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1. INTRODUCTION

This Construction Environmental Management Plan (EMP) has been compiled for the proposed development of a residential estate on Portion 7 of the farm Dassenberg no. 940, Noordhoek. The total area of the property is approximately 78, 7 ha and is bounded by Sun Valley and Hazel wood to the south, whilst Ou Kaapse Weg forms the northern and western boundaries. The Table Mountain National Park forms the eastern boundary and also extends around the northern part of the site. The competent authority, Department of Environmental Affairs and Development Planning request a Construction Environment Management Plan for the above development. Doug Jeffery Environmental Consultants (Pty) Ltd have been appointed by Dassenberg Property Development Trust (Pty) Ltd to compile the Construction EMP. As the management will differ considerably with the different alternatives that have been proposed, one management plan cannot be developed to manage different development scenarios. This plan is therefore focused on the preferred alternative.

1.1. BACKGROUND

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, District H: South Peninsula Region. To the north of the site lies the Cape Peninsula Protected Natural Environment (CPPNE) and its boundary runs through the north-eastern section of the site, dividing the property into two portions. Land above this boundary line has been identified as a natural environment worthy of protection and development may not occur on this land. 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.

1.2. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)
 The National Environmental Management Act,

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1998 (Act No. 107 of 1998) (NEMA) makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs and Tourism (DEAT). These powers are delegated in the Western Cape to the Department of Environmental Affairs and Development Planning (DEA&DP). According to the regulations of Section 24(5) of NEMA, authorisation is required for the following Government Notice R386 listed activities: 1k The construction of facilities or infrastructure, including associated structures or infrastructure, for – the bulk transportation of sewage and water, including storm water, in pipelines with – (i) an internal diameter of 0,36 metres or more; or (ii) a peak throughput of 120 litres per second or more. 12 The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). 15 The construction of a road that is wider than 4 metres or that has a reserve wider than 6metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long. 16 The transformation of undeveloped, vacant or derelict land to – (a) establish infill development covering an area of 5 hectares or more, but less than 20 hectares; or (b) residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare. 18 The subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less. According to the regulations of Section 24(5) of NEMA, authorisation is required for the following Government Notice R387 listed activities: 2 Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.

1.3. AIMS OF THIS DOCUMENT

The purpose of this Construction EMP is to ensure that the impacts of the construction phase of the project on the environment are kept to a minimum. This includes ensuring that the mitigation measures described in the Specialists Reports and the Environmental Impact Report (EIR) are implemented, to ensure continued monitoring of the construction phase as well as construction of houses and to ensure the involvement of interested and affected parties (I&APs) in a meaningful way.

1.4. STATUS OF THIS DOCUMENT

The Environmental Plan forms part of the Contract Document. The plan must be read in conjunction with the contract documents including the Specifications and where applicable, the Bill of Quantities. Where a conflict exists between the Specifications and Bill of Quantities and the Environmental Management Plan the matter shall be brought to the attention of the client/client's representative for resolution. The rates quoted for each activity in the Bill of Quantities shall include for compliance with the Environmental Management Plan. No separate item shall be priced in the bill for compliance with the Environmental Management Plan. The acceptance of the draft CEMP by the Department of Environmental Affairs and Development Planning will confer a legal obligation to comply with the specifications of the CEMP on the developer. This CEMP includes all relevant documentation contained or referred to within it, along with any amendments or annexures to this document. Any substantial changes, updates or upgrades to the CEMP must be communicated to the Directorate within 14 days of such changes, updates or upgrades being made to the CEMP by the applicant.

2. DESIGN CONSIDERATIONS

This section highlights several environmental constraints and/or recommendations that were identified during the Environmental Process that need to be incorporated into the detailed design of the works or otherwise before commencement of construction. The developer is to incorporate water and energy saving measures such as low flow shower heads, dual flush toilets, external lighting must be kept to a minimum, use of low energy light bulbs.

2.1 BUFFERS

Appropriate buffers between seasonal wetlands, dunes and streams and the residential units must be established in consultation with a suitably qualified ecological specialist prior to the commencement of activities. In addition, no hardening of the catchment in the established buffer areas must take place.

2.2 BOTANICAL

All areas outside the approved development footprints must be fenced off before installation of bulk services and roads. These areas must carry signs that these are No Go areas. No dumping of sand or any material may occur in the No Go areas.

2.3 FRESHWATER

Pathways and access roads must be routed around the wetlands and with minimum disturbance of the streams. Stream crossings must be raised above the stream bed and banks rather than allowing trucks to pass through the stream channel. No development may take place

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within the 1:100year flood line. Sensitive areas must be demarcated prior to construction and no access allowed through them. Construction activities and pathways must avoid the streams and wetlands. Any crossings over streams or wetlands, and the design of fences that might cross over natural areas, must also seek ecological advice. Fencing must not impede water flow or themovement of fauna and flora across the site. Stormwater must bedirected into detention pond(s) and not directly into the streams or wetlands. These ponds must be unlined to allow for some polishing of water quality before the water exits the site.

2.4 VISUAL

On average, a 5 meter strip should be provided between all erven, except the double units in the group housing area on the lower slopes adjacent to the wetland, to allow for screen planting to minimize visual impact. Protect the average 5m wide strip between units by fencing before construction commences. The units adjacent to the larger drainage course in the mid – west section, will be visible from the scenic route below, south of, the site. Landscaping by way of berming and planting will help to mitigate these but will not completely screen them from view, as are those below the road. The Landscaping and berming must be done before the operational phase commences. The road width must be on average 5 meters and colour of material 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. Landscaping, as per plan provided by the Landscape Architects, indicates extensive tree and shrub planting to visually enclose the units and roads. This must be done as soon as the roads and services are installed in those areas between units allowed for such and alongside the road.

2.5 HERITAGE

With regard to views from Ou Kaapse Weg, the following must apply:
A building line of 50m must be established from the road reserve within which no development may be permitted. Boundary treatments along this edge must be visually permeable. When the road is in a cutting, the embankments must be made to appear as natural as possible. Fences may 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. Consideration must be given to the following to enhance the aesthetic appearance of the route: The preservation of the natural environment; the promotion of a sense of fit with the immediate landscape adjacent to the route; the provision of a natural roadside appearance through the appropriate use of natural materials

and street furniture; and the planting of vegetation appropriate to the locality. The adoption of curvilinear profiles rather than steep sided slopes and squared shoulders. Building forms must be limited in massing and height, particularly in the high visibility zones identified in the Visual Impact Assessment (VIA). Contemporary architectural treatments must be encouraged. Traditional Cape Dutch or foreign imported styles must be avoided. No front facing gables may be permitted. Natural materials must be used wherever possible. Contrasting or bright colours for walls and roofs must be avoided. Environmental appropriateness must be the criteria rather than any specific architectural treatment. Particular attention must be paid to thelandscaping framework to ensure that appropriate tree planting occurs, to absorb the development to as great an extent as possible. Building heights must be limited to 6m above natural ground level measured to the highest point of the roof structure for monopitched roofs and to the midpoint between ridge line and eaves line for pitched roofs. Building on stilts or on high platforms may not be permitted. A limited number of building types may be considered to avoid a cacophony of architecturalstyles. Buildings should be predominantly single storey but allowance could be made for some developments to occur either in an attic or basement in response to the sloping nature of the topography. The ground floor of any unit may not exceed 300m² excluding garages, carports and verandahs. Accommodation in either an attic or basement may not exceed a third of this figure. The design manual proposed must prescribe materials and building forms but allow for a degree of design flexibility for individual purchasers. Views from existing scenic drives must be 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” must be avoided by providing bands of green natural vegetation horizontally along the contour lines wherever possible. Such green bands should coincide with the steeper slopes to avoid the sense of residential units being perched above steep embankments.

2.6 FAUNA

Special care must be taken between the months of July to December when the Western Leopard Toads begin there migrations. A suitably qualified ecologist must be appointed during (preferably prior to) the construction phase to monitor the safekeeping of the Western Leopard Toad (*Amietophrynus pantherinus*) and to determine the Existing corridors which are to remain in situ or the establishment of other suitable corridors for the local Faunal communities. The establishment of adequate

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ecological corridors and natural open areas serve as avenues along which the Western Leopard Toad can migrate seasonally. The streams and the wetland are important for the migration of the Western Leopard Toad, and other aquatic and semiaquatic fauna, as well as act as a refuge. It is important that these areas are protected and no access by site staff be allowed. At the design stage to pools, fences, stormwater retention ponds consideration must also be given to the local small fauna (WL toads ect.). Special modifications must be incorporated into the road design so that toad mortalities can be limited. 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.

A consulting group (ecologist, ER, engineer and architect) must be formed 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. Should any toads be found during the construction period they must be moved to neighbouring natural areas in close proximity. Linkage to the areas lying west of Dassenberg still requires further planning. Ideally, several nodes should be established along the western perimeter (i.e. Ou Kaapse Weg) that would allow for safe movements of WL Toads between Dassenberg and areas to the west. The most important of these nodes is the linkage between the southern wetlands and the area immediately adjacent to the west. The current linkage is in the form of a culvert, but it needs to be improved to maximise functionality. Modifications should include widening or increasing culverts, and the erection of low walls that will direct or funnel toads towards this safe underpass. Any modifications to OU Kaapse Weg is the responsibility of the Municipality.

2.7 SOCIO ECONOMIC

Services are to be installed to Municipal standards and capital contributions to be paid to the Municipality. The size and standard of housing to be developed must be equal or better than adjacent properties. The site will be inspected on a regular basis and all illegal occupants will be removed immediately. Contractors must be encouraged to employ locally available labourers. Support for local businesses must be encouraged.

2.8 TRAFFIC

Access to the proposed development will be via a security controlled access road on Ou Kaapse Weg. This access will be situated 370m north of the intersection of Noordhoek Road with Ou Kaapse Weg. Turning lanes are proposed on Ou Kaapse Weg to accommodate traffic turning into the development and reduce the impact on north-

bound and southbound through traffic.

The taper rate and turn lane for the northbound traffic will be 60km/h while the deceleration lane for the southbound traffic will be 90km/h. A single entrance lane widening to two boom controlled lanes is proposed at the entrance to Dassenberg. Separate left and right turn lanes will be provided exiting the development.

2.9 ROADS

Roads will generally follow the ground slope. Cut and fill slopes will be retained within the road reserve areas. The grade of the road will take cognizance of the landscaping proposals so that where cut and fill slopes are necessary the landscaping will be accommodated as well.

3 GENERAL REQUIREMENTS

3.1 EMP ADMINISTRATION

Copies of this EMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document.

3.2 ROLES AND RESPONSIBILITIES

The implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase.

3.2.1 Department of Environmental Affairs and Development Planning

The Department of Environmental Affairs and Development Planning is the designated authority responsible for authorising the development and approvals. This Directorate has overall responsibility for ensuring that the applicant Dassenberg Property Development Trust (Pty) Ltd complies with the conditions of its Environmental Authorisation as well as this EMP.

3.2.2 Employer: Dassenberg Property Development Trust (Pty) Ltd Under South African environmental legislation, the Applicant / Employer is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. Dassenberg Property Development Trust (Pty) Ltd as the Applicant / Employer therefore has overall environmental responsibility to ensure that the implementation of this EMP complies with the relevant legislation and the conditions of the Environmental Authorisation (EA).

3.2.3 Employer's Representative (ER)

The Employer's Representative (ER) would act as the Employer's on-site implementing agent and has the responsibility to ensure that the Employer's

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responsibilities are executed in compliance with relevant legislation and the EA. Any on-site decisions/inputs regarding environmental management are ultimately the responsibility of the ER. The on-site ER shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:

- Ensuring that the necessary environmental authorisations and permits have been obtained.
- Reviewing and approving the Contractor's method statements with input from the ECO (see 3.2.4 below) where necessary.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO.
- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Issuing fines for transgressions of site rules and penalties for contravention of the EMP.
- Providing input into the ECO's ongoing internal review of the EMP, which is submitted as a report to the Employer.

3.2.4 Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) will be an independent environmental consultant appointed by the client/developer to act as the client's representative to monitor and review the on-site environmental management and implementation of this EMP by the Contractor. The ECO will be appointed at least two weeks prior to the commencement of activities on site.

The ECO's duties will include the following:

- Assisting the ER in ensuring that the necessary environmental authorisations and permits have been obtained.
- Maintaining open and direct lines of communication between the ER, Employer, Contractor and the public with regard to environmental matters.
- Appointing specialists (botanists, freshwater specialists, etc.) as required to advise the Engineer/Client.
- Reporting on environmental issues at construction site meetings.
- Training of all construction staff, including day workers, as to the requirements for working on the site.
- Reviewing and approving the Contractor's construction method statements together with the ER.
- Regular site inspections of all construction areas with regard to compliance with the EMP.
- Monitoring and verifying adherence to the

EMP, the EA and approved method statements at all times, monitoring and verifying that environmental impacts are kept to a minimum. Taking appropriate action if the specifications are not followed.

- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ER).
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP (via the ER).
- Auditing the implementation of the EMP and compliance with the EA on a monthly basis.
- Undertaking a continual review of the EMP and recommending additions and/or changes to the document to the directorate.
- Compiling a final audit report regarding the EMP and its implementation during the construction period after completion of the contract and submitting this report to the Employer and the competent authority before the contractor leaves site.
- A revised audit report must be compiled and submitted to the Employer and competent authority 6 months after the completion of the construction phase should it be necessary.

3.2.5 Contractor's Designated Environmental Officer (DEO)

The Contractor refers to the team appointed by the Employer to undertake the construction activities for the Dassenberg Residential Development. The appointed Contractor will be required to appoint a competent individual as the Contractor's on-site Designated Environmental Officer (DEO). The DEO must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management to all personnel involved in the contract. The DEO will be responsible for overseeing the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to. The DEO will be responsible for keeping detailed records of all site activities that may pertain to the environment (in the form

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of a site book). This includes:

- Daily site inspections.
- Supervision of work where environmental management is a key aspect (e.g. in sensitive areas, with high environmental risk, etc.).
- Communicating with and providing information to the ECO.
- Completing start-up, weekly, monthly and temporary site-closure checklists
- Keeping a photographic record of progress on site from an environmental perspective.
- Keeping a register of complaints in the site office and recording and dealing with any community comments or issues.
- Keeping a record of on-site incidents and accidents and how these were dealt with.

3.2.6 Organisational structure

Details of the organisational structure are presented in Figure 1. The structure illustrates the reporting procedures for stakeholders in the implementation of this EMP.

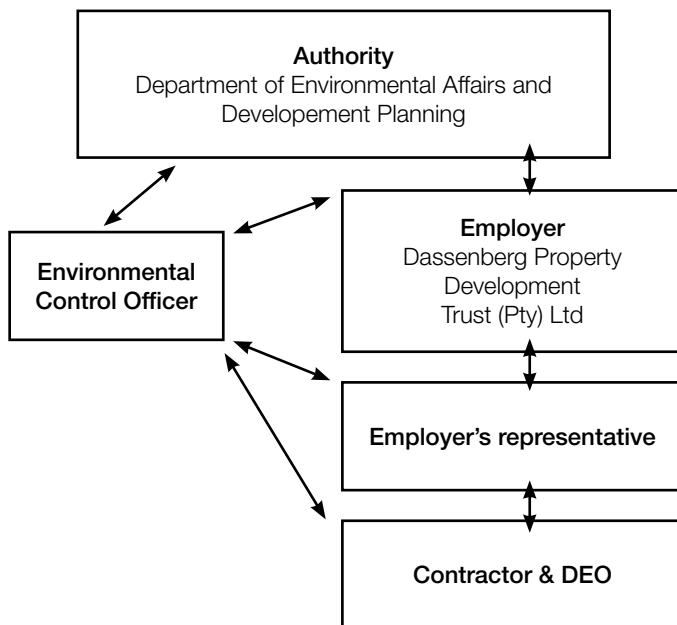


Figure 1: EMP implementation organisational structure.

3.3 ENVIRONMENTAL AWARENESS TRAINING

The ECO in consultation with the contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMP. The presentation shall be conducted, as far as is possible, in the employees' language of choice. As a minimum, training should include:

- Explanation of the importance of complying with the EMP.
- Discussion of the potential environmental

impactsof construction activities.

- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMP and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the EMP. The contractor/DEO shall keep records of all environmental training sessions, including names, dates and the information presented.

3.4 COMMUNITY RELATIONS

The Contractor shall erect and maintain information boards in the position, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer. The contractor shall also keep a "Complaints Register" on site. The register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself, how the complaint was remedied.

3.5 METHOD STATEMENTS

Method statements are written submissions by the Contractor to the ER in response to the requirements of this EMP or to a request by the ER. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects. The Contractor shall not commence the activity for which a method statement is required until the ER has approved the relevant method statement. Method statements must be submitted at least five (5) days prior to the date on which approval is required (start of the activity). Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost. The method statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site.
- Start date and duration of the procedure.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.

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- Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
- Compliance / non-compliance with the EMP Specification and motivation if noncompliant.

Method statements required:

Based on the specifications in this EMP, the following method statements are required as a minimum: (more method statements may be requested as required)

- MS1: Site clearing/Protection of Sensitive Areas (4.2)
- MS2: Site layout and establishment (4.3.1)
- MS3: Hazardous substances (5.2.4)
- MS4: Cement and concrete batching (for each operation) (5.2.5)
- MS5: Traffic accommodation (5.3)
- MS6: Solid waste control system (5.4.1)
- MS7: Wastewater control system (5.4.3)
- MS8: Erosion remediation and stabilisation (5.7.1).
- MS9: Fire control and emergency procedures (7.1)
- MS10: Petroleum, chemical, armful and hazardous materials (7.2)
- MS11: Alien vegetation-clearing programme (9)
- MS12: Vegetation rehabilitation plan (10)

4 SITE ESTABLISHMENT

4.1 DEMARCATION OF THE SITE

The "site" here refers to all areas required for construction purposes. All areas outside the approved footprints as well as the 5m wide strips between erven must be fenced off before installation of bulk services and roads. These areas must carry signs that these areas are no go areas. The boundary of the site will be agreed with the ER and ECO. The Contractor shall demarcate the boundaries of the site in order to restrict his construction activities within the site. The method of demarcating the boundaries shall be determined by the Contractor and agreed to by the ER prior to any work being undertaken. The Contractor shall maintain the demarcation line and ensure that materials used for construction on the site do not blow on or move outside the site and environs. The boundaries of the site shall be demarcated prior to any work commencing on the site. The site boundary demarcation fence shall be removed when the site is disestablished. The Contractor shall ensure that all his plant, labour and materials remain within the boundaries of the site. No dumping or storage of building material may occur outside the designated building footprint area. No sand may be piled within 10m of any sensitive area. It will be the responsibility of the Contractor to decide on an appropriate system of protective fencing for the site.

4.2 SITE CLEARING

MS1: The Civil Contractor shall submit a site clearing method statement for all areas where the Contractor is required to, or intends to, clear vegetation within the development footprint. The method statement shall clearly indicate chainage or land references and shall detail all areas, no go areas, streams and wetlands that will be cordoned off, etc. It must also explain where and how the cleared material will be stored and disposed of. This must be approved and a site inspection undertaken prior to land clearing to ensure that it has been followed. All alien vegetation for clearing must be removed before any other clearing is to take place. The civil contractor must consult a botanist to ensure this has been done before any other clearing commences.

4.2.1 Vegetation clearing

No vegetation clearing shall take place without written approval of the method statement by the ER. No vegetation clearing shall take place until all conservation areas/no – go areas are clearly fenced off with two-strand wire fencing in addition to coloured (painted red) corner posts. Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material and alien vegetation is removed from the area to be cleared. Vegetation clearing shall take place in a phase manner in order to retain vegetation cover for as long as possible. All indigenous plant material removed from cleared areas and that will not be transplanted shall be stockpiled for mulching. Alien vegetation may be used for mulching if it is not in seed, this must be overseen by the ECO. All remaining vegetation shall be removed and disposed of at the nearby organic waste site near Heron Park.

4.2.2 Topsoil

The Contractor shall remove topsoil from all areas where topsoil will be impacted on by construction activities, including temporary activities such as storage and stockpiling, etc. Stripped topsoil shall be stockpiled in areas agreed with the ER for later use in revegetation and shall be adequately protected. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. The upper 300mm of the soil horizon must be removed by mechanical means and stored separately. Topsoil stockpiles shall be convex and no more than 2 m high. Stockpiles shall be shaped so that no surface water ponding can take place. No stockpile may be placed within 50m of

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any stream or wetland. Topsoil stockpiles shall be protected from erosion by wind and rain by providing suitable stormwater and cut off drains and/or by establishing suitable temporary vegetation. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank. Topsoil stockpiles shall not be subject to compaction greater than 1500 kg/m² and shall not be pushed by a bulldozer for more than 50m. Topsoil stockpiles shall be monitored regularly to identify any alien plants, which shall be removed when they germinate to prevent contamination of the seed bank. Before topsoil is to be re-used the stockpiles shall be analysed by a suitably qualified landscape contractor / horticulturist and, if necessary, upgraded before use. Any topsoil contaminated by hazardous substances shall not be used but shall be disposed of at a permitted hazardous landfill site such as Vissershok, or at an approved hazardous waste disposal facility. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the approved method statements and the requirements of this EMP.

4.3 MANAGEMENT OF SITE FACILITIES

The construction, layout and extent of the construction site and its components shall be planned, designed and managed in such a manner that environmental impacts are minimised. Temporary structures and facilities shall be decommissioned to the satisfaction of the ER and clean up after construction shall be effectively undertaken.

4.3.1 Site layout and establishment

The Contractor shall establish construction camps, offices, workshops, testing facilities, stockpiling areas, staff accommodation etc. in a manner that does not adversely affect the environment. The construction area shall be kept to a minimum. Site establishment shall not take place on steep slopes or at sites declared as no-go areas (see 4.3.2 below). The site layout shall take cognisance of access for deliveries and services. Likely disturbance to neighbours as well as security implications shall be considered. Turning circles for construction vehicles must be clearly demarcated and controlled to prevent damage of the natural environment. Pathways and access roads must be routed around streams and wetlands. Any stream crossings must be raised above the stream bed and

banks instead of allowing trucks to pass through the channel. Before construction can begin, the Contractor shall submit to the ER for approval a method statement detailing:

MS2: A layout plan and the method of establishment of the construction camp, i.e. all offices, accommodation facilities, testing facilities / laboratories, cement batching areas, storage & stockpiling areas, workshops and all other areas/ facilities required for the undertaking of activities required for completion of the project. The plan shall include the location and layout of waste storage and treatment facilities, ablution facilities, stockpiling, spoil areas and hazardous material storage areas. None of these areas must be placed within 50m of any stream, wetland or no go area. The demolition and removal of these facilities on completion of construction works shall also be detailed. The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified. The Contractor shall ensure that the approved construction area will be adequate to cover the project without further space adjustments being required at a later date. Construction material (pipes and fittings) must be stored in areas designated by the site agent and in a neat and orderly manner and must not damage natural vegetation. Movement of pipes and other construction materials from stored areas to the construction site must be carefully transported to the area of use to prevent any damage to the natural vegetation.

4.3.2 No-go areas

Areas where construction activities (including traffic accommodation) are prohibited are referred to as no-go areas. Entry into these areas by any person, vehicle or equipment without the ER's written permission will result in a penalty. All declared no-go areas will be demarcated by temporary fencing (4.3.3) the position of which shall be agreed to by the ER and ECO, in consultation with a Botanist/ Freshwater specialist. The following is a list of preliminary no go areas:

- Wetland and streams
 - All areas outside the development foot print are considered no go areas and are sensitive.
 - 5m wide strips between erven must be fenced off and no access be allowed
- All private property outside of the

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construction areas as set out in the site layout plan shall be considered no-go areas. The ER may declare additional no-go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO, Freshwater Specialist and/or Botanist. Demarcation materials (fencing, signage, etc.) shall not be moved or removed at any stage of the project without the written consent of the ER.

4.3.3 Temporary fencing

The Contractor shall erect temporary fencing along the perimeter of designated no-go areas. Temporary fencing shall, as a minimum, consist of wooden or metal posts (painted red) at 3m intervals, with two plain wire strands tensioned horizontally at heights of 300 mm and

5 CONTROL OF CONSTRUCTION ACTIVITIES

5.1 WORKSHOP, EQUIPMENT AND STORAGE

All vehicles and equipment shall be kept in good working order to maximise efficiency and minimise pollution. All maintenance and refuelling of plant on site shall take place at designated locations approved by the ER. All areas (as far as possible) where machinery is located and used must be bunded to prevent pollution entering the streams. The Contractor shall ensure that no contamination of soil or vegetation occurs around workshops and plant maintenance facilities. Where practical, all maintenance of plant and equipment on site shall be performed in the workshop. If it is necessary to do maintenance outside of the workshop area, the contractor shall obtain the approval of the Engineer prior to commencing activities. All machinery servicing areas/ workshop shall have an impermeable surface, which is bunded and sloped towards an oil trap to contain any spillages. Drip trays shall be used to collect used oil, lubricants, etc. during maintenance. Drip trays shall be provided for all stationary plant, generators, pumps and compressors. Drip trays shall be inspected and emptied daily and closely monitored during rain events to ensure that they do not overflow. All static plant (stationary > 6 months) shall be located within a bunded area with an impermeable surface. Washing of equipment shall be restricted to urgent maintenance requirements only. Adequate wastewater collection facilities shall be provided (5.4.3). The use of detergents for washing shall be restricted to low phosphate and nitrate concentration as well as being a low sudsing type detergent.

5.1.1 General aesthetics

The Contractor shall ensure that the type and colour of roofing and cladding materials of any new buildings and

structures constructed as part of the project are selected to reduce reflection and blend with the natural environment. No stockpiles may exceed 6 meters. Roads must be finished in dark grey or similar coloured material for the surface so that it blends in with the fynbos and other planted vegetation. The Contractor shall not deface, paint, damage or mark any natural feature (e.g. rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand with the ER. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the ER.

A building line of 50 m must be established from the road reserve of Ou Kaapse Weg within which no development may be permitted. All construction areas must be kept neat and tidy at all times. Different materials and equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. Lighting must be minimal and cause the least visual impact at night. No light sources, internal or external, should be directly visible. All sources must be shielded so that only the area that needs to be lit is lit. Lighting at the entrance structure must be by means of shielded down lighters with only the security area being lit. No neon or backlit signage is to be allowed. All lighting must be directed away from sensitive areas.

5.2 MATERIALS HANDLING, USE AND STORAGE

The potential environmental impact of the handling, use, storage and disposal of materials used during construction shall be minimised.

5.2.1 General

Environmental considerations shall be taken into account in the siting of any material storage areas. All manufactured and/or imported material shall be stored within the Contractor's Camp, and if required out of the rain. All lay down areas outside of the Contractor's Camp must be approved by the ECO and included in the Site Establishment Plan.

5.2.2 Transportation

The Contractor shall ensure that all suppliers and their delivery drivers are aware of procedures and restrictions (e.g. no-go areas) in terms of this EMP. The contractor shall ensure that delivery personnel are supervised during offloading by someone with an adequate understanding of the requirements of the specifications. Material shall be appropriately secured to ensure safe passage between destinations during

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transportation. Loads shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. All access roads must be routed around the stream and wetland areas. Should stream crossings be necessary they must be raised above the stream bed and banks rather than allowing trucks to pass through the stream channel.

5.2.3 Stockpiling

Should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the ER for his approval (MS2), together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage. The areas must be approved by the ECO as well as the Botanist should they fall outside the development footprint. No sand/spoil may be stored within 50m of any stream or wetland. All sand piles must be fenced off with shade cloth screening to reduce windblown sand effects and must be staked down at the sides to prevent sand blowing into sensitive areas. Stockpiles shall be positioned and sloped to create the least visual impact. A height restriction of 2m may be implemented should the stockpile a visual impact. No stockpiling of materials that could leach out and cause pollution may occur. Stockpiling must be confined within the road reserves except where specific additional areas may be required, and then these areas are to be located on land that will be used for construction later. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be reinstated to the satisfaction of the ER and ECO.

5.2.4 Hazardous substances

All hazardous material / substances (e.g. petrochemicals, oils, etc.) shall be stored on site only under controlled conditions. All hazardous material / substances shall be stored in a secured, appointed area that is fenced and has restricted entry. All storage shall take place using suitable containers to the approval of the ER.

Hazard signs/data sheets indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Symbolic safety

signs depicting "No Smoking", No Naked Lights" and "Danger" are to be provided, and are to conform to the requirements of SABS 1186. Fuel shall be stored in a steel tank supplied and maintained by the fuel suppliers. The tank shall be located in a secure, demarcated area and an adequate bund wall (110% of volume) shall be provided. The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled / leaked fuel into the soil. The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. The sump must have a lock off valve that can only be opened in an emergency. A bioremedial product approved by the ECO must be stored on site and near the fuel stores for any emergencies. Areas for storage of fuels and other flammable materials shall comply with standard firesafety regulations and may require the approval of fire prevention officer. The contractor must ensure that there is adequate fire fighting equipment at the fuel stores and that persons are adequately trained to use this equipment. Only empty and externally clean drums may be stored on the bare ground. All empty and externally dirty drums shall be sealed and stored in the bunded area. If fuel is dispensed from 200l drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use.

MS3: The Contractor shall provide a method statement detailing the hazardous substances / material that are to be used during construction, as well as the storage, handling, and disposal procedures for each substance / material and emergency procedures in the event of misuse or spillage that might negatively affect people or the environment.

5.2.5 Cement and concrete batching

Cement and concrete are highly toxic to plants and animals and should only be mixed or stored in approved areas away from any sensitive areas, and only in areas that are part of the final construction sites (i.e. within the final building footprints) and must preferably be at least 100m from any wetlands or seepage areas. Concrete mixing directly on the ground shall not be allowed and shall take place on impermeable surfaces to the satisfaction of the ER. The concrete batching activities shall be

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located in an area of low environmental sensitivity to be identified and approved by the ER. Cement is a strong alkali and will seriously affect the natural vegetation on the site should contamination of the soils take place. Such residues are to be removed from the site at the end of the contract period. All runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the ER. Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented. Unused cement bags shall be stored out of the rain where runoff won't affect it. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent wind blown cement dust and water contamination. Used cement bags shall not be used for any other purpose and shall be disposed of on a weekly basis via the solid waste management system (5). All excess concrete shall be removed from site on completion of concrete works and disposed of. Washing of the excess into the ground is not allowed. All excess aggregate shall also be removed. MS4: The Contractor shall submit a method statement detailing cement storage, concrete batching areas and methods, method of transport of cement and concrete, storage and disposal of used cement bags, etc. for each concrete batching operation.

5.3 TRAFFIC ACCOMMODATION

The Contractor shall be required to ensure that traffic along public roads is accommodated at all times and construction activities do not interfere with the public road system. Access to all the sites must be along the road reserves. The creation of short-cut paths or temporary vehicular tracks is to be strictly prevented. Construction workers are to be forbidden access to any conservation areas. All access roads must be routed around streams and wetlands. Turning circles for construction vehicles must be clearly demarcated and controlled to prevent damage of the natural environment.

MS5: The Contractor shall submit a method statement for approval, detailing how traffic is to be accommodated within the development during construction. Cognisance must be taken of no-go areas within the development.

5.4 WASTE MANAGEMENT

Waste management on site shall be strictly controlled and monitored. Only approved waste dis-

posal methods shall be allowed. The Contractor shall ensure that all site personnel are instructed in the proper disposal of all waste. The contractor will as far as possible consider the philosophy of reduce, reuse and recycle when managing waste.

5.4.1 Solid waste

The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the Contractor shall provide litterbins, containers and refuse collection facilities for later disposal. Solid waste may be temporarily stored on site in a designated area approved by the ER prior to collection and disposal. Solid waste must be removed on a weekly basis to a licensed waste disposal site. Recyclable waste must be recycled. Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter. No burning, on-site burying or dumping of waste shall occur. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent wind blown cement dust and water contamination. Used cement bags shall not be used for any other purpose and shall be disposed of on a weekly basis via the solid waste management system. All solid waste shall be disposed of off site at an approved landfill site. The Contractor shall supply the ER with certificates of disposal.

MS6: The Contractor shall submit a method statement detailing a solid waste control system (storage, provision of bins, site clean-up schedule, bin clean-out schedule, etc.) to the ER for approval.

5.4.1.1 Domestic waste

The Contractor shall provide metal refuse bins to BS 792 or equivalent plastic refuse bins, all with lids, for all buildings. Refuse shall be collected and removed from all facilities at least twice per week. Domestic waste shall be transported to the approved refuse disposal site in covered containers or trucks.

5.4.1.2 Construction rubble/waste

Inert construction rubble shall be disposed of at a site approved by the ER in consultation with the ECO.

5.4.1.3 Scrap metal

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Options for the recycling of scrap metal must be investigated. Scrap metal shall be disposed of off site.

5.4.2 Hazardous waste

All hazardous waste (including bitumen, etc.) shall be disposed of at a Department of Environmental Affairs and Tourism approved hazardous landfill site. The Contractor shall provide disposal certificates to the ER. Used oil and grease shall be removed from site and sold to an approved used oil recycling company. Under no circumstances shall the spoiling of tar or bituminous products on the site, over embankments, or any burying, be allowed. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant. Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at a DEAT approved hazardous waste site.

5.4.3 Wastewater

The ER's approval shall be required prior to the discharge of contaminated water into sewer systems. Water from kitchens, showers, laboratories, sinks etc. shall be discharged into a conservancy tank for removal from the site. Runoff from fuel depots / workshops / machinery washing areas and concrete batching areas shall be collected into a conservancy tank and disposed of at a site approved by the ER. Water that is pumped out of excavations must be directed into a settlement pond first before being allowed to flow across the bare ground. No runoff may enter any wetland, seepage area or stream.

MS7: The Contractor shall submit a method statement to the ER detailing how wastewater would be collected from all wastewater generating areas, as well as storage and disposal methods. If the Contractor intends to carry out any on-site wastewater treatment, this should also be included.

5.5 NOISE CONTROL

The Contractor shall endeavour to keep noise generating activities to a minimum. The Contractor shall restrict all operations that result in undue noise disturbance to local communities and/or dwellings to daylight hours on weekdays or as otherwise agreed with the ER. The Contractor shall warn any local communities and/or residents that could be disturbed by noise generating

activities such as blasting well in advance and shall keep such activities to a minimum. The Contractor shall be responsible for compliance with the relevant legislation (Environmental Conservation Act, No. 73 of 1989) with respect to noise.

5.6 DUST CONTROL

The Contractor shall ensure that the generation of dust is minimised and shall implement a dust control programme to maintain a safe working environment, minimise nuisance for surrounding residential areas / dwellings and protect damage to natural vegetation. Construction vehicles shall comply with speed limits and haul distances shall be minimised. Material loads shall be suitably covered and secured during transportation. During high wind conditions, the ER will evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or weather working will cease altogether until the wind speed drops to an acceptable level.

Exposed soil and material stockpiles shall be protected against wind erosion and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors. The Contractor shall implement dust suppression measures (e.g. water spray vehicles, covering of material stockpiles, chemical soil binders etc.) if and when required.

Consideration and provision shall be made for the following methods (or combination thereof): brush cut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.).

5.7 SOIL EROSION AND SEDIMENTATION CONTROL

5.7.1 During construction

The Contractor shall, as an ongoing exercise, implement erosion and sedimentation control measures to the satisfaction of the ER. During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc. The use of water on the site (especially at concrete batching plants and access road construction where large water bowsers are used) must be carefully monitored to ensure that the start of erosion on steep slopes does not take hold. Any runnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition. Any excavations for bulk services on slopes

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steeper than 1:4 should where possible, takeplace at right angles to the slope to avoid having to cut a 'road' into the slope. Any excavations into the slope by mechanical means will need to be temporarily shored up to prevent slumping. Such shoring can take the form of untreated wooden boards pegged into the slope. The necessary compaction of the replaced sand over the trench and disturbed slope must be undertaken. The brushwood removed from the excavation should be replaced over the disturbed area to prevent wind and water erosion and facilitate the rehabilitation process. The temporary shoring can be left in place, which will eventually rot and be absorbed into the soil. Care must be taken to minimise cut and fill and any slopes must be immediately rehabilitated with indigenous plant material. Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ER. Consideration and provision shall be made for the following methods (or combination thereof): brushcut packing, mulch or chip cover, straw stabilising, watering, planting/ sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.). Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ER. In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and revegetation should commence as soon as possible.

MS8: The Contractor shall submit a method statement to the ER detailing how soil erosion and sedimentation control will be implemented, methods to be used and rehabilitation of disturbed areas.

5.8 STORMWATER CONTROL MEASURES

The contractor shall take reasonable measures to control the erosive effects of stormwater runoff. The contractor shall use silt screens to prevent overland flowing water from causing erosion. Surface flow must be accommodated and not be impeded by construction activities. Water must be allowed to flow through pipes and diversions. The road must slope towards the cut slope where stormwater channels must be installed to remove stormwater at regular intervals. Point source discharge of stormwater must be

prevented on the steeper slopes as this will lead to erosion of the unstable slope with loss of vegetation and resultant deep donga erosion. The use of straw bale/ cleared indigenous vegetation as filters, which are placed across the flow of overland stormwater flows, shall be used as an erosion protection measures. The ploughing-in of straw offers limited protection against stormwater runoff-induced erosion and shall be used as an erosion protection measure. The Contractor shall be liable for any damage to downstream property caused by the diversion of overland stormwater flows. Storm water from the construction site may not flow directly into the streams and wetlands. Drip trays shall be used for all pumps, generators, etc. in order to prevent water contamination as a result of fuel spills or leaks.

6. PROTECTION OF NATURAL FEATURES AND SYSTEMS

6.1 PROTECTION OF NATURAL VEGETATION

The Contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction site as a result of their activities. Clearing of natural vegetation shall be kept to a minimum. The removal, damage and disturbance of natural vegetation without the written approval of the ER is prohibited. All no go areas, areas outside the approved development footprints as well as a 5m strip between units must be fenced off prior to construction. All trees that are to be maintained must be clearly demarcated prior to any machinery moving onto site. Machinery operators and contractors should be briefed about the constraints before commencing work on site.

6.2 PROTECTION OF FAUNA

The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place. The establishment of adequate ecological corridors and natural open areas serve as avenues along which the Western Leopard Toad can migrate seasonally. The streams and the wetland are important for the migration of the Western Leopard Toad, and other aquatic and semi-aquatic fauna, as well as act as a refuge. It is important that these areas are protected and no access by site staff be allowed. Special modifications must be incorporated into the road design so that toad mortalities can be limited. 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. Please see section 2.6. Should any toads be found during the construction period they must be moved to neighbouring natural areas in close proximity.

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The feeding of any wild animals is prohibited.
The use of pesticides is prohibited unless approved by the ER. No animals/livestock may be kept by construction workers on site.
Drainage structures (e.g. gutters, drains, sumps, ditches) must be designed so that they do not act as pitfall traps for small creatures i.e. they should either have gently sloping edges or be adequately covered to prevent creatures from falling into them.

6.3 PROTECTION OF HERITAGE AND CULTURAL FEATURES

If any archaeological remains (including but not limited to fossil bones and fossil shells, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts and bone remains, structures and other built features, rock art and rock engravings) are discovered during construction they must immediately be reported to HWC and must not be disturbed further until the necessary approval has been obtained from HWC. If any graves or unmarked human burials are discovered, they must be treated with respect and the South African Heritage Resources Agency (SAHRA) must be notified immediately and the burials must not be disturbed further until the necessary approval has been obtained from SAHRA. An archaeologist must be contacted to remove the remains at the expense of the developer.

6.4 PROTECTION OF WETLANDS AND STREAMS

All building materials must be stored at least 50m from any stream or wetland. The areas must be bunded appropriately such that there will be no runoff from these areas towards the sensitive ecosystems. Any water pumped from excavations or the construction site must be pumped into a settlement pond/ area first and not directly into a natural ecosystem. Construction activities that impact directly on the streams or wetlands (e.g. building of roads over the streams, landscaping of gardens) should take place during the dry season, to reduce the risks of contamination of the fresh-water ecosystems through rainfall, runoff and erosion. Stream crossings must be raised above the stream bed and banks rather than allowing trucks to pass through the stream channel. Unnecessary excavations and infilling of the stream corridors and wetland areas (unless associated with rehabilitation) must be avoided. All means of diverting flow (sandbags, pipes) must be removed from the streams when no longer required. Any crossings over streams or wetlands, and the design of fences that might cross over natural areas, must seek ecological advice. Fencing must not impede water flow or the movement of fauna and flora across the site.

7 EMERGENCY PROCEDURES

7.1 FIRE CONTROL

The Contractor shall take all reasonable steps to avoid increasing the risk of fire through activities on site. The Contractor shall ensure that basic fire-fighting equipment is available at all construction areas and facilities. Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. A fire extinguisher of the appropriate type must be present when welding or other "hot" activities are undertaken. In terms of the Atmospheric Pollution Act, burning is not permitted as a disposal method. The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire.

MS9: The Contractor shall submit a fire control and fire emergency method statement to the ER for approval. The method statement shall detail the procedures to be followed in the event of a fire and the name of the appointed fire officer.

Any work that requires the use of fire may only take place at a designated area approved by the ER and must be supervised at all times.

Fire-fighting equipment shall be available.

7.2 PETROLEUM, CHEMICAL, HARMFUL AND HAZARDOUS MATERIALS

The contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the engineer and ECO. The Contractor shall ensure that the necessary materials (e.g. chemcap, spill-sorb, drizzat pads, enrettech and peat moss) and equipment for dealing with spills and leaks are available on Site at all times.

The source of the spillage shall be isolated.

The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, sawdust or absorbent materials. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer and ECO.

MS10 The Contractor shall be responsible for establishing an emergency procedure for dealing with spills of release of these substances. He shall also ensure that the relevant construction personnel are familiar with these emergency procedures. The Contractor shall submit his emergency procedure to the ER prior to bringing on site any such substances. All spills or accidents involving such materials are to be recorded.

The clean up of spills and any damage caused by the spill shall be for the Contractor's account.

The Occupational Health and Safety Act 85 of 1993 requirements shall be adhered to.

Telephone numbers of emergency services,

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including the local fire fighting service, shall be displayed conspicuously in the Contractor's office near a telephone. No firearms are permitted on site. The Contractor shall ensure that contact details of the local medical services are available to the relevant construction personnel prior to commencing work.

8 SITE CLEAN UP AND REHABILITATION

8.1 SITE CLEAN UP

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction activities are removed upon completion of the project. The Contractor shall clear and clean the construction site to the satisfaction of the ER upon completion of the project.

8.2 REHABILITATION

The contractor will undertake all rehabilitation of areas disturbed as a result of activities on site. Expenses incurred in rehabilitating the site shall be for the Contractor's account. The estimated cost of rehabilitation will be provided to the Contractor prior to the work commencing.

9. ALIEN VEGETATION CLEARING PROGRAMME

GENERAL REQUIREMENTS

MS11: The Contractor shall refer to DWAF's Working for Water guidelines in compiling and implementing an alien vegetation clearing programme (AVCP), which shall indicate eradication areas, vegetation types, method of eradication and an order of priority for all the actions to be undertaken. The AVCP shall be submitted to the ER for approval. Local labour must be used for this programme and can be discussed in the community forum. The AVCP shall comprise specifications on the biological, mechanical, and chemical control methods as required for the management of alien species. The applicant must set up a long term Environmental Management Fund that will allow for the ongoing annual, alien clearing work on the site. The AVCP shall provide for short, medium and long-term eradication and maintenance programs for this project. The program shall include the following three phases:

1. Initial control (reduction of existing population).
2. Follow-up control (control of seedlings, etc. after initial eradication).
3. Maintenance control (longer term monitoring and eradication of alien vegetation in areas that have been cleared) for the duration of the contract period.

The Contractor shall ensure that cognisance is taken of the possibility of fire hazard, spread of alien vegetation seeds released when mature vegetation is chopped down. The AVCP should also include the safe, effective disposal of removed vegetation. This is particularly important in terms of stormwater management.

GENERAL ERADICATION GUIDELINES

Alien invasive species noted on site include Hakea

drupacea, Hakea sericea, Paraserianthes lophantha, Schinus terebinthifolius, Acacia cyclops, Acacia mearnsii, Acacia saligna and Leptospermum leavigatum. Initial clearing should take place prior to and during the construction phase and must be completed prior to the final handover of the construction phase. Alien clearing should be undertaken only by properly equipped and trained clearing teams. All alien trees must be cut at no higher than 100mm above the surface of the ground. Seedlings can be hand pulled, and saplings up to a diameter of 30mm at the base can be cut with loppers. Trees larger than this should be cut with a chainsaw. Rooikrans are often multi-stemmed; care should be taken to ensure that all stems of the plant are cut. As all the invasive species on site may occasionally coppice, it is necessary to apply appropriate dye treated herbicide to the cut stumps within 5 minutes of cutting. This should be done with a sponge, brush or small hand held spray bottle. Failure to do this will result in the plants potentially resprouting. Alien clearing should not take place in the rain or when rain is imminent, as rain will wash off the herbicides. All alien vegetation within the development footprint shall be cleared. If any alien vegetation clearing is required within no-go areas, this shall not take place without the written approval of the ER and shall be undertaken under supervision of the ECO. Special care shall be taken to protect indigenous vegetation in no-go areas from trampling. Vehicle driven brush cutting, grading and bulldozing will not be permitted for alien clearing. Eradication must start in the least infected areas and from highest lying areas. Follow up clearing will be addressed in the Operational Management Plan.

10. VEGETATION REHABILITATION

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MS12: The Contractor shall appoint a suitably experienced landscaping contractor /horticulturist to compile a vegetation rehabilitation plan that shall detail seed mixing, seeding methods, planting and vegetation establishment in all construction areas. The Contractor shall submit the vegetation rehabilitation plan to the ER for approval. The landscaping contractor / horticulturist shall be familiar with Dune Strandveld vegetation and his/her appointment must be approved by the ER. The landscaping plan must incorporate ecologically sound rehabilitation guidelines for all disturbed areas and gardens, it must focus on using locally indigenous Fynbos and Strandveld species. The landscaper must work closely with the Botanist to compile a list of usable species. The vegetation rehabilitation plan shall include the following:

- Handling of plant material rescued (translocation areas, propagation, etc.);
- Topsoil, mulch, fertiliser and soil stabiliser requirements and application;
- Landscaping and revegetation methods for each area, i.e. hydroseeding / hydromulching, planting, including locations and timing;
- Procurement requirements and a list of species of

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- plants to be procured, if any;
- Vegetation establishment and maintenance requirements (irrigation, etc.) for all revegetated areas; and
- The use of any herbicides, pesticides and other poisonous substances, if required.

GENERAL

All areas disturbed by construction activities, storage and stockpiling areas, etc. shall be rehabilitated to the satisfaction of the ER. Re-vegetation and landscaping may only make use of locally found indigenous vegetation. Re-vegetation of construction areas shall take place as soon as possible after completion of construction works. The timing of revegetation shall take cognisance of maintenance requirements and provision shall be made for any irrigation requirements.

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been revegetated.

MULCH

Mulch shall be used in all areas where revegetation has to take place. Mulch shall be obtained from all areas where vegetation is cleared, after removal of alien vegetation and search and rescue of conservation-worthy species. Mulch shall as far as possible be free of seed of alien species. It may be necessary to hand pull germinating alien seedlings from mulch. Plant material shall be reduced by either mechanical means (chipper) or by hand-axing to pieces no longer than 50mm.

No harvesting of vegetation for mulching outside of the construction areas shall be allowed. Every effort shall be taken to ensure the retention of as much seed as possible in mulch made from indigenous vegetation.

Bush-cut mulch shall be stored for as short a time-period as possible, and seed released from stockpiles shall be collected for use in revegetation. Compost from an organic source (Reliance compost) may be used as mulch during revegetation, but must be approved by the ER. Compost shall be well decayed, friable and free from weed seeds. Seed free, half-composted material, such as mulled-bark, may be used as an additive to extend indigenous mulch. No more than 50% compost shall be used under these circumstances. Wood chips (including bark), which are half composted and have not been treated with preservatives can also be used as mulch during revegetation. Wood chips may be obtained from alien and indigenous species removed during site clearing of construction areas. If alien material is used then the seed bearing branches must be separated and removed beforehand. Chips shall be no longer than 50 mm in length or breadth and the ER shall approve the source of the chips.

FERTILISER

The use, storage and handling of fertiliser shall be strictly controlled. There must be a minimum use of fertiliser on the site. Only organic fertilisers and sprays shall be used on site. (E.g. Bio grow products) Fertilisers shall be suitably stored in sealed containers in areas approved by the ER. Care shall be taken when using fertilisers near no-go areas, watercourses and other sensitive

natural areas. No fertilisers may be used within 50m of any watercourses or wetlands. Soil shall be well watered and moist before any fertiliser is applied.

LANDSCAPING AND GROUND

SURFACE PREPARATION

Prior to revegetation, the Contractor shall ensure that the area is clear of any building materials and other foreign debris. All visible weeds shall be removed from the area before replacing topsoil. Compacted soil shall be ripped along the contour and hand-trimmed. Topsoil shall then be spread evenly over the surface. The final prepared ground surface shall be furrowed to follow the natural contours of the land and not smooth.

HYDROSEEDING / HYDROMULCHING

The hydroseeder shall be capable of pumping the specified seed mix, fertiliser, soil stabiliser, etc. at the specified rates over the areas to be seeded, according to the approved method statement. The hydroseeder shall have an agitation system, which shall be sufficient to agitate, suspend and homogeneously mix the specified slurry. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with hydraulic spray nozzles suitable for the even distribution of the slurry on the various slopes to be seeded.

PLANTS / TREES

The handling, maintenance and planting of plants / trees shall be undertaken under supervision of the appointed landscape architect / horticulturist. The Contractor shall ensure that each plant / tree is handled and packed in the approved manner for that species or variety, and that all necessary precautions are taken to ensure that the plants arrive on site in a proper condition for successful growth. Plants shall be protected from wind during transportation. No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase. The Contractor shall ensure that the plants are in a good condition and free from plant diseases and pests. The Contractor shall immediately remove plants containing any diseases and/ or pests from site. All plants supplied by the Contractor shall be healthy, well formed, and well rooted. Roots shall not show any evidence of having been restricted or deformed at any time. The potting materials used shall be weed free. There shall be sufficient topsoil around each plant to prevent desiccation of the root system.

TIMING

Revegetation of disturbed construction areas shall take place as soon as possible after construction work is completed. As far as possible, revegetation shall take place at the start of the winter rains to maximise water availability and minimise the need for watering. If revegetation takes place during the dry season, irrigation of planted areas will be necessary.

ESTABLISHMENT OF VEGETATION

Irrigation

The Contractor shall be responsible for maintaining the desired level of irrigation necessary

DRAFT CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

to maintain vigorous and healthy growth, as advised by the appointed landscaping contractor / horticulturist. Water used for the irrigation of revegetated areas shall be free of chlorine and other pollutants that will have a detrimental effect on the plants. Where hydroseeding was undertaken, the commencement of watering may be postponed until seeds have germinated and growth begins. Where an irrigation system is required, the Contractor shall be responsible for its installation prior to seeding or planting. The Contractor shall supply all required water as well as all equipment as required by the approved method statement. Every effort shall be made to avoid irrigation overspray into no-go areas and other areas with natural vegetation.

WEED, DISEASE AND PEST CONTROL

The Contractor shall be responsible for ensuring that all revegetated areas remains free of all alien and indigenous weed species during the contract and establishment period. Weeding, removal methods and storage of this material shall be undertaken in such a manner that prevents the re-infestation of the cleaned areas. All dead plant material shall be removed immediately as it may become a fire hazard.

The Contractor shall ensure that all plants are disease and pest free. Any methods used to control any diseases and/or pests, including the use of herbicides and pesticides, must be approved by the ER.

11. NON-COMPLIANCE PROCEDURES

The Contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty. In the event of non-compliance the following recommended process shall be followed:

The ER shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.

The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice. The Contractor shall provide the ER with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.

In the case of the Contractor failing to remedy the situation within the predetermined time frame, the ER shall impose a monetary penalty based on the conditions of contract. In the case of non-compliance giving rise to physical environmental damage or destruction, the ER shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so. In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be

referred to specialists for determination. The ER shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

OFFENCES AND PENALTIES

Any avoidable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty.

Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas;
- Catching and killing of wild animals;
- Unauthorised damage to natural vegetation;
- Unauthorised camp establishment (including stockpiling, storage, etc.);
- Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage;
- Ablution facilities: non-use, insufficient facilities, insufficient maintenance;
- Late method statements or failure to submit method statements;
- Insufficient solid waste management (including clean-up of litter, unauthorised dumping etc);
- Erosion due to negligence / non-performance;
- Excessive cement / concrete spillage / contamination;
- Insufficient fire control and unauthorised fires;
- Non-induction of staff.

A list of indicative penalty fines is provided in Annexure 2.

ANNEXURE 2: INDICATIVE LIST OF PENALTIES FINES

ANNEXURE 2: INDICATIVE LIST OF PENALTIES FINES

Fines will be issued for the transgressions listed below. Fines may be issued per incident at the discretion of the ER and to a maximum as indicated below. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specifications. The ER will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract. The money will be donated to an environmental organisation nominated by the ER. In this particular development Table Mountain National Park should be considered. Fines for the activities detailed below, will be imposed by the ER on the Contractor and/or his Subcontractors.

- A Any persons, vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a "no-go" area R4,000
- B Any vehicle driving in excess of designated speed limits R1,000
- C Any vehicle being driven, and items of plant or materials being parked or stored outside the demarcated boundaries of the site R2,000
- D Persons walking outside the demarcated boundaries of the site R 500
- E Persons collecting firewood outside the demarcated boundaries of the site R 50
- F Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling such as the use of a funnel rather than a pump R3,000
- G Litter on site R1,000
- H Deliberate lighting of illegal fires on site R5,000
- I The eating of meals on site outside the defined eating area. Individual not making use of the site ablution facilities R1,000
- J Dust or excess noise on or emanating from site R1,000
- K Any person, vehicle, item of plant, or any thing related to the Contractors operations causing a public nuisance R2,000
- L Damage to the streams and wetland without a proper method statement in place R3,000. For each subsequent similar offence the fine may, at the discretion of the ER, be doubled in value to a maximum value of R50, 000.

- b. environmental damage ensues due to negligence
- c. the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time
- d. the Contractor fails to respond adequately to complaints from the public
- 3. Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.
- 4. An Environmental Performance Guarantee of 5% of Contract Value shall be deposited by the Contractor with the Engineer. This fund shall be used in the event of penalties or rehabilitation costs for non-conformance or contraventions of the EMP. The balance shall be given back to the Contractor at Contract closure.
- 5. The following penalties are suggested for transgressions:
 - a. Erosion A penalty equivalent in value to the cost of rehabilitation plus 20%
 - b. Oil spills A penalty equivalent in value to the cost of clean up operation plus 20%
 - c. Damage to indigenous vegetation A penalty equivalent in value to the cost of restoration plus 20%.
 - d. Damage to sensitive environments A penalty equivalent in value to the cost of restoration plus 20%.
 - e. Damage to cultural sites A penalty to a maximum of R 100 000 shall be paid for any damage to any cultural/ historical sites
 - f. Damage to trees A penalty to a maximum of R100 000 shall paid for each tree removed without prior permission, or a maximum of R5 000 for damage to any tree, which is to be retained on site.
 - g. Penalties for removing or damaging trees:

Girth of trunk (1m above groundlevel)	Replacement value per tree
0 – 15 mm	R100.00
16 – 30 mm	R200.00
31 – 50 mm	R500.00
51 – 75 mm	R1 000.00
76 – 100 mm	R2 500.00
101 – 150 mm	R5 000.00
150 – 300 mm	R10 000.00
Larger than 300 mm	R15 000.00 to R100 000.00

PENALTIES

1. Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence. {In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages. Accordingly, where a Contractor causes damage, the Employer can either enforce a penalty or make the Contractor make good the damage, but not both.}
2. The Contractor is deemed NOT to have complied with this Specification if:
 - a. within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of the Specification

ANNEXURE 3: DEFINITIONS, ACRONYMS AND ABBREVIATIONS

ANNEXURE 3: DEFINITIONS, ACRONYMS AND ABBREVIATIONS

DEFINITIONS

For the purpose of this Construction EMP the following definitions will apply:

Alien vegetation

means all undesirable vegetation, defined as but not limited to, all declared category 1 and category 2 plants in terms of the Conservation of Agricultural Resources Act (43 of 1983) (CARA) amended regulations 15 and 16 as promulgated in March 2001.

Construction activity

refers to any action taken by the Contractor, his sub-contractors, suppliers or personnel in undertaking the construction work.

Construction area(s)

refers to all areas used by the Contractor in order to carry out the required construction activities. This includes all offices, accommodation facilities, testing facilities /laboratories, batching areas, storage & stockpiling areas, workshops, spoiling areas, access roads, traffic accommodation (e.g. bypasses), etc.

Environment

means the surroundings within which humans exist and that are made up of -

- land, water and atmosphere;
- micro-organisms, plant and animal life;
- any part or combination of the above and the interrelationships among and between them;
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact

refers to any change to the environment, whether desirable or undesirable, that would result directly or indirectly from any construction activity.

Hazardous material / substances

refers to any substance that contains an element of risk and could have a deleterious effect on the environment.

Vegetation rehabilitation refers to the re-establishment of locally indigenous vegetation with a similar species composition to that which naturally occurs in the area.

ACRONYMS AND ABBREVIATIONS:

DEO	Designated Environmental Officer
DEA&DP	Department of Environmental Affairs & Development Planning (Western Cape)
DWAF	Department of Water Affairs and Forestry
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
ER	Employer's Representative

I&AP	Interested and Affected Party
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NHRA	National Heritage Resources Act (Act No. 25 of 1998)
RDB	Red Data Book

ANNEXURE 4: DEVELOPMENT LAYOUT



PORTION 1 OF PORTION 7 OF THE FARM DASSENBERG NO 940 NOORDHOEK PROPOSED SUBDIVISION AND ZONING

NOTATION:
 — BOUNDARY OF THE SUBDIVISION
 --- BOUNDARIES AT Bx V.I.
 --- 1:100 YEAR FLOODLINE
 --- EXISTING SERVICES

COLOR CODE	POSITION	AREA (HA)	PROPOSED LAND USE	ZONING
Yellow	3-17	1.18	DOMESTIC DWELLING	SPECIAL INTERMEDIATE ZONING (SIZ)
Orange	1-2, 18-130	8.18	SMALL AND MEDIUM HOUSES	SINGLE AND DUPLEX RESIDENTIAL
Green	33	33.00	RESERVE OPEN SPACE	OPEN SPACE
Orange	132	4.80	PRIVATE ROADS	ROAD
Sub Total:		47.16		

HAZ. DEV. ZONE	AREA (HA)	NATURE AREA	AGRICULTURAL
	19.28		
TOTAL	78.74		

- NOTES:**
- The Figure A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A1 B1 C1 D1 E1 F1 G1 H1 J1 K1 L1 M1 N1 P1 Q1 R1 S1 T1 U1 V1 W1 X1 Y1 Z1 A2 B2 C2 D2 E2 F2 G2 H2 J2 K2 L2 M2 N2 P2 Q2 R2 S2 T2 U2 V2 W2 X2 Y2 Z2 represents Portion 1 of the Farm Dassenberg No. 940 Noordhoek, 78.74ha in extent.
 - The Figure A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A1 B1 C1 D1 E1 F1 G1 H1 J1 K1 L1 M1 N1 P1 Q1 R1 S1 T1 U1 V1 W1 X1 Y1 Z1 A2 B2 C2 D2 represents Portion 1 of Portion 7 of the Farm Dassenberg 940 Noordhoek, 47.16ha in extent, which is to be subdivided as shown to accommodate 115 Single dwelling residential units, 18 Group housing units, 1 row of 4 and 1 private open space lot.
 - A.C. marks shall be placed on the map to be registered over the street (positive) based on an as built survey after the sewer has been installed and signed.
 - The road is to be registered as a utility services corridor in favor of the City of Cape Town, on the basis of an as built survey.
 - All areas and dimensions are approximate and must be confirmed by a land surveyor.

COUNCIL STAMP

SCALE 1:2000
 16 SEPTEMBER 2008 **26**

PLAN No.	PLAN No.	3	0	9	4	8
PROBATION	DATE					

PLANNING PARTNERS
 BEPLANNINGS-ADVISE

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