary of the site wherever feasible. 3. Possible construction of a short length of barrier on the eastern side of the haul road in the vicinity of the Tanlane site on the basis of a detailed review of noise levels, once the Tanlane site is occupied. At that time background noise levels could be measured, as well as noise levels from intermittent truck movements, to undertake a detailed barrier design. 4. Standard construction work hours will be as follows: • Monday to Friday 7.00am to 6.00pm. • Saturday 8.00am to 1.00pm. • No work on Sundays or public holiday. 5. Ensure mobile plant used is fitted with residential grade silencers. 6. At all times, but particularly prior to 7:00am, trucks should be loaded in a quiet manner by placing rather than dropping material into trucks. 7. Plant based at the site must incorporate "quacker" style reversing alarms. 8. Trucks with traditional "beep beep" alarms will not reverse on the site prior to 7:00am.
Monitoring	As required by Conditions/Licence.
Reporting	As required by Conditions/Licence.
Responsible Person	Environmental Officer to organise monitoring and reporting as required. Truck drivers responsible for required actions to reduce noise.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 4 - AIR QUALITY MANAGEMENT PLAN
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To minimise dust generation and air pollution to prevent impact on surrounding residences and comply with the following ambient goals: (i) dust deposition - 4g/m^2/month (annual average); (ii) PM_{10} - 50µg/m^3 (average for rolling 24 hour period) or 30µg/m^3 (annual average). To ensure employees are not subject to dust levels above those specified in the OH&S legislation.
Procedures	1. Minimise the area of disturbance. 2. Maintain dust suppression devices to all processing equipment. 3. Maintain the sprinkler system including fine sprays on the conveyors of the processing plant and stockpile sprinklers. 4. Stockpiles used for visual and/or acoustic mitigation to be planted with a non-invasive vegetation cover. 5. Use water cart to suppress dust on unsealed roads, truck loading areas and non permanent stockpiles during dry conditions on days of operation. 6. 20 km/hr speed limit on internal, unsealed access tracks to minimise dust generation. 7. All loaded vehicles entering and leaving the site to be covered. 8. Surface access road in selected hard, non-friable material. 9. Regular maintenance of mobile and fixed equipment to minimise exhaust emissions.
Monitoring	As required by Conditions/Licence.
Reporting	As required by Conditions/Licence.
Responsible Person	1. Drivers responsible for adherence to speed limits, covering loads, regular vehicle maintenance. 2. Site supervisor responsible for ensuring processing plant operator(s) maintain dust suppression equipment on the plant. 3. Environmental Officer or person(s) authorised by Environmental Officer responsible for dust and air quality monitoring and reporting, implementation of dust suppression controls.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 5 - WASTE MANAGEMENT PLAN
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To minimise waste generated, maximise reuse and recycling, and ensure wastes are managed effectively to minimise impact on the environment.
Procedures	1. Maintain separate receptacles for paper, aluminium, glass, plastic and general domestic waste. 2. Recyclables (paper, aluminium, glass and plastic) to be collected and taken to a recycling depot. 3. Non-recyclable waste to be disposed of at registered landfill. 4. No putrescible material to be disposed of on site. 5. No waste generated outside site to be stored, treated, processed, or disposed on site except as permitted by a licence. 6. Maintain on-site sewage storage facility. 7. Encouragement of employees to adopt waste-reducing practices. 8. Apart from visual inspections of waste as it arrives at the site, it is a requirement of the EPA that all material leaving the site complies with the POEO (Waste) Regulation 2005 - General Exemption Under Part 6, Clause 51 and 51A "The Recovered Aggregate Exemption 2010" or "The Excavated Natural Material Exemption 2008". These exemptions detail both the processes which must be adhered to and the chemical testing program required to allow the material leaving the site to be applied to land. These exemptions are to be utilised and complied with as part of the operation of the facility.
Monitoring	Monthly inspection of on-site sorting and storage of recyclables.
Reporting	As required by Conditions/Licence.
Responsible Person	All staff are responsible for correct management and disposal of waste. Environmental Officer to educate new staff of waste minimisation procedures.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 6 - STORMWATER MANAGEMENT PLAN
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To ensure discharge of stormwater from the site is clear of sediment, downstream ecosystems are protected, on-site re-use of water is maximised.
Procedures	1. Install and maintain water management structures as per Environmental Assessment Appendix 7 to contain and treat all rainfall and runoff. 2. Erosion and sediment control works to be implemented in accordance with EMP 2. 3. Minimise the area of disturbance. 4. Install tank farm to store stormwater collected on the site for re-use in dust mitigation. 5. Testing of stormwater discharge after completion of the site preparation to confirm that the pH is within acceptable limits
Monitoring	As required by Conditions/Licence.
Reporting	As required by Conditions/Licence.
Responsible Person	Environmental Officer or person(s) authorised by Environmental Officer.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 7 - TRAFFIC MANAGEMENT PLAN
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To minimise the impact of trucks on the local road network and local residents, and to comply with approved access and vehicle movements.
Procedures	1. All new truck drivers to be provided with *Site Induction for Drivers* form at the site entrance. 2. Drivers provided with Site Traffic Management Policy. 3. All loads must be fully covered prior to leaving the site. 4. 20 km/hr speed limit on internal road. 5. All vehicles are to enter and leave the site in a forward direction.
Monitoring	1. All loads to be inspected at site entrance to make sure they are covered. 2. Complaints register to be used to record traffic management complaints.
Reporting	As required by Conditions/Licence.
Responsible Person	1. Environmental Officer responsible for weekly inspections of site entrance for sand/clay accumulation, monthly inspections of road pavements for damage condition. 2. Truck drivers responsible to comply with permitted hours of operation.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 8 - BUSHFIRE CONTROL
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To: • afford occupants of any building adequate protection from exposure to a bush fire; • provide for a defendable space to be located around buildings; • provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition; • ensure that safe operational access and egress for emergency service personnel and residents is available; • provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and • ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).
Procedures	The following measures will be employed for bushfire fighting purposes: 1. Two onsite water storage tanks will be provided, each with a maintained capacity of 5000L. One shall be located near the weighbridge offices and another near the staff lunch rooms and workshop. 2. Where an on-site water supply is provided, a suitable connection for firefighting purposes will be made available and located within the inner protection area (IPA) and away from the building. An Rural Fire Service standard 65mm metal Storz outlet with a gate or ball valve will be provided. The gate or ball valve, pipes and tank penetration are adequate for full 50mm inner diameter water flow through the Storz fitting and are metal rather than plastic. 3. Exposed, above ground tanks will be manufactured of concrete or metal and raised tanks will have their stands protected. 4. A Pump will be provided to supply water for fire suppression activities and be a minimum 5hp or 3kW (petrol or diesel powered). 5. Pumps for the water tank will be adequately shielded from potential bush fire threat. 6. All above ground water and gas service pipes/outlets/fittings external to the building will be metal, including and up to any taps. 7. Electrical transmission lines will be located underground. 8. Overhead electrical transmission lines will be installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and

	no part of a tree is to be closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia. 9. Reticulated or bottled gas will be installed and maintained in accordance with Australian Standard AS/NZS 1596:2002: 'The storage and handling of LP gas' and the requirements of relevant authorities. Gas cylinders kept close to the building shall have release valves directed away from the building and be located at least 2 metres away from any combustible material. Connections to and from gas cylinders are to be metal.
Monitoring	Status of bushfire fighting equipment to be checked monthly.
Reporting	Record of all incidents of bushfire.
Responsible Person	Environmental Officer responsible for ensuring all persons working on the site are properly inducted and retraining provided as required.
Information/References	Insert relevant EMPs and Policies.

TITLE	EMP 9 - COMPLAINTS MANAGEMENT
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To ensure any site problems brought to the attention of Concrete Recyclers by the local community and/or relevant authorities are documented and acted upon to avoid re-occurrence.
Procedures	1. Complaints telephone number signposted at front gate. Telephone number, along with postal and email address for complaints advertised on website. 2. All complaints/concerns raised by local community/relevant authorities to be recorded on *Complaints Register* by Environmental Officer. *Complaints register* to be retained on site. 3. All complaints to be bought to the attention of the Environmental Officer immediately. 4. Environmental Officer to identify and initiate appropriate action in response to complaint and follow-up contact with complainant. 5. Any complaints received to be reviewed to ascertain if site management requires amendment.
Monitoring	1. All complaints to be recorded on *Complaints Register*. 2. *Complaints Register* to be checked monthly.
Reporting	Summary of complaints to the EPA as part of Annual Return for Licence.
Responsible Person	1. All persons who receive telephone complaints are responsible for completing the *Complaints Register* and notifying the Environmental Officer within 24 hours. 2. Environmental Officer responsible for initiating follow-up action and contact with complainant.
Information/References	Insert relevant EMPs and Policies

TITLE	EMP 10 - HAZARD REDUCTION
Consent/Licence Ref.	Insert relevant Conditions of Consent Insert relevant POEO Licence Conditions
Objectives	To ensure any potential hazards are mitigated.
Procedures	1. Spill kits in the storage shed and adjacent to the diesel fuel tank will be installed. 2. Staff will be trained in spill cleanup procedures and use of the spill kits at the Site. 3. A dry powder fire extinguisher will be installed in the shed and adjacent to the diesel fuel tank. 4. Staff at the Site will be trained in the use of first attack fire fighting. 5. A procedure for the refuelling of mobile plant will be developed and refuelling operations will be performed no closer than 12 metres to the Site boundary. 6. Operational plant will be located no closer than 25 metres to the Site boundary.
Monitoring	1. All incidents will be recorded detailing measures taken to mitigate impact. 2. Spill kits and firefighting equipment to be checked monthly.
Reporting	Summary of incidents to the EPA as part of Annual Return for Licence.
Responsible Person	1. Environmental Officer responsible for initiating follow-up action and monitoring of equipment.
Information/References	Insert relevant EMPs and Policies

13.4 Monitoring and Reporting

During both the construction and operational stages of the development, environmental reporting is essential to ensure that the facility operates within the parameters set down in the consent for the development and the relevant legislation and licences which guide the operation of the facility.

Reporting will include details of:

- The parties who are responsible for the on-site Management Plan at the Site.
- The methods of communication with regard to matters contained in the EMP.
- Contact details of those responsible for the operation of the EMP.

- Compliance reports.
- Remedial action taken as a result of the reporting on an incident.
- Details of auditing carried on in compliance of consent and licence conditions.
- Details of any monitoring such as air quality, acoustic monitoring and groundwater monitoring.

Part Fourteen

DEVELOPMENT JUSTIFICATION AND ALTERNATIVES

14.1 Development Need and Justification

As detailed in **Part One** of this Environmental Assessment, the then NSW Department of Environment & Climate Change released the *NSW Waste Avoidance and Resource Recovery Strategy 2007* which states, among other things:

> *The Waste Avoidance and Resource Recovery Strategy 2007 (Waste Strategy 2007) updates the Waste Avoidance and Resource Recovery Strategy 2003 (Waste Strategy 2003).*
>
> *The underlying policy drivers behind Waste Strategy 2003 were the need to maximise conservation of our natural resources and to minimise environmental harm from waste management and disposal of solid waste. These drivers are even more important in 2007 against a backdrop of a growing population in NSW and a healthy economy that is producing more goods and services.*
>
> *Waste Strategy 2007 continues to provide guidance and priorities for action to ensure that efficient resource use and impacts on the environment are considered throughout the life cycle of goods and materials. This includes extraction of raw materials, manufacturing, distribution, consumption and recovery for reprocessing or safe disposal.*
>
> *Since Waste Strategy 2003 was released, there has been mounting scientific research that has quantified the benefits and impacts of waste related actions to other parts of the environment e.g. water savings, conservation of virgin resources, greenhouse gas and soil health. There has also been a growing understanding that actions taken to tackle any environmental or resource use issue are strongly interconnected in people's minds. This means that continuing to encourage waste related actions, such as recycling, that are practical and relatively easy to undertake, can naturally lead to actions on other important environmental issues such as reducing energy and water consumption.*
>
> *All of these factors reinforce the importance of a Waste Avoidance and Resource Recovery Strategy for NSW.*
>
> *Waste Strategy 2007 has been produced in light of current national and international practice, and emerging trends and challenges. It identifies priority actions that will guide the work of all key groups in NSW in contributing to the minimisation of environmental harm from waste disposal and the conservation and efficient use of our resources. The Strategy focuses on solid wastes that, unless recovered and diverted to beneficial uses, would be disposed of to solid and inert waste landfills throughout NSW.*

The proposed Materials Recycling Facility would provide an effective means of reducing the total waste stream to landfill through recovery and recycling of waste from the building and construction industry in the Sydney metropolitan area. The objectives of the proposed development are:

(a) To establish a commercially viable Materials Recycling Facility which is capable of recovering recyclable concrete, brick, asphalt, sandstone and sand from the waste stream for reuse.

(b) To assist the NSW State government in achieving its objectives for the recovery and recycling of waste as detailed in the *NSW Waste Avoidance and Resource Recovery Strategy 2007*.

(c) To establish an environmentally responsible and sustainable industry which would create employment.

Concrete Recyclers currently operate three (3) sites in the Sydney metropolitan area at Camellia, Kimbriki Recycling & Waste Disposal Centre and Kurnell. The south western sector of Sydney is a large growth area with recycled products currently being delivered to that area from the Camellia and Kurnell sites. The proposed Materials Recycling Facility at Moorebank would provide a means by which the south western sector would be serviced in a more efficient and cost effective manner with commensurate dramatic reduction in traffic movements on the metropolitan road network.

Large scale demolition companies working in the Bankstown, Moorebank, Villawood, Liverpool and suburbs further to the east currently transport waste materials to either Wetherill Park or Badgerys Creek disposal sites. The proposed Moorebank Materials Recycling Facility would offer a more convenient option with commensurate:

- reduction in haulage distance and haulage time.
- reduction in the number of trucks on some metropolitan roads.
- cost savings to the industry and hence the economy in general.

14.2 The Principles of Ecologically Sustainable Development

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 provides the parameters for an Environmental Impact Statement with regard to the principles of ecologically sustainable development, being:

(1) The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations, including the following principles of ecologically sustainable development:

*(a) the **precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options,

*(b) **inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*

*(c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*

*(d) **improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:*

(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

14.2.1 The Precautionary Principle

This Environmental Assessment has assessed the possible alternatives to the proposed development in terms of environmental risk. Investigations have been undertaken to identify risk associated with the proposed development in terms of hazardous impacts, air quality, traffic, acoustic amenity and visual amenity.

None of the potential risks identified during the assessment of the proposed development would pose a threat of serious irreversible environmental damage. Where potential impacts have been identified, mitigation measures have been put into place which would mitigate those potential impacts.

14.2.2 Inter-generational Equity

The principle of inter-generational equity requires that the present generation ensures that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The proposed development is for the establishment of a Materials Recycling Facility on the Site for the collection and recovery of waste from the building and construction industry which will be reused and recycled in the Sydney metropolitan area. The proposed development would provide an environmental benefit through the recovery of concrete, brick, asphalt, sandstone and sand from the waste stream of the building and construction industry in the Sydney metropolitan area, thus removing some of the pressure on natural material resources which might otherwise have been required to produce materials which would be generated by the proposed Materials Recycling Facility.

The proposed development would divert building and construction waste from the waste stream which might otherwise have been directed to landfill, thus minimising the environmental impacts to existing landfill operations, assisting in extending the lifespan of such landfill operations, and, hence, assisting in stalling the need for the creation of new landfill sites.

14.2.3 Conservation of Biological Diversity and Ecological Integrity

The proposed development is for the use of a disused landfill site as a Materials Recycling Facility. There would be no impact to biological diversity or ecological integrity as a result of the proposed development.

14.2.4 Improved Valuation, Pricing and Incentive Mechanisms

The proposed development is one where waste from the building and construction industry in the Sydney metropolitan area would be received as an incentive to recycle waste rather than dispose of that waste to landfill. The money saved by industry and the State government in waste disposal costs is such that there is an economic incentive to recycle waste.

The proposed development would provide:

(i) Increased life to existing landfill operations by the removal of building and construction waste from the waste stream.

(ii) A means by which the waste reduction targets of the State government can be achieved.

(iii) An avenue whereby what would otherwise be waste becomes a valuable resource and hence improves its value.

(iv) A resource based industry which would provide benefits to future generations through the reduction in the use of raw materials for the production of materials for road construction and the like, and extending the life of existing landfill operations.

14.3 Development Alternatives

14.3.1 Location

Concrete Recyclers has incurred considerable expense in the investigation of suitable sites in the Sydney metropolitan area for the proposed Materials Recycling Facility such that the environmental impact of such a facility would be minimal.

There is a shortage of land in the Sydney metropolitan area which is large enough to accommodate a Materials Recycling Facility such as that which is proposed while at the same time being sufficient distance from potentially affected land uses to ensure that such a facility operates in harmony with other land uses.

Notwithstanding a continued review of the available industrial land, Concrete Recyclers has concluded that the most cost effective and environmentally acceptable location is the subject site.

14.3.2 Production Method

The proposed means by which waste from the building and construction industry would be received, processed and recycled to the market is state of the art practice which has been developed over the life of the industry, and by Concrete Recyclers in particular.

There are no practical cost effective alternatives to those proposed as part of the proposed development.

14.3.3 Non Development

The proposed development is to facilitate the recycling of building and construction industry waste.

The proposed operation of the Concrete Recyclers facility from the Site is a business decision made by that company to promote the most cost effective means by which its business can operate. The non development option would not promote the efficient operation of its business in the Sydney metropolitan area and would not assist the State government in its goal to reduce the waste stream to landfill.

No significant environmental benefit would be gained by non development.

Part Fifteen

CONCLUSIONS

15.1 Introduction

Consultation with the Director-General of the then Department of Planning has resulted in a number of Key Issues being identified for assessment as part of the preparation of this Environmental Assessment.

This Environmental Assessment has, in accordance with the requirements of the Director-General, considered the likely impacts to the environment which might potentially result from the use of the Site as a materials recycling facility.

Key issues which have been identified are:

- the potential for the proposed development to impact on the acoustic environment of the Site and its surroundings;
- the potential for activity associated with the proposed development to affect air quality in the environs of the Site;
- the potential for traffic generated by the proposed development to impact on the local road network;
- to potential for visual impact to the locality associated with the buildings and other structures;
- the potential impact of the proposed development on the flooding regime of the locality, and
- the potential impact of the proposed development on the integrity of the landfill upon which it is to be located.

15.2 Acoustic Impact

There is potential for the activities associated with the proposed development to impact on the existing acoustic environment of both the Site and its environs.

A comprehensive acoustic impact assessment has been undertaken by Wilkinson Murray which concludes that the proposed development of a concrete recycling facility at Lot 6 DP 1065574 has been assessed in accordance with the then DECCW Industrial Noise Policy.

A short section of noise barrier would be required along the eastern edge of the proposed haul route into the Site near the corner with the link road to Brickmakers Drive. On this basis comparison of predicted noise levels with relevant intrusive and amenity criteria indicates compliance is achieved on all occasions during the operation phase of the proposed recycling facility.

It is recommended the need for this barrier be reviewed once the proposed residential development within the Benedict Sand site is occupied and background noise levels as a result of traffic on Brickmakers Drive can be measured.

In addition, potential noise impact from traffic on Brickmakers Drive and Newbridge Road arising from additional truck movements associated with the operation of the recycling facility would be well within relevant allowance criteria at all residences.

Noise impacts associated with the construction of the facility, including the earth mound around the perimeter of the Site, is predicted to be within the relevant criteria for construction noise at nearby existing and possible future residences.

The applicant has confirmed in its draft statement of commitments that it is prepared to undertaken the recommendations of Wilkinson Murray. With those recommendations and commitments in place, the proposed development should not have a significant impact on the acoustic environment.

15.3 Air Quality

There is potential for the proposed development to impact the existing air quality in the environs of the Site.

PAEHolmes has assessed that potential impact having regard to the impact mitigation measures proposed as part of the proposal and has concluded that the dust modelling results showed that annual average PM_{10}, TSP and deposition levels at nearest sensitive receptors would be below the DECCW's assessment criteria, even when considering existing levels. The activities could only have the potential to cause exceedances of the DECCW's 24-hour average PM_{10} criterion when background levels are already high.

It is concluded that there would be no adverse air quality impacts arising from the operation of the proposed materials recycling yard.

15.4 Traffic Impact

The proposed access to the Site is discussed in the report of Lyle Marshall & Associates Pty Ltd with the conclusion that the 18 metre wide Lot 309 between Brickmakers Drive and the access handle to the Moorebank recycling facility is wide enough to permit two 15 metre long tri-axle semi trailers to pass each other on the 90 degree bends.

The 6 metre kerb return will prevent trucks from turning left into Brickmakers Drive to exit to Nuwarra Road. In addition a 'No Left Turn' R2-6A Regulatory sign will be erected to ban this movement. It is an offence to disregard a regulatory sign.

With regard to the performance of the intersection of Lot 309 with Brickmakers Drive, the Level of Service and Degree of Saturation shows that this intersection will provide satisfactory performance under traffic signal control.

With regard to the impact truck traffic from the proposed materials recycling facility would have on the existing road network, the estimated hourly truck volumes generated by the materials recycling facility are very low and will have no impact on the arterial road network.

Trucks turning right into Brickmakers Drive will operate under traffic signal control. The delays under Give Way sign control are unacceptable.

15.5 Visual Impact

A development such as that which is proposed has potential to impact on the visual environment in that it would comprise of buildings to house processing machinery and there would be stockpiles of unprocessed and processed material on the site.

Richard Lamb & Associates has undertaken nd impact assessment in terms of the visual environment. The assessment has considered the range of potential visual impacts that could be ensued as a result of the construction of the proposal as well as the range of potential public and private domain locations from which it may potentially be visible.

It is concluded that the overall visibility of the structures and activities on the subject site would be minimal subject to the proposed height limits on buildings, other structures and stockpiles. The minimal impacts lead to few residual impacts which require mitigation measures. Mitigation of visibility is only required on the northern boundary of the subject site, where there is a potential for view from the public domain on a small part of Brickmakers Drive, on part of the Georges River to the north of the subject site and from future residential development on the Benedict Sand and Gravel site.

Subject to controls on the colours and materials to be employed in buildings on the subject site and a requirement for screen planting of appropriate species on the northern boundary and assuming a best practice dust management plan, the visual impacts of the development would be negligible and the application can be supported on visual grounds.

15.6 Flood Impact

The Site is classified as flood prone. All operational activities associated with the Materials Recycling Facility will be protected from flood waters by means of perimeter

mounds, site levels and a low bund.

The Site access from Brickmakers Drive will require an embankment to transition between the level of Brickmakers Drive and the remainder of the access road, which will be substantially at existing ground level. The levels adopted for the Access Road have been designed to minimise the loss of flood storage. Notwithstanding, the earthworks associated with the access road will lead to a loss of flood storage of 3,500m^3. The loss of flood storage resulting from the construction of the access road will be offset by lowering the surface level of Area 2 by a minimum of 150 mm.

A flood evacuation plan has been prepared to ensure the safety of workers on the Site in times of flood activity. Access to the Site and surrounding local areas are relatively low lying and prone to flooding from the Georges River. The direct access road to the Site is subject to minor inundation during a 3 year ARI flood.

The Warning System and Site Emergency Response Flood Plan (the Plan) has been developed to ensure the safe, orderly and timely evacuation of all persons from the Site during times of flood, without the need for rescue by the State Emergency Service (SES) or other authorised emergency services personnel.

The Plan has been developed using the SES Business Floodsafe Toolkit as a guide, and is consistent with the report Georges River Floodplain Risk Management Study and Plan (2004) prepared by Bewsher Consulting and adopted by Liverpool City Council.

The Plan is site specific for the Site.

The evacuation plan has been formulated to detail procedures during certain events relating to potential flooding of the area. The plan is comprehensive and would ensure that the requirements of the criterion are achieved.

15.7 Impact on Landfill

The Site is a disused landfill which ceased operating as a landfill in 1979. In 1998, a Remedial Action Plan for the Site was prepared by Enproc Pty Ltd entitled *Remedial Action Plan, Moorebank Landfill, Newbridge Road, Moorebank. 19 November, 1998*; that Remedial Action Plan being required as part of the remedial work required to maintain the landfill capping.

The remediation of the Site has taken place and an independent site audit has been undertaken of that remediation by EGIS Consulting Australia. The EGIS Consulting Australia Site Audit Statement certifies that the Site is suitable for *commercial/industrial use, including concrete recycling facility.*

The requirements of SEPP55 provided that:

- The integrity of the landfill caps and bunds are maintained;

- The infra-structure constructed to control water levels inside the landfill and treat any extracted ground water are maintained;

- The groundwater level and properties (including pH) both inside and outside the landfill are monitored on a regular basis;

- The detailed design includes suitable measures to prevent the ingress of landfill gas into buildings or enclosed spaces.

15.8 Conclusion

The proposed development is for a materials recycling facility to be located at Newbridge Road, Moorebank.

The assessment undertaken of the impact the proposed development would have on the environment of the Site and its locality has been canvassed in the main body of the Environmental Assessment with the conclusion that, with attenuation measures, there would be no impact to the environment of the Site which would be considered significant.

It is concluded that the proposed development is an acceptable land use for the Site.

GLOSSARY OF TERMS AND ABBREVIATIONS

Consent Authority	In relation to a project application under Part 3A of the Environmental Planning and Assessment Act 1979, the Minister for Planning.
Project	The carrying out of development that is declared to be a project: (a) by a State environmental planning policy, or (b) by order of the Minister published in the Gazette.
Designated development	Section 77A of the Environmental Planning and Assessment Act 1979 states that *"Designated development is development that is declared to be designated development by an environmental planning instrument or the regulations."* Schedule 3 of the Environmental Planning and Assessment Regulation 2000 defines the type of development which is classified as designated development.
Integrated development	Development which requires development consent and one or more of the approvals listed in Section 91 of the Environmental Planning and Assessment Act 1979.
Local Environmental Plan	Local Environmental Plans are planning documents prepared by a Council which detail the zoning of land and the type of development which is permitted with consent or prohibited in a particular zone. Controls on development are also provided.
State Environmental Planning Policy	A planning instrument made by the State. State Environmental Planning Policies deal with issues of State significance.
The Site	Refers to the land upon which the proposed development is to take place.

OEH	NSW Office of Environment and Heritage
DP	Deposited Plan
EA	Environmental Assessment
EMP	Environmental Management Plan
EPBA Act	Environment Protection and Biodiversity Conservation Act 1999
INP	Industrial Noise Policy
LEP	Local Environmental Plan
POEO Act	Protection of the Environment Operations Act 1997
RMS	NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy
vph	Vehicles per hour
vpd	Vehicles per day