ENVIRONMENTAL MANAGEMENT PROGRAMME

DEVELOPMENT OF A ROAD AND ASSOCIATED INFRASTRUCTURE AT FABLE SMALLHOLDINGS RESULTING IN THE CLEARANCE OF INDIGENOUS VEGETATION, DEVELOPMENT OF INFRASTRUCTURE WITHIN 32M OF A WATERCOURSE AND THE INFILLING AND EXCAVATION OF MATERIAL WITHIN A WATERCOURSE

KWADUKUZA MUNICIPALITY

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CONFLUENCE
Strategic Development & Environmental Partner

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TABLE OF CONTENTS

1.0. PROJECT DESCRIPTION

1.1. BACKGROUND

The Iron Property Group (Pty) Ltd are in the process of developing "*Fable Smallholdings*" (previously known as Foxhill Smallholdings Development). Fable Smallholdings is located within Ward 22 of the KwaDukuza Local Municipality, iLembe District. Fable Smallholdings itself does not trigger any listed activities (confirmed by the Department of Economic Development, Tourism and Environmental Affairs for query DC29/Q0079/2020) however a new road is proposed which traverses a watercourse. Environmental Authorisation is therefore required for the proposed gravel road. All listed activities being applied for are provided in Table 1.

The road traverses two properties; Portion 585 and REM of Portion 2 of the Farm Lot 61 No. 1521. The road starts at 29°29'34.10"S; 31°13'34.88"E and ends at 29°29'30.89"S; 31°13'43.41"E. A new gatehouse will be constructed on Portion 585 of the Farm Lot 61 No. 1521.

Table 1: Listed and Specified Activities Triggered and Being Applied for.

Activity #	Relevant Listing Notice	Description of Listed Activity as Per the Project Description
12 (ii)(c)	Listing Notice 1 (GNR327) 04th December 2014 as amended.	Approximately 274.4m^2 of road infrastructure will be developed within watercourses and within 32m of watercourses (concrete road strips, dam wall re-enforcement, culvert and gatehouse).
19	Listing Notice 1 (GNR327) 04th December 2014 as amended.	The road traverses one section of wetland. The total volume of material excavated and infilled into the wetland during the construction of the road and culvert is 295.5m^3.
12 (d)(iv)	Listing Notice 3 (GNR324) 04th December 2014 as amended.	The total area of indigenous vegetation to be cleared within the critically endangered Northern Coastal Grassland Ecosystem is 879.5m^2 (3m wide dirt road, dam wall re-enforcement, culvert and gatehouse).

1.2. DESCRIPTION OF ACTIVITY

The proposed road is 285m in length and is a 3m wide gravel road. Concrete strips are proposed in steeper sections (2 x 0.5m concrete strips with a grass in the middle).

- 16.95m^2 of concrete infrastructure will be located within 32m of watercourses. Of this, 4.95m^2 will be located within a watercourse.
- 67.5m^3 of material will be excavated from wetland during the construction of the road.
- 620m^2 of indigenous vegetation will be cleared during earthworks for the new road.

The road crosses an existing dam wall. The width of the road across the dam wall will be increased by 1m by constructing a gabion basket retaining wall on the eastern side of the dam wall (Figure 1). Gabion baskets (1m x 1m) will be placed on top of one another at intervals. The gabion retaining wall will be constructed within the footprint of the existing dam wall embankment and therefore no excavation / infilling of wetland is anticipated. The rudimentary spillway will be formalised using cement and reno-mattresses.

- A total footprint of 165m^2 of infrastructure will be constructed within 32m of a watercourse (gabion baskets and cement spillway).

- The re-enforcement of the dam wall will result in 132m^2 of indigenous vegetation being cleared.

The road crosses a hillside seep wetland (WC1). A precast concrete structure will be constructed at this point (Figures 2 & 3). The structure consists of:

- 2 x 1 200mm wide x 3 500mm long x 1 200mm high precast concrete culverts;
- Infrastructure will be constructed on a 1 000mm thick rockfill base layer wrapped in geotextile to allow sub-surface flow.
- Gabion basket wingwalls and reno-mattresses will be constructed at the entrance and exit of the culvert for scour protection.
- Compacted backfill will be placed between the wingwalls.
- A total footprint of 67.5 m^2 of infrastructure will be constructed within wetland.
- The construction of the culvert will result in the infilling of 228m^3 of material into wetland.
- The construction of the culvert will result in 107.5m^2 of indigenous vegetation being cleared.

A security gatehouse is proposed at the boundary of the property (Figure 4).

- The gatehouse is 2.95m wide x 6.78m long and will be constructed within 32m of a watercourse (20m^2).
- The construction of the gatehouse will result in 20m^2 of indigenous vegetation being cleared.

Table 2: Summary of Infrastructure to be Constructed Within the Watercourses, Volume of Material Excavated From / Infilled Into the Watercourse and Extent of Indigenous Vegetation Cleared for the Construction of the Fable Road.

Activity	Infrastructure Footprint within watercourse (m^2)	Infrastructure within 32m of watercourse (m^2)	Volume of material excavated from / infilled into watercourse (m^3)	Area of indigenous vegetation cleared (m^2)
Road	4.95	16.95	67.5	620
Dam Wall Re-enforcement	0	165	0	132
Culvert	67.5	0	228	107.5
Gatehouse	0	20	0	20
Total:	**72.45**	**201.95**	**295.5**	**879.5**

Figure 1: Typical Detail of the Gabion Basket Retaining Wall Proposed for the Re-Enforcement of the Dam Wall (Source: Struxit Projects, 2022).

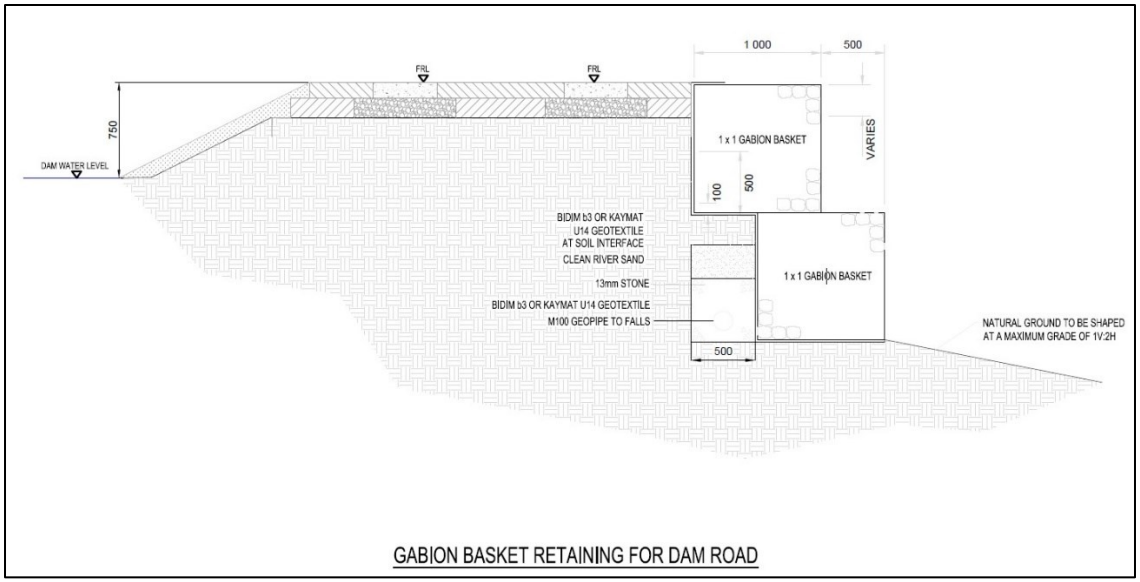


Figure 2: Section Through the Culvert Proposed at WC1 (Source: Struxit Projects, 2022).

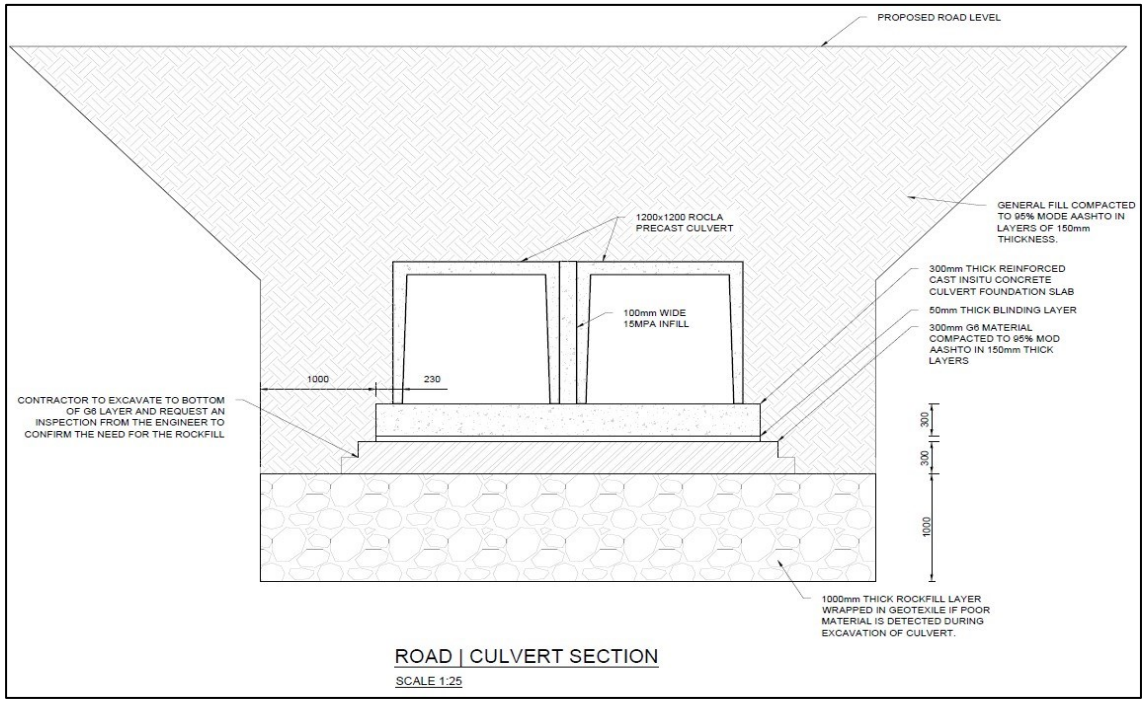


Figure 3: Overview of the Culvert Proposed at WC1, Including Erosion Control Measures (Source: Struxit Projects, 2022).

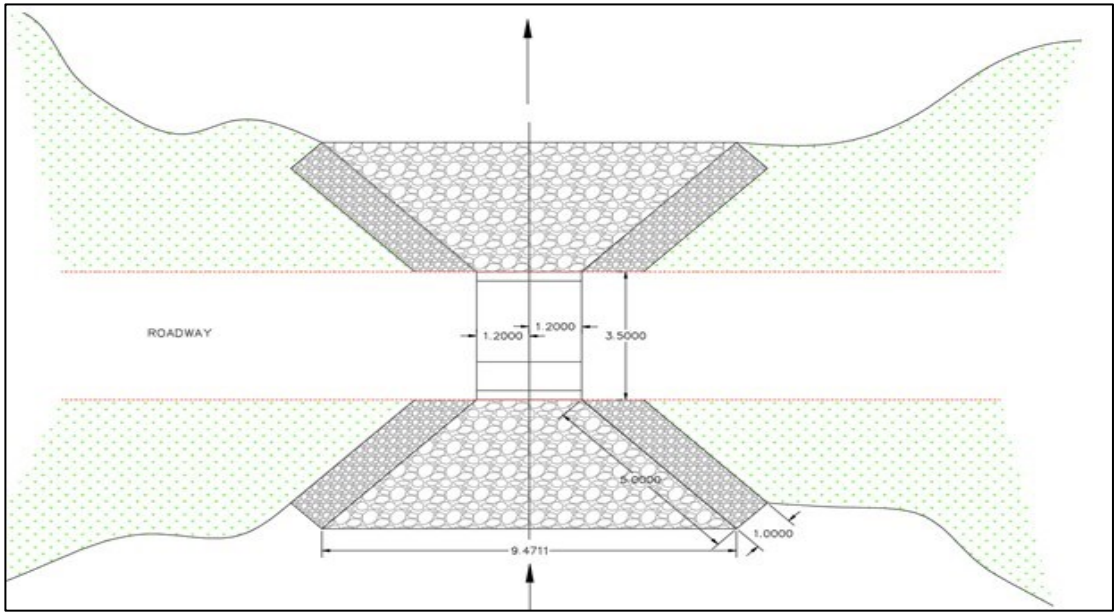


Figure 4*:* Ground Floor Plan of the Proposed Container Gatehouse Located in the South-Eastern Corner of Fable Smallholdings (Source: COA, 2021).

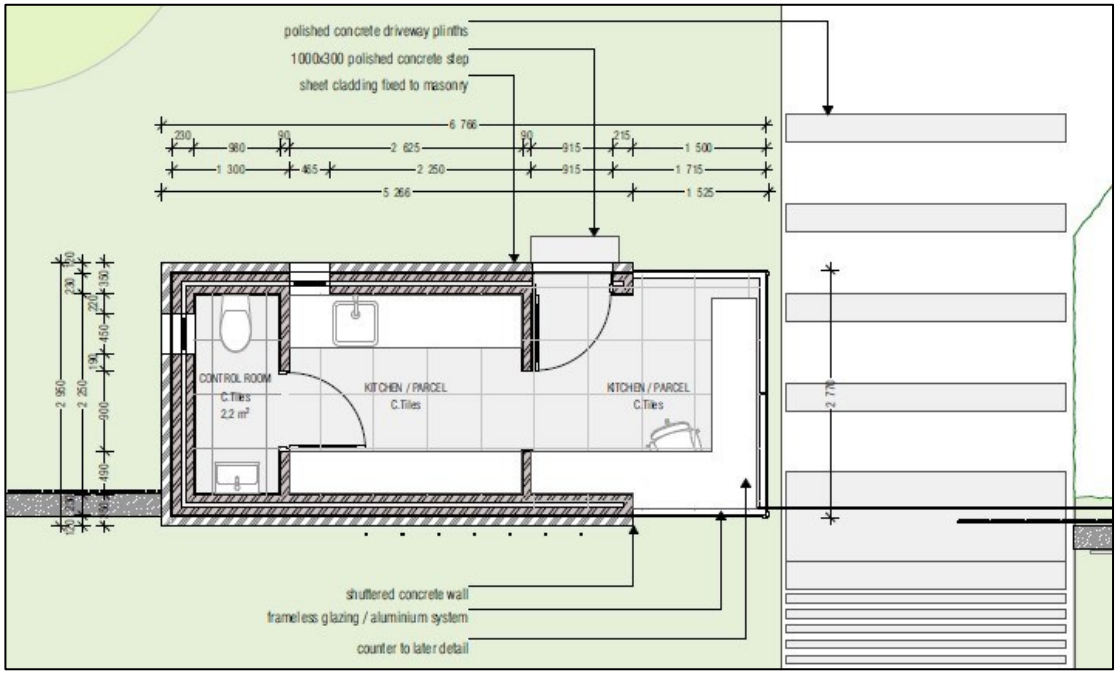
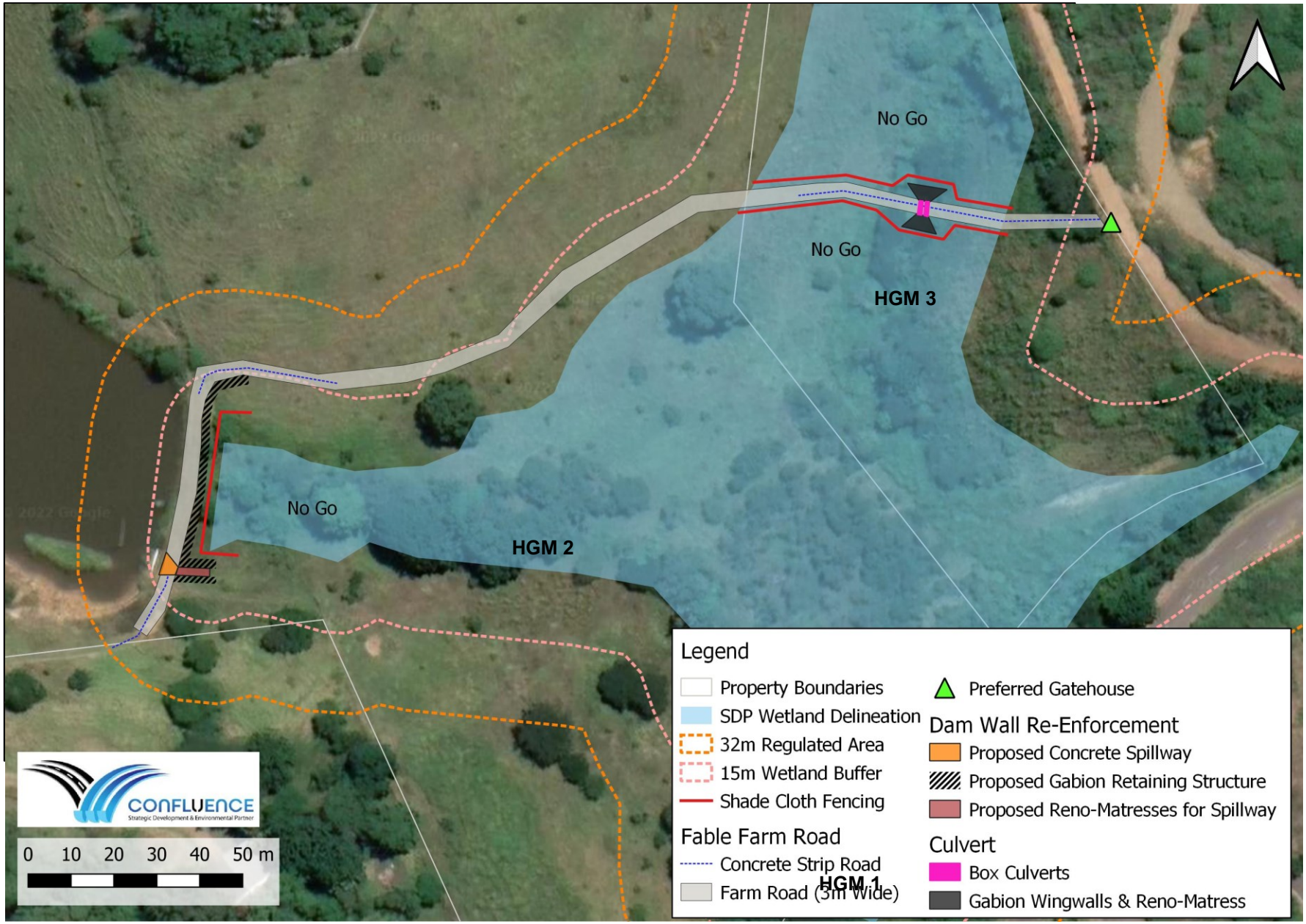


Figure 5: Map Superimposing the Proposed Activity and Associated Infrastructure on the Environmentally Sensitivities of the Site.



1.3. ENVIRONMENTAL SENSITIVITIES

The following environmental sensitives have been identified within the study area:

- Infrastructure to be constructed in Northern Coastal Grassland ecosystem. This is classified as "*critically endangered*". Clearing of vegetation must be constraint to the development footprint.
- Three wetland hydrogeomorphic (HGM) units are located within Fable Smallholdings and are indicated in Figure 5. The proposed precast concrete culvert will be constructed in HGM Unit 3. Fable Smallholdings Road will be constructed in close proximity the other wetland HGM Units.

Contractors, Homeowners and Occupiers on site must be made aware of the environmental sensitivities and No Go areas. The wetlands and preferred route alignment for the new road must be clearly demarcated by the Environmental Control Officer (ECO) prior to construction commencing. An Environmental Awareness Plan has been prepared for Contractors working on site (section 5.0 of the EMPr). The Environmental Awareness Plan will form part of the Environmental Induction training prior to work commencing.

1.4. IMPACT MANAGEMENT OUTCOMES

Considering the type of activity and the environmental sensitivities associated with the site, impact management actions were formulated during the Environmental Impact Assessment to avoid, manage and mitigate risks that were identified for the different phases of the activity including planning and design, pre-construction activities, construction activities, rehabilitation / post-construction and operational activities (where applicable). Impact management actions are in place to achieve the following impact management outcomes:

The overall impact management outcome for the project is for construction to be constrain to the authorised development footprint thereby minimising and further impact on the wetland system and to ensure the Present Ecological State (PES) of the greater wetland system within Fable Smallholdings is improved.

Table 3: Impact Management Outcomes

Primary Impact Management Outcome: *To create a sustainable development by constraining the development footprint to minimise impacts on the adjacent wetland system and ensure the PES of the greater wetland system within Fable Smallholdings is improved.*		
#	**Impact Management Outcome**	**Phase**
1	To avoid unnecessary clearing of vegetation outside of the authorised development footprint, reducing erosion potential.	Construction
2	Staff to be aware of the sensitive wetland systems outside of the authorised development footprint and the restrictions associated with it.	Pre-Construction
3	To avoid any further disturbance (direct or indirect) to the adjacent wetland system (HGM Units 1 - 3).	Construction
4	Improve the state of the remaining portions of wetland within Fable Smallholdings.	Post-Construction

2.0. LEGISLATION

Table 4 provides a list of legislation and municipal planning frameworks which are applicable to the activity. The holder of the Environmental Authorisation and Contractors working on site must be aware of the legal requirements and address non-compliances when they arise.

Table 4: Legislation Applicable to The Construction of the Fable Smallholdings Road.

Legislation	Acronym	Comment
National Environmental Management Act (Act No. 107 of 1998 as amended).	NEMA	NEMA provides environmental management principles that are applicable across South Africa to fulfil section 24 of the Constitution, which is the right to "an environment that is not harmful to their health or wellbeing". Section 24 of NEMA defines the activities requiring Environmental Authorisation and the processes to be followed to obtain Environmental Authorisation (published in the Environmental Impact Assessment Regulations, 2014 as amended). This application triggers activities listed in Listing Notice 1 and 3 of the Environmental Impact Assessment Regulations, 2014 as amended. A Basic Assessment process is therefore underway to obtain Environmental Authorisation prior to any activities commencing.
National Environmental Management: Waste Act (Act No. 59 of 2008 as amended).	NEM: WA	NEM: WA provides measures to protect health and the environment of South Africa by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. There are no activities proposed that will trigger a Waste Management License however measures have been provided in the EMPr to ensure that waste management is compliant with the requirements of NEM: WA.
National Environmental Management Biodiversity Act (Act No. 10 of 2004).	NEM: BA	To manage and conserve South Africa's Biodiversity and protect species and ecosystems that warrant national protection. The proposed development does not require any specific permissions in terms of NEM:BA however the landowner must comply with the requirements of the Alien and Invasive Species Regulations (2020) which have been published in terms of section 97(1) of NEM:BA. These regulations categorise invasive species and outlines the way these species must be controlled by landowners. Section 52 of NEMBA allows for the publication of a national list of ecosystems that are threatened and in need of protection. The property is located within the Northern Coastal Grasslands Ecosystem which has been identified as "critically endangered" by the South African National Biodiversity Institute (SANBI).
National Environmental Management: Air Quality Act (Act No. 39 of 2004).	NEM: AQA	Regulates air quality to protect the environment by providing measures to prevent pollution and ecological degradation and for securing ecologically sustainable development. There are no activities on site that will trigger an Air Emissions License however measures have been provided in the EMPr to ensure that air quality is managed in line with the requirements of NEM: AQA.
National Water Act (Act No. 36 of 1998) (as amended).	NWA	Provides for fundamental reform of the law relating to water resources. Infrastructure will be constructed within 500m of various watercourses with the culvert at WC1 being constructed within wetland. A Water Use Authorisation is required from the Department of Water and Sanitation in terms of section 21(c) & (i) of the NWA.
National Forests Act (Act No. 84 of 1998).	NFA	To conserve and protect natural forests and woodlands as well as ensuring development with principles of sustainable management. The Department of Forestry Fisheries and Environment (DFFE) governs the removal, disturbance, cutting or damaging of protected tree species and natural forests. No natural forests or protected tree species will be impacted by the proposed development.
National Heritage Resources Act (Act No. 25 of 1999).	NHRA	For the management of national heritage resources and to nurture and conserve heritage resources so that they may be bequeathed to future generations. There is no existing infrastructure on site and therefore no structures with heritage or archaeological value. No graves are located on site. The property falls within a "high" palaeontological (i.e. fossils) sensitive area. A Palaeontological Impact Assessment was therefore carried out.

KwaDukuza Spatial Development Framework	KDM SDF	The KDM SDF classifies Salt Rock as an area with short-term development potential. As per the town planners Spatial Planning Land Use Management Act (SPLUMA) application for Fable Smallholdings, the proposed development is well aligned to the KDM SDF and municipality's vision for the Mount Richmore area.
iLembe District Municipality Integrated Development Plan (2021/2022 Review).	iLembe IDP	The proposed gravel road and road infrastructure is directly associated with the Fable Smallholdings development. The Fable Smallholdings development was recently granted SPLUMA approval and is aligned with the iLembe District's vision which is "by 2030 iLembe District Municipality will be a sustainable people-centred economic hub providing excellent services and quality of life".

3.0. MONITORING REQUIREMENTS

As per the findings of the Environmental Impact Assessment, the holder of the Environmental Authorisation is responsible for appointing an independent Environmental Control Officer (ECO) to monitor the implementation of the impact management actions. Table 5 provides a summary of the monitoring requirements to ensure effective implementation of the EMPr. It is noted that the mitigation measures listed in the EMPr as well as the Conditions of the Environmental Authorisation must be adhered to.

The appointed ECO must have the following skills:

- Knowledge and understanding of the construction industry.
- Knowledge of good practise environmental management standards.
- Understanding of the legal context of the activity including the Duty of Care and Polluter Pays principles.
- At least 1 year experience in the ECO field.

Table 5: Monitoring Requirements

Method of Monitoring	• Site inspection by ECO to monitor the implementation of the EMPr during construction and the post-construction audit. • Visual inspections & photographs for record keeping purposes.
Frequency of Monitoring	• Weekly site inspection by ECO during the earthworks phase. • Monthly site inspection by ECO during the remainder of the construction. • One post-construction audit by ECO on completion of construction.
Mechanism for Monitoring Compliance	• Written audit report to be submitted by the ECO after the site inspection to the Holder of Environmental Authorisation, relevant Contractor and EDTEA: Compliance, Monitoring & Enforcement.
Program for Reporting on Compliance	• Prior to a Contractor commencing with construction, environmental induction training must be carried out in accordance with the Environmental Awareness Plan in section 5.0. • The register in section 6.0 must be signed by all Primary Contractors working on the site. • The roles and responsibilities of the individuals involved must be determined and the line of communication outlined by the ECO in the audit reports. • Any non-compliances with the EMPr identified during the site inspection must be reported to the relevant Contractor, who must rectify the non-compliance immediately or within a reasonable timeframe as agreed upon with the ECO. • An Environmental Audit Report, compliant with Appendix 7 of the NEMA EIA Regulations 2014 as amended, must be compiled by the ECO and submitted to the relevant parties as listed above.

4.0. IMPACT MANAGEMENT ACTIONS

Mitigation measures provided in the table below have been formulated during the Environmental Impact Assessment process to ensure that the development is a sustainable development, as contemplated in the principles of NEMA. The actions aim to:

(i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; and
(ii) Comply with any prescribed environmental management standards or practices.

The tables below indicate the persons who will be responsible for the implementation of the mitigation measures / actions. Abbreviations provided below:

- Independent Environmental Control Officer *ECO*
- Engineer *ENG*
- Holder of Environmental Authorisation *DEV*
- Contractors *CON*
- Wetland Specialist *WET*

4.1. PLANNING & DESIGN

Table 6: Impact Management Actions to be Adhered to During the Planning & Design Phase of the Fable Smallholdings Road.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Stripping of vegetation during earthworks phase of new road.	**Clearance of 879.5m^2 of indigenous vegetation altering the local habitat (SDP, 2022).**	• The road must avoid larger, woody plant species.	CON	
Construction of Precast Concrete Culvert in Wetland HGM 3.	**Infilling of 287m^2 of hillside seep wetland.**	• The engineer must cater for such flow through the installation of a below-ground box culvert / piping system to allow free flow of water beneath the road (i.e. two large precast culverts to be constructed; Technology Alternative 2). • Grass block road in between concrete strips must be established to increase the percolation of water proximal to the wetland, while facilitating stability of the surface. • The smallest excavator that is practically feasible must be used to carry out any work within wetland. • A Water Use Authorisation from the Department of Water and Sanitation is required prior to any work commencing within wetland.	ENG CON DEV	
Operational phase of the new Fable	**Alteration of flow through hillside wetland (HGM Unit 3) because of unsuitable**	The following measures must be carried out to avoid potential alteration of flow dynamics within the wetland HGM Unit 3 in the long-term:		

Smallholdings Road and Gatehouse.	**placement of the concrete culvert in wetland.**	• The contractor must build the culvert underneath the road as per the approved design (Figures 2 & 3). • The in-situ concrete boxes must be installed at a downward sloping angle of to ensure that the water velocity flowing through the culvert is high enough to avoid sedimentation accumulation in the culvert. • Gabion mattresses / baffling structures must be constructed at both the inlet and outlet points to prevent erosion.	CON	

4.2. PRE-CONSTRUCTION

Table 7: Impact Management Actions to be Adhered to During the Pre-Construction Phase of the Fable Smallholdings Road.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Stripping of vegetation and earthworks associated with the road layer works.	**Clearance of vegetation altering the local habitat (SDP, 2022).**	• Prior to excavations taking place on site, an independent Environmental Control Officer (ECO) must be appointed and conduct Environmental Awareness training as per section 5.0 of the EMPr. The induction training must include: - An indication of the location of the environmentally sensitive areas (i.e. wetland systems and the 32m regulated area). - The importance of the environmentally sensitive areas. - Restrictions associated with the wetland system (i.e. No Go areas). • Prior to earthworks commencing, the development footprint must be determined and cordoned (shown in Figure 5). • The road must avoid larger, woody plant species.	CON & ECO CON CON	
Construction of Precast Concrete Culvert in Wetland HGM 3.	**Infilling of 287m² of hillside seep wetland.**	The following measures are applicable to the culvert at WC1 and road traversing HGM 3: • The excavator driver must undergo environmental induction training with the ECO / wetland specialist to understand the sensitivity of the area and the relevant restrictions.	CON & ECO	
	Unintentional increase in the development footprint resulting in further loss of wetland and reduction in overall wetland functionality.	• Prior to any excavations taking place on site, the independent ECO must conduct Environmental Awareness training with the Contractor responsible for the earthworks. This training must include an indication of the wetland systems and the restrictions associated with the wetlands. • Where the road traverses wetland, the authorised development footprint must be clearly demarcated to ensure minimal wetland loss occurs. • Distinct fences (i.e. shade cloth fencing) must be established to demarcate adjacent wetland areas (position of shade cloth fencing indicated in Figure 5).	CON & ECO CON & ECO CON	

Re-Enforcement of the Existing Dam Wall Using Gabion Basket Retaining Wall and Formalisation of Spillway within 32m of Wetland.	**Direct and indirect impact on wetland HGM 2, directly downstream of the dam wall.**	• Prior to construction commencing in this section, the Contractor and ECO must clearly demarcate the construction footprint (i.e. the outer limit of the gabion basket retaining wall). • The footprint of the gabion basket retaining wall must remain within the existing dam wall embankment footprint to avoid any infilling of wetland downstream (Technology Alternative 2; shown in Figure 5). • A distinct fence (i.e. shade cloth fencing) must be erected immediately downstream of the dam wall embankment to demarcate the adjacent wetland area. The recommended position of the shade cloth fencing is indicated in Figure 5. • The ECO must inspect the fencing prior to excavations taking place for the dam wall re-enforcement.	CON CON CON ECO	
Construction of Fable Smallholdings Road and Gatehouse Within 32m of Wetland.	**Direct and indirect impacts on the adjacent wetland (HGM 1, 2 & 3).**	During the construction of the Fable Smallholdings Road, the Contractor must adhere to the following to prevent any negative impact on the adjacent wetland system: • All construction staff must have undergone environmental induction training as per section 5.3 of the EMPr (Appendix E). • Proof of environmental induction training must be retained in the site file for auditing purposes.	CON & ECO	

4.3. CONSTRUCTION

Table 8: Impact Management Actions to be Adhered to During Construction of the Fable Smallholdings Road.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Stripping of vegetation during earthworks phase of new road.	**Clearance of 879.5m^2 of indigenous vegetation altering the local habitat (SDP, 2022).**	• Excavation and clearance activities must be restricted to the approved project footprint (grey in Figure 5). • To prevent excessive clearance of vegetation, heavy machinery must not be permitted to move beyond the demarcated footprint • No vegetation may be cleared from outside of the authorised developable area. • Topsoil cleared from the road footprint must be stored during construction, returned to the bank after earthworks and compacted. • Topsoil must not be stockpiled directly adjacent to the wetland but remain 15m from the edge of the wetland (15m buffer shown in Figure 5).	CON	
	Disturbance leading to establishment and proliferation of alien invasive vegetation on site and into the	• The "*Eradication of Alien Invasive Plant*" Management Plan must be implemented on site during construction (section 5.4.2 of the EMPr). This Management Plan includes a list of common alien invasive plant species anticipated on site, identification photographs and eradication measures.	CON	

	surrounding wetland environment.	• Alien invasive species must not be permitted to establish on site. • The clearance of alien vegetation must take place in phases and make use of registered herbicides where necessary.		
	Localised erosion of banks during rain resulting in sedimentation of adjacent wetland. This has the potential to alter the local hydrological regime of the wetland system (SDP, 2022).	• Stormwater management (temporary / permanent) must be established at an early point in the construction programme. This must ensure appropriate channelling of stormwater runoff from the road (i.e. regularly placed cut-off drains directing stormwater off road at intervals). • Erosion prevention and sediment control measures must be established. These include silt fences, sandbags, interceptor ditches, seeding and sodding. • The stormwater management system must be inspected by the ECO during audits and any significant topography anomalies identified and rectified immediately. • Construction within wetland HGM 3 must take place in the dry season (i.e. March - August) when water levels are lowest and the risk of erosion and downstream siltation is lower. • Wetland areas not within the direct construction footprint must be demarcated as 'no-go' areas (refer to Figure 5). No site staff or vehicles are permitted to enter these No-Go areas at any time. • No excavated material or fill material may be stored within the No-Go areas. • No excavated material or fill material may be stored over an extended period of time (i.e. more than 24hours) within the 15m wetland buffer (indicated in Figure 5). • Sandbags or pack rock must be placed below the soil stockpiles as berms should erosion start to occur from these areas. • Vegetation must remain in place wherever possible and for as long as possible during earthworks. • Recommendations made in the Geotechnical Investigation must be adhered to. These are as follows: - Sloughing of the upper hill washed sandy soils can be expected. - Stormwater management, erosion and subsoil drainage control measures must therefore be adhered to whilst construction takes place.	CON CON ECO DEV CON	
Construction of Precast Concrete Culvert in Wetland HGM 3.	**Infilling of 287m^2 of hillside seep wetland.**	The following measures are applicable to the culvert at WC1 and road traversing HGM 3: • All excavations to be carried out under supervision of the ECO / wetland specialist. • The excavator and other construction equipment must be limited to specific areas of the wetland where work is required. No other disturbance to the bed / banks of the wetlands is permitted. • No ad-hoc roads through the wetland are permitted.	CON	

		• All areas disturbed by the excavator must be ripped and rehabilitated using suitable hygrophilous indigenous grasses / plant species, as advised by the ECO.		
	Unintentional increase in the development footprint resulting in further loss of wetland and reduction in overall wetland functionality.	• Areas outside of the authorised footprint must be treated as No-Go areas. No site staff or vehicles are permitted to enter these areas. • Should staff personnel enter the No-Go area beyond the shade cloth fences or dispose of any waste or construction material into the No-Go areas, that staff member must be given a disciplinary warning. • The contractor must limit work within the wetlands to minimize bed, bank and flow disturbance. • No storage areas are permitted within the No-Go areas. • Any areas disturbed outside of the authorised construction footprint must be rehabilitated within a month of occurrence to the satisfaction of the ECO (see section 4.4 of the EMPr). • All activity within the wetland must be carried out strictly according to the approved layout and technology alternatives (Figures 1 - 4).	CON	
Re-Enforcement of the Existing Dam Wall Using Gabion Basket Retaining Wall and Formalisation of Spillway within 32m of Wetland.	**Direct and indirect impact on wetland HGM 2, directly downstream of the dam wall.**	• No large, woody tree species must be cleared during the construction of the gabion basket retaining wall. • Vehicles and machinery used to excavate material and place the gabion baskets must be as small as practically possible and must not traverse the wetland system downstream (see No-Go areas indicated in Figure 5). • All staff working on the re-enforcement of the dam wall must have undergone environmental induction training and the training register retained in the site file for auditing purposes. • Any areas outside of the authorised development footprint unintentionally disturbed during construction must be rehabilitated in accordance with section 4.4 of the EMPr.	CON	
Construction of Fable Smallholdings Road and Gatehouse Within 32m of Wetland.	**Direct and indirect impacts on the adjacent wetland (HGM 1, 2 & 3).**	• The authorised development footprint (Figure 5) must be strictly adhered to so that construction work within the 32m regulated area is minimised.	CON	
Site Camp	**Incorrect placement of the site camp indirectly impacting adjacent sensitive wetland area.**	• The site camp must be located outside the 32m regulated area (Figure 5). • The site camp must be located on a flat portion of land and must include a parking area for vehicles. • Signage is to be erected outside site camp indicating relevant contact details of responsible person in case of complaints or emergencies after hours.	CON	

Record Keeping	**Proof of safe disposal & sustainably sourced material.**	The following documents must be retained on site for auditing purposes: • Environmental Authorisation • Environmental Management Program • Environmental Audits for the site • A full inventory of all hazardous materials must be retained on site with the respective Material Safety Data Sheets • Safe disposal slips for waste (general, hazardous and chemical toilets) • Proof of raw material sourcing (i.e. building sand, gravel etc.) • Environmental training registers • Record of incidents on site, including photographs (if applicable) • Any other permits, licenses or approvals that may be applicable to the site.	CON	
Vehicles & Equipment	**Disturbance to areas adjacent to construction site and contamination of environment.**	• Major vehicle servicing is not permitted on site. Only emergency / minor repair work is permitted. • A drip tray must be used to capture any spills during emergency / minor repair work. • No vehicles or equipment must be washed on site unless at a designated wash bay where dirty water must drain into a sump where hydrocarbons / contaminated material is separated out before the water is discharged into the surrounding environment. • The vehicle wash bay must be located outside of the 32m regulated area (indicated in Figure 5). • Roadways must be demarcated at site set up. No ad hoc roads must be constructed.	CON	
Material Storage Areas & Stockpiles	**Sedimentation risk and unsustainable use of topsoil.**	• Soil stockpiles must not exceed 2m in height, must be covered, or grassed to prevent erosion caused by exposure to heavy wind or rain. • Stockpiling of material must not take place on steep slopes where there is an opportunity for material to wash into the adjacent wetlands (i.e. outside of the 32m regulated area). • Topsoil stripped off the site must be stockpiled separately and used during rehabilitation / landscaping. • The topsoil stockpile must be kept free of weeds and alien invasive species.	CON	
Waste Management	**Littering and improper storage / disposal of waste accumulating on site and within adjacent sensitive wetland areas.**	• All waste must be disposed of in the designated waste management area to ensure that it is not blown around the site into the environmentally sensitive areas or adjacent properties. • The waste management area must be located outside of the 32m regulated area. • All waste must be stored under cover to prevent rain ingress and/or waste from being blown around site.	CON	

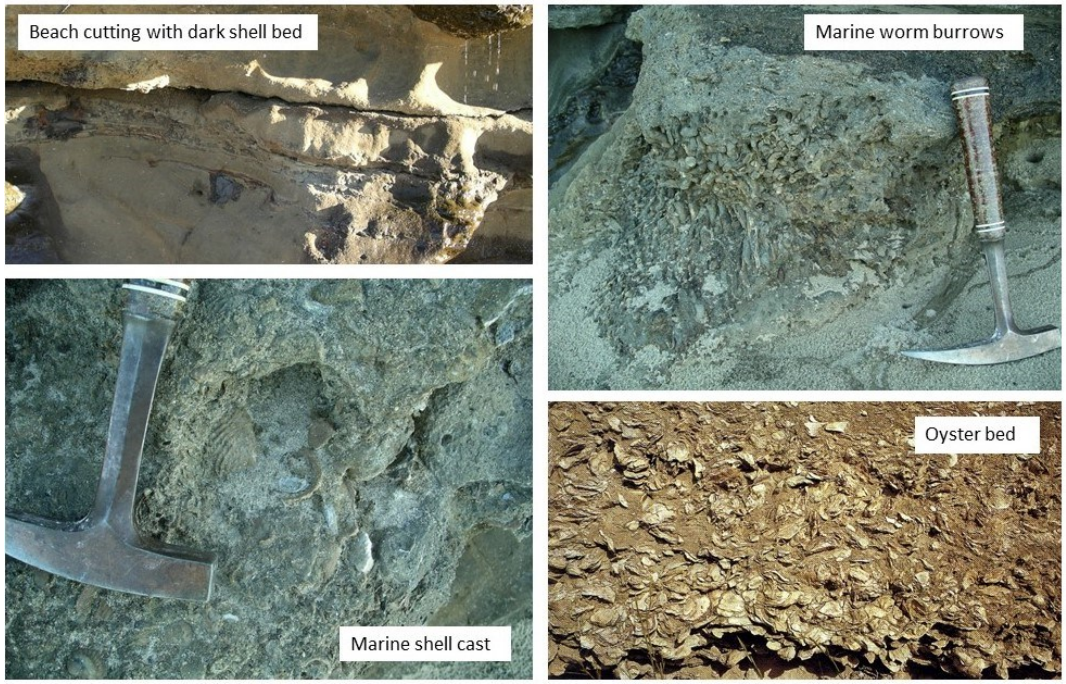
		• No waste must be buried or burnt on site or dumped in environmentally sensitive areas.		
	Greywater / hydrocarbons / chemicals washing into wetlands polluting the systems.	• Reduce requirements for storage and use of noxious liquids (i.e. fuel) on site. • No chemicals to be stored on site. • Potentially hazardous substances1 to be stored in a fenced off area that is undercover to prevent contamination of rainwater. • A full inventory of all hazardous materials must be retained on site with the respective Material Safety Data Sheets. • The hazardous storage area must not be located within 32m of the wetlands. • All potentially hazardous substances must be stored, in a bunded area (110% capacity of largest container) with an impermeable surface to prevent soil contamination during handling. • No bulk storage of fuel on site (>30m3). • Decanting of potentially hazardous substances must be carried out within the confines of a drip tray / similar or using a hand pump. • Hazardous waste must be disposed of at a registered hazardous landfill site. • All machinery and equipment working within the wetland must be inspected for faults and leaks to reduce the likelihood of hydrocarbons entering the adjacent watercourses. • Any spills on site must be cleaned up immediately using the Spill Response Procedure provided in section 5.4.1 of the EMPr. • The seven step Spill Response Procedure must be included in the ECO's environmental toolbox talk.	CON	
	Improper placement and management of toilet facilities negatively impacting adjacent sensitive wetland area.	• Ablution facilities must be accessible to all construction workers. • No pit latrines are permitted on site. • Toilets must be located within the site camp, outside of the 32m regulated area. • Staff must use the toilets provided and must not use any other areas on site as toilet facilities. • Toilets should be screened as far as is practically possible. • Ablution facilities must be checked regularly and kept in a clean state.	CON	
Spills & Incidents	**Hydrocarbons or other liquids / chemicals contaminating watercourses and the surrounding environment.**	• The ECO's environmental toolbox talk must include a spill response procedure and incident reporting so all staff know how to clean up minor and major spills (included in the Environmental Awareness Plan; section 5.0 of the EMPr). • Drip trays must be available near the hazardous storage area and where hazardous materials are being used on the site.	CON	

[1] Hazardous substances refer to substances scheduled in the Hazardous Substances Act (1973) and Hazardous Chemical Substances Regulations (1995) and include paint, oils, fuels, solvents, pesticides.

		• A Spill Kit / similar must be available near the hazardous storage area. • If a spill does occur, every effort must be made to prevent the spill from entering the adjacent wetland systems (berms, booms etc.). • No vehicles or equipment must be washed on site unless at a designated wash bay where dirty water must drain into a sump where hydrocarbons / contaminated material is separated out before the water is discharged into the surrounding environment. • The vehicle wash bay must be located outside of the 32m regulated area (indicated in Figure 14). • No refuelling of machinery / vehicles on site.		
Dust & Emissions	**Dust coating adjacent wetland vegetation reducing functionality.**	• During high winds, dust supressing must take place using water carts / hose to prevent excessive dust on site. • Any fine materials stockpiled on site must be covered to prevent dust from being blown around. • Material transported to site on the back of trucks must be covered, • A complaints register must be maintained on site and any complaints received addressed timeously. • A shade cloth fence / other screening techniques must be used to reduce dust from entering adjacent wetland systems. • All construction vehicles and equipment must be well maintained to reduce emissions generated on site.	CON	
Cultural / Heritage	**Items of historical, archaeological or cultural significance destroyed or disturbed during excavations.**	• During earthworks, should any objects with historical, archaeological or cultural significance be uncovered, all work in this area must cease and the heritage authority, AMAFA, notified. • Objects with historical, archaeological or cultural significance must not be destroyed or removed from site without prior permission from AMAFA. • Should any human remains be discovered, all work in this area must cease and the South African Police contacted for further direction.	CON	

Palaeontological / Fossils	**Fossils destroyed or disturbed during excavations.**	• During earthworks, the following procedure must be adhered to if fossils are discovered (see photographs provided below for examples of the type of fossils that could be found on the site): - When excavations begin the rocks must be given a cursory inspection by the ECO or designated person. Any fossiliferous material (shells, plants, insects, bone, coal – see Figure 6) must be put aside in a protected place. This way construction activities will not be interrupted. - Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (see below). - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. - If there is any possible fossil material found then a qualified palaeontologist, must visit the site to inspect the selected material. - Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. - If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. - If no fossils are found and the excavations have finished then no further monitoring is required.	CON & ECO	

Figure 6: Examples of fossils from the Quaternary Coastal Deposits (Source: Prof. Marion Bamford).



4.4. REHABILITATION / POST CONSTRUCTION

Once construction is complete, the Contractor and ECO must ensure that the mitigation measures listed in the table below are adhered to. This will ensure that there will be no residual impacts on the environment remaining once construction is complete. Rehabilitation will therefore take place in a phased manner concurrently with construction.

Table 9: Impact Management Actions to be Adhered to Once Construction is Complete.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Construction of Precast Concrete Culvert in	**Infilling of 287m^2 of hillside seep wetland.**	To remediate the loss of wetland, the wetland specialist recommends that the applicant implement measures to improve the state of the remaining portions of wetland (shown in Figure 5). The rehabilitation interventions include: • Removal of any material previously infilled into wetland when the land was under cultivation.	CON	

Wetland HGM 3.		• An alien vegetation removal program must be implemented within the wetland system (see section 5.4.2 of the EMPr). • The remaining wetland area within Fable Smallholdings must be retained for conservation (non-development servitude registered).	CON DEV	
Post-Construction Audit	**To ensure the site is stable and there are no outstanding environmental non-compliances that need to be corrected by the Contractor.**	• The ECO must carry out a post-construction inspection of the site once construction in certain areas of the Estate is complete. • Clearance from the ECO must be obtained to ensure there are no outstanding environmental non-compliances prior to the Contractor vacating the site. • The following areas must be audited by the ECO in the post-construction inspection: - No waste / litter remaining on site; - There is no evidence of spills or building rubble remaining on site; - There are no left over building material remaining on site; - All exposed surfaces have been rehabilitated / landscaped to avoid sediment wash away; - Stormwater management has been formalised; - There is no evidence of erosion; and - No environmentally sensitive areas, indicated in Figure 5, have been damaged. If damage is evident, rehabilitation measures must be prescribed by the ECO and carried out by the Contractor.	CON & ECO	
Unintentional damage to wetlands	**Rehabilitation.**	• Where the wetland has been damaged the following measures are to be taken to ensure restoration of the habitat: ○ ECO must assess the damaged area ○ Any construction debris or contaminants within the wetland must be removed ○ Original soil structure must be restored ○ Any impedance or diversion to waterflow must be removed ○ Area must be vegetated with riparian or wetland species. • No loose soil or damaged banks can be left behind after construction.	CON & ECO	

4.5. OPERATION

Provided that the above mitigation measures /actions are adhered to, the operational phase will have a low impact on the surrounding environment. Table 10 provides mitigation measures which are ongoing through-out the lifespan of the project.

Table 10: Impact Management Actions to be Adhered to During the Operational Phase.

Aspect	Impact	Mitigation / Actions	Responsible Person	Compliant (Yes / No)
Operational phase of the new Fable Smallholdings Road and Gatehouse.	**Alteration of flow through hillside wetland (HGM Unit 3) because of unsuitable placement of the concrete culvert in wetland.**	• Should the culvert become blocked / require maintenance work, only material within the culvert may be removed (i.e. no excavation within the wetland area to take place).	DEV	

5.0. ENVIRONMENTAL AWARENESS PLAN

This Environmental Awareness Plan describes the manner in which the holder of the Environmental Authorisation must inform all Contractors and employees of the environmental risk which may result from their work; and that the risks must be dealt with to avoid pollution or the degradation of the environment.

5.1. INDUCTION

All Primary Contractors must receive a copy of the Environmental Awareness Plan and sign the register attached stating that they have received a copy of the EMPr and are aware of the environmental risks. Contact details for the Environmental Control Officer (ECO) must be provided below if Contractors require any clarification or assistance with the demarcation of sensitive areas (shown in Figure 5).

Table 11: Important Contact Information.

Designation	Company	Contact Person	Contact Details
Holder of the Environmental Authorisation	Iron Property Group (Pty) Ltd	As per the requirements of the Protection of Personal Information Act (POPI), contact details to be provided prior to construction.	
Environmental Control Officer	TBC		
Consulting Engineer	Struxit Projects		

5.2. ENVIRONMENTALLY SENSITIVE AREAS

Please refer to section 1.3 of the EMPr and Figure 5, which provides a description of the environmentally sensitive areas associated with the Fable Smallholdings Road. These areas must be demarcated and avoided during construction. Contractors must be aware of the primary Impact Management Outcome for the project, which is for ***construction to be constrain to the authorised development footprint thereby minimising and further impact on the wetland system and to ensure the Present Ecological State (PES) of the greater wetland system within Fable Smallholdings is improved.***

5.3. BASIC ENVIRONMENTAL TRAINING POINTS

All staff working within the 32m regulated area associated with the wetlands must receive basic environmental training, which includes the items listed below. Please note that the ECO is available to conduct environmental training should the Contractor prefer.

- Context of the Fable Smallholdings Road and the applicability of the EA and EMPr.
- The location of environmentally sensitive features (Figure 5).
- Restrictions associated with the environmentally sensitive features (i.e. no-go areas)
- Waste management (general & hazardous).
- No cement mixing directly on exposed soil outside of construction footprint.
- Management of hazardous substances (paint, oil, drip trays, spills etc.).
- Sanitation (i.e. the use of toilets).

5.4. PROCEDURES FOR HANDLING ENVIRONMENTAL RISKS

All construction staff working on the Fable Smallholdings Road must be aware of the procedures listed below.

5.4.1. SPILL RESPONSE[2]

In the event of a spillage, the following procedure must be adhered to so that there is minimal impact on the surrounding environment. Diesel and oil are the most likely hydrocarbons that will be spilled on the site.

1. **ASSESS** THE RISK
    - WHAT was spilled; and
    - HOW MUCH was spilled.

2. SELECT THE RELEVANT PERSONAL PROTECTIVE EQUIPMENT **(PPE)**

3. **CONFINE** THE SPILL
    - Block, Divert away from sensitive environmental areas and confine spill.
    - Use absorbents or boom in Spill Kit
    - Stop the flow of the spill.

4. **STOP** THE SOURCE

5. EVALUATE THE SPILL AND IMPLEMENT APPROPRIATE **CLEAN UP**
    - Re-assess the spill and decide on most appropriate method of clean up.
    - Absorb spill using materials in Spill Kit or soil / wood chips.
    - Using a broom, rag or other material, scrub the impacted area or using a spade, dig out the contaminated soil.

6. **DECONTAMINATE**
    - All PPE must be removed and disposed of as hazardous waste if contaminated.
    - All rags / materials used during the clean up as well as the actual spilled material must be disposed of as hazardous waste.

7. **REPORT**ING
    - Responsible person to determine if the spill constitutes an “incident”, see definition below.
    - All incidents must be reported as per the procedure outlined in section 5.4.3.

[2] Seven Step Spill Procedure Accessed from Border Hazmat: Specialised Environmental Cleaning (http://borderhazmat.co.za/7-step-spill-procedure/). Accessed on 12th March 2021.

5.4.2. ERADICATION OF ALIEN INVASIVE PLANTS

Alien Invasive Plant (AIP) species rapidly establish in disturbed areas due to the lack of competition from other indigenous species. AIP species rapidly colonise and area and can spread to other areas. It is therefore important for construction staff to receive some training on how to identify and remove AIPs before they become a nuisance and negatively impact the rehabilitation efforts underway within the study area.

Notes:

- *Mechanical removal of AIPs (i.e. hand pulling / slashing) is preferred above chemical control especially in the No-Go areas.*
- *All mixes given as a percentage (ml per 100 l water/diesel).*
- *Apply methods either by species or by area i.e. multiple areas, one species or one area, multiple species.*
- *Autumn and winter - basal stem and cut stump treatments, no foliar spraying.*
- *Spring and summer - foliar spraying can be done on suitable plants. Rule of thumb - don't spray anyting over 1.5 m tall. Spray during the morning (8 am to 11 am) during calm conditions.*
- *NB PPE when spraying - rubber gloves, goggles, respirator, apron/chemical overall, rubber boots.*
- *NEVER use diesel for foliar application.*
- *If in doubt check the herbicide label.*
- *Follow up treatment/clearance is essential for effective AIP management.*

Table 12: Alien Invasive Plant Management[3].

	Species	Common Name	Category (NEMBA)	Size class	Mechanical control	Chemical control	Special considerations	Photographs
Terrestrial AIPs	***Ageratum conyzoides***	Invading ageratum	1b	All plants	Hand pull, slash, mow regularly	Folair spray 0.5% Triclopyr (Garlon 480) in water with adjuvant (Actipron Super @ 0.5%)		

[3] Information in the table has been obtained from SDP: Ecological and Environmental Services.

	Caesalpinia decapetala	Mauritius thorn	1b	Small plants (<1 m)	Hand pull, slash	Folair spray 0.5% Triclopyr (Garlon 480) in water with adjuvant (Actipron Super @ 0.5%)		
				Large plants (>1 m)	Slash and cut, pull up root.	Folair spray 0.5% Triclopyr (Garlon 480) in water with adjuvant (Actipron Super @ 0.5%). If plants are higher than 1.5 m, cut back and spray regrowth when 0.5 m high.		
	Cestrum laevigatum	Ink Berry	1b	Small plants (<1 m)	Hand pull, slash.	None		
				Large plants (>1 m)	Slash and cut, pull up root.	Treat cut stump with 1.0% Triclopyr (Garlon 480) in diesel or water with adjuvant (Actipron Super @ 0.5%). Basal stem application with 1.0% Triclopyr (Garlon 480) in diesel.		
	Chromolaena odorata	Triffid Weed	1b	Small plants (<1 m)	Hand pull, slash, mow.	Foliar spray 0.375% Triclopyr (Garlon 480) in water with adjuvant (Actipron Super @ 0.5%)		
				Large plants (>1 m)	Slash and cut, pull up root.	Treat cut stump with 1.0% Triclopyr (Garlon 480) in diesel or water with adjuvant (Actipron Super @ 0.5%)	**To address dense infestations:** 1) cut back plants and treat stump during winter 2) treat regrowth with a foliar spray once spring regrowth has occurred (new growth approx 0.5m in height). Use dye to mark sprayed plants.	

	Datura stramonium	Common thorn apple	1b	All Plants	Hand pull	Folair spray Glyphosate (Springbok 360 SL) @ 2l per Ha.	Hand pulling should be sufficient on smaller properties.	
	Grevillea robusta	Silky oak	3	Small plants (<1 m) and coppice	Hand pull and slash	Try: foliar spray 0.75% Triclopyr (Garlon 480) in water with adjuvant (Actipron Super @ 0.5%)		
				Large trees and saplings > 1 m	Fell or ring bark	Try: Treat cut stump with 2.0% Triclopyr (Garlon 480) in diesel or water with adjuvant (Actipron Super @ 0.5%)		
	Ipomoea purpurea	Morning glory	1b	All plants	Pull down and slash	Scrape and paint stem using undiluted Glyphosate (Springbok 360 SL or similar).		

	Ipomoea alba	Moon flower	1b	All plants	Pull down and slash	Scrape and paint stem using undiluted Glyphosate (Springbok 360 SL or similar).		
	Lantana camara	Lantana	1b	Small plants (<1 m)	Hand pull and slash	Foliar spray 0.75 - 1% Picloram (Access 240 SL) in water with adjuvant (Actipron Super @ 0.5%)		
				Large plants (>1 m)	Slash and cut, pull up root.	Treat cut stump with 1.0% Picloram (Access 240 SL) in water with adjuvant (Actipron Super @ 0.5%)	Apply to low cut stumps (10 – 20 cm high) preferably with a single cut surface. Apply to complete cut surface of stumps with a diameter or less than 10 cm. Where multiple stumps are present, all cut surfaces must be treated. For bigger stumps apply to the cambial region (sapwood) of the cut surface. In all cases, apply until the point of run-off. A follow-up spray as a coppice application may be required. Use dye to mark cut stumps.	

	Melia azedarach	Syringa	1b	Small plants (<1 m)	Hand pull and slash	None		
				Large trees and saplings > 1 m	Fell or ring bark	Trees up to 25 cm stem diameter: Basal stem application with 2.0% Triclopyr (Garlon 480) in diesel. Larger trees: Treat cut stump with the same mixture (or in water with adjuvant - Actipron Super @0.5%)		
	Pennisetum purpureum	Napier Fodder	1b	All plants	Cut back and pull up roots	Cut back and treat regrowth with a Glyphosate (Springbok 360 SL or similar) herbicide - 1.5% solution with water.		
	Psidium guajava	Guava	2/3 in KZN	Small plants (<1 m)	Hand pull and slash	Foliar spary 1.5% fluroxypyr / picloram (Plenum 160 ME) in water with adjuvant (Actipron Super @ 0.5%)		
				Large trees and saplings > 1 m	Fell or ring bark	Treat cut stump with 12.5% Imazapyr (ECO-Imazapyr 100SL) in water	Use dye to mark treated stumps	

	Ricinus communis	Castor Oil	1b	Small plants (< 1m)	Hand pull and slash	None		
				Large plants (>1 m)	Cut back and pull up roots	Treat cut stump with 1.0% luroxypyr / picloram (Plenum 160 ME) in water with adjuvant (Actipron Super @ 0.5%)		
	Schinus terebinthefolius	Brazilian Pepper	1b in KZN	Small plants (<1 m)	Hand pull	None		
				Large plants (>1 m)	Fell or ring bark	Basal stem treatment using 2.0% Triclopyr (Garlon 480) in diesel.	Coppices readily. Dispose of cut material.	
	Solanum mauritianum	Bugweed	1b	Small plants (up to 1.5 m)	Hand pull	Foliar spray 0.5% Triclopyr (Garlon 480) in water with adjuvant (Actipron Super @ 0.5%)		
				Large plants (>1.5 m)	Cut back and pull up roots	Basal stem treatment using 2.0% Triclopyr (Garlon 480) in diesel.		

Aquatic AIPs	***Azolla filiculoides***	Red Water Fern	1b	All plants	Remove by hand	Not necessary	The biological control agent *Stenopelmus rufinasus* is naturalised in KZN and is effective. If infestation occurs, plants must be checked for the presence of the weevil. Once its presence has been confirmed, no further action must be taken. The weevil will effectively control the infestation.	

5.4.3. REPORTING OF ENVIRONMENTAL INCIDENTS

Definitions

"Incident" as defined in NEMA	An unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property.
"Incident" as defined in NWA	Incident or accident in which a substance- (i) pollutes or has the potential to pollute a water resource: or (ii) has or is likely to have. a detrimental effect on a water resource.
"*responsible person*" as defined in NEMA & NWA	Includes any person who- (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident.
"*relevant authority*" as defined in NEMA	(i) a municipality with jurisdiction over the area in which an incident occurs; (ii) a provincial head of Department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs; (iii) the Director-General; (iv) any other Director-General of a national department.

Procedure should an *incident*, as defined above, occur on site:

The responsible person or, where the incident occurred in the course of that person's employment, his or her employer	Complete an Emergency Incident Report (template provided in Appendix 2). The report must be sent to the following personnel within 14 days of the incident occurring. (i) the Director-General of the Department of Environmental Affairs; (ii) the Director-General of the Department of Water & Sanitation; (iii) the South African Police Services and the relevant fire prevention service; (iv) the relevant provincial head of department or municipality; (v) The relevant catchment management agency, if applicable; and All persons whose health may be affected by the incident.
The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident-	(i) Take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons; (ii) Undertake clean-up procedures; (iii) Remedy the effects of the incident; (iv) Assess the immediate and long-term effects of the incident on the environment and public health;

Should the responsible person fail to comply, or inadequately comply with a directive received by a relevant authority, there be uncertainty as to who the responsible person is; or there be an immediate risk of serious danger to the public or potentially serious detriment to the environment, a relevant authority may take the measures it considers necessary to contain and minimise the effects of the incident; undertake clean-up procedures; and remedy the effects of the incident. A relevant authority may claim reimbursement of all reasonable costs incurred by it in terms of subsection (8) from every responsible person jointly and severally.

6.0. RECEIPT OF ENVIRONMENTAL MANAGEMENT PROGRAMME & ACKNOWLEDGEMENT OF ENVIRONMENTAL RISKS

By signing this register, I confirm that I have received a copy of the Environmental Management Programme (EMPr) prepared by Confluence Strategic Development (Pty) Ltd and dated June 2022. I am aware of the environmental sensitivities of the site as shown in Figure 5 of the EMPr.

COMPANY	NAME	CONTACT DETAILS	AREA OF WORK	SIGN

APPENDIX 1

EMERGENCY INCIDENT REPORT TEMPLATE