1 IMPACTS AND RESIDUAL RISKS ASSESSMENT

1.1 Introduction

Impact assessment must take account of the nature, scale and duration of effects on the environment, whether such effects are positive (beneficial) or negative (detrimental). It is also imperative that each issue / impact is also assessed according to the project stages from planning, through construction and operation to the decommissioning phase. Where necessary, the proposal for mitigation or optimisation of an impact is noted.

The environmental impact assessment is focused on the following phases of the project, namely, the **Construction** and **Operational Phases** only. As the project entails expansion and development of new infrastructure which will be permanent, decommissioning is not applicable to this project.

1.2 Methodology

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- Nature: A brief written statement of the environmental aspect being impacted upon by a particular action or activity;
- Extent: The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- Duration: Indicates what the lifetime of the impact will be;
- Intensity: Describes whether an impact is destructive or benign;
- Probability: Describes the likelihood of an impact actually occurring; and
- Cumulative: In relation to an activity, means the impact of an activity that in itself may not be significant
 but may become significant when added to the existing and potential impacts eventuating from similar or
 diverse activities or undertakings in the area.

Significance is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

The total number of points scored for each impact indicates the level of significance of the impact.

Table 1-1: Criteria to be used for the rating of impacts

Criteria		Descr	iption	
EXTENT	National (4) The whole of South Africa	Regional (3) Provincial and parts of neighbouring provinces	Local (2) Within a radius of 2 km of the construction site	Site (1) Within the construction site
DURATION	Permanent (4) Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	Long-term (3) The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter. The only class of impact which will be non-transitory	Medium-term (2) The impact will last for the period of the construction phase, where after it will be entirely negated	Short-term (1) The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase
INTENSITY	Very High (4) Natural, cultural and social functions and processes are altered to the extent that they permanently cease	High (3) Natural, cultural and social functions and processes are altered to the extent that they temporarily cease	Moderate (2) Affected environment is altered, but natural, cultural and social functions and processes continue, albeit in a modified way	Low (1) Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected
PROBABILITY OF OCCURRENCE	Definite (4) Impact will certainly occur	Highly Probable (3) Most likely that the impact will occur	Possible (2) The impact may occur	Improbable (1) Likelihood of the impact materialising is very low

Table 1-2: Criteria for the rating of classified impacts

	Class	Description
+	Any value	Any positive / beneficial 'impact', i.e. where no harm will occur due to the activity being undertaken.
	Low impact (4 – 6 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
	Medium impact (7 – 9 points)	Mitigation is possible with additional design and construction inputs.
-	High impact (10 – 12 points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
	Very high impact (12 – 14 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw.
	Status	Denotes the perceived effect of the impact on the affected area.
	Positive (+)	Beneficial impact.
	Negative (-)	Deleterious or adverse impact.
	Neutral (/)	Impact is neither beneficial nor adverse.
		nat the status of an impact is assigned based on the status quo – i.e. should the project not all negative impacts are equally significant.

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

Mitigation measures identified as necessary will be included in an EMPr.

1.3 Rating of Potential Impacts

The potential impacts identified are explained per phase of the project and mitigation measures are provided. The impacts are explained in terms of construction and operational phases.

1.3.1 Soils and Agriculture

Table 1-3: Earth-works – soils and agricultural impacts

Table 1-3: Ear	Table 1-3: Earth-works – soils and agricultural impacts	II impacts						
Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	(E+D+I+P)
Construction	Aspect:	Without	2	2	2	2	ø	Medium
	Construction activities (site	With	_	-	~	~	4	Low
	Impact: Physical degradation due to the	Mitigation measures: Strip topsoil prior t	gation measures: Strip topsoil prior to any construction activities.	tion activities.				
	removal and compaction of soil during construction activities.	 No topsoil may Topsoil must be Topsoil must no 	be removed excel e kept separate fro et be stockpiled for	pt from those area om overburden and r an extended peri	s where construct I must not be mixe od of time.	No topsoil may be removed except from those areas where construction will be undertaken. Topsoil must be kept separate from overburden and must not be mixed with other layers of soil and sub-soil. Topsoil must not be stockpiled for an extended period of time.	ken. s of soil and sub-s	oil.
		 Soil must be returned. be de-compacted. 	turned to any exca	avated or disturbe	d area in the corre	Soil must be returned to any excavated or disturbed area in the correct order, with topsoil on top. The top-soil must then be de-compacted.	oil on top. The top	o-soil must then
	Aspect:	Without	2	2	2	ဗ	o-	Medium
	Construction activities (site	With	_	_	~	2	-5	Low
	Impact: Physical degradation due to soil erosion as a result of exposed soil and topsoil.	Mitigation measures: Soil erosion is rela Mitigation measur exposed areas arr exposed areas arr Site clearing to be Exposed soil to be	elated to the wate sures therefore in are rehabilitated a be undertaken in a be protected from	Soil erosion is related to the water velocity and volume as well as the prese Soil erosion is related to the water velocity and volume as well as the prese Mitigation measures therefore include the development of velocity barries exposed areas are rehabilitated as detailed in the EMPr. Site clearing to be undertaken in a phased manner to minimise the area of Exposed soil to be protected from erosion, especially during rainfall events	me as well as the ment of velocity I IMPr. to minimise the ar	Soil erosion is related to the water velocity and volume as well as the presence of well-established vegetation. Soil erosion is related to the water velocity and volume as well as the presence of well-established vegetation. Mitigation measures therefore include the development of velocity barriers/berms for stormwater run-off and ensuring exposed areas are rehabilitated as detailed in the EMPr. Site clearing to be undertaken in a phased manner to minimise the area of soil exposed to erosion. Exposed soil to be protected from erosion, especially during rainfall events	sstablished vegeta stormwater run-o to erosion.	tion. If and ensuring
	Aspect:	Without	_	2	2	2	7-	Medium
	Establishment of contractor lavdown area (camp)	With	1	1	1	1	4-	Low
	Impact: Impact on land use and land capability – disturbance of soils due to the location of the construction camp and	Mitigation measures: The contractor lay The contractor lay Mo material may b	es: laydown area mus laydown area may y be stored or equ	st not be placed in r not be placed in or ipment repaired b	close proximity to or in close proximi eyond the bounda	lation measures: The contractor laydown area must not be placed in close proximity to any of the residential houses. The contractor laydown area may not be placed in or in close proximity to any watercourse. No material may be stored or equipment repaired beyond the boundaries of the contractor laydown area.	tial houses. rse. tor laydown area.	
	associated infrastructure.							

1.3.2 Geology and Topography

Table 1-4: Geology and topography impacts

מטוב ויד. ספר	able 1-4. Geology and topography impacts								
Phase	Potential Aspect and/or Impact	Mitigation		Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I +P)	ıce (E+D+I P)
Construction	Aspect:	Without		~	2	င	က	6-	Medium
	Foundations.	With		~	2	~	2	9	Low
	Impact: Disturbance of surface geology	Mitigation me	measures:] 			-		
	resulting in site instability due to	It is imposer	ortant to	allow for on-stability proble	site inspections ar	nd evaluations by	It is important to allow for on-site inspections and evaluations by an experienced engineering geologist / geotechnical engineers of that stability problems can be timeously identified and remedied	ngineering geologi	ist / geotechnical
	inappropriate engineering	All earth-	-works sh	nould be carrie	ed out in a manner	r to promote stable	All earth-works should be carried out in a manner to promote stable development of infrastructure.	frastructure.	
	planning and interventions.	It is recor	mmende	d that earth-w	orks be carried ou	it along the guidel	It is recommended that earth-works be carried out along the guidelines given in SANS 1200 (current version).	1200 (current ver	sion).
		 Earth-wo of storm 	orks and (drainage mea	Earth-works and drainage measures should be desig of stormwater or droindwater anywhere on the sites	designed in such a	Earth-works and drainage measures should be designed in such a way as to prevent ponding of, or high concentrations of stormwater or groundwater anywhere on the sites	ponding of, or hig	yh concentrations
		The geol	logy must	t be returned	The geology must be returned to pre-construction condition.	condition.			
	Aspect:	Without		_	2	2	2	L-	Medium
	Construction activities (site	With		_	1	~	_	4	Low
	Impact:	Mitigation me	measures:						
	Gully or 'donga' erosion by	Cut emb	bankment	s must be p	rotected against s	surface erosion k	Cut embankments must be protected against surface erosion by the establishment of vegetation immediately after	it of vegetation ii	mmediately after
	concentrated, uncontrolled water-	construction.	tion.		•		•	,	
	flow.	Suitable s	subsoil d	rainage, storr	nwater control and	I preventable solu	le subsoil drainage, stormwater control and preventable solutions to avoid soil erosion will be required in areas with	rosion will be requ	ired in areas with
		sandy so	oils, and p	particularly in	soils, and particularly in close proximity to watercourses.	watercourses.			
		Adequate	e stormw	ater surface c	ıate stormwater surface drainage must be adopted.	adopted.			

1.3.3 Air Quality and Odour

Table 1-5: Air quality and odour impacts

						_					
(E+D+I+P)	Medium	Low				I be limited and		ion.		aking enclosures)
Significance (E+D+I+P)	6 -	ç.		olication of water.	tion of run-off.	ction locations wil		rable to wind eros		osed by wind-brea	
Probability (P)	3	2		Dust must be suppressed on the construction-site during dry periods by the regular application of water.	Water used for this purpose must be used in quantities that will not result in the generation of run-off.	dispersion from construction activities, roads, soil stockpiles and other construction locations will be limited and		Stockpiles and other fill material sources will be positioned such that they are not vulnerable to wind erosion.	S.	All stockpiles should be maintained for as short a time as possible and should be enclosed by wind-breaking enclosures	
Intensity (I)	2	~		e during dry period	ntities that will not	ds, soil stockpiles		positioned such that	Istruction material	a time as possible	
Duration (D)	2	_		ne construction-site	ust be used in qua	tion activities, roa	xtent practical.	al sources will be p	Cover skips and trucks which are loaded with construction materials.	ained for as short a	
Extent (E)	2	-	ures:	e suppressed on the	for this purpose m	sion from construc	to the maximum ex	nd other fill materia	and trucks which a	s should be mainta	of similar height to the pile.
Mitigation	Without	With	Mitigation measures:	Dust must be	 Water used 	 Dust dispers 	suppressed	 Stockpiles a 	 Cover skips 	 All stockpiles 	of similar he
Potential Aspect and/or Impact	Aspect:	Construction activities (site clearing, operation of vehicles,	equipment etc.).	Impact:	rugilive dust eriissioris irom	debris nandling and debris piles;	mobile plant / machinery and	general construction activities.			
Phase	Construction Aspect:										

	Stockpiles s	Stockpiles should be situated away from watercourses and nearby receptors and should take into account the predominant	way from watercou	rses and nearby re	ceptors and shou	Id take into accoun	t the predominant
	A speed limit o Dust and mud construction a	wind unection. A speed limit of 40 km/hr should be set for all vehicles travelling on any gravel roads or near stockpiles. Dust and mud should be controlled at vehicle exit and entry points to prevent the dispersion of dust and mud beyond the construction area boundaries.	ld be set for all veh olled at vehide exit	icles travelling on and entry points t	any gravel roads to prevent the disp	or near stockpiles. oersion of dust and	I mud beyond the
Aspect:	Without	2	_	2	က	φ	Medium
Construction activities (site clearing; operation of vehicles,	With	2	_	1	2	မှ	Low
equipment etc.). Impact: Generation of fumes from vehicle emissions may pollute the air.	Mitigation measures: All vehicles and ec A register must be Vehicles should tra	gation measures: All vehicles and equipment must be in good working order. A register must be maintained for vehicle maintenance. Vehicles should travel the shortest distances practical in order to undertake the required construction activities.	st be in good work for vehicle mainter test distances prac	ng order. lance. tical in order to un	dertake the requi	red construction ac	tivities.
Aspect:	Without	_	7	ဇ	2	φ	Medium
Chemical toilets.	With	~	_	-	2	ς	Low
Release of odours as a result of the chemical toilets on-site	Mitigation measures:	sures:	-	-			
	Chemical toThey must k	Chemical follets must be provided and cleaned on a regular basis. They must be situated at least 50 m from any watercourse.	ded and cleaned or 50 m from any wat	ה a regular basis. ercourse.			
	They must k	They must be provided at a ratio off 1:15 i.e. one toilet for every 15 labourers.	io off 1:15 i.e. one	toilet for every 15 l	abourers.		
	 Servicing re 	icing receipts must be maintained and kept on site within the site environmental file.	intained and kept o	n site within the sit	te environmental	file.	

1.3.4 Waste

Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	(E+D+I+P)
Construction Aspect:	Aspect:	Without	_	Τ-	2	3	2-	Medium
	Construction staff, vehicles and equipment.	With	_	_	1	2	-5	Low
	Impact:	Mitigation measures:	ures:					
	Increased litter and waste within the project areas due to	 Ensure that waste general 	Ensure that an adequate number of rubbish b waste generated during construction activities.	ber of rubbish bins uction activities.	s are provided so	Ensure that an adequate number of rubbish bins are provided so as to prevent litter and ensure the proper disposal of waste generated during construction activities.	and ensure the pı	oper disposal of
	construction activities and start	Implement eff environment.	ffective waste mar	nagement in order	to prevent constru	Implement effective waste management in order to prevent construction related waste from impacting on the surrounding environment.	from impacting or	the surrounding
		 Waste dispos 	sal to be done at a	Waste disposal to be done at a registered landfill site.	site.			
		 No burning a 	No burning of waste is permitted.	∍d.				
Construction Aspect:	Aspect:	Without	_	2	2	2	2-	Medium
	Construction staff, vehicles and equipment.	With	_	_	_	2	-5	Low
	Impact: Accidental spills from vehicles or equipment can pollute the surrounding environment	Mitigation measures: Ensure that spill ki	ures: spill kits are availa	ble during construc	ction activities in th	gation measures: Ensure that spill kits are available during construction activities in the event of accidental spills and/or leaks.	tal spills and/or lea	iks.

Re-fuelling should take place at the local petrol station, if not possible, bunded surfaces will be necessary where any refuelling is undertaken. Vehicular maintenance should be undertaken at a local workshop, if not available, bunded surfaces will be necessary where any works are undertaken on vehicles. Staff environmental awareness training should be done in toolbox talks.

1.3.5 Noise

Table 1-6: Noise impacts

1.3.6 Visual

Table 1-7: Visual impacts

Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	(E+D+I+P)
Construction Aspect:	Aspect:	Without	2	ဇ	2	1	æ	Medium
	Construction activities.	With	2	2	_	_	φ	Low
	During construction the dearing and grading of the site would create a visual scar in the landscape. Construction vehicles and staff will be a visual disturbance to the surrounding community and landowners.	Mitigation measures: Vegetation clearing Locate the constru Vegetation clearing Rehabilitate cleare Dust suppression t Maintain a neat co	yation measures: Vegetation clearing should be limited to the min Locate the construction camp and storage areas Vegetation clearing should use a phased approx Rehabilitate cleared areas as soon as possible. Dust suppression techniques should be made u Maintain a neat construction site by removing ru	fation measures: Vegetation clearing should be limited to the minimum area necessary for upgrading Locate the construction camp and storage areas in zones of low visibility i.e. behind Vegetation clearing should use a phased approach, only clearing vegetation when rechabilitate cleared areas as soon as possible. Dust suppression techniques should be made use of. Maintain a neat construction site by removing rubble and waste materials regularly.	num area necessa in zones of low vis ch, only clearing vo e of.	gation measures: Vegetation clearing should be limited to the minimum area necessary for upgrading of the road and culverts. Locate the construction camp and storage areas in zones of low visibility i.e. behind dense bush or away from receptors. Vegetation clearing should use a phased approach, only clearing vegetation when required. Rehabilitate cleared areas as soon as possible. Dust suppression techniques should be made use of. Maintain a neat construction site by removing rubble and waste materials regularly.	the road and culve nse bush or away iired.	rts. from receptors.

1.3.7 Traffic

Table 1-8: Traffic impacts

Without With With 1 With 1 With 1 Mitigation measures: Arrangements must be made winetworks. All damaged roads must be reparately are to be roadworthy. All vehicles are to be roadworthy. Seatbelts are to be worn at all time. When using heavy or large vehic. Any incident or damage to a vehic.				;			:	i .
Without 1 2 3 -6 Low Mitigation measures: Arrangements must be made with local communities in order to accommodate construction vehicles on existing roan networks. All damaged roads must be repaired by the contractor. Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately.	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance	(E+D+I+P)
With 1 1 3 -6 Low Mitigation measures: Arrangements must be made with local communities in order to accommodate construction vehicles on existing roan networks. All damaged roads must be repaired by the contractor. Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately.		Without	-	7	2	က	φ	Medium
 Mitigation measures: Arrangements must be made with local communities in order to accommodate construction vehicles on existing roan networks. All damaged roads must be repaired by the contractor. Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		With	~	-	_	က	φ	Low
 Arrangements must be made with local communities in order to accommodate construction vehicles on existing roan networks. All damaged roads must be repaired by the contractor. Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		Mitigation meas	ures:					
 networks. All damaged roads must be repaired by the contractor. Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		Arrangemen	ts must be made	with local commu	nities in order to	accommodate cons	truction vehicles	on existing road
 All damaged roads must be repaired by the contractor. Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		networks.						
 Construction vehicles are to avoid main roads during peak traffic hours. All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		 All damaged 	roads must be re	paired by the contri	actor.			
 All vehicles are to be roadworthy. Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		 Construction 	vehicles are to av	void main roads du	ring peak traffic he	ours.		
 Seatbelts are to be worn at all times. When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		 All vehicles a 	are to be roadwort	hy.				
 When using heavy or large vehicles / equipment, "spotters" are to be present to assist the driver with his blind spots. Any incident or damage to a vehicle must be reported immediately. 		 Seatbelts are 	e to be worn at all	times.				
 Any incident or damage to a vehicle must be reported immediately. 		 When using 	heavy or large vel	nicles / equipment,	"spotters" are to k	be present to assist t	the driver with his	blind spots.
		 Any incident 	or damage to a ve	ehicle must be repo	orted immediately.			

1.3.8 Stormwater

Table 1-9: Stormwater impacts

Phase	Potential Aspect and/or Impact	Mitigation	tion	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	(E+D+I+P)
Construction	Aspect:	Without	nt	_	2	3	3	် -	Medium
	Construction activities.	With	_	_	-	—	2	-5	Low
	Increased run-off as a result of	Mitigation measures:	n measu	res:					
	construction activities and bare, exposed ground. Potential knock-	Sancstorn	Ibag bern Iwater ru	ns must be place	d at regular intervurses and/or drain	als on all expose	Sandbag berms must be placed at regular intervals on all exposed steep slopes to minimise erosion and contaminated stormwater run-off into watercourses and/or drainage lines.	iinimise erosion a	nd contaminated
	on impacts to nearby	■ Whe	re trenche	es and excavation	is are required, the	e topsoil excavate	Where trenches and excavations are required, the topsoil excavated must be stored on the down-slope side of the trench	the down-slope	side of the trench
	watercourses and drainage lines	and t	he sub-s	and the sub-soil on the up-slope side.	e side.				
	unougn erosion and siliation.	0	This is im	oortant for two rea	asons: (1) the larg	er volume of soil i	This is important for two reasons: (1) the larger volume of soil is stored upslope of the excavations so that if soil fines	the excavations s	o that if soil fines
			and silt a	re washed off the	e stockpile during	rainfall events, t	and silt are washed off the stockpile during rainfall events, these are washed into the excavation and not into a	nto the excavatio	n and not into a
			vatercour	se, and (2) it is in	portant to separat	te the two so that	watercourse, and (2) it is important to separate the two so that the topsoil is placed on top of the subsoil when the soil	on top of the subs	soil when the soil
		_	is backfilled.	.pq.					
		0	This is es	sential to promote	e rapid growth of v	egetation during t	This is essential to promote rapid growth of vegetation during the rehabilitation phase.	ase.	
		■ Whe	re culvert	s are to be consti	ructed within a dra	ainage line or wat	Where culverts are to be constructed within a drainage line or watercourse, the construction area must be isolated by a	ruction area must	be isolated by a
		sand	bag bund	in order to protect	ot the area from po	ssible silt contan	inated run-off.		
		Suita	ble eros	ion control mea	sures shall be	implemented at	Suitable erosion control measures shall be implemented at stormwater discharge points, exposed	rge points, expc	sed areas and
		emp	ankments	embankments. These measures could include:	s could include:				
		0	The suital	The suitable use of sand bags or soil saver;	ags or soil saver;				
		0	The prom	pt rehabilitation o	The prompt rehabilitation of exposed areas with indigenous vegetation; and	ith indigenous ve	getation; and		
		0	The remo	val of vegetation,	The removal of vegetation, only as it becomes necessary for work to proceed	s necessary for w	ork to proceed.		
		Over	-wetting,	saturation and un	necessary run-off	during dust contr	Over-wetting, saturation and unnecessary run-off during dust control activities must be avoided.	avoided.	
		Storr	nwater ru	n-off to be chann	elled through natu	ral grass and surr	Stormwater run-off to be channelled through natural grass and surrounding vegetation.		

1.3.9 Biodiversity

Table 1-10: Biodiversity impacts

idale i-io. Ek	and a second migration							
Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	; (E+D+I+P)
Construction	Aspect:	Without	_	-	_	2	-5	Low
	Clearing of vegetation for construction.	With	_	_	1	1	4	Low
	Impact: Loss of plant species of conservation concern and biodiversity loss	Mitigation measures: Workers must be I No disturbance to a collecting of firew. Disturbed areas of the linear of water course of water course of lollowing specifical where my where my	Workers must be limited to areas under co No disturbance to vegetation outside of the Collecting of firewood or traditional medicir Disturbed areas of natural vegetation must Due to the linear extent of the road upgrac of water course observed, and the relativistic following specifications are recommended: Submit a license application for th where maintenance activities will	Workers must be limited to areas under construction and within the road servitude. Workers must be limited to areas under construction and within the road servitude. No disturbance to vegetation outside of the construction footprint is permitted. Collecting of firewood or traditional medicinal plants is prohibited. Disturbed areas of natural vegetation must be rehabilitated immediately to prevent so Due to the linear extent of the road upgrade, as well as the degraded and transform of water course observed, and the relatively low density (or number of species following specifications are recommended: Submit a license application for the removal of protected plant species to Executed plants should not be planted in areas that will be disturbed in the construction of the plants their removal or cutting them in the construction of the plants their removal or cutting them.	ion and within the ruction footprint is its prohibited. abilitated immedi well as the degrac w density (or nur oval of protected k areas that will be their removal or she is the interval or	Morkers must be limited to areas under construction and within the road servitude. No disturbance to vegetation outside of the construction footprint is permitted. Collecting of firewood or traditional medicinal plants is prohibited. Disturbed areas of natural vegetation must be rehabilitated immediately to prevent soil erosion. Due to the linear extent of the road upgrade, as well as the degraded and transformed character of most of the sections of water course observed, and the relatively low density (or number of species encountered per sampling site), the following specifications are recommended: Submit a license application for the removal of protected plant species to DEDEAT. Rescued plants should not be planted in areas that will be disturbed in the future, e.g. not along the road reserve	erosion I character of mos countered per sa DEAT.	of the sections mpling site), the
Construction	Aspect:	Without	-	4	2	4	7-	High
	Clearing of vegetation for construction activities.	With	_	7	~	2	-5	Low
	Impact: Proliferation of alien vegetation in disturbed areas.	Mitigation measures: Remove any alien or Alien plant seed disp has to be controlled. Rehabilitate/plant dis Care should be take	ures: alien or non-indiged dispersal with ntrolled. plant disturbed and be taken with the secure.	gation measures: Remove any alien or non-indigenous plant species as they estab Alien plant seed dispersal within the top layers of the soil footprin has to be controlled. Rehabilitate/plant disturbed areas with natural/indigenous plants. Care should be taken with the choice of any herbicide used to eplant species occurs.	es as they establis the soil footprint ligenous plants. bicide used to en	Remove any allen or non-indigenous plant species as they establish during the construction period. Alien plant seed dispersal within the top layers of the soil footprint areas, that will have an impact on future rehabilitation, has to be controlled. Rehabilitate/plant disturbed areas with natural/indigenous plants. Care should be taken with the choice of any herbicide used to ensure that no additional impact and loss of indigenous plant species occurs.	an impact on futt	ire rehabilitation, ss of indigenous

Berha Erf 225 Development – Impact Statement Report

	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	: (E+D+I+P)
Aspect:	-	Without	~	1	2	3	-7	Medium
Construct culverts.	Construction of roads and culverts. Vegetation and site	With	_	_	←	2	ςγ	Low
clearing.		Mitigation measures:	ures:					
Impact: Degrada	Impact: Degradation and loss of soil.	Top soil stripSub-soil and	ping must be restratory topsoil (the top	Top soil stripping must be restricted to the construction footprint and appropriatel Sub-soil and topsoil (the top \pm 30–50 cm of the soil) should be stored separately.	uction footprint an oil) should be stor	soil stripping must be restricted to the construction footprint and appropriately stored for later use in back-filling. soil and topsoil (the top \pm 30–50 cm of the soil) should be stored separately.	ed for later use in	oack-filling.
		 Soil stockpile the height an 	Soil stockpiles are to be protected fro the height and angle of the stockpile.	ted from possible e ckpile.	rosion, e.g. throug	stockpiles are to be protected from possible erosion, e.g. through covering of the stockpiles with tarpaulin, and limiting neight and angle of the stockpile.	tockpiles with tarpa	ulin, and limiting
		Soil stockpile Soil stockpilie	stockpiles must not exceed 1 m in height. stockpiling areas must be sufficiently situatorized during the	stockpiles must not exceed 1 m in height. stockpiling areas must be sufficiently situated away from drainage areas.	d away from drains	stockpiles must not exceed 1 m in height. stockpiling areas must be sufficiently situated away from drainage areas.	on octoblishment	יים ביים ליים ליים ליים ליים ליים ליים ל
		backfilled an	d compacted to pr	backfilled and compacted to promote vegetation growth.	growth.			
		The ContractDisturbed areIn accordancbe contoured	or should ensure sas of natural vegree with the Conser I and slopes in exc	The Contractor should ensure that cleared areas are effective Disturbed areas of natural vegetation must be rehabilitated in In accordance with the Conservation of Agricultural Resource be contoured and slopes in excess of 12% must be terraced.	are effectively sta nabilitated immedi al Resources Act oe terraced.	The Contractor should ensure that cleared areas are effectively stabilised to prevent and control erosion. Disturbed areas of natural vegetation must be rehabilitated immediately to prevent further soil erosion. In accordance with the Conservation of Agricultural Resources Act, Act No. 43 of 1983, any slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced.	nd control erosion her soil erosion. 3, any slopes in ex	cess of 2% must
Aspect:	ct:	Without	. ~	_	2	3	2-	Medium
Mainte roads.	Maintenance and repairs of roads.	With	_	_	~	_	4	Low
Impact: Disturba	Impact: Disturbance of rehabilitation.	Mitigation measures: Implementation of manner that is leas	ures: on of an operatio is least intrusive t	gation measures: Implementation of an operational EMPr to ensure that any mainten manner that is least intrusive to the surrounding natural environment.	re that any maint iatural environmei	gation measures: Implementation of an operational EMPr to ensure that any maintenance and repairs to the roads are undertaken in a manner that is least intrusive to the surrounding natural environment.	s to the roads are	undertaken in a
Aspect:	oct:	Without	~	_	2	3	2-	Medium
Mainte roads.	Maintenance and repairs of roads.	With	_	_	2	_	ςγ	Low
Impact:	<u></u>	Mitigation measures:	ures:					
Disturk	Disturbed areas and exposed	The road res	erve should be cle	eared of alien vege	tation during mair	road reserve should be cleared of alien vegetation during maintenance activities.		
the op	the opportunity for alien invasive							
sbecie	species to establish.							

1.3.10 Heritage

Table 1-11: Heritage impacts

1 able 1-11.116	Table 1-11. Heritage impacts							
Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	• (E+D+I+P)
Construction	Aspect:	Without	~	4	_	2	89	Medium
	Site clearing.	With	_	_	_	2	-5	Low
	Potential disturbance of sites of	Mitigation measures	ures:					
	archaeological, historical and cultural significance.	■ Archaeologic	Archaeological and cultural heritage des	itage desktop infor	mation indicates	naeological and cultural heritage desktop information indicates a low probability of the likelihood of protected heritage	the likelihood of p	otected heritage
	,	In the event	of any incidental a	rchaeological and	cultural heritage r	become of any incidental archaeological and cultural heritage resources, as defined and protected by the	d and protected b	/ the
		 NHRA 1999, Specialist Str 	being identified c udv - Protocol for I	during the course on cidental Finds du	of development the	NHRA 1999, being identified during the course of development the process described in 'Appendix A: of the Heritage Specialist Study - Protocol for Incidental Finds during the Construction Phase' should be followed	ed in 'Appendix A oe followed	of the Heritage
		 Contractors a archaeologic 	and workers shall al or paleontologic	be advised of the al artefacts, as set	penalties assocout in the Nationa	Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section	wful removal of cuss Act (Act No. 25	Iltural, historical, of 1999), Section
		51(1).	oitomofai ac todt	7.141.10 ao aoitaga a		51(1). It is advisable that an information section on a literal hearitons recourses be included in the Environmental Industion training	- Ictaomacriva I oc	Caiaiost acitorida
		and a chance-find these procedures.	e find procedure bures.	e developed. All co	annentage resour	advisable triar an information section of culturalmentage resolutes be included in the Environmental induction training a chance-find procedure be developed. All contractors involved in surface earthmoving activities must be trained on the procedures.	le Environmental loving activities m	ust be trained on
Construction	Aspect:	Without	-	4	2	2	6-	Medium
	Site dearing.	With	-	1	1	2	-5	Low
	Potential disturbance of sites of	Palaeontological	significance is very	/ high as the projec	t falls within a fos	Palaeontological significance is very high as the project falls within a fossiliferous formation – the Karoo Supergroup. (Geology)	- the Karoo Super	group. (Geology)
	palaeontological significance.	Mitigation measures:	ıres:					
		Care must be	staken during the	grading of the roa	d, digging of foun	Care must be taken during the grading of the road, digging of foundations and removing topsoil, subsoil and overburden	ng topsoil, subsoil	and overburden
		or blasting of	bedrock.			or blasting of bedrock.		
		 If any palaed notified. All continued. 	ontological materia onstruction activitie	al is exposed duri es must be stopped	ng clearing, digg I and a palaeontol	If any palaeontological material is exposed during clearing, digging, excavating, drilling or blasting SAHRA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation	illing or blasting sed in to determine	SAHRA must be proper mitigation
		measures.						

1.3.11 Socio-economic and Health

Table 1-12: Socio-economic and health impacts

able 1-12: So	able 1-12: Socio-economic and health impacts	ts						
Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significanc	Significance (E+D+I+P)
Construction	Aspect:	Without	2	2	1	2	+7	Medium
	Construction activities.	With	2	2	2	4	+10	High
	Job creation during the	Mitigation measures:	ures:					
	construction phase of the project.	All labour (skA labour and	killed and unskilled recruitment policy	d) and Contractors y will be developed	should be sourced, displayed and in	All labour (skilled and unskilled) and Contractors should be sourced locally where possible. A labour and recruitment policy will be developed, displayed and implemented by the contractor.	sible. contractor.	
		RecruitmentWhere possiThe principle	at the construction ble, labour intension soof equality, BEE	Recruitment at the construction site will not be allowed Where possible, labour intensive practices (as opposed The principles of equality, BEE, gender equality and no	lowed. sposed to mechan and non-discrimine	Recruitment at the construction site will not be allowed. Where possible, labour intensive practices (as opposed to mechanised) should be practiced. The principles of equality, BEE, gender equality and non-discrimination will be implemented.	cticed. ented.	
	Aspect:	Without	2	2	2	. 2	φ	Medium
	Construction activities.	With	2	_	~	_	ငှ	Low
	Job creation during the	Mitigation measures:	ures:					
	construction phase could result in the influx of people to the area.	■ Ensure trans	sparent employme	ant process and rec	gular communicat	Ensure transparent employment process and regular communication via formal communication platforms (for example,	nunication platfor	ms (for example,
		Municipal Fu The office the	ublic Notice Board at is handling all r	 In this way the precedular 	ublic is kept inform (off-site) must un	Municipal Public Notice Board). In this way the public is kept informed of the work scenario. The office that is handling all recruitment matters (off-site) must undertake the necessary monitoring and communication	iario. ary monitoring an	d communication
		on site, to po On site cons	on site, to potential work-seekers. On site construction camps shoul	on site, to potential work-seekers. On site construction camps should not be considered	ered.		,	
	Aspect:	Without	2	2	2	2	æρ	Medium
	Construction activities.	With	2	_	_	_	ဌာ	Low
	Increased noise and dust leading for increased safety risk and inconvenience to nearby residents	Mitigation measures: The contractor will Construction activ Mechanical equipment will be Equipment will be All equipment will A grievance proce The construction a All employees, col Appropriate health Dust suppression dirt roads.	ures: or will adhere to lo activities are to be equipment with low d. will be fitted with sill be adequate procedure will be cation area will be cas, contractors and health and safety ssion should be us	The contractor will adhere to local authority by-laws relating to noise control. Construction activities are to be undertaken during daylight working hours. Construction activities are to be undertaken during daylight working hours. Mechanical equipment with lower sound power levels will be selected to ens not exceeded. Equipment will be fitted with silencers as far as possible to reduce noise. All equipment will be adequately maintained and kept in good working order A grievance procedure will be established, allowing complaints to be receive The construction area will be cordoned off, thus not causing added safety iss All employees, contractors and sub-contractors must comply with the Munici Appropriate health and safety signage must be displayed on site. Dust suppression should be used if there is excessive dust from constructio dirt roads.	ws relating to nois ng daylight working evels will be select ossible to reduce rept in good work ng complaints to b not causing added nust comply with ti isplayed on site. sssive dust from co	The contractor will adhere to local authority by-laws relating to noise control. Construction activities are to be undertaken during daylight working hours. Construction activities are to be undertaken during daylight working hours. Mechanical equipment with lower sound power levels will be selected to ensure that the permissible occupation noise is not exceeded. Equipment will be fitted with silencers as far as possible to reduce noise. All equipment will be adequately maintained and kept in good working order to reduce noise. All equipment will be established, allowing complaints to be received, recorded and responded to appropriately. The construction area will be cordoned off, thus not causing added safety issues to pedestrian traffic. All employees, contractors and sub-contractors must comply with the Municipality's Health and Safety Policy. All employees, contractors and sub-contractors must comply with the construction activities or from vehicles travelling on any dirt roads.	ne permissible ocnoise. d and responded destrian traffic. salth and Safety P. s or from vehicles	cupation noise is to appropriately. olicy. Low
		With	_	_	_	-	+4	Low

E+D+I+P)	e on site.	Medium	Low		limited to the	ntrolled.		cy.	High	Very high	
Significance (E+D+I+P)	everyday goods. or the period they a	φ	-5		s. The receptor is	s must be strictly co		alth and Safety Poli	-10	+12	
Probability (P)	gation measures: Small-scale vending ventures are likely to experience an increase in the trade of small everyday goods. This is not a sustained activity as it will probably only service the construction workers for the period they are on site.	2	~		Moving vehicles, suspended loads, loading and unloading of materials all pose risks. The receptor is limited to the	construction workforce. The construction site must be fenced off to prohibit unauthorised access and site access must be strictly controlled.	e PPE.	All employees, contractors and sub- contractors must comply with the Municipality's Health and Safety Policy. Appropriate health and safety signage must be displayed on site.	2	4	
Intensity (I)	ence an increase i	8	_		d unloading of ma	oit unauthorised ac	to wear appropriate	must comply with tisplayed on site.	3	8	ing.
Duration (D)	are likely to experi as it will probably	2	2		loads, Ioading and	fenced off to prohik	d sub- contractors t arly marked	All employees, contractors and sub- contractors must comply with Appropriate health and safety signage must be displayed on site.	3	8	gation measures: Maintenance on the infrastructure must be on-going.
Extent (E)	rures: vending ventures sustained activity	_	~	ures:	icles, suspended	workforce.	es, contractors and	es, contractors and health and safety	2	2	ures:
Mitigation	Mitigation measures: Small-scale vendir This is not a susta	Without	With	Mitigation measures:	■ Moving veh	 Construction workforce. The construction site m 	 All employee Onen excav 	All employee Appropriate	Without	With	Mitigation measures: Maintenance on the
Potential Aspect and/or Impact	Aspect: Construction activities. Impact: Increase in informal and formal procurement of goods and services leading to increased local economic activity	Aspect:	Construction activities.	Compromised Contractor health	and safety.				Aspect:	Community safety and well-being.	Improvement in the condition of the road and culverts.
Phase									Cumulative		

1.3.12 Geohydrology

Table 1-13: Geohydrology impacts

	and the form the same								
Phase	Potential Aspect and/or Impact	Mitig	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	; (E+D+I+P)
Construction Aspect:	Aspect:	With	Without	~	2	က	ဇ	ဝှ	Medium
	 Water supply and quality Improper storage of files 	With	£.	_	2	_	2	ဖှ	Low
	chemical, etc.	Mitigati	Mitigation measures:	res:					
	Construction equipment,	■ Pot	entially haz	zardous substano	es must be stored	on an impervious	Potentially hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain	ated bunded area	, able to contain
	vericies, workshop and wash	110)% of the tc	stal volume of mai	110% of the total volume of materials stored at any given time.	y given time.			
	bay areas	Mat	terial safety	y data sheets (MS	3DSs) are to be cle	sarly displayed for	Material safety data sheets (MSDSs) are to be clearly displayed for all hazardous materials.	rials.	
	 Inadequate ablutions. 	The	integrity o	f the impervious s.	urface and bunded	area must be ins	The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted	any maintenance	work conducted
	Impact:	mu	st be recon	must be recorded in a maintenance report.	ance report.				
	Groundwater contamination as a	• Em	ployees sh	nould be provided	with absorbent spi	ill kits and dispos	Employees should be provided with absorbent spill kits and disposal containers to handle spillages.	lle spillages.	
	result of:	- Tra	in employe	ses and contractor	ors on the correc	t handling of spi	Train employees and contractors on the correct handling of spillages and precautionary measures that need to be	onary measures t	that need to be
		ami	lemented t	implemented to minimise potential spillages.	tial spillages.				

 Spillage of fuels, lubricants and other chemicals. Construction equipment, source of provision of ablutions. Lack of provision of ablutions. Informal ablutions. Spillage of fuels, lubricants and other chemicals. Contractor laydown area. Contractor laydown area. Immediate reporting and rectification of any incident that might lead to pollution. Implementation of best practice methods working and monitoring and monitoring and monitoring and monitoring as valid be a likely source of pollution as a non-point source. Lack of provision of ablutions. Inconstruction workforce must have adequate sanitation facilities. The construction workforce must have adequate sanitation facilities. The sanitation facilities should be on-site prior to the extended workforce, to ensure that no unauthorised sanitation practices that might lead to groundwater contamination should be conducted on areas with impervious surfaces to avoid infiltration of contaminated stormwater should be treated before being discharged into the surrounding natural environment. 	Phase	Potential Aspect and/or Impact		Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)
vash to proper system wash to proper system of the		Spillage of fuels, lubricants	٠	All mobile plar	nt and equipment r	nust be regularly r	naintained to en	sure their integrity	and reliability. No repairs may be
vash to proper system system system on the proper system of the proper s		and other chemicals.		undertaken be	yond the contracto	r laydown area.			
System to proper system		Construction equipment,	•	Immediate rep	orting and rectifica	tion of any incident	that might lead	to pollution. Implem	nentation of best practice method
Syste System An E Acce Acce Acce Cont The The Pote Imperimentation Imperimentation All \(\text{A} \)		vehicles, workshop and wash		to prevent pote	ential incidents fron	n occurring e.g. an	Environmental	Management Syster	m (EMS) reporting and monitoring
An E Acce Acce The The Pote		bay areas will be a likely		system.					
Acce Cont The The Pract Pote Impe		source of pollution as a non-	•	An Emergency	r Preparedness an	d Response Plan v	vill be developed	and implemented s	should an incident occur.
Cont The The prac		point source.	•	Access to stor	age areas on-site r	nust be restricted t	o authorised em	ployees only.	
The The prace Pote impe		 Lack of provision of ablutions 	•	Contractors wi	Il be held liable for	any environmental	damages cause	ed by spillages.	
The prac		that may lead to the creation	•	The constructi	on workforce must	have adequate sar	nitation facilities.		
 practices are implemented on-site. Potential construction practices that might lead to groundwater contamination should be condtimed into the groundwater aquifer. All contaminated stormwater should be treated before being discharged into the surrounding natural 		of informal ablutions.	•	The sanitation	facilities should t	be on-site prior to	the extended w	vorkforce, to ensure	e that no unauthorised sanitatio
 Potential construction practices that might lead to groundwater contamination should be condumed in the groundwater aquifer. All contaminated stormwater should be treated before being discharged into the surrounding natural 				practices are ii	mplemented on-sit	a;			
impervious surfaces to avoid infiltration of contaminated substances into the groundwater aquifer. • All contaminated stormwater should be treated before being discharged into the surrounding natural			•	Potential cons	struction practices	that might lead to	o groundwater o	contamination shou	uld be conducted on areas wit
All contaminated stormwater should be treated before being discharged into the surrounding natural				impervious sur	faces to avoid infili	tration of contamina	ated substances	into the groundwat	er aquifer.
			•	All contaminat	ed stormwater sho	uld be treated befo	re being dischar	ged into the surrour	nding natural environment.

1.3.13 Riverine Habitat

Table 1-14: Riverine habitat impacts

I able 1-14: KI	l able 1-14: Kiverine nabitat impacts							
Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	e (E+D+I+P)
Construction	Aspect:	Without	2	_	2	4	6-	Medium
	Construction activities within watercourses / drainage lines.	With	2	1	1	1	-5	Low
	Impact:	Mitigation measures	ures:					
	Altered drainage patterns and associated disturbance / loss of	 As a matter commencing 	of procedure, sto	rmwater managen include any constr	nent plans are de uction phase mitio	As a matter of procedure, stormwater management plans are designed by the project Engineer prior to construction commencing. This plan should include any construction phase mitigation measures (Engineering specifications) to reduce	ect Engineer prio	r to construction ations) to reduce
	habitat due to increased soil	sheet run-of	f and to ensure ade	equate stormwater	· management and	sheet run-off and to ensure adequate stormwater management and erosion control during the construction phase, where	ring the constructi	on phase, where
	erosion, sedimentation and	necessary fr	necessary from the road and at any of the water course crossings. Drawart surface water from being concentrated, and from flowing	t any of the water o	course crossings.	necessary from the road and at any of the water course crossings. Devoat surface water from baing concentrated, and from flowing down transhes without enging protection measures in	ootora acisora tu	ai againacam noit
	tal state) :	place.	ace water norm be	ing concentrated, o			מנו פוספוסוו אוסופס	נוסון ווופמסמופס ווו
		 Sediment-la 	den stormwater sh	ould not flow direct	tly off the construc	Sediment-laden stormwater should not flow directly off the construction area during the establishment phase. It should be	establishment ph	ase. It should be
		directed into	directed into areas where sediment can settle out and be removed.	nent can settle out	t and be removed.			
		 Preserve as 	Preserve as much natural vegetation on site as possible.	station on site as p	ossible.			
		 Rehabilitate 	Rehabilitate areas as soon as possible with indigenous grasses.	possible with indige	enous grasses.			
		 If necessar 	y and where pos	ssible, stockpile to	opsoil for re-use	If necessary and where possible, stockpile topsoil for re-use when planting of indigenous plants in disturbed	f indigenous pla	nts in disturbed
		areas/constr	areas/construction tootprints (rehabilitation)	ehabilitation).				
		 Repair any e 	erosion damage as	soon as possible.				
		 A Water Use 	e License Applicati	ion with the Depar	tment of Water Ai	A Water Use License Application with the Department of Water Affairs will be necessary for infrastructure development	ary for infrastruct	ure development
		within 500 m	within 500 m of a wetland, under a possible General Authorisation.	er a possible Gene	eral Authorisation.			
		 An Environn 	nental Managemer	nt Programme (EI∿	IP) is required by	Environmental Management Programme (EMP) is required by the NEMA Basic Assessment regulations and these	Assessment regul	ations and these
		specification	is should be includ	led to manage stor	rmwater and eros	specifications should be included to manage stormwater and erosion, as well as immediate rehabilitation to reduce soil	ediate rehabilitati	on to reduce soil
		erosion and	erosion and sedimentation.					
		 Employment 	Employment of an Environmental Control Officer to ensure	mental Control	Officer to ensu	are compliance with the	EMP	and Record of
		Decision/En	Decision/Environmental Authorisation	isation.				

Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	(E+D+I+P)
Operational	Aspect:	Without	2	ဗ	2	2	o ₋	Medium
	Modification of flow dynamics and flow patterns.	With	_	2	₩	~	-5	Low
	Impact:	Mitigation measures:	ures:					
	Increased velocity of surface water flows - reduction in	As a matter	of procedure, sto	ırmwater managen	nent p <mark>l</mark> ans are de	matter of procedure, stormwater management plans are designed by the project Engineer prior to construction	ject Engineer prio	to construction
	permeable surfaces (hydrological processes)	commencing Storm-water	l, to manage incres design should foll ce water flow velo	ased water volume ow natural drainag cities are reduced	es and velocities (he patterns as far a	commencing, to manage increased water volumes and velocities (hydrological impacts). Storm-water design should follow natural drainage patterns as far as is possible i.e. drainage towards streams, and must ensure surface water flow velocities are reduced before draining into any of the watercourses (wetlands and streams)	s). rainage towards st	reams, and must
		Surface water	er flow should be d	ischarged into gras	ssed (indigenous)	Surface water flow should be discharged into grassed (indigenous) retention swales or areas with rock rip-rap to decrease	areas with rock rip	-rap to decrease
		water velocit	y and water volum	ie, which may pote	ntially enter the w	water velocity and water volume, which may potentially enter the watercourses (wetlands and streams).	nds and streams).	7
		 Correct siting to prevent er 	g of these energy or osion and to main	dissipation structur Itain natural base f	es snould manage Iows within the str	Correct string of these energy dissipation structures should manage flows prior to draining into the streams and wetlands, to prevent erosion and to maintain natural base flows within the streams; and maintaining the hydrological regime (water	ning into the strear ning the hydrologic	ns and wetlands, al regime (water
		quantity and quality)	quality).					
		 Localised gr regime (wate 	lised groundwater recharge wine (water quantity and quality).	ge will be encoura ality).	aged through the	Localised groundwater recharge will be encouraged through the grassed swales thereby maintaining the hydrological regime (water quantity and quality).	ereby maintaining	the hydrological
Operational	Aspect:	Without	2	3	2	2	6 -	Medium
	Changes to water quality	With	-	2	~	~	-5	Low
	Discharges or spills from the road	Mitigation measures:	ures:					
	can impact on water quality	 It is recomm 	ended, although n	ot within the scope	e of this project, the	It is recommended, although not within the scope of this project, that all stormwater and pipeline leaks within the region	and pipeline leaks	within the region
		be attendedPertaining to	to, to improve the the the road, remedia	be attended to, to improve the water quality within the observed water courses. Pertaining to the road, remedial action where spillages occur must be initiated I	n the observed wa lages occur must	be attended to, to improve the water quality within the observed water courses. Pertaining to the road, remedial action where spillages occur must be initiated by the relevant emergency personal.	elevant emergency	personal.

1.3.14 Wetland

Phase	Potential Aspect and/or Impact	Mitigation	Extent (E)	Duration (D)	Intensity (I)	Probability (P)	Significance (E+D+I+P)	; (E+D+I+P)
Construction Aspect:	Aspect:	Without	2	3	2	4	-11	High
	Impact on the wetlands associated with the culverts.	With	2	1	_	1	-5	Low
	Impact:	Mitigation measures:	ures:					
	Loss of wetland habitat	Adequate st	ormwater manager	ment and erosion	control must be in	Adequate stormwater management and erosion control must be implemented to prevent increased flows and velocity of	ent increased flow	s and velocity of
	(biodiversity loss and hydrological	water enterir	water entering these systems.					
) (sessed of	Ensure 32 m	buffers around all	streams / drainage	e lines (apart fron	Ensure 32 m buffers around all streams / drainage lines (apart from road crossing sites).	···	
	(2000)	 Immediate re 	shabilitation/plantin	ig of disturbed area	as once construct	Immediate rehabilitation/planting of disturbed areas once construction is complete, with indigenous plants.	indigenous plant	vi.
		 If necessary 	and where pos	sible, stockpile to	opsoil for re-use	If necessary and where possible, stockpile topsoil for re-use when planting of indigenous plants in disturbed	indigenous plar	its in disturbed
		areas/constr	areas/construction footprints (rehabilitation).	ehabilitation).				
		Employment	of an Environ	mental Control	Officer to ensu	Employment of an Environmental Control Officer to ensure compliance with the EMP and Record of	ith the EMP a	nd Record of
		Decision/Env	Decision/Environmental Authorisation.	isation.				

2 ENVIRONMENTAL IMPACT STATEMENT

2.1 Introduction

Potential environmental impacts (biophysical and social) associated with the proposed Erf 225 development have been identified and discussed herein.

This Basic Assessment assesses and addresses all potentially significant environmental issues as deemed of relevance for the nature of the specific development and the wider context within which it is placed, in order to provide the EC DEDEAT with sufficient information to make an informed decision regarding the proposed project.

The tables overleaf provide an indication of aspects considered in terms of the potential impacts thereon, and provides a summary of advantages / disadvantages, along with an indication of the potential for mitigation of the negative aspects.

2.2 Comparative Analysis of Alternatives

The following table provides an average of the alternatives against each other, for the construction phase.

Table 2-1: Advantages and disadvantages of the proposed Erf 225 project in relation to the 'No-Go' alternative

				No-Go (Status Quo)
	Advantages	Disadvantages and Responding Mitigation	Advantages	Disadvantages and Responding Mitigation
Soils and Agricultural	No foreseen advantages.	 Physical degradation due to the removal and compaction of soil during construction activities. Physical degradation due to soil erosion as a result of exposed soil and topsoil. All above mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	No foreseen disadvantages.
Geology and Topography	No foreseen advantages.	 Disturbance of surface geology resulting in site instability due to inadequate drainage and/or inappropriate engineering planning and interventions. Erosion by concentrated, uncontrolled water-flow. All above mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	No foreseen disadvantages.
Air Quality and Odour	No foreseen advantages.	 Fugitive dust emissions from construction activities and mobile plant / machinery. Generation of fumes from vehicle emissions may pollute the air. Release of odours as a result of the chemical toilets on-site. All above mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	No foreseen disadvantages.
Noise	No foreseen advantages.	 Increase in noise pollution from construction vehicles and construction staff. Mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	No foreseen disadvantages.
Visual	No foreseen advantages.	 During construction the clearing and grading of the site would create a visual scar in the landscape. Large construction vehicles and equipment will be visible to receptors within the study area. Mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	No foreseen disadvantages.

Report
Statement
- Impact
Development
Erf 225 De
3erha

				No-Go (Status Quo)
	Advantages	Disadvantages and Responding Mitigation	Advantages	Disadvantages and Responding Mitigation
Traffic	No foreseen advantages.	 Increase in traffic from construction vehicles. Mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	■ The road will continue to be heavily congested and the road surface will not be upgraded.
Stormwater	No foreseen advantages.	 Increased run-off due to construction activities and bare, exposed ground. Mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	 Stormwater infrastructure is in need of repair and has contributed to the poor state of the existing roads. Flooding of the road during rainfall events will continue.
Biodiversity	No foreseen advantages.	Disturbance of natural vegetation due to construction activities.Degradation and loss of soil.	Status quo will remain.	No foreseen disadvantages.
Social and Socio- economic Geohydrology and Hydrology	 New residential property for proponent. Unskilled employment opportunities during construction phase. Upgrade to culverts will improve water flow and decrease existing sedimentation 	 As could be expected, the construction phase is characterised by a number of negative social impacts (viz. arrival of construction workers; inflow of job seekers, additional demand on services, crime, etc.) which is mainly due to the nature of the activities that take place during this phase. Although the expected social impacts associated with the construction phase are mostly negative, these impacts are for the most part only temporary in nature and as such are expected to only last over the construction period. Client and Contractor should commit to minimising negative social aspects where possible. Potential for shallow groundwater contamination through the spillage of fuels, lubricants, lack of provision of ablutions and other aspects such as construction equipment, vehicles and wash bay areas exist. Run-off from the construction area into groundwater or surface water resources will need to be managed. Mitigated against by following recommendations contained within the EMPr. 	No foreseen advantages. Status quo	 Roads and stormwater infrastructure will continue to deteriorate. Traffic congestion will increase with time. Flooding of the road at the culverts will continue during rainfall events. Community will have to walk if roads are unsuitable for vehicles to travel on them. Loss of an opportunity to provide unskilled employment opportunities. Heavy rainfall may result in further deterioration of the road surface and stormwater infrastructure.
Riverine Habitat / Wetlands	No foreseen advantages.	 Site clearing, removal of vegetation, and associated disturbances to soils, leading to increased run-off and erosion with consequent sedimentation of drainage lines. Mitigated against by following recommendations contained within the EMPr. 	Status quo will remain.	 Stormwater infrastructure will further deteriorate which will increase existing sedimentation and flooding of the road.