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1. INTRODUCTION

- 1.1 Background

The applicant, Dassenberg Property Development Trust, proposes to establish a residential estate on Portion 7 of Farm Dassenberg no 940, Noordhoek. The total area of the property is 78ha. A total of 130 residential erven are proposed, with 15 erven possibly occupying double dwellings (thus 145 dwelling units on 130 erven). The residential plots are approximately 700 m² in extent and most plots have an open space of approximately 5 metres between them, with extensive openspace/ecological areas in front. The wetland and mountain buffer areas are conserved, and a landscaped open space alongside Ou Kaapse Weg provides a buffer along the tourist route. AMATHEMBA Environmental Management Consulting in association with Doug Jeffery Environmental Consultants has been appointed to compile the Operational Environmental Management Plan (OEMP).
- 1.2 Aim of the OEMP

The aim of an OEMP is to facilitate appropriate environmental input during the operational phase of a project. To achieve this, the OEMP must specify the environmental management actions that residents must abide by during the operational phase of the housing development. The OEMP should detail the issues that should be taken cognisance of and indicate specific actions that must not be undertaken so as to ensure that the environment is not unnecessarily damaged. In addition, the OEMP provides a clear indication of the environmental management requirements of each of the role players involved in the housing development. Guidance for the implementation of the OEMP is provided including a summary table of environmental management aspects and actions required to ensure compliance with the OEMP. Corrective actions and/or penalties in the event of non-compliance with the OEMP can be defined if requested.

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The OEMP is divided into the following sections:

1. Introduction
2. Description of the area and current management
3. Description of proposed relevant management aspects
4. Monitoring and Reporting
5. Table of management and maintenance actions
At any stage of the operational phase of the development, should further construction occur, it must be in accordance with the Construction Environmental Management Plan and any recommendation made by specialists.

1.3 Application

The implementation of the Operational Environmental Management Plan (OEMP) shall be the responsibility of a Homeowners Association (HA). The Homeowners Association may form an Environmental Liaison Committee (ELC) to facilitate the implementation of the OEMP. If the ELC is formed, many of the responsibilities of the Homeowners Association may be delegated to the ELC. The ELC should consist of at the very least the following:

- Representative(s) of the homeowners within Dassenberg; and
- Representative of the local authority; and
- If agreed by the above mentioned parties other members, who may include an external Environmental Control Officer (ECO) or representatives from community based organisations such as rate payers associations or environmental groups such as TMNP.

The OEMP must be part of the land owner agreement within Dassenberg.

The OEMP is a working document that may be amended to enhance its effectiveness for environmental control. Therefore not all specifications and details are prescribed here but should be discussed and the best possible practicable application made by the ELC.

The OEMP must be implemented as soon as any aspect of Dassenberg becomes operational.

1.4 Financing for Environmental Management

The estate will be managed by a Homeowners Association (HA) with funding from monthly levies paid by home owners. Management will be in accordance with this approved environmental management plan. Additional funds may be obtained through penalties for transgressions and fund raising events.

1.5 Key terms and Abbreviation

Affected Environment –

Those parts of the socio-economic and biophysical environment impacted on by the development

CPPNE –

Cape Peninsula Protected Natural Environment

DEADP –

Department of Environmental Affairs and

Development Planning:

Environmental regulatory authority in the Western Cape.

EIA – Environmental Impact Assessment:

A process of collecting, analysing, interpreting and communicating data as it pertains to possible impacts (positive and negative) upon the environment due to a development.

ELC – Environmental Liaison Committee

EMP – Environmental Management Plan:

A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of the proposed development.

EO – Environmental Officer:

The person appointed by the City of Cape Town and representing the City to ensure implementation of the OEMP

HA – Homeowners Association.

The HA is comprised of representatives of the homeowners of Dassenberg

Mitigation – The implementation of practical measures to reduce adverse impacts

OEMP – Operational Environmental Management Plan: A plan that is focused on the operational aspects of the development

SAHRA – South African Heritage Resources Agency

TMNP – Table Mountain National Park

WL Toad – Western Leopard Toad
(Bufo pantherinus)

1.6 Environmental Legislation

Cognisance will be taken of, but is not limited to, the following pieces of legislation during the operational phase of the development:

- Atmospheric Pollution Prevention Act (No. 45 of 1965)
- Environment Conservation Act (No. 73 of 1989)
- Hazardous Substances Act (No. 15 of 1973)
- Health Act (No. 63 of 1977)
- National Environmental Management Act (No. 107 of 1998)
- National Heritage Resources Act (No. 25 of 1999)
- National Water Act (No. 36 of 1998)
- Occupational Health and Safety Act (No. 85 of 1993)

1.7 Acknowledgement

The following documents were used in the compilation of the OEMP

- Freshwater Assessment prepared by Freshwater Consulting Group;
- Botanical Assessment prepared by Nick Helme Botanical Surveys;
- Faunal Assessment prepared by Sungazer cc
- Visual Assessment prepared by Megan Anderson Landscape Architects;
- Heritage Assessment prepared by Nicolas Bauman and Sarah Winter;
- Social Assessment prepared by NS Terblanche & Associates;

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- Services Report prepared by ASCH consulting engineers; and
- Traffic Impact Assessment prepared by Agmac Consulting cc.
- Subdivision Application by Planning Partners
- Scoping Report Executive Summary by Doug Jeffrey and Associates
- Architecture: Lennard Architects and planners
- Energy Savings: Dassenberg Property Development Trust Planning Partners' Lennard Architects; Africon Electrical Engineers; Asch Civil Engineering
- Groundwater: WSP R Giljam and J McStay
Input from Nature Conservation Corporation for the Draft Fire Management Plan is also acknowledged.

2. DESCRIPTION OF THE AREA AND CURRENT MANAGEMENT PLANS

2.1 Residential Development

2.1.1 Location

The site is situated in Noordhoek, north of Sun Valley and Hazelwood Park residential areas and it falls within the jurisdictional area of the City of Cape Town: South Peninsula Region. The site is bounded by Ou Kaapse Weg to the north and west. The development will gain access from OuKaapse Weg. To the north of the site lies the Cape Peninsula Protected Natural Environment (CPPNE) and its boundary runs through the northeastern section of the site, dividing the property into two portions. The land above the CPPNE line will not be rezoned. This land will continue to be managed as a nature area.

The site slopes from north to south with an average gradient of 1:6. Steeper slopes are dispersed throughout but occur mainly in an east-west belt through the middle of the site. There are sections of flatter gradients, especially around the lower wetland.

The location of the site can be seen in Figures 2.1 and 2.2.

2.1.2 Land Use and Zoning

The property is currently zoned Agricultural. The development proposal entails a rezoning to subdivisional area (and hence an amendment to the zoning scheme) as well as subdivision, and is thus subject to the provisions of the Land Use Planning Ordinance.

The area within the CPPNE will remain zoned for agricultural and managed as a nature area.

2.1.3 Residential Component

The residential development will extend up the site with ecological corridors between the residential erven. A total of 130 residential erven are proposed, with 15 erven



FIGURE 2.1: Site Context 1:50000 (Taken from Planning Partners, (2007)



FIGURE 2.2: Aerial photograph indicating site boundary (red) and CPPNE boundary (green) (City of Cape Town)

possibly occupying double dwellings (thus 145 dwelling units on 130 erven).

The residential plots are approximately 700 m² in extent and most plots will have an open space of approximately 5 metres between them to provide local ecological connections. The local ecological connections will ensure that there are always gaps in the built form, thereby creating additional opportunities for tree planting and for homeowners to walk through the estate. In addition larger ecological corridors are provided throughout the site.

The ecological corridors will be owned by the Homeowners Association and will be zoned "Open Space". These corridors must never be developed. They connect the upper mountain parts with the lower wetland parts, thereby creating continuous open areas. The wetland areas will be conserved, buffer areas will be provided for

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the Western Leopard (WL) Toads and most of the sensitive vegetation will be conserved. A 50 m buffer is provided all the way around the boundary with Ou Kaapse Weg to ensure that development is set back from the road. The proximity of homes to the riverine corridor will lead to an increase in disturbance in the form of noise, light, pets and physical disturbance from trampling. No development is to occur below the 1 in 100 year flood line and development on the steepest parts of the site are to be avoided. Visual impact and natural materials would be the key elements governing architectural controls and the entire thrust of the controls would be environmental appropriateness.

2.1.4 Access control, Security and Law enforcement

Access control to the development will be via a security controlled access road on Ou Kaapse Weg. A single entrance lane widening to two boom controlled lanes is proposed at the entrance. Residents will be issued with access control disks. The perimeter of the estate will be fenced and internal fences will be limited. The HA is responsible for security within the development. For any breach of the law beyond the parameters of the OEMP, the local law enforcement agents are contacted.

2.1.5 Visual Characteristics

The site is situated in the Noordhoek – ish Hoek Valley. The valley is rich in scenic resources, both of a natural, rural and cultural character. The lower lying valley basin has been extensively developed, but the western extent of wetlands, beach, lagoons and Wildevoelvie are being conserved as part of the Table Mountain National Park (TMNP), a natural wilderness area. The valley is accessed by scenic, tourist routes namely Ou Kaapse Weg in the middle of the valley, Chapman's Peak Drive in the west, and Main Road and Boyes' Drive in the east. Dassenberg is on the south facing slopes of a hillside of the valley with a local ridgeline immediately north of it and therefore the visibility of the site is predominantly southward. The site is particularly visible from the following roads:

- Glencairn Express Way adjacent to Capri and Brakkekloof
- Lower Ou Kaapse Weg between Sunnydale and Sun Valley
- Ou Kaapse Weg immediately adjacent to the site

Visibility from Fish Hoek, Kommetjie and

Noordhoek Roads is interrupted by development and planting.

2.1.6 Infrastructure and services

2.1.6.1 Roads and access

Access to the site is from the lower portion of Ou Kaapse Weg, on the outside of a bend. This access is situated 370m north of the intersection of Noordhoek Road and Ou Kaapse Weg. Acceptable site distance will be ensured and turning lanes will be provided on Ou Kaapse Weg. A single entrance lane widening to two lanes is proposed at the entrance. Separate left and right turn lanes will be provided at the exit. The internal road system will consist of two branches, with a number of cul-de-sac spurs leading up the slope. Roads are currently proposed as 5m wide. Roads will generally follow the slope of the ground with grades kept to a maximum of 16%. Cut and fill slopes will be retained within the road reserves which are generous for a residential development (18m). The road reserves allow for tree planting and space for localised parking areas. Two parking bays per single residential unit will be provided with visitors parking in the driveways. The road reserves will be wide enough to accommodate some on street parking within the development. Cognizance will also be taken of driveway access off the road ways. Garage levels will thus be designed for each property. The grade of the road will take cognizance of the landscaping proposals so that where cut and fill slopes is necessary, the landscaping will be accommodated as well. Landscaping and berms around the perimeter will help screen the houses from the road and protect the houses from external traffic noise. Particular emphasis will be placed on landscaping the internal roads to create well treed areas that are reminiscent of the woody thickets commonly visible down the mountainside. These thickets will break up the form of the

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development and help to soften the impact of the houses.

Road specification will include requirements to help protect the WL Toad such as culverts and drains that the toads can climb out of.

2.1.6.2 Water

Water Reticulation

Potable water reticulation exists in the adjacent Crofter's Valley as well as Sun Valley. The pressure available from the reticulation existing in Sun Valley is insufficient to supply this development. Council have stated that the existing 300 mm main in Noordhoek Road has an available pressure head of approximately 12 bar which should be suitable for supply to the development. The peak domestic flow is estimated as 15 l/s and will be checked for instantaneous fire flow in accordance with National Building regulations (20 l/s @ 3 bars). Preliminary design checks of the overall system indicate that the pressure drops and velocities are acceptable for peak domestic flow including fire flow conditions.

Stormwater. An increase in quantity and deterioration in the quality of stormwater runoff from the site are some of the impacts of this development. This is as a result of hardening of the slopes, and the loss of natural recharge of groundwater. Both of these impacts can be mitigated against through the correct location and design of stormwater detention ponds. These should be of sufficient capacity to limit stormwater runoff to pre-development quantities and quality, and should be permeable, allowing water to filter into the ground thus recharging the aquifers. Residential stormwater runoff contains a number of potentially harmful pollutants, including fuels and oils, lead, fertilizers, herbicides and detergents. The site is divided into two sub-catchments and the proposed stormwater management will be treated similarly so as to retain the status

quo. A wetland exists in the lower south portion of the east catchment area close to Sun Valley. This wetland has been formed by natural drainage from the surrounding terrain.

The upper west catchment is drained by an existing 450 mm diameter pipe culvert, which runs underneath Ou Kaapse Weg and discharges into the drainage system of Crofter's Valley. An additional crossing is located in the southwestern corner of the wetland area and drains overflow from this region. The fingers of even in the north south direction have been laid out in such a way that existing runoff routes are retained and will fall within the open space areas. These run-off routes, as well as piped run-off from roads, will drain to a series of overland "channels" along the southern boundary of the site. Ponds will collect stormwater runoff from the two catchment areas close to the culvert locations. These ponds will be vegetated to act as natural filters and allow infiltration, as well as detention storage to ensure that post-development flow will not exceed pre-development flow. Runoff from residential areas can lead to increased mobilisation of fine sediments during rain and storm events.

Minor storm

The internal system will be designed to accommodate the discharge generated from the development area, for a storm of 1:5 year recurrence.

The stormwater generated from the development will discharge via the abovementioned ponds into the existing culverts crossing Ou Kaapse Weg, without using the existing wetland as a detention facility, thus minimising the nitrification and pollution threat posed to the wetlands.

Major storm

Escape routes will be designed to accommodate the discharge generated for a storm of 1:50 year recurrence. The run-off will eventually be discharged into the existing wetland, which will serve

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as a detention facility. No development will take place within the 1 in 100 year floodline.

2.1.6.3 Energy and Telkom

The Cape Town City Council is the authority for the supply of electricity. The main electrical reticulation will follow the road network. Telkom reticulation will follow the roads. Energy conservation issues have been applied as part of this project to mainly the house design (end user). The savings that are applied will have a significant impact on the overall bulk infrastructure requirements. Whilst the bulk infrastructure itself will not be changed significantly the demands will be reduced. The development incorporates energy saving techniques as compared to conventional development. Some of the techniques applied include:

a. Architectural Design

Heat losses in the dwelling houses are reduced by good architectural design. Draughts are reduced through the use of door and window systems with successful sealing mechanisms, and insulation provided in the ceiling and roof space. The north winter sun is captured and the summer sun is excluded by house orientation and provide correct shading to glass areas. Open fireplaces are discouraged (because open fires draw warm air out of the room) and glass fronted, energy efficient free standing units are favoured. These principles have been incorporated into the house proto-types that have been designed for the project, and are incorporated as part of the architectural design manual.

b. Hot Water Systems

Solar systems are used for hot water heating. A highly efficient evacuated tube system, known as Apricus or similar product, is used. The panel is mounted on the roof, the cylinder is within the house and water circulation is ensured by means

of a solar pump. This system is linked to the main electricity supply with a timer to ensure continuity, but minimises use of the main supply.

c. Estate Lighting

The street lighting system has been carefully designed, utilising fittings with the latest energy-efficient sodium lamps and efficient reflectors. The estate does not have high energy street lighting, but instead uses low height and low energy ambient lights, and then only when necessary. Lighting of the main entrance, street names at intersections and occasional low level lighting along the roadways exists. Not only is this appropriate for energy saving, but it is also important to limit the visual impact at night.

2.1.6.4 Solid Waste

Solid waste will be collected in refuse bins and a collection schedule will be organised with the City of Cape Town municipality. A refuse collection point will be situated near the entrance to Dassenberg.

2.1.6.5 Sewerage

Sewage flows resulting from the development will be small and can be accommodated in the existing and adjacent infrastructure. The existing sewer pipeline from the Silvermine retirement village area is located across the site. The sewer is a 150 mm diameter pipe in the steep regions of the site and increases to a 250 mm pipe in the flatter regions near the wetland. A five meter servitude will be registered over the pipeline where it crosses the site. A limited length of this pipe is proposed to be relocated to tie into the new layout. Maintenance of the existing sewerage infrastructure crossing the Dassenberg site has been identified as a problem. The site is heavily overgrown and blockages due to broken manholes cause regular sewage spills into the wetland. It is suggested that the

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development of the site will enable better control to be exerted over the state of the existing sewer where it is situated within the site boundaries.

2.2 Natural Environment

2.2.1 Topography and Geology

The site slopes from north to south with an average gradient of 1:6. Steeper slopes are dispersed throughout but occur mainly in an east-west belt through the middle of the site. There are sections of flatter gradients, especially around the lower wetland.

The slopes of the Dassenberg consist of thick-bedded quartzite of the Ordovician age Peninsula Formation. On the lower parts of the southern slopes of the Dassenberg are outcrops of ferricrete in the form of weathered ferruginised sands and gravels. These materials may range in age from late Miocene to Recent. The remnants of a once extensive dune field are encountered on the lower slopes.

2.2.2 Geohydrology

The Noordhoek Valley Basin has at least three locally distinct aquifers. The lower slopes of the Dassenberg do provide a potentially viable groundwater resource.

Streams / seeps

There are 3 seasonal streams / seeps that traverse the Dassenberg property:

- A seep system crosses the western edge of the property, comprising primarily wetland marsh habitat rather than a defined stream channel. The seep is heavily invaded by Kikuyu grass, but it also supports wetland plants such as arum lilies and watsonias. It appears that the seep is linked to a slightly more defined stream channel located above Ou Kaapse Weg.
- Stream 1 is located further to the east and is more of a defined channel that crosses the site between the two stretches of road (Ou Kaapse Weg) that form the northern and southern boundaries of the property. The stream channel is approximately 2 – 4m wide, flowing along a steep and fairly sandy bed, with several alien grass and shrub species along the banks. The stream drains the slopes of the Dassenberg outcrop. On the flatter slopes of the property, the stream occupies a fairly wide area, looking more like a marshy wetland, with numerous stream channels making its way through the marshy area.
- Stream 2 is a gully that transports a sewage pipe across the site. There are at least 2 separate gullies that run parallel

across the site – one on each side of the footpath. The gully to the west of the footpath is in fairly good condition, supporting various restio's and other indigenous plants. The gully to the east of the footpath has not been observed flowing, and seems to be less of a stream and more like an erosion gully, and is probably where the pipe is located. The western "branch" of Stream 2 flows as a clearly defined channel through the less disturbed northern section of the property, but then disappears into the aeolian sands that dominate the soil profile below the alien trees. There is no clear channel that conveys water from this system into the Loch Venus wetlands.

Loch Venus wetlands

The seasonal wetlands, part of the system known as the Sun Valley Wetlands, are located along the southern boundary of the study site. The wetlands are temporary coastal wetlands, providing diverse habitat for wetland flora and fauna, such as the Endangered Western Leopard Toad (*Bufo pantherinus*) and several species of bird.

Urban development, stormwater management and release of treated sewage effluent have heavily modified the general geological controls on wetlands in Sun Valley. It is considered that the Loch Venus wetlands were once typical of the seasonal seeps developed at the foot of fault bounded quartzite ridges in the South-West Cape. It now appears that water depths have increased and the standing water is a more perennial feature due to increased surface water inflows from urban catchments to the south and east. The water balance is thus a complex mixture of natural groundwater seepage, mountain run-off and surface water inflows from a variety of urban sources. The wetland appears to result from the seepage of water from the steeper slopes of the mountain, which, in winter, soon results in surface water due to the high water table in the valley. In summer, the surface waters of the wetland dry up and the area normally occupied by the wetland is grown over by *Paspalum vaginatum* (couch grass), and sedges such as *Cyperus* spp. (probably *textilis*) and *Hellmuthia membranacea*. The wetlands could be the source of stream flow for streams on the Noordhoek Valley floor. It has been noted that water flows from the Loch

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Venus wetlands both in the direction of Fish Hoek towards the Silvermine River system and also under Ou Kaapse Weg towards the Noordhoek wetlands.

The riparian zone of the wetlands is now severely invaded by alien tree species, while the wetlands themselves are full of various weedy species. The waters also support nuisance quantities of the alga *Cladophora* sp. The Loch Venus wetlands are considered to be of high conservation importance. Seasonal wetlands are one of the most threatened ecosystems in the City of Cape Town and thus efforts should be made to conserve them. The aquifers in the Noordhoek Valley are recharged, to some extent, by the seeps and streams that flow off the surrounding slopes. Any loss of seep or stream habitat, or condition, could interfere with the natural recharge of surface and subsurface water resources to groundwater.

In addition, if natural surface runoff is diverted away from houses on the site, this might interfere with subsurface drainage across the site.

2.2.3 Flora/Vegetation/Gardens

The vegetation patterns in the study area are complex, as it is a transition zone for a number of vegetation types, and these types all have a number of different names including: Peninsula Sandstone Fynbos, Hangklip Sand Fynbos and Cape Flats Dune Strandveld. Much of the site has alien vegetation infestations.

Cape Flats Dune Strandveld

This is the dominant natural vegetation type on the site currently covering about 30-40% of the site. Soils are typically deep, windblown alkaline sands of the Witzand formation, but in some cases are intermixed with more acidic sands, which have given rise to a transitional vegetation type with elements of both Sand Fynbos and Sandstone Fynbos. Large parts of this vegetation type on site have been heavily invaded by alien vegetation. Rehabilitation potential is low to moderate in all areas if alien removal is properly conducted. At least four rare species were recorded in this area. Cape Flats Dune Strandveld is severely threatened over large parts of its range and is regarded as an endangered vegetation type. Urbanization pressures on the Cape Flats are particularly severe, with ongoing loss of habitat. On the Cape Peninsula the vegetation type is now largely restricted to Cape of Good Hope NR (now part of TMNP), the Witsands

area, and the Noordhoek flats, with large areas having been lost in the Sun Valley – Fish Hoek area, and in the Hout Bay valley.

Peninsula Sandstone Fynbos

This very varied vegetation type is barely represented within the study area, occupying the slopes and summit of Skildersgatkop, most of which lies above the CPPNE boundary. Milkwoods are a legally protected species and may not be removed without the relevant permits. The lower part of this habitat grades into Cape Flats Dune Strandveld and Sand Fynbos and is an important ecotone. This area (within the CCPNE) has a high conservation value.

Hangklip Sand Fynbos

This is probably the most impacted of the vegetation types on site, as it would probably have occupied the bulk of the central and western part of the site, along with Dune Strandveld. No typical areas of Hangklip Sand Fynbos still occur on site. Disturbed areas and alien plants

Areas were usually disturbed by agricultural or ferricrete quarrying operations, illegal dumping and disturbance associated with putting in of a pipeline across the site. The property currently has a major problem with invasive alien plants. The disturbance associated with the development will provide ideal conditions for the invasion of alien plants, and this must be prevented. Residential gardens and landscaped areas may contain exotic species that easily invade into natural areas (e.g. the Loch Venus wetlands), thus out-competing indigenous species, and leading to a loss of diversity. It should be noted that the proponent has repeatedly been advised and requested to initiate alien clearing across the site and has failed to do so, in spite of legislation that requires landowners to clear invasive alien vegetation on their land. The Fynbos open space corridors will tend to transform over time to Coastal thicket due to the lack of periodic burning. This will result in the increase in the general vegetation height to 3m especially adjacent to the houses where watering will occur. This will tie in with the Riverine forest Mitigation planting and further limit the visual impact of the development.

2.2.4 Fauna/Wildlife/Pets

From a faunal perspective, the Dassenberg site has a moderate diversity at the habitat and landscape scales. This mosaic of habitat types contributes to the overall faunal

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richness and population dynamics on the site. At a local scale, this site serves as a sanctuary for many of the more sedentary species, i.e. those species that can maintain viable populations for consecutive generations in a relatively small area. The site also serves to accommodate some of the 'spill-over', from the adjacent TMNP, of the more mobile animal species (e.g. birds, bats, larger mammals). In addition, the removal of alien vegetation and re introduction of indigenous species may attract additional avifauna to the area. The obvious negative impact of most developments is the loss and fragmentation of the natural habitat. Most of these losses occur during the construction phase, but the system will continue to degrade if the overall layout does not adequately cater for the site-specific ecological dynamics. The development does not significantly compromise the long-term ecological viability of the site as the development footprint is limited and is set off against a patchwork of conservation areas, buffer zones and interlinking corridors, that serve to adequately accommodate most of the other vertebrate and invertebrate faunal groups.

Faunal corridors and the Western Leopard Toad

Macro-corridors: The establishment of adequate ecological corridors and natural open areas is the key to successfully combining a residential development with the long-term viability of the Dassenberg faunal communities, and particularly the Western Leopard (WL) Toad population. Corridors serve both as avenues along which toads can migrate seasonally, and as their main habitat which they frequent for the most of the year, i.e. their home-range which is utilised for shelter and feeding. It is thus important to keep in mind that it is not only the southern wetlands that are important for the Dassenberg WL Toad population, but much of the terrain to the north of the wetlands (i.e. the site of the proposed development) is also inhabited by the toads.

1. An important corridor extends along the western perimeter of Dassenberg, from the top of the Ou Kaapse Weg horseshoe bend down south-east to the wetlands on the southern perimeter. This corridor facilitates movements of WL Toads between the wetlands and their home-range to the north.

The clustering of erven makes provision for three gaps in the urban setting that will further facilitate the dispersal of toads northwards.

2. Three middle corridors extend north south across the Dassenberg site. These corridors are also important for linkage between the main wetland and the general home-range of the toads. However, a residential road breaks their continuity near the south-western limits of these corridors
3. The corridor at the eastern perimeter, feeding the eastward dispersals, is also crucial for the WL Toad population of Sun Valley, Fish Hoek and Clovelly. Care must be taken not to break this linkage.
4. Due to the dense Sun Valley residential complex already in existence at the southern perimeter of Dassenberg, there is unfortunately no scope for a corridor extending southwards of the wetlands. However, the area in between the wetlands and this residential zone must be kept undeveloped.

Micro-corridors: A special feature of the proposed Dassenberg development is the placement of spaces in between erven, rendering the whole estate permeable for toad migrations.

- 2.2.5 Archaeological and Heritage features
- The Archaeological Contracts Office found no significant archaeological resources sites on site. There are no heritage resources on the site. Heritage resources relate to the location of the site adjacent to the Table Mountain National Park (TMNP) and the role of Ou Kaapse Weg which bounds the site as an integral component of the metropolitan scenic route network. The nature of heritage impacts relates primarily to visual. When approached from the south, the role of the site is a gateway to the TMNP. Rather than functioning as a specific point of entry, the notion of a gateway is one that is experienced sequentially, as one moves up and away from the valley floor. The site thus functions as a buffer or transition zone between Sun Valley and its associated urban development and the TMNP to the north. Ou Kaapse Weg is a Scenic Drive and the route embraces and frames the site. Ou Kaapse Weg is a route of high scenic and historical significance. It also has high linkage value in terms of the role it plays in the metropolitan scenic drive network. It is one of the main routes through which tourists experience the high natural and scenic qualities of the TMNP

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when moving south to Cape Point.

2.2.6 Socio-Economic

There will be positive socio-economic impacts associated with the development in terms of increased job opportunities particularly with respect to maintenance contractors, domestic workers and garden services. A Black Economic Empowerment structure is to be formalized.

Development and long term maintenance of nature areas is to be funded by levies from HA, donations from sponsors and visiting groups and to be ploughed back into disadvantaged community via the Empowerment Trust structure. The development will also result in the expansion of the middle income residential property base in an area. There will be a reduction in informal settlements resulting in a reduction of potential fires in the area. Although the development will reduce the aesthetics and "rural" feel of the gateway to the TMNP, impacting on those who use the scenic route and reside in the surrounding community, screen plantings and design layout will reduce any negative visual impact. It is also proposed that the wetland area be developed with an educational centre.

2.3 Emergency Procedures

2.3.1 Fire

Many Fynbos systems are fire driven, and species diversity is maintained by fires at appropriate intervals. The vegetation found on most of the site would originally have been a mosaic of Cape Flats Dune Strandveld and various Fynbos elements. The former is a fire repellent/resistant habitat, and the latter elements require regular fire (once every ten to fifteen years). Increasing development and urbanisation within such an area is likely to mean a reduction in fires and a gradual transition to Strandveld and Thicket, at the expense of the Fynbos elements. This is not necessarily a bad thing, and is in fact advantageous for many organisms (including many birds and small mammals), but it is negative for species that are found only in Fynbos and that cannot survive in a pure Strandveld Thicket environment. Owing to the location of the site relative to the CPPNE and Table Mountain National Park, the risk of fires increases significantly considering fynbos is fire driven. Fire management and evacuation plans are essential to any development boarding on areas such as these.

2.3.2 Flooding

For a storm of 1:5 year recurrence, the in-

ternal stormwater system will be designed to accommodate the discharge generated from the development area into ponds. For a storm of 1:50 year recurrence, the run-off will eventually be discharged into the existing wetland, which will serve as a detention facility. No development will take place within the 1 in 100 year floodline.

3. DESCRIPTION OF PROPOSED RELEVANT MANAGEMENT ASPECTS

3.1 Residential Development

3.1.1 Location and Layout

Dassenberg borders onto the Table Mountain National Park, and thus a development needs to be 'soft' enough to be a type of transition between the TMNP and the residential developments currently in existence. All renovations of units must be monitored such that they comply with all mitigation requirements. Landscape work must be maintained and vegetation must not be removed

or pruned to negate the screening effect.

- A sense of nature should predominate with residential units being fragmented and set in a matrix of green. The development should merge with the natural landscape rather than being perceived to be imposed upon it. Particular attention should be paid to the landscaping framework to ensure that appropriate tree planting occurs and is maintained to absorb the development to as great an extent as possible.
- Green fingers have been established and should be maintained to avoid the possible adverse effect of residential "stacking" and to clearly indicate a natural merging with the TMNP to the north. Continuous bands of residential development along the contour at this interface have been avoided and green natural vegetation horizontally along contour lines must be encouraged. Such green bands should coincide with the steeper slopes to avoid the sense of residential units being perched above steep embankments and ridgelines.
- Tongues of planting must be maintained in the 5m strip of open space between each plot. Landscaping, i.e. indigenous shrub and tree planting belt, will effectively screen units from the scenic drive without interfering with the long view. Landscaping by way of berming and planting will help to mitigate against the visual impact but will not completely screen the development from view. Vegetation must not be removed or

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- pruned to negate screening effect.
- The proximity of homes to the riverine corridor will lead to an increase in disturbance in the form of noise, light, pets and physical disturbance from trampling. This can be mitigated against through the following measures:
 - Lights must be directed away from sensitive areas.
 - Residents should be encouraged to minimise trampling of the streams' beds and banks, and to minimise access to these areas by pets.
 - Fences should not be built across or through the streams or (if possible) the wetlands. The boundary fence should definitely not impede the flow of water between the ponds of that system. If fences must be constructed, these must allow for the free movement of the larger mammals that frequent natural areas.
 - Fences must be maintained and should not be constructed on the top of slopes where they will be seen in silhouette from the road but located less conspicuously below the skyline.
 - Views from existing scenic drives (Glencairn Expressway and Ou Kaapse Weg) should be protected. With regard to views from Ou Kaapse Weg, the following should apply:
 - A building line of 50m from the road reserve has been provided and must be maintained within which no development should be permitted.
 - Boundary treatments along this edge should be visually permeable.
 - All renovations of units must be monitored such that they comply with all mitigation requirements. Housing units are to conform to the building regulations for the development.
 - The road must have a colour of material that will reduce visibility thereof – i.e. the colour should be a darker shade of grey so that it blends into the landscape from a distance.
 - Visual impact and natural materials are the key elements governing architectural controls.
 - Environmental appropriateness should be the criteria rather than any specific architectural treatment, although a limited number of building types should be considered to avoid a cacophony of architectural styles. Contemporary architectural treatments should be encouraged. Traditional Cape Dutch or foreign imported styles should be avoided.
 - Houses will be controlled with a special emphasis on making the houses visually recessive, with dark roofs and earthy external finishes. Natural materials should be used wherever possible. Contrasting or bright colours for walls and roofs should be avoided. All materials and colours visible on the exterior of the buildings will be required to comply with a maximum allowable reflective index co-efficient. Wall colours – whether timber, masonry or natural stone will follow a similar colour range and once again the reflective index will be the benchmark to which all homeowners must comply. The colour range for roofs will be from charcoal to dark Grey/ Khaki and fibreglass re-inforced Asphalt shingles will be the preferred roof finish.
 - Large glass areas will require shading to prevent reflection and to modulate the vertical height scale. Large openings on north and west faces, such as sliding doors should be set back from the façade by at least 1, 5 meters or screened by verandas or pergolas. No front facing gables should be permitted.
 - Houses will take advantage of the sloping ground with a split-level form. Allowance is made for some developments and or renovations to occur either in an attic or basement in response to the sloping nature of the topography (refer to building guidelines in Appendix 1). The ground floor of any unit should not exceed 300m² excluding garages, carports and verandas. Accommodation in either an attic or basement should not exceed a third of this figure. Building heights should be limited to a maximum of 6m above Natural Ground Level (NGL) measured to the highest point of the roof structure for monopitched roofs and to the midpoint between ridgeline and eaves line for pitched roofs. Building on stilts or on high platforms is not permitted. Maximum size of units will be limited as follows: (See table over page

3.1.2 Staff

The HA is responsible for the enforcement of the OEMP. However, for any breach of the law beyond the parameters of the OEMP, the local law enforcement agents should be contacted. The HA is to meet at least once every three months or as required. Staff from less privileged areas

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Component	Maximum Size of Units :Single Dwellings			
	Types A1, A2, A3, C Semi-basement Unit	Type B Double Dwelling	Type D Loft Unit	Type E Single Storey Unit
Garage	50m ²	100m ²	50m ²	50m ²
Covered veranda ⁽¹⁾	50m ²	75m ²	50m ²	50m ²
Ground floor	250m ²	250m ²	250m ²	300m ²
“Semi basement” ⁽²⁾	100m ²	N/A	N/A	N/A
“Loft”	N/A	100m ²	100m ²	N/A

Notes: (1): 50% of the covered veranda may be enclosed.

(2): Additional basement area below ground floor will be permitted if it has no visible face i.e. is entirely buried.

could be trained in invasive alien vegetation removal and indigenous vegetation identification.

3.1.4 Access control, Security and Law enforcement

The HA is responsible for the security of the area and informing residents of security issues and maintenance of perimeter fencing.) Individual residents are responsible for their household security needs. For any breach of the law beyond the parameters of HA, the local law enforcement agents should be contacted. A law enforcement incident register should be implemented. Gardens are potentially suitable habitat for WL Toads and fencing around gardens must never form impenetrable barriers for the WL Toads. Internal fencing should be kept to a minimal. Solid walls around properties are entirely unsuitable for WL Toads. They prevent access to gardens, causing local extinction and fragmentation of toad populations. A solid wall, even if only higher than 20 cm, can be an impenetrable barrier to toads. However, railing and hedges are generally permeable. Fencing with a small mesh diameter is still suitable for juvenile toads, but adults are too big to pass through. A good example of a toad-friendly fence is wooden poles, integrated with a solid metal railing to cover both security and aesthetical considerations. A Security fence will be erected on boundary around the development. Regular site patrols/inspections by HA as well as law enforcement officials will control occupation of nature areas. The HA is responsible for correct and

routine maintenance of signage within Dassenberg. The HA is responsible to ensure the requirements of the OEMP are successfully implemented.

3.1.5 Infrastructure and Services

3.1.5.1 Roads and Access

A buffer of at least 50 m is provided and must be maintained all the way around the boundary with Ou Kaapse Weg to ensure that development is set well back from the road. Vegetation must be maintained to sustain the screening effect. There is some loss of habitat associated with the construction of access roads across the streams. The internal road system runs generally across the contours. Planting along these roads should be maintained to create tree clusters reminiscent of the kloofs on the mountain side. Alien clearing and maintenance program must be adhered to. Three central ecological corridors extend north-south across the Dassenberg site. These corridors are also important for linkage between the main wetland and the general home-range of the toads. However, a residential road breaks their continuity near the south-western limits of these corridors. Roads pose a threat to the WL toad and thus special modifications need to be incorporated into the road design

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so that toad mortalities can be limited or prevented:

- It is important to soften these breaks by directing toads to pass below the road where possible.
- Roads must be raised at strategic points, and be integrated with a series of culverts and drift-fences or low walls to direct toad movements, with no steep-sided pavements or guttering.
- The development team should consult with a specialist to come up with novel designs to be proactive in safeguarding WL Toads from road mortality. This initiative can then serve as a model for further developments of this nature. This must be a specific responsibility of the developer.
- A deep, steep-sided canal and gutter forms a barrier that hinders toad dispersal in an urban environment. Step-type guttering causes mass mortality of newly metamorphosed toad-lets, because they get trapped below when trying to disperse at night, and end up desiccating in the day. The shallow guttering presents no such problems.

Micro-corridors: A special feature of the Dassenberg development is the placement of spaces in between erven, rendering the whole estate permeable for toad migrations. These spaces or pathways must always be at least one metre in width, but wider will be better. These spaces must also be vegetated – a low shrub cover would be ideal. Collectively these path-ways would effectively serve as a fine-scale network of mini-corridors for toad migrations, and they would constitute suitable shelter and feeding grounds for the WL Toads.

An eradication programme for invasive alien vegetation must be implemented and adhered to with strict time frames.

The emphasis of such a programme should, however, be on invasive alien vegetation although the importance of

non-invasive exotic trees in local landscapes should be recognized. Maintenance of landscaping and invasive alien vegetation eradication must be at the expense of the Homeowners Association. Paths within the areas zoned “Open Space” and within the wetland area must be well defined. The paths should be constructed and maintained in such a manner so as to prevent erosion and degradation.

A regular maintenance scheduled must be adhered to. Levies paid by the Dassenberg homeowners will be disbursed for the maintenance and rehabilitation of paths, fencing, open space and wetland areas. Individual driveways for residential units are the responsibility of each individual owner.

3.1.5.2 Water

Stormwater management

The construction of hardened surfaces on the property will lead to an increase in the quantity of runoff flowing across the site. In addition, overflow from the detention ponds (such as during major storm events) will enter Loch Venus.

Any increase in stormwater exiting the site will have downstream impacts for Noordhoek Valley, if not adequately dealt with. The HA and ELC should encourage other conservation groups and residents organizations outside of Dassenberg to follow a similar storm water management plan as that of Dassenberg. As there is already development upstream of Dassenberg, the HA cannot be held solely responsible for any deterioration on water quality.

- Stormwater management must prevent an increase of flow into the wetlands. Stormwaters should be allowed to flow as sheet flow over gardens and other open spaces to assist with groundwater recharge, or in earth-lined or porous channels or permeable paving, rather than conveyed through pipes, concrete channels and culverts. This will allow for water retention and filtration of water into the ground for some cleaning of the water before it enters any retention or detention ponds.
- Surface water collection alongside the roads would contain a series of small linked open channels that feed into

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the retention ponds. This system would promote the watering of roadside landscaping where possible, as well as provide an overall delay in flow time to the retention ponds. The stormwater management as well as overall filtration of stormwater would be enhanced.

- Linear detention ponds will aid in the control of stormwater quality as will silt and litter traps that should be placed at various points on the stormwater system, where they can easily be maintained. The silt and litter traps must be cleared on a regular basis. Detention ponds can be placed within the stream corridors and wetland buffers (but not within 20m of Loch Venus). A monitoring and management program for the wetlands and streams on the site should be drafted by an appropriate specialist in order to ensure that these systems continue to function in an ecologically viable manner, or, preferably, improve in terms of their ecological "value". Such a program should form an appendix to the OEMP. This program must be compiled within six months of authorisation and be implemented once the operation phase begins.
- Retention ponds should be built on the lower contours of the site, allowing for the collection of water running across the sites. These ponds should be earth-lined structures, allowing some infiltration of water into the groundwater. Water can be conveyed from these ponds into the stormwater system, or into the Loch Venus wetlands once the quality reaches an acceptable level.
- Storm-water retention ponds should be developed for the additional benefit of providing breeding habitats for the WL Toad.
- Monitoring of the retention ponds and the wetland forms part of ongoing environmental management on site. Seasonal water quality measurements must be made and documented.
- The re-planting of indigenous plants and irradiation of invasive alien vegetation should be done in such a way that these plants encourage sheet flow of runoff across the open spaces, thus reducing the quantity and improving the quality of the runoff.

- Stormwater must be disposed of without causing soil saturation, erosion and sloughing. Stormwater should be conveyed into detention ponds that are earth-lined, thereby allowing settling out of sediments.
- Swimming pools can be a hazard for toads when they fall in without being able to get out again. Under these circumstances the toads usually drown. Pools must thus either be raised to prevent toad access, or the pools need to have overflow areas where toads can escape. Alternatively, devices can be placed in the pools to provide a means for climbing out.
- Measures must be implemented such that erosion is minimised during and after construction. Erosion protection measures and overland channels must be maintained and conform to the capacity of the existing downstream system. Suitable erosion control measures must be implemented in sensitive areas such as near water supply points and edges of slopes. These measures must include:
 - The suitable use of sandbags or Hessian sheets
 - The prompt rehabilitation of exposed soil areas with indigenous vegetation to ensure that soil is protected from the elements
 - The removal of vegetation, only as it becomes necessary for work to proceed
 - Prevent the unnecessary removal of vegetation especially on steep slopes
 - Annual inspections and maintenance of the erosion control and stability measures should be done by a suitably qualified individual at the expense of the residents.

3.1.5.3 Energy

The extent to which the HA can implement energy and lighting savings is largely determined during the design phase of the development. Energy saving devices and design aspects have been considered in the planning. Energy efficiency must be encouraged. This can be done through "energy saving tips" displayed at appropriate locations or pamphlets being distributed throughout the residential area. Low intensity

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light bulbs should be used. Use of electricity during off-peak periods should be encouraged. Energy efficient management systems should recommend switching off non-essential energy consumers when possible. These would include:

- Computers
- Televisions
- Heating systems (e.g. geysers, air conditioners, heaters)
- Unnecessary lights

Energy consumption should be monitored for the estate.

3.1.5.4 Solid Waste

Litter/refuse found on the site shall be disposed of in refuse bins. Frequency of collection will be determined by the Municipality. Refuse may not be burnt or buried on or near the site. Recycling and reusing materials must be encouraged. Waste separation is best conducted at source. Recycling will involve greater effort but offers the reward of environmentally sustainable practices and potential employment opportunities. The HA should establish what recycling facilities are available within the area and determine a recycling program that can support any community efforts already underway. Grass and garden cuttings should be collected on a "garden refuse collection day" and composted at a suitable location. All builders' rubble must be removed from site and disposed of in an appropriate manner and approved method. The contractor is responsible for the removal of the construction rubble and must supply the HA with a certificate indicating safe disposal of such rubble at the permitted waste disposal site.

3.1.5.5 Sewerage and Waste water

Maintenance of the existing sewerage infrastructure crossing the Dassenberg site has been identified as a problem. Although the pipeline will be repaired during construction, it must be monitored to ensure the site does not become heavily overgrown or blocked due to broken manholes resulting in sewage spills into the wetland. Existing pipes and manholes must be closely monitored and, where necessary, replaced. This will be especially evident in the wetland area where the existing pipe crossing is hidden amongst the wetland growth. The development will allow better access to the infrastructure for maintenance and will be more

adequately controlled due to the more secure environment within the site. Sewage and facilities must be maintained in a hygienic state and serviced regularly. It is recommended that any cleared areas be more than just hydroseeded, but utilise geojute or similar stabilization material. Wastewater must be disposed of in an appropriate manner – by entering the sewage system - to ensure no contamination or pollution to the surrounding areas and thus preventing any health or pollution risks. The reduction of water demand in the individual properties will reduce flows in the sewer reticulation. This will have an impact in the ultimate treatment of sewage whereby energy savings will apply at the waste water treatment works. Water wise actions and tips to reduce water consumption such as dual flush systems must be encouraged. Water saving tips should be displayed at appropriate locations. Low flush toilets, low flow taps etc will reduce the household water demands. These aspects can have a significant impact on the daily water requirements and peak flow in the bulk infrastructure. Water requirements could be reduced by up to 30%.

3.2 Natural Environment

3.2.1 Topography and Geohydrology

- Buffers must be maintained around the seep in the west of the site, the seep at the top of Stream 1 and the ecological corridor around Stream 2.
- The stream channels require no rehabilitation in terms of their physical profiles, but the banks could be shaped in places to a less steep gradient, allowing for the establishment of riparian plant species.
- The construction of artificial dams, for example as retention ponds to deal with the site's stormwater, may lead to successful colonisation by WL Toads as even small ponds can form suitable breeding habitat for WL Toads. This is a positive development that is likely to strengthen the long-term viability of the Dassenberg population.
- The southern natural wetland must remain undeveloped. No hardening of the catchment should take place within these buffer areas. In the case of the Loch Venus wetland, entry into an area of at least 20m from the edge of the wetland should not be allowed, in order

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to protect the wetland from human (and pets) disturbance. Structures such as boardwalks, pathways, bird-hides and benches can be placed in the remaining buffer area, but no hardened (i.e. impermeable) surfaces should be allowed.

- If cutoff drains are used to divert water, these must be shallower than 0.7m in order not to impede natural subsurface flow. This is important in order to allow continued natural recharge of the aquifers of the Noordhoek Valley.

3.2.3 Flora/Vegetation/Gardens

Landscaping and Private Gardens

Landscaping on all public and private land, including private residential gardens/balconies, should be with waterwise, locally indigenous plants. This should be encouraged and a plant list for use on the site should be compiled in consultation with the botanist and used by the landscaper and local homeowners.

Species on this list should be primarily locally indigenous species, plus a limited number of more widely indigenous species (from the southern and eastern Cape). If exotic species are used, they must be non-invasive species (i.e. not listed under the Conservation of Agricultural Resources Act Regulations). Although the soils are degraded on most of the site, some topsoil could be replaced and indigenous plants established. All soils and top material must be bought from a reliable source, and must be free of alien seeds or grass runners. The plant species list should be included as an appendix to the OEMP. This list must be compiled within two months or sooner of authorisation and be implemented once the operation phase begins. The gardens of erven are also potentially suitable habitat for WL Toads. The conservation plight of WL Toads must be brought to the attention of residents so that they can consider its micro-habitat requirements when cultivating their gardens as vegetation provides shelter and feeding grounds for the WL Toad. If the gardens can form part of the WL Toad's home-range, then the overall resilience of the Dassenberg WL Toad population will be hugely strengthened. Lawns should be kept to a minimum. No kikuyu shall be allowed on the site. Water schedules should reflect the need of the vegetation and be limited to early morning or in the evening.

Invasive Alien Vegetation

The removal of alien and invasive plant

species that have invaded the site will allow rehabilitation of the streams and wetlands, and the introduction of a more diverse community of plants within the stream corridors. Removal of the exotics is also likely to lead to more water flow in the streams.

Essential Mitigation:

- An alien invasive vegetation management plan must be drawn up. This must include guidelines for controlling all CARA listed alien invasives detailing the species that need to be removed (Acacia saligna, A. cyclops, Hakea drupacea and Eucalyptus species are the priority in terrestrial areas, with Schinus terebinthifolius and Acacia longifolia in the wetland areas) and how best to remove them. This should incorporate DWAF approved methodology, which refers to manual cutting of stems as low to the ground as possible, immediate (within 10 minutes) treating of cut stumps with approved, dye tinted herbicide, removal of any cut material to approved organic waste dump, and ongoing, annual follow up clearing of seedlings and resprouts. Herbicide spraying should not be allowed anywhere on site due to damage caused to non target species. Staff should be trained or provision of training to less advantaged locals in the use of herbicides, alien removal and methods of identifying indigenous species. Herbicide use to be closely monitored. Further methods to eradicate and manage alien invasive vegetation should also be identified. The proposed alien invasive management plan should form an appendix to the OEMP. This program must be compiled within six months of authorisation and be implemented once the operation phase begins.
- Where appropriate areas should be re-vegetated once alien removal has taken place using the approved indigenous mix of species found on the planting list. The alien vegetation clearing program continues after the reintroduction of indigenous vegetation. Known sensitive areas/features must be demarcated and access must be controlled/restricted especially in 'no-go' areas.
- An on-going method statement for alien vegetation removal and wetland maintenance (including riparian zones) must be developed. This must have

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strict time frames and a schedule to clear infested areas bi annually and monitor regrowth areas, following-up as required at the expense of the HA. Alien clearing is to be done on the entire site, with specific reference to the wetland. The emphasis of such a programme should, however, be on invasive alien vegetation although the importance of non-invasive exotic trees in local landscapes should be recognized. The spread of exotics must be monitored and prevented by the HA.

- No alien invasive vegetation (as per Conservation of Agricultural Resources Act (CARA) legislation) may be allowed anywhere on site, cultivated or grown on site, and all open spaces and private erven must be planted only with species on a planting list approved by the botanist. This is especially important given that the site is immediately adjacent to a National Park. These species should be primarily locally indigenous species, and should help contribute to reestablishment of the Dune Strandveld vegetation that used to occur on site. Invasive species that must not be used anywhere on site include:
 - *Pennisetum clandestinum* (kikuyu grass)
 - *Cortaderia* spp. (pampas grass)
 - *Schinus terebinthifolius* (Brazilian pepper tree) and
 - *Metrosideros excelsa* (New Zealand Christmas tree)
- The proponent must set aside sufficient long term funds in an Environmental Management Fund (EMF) that will allow for ongoing annual, alien clearing work on the site. Because initial costs will be relatively high, given the dense aliens on much of the site, the EMF will need to raise funds within the first two years of operation, with additional subsequent inputs. Alternatively, the applicant must capitalise the EMF with an initial amount and the remainder of the necessary funds for full EMF operation must be derived from HA levies once 25% of the erven are sold.

CPPNE: Cape Peninsula Protected Natural Area The 31ha upper portion of the property could either be ceded or donated to TMNP, or the applicant may choose to retain it, subject to certain very clear management requirements. If the property is ceded or donated to TMNP then the property should be managed in line with current TMNP Fynbos management

principles, which are based on generally accepted ecological best practice. Should the applicant prefer to retain ownership of the 31ha of land within the CPPNE then they must manage this area according to ecologically sound principles (as practiced by TMNP), including those outlined in this report (notably the need for annual invasive alien clearing operations and a controlled fire once every fifteen to twenty years, starting in autumn 2009 or 2010, (whichever is applicable in terms of the timing of any approvals). Finances for this ongoing management (actual management can be outsourced) should be provided by the applicant, should reside within an Environmental Management Fund (kept in a low risk fixed deposit or money market type account), and must be capitalised; escalating annually in line with inflation. The capital amount should ideally remain intact, with annual environmental management funding drawn only from accumulated interest, so that future operating expenses are not compromised by lack of capital. In some years the expenses will be more than others (such as years when fire needs to be managed).

3.2.4 Fauna/Wildlife/Pets

Fragmentation and loss of habitat cause fragmentation and reduction of faunal communities. This can result in the potential local extinction of rare species. For these reasons, it is very important that special attention be given to the finer details of planning and managing, especially for the WL Toad population. It is required that relevant consultants be tasked to draft a management plan, with details of structural modifications, specifically to conserve the WL Toad on site. The details of the development are as important as the large-scale layout designs.

- Fences should not be built across or through the streams or (if possible) the wetlands. If fences must be constructed, these must allow for the free movement of the larger mammals that frequent natural areas.
- The boundary of the property that traverses the Loch Venus wetlands should not be marked by any impermeable structures, but should be designed to allow movement of fauna through the entire wetland system.
- The critical period when development operations may negatively influence the toads, particularly in the close vicinity of

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wetlands, is July to December.

Migrations of adults to wetlands usually start about early July, with the breeding peak being in August to early September. Thereafter the emergence and dispersal of juveniles usually occur during October to December. At such times, construction sites must be fenced with low temporary fencing. Workers on site must be informed about the toads and instructed to move individuals from the development nodes to neighbouring natural areas in close proximity.

- On rainy nights between July and October special signs to be placed along roads to inform drivers of toads crossing roads.
- The Homeowners Association of Dassenberg must advocate the plight of the WL Toad so that residents and visitors can act responsibly in this regard. This can be in the form of road-side notices, and interpretive displays along the wetland boardwalk or bird-hide. The proximity of homes to the riverine corridor will lead to an increase in disturbance in the form of pets and physical disturbance from trampling. This can be mitigated against through the following measures:
 - Pets may be kept by residents but should not be allowed in the wetland and other “no-go” areas.
 - Pets must be controlled and kept on a leash when being exercised.
 - In the case of the Loch Venus wetland, entry into an area of at least 20m from the edge of the wetland should not be allowed, in order to protect the wetland from human (and pets) disturbance.
 - Residents should be encouraged to minimise trampling of the streams’ beds and banks, and to minimise access to these areas by pets.
 - There is to be no harming or feeding of fauna or avifauna. Fauna and avifauna may become present within the wetland. Fish are not to be stocked in the wetland. Any identified “no-go” areas must be adhered to.

- 3.2.5 Archaeological and Heritage Features
Views from existing scenic drives are protected. This refers to views from both the Glencairn Expressway and Ou Kaapse Weg. With regard to the former, the possible adverse effect of residential “stacking” has been avoided by maintaining bands of green natural vegetation horizontally along the contour

lines wherever possible. Such green bands coincide with the steeper slopes to avoid the sense of residential units being perched above steep embankments.

3.2.6 Socio-Cultural

Where possible employment of local people should be used. The area has been highlighted to potentially increase job opportunities. For example gardeners and housekeepers should be employed from less privileged areas as well as employment through recycling programmes and alien clearing.

3.3 Emergency Procedures

3.3.1 Fire

Controlled fires are not seen as feasible anywhere on site below the uppermost houses, but it is essential that a fire management plan be instituted for all areas above the houses (including the portion within the CPPNE), as this area is in urgent need of a fire, and should be burned in autumn (March) once every ten to fifteen years. Firebreaks just above the upper erf level should be bushcut annually (manually, and not by tractor and bossieslaner) in November, but should not be ploughed or ripped, as this disturbs the soil and causes species loss. Suggested width is 8 to 10m. The fire hydrants and fire hoses must be clearly visible. They should be inspected regularly to ensure that they are in working order, and any of the fire fighting equipment that is not in good working order should be repaired or replaced immediately. The HA is responsible for the installation and inspection of extinguishers as well as taking control in the event of an evacuation. “Safe areas” within the development should be identified. Emergency numbers, maps indicating locations of fire hydrants and evacuation plans should be displayed at key entrances/exits to the development.

3.3.2 Flooding

No development is allowed below the 1:100 year flood line.

4. MONITORING AND REPORTING

4.1 Homeowners Association (HA)

The Homeowners Association (HA) must be formed prior to commencement of the Operational Phase of the EMP. All homeowners within the Dassenberg must be kept up to date with the Homeowners Association (HA) and adhere to their rules and regulations. The Homeowners Association may form the Environmental Liaison Committee (ELC) to facilitate the implementation of the OEMP. If the ELC is formed, many of the responsibilities of the Homeowners Association

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may be delegated to the ELC. The ELC should consist of at the very least the following:

- Representative(s) of the homeowners within Dassenberg; and
- Representative of the local authority; and
- If agreed by the above mentioned parties other members, who may include an external Environmental Control Officer (ECO) or representatives from community based organisations such as rate payers associations or environmental groups such as TMNP. The HA or ELC is responsible for ensuring the OEMP is adhered to and amended as necessary. The HA or ELC must review proposed changes to the OEMP prior to the changes being presented to the authorizing agents; and the HA or ELC will review and advise on penalties for transgression of the OEMP.

4.2 Monitoring and Reporting

A contractual agreement must be drawn up between the individual home owner and the HA, binding them to the relevant conditions of authorisation and the OEMP. Communication channels need to be established between the HA, ELC, and City of Cape Town Municipality to ensure all stakeholders are kept informed about the implementation of the OEMP.

A schedule for the review of the OEMP should be established by the HA or ELC. The OEMP must be kept on site at all times and is applicable to all parties operating on the site. In addition DEA&DP should monitor compliance with all Conditions of Approval.

Audits of the OEMP implementation should be undertaken on a regular basis. Internal audits could be done on six-month basis with an external audit conducted by an independent consultant on an annual basis. All recommendations and mitigation measures proposed/suggested in the specialist reports produced during the EIA process must be considered in the audit report.

It is recommended that the HA meet on an annual basis to review the effectiveness of the OEMP implementation and make any necessary amendments. The annual meeting must review maintenance procedures as set out in the OEMP, with particular reference to alien clearance and wetland maintenance. A verbal environmental report including the invasive alien clearing and wetland and stream programs, report of emergency equipment maintenance, law enforcement incident register, issues raised by the public and corrective action that has been taken will be discussed. Minutes will be taken to document the issues discussed and agreed upon.

4.3 Non – Conformance and Disputes

Issues of non - conformance must be noted by the HA so appropriate action can be taken with corrective actions (penalties) enforced where

necessary. These shall be agreed upon collectively. Penalties enforced will be paid to a fund for the maintenance of the wetland including invasive alien removal programs. Any disputes or disagreements between role players on site with regards to the environmental management or OEMP specifications will firstly be referred to the HA. For any breach of the law beyond the parameters of the OEMP, the local law enforcement agents are contacted. Any complaint from the public and interested and affected parties regarding this project must be addressed to the Municipality or HA as appropriate.

The proponent must set aside sufficient long term funds in an Environmental Management Fund (EMF) that will fund all environmental management required in terms of the OEMP (including but not limited to ongoing alien clearing, fire management, bush clearing, etc). Because initial costs will be relatively high, given the dense aliens on much of the site, the EMF will need to raise funds within the first two years of operation, with additional subsequent inputs. Alternatively, the applicant must capitalise the EMF with an initial amount and the remainder of the necessary funds for full EMF operation must be derived from HA levies once 25% of the erven are sold.