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Dear Keith

WHITFORD NODES STAIRWAY ECOLOGICAL ASSESSMENT

INTRODUCTION

Ecoscope was approached by the City of Joondalup (CoJ) to provide an ecological assessment of the installation of a staircase on the northern sand dune at Whitford Nodes, Hillarys Beach Park. The proposed staircase is positioned on the west face of the dune and is approximately 80 m long from the base of the dune to the existing gazebo (look-out) located on top of the dune (see **Map 1**).

OBJECTIVES

The objectives of this assessment were to:

- perform both desktop and site based assessments to determine the potential ecological and social constraints and/or opportunities of building a staircase on the northern dune at Whitford Nodes
- determine the likely environmental approvals and on-going management requirements if the proposed installation were to proceed, and provide recommendations on best practice.

DESKTOP ASSESSMENT

CLIMATE AND WIND

The closest Bureau of Meteorology (BoM) recording site is Swanbourne (station 009215, operating since 1993) located approximately 20 km south of Whitford Nodes. The mean annual rainfall is 725.3 mm, most of which falls in May to September. February is the hottest month, with a mean maximum temperature of 30.4°C. July is the coldest month, with a mean maximum temperature of 18.3°C (Bureau of Meteorology 2013).

Annual average wind data for the site indicate wind strength and direction changes from easterlies reaching up to 40 km/h, but primarily at speeds between 10 km/h and 30 km/h, at 9.00 am changing to south westerlies by 3.00 pm that reaching up to 40 km/h, but are primarily at speeds between 20 km/h and 30 km/h (Bureau of Meteorology 2013).

TOPOGRAPHY, SURFACE GEOLOGY AND SOILS

The northern dune at Whitford Nodes is located approximately 200 m from the coast and forms part of the stable dune alliance in the area. The dune itself ranges in height from less than 5 m AHD up to over 20 m AHD (Landgate 2014). Percent Slope (calculated from 5 m contours viewable on WA Atlas (Landgate 2014)) within the envelope encompassing the proposed staircase location (see **Map 2**) is predominately moderate to steep (10 – 15 % slope, 37.7% of area) or steep (> 30% slope, 34.3% of the area).

The Perth map sheet of the Perth Metropolitan Region Environmental Geology Series published by Geological Survey of Western Australia (Gozzard 1986) delineates the surface geology of the dune as S2 - *Calcareous Sand*. Similarly, Soil-landscape mapping produced by the Department of Agriculture and Food Western Australia (DAFWA 2012)) outlines the dune system to be part of the *Youngest Dune Phase* (subsystem 211Qu__Q4) of the wider *Quindalup South System*. The phase is described as ; *the youngest phase. Irregular dunes with slopes up to 20%. Loose pale brown calcareous sand with no soil profile development.*

The Quindalup dunes are composed of unconsolidated sand (quartz grains) and shell fragments. Sometimes organic matter darkens the surface layers. The shell fragments are mostly calcium carbonate, so the sands are alkaline. The dunes hold very little water and are only wet when heavy rain is falling. The dunes are also extremely infertile and, when cleared of native vegetation, are very easily eroded by winds. (Bolland 1998).

ACID SULFATE SOILS

According to the Acid Sulfate Soil (ASS) risk mapping for the Swan Coastal Plain, viewable online using the Government of Western Australia's *WA Atlas* (Landgate 2014), there is no known risk of ASS occurring within three meters of natural soil surface (or deeper) within the Whitford Nodes location.

REGIONAL VEGETATION MAPPING

The Quindalup Complex is the only Heddlé *et al.* (1980) Vegetation Complexes at Whitford Nodes. The complex is associated with coastal dunes and consists mainly of two alliances - the strand and foredune alliance, and the mobile and stable dune alliance. The Quindalup Complex extends in a narrow coastal strip, almost continuously from Dongara to Busselton. Local variations include the low closed forest of *Melaleuca lanceolata* – *Callitris preissii* and the closed scrub of *Acacia rostellifera*. The status of the complex on the Swan Coastal Plain (SCP, Moore River to Busselton) is shown in **Table 1**.

Table 1: Vegetation Complexes remaining on the Swan Coastal Plain

Vegetation Complex	Remaining on SCP	
	Area (ha)	% Original Area
Quindalup Complex	18,000	47.1

Over 40% of the original pre-1750 extent of the Quindalup complex remains within the System 6 area. This is above the 30% level at which the Environmental Protection Authority (EPA) applies a general presumption against clearing (EPA 2006).

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

Ecological Communities are defined as 'naturally occurring biological assemblages that occur in a particular type of habitat' (English & Blyth 1997). Threatened Ecological Communities (TECs) are listed at both State and Commonwealth levels for protection under the *Wildlife Conservation Act 1950* and *Environment Protection and Biodiversity Conservation Act 1999*, respectively.

Possible TECs that do not meet the criteria to be listed as such may be classified at a state level as Priority Ecological Communities (PECs):

- the community does not meet survey criteria or is not adequately defined (Priorities 1, 2 and 3)
- the community is adequately known, and rare but not threatened or meets criteria for Near Threatened, or has been recently removed from the threatened list (Priority 4)
- the community is conservation dependent (Priority 5).

According to a *NatureMap* (Department of Environment and Conservation (DEC) 2007-2014) search and the commonwealth governments *Protected Matter Search Tool* (Australian Government and Department of the Environment (DoE) 2014), there are no recorded TECs or PECs within 5 km of Whitford Nodes.

CONSERVATION ESTATE AND BUSH FOREVER

Whitford Nodes is not part of conservation estate managed by the Department of Parks and Wildlife (DPaW) under the *Conservation and Land Management Act 1984 (CALM Act 1984)* according to the *DPaW Managed Lands and Waters* layer viewable on the online *WA Atlas*. It is also not part of a regional park (Landgate 2014).

Whitford Nodes does constitute a part of Bush Forever site 325 (Coastal strip from Burns Beach to Hillarys) that extends to the north along the coast to Ocean Parade, Burns Beach (Government of Western Australia 2000b). Bush Forever sites are regionally significant areas of natural vegetation within the Perth Metropolitan Region (Government of Western Australia 2000a). The Western Australian Government, the Western Australian Planning Commission (WAPC), the EPA and other key environmental agencies have endorsed Bush Forever and the sites are set aside for protection (WAPC 2010).

ENVIRONMENTALLY SENSITIVE AREAS

There are a number of areas around Western Australia of environmental significance within which the exemptions to the Native Clearing Regulations do not apply. These are referred to as Environmentally Sensitive Areas (ESAs), and are declared under section 51B of the *Environmental Protection Act 1986 (EP Act 1986)* and described in the *Environmental Protection (Environmentally Sensitive Areas) Notice* (Government of Western Australia 2005).

According to the ESA mapping, viewable on the online *WA Atlas*, the study area falls entirely within an ESA associated with Bush Forever site 325 (Landgate 2014).

ECOLOGICAL LINKAGES

The study area is located in a Perth Metropolitan Regional Link as delineated as part of the Perth Biodiversity Project (Government of Western Australia, 2000). It also forms part of Greenway '1 – Coastal Strip' in *A Strategic Plan for Perth's Greenways* (Alan Tingay and Associates, 1998). Greenways can be defined as "networks of land containing linear elements that are planned, designed and managed for multiple purposes including ecological, recreational, cultural aesthetic, or other purposes compatible with the concept of sustainable land use" (Ahern, 1995). In urban areas, greenways can provide linear linkages between more substantial bushland and coastal reserves.

FLORA VALUES

According to a *NatureMap* (DEC 2007-2014) search there are 36 vascular flora species including one Department of Environment Regulation (DER) listed conservation significant flora species (*Jacksonia sericea* - Priority 4) within 2 km of Whitford Nodes.

The *Protected Matter Search Tool* (Australian Government and DoE 2014) identified five additional commonwealth listed conservation significant species or species habitat that is likely to or may occur within the search area (2 km buffer); *Caladenia huegelii* (E), *Diuris micrantha* (E), *Diuris purdiei* (E), *Isopogon uncinatus* (E) and *Centrolepis caespitosa* (E), although the latter is no longer listed as Threatened by DPaW.

None of the conservation significant species listed above, except *Jacksonia sericea*, are known to occur on sand dunes according to *FloraBase* (WAH 1998-2014).

FAUNA VALUES

A total of 104 fauna species were identified through a *NatureMap* search (DEC 2007-2014) of the Whitford Node location, using a 2 km buffer including five conservation significant fauna species listed below in **Table 2**.

A total of 19 additional Threatened fauna species were identified through the *Protected Matters Search Tool* (Australian Government and DoE 2014) listed in **Table 2**. This excludes 54 listed marine species and migratory marine birds.

Table 2: *NatureMap* and *Protected Matter Search Tool* conservation significant fauna results

Naturemap Search Results				
Scientific Name	Common Name	EPBC Act	WC Act	State/DEC Listing
<i>Ardea modesta</i>	Eastern Great Egret	Marine; Migratory	-	-
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	Endangered	Schedule 1	T - EN
<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Schedule 1	EN
<i>Neelaps calonotos</i>	Black-striped Snake	-	-	P3
Protected Matters Search Tool Results (excluding Marine Migratory Species and Migratory Birds)				
Scientific Name	Common Name	EPBC Act	WC Act	State/DEC Listing
Birds				
<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy	Vulnerable	Schedule 1	EN
<i>Diomedea epomophora epomophora</i>	Southern Royal Albatross	Vulnerable	Schedule 1	VU
<i>Diomedea epomophora sanfordi</i>	Northern Royal Albatross	Endangered	Schedule 1	VU
<i>Diomedea exulans amsterdamensis</i>	Amsterdam Albatross	Endangered	Schedule 1	CR
<i>Diomedea exulans exulans</i>	Tristan Albatross	Endangered	Schedule 1	CR
<i>Diomedea exulans (sensu lato)</i>	Wandering Albatross	Vulnerable	Schedule 1	VU
<i>Leipoa ocellata</i>	Malleefowl	Vulnerable	Schedule 1	VU
<i>Macronectes giganteus</i>	Southern Giant-Petrel	Endangered	-	P4
<i>Macronectes halli</i>	Northern Giant-Petrel	Vulnerable	-	-
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Schedule 1	EN
<i>Sternula nereis nereis</i>	Australian Fairy Tern	Vulnerable	Schedule 1	VU
<i>Thalassarche cauta cauta</i>	Shy Albatross, Tasmanian Shy Albatross	Vulnerable	Schedule 1	VU
<i>Thalassarche cauta steadi</i>	White-capped Albatross	Vulnerable	Schedule 1	VU
<i>Thalassarche melanophris</i>	Black-browed Albatross	Vulnerable	Schedule 1	EN
<i>Thalassarche melanophris impavida</i>	Campbell Albatross	Vulnerable	Schedule 1	VU
Mammals				
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	Vulnerable	Schedule 1	VU
Reptiles				
<i>Chelonia mydas</i>	Green Turtle	Vulnerable	Schedule 1	VU
<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Endangered	Schedule 1	VU
<i>Natator depressus</i>	Flatback Turtle	Vulnerable	Schedule 1	VU

ABORIGINAL HERITAGE

The Department of Indigenous Affairs online *Aboriginal Heritage Enquiry System* (Department of Indigenous Affairs 2014) was investigated to identify surveys within the study area and any known heritage concerns. The results of the online heritage database searches revealed that Whitford Nodes contains no registered heritage sites.

There are no National or Commonwealth Heritage Places listed under the *EPBC Act* within a 2 km radius of the Whitford Nodes location according to the PMST results (Australian Government and DoE 2014).

SITE VISIT RESULTS

On January 10, 2014 Richard Daniel (Environmental Scientist) performed a site assessment to verify desktop results, examine the ecological constraints of the staircase development at Whitford Nodes (with regard to vegetation, fauna and dune management) and become familiar with the current infrastructure and public access at the park.

VEGETATION COMMUNITIES AND CONDITION

Map 2 shows bushland condition throughout the site. The base of the dune on the south and west edges were mapped as Good condition (0.21 ha) and the remaining vegetation as Very Good condition (1.61 ha) under the Keighery Bushland Condition Scale (Keighery 1994). Bushland was rated as Good condition due to the presence of invasive weed species, rubbish, trampling and plant death – all likely due to human activity in the area.

Four vegetation communities were mapped (**Map 2**). Vegetation communities include:

1. *Eucalyptus gomphocephala* and *Callitris preissii* isolated trees over *Acacia rostellifera* low woodland over *Spyridium globulosum* and *Scaevola nitida* tall open shrubland over *Olearia axillaris* open shrubland over *Scaevola crassifolia* and *Rhagodia baccata* low open shrubland over *Threlkeldia diffusa* and *Acanthocarpus preissii* open herbs and *Lepidosperma gladiatum* very open sedges with *Cassytha racemosa*, *Comesperma integerrimum* and *Hardenbergia comptoniana* climbers
2. *Acacia rostellifera* tall open shrubland over *Spyridium globulosum* open shrubland over *Acanthocarpus preissii* low closed heath over *Rhagodia baccata* low open shrubland with *Lepidosperma gladiatum* very open sedges and *Cassytha racemosa* and *Hardenbergia comptoniana* climbers
3. *Eucalyptus gomphocephala* scattered tall trees over *Acacia rostellifera* tall open shrubland over *Spyridium globulosum* open shrubland over *Rhagodia baccata* and *Scaevola crassifolia* open shrubland over *Acanthocarpus preissii* and *Threlkeldia diffusa* very open herbland with *Lepidosperma gladiatum* closed sedges and *Cassytha racemosa* climbers
4. *Acacia rostellifera* and *Melaleuca lanceolata* low open forest over *Rhagodia baccata* scattered low shrubs with *Acanthocarpus preissii* and *Threlkeldia diffusa* scattered herbs and *Lepidosperma gladiatum* scattered sedges.

Common weeds at Whitford Nodes include *Pelargonium capitatum*, *Euphorbia terracina*, *Bromus diandrus*, *Avena barbata*, *Briza maxima*, *Ehrharta longifolia*, *Lagurus ovatus* and *Cenchrus clandestinus*.

FORMAL ACCESS AND INFRASTRUCTURE PRESENT

Whitford Nodes is accessible to the public from Whitfords Avenue. The Whitford Nodes parkland has a series of limestone paths that join the park below to the stable dunal system to the east. There are two prominent high points within the dune system at Whitford Nodes, one to the north and one the south of the Whitford Nodes area. There is approximately 900 m in total of existing stabilised limestone path throughout the north and south dunes; this includes an access path to the top of the northern dune where a lookout and gazebo are situated (**Plate 1**). This lookout is where the proposed stairway is to join from the bottom of the dune. These paths have been overlaid with emulsion stabilised limestone within the last five years to prevent erosion and are wide enough to accommodate firefighting equipment. **Map 1** shows the extensive limestone path on the north and south dunes. The shortest distance of limestone path to get from the park land below to the lookout and gazebo on the north dune is approximately 245 m (**Plate 2**).



Plate 1: Gazebo and lookout



Plate 2: Limestone path to gazebo/lookout

The City of Joondalup has erected a wooden fence around the base of the dune, adjacent to the parkland and car park areas (**Plate 3, Plate 4**). **Map 1** shows the path system on the dunes a wire fence, with occasional wooden barriers, has been installed to prevent access and stop sand movement (**Plate 5, Plate 6**).



Plate 3: Wooden fence at base of north dune



Plate 4: Wooden fence at base of north dune



Plate 5: Wire fencing on limestone paths



Plate 6: Wooden barriers

MANAGEMENT ACTIVITIES

Management activities to date include rehabilitation of native vegetation on the dune with the inclusion of plant species that will restrict public access, erosion and weed infestation. This has occurred predominantly at the base of the dune adjacent to the parkland (**Plate 7**). Weed control programs to prevent the establishment of exotic species such as *Pelargonium capitatum*, *Ehrharta calycina* and *Euphorbia terracina* has also occurred (**Plate 8**). Limestone paths for public access and fire management with substantial fencing have been implemented to remediate public pressure on the dunes. Prevention of erosion has also been exercised through excavation, sand addition and use of wooden barriers.

Much of the proposed vegetation to be cleared is in Very Good condition with the exception of a few unofficial paths that have been created through human trampling and animal movement. The areas at the base of the dune mapped in 'Good' condition have been extensively managed and protected with vegetation condition likely to improve though continued planting, weed control and access management.



Plate 7: Heavily bushed to prevent access



Plate 8: Dead weeds as a result of weed spraying activities

DISCUSSION

ECOLOGICAL IMPACTS

If the proposed construction of the staircase proceeds the following ecological impacts may occur with the requirement of management practises.

Dune Erosion and Blowouts

Clearing of vegetation for the purpose of the proposed staircase at Whitford Nodes has the potential to result in large areas of exposed and unstabilised sand on the western side of the north dune. This poses an immediate risk of the dune eroding from strong winds, which can reach up to 40 km/h on a daily basis. Blowouts and major sand movement are highly likely to occur without effective control measures. Exposed sand is also at risk of erosion from increased public pressure as the dune is used to play on or walk up. This will likely cause damage to surrounding vegetation, modify the dunes natural process and pose a risk to the stair ways structural integrity.

Weed Invasion and Decline of Species Diversity

The clearing of vegetation and increased public pressure on the dune will provide a greater opportunity for weeds to invade though seed distribution and reduction in the competitive pressures of native species. Increased cleared area will provide suitable habitat for seed germination and plant establishment. Unless managed correctly, invasive weeds will thrive, posing a risk to surrounding vegetation. Environmental weeds are plants that establish themselves in natural ecosystems and modify natural processes, resulting in the decline of the communities they invade (Department of Conservation and Land Management 1999).

Impacts on ecosystem function by environmental weeds include:

- resource competition, as weeds often outcompete native species
- prevention of seedling recruitment of native species
- alteration to geomorphological processes, such as increased erosion
- changes to soil nutrient status
- alteration of fire regime, usually through susceptibility to increased fire frequency
- changes to the abundance of indigenous fauna due to less diverse habitat
- loss of genetic diversity
- loss of species diversity
- changes to the structure of vegetation communities, often by the removal of the shrub layer or native ground covers.

MANAGEMENT CONSIDERATIONS

Dune Restoration and Revegetation

Rebuilding of the impacted dune may be required in areas where the sand surface has been breached or eroded as a result of loss of vegetation cover, due to either natural or human-induced causes. Rebuilding dunes prevents further wind funnelling, sand scour and sand transportation inland (Oma *et al.* 1992). Rebuilding may be achieved by means of earthworks, brush layering or sand trapping fences. The latter two approaches are most relevant to the City of Joondalup, as blow outs are generally localised and in most cases the dune formations have not been comprised to the extent that large-scale, urgent reconstruction would be required.

Sand trapping fences may take several years to reform dune faces. The fences work on the principle that wind energy and speed is reduced as it flows over the fence, resulting in deposition of sand behind and downwind of the fence. The eventual height of the resulting dune is as high as the fence itself, with the width between five and ten times the height of the fence. The effectiveness of sand trapping fences depends on wind speed, the amount of sand transported by winds, and characteristics of fence construction (Oma *et al.* 1992). These fences can only be used on stable or accreting coastlines, where there is a steady supply of sand to the beach front. Brush layering works on the same principle as sand trapping fences, with layers of brush added to exposed sand, gradually building the height of the dune. Brush layering is much cheaper than sand fencing, has fewer problems with vandalism, and provides shelter for plant establishment.

Revegetation of cleared dune areas should be done to provide stability to dune surfaces, enhance environmental and conservation values and enhance amenity, and will also reduce the cost of future maintenance of coastal areas by reducing erosion. It is best to use a variety of indigenous species that are present, or thought to have once been present, at each area, using locally collected material. Primary and secondary colonising species can be used on dunes further from the beach such as the ones at Whitford Nodes. Cuttings or seed should be collected locally. The timing of first planting should occur when the first winter rains have dampened the sand to a depth of 20-30 cm, generally in June to July. Planting should be completed by the end of the wettest period of the year at the latest (September).

Management notes:

- current and new fencing should be maintained in good condition
- current pathways to points of interest should be maintained
- informal pathways should be brushed
- direct planting, seeding and brushing should be used wherever possible
- plant tube-stock should be used in preference to mature plants
- indigenous species should be given preference over exotics
- species diversity should be encouraged
- signage informing the public of the fragility of the coastal dunes and vegetation should be erected
- people presence and sandboarding in the dunes should be policed
- weed control.

Weed Control

In some areas, environmental weeds are the dominant component of the flora and play an important role in preventing dune erosion. *Arctotheca populifolia*, *Cakile maritima* and *Tetragonia decumbens* are all *Moderate* rated weeds, and *Trachyandra divaricata* has a *Mild* rating according to the *Environmental Weed Strategy for Western Australia* (Department of Conservation and Land Management 1999), and should only be controlled where there is no danger of a blow-out occurring. *Pelargonium capitatum* is a *High* rated weed and should be controlled, preferably with a herbicide as the dead plant material will help to hold the soil together and reduce the likelihood of erosion.

On west-facing dunes (such as the dune in question, where wind erosion is likely) with a high proportion of these species, it will be prudent to immediately plant native dune-colonising species following the removal of weed species, and to ensure that large bare patches of sand are not created by weeding. Incremental weed control in these areas will be vital to ensure that erosion does not occur.

Management notes:

- manually remove large exotic species and immediately replaced with native species
- mow road and path edges regularly to reduce seed production
- brushing and direct planting of indigenous vegetation close to the staircase location should be an ongoing process
- further planting of exotic species within the staircase area should be discouraged
- application of the grass-selective herbicide carried out regularly and as needed in bushland areas, and the application of Glyphosate® to removal any spot occurrences of other weeds.

Fencing and Signage

Fencing should be used to control access and exclude access to sensitive areas. This will reduce erosion and the spread of environmental weeds. The staircase should have rails or adjacent fencing to prevent people from accessing the sand dune from the staircase. Recreational use of natural areas should be confined to beach areas, paths, parkland, lookouts and other such designated areas. Pedestrian traffic across sand dunes and in blow outs should be minimised by fencing these areas and maintaining current fences, with accompanying signage to encourage people to use the paths to improve the condition of coastal areas.

Aspects of fencing requiring continual maintenance are:

- holes in fences and broken fences through normal wear and tear
- fences cut through vandalism; dog owners and recreational fishers have been identified as repeatedly cutting holes in fences to allow access to the limestone cliffs
- fences becoming partially submerged in sand during winter storms.

Signage is generally located at major beach access points, along dual-use paths, near dangerous areas or at areas that require conservation. Signs are generally either for safety, regulatory or direction. There are no interpretive signs at present around the Whitford Nodes area with regard to dune conservation.

Aspects of fencing requiring continual maintenance are:

- replacing or repairing signs from wind damage
- replacing, repairing or cleaning signs after acts of vandalism
- updating signage with new information.

Fire Management

Fire management is of primary importance to protect human life. Fire management considerations will need to be identified through a fire management strategy. The strategy should be to determine fire risk hazard levels, based on dune gradient, fuel loads and vegetation type. This in turn will determine the appropriate hazard separation distance (i.e. firebreak). The plan will need to be approved by the Department of Fire and

Emergency Services (DFES) before any construction may commence. It is likely that a significant amount of dune vegetation will need to be cleared to satisfy DFES's safety requirements.

Plant Health

Management strategies for reducing plant stress involve the ready availability of the plants' needs and prevention of adverse external factors. The use of appropriate revegetation techniques and minimisation of disturbance is of high importance particularly in the initial stages of plant development. Following is a list of techniques that can act to minimise plant stress and increase survival rates of seedlings. The level of care required will depend on the species selected for restoration and stabilisation of the dune. Management may include:

- tree guards to help maintain a moist microenvironment and shelter plants from wind stress and sandblasting
- mulching to primarily discourage weed growth but also helps trap nutrients and water and stabilises sand
- weed control to prevent competition
- reticulation that may be required in some areas to alleviate water stress
- soil preparation – fertiliser may sometimes be required to provide sufficient nutrients
- brushing to stabilise sand and deter disturbance by people.

LIKELY ENVIRONMENTAL APPROVALS

The following information is provided as an indication of the environmental approvals that the CoJ may require to allow the installation of the exercise staircase at Whitford Nodes. The requirements as outlined below are likely to become more defined according to the level of consultation the City has with the relevant decision making authorities (e.g. Department of Planning (DoP) / WAPC, DPaW, DER, EPA) throughout the design and development of the proposal.

Since Whitford Nodes forms part of a Bush Forever site the proposed stairway installation should be referred to the DoP in the first instance as the co-ordinating agency responsible for the implementation of Bush Forever. The general objective of this liaison would be to consult on how the design of the installation and proposed ongoing management activities has been derived to try to avoid or minimising impacts on the Bush Forever Site. Where a reasonable outcome is not likely, and the COJ still wishes to proceed, the proposal would most likely need to be referred to the EPA for comment and determination of level of assessment (EPA 2006).

State Planning Policies

The DoP/WAPC has two key policies that are relevant to the proposed stairway installation:

1. *State Planning Policy (SPP) 2: Environment and Natural Resources Policy* (a broad overarching policy for environmental planning (WAPC 2003))
2. *SPP 2.8: Bushland Policy for the Perth Metropolitan Region* (a supplementary policy that addresses the protection and management of Bush Forever sites) (WAPC 2010).

Under SPP 2.8 there are both general and specific policy measures that relate to Bush Forever areas. For existing Bush Forever reserves, such as Whitford Nodes, there is a general presumption against clearing of regionally significant bushland or other degrading activities except where a proposal:

- a. *is consistent with existing approved uses or existing planning/environmental commitments or approvals; or*
- b. *is in accordance with a management plan approved under the Conservation and Land Management Act 1984; or*
- c. *is a compatible operation or necessary operation carried out under the Conservation and Land Management Act 1984; or*
- d. *is in accordance with a management plan, or similar, which has been endorsed by the WAPC and has appropriately considered bushland protection requirements; or*

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- e. *is consistent with the overall purpose and intent of an existing Crown reserve or can be reasonably justified with regard to wider environmental, social, economic or recreational needs, and all reasonable alternatives have been considered in order to avoid or minimise any direct loss of regionally significant bushland, and reasonable offset strategies are secured to offset any loss of regionally significant bushland, where appropriate and practical.*

For the required clearing associated with the installation and management of the exercise stairway to not be at variance with this policy measure, the WAPC would most likely need to be satisfied that exemption “e” applies in this case. This is likely to be problematic since there is existing formal access to the top of the dunes is well developed and maintained.

Beyond this if the city were to proceed, as per impact assessment processes outlined in Figure 2 of the policy, the city would need to submit an application with sufficient supporting information as outlined in Appendix One of the policy to permit the decision making authority to conduct an assessment. The documentation would need to include a statement of environmental effects that will include but not be limited to:

- i. *provide evidence and demonstrate that a proposal or decision is consistent with this policy, in particular the planning assessment criteria set out in Appendix 2;*
- ii. *describe and provide a rationale and planning context for the proposal;*
- iii. *describe the impacted area’s bushland values and environmental attributes (to be consistent with the information sets in Bush Forever and with reference to the site descriptions therein; and Environmental Protection Authority Guidance Statements 51 and 56, where appropriate);*
- iv. *demonstrate that all reasonable steps have been taken to avoid or minimise any likely adverse impacts consistent with the requirements of this policy, including a review of reasonable alternatives and details of any bushland-sensitive design measures to be adopted;*
- v. *provide an evaluation of and justification for any likely adverse impacts;*
- vi. *provide an environmental and/or bushland management plan, where appropriate, and details of proposed conservation management measures to be adopted; or, where agreed, the environmental and/or bushland management plan or related measures may be a requirement through the statutory planning process; and*
- vii. *provide details of proposed long-term protection, management, offset measures and implementation commitments to be adopted.*

After assessment of the documentation against the impact assessment criteria and policy measures outlined in SPP 2.8 the proposal is either determined to be:

- *consistent with SPP 2.8 and other planning and environmental considerations – likely to be approved by the decision making body and unlikely to be formally assessed by the EPA, at which point the proposal is accepted and the associated long-term protection, management and offset measures are implemented*
- *inconsistent with SPP 2.8 – likely to be refused by the decision making body or referred to the EPA.*

EPA Approval

The environmental approvals process under the *EP Act 1986* for proposals that impact on Bush Forever sites are outlined in Table 1 of *EPA Guidance Statement 10* (EPA 2006). At a broad level proposals that would result in the clearing of native vegetation are most likely to be managed by DER under Part V Division 2 (clearing of native vegetation) of the *EP Act 1986*. If other significant impacts in addition to clearing might occur proposals should be referred to the EPA. In the case of Bush Forever sites protected through local reserves such as Whitford Nodes, the DER and EPA will normally liaise on a case-by-case basis to determine the appropriate course of action. The EPA would expect proposals to be designed to minimise or avoid direct loss of bushland consistent with Bush Forever expectations (EPA 2006).

Native Vegetation Clearing Controls

Controls have been implemented to regulate the clearing of native vegetation under the *EP Act 1986* since 2004. These controls generally require the obtaining of clearing permits unless a valid exemption applies (EPA 2006). Under the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* (Government of Western Australia 2005) all Bush Forever sites are classified as Environmentally Sensitive Areas within which the exemptions to the Native Clearing Regulations do not apply.

When deciding to grant, or refuse, a permit the proposal is assessed against the following 10 clearing principles as listed below:

- a. *Native vegetation should not be cleared if it comprises a high level of biological diversity.*
- b. *Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.*
- c. *Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.*
- d. *Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.*
- e. *Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.*
- f. *Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.*
- g. *Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.*
- h. *Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.*
- i. *Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.*
- j. *Native vegetation should not be cleared the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.*

For the vegetation clearing associated with the construction and ongoing management of the proposed staircase to be approved it must be shown that it is not at variance with any of these principles. To provide sufficient information for assessment of these criteria the CoJ, as a minimum, would need to conduct Level 1 Terrestrial Biological Surveys (Flora, Vegetation and Fauna) in accordance with EPA documents:

- *Terrestrial Biological Surveys As An Element Of Biodiversity Protection - Position Statement 3* (EPA 2002)
- *Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia No. 51* (EPA 2004a)
- *Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia No. 56* (EPA 2004b)
- *Technical Guide -Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA & DEC 2010).

Particular focus would also need to be made on providing evidence to illustrate how the proposed stairway is not at variance with criteria (g) and (h) given its location within a Bush Forever area on a coastal dune system which is at high risk of erosion once cleared.

CONCLUSION

Based upon the desktop and site based assessments Ecoscape believes the Whitfords Nodes area is a coastal dune area that has been identified as a regionally significant bushland area that has been set aside for protection as a Bush Forever site. Existing management activities and infrastructure on site have been focused on dune stabilisation, weed control and preventing uncontrolled access to the dune via fencing, rehabilitation and provision of formalisation access tracks to the high vantage points on the dune.

The construction of the exercise staircase in its proposed location will require the clearing of native vegetation to allow construction and ongoing management (firebreaks etc). Given Whitford Nodes is located within a BushForever site there is a general presumption against clearing. For the proposal to be considered not at variance with environmental legislation and policies, significant investment on the part of the CoJ to outline how the stairway has been designed, will be constructed, and managed into the future so that the direct and indirect impacts associated with the proposed clearing can be implement to the satisfaction of the decision making authorities.

Yours sincerely

Ecoscape (Australia) Pty Ltd

A handwritten signature in black ink, appearing to read 'Jared Nelson', is positioned above the typed name.

JARED NELSON

Senior Environmental Scientist

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GDA 1994 MGA Zone 50

IMAGERY SOURCE: Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

AUTHOR: RD CHECKED: JN
 DATE: JAN-13 PROJECT NO: 3133-13

WHITFORD NODES STAIRWAY ECOLOGICAL ASSESSMENT

CLIENT: CITY OF JOODALUP

SOCIAL ASSETS

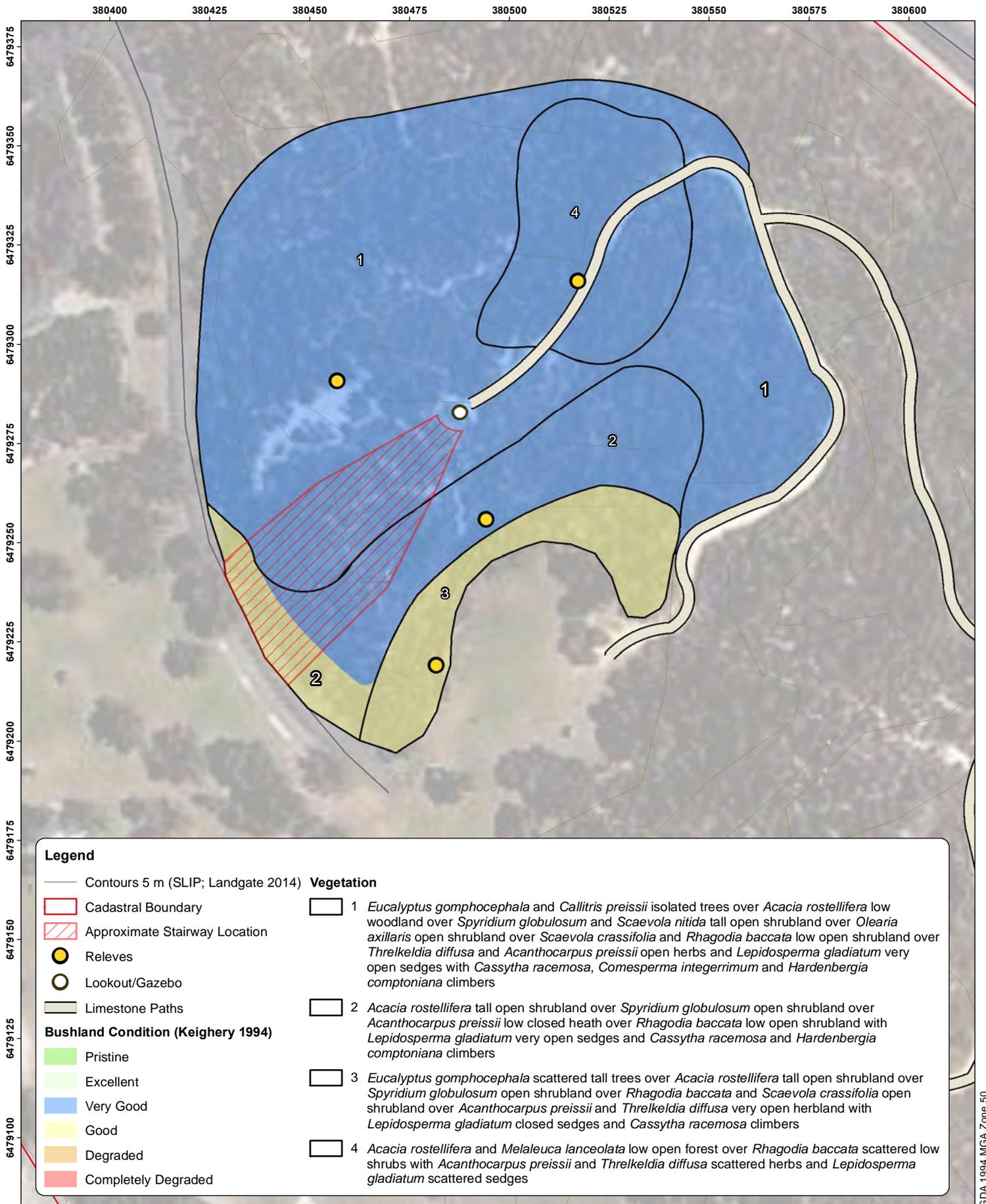


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Scale 1:4,250 @ A4



MAP 1



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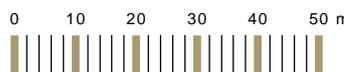
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MAP 2

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Proposed Stairway to the Lookout on the Northern Dune Whitfords Nodes (South) Park Hillarys

Tuesday, 6 May 2014

1:2154

