Amended Statement of Environmental Effects To Carry Out Bank Stabilisation Works along the Georges River Foreshore and under the M5 Motorway Bridge. 56 Prescott Parade, Milperra.

July 2021

Mersonn Pty Ltd
20 Wylde Street
Potts Point NSW 2011

Contents

1.0 Introduction

This report has been prepared on behalf of Mirvac Homes (NSW) Pty Ltd by Mersonn Pty Ltd and is submitted to the Canterbury Bankstown Council in support of an amended development application to bank stabilisation and remediation works at 56 Prescott Parade, Milperra (Lot 10 DP 731859, Lot 1 DP 625013, Lot 1 DP 813006, Lot 1 DP 813007, Lots 231 & 232 DP 805826, Lots 23-27, 38-41 & 50-59 DP 7304).

The overall development of the land at 56 Prescot Parade, Milperra is proposed to be conducted in stages and will ultimately involve the subdivision of land into a Community Title residential subdivision including a 8,480m^2 Southern Reserve (to integrate with the Council Cumberland Plain Woodland Reserve on Lot 5 DP 731859 south of the subject site), residential lots and 'pocket' park areas with associated infrastructure (roads, drainage basins) within the development footprint. A Vegetation Management Plan has been completed for the Southern Reserve. The road infrastructure will comprise a road network within the residential subdivision as well as a primary 'connector' road, known as Keys Parade, that will link the proposed residential area with a main road, Henry Lawson Drive. Other staged works include bank stabilisation works, construction of a shared cycleway/pathway along the Georges River and rehabilitation of riparian corridors in accordance with a Voluntary Planning Agreement. The development is Integrated Development for the purpose of Section 100B of the Rural Fires Act 1997.

A Voluntary Planning Agreement (VPA) was executed as part of the rezoning process. An amended VPA has subsequently been approved by the Council since the rezoning. The details of the VPA included a number of commitments for the delivery of road infrastructure, environmental management works, remediation of the site and dedication of land.

The following works were proposed:

- Bank stabilisation works at locations across proposed Lot 4;

- Construction of connecting road network – Keys Parade, Raleigh Road and Pozieres Avenue;
- Road infrastructure upgrades - Pozieres Parade improvements, raised junctions, school zone, roundabout, public shared access to public foreshore walkway;
- Foreshore walkway embellishment – pedestrian/cycleway;
- Build a pedestrian/cyclist crossing over the northern creek and southern mangroves on the Zone RE1 land;
- Riparian Corridor along the Foreshore Walk and Zone RE2 land;
- Riparian Corridor along the Northern Creek;
- Road infrastructure upgrades - Keys Parade and Henry Lawson Drive intersection;
- Dedication of land known as proposed Lot 4.

The delivery of the VPA is aligned to the delivery of lots. Given the proposed staging of the construction, certain works will need to be undertaken prior to the release of those stages.

The procedural subdivision, residential subdivision and Keys Parade extension works comprise three separate development applications.

Amended Development Application No. 370/2020 seeks consent for:

Bank stabilisation works along the Georges River foreshore (being Proposed Lot 4 under DA-1107/2019 and land under the M5 Motorway bridge over the Georges River), and remediation and environmental rehabilitation works on the Riverlands Golf Course Site.

The proposal is Integrated Development as defined in section 4.46 of the Environmental Planning and Assessment Act, 1979, because an approval is required in accordance with the Water Management Act, 2000.

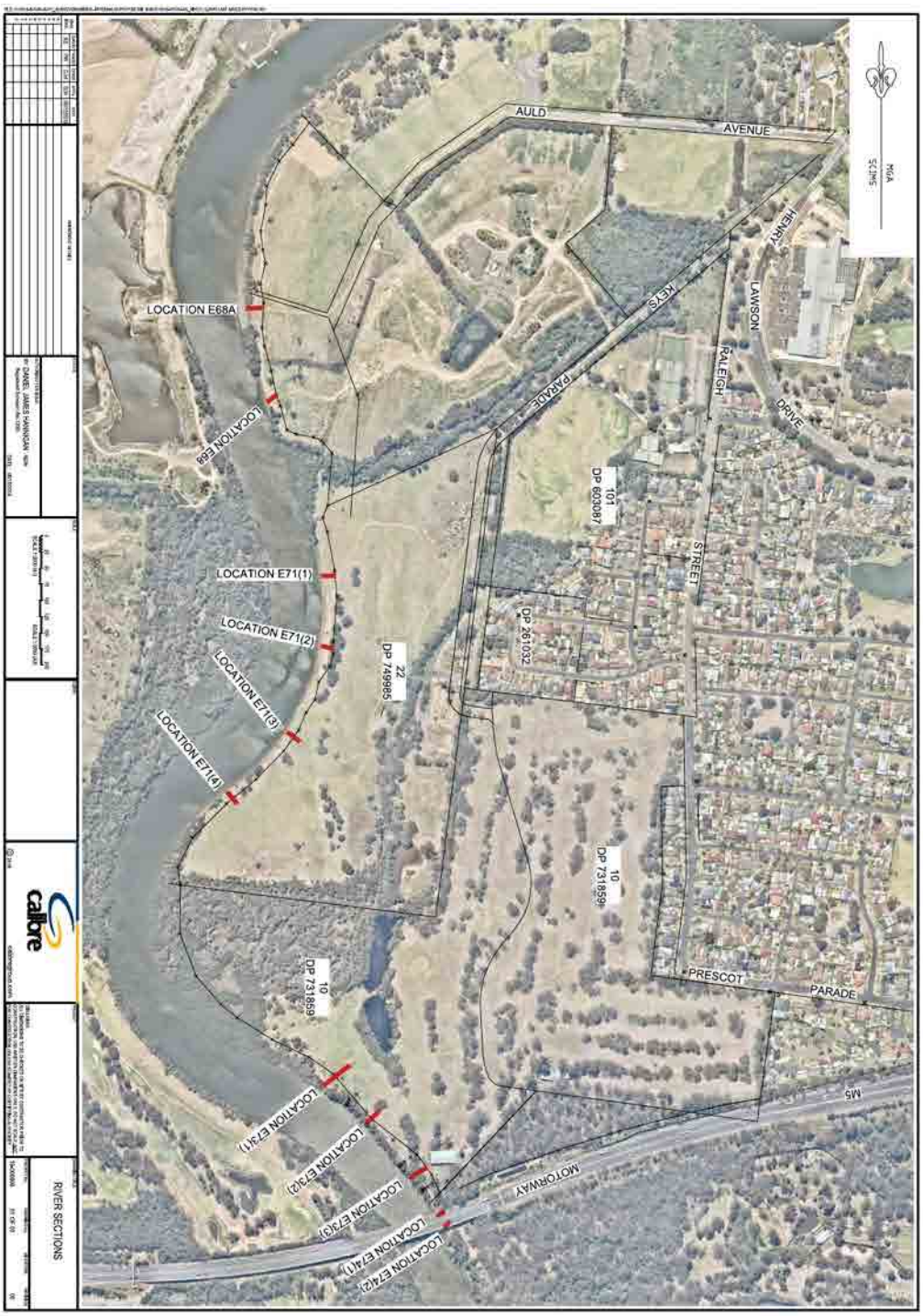
The proposal includes the following specific works:

- Bank stabilisation works (regrading of bank predominantly to a 1:4 gradient (and partly 1:5 gradient under the M5 bridge with

rock rip rap wall), with installation of linear rock placement, and vegetation planting on bank areas and berms) at specific locations along the banks of the Georges River along the western boundary of the former Riverlands Golf Course site, contained within Proposed Lot 4 to be created under DA-1107/2019 and partly under the existing M5 Motorway.

- Remediation of areas of the site identified as contaminated in accordance with the submitted Remedial Action Plans.

At the time of the re-zoning of part of the former Riverlands Golf Course site to R2 – Low Density Residential, a Voluntary Planning Agreement (VPA) was entered into by the Council and the landowner. This VPA required, as part of any future development of the site, a number of works to be undertaken by the developer. The bank stabilisation works was one of the works required in the VPA.



River Sections

Source: Calibre 1 June 2021

This Statement has been prepared pursuant to Section 4.12 of the Environmental Planning and Assessment Act, 1979 and Clause 50 of the Environmental Planning and Assessment Regulation, 2000. The purpose of this document is to describe the existing improvements on the site, detail the proposed development, review the applicable planning regime relating to the proposal, assess the degree of compliance and examine the environmental effects of the development when measured against the Evaluation Criteria prescribed under Section 4.15(1) of the Environmental Planning and Assessment Act, 1979. In respect of the assessment of the proposal, where impacts are identified, measures proposed to mitigate any harm to environmental amenity have been addressed in this report.

This report should be read in conjunction with:

- Amended Detail Survey Plan prepared by Calibre Consulting dated 19 January 2021;
- Amended Bank Stabilisation Plan prepared by Calibre Consulting dated 1 June 2021;
- Amended Bank Stabilisation Report prepared by Tooker and Associates dated June 2021;
- Amended Biodiversity Development Assessment Report Bank Stabilisation prepared by Cumberland Ecology dated 5 July 2021;
- Acid Sulphate Soils Management Plan prepared by SESL Australia dated 11 November 2019;
- Amended Contamination Assessment Report prepared by Sullivan Environmental Sciences dated 1 July 2021;
- Remediation Action Plan Foreshore Area prepared by Sullivan Environmental Services dated 1 July 2021;
- Amended Vegetation Management Plan prepared by Cumberland Ecology dated 5 July 2021;
- Amended Arboriculture Impact Assessment Bank Stabilisation prepared by Urban Forestry Australia dated July 2021;
- Amended Aboriginal Archaeological Assessment prepared by Artefact dated July 2021;

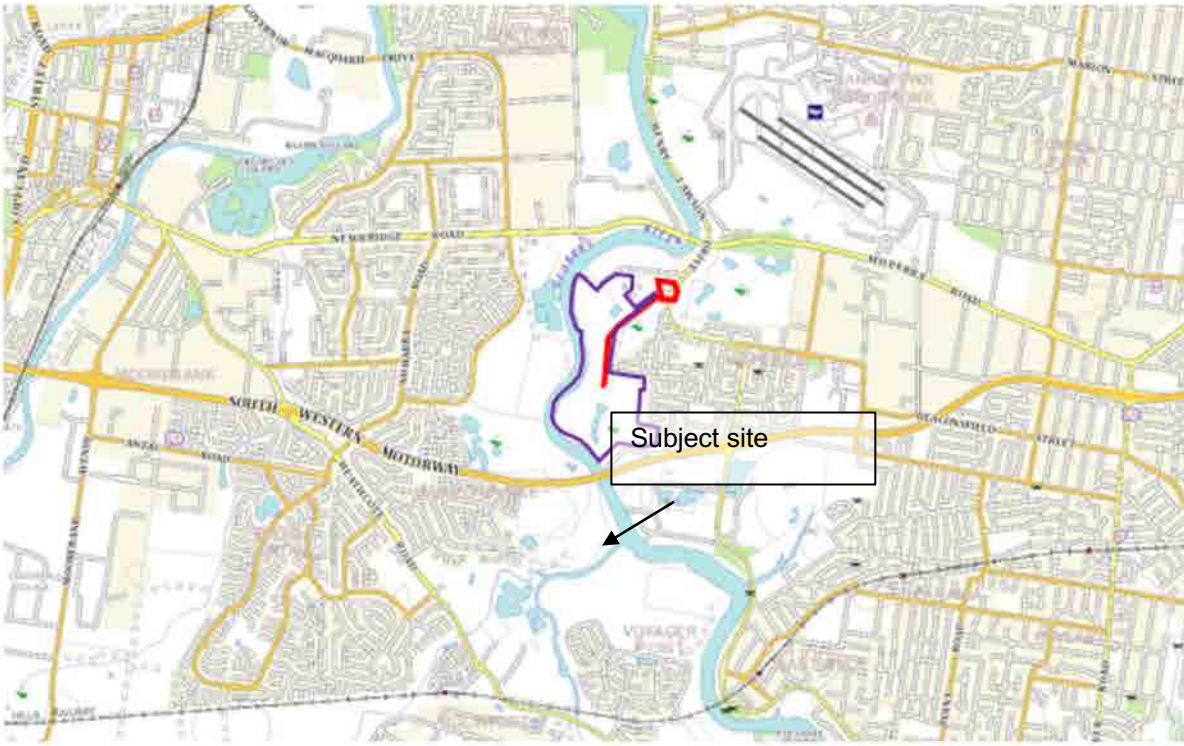
- Amended Heritage Impact Assessment prepared by Artefact dated July 2021;

Source: six maps

Figure 1: Aerial View of the Subject Site

Source: SixMaps 2021

2.0 The Site and Context



Source: six maps

Greater site area is coloured in purple

Works area is coloured in red

Figure 2: Location Plan

The site is located within the residential suburb of Milperra located between Liverpool to the north-west and Bankstown to the north-east. Milperra is approximately 9 kilometres south-west of Bankstown and 10 kilometres south-east of Liverpool. Each of these centres provide significant levels of services and amenities for local residents, with heavy rail connecting the centres to the broader metropolitan area. Milperra is connected to each centre via bus services on Pozieres Avenue and Henry Lawson Drive.

The site is located on the northern side of the South-Western M5 Motorway and fronts the Georges River to the west. , Lot 1 DP813007, Lots 231 & 232 DP 805826, Lots 23-27, 38-41 & 50-59 DP7304.

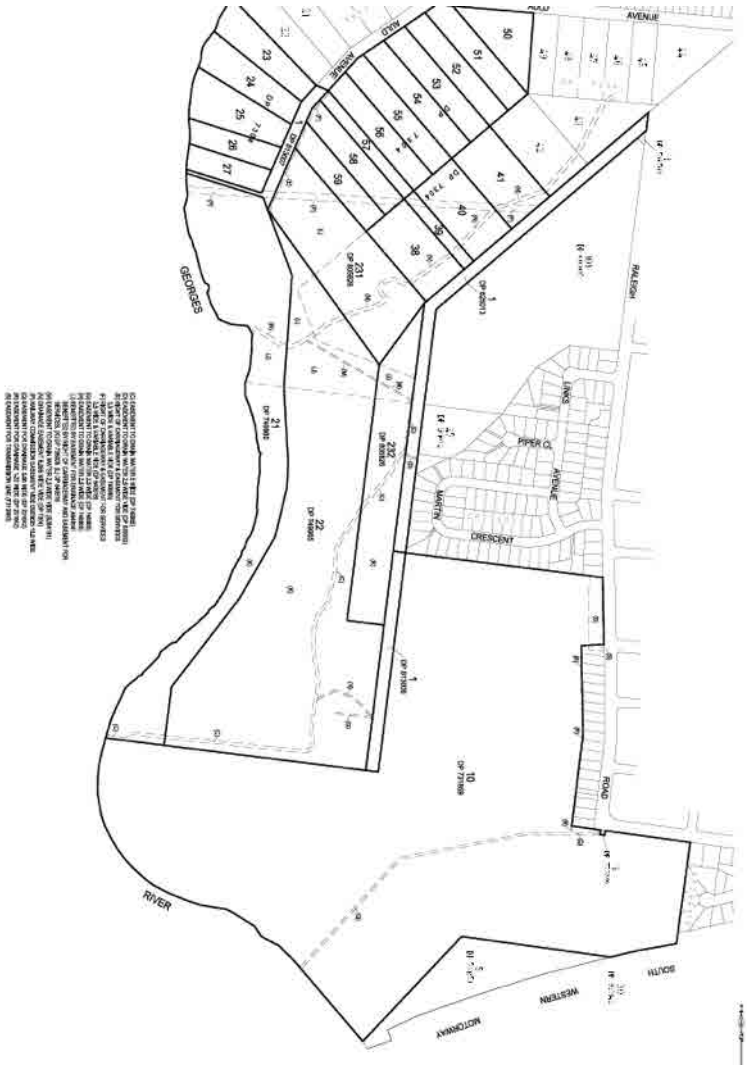
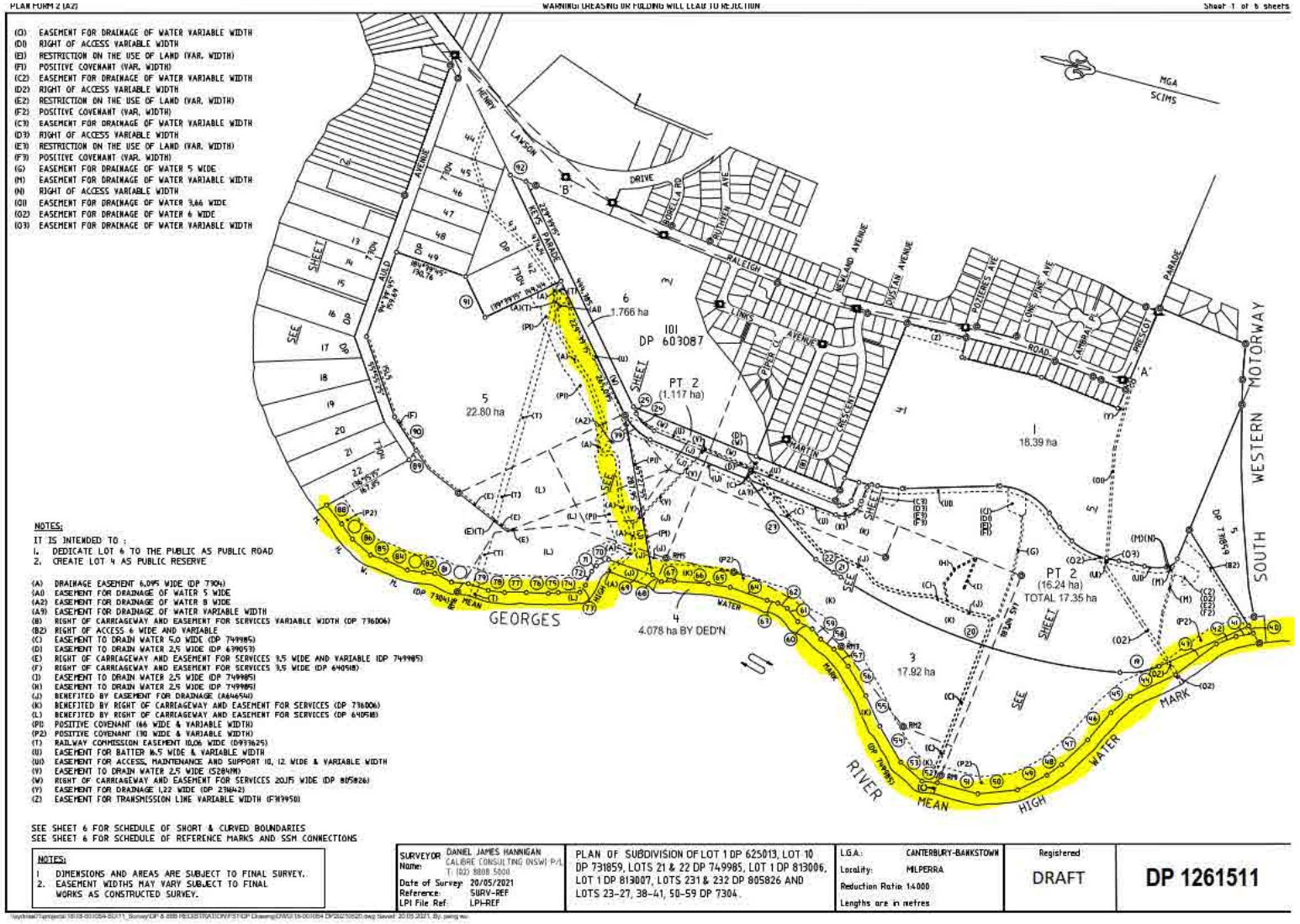


Figure 3: Survey Extract
PCB Surveyors 2019

The subject site is best understood by the survey extract below which highlights the Georges River foreshore in yellow.

Figure 4: Survey Extract



The Bankstown LEP 2015 zoning Map extract below demonstrates the zoning across the Riverlands Golf Course site.

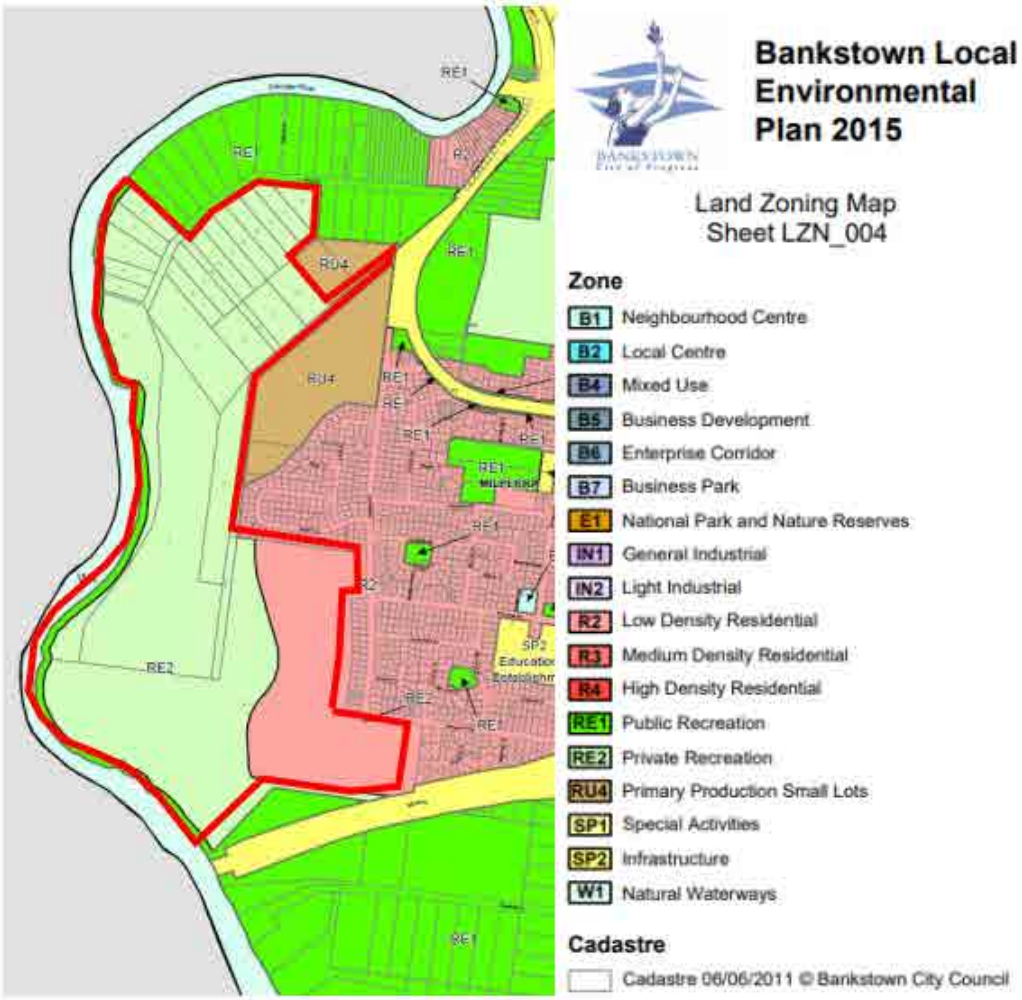


Figure 5: Zoning Map Extract
Bankstown LEP 2015

The Site contains part of the former Riverlands Golf Course and associated greens, fairways and minor built structures. The site contains over 800 trees and tree groups comprising several remnant local native species, exotic species and planted non-local native species of varying condition. Hollow-bearing trees have been identified that provide habitat to several fauna species.

The site and the surrounding area that once made up the Riverlands Golf Course is subject of another development application for the re-subdivision of 27 lots into 6 lots under Torrens title (DA-1107/2019). Under this subdivision development application, the residential development site aligns with proposed Lot 1 as illustrated in Figure 4 above. The development of the site into residential lots (DA-4/2020) also requires the extension and opening of Keys Parade. The extension of Keys Parade is the subject of the amended development application and comprises the construction and extension of Keys Parade roadway and associated works connecting to an upgraded signalised intersection of Keys Parade at Henry Lawson Drive. The subject development application (DA-370/2020) comprises bank stabilisation works along the Georges River foreshore and remediation and environmental rehabilitation works on the Riverlands Golf Course site.

Residential Context

The site adjoins the established residential settlement of Milperra to the north and east and has frontage to Raleigh Road and Prescot Parade and backs onto the rear of properties fronting Raleigh Road (in the east), Martin Crescent (in the north) and Maygar Close (in the south-east). The subject site adjoins the South-Western M5 Motorway (in the south-east) and the Cumberland Plain Woodland Reserve on Lot 5 DP 731859 to the south.

The immediate vicinity of the Site to the north and east is zoned R2 – Low Density Residential pursuant to the Bankstown LEP 2015. The immediate vicinity of the Site to the West is zoned RE2 – Private Recreation. The surrounding properties to the north (in Martin Crescent) and east (in Raleigh Road and Prescott Parade) are typified by single- and two-storey detached dwelling houses, interspersed with the dual occupancy and semi-detached dwellings. Milperra Public School is located approximately 350 metres from the site, to the east in Pozieres Avenue. The site is located approximately 500m from the intersection of the M5 Motorway and Henry Lawson Drive, to the east.

The Georges River to the west, Henry Lawson Drive to the north and east and the Western Motorway to the south define the broader area and serve to enclose and delineate its character. The broader residential area provides a range and mix of one and two storey single dwellings and dual occupancies. While the majority of the existing dwellings have street frontage, battle-axe allotments do occur within the deeper street blocks and particularly on the corners of the crescents.

The street pattern is generally curvilinear (characteristic of the age of the original subdivision) and consists of broad crescents and a fragmented grid generally oriented north-south. The fragmented grid is supplemented by sweeping crescents and then infilled in parts by some limited cul-de-sacs.

Generally, the main thoroughfares, being Raleigh Road (north-south) and Pozieres Avenue (east-west) have a carriageway of around 12 – 14m with 3 – 4m grassed verges on either side. Only the southern side of Pozieres Avenue is provided with a concrete footpath of 1.5 – 2m.

The secondary roads have a reduced carriageway of around 7 – 8m with 3 – 4m grassed verges on either side with the minor roads reducing down to carriageways of around 6.5m.

Vehicular entry into the broader area is limited to Pozieres Avenue and a connection just north of Treadgold Street to the east, and Amiens Avenue, the Ruthven Avenue connection and Raleigh Road to the north.

The local centre is set within the lower third and focuses on the local business centre at the corner of Pozieres Avenue and Amiens Avenue and the Milperra Public School opposite to the south.

The Milperra Public School has frontage to Pozieres Avenue and provides an extensive area of open space (approximately 2 hectares) interspersed with school facilities. The open space accommodates extensive mature tree canopy.

While the school has frontage to Pozieres Avenue, it directly adjoins the rear yards of a variety of single dwellings on lots generally in the

order of 560m^2 to 580m^2. It is noted that the adjoining dwellings accommodate very little in the way of mature plantings and the extensive canopy is mostly within the school grounds with the street planting having a much reduced canopy.

The Milperra Shopping Centre is located on the north-western corner of Pozieres Avenue and Amiens Avenue opposite the Milperra Public School. The centre has at grade parking for 34 cars with access from Pozieres Avenue and Amiens Avenue with service facilities to the west. The local centre contains a supermarket, bottle shop, bakery, café, fruit shop and local services. It is noted that the proximate local centre on the Flower Power site to the north of Henry Lawson Drive accommodates a number of very good grocery and produce stores within easy walking distance of the broader area.

Milperra Public School and the local business centre is within comfortable walking distance of all of the broader area with most dwellings being within a 530 – 845m radius of the local centre. All of the local roads have fairly direct connections to Prescot Parade, Raleigh Road, Nieuport Avenue, Amines Avenue and Pozieres Avenue offering easy pedestrian and bicycle access to the local centre and school.

It is noted that all of the streets rely on grass verges for pedestrian access and on the street carriageway for bicycle access. Only the southern side of Pozieres Avenue and a limited part of Amiens Avenue in the vicinity of the centre provide concrete pedestrian footpaths.

The residential fabric in the broader area is fairly homogenous low density residential development comprising single dwellings, detached and attached dual occupancies. There is no medium or high density residential development within the locality.

The subdivision pattern and character comprise lot sizes which are predominantly in the mid-500m^2; with larger lots on the corners and radii of the curves.

It is readily apparent that a later wave of subsequent subdivision of dual occupancies has occurred following the Bankstown Local Environmental Plan Clause 4.1A which allows the subdivision of attached dual occupancies down to 250m^2 and detached dual occupancies down to 350m^2. This wave of further subdivision change is well advanced and is continuing to develop. This is particularly characteristic of attached dual occupancies subdividing the 550m^2 sites to 250m^2 plus Torrens title lots.

The character of the residential dwellings in the area is fairly homogenous, low density residential development comprising single dwellings, detached and attached dual occupancies. The single dwellings vary between single and two storey, with a characteristic of first floor additions added to what would have originally been single storey dwellings. The dual occupancies tend to be predominately double storey in both attached and detached form.

The subdivision pattern reflects a character of battle-axe blocks on the corners and curves of the crescents with narrow driveway frontages with dwellings located behind and the rear of the dwellings fronting the streets.

Biodiversity Environment[1]

The subject land comprises several discrete locations along the banks of the Georges River (Lot 21 DP 749985, Lot 10 in DP 731859) along the western extent of the Riverlands site and the adjacent land owned by Canterbury Bankstown Council (Lot 5 in DP 731859), and Roads and Maritime Services (RMS) being the area of land under the M5 motorway (part of Lot 30 DP 827142), collectively covering an area of 0.28 ha.

The proposed works comprise environmental protection works, specific to each of the above five locations and will comprise the following components:

[1] Cumberland Ecology Riverlands Bank Stabilisation Development Biodiversity Development Assessment Report 2021 p10

- Regrading of banks;
- Placement of linear rock (or equivalent) or degradable mats over regraded banks as required;
- Placement of coir rolls (or equivalent) at base or toe of banks;
- Placement of rock rip rap scour protection over geotextile matting;
- Contamination removal in accordance with the Remediation Action Plan (RAP) (SES, 2021); and
- Revegetation of banks for further stabilisation.

The Riverlands site has long been modified and disturbed from its original condition. The proposed residential development (the subject land) is largely located at the site of the former 18-hole Riverlands Golf Course that was created in stages between the 1940s and 1960s. The now disused golf course area is typified by large expanses of grassland which used to comprise the fairways amid rows of remnant trees and planted vegetation. Parts of the former golf course are currently used for grazing cattle.

Parts of the wider Riverlands site between the now disused golf course and the Georges River were utilised for sand extraction activities in the 1960s.

Native vegetation occurring within the subject land occurs as scattered patches and consists of planted and remnant native vegetation. Three PCT's have been identified within the subject land, PCT 835, PCT 1232 and PCT 1800, each occurring in one condition state. Two of the PCT's within the subject land (PCT 835 and PCT 1232) align with TECs listed under the BC Act, including River-flat Eucalypt Forest EEC and Swamp Oak Floodplain Forest EEC. The remainder of the subject land comprises planted vegetation that does not conform to a TEC, exotic vegetation and previously cleared land.

The subject land is in areas mapped as Biodiversity and/or Riparian lands under the BLEP as well as on lands mapped on the BV map. These river flats have been degraded by past and current land uses that have

extensively cleared the original vegetation and caused ongoing erosion that will result in further loss of existing bank vegetation without the stabilisation works. The stabilisation works target unstable riverbanks so there is little to no scope to vary the location of works to avoid some impacts to trees. The works are required to be done in accordance with the VPA, which specifies locations for these stabilisation works.

Nonetheless, consideration has been given to locating work areas within the areas specified in the VPA to utilise the denuded/cleared areas as work sites. The resultant location of work areas will clear a maximum of three trees. The trees proposed for removal are located on the bank edge and have a considerable proportion of roots exposed, indicating that these trees are likely to be lost naturally during flooding in a 'no works' scenario. The trees to be removed are small, regrowth individuals and are not significant trees. Further details on trees to be removed are provided in the Arboricultural assessment prepared by Urban Forestry Australia Pty Ltd (UFA, 2021).

In determining the location of the works area within the subject land, the project has been designed to avoid and minimise direct and indirect impacts on native vegetation and habitat by:

- Locating the project predominantly within areas previously cleared land and exotic vegetation;
- Locating the project so as to remove only three small trees with some associated understorey.

As the nominated areas for bank stabilisation works are exposed to different levels of factors such as boat wake, turbulence, flooding and run-off, a single strategy for stabilisation is unlikely to result in long term stability along the Riverlands site frontage. The project has been designed to utilise a mix of bank stabilisation strategies specific to the conditions at the nominated locations. The proposed designs also utilise and enhance existing stabilisation structures that currently allow for some natural establishment of plants.

The project has sought to avoid and minimise direct impacts on native vegetation and habitat by:

- Utilising stabilisation strategies that allow for the retention of larger/older trees present within the subject land;
- Utilisting stabilisation strategies that utilise stabilising forces of existing vegetation and structures; and
- Utilising a mix of stabilising strategies to allow for variation in factors such as boat wake and surface run- off across the extent of the subject land.

The proposed works comprise environmental protection works to improve stability of the banks along the Georges River. Although the project design results in some minor loss of vegetation for implementation of the works, in the long term, the works will enable re-establishment of substantial areas of riparian vegetation in denuded/eroded areas that currently do not allow for natural establishment.

The proposed works will entail the complete removal of 3 trees within E71 (PCT 835) and disturbance to the ground layers across the subject land during works. Due to the very small areas of vegetation within the subject land, the separation of impacts into differing management zones (e.g Full clearing and Tree Retention) does not make any material difference to the numbers of credits generated, i.e both scenarios generate the minimum of one credit for each vegetation zone. Therefore, a conservative approach has been taken, and despite the majority of the trees being retained, all native vegetation within the subject land has been assessed as fully cleared within the BAM-C due to disturbance to the ground layer.

Under the VPA, in addition to bank stabilisation works, a 50m riparian corridor is to be revegetated along the Georges River frontage of the Riverlands site. While the riparian corridor revegetation does not form part of the current DA per se, a Vegetation Management Plan to guide the revegetation of the riparian corridor has nonetheless been prepared. As further works such as the requisite shared pathway will also occur within the 50m corridor, this Vegetation Management Plan

constitutes a high-level guidance document that is to be updated as required in response to future works along the river frontage.

Topography and Soils

The subject land and wider Riverlands site have a relatively flat topography, with elevations ranging between approximately 0 m Australian Height Datum near the Georges River to about 20 m above the Australian Height Datum in the disused Golf Course.

The Soil Landscapes of the Penrith 1:100 000 Sheet Map (Hazelton, Bannerman, & Tille, 1989) and soil landscapes available on eSpade (DPIE, 2020) indicates that the Riverlands site is mapped as a mix of the Richmond soil landscape and the Blacktown soil landscape. The Richmond soil landscape is generally flat with poorly structured clay loams, clays and sands. The Blacktown soil landscape comprises gently undulating rises on Wianamatta Group shales with red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines.

However, the landform has been reshaped for the disused Riverlands golf course which has been subject to extensive filling, with unconsolidated fill material covering large parts of the disused golf course to depths between 20cm and 150cm. The former sand extraction between the golf course and the Georges River has also resulted in a general lowering of the land surface.

Hydrology

The hydrology of the Riverlands site is dominated by the Georges River, a major river that occurs directly adjacent to the western boundary, and all surface water ultimately drains into this river.

The drainage patterns and hydrology of the proposed residential area have been substantially changed by the historic works for the old golf course. These included forest clearance, deposition of fill, re-contouring and the construction of drainage channels and fill.

Two minor unnamed streams are present within the Riverlands site. One stream, which comprises a 1st order stream as per the Strahler System of ordering watercourses is present towards the southern parts of the Riverlands site and drains into a series of dams. Previous studies of the 1st order stream determined that it was a constructed drainage channel that was likely formed between 1961 and 1965 as part of soil extraction activities, to collect and redirect runoff from higher areas to the river without affecting the extraction activities (Clements, 2012).
A second un-named stream is present towards the northern parts of the Riverlands site near Keys Parade. This stream comprises a 2nd order stream as per the Strahler System of ordering watercourses. This stream flows from residential areas to the east and discharges into the Georges River in the vicinity of the former sand extraction areas.

Vegetation

The vegetation of the Canterbury-Bankstown LGA and greater Western Sydney area have been heavily cleared for urban development. Although large areas of the pre-existing vegetation have been historically cleared native forest vegetation is still found along parts of the Georges River, particularly in flood-prone sites unsuitable for residential development. However, these areas are generally heavily modified and/or disturbed from surrounding land uses.
Several recent ecological studies have been conducted within the Riverlands site as part of a Planning Proposal for the rezoning of the Riverlands site under the Bankstown Local Environment Plan 2015 (BLEP 2015). Under the BLEP 2015, remnant vegetation outside of the disused golf course and extraction areas was largely mapped as ‘Biodiversity’ based on the flora assessment study by Anne Clements and Associates (2012) that determined that the remnant vegetation conformed to the Threatened Ecological Community (TEC) Swamp Oak Floodplain Forest. While the vegetation within the disused golf course area was assessed as not conforming to any listed TEC, the vegetation was nonetheless considered to be locally significant due to the size and/or age of trees within a highly developed landscape.

Bushfire Environment[2]

The subject site was formally a golf course (Riverlands Golf Course) with the previous fairways still visible. At the time of our inspection the eastern portion of the site was found to be used for grazing.

The vegetation identified as being the hazard is located to the south and west of the proposed residential allotments within neighbouring allotments and the residue part of the subject site.

It is acknowledged as part of a Voluntary Planning Agreement that, amongst other items, a 50 metre riparian corridor is required to be established along the Georges River. This future riparian corridor is located outside the 140 metre assessment area from the proposed residential allotments.

The site has been identified by Cumberland Ecology as containing the following Plant Community Types (PCTs):

- *PCT 849: Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion;*
- *PCT 835: Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (in two condition classes or vegetation zones);*
- *PCT 1232: Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion;*
- PCT 1800: Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley; and
- *PCT 1083 Red Bloodwood - Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion.*

It is understood that the extent of vegetation embellishment onsite will be concentrated along the Georges River within the required 50 metre riparian corridor.

[2] Building Code and Bushfire Hazard Solutions P/L Supplementary Bushfire Assessment Report *Proposed:* Residential Development 56 Prescot Parade, Milperra NSW 2021 p12

An expanded environmental study for the site was undertaken by Cumberland Ecology (2021) and advice provided which supports a 'worst case' Woodland classification for part of the 'RE2 Private Recreation' zoned land to the west of the proposed residential allotments.

The vegetation posing a hazard to the south is located within an existing allotment zoned 'RE1 Public Recreation' and the subject site. The mapped vegetation PCT is associated with Cumberland Plain Woodland (CPW), a critically endangered ecological community (CEEC) listed under the *Biodiversity Conservation Act 2016* and the *Environment Protection and Biodiversity Conservation Act 1999*. CPW is classified as a Grassy Woodland formation and our site observations are consistent with this classification.

For the purpose of assessment the vegetation posing a hazard to the south and west was determined to be Woodland.

The slope that would most significantly affect bushfire behaviour within the hazard must be assessed for at least 100 metres. The effective slopes were determined using 1 metre LiDar contour mapping of the subject area in conjunction with site observations to be 0 – 5 degrees down to the south and west.

Geotechnical Environment[3]

The purpose of the investigation was to assess the subsurface conditions at thirty two borehole locations and, based on the information obtained, to present our comments and recommendations on earthworks, preliminary site classifications to AS2870-2011, flexible road pavements and additional investigations.

Generally, the boreholes encountered fill overlying natural soil. Weathered shale bedrock was encountered at relatively shallow depths in JK19, JK25, JK27 and JK29 (southern end of the site). Reference

[3] JKGeotechnics Geotechnical Investigation Rivderlands Residential Subdidision 2020 p2

should be made to the attached borehole logs for details at each specific location. A summary of the encountered subsurface characteristics is provided below:

- *Fill*, predominantly comprising sandy soils, was encountered in all boreholes to depths ranging from 0.2m (JK30 & JK31) to 2.2m (JK32). In JK32, the basal fill profile comprised clayey soils. The fill at all borehole locations was grass covered.
- *Natural soil*, predominantly comprising silty clay, sandy clay and silty sandy clay, and to a lesser extent silty sand (JK8 only), sand (JK9 only), clayey sand (JK1 only) and sandy gravel (JK5 only), was encountered below the fill in all boreholes. The natural clays were of variable plasticity and of stiff to hard strength. The natural sands were medium dense to dense.
- *Weathered shale bedrock* was encountered in JK19, JK25, JK27 and JK29 at depths ranging from 1.7m (JK29) to 3.15m (JK19). The shale on first contact was extremely weathered and of extremely low ('hard' soil) strength. In JK27 and JK29, the shale improved with depth to low and medium strength.
- *Groundwater seepage* was encountered during and on completion of drilling in JK12, JK16 and JK30 at depths of 3.4m, 3.3m and 3.2m, respectively. The remaining boreholes were 'dry' during and on completion of drilling. We note that the groundwater levels may not have stabilised within the limited observation period. No long-term groundwater level monitoring was carried out.

Following removal of all trees (including their root balls), demolition of the existing sheds, slabs and pavements, all grass, topsoil, root affected soils and any deleterious fill or contaminated soil should be stripped. Based on the results of the investigation, topsoil/root affected soil should be stripped to a nominal depth of about 0.1m. We note that it is difficult to accurately assess the depth of topsoil and root affected soils in a 100mm diameter borehole. If considered to be an important contractual issue, we recommend that a number of shallow test pits be excavated across the site to more accurately confirm the topsoil/root affected soil stripping depth. or alternatively a geotechnical inspection

could be carried out after initial stripping to confirm the depth. Stripped topsoil and root affected soils should be stockpiled separately as they are considered unsuitable for reuse as engineered fill. Reference should be made to Section 6 for guidance on the offsite disposal of soil.

For the same reasons why we have recommended the early removal of trees in Section 4.3, we strongly also recommend that the sheds, floor slabs, concrete hardstand and all AC pavements (including the access road) at the southern end of site be demolished as early as possible ahead of construction.

As discussed above, all existing fill will need to be stripped down to the surface of the underlying natural soils. In addition, we recommend that all soil within the primary root structure of the trees, which are to be removed, be excavated and stockpiled for reuse as engineered fill. These 'over-dry' clay soils will most likely need to be 'wetted up' in order to conform to the engineered fill specification provided in Section 4.4.5 below. As the trees are mostly found within 'corridors' (between fairways), we envisage that the removal of the 'over-dry' clay soils will occur as trenches, excavated using large dozers and/or large excavators. We recommend that test pits be excavated across the site area and adjacent to several trees to confirm the width and depth of excavations.

Care must be taken not to undermine or remove support from the site boundaries during stripping and subsequent bulk excavation works.

Site Contamination Environment[4]

The Foreshore site history was adequately described by Environmental Strategies Phase 1 (ES, 2014a). While past and present investigations of the Foreshore provide an adequate level of characterisation to assess contamination risks, there are human and ecological health risks related to wastes used as landfilling along the Foreshore. Due to the presence of the sensitive ecology (e.g. No-Go zones such as

[4] Sullivan Environmental Sciences Riverlands Contamination Assessment 2021 pvi

mangroves, protected trees, sensitive terrestrial and aquatic organisms, etc) in the Foreshore land, the recommended remediation should target only those accessible areas where there is potential health risk from chemical contamination and or aesthetic issues requiring remediation due to gross anthropogenic materials/wastes. The remediation strategy is to be considerate of removing contamination to the extent practicable while preserving the sensitive environment within the Foreshore. A number of options will be proposed to satisfy this goal.

Of specific concern are the landfill wastes present at FP10 (and proximal to that location) containing concentrations of PCB and non-bonded forms of asbestos. Other locations including FP05 and FP11 contain similar landfill wastes (and detectable residues of asbestos (FP05) and PCB (FP11)). These areas are considered areas of concern for human and ecological health based on the presence of these wastes alone.

Detectable residues of PCBs were also reported at FP13, FP14 and FP15 in Area 2 of the Foreshore which adds to the level of risk. While not considered particularly deep, the depth of wastes used as landfilling has not been determined, specifically at areas of high contamination risk at FP05, FP10 and FP11.

It should be noted that soil materials containing concentrations of PCBs at levels greater than 2mg/kg are subject to regulation under the Polychlorinated Biphenyl (PCB) Chemical Control Order 1997 (PCB CCO 1997). The PCB CCO 1997 sets out the requirements for:

- defining non-scheduled and scheduled PCB materials and wastes (Clauses 4.25 and 4.26);
- defining priority areas (Clause 4.23);
- conveying of PCB material and PCB waste (Clause 6.4); and
- disposing of PCB waste (Clause 6.5).

Based on the concentration of PCB at location FP10 and the expected very shallow depth to groundwater along the Foreshore zone leaching

to the immediate underlying groundwater was considered a plausible risk. We conducted neutral leaching analysis at this location. Results showed the PCB at this location did not leach under a neutral deionised water solution (to emulate rainfall), being less than the laboratory detection (<1.0 µg/L). This indicates there is a low risk of PCBs migrating from the Foreshore waste into the underlying watertable and then discharging into the adjoining Georges River aquatic ecosystem.

We conclude that existing data demonstrates that remediation to clean up contamination on the Foreshore is necessary because the presence of landfilling wastes and associated contamination poses a high health risk in localised areas to human and ecological health, although additional work would be required to delineate the extent of remediation required.

- Based on existing information, the proposed Foreshore development land is suitable for future open space public land use, subject to updating and implementing the existing RAP (Sullivan-ES, Dec 2019) to cover the following items:
    - To the extent practicable, delineate contaminated wastes in both Areas 1 and 2, as well as other accessible locations along the Foreshore, to ascertain the full extent of landfilling of wastes.
    - In consideration of sensitive ecological receptors, and to the extent practicable so as not to cause irreversible damage to those receptors, remediate contaminated wastes used as landfilling in Area 1 and Area 2. These wastes contain concentrations of asbestos, heavy metals and PCBs at levels that pose a human and ecological health risk.
    - Management of anthropogenic waste strewn across and protruding from ground surfaces to remove the aesthetic impacts to the Foreshore. In particular, wastes and general refuse that has washed up from Georges River accumulating within low lying swampy areas.

Acid Sulfate Soil Environment[5]

The soil profile of the areas in lower lying areas on the site and in close vicinity to the river were found to be marine deposited, and therefore pose a threat of actual and potential acid sulfate soils.

The NSW Natural Resource Atlas Acid Sulfate Soil Map indicates that areas of the site range between Class 2 - Works below the ground surface, Class 3 – Work 1m below the ground surface and Class 5 – Works within 500m to Classes 1 – 4. The boundary of Class 2 and Class 5 has been set based on site elevation alone, making a site-specific assessment of acid sulfate soils necessary to determine if the boundary is correct and determine accurately the risk posed by any excavation or construction within the site.

Based on the findings of the detailed, intrusive soil investigation undertaken as part of the ASSI, SESL concluded the following:

- From the results obtained in this ASSI, the soil encountered in the region of the proposed rezoning for residential development purposes shows no indication of the presence of acid sulfate soils. This refers to the areas intended for residential lots.
- The occurrence of acid sulfate soils is to the west of the boundary of proposed residential rezoning (the proposed residential lots) and will not require consideration for ongoing works in the residential area. No acid sulfate soil management plans will be required during construction in this residential zone (the residential lots), unless work extends to the west of the proposed rezoning boundary for utility infrastructure placement (as are proposed in the detailed design drawings provided by the client).
- It is the recommendation of SESL that an Acid Sulfate Soil Management Plan (ASSMP) be developed for the region to the west of the proposed residential rezoning, in the event

[5] SESL Australia Acid Sulfate Soil Management Plan 2019 p8

that intrusive works are scheduled at a later date. The information gathered by the ASSI is sufficient for the ASSMP to be developed.

Aboriginal Heritage Environment[6]

In May 2012, Archaeological & Heritage Management Solutions (AHMS) completed an Aboriginal Heritage Study of an area which encompasses the study area, to support a planning proposal to rezone the project area from rural and open space to a Residential (2A) zone. AHMS identified an area of moderate-high archaeological sensitivity in the southeast portion of the project area (the study area) and recommended that archaeological test excavations be completed to identify any subsurface Aboriginal objects.

In January 2020, Comber Consultants completed an additional Aboriginal Archaeological Assessment of the Riverlands Golf Course on behalf of the proponent. The assessment confirmed the findings of AHMS (2012) and identified an area of moderate-high archaeological sensitivity within the study area. Comber 2020 recommended that test excavations be completed in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (Department of Environment, Climate Change & Water [DECCW] 2010a) (Code of Practice).

Subsequently, Artefact Heritage Services Pty Ltd (Artefact Heritage) was engaged by the Proponent to prepare a test excavation methodology (Artefact Heritage 2020a) for the area of area of moderate- high archaeological sensitivity. During preparation of the test excavation methodology, the area of moderate-high archaeological sensitivity was registered on the Aboriginal Heritage Information Management Systems (AHIMS) database as a Potential Archaeological Deposit (PAD). The area of moderate-high archaeological sensitivity is registered on the AHIMS site register as the Riverlands Golf Course PAD (AHIMS ID 45-5-5286).

[6] Artefact Riverlands Milperra Aboriginal Archaeological Assessment 2021 pii

A test excavation program was completed within the Riverlands Golf Course PAD (AHIMS ID 45-5- 5286) in March 2020. The results of the excavation program were documented in an Archaeological Test Excavation Report (ATER) prepared by Artefact Heritage (2020b). The ATER found one Aboriginal site, RGC2020-AS01 (AHIMS ID 45-5-5334), which was considered to be of low scientific significance. The ATER recommended that an Aboriginal Cultural Heritage Assessment Report (ACHAR) be completed to support an application for an Aboriginal Heritage Impact Permit (AHIP) that would authorise impacts to RGC2020-AS01 (AHIMS ID 45-5-5334) through the proposed works. It was also recommended that recommendations for the long-term management of the RGC2020-AS01 (AHIMS ID 45-5-5334) be included in ACHAR in consultation with the RAPs.

- A study area based AHIP should be sought to authorise impacts to RGC2020-AS01 (AHIMS ID 45-5-5334)
- No works that impact the ground surface should be undertaken within the established site extent of RGC2020-AS01 (AHIMS ID 45-5-5334) until an approved AHIP has been issued.
- This ACHAR and appendices should be submitted to NSW Heritage, DPC to support the AHIP application.
- No further archaeological investigations will be required.
- The assemblage retrieved from the test excavation should be reburied on site. Reburial should occur within an area which will not be impacted by future ground disturbing works. Reburial should be undertaken in accordance with the Code of Practice and comments received from the RAPs.
- If human skeletal material is identified works should cease and the unexpected finds policy for the project would be implemented. Impacts to human skeletal remains would not be approved under the AHIP.
- The AHIP boundary must be marked on site work plans to ensure that works do not extend outside the approved AHIP area.

European Heritage Environment[7]

This HIA has determined that the study area is adjacent to one heritage item listed on the Bankstown
LEP 2015:

- Milperra Soldier Settlement (Roads) (Bankstown LEP 2015 I29).

The study area is also partially within one non-statutory indicative place listed on the Register of the National Estate (RNE):

- Georges River Wetlands (Place ID: 18397).

The proposed cycleway (which would form part of the future EIS) is also partially within the SEPP (*Coastal Management*) area 2018.

This HIA has found that the Former Riverlands Golf Course has some heritage significance at a local level for its aesthetic, rarity and potential social heritage values. The heritage values of the area are largely tied to the natural landscape character of the area and the remnant wetlands, rather than to the grounds of the former golf course itself.

This HIA has determined that the proposed works would result in neutral direct impacts and negligible visual impacts to the Milperra Soldiers Settlement (Roads) (Bankstown LEP 2015 I29).
The proposed works would result in a negligible direct impact and a cumulative minor visual impact to the Georges River Wetlands (Place ID: 18397).

The proposed works would result in a cumulative minor direct impact and cumulative minor visual impacts to the Former Riverlands Golf Course.

This HIA has identified three land use phases within the study area:

- Phase 1: Exploration of the Georges River (1788 onwards);

[7] Artefact Riverlands Milperra Heritage Impact Assessment 2021 pii

- Phase 2: Thomas Bevan and William Mitchells land grants (1800 – c.1940);
- Phase 3: Riverlands Golf Course (c.1940-2018).

It was determined that there is nil archaeological potential associated with Phase 1 within the study area. There is low archaeological potential associated with Phase 2 land grants. There is high archaeological potential for soil fills associated with the establishment of the Riverlands Golf Course in Phase 3. Intact archaeological remains associated with Phase 2 would reach the threshold of local significance. Remains associated with Phase 3 would not reach the threshold of local significance. It is not anticipated that the project would impact on significant archaeological resources.

3.0 Proposed Amended Development

This section should be read in conjunction with the Tooker and Associates Amended Bank Stabilisation Report and the Amended Bank Stabilisation Plan prepared by Calibre Consulting dated 1 June 2021.

Amended Development Application No. 370/2020 seeks consent for:

Bank stabilisation works along the Georges River foreshore (being Proposed Lot 4 under DA-1107/2019 and land under the M5 Motorway bridge over the Georges River), and remediation and environmental rehabilitation works on the Riverlands Golf Course Site.

The proposal is Integrated Development as defined in section 4.46 of the Environmental Planning and Assessment Act, 1979, because an approval is required in accordance with the Water Management Act, 2000.

The proposal includes the following specific works:

- Bank stabilisation works (regrading of bank predominantly to a 1:4 gradient (and partly 1:5 gradient under the M5 bridge with rock rip rap wall), with installation of linear rock placement, and vegetation planting on bank areas and berms) at specific locations along the banks of the Georges River along the western boundary of the former Riverlands Golf Course site, contained within Proposed Lot 4 to be created under DA-1107/2019 and partly under the existing M5 Motorway.
- Remediation of areas of the site identified as contaminated in accordance with the submitted Remedial Action Plans.

At the time of the re-zoning of part of the former Riverlands Golf Course site to R2 – Low Density Residential, a Voluntary Planning Agreement (VPA) was entered into by the Council and the landowner. This VPA required, as part of any future development of the site, a number of works to be undertaken by the developer. The bank stabilisation works was one of the works required in the VPA.

The amended application also includes a Vegetation Management Plan

Although this Vegetation Management Plan (VMP) has been prepared as part of the documentation package of the DA for the bank stabilisation works, it nonetheless provides an overarching guideline for all revegetation works required under the VPA, including revegetation works associated with the Shared Pathway (Georges River) and the connector road (Northern Creekline).

The proposed alignment for the Shared Pathway along the Georges River, as per the requirements of the VPA. While the alignment will unavoidably pass through areas of existing native vegetation, the alignment has been sited to minimise impacts to existing vegetation. Although, minor on-site adjustments to the Shared Pathway alignment may be required at specific locations to maximise avoidance of remnant native vegetation and areas of bank stabilisation works, the current proposed alignment is considered to minimise overall impacts on native vegetation while meeting the location requirements specified within the VPA. Any minor on-site adjustments at the detailed design stage are to give due consideration to the proposed vegetation management zones of this VMP (as detailed in Chapter 4) with revegetation areas to be assigned to the proximate management zone following site specific adjustments.

This VMP also outlines measures for the management of vegetation to be cleared for future DAs, in particular the shared pathway, and provides specifications for vegetation clearing protocols, hygiene protocols to minimise the risk of spreading plant pathogens and weed management measures to be implemented during clearing and construction works for developments within the wider Riverlands site.

The establishment phase includes the initial primary weeding and planting works and will occur shortly after approval of Construction Certificate drawings. A five-year maintenance period following the primary works has been allowed for in this plan and will commence upon Council certified completion of the establishment phase. This Revegetation Plan covers work to be carried out on site over five years.

The measures that are planned over this time period within the Riverlands site are as follows:

Short term: years 1 and 2

- Weed control;
- Planting of canopy species;
- Planting of canopy, shrub, and groundcover species;
- Replacement of any tube stock individuals that have died between site visits; and
- Monitoring, management and reporting.

Long Term: years 3, 4, and 5

- On-going weed control in accordance with Council weed management practices;
- Replacement of any tube stock individuals that have died between site visits; and
- Monitoring, management and reporting in accordance with Council policy.

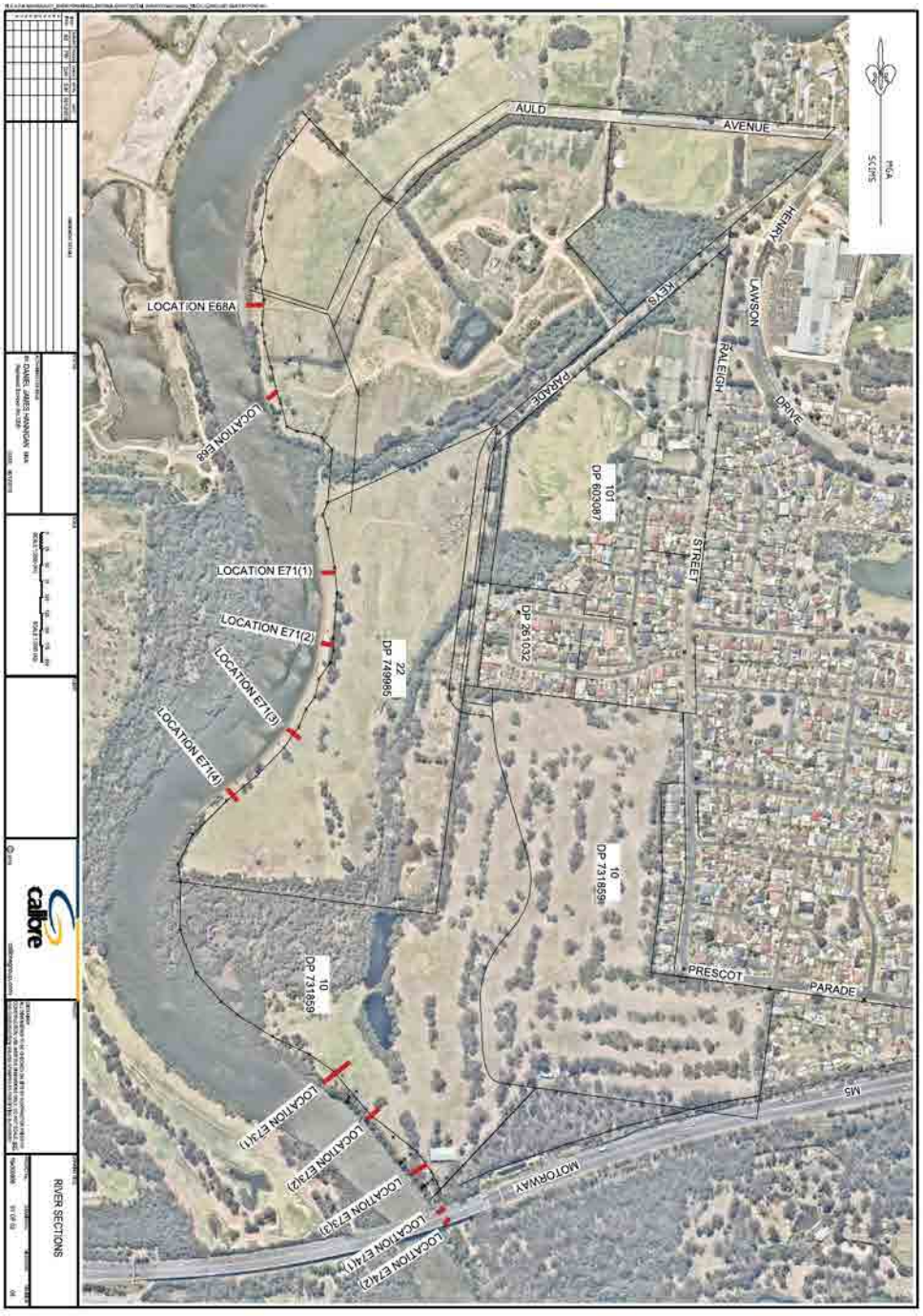
The objective of remediation is to undertake the remedial works documented in the remediation action plan to address soil contamination and remove potential health risks to sensitive receptors. The proposed remedial methods for the Foreshore consist of:
1. For Foreshore Remediation Area (FRA01) – Combined Option 1 and Option 2 and Option 3:

- Option 1 - No action in areas where sensitive ecological receptors are present (No-Go zones) which could be irreversibly harmed if active remediation where to occur. E.g. mangroves and roots of protected vegetation;
- Option 2 - Excavate or mechanically collect and remove contaminated wastes where there is no presence of sensitive ecological receptors and no risk of harm to those receptors. Dispose collected wastes offsite.

- Option 3 - Insitu capping of waste materials by existing surface soils and natural sedimentation layers within the sensitive intertidal zone (No-Go zones).

2. For Foreshore Remediation Area FRA02 – Option 2:
   - Option 2 - Excavate or mechanically collect and remove all surface rubbish/trash visible at the ground surfaces, all stockpiled soils from accessible areas, and dispose offsite or assess for onsite reuse.
3. For Foreshore Remediation Area FRA03 – Option 1 and Option 2:
   - Option 1 - No action in areas where sensitive ecological receptors are present (No-Go zones) and could be irreversibly harmed if active remediation where to occur. E.g. mangroves and roots of protected vegetation.
   - Option 2 - Excavate or mechanically collect and remove contaminated wastes where there is no presence of sensitive ecological receptors. Dispose collected wastes offsite.

Detail Description



Amended Development Application River Sections Plan

Original Development Application Bank Stabilisation Layout Plan 01/03

Amended Development Application Bank Stabilisation Layout Plan 01/03

Original Development Application Bank Stabilisation Layout Plan 02/03

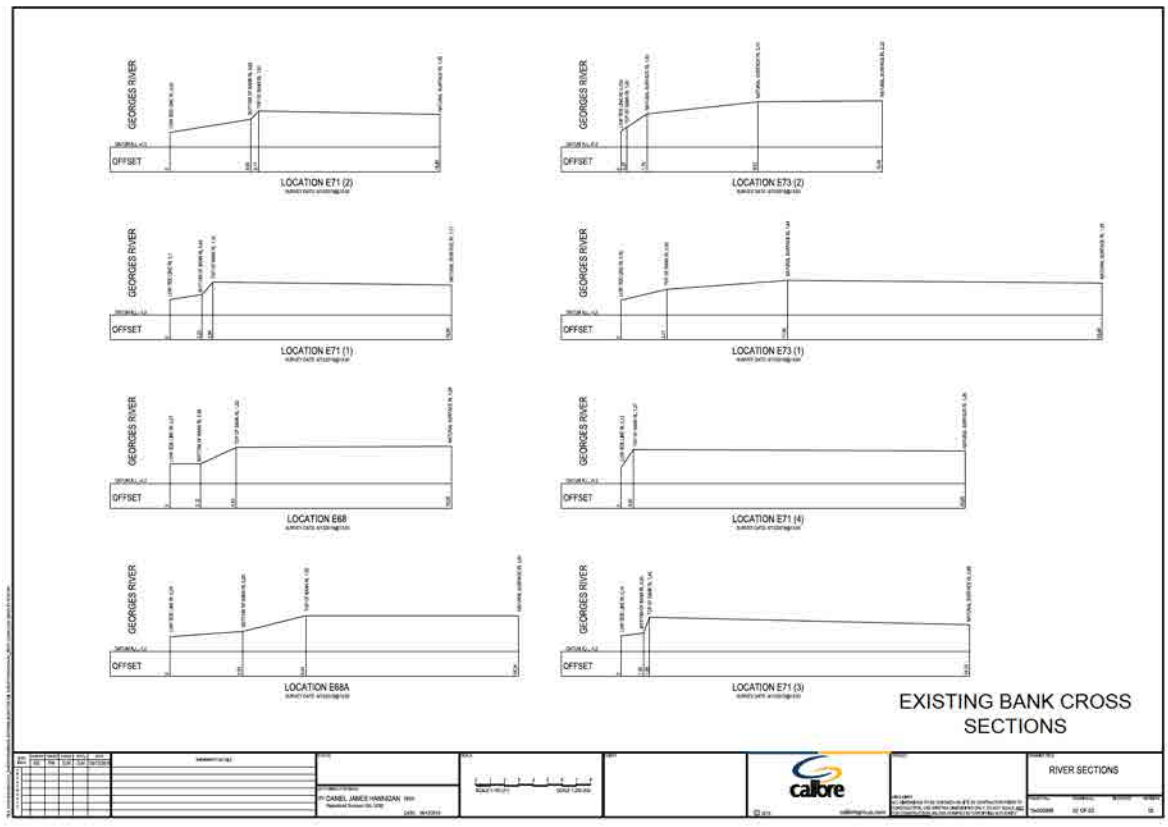
Amended Development Application Bank Stabilisation Layout Plan 02/03

Original Development Application Bank Stabilisation Layout Plan 03/03

Amended Development Application Bank Stabilisation Layout Plan 03/03

None

Original Development Application Existing Bank Cross-Sections

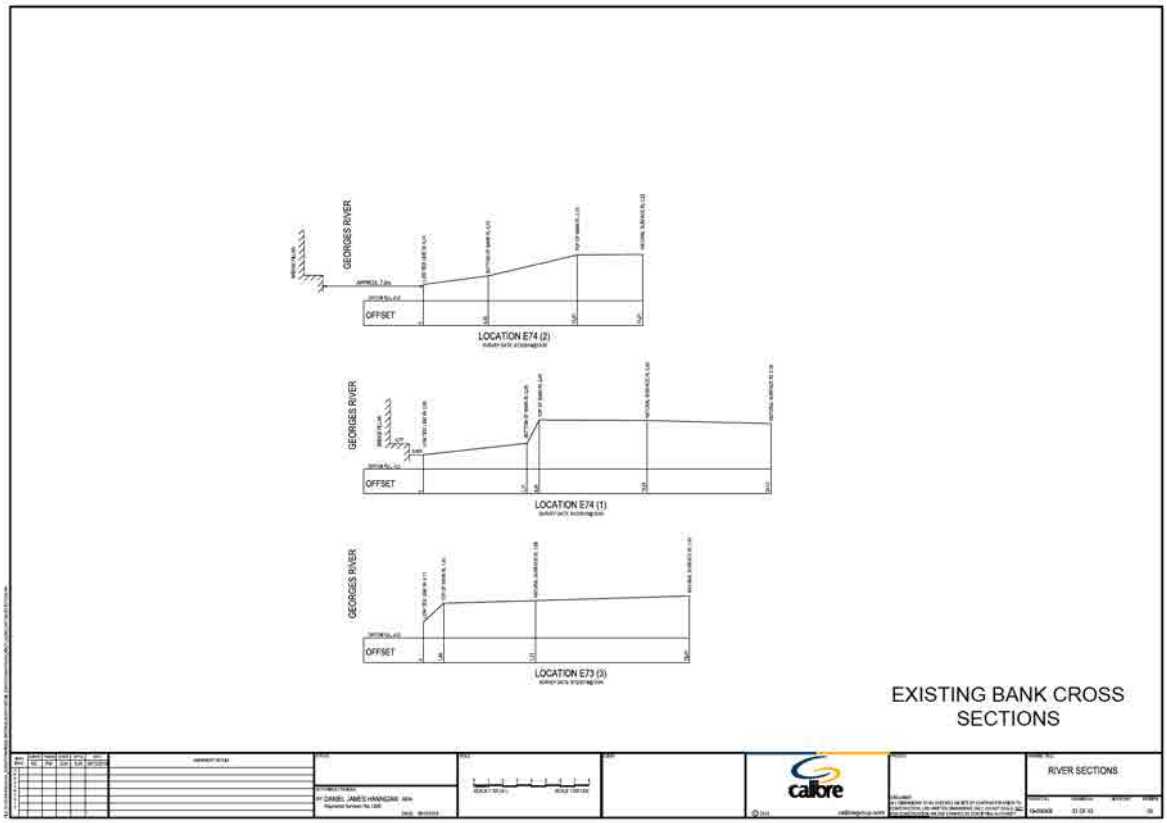


Amended Development Application Existing Bank Cross-Sections

- Additional engineering Information;

None

Original Development Application Existing Bank Cross-Sections

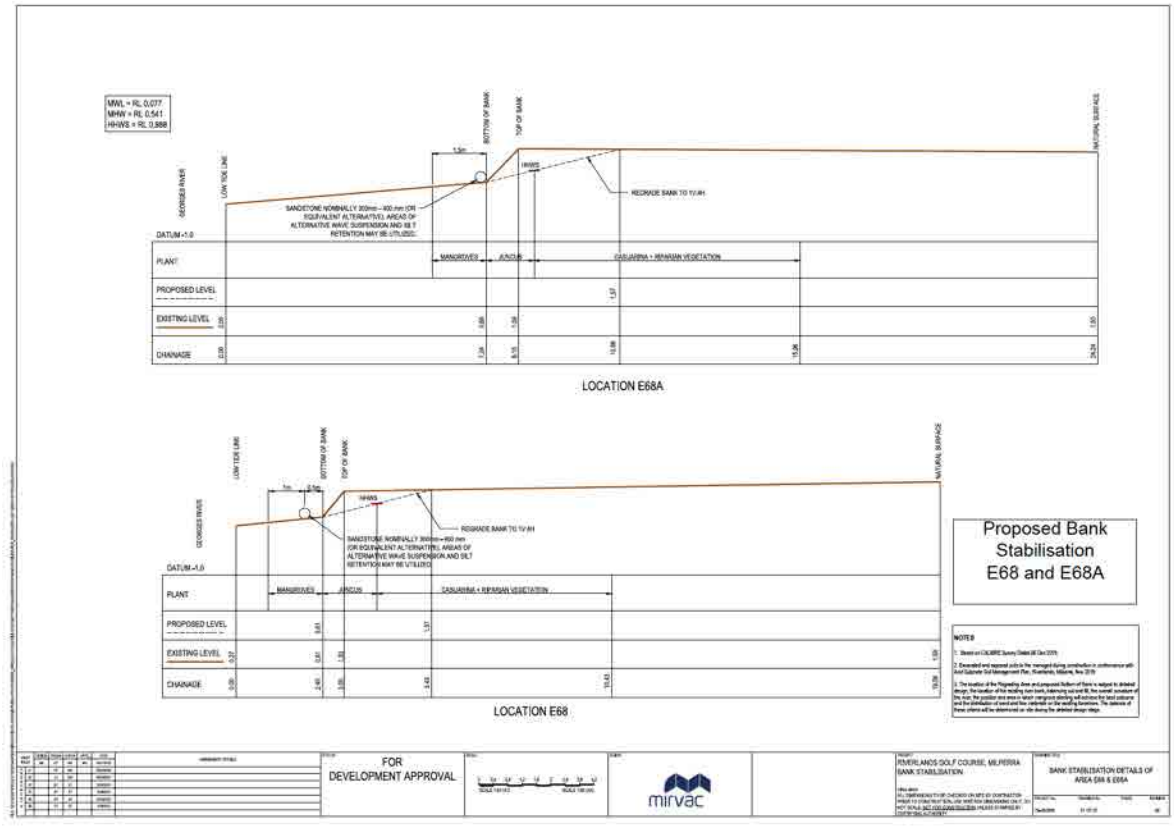


Amended Development Application Existing Bank Cross-Sections

- Additional engineering Information;

None

Original Development Application Proposed Bank Stabilisation E68 and E68A

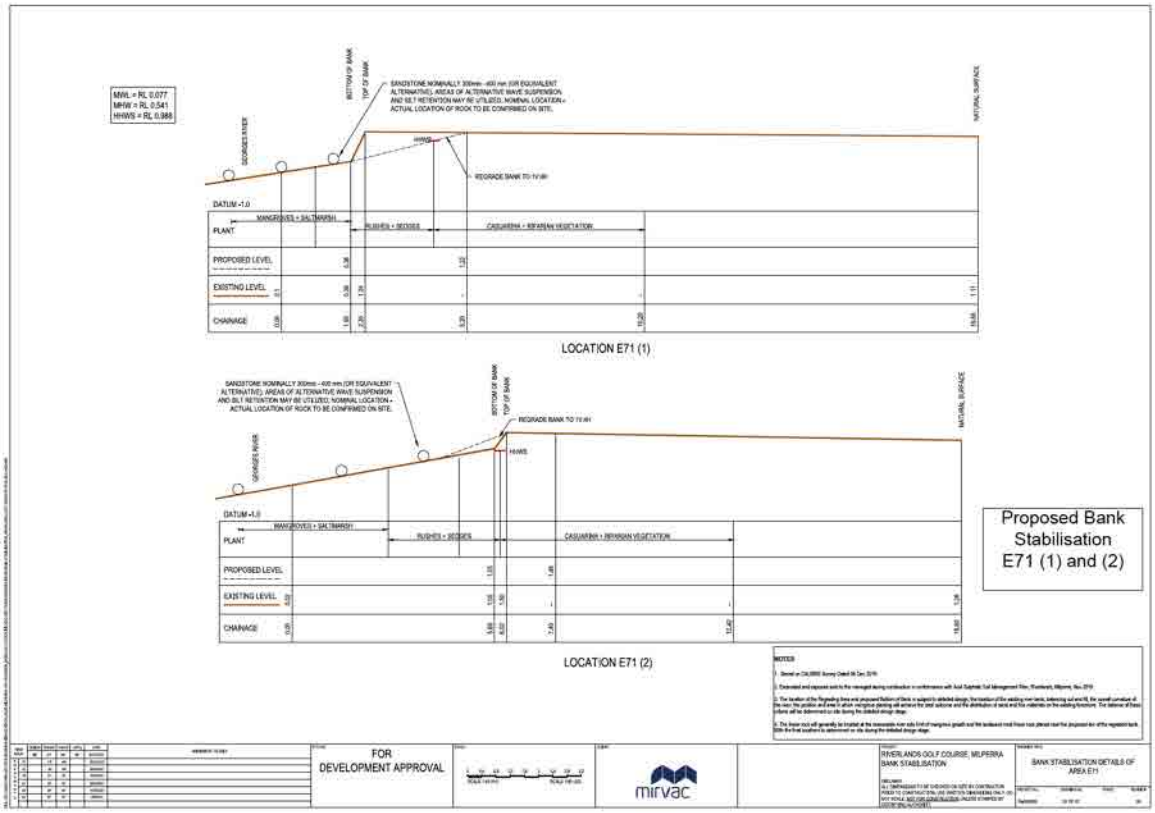


Amended Development Application Proposed Bank Stabilisation E68 and E68A

- Additional engineering Information;

None

Original Development Application Proposed Bank Stabilisation E71 (1) and (2)

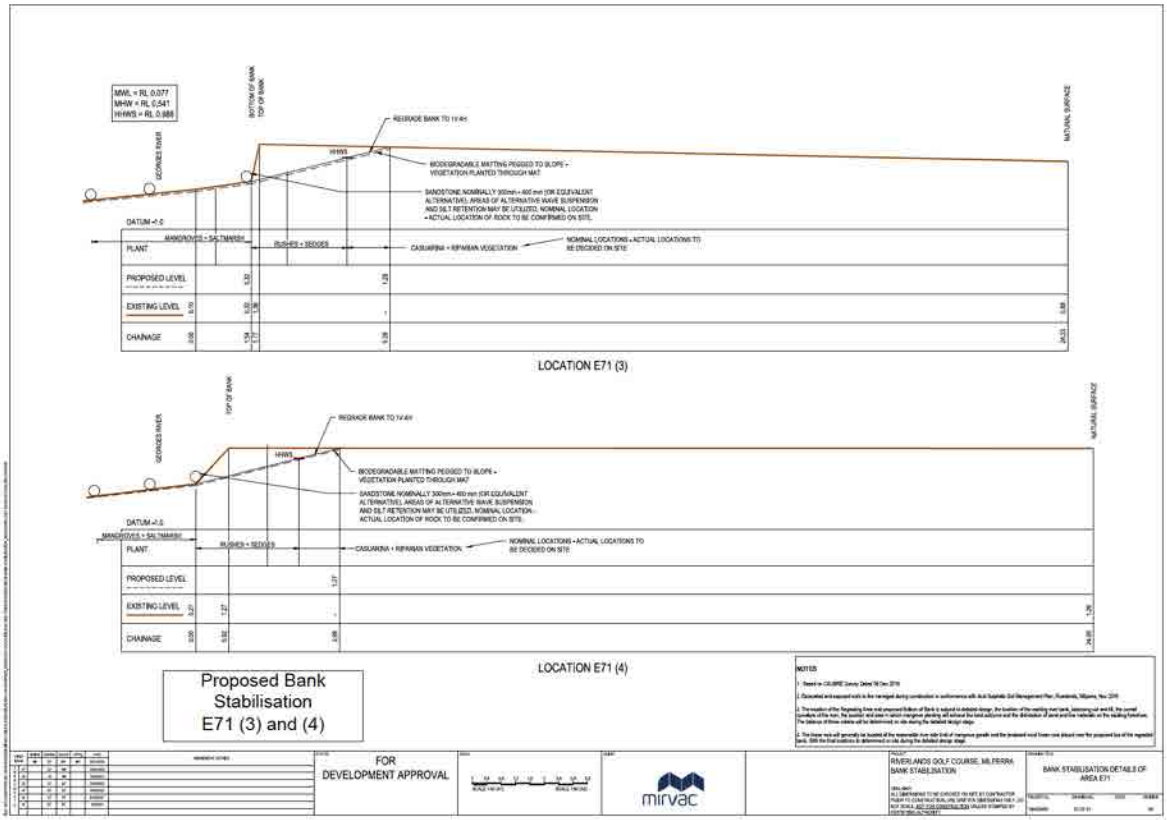


Amended Development Application Proposed Bank Stabilisation E71 (1) and (2)

- Additional engineering Information;

None

Original Development Application Proposed Bank Stabilisation E71 (3) and (4)

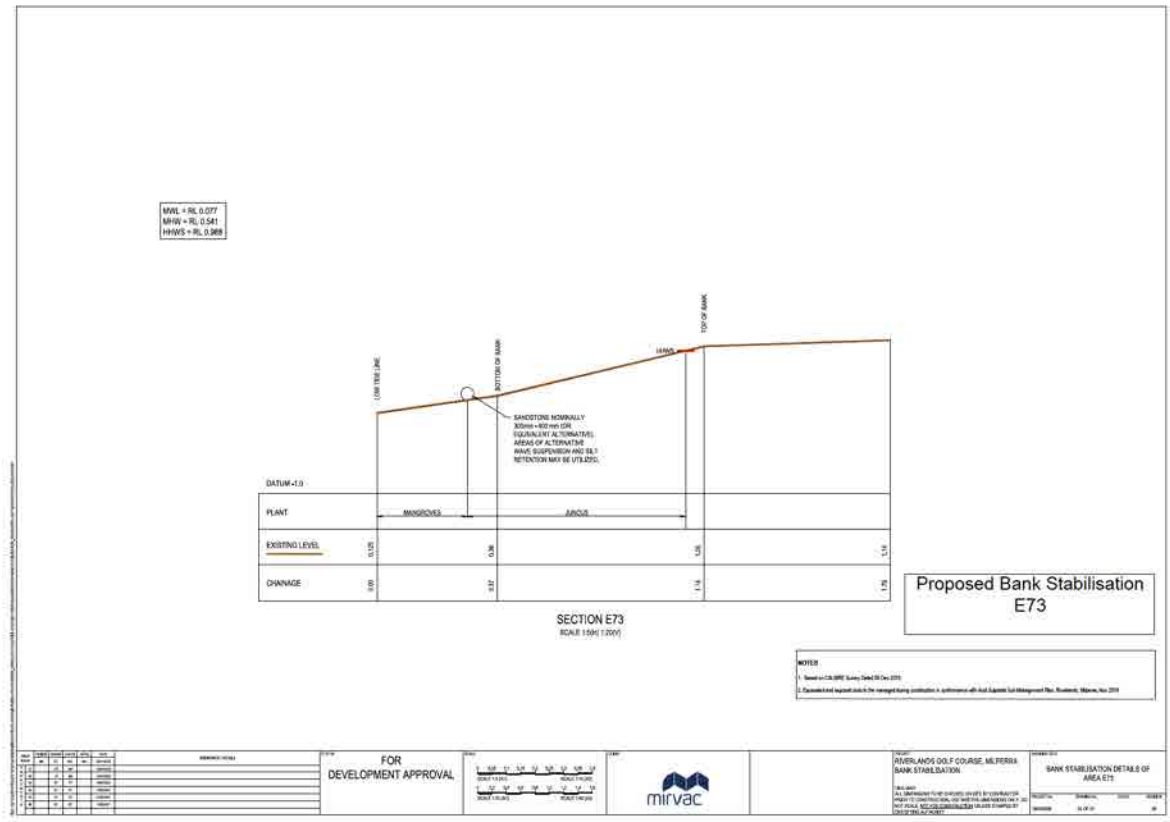


Amended Development Application Proposed Bank Stabilisation E71 (3) and (4)

- Additional engineering Information;

None

Original Development Application Proposed Bank Stabilisation E73

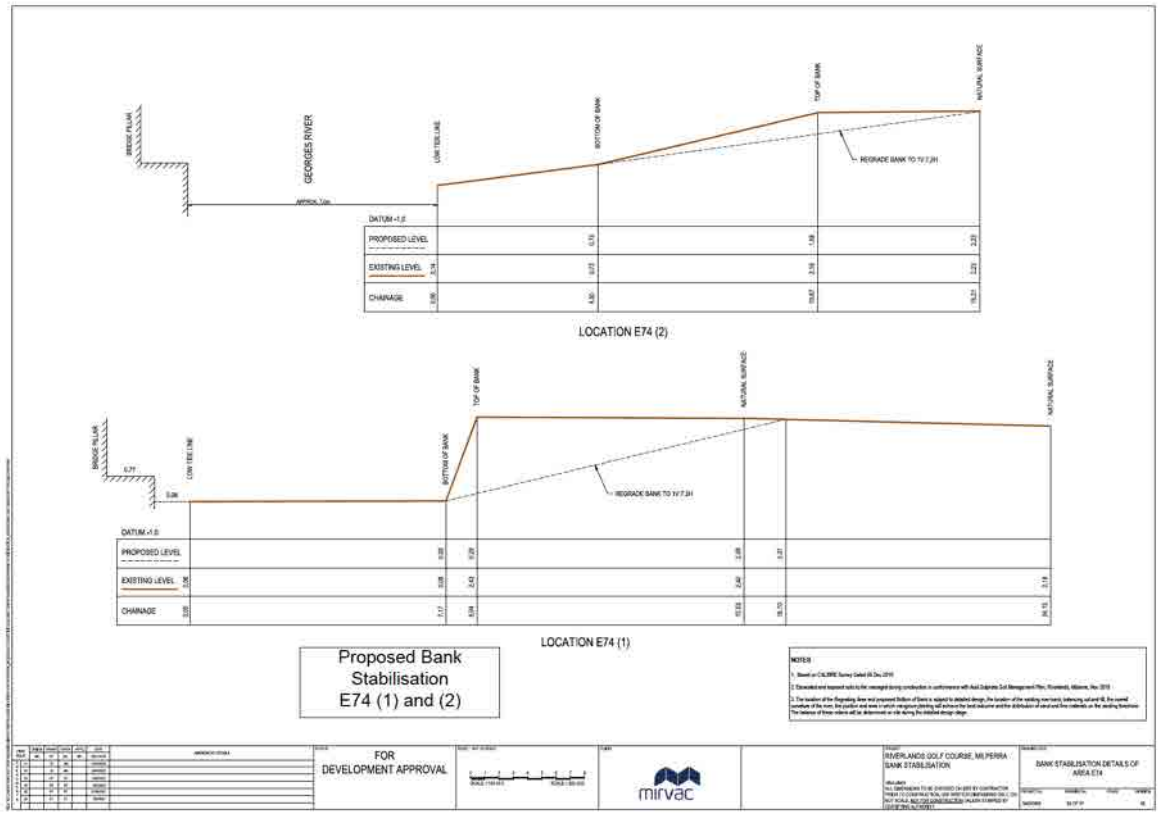


Amended Development Application Proposed Bank Stabilisation E73

- Additional engineering Information;

None

Original Development Application Proposed Bank Stabilisation E74 (1) and (2)

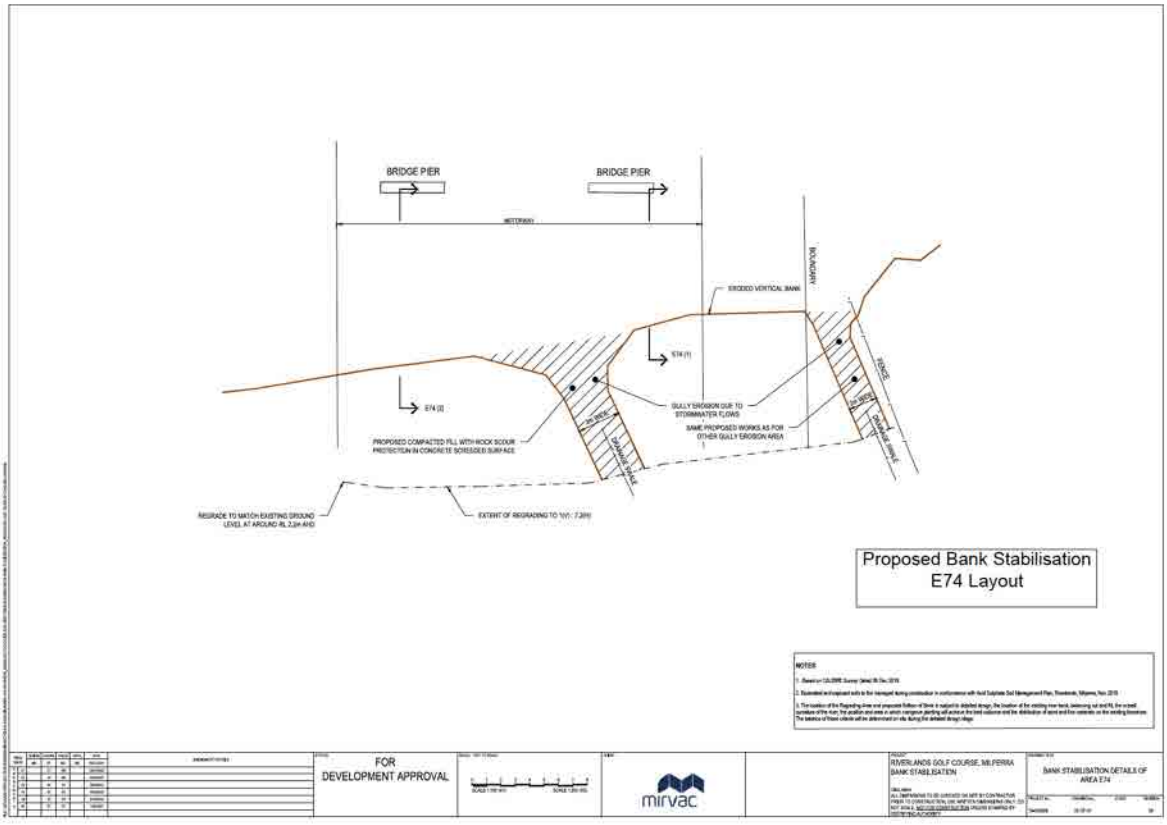


Amended Development Application Proposed Bank Stabilisation E74 (1) and (2)

- Additional engineering Information;

None

Original Development Application Proposed Bank Stabilisation E74

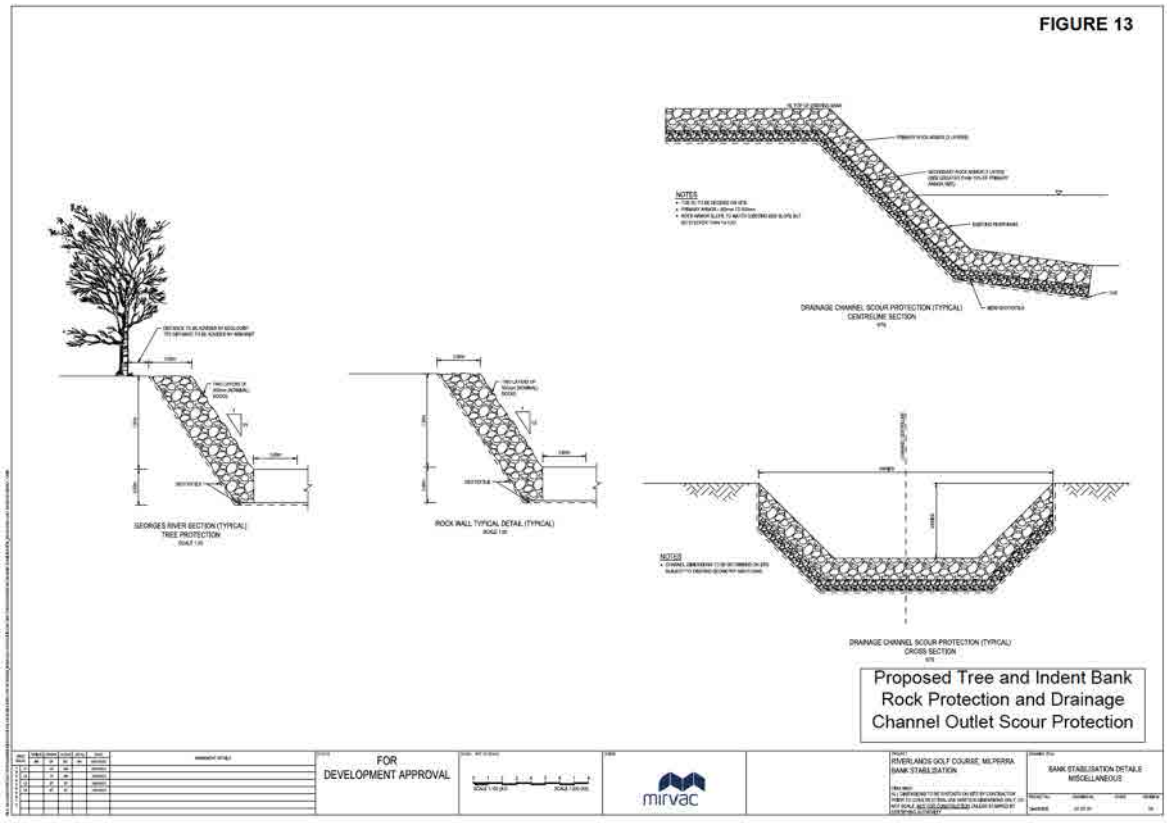


Amended Development Application Proposed Bank Stabilisation E74

- Additional engineering Information;

None

Original Development Application Proposed Tree and Indent bank Rock Protection and Drainage Channel Outlet Scour Protection



Amended Development Application Proposed Tree and Indent bank Rock Protection and Drainage Channel Outlet Scour Protection

- Additional engineering Information;

4.0 Planning Controls

The proposed development has been assessed against the relevant requirements and guidelines set by Canterbury Bankstown Council. These are contained within the:

- SEPP Coastal Management 2018
- SEPP 55 – Remediation of Land
- Bankstown Local Environmental Plan 2000
- Bankstown Local Environmental Plan 2015
- Bankstown Development Control Plan – Subdivision 2000
- Bankstown Development Control Plan 2015

4.1 SEPP Coastal Management 2018

The SEPP requires consideration to be given to the following matters when an application for development within the are identified on the Coastal Zone Map as partly Coastal Use and partly Wetlands and Littoral Rainforest and Coastal Environment Area.

10 Development on certain land within coastal wetlands and littoral rainforests area

(1) The following may be carried out on land identified as "coastal wetlands" or "littoral rainforest" on the *Coastal Wetlands and Littoral Rainforests Area Map* only with development consent:

(a) the clearing of native vegetation within the meaning of Part 5A of the *Local Land Services Act 2015*,

(b) the harm of marine vegetation within the meaning of Division 4 of Part 7 of the *Fisheries Management Act 1994*,

(c) the carrying out of any of the following:

(i) earthworks (including the depositing of material on land),

(ii) constructing a levee,

(iii) draining the land,

(iv) environmental protection works,

(d) any other development.

Note.

Clause 17 provides that, for the avoidance of doubt, nothing in this Part:

(a) permits the carrying out of development that is prohibited development under another environmental planning instrument, or

(b) permits the carrying out of development without development consent where another environmental planning instrument provides that the development may be carried out only with development consent.

(2) Development for which consent is required by subclause (1), other than development for the purpose of environmental protection works, is declared to be designated development for the purposes of the Act.

(3) Despite subclause (1), development for the purpose of environmental protection works on land identified as "coastal wetlands" or "littoral rainforest" on the *Coastal Wetlands and Littoral Rainforests Area Map* may be carried out by or on behalf of a public authority without development consent if the development is identified in:

(a) the relevant certified coastal management program, or

(b) a plan of management prepared and adopted under Division 2 of Part 2 of Chapter 6 of the *Local Government Act 1993*, or

(c) a plan of management approved and in force under Division 6 of Part 5 of the *Crown Lands Act 1989*.

(4) A consent authority must not grant consent for development referred to in subclause (1) unless the consent authority is satisfied that sufficient measures have been, or will be, taken to protect, and where possible enhance, the biophysical, hydrological and ecological integrity of the coastal wetland or littoral rainforest.

(5) Nothing in this clause requires consent for the damage or removal of a priority weed within the meaning of clause 32 of Schedule 7 to the *Biosecurity Act 2015*.

(6) This clause does not apply to the carrying out of development on land reserved under the *National Parks and Wildlife Act 1974* if the proposed development is consistent with a plan of management prepared under that Act for the land concerned.

11 Development on land in proximity to coastal wetlands or littoral rainforest

Note.

The *Coastal Wetlands and Littoral Rainforests Area Map* identifies certain land that is inside the coastal wetlands and littoral rainforests area as "proximity area for coastal wetlands" or "proximity area for littoral rainforest" or both.

(1) Development consent must not be granted to development on land identified as "proximity area for coastal wetlands" or "proximity area for littoral rainforest" on the *Coastal Wetlands and Littoral Rainforests Area Map* unless the consent authority is satisfied that the proposed development will not significantly impact on:

(a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or

(b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

(2) This clause does not apply to land that is identified as "coastal wetlands" or "littoral rainforest" on the *Coastal Wetlands and Littoral Rainforests Area Map*.

13 Development on land within the coastal environment area

(1) Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,

(b) coastal environmental values and natural coastal processes,

(c) the water quality of the marine estate (within the meaning of the *Marine Estate Management Act 2014*), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,

(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,

(e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,

(f) Aboriginal cultural heritage, practices and places,

(g) the use of the surf zone.

(2) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

(a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or

(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

(3) This clause does not apply to land within the Foreshores and Waterways Area within the meaning of *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005*.

14 Development on land within the coastal use area

(1) Development consent must not be granted to development on land that is within the coastal use area unless the consent authority:

(a) has considered whether the proposed development is likely to cause an adverse impact on the following:

(i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,

(ii) overshadowing, wind funnelling and the loss of views from public places to foreshores,

(iii) the visual amenity and scenic qualities of the coast, including coastal headlands,

(iv) Aboriginal cultural heritage, practices and places,

(v) cultural and built environment heritage, and

(b) is satisfied that:

(i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or

(ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or

(iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and

(c) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.

(2) This clause does not apply to land within the Foreshores and Waterways Area within the meaning of Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005.

The study area is mapped as a Coastal Wetlands and these are each surrounded by a buffer zone identified as Proximity Areas for Coastal Wetlands.

Coastal Environment Area

The management objectives for the Coastal Environment Area are:

- To protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes, and coastal lagoons;
- To enhance natural character, scenic value, biological diversity, and ecosystem integrity;
- To reduce threats to, and improve the resilience of, coastal waters, estuaries, coastal lakes, and coastal lagoons, including in response to climate change;
- To maintain and improve water quality and estuary health;
- To support the social and cultural values of coastal waters, estuaries, coastal lakes, and coastal lagoons;
- To maintain the presence of beaches, dunes, and the natural features of foreshores, taking into account the beach system;
- To maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands, and rock platforms.

The project has been designed to retain and conserve the ecologically sensitive areas of the subject site that includes Georges River and the vegetation within the buffer zone. The project will reduce the current threats of grazing and uses that impact on water quality and riverine health through conservation of the study area and removal of cattle from the property. Further improvements to water quality are predicted to occur through the implementation of an environmentally sensitive urban water design that is incorporated into the stormwater management plan, including the use of bioretention basins to filter runoff that currently flows untreated directly into Georges River. The

project will improve public access to the Georges River through construction of access to areas of the river banks which are currently inaccessible to the public. Therefore, the project is considered consistent with the management objectives of the Coastal Environment Area.

Coastal Wetlands and Littoral Rainforest Area
The management objectives for the Coastal Wetlands and Littoral Rainforests Area are:

- To protect coastal wetlands and littoral rainforests in their natural state, including their biological diversity and ecosystem integrity;
- To promote the rehabilitation and restoration of degraded coastal wetlands and littoral rainforests;
- To improve the resilience of coastal wetlands and littoral rainforests to the impacts of climate change, including opportunities for migration;
- To support the social and cultural values of coastal wetlands and littoral rainforest; and
- To promote the objectives of State policies and programs for wetlands or littoral rainforest management.

No area of coastal wetlands or littoral rainforest occurs within the development footprint. The project has been situated in such a way to avoid impacts to these communities.

The proposed development will not significantly impact on the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

The proposed development is of a type, scale and size which is consistent with its context and surrounding subdivision pattern so that it is considered appropriate to its coastal location.

The proposal does not hinder existing access to the coastal foreshore and is not of a type that lends itself to providing increased access at this point in time. A consideration of the impacts of the proposal demonstrate that there will be no significant impact on the coastal foreshore and that the public domain will not be affected by the proposal.

The proposal is not considered to adversely affect scenic qualities, conservation measures, wildlife corridors, coastal processes or coastal hazards. The proposal is not considered to give rise to any potential conflict with water-based activities or adversely impact on water quality.

It is considered that the proposal is consistent with the requirements of the Policy.

4.2 SEPP 55 – Remediation of Land

The greater site area has been assessed against the requirements of SEPP 55. In relation to land contamination and remediation, Sullivan Sciences Contamination Assessment Report 2021 considered the site's suitability to accommodate future development and analysed the inground conditions.

All of the work for the Contamination Assessment and the Remediation Action plans was undertaken in accordance with the regulatory framework.

SEPP 55 requires that:
7 Contamination and remediation to be considered in determining development application
(1) A consent authority must not consent to the carrying out of any development on land unless—

(a) it has considered whether the land is contaminated, and
(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state

(or will be suitable, after remediation) for the purpose for which the development is proposed
to be carried out, and

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

(2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.

(3) The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority. The consent authority may require the applicant to carry out, and provide a report on, a detailed investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.

(4) The land concerned is—

(a) land that is within an investigation area,

(b) land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,

(c) to the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital land—

(i) in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and

(ii) on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).

The site has the benefit of detailed site investigations prepared for the purposes of assisting the consent authority to discharge its functions under SEPP 55. These investigations reveal some contamination to be present associated with pesticide and chemical storage associated with the now dormant golf club use and also some landfill waste underneath the area closer to the foreshore. These matters are discussed in significant details in the investigations that accompany these amended development applications. Importantly, the detailed site investigations conclude that the land can be made suitable for its intended uses. The detailed site investigations comprehensively include both the requirement for a preliminary investigation of land required for a change of use as specified in clause 7(2) of SEPP 55 and also the detailed investigation recommends the preparation of a remediation action plan that satisfies the requirements of clause 7(1((b) and (c) of SEPP 55.

4.3 Bankstown Local Environmental Plan 2015

The subject site is Zoned RE1 Public Recreation, RE2 Private Recreation and R2 Low Density Residential Zone under Bankstown Local Environmental Plan 2015. The specific objectives of the *zones are:*

Zone RE1 Public Recreation

1 *Objectives of zone*

- *To enable land to be used for public open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*

2 *Permitted without consent*

Nil

3 *Permitted with consent*

Aquaculture; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Car parks; Caravan parks; Centre-based child care facilities; Charter and tourism boating facilities; Community facilities; Eco-tourist facilities; Emergency services facilities; Entertainment facilities; Environmental facilities; Environmental protection works; Extensive agriculture; Flood mitigation works; Food and drink premises; Function centres; Information and education facilities; Intensive plant agriculture; Jetties; Kiosks; Marinas; Markets; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Respite day care centres; Roads; Water recreation structures; Water supply systems; Wharf or boating facilities

Zone RE2 Private Recreation

1 *Objectives of zone*

- *To enable land to be used for private open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*

2 *Permitted without consent*

Nil

3 *Permitted with consent*

Aquaculture; Building identification signs; Business identification signs; Car parks; Community facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Helipads; Kiosks; Marinas; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Roads; Water supply systems

4 *Prohibited*

Any development not specified in item 2 or 3

Zone R2 Low Density Residential

1 *Objectives of zone*

- *To provide for the housing needs of the community within a low density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To allow for certain non-residential development that is compatible with residential uses and does not adversely affect the living environment or amenity of the area.*
- *To allow for the development of low density housing that has regard to local amenity.*
- *To require landscape as a key characteristic in the low density residential environment.*

2 *Permitted without consent*

Home occupations

3 *Permitted with consent*

Bed and breakfast accommodation; Boarding houses; Boat sheds; Building identification signs; Business identification signs; Car parks; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Emergency services facilities; Environmental facilities; Environmental protection works; Exhibition homes; Flood mitigation works; Group homes; Health consulting rooms; Home-based child care; Home businesses; Hospitals; Information and education facilities; Jetties; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Public administration buildings; Recreation areas; Respite day care centres; Roads; Secondary dwellings; Semi-detached dwellings; Seniors housing; Tank-based aquaculture; Water recreation structures; Water supply systems

4 Prohibited
Any development not specified in item 2 or 3

The proposal as a site amalgamation and procedural subdivision conforming with the zoning boundaries and permissible uses is consistent with the objectives of the zones and it is noted that no work is proposed under this amended development application.

The proposal is assessed under the relevant clauses of this LEP 2015 in the table below.

TABLE 1: Compliance with LEP 2015

4.1 Minimum subdivision lot size (1) The objectives of this clause are as follows— (a) to ensure lots are of sufficient size to accommodate certain development that is consistent with relevant planning provisions without adversely impacting on residential amenity, (b) to ensure the subdivision of low density residential sites reflects and reinforces the predominant subdivision pattern of the area. (2) This clause applies to a subdivision of any land shown on the Lot Size Map that requires development consent and that is carried out after the commencement of this Plan.

(3) The size of any lot resulting from a subdivision of land to which this clause applies is not to be less than the minimum size shown on the Lot Size Map in relation to that land. (3A) If a lot is a battle-axe lot or other lot with an access handle, the area of the access handle is not to be included when calculating the size of the lot for the purposes of this clause. (4) This clause does not apply in relation to the subdivision of any land— (a) by the registration of a strata plan or strata plan of subdivision under the *Strata Schemes Development Act 2015*, or (b) by any kind of subdivision under the *Community Land Development Act 1989*.
Not applicable. No subdivision is proposed.
4.1A Minimum lot sizes and special provisions for dual occupancies (1) The objectives of this clause are as follows— (a) to ensure that lot sizes are sufficient to accommodate development that is consistent with the objectives and planning provisions for dual occupancies, (b) to minimise any likely adverse impact of development on the amenity of the area. (2) Development consent must not be granted to development for the following purposes— (a) a dual occupancy (attached) on a lot in Zone R2 Low Density Residential unless the lot has an area of at least 500 square metres and is at least 15 metres wide at the front building line, (b) a dual occupancy (detached) on a lot in Zone R2 Low Density Residential unless the lot has an area of at least 700 square metres and is at least 20 metres wide at the front building line, (c) a dual occupancy on a lot being land identified as “Area 2” on the Special Provisions Map. (3) Despite subclause (2), development consent must not be granted to development for the purpose of a dual occupancy unless the consent authority is satisfied that each dwelling will have a frontage to a road.

(4) The consent authority may grant development consent for the subdivision of— (a) a dual occupancy (attached), if the size of each lot to be created will be at least 250 square metres, or (b) a dual occupancy (detached), if the size of each lot to be created will be at least 350 square metres.
Not applicable. No subdivision is proposed.
4.1AA Minimum subdivision lot size for community title schemes (1) The objectives of this clause are as follows— (a) to ensure lots are of sufficient size to accommodate certain development that is consistent with relevant planning provisions without adversely impacting on residential amenity. (2) This clause applies to a subdivision (being a subdivision that requires development consent) under the *Community Land Development Act 1989* of land in any of the following zones— (a) Zone R2 Low Density Residential, but does not apply to a subdivision by the registration of a strata plan. (3) The size of any lot resulting from a subdivision of land to which this clause applies (other than any lot comprising association property within the meaning of the *Community Land Development Act 1989*) is not to be less than the minimum size shown on the Lot Size Map in relation to that land. (4) This clause applies despite clause 4.1.
Not applicable. No subdivision is proposed.
4.3 Height of buildings (1) The objectives of this clause are as follows— (a) to ensure that the height of development is compatible with the character, amenity and landform of the area in which the development will be located,

(b) to maintain the prevailing suburban character and amenity by limiting the height of development to a maximum of two storeys in Zone R2 Low Density Residential, (c) to provide appropriate height transitions between development, particularly at zone boundaries, (d) to define focal points by way of nominating greater building heights in certain locations. (2) The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map. (2A) Despite subclause (2)— (a) for land in Zone B2 Local Centre—if a lot is in "Area 1" as identified on the Height of Buildings Map and has a width of less than 20 metres at the road frontage, the maximum building height is 17 metres, and (b) for land in Zone B6 Enterprise Corridor—if a lot is in "Area 2" as identified on the Height of Buildings Map and has an area less than 5,000 square metres, the maximum building height is 11 metres. (2B) Despite subclause (2), the following restrictions apply to development on land in Zone R2 Low Density Residential— (a) for a secondary dwelling that is separate from the principal dwelling—the maximum building height is 6 metres and the maximum wall height is 3 metres, (b) for a dwelling house or a dual occupancy—the maximum wall height is 7 metres, (c) for boarding houses— (i) the maximum building height for a dwelling facing a road is 9 metres and the maximum wall height is 7 metres, and (ii) the maximum building height for all other dwellings at the rear of the lot is 6 metres and the maximum wall height is 3 metres. (2C) In this clause, *wall height* means the vertical distance between ground level (existing) and the underside of the eaves at the wall line or the top of the parapet or the flat roof (whichever is the highest).
Not applicable. Environmental Protection works and remediation works only.
4.4 Floor space ratio

(1) The objectives of this clause are as follows—

(a) to establish the bulk and maximum density of development consistent with the capacity and character of the locality of a development site,

(b) to ensure the bulk of non-residential development in or adjoining a residential zone is compatible with the prevailing suburban character and amenity of the residential zone,

(c) to encourage lot consolidations in commercial centres to facilitate higher quality built form and urban design outcomes.

(2) The maximum floor space ratio for a building on any land is not to exceed the floor space ratio shown for the land on the Floor Space Ratio Map.

(2A) Despite subclause (2), the maximum floor space ratio for non-residential development on land in Zone R2 Low Density Residential is 0.4:1.

(2B) Despite subclause (2), the maximum floor space ratio for development for the purpose of high technology industries on land in Zone R2 Low Density Residential and identified as “Area 6” on the Floor Space Ratio Map is 0.6:1.

(2C) Despite subclause (2), the maximum floor space ratio for development on land in Zone B2 Local Centre—

(a) that has a width of less than 20 metres at the front building line and is identified as “Area 1” on the Floor Space Ratio Map is 1:1, and

(b) that has a width of less than 18 metres at the front building line and is identified as “Area 7” on the Floor Space Ratio Map is 2:1.

(2D) Despite subclause (2), the maximum floor space ratio for development on land in Zone B4 Mixed Use that has a width of less than 30 metres at the front building line and is identified as “Area 4” on the Floor Space Ratio Map is 2:1.

(2E) Despite subclause (2), the maximum floor space ratio for development on land in Zone B4 Mixed Use that has a width of less than 18 metres at the front building line and is identified as “Area 2” on the Floor Space Ratio Map is 1:1.

(2F) Despite subclause (2), the maximum floor space ratio for development on land in Zone B4 Mixed Use that has a width of less

than 18 metres at the front building line and is identified as “Area 3” on the Floor Space Ratio Map is 2:1. (2G) Despite subclause (2), the maximum floor space ratio for development on land in Zone B4 Mixed Use that does not provide at least a 20 metre wide mid-block connection for public use and is identified as “Area 5” on the Floor Space Ratio Map is 2:1.
Not applicable. Bank stabilization, revegetation and remediation works only.
5.10 Heritage conservation Note— Heritage items (if any) are listed and described in Schedule 5. Heritage conservation areas (if any) are shown on the Heritage Map as well as being described in Schedule 5. (1) Objectives The objectives of this clause are as follows— (a) to conserve the environmental heritage of Bankstown, (b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views, (c) to conserve archaeological sites, (d) to conserve Aboriginal objects and Aboriginal places of heritage significance. (2) Requirement for consent Development consent is required for any of the following— (a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance)— (i) a heritage item, (ii) an Aboriginal object, (iii) a building, work, relic or tree within a heritage conservation area, (b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,

(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,

(d) disturbing or excavating an Aboriginal place of heritage significance,

(e) erecting a building on land—

(i) on which a heritage item is located or that is within a heritage conservation area, or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,

(f) subdividing land—

(i) on which a heritage item is located or that is within a heritage conservation area, or

(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

(3) When consent not required However, development consent under this clause is not required if—

(a) the applicant has notified the consent authority of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development—

(i) is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or archaeological site or a building, work, relic, tree or place within the heritage conservation area, and

(ii) would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place, archaeological site or heritage conservation area, or

(b) the development is in a cemetery or burial ground and the proposed development—

(i) is the creation of a new grave or monument, or excavation or disturbance of land for the purpose of conserving or repairing monuments or grave markers, and

(ii) would not cause disturbance to human remains, relics, Aboriginal objects in the form of grave goods, or to an Aboriginal place of heritage significance, or

(c) the development is limited to the removal of a tree or other vegetation that the Council is satisfied is a risk to human life or property, or

(d) the development is exempt development.

(4) Effect of proposed development on heritage significance The consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned. This subclause applies regardless of whether a heritage management document is prepared under subclause (5) or a heritage conservation management plan is submitted under subclause (6).

(5) Heritage assessment The consent authority may, before granting consent to any development—

(a) on land on which a heritage item is located, or

(b) on land that is within a heritage conservation area, or

(c) on land that is within the vicinity of land referred to in paragraph (a) or (b),

require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.

(6) Heritage conservation management plans The consent authority may require, after considering the heritage significance of a heritage item and the extent of change proposed to it, the submission of a heritage conservation management plan before granting consent under this clause.

(7) Archaeological sites The consent authority must, before granting consent under this clause to the carrying out of development on an archaeological site (other than land listed on the State Heritage Register or to which an interim heritage order under the *Heritage Act 1977* applies)—

(a) notify the Heritage Council of its intention to grant consent, and

(b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.

(8) Aboriginal places of heritage significance The consent authority must, before granting consent under this clause to the carrying out of development in an Aboriginal place of heritage significance—

(a) consider the effect of the proposed development on the heritage significance of the place and any Aboriginal object known or reasonably likely to be located at the place by means of an adequate investigation and assessment (which may involve consideration of a heritage impact statement), and

(b) notify the local Aboriginal communities, in writing or in such other manner as may be appropriate, about the application and take into consideration any response received within 28 days after the notice is sent.

(9) Demolition of nominated State heritage items The consent authority must, before granting consent under this clause for the demolition of a nominated State heritage item—

(a) notify the Heritage Council about the application, and

(b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.

(10) Conservation incentives The consent authority may grant consent to development for any purpose of a building that is a heritage item or of the land on which such a building is erected, or for any purpose on an Aboriginal place of heritage significance, even though development for that purpose would otherwise not be allowed by this Plan, if the consent authority is satisfied that—

(a) the conservation of the heritage item or Aboriginal place of heritage significance is facilitated by the granting of consent, and

(b) the proposed development is in accordance with a heritage management document that has been approved by the consent authority, and

(c) the consent to the proposed development would require that all necessary conservation work identified in the heritage management document is carried out, and

(d) the proposed development would not adversely affect the heritage significance of the heritage item, including its setting, or the

heritage significance of the Aboriginal place of heritage significance, and

(e) the proposed development would not have any significant adverse effect on the amenity of the surrounding area.

The amended proposal includes an Aboriginal Heritage Assessment and European Heritage Assessment which have been undertaken by Artefact and submitted with the application which conclude that the proposed works are consistent with the provisions of this clause.

6.1 Acid sulfate soils

(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.

(2) Development consent is required for the carrying out of works described in the table to this subclause on land shown on the Acid Sulfate Soils Map as being of the class specified for those works.

Class of land	Works
1	Any works.
2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.
3	Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.
4	Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.
5	Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered

below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

(3) Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.

(4) Despite subclause (2), development consent is not required under this clause for the carrying out of works if—

(a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and

(b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.

(5) Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power)—

(a) emergency work, being the repair or replacement of the works of the public authority, required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety,

(b) routine maintenance work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil),

(c) minor work, being work that costs less than $20,000 (other than drainage work).

(6) Despite subclause (2), development consent is not required under this clause to carry out any works if—

(a) the works involve the disturbance of less than 1 tonne of soil, and

(b) the works are not likely to lower the watertable

The amended proposal includes an Acid Sulphate Soil Management Plan which have been undertaken by SESL Australia and submitted with the application which concludes that this acid sulfate soil management plan details the methodologies for the disturbance and treatment of the actual and potential acid sulfate soils at the site throughout the course of the proposed development. All methodologies have been developed in accordance with relevant NSW guidelines. SESL considers that this management plan is sufficient to manage the risks associated with actual and potential acid sulfate soils at the site and that the proposed works are consistent with the provisions of this clause.
6.2 Earthworks (1) The objective of this clause is to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. (2) Development consent is required for earthworks unless— (a) the earthworks are exempt development under this Plan or another applicable environmental planning instrument, or (b) the earthworks are ancillary to development that is permitted without consent under this Plan or to development for which development consent has been given. (3) In deciding whether to grant development consent for earthworks (or for development involving ancillary earthworks), the consent authority must consider the following matters— (a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development, (b) the effect of the development on the likely future use or redevelopment of the land, (c) the quality of the fill or the soil to be excavated, or both, (d) the effect of the development on the existing and likely amenity of adjoining properties, (e) the source of any fill material and the destination of any excavated material,

(f) the likelihood of disturbing relics, (g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area, (h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. Note— The *National Parks and Wildlife Act 1974*, particularly section 86, deals with harming Aboriginal objects
The nature of the Banks Stabilisation works requires earthworks which is described in detail as part of the Tooker and Associates River Bank Stabilisation report which has been prepared consistent with the requirements of these provisions and are submitted with the application.
6.3 Flood planning (1) The objectives of this clause are as follows— (a) to minimise the flood risk to life and property associated with the use of land, (b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change, (c) to avoid significant adverse impacts on flood behaviour and the environment. (2) This clause applies to land at or below the flood planning level. (3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development— (a) is compatible with the flood hazard of the land, and (b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and (c) incorporates appropriate measures to manage risk to life from flood, and

(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and (e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding. (4) A word or expression used in this clause has the same meaning as it has in the *Floodplain Development Manual (*ISBN 0 7347 5476 0*)* published by the NSW Government in April 2005, unless it is otherwise defined in this clause. (5) In this clause— *flood planning level* means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.	
	Tooker and Associates River Bank Stabilisation report identifies the works will not have any adverse impacts on the flooding behaviour and has been prepared consistent with the requirements of these provisions are submitted with the application.
6.4 Biodiversity (1) The objective of this clause is to maintain terrestrial and aquatic biodiversity by— (a) protecting native fauna and flora, and (b) protecting the ecological processes necessary for their continued existence, and (c) encouraging the conservation and recovery of native fauna and flora and their habitats. (2) This clause applies to land identified as “Biodiversity” on the Terrestrial Biodiversity Map. (3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must consider— (a) whether the development is likely to have— (i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and	

(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and (iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and (iv) any adverse impact on the habitat elements providing connectivity on the land, and (b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. (4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that— (a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or (b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minim
This clause addresses whether the development is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and any adverse impact on the habitat elements providing connectivity on the land, and any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. The impact of the development on biodiversity has been assessed in the Amended Biodiversity Development Assessment Report prepared by Cumberland Ecology which has been prepared consistent with the requirements of these provisions and is submitted with the application. This BDAR has been prepared to assess the impacts of the proposed development on biodiversity values, in accordance with the BAM

streamlined assessment module for small areas. The project involves the implementation of environment protection works (bank stabilisation) along limited areas of the banks of the Georges River as required under an executed VPA. The project will complement work done for the re- establishment of a 50 m wide corridor of riparian vegetation which is also required under the executed VPA. The combined bank stabilisation works and riparian reestablishment will form a substantial and stable ecological corridor along the river in the long term. It will conserve substantial area of the TECs RFEF and SOFF in the long term.

Native vegetation occurring within the subject land currently includes small patches of River-flat Eucalypt Forest EEC (approximately 0.02 ha) and Swamp Oak Floodplain Forest (approximately 0.04ha), which extends beyond the subject land along other parts of the Georges River as well as the wider Riverlands site. The proposed environmental protection works will involve the removal of three trees and disturbance to understorey. Nonetheless a conservative approach has been taken and all vegetation within the subject land has been assessed as directly impacted (ie removed).

As the project includes the removal of an area of native vegetation, a small number of offsets are required in the form of ecosystem credits. This assessment indicates that the removal of the native vegetation within the subject land requires a total of 1 ecosystem credits of PCT 835 and 1 ecosystem credit for PCT 1232.

No threatened flora or fauna species that are considered as species credit species were recorded within the subject land and none are considered likely to occur. Therefore, no species credits species are required to be offset.

Measures to avoid and minimise impacts to the biodiversity values of the study area have been proposed and include consideration of the project location and design. However, when considering the

requirements associated with the requirements for bank stabilisation at specific locations under the executed VPA, the small size of the site and the fact that the riverbanks have already been modified and are subject to ongoing erosion, opportunities to avoid all impacts on biodiversity values in general are limited. Nonetheless, most of the existing remnant vegetation along the banks of the Georges River will be retained and managed, with a Riparian corridor to planted along the length of the banks within the Riverlands site as part of the executed VPA requirements.

Further impacts of the project may entail potential indirect impacts, including inadvertent impacts on adjacent habitat and so prescribed impacts such as changes to hydrological processes during works have been considered and provided for.

A suite of mitigation measures is proposed to minimise and manage the impacts to biodiversity values, such as tree protection measures, weed management and sediment management. Restoration of retained areas of riparian vegetation and replanting of new areas of the TECs are proposed to be managed and enhanced under a Vegetation Management Plan.

With the implementation of the proposed mitigation measures and the offsetting described previously, it is considered that the impacts of this project on biodiversity will be limited and can be appropriately managed.

The proposed works comprise environmental protection works and therefore will improve conditions along the Georges River in the long term via stabilisation of eroded/eroding banks and enabling re-establishment of riparian and estuarine vegetation in currently denuded/degraded banks thus creating and improving riparian, estuarine and aquatic habitats in the long term. The proposed development is consistent with the No Net Loss standard as impacts to biodiversity values have been avoided/minimised/mitigated where feasible and all residual

impacts are to be offset by retirement of the required number of biodiversity credits.

6.4A Riparian land and watercourses

(1) The objective of this clause is to protect and maintain the following—

(a) water quality within watercourses,

(b) the stability of the bed and banks of watercourses,

(c) aquatic and riparian habitats,

(d) ecological processes within watercourses and riparian areas.

(2) This clause applies to all of the following—

(a) land identified as “Riparian land” on the Riparian Lands and Watercourses Map,

(b) land identified as “Watercourse” on that map.

(3) In deciding whether to grant development consent for development on land to which this clause applies, the consent authority must consider—

(a) whether or not the development is likely to have any adverse impact on the following—

(i) the water quality and flows within the watercourse,

(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,

(iii) the stability of the bed and banks of the watercourse,

(iv) the free passage of fish and other aquatic organisms within or along the watercourse,

(v) any future rehabilitation of the watercourse and riparian areas, and

(b) whether or not the development is likely to increase water extraction from the watercourse, and

(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

(4) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied that—

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or (b) if that impact cannot be avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact
This clause addresses whether the development is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and any adverse impact on the habitat elements providing connectivity on the land, and any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. This has been addressed in the BDAR which concludes that the bank stabilisation and remediation works will have a positive impact on the riparian land and watercourses.
6.5 Limited development on foreshore area (1) The objective of this clause is to ensure that development in the foreshore area will not impact on natural foreshore processes or affect the significance and amenity of the area. (2) Development consent must not be granted for development on land in the foreshore area except for the following purposes— (a) the extension, alteration or rebuilding of an existing building wholly or partly in the foreshore area, (b) boat sheds, sea retaining walls, wharves, slipways, jetties, waterway access stairs, swimming pools, fences, cycleways, walking trails, picnic facilities or other recreation facilities (outdoors). (3) Development consent must not be granted under this clause unless the consent authority is satisfied that— (a) the development will contribute to achieving the objectives for the zone in which the land is located, and

(b) the appearance of any proposed structure, from both the waterway and adjacent foreshore areas, will be compatible with the surrounding area, and (c) the development will not cause environmental harm such as— (i) pollution or siltation of the waterway, or (ii) an adverse effect on surrounding uses, marine habitat, wetland areas, fauna and flora habitats, or (iii) an adverse effect on drainage patterns, and (d) the development will not cause congestion or generate conflict between people using open space areas or the waterway, and (e) opportunities to provide continuous public access along the foreshore and to the waterway will not be compromised, and (f) any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained, and (g) in the case of development for the alteration or rebuilding of an existing building wholly or partly in the foreshore area—the alteration or rebuilding will not have an adverse impact on the amenity or aesthetic appearance of the foreshore, and (h) sea level rise or change of flooding patterns as a result of climate change has been considered
This clause addresses whether the development is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and any adverse impact on the habitat elements providing connectivity on the land, and any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development. This has been addressed in the BDAR which concludes that the bank stabilisation, revegetation and remediation works will have a positive impact on the riparian land and watercourses.

6.11 Development on Riverlands Golf Course site

(1) This clause applies to the following land at Milperra (known as the Riverlands Golf Course site)—

(a) Lots 23–27, 38–41 and 50–59, DP 7304, Lots 21 and 22, DP 749985, Lots 231 and 232, DP 805826 and Lot 1, DP 813007, being 67, 67A, 80, 80A, 90 and 100 Auld Avenue,

(b) Lot 1, DP 625013 and Lot 1, DP 813006, being 123 and 123A Raleigh Road,

(c) Lot 10, DP 731859, being 56 Prescott Parade, Milperra.

(2) The objectives of this clause are as follows—

(a) to ensure that development on the site reflects the low density residential character of the surrounding area,

(b) to ensure that traffic generated by development of the site does not adversely affect the efficiency and safety of Henry Lawson Drive and surrounding local roads,

(c) to ensure that development protects and conserves the cultural heritage, ecological and habitat values of the site and the scenic values of the surrounding waterways and riparian corridors,

(d) to ensure that development integrates with the landform, vegetation, overland flow path and landscape of the site.

(3) Development consent must not be granted for development on land to which this clause applies unless the consent authority is satisfied of the following—

(a) that the development is consistent with the low density residential scale and character of the surrounding area,

(b) that the development will not significantly impact on the efficiency and safety of the surrounding road network,

(c) that the development of the site integrates with the road, pedestrian and cycle networks of the surrounding established Milperra neighbourhood area,

(d) that the development, including any lots created by the development, will be compatible with the topography of the site and integrate with the landform, vegetation and landscape of the site,

(e) that the development is appropriate given the environmental capabilities of, and environmental constraints that affect, the site (including, but not limited to, flood risks, land contamination, acid sulfate soils and bushfire risks), (f) that the development will protect the cultural heritage values of the site and the scenic values of the surrounding waterways and riparian and biodiversity corridors, (g) that the development will protect and conserve the ecological communities and areas on the site, (h) that adequate provision has been made for protecting and conserving hollow bearing trees on the site, (i) that any adverse impacts of stormwater on the site, or caused by stormwater runoff on adjoining properties, native vegetation, wetlands or waterways, are properly managed or mitigated, (j) that any lot created by the development will be compatible with the stormwater management measures on the site
(a) that the development is consistent with the low density residential scale and character of the surrounding area No residential development is proposed as part of this amended development application. *(b) that the development will not significantly impact on the efficiency and safety of the surrounding road network* No road works are proposed as part of this amended development application. *(c) that the development of the site integrates with the road, pedestrian and cycle networks of the surrounding established Milperra neighbourhood area* No road works are proposed as part of this amended development application. *(d) that the development, including any lots created by the development, will be compatible with the topography of the site and integrate with the landform, vegetation and landscape of the site*

The impact of the development on biodiversity has been assessed in the Amended Biodiversity Development Assessment Report prepared by Cumberland Ecology which has been prepared consistent with the requirements of these provisions and is submitted with the application.

This BDAR has been prepared to assess the impacts of the proposed development on biodiversity values, in accordance with the BAM streamlined assessment module for small areas. The project involves the implementation of environment protection works (bank stabilisation) along limited areas of the banks of the Georges River as required under an executed VPA. The project will complement work done for the re- establishment of a 50 m wide corridor of riparian vegetation which is also required under the executed VPA. The combined bank stabilisation works and riparian reestablishment will form a substantial and stable ecological corridor along the river in the long term. It will conserve substantial area of the TECs RFEF and SOFF in the long term.

(e) that the development is appropriate given the environmental capabilities of, and environmental constraints that affect the site (including, but not limited to, flood risks, land contamination, acid sulfate soils and bushfire risks)

The proposed works are restricted to environmental protection works within the foreshore area and land rehabilitation works which are conducive to improving and facilitating objectives such as connectivity, compatibility of site character, environmental capabilities, heritage, ecology and stormwater through separate planning applications.

The environmental protection works are the precursor to the provision of a bike and pedestrian footpath along the river corridor, an obligation of the VPA and the subject of a future DA. The works involve regrading of banks areas, installation of coir rolls, and vegetation planting to stabilise soils at the bank, limit erosion and restore environmental conditions favourable to the environment.

The development is not expected to have adverse environmental

effects with assessments covering bank conditions, engineering, acid sulfate soil management, Phase 2 Environmental Site Assessment and Remedial Action Plans.

(f) that the development will protect the cultural heritage values of the site and the scenic values of the surrounding waterways and riparian and biodiversity corridors

The amended development will protect the cultural heritage values of the Riverlands site and the scenic values of the surrounding waterways and riparian and biodiversity corridors. The amended proposal has updated Aboriginal Archaeological Assessment reports and European Heritage reports that address the scenic values of the site

In relation to the scenic values of the surrounding waterways and riparian and biodiversity corridors, it is noted that the riparian land and watercourse areas within the Riverlands site as mapped in the Riparian Lands and Watercourses Map and the Terrestrial Biodiversity Map in the LEP comprises the banks of the Georges River as well as the second order stream known as 'the Northern Creek line' near Keys Parade. The Proposed Development will not have any significant impacts on water quality or flows as no water is proposed to be extracted from the waterbodies and all discharges will either connect to existing services or be treated in bioretention basins before discharge thus ensuring equal or better quality discharges into the receiving waters.

All areas of riparian land are also required to be revegetated/enhanced under a Vegetation Management Plan and bank stabilisation works in accordance with the requirements of a VPA - thus resulting in improved bed/bank stability and improved riparian habitats.

The scenic values of the surrounding waterways and riparian corridors will be retained and enhanced through the dedication of a 20m wide, from the cadastral boundary, riparian corridor for public use along the Georges River frontage. This is in addition to a further 30m vegetated under the VMP as per the requirements of the VPA as

a well as a 20m corridor in the Northern Creek to be revegetated under the VMP as per the requirements of the VPA. Public access to the river frontage will be provided through new pedestrian/cycleway connections and a riparian corridor extending eastwards from the Georges River corridor in accordance with the VPA under a separate DA.

(g) that the development will protect and conserve the ecological communities and areas on the site.

The mapping of native vegetation has been expanded to cover the entire Riverlands Site. The resultant information shows that in addition to vegetation retained on the proposed development area, extensive areas of all existing PCTs can be retained in the wider site area.

(h) that adequate provision has been made for protecting and conserving hollow bearing trees on the site

In determining the design and layout of the development footprint, the project has sought to avoid and minimise direct impacts on native vegetation and habitat by selective retention of large old trees and hollow bearing trees where feasible.

The mapping of hollow bearing trees has been expanded to cover the entire Riverlands Site. The resultant information shows that hollow bearing trees are not restricted to the proposed development site and so in addition to tree hollows retained on the proposed development area, extensive areas of hollow bearing trees will also be retained in the wider site area and no Hollow bearing trees will be removed as a part of these works.

(i) that any adverse impacts of stormwater on the site, or caused by stormwater runoff on adjoining properties, native vegetation, wetlands or waterways, are properly managed or mitigated

The amended development will not have any significant impacts on water quality or flows as no water is proposed to be extracted from

the waterbodies and all discharges will either connect to existing services or be treated in bioretention basins before discharge thus ensuring equal or better quality discharges into the receiving waters.

All areas of Riparian land are also required to be revegetated/enhanced under a Vegetation Management Plan (VMP) in accordance with the requirements of a VPA - thus resulting in improved bed/bank stability and improved riparian habitats.

(j) that any lot created by the development will be compatible with the stormwater management measures on the site

No subdivision is proposed under this amended development application.

It is considered that the amended proposal satisfies the provisions of Clause 6.11.

It can be seen from the table that the proposal either complies with the relevant provisions of the LEP or the objectives of those provisions, where relevant.

4.4 Bankstown Development Control Plan 2015

The proposed development is assessed under the relevant controls of DCP 2015 as follows:

Bankstown DCP 2015

Part A – Precinct Controls
Part A3 – Key Infill Development Sites
Section 6 Riverlands Golf Course Site
Subdivision 6.1 Development that proposes the subdivision of land must submit a concept subdivision plan, landscape plan and detailed tree survey to the satisfaction of Council. These plans must be prepared by suitably qualified persons in the field of town planning, architecture and landscape architecture.
The amended proposal is only the bank stabilisation, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
6.2 The intended outcomes of the concept subdivision plan, landscape plan and detailed tree survey are: (a) to identify the overall strategic vision and guiding principles to the subdivision and development of the site; (b) to demonstrate the opportunities and constraints of the site; (c) to contribute to the sustainable growth of the city; and (d) to respond and contribute to the local context and the urban structure of the city.
The amended proposal is only the bank stabilisation, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
6.3 The concept subdivision plan, landscape plan and detailed tree survey must consist of a written statement (supported by plans or illustrations) explaining how the design and layout of the streets, lots and subsequent development on the site have regard to the following:

(a) Design principles

The design and layout of the streets, lots and subsequent development must have regard to the design principles drawn from the site analysis and local context including:

(i) Context and character studies.

(ii) Visual assessment of the site and the local context.

(iii) Survey of the site and neighbouring buildings.

(iv) Survey of the topography, stormwater and drainage systems, trees, vegetation and landscape.

(b) The studies which informed the planning proposal

The design and layout of the streets, lots and subsequent development are to conform to the studies and their recommendations which informed the planning proposal (PP_2011_BANKS_001) for the site including:

(i) The 'Flora Assessment: Updated Study of the approximately 82 ha site of the Riverlands Golf Course site at Milperra', dated 23 January 2012, prepared by Anne Clements and Associates.

(ii) The 'Fauna Habitat & Species Constraints to Potential Redevelopment of the Riverlands Golf Course, Milperra', dated 22 January 2012, prepared by Ambrose Ecological Services.

(iii) The 'Fauna Investigation and Tree Retention Advice', dated June 2015, prepared by NGH Environmental.

(iv) The 'Riverlands Flood Study and Evacuation Plan', dated April 2012, prepared by BMT WBM.

(v) The 'Bushfire Assessment', dated 30 April 2012, prepared by Eco Logical Australia.

(vi) The 'Aboriginal Heritage Study', dated May 2012, prepared by Archaeological & Heritage Management Solutions.

This includes the need for subdivision development to undertake additional archaeological investigations in accordance with relevant statutory requirements and guidelines.

(vii) The 'Phase 2 Environmental Site Assessment–Riverlands

Environmental Site Assessment', dated July 2015, prepared by Environmental Strategies.

(viii) The 'Acid Sulfate Soil Preliminary Site Investigation', dated December 2011, prepared by Sydney Environmental & Soil Laboratory.

(ix) The 'River Bank Stabilisation Study', dated April 2014, prepared by National Project Consultants.

(x) The Riverlands Golf Course voluntary planning agreement and corresponding vegetation management plan

(c) Sustainability and energy efficiency outcomes

The design and layout of the streets, lots and subsequent development must have regard to the sustainability and energy efficiency outcomes through design including:

(i) The integration of the streets and development with the topography, stormwater, biodiversity and riparian corridors, native vegetation and hollow bearing trees, and landscape of the site.

(ii) Lot orientation. In assessing proposals for residential subdivisions, Council places major emphasis on the ease with which future dwellings with good solar access can be erected on the proposed lots. In general, this condition is best fulfilled when the side boundaries of the majority of the lots are on or near a north–south axis; however, there may be other solutions. It is important to strive for a future residential area in which the great majority of dwellings can achieve good solar access.

(iii) The provision of deep soil zones and landscaping.

(iv) Passive surveillance.

(d) Built form and character

The design and layout of the streets, lots and subsequent development must:

(i) Provide for mostly dwelling houses or a balanced mix of dwelling houses and dual occupancies on the site that is compatible with the character, amenity and built form of the established Milperra neighbourhood area.

(ii) Provide for a variety of lot widths other than 15 metres to

encourage a diversity of house and dual occupancy designs.

(e) Traffic and access

The design and layout of the streets, lots and subsequent development must have regard to traffic and access including:

(i) The links between the site and the surrounding pedestrian, cycle, public transport and road access and circulation networks.

This includes details of the internal and external movement networks, the public transport access routes, the pedestrian and cycle paths, linkages to external networks and pedestrian through–site links. The internal street network should avoid cul–de–sac roads.

(ii) The links to the road access to the site being Keys Parade, Pozieres Avenue and Prescott Parade. Road access is not to be provided through Martin Crescent.

(iii) The pedestrian / cycle link between the site and the public open space on the foreshore.

(iv) The evacuation routes for residents during flooding.

(f) Infrastructure and stormwater management

The design and layout of the streets, lots and subsequent development must have regard to infrastructure and stormwater

management including:

(i) The works to be undertaken in accordance with the Riverlands Golf Course voluntary planning agreement and corresponding vegetation management plan.

(ii) The minimum 17 metre road width for public roads. This comprises a 10 metre wide carriageway and a 3.5 metre wide footpath on each side of the carriageway.

(iii) Access for Council's waste trucks and emergency vehicles.

(iv) The integration of the streets and development with the overland flow paths shown in Figure 2.

(v) The incorporation of water sensitive urban design principles in the street and development design to attenuate runoff and promote water quality. Consideration may be

given to treating stormwater runoff from the site by establishing wetlands, or installing bioswales or bio–retention basins prior to surface discharge. (vi) The siting of the electricity power lines and telecommunication lines underground in accordance with the bushfire assessment, and urban design and streetscape guidelines.
The amended proposal is only the bank stabilisation, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
Development – general requirements 6.4 In deciding whether to grant development consent, Council must be satisfied that development on the site conforms to the concept subdivision plan, landscape plan and detailed tree survey approved by Council.
The amended proposal is only the bank stabilisation, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
6.5 Development on the site must provide for mostly dwelling houses on the site, or a balanced mix of dwelling houses and dual occupancies on the site that is compatible with the character, amenity and built form of the established Milperra neighbourhood area.
The amended proposal is only the bank stabilisation , revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
6.6 Development on the site must locate the electricity power lines and telecommunication lines underground.
The amended proposal is only the bank stabilisation, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.

6.7 Development on the site must submit an Environmental Management Plan detailing the extent to which the development will impact on the site during construction in accordance with the flora and fauna studies which informed the planning proposal (PP_2011_BANKS_001) for the site and the Bankstown Demolition and Construction Guidelines.
The provision of the Environmental Management Plan will become a condition of consent linking each of the development applications.
Biodiversity protection 6.8 In deciding whether to grant development consent, Council must be satisfied that development on the site conforms to the studies which informed the planning proposal (PP_2011_BANKS_001) for the site including: (a) The 'Flora Assessment: Updated Study of the approximately 82 ha site of the Riverlands Golf Course site at Milperra', dated 23 January 2012, prepared by Anne Clements and Associates. (b) The 'Fauna Habitat & Species Constraints to Potential Redevelopment of the Riverlands Golf Course, Milperra', dated 22 January 2012, prepared by Ambrose Ecological Services. (c) The 'Fauna Investigation and Tree Retention Advice', dated June 2015, prepared by NGH Environmental. (d) The Riverlands Golf Course voluntary planning agreement and corresponding vegetation management plan.
The amended BDAR and Vegetation Management Plan submitted with the application directly addresses these provisions consistent with this Clause and is consistent with the intent and the provisions of the Planning Proposal.
6.9 Development on the site must protect the hollow bearing trees shown in Figure 3 in accordance with the 'Fauna Investigation and Tree Retention Advice', dated June 2015, prepared by NGH Environmental. In deciding whether to grant development consent, Council must be satisfied that the development is designed, and will be sited and managed, to avoid any potentially adverse environmental impact or, if a potentially adverse environmental impact cannot be avoided:

(a) the development minimises disturbance and adverse impacts on the native vegetation and habitat; and (b) measures have been considered to maintain native vegetation and habitat in parcels of a size, condition and configuration that will facilitate biodiversity protection and native flora and fauna movement through biodiversity corridors; and (c) measures have been considered to achieve no net loss of significant native vegetation or habitat. In this clause, biodiversity corridor means an area that facilitates the connection and maintenance of native fauna and flora habitats and, within the urban landscape, includes areas that may be broken by roads and other urban elements and may include remnant trees and associated native and exotic vegetation.
The amended BDAR, Vegetation Management Plan and arborist report submitted with the application directly addresses these provisions consistent with this Clause and the development is designed, and will be sited and managed, to avoid any potentially adverse environmental impact.
Stormwater and water sensitive urban design 6.10 Development on the site must submit a Water Management Plan that provides the following details: (i) the stormwater management methods during construction and post construction; and (ii) how the water sensitive urban design methods will be used to meet the stormwater reduction targets set out in the Botany Bay and Catchment Water Quality Improvement Plan for greenfield development / large redevelopment.
The amended proposal is only the bank stabilisation, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
6.11 In deciding whether to grant development consent to development on the site, Council must be satisfied that: (a) water sensitive urban design principles are incorporated into the design of the development; and

(b) riparian, stormwater and flooding measures are integrated; and (c) the stormwater management system includes all reasonable management actions to avoid any adverse impacts on the land to which the development is to be carried out, adjoining properties, native bushland, waterways and groundwater systems; and (d) if a potential adverse environmental impact cannot be feasibly avoided, the development minimises and mitigates the adverse impacts of stormwater runoff on adjoining properties, native bushland, waterways and groundwater systems. For the purposes of this clause, the water sensitive urban design principles are: (i) protection and enhancement of natural waterways; (ii) protection and enhancement of water quality, by improving the quality of stormwater runoff from urban catchments; (iii) minimisation of harmful impacts of urban development on water balance and on surface and groundwater flow regimes; (iv) integration of stormwater management systems into the landscape in a manner that provides multiple benefits, including water quality protection, stormwater retention and detention, biodiversity / habitat provision, public open space, and recreational and visual amenity; (v) retention, where practical, of on–site stormwater for use as an alternative supply to mains water, groundwater or river water; (vi) reduce peak flows through storage and infiltration.
The amended proposal is only the bank stabilization, revegetation and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.
B11 – Tree management order Works Requiring a Permit 2.1 A person must not cut down, fell, uproot, kill, poison, ringbark, burn or otherwise destroy, lop or otherwise remove a substantial part

of any prescribed tree defined in clause 2.3 or carry out excavation and earthworks within the tree protection zone except with a permit from Council and subject to any conditions specified in the permit. 2.2 Development consent is required to remove any tree: (a) located on a property listed as a heritage item in Schedule 5 of Bankstown Local Environmental Plan 2015; or (b) located on biodiversity lands listed on the Biodiversity Protection Map under the Bankstown Local Environmental Plan 2015. Prescribed Trees. 2.3 Part B11 applies to the following trees: (a) All trees that are 5.0 metres or more in height; and (b) All mangroves, regardless of size; and (c) All trees, regardless of size, listed as Vulnerable or Endangered or a component of an Endangered Ecological Community listed under the Biodiversity Conservation Act 2016; and (d) All trees, regardless of size, listed under the Environmental Protection and Biodiversity Conservation Act 1999; and (e) All trees, regardless of size, located on lands included on the Terrestrial Biodiversity Map under Bankstown Local Environmental Plan 2015; and (f) All trees, regardless of size, located on properties listed as a heritage item in Schedule 5 of Bankstown Local Environmental Plan 2015; and (g) All trees, regardless of size, located in the foreshore area under the Bankstown Local Environmental Plan 2015.
The amended BDAR and arborist report submitted with the application directly addresses these provisions consistent with this Clause and the proposal is consistent with these provisions.
B12 – Flood risk management 2.2.3 Low flood risk precinct Low Flood Risk Precinct is defined as all other land within the floodplain (within the extent of the probable maximum flood) but not

identified within either the High Flood Risk or the Medium Flood Risk Precinct.

The risk of damages due to flood event in low flood risk precinct is low for most of the land uses.

(a) The proposed development should not result in any significant increase in risk to human life, or in a significant increase in economic or social costs as a result of flooding.

(b) The proposal should only be permitted where effective warning time and reliable access is available to an area free of risk from flooding, consistent with any relevant Flood Plan or flood evacuation strategy.

(c) Development should not significantly increase the potential for damage or risk other properties either individually or in combination with the cumulative impact of development that is likely to occur in the same floodplain.

(d) Motor vehicles are able to be relocated, undamaged, to an area with substantially less risk from flooding, within effective warning time.

(e) Procedures would be in place, if necessary, (such as warning systems, signage or evacuation drills) so that people are aware of the need to evacuate and relocate motor vehicles during a flood and are capable of identifying the appropriate evacuation route.

(f) To minimise the damage to property, including motor vehicles arising from flooding.

(g) Development should not result in significant impacts upon the amenity of an area by way of unacceptable overshadowing of adjoining properties, privacy impacts (e.g. by unsympathetic house–raising) or by being incompatible with the streetscape or character of the locality.

The amended proposal is only the bank stabilization, revegetation ,and remediation works so that these provisions are not considered to apply until the detailed subdivision of the land for residential use.

5.0 Environmental Planning Assessment

Section 4.15(1) of the Environmental Planning and Assessment Act 1979 as amended specifies the matters which a consent authority must consider when determining a development application.

5.1 s.4.15(1)(a)(i) the provision of any Environmental Planning Instrument (EPI)
Consideration of LEP 2015 are discussed under Section 4.

5.2 s.4.15(1)(a)(ii) the provision of any draft Environmental Planning Instruments
Not applicable to this application.

5.3 s.4.15(1)(a)(iii) any development control plan
Consideration of Development Control Plan 2015 is discussed under Section 4.

5.4 s.4.15(1)(a)(iv) any matters prescribed by the regulations
Not applicable to this application.

5.5 s.4.15(1)(b) the likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality

- Context and Setting

The location is characterised by recreational open space and the proposal responds to this context.

- Access, Transport and Traffic

No road works are proposed.

- Public Domain

The proposal includes significant public domain works which will be dedicated to Council.

- Utilities

Not applicable.

- Heritage

Aboriginal Heritage Environment[8]

In May 2012, Archaeological & Heritage Management Solutions (AHMS) completed an Aboriginal Heritage Study of an area which encompasses the study area, to support a planning proposal to rezone the project area from rural and open space to a Residential (2A) zone. AHMS identified an area of moderate-high archaeological sensitivity in the southeast portion of the project area (the study area) and recommended that archaeological test excavations be completed to identify any subsurface Aboriginal objects.

In January 2020, Comber Consultants completed an additional Aboriginal Archaeological Assessment of the Riverlands Golf Course on behalf of the proponent. The assessment confirmed the findings of AHMS (2012) and identified an area of moderate-high archaeological sensitivity within the study area. Comber 2020 recommended that test excavations be completed in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (Department of Environment, Climate Change & Water [DECCW] 2010a) (Code of Practice).

Subsequently, Artefact Heritage Services Pty Ltd (Artefact Heritage) was engaged by the Proponent to prepare a test excavation methodology (Artefact Heritage 2020a) for the area of area of moderate- high archaeological sensitivity. During preparation of the test excavation methodology, the area of moderate-high archaeological sensitivity was registered on the Aboriginal Heritage Information Management Systems (AHIMS) database as a Potential Archaeological Deposit (PAD). The area of moderate-high

[8] Artefact Riverlands Milperra Aboriginal Archaeological Assessment 2021 pii

archaeological sensitivity is registered on the AHIMS site register as the Riverlands Golf Course PAD (AHIMS ID 45-5-5286).

A test excavation program was completed within the Riverlands Golf Course PAD (AHIMS ID 45-5- 5286) in March 2020. The results of the excavation program were documented in an Archaeological Test Excavation Report (ATER) prepared by Artefact Heritage (2020b). The ATER found one Aboriginal site, RGC2020-AS01 (AHIMS ID 45-5-5334), which was considered to be of low scientific significance. The ATER recommended that an Aboriginal Cultural Heritage Assessment Report (ACHAR) be completed to support an application for an Aboriginal Heritage Impact Permit (AHIP) that would authorise impacts to RGC2020-AS01 (AHIMS ID 45-5-5334) through the proposed works. It was also recommended that recommendations for the long-term management of the RGC2020-AS01 (AHIMS ID 45-5-5334) be included in ACHAR in consultation with the RAPs.

- A study area based AHIP should be sought to authorise impacts to RGC2020-AS01 (AHIMS ID 45-5-5334)
- No works that impact the ground surface should be undertaken within the established site extent of RGC2020-AS01 (AHIMS ID 45-5-5334) until an approved AHIP has been issued.
- This ACHAR and appendices should be submitted to NSW Heritage, DPC to support the AHIP application.
- No further archaeological investigations will be required.
- The assemblage retrieved from the test excavation should be reburied on site. Reburial should occur within an area which will not be impacted by future ground disturbing works. Reburial should be undertaken in accordance with the Code of Practice and comments received from the RAPs.
- If human skeletal material is identified works should cease and the unexpected finds policy for the project would be implemented. Impacts to human skeletal remains would not be approved under the AHIP.
- The AHIP boundary must be marked on site work plans to ensure that works do not extend outside the approved AHIP area.

European Heritage Environment[9]
This HIA has determined that the study area is adjacent to one heritage item listed on the Bankstown
LEP 2015:

- Milperra Soldier Settlement (Roads) (Bankstown LEP 2015 I29).

The study area is also partially within one non-statutory indicative place listed on the Register of the National Estate (RNE):

- Georges River Wetlands (Place ID: 18397).

The proposed cycleway (which would form part of the future EIS) is also partially within the SEPP (*Coastal Management*) area 2018.

This HIA has found that the Former Riverlands Golf Course has some heritage significance at a local level for its aesthetic, rarity and potential social heritage values. The heritage values of the area are largely tied to the natural landscape character of the area and the remnant wetlands, rather than to the grounds of the former golf course itself.

This HIA has determined that the proposed works would result in neutral direct impacts and negligible visual impacts to the Milperra Soldiers Settlement (Roads) (Bankstown LEP 2015 I29).
The proposed works would result in a negligible direct impact and a cumulative minor visual impact to the Georges River Wetlands (Place ID: 18397).

The proposed works would result in a cumulative minor direct impact and cumulative minor visual impacts to the Former Riverlands Golf Course.

This HIA has identified three land use phases within the study area:

[9] Artefact Riverlands Milperra Heritage Impact Assessment 2021 pii

- Phase 1: Exploration of the Georges River (1788 onwards);
- Phase 2: Thomas Bevan and William Mitchells land grants (1800 – c.1940);
- Phase 3: Riverlands Golf Course (c.1940-2018).

It was determined that there is nil archaeological potential associated with Phase 1 within the study area. There is low archaeological potential associated with Phase 2 land grants. There is high archaeological potential for soil fills associated with the establishment of the Riverlands Golf Course in Phase 3. Intact archaeological remains associated with Phase 2 would reach the threshold of local significance. Remains associated with Phase 3 would not reach the threshold of local significance. It is not anticipated that the project would impact on significant archaeological resources.

- Other Land Resources

Not applicable to this application.

- Flooding

Not applicable to this application.

- Air and Microclimate

It is considered that the proposal will not give rise to any significant air or microclimate impacts.

- Flora and Fauna

This clause addresses whether the development is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and any adverse impact on the habitat elements providing connectivity on the land, and any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

The impact of the development on biodiversity has been assessed in the Amended Biodiversity Development Assessment Report prepared by Cumberland Ecology which has been prepared consistent with the requirements of these provisions and is submitted with the application.

This BDAR has been prepared to assess the impacts of the proposed development on biodiversity values, in accordance with the BAM streamlined assessment module for small areas. The project involves the implementation of environment protection works (bank stabilisation) along limited areas of the banks of the Georges River as required under an executed VPA. The project will complement work done for the re- establishment of a 50 m wide corridor of riparian vegetation which is also required under the executed VPA. The combined bank stabilisation works and riparian reestablishment will form a substantial and stable ecological corridor along the river in the long term. It will conserve substantial area of the TECs RFEF and SOFF in the long term.

Native vegetation occurring within the subject land currently includes small patches of River-flat Eucalypt Forest EEC (approximately 0.02 ha) and Swamp Oak Floodplain Forest (approximately 0.04ha), which extends beyond the subject land along other parts of the Georges River as well as the wider Riverlands site. The proposed environmental protection works will involve the removal of three trees and disturbance to understorey. Nonetheless a conservative approach has been taken and all vegetation within the subject land has been assessed as directly impacted (ie removed).

As the project includes the removal of an area of native vegetation, a small number of offsets are required in the form of ecosystem credits. This assessment indicates that the removal of the native vegetation within the subject land requires a total of 1 ecosystem credits of PCT 835 and 1 ecosystem credit for PCT 1232.

No threatened flora or fauna species that are considered as species credit species were recorded within the subject land and none are

considered likely to occur. Therefore, no species credits species are required to be offset.

Measures to avoid and minimise impacts to the biodiversity values of the study area have been proposed and include consideration of the project location and design. However, when considering the requirements associated with the requirements for bank stabilisation at specific locations under the executed VPA, the small size of the site and the fact that the riverbanks have already been modified and are subject to ongoing erosion, opportunities to avoid all impacts on biodiversity values in general are limited. Nonetheless, most of the existing remnant vegetation along the banks of the Georges River will be retained and managed, with a Riparian corridor to planted along the length of the banks within the Riverlands site as part of the executed VPA requirements.

Further impacts of the project may entail potential indirect impacts, including inadvertent impacts on adjacent habitat and so prescribed impacts such as changes to hydrological processes during works have been considered and provided for.

A suite of mitigation measures is proposed to minimise and manage the impacts to biodiversity values, such as tree protection measures, weed management and sediment management. Restoration of retained areas of riparian vegetation and replanting of new areas of the TECs are proposed to be managed and enhanced under a Vegetation Management Plan.

With the implementation of the proposed mitigation measures and the offsetting described previously, it is considered that the impacts of this project on biodiversity will be limited and can be appropriately managed.

The proposed works comprise environmental protection works and therefore will improve conditions along the Georges River in the long term via stabilisation of eroded/eroding banks and enabling re-establishment of riparian and estuarine vegetation in currently denuded/degraded banks thus creating and improving riparian,

estuarine and aquatic habitats in the long term. The proposed development is consistent with the No Net Loss standard as impacts to biodiversity values have been avoided/minimised/mitigated where feasible and all residual impacts are to be offset by retirement of the required number of biodiversity credits.

- Site Design and Internal Design

The proposal has been designed in keeping with the orientation of the site, and measures have been taken in order to create the best possible outcome within the constraints of the site. Therefore it is considered that the proposal is an appropriate development solution to the use of the site.

- Cumulative Impacts

The subject allotments are generously sized, shaped and orientated to accommodate future development. It is anticipated that the proposal will have a negligible cumulative effects.

5.6 s.4.15(1)(c) suitability of the site for development

Having regard to the location of the proposal, the site will adequately accommodate the proposed development.

5.7 s.4.15(1)(d) submissions made in accordance with the Act or the Regulations

The Consent authority will need to consider the submissions received in response to the public exhibition of the proposed development.

5.8 s.4.15(1)(e) the public interest

There are no known Federal and/or state Government policy statements and/or strategies other than those discussed in this report that are of relevance to this particular case. We are not aware of any other circumstances that are relevant to the consideration of this development application.

6.0 Conclusion

The proposed development comprises an amended development application to bank stabilisation and remediation works at 56 Prescott Parade, Milperra (Lot 10 DP 731859, Lot 1 DP 625013, Lot 1 DP 813006, Lot 232 DP 805826).

The overall development of the land at 56 Prescot Parade, Milperra is proposed to be conducted in stages and will ultimately involve the subdivision of land into a 8,480m^2 Southern Reserve (to integrate with the Council Cumberland Plain Woodland Reserve on Lot 5 DP 731859 south of the subject site), residential lots and 'pocket' park areas with associated infrastructure (roads, drainage basins) within the development footprint. A Vegetation Management Plan has been The road infrastructure will comprise a road network within the residential subdivision as well as a primary 'connector' road, known as Keys Parade, that will link the proposed residential area with a main road, Henry Lawson Drive. Other staged works include bank stabilisation works, construction of a shared cycleway/pathway along the Georges River and rehabilitation of riparian corridors in accordance with a Voluntary Planning Agreement. The development is Integrated Development for the purpose of Section 100B of the Rural Fires Act 1997.

A Voluntary Planning Agreement (VPA) was executed as part of the rezoning process. An amended VPA has subsequently been approved by the Council since the rezoning. The details of the VPA included a number of commitments for the delivery of road infrastructure, environmental management works, remediation of the site and dedication of land.

The following works were proposed:

- Bank stabilisation works at locations across proposed Lot 4;
- Construction of connecting road network – Keys Parade, Raleigh Road and Pozieres Avenue;

- Road infrastructure upgrades - Pozieres Parade improvements, raised junctions, school zone, roundabout, public shared access to public foreshore walkway;
- Foreshore walkway embellishment – pedestrian/cycleway;
- Build a pedestrian/cyclist crossing over the northern creek and southern mangroves on the Zone RE1 land;
- Riparian Corridor along the Foreshore Walk and Zone RE2 land;
- Riparian Corridor along the Northern Creek;
- Road infrastructure upgrades - Keys Parade and Henry Lawson Drive intersection;
- Dedication of land known as proposed Lot 4.

The delivery of the VPA is aligned to the delivery of lots. Given the proposed staging of the construction, certain works will need to be undertaken prior to the release of those stages.

The procedural subdivision, residential subdivision and Keys Parade extension works comprise three separate development applications.

Amended Development Application No. 370/2020 seeks consent for:

Bank stabilisation works along the Georges River foreshore (being Proposed Lot 4 under DA-1107/2019 and land under the M5 Motorway bridge over the Georges River), and remediation and environmental rehabilitation works on the Riverlands Golf Course Site.

The proposal is Integrated Development as defined in section 4.46 of the Environmental Planning and Assessment Act, 1979, because an approval is required in accordance with the Water Management Act, 2000.

The proposal includes the following specific works:

- Bank stabilisation works (regrading of bank predominantly to a 1:4 gradient (and partly 1:5 gradient under the M5 bridge with rock rip rap wall), with installation of linear rock placement, and vegetation planting on bank areas and berms) at specific

locations along the banks of the Georges River along the western boundary of the former Riverlands Golf Course site, contained within Proposed Lot 4 to be created under DA-1107/2019 and partly under the existing M5 Motorway.

- Remediation of areas of the site identified as contaminated in accordance with the submitted Remedial Action Plans.

At the time of the re-zoning of part of the former Riverlands Golf Course site to R2 – Low Density Residential, a Voluntary Planning Agreement (VPA) was entered into by the Council and the landowner. This VPA required, as part of any future development of the site, a number of works to be undertaken by the developer. The bank stabilisation works was one of the works required in the VPA.

The proposal has been designed in accordance with the LEP 2015 and Council's policies and planning instruments and will make a positive contribution to the neighbourhood and broader locality.

The proposal also addresses the matters for consideration under Section 4.15 of the Environmental Planning and Assessment Act, 1979. It will deliver a suitable and appropriate development and is worthy of approval.

Amended Statement of Environmental Effects prepared by:

Name:	Andrew Darroch of Mersonn Pty Ltd
Qualification:	BA (Enviro. Sc.) Master City and Regional Planning Grad. Dip Urban Estate Management MPIA, MEPLA, MPCA
Address:	20 Wylde Street, Potts Point

In respect of the following Development Application:

Land to be developed:	56 Prescott Parade, Milperra
Proposed development:	To Carry Out Bank Stabilisation Works along the Georges River Foreshore and under the M5 Motorway Bridge and Remediation.

Declaration: I declare that I have prepared this Statement and to the best of my knowledge:

1. The Statement has been prepared in accordance with clause 4.12 of the EP & A Act and Clause 50 of the EP & A Regulations.
2. The Statement contains all available information that is relevant to the environmental assessment of the development to which this Statement relates, and
3. That the information contained in the Statement is neither false nor misleading.

Signature:

Name: Andrew Darroch

Date: July 2021

Our reference: 21/08391
LOC No: 632284

Minter Ellison
Level 40 Governor Macquarie Tower
1 Farrer Place
Sydney, NSW 2000

Dear Mr Luke Walker

Consent of Owner for lodgement of a Development Application:

Reference is made to your application for issue of Landowner's Consent from the Department of Planning & Environment – Crown Lands (the department) to the making of a development consent application with City of Canterbury Bankstown to authorise on Crown land as detailed below:

Property Details: Crown land below mean high water mark (MHWM) adjoining Lot 21 DP 749985, Lot 10 DP731859, Lots 23-27 DP7304, Lot 5 DP731859, Lot 30 DP827142, known as the Georges River.

Description of Application: Riverlands Foreshore Stabilisation Works

After consideration of your application, consent is granted to the lodgement of a development application under the *Environmental Planning and Assessment Act 1979*, and other associated applications required under other legislation, for the proposal described above.

This consent is provided subject to the following:

1. This consent is given without prejudice so that consideration of the proposal may proceed under the *Environmental Planning and Assessment Act 1979*, and any other relevant legislation;

2. This consent does not imply the concurrence of the Minister, or the issue of any necessary lease, licence or other required approval under the *Crown Land Management Act 2016*; and does not prevent the department from making any submission;

3. This consent will expire after a period of 12 months from the date of this letter if not acted;

4. The Minister reserves the right to issue landowner's consent for the lodgement of applications for any other development proposals on the subject land concurrent with this Landowners Consent;

5. Irrespective of any development consent or any approval given by other public authorities, any activity of Crown land cannot commence without a current tenure from the department authorising such work or occupation.

This letter should be submitted to the relevant consent or approval authority in conjunction with this application and/or any other application, with the approved plans marked Figure A and Figure B.

If any modifications are made to the application (whether in the course of assessment, by conditions of consent, or otherwise), it is your responsibility to ensure the modification remains consistent with this landowner's consent.

You are required to forward to the department a copy of any consent or other approval as soon as practical after that consent or approval is received.

If you require any further information please contact Tara O'Brien on (02) 8222 4136 or via email: tara.obrien@crownland.nsw.gov.au.

Yours sincerely

Silas Sutherland
A/Area Manager Sydney Metropolitan
By Delegation (Level D) of the Minister administering the *Crown Land Management Act 2016*
DPE - Crown Lands

27 April 2022

Figure A: Site Layout

Our reference: 21/08391
LOC No: 632284

Figure B: Works Areas

Our reference: 21/08391
LOC No: 632284

Department of Planning and Environment

Contact: Department of Planning and Environment—Water
Phone: 1800 633 362
Email: waterlicensing.servicedesk@dpie.nsw.gov.au

Our ref: IDAS1-2021-10124
Your ref: DA-370/2020

5 May 2022

The General Manager
Canterbury Bankstown Council
PO Box 8
BANKSTOWN NSW 1885

Attention: Nicholas Aley

Uploaded to the ePlanning Portal

Dear Sir/Madam

Re: IDAS1-2021-10124 - Integrated Development Referral – General Terms of Approval
Dev Ref: DA-370/2020
Description: Bank stabilisation, remediation and rehabilitation works[Subject]
Location: 56 PRESCOT PARADE MILPERRA 2214

I refer to your recent referral regarding an integrated Development Application (DA) proposed for the above location. Attached, please find the Department of Planning and Environment—Water's General Terms of Approval (GTA) for part of the proposed development requiring a Controlled Activity approval under the *Water Management Act 2000* (WM Act), as detailed in the subject DA.

Please note Council's statutory obligations under section 4.46 of the *Environmental Planning and Assessment Act 1979* (EPA Act) which requires consent, granted by a consent authority, to be consistent with the general terms of any approval proposed to be granted by the approval body.

If the proposed development is approved by Council, the department requests these GTA be included (in their entirety) in Council's development consent. Please also note the department requests notification:

- if any plans or documents are amended and these amendments significantly change the proposed development or result in additional works or activities (i) in the bed of any river, lake or estuary; (ii) on the banks of any river lake or estuary, (iii) on land within 40 metres of the highest bank of a river lake or estuary; or (iv) any excavation which interferes with an aquifer.

  The Department of Planning and Environment—Water will ascertain from the notification if the amended plans require review of or variation/s to the GTA. This requirement applies even if the amendment is part of Council's proposed consent conditions and do not appear in the original documentation.

- if Council receives an application under s4.46 of the EPA Act to modify the development consent and the modifications change the proposed work or activities described in the original DA.
- of any legal challenge to the consent.

As the proposed work or activity cannot commence before the applicant applies for and obtains an approval, the department recommends the following condition be included in the development consent:

The attached GTA issued by the Department of Planning and Environment—Water do not constitute an approval under the *Water Management Act 2000*. The development consent holder must apply to the department for a Controlled Activity approval **after consent** has been issued by Council **and before** the commencement of any work or activity.

A completed application must be submitted to the department together with any required plans, documents, application fee and proof of Council's development consent. Finalisation of an approval can take up to eight (8) weeks from the date the application and all required supporting documentation is received.

Applications for controlled activity approval should be made to the department, by lodgement of a Controlled Activity Approval – New approval application on the NSW Planning Portal at: https://www.planningportal.nsw.gov.au/

The Department of Planning and Environment—Water requests that Council provide a copy of this letter to the development consent holder.

The Department of Planning and Environment—Water also requests a copy of the determination for this development application be provided by Council as required under section 4.47(6) the EPA Act.

Yours Sincerely

For
Bryson Lashbrook
Manager
Licensing and Approvals
Department of Planning and Environment—Water

General Terms of Approval

for proposed development requiring approval under s89, 90 or 91 of the Water Management Act 2000

Reference Number:	IDAS1-2021-10124
Issue date of GTA:	5 May 2022
Type of Approval:	Controlled Activity
Location of work/activity:	56 PRESCOT PARADE MILPERRA 2214
Waterfront Land:	Georges river
DA Number:	DA-370/2020
LGA:	CANTERBURY-BANKSTOWN COUNCIL

The GTA issued by Department of Planning and Environment—Water do not constitute an approval under the *Water Management Act 2000*. The development consent holder must apply to the Department of Planning and Environment—Water for the relevant approval **after development consent** has been issued by Council **and before** the commencement of any work or activity.

Condition Number	Details
TC-G001	Before commencing any proposed controlled activity on waterfront land, an application must be submitted to Department of Planning and Environment—Water, and obtained, for a controlled activity approval under the Water Management Act 2000.
TC-G004	A. This General Terms of Approval (GTA) only applies to the proposed controlled activity described in the plans and associated documents found in Schedule 1, relating to Development Application DA-370/2020 provided by Council to Department of Planning and Environment—Water. B. Any amendments or modifications to the proposed controlled activity may render the GTA invalid. If the proposed controlled activity is amended or modified, Department of Planning and Environment—Water, must be notified in writing to determine if any variations to the GTA will be required.
TC-G005	A. The application for a controlled activity approval must include the following plan(s): i. Site plans indicating the demarcation of waterfront land, designated riparian corridors, and identifying any areas of encroachments and offsets ii. Detailed civil construction plans; iii. Rehabilitation plan; iv. Construction streamworks plans; v. Soil and water management plan; vi. Erosion and sediment control plans; vii. Construction stormwater drainage outlet plan; viii. Vegetation management plan; ix. Construction cut and fill cross sections and plan view details of site; B. The plan(s) must be prepared in accordance with Department of Planning and Environment—Water 's guidelines located on the website https://www.nrar.nsw.gov.au/how-to-apply/controlled-activities/guidelines-for-controlled-activities

SCHEDULE 1

The plans and associated documentation listed in this schedule are referred to in general terms of approval (GTA) issued by Department of Planning and Environment—Water for integrated development associated with IDAS1-2021-10124 as provided by Council:

- Amended Statement of Environmental Effects, prepared by Mersonn pty ltd, dated July 2021
- Vegetation Management Plan By Cumberland Ecology Dated 5 July 2021
- River Bank Stabilisation Plan By Tooker & Associates Dated Jun2 2021

Riverlands Site – Georges River and Northern Creekline Revegetation Works

Vegetation Management Plan

Mirvac

5 July 2021

Final

(02) 9868 1933 | PO Box 2474 Carlingford Court NSW 2118 | cumberlandecology.com.au

Report No. 19126RP5

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
3	5/07/2021	GK/TM/DR	Updated report for LEC-merit appeal amendment application

Approved by:	David Robertson
Position:	Director
Signed:	
Date:	5 July, 2021

Table of Contents

Table of Tables

Table of Photographs

Table of Appendices

Table of Figures

Glossary

ACM	Asbestos Containing Material
BAM	Biodiversity Assessment Method
BBAM	BioBanking Assessment Methodology
BC Act	NSW *Biodiversity Conservation Act 216*
BDAR	Biodiversity Development Assessment Report
BLEP 2015	Bankstown Local Environment Plan 2015
BRC	Bushland Regeneration Contractor
Council	Canterbury Bankstown Council
DA	Development application
LGA	Local Government Area
NRAR	National Resources Access Regulator
RFEF	River-flat Eucalypt Forest
Riverlands Site	Land contained within 56 Prescot Parade, Milperra, and subject to Clause 6.11 of the BLEP 2015
SEPP	State Environmental Planning Policy
SOFF	Swamp Oak Floodplain Forest
TEC	Threatened Ecological Community
the Shared Pathway	The shared walkway and cycleway to be constructed in accordance with Schedule 2 of the VPA
VMP	Vegetation Management Plan
VPA	Voluntary Planning Agreement
VRZ	Vegetated Riparian Zone
WM Act	NSW *Water Management Act 2000*

1. Introduction

Cumberland Ecology has been commissioned by Mirvac Homes (NSW) Pty Ltd (Mirvac) to prepare a Vegetation Management Plan for the enhancement and management of Riparian Corridors within the Riverlands Golf course site at 56 Prescot Parade Milperra (hereafter referred to as the 'Riverlands site').

1.1. Background

The Riverlands site is situated on the eastern shore of the Georges River, in the Canterbury-Bankstown Local Government Area (LGA). The Riverlands site is subject to Clause 6.11 of the Bankstown *Local Environment Plan 2015* (BLEP 2015) which includes provisions to enable the redevelopment of the Riverlands site, in particular residential development in the south to south-eastern parts of the site. The Riverlands site is also subject to an executed Voluntary Planning Agreement (VPA).

The overall development of the Riverlands site (hereafter referred to as the 'Project') is proposed to be conducted in stages and will ultimately involve the subdivision of land into residential lots and 'pocket' park areas with associated infrastructure (roads, drainage basins) within the development footprint. The road infrastructure will comprise a road network within the residential subdivision as well as a primary 'connector' road (known as Keys Parade) that will link the proposed residential area with a main road – Henry Lawson Drive. Other staged works for the Project include bank stabilisation works, construction of a shared cycleway/pathway along the Georges River and rehabilitation of riparian corridors in accordance with the executed VPA.

The VPA contains several works that are to be implemented within the Riverlands site, including (but not limited to):

- Staged infrastructure works including construction of a connecting road network and road infrastructure upgrades;
- Bank stabilisation works on the Georges River;
- Construction of a foreshore walkway/cycleway along the Georges River; and
- Revegetation and enhancement of a 50m wide riparian corridor along the Georges River and a 20m wide corridor along each bank of the Northern creekline.

The works directly relevant to ecology include the requirement for the revegetation and enhancement of the riparian corridors along the Georges River and the Northern Creekline, a second order stream in the northern parts of the Riverlands site that drains into the Georges River. The indicative locations of the requisite riparian corridors subject to the VPA (referred to as 'VPA Riparian Corridors') is shown in **Figure 1**.

To date, development applications (DAs) have been submitted to Canterbury-Bankstown Council (Council) by Mirvac for :

- Subdivision of existing 27 lots into 6 lots under Torrens title, requiring no works, (DA No. 1107/2019);
- The residential subdivision (DA 4/2020);
- Construction of a connector road for residential development as required under the VPA (108/2020); and

- Bank stabilisation works required under the VPA DA (DA 370/2020).

The locations of the DAs with physical works within the Riverlands site are shown in **Figure 1**.

The Project is currently the subject of four related Class 1 Land and Environment Court (LEC) proceedings known as Mirvac Homes (NSW) Pty Ltd (Mirvac) v Canterbury Bankstown Council ('Council') (Case numbers 2020/00267217, 2020/00267229, 2020/00267230 and 2020/00267231). Ecological issues for the DA, as raised in Council's Statement of Facts and Contentions (SoFC) for the four cases largely relate to alleged insufficient ecological investigations of impacts on threatened species and ecological communities as listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and alleged non-compliance with specific clauses and requirements of the *Bankstown Local Environment Plan 2015* (BLEP 2015) and the *Bankstown Development Control Plan 2015* (BDCP 2015).

The DAs for the residential subdivision and Keys Parade connector road, as submitted to Council, were supported by Biodiversity Development Assessment Reports (BDARs), as required, prepared by Cumberland Ecology. The residential subdivision and Keys Parade connector road BDARs have been updated and an additional BDAR for bank stabilisation has been prepared for the LEC proceedings. These BDARs comprise separate documents to this VMP.

A DA for the construction of the Georges River foreshore walkway/cycleway as required under the executed VPA (hereafter referred to as the 'Shared Pathway') is yet to be submitted to Council at the time of the preparation of this document and will also require revegetation works. Therefore, the purpose of this VMP is to provide overarching guidelines for management and revegetation within the Northern Creekline and the Georges River corridor as required for various works required under the VPA.

Although this Vegetation Management Plan (VMP) has been prepared as part of the documentation package of the DA for the bank stabilisation works, it nonetheless provides an overarching guideline for all revegetation works required under the VPA, including revegetation works associated with the Shared Pathway (Georges River) and the connector road (Northern Creekline).

The proposed alignment for the Shared Pathway along the Georges River, as per the requirements of the VPA, is shown in **Figure 1**. While the alignment will unavoidably pass through areas of existing native vegetation, the alignment has been sited to minimise impacts to existing vegetation. Although, minor on-site adjustments to the Shared Pathway alignment may be required at specific locations to maximise avoidance of remnant native vegetation and areas of bank stabilisation works, the current proposed alignment is considered to minimise overall impacts on native vegetation while meeting the location requirements specified within the VPA. Any minor on-site adjustments at the detailed design stage are to give due consideration to the proposed vegetation management zones of this VMP (as detailed in Chapter 4) with revegetation areas to be assigned to the proximate management zone following site specific adjustments.

This VMP also outlines measures for the management of vegetation to be cleared for future DAs, in particular the shared pathway, and provides specifications for vegetation clearing protocols, hygiene protocols to

minimise the risk of spreading plant pathogens and weed management measures to be implemented during clearing and construction works for developments within the wider Riverlands site.

1.2. Project Description

DA 370/2020, as amended for the LEC proceedings, seeks consent to conduct the bank stabilisation works along the Georges River in accordance with specific components of the requirements under Schedule 2 of the executed VPA for the Riverlands Site.

For the purposes of the stabilisation works, the Georges River foreshore is roughly divided into five sections denoted as Locations E68A, E68, E71 (1–4), E73 (1-3) and E74 (1-2) in accordance with the VPA. Of these, sections E68A, E68, E71 and E73 occur within the Riverlands site while section E74 lies under the M5 Motorway outside of the Riverlands site. The locations of these sections, as per the executed VPA, are shown in **Figure 2**. Contamination remediation in accordance with the Remediation Action Plan (RAP) prepared by Sullivan Environmental Services (SES, 2021) will also be conducted.

Although this Vegetation Management Plan (VMP) has been prepared as part of the documentation package of the DA for the bank stabilisation works, it also addresses all revegetation works required under the VPA and is not limited to revegetation works for the current bank stabilisation DA.

1.3. Legislation

1.3.1. Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) was introduced as part of the NSW Land Management and Biodiversity Conservation reforms and legally came into force on 25 August 2017. A key part of the reforms is the introduction of the Biodiversity Offsets Scheme (BOS). The BOS applies to local development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that is likely to significantly affect threatened species or communities or that triggers threshold levels for when assessment via the BOS is required. The threshold has three elements:

- Whether the amount of native vegetation being cleared exceeds a threshold area;
- Whether the area being cleared is mapped on the Biodiversity Values map published by the Minister for the Environment; and
- Whether the impact on threatened species or ecological communities is deemed significant.

At the time of submission of the original DA in February 2020, the Biodiversity Values (BV) Map did not include any mapped areas within the proposed works site and native vegetation clearing was below thresholds, therefore the requirement for a BDAR was not triggered. The BV map is updated every 90 days and has since been updated to include mapped areas within the Riverlands site. As areas within the proposed work sites have been included on the BV map for more than 90 days at the commencement of the LEC proceedings, the requirement for a BDAR was re-evaluated. Accordingly, a BDAR for bank stabilisation works has been prepared in relation to DA 370/2020 as a separate document to this VMP for the LEC proceedings.

Separate BDARs have been prepared to support the DA applications for the connector road and the residential development within the Riverlands site. A BDAR, if required, will be prepared for any future DAs associated with the Shared Pathway.

1.3.2. Water Management Act 2000

Under the NSW *Water Management Act 2000* (WM Act), waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary. The National Resources Access Regulator (NRAR) administers the WM Act and is required to assess the impact of any proposed activity to ensure that no more than minimal harm will be done to waterfront land as a consequence of carrying out the activity.

Under the WM Act, a riparian corridor, comprising the channel (the bed and banks of the watercourse to the highest bank) and a vegetated riparian zone (VRZ) adjoining the channel are required to protect waterfront land. The VRZ width is based on watercourse order as classified under the Strahler System of ordering watercourses.

The work sites for the connector road DA submitted to Council by Mirvac encroaches upon the 40m waterfront land zone of the Northern creekline, a second order stream (**Figure 1**). Therefore, in accordance with the requirements of the *Water Management Act 2000*, a 20m Vegetated Riparian Zone (VRZ) on each bank of the Northern creekline is required and is to be managed under a VMP. The requisite VRZ under the WM Act fully coincides with the riparian corridor area listed in the VPA for the Riverlands site and therefore is to be managed under this VMP.

As the land along the Georges River is to be dedicated to Council prior to any works being completed, the works along the Georges River are exempt from Controlled activity approvals under Clause 41 of the *Water Management Regulations 2018*. Nonetheless, the requisite 50m riparian corridor required under the VPA exceeds the 40m VRZ required under the WM Act.

The proposed works are therefore considered to be consistent with the requirements for waterfront land under the WM Act.

1.3.3. State Environmental Planning Policy (Coastal Management) 2016

State Environmental Planning Policy (Coastal Management) 2016 (Coastal Management SEPP) came into force on 3 April 2018, replacing State Environmental Planning Policy No 14—Coastal Wetlands, State Environmental Planning Policy No 26—Littoral Rainforests and State Environmental Planning Policy No 71—Coastal Protection.

The following zones of the Coastal Management SEPP occur within the Riverlands site (**Figure 3**):

- Coastal Wetlands;
- Proximity Area for Coastal Wetlands;
- Coastal Environment Area; and

- Coastal Use Area.

The consistency of the proposed works with the objectives of each zone is outlined below.

i. Coastal Wetland Zone

Under the Coastal Management SEPP, development can be carried out in areas mapped as Coastal Wetlands if the consent authority is satisfied that sufficient measures have been, or will be, taken to protect, and where possible enhance, the biophysical, hydrological and ecological integrity of the coastal wetland.

Proposed works within the coastal wetland zones of the Riverlands site largely constitute environmental protection works (revegetation) and improved public access (the Shared Pathway) as required under the VPA.

The current proposed Bank Stabilisation works will not remove any Coastal Wetland vegetation and will benefit/enhance existing vegetation via the stabilisation works. Although the future cycleway will result in some encroachment on coastal wetlands, the overall management and enhancement of the Georges River frontage will improve the biophysical, hydrological and ecological integrity of the coastal wetlands in the long term. The proposed works are therefore consistent with the objectives for areas mapped as Coastal Wetlands under the Coastal Management SEPP as these areas will be protected and enhanced thus improving ecological integrity above existing conditions.

ii. Proximity to Coastal Wetland Zone

Under the Coastal Management SEPP, development can be carried out in areas mapped as "proximity area for coastal wetlands" if the consent authority is satisfied that the proposed development will not significantly impact on the biophysical, hydrological and ecological integrity of the coastal wetland or the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

The areas mapped as 'Proximity to Coastal Wetland' are within areas that are to be managed under this VMP. The areas mapped as 'Proximity to Coastal Wetland comprise a mix of cleared/denuded areas and riparian vegetation. The ecological integrity of the Proximity zones will be enhanced through active management under a VMP. Therefore, the proposed development is consistent with the objectives for areas mapped as 'Proximity to Coastal Wetland' as there will be no significant impacts on the biophysical, hydrological and ecological integrity of the coastal wetland or the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

iii. Coastal Environment Area

Under the Coastal Management SEPP, development can be carried out in areas mapped within the coastal environment area if the consent authority is satisfied that the proposed development will not significantly impact on the following:

- the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,
- coastal environmental values and natural coastal processes,

- the water quality of the marine estate (within the meaning of the *Marine Estate Management Act 2014*), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,
- marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,
- existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
- Aboriginal cultural heritage, practices and places,
- the use of the surf zone.

The proposed works will largely avoid impacts to ecological integrity, marine environments, surf zones and cultural places as well as improve public access. Potential impacts to ecological integrity will be managed under a VMP. The proposed modification is therefore consistent with the objectives of the Coastal Environment Area zone.

iv. Coastal Use Area

Under the Coastal Management SEPP, development can be carried out in areas mapped within the Coastal Use area if the consent authority is satisfied that the proposed development will not significantly impact on the following:

- existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
- overshadowing, wind funnelling and the loss of views from public places to foreshores,
- the visual amenity and scenic qualities of the coast, including coastal headlands,
- Aboriginal cultural heritage, practices and places,
- Cultural and built environment heritage.

The proposed will avoid impacts to items listed above and will improve access to coastal areas for members of the public. The proposed modification is therefore considered to be consistent with the objectives of the Coastal Use Area zone.

2. Methodology

2.1. Literature Review

The preparation of this VMP involved a literature review to determine the most up to date methods of weed control for exotic species that are present in the subject land. This literature review involved a variety of sources including government fact sheets and websites. Cumberland Ecology staff with expertise in bushland maintenance were also consulted in regard to current best practice weed control and revegetation methods and techniques.

In order to prepare species planting lists for revegetation the following documents were reviewed in conjunction with a review of the field data collected by Cumberland Ecology (see **Section 2.2**):

- Restoring Bushland on the Cumberland Plain (DEC (NSW), 2005);
- Atlas of NSW Wildlife (OEH, 2019);
- Planning Agreement Riverlands Golf Course (2015): Demian Holdings Pty Ltd and Bankstown City Council;
- Updated study of the approximately 82 ha site of the Riverlands Golf Course site at Milperra. Prepared for Bankstown City Council (Clements, 2012);
- Fauna Habitat and Species Constraints Assessment (Ambrose Ecological Services, 2012);
- Guidelines for riparian corridors on waterfront land (DPI, 2012);
- Swamp Oak Floodplain Forest – Final Determination (NSW Scientific Committee, 2011);
- River-flat Eucalypt Forest – Final Determination (NSW Scientific Committee, 2011);
- Arboricultural Impact Assessment: Riverlands 56 Prescot Parade Milperra for Proposed Bank Stabilisation Works – Georges River Foreshore (Urban Forestry Australia 2021); and
- Proposed Residential Development, Riverlands Golf Course Site, Milperra – River Bank Stabilisation. (Tooker and Associates, 2021).

2.2. Flora Surveys

2.2.1. Vegetation Mapping

Cumberland Ecology initially conducted vegetation surveys of the Riverlands site on 17-18 December 2018 for Statewide Planning to revise and update previous broad-scale mapping produced by the then NSW Office of Environment and Heritage (OEH) and the planning proposal documents, data which is permitted to be utilised for this VMP. Additional surveys to further refine the mapping within the Riverlands site were conducted from 1 – 3 July 2019. Additional mapping and mapping refinement along the Georges River was conducted on 23 July 2020. Although the 23 July 2020 surveys were conducted for a separate DA for the proposed shared pathway (not part of the LEC proceedings), the proposed footprint for these works overlaps with those of the current subject land and therefore the data has been utilised to guide this VMP.

The vegetation within the Riverlands site was ground-truthed to examine and verify the mapping of the condition and extent of the different vegetation communities by conducting random meander searches, noting key characteristics of areas in similar broad condition states such as similar tree cover, shrub cover, ground cover, weediness or combinations of these. Where vegetation community boundaries were found to differ significantly (2018 surveys) or required further refinement (2019 surveys) records were made of proposed new boundaries using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs.

2.2.2. Flora plots

2.2.2.1. BAM plots

Vegetation integrity assessments were undertaken in the Riverlands site in accordance with the Biodiversity Assessment Method (BAM) during the 1 – 3 July 2019 and 23 July 2020 survey period. Surveys included establishment of 20 x 50 m plots, with an internal 20 x 20 m floristic plot. The following data was collected within each of the plots:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within the 20 m x 20 m floristic plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within the 20 m x 20 m floristic plot;
- Cover of 'High Threat Exotic' weed species within the 20 m x 20 m floristic plot;
- Assessment of function attributes within the 20 m x 50 m plot, including:
    - Count of number of large trees;
    - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
    - Regeneration based on the presence of living trees with stems <5 cm DBH;
    - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within each 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within each 20 m x 50 m plot.

A total of 15 BAM plots were undertaken within the Riverlands site, and their location is shown in **Figure 4**.

2.2.3. Random Meander Survey

A Random Meander survey was undertaken to identify plant species, in particular exotic weed species not recorded during quadrat sampling, for future management. The Random Meander survey was undertaken throughout the entirety of the Riverlands site. The random meander survey tracks are shown in **Figure 4**.

2.2.4. Targeted Threatened Flora Surveys

Targeted threatened flora searches were undertaken across the Riverlands site in conjunction with the random meander surveys. Although conditions within the Riverlands site were considered unsuitable for naturally

occurring threatened flora species due to level of past clearing and modification of soils from previous land uses, the targeted surveys focussed on the following threatened flora species as a precautionary measure:

- *Acacia pubescens;*
- *Eucalyptus benthamii;*
- *Pimelea spicata*; and
- *Wahlenbergia multicaulis*.

It is noted that although these species were considered as 'possible' in the previous 2012 Clements study, the habitat for these species was considered "likely to occur only in the Council Reserve Lot 5" located to the south of the Riverlands site. Additional species considered as 'possible' but limited to Council Reserve Lot 5 in the 2012 Clements study include:

- *Caladenia tessellata;*
- *Grevillea parviflora* ssp. *parviflora;*
- *Dillwynia tenuifolia*;
- *Persoonia nutans;*
- *Pultenaea parviflora;* and
- *Pultenaea pedunculata*.

These species were not included in the precautionary targeted surveys as the flora surveys were conducted outside of the recommended survey periods for these species. However, vegetation and habitat condition assessments determined that these species are unlikely to occur within the Riverlands site due to lack of suitable habitat from past and current land uses. Therefore, additional surveys for these species were not conducted. The locations of any naturally occurring threatened flora species observed during surveys, if present, were recorded using a hand-held GPS.

3. Vegetation of the Riparian Corridors

Surveys conducted by Cumberland Ecology supplemented and refined the pre-existing mapping provided by OEH and identified seven vegetation communities within the Riverlands site. These seven communities were assigned to six Plant Community Types (PCTs), including best-fit PCTs for planted vegetation as outlined in **Table 1**. The distribution of the PCTs within the Riverlands site is shown in **Figure 5**.

Table 1: Vegetation Communities of the Riverlands Site

Mapped Vegetation Community	Assigned Plant Community Type	Presence in VPA Riparian Corridors
Swamp Oak Floodplain Forest (SOFF)	1232 - Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion	Present
River-flat Eucalypt Forest (RFEF)	835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Present
Mangroves	920 - Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion	Present
Scattered Trees - Cumberland Plain Woodland origin	849 - Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (best fit PCT for modified vegetation)	Present
Scattered Trees - RFEF origin	835 - Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (best fit PCT for modified vegetation)	Present
Scattered Trees – Scribbly Gum Woodland origin	883 – Castlereagh Scribbly Gum Woodland	Absent
Planted Casuarinas	1800 - Swamp Oak open forest on river flats of the Cumberland Plain and Hunter valley (best fit PCT for planted vegetation)	Absent
Planted non-endemic Natives	1083 - Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux of the Sydney Basin Bioregion (best fit PCT for planted vegetation)	Absent

Of these, five communities occur within the VPA Riparian Corridors and are described further below. Descriptions of the vegetation communities outside of the VPA Riparian Corridors are not addressed further within this VMP.

3.1. Vegetation Communities

3.1.1. Swamp Oak Floodplain Forest

Swamp Oak Floodplain Forest (SOFF) occurs along the majority of the Northern creekline and as a large patch adjacent to the Georges River towards the southern parts of the Riverlands site, with smaller scattered patches along the Georges River banks. The condition of SOFF within the VPA Riparian corridors varies from good quality patches within the Northern Creekline and in the main Georges River patch to degraded regrowth in the smaller scattered patches. Rubbish dumping of items such as plastic bottles and debris, also occurs in patches within this community, particularly along the foreshore areas.

The dominant canopy species of this community is *Casuarina glauca* (Swamp Oak) with a relatively open mid-storey (**Photograph 5**). A low diversity of native groundcovers is present within the community and vary depending on the level of estuarine influence and level of historic disturbance. The groundcovers within the more estuarine areas adjacent to the Georges River and mangrove areas include *Tetragonia tetragonioides* (New Zealand Spinach), *Samolus repens* (Creeping Brookweed), *Juncus kraussii* subsp. *australiensis* (Sea Rush), *Bolboschoenus fluviatilis* (Marsh Club-rush) and *Baumea juncea* (Baumea). Two exotic species are present within the Swamp Oak Flood Plain Forest and include a rush species *Juncus acutus* subsp. *acutus* (Sharp Rush) and a groundcover chenopod *Atriplex prostrata*. Some estuarine areas along the Georges River comprise a near monoculture of the *Phragmites australis* (Common Reed), lacking any canopy species.

Photograph 1 : SOFF (good quality) in the main patch of the Georges River

Photograph 2 : Degraded SOFF along parts of the Georges River

3.1.2. River-flat Eucalypt Forest

River-flat Eucalypt Forest generally occurs as scattered patches along the first order stream that drains into the dams in the Riverlands site with minor occurrences along the Northern creekline and Georges River. Scattered occurrences of rubbish dumping are present within this community, particularly near the foreshore areas.

RFEF within the VPA Riparian Corridors is degraded, having been exposed to fragmentation in the past. The canopy along the Georges River is dominated by *Eucalyptus baueriana* (Blue Box) with occurrences of *Casuarina glauca*. A relatively low abundance of native understorey species was recorded and comprised scattered occurrences of *Einadia hastata* (Berry Saltbush)*, Einadia trigonos* (Fishweed) and *Cotula australis* (Common Cotula). The grass *Cynodon dactylon* is the most common of these, with other species occurring as scattered individuals within a predominately exotic ground layer. Dominant exotic species within this community include *Cenchrus clandestina* (Kikuyu Grass), and *Bromus catharticus* (Prairie Grass).

Areas along the Northern Creekline are generally dominated by *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple) with occasional occurrences of *Eucalyptus baueriana* (Blue Box). A relatively low abundance of native understorey species was recorded and comprised scattered occurrences of *Bursaria spinosa* (Blackthorn), *Microlaena stipoides* (Weeping Grass), *Cynodon dactylon* (Couch), *Einadia hastata* (Berry Saltbush), *Lomandra longifolia (*Spiny Mat-rush), *Solanum prinophyllum* (Forest Nightshade)*, Pratia purpurascens* (Whiteroot), *Glycine microphylla* (Small-leaf Glycine) and *Cotula australis* (Common

Cotula). The grasses *Microlaena stipoides* and *Cynodon dactylon* are the most common of these, with other species occurring as scattered individuals within a predominately exotic ground layer. Dominant exotic species within this community include *Cenchrus clandestina* (Kikuyu Grass), *Paspalum dilatatum* (Paspalum), *Bromus catharticus* (Prairie Grass), *Asparagus aethiopicus* (Asparagus Fern), *Asparagus asparagoides* (Bridal Creeper), and *Senecio madagascariensis* (Fireweed).

Photograph 3 : Degraded patches of RFEF along the banks of the Georges River

3.1.3. Mangroves

Mangrove vegetation largely occurs in the south-western region of the Riverlands site within the intertidal zone of the Georges River. This community is primarily dominated by *Avicennia marina* (Grey Mangrove) within the canopy. The mangrove vegetation within the intertidal zone consists of a mix of mature and young regenerating plants.

The mangrove area largely lacks any understorey and the ground layer is largely dominated by mangrove seedlings and pneumatophores of young to mature trees (**Photograph 4**). Rubbish such as plastic bottles and debris, was observed across the root mat zone.

Photograph 4 : Mangrove vegetation along the Georges River

3.1.4. Scattered Trees – RFEF origin

Scattered Trees – RFEF origin comprises scattered remnant trees of RFEF origin such as *Eucalyptus baueriana* (Blue Box), *Eucalyptus tereticornis* (Forest Red Gum), and *Angophora floribunda* (Rough-barked Apple) over exotic understorey within the highly modified soils of the former golf course and around developed hardstand areas. Within the subject site this community is limited to scattered patches at the south-eastern extent near the former club house car park (**Photograph 5**).

Photograph 5 Scattered trees of RFEF origin near the former club house

3.1.5. Scattered Trees – CPW origin

Scattered Trees – CPW origin comprises scattered remnant trees of Cumberland Plain Woodland origin such as *Eucalyptus moluccana* (Grey Box) and *Eucalyptus crebra* (Narrow-leaved Ironbark) over exotic understorey within the highly modified soils of the former golf course and around developed hardstand areas. Within the subject site this community is limited to parts of the canopy of a single *Eucalyptus crebra* located on the bitumen track to the south of the former club house (**Photograph 6**).

Photograph 6 Eucalyptus crebra on edges of subject site.

3.2. Threatened Ecological Communities

River-flat Eucalypt Forest (PCT 835) is associated with the Threatened Ecological Community (TEC) River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (River Flat Eucalypt Forest). This community is listed as an Endangered Ecological Community (EEC) under the BC Act.

Swamp Oak Floodplain Forest (PCT 1232) is associated with the following TECs within the OEH BioNet Vegetation Classification database:

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (part);
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (part); and
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (equivalent).

The onsite community is considered to conform to Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion communities only, which is listed as an EEC under

the BC Act. This community also corresponds to the EPBC Act listed EEC: Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community.

Some areas of remnant Swamp Oak, such as those within the large patch along Georges River where the community intergrades with Mangroves and has an understorey of *Phragmites australis*, meet the thresholds to be classified as a Category C patch (large patch of moderate quality) under the EPBC Act. The smaller scattered fragments of Swamp Oak along parts of the Georges River as well as parts of the Northern creekline do not meet the thresholds to be classified as Swamp Oak Forest under the EPBC Act, due to either a total lack of an understorey or a predominantly exotic understorey layer (≥90% exotic).

3.3. Threatened Flora Species

No threatened flora species were recorded within the VPA Riparian Corridors or the wider Riverlands site. Therefore, no specific management actions are required for threatened flora species

3.4. Priority Weeds

Six of the exotic plant species recorded within the Riverland site are listed as State Priority weeds under the *Biosecurity Act 2015* and Weeds of National Significance (WONS) under the National Weeds Strategy. State-listed Priority weeds have specific legal requirements for management and have higher management priorities. These species are; *Alternanthera philoxeroides* (Alligator Weed), *Anredera cordifolia* (Madeira Vine), *Asparagus aethiopicus* (Asparagus Fern), *Asparagus asparagoides* (Bridal Creeper), *Salvinia molesta* (Salvinia) and *Senecio madagascariensis* (Fireweed).

4. Vegetation Management Zones

The areas nominated under the VPA to be revegetated is comprise two main areas – one along the Northern Creekline and one along banks of the Georges River.

The Northern Creekline corridor comprises a 40m wide (20m on each bank) riparian corridor that is to be managed and enhanced.

The area of the Georges River bank to be revegetated is a 50m wide riparian corridor that stretches from the embankment of the Georges River along its length within the Riverlands site. The initial 20m width of the corridor from the cadastral boundaries comprises land that is to be dedicated to Council while the remaining 30m width of the corridor landward of the dedicated land will be situated on private land. Under the VPA, a minimum 3.5m wide Shared Pathway is also to be constructed within the dedicated land as part of the foreshore improvement.

As the Shared Pathway is to be located within the dedicated land, any proposed alignment will unavoidably pass through areas of existing native vegetation. Nonetheless, the current proposed alignment has been sited to minimise impacts to existing vegetation.

The works under the VPA occur in various stages. This VMP provides overarching guidelines for the management and revegetation within the Northern Creekline and the Georges River corridor as required under the VPA.

4.1. Vegetation Management Zones

Bank stabilisation works are roughly limited to five sections denoted as Locations E68A, E68, E71 (1–4), E73 (1-3) and E74 (1-2) in accordance with the VPA. Of these, Sections E68A, E68, E71 and E73 occur within the Riverlands site while Sections E74 lies under the M5 Motorway outside of the Riverlands site (**Figure 2**). As the proposed stabilisation works for Sections E74 (1-2) include rock rip-rap and batter stabilisation and do not incorporate any revegetation, these sections are not incorporated into any vegetation management zones and are not addressed further within this VMP.

As the current proposed alignment of the Shared Pathway is in very close proximity to the bank stabilisation works (**Figure 2** and **Figure 6**), for the purposes of this VMP, separate management zones for the bank stabilisation works or Shared Pathway works are not proposed but are incorporated into the overall vegetation management zones for the Georges River foreshore.

A total of six management zones are proposed for the VPA Riparian corridors (**Figure 6**). The management zones comprise:

- Zone 1a – Remnant SOFF
- Zone 1b – SOFF revegetation
- Zone 2a – Remnant RFEF
- Zone 2b – RFEF revegetation
- Zone 3a – Remnant Mangrove

- Zone 3b – Mangrove revegetation

The areas for proposed bank stabilisation works largely overlap with Zone 3b (within the mid tide berm) and are to be revegetated accordingly. However, the landward extent of bank stabilisation works varies between the five on-site locations. For sections where any revegetation areas associated with bank stabilisation works extend beyond the crest of the bank, these areas are to be revegetated using species for Zone 1b, with due consideration to other stabilisation requirements as recommended in Tooker and Associates (2021).

An existing, disused building (part of the former golf course) is present in the southern parts of the Georges River riparian corridor within the 30m band on private land. This building is not proposed to be demolished under any of the currently submitted DAs and therefore no revegetation works are currently proposed at this location. This area has therefore been excluded from the vegetation management zones for the Georges River riparian corridor in this VMP.

Minor on-site adjustments to the Shared Pathway alignment may be required at specific locations during detailed design/construction stages to maximise avoidance of remnant native vegetation and areas of bank stabilisation works. These adjustments, if required, are to give due consideration to the proposed vegetation management zones of this VMP and revegetation areas are to be assigned to the most proximate management zone following site specific adjustments following all feasible measures to avoid bank stabilisation plantings.

4.2. Management Zone Objectives

Each vegetation management zone has differing objectives as summarised in below:

4.2.1. Zone 1a – Remnant SOFF

The objectives for Zone 1a – Remnant SOFF are to:

- Removal of rubbish/debris from the zone;
- Retain and protect existing SOFF remnants where feasible;
- Control environmental weeds;
- Supplement retained areas with planting for diversity where required; and
- Establish a diverse array of native species to enhance fauna habitat potential; and
- Establish native species along the bank to enhance erosion control and bank stabilisation.

4.2.2. Zone 1b – SOFF revegetation

The objectives for Zone 1b –SOFF revegetation are to:

- Removal of rubbish/debris from the zone;
- Restore cleared areas to form high-quality areas of SOFF;
- Control environmental weeds;

- Revegetate cleared areas with native canopy, understorey and ground layer species to create habitat typical of floodplain forests;
- Establish a diverse array of native species to enhance fauna habitat potential; and
- Establish native species along the bank to enhance erosion control and bank stabilisation.

4.2.3. Zone 2a – Remnant RFEF

The objectives for Zone 2a –Remnant RFEF are to:

- Removal of rubbish/debris from the zone;
- Retain and protect existing RFEF remnants where feasible;
- Control environmental weeds;
- Supplement retained areas with planting for diversity where required; and
- Establish a diverse array of native species to enhance fauna habitat potential.

4.2.4. Zone 2b – RFEF revegetation

The objectives for Zone 2b –SFEF revegetation are to:

- Removal of rubbish/debris from the zone;
- Restore cleared areas to form high-quality areas of RFEF;
- Control environmental weeds;
- Revegetate cleared areas with native canopy, understorey and ground layer species to create habitat typical of floodplain woodland/forest habitat; and
- Establish a diverse array of native species to enhance fauna habitat potential.

4.2.5. Zone 3a – Remnant Mangroves

The objectives for Zone 3a –Remnant Mangroves are to:

- Removal of rubbish/debris from the zone;
- Retain and protect existing mangrove remnants where feasible;
- Control environmental weeds;
- Supplement retained areas with planting for diversity where required; and
- Establish a diverse array of native species to enhance habitat potential for coastal wetland fauna species;
- Establish native species along the bank to enhance erosion control and bank stabilisation.

4.2.6. Zone 3b – Mangrove revegetation

The objectives for Zone 3b –Mangroves revegetation are to:

- Removal of rubbish/debris from the zone;
- Restore cleared areas to form high-quality areas of mangrove;
- Control environmental weeds;
- Revegetate cleared areas with native canopy and understorey species to create habitat typical of coastal wetlands; and
- Establish a diverse array of native species to enhance habitat potential for coastal wetland fauna species; and
- Establish native species along the bank to enhance erosion control and bank stabilisation.

4.3. Actions

The VPA Riparian Corridor is to undergo management by a Bushland Regeneration Contractor (BRC).

All management zones are to be planted with a diverse range of the locally endemic species listed in **Appendix A**. The species selection and planting densities for the different management zones are addressed in **Section 7.3.2** of this VMP.

All vegetation management zones have been subject to the dumping of general rubbish such as glass bottles, plastics and residential household items as well as commercial/industrial rubbish. All rubbish/debris will need to be cleared in order to proceed with vegetation management – i.e. all rubbish is to be cleared prior to site preparation by the BRC and commencement of weed management. The clean-up of the riparian corridor zones will be conducted in accordance with the relevant RAP prepared for the site (SES, 2021) .

5. Vegetation Clearing Protocols

5.1. Introduction

This chapter outlines the protocols to be adhered to during clearing of vegetation within the work sites within the wider Riverlands site. These protocols also apply for any vegetation to be cleared for the construction of the future Shared Pathway.

Although vegetation proposed to be removed for the bank stabilisation works is limited to three trees and associated understorey, due consideration to protocols for marking of work zones and disposal of weeds should be given during implementation of these works.

5.2. Marking Limits of Vegetation Clearing

Prior to the commencement of any vegetation clearing within the Riverlands site, the edge of the vegetation to be cleared is to be clearly delineated. In particular, appropriate tree protection measures should be installed around all trees to be retained to prevent damage during adjacent cut and fill works.

Clearing limits can be marked with high visibility tape, temporary fencing, or other appropriate boundary markers. To avoid unnecessary damage to vegetation or inadvertent habitat removal, disturbance is to be restricted to the delineated area. No stockpiling of equipment, soils, or machinery will occur beyond the boundary.

The person responsible for the clearance activities will be responsible for ensuring that the boundary markers are installed to enable the suitable environmental and technical inspections of the proposed disturbance to be undertaken.

5.3. Rubbish Removal

As rubbish, in particular items such as dumped household items and glass/plastic bottles) can comprise an impediment/hazard to fauna rescue, all rubbish should be removed from areas subject to clearing works following delineation of clearing limits.

5.4. Weed Management During Construction

Prior to clearing, all plant equipment entering the site will be inspected and recommended for wash down (in designated wash down areas) if required to ensure weed material from offsite locations do not establish or spread into native vegetation within the Riverlands site.

Any weed materials present in the work sites will need to be carefully removed off site in a manner appropriate to the species or at the direction of the ecologist or a bush regeneration contractor (BRC) and The Canterbury-Bankstown Council guidelines so as to prevent the spread of propagules to uncleared areas of native vegetation, both on and off site.

Machinery involved in weed management is also recommended to be washed down prior to removal from site to prevent weeds from spreading into off site areas.

After construction is complete, a final inspection will be undertaken by the ecologist to check that weeds have been successfully contained to prevent weed spread.

5.5. Sediment and Erosion Control

As weed species are removed from the work sites, the soil may become susceptible to erosion during periods of rain, particularly along the Georges River and Northern Creekline banks. As such erosion control measures will be installed where appropriate following weed removal.

This potential impact will be avoided through the implementation of appropriate erosion and sediment control measures that includes measures such as:

- Stabilisation of areas of bare soil using jute matting or mulch;
- Stabilisation of areas of bare soil by re-vegetating immediately with appropriate local native plants;
- Covering soil stockpiles;
- Control of sediment by installation of erosion fences around all work sites, particularly along the banks of the waterways to avoid potentially nutrient and seed rich run-off entering the waterways.
- On slopes on the site, logs (either coir logs or salvaged logs from clearing works) should be used in combination with wooden stakes to stabilise soils following weed control. The logs can be left on site indefinitely, as they will break down after native plants have re-established. In steep areas in which natural regeneration is not occurring, logs should be used in addition to planting native species to stabilise the soil surface.
- In areas that channel water with no native regeneration following weed control, biodegradable jute matting should be used to stabilise the soil surface, with native species planted through the matting.

5.6. Pre-clearing Surveys

Prior to the commencement of any clearing, a pre-clearing survey will be undertaken by a certified ecological consultant. During the survey, weeds present in the work sites and habitat for native fauna that have the potential to be disturbed during clearing will be identified.

5.6.1. Flora Pre-clearing Surveys

Prior to clearance, a pre-clearance survey will be conducted in the work sites to determine locations of any infestations of significant weeds (i.e. Priority weeds listed under the *Biosecurity Act 2015* or Weeds of National Significance (WONS)) in the Riverlands site. If recommended by the ecologist, control of weeds will be undertaken to minimise the risk of spread of weeds during clearing. Weed control measures will be species specific.

5.6.2. Fauna Pre-clearing Surveys

A fauna pre-clearing survey will be undertaken by a qualified ecologist prior to any vegetation clearance. Habitat features that have a high potential to support native fauna species will be identified prior to any clearing activities. These include significant rock outcrops and in particular trees bearing hollows that have potential to contain species such as bats, gliders, possums, reptiles and birds. Trees to be cleared that contain hollows or

nests that have a high potential to contain fauna will be identified, recorded, flagged with fluorescent marking tape, and marked with a large (>1 m) "H" using spray paint on two sides of the tree.

In particular, trees that are suitable for 'salvage' and translocation to the foreshore corridor will be identified and marked with further fluorescent tape. All trees identified as suitable for translocation should be further inspected for infection in accordance with the pathogen management plan (SESL, 2017) to ensure no spread of pathogens into the foreshore area. In the event of contamination, particularly found in the root-ball, un-contaminated sections should be salvaged where feasible, relocated to the foreshore area and secured to suitable structures to provide additional fauna habitat within the corridor.

To determine fauna usage, the ground around each tree to be removed will be inspected for scats, and each tree trunk will be inspected for scratch marks and tree hollows. Any fauna utilising the area will be recorded, and where possible, these will be encouraged to leave the area prior to clearing. The location of suitable nearby habitat for the release of fauna that may be encountered during the pre-clearing process will be identified and marked on a map. It is recommended that fauna pre-clearance surveys are conducted within two weeks of commencement of clearing and/or translocation activities to reduce risk of nesting by fauna.

5.7. Clearing Supervision

Fourteen microbat species have been identified within the Riverlands site by Cumberland Ecology in 2018. Of these species, five have been listed as threatened under the BC Act and/or EPBC Act. Most of these species are hollow-roosting and thus have potential to inhabit the hollow-bearing trees throughout the Riverlands site. For the duration of vegetation clearing, a qualified ecologist must be present at all times to actively seek, capture and release any microbats or other native species that may be disturbed and flee from felled trees to limit the impacts to native fauna caused by clearing.

Any trees that were identified as habitat items (see Section 5.4.2 above) will be initially isolated by clearing all other non-habitat trees around them, then left in-situ for a 24-hour period prior to clearance under ecologist supervision. During clearance works standard clearance supervision protocols will be observed. This will involve the ecologist inspecting habitat features immediately prior to disturbance for occupying fauna. Following the initial inspection, each habitat tree will be agitated prior to felling in the presence of an ecologist and then inspected by an ecologist once felled. Inspections will consist of a thorough examination of hollows, nests and decorticating bark to find any remaining resident fauna. A torch will be used to facilitate the inspection of deeper parts of hollows for fauna such as microbats. For each species captured and identified after felling, an experienced ecologist will place the animal in an appropriate container/calico bag and relocate it to an appropriate area outside the disturbance footprint.

5.8. Salvage of Fauna Habitat Features

Fauna habitat features are to be salvaged during clearing and stockpiled for future use in revegetation of the VPA Riparian Corridors. The placement of salvaged items within appropriate areas of the VPA Riparian corridors will increase habitat complexity as such items are used by a variety of invertebrate and vertebrate species as microhabitat areas.

If present, habitat features such as hollow-bearing logs, other woody material and bushrock are to be stored until such time as revegetation works commence. Storage must be undertaken within designated stockpile areas with onsite contractors made aware that the material is to be retained, to prevent loss of stored habitat features prior to utilisation. Placement of stored habitat features within revegetated areas will be undertaken in co-ordination with the bush regeneration contractor or the ecologist.

6. Weed Management Plan

6.1. Introduction

6.1.1. Species Lists

Under the NSW *Biosecurity Act 2015*, state listed Priority Weeds have specific legal requirements for management and have higher management priorities. State listed Priority Weeds recorded within the Riverlands site are listed in **Table 2** below. These species are also listed as Weeds of National Significance (WoNS) under the National Weed Strategy.

Table 2: State listed Priority Weeds and WONs recorded within the Riverlands Site

Scientific Name	Common Name	Biosecurity Act Status	WONS
Alternanthera philoxeroides	Alligator Weed	State Priority	YES
Anredera cordifolia	Madeira Vine	State Priority	YES
Asparagus aethiopicus	Asparagus Fern	State Priority	YES
Asparagus asparagoides	Bridal Creeper	State Priority	YES
Salvinia molesta	-	State Priority	YES
Senecio madagascariensis	Fireweed	State Priority	YES

6.1.2. Best Management Practice

The entire revegetation area (Northern creekline and Georges River foreshore) is to undergo weed management by a bush regeneration contractor (BRC) of any exotic species prior to rehabilitation works commencing. As all vegetation management zones are subject to historic rubbish dumping which comprises a hazard/impediment to vegetation management, weed management and associated site preparation is to commence following appropriate removal of rubbish by an approved/licenced contractor in accordance with the RAP for the site.

Contractors for weed removal within the revegetation area will have regard to the following, to minimise impacts upon existing vegetation and habitats:

- The main principles of the Bradley Method of bush regeneration, i.e. not over-clearing (remove only targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance, and replacement of disturbed mulch/leaf-litter;
- Sweep from one end of the weeding zone to the other. During this sweep regrowth individuals of harder to manage weeds that require other techniques such as sawing, digging, drilling etc. should be targeted;
- Removal of fruiting/seeding parts of weeds carefully, to minimise spread of plant propagules;
- Spot spray weeds in open areas with no natives with herbicide. Use of chemicals and sprays only during suitable weather conditions (i.e. not during wet or windy conditions), and only during appropriate seasons;
- All equipment should be thoroughly cleaned prior to entering the site to minimise contamination;

- Proximity to watercourses and swampy areas;
- Presence of native fauna or nesting/breeding sites; and
- Bag and remove weed material from the Riverlands site.

6.1.3. Weed Control Methods

Bush reconstruction weed control is to be implemented over the entire revegetation area. All weed removal works should be approached using the strategies outlined below.

6.1.3.1. Manual Weed Removal

Manual removal, or hand weeding, is an effective form of weed control when all viable parts of the plant are removed from the soil (roots, fruiting material and rhizomes) and site. All weeds removed by hand will be handled according to best practice bush regeneration techniques to prevent subsequent seed set from the removed weeds, and the unviable plant material will be retained on site to provide mulch and natural leaf litter to protect the soil surface.

Specific manual removal techniques for Salvinia (an aquatic weed) include the use of scoops, nets, shovel rakes, bins, bags, waders/wetsuits. Where possible, booms are to be used to contain areas while manual removal is being carried out. Manual removal should start at the most upstream point and work downstream.

6.1.3.2. Use of Herbicides

All herbicides should be used according to recommendations on the herbicide label. Appropriate Personal Protective Equipment (PPE) should be worn and consideration given to time of day, likelihood of rainfall, wind direction and likely impact on native species as per guidelines on the label. Use of glyphosate will be appropriate for most species. Glyphosate is the preferred herbicide for use in environmentally sensitive areas as it is rapidly broken down by microbes in the soil so residue is short lived and will not affect remnant and planted native individuals in the long-term following application. Due to the proximity of the revegetation area to the Georges River, an appropriate form of the herbicide should be used to minimise impact to aquatic life and amphibians. Herbicide use should be avoided within 2 m of the riparian edges. Examples of appropriate herbicide forms are Roundup Bioactive and Clearup Bio 360 which have surfactants that are formulated to minimise harm to amphibians. As runoff is a likely way for herbicide residue to enter watercourses, chemical treatment should be avoided prior to or directly after rains.

It is important to note that there can be legal restrictions and permit requirements for use of specific herbicides for specific plants, and chemical labels and permit requirements always need to be researched prior to herbicide application. While the recommended methods for weed treatment detailed in **Appendix B** are effective, some will require a permit to be undertaken. The relevant permit numbers are PER9907, and PER11916. These permits need to be obtained from the Federal Government body, the Australian Pesticides and Veterinary Management Authority.

Manual removal will be an appropriate form of control for some species, and all chemical treatment should be carried out according to best practice guidelines.

Planting should not occur within 10 days of herbicide application.

6.1.4. Types of Weed Control

This section provides information on the types of weed control that will be undertaken in the revegetation areas. Further information on effective methods for controlling specific weed species present within the subject site and legal and environmentally safe use of herbicides is included in **Appendix B**. Note the weed control methods outlined in Appendix B also include control methods for weeds not specifically recorded within the Riverlands site but known to occur in the wider Cumberland plain region as a precautionary measure.

6.1.4.1. Primary Weeding

Primary weeding is the first stage of bushland regeneration. Primary weeding may involve techniques such as:

- The selective spraying of large weed infestations of weeds or cleared areas with no natives present, with selective and non-selective herbicides;
- Cutting/scraping/drilling deep rooted woody weeds and climbers with hand tools, chainsaws and brush cutters and painting cut stumps and scraped surfaces, or filling drilled holes with herbicides containing Glyphosate or Picloram; and
- Selective hand removal of weeds and wicker wiping of tall herbaceous weeds in situations where damage to proximate, low growing native plants can be avoided.

6.1.4.2. Maintenance Weeding

After primary weeding has been completed, maintenance weeding is to be undertaken throughout the entire revegetation area to treat any regrowth of woody weeds.

Maintenance weeding involves the selective removal or treatment of weeds, whilst allowing regenerating native plants to increase in size, abundance and percentage cover. All species of weeds should be targeted during maintenance weeding. The maintenance weeding bushland regeneration works are likely to be required at least every month until weeds are at negligible levels. Site visits may be more frequent if it is determined necessary.

It is recommended that any woody weeds, climbers, and key herbaceous weeds identified during reconstruction are subject to a programme of intense follow up weeding around any patches of planted native herbaceous plants to encourage the spread of the native plant species.

Follow-up weeding should be implemented for a minimum period of five continuous years, upon the completion of the initial reconstruction works. After the five-year follow-up and maintenance period has been completed, a review should be conducted to determine on-site maintenance requirements.

6.2. Weed Management within the Revegetation area

6.2.1. Site Preparation

The directions under the following headings should be undertaken sequentially during preparation of the revegetation area for bushland reconstruction.

6.2.1.1. Sediment Fencing

As the revegetation areas generally lie downslope of the development area footprints, it should be determined whether the topography of the land will facilitate runoff of surface soil during clearing works. In areas where soil runoff is likely to occur, temporary silt sediment fencing will be installed around the area to be revegetated, to prevent soil runoff during rain into drainage lines and the Georges River. Sediment fencing may be installed by the BRC or the Civil contractor.

6.2.1.2. Initial Weed Treatment

After installation of sediment fencing has been completed, initial weed treatment will commence. This will consist of spraying all weeds in the revegetation area with Glyphosate 360g/L at a concentration of 10 mL herbicide to 1 L of water. This strength is commonly used in bushland regeneration works as it will effectively kill most herbaceous weed species. A marker dye should be used in the herbicide solution to ensure no areas are missed. Knapsack sprayers with a spray cone to direct the spray towards the ground are recommended to be used to prevent herbicide drift into adjacent vegetated areas. A high-volume sprayer, or other method of sprayer more suited to large sites may be used if adequate measures are undertaken to prevent herbicide drift into non-target areas.

Following the initial spraying, the site should be left for three weeks to allow time for any treated weeds to die back. After this period, any weeds remaining should be resprayed with Glyphosate again, with a focus made on treating any exotic plant species that still have green colouring left in foliage, and any juvenile germinated exotic grasses.

The BRC may use other herbicides if labels and permits are followed. As the reconstruction area is a riparian corridor however, care must be taken to use only herbicides suitable for use near water courses.

6.2.1.3. Laying of Weed Suppression Materials

Several days after the second application of herbicide across the bushland reconstruction areas weed suppression materials should be installed across all exposed soil surfaces. This will inhibit germination rates of exotic weed seed in the soil, inhibit vegetative regrowth of resilient exotic weed species, and prevent soil runoff of surface soils during rain in the period until native plantings have become established sufficiently to prevent erosion. Weed suppression material can be a form of biodegradable matting such as jute matting, or mulch.

Jute matting is a commonly used biodegradable form of matting for bushland regeneration works. The heavier available forms of this product suppress weed growth. Holes would be cut into the matting to plant tube stock. As this is quite labour intensive, the most cost-effective method of weed suppression for the reconstruction areas would be using mulch. However, jute matting will be required to be used in any areas in which mulch will not prevent erosion of surface soils.

Mulch can be easily laid across the revegetation area in areas that contain no native plants. In areas containing native plants, the mulch can be spread on the ground surface around the occurrences of remnant native plants. If mulch is used a certified weed-free mulch of known provenance should be used. While mulch or any other form of weed suppressing layer across the ground will inhibit regrowth of weeds, it will also inhibit regrowth of native plants from seed. For this reason, weed suppression matting or mulch should only be used initially to establish the reconstruction of the site while weed control is needed, and be allowed to biodegrade over time

without being reapplied, unless required during the establishment period. Following application of weed suppression materials the reconstructed bushland areas will be planted out with native plants as per **Chapter 7**.

6.2.2. Ongoing Weed Maintenance

Weed suppression methods such as mulching/matting will suppress mass regrowth of weeds within the revegetation area, but not entirely prevent regrowth of weeds. The most cost and time effective method of controlling weed regrowth will be by spraying a non-selective Glyphosate herbicide. A list of effective methods for control of weeds on site is found in **Appendix B**. This is only to be used for large infestations. If targeting individual weeds then wick wiping/direct press techniques are advisable.

Ongoing maintenance of the revegetation area should occur for a five year period by the contracted bushland regeneration company, and the revegetation area be covered in its entirety once every month, to diminish the soil seed bank of exotic weed species present on site. In order to eliminate the occurrence of these species they need to be controlled before they have a chance to set seed, otherwise progress on the site will not be made.

Tree guards should remain around all native planted trees and shrubs, for at least 18 months to protect them from herbivory. Tree guards will allow herbicide to be used for control of the majority of regrowth weeds, without damage to native plants by herbicide drift.

The following sequential steps are recommended to manage each area of the site effectively for each site visit:

1. Initially the bushland regeneration team visiting the site should sweep from one end of each area to the other. During this sweep weeds occurring within each tree guard alongside native plants should be removed by hand and any weed occurring within a patch of dominant native plants (such as a patch of grasses).

2. A member of the team should then sweep the entire area, spraying all regrowth weeds between native plantings/remnant natives in open areas with herbicide, and spot spraying where possible in regeneration areas.

3. It is important during site visits for ongoing weed maintenance that as many weed species as possible are controlled. This will minimise maturity and set seed of weeds between site visits. Some weed species such as *Bidens pilosa* (Cobbler's Pegs), and *Ehrharta erecta* (Panic Veldtgrass) are prolific seeders, and many exotic plants can have seed that remains viable in the soil for long periods of time. In order to effectively diminish the soil seed bank occurrences of exotic species it is important that individuals are not allowed to set seed.

4. During site visits for weed control, Priority weeds and WONS (**Table 5.1**) must be prioritised for control. Individual plants of these species on site should not be allowed to achieve a reproductive stage in their life cycles.

5. Temporary sediment fencing should be retained until it is determined plants have sufficiently established to prevent surface soil erosion.

6. It is recommended that signs of rabbit herbivory be noted during site visits, and control measures undertaken if significant impacts to planted vegetation are occurring threatening the long-term viability of the reconstruction area.

6.3. Weed Control Methods

Weed control methods for all exotic and non-endemic species recorded on the site are located in **Appendix B**. Note the weed control methods outlined in **Appendix B** also include control methods for weeds not specifically recorded within the Riverlands site but known to occur in the wider Cumberland plain region as a precautionary measure.

6.4. Hygiene Protocols

To avoid the spread of *Phytophthora cinnamomi* and other soil borne pathogens from areas of known occurrence in the development sites, in particular the residential subdivision area, appropriate hygiene procedures and guidelines described in Best Practice Management Guidelines for *Phytophthora cinnamomi* within the Sydney Metropolitan Catchment Management Authority Area (Botanic Gardens Trust, 2008) will be followed.

This will involve the disinfection of all machinery, clothing (such as boots and gloves), and tools which have been in contact with soil with a spray prior to entering and leaving the site.

Recommended disinfectant products include:

- Non-corrosive disinfectants including Coolacide®, Phytoclean®, or Biogram® which can be for cleaning footwear, tools, tyres, machinery and other items in contact with soil;
- 70% Methylated spirits solution in a spray bottle which is suitable for personal use (clothing); and
- Sodium Hypochlorite 1%, which is effective, but can damage clothing and degrades rapidly in light.

The disinfectant used should also be suitable for killing Chytrid fungus, a major amphibian pathogen associated with decline in frog populations across Australia and world-wide, due to management zone 1a and 2a predominately occurring in wetland areas of frog habitat. Phytoclean®, and 70% methylated spirits solution are both generally considered appropriate for controlling Chytrid fungus as well as *Phytophthora (DECC (NSW), 2008)*.

Additionally, it is important to clean equipment and clothing prior to commencing work to prevent bringing weed propagules into the site, and after work to prevent transporting propagules off-site.

7. Revegetation Plan

7.1. Introduction

This chapter provides specific revegetation details for Management Zones 1b, 2b and 3b as described in **Chapter 4**. However, these measures should also be applied to areas of existing vegetation (Zones 1a, 2a and 3a) within the revegetation area, particularly Northern creekline and southern parts of the foreshore corridor in the event that natural regeneration does not occur following weed removal as this will increase the ecological value of the communities within the Riverlands site.

Appropriate plant species to be used for revegetation of each management zone are provided in **Appendix A**, and plants from the appropriate list are to be used for selection for revegetation of the management zones in the revegetation area.

7.2. Aims

The aim for the revegetation area is to achieve the following performance-based outcomes:

- Establish a suitable riparian corridor along the Northern creekline by increasing native species diversity and cover to appropriate levels for the community; and
- Establish a riparian corridor along the Georges River foreshore that connects remnant vegetation to the north and south in accordance with the Bankstown Biodiversity Strategic Plan.

7.3. Recommended Revegetation Techniques

Appropriate plant species for use within the different management zones are provided in **Appendix A** and are to be used for selection for revegetation. This includes assistive replanting in the existing areas of SOFF, RFEF and Mangrove if natural regeneration does not take place following weed removal. Plants will be sourced from local provenance stock where feasible, including opportunistic seed collections or cuttings from within existing remnant vegetation within the Riverlands site and the wider locality.

7.3.1. Species Selection

It is recommended that a mix of local native flora species are replanted at the specified densities outlined below. Although final species selection will be based on availability, a list of suitable plant species for SOFF and RFEF within Vegetation Management Zones 1a/b and 2a/b are provided in **Table 4** and **Table 5** of **Appendix A**.

Mangrove communities generally lack any understorey species. Nonetheless, some salt-tolerant understorey species are recommended for planting on the upper breams, particularly for areas of bank stabilisation works. The recommended understorey species for Zone 3a/b are provided in **Table 6** of **Appendix A**.

In general, as many species as are able to be sourced for each stratum should be planted to maximise diversity within the revegetation areas. Final species selection should be based upon:

- Availability of seed material;
- Exclusion of plants likely to naturally regenerate on the site; and

- Previous experience with species re-vegetation performance.

All plants will be disease and pest-free, hardened off and well-watered at the time of planting. All plants are to be provided in a healthy condition. They must have good root development and a sturdy shoot system.

7.3.2. Vegetation Planting Densities

The recommended planting specifications outlined below are for management zones that are to be fully revegetated (Zones 1b, 2b and 3b). Natural regeneration will be encouraged in areas of remnant vegetation (Zones 1a, 2a and 3a) with planting to be undertaken where needed only if natural regeneration does not occur in months following weed removal. If required, canopy species are to be planted in bare patches. Planting of understorey and ground layer species will be undertaken to restore areas where dense weed infestations have been removed and for the purposes of increasing species diversity in these strata. Any assisted revegetation of retained area should be adjusted to achieve the same overall strata densities as fully revegetated areas.

The recommended planting densities for Zone 1b (SOFF) are:

- Canopy Trees @ 2 units/10m^2
- Shrubs @ 1 unit/5m^2
- Groundcovers 4 unit/m^2

The recommended planting densities for Zone 2b (RFEF) are:

- Canopy Trees @ 1 unit/16m^2
- Shrubs @ 1 unit/3m^2
- Groundcovers 6 units/m^2

7.3.3. Recommended Planting Units

Species within all management zones should be planted in characteristic planting units to correspond with the topology, aspect, soil type and proximity to water.

Grasses may be planted in clumps of three or more (spaced 15–20 cm apart within clumps) to generate physical / structural support for each other and microclimates. Wind pollinated grasses such as *Microlaena stipoides* (Weeping Grass) may be particularly planted in clumps to aid fertilisation and to create a natural grassland understorey within the Riverlands site.

7.3.4. Plant Supply

Seeds and vegetative propagules should be of local provenance from within the Canterbury-Bankstown LGA, preferably from within 10 kilometres of the site. Material should be propagated in a local commercial or community nursery, with well-established plants used for revegetation, for trees and shrub species particularly.

It may be necessary to get the required amounts of seed and vegetative material contract-collected and grown-on by specialist nurseries. Local native plants should be grown in "Hiko" tube, maxi cell or viro-tube, or Forestry Tube-type containers.

7.3.5. Planting Guide

The following is a guide to ensure success of tube stock plantings.

- Mulch needs to be scraped back to expose soil surface;
- Holes for tube stock should be dug deep enough that at least a few centimetres of the plant are below the soil surface;
- Soil should be filled back in surrounding the tube stock;
- Mulch should be spread back to surround the new planting, but not smother it;
- Plants need to be watered once immediately following planting; and
- A plastic tree guard should be installed around each plant (or clump of planted groundcovers) following planting and watering to protect them from herbivory, and herbicide drift during site visits for weed control.

7.3.6. Re-vegetation Objectives to Maximise Fauna Utilisation

In order to improve habitat on site for fauna, plant species will be chosen that provide food, shelter and refuge opportunities for native and threatened fauna. Plant species selection for SOFF and RFEF has taken account of the following principles:

- Increase food and nesting resources for threatened bird species such as the Glossy Black-cockatoo (*Calyptorhynchus lathami)*, White-bellied Sea-eagle (*Haliaeetus leucogaster*) and Osprey (*Pandion haliaetus*);
- Include mammalian feed trees such as *Eucalyptus tereticornis* (Forest Red Gum);
- Increase trees and groundcovers favoured by arboreal mammals such as flowering Eucalypts; and
- Include species that mature to become good hollow-bearing trees (such as eucalypts) for hollow-dependent fauna such as parrots, owls, gliders and microchiropteran bats.

7.4. Revegetation Preparation

The replanting of individuals from seed or tube stock will require the treatment of soils, the installation of protective plant fencing, and ongoing maintenance treatments such as watering and weeding.

Recommended revegetation strategies should include:

- Initial and ongoing control of weeds and competing grasses using bushland regeneration techniques and conventional best practice chemical and physical strategies (see **Chapter 5**);

- Specifically collecting local plant seed and subsequent propagation in cell-grown seedling containers;
- Treatment of soils within each planted tube stock plant hole with a plant establishment aid that contains a mix of materials such as slow and quick release fertilisers, water holding crystals, rooting hormones and wetting agents, (i.e. products such as Terra Cottem by TC Advantage Pty Ltd or Sure Start by Barmac). These agents assist in establishing newly installed plants and can reduce establishment watering resources by up to 50%;
- Installing suitable propagated cell-grown seedlings, using specified techniques, species composition schedules and rates, using hand planting or mechanical planting techniques;
- Stabilising soils and suppressing weeds around individual reconstruction plantings using products, such as 40 cm square jute fibre mats or woodchip leaf mulch to a 50 cm diameter and 75 mm depth;
- Protecting individual tree and shrub plantings with a tree guard from feral animal grazing, frost and maintenance herbicide spraying overspray. Bamboo stakes 3 x 10-12 mm x 750 mm and 1 x 350 mm x 450 mm plastic tree guards are suitable for this purpose; and
- Maintaining revegetation treatments (including watering, weeding, replacing dead plant material and repairing / replacing weed mat/mulch), as a part of an ongoing maintenance programme.

7.5. Signage

Signage should be installed across the length of the foreshore corridor and at any public access points to areas to be reconstructed, such as at gates and the proposed foreshore walkway. **Figure 7** provides an indicative layout for signage although this is subject to change depending on the final layout of the pathway and confirmation of access points. The aim of the signage is to inform residents, public or construction workers of the presence of environmentally significant vegetation.

Signs will be made of a durable material, have a minimum size of A4 (210 mm x 297 mm) and contain the following permanent and legible wording:

"*The vegetation within bushland is protected. Activities such as firewood collection, bushrock removal, picking of native flowers and dumping of garden waste are prohibited*".

7.6. Maintenance of Revegetation Areas

After planting works have been completed, treated areas should be maintained by appropriately qualified personnel, selectively spot spraying and hand weeding around native plants, watering plants and replacing dead plants as needed.

Provision should be made to irrigate newly revegetated areas, as required, in the first three months after installation, (on at least four to five occasions, depending on rainfall conditions, more watering if required). A permit from the NSW Office of Water should be sought to use water for watering-in of newly installed plants.

Re-establishing environmental weeds such as vines, woody trees and shrubs, broadleaf annuals and naturalised grasses should be closely monitored and controlled using ecologically sensitive bushland regeneration hand

weeding and spot-spraying methods, to ensure adequate weed control and native plant establishment. Weeding inside each planting bay by hand or selective herbicides will be required, as well as in an approximate 50 cm radius around the outside of each plant and tree guard.

Plants that have died due to drought or pests and disease should be replaced as required. Plants that are observed to have died should be replaced by the bushland maintenance team with a planting of the same form. At the end of the annual maintenance period the density of living planted plants should be as outlined in ***Section 7.3.1*** and described within the annual report.

7.7. Ongoing Management

Revegetation will involve an initial establishment phase followed by a maintenance period. The establishment phase includes the initial primary weeding and planting works and will occur shortly after approval of Construction Certificate drawings.

A five-year maintenance period following the primary works has been allowed for in this plan and will commence upon Council certified completion of the establishment phase.

The requisite maintenance works are outlined below.

7.7.1. Weed Control

Weed control is the largest component of long-term management of the site. Eradication of Priority and / or serious weeds will occur along with the suppression of introduced grasses, annuals, vines and perennial weeds. A strategic weed control plan is included in this report (**Chapter 6**) for a maintenance period of five years.

7.7.2. Monitoring of Revegetated Areas

Inspection of the revegetated areas should be undertaken by the supervisor / project manager monthly thereafter for the duration of the project. Areas where Priority / serious weeds have been treated should be inspected on a fortnightly basis following initial treatment to assess when and if repeat treatments are necessary. This can be done by maintenance personnel during normal maintenance tasks and reported back to the supervisor / project manager.

In addition to monitoring of vegetation condition, the vegetation zones should also be monitored for potential rubbish dumping, particularly in intertidal areas where debris may be swept in by tides. Any significant areas of debris should be noted and subject to appropriate clean-up, either by the BRC if feasible or other nominated contractor.

7.8. Schedule of Works

This Revegetation Plan covers work to be carried out on site over five years. The measures that are planned over this time period within the Riverlands site are as follows:

7.8.1.1. Short term: years 1 and 2

- Weed control;
- Planting of canopy species;

- Planting of canopy, shrub, and groundcover species;
- Replacement of any tube stock individuals that have died between site visits; and
- Monitoring, management and reporting.

7.8.1.2. Long Term: years 3, 4, and 5

- On-going weed control in accordance with Council weed management practices;
- Replacement of any tube stock individuals that have died between site visits; and
- Monitoring, management and reporting in accordance with Council policy.

8. Monitoring and Reporting

It is recommended that a project manager/supervisor with the BRC be assigned to co-ordinate, supervise and manage all works and correspondence with respect to the revegetation area. The project manager must be available for the duration of the project and become familiar with the site and progress of all aspects of works undertaken.

The project manager will be responsible for allocation of maintenance tasks to personnel in response to establishment issues and other factors as monitoring results are reported (e.g.: plant losses/re-planting, weed control, irrigation). Regular monitoring and feedback from personnel will assist in the allocation of labour relative to available funds.

8.1. Monitoring Program

The following activities are to be conducted as part of the monitoring program:

- Establish a series of fixed monitoring points within the VPA riparian corridors, largely where full revegetation is to be implemented. Additional points can be established over the life of the VMP for areas with particular weed problems;
- Take photographs annually from each monitoring point. Compare photographs to previous years;
- Use the photograph point to form a corner of a 20 x 20 m quadrat at each monitoring point. Note any weeds occurring in the quadrat and state relative abundance of weed species (using an appropriate scale), as well as projective foliage cover of native species in each strata. Record numbers of failed plantings in each quadrat; and
- Note any other weed outbreaks in the revegetation areas This can be done while walking between monitoring points.

Indicative locations of where monitoring points are to be established are identified in **Figure 8**. The co-ordinates for final locations should be recorded at establishment of the monitoring site and documented in the annual report.

An initial monitoring visit should be conducted before weed control commences, then once every month while reconstruction works are undertaken. Once initial plantings are complete, monitoring will be conducted every three months for the next year, then every six months after that for the life of the VMP.

During the period of six-monthly monitoring, if maintenance weeding is conducted, each patch of land where weed control has occurred should be checked approximately a month afterwards, or after rain, in order to determine whether more weeding is required.

8.2. Reporting

A brief and concise report should be prepared every 12 months for the life of the VMP. This report will be forwarded to relevant authorities (Council, Office of Water) and will provide a record of the implementation of the VMP. The report will:

- Describe the revegetation works undertaken;

- State the findings of the monitoring activities including results and analysis of the performance criteria;
- Discuss any problems encountered in implementing the VMP; and
- Recommend any adaptations or additions to the VMP.

The report should contain the photographs, as well as a short description of weeds in each quadrat and a short comparison of the photographs to the previous years. Any other notable occurrences of weeds should also be reported. The report should also recommend and prioritise areas where weed control should be targeted and replanting should occur, based on the performance criteria.

9. Timing and Responsibilities

The revegetation area is to be managed in a series of phases as follows:

- Phase 1 – Site Preparation;
- Phase 2 – Revegetation Works Commence;
- Phase 3 – Maintenance; and
- Phase 4 – Monitoring and Reporting

Timing and responsibilities at each phase of management within the revegetation area are shown within **Table 8.1**. This table assigns each activity for the revegetation area to those responsible.

Table 3 Timing and Responsibilities for VMP work within Management zones

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
Phase 1 Site Preparation					
Seed Collection	Bush Regeneration Contractor	Seed collected from native plants and germinated; or BRC to commission the propagation of plants required for VMP works to ensure adequate supply.	Species list of all seeds collected includes all species present on site prior to clearing.	Increase seed collection or source additional seed from local nursery if seed isn't available on-site.	Immediately
Rubbish Removal	Property Owner or nominated contractor	Rubbish is removed from all zones and disposed of in an appropriate facility	Rubbish is removed	Monitoring for potential influx of rubbish on tides. Vegetation management is not be proceed until rubbish, in particular ACMs are removed.	Before construction works/ vegetation management site preparation works commence
Delineation of clearing boundary	Property Owner or Subcontractor	Marking using GPS and high visibility tape, fencing and boundary markers.	All clearing boundaries have been clearly marked and photographs taken for	Delineate all clearing boundaries.	Before construction works commence

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
			documentation.		
Establish fixed monitoring points	Bush Regeneration Contractor or Ecologist	Using star pickets and GPS establish a series of monitoring sites that can be used for photograph comparison, measuring weed and plant retention.	All monitoring points have a star picket installed and photographs taken for documentation.	Install star picket at all monitoring points.	Prior to commencement of Reconstruction and Weeding works
Flora Pre-clearing Surveys	Ecologist	Identify any weed species within clearing areas.	Pre-clearing surveys are completed and results are documented.	Undertake pre-clearance surveys.	Prior to any vegetation clearing
Installation of signage identifying areas of bushland reconstruction	Property Owner or Subcontractor	All areas adjacent to native vegetation to be planted.	Signs have been installed and locations documented.	Install signs in appropriate area.	Prior to commencement of Phase 2
Implementation of appropriate sediment/erosion controls	Property Owner or Subcontractor	Adequate controls are implemented so no erosion or sedimentation into areas of bush land reconstruction occurs	Photograph at each monitoring point.	Installation of additional sediment/erosion controls and or fix existing controls.	Prior to any vegetation clearing
Phase 2 - Revegetation Works Commence					
Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites before initial weeding	Photograph have been taken.	Take photographs.	Prior to commencement of

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
					revegetation works
Carry out initial weeding.	Bush Regeneration Contractor/ Botanist	Main weed infestations and Priority weeds and WONS removed - Reproductively mature plants absent from site.	Primary weeding completed and documented.	Targeted weeding	First month of revegetation works
Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites prior to weeding each month.	Photographs have been taken.	Take photographs.	Once a month for duration of VMP revegetation works
Planting - Canopy, small tree, shrub, and ground cover SOFF and RFEF species are planted according to species lists in Appendix A.	Bush Regeneration Contractor	Native plants have been planted (species from Appendix A) in all vegetation strata.	Revegetation has occurred and been documented.	Undertake revegetation works.	Immediately upon establishment of revegetation areas
Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites to compare the survival and retention of plantings.	Photographs have been taken.	Take photographs.	Every 3 months after the first year of plantings. Every 6 months following the initial year for the life of the VMP.
Carry out maintenance weeding.	Bush Regeneration Contractor	Weed regrowth following primary weeding removed. Work has commenced	Weeding of regrowth following primary weeding	Targeted weeding.	Following primary weeding, site visits monthly.

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
		on control of annual weed species.	completed and documented.		
Phase 3 – Maintenance					
Carry out maintenance weeding throughout the site	Bush Regeneration Contractor	Priority weeds are less than 2% cover	Monitoring point 20x20 m quadrat data results.	Undertake maintenance weeding.	Monthly for the duration of 5 year maintenance period under VMP
		Non-Priority weeds are less than 4% cover	Monitoring point 20x20 m quadrat data results.		
		No new weed species or infestations, including the encroachment of exotic lawn/vegetation into area of bush land regeneration	Monitoring point 20x20 m quadrat data results.		
Maintenance of plantings	Bush Regeneration Contractor	Survival rate of plantings is 100%	Monitoring point 20x20 m quadrat data results.	Any dead plantings replaced.	Annually for the duration of 5 year maintenance period under VMP
		Species diversity and density equal to or greater than baseline data	Monitoring point 20x20 m quadrat data results.	Additional plantings where required due to observed gaps in any strata.	
		Plants watered when drought stressed	Plants are watered during times of drought	Water plants in times of drought.	

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
			and documented.		
Phase 4 - Monitoring and reporting					
Biannual inspection of site completed as outlined in Chapter 7	Bushland Management or Ecologist	Survival rate of plantings is 100%	Monitoring point 20x20 m quadrat data results.	Undertake replanting.	Every 6 months for 5 year maintenance period of VMP
		Priority weeds to be less than 2% cover.	Monitoring point 20x20 m quadrat data results.	Targeted weeding.	
		Non-Priority weeds to be less than 4% cover.	Monitoring point 20x20 m quadrat data results.	Targeted weeding.	
		Species diversity and density equal to or greater than previous inspection.	Monitoring point 20x20 m quadrat data results.	Undertake replanting and/or plant additional species.	
		No encroachment of exotic lawn/vegetation into area of bush land regeneration	Monitoring point 20x20 m quadrat data results.	Targeted weeding and/or installation of physical barrier.	
		No erosion or sedimentation into areas of bushland regeneration.	Photographic evidence	Installation of further sediment/erosion controls.	
Progress report preparation.	Bushland Management or Ecologist	Annual Report prepared on progress of restoration works	Results of data analysis of all data collected in	Undertake corrective measures including:	Once a year for the 5 year maintenance period of VMP

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
		including all data collected in biannual inspections.	biannual inspections.	targeted weeding, replanting or additional species plantings and install additional sediment/erosion controls.	
Final Inspection of Site carried out at completion of VMP.	Bushland Management or Ecologist	Survival rate of plantings is 100%	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	After 5 years of maintenance under VMP
		Priority weeds to be less than 2% cover.	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
		Non-Priority weeds to be less than 4% cover.	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
		Species diversity and density equal to or greater than previous inspection.	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
		No encroachment of exotic lawn/vegetation into area of bush land regeneration	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
Final Report.	Bushland Management or Ecologist	Final report detailing success of restoration or	Results of data analysis of all data collected for	Extend life of VMP until performance criteria are met.	After 5 years of maintenance under VMP

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
		outlining further works needed.	the life of the VMP.		

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APPENDIX A :
Species Planting Lists

Table 4 Species Planting List – Swamp Oak Floodplain Forest (includes crest for bank stabilisation areas)

Form	Family	Scientific Name	Common Name
Canopy	Casuarinaceae	*Casuarina glauca*	Swamp Oak
	Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree
	Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree
	Rhamnaceae	*Alphitonia excelsa*	Red Ash
Shrubs	Myoporaceae	*Myoporum acuminatum*	Boobialla
	Myrtaceae	*Melaleuca ericifolia*	Swamp Paperbark
	Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
	Poaceae	*Phragmites australis*	Common Reed
	Violaceae	*Viola banksii*	
Groundcovers	Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower
	Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach
	Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed
	Amaryllidaceae	*Crinum pedunculatum*	Swamp Lily
	Apiaceae	*Apium prostratum*	Sea Celery
	Apiaceae	*Centella asiatica*	Indian Pennywort
	Apocynaceae	*Parsonsia straminea*	Common Silkpod
	Asteraceae	*Enydra fluctuans*	
	Chenopodiaceae	*Atriplex australasica*	
	Commelinaceae	*Commelina cyanea*	Native Wandering Jew
	Convolvulaceae	*Calystegia sepium*	
	Cyperaceae	*Baumea juncea*	
	Cyperaceae	*Carex appressa*	Tall Sedge
	Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
	Cyperaceae	*Isolepis inundata*	Club-rush
	Cyperaceae	*Ficinia nodosa*	Knobby Club-rush
	Goodeniaceae	*Selliera radicans*	Swamp Weed
	Juncaceae	*Juncus kraussii* subsp. *australiensis*	Sea Rush
	Juncaceae	*Juncus planifolius*	
	Juncaceae	*Juncus usitatus*	
	Lobeliaceae	*Lobelia anceps*	
	Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush

Form	Family	Scientific Name	Common Name
	Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily
	Phormiaceae	*Dianella caerulea*	Blue Flax-lily
	Poaceae	*Entolasia marginata*	Bordered Panic
	Poaceae	*Imperata cylindrica*	Blady Grass
	Poaceae	*Oplismenus imbecillis*	
	Poaceae	*Sporobolus virginicus*	
	Polygonaceae	*Persicaria decipiens*	Slender Knotweed
	Polygonaceae	*Persicaria strigosa*	
	Primulaceae	*Samolus repens*	Creeping Brookweed
Ferns	Blechnaceae	*Blechnum indicum*	Swamp Water Fern
	Dennstaedtiaceae	*Hypolepis muelleri*	Harsh Ground Fern
Vines/ Scramblers	Apocynaceae	*Marsdenia rostrata*	Milk Vine
	Bignoniaceae	*Pandorea pandorana* subsp. *pandorana*	Wonga Wonga Vine
	Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry
	Menispermaceae	*Stephania japonica* var. *discolor*	Snake Vine
	Smilacaceae	*Smilax australis*	Lawyer Vine

Table 5 Species Planting List – River-flat Eucalypt Forest

Form	Family	Scientific Name	Common Name
Trees	Fabaceae (Mimosoideae)	*Acacia floribunda*	White Sally Wattle
	Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle
	Myrtaceae	*Angophora floribunda*	Rough-barked Apple
	Myrtaceae	*Angophora subvelutina*	Broad-leaved Apple
	Myrtaceae	*Eucalyptus amplifolia* subsp. *amplifolia*	Cabbage Gum
	Myrtaceae	*Eucalyptus baueriana*	Blue Box
	Myrtaceae	*Eucalyptus eugenioides*	Thin-leaved Stringybark
	Myrtaceae	*Eucalyptus moluccana*	Grey Box
	Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum
	Myrtaceae	*Melaleuca decora*	-
	Myrtaceae	*Melaleuca linariifolia*	-
	Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree
Shrubs	Asteraceae	*Ozothamnus diosmifolius*	Rice Flower
	Lamiaceae	*Plectranthus parviflorus*	Cockspur Flower
	Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
	Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush
	Phyllanthaceae	*Phyllanthus gunnii*	Scrubby Spurge
	Pittosporaceae	*Bursaria spinosa*	Blackthorn
	Rosaceae	*Rubus parvifolius*	Native Raspberry
Vines	Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine
	Fabaceae (Faboideae)	*Desmodium varians*	Slender Tick-trefoil
	Fabaceae (Faboideae)	*Glycine clandestina*	Lovetwiner
	Fabaceae (Faboideae)	*Glycine microphylla*	Lovetwiner
	Fabaceae (Faboideae)	*Glycine tabacina*	Lovetwiner
	Fabaceae (Faboideae)	*Hardenbergia violacea*	Purple Coral Pea
	Luzuriagaceae	*Eustrephus latifolius*	Wombat Berry
	Luzuriagaceae	*Geitonoplesium cymosum*	Scrambling Lily
	Menispermaceae	*Stephania japonica* var. *discolor*	Snake Vine
	Ranunculaceae	*Clematis glycinoides*	Headache Vine
	Ranunculaceae	*Clematis aristata*	Old Man's Beard
	Vitaceae	*Cayratia clematidea*	Native Grape
Ground Covers	Acanthaceae	*Brunoniella australis*	Blue Trumpet

Form	Family	Scientific Name	Common Name
	Apiaceae	*Centella asiatica*	Indian Pennywort
	Apiaceae	*Hydrocotyle peduncularis*	-
	Apiaceae	*Centella asiatica*	Indian Pennywort
	Asteraceae	*Cotula australis*	Common Cotula
	Asteraceae	*Euchiton sphaericus*	-
	Asteraceae	*Senecio hispidulus*	Hill Fireweed
	Asteraceae	*Vernonia cinerea*	-
	Asteraceae	*Sigesbeckia orientalis* subsp. *orientalis*	Indian Weed
	Blechnaceae	*Doodia aspera*	Prickly Rasp Fern
	Campanulaceae	*Wahlenbergia gracilis*	Sprawling Bluebell
	Chenopodiaceae	*Einadia hastata*	Berry Saltbush
	Chenopodiaceae	*Einadia trigonos*	Fishweed
	Clusiaceae	*Hypericum gramineum*	Small St. John's Wort
	Commelinaceae	*Commelina cyanea*	Native Wandering Jew
	Convolvulaceae	*Dichondra repens*	Kidney Weed
	Cyperaceae	*Carex appressa*	Tall Sedge
	Cyperaceae	*Carex inversa*	-
	Cyperaceae	*Cyperus gracilis*	Slender Flat-sedge
	Cyperaceae	*Isolepis prolifera*	
	Dennstaedtiaceae	*Hypolepis muelleri*	Harsh Ground Fern
	Dennstaedtiaceae	*Pteridium esculentum*	Common Bracken
	Geraniaceae	*Geranium solanderi*	Native Geranium
	Juncaceae	*Juncus bufonius*	Toad Rush
	Juncaceae	*Juncus usitatus*	-
	Juncaginaceae	*Triglochin microtuberosa*	-
	Lobeliaceae	*Pratia purpurascens*	Whiteroot
	Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush
	Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush
	Lomandraceae	*Lomandra filiformis*	Wattle Mat-rush
	Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush
	Oxalidaceae	*Oxalis perennans*	-
	Phormiaceae	*Dianella longifolia*	Blueberry Lily

Form	Family	Scientific Name	Common Name
	Phyllanthaceae	*Poranthera microphylla*	-
	Plantaginaceae	*Veronica plebeia*	Trailing Speedwell
	Poaceae	*Aristida vagans*	Threeawn Speargrass
	Poaceae	*Bothriochloa decipiens* var. *decipiens*	Redleg grass
	Poaceae	*Cymbopogon refractus*	Barbed Wire Grass
	Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass
	Poaceae	*Eragrostis leptostachya*	Paddock Lovegrass
	Poaceae	*Lachnagrostis filiformis*	-
	Poaceae	*Microlaena stipoides*	Weeping Grass
	Poaceae	*Oplismenus aemulus*	Basket Grass
	Poaceae	*Paspalidium distans*	-
	Poaceae	*Austrostipa ramosissima*	Stout Bamboo Grass
	Poaceae	*Digitaria parviflora*	Small-flowered Finger Grass
	Poaceae	*Echinopogon caespitosus* var. *Caespitosus*	Tufted Hedgehog Grass
	Poaceae	*Entolasia marginata*	Bordered Panic
	Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass
	Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass
	Poaceae	*Entolasia stricta*	
	Poaceae	*Imperata cylindrica*	Blady Grass
	Poaceae	*Themeda triandra*	Kangaroo Grass
	Polygonaceae	*Persicaria decipiens*	Slender Knotweed
	Polygonaceae	*Persicaria lapathifolia*	Pale Persicaria
	Pteridaceae	*Cheilanthes sieberi* subsp. *sieberi*	Poison Rock Fern
	Pteridaceae	*Adiantum aethiopicum*	Common Maidenhair
	Ranunculaceae	*Ranunculus inundatus*	River Buttercup
	Rubiaceae	*Galium propinquum*	Maori Bedstraw
	Rubiaceae	*Opercularia diphylla*	
	Solanaceae	*Solanum prinophyllum*	Forest Nightshade
	Violaceae	*Viola hederacea*	Ivy-leaved Violet

Table 6: Species Planting List Mangrove (includes mid berm for bank stabilisation)

Form	Family	Botanical Name	Common Name
Trees	Acanthaceae	*Avicennia marina*	Grey Mangrove
Understorey	Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach
	Chenopodiaceae	*Tecticornia pergranulata* subsp. *pergranulata*	
	Chenopodiaceae	*Sarcocornia quinqueflora*	Samphire
	Chenopodiaceae	*Suaeda australis*	Seablite
	Cyperaceae	*Baumea juncea*	
	Juncaceae	*Juncus kraussii*	Sea Rush
	Juncaginaceae	*Triglochin striata*	Streaked Arrowgrass
	Poaceae	*Sporobolus virginicus*	Sand Couch
	Theophrastaceae	*Samolus repens*	Creeping Brookweed

APPENDIX B :
Weed Control Methods

Table 7: Weed Control Methods

Family	Scientific Name	Common Name	Treatment Method
Amaranthaceae	*Amaranthus retroflexus*	Redroot Amaranth	- Handweed, Spot spray with 10m/L Glyphosate
Amaranthaceae	*Gomphrena celosioides*	Gomphrena Weed	
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	
Apiaceae	*Foeniculum vulgare*	Fennel	
Asteraceae	*Arctotheca calendula*	Capeweed	
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	
Asteraceae	*Cirsium vulgare*	Spear Thistle	
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	
Asteraceae	*Conyza sumatrensis*	Tall fleabane	
Asteraceae	*Cotula coronopifolia*	Water Buttons	
Asteraceae	*Gamochaeta americanum*		
Asteraceae	*Gamochaeta pensylvanica*	Cudweed	
Asteraceae	*Gamochaeta purpurea*	Purple Cudweed	
Asteraceae	*Hypochaeris microcephala* var. *albiflora*	White Flatweed	
Asteraceae	*Hypochaeris radicata*	Catsear	
Asteraceae	*Senecio madagascariensis*	Fireweed	
Asteraceae	*Soliva sessilis*	Bindyi	
Asteraceae	*Sonchus asper*	Prickly Sowthistle	
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	

Family	Scientific Name	Common Name	Treatment Method
Asteraceae	*Taraxacum* officinale	Dandelion	
Asteraceae	*Xanthium spinosum*	Bathurst Burr	
Brassicaceae	*Capsella bursa-pastoris*	Shepherd's Purse	
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow	
Caryophyllaceae	*Polycarpon tetraphyllum*	Four-leaved Allseed	
Caryophyllaceae	*Silene gallica*	French Catchfly	
Caryophyllaceae	*Spergularia rubra*	Sandspurry	
Caryophyllaceae	*Stellaria media*	Common Chickweed	
Chenopodiaceae	*Atriplex prostrata*		
Cyperaceae	*Cyperus rotundus*	Nutgrass	
Fabaceae (Faboideae)	*Lotus uliginosus*	Birds-foot Trefoil	
Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic	
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	
Fumariaceae	*Fumaria muralis* subsp. *muralis*	Wall Fumitory	
Gentianaceae	*Centaurium tenuiflorum*	Branched Centaury, Slender centaury	
Malvaceae	*Malva parviflora*	Small-flowered Mallow	
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	
Malvaceae	*Pavonia hastata*		
Myrsinaceae	*Lysimachia arvensis*	Scarlet Pimpernel	
Oxalidaceae	*Oxalis corniculata*	Creeping Oxalis	
Oxalidaceae	*Oxalis debilis* var. *corymbosa*		

Family	Scientific Name	Common Name	Treatment Method
Phytolaccaceae	*Phytolacca octandra*	Inkweed	
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	
Plantaginaceae	*Veronica anagallis-aquatica*	Blue Water-speedwell	
Poaceae	*Avena barbata*	Bearded Oats	
Poaceae	*Axonopus fissifolius*	Narrow-leafed Carpet Grass	
Poaceae	*Bromus catharticus*	Praire Grass	
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	
Poaceae	*Digitaria sanguinalis*	Crab Grass	
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	
Poaceae	*Eleusine indica*	Crowsfoot Grass	
Poaceae	*Eragrostis curvula*	African Lovegrass	
Poaceae	*Lolium perenne*	Perennial Ryegrass	
Poaceae	*Paspalum dilatatum*	Paspalum	
Poaceae	*Setaria parviflora*		
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass	
Poaceae	*Vulpia bromoides*	Squirrel Tail Fesque	
Polygonaceae	*Rumex conglomeratus*	Clustered Dock	
Solanaceae	*Salpichroa origanifolia*	Pampas Lily-of-the-valley	
Solanaceae	*Solanum linnaeanum*	Apple of Sodom	
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	
Solanaceae	*Solanum sisymbriifolium*	Sticky Nightshade	

Family	Scientific Name	Common Name	Treatment Method
Verbenaceae	*Verbena bonariensis*	Purpletop	
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	- Any branches profuse with fruit should be cut with secateurs and bagged to prevent further spread of species by birds - Juvenile plants can be eased out of soil with a trowel or knife - care should be taken to remove below ground plant material - For large, mature plants the woody crown at the base can be cut around with a sharp knife, or hacked out with a mattock or peter lever and removed - it is easiest to cut all branches off near the base with secateurs prior to removing crown - plant will not resprout from water storing tubers or roots below ground so these can be left to rot to reduce soil disturbance. - Spray mature and juvenile plants with metsulfuron methyl 6g/100mL + surfactant
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	- Cut and scrape vine stems with undiluted glyphosate - Hand weed seedlings - Spray low lying foliage, regrowth foliage, and seedlings with 20mL/1L Glyphosate & metsulfuron methyl(e.g. Brush-Off) 10.5g/10L + non ionic surfactant - Roots of plant can be dug up with mattock or shovel
Asparagaceae	*Asparagus asparagoides*	Bridal Creeper	- Dig out with hand tools - Care needs to be taken to remove all tuberous masses and rhizomes. Tuberous

Family	Scientific Name	Common Name	Treatment Method
			masses need soil excavation around and careful levering with hand tools to remove without leaving plant material behind to resprout. - July-September - Spray foliage with glyphosate 10mL/1L + surfactant - May to June - Spray foliage with metsulfuron methyl (e.g. Brush Off) 5g/100L + non-ionic surfactant
Basellaceae	*Anredera cordifolia*	Madeira Vine	- Hand pull juvenile vines, or remove with hand tools taking care to remove roots and tubers - Skirting vines is not recommended as plant can remain alive for up to 2 years without roots - Pulling vines down from canopy is similarly not recommended as it will result in fall of aerial tubers and bulbils which will sprout new plants - Scrape and paint stems with undiluted glyphosate, scrape both sides of stem and scrape from ground to as high as can be reached, taking care not to completely ringbark stem which will stop herbicide dispersal through plant - Spray seedlings with glyphosate 10 mL/1L + surfactant - When removing vines all bulbils and aerial tubers should be bagged and removed from site, and fallen tubers collected and removed from the ground beneath mature vines
Sapindaceae	*Cardiospermum grandiflorum*	Balloon Vine	- Hand weed juveniles or spray with glyphosate 10mL/1L

Family	Scientific Name	Common Name	Treatment Method
			- Hand pull roots of mature vines - Vines growing over trees, shrubs, or other objects should be skirted with shears as close to the ground as possible - Spray remaining ground coverage with glyphosate 10mL/1L, or treat cut stems with undiluted glyphosate - Bag and remove seed cases where possible
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet	- Hand weed juveniles - Drill holes with power drill with thick drill bit into mature trees, around base of trunk and fill holes with undiluted glyphosate. Once glyphosate has been absorbed refill holes with undiluted glyphosate several times. - Cut shrub and mature individuals as close to ground as possible with loppers or hand saw (or chainsaw) and treat stump with undiluted glyphosate - Spray juveniles and regrowth foliage of cut and painted individuals with glyphosate 10mL/1L
Oleaceae	*Ligustrum sinense*	Small-leaved Privet	
Solanaceae	*Solanum seaforthianum*	Climbing Nightshade	- Hand weed juveniles - Hand weed mature individuals; species is shallow rooted and generally pulls from the ground easily in soft soils - Dig roots out of ground for larger individuals (if required) or use secateurs to cut the vine near the base and treat cut surface with undiluted glyphosate
Solanaceae	*Cestrum parqui*	Green Cestrum	- Hand weed juveniles - Scrape stem and paint with undiluted glyphosate

Family	Scientific Name	Common Name	Treatment Method
			- Cut all above ground suckering individuals with loppers or saw and paint stumps with undiluted glyphosate - Spray regrowth foliage with glyphosate 10mL/1L
Apocynaceae	*Araujia sericifera*	Moth Vine	- Hand Weed Juveniles - Spray juveniles with glyphosate 10mL/1L - Skirt mature vines (cut through plant close to root) and then pull root manually or apply undiluted glyphosate to cut surface - Scrape and paint vine with undiluted glyphosate
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	- Hand weed seedlings - Spray seedlings and coppice regrowth with glyphosate 10mL/1L - Drill and inject stem with, or chisel and apply, undiluted glyphosate - Cut and paint stump with undiluted glyphosate (will require an arborist for large trees) - Cut and grind stump of large trees (arborist)
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	- Hand weed - Spray with glyphosate 10mL/1L - Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted glyphosate
Oleaceae	*Jasminum polyanthum*	White Jasmine	- Hand weed, taking care to dig out all root material - Cut stems back to roots and apply undiluted glyphosate to cut surfaces - Plant can be cut back to roots and then in subsequent months regrowth foliage sprayed with

Family	Scientific Name	Common Name	Treatment Method
			glyphosate (10mL/1L) + penetrant , or metsulfuron-methyl 600g/kg (5g/10L) + penetrant - Any cut plant material should be bagged and removed from site as plant will resprout roots from cut stems
Solanaceae	*Datura stramonium*	Common Thornapple	- Highly toxic to humans livestock and pets, capable of causing serious illness or death. Avoid ingestion of nectar, seeds and flowers. - Herbicidal treatment - spray with 2,4-D Amine 1.6-2.4L/ha. Do not allow livestock to graze for 7 days after application.
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	- Large trees require an arborist to safely remove - PPE including thick leather gloves and eye protection should be used when handling small individuals due to dangerous spines at leaf bases - Cut all leaves off at base with long handles loppers - Remove leaves from site for safety of other site users (handle with caution due to spines) - Cut tree below crown and leave stump to rot - Use hand tools such as a trowel or knife to dig up seedlings
Malaceae	*Cotoneaster glaucophyllus*		- Mildly toxic to humans and mild symptoms can occur if small amounts are consumed. Cut stumps and paint or drill and fill with 1 part glyphosate per 1.5 parts water.
Amaranthaceae	*Alternanthera philoxeroides*	Alligator Weed	- Spotspray with Metsulfuron-methyl 10g/100L herbicide (for aquatic applications under permit), 10g/100L (for terrestrial applications). Manually

Family	Scientific Name	Common Name	Treatment Method
			remove terrestrial and aquatic infestations where possible by digging up roots and disposing of all material into bags. Be sure to bag all materials as small fragments can remain viable. Placing a boom or rope along the water to contain fragments is useful while physical removal takes place and avoids spread downstream.
Bignoniaceae	*Tecoma capensis*	Cape Honeysuckle	- Spray juveniles with glyphosate 10mL/1L - Cut mature individuals with loppers near ground level and paint stump with undiluted glyphosate - Spray foliage of mature and regrowth individuals with glyphosate 10mL/1L
Juncaceae	*Juncus acutus subsp. acutus*	Sharp Rush	- Tips of foliage are sharply pointed so appropriate PPE should be worn including gloves and eye protection while managing individuals - Use a hand mattock to dig individuals out, taking care to remove all below ground vegetative material. Follow up treatment will be needed for new seedlings, and regrowth from missed rhizomes - Spray foliage with glyphosate 20 mL/1L (of environmentally sensitive solution in waterways)
Juncaceae	*Juncus cognatus*		- Use a hand mattock to dig individuals out, taking care to remove all below ground vegetative material. Follow up treatment will be needed for new seedlings, and regrowth from missed rhizomes '- Spray foliage with glyphosate 20 mL/1L (of environmentally sensitive solution in waterways)

Family	Scientific Name	Common Name	Treatment Method
Solanaceae	*Solanum mauritianum*	Wild Tobacco Bush	- When working with this plant additional PPE may be required as some individuals are sensitive to the shedding fine hairs of the species - Recommended PPE is a dustmask, long sleeve shirt and pants + gloves - Hand weed juveniles - Mature individuals can be cut and painted with glyphosate 10mL/1L
Salviniaceae	*Salvinia molesta*		- Where infestations are large, small scale manual removal is appropriate. Scoop out large infestations and place onto land - this species cannot survive terrestrially or in saltwater. Herbicidal applications may only be done so with herbicides registered for the control of salvinia. Registered herbicides include: Reglone, Vegetrol and Watrol. Use as instructed on the labels.

FIGURES

Legend

- VPA Riparian Corridors
- Residential Development Area
- Connector Road Development Area
- Bank Stabilisation Works
- Riverlands Site
- Shared Pathway Alignment

Coordinate System: MGA Zone 56 (GDA 94)

Image Source:
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Dated: 23/01/2020

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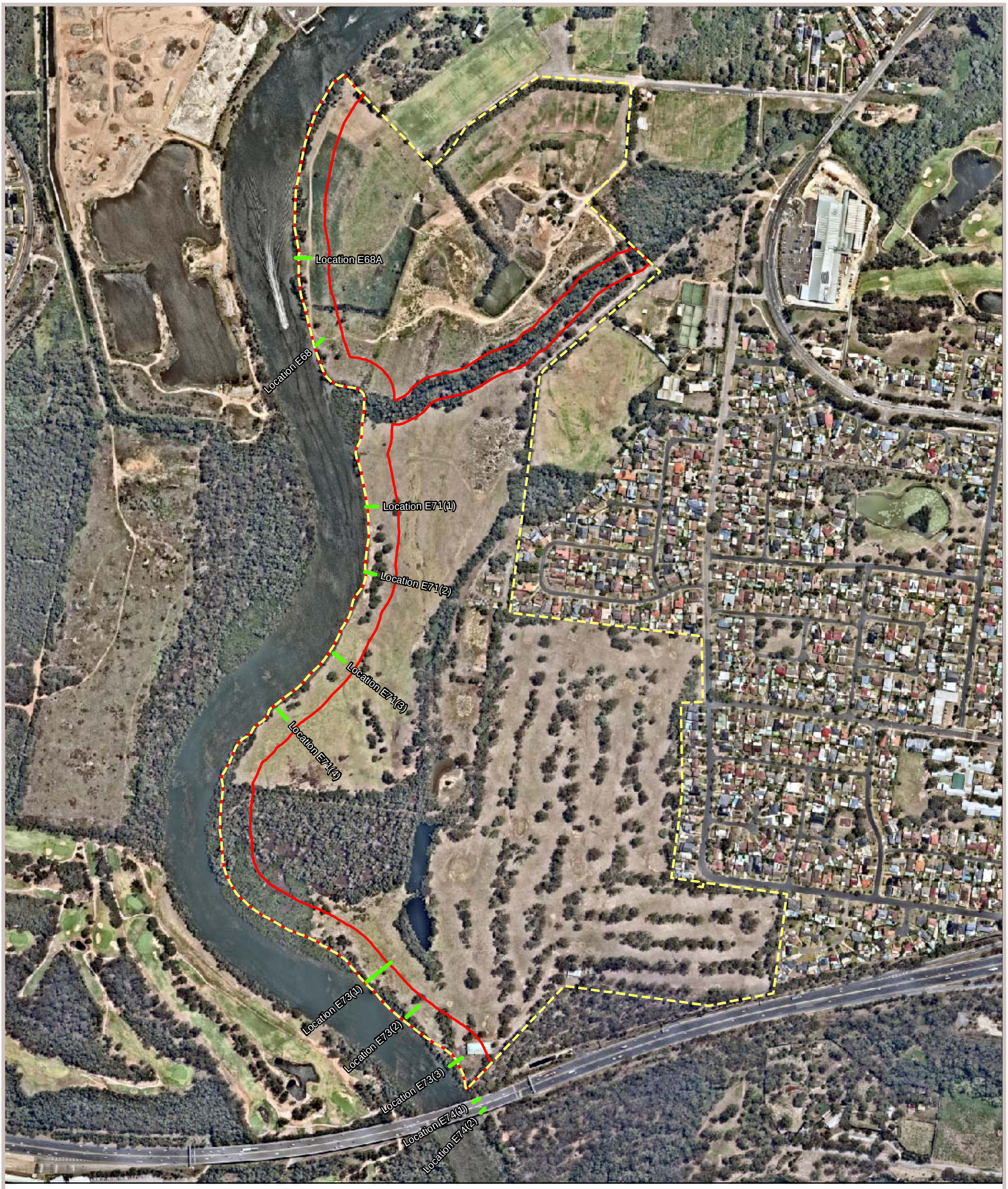
0 50 100 150 200 m

I:\...\19126\Figures\RP5\20210703\Figure 1. Layout_Riverlands Site

Figure 1. Layout of Riverlands Site



Legend

- VPA Riparian Corridors
- Riverlands Site
- Bank Stabilisation Sites

Coordinate System: MGA Zone 56 (GDA 94)

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I:\...\19126\Figures\RP5\20200206\Figure 2. Bank Stabilisation

Figure 2. Locations of Bank Stabilisation Works

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Legend

Riverlands Site

Coastal Management SEPP 2018

Coastal Wetland

Coastal Wetland Proximity Area

Coastal Environmental Area

Coordinate System: MGA Zone 56 (GDA 94)

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I:\...\19126\Figures\RP5\20200206\Figure 3. Coastal Wetlands_Riverlands Site

Figure 3. Coastal Wetlands within the Riverlands site (Coastal Management SEPP)

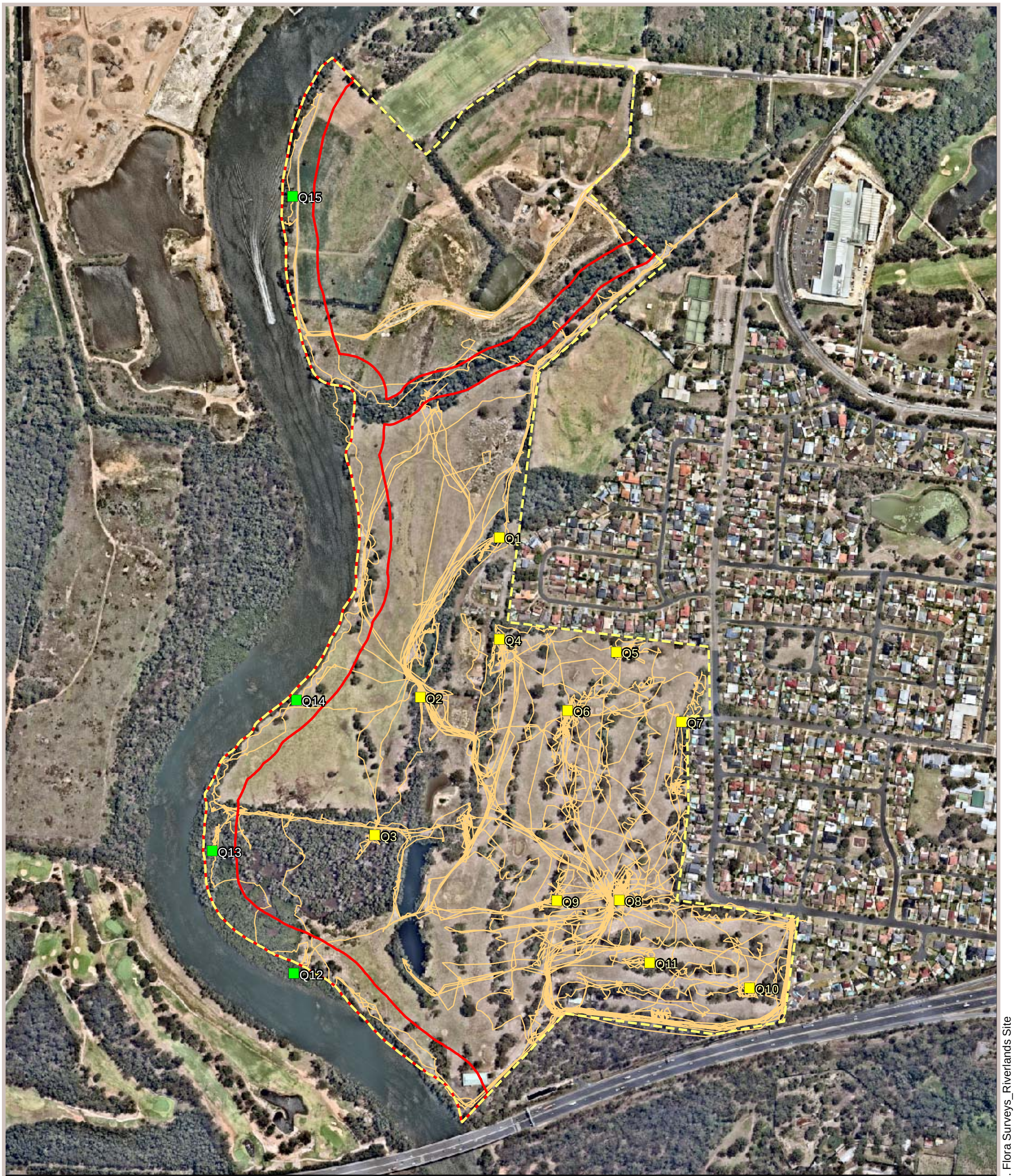

Figure 4. Flora surveys within the Riverlands Site

Legend

VPA Riparian Corridors

Riverlands Site

Plant Community Type

- PCT 849_Cumberland Plain Woodland Remnant Trees
- PCT 835_Riverflat Eucalypt Forest
- PCT 835_ Riverflat Eucalypt Forest Remnant Trees
- PCT 1232_Swamp Oak Forest
- PCT 883_Scribbly Gum Woodland Remnant Trees
- PCT 1800_Planted Casuarinas
- PCT 920_Mangrove forest
- PCT 1232_Phragmites regrowth
- PCT 835_Planted Trees
- Planted non-endemic natives

Coordinate System: MGA Zone 56 (GDA 94)

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I:\...\19126\Figures\RP5\20210703\Figure 5. PCTs_Riverlands Site

Figure 5. Vegetation (PCTs) within the Riverlands Site

Legend

VPA Riparian Corridors

Riverlands Site

Shared Pathway Alignment

Management Zone

Zone 1a - Remnant SOFF

Zone 1b - SOFF Revegetation

Zone 2a - Remnant RFEF

Zone 2b - RFEF revegetation

Zone 3a - Remnant Mangrove

Zone 3b - Mangrove Revegetation

Coordinate System: MGA Zone 56 (GDA 94)

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I:\...\19126\Figures\RP5\20200206\Figure 6. Management Zones_Riparian Corridors

Figure 6. Management Zones within the Riparian Corridors

Legend

- VPA Riparian Corridors
- Riverlands Site
- Shared Pathway Alignment
- Signage Locations

Management Zone

- Zone 1a - Remnant SOFF
- Zone 1b - SOFF Revegetation
- Zone 2a - Remnant RFEF
- Zone 2b - RFEF revegetation
- Zone 3a - Remnant Mangrove
- Zone 3b - Mangrove Revegetation

Coordinate System: MGA Zone 56 (GDA 94)

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I:\...\19126\Figures\RP5\20200206\Figure 7. Signage

Figure 7. Indicative locations for installation of signage

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Legend

- VPA Riparian Corridors
- Riverlands Site
- Shared Pathway Alignment
- Monitoring Locations

Management Zone

- Zone 1a - Remnant SOFF
- Zone 1b - SOFF Revegetation
- Zone 2a - Remnant RFEF
- Zone 2b - RFEF revegetation
- Zone 3a - Remnant Mangrove
- Zone 3b - Mangrove Revegetation

Coordinate System: MGA Zone 56 (GDA 94)

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I:\...\19126\Figures\RP5\20200206\Figure 8. Monitoring

Figure 8. Indicative monitoring locations

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