

# RIVER MAINTENANCE MANAGEMENT PLAN

**PROPOSED VLAKKELAND RESIDENTIAL DEVELOPMENT ON ERF 8359, RE/ERF 8370, ERF 8378, ERF 8399, ERF 8400, ERF 12628, ERF 12633 AND ERF 33027 IN PAARL, WESTERN CAPE**

**DEA&DP REF NR: 16/3/1/2/B3/28/1006/13**

**Prepared for:**

DRAKENSTEIN MUNICIPALITY  
Anthea Shortles  
P.O Box 1  
Paarl  
7620

**Prepared by:**

GUILLAUME NEL ENVIRONMENTAL CONSULTANTS cc  
P.O. Box 2632  
Paarl  
7620

Tel: (021) 870 1874

Fax: (021) 870 1873

Cell: 072 157 1321

E-Mail: [guillaume@gnec.co.za](mailto:guillaume@gnec.co.za)



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GUILLAUME NEL ENVIRONMENTAL CONSULTANTS

45 FABRIEK STREET PAARL,  
PO BOX 2632, PAARL, 7620

(TEL) 021 870 1874  
(FAX) 021 870 1873

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**RIVER MAINTENANCE MANAGEMENT PLAN**

GUILLAUME NEL ENVIRONMENTAL CONSULTANTS (GNEC) was appointed on behalf of DRAKENSTEIN MUNICIPALITY as ENVIRONMENTAL ASSESSMENT PRACTITIONER for the proposed construction of water pipelines on ERF 8359, RE/ERF 8370, ERF 8378, ERF 8399, ERF 8400, ERF 12628, ERF 12633 AND ERF 33027 in Paarl, Drakenstein Municipality.

GNEC commenced with the Environmental Impact Assessment Process where, according to Government Notice R. No. 543, GN R. No 544, GN R. No 545, GN R. No 546 and GN R. No 547) the following activities are triggered.

**GN R. No 544 (Listing Notice 1) { Activities 9, 11, 18, 21, 22 and 23}**

**GN R. No 545 (Listing Notice 2) {Activity 15}**

**GN R. No 546 (Listing Notice 3) {Activities 4, 12 and 16}**

as described in the National Environmental Management Act (NEMA).

The RIVER MAINTENANCE MANAGEMENT PLAN (RMMP) submitted herewith is broad and general in terms of its objectives and expected outcomes, and is intended to be viewed in conjunction with the ENVIRONMENTAL MANAGEMENT PLAN (EMP).

The objections of this RMMP are divided into three sections to ensure the sensitive planning, construction and ongoing maintenance of the construction site, once construction activities have been completed. Each of the three sections is divided into **Objections, Actions and Expected outcomes/Monitoring**.

The RIVER MANAGEMENT MAINTENANCE PLAN (RMMP) will guide the process of rehabilitation through various objectives and expected outcomes to ensure that the area is transformed and maintained sustainably.

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45 FABRIEK STREET PAARL,  
PO BOX 2632, PAARL, 7620

(TEL) 021 870 1874  
(FAX) 021 870 1873

RIVER MAINTENANCE MANAGEMENT PLAN

OBJECTIVES FOR PRE-CONSTRUCTION PLANNING PHASE

NATURAL ENVIRONMENT			
ISSUE	OBJECTIVE	PROPOSED ACTIONS	OUTCOME/INDICATOR/MONITORING
<b>HYDROLOGY</b>	PLAN TO ENSURE WATER QUALITY IS MAINTAINED	CONSTRUCTION TO COMMENCE DURING SUMMER (Dry Months) WHEN THE STREAM-FLOW AND EXPECTANCY OF RAIN ARE LOW	NO POLLUTION OF WATER RESOURCES  ECO TO KEEP RECORDS
<b>HYDROLOGY/ EROSION CONTROL</b>	TO ENSURE REHABILITATION OF THE STREAM BANKS	ALL AREAS THAT ARE TO UNDERGO EARTHWORKS SHALL HAVE THE TOPSOIL REMOVED AND STOCKPILED FOR LATER REUSE DURING REHABILITATION. TOPSOIL TO BE STOCKPILED NO HIGHER THAN 1 METER	NO POLLUTION SILTATION OF WATER RESOURCES  ECO INSPECTION AND AUDIT REPORTS
<b>EROSION CONTROL</b>	APPROPRIATE ENGINEERING FOR STREAM BANKS	KEEP DISTURBANCE OF THE CHANNEL BOTTOM, SIDES, ADJACENT LAND AND SURROUNDING NATURAL LANDSCAPE TO A MINIMUM DURING CONSTRUCTION ACTIVITIES	NO POLLUTION OF WATER RESOURCES  EROSION CONTROL OF STREAM BANKS  ECO INSPECTIONS AND RECORD KEEPING
<b>HYDROLOGY/ EROSION CONTROL</b>	TO ENSURE IMPROVED CONDITIONS OF STREAM BANKS	THE CONTRACTOR SHALL TAKE COGNISANCE OF WEATHER FORECASTS AND PREPARE / MAINTAIN THE CONSTRUCTION AREA AHEAD OF POSSIBLE FLOODING EVENTS	NO EROSION AND SEDIMENTATION OF WATER RESOURCES.  REMOVAL OF STOCKPILED MATERIALS AND STATIONARY PLANT  DIVERSIONS ARE KEEPING PACE WITH FLOOD WATERS AND CLEAR ANY INITIAL DEBRIS FLOATING DOWNSTREAM  ECO INSPECTIONS AND MONITORING

<b>HYDROLOGY/ POLLUTION CONTROL</b>	TO ENSURE CONSTRUCTIONS' CREW UNDERSTANDING OF THE AQUATIC HABITAT	ENVIRONMENTAL INDUCTION TRAINING AND TOOLBOX TALKS	NO POLLUTION OF WATER RESOURCES AND NO DAMAGE TO STREAM BANKS  ECO TO CONDUCT INSPECTIONS AND KEEP RECORDS OF TRAINING RECEIVED.
<b>ALIEN VEGETATION REMOVAL</b>	TO ENSURE REMOVAL OF ALIEN INVASIVE PLANTS	MAP AREAS OF ALIEN INVESTATION  PLAN TO PROVIDE GUIDELINES TO MONITOR RE-GROWTH AREAS AND FOLLOW-UP AS AND WHEN NEEDED	NO ALIEN INVASIVE PLANT SPECIE GROWTH AFTER CONSTRUCTION ACTIVITIES  ECO TO CONDUCT INSPECTIONS
<b>REHABILITATION</b>	PLAN TO ENSURE THE WATERCOURSE AREA IS REHABILITATED WITH THE BUDGET PROVIDED	MULCH AND RE-VEGETATE WITH A SUITABLE NON-INVASIVE, BINDING, INDIGENOUS GRASS SPECIES, I.E. <b>CYNODON DACTYLON</b> ) ALL DISTURBED AREAS AFTER CONSTRUCTION	USE SILT FENCES OR OTHER APPROPRIATE EROSION CONTROL MEASURES TO PREVENT OR REDUCE EROSION AND SEDIMENTATION UNTIL STABILIZING VEGETATION IS ESTABLISHED.  ECO TO CONDUCT INSPECTIONS AND AUDIT REPORTS
<b>FAUNA/WILDLIFE</b>	TO ENCOURAGE AVIFAUNA AND AQUAFAUNA TO THE AREA	PLAN THE DEMARCATION OF SENSITIVE/NO-GO AREAS AND ENSURE ACCESS IS RESTRICTED/CONTROLLED	INCREASE IN AVIFAUNA AND AQUAFAUNA

RIVER MAINTENANCE MANAGEMENT PLAN

OBJECTIVES FOR CONSTRUCTION PHASE

NATURAL ENVIRONMENT			
ISSUE	OBJECTIVE	PROPOSED ACTIONS	OUTCOME/INDICATOR/MONITORING
<b>HYDROLOGY</b>	TO ENSURE WATER QUALITY IS MAINTAINED AND IMPROVED	INSTALL LITTER AND GREASE TRAPS	NO POLLUTION/SILTATION OF WATER RESOURCES  ECO TO CONDUCT INSPECTIONS AND AUDIT REPORTS
<b>HYDROLOGY/ POLLUTION CONTROL</b>	TO ENSURE IMPROVED CONDITIONS OF STREAM BANKS	ALL STATIONARY PLANT SHALL EMPLOY DRIP TRAYS TO CAPTURE ALL SPILT OIL AND FUEL. THESE SHALL BE MAINTAINED TO PREVENT OVERTOPPING DURING RAINFALL EVENTS. STATIONARY OR MOBILE PLANT WITH SIGNIFICANT LEAKS MUST BE REPAIRED IMMEDIATELY OR REMOVED FROM THE CONSTRUCTION AREA. MACHINERY AND PLANT SHALL BE INSPECTED DAILY AND REPAIRED / MAINTAINED IN A SOUND WORKING STATE WITH NO LEAKS. EXCESS GREASE AROUND BEARINGS SHOULD BE WIPED OFF BEFORE PLANT WORKS IN OR NEAR THE WATERCOURSE	NO POLLUTION OF WATER RESOURCES.  ECO TO CONDUCT DAYLY INSPECTIONS AND SUBMIT AUDIT REPORTS
<b>HYDROLOGY/ POLLUTION CONTROL</b>	TO ENSURE IMPROVED CONDITIONS OF STREAM BANKS	NO INERT BUILDING MATERIALS (SAND, AGGREGATE, TOPSOIL, PRECAST BUILDING MATERIALS, GABION BASKETS, ETC) SHALL BE STOCKPILED IN THE WATERCOURSE CHANNEL	ECO INSPECTIONS AND AUDIT REPORTS

<p><b>HYDROLOGY/ POLLUTION CONTROL</b></p>	<p>TO ENSURE IMPROVED CONDITIONS OF STREAM BANKS</p>	<p>ANY HAZARDOUS MATERIALS, TEMPORARY TOILETS, FUEL STORAGE TANKS, LUBRICANTS, PAINTS, CEMENT, CEMENT ADDITIVES, MUST BE KEPT AT LEAST 32M FROM THE RIVER BANK AND MUST BE PROPERLY SECURED. ANY SPILT HAZARDOUS MATERIALS WITHIN THE CONSTRUCTION AREA SHALL BE RECOVERED IMMEDIATELY AND DISPOSED OF APPROPRIATELY</p>	<p>ECO INSPECTIONS AND AUDIT REPORTS</p>
<p><b>HYDROLOGY/ POLLUTION CONTROL</b></p>	<p>TO ENSURE IMPROVED CONDITIONS OF STREAM BANKS</p>	<p>A SUFFICIENT NUMBER OF REVUSE BINS SHALL BE PROVIDED AROUND THE CONSTRUCTION CAMP TO AVOID THE BUILD-UP OF LITTER AND FINE CONSTRUCTION DEBRIS. A LITTER COLLECTION PARADE SHALL BE CONDUCTED WEEKLY OR AS REQUIRED TO PREVENT THE BUILD-UP OF LITTLE ON SITE</p>	<p>ECO INSPECTION AND AUDIT REPORTS  ECO TO SUPERVISE WEEKLY LITTER PARADES</p>
<p><b>ALIEN VEGETATION REMOVAL</b></p>	<p>TO ENSURE REMOVAL OF ALIEN INVASIVE PLANTS</p>	<p>MAP AREAS OF ALIEN INVESTATION  PLAN TO PROVIDE GUIDELINES TO MONITOR RE-GROWTH AREAS AND FOLLOW-UP AS AND WHEN NEEDED</p>	<p>NO ALIEN INVASIVE PLANT SPECIE GROWTH AFTER CONSTRUCTION ACTIVITIES  ECO TO CONDUCT INSPECTIONS AND AUDIT REPORTS</p>
<p><b>REHABILITATION</b></p>	<p>PLAN TO ENSURE THE WATERCOURSE AREA IS REHABILITATED WITH THE BUDGET PROVIDED</p>	<p>MULCH AND RE-VEGETATE (WITH A SUITABLE NON-INVASIVE, BINDING, INDIGENOUS GRASS SPECIES, I.E. <b>CYNODON DACTYLON</b>) ALL DISTURBED AREAS AFTER INSTALLATION</p>	<p>USE SILT FENCES OR OTHER APPROPRIATE EROSION CONTROL MEASURES TO PREVENT OR REDUCE EROSION AND SEDIMENTATION UNTIL STABILIZING VEGETATION IS ESTABLISHED  ECO TO CONDUCT INSPECTION AND AUDIT REPORTS</p>

<p><b>FAUNA/WILDLIFE</b></p>	<p>TO ENCOURAGE AVIFAUNA AND AQUAFAUNA TO THE AREA.</p>	<p>PLAN THE DEMARCATION OF SENSITIVE/NO-GO AREAS AND ENSURE ACCESS IS RESTRICTED/CONTROLLED</p>	<p>INCREASE IN AVIFAUNA AND AQUAFAUNA. NO ACCESS TO NO-GO AREAS ECO SUPERVISION</p>
<p><b>BIODIVERSITY MANAGEMENT</b></p>	<p>TO ENSURE THAT SENSITIVE NATURAL AREAS ARE ADEQUATELY MANAGED AND CONSERVED IN ACCORDANCE WITH THE MAINTENANCE MANAGEMENT PLAN</p>	<p>ENSURE THAT ALL CONTROLS/GUIDELINES AS STIPULATED IN THE EMP ARE IN PLACE  ENSURE THAT THE ENVIRONMENTAL CONTROL OFFICER (ECO) IS APPROPRIATELY QUALIFIED</p>	<p>THE AREA IS DEVELOPED ACCORDING TO PRINCIPLES ADOPTED IN THE RIVER MAINTENANCE MANAGEMENT PLAN</p>

RIVER MAINTENANCE MANAGEMENT PLAN

OBJECTIVED FOR THE ONGOING OPERATION PHASE

NATURAL ENVIRONMENT			
ISSUE	OBJECTIVE	PROPOSED ACTIONS	OUTCOME/INDICATOR/MONITORING
<b>HYDROLOGY</b>	TO ENSURE WATER QUALITY IS MAINTAINED AND IMPROVED	WATER LEVELS MEASURED IN CASE OF FLOODING  WATER QUALITY AND FLOW-RATES TO BE TESTED	ECO TO MONITOR WATER LEVELS AND KEEP RECORDS
<b>HYDROLOGY/ EROSION CONTROL</b>	TO ENSURE REHABILITATION OF THE WATERCOURSE AREA	CONTINUED REHABILITATION, INCLUDING BANK STABILIZATION AND ALIEN VEGETATION REMOVAL	NO EROSION OF STREAM BANKS  NO RE-GROWTH OF ALIEN INVASIVE VEGETATION  ECO TO CONDUCT INSPECTION AND AUDIT REPORTS
<b>EROSION CONTROL</b>	APPROPRIATE ENGINEERING FOR POORLY STABILIZED BANKS	PREVENT EROSION BY STABILIZING BANKS	STREAM BANKS STABILIZED WITH NO COLLAPSING  ECO TO CONDUCT INSPECTION AND AUDIT REPORTS
<b>HYDROLOGY/ POLLUTION CONTROL</b>	TO ENSURE CONSTRUCTION'S CREW UNDERSTANDING OF THE AQUATIC HABITAT	CONSTRUCTION CREW ENVIRONMENTALLY TRAINED	MINIMAL IMPACT ON THE ENVIRONMENT  ECO SUPERVISION AND AUDIT REPORTS
<b>ALIEN VEGETATION REMOVAL</b>	TO ENSURE REMOVAL OF ALIEN INVASIVE VEGETATION	MAP AREAS OF INVASIVE ALIEN INFESTATION  DEVELOP SCHEDULE TO CLEAR INFESTED AREAS	DECREASE AREA COVERED BY ALIEN INVASIVE VEGETATION  ECO TO DEVELOP SCHEDULE
<b>REHABILITATION</b>	TO ENSURE THE WATERCOURSE AREA IS REHABILITATED ADEQUATELY	REMOVAL OF ALIEN VEGETATION AND STABILIZATION OF STREAM BANKS	REHABILITATION OF CONSTRUCTION AREA AND DECREASE IN EROSION AND DESTABILIZED BANKS  ECO TO CONDUCT INSPECTION AND AUDIT REPORTS

GUILLAUME NEL ENVIRONMENTAL CONSULTANTS

(TEL) 021 870 1874  
(FAX) 021 870 1873

45 FABRIEK STREET PAARL,  
PO BOX 2632, PAARL, 7620



		RE-VEGETATE WITH A SUITABLE NON-INVASIVE, BINDING, INDIGENOUS GRASS SPECIES, I.E. <b>CYNODON DACTYLON</b>	
<b>EROSION CONTROL MEASURES</b>	TO ENSURE EROSION IS KEPT TO A MINIMUM	REHABILITATE EXPOSED SOIL  PREVENT UNNECESSARY REMOVAL OF VEGETATION  ANNUAL INSPECTION OF EROSION CONTROL MEASURED	NO EROSION REPORTED  ECO INSPECTION AND AUDIT REPORTS
<b>FAUNA/WILDLIFE</b>	TO ENCOURAGE AVIFAUNA AND AQUAFAUNA TO THE AREA	ENCOURAGE INDIGENOUS VEGETATION  PLAN THE DEMARCATION OF SENSITIVE/NO-GO AREAS AND ENSURE ACCESS IS RESTRICTED/CONTROLLED	INCREASE IN INDIGENOUS PLANT MIX  INCREASE IN AVIFAUNA AND AQUAFAUNA  ECO MONITORING
<b>BIODIVERSITY MANAGEMENT</b>	TO ENSURE THAT SENSITIVE NATURAL AREAS ARE ADEQUATELY MANAGED AND CONSERVED IN ACCORDANCE WITH THE MAINTENANCE MANAGEMENT PLAN	ENSURE THAT ALL CONTROLS/GUIDELINES AS STIPULATED IN THE EMP ARE IN PLACE  ENSURE THAT THE ENVIRONMENTAL CONTROL OFFICER (ECO) IS APPROPRIATELY QUALIFIED  ENSURE MULCH AND RE-VEGETATION WITH A SUITABLE NON-INVASIVE, BINDING, INDIGENOUS GRASS SPECIES, I.E. <b>CYNODON DACTYLON</b> AFTER CONSTRUCTION ACTIVITIES	THE AREA IS DEVELOPED ACCORDING TO PRINCIPLES ADOPTED IN THE RIVER MAINTENANCE MANAGEMENT PLAN

**Guillaume Nel**

**FOR: GNEC**

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