GLENCORE OPERATIONS SOUTH AFRICA (PTY) LTD

IMPUNZI OPENCAST OPERATIONS DRAGLINE RELOCATION
BASIC ASSESSMENT
DRAFT BASIC ASSESSMENT REPORT

Report No.: JW200/13/D424 – Rev 1

MAY 2014

Jones & Wagener
Engineering & Environmental Consultants
59 Bevan Road PO Box 1434 Rivonia 2128 South Africa
tel: 0027 11 519 0200 www.jaws.co.za email: post@jaws.co.za

DOCUMENT APPROVAL RECORD

Report No.: JW200/13/D424 – Rev 1

ACTION	FUNCTION	NAME	DATE	SIGNATURE
Prepared	Environmental Scientist	G. Martin	17/03/2014	
Reviewed	Project Manager	K. Kruger	24/03/2014	
Approved	Project Manager	K. Kruger	24/03/2014	

RECORD OF REVISIONS AND ISSUES REGISTER

Date	Revision	Description	Issued to	Issue Format	No. Copies
17/03/2014	Rev A	Draft for internal review	K. Kruger	Electronic	N/A
28/03/2014	Rev 0	Draft for client review	T. Chauke	Electronic	N/A
29/04/2014	Rev 1	Draft for updating	G. Martin	Electronic	N/A
09/05/2014	Rev 1	Draft for distribution	Public Places Commenting Authority Competent Authority	Hard Copies Electronic Copies	Multiple

GLENCORE OPERATIONS SOUTH AFRICA (PTY) LTD

IMPUNZI OPENCAST OPERATIONS DRAGLINE RELOCATION

DRAFT BASIC ASSESSMENT REPORT REPORT NO: JW200/13/D424 – Rev 1

CONTENTS **PAGE**

APPENDIXES

List of Tables

List of Figures

Please refer to Appendix A (Maps) for all other figures and drawings referred to throughout this report.

LIST OF ABBREVIATIONS

BA	Basic Assessment
BID	Background Information Document
CBA	Critical Biodiversity Area
DBAR	Draft Basic Assessment Report
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
HIA	Heritage Impact Assessment
J&W	Jones & Wagener Engineering and Environmental Consultants (Pty) Ltd
kJ	Kilojoules
km	Kilometres
kV	Kilovolt
m	Metres
m^2	Square metres
mm	Millimetres
PES	Present Ecological Status
RBCT	Richards Bay Coal Terminal
ROM	Run-of-Mine
WUL	Water Use Licence

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **1 September 2012**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included on the electronic copy of the report submitted to the competent authority.

Jones & Wagener
Engineering & Environmental Consultants
59 Bevan Road PO Box 1434 Rivonia 2128 South Africa
tel: 0027 11 519 0200 www.jaws.co.za email: post@jaws.co.za

GLENCORE OPERATIONS SOUTH AFRICA (PTY) LTD

IMPUNZI OPENCAST OPERATIONS DRAGLINE RELOCATION

DRAFT BASIC ASSESSMENT REPORT REPORT NO: JW200/13/D424 – Rev 1

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? YES ✓

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

INTRODUCTION

Background

Glencore Operations South Africa (Pty) Ltd (hereafter referred to as "Glencore"), previously known as Xstrata Coal South Africa (Pty) Ltd, is currently planning the relocation of a dragline at their iMpunzi Opencast Operations. Glencore intends mining out the remaining coal from previous bord and pillar operations at the Tweefontein and iMpunzi mining complexes. It is intended to mine the Boschmans South East Pit at Tweefontein and the River West Pit, Van Dyksdrift South Pit and North Pit at iMpunzi.

The mining plans for these areas are based on using dragline operations in order to economically mine the pits.

Locality

The Tweefontein and iMpunzi mining complexes are located within the Emalahleni Local Municipality of the Nkangala District Municipality, Mpumalanga Province (**Figure1.1**). The area concerned stretches approximately 16 km to 28 km south of the town of eMalahleni / Witbank and 11 km to 22 km east of the town of Ogies. Please refer to **Figure 1.2** for a locality map.

Project Scope

Jones & Wagener (Pty) Ltd (J&W) has been appointed by Glencore to undertake a Basic Assessment (BA) and Water Use Licence (WUL) process in terms of the National Environmental Management Act (Act 107 of 1998) and the National Water Act (Act 36 of 1998) respectively, for the proposed relocation of draglines for the continuation of mining at the iMpunzi and Tweefontein Opencast Operations. This document serves as the Draft Basic Assessment Report (DBAR) for the proposed dragline walkways relating to the iMpunzi Opencast Operations.

Purpose of this Document

The purpose of this document is to present the findings of the Basic Assessment study, including:

- An explanation of the routes identified for the relocation of the draglines to the destinations;
- An explanation of the environmental and engineering considerations for the walkway routes identified;
- An explanation of the typical design required for the dragline walkways;
- A description of the baseline environment;
- An impact assessment of the various options identified;
- A discussion and recommendation on the preferred dragline walkway routes; and
- A draft Environmental Management Programme (EMPr).

PROJECT DESCRIPTION

Larger Project

Glencore is currently mining coal on the Highveld of Mpumalanga. At the Tweefontein and iMpunzi operations of Glencore, new opencast pits are being developed and draglines are required to mine the coal found in these pits. At present Glencore is busy investigating the relocation of draglines to these pits in order to ensure the on-going mining of their resources. **Figure 1.3** shows the various pits that will be mined in the larger study area as well as the various dragline relocation routes under investigation. Some initially proposed routes have subsequently been excluded from the dragline relocation options. The routes are 3C and 3D. Route 3D was excluded as it does not fall within Glencore property. Route 3C was excluded because a portion of it also runs over a property of different ownership. Additionally, the river crossing of Route 3C is very wide (approximately 50 m) and thus more environmentally and financially costly to cross.

A BA for the relocation of a dragline within the Tweefontein mining complex has been compiled separately. This report will therefore focus only on the iMpunzi related dragline relocations, shown as route 1A, 1B, 1C, 2A, 2B, 3A, 3B, 3E and 3F in **Figure 1.3**.

iMpunzi Project

The iMpunzi mining complex is located approximately 110 km east of Johannesburg and 27 km south of the town of eMalahleni / Witbank. The complex consists of two underground mines, Phoenix Colliery and Arthur Taylor Colliery, as well as the iMpunzi Opencast Operations.

Current planning indicates that a dragline located at the Steenkoolspruit Pit of the iMpunzi Complex will complete work at the Steenkoolspruit Pit mid-2015. It is proposed for the dragline to be relocated to the Van Dyksdrift South Pit, River West Pit or Tweefontein Section during the winter months of 2015.

It should be noted that an earlier relocation will not be possible since the environmental authorisations will not be in place.

Route Description

In the iMpunzi region, the Steenkoolspruit Pit is currently being mined using a Bucyrus Erie dragline. Once the Steenkoolspruit Pit is mined out it will be necessary to relocate the dragline to a new opencast mining area. At present there are four proposed mining areas where the dragline can be re-located to, namely:

- River West Pit – forming part of the iMpunzi mining area;
- Van Dyksdrift South Pit – forming part of the iMpunzi mining area;

- North Pit – forming part of the iMpunzi mining area; and
- Boschmans South East Pit – forming part of the Tweefontein mining area.

Although all of the abovementioned pits will be mined, it is not yet known in which order the pits will be mined. For this reason, options for dragline relocation to all of the pits mentioned above, in all of the possible orders in which mining may be undertaken, need to be considered. There are a few alternatives for route selection in terms of each of these relocations. The various dragline walkway options are described in more detail below, illustrated in **Figure 1.3** and summarised in **Table 1-1**.

Please Note: Each of these routes may be located anywhere within a 250 m wide corridor. The purpose of these corridors being authorised as opposed to the routes alone, is to provide enough space for the engineers to alter the routes slightly on site if need be.

Route 1A

This walkway route crosses the Olifants River and the Richards Bay Coal Terminal (RBCT) railway line. In 2010 a haul road bridge was constructed across the river to connect the Steenkoolspruit Pit with the new Run-of-Mine (ROM) tip. During the haul road bridge planning stage, the bridge position was moved east along the river to avoid an environmentally sensitive area. The most feasible area to construct the walkway crossing is therefore considered to be directly east of the haul road bridge where an existing low water crossing is located. This route is 4.6 km long.

Route 1B

This walkway route runs south, across the RBCT railway line and then east to the Van Dyksdrift South Pit, crossing a set of power lines along the route. Route 1B can also be reversed to run from Van Dyksdrift South Pit to River West Pit. This route is 5.3 km long.

Route 1C

This walkway route can be followed south east from the River West Pit, either on or alongside an existing haul road. It should be noted that the haul road was not designed as a dragline walkway and walking on the haul road may cause substantial damage to the haul road and drainage structures. Alternatively a walkway can be constructed next to the existing road. A large section of this route crosses a wetland area. Route 1C then leaves the haul road, running north of and parallel to the RBCT railway line. This route than joins the southern portion of Route 1A, crosses over the RBCT railway line and enters the Van Dyksdrift South Pit. Route 1C can also be reversed to run from Van Dyksdrift South Pit to River West Pit. This route is 5.2 km long.

Route 2A

Route 2A crosses the Olifants River next to the existing haul road bridge, i.e. the same position as for Route 1A. From here the route follows the existing haul road that was constructed in 2010 in a westerly direction before turning north towards the River West Pit. It should be noted that the haul road was not designed as a dragline walkway and walking on the haul road may cause substantial damage to the haul road and drainage structures. Alternatively a walkway can be constructed next to the existing road. A large section of this route (section adjacent the haul road) crosses a wetland area. This route is 4.7 km long.

Route 2B

This route forms the alternative to Route 2A and entails walking the dragline across the Steenkoolspruit Pit and crossing the Olifants River directly west of the Steenkoolspruit Pit. Route 2B is the shorter of the two routes and also involves the least disturbance to wetlands. This route is 2.2 km long.

Route 3A

This route runs east across the Steenkoolspruit and then heads north until it reaches the mining area's boundary with Kleinkopje Mine. The route than follows this boundary in a north westerly

direction along an existing mine haul road located on the boundary between the two mining areas, crossing over the Tweefonteinspruit. After this, the dragline crosses the river again at an already approved river crossing and enters the active Tweefontein Mining Area, from where it will be moved to the Boschmans South East Pit. This route is 16.7 km long.

Route 3B

This route runs north across the Steenkoolspruit and then heads north-west along the mining area's boundary with Kleinkopje Mine. The route than follows this boundary in a north westerly direction along an existing mine haul road located on the boundary between the two mining areas, crossing over the Tweefonteinspruit. After this, the dragline crosses the river again at an already approved river crossing and enters the active Tweefontein Mining Area, from where it will be moved to the Boschmans South East Pit. This route is 15.5 km long.

Route 3E

This route runs east across the Steenkoolspruit at a gentler crossing angle than that associated with Route 3F. After the river crossing, this route then runs north-east to the North Pit. Route 3E can also be reversed to run from North Pit to River West Pit. This route is 2.9 km long.

Route 3F

This route heads in a northerly direction from the River West Pit, crossing over the Steenkoolspruit before turning north-west towards the North Pit. Route 3F can also be reversed to run from North Pit to River West Pit. This route is 1.3 km long.

The various combinations of route options are depicted in **Table 1-1**. The routes are also shown graphically in **Figure 1.3**. An image plate containing photographs from site may be found in **Appendix B**.

Table 1-1: Dragline walkway options.

DRAGLINE RELOCATION OPTIONS	ROUTE ALTERNATIVES
From Steenkoolspruit Pit (current dragline location)	
Steenkoolspruit Pit to Van Dyksdrift South Pit	Route 1A
	Route 2B + Route 1C
	Route 2B + Route 1B
Steenkoolspruit Pit to River West Pit	Route 2A
	Route 2B
Steenkoolspruit Pit to North Pit	Route 2A + Route 3E
	Route 2A + Route 3F
	Route 2B + Route 3E
	Route 2B + Route 3F
Steenkoolspruit Pit to Boschmans South East Pit	Route 2A + Route 3A
	Route 2A + Route 3B
	Route 2B + Route 3A
	Route 2B + Route 3B

From Van Dyksdrift South Pit	
Van Dyksdrift South Pit to River West Pit	Route 1C
	Route 1B
From River West Pit	
River West Pit to Van Dyksdrift South Pit	Route 1C
	Route 1B
From North Pit	
North Pit to River West Pit	Route 3E
	Route 3F
North Pit to Van Dyksdrift South Pit	Route 3E + Route 1C
	Route 3E + Route 1B
	Route 3F + Route 1C
	Route 3F + Route 1B

Dragline Information

Surface mining involves the extraction of underground resources that are close to the Earth's surface. This involves a process of moving the soil covering the resource (overburden) to a temporary storage location in order to remove the resource. In many surface mining scenarios, overburden is most efficiently moved by a dragline excavation system (Kyle & Costello, 2006). A dragline excavation system has an open bucket supported by a cable from above, hanging on the end of a boom (**Image 1-1**). The dragline operates by dragging this bucket along the ground by means of a cable, until the bucket is filled with overburden to be stored elsewhere. The bucket is controlled by an operator in the excavator via the manoeuvring of the boom and cables (Kyle & Costello, 2006).

Draglines are mostly used in the excavation of deep pits or when significant overburden removal is required. The removal of overburden is often the dominating cost of surface mine operation. Draglines significantly reduce this cost as a result of their efficiency (Kyle & Costello, 2006).

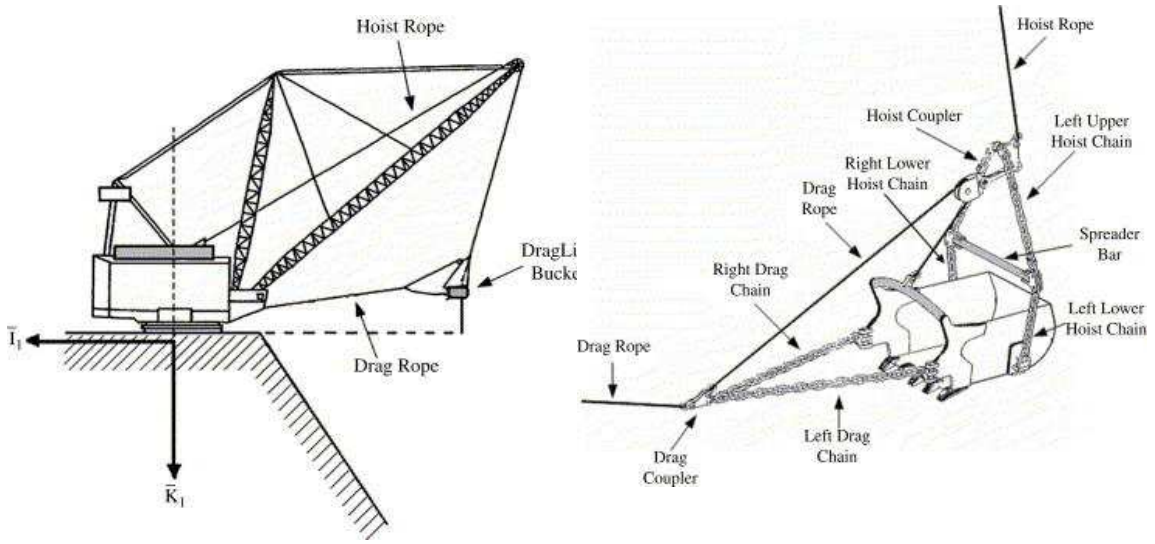

Image 1-1: Schematic diagram of a dragline and dragline bucket (Kyle & Costello, 2006).

Dragline excavators are initially assembled on site and typically weigh between 1 000 to 5 000 tons. The relocation of draglines usually involves "walking" the machine along a specifically constructed route/corridor. This "walking" is usually slow, with the dragline moving approximately 100 – 200 m per hour. **Image 1-2** depicts dragline relocations that have been previously undertaken. Typical dragline walkways constructed for such relocations are also shown in the Image.

Dragline crossing a tar road.

Dragline using a dragline walkway.

Dragline walkway prior to relocation of dragline.

Dragline walkway at ground level view.

Image 1-2: Photographs depicting typical dragline relocations.

Description of Activities: Construction

The dragline walk will consist of three phases – construction, operation (dragline relocation) and decommissioning. The construction phase consists of route construction and preparation according to engineering specifications. The activities associated with this phase are described below.

Walkway Preparation

Dragline walkways require a significant improvement of the properties of the *in situ* materials to allow the walking of the dragline without problems. Importing of materials is therefore avoided as far as possible. High strength materials, such as rock for layer works are only imported when necessary, such as in wet areas and where the *in situ* materials are clayey.

Additionally, it is aimed to walk the dragline during the dry season. If the *in situ* materials are saturated (as would occur during the wet months) it is not possible to improve their properties sufficiently to facilitate the dragline walk. In cases like this, the importation of higher strength material at a significant cost cannot be avoided.

The dragline walkway may be up to 60 m wide, taking into consideration the walkway itself and sites for stockpiling soil alongside. It is important to note that each of these walkway routes may be located anywhere within a 250 m wide corridor. The purpose of these corridors being authorised as opposed to the routes alone, is to provide enough space for the engineers to alter the routes slightly on site if required.

Based on the practice discussed above, the construction of the walkway is usually divided into zones that required different treatment. There are typically three zones, which include the following:

- Zone 1: Areas of shallow soils (usually <1 m deep) where competent materials, such as rock or ferricrete, are near surface and rocky outcrops may occur. This zone is typically strong enough for the dragline to walk across, however the dragline tub may be damaged in the process. Construction in this zone comprises the following process:
    - Clear vegetation and soil to a depth of not less than 300 mm and stockpile separately in windrows adjacent to the walkway;
    - Compact in situ material after moistening, if required, with 20 passes of a 15 kJ impact roller; and
    - In the eventuality of areas with exposed rock at the surface or very shallow soil and vegetation cover being encountered, the vegetation and available soil will be removed and stockpiled and a levelling course of soil will be placed over the exposed area.
- Zone 2: Areas of deep soils (usually >1 m deep) and usually thick compressible sandy materials occurring. Typically these areas are associated with maize fields. Construction in this zone comprises the following process:
    - Clear vegetation and topsoil to a depth of not less than 300 mm and stockpile in windrows adjacent to the walkway;
    - Remove additional material in typically 10 m wide strips along the width of the walkway to a depth of between 600 and 1000 mm and stockpile separately from topsoil, within the walkway reserve;
    - Compact in situ material with 20 passes of a 15 kJ impact roller; and
    - Return stockpiled material to the walkway and compact with 20 passes of a 15 kJ impact roller.
- Zone 3: Saturated areas, most likely considered to be either marshes or wetlands that have a poorly developed substrate. In these clayey areas it is often not possible to improve the in situ material to facilitate a dragline walk. In cases such as this, rock layers will need to be imported and some in situ material may need to be removed. It is further necessary to import fill to ensure that slopes at steep approaches (e.g. west of the Steenkoolspruit) are reduced sufficiently to enable the dragline to cross. Construction in this zone comprises the following process:
    - Clear vegetation and topsoil to a depth of not less than 300 mm and stockpile on dry land;
    - Remove saturated, soft or clayey subsoil according to soil type and colour in typically 10 metre wide strips along the width of the walkway to competent material and stockpile separately from topsoil in a designated area;
    - Place rock pioneer layer of felsite or sandstone in layers and compact with 20 passes of a 15 kJ impact roller;

- Place granular material from borrow areas in layers to form a capping layer and compact to achieve suitable profile; and
- Where saturated areas have a stable or well-developed substrate a rock pioneer layer of typically 1 m thick will be placed directly on the underlying material after removal of the 300 mm of topsoil and the rock then compacted with 20 passes of a 15 kJ impact roller. A gravel levelling course will be placed over the rockfill layer.

Watercourse Crossings

Watercourse crossings may have a significant environmental impact, as watercourses are usually comprised of streams or rivers and the wetlands associated with these streams or rivers.

It is necessary to cross the Olifants River with the dragline, as all the pits proposed for future mining are located west or south of the river. Route 1A to the Van Dyksdrift South Pit and Route 2A and 2B to the River West Pit will only cross the Olifants River.

Routes 3A, 3B, 3E and 3F also cross the Steenkoolspruit to reach the North Pit and the Tweefontein Opencast Operations.

Routes 3A and 3B cross the Tweefonteinspruit in the route section from the North Pit to the Tweefontein Opencast Operations.

The existing river crossing at the Tweefonteinspruit is designed as per the already approved crossing submitted as part of the Tweefontein Optimisation Project. This was authorised in Water Use Licence number 04/B11F/ACGIJ/2004, the water use license for the Tweefontein Optimization Project (February 2013).

The proposed new watercourse crossings (specifically those of the upstream and downstream Steenkoolspruit crossings, the upstream and downstream Olifants River crossings and the new Tweefonteinspruit crossing) will be undertaken in the following manner:

*(Please refer to the Method Statement for the watercourse crossings in **Appendix C** for a description of each watercourse crossing).*

Approaches to the stream

Watercourses comprise areas where it is not possible to improve the *in situ* material due to wet or soft clayey materials. In these areas construction generally comprises:

- The stream crossing approaches will be constructed by removing the upper layer of vlei soils (organic alluvium), before placing rockfill material. The purpose of removing the clay layer is to ensure that the crossing can be rehabilitated more effectively after the rockfill layer is removed.
- The rockfill layer provides the required bearing capacity to ensure that the dragline can cross the wet stream areas. The rock layer varies in thickness depending on the conditions and walkway geometry. The rockfill layer will consist of clean (non-carbonaceous) hard rock and the surface will be compacted with an impact roller.
- Pipes will be installed to accommodate the base flow and the design flood.
- A layer of compacted gravel will be placed on the rockfill layer to provide a smooth level surface for the dragline to walk on.

The construction of the approaches will be completed prior to the actual crossing date. The approaches will also be used to stockpile material required for the stream bed section (see below).

Stream bed area

Construction materials required for the construction of the streambed section will be stockpiled on the walkway approaches prior to the actual date the dragline will cross the watercourse.

The proposed crossing sites for Steenkoolspruit and Olifants River are characterised by a deep stream bed with steep river banks and water ponding in the stream bed section. Due to the ponding water it will not be possible to excavate residual material through the streambed section. It will also be difficult to remove rockfill placed in the streambed section during rehabilitation of the stream crossing.

To mitigate these problems it is proposed to implement the following construction method within the stream bed section:

- Pack gabion mattresses or similar approved product with non-carbonaceous rock (this will be done on the approaches). Lifting hooks will be installed in the mattresses to enable the mattresses to be lifted with a crane.
- During the crossing the mattresses or similar approved product will be placed with a crane along the upstream and downstream edges of stream bed section to an elevation above the normal ponding water level. The purpose of the gabions will be to define the edge of the walkway and to form a containment structure for the rockfill material.
- Once the mattresses or similar approved product is in place, a layer of geotextile and a protection / separation layer will be placed through the stream bed section. The geotextile will also be placed on the sides of the gabion to form a sediment barrier.
- With no excavation work taking place below the water level and the use of clean rock, it will be ensured that minimal sediment will be disturbed. The intention of the geotextile is also to contain sediment generated / contained in the rockfill.

Finally the crossing will be completed by placing a layer of rockfill and wearing course layer to provide sufficient bearing capacity to ensure that the dragline can cross the wet streambed section.

Road Crossings

When crossing a road the following methodology will be employed:

- A temporary road deviation will be built adjacent to the existing road by:
  - Installing the necessary signage as per Mpumalanga Department of Public Works, Roads and Transport requirements;
  - Stripping the vegetation and topsoil of the road deviation to a depth of 300 mm and stockpiling separately;
  - Compacting the in situ material with 20 passes of a 15 kJ impact roller; and
  - Backfilling the road with gravel or other approved material and compacting to the Engineer's specifications.
- The dragline walkway crossing over the road will be built by:
  - Building the approach ramp of the dragline walkway with soil to a height of approximately 2 metres above the road surface;
  - Stockpiling additional material on the approach ramp from the direction in which the dragline is walking;
  - Deviating traffic along the temporary road deviation; and
  - Bulldozing stockpiled material onto the road and preparing for the dragline crossing.

Power Line Crossings

Two alternatives exist for crossing power lines. Firstly, if the users along the power line can be fed by alternative sources via a ring-feed, the temporary shutdown of the power line at the crossing can be allowed with no impact. In these cases the power line is simply dropped during the crossing and reinstated after the dragline has passed. Where this alternative cannot be used, the following methodology is employed to temporarily box out the power line:

- An alternative power line route at the point of crossing (called a box) will be built;
- The power will be rerouted along the alternative line; and
- The existing power line will be dropped so that the dragline may pass.

Railway Line Crossings

The crossing of the RBCT railway line may be problematic due to the high train traffic volumes and the strategic importance of this route. Spoornet has in the past allowed 24 to 48 hour occupations for draglines to cross the railway line. Such a short occupation duration will require crossing sites where shallow bedrock / competent material is available as there will not be enough time to remove the rail tracks and to reinstate them once the dragline has passed. This will ensure that the settlement below the rail tracks is limited and the rail tracks can remain in place (i.e. do not have to be removed). During a site visit, possible sites were identified where the railway line complies with these specifications. The crossing site on Route 1B will require significant engineering to cross with the dragline. From an engineering point of view the crossing on Route 1A and Route 1C is preferred over the crossing site along Route 1B.

All Route Infrastructure and River Crossings

Table 1-2 below and **Figure 1.4** indicate all the infrastructure and river crossings associated with the proposed dragline walkways.

Table 1-2: Route Infrastructure and River Crossings.

ROUTE	DESCRIPTION		
	River	Railway line	Power lines
Route 1A	✓ (Olifants River downstream)	✓	✓
Route 1B	-	✓ (two crossings)	✓
Route 1C	-	✓	✓
Route 2A	✓ (Olifants River downstream)	-	-
Route 2B	✓ (Olifants River upstream)	-	-
Route 3A	✓ (Steenkoolspruit upstream and Tweefonteinspruit River)	-	✓
Route 3B	✓ (Steenkoolspruit downstream and Tweefontinspruit River)	-	✓
Route 3E	✓ (Steenkoolspruit upstream)	-	✓
Route 3F	✓ (Steenkoolspruit downstream)	-	-

Description of Activities: Operation

The operation phase consists of the walking of the dragline. The activities associated with this phase are described below.

Once the dragline walkway has been constructed (for whichever route will be undertaken) the dragline will set out from Steenkoolspruit Pit, this will signify the commencement of the

operational phase. The dragline walks at approximately 100 to 200 metres per hour. The operational phase will be completed once the dragline reaches its destination of a pit in which to commence mining.

Description of Activities: Decommissioning

The decommissioning phase consists of rehabilitation of the route after the dragline has passed. The activities associated with this phase are described below.

Road Crossings

Once the dragline has crossed the road:

- The dragline will be walked into the space between the road and the temporary road deviation;
- The fill which had been placed on the road will be removed from the road; and
- The road will be rehabilitated with a new surfacing layer, if required.

Once the road has been rehabilitated, traffic will be reinstated to the original road.

Power Line Crossings

Once the dragline has crossed the power line:

- The dragline will be walked into space between the temporary alternative line (now carrying the electrical current) and the existing line (which has been dropped to allow the dragline crossing);
- Once the dragline is inside the box, the permanent line will be reinstated and power will be rerouted to it from the alternative line;
- The alternative line will be dismantled and the dragline will continue on its route.

Watercourse Crossings

General

The objective of the rehabilitation is to return the watercourse crossing areas as close as practically possible to their original condition. In addition, the banks of the streambed will be protected against erosion until the vegetation has established.

Stream crossings

Rehabilitation in the watercourse crossing sections entails removing the rock layer, wearing course and pipes and replacing the 'top soil' removed prior to construction. At the watercourse crossing, additional rehabilitation measures may be required by the environmental consultant in order to stabilise the riverbanks and to re-establish the vegetation.

*(Please refer to the Method Statement for the watercourse crossings in **Appendix C** for a description of each watercourse crossing).*

Vegetation

The majority of the route is in maize fields where no vegetation as part of rehabilitation is required. Where the walkway covers sections of natural vegetation, the environmental consultant will specify the re-vegetation of the area.

General

All of the dragline routes cross mine owned land. It is recommended to rehabilitate the dragline walkway immediately after the walk in areas where mining will not take place in the near future. Not rehabilitating the walkway will lead to soil erosion. In addition, all the sections of walkway through watercourse crossings will have to be removed before the rainy season commences. Details for the rehabilitation can be summarised as follows.

- Zone 1: The following ripping procedure in areas where Zone 1 preparation was done is suggested.
  - Rip to 600 mm depth with a D6 dozer or equivalent using a multiple tooth ripper with a spacing not exceeding 600 mm;
  - Level the surface with a grader;
  - Spread lime on the lower layer as specified and disc 100 to 200 mm deep to break up soil and to achieve some mixing;
  - Doze topsoil into position;
  - Rip topsoil to 600 mm depth with D6 dozer or equivalent and also both sides where topsoil was stockpiled;
  - Spread lime as specified; and
  - Disc to mix lime and level surface with grader.
- Zone 2: The following ripping procedure in areas where Zone 2 preparation was done is suggested.
  - Rip to 600 mm depth with a D6 dozer or equivalent using a multiple tooth ripper with a spacing not exceeding 600 mm;
  - Rip to 1 200 mm depth with a single tine ripper using a D9 dozer or equivalent at a spacing of 1 500 mm and then in-between to a depth of 1 500mm to give an effective spacing of 750 mm;
  - Cross rip at an inclined angle of 35° over 400 m at 1 500 mm centres and 1 500 mm depth with the D9 dozer and single tine ripper;
  - Level surface with a grader;
  - Spread lime on lower layer as specified and disc 100 to 200 mm deep to break up soil and to achieve some mixing;
  - Spread fertiliser on lower layer as specified and disc 100 to 200 mm deep to break up soil and to achieve some mixing;
  - Doze topsoil into position;
  - Rip topsoil to 600 mm depth with D6 dozer or equivalent and also both sides where topsoil was stockpiled;
  - Spread lime as specified; and
  - Disc to mix lime and level surface with grader.
- Zone 3: Rehabilitation in sections constructed as Zone 3 entails removing the rock and wearing course and replacing the 'top soil' removed prior to construction. At a watercourse crossing additional rehabilitation measures will be required by the environmental consultant in order to stabilise the riverbanks.

Fertilisation

Fertilisation will depend on the land conditions as determined by an agricultural expert. Guidelines for fertiliser requirements are:

- 1 ton of dolomitic lime per hectare in the topsoil over 60 m width;
- 3 tons of dolomitic lime per hectare on the lower layer of soil over 35 m width;
- 1 ton of superphosphate (10,5% P) per hectare on the lower layer over 35 m width; and
- 0,5 tons of potassium chloride per hectare on the lower layer over 35 m width.

Vegetation

Where the walkway crosses over maize fields, no re-vegetation as part of rehabilitation is required. Where the walkway covers sections of natural vegetation and watercourses, the re-vegetation of the area must occur as specified in the EMPr (**Appendix G**). *Please note that there are nine (9) alternative routes, none of which are preferred, due to the possibility of a number of combinations of the routes having to be used for the movement of the dragline. This is dependent on which section of the iMpunzi Opencast Operations is available to be mined first.*

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN R.544, 545 and 546	Description of project activity
Example: ***GN R.544 Item 11(3): The construction of a bridge where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.***	***A bridge measuring 5 m in height and 10m in length, no wider than 8 meters will be built over the Orange river***
GN R.544 Activity 10 The construction of facilities or infrastructure for the transmission and distribution of electricity outside urban areas with a capacity of more than 33 kV but less than 275 kV.	Six of the route alternatives, namely Route 1A, 1B, 1C, 3A, 3B and 3E, will have to cross power lines. In order to do this, the power lines will either be dropped or temporarily boxed out.
GN R.544 Activity 11 The construction of: (xi.) infrastructure or structures covering 50m^2 or more, where such construction occurs within a watercourse or within 32m of such a watercourse, measured from the edge of the watercourse.	All route alternatives for construction of the proposed dragline walkways will cross watercourses (streams/rivers and/or wetlands).
GN R.544 Activity 18 The infilling or depositing of any material of more than 5m^3 into or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from a: (i) watercourse.	All route alternatives for construction of the proposed dragline walkways will cross watercourses (streams/rivers and/or wetlands). The activities listed alongside may be triggered with these crossings.
GN R.544 Activity 22 The construction of a road, outside urban areas, (ii) where no reserve exists where the road is wider than 8m.	The proposed dragline walkways themselves will be temporary roads, up to 60m wide.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;

(b) the type of activity to be undertaken;

(c) the design or layout of the activity;

(d) the technology to be used in the activity;

(e) the operational aspects of the activity; and

(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Regulation 22(2)(h) of GN R.543. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

~~**Alternative 1 (preferred alternative)**~~		
~~Description~~	~~Lat (DDMMSS)~~	~~Long (DDMMSS)~~
~~**Alternative 2**~~		
~~Description~~	~~Lat (DDMMSS)~~	~~Long (DDMMSS)~~
~~**Alternative 3**~~		
~~Description~~	~~Lat (DDMMSS)~~	~~Long (DDMMSS)~~

In the case of linear activities:

Please note that there are nine (9) alternative routes, none of which are preferred, due to the possibility of a number of combinations of the routes having to be used for the movement of the dragline. This is dependent on which section of the iMpunzi Opencast Operations is available to be mined first.

Each route mentioned below is being applied for as a corridor. The corridors being assessed are 250 m wide.

Alternative:	**Latitude (S):** **Longitude (E):** Please refer to **Appendix J** for 250m coordinates along the corridor
Alternative S1 (preferred) **Route 1A** • Starting point of the activity • Middle/Additional point of the activity	

• End point of the activity	
Alternative S2 (if any) **Route 1B**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Alternative S3 (if any) **Route 1C**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Additional Alternative **Route 2A**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Additional Alternative **Route 2B**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Additional Alternative **Route 3A**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Additional Alternative **Route 3B**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Additional Alternative **Route 3E**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	
Additional Alternative **Route 3F**	Please refer to **Appendix J** for 250m coordinates along the corridor
• Starting point of the activity • Middle/Additional point of the activity • End point of the activity	

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.
Please refer to the addendum in **Appendix J**.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

b) Lay-out alternatives

No layout alternatives are being assessed for this application.

~~Alternative 1 (preferred alternative)~~		
~~Description~~	~~Lat (DDMMSS)~~	~~Long (DDMMSS)~~
[redacted]		
~~Alternative 2~~		
~~Description~~	~~Lat (DDMMSS)~~	~~Long (DDMMSS)~~
[redacted]		
~~Alternative 3~~		
~~Description~~	~~Lat (DDMMSS)~~	~~Long (DDMMSS)~~
[redacted]		

c) Technology alternatives

No technology alternatives are being assessed for this application.

~~Alternative 1 (preferred alternative)~~
[redacted]
~~Alternative 2~~
[redacted]
~~Alternative 3~~
[redacted]

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)
Current planning indicates the dragline located at the Steenkoolspruit Pit of the iMpunzi Complex will deplete the dragline reserve by mid-2015. If the Van Dyksdrift South Pit is ready to be mined by this time, it is proposed for the dragline to be relocated to the Van Dyksdrift South Pit. The relocation of the dragline from the Steenkoolspruit Pit to the Van Dyksdrift South Pit may happen by any one of three route alternatives or combination of routes: • Route 1A; • Route 2B + Route 1C; or • Route 2B + Route 1B.
Alternative 2
Current planning indicates the dragline located at the Steenkoolspruit Pit of the iMpunzi Complex will deplete the dragline reserve by mid-2015. If the Van Dyksdrift South Pit is not available for mining at this point in time and the River West Pit is ready to be mined, it is proposed for the dragline to be relocated to the River West Pit. The relocation of the dragline from the Steenkoolspruit Pit to the River West Pit may happen by one of two route alternatives: • Route 2A; or • Route 2B.
Alternative 3
Current planning indicates the dragline located at the Steenkoolspruit Pit of the iMpunzi Complex will deplete the dragline reserve by mid-2015. If the Van Dyksdrift South Pit and the River West Pit are not available for mining at this point in time and the North Pit is ready to be mined by this time, it is proposed for the dragline to be relocated to the North Pit. The relocation

of the dragline from the Steenkoolspruit Pit to the North Pit may happen by any one of four combinations of routes:

- Route 2A + Route 3E;
- Route 2A + Route 3F;
- Route 2B + Route 3E; or
- Route 2B + Route 3F.

Alternative 4

Current planning indicates the dragline located at the Steenkoolspruit Pit of the iMpunzi Complex will deplete the dragline reserve by mid-2015. If the Van Dyksdrift South Pit, the River West Pit and the North Pit are not available for mining at this point in time and the Boschmans South East Pit is ready to be mined by this time (and if a dedicated dragline is not available for these Tweefontein Opencast Operations), it is proposed for the dragline to be relocated to the Boschmans South East Pit. The relocation of the dragline from the Steenkoolspruit Pit to the Boschmans South East Pit may happen by any one of four combinations of routes:

- Route 2A + Route 3A;
- Route 2A + Route 3B;
- Route 2B + Route 3A; or
- Route 2B + Route 3B.

Alternative 5

If the dragline has already been relocated to and mined out the Van Dyksdrift South Pit as described by the process in Alternative 1 above, it would then necessary for the dragline to move again to whichever pit may next require it for mining. The only pit that the dragline can move to directly from the Van Dyksdrift South Pit is the River West Pit. The relocation of the dragline from the Van Dyksdrift South Pit to the River West Pit may happen by one of two routes:

- Route 1C; or
- Route 1B.

Alternative 6

If the dragline has already been relocated to and mined out the River West Pit as described by the process in Alternative 2 above, it would then necessary for the dragline to move again to whichever pit may next require it for mining. The preferable pit that the dragline can next move to from the River West Pit is the Van Dyksdrift South Pit. The relocation of the dragline from the River West Pit to the Van Dyksdrift South Pit may happen by one of two routes:

- Route 1C; or
- Route 1B.

Alternative 7

If the dragline has already been relocated to and mined out the North Pit as described by the process in Alternative 3 above, it would then necessary for the dragline to move again to whichever pit may next require it for mining. One of the pits the dragline can move to from the North Pit is the River West Pit. The relocation of the dragline from the North Pit to the River West Pit may happen by one two routes:

- Route 3E; or
- Route 3F.

Alternative 8

If the dragline has already been relocated to and mined out the North Pit as described by the process in Alternative 3 above, it would then necessary for the dragline to move again to whichever pit may next require it for mining. One of the pits the dragline can move to from the North Pit is the Van Dyksdrift South Pit. The relocation of the dragline from the North Pit to the Van Dyksdrift South Pit may happen by any one of four combinations of routes:

- Route 3E + Route 1C;
- Route 3E + Route 1B;
- Route 3F + Route 1C; or
- Route 3F + Route 1B.

e) No-go alternative

The no-go alternative would involve not constructing the proposed dragline walkways. Should the dragline walkways not be constructed, coal from the iMpunzi and Tweefontein Opencast Operations would not be easily, cost effectively and efficiently mined. This would have negative implications for the timeframes and cost of electricity generation.

In addition, approximately 3 000 people with temporary and permanent jobs at the iMpunzi mining complex will lose their jobs.

Taking the strategic importance of coal supply to coal fired power plants and the generation of electricity into consideration, it is essential for South Africa's economy and sustainability for the no-go alternative to be undesirable.

Paragraphs 3 – 13 below should be completed for each alternative.

The information in the sections below (paragraph 3 - 13) is applicable to all of the route alternatives, namely **Route 1A**, **Route 1B**, **Route 1C**, **Route 2A**, **Route 2B**, **Route 3A**, **Route 3B**, **Route 3E** and **Route 3F**.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

~~**Alternative:**~~	~~**Size of the activity:**~~
~~Alternative A1[1] (preferred activity alternative)~~	[redacted]
~~Alternative A2 (if any)~~	
~~Alternative A3 (if any)~~	

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative) **Route 1A**	4 626.74 m

[1] "Alternative A.." refer to activity, process, technology or other alternatives.

Alternative A2 (if any) **Route 1B**	5 319.88 m
Alternative A3 (if any) **Route 1C**	5 259.73 m
Additional Alternative **Route 2A**	4 794.63 m
Additional Alternative **Route 2B**	2 207.71 m
Additional Alternative **Route 3A**	13 310.04 m
Additional Alternative **Route 3B**	12 088.95 m
Additional Alternative **Route 3E**	3 004.53 m
Additional Alternative **Route 3F**	1 280.07 m

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

~~**Alternative:**~~	~~**Size of the site/servitude:**~~
~~Alternative A1 (preferred activity alternative)~~ ~~Alternative A2 (if any)~~ ~~Alternative A3 (if any)~~	[redacted]

4. SITE ACCESS

Does ready access to the site exist?	YES ✓
If NO, what is the distance over which a new access road will be built	[redacted]

Describe the type of access road planned:

The existing roads in the study area will be used for access. The routes are located largely within existing mine haul roads and over mined land or planned mining land (**Figure 1.4**). For sections of the dragline walkway which will have to cross over open land, the dragline walkway construction itself within the corridor will be the access road – no additional roads will have to be built.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;

- closest town(s;)
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

Please refer to **Figure 1.2** in **Appendix A** and **Drawing D424-03-013** in **Appendix C**.

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

Please refer to **Figure 1-5** in **Appendix A.**

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

Please refer to **Figure 1-6**, **Figure 1-7** and **Figure 1-8** in **Appendix A** and **Drawing D424-03-013** in **Appendix C**.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

Please refer to the Image Plate in **Appendix B**.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES ✓		Please explain
The dragline walkway will be built within Glencore owned land.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES ✓		Please explain
According to the Mpumalanga Provincial Government Five Year Review, one of the Provincial Growth and Development Strategies is to accelerate investment in basic services such as water, decent sanitation and electricity. The construction of these dragline walkways will enable coal mining on the site to continue, providing coal to power plants and allowing for electricity generation while supporting local economic development. Mpumalanga is an important region in terms of energy production as it forms part of the Maputo Development Corridor and is positively influencing businesses and sustainability in the region. The construction of the walkways will also be aligned to job creation and sustainability which is an important part of the Extended Public Works Programme for the province.			
(b) Urban edge / Edge of Built environment for the area	YES ✓		Please explain
There will not be any urban sprawl associated with this activity, as no building construction is to take place and the construction of the dragline walkways will be within Glencore owned land, largely within existing and future mining areas.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES ✓		Please explain
Service delivery and development are the core priorities of the eMalahleni Local Municipality, as explained in the 2013/14 IDP for the municipality. The dragline walkways will contribute towards the betterment of both of these priorities. This will be done by providing jobs in the walkway construction phase and by ensuring the continuation of mining on the site, promoting the continuation of existing jobs. Mining currently contributes 52.8% to the economy of eMalahleni Local Municipality. The coal that is mined as a result of the use of the dragline, ultimately also increases the availability and reliability of electricity in the area.			

(d) Approved Structure Plan of the Municipality		NO ✓	Please explain
Aging infrastructure is a problem in the municipality, especially that of power generation. There is also an imbalance in power generation supply and demand in the area. The municipality recognises its shortcomings in this area and has prioritised the drafting of an energy master plan, as well as the upgrading of power stations and substations. This upgraded power infrastructure will need a reliable supply of coal, to which the movement of draglines will contribute. However, the municipal planning does not include walkway for heavy equipment such as draglines. These walkways are temporary and built on an "as-and-when" required basis by the Mining Houses, and removed and rehabilitated.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES ✓		Please explain
The Environmental Management Frameworks for the area have the common goal of balancing economic needs and protecting the environment for future generations. The dragline walkways will be built according to environmental management principles and will be predominantly on existing roads and largely within existing and future mining areas.			
(f) Any other Plans (e.g. Guide Plan)	YES ✓		Please explain
The Nkangala Service Delivery and Budget Implementation Plan (2011/12) aims to ensure the provision of adequate electricity to all local municipalities and to grow the district economy via the implementation of strategies to optimise intervention in regional economic development. The enabling of the continuation of coal mining meets both of these aims.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES ✓		Please explain
The land use of the area will not change as the dragline walkway corridors will be solely within Glencore's mining operations area.			
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES ✓		Please explain
For the continuation of mining at iMpunzi Opencast Operations and/or Tweefontein Opencast Operations (a major economic activity of the Mpumalanga region), the proposed dragline walkways are needed.			

5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES ✓		Please explain
The dragline will utilise existing electricity supply from the mine and no additional services are required.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)		NO ✓	Please explain
This infrastructure was not provided for in the infrastructure planning of the municipality as this infrastructure is a utility for an existing mining operation, as mentioned above. The municipality has been consulted and no problems were encountered, therefore no confirmation of infrastructural implications has been appended to this document.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES ✓		Please explain
This project provides the means to mine coal more efficiently, allowing for greater electricity generation which will be fed into the Eskom electricity grid. This project is essential with the ever increasing demand on electricity as a resource.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES ✓		Please explain
The dragline walkway corridors will be solely within Glencore's mining operations area.			
9. Is the development the best practicable environmental option for this land/site?	YES ✓		Please explain
The dragline walkways will be built according to environmental management principles and will be predominantly on existing roads and largely within existing and future mining areas so as to limit any disruption to environmental processes. In addition, the dragline walkway routes will be rehabilitated, in many cases with the goal improving the health and functionality of the mining impacted wetlands and watercourses the corridors will have crossed. Although some areas are still being used for agriculture at present, the walkway will temporarily impact on the farming activities, but once rehabilitated farming can continue.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES ✓		Please explain
The dragline walkways will have minimal negative impacts due to their location (within mined or to be mined land) and the rehabilitation of the corridors after the dragline has walked. The positive impacts of continued, cost-effective and time-effective mining are far reaching.			

11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	[redacted]	NO ✓	Please explain
The dragline walkways serve a function for a specific mining operation. As this is a defined task/service, no similar activities can be undertaken.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	[redacted]	NO ✓	Please explain
The dragline walkway corridors will be solely within Glencore's mining operations area.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	[redacted]	NO ✓	Please explain
The dragline walkway corridors will be solely within Glencore's mining operations area.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	[redacted]	NO ✓	Please explain
The proposed dragline walkways do not contribute directly to any of the SIPs. They will however, allow for the continued mining of the iMpunzi and/or Tweefontein operations in a cost-effective and efficient manner. The coal that is mined will contribute to power generation indirectly.			
15. What will the benefits be to society in general and to the local communities?			Please explain
Society in general will receive additional or continued electricity provision, as the dragline transported by the dragline walkway will be utilised by opencast coal mining operations, which in turn is required to provide coal for the generation of electricity to feed into the existing Eskom grid. Local communities will experience new and/or prolonged employment opportunities on the dragline walkway construction and dragline movement, and at the mining operations.			
16. Any other need and desirability considerations related to the proposed activity?			Please explain
There are no other need and desirability considerations related to the proposed pipeline which have not already been addressed.			
17. How does the project fit into the National Development Plan for 2030?			Please explain
Job creation and livelihoods is a recurring theme in the National Development Plan for 2030. The Plan also talks to improving infrastructure, with electricity generation listed as an area for improvement. The dragline walkways will facilitate the mining of coal which will provide/extend employment opportunities as well as contribute to the provision of electricity, until more renewable sources are available.			

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.
The potential and actual impacts on the environment, as well as management and mitigation thereof, have been taken into account by the undertaking of relevant specialist studies in that regard. The best suited methods of environmental management have been employed, favouring methods and alternatives that pose the least environmental impact. Public participation regarding the activities has also been undertaken, to ensure that the community and stakeholders had adequate and appropriate opportunity to become involved in decisions that may affect the environment. The proposed activities are thus in line with Section 23 of NEMA.
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.
The proposed activity will be in accordance with national policies, guidelines and principles outlined by NEMA. People and their needs have been placed at the forefront of concern and it is understood that all elements of the environment are interlinked. The key principle of sustainability is addressed by the proposed activity avoiding, minimising and remedying any disturbance of ecosystems/loss of biological diversity and disturbance of landscapes/sites that constitute national heritage.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Water Act	Water Use Licence required for the dragline walkway watercourse crossings.	Department of Water Affairs	1998
Constitution of the Republic of South Africa (Act 108 of 1996)	Everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations. This project encourages public participation and involvement.	National	1996
National Environmental Management Act No. 107 of 1998	Listed activities triggered by the construction of the dragline walkways require authorisation to proceed.	National & Provincial	1998
National Environmental Waste Management Act, (Act 59 of 2008)	All aspects relating to waste management.	National & Provincial	2008
The Environmental Conservation Act (Act 73 of 1989)	Controls for the effective protection and utilisation of the environment, littering, waste disposal, noise and various other activities, which may	National & Provincial	1989

	have a detrimental effect on the environment.		
The National Environmental Management: Biodiversity Act (Act 10 of 2004)	All aspects related to fauna and flora management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection.	National & Provincial	2004
National Environmental Management: Air Quality Act (Act 39 of 2004)	The prevention of air pollution and ecological degradation while promoting justifiable economic and social development.	National & Provincial	2004
The National Heritage Resources Act (Act 25 of 1999)	A cultural and heritage assessment is necessary in areas earmarked for development, which exceed 0.5 hectares (ha).	National & Provincial	1999
Occupational Health and Safety Act (Act 85 of 1993)	Prescribes health and safety measures necessary to adhere to for all construction workers.	National & Provincial	1993

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase? NO ✓

If YES, what estimated quantity will be produced per month? ~~m~~^{3}

How will the construction solid waste be disposed of (describe)?

N/A

Where will the construction solid waste be disposed of (describe)?

N/A

Will the activity produce solid waste during its operational phase? NO ✓

If YES, what estimated quantity will be produced per month? ~~m~~^{3}

How will the solid waste be disposed of (describe)?

Although there will be no solid waste material produced, natural material (sandstone rock) will be used along the dragline walkway and returned back to the quarry from where it was sourced after its use.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

N/A

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA? [redacted] NO ✓

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility? [redacted] NO ✓

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? [redacted] NO ✓

If YES, what estimated quantity will be produced per month? ~~m~~^{3}

Will the activity produce any effluent that will be treated and/or disposed of on site? [redacted] NO ✓

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility? [redacted] NO ✓

If YES, provide the particulars of the facility:

Facility name:	N/A
Contact person:	[redacted]
Postal address:	
Postal code:	
Telephone:	**Cell:**
E-mail:	**Fax:**

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	NO ✓
If YES, is it controlled by any legislation of any sphere of government?	NO ✓

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If NO, describe the emissions in terms of type and concentration:

No emissions are anticipated from the proposed development other than dust and exhaust emissions.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?	NO ✓

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?	YES ✓
If YES, is it controlled by any legislation of any sphere of government?	NO ✓

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
If NO, describe the noise in terms of type and level:

Construction related noise due to construction vehicles and brief operational noise related to machinery only.

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

	The activity will not use water ✓

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	~~litres~~
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	YES ✓

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

The WUL application is in process. Please refer to **Appendix E.6** for a copy of the WUL pre-application minutes.

14. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The dragline utilises electricity to move and all efforts have been made to ensure that the routes are as level as possible to ease the dragline relocation and use power as efficiently as possible.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

N/A

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A): [redacted]

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES ✓ [redacted]

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Mpumalanga
District Municipality	Nkangala District Municipality
Local Municipality	Emalahleni Local Municipality
Ward Number(s)	32
Farm name and number	Vandyksdrift 19 IS Steenkoolspruit 18 IS Klipplaat 14 IS Tweefontein 13 IS
Portion number	Vandyksdrift 19 IS Portions: 1, 6 Steenkoolspruit 18 IS Portions: 1, 2, 5, 6, 7, 8, 9, 10, 11, 25, 29 Klipplaat 14 IS Portions: 2, 6, 7 Tweefontein 13 IS Portions: Re, 1
SG Code	T0IS00000000001900001 T0IS00000000001900006 T0IS00000000001800001 T0IS00000000001800002 T0IS00000000001800005 T0IS00000000001800006 T0IS00000000001800007 T0IS00000000001800008 T0IS00000000001800009 T0IS00000000001800010 T0IS00000000001800011 T0IS00000000001800025 T0IS00000000001800029 T0IS00000000001400002 T0IS00000000001400006 T0IS00000000001400007 T0IS00000000001300000 T0IS00000000001300001

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:	Please refer to **Figure 1-5** in **Appendix A** for the land use of the area. All land over which the dragline walkways are proposed to be constructed is zoned as mining.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?	[redacted] NO ✓

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1: (Route 1A)

Flat ✓	[redacted]			

Alternative S2 (if any): (Route 1B)

Flat ✓	[redacted]			

Alternative S3 (if any): (Route 1C)

Flat ✓	[redacted]			

Additional Alternative: (Route 2A)

Flat ✓	[redacted]			

Additional Alternative: (Route 2B)

Flat ✓	[redacted]			

Additional Alternative: (Route 3A)

Flat ✓	1:50 – 1:20 ✓	1:20 – 1:15 ✓	1:15 – 1:10 ✓	[redacted]

Additional Alternative: (Route 3B)

Flat ✓	1:50 – 1:20 ✓	1:20 – 1:15 ✓	1:15 – 1:10 ✓	[redacted]

Additional Alternative: (Route 3E)

Flat ✓	1:50 – 1:20 ✓	1:20 – 1:15 ✓	[redacted]

Additional Alternative: (Route 3F)

Flat ✓	1:50 – 1:20 ✓	1:20 – 1:15 ✓	[redacted]

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

Route 1A, Route 1B, Route 1C, Route 2A and Route 2B

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	✓
2.2 Plateau	✓	2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	

Route 3A, Route 3B, Route 3E, Route 3F

2.1 Ridgeline	✓	2.4 Closed valley		2.7 Undulating plain / low hills	✓
2.2 Plateau	✓	2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1: (Route 1A)		**Alternative S2 (if any): (Route 1B)**		**Alternative S3 (if any): (Route 1C)**	
Shallow water table (less than 1.5m deep)	YES ✓		YES ✓		YES ✓	
Dolomite, sinkhole or doline areas		NO ✓		NO ✓		NO ✓
Seasonally wet soils (often close to water bodies)	YES ✓		YES ✓		YES ✓	
Unstable rocky slopes or steep slopes with loose soil		NO ✓		NO ✓		NO ✓
Dispersive soils (soils that dissolve in water)		NO ✓		NO ✓		NO ✓
Soils with high clay content (clay fraction more than 40%)	YES ✓		YES ✓		YES ✓	
Any other unstable soil or geological feature		NO ✓		NO ✓		NO ✓
An area sensitive to erosion	YES ✓			NO ✓		NO ✓

	Additional Alternative: (Route 2A)		**Additional Alternative: (Route 2B)**		**Additional Alternative: (Route 3A)**	
Shallow water table (less than 1.5m deep)	YES ✓		YES ✓		YES ✓	

Dolomite, sinkhole or doline areas	NO ✓	NO ✓	NO ✓
Seasonally wet soils (often close to water bodies)	YES ✓	YES ✓	YES ✓
Unstable rocky slopes or steep slopes with loose soil	NO ✓	NO ✓	YES ✓
Dispersive soils (soils that dissolve in water)	NO ✓	NO ✓	NO ✓
Soils with high clay content (clay fraction more than 40%)	YES ✓	YES ✓	YES ✓
Any other unstable soil or geological feature	NO ✓	NO ✓	NO ✓
An area sensitive to erosion	YES ✓	YES ✓	YES ✓

	Additional Alternative: (Route 3B)	**Additional Alternative: (Route 3E)**	**Additional Alternative: (Route 3F)**
Shallow water table (less than 1.5m deep)	YES ✓	YES ✓	YES ✓
Dolomite, sinkhole or doline areas	NO ✓	NO ✓	NO ✓
Seasonally wet soils (often close to water bodies)	YES ✓	YES ✓	YES ✓
Unstable rocky slopes or steep slopes with loose soil	YES ✓	YES ✓	YES ✓
Dispersive soils (soils that dissolve in water)	NO ✓	NO ✓	NO ✓
Soils with high clay content (clay fraction more than 40%)	YES ✓	YES ✓	YES ✓
Any other unstable soil or geological feature	NO ✓	NO ✓	NO ✓
An area sensitive to erosion	YES ✓	YES ✓	YES ✓

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

The information below is applicable to all of the route alternatives, namely **Route 1A**, **Route 1B**, **Route 1C**, **Route 2A**, **Route 2B**, **Route 3A**, **Route 3B**, **Route 3E** and **Route 3F**.

	Natural veld with scattered aliens[E] ✓			
	Cultivated land ✓		Building or other structure ✓ (Coal Mining)	Bare soil ✓

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES ✓	
Non-Perennial River		NO ✓
Permanent Wetland	YES ✓	
Seasonal Wetland	YES ✓	
Artificial Wetland		NO ✓
Estuarine / Lagoonal wetland		NO ✓

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

Rivers/Streams

A specialist Aquatics Assessment has been undertaken for this specific project. For additional information please refer to the full Aquatics Assessment Report, found in **Appendix D**.

The region where the iMpunzi and Tweefontein Opencast Operations is situated falls within the Olifants River catchment. The Olifants River Catchment is of considerable economic importance as a significant number of mining, industrial and agricultural activities (including intensive irrigation schemes) are concentrated within the catchment. This catchment is a principal sub-catchment of the Limpopo River and covers an area of approximately 54 570 km^2 within the eastern parts of South Africa.

The Olifants River originates to the east of Johannesburg and flows north, before curving eastwards through Mpumalanga and the central Kruger National Park to Mozambique, where finally it discharges into the Indian Ocean. The basin experiences a diversity of climatic regions, from the cool Highveld in the south of the basin to the sub-tropical region east of the escarpment. The mean annual rainfall over the WMA portions located in South Africa ranges from 500 mm to 800 mm. Economic activity in the catchment is diverse, ranging from mining and industry to agriculture and eco-tourism. As the Olifants River runs through the Kruger

National Park, the provision of water to meet ecological requirements is also an important water management requirement of the WMA.

The study area falls across quaternary catchments B11F, B11E and B11B (**Figure 1-8**) The downstream receiving water body is the Olifants River. The Tweefonteinspruit and the Steenkoolspruit rivers are also directly affected water bodies, however they also lead into the Olifants River downstream.

The Tweefonteinspruit has been seriously negatively affected by mining activities, with high sulphate levels, high levels of total dissolved solids and highly saline and acidic conditions. Sulphate levels were higher than chloride levels at all sites indicating mining impacts throughout the study area.

The Steenkoolspruit and the Olifants River have suffered severe flow modifications which have caused evident channel incision and bank erosion. Alien vegetation is also widespread along these rivers. These impacts are more severe along the Steenkoolspruit and lower Olifants River

Kleinkopje Colliery and Middelburg Mine (Douglas Colliery) are the two major water users between the study area and the Witbank Dam.

There are no major dams between the site and Witbank Dam. The water downstream of the site, up to Witbank Dam, is used primarily for agricultural and mining purposes. It is worth noting that all the land is owned by Glencore, with the directly adjacent land owned by BHP Billiton Energy Coal South Africa.

Wetlands

A specialist Wetlands Assessment has been undertaken for this specific project. For additional information please refer to the full Wetlands Assessment Report, found in **Appendix D**.

There is a presence of riparian habitat associated with the Steenkoolspruit and Olifants River and wetlands of the following hydro-geomorphic types occur in the study area (**Figure 1-9**):

- Floodplain;
- Channelled Valley Bottom;
- Unchannelled Valley Bottom;
- Hillslope Seepage; and
- Pan (Depression).

All of the wetlands have been modified to degree, with no pristine wetlands found to occur on site. Impacts include past and current coal mines adjacent to the wetlands on site, extensive cultivation along and within the wetland boundaries, conversion of natural moist grasslands to planted pasture, road and railway crossings, dams along the Tweefonteinspruit and the presence of alien invasive vegetation.

The wetlands in the study area were found to have a Present Ecological Status (PES) of “Largely Natural” to “Seriously Modified” depending on the level of impacts with “Seriously Modified” wetlands being those along the Tweefonteinspruit (**Figure 1-10**).

The large hillslope seepage wetlands and the wetlands associated with rocky ridges along the river channels were found to have the greatest importance and sensitivity of the all wetlands on site due to the high species richness associated with the habitat niches available. Additionally, the hillslope seepage wetlands have a great water purification potential, providing an ecological service to the surrounding area (**Figure 1-10**). The Ecological Importance and Sensitivity (EIS) of the wetlands found in the study area was rated as “Low” to “High” with the related Ecological Management Classes ranging from Category D to Category B/C. The hillslope seep wetlands north of the Tweefonteinspruit require the highest Ecological Management Class of the wetlands in the study area (**Figure 1-11**).

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	
Low density residential	Hospital/medical centre	
	School	
		Agriculture
		River, stream or wetland
		Mountain, koppie or ridge
Heavy industrial **AN**	Railway line **N**	
Spoil heap or slimes dam**A**		
Quarry, sand or borrow pit		

If any of the boxes marked with an "N "are ticked, how will this impact / be impacted upon by the proposed activity?

Some of the dragline walkways will cross over the Richards Bay Coal Terminal (RBCT) railway line. The crossing of the RBCT railway line may be problematic due to the high train traffic volumes and the strategic importance of this route. Spoornet has in the past allowed 24 to 48 hour occupations for draglines to cross the railway line. Such a short occupation duration will require crossing sites where shallow bedrock / competent material is available as there will not be enough time to remove the rail tracks and to reinstate them once the dragline has passed. This will ensure that the settlement below the rail tracks is limited and the rail tracks can remain in place (i.e. do not have to be removed). During a site visit, possible sites were identified where the railway line complies with these specifications. The crossing site on Route 1B will require significant engineering to cross with the dragline. From an engineering point of view the crossing on Route 1A and Route 1C is preferred over the crossing site along Route 1B.

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

The heavy industrial activity which is located close to the proposed dragline walkways is the opencast mining for which the dragline is required. This activity will not be negatively affected by the dragline walkways as the dragline will be walking on mined out areas, existing haul roads or areas to be mined in the future.

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES ✓	
Core area of a protected area?		NO ✓
Buffer area of a protected area?		NO ✓
Planned expansion area of an existing protected area?		NO ✓
Existing offset area associated with a previous Environmental Authorisation?		NO ✓
Buffer area of the SKA?		NO ✓

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

Please refer to **Figure 1-6** in **Appendix A**.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:		NO ✓
No heritage features were identified along the routes although several graves were identified in the larger study area.		

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Heritage/Cultural

A specialist Heritage Assessment has been undertaken for this specific project. For additional information please refer to the full Heritage Statement, found in **Appendix D**.

In addition to the Heritage Statement undertaken for the proposed dragline relocation, previous Heritage Impact Assessments (HIAs) have been conducted within the project area and a variety of heritage resources have been identified. These heritage resources include 14 historical houses and 12 burial grounds (Fourie *et al*., 2000; Fourie, 2012), including farmsteads and associated farming structures. Farmsteads that have been identified as a result of the historical aerial imagery are well established, so it can be assumed that farming activities have been present before 1954. As such the project area has gone through years of transformation rendering the possibility of *in situ* heritage resources to a very low possibility.

A total of four previously un-identified heritage resources were recorded during the screening assessment for the proposed dragline relocation. These include two historical farmsteads and associated buildings, one historical shed or workshop and one decommissioned mine shaft.

These heritage resources are located more than 50 m from the proposed route options. The historical farmstead is located approximately 70 m from the proposed routes; however the historical werf may extend into the proposed route option.

Palaeontological

Few significant archaeological and palaeontological resources are expected to occur within the project area as it has been extensively altered due to mining activities.

The study area is situated near the edge of the Highveld Coal Field that forms part of the Karoo Basin. In the project area, the underlying stratigraphic unit is the *Madzaringwe Formation* (predominantly shales interspersed with coal seams). The model which best describes the formation of the *Madzaringwe Formation* sequence is that of a marsh that was periodically flooded. If this model is correct the fossils found between the shale sequences would include *Glossopteris* leaves, roots and inflorescences, lycopod and sphenophyte stems, ferns, and insects. Vertebrates that occurred at this time are seldom preserved with the plants (Bamford, 2012).

No significant Stone Age (ca. 2 mya to ca. 1600 CE) sites have been identified previously within the project area. Fourie *et al*. (2000) described the predominant expected archaeological record in the project area is the Late Iron Age (ca. 1000 to 1850 CE) as a Late Iron Age site was identified within the project area. This site is located approximately 200 m from one of the proposed dragline routes. Fourie *et al*. (2000) described the site as consisting of two stone enclosures, ceramics, bone, glass and metal fragments were found. Based on the location of the site and known distributions of Iron Age communities, the site may possibly be affiliated with either *Doornkop, Klingbeil, Mzonjani* or *Marateng* ceramic facies as well (Huffman, 2007).

A Letter of Request for Exemption is recommended as for the following reasons:

The project area has been extensively assessed in the past. As a result, heritage resources have been identified, assessed and mitigated;

- The brownfields accounted for more than 90% of the proposed project area of which:
  - Approximately 44% is mined areas; and
  - Approximately 50% is cultivated maize fields.
- Greenfield areas, i.e. areas considered pristine such as wetlands, ridges and water courses accounted for less than 10% of the total project area.

The construction and rehabilitation of the dragline routes will not directly impact on any known heritage resources. However, to ensure that subsurface heritage resources are identified during construction, a watching brief, chance finds procedures and fossil finds procedures in the greenfields areas are suggested.

All mitigation measures including grave relocation, application for destruction permits and site monitoring that may already be in place for the various mining right areas must be observed.

Will any building or structure older than 60 years be affected in any way?	NO ✓
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	NO ✓

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

27.3% of people in the eMalahleni Local Municipality are unemployed (StatsSA, 2013).

Economic profile of local municipality:

There are 190 662 economically active people (employed or unemployed but looking for work) in the eMalahleni Local Municipality. The most household incomes range from R 38,201 to R 76 400 per annum, with 17.5% of the local population falling within this income bracket.

There are 119 874 households within the local municipality, with an average household size of 3.2 people per household. 80.3% of the households have access to piped water, either in their dwelling or in their yard. 5.2% of households do not have access to piped water. 73.4% of households within the local municipality have access to electricity for lighting.

95.4% of people residing in eMalahleni Local Municipality live in urban areas, while the remaining percentage live on farms (StatsSA, 2013).

Level of education:

The Census 2011 results show that eMalahleni Local Municipality has a total population of approximately 395 466 people. Of those aged 20 years and older, 4% have completed primary school, 35.7% have some secondary education, 31.5% completed matric, and 14% have some form of higher education. The percentage of those aged 20 years and older with no form of schooling is 5.8% (StatsSA, 2013).

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	TBC
What is the expected yearly income that will be generated by or as a result of the activity?	R0.00
Will the activity contribute to service infrastructure?	NO ✓
Is the activity a public amenity?	NO ✓
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Approximately 15
What is the expected value of the employment opportunities during the development and construction phase?	TBC
What percentage of this will accrue to previously disadvantaged individuals?	60%
How many permanent new employment opportunities will be created during the operational phase of the activity?	Approximately 25
What is the expected current value of the employment opportunities during the first 10 years?	TBC
What percentage of this will accrue to previously disadvantaged individuals?	60%

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA) ✓	[redacted]	Other Natural Area (ONA) ✓	No Natural Area Remaining (NNR) ✓	A number of plant species with conservation importance have been found by the vegetation specialist along the proposed dragline route corridors. For more information on the specific plant species found in these areas, which classify them as CBA please refer to the specialist biodiversity report in **Appendix D**.

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	-
Near Natural (includes areas with low to moderate level of alien invasive plants)	15%	Olifants River, Steenkoolspruit and Tweefonteinspruit floodplain, surrounded by mining and farming.
Degraded (includes areas heavily invaded by alien plants)	15%	Old fields, alien bluegum and wattle stands
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	70%	Large section of the site transformed by opencast coal mining as well as maize cultivation. Maize harvested in winter months.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems				
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Endangered ✓	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)		Estuary		Coastline
		YES ✓		NO ✓		NO ✓

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

Vegetation

A specialist Vegetation Assessment has been undertaken for this specific project. For additional information please refer to the full Report, found in **Appendix D**.

Although the natural vegetation of the study area is Eastern Highveld Grassland, the terrestrial habitats and vegetation of the majority of the study area have been transformed by anthropogenic impacts. Anthropogenic activities impacting on the area include cultivation (ploughing of soils), mining (e.g. open cast pits, discard dumps, plants, offices and residential areas), linear infrastructure (roads and railway lines), damming of watercourses (including the large Tweefontein Dam), planting of alien invasive trees and invasion by other alien plant species.

Cultivation and opencast mining have transformed most of the terrestrial vegetation of the study area and the only remaining untransformed vegetation occurs along drainage lines and around sandstone outcrops or scarps, where elevated soil moisture or rockiness and shallow soils impede successful cultivation. Though untransformed, much of the remaining indigenous vegetation has been degraded by anthropogenic impacts such as heavy grazing by cattle and sheep (or in some cases exclusion of grazing by ungulates), brief (one or two years) ploughing of marginal soils that were subsequently abandoned but are still vegetated by 'degraded vegetation', altered fire regimes (in the form of reduced or increased frequency of burning and unseasonal burns), alterations to hydrological patterns and water quality, and various edge effects emanating from surrounding transformed areas.

No "Ecological Support Areas" or "Protected Areas" occur within the study area. A few fragmented patches of habitat mapped as "Critical Biodiversity Areas" occur mostly along the streams in the study area. These patches comprise mostly degraded grassland, valley-bottom wetlands and pans. The bulk of the habitat is mapped as "Modified". This categories comprises largely of degraded grazing land and cultivated land, but also includes significant areas of mining infrastructure and plantations and invasive stands of alien trees. **Figure 1.6** shows the areas highlighted by the Mpumalanga Biodiversity Sector Plan (2013).

As illustrated in **Figure 1-7** the dragline routes will cross a variety of vegetation units, however it should be noted that the bulk of the area will be mined within the next 2–8 years.

No Red List plant species were found on site, but there are four plants listed as threatened. Plant species of conservation concern that are likely to occur in the study area include:

- *Encephalartos lanatus* (Vulnerable): Found in sheltered, wooded ravines in sandstone ridges;
- *Frithia humilis* (Endangered): Found in very shallow soils derived from coarse sediments;
- *Khadia carolinensis* (Vulnerable): Found in grassland in well-drained, sandy loam soils among rocky outcrops, or at the edges of sandstone sheets; and
- *Pachycarpus suaveolens* (Vulnerable): Found in short or annually burnt grasslands.

Protected tree species that have geographical distributions around the study area are *Boscia albitrunca, Curtisia dentata, Elaedendron transvaalensis, Pittosporum viridiflorum, Prunus africana* and *Sclerocarya birrea subsp. caffra*. However, as none of these species occur on the site or have ever been recorded near the study area, it is thought that no protected trees are likely to occur on site.

Aquatic Ecosystem

A specialist Aquatics Assessment has been undertaken for this specific project. For additional information please refer to the full Report, found in **Appendix D**.

The region where the iMpunzi and Tweefontein Opencast Operations is situated falls within the Olifants River catchment. The main aquatic ecosystems associated with the study area are the Olifants River, Steenkoolspruit and the Tweefonteinspruit.

The Tweefonteinspruit has been seriously negatively affected by mining activities, with high sulphate levels, high levels of total dissolved solids and highly saline and acidic conditions. This is likely to have seriously impacted upon aquatic biota. Sulphate levels were higher than chloride levels at all sites indicating mining impacts throughout the study area. However, only the Tweefonteinspruit site is likely to be seriously restrictive to aquatic macroinvertebrates and fish. High salinity levels within the Olifants River sites may also be limiting to algae and may have indirectly affected sensitive aquatic species. Metals highly associated with the Tweefonteinspruit but low at all the other sites included Ca, Li, Co, K, Mg, Na, Ni and Sr.

Diatom species compositions were also used to determine the impacts of the surrounding mines on the existing water quality of the watercourses. While all the sites indicated slight mine waste water contamination, Tweefonteinspruit was shown to be heavily impacted by mine waste water.

The Steenkoolspruit and the Olifants River have suffered severe flow modifications which have caused evident channel incision and bank erosion. Alien vegetation is also widespread along these rivers. These impacts are more severe along the Steenkoolspruit and lower Olifants River, which are considered “Largely Modified” (Category D) in terms of instream and riparian habitats. The Tweefonteinspruit is considered “Seriously Modified” (Category E) as a result of water quality impacts as well as channel modification and road crossings which have caused inundation of water.

Most Olifants River sites are considered “Moderately Modified” for aquatic macroinvertebrates (Category C). The downstream Steenkoolspruit site is considered “Largely Modified” for aquatic macroinvertebrates (Category D), a response to the lack of instream habitats available due to erosion and channel incision.

Cover features for fish are generally limited, mostly being provided in the form of overhanging vegetation, undercut banks and substrate (stones). Based on available information (from the site visit in April 2013 and other recent surveys in the area), only three naturally indigenous fish species have previously been sampled in the study area of concern, namely Sharptooth catfish (*Clarias gariepinus*), Southern mouthbrooder (*Pseudocrenilabrus philander*) and Banded tilapia (*Tilapia sparrmanii*). The presence of three translocated indigenous species and three alien species have also been confirmed. Based on all available information, eight indigenous fish species have a known distribution range overlapping the study area. None of the fish species expected or observed in the study area are classified as threatened on any scale (international, national or regional). The Olifants River and the Steenkoolspruit are currently in a “Largely Modified” (Category D) state for fish, while the Tweefonteinspruit is “Seriously Modified” (Category E) for fish. The primary impacts responsible for the current status of the fish

assemblages is associated to flow modification, sedimentation, physical disturbance, water quality deterioration, over-grazing, migration barriers and the presence of alien fish species.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Witbank News	
Date published	28 June 2013	
Publication name	Middelburg Observer	
Date published	28 June 2013	
Site notice position	Latitude	Longitude
	26°08,23.4'S	29°16,27.5'E
	26°08,21.2'S	29°15,94.0'E
	26°04,26.0'S	29°12,09.8'E
	26°01.16.3'S	29°12,26.4'E
	26°02,03.7'S	29°11,13.8'E
	26°02.09.1'S	29°11,03.0'E
	26°01.33.3'S	29°10,23.2'E
	Notice Boards were placed in conspicuous places within the vicinity of the proposed dragline walkway routes (Please refer to **Appendix E.1** for the coordinates and photographs of their placement).	
Date placed	25 June 2013	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2)(e) and 54(7) of GN R.543.

The following measures were applied to ensure that potential interested and affected parties, including persons desiring but unable to participate due to particular disadvantages (e.g. illiteracy, disability, language, etc.) are afforded an opportunity to participate in the application and provided with information containing all relevant facts. The opportunity to participate in the BA study and licensing process was announced from 27 June 2013 as follows:

- A Background Information Document (BID), which provided information regarding the development of walkways to relocate a dragline from the iMpunzi Opencast Operations, was distributed. Stakeholders were also sent a map indicating proposed walkway routes for the dragline as well as a registration sheet. BIDs were hand delivered at the houses close to the Makuase School and copies were also left at the Tweefontein golf club and

with the occupants of houses in the area. A copy of the BID is attached to this report as **Appendix E.2**.

- Media advertisements (**Appendix E.1**) describing the proposed project and the listed activities which will be triggered by the proposed project were placed in two newspapers, the Witbank News and the Middelburg Observer. The contents of the media advertisements were in accordance with requirements as stipulated by NEMA.
- Notice Boards (**Appendix E.1**) were placed in conspicuous places within the vicinity of the proposed dragline walkway routes. Placement of notice boards was conducted on 25 June 2013 to invite stakeholder participation.

The following opportunities are available for contribution from the I&APs:

- Completing and returning the registration/comment sheets on the BID, the Draft and Final BAR on which space will be provided for comment;
- Providing comment telephonically or by email to the public participation office;
- Providing comment when the BID was hand delivered to residents who live close to Makause School; and
- Response on the notice boards or media advertisements placed and published.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

The following individuals representing key sectors in the study area were identified and registered on the stakeholder database as key stakeholders. These key stakeholders received written notification of the proposed activities (**Appendix E.4**).

Title, Name and Surname	**Affiliation/ key stakeholder status**	**Contact details (tel number or e-mail address)**
Mr Collin du Plessis	Representing the landowner – Glencore South Africa	Colin.duPlessis@glencore.co.za
Dolly Mthethwa	Representing the landowner – Anglo American	dolly.mthethwa@angloamerican.com
Mr FC Cloete	Neighbouring property	013 643 2314
AJ Cronje	Neighbouring property	017 648 4235
E de Villiers	Neighbouring property	013 656 9416
G de Vos Breet	Neighbouring property	013 643 1504
DJS de Wet	Neighbouring property	013 643 3012
H Meiring	Neighbouring property	013 643 3058
AP Olwage	Neighbouring property	013 686 9306
F Roux	Neighbouring property	013 643 3008
B roux	Neighbouring property	017 687 2146
TM Roux	Neighbouring property	013 686 9501

G Smith	Neighbouring property	013 656 9449
AN Steenkamp	Neighbouring property	013 686 9511
J Stolz	Neighbouring property	013 643 1494
A vd Merwe	Neighbouring property	013 643 3006
A vd Heever	Neighbouring property	013 697 4370
SJ & V van Jaarsveld	Neighbouring property	013 697 4370

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
Mr Hennie Laas, AgriSA sent a copy of a power point presentation which raised concerns regarding the future of food security in Mpumalanga / South Africa.	The proposed dragline relocation project will not have a permanent impact on agricultural as the proposed walkway will be completely rehabilitated. Crops are very successfully planted again in the rehabilitated walkways.
Eskom would like a set of maps to verify how the proposed relocation may impact on their power lines.	A map of the proposed alternative dragline routes were sent to Eskom. The engineering design team also contacted Eskom for further discussions.

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name	Tel No	Fax No	e-mail	Postal address

	and Surname)				
National Department of Water Affairs (DWA)	Mr Ackerman Pieter	(012) 336 8217	(012) 336 6608	ackerman@dwa.gov.za	Private Bag X313, Pretoria
National Department of Agriculture, Forestry and Fisheries	Ms Buthelezi Thoko	(012) 319-7508	(012) 329-5938	Thokob@daff.gov.za	Private Bag X250, Pretoria
Department of Environmental Affairs	Ms Ngubeni Nyiko	(012) 310 3911		nngoveni@environment.gov.za/ nnkosi@environment.co.za	315 Cnr Pretorius & Lilian Ngoyi Street, Pretoria
Department of Water Affairs (DWA)	Mr Macevele Stanford	(013) 932 2061	(086) 661-7621	MaceveleS@dwa.gov.za	Private Bag X11259, Bronkhorstspruit
Mpumalanga Department of Economic Development, Environment and Tourism	Ms Martha Seshweni	(013) 692 5806	(086) 695-3928	mmseshweni@mpg.gov.za	P O Box 11205, Witbank
Mpumalanga Department of Economic Development, Environment and Tourism	Ms Mthimunye Charity	(013) 690 2595	(086) 695-3928	cnmthimunye@mpg.gov.za	Private Bag X7255, Witbank
Mpumalanga Department of Water Affairs (DWA)	Mr Soko Mthobisi	(013) 759 7310	(013) 7590 7525	sokom@dwa.gov.za	Priavte Bag X 11259, Nelspruit
Mpumalanga Department of Water Affairs (DWA)	Ms Dlamini Mbali Marcia	(013) 759 7310	(013) 7590 7525	dlaminim@dwa.gov.za	Private Bag X 11260, Nelspruit
Mpumalanga Department of Mineral Resources	Mr Tshivhandekano Aubrey	013 653 0500	(013) 690 3288	Aubrey.Tshivhandekano@dmr.gov.za	Private Bag X 7279, Witbank
Mpumalanga Department of Mineral Resources	Ms Maphopha Lydia	013 653 0500	(013) 690 3288	Lydia.Maphopha@dmr.gov.za	Private Bag X 7280, Witbank
Mpumalanga Department Public Works, Roads and Transport	Mr Mohlasedi Kgopana	(013) 766-6554	(013) 766-8449	kmohlasedi@mpg.gov.za	Private Bag X11310, Nelspruit
Mpumalanga Tourism and Parks Agency	Mr Hoffman Andre	(013) 262 4844	(013) 262 4858	andre.hoffman@vodamail.co.za	P O Box 1414, Marblehall

Mpumalanga Tourism and Parks Agency	Dr Botha Hannes	(013) 262 4844	(013) 262 4858	hanbotha@mweb.co.za	P O Box 1250, Nelspruit
Mpumalanga Tourism and Parks Agency	Mr Boshoff André	(013) 262 4844	(013) 262 4858	andre.hoffman@vodamail.co.za	P O Box 1250, Nelspruit
Mpumalanga Department of Agriculture, Rural Development and Land Administration	Mr Mzara Desire	(013) 262 4844	(013) 262 4858	mzaradt@gmail.com	Private Bag X11220, Nelspruit
Mpumalanga Department of Agriculture, Rural Development and Land Administration	Ms Sithole Nelisiwe	(013) 766 6020	(013) 262 4858	okmosome@mpg.gov.za	Private Bag X11220, Nelspruit
Mpumalanga Department of Agriculture, Rural Development and Land Administration	Mr Magagula One day	(013) 766 6082	(013) 766 8429	OMagagula@mpg.gov.za/ magagulaob@gmail.com	Private Bag X11219
Mpumalanga Department of Agriculture, Rural Development and Land Administration	Dr Cele LB	(013) 766 6082	(013) 766 8429	lcele@mpg.gov.za	Private Bag X11220, Nelspruit
Nkangala District Municipality	Cllr Mashilo SK	(013) 947 2551	(013) 249-2087	vanbuurensmp@nkangaladm.gov.za	PO Box 437, Middelburg
Nkangala District Municipality	Ms van Buuren Susan	(013) 249-2006	(013) 249-2088	vanbuurensmp@nkangaladm.gov.za	PO Box 437, Middelburg
Nkangala District Municipality	Ms Gambu Lerato	(013) 249-2006	(013) 249 2088	gambulc@nkangaladm.gov.za	PO Box 437, Middelburg
Nkangala District Municipality	Mr Zimbwa Allan	(013) 249 2006	(013) 249-2087	zimbwaag@nkangaladm.gov.za	PO Box 437, Middelburg
Nkangala District Municipality	Cllr Nkwanya AB	(013) 249-2006	(013) 249-2087	silandasn@nkangaladm.gov.za	PO Box 437, Middelbrg
Nkangala District Municipality	Ms Silinda Susan	(013) 249 2010	(013) 249-2087	silindasn@nkangaladm.gov.za	PO Box 437, Middelburg
Emalahleni Local Municipality	Clr Dikgale	(013) 249 2010	(013) 249-2087	dikgalelj@nkangaladm.org.za	PO Box 437, Witbank

	L				
Emalahleni Local Municipality	Cllr Sithole Salome	(013) 249 2010	(013) 690 6430	khubenc@emalahleni.gov.za	PO Box 437, Witbank
Emalahleni Local Municipality	Mr van Vuuren Jansen	(013) 690 6234	(013) 690 6479	jansenvanvuurent@emalahleni.gov.za	PO Box 3, Witbank
Steve Tshwete Local Municipality	Cllr Mkwansi Augustine	(013) 690 6208	(013) 249 7072	lorraine@stevetshwetelm.gov.za	PO Box 14, Middelburg
Steve Tshwete Local Municipality	Cllr Masina Mike	(013) 249 7043	(013) 249 7072	mayorsecretary@stevetshwetelm.gov.za	PO Box 14, Middelburg
Steve Tshwete Local Municipality	Mr Fouche WD	(013) 249-7261	(013) 282-5607	mmoffice@stevetshwetelm.gov.za	PO Box 14, Middelburg

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Activity	Impact summary	Significance	Proposed mitigation
Alternative 1 (preferred alternative) – **Route 1A**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Moderate	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.

Activity	Impact summary	Significance	Proposed mitigation
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	High	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Moderate	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Moderate	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Moderate	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Clear vegetation immediately prior to construction to minimise time the soil is bare for. Disturbed areas must be stabilised immediately to prevent erosion. Physically demarcate the limit of the walkway construction area. Remove topsoil prior to construction and store different soils separately. Rip compacted soils to specified depths prior to the replacement of topsoils. Locate stockpiles on high ground out of the reach of flood levels in the streams. Constructing the walkway in winter, followed by immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Low	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.

Activity	Impact summary	Significance	Proposed mitigation
	Complete loss of wetland habitat	High	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles.

Activity	Impact summary	Significance	Proposed mitigation
			Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	High	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Alternative 2 – **Route 1B**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Very Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Low	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Low	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.

Activity	Impact summary	Significance	Proposed mitigation
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Low	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	Very Low	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Very Low	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Very Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	N/A	
	Loss of individuals of threatened plants	N/A	
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	Low	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Low	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Low	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts.

Activity	Impact summary	Significance	Proposed mitigation
	security risk to local inhabitants, possibly bring disease and increase the risk of veld fires		No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Low	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	Moderate	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Very Low	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Very Low	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Very Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Low	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Very Low	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.

Activity	Impact summary	Significance	Proposed mitigation
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	Low	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Very Low	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Low	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Very Low	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Alternative 3 – **Route 1C**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.

Activity	Impact summary	Significance	Proposed mitigation
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Low	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	High	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Moderate	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings.

Activity	Impact summary	Significance	Proposed mitigation
			Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Low	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Low	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Low	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	Moderate	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope.

Activity	Impact summary	Significance	Proposed mitigation
			Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time.

Activity	Impact summary	Significance	Proposed mitigation
			On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Additional Alternative – **Route 2A**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Low	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area,	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management.

Activity	Impact summary	Significance	Proposed mitigation
	during the construction of the walkway		All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	High	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Moderate	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Low	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Low	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Low	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	Moderate	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas.

Activity	Impact summary	Significance	Proposed mitigation
			Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Low	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants.

Activity	Impact summary	Significance	Proposed mitigation
			Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	High	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Additional Alternative – **Route 2B**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	High	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Moderate	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.

Activity	Impact summary	Significance	Proposed mitigation
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	High	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Low	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	High	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Moderate	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Moderate	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic	Moderate	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced.

Activity	Impact summary	Significance	Proposed mitigation
	and protected faunal species due to reduced habitat viability		Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	High	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	High	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	High	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area.

Activity	Impact summary	Significance	Proposed mitigation
	disease and increase the risk of veld fires		Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Additional Alternative – **Route 3A**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.

Activity	Impact summary	Significance	Proposed mitigation
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Moderate	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	Moderate	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Low	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Moderate	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Moderate	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows.

Activity	Impact summary	Significance	Proposed mitigation
			The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Moderate	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	High	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.

Activity	Impact summary	Significance	Proposed mitigation
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Additional Alternative – **Route 3B**			

Activity	Impact summary	Significance	Proposed mitigation
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Moderate	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	Moderate	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Low	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.

Activity	Impact summary	Significance	Proposed mitigation
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	High	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Moderate	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Moderate	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Moderate	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	High	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.

Activity	Impact summary	Significance	Proposed mitigation
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	High	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time.

Activity	Impact summary	Significance	Proposed mitigation
	may become stressed by the construction process)		Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Additional Alternative – **Route 3E**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Moderate	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas. Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.

Activity	Impact summary	Significance	Proposed mitigation
	or using dangerous machinery, may pose a safety risk to workers		
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	Low	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Low	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	Moderate	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Moderate	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Moderate	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	Moderate	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas.

Activity	Impact summary	Significance	Proposed mitigation
			Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	Moderate	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	Moderate	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
	Direct impacts:		

Activity	Impact summary	Significance	Proposed mitigation
Decommissioning / Closure Phase	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
Additional Alternative – **Route 3F**			
Construction Phase	***Direct impacts:***		
	Sub-surface heritage resource destruction	Very Low	Contact heritage agency if any resources found. Relocation or protection of resources if necessary. Education of employees.
	Disturbance of palaeontological resources	Very Low	Fossil rescue and donation to a recognised research or storage facility.
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	High	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Winter construction should be undertaken. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - sedimentation	Moderate	Sediment movement off the construction areas should be minimised. Minimise vegetation clearing footprint. Limit construction to a small area and short duration, ideally in winter months only.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, construction activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Deterioration of wetland habitat - soil compaction	Moderate	Compacted soils need to be ripped and landscaped to the surrounding landscape profile. Long term follow up of rehabilitated and re-vegetated areas.

Activity	Impact summary	Significance	Proposed mitigation
			Immediate repair of erosion damage.
	Decline in marginal aquatic and riparian habitats	High	Compacted soils need to be ripped and landscaped to the surrounding land profile. Long term follow up of rehabilitated and re-vegetated areas. Erosion damage that does occur will need to be repaired immediately.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Barriers to fish migration	Low	Ensure that there is no pronounced drop in water levels or barriers to flow. Ideally the project should be undertaken in winter when migratory activity is low.
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Regular watering of the construction area and roads in the vicinity of human settlements to suppress dust. Restricting construction activities to the walkway area.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	An increase in the amount of rubbish, construction rubble and sewage may be produced by the workers in the area, during the construction of the walkway	Low	Environmental induction training to address the use and management of sanitation facilities (chemical portable toilets) and general site management. All rubbish and rubble must be collected in separate, demarcated bunded areas. Provide bunded containment and settlement facilities for hazardous materials, such as fuel and oil.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Loss or fragmentation of indigenous natural vegetation	Moderate	Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Loss of individuals of threatened plants	Low	Surveys for potentially affected species. Construction impacts to be contained within the infrastructure footprint. Immediate rehabilitation.
	Establishment and spread of declared weeds and alien invader plants	Low	Immediate rehabilitation of disturbed areas. Do not introduce alien plant seeds through soil stockpiles. Monitor for alien plant species. Immediately control any alien species.
	Habitat fragmentation and loss of faunal habitats	High	Walkway routes should be aligned along existing infrastructure routes and river crossings. Contain activities to as small a footprint as possible. Immediate rehabilitation.
	Faunal habitat quality deterioration	High	Minimise night lighting and light spill into faunal habitat where possible. Control activities or structures within highly sensitive habitats. Dust should be controlled. Treat dirty water on site to acceptable quality standards or store and then remove by waste management contractors to be treated off-site. Any clean water must not cause erosion or alter the natural hydrology within wetlands and rivers. Remove invasive and declared weed species. Keep soil stockpiles clear of weed vegetation.
	Deterioration of wetland habitat - encroachment of exotic/weed vegetation	Moderate	Immediate rehabilitation of disturbed areas. Monitor for alien plant species. Immediately control any alien species.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles.

Activity	Impact summary	Significance	Proposed mitigation
			Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Loss of faunal species diversity and loss of Red Data, endemic and protected faunal species due to reduced habitat viability	Moderate	Appropriate removal of red data fauna encountered. Conservative speed limits should be enforced. Limited access to habitat surrounding the dragline walkway construction servitude by mine personnel. Induction of personnel including environmental awareness. Minimising of potential harm to fauna by vegetation clearing methods.
	Complete loss of wetland habitat	High	The walkways should ideally cross valley bottom wetlands/rivers perpendicular to the direction of flow. Infilling within the wetlands should be kept to a minimum. Keep dragline walkway and construction servitude as narrow as possible. No activity or movement of machinery allowed outside demarcated servitude. Store removed topsoil outside the wetland boundaries.
	Water quality impacts on aquatic habitats due to mobilisation of sediments	High	Minimise disturbance footprint and bank disturbance. River diversions should be avoided if at all possible. Riparian and wetland areas adjacent to the footprint should be no-go areas. Dry season construction, operation and rehabilitation. Sediment traps should be regularly inspected and maintained for optimal functionality. No vegetation clearing or stockpiling of soils should occur in riparian or wetland areas. Design topsoil stockpile to prevent collapses or slumping. Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures should be utilised at stormwater outlets to prevent erosion. Immediate rehabilitation.
	Decline in aquatic habitats due to flow modification	Moderate	The construction of a walkway crossing should aim to minimise any changes in the volumes and velocities of flows. The project should be undertaken in the dry season when flow rates are lower. Culverts should be large enough to minimise impacts to flow rate Immediate rehabilitation.
Operation Phase	***Direct impacts:***		
	Disturbance of faunal migration routes	Moderate	Proper rehabilitation of the vegetation along the routes, particularly within highly sensitive habitats, such as wetlands and rivers and along rocky ridges and outcrops.
	Alteration of hydrology - flow impoundment and concentration	High	Ensure hydrological conductivity across the full wetland front. Erosion protection measures should be installed downstream of permanent crossings. Discharge points for clean stormwater to include erosion protection measures and energy dissipaters, encouraging dispersion across the extent of the wetland. Where clearspan bridges not feasible, culverts to be used to prevent concentration of flow downstream of the crossing and impoundment upslope. Immediate rehabilitation with erosion monitoring and repair. Where possible, cross valley bottom wetlands perpendicular to the direction of flow.
	Water quality deterioration - contamination	Low	Any spills should be recorded, reported, and cleaned up immediately under supervision of a qualified specialist. Ideally, operation activities should only take place in the winter months so as to minimise surface runoff from the disturbed areas and possible transport of polluting substances into the wetlands.
	Erosion resulting from diversions and/or culverts	Moderate	Deflect stormwater away from the dragline walkway into vegetated areas. Dirty water should be channelled into stormwater control dams. Flow attenuation structures to be used at stormwater outlets to prevent erosion.
	Positive impact on livelihoods and the local economy	Moderate (positive)	Project workers should be sourced from local communities where possible and local business should be supported (e.g. with respect to the purchase of materials) where possible.
	The clearing of woody vegetation for the construction of the walkway, by felling trees or using dangerous machinery, may pose a safety risk to workers	Low	Potentially hazardous areas are to be cordoned off and clearly marked at all times. Personal Protective Equipment and safety gear to be provided to all site personnel.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Habitat fragmentation and loss of faunal habitats	High	Walkway routes should be aligned along existing infrastructure routes and river crossings.

Activity	Impact summary	Significance	Proposed mitigation
			Contain activities to as small a footprint as possible. Immediate rehabilitation.
	The influx of people to the area during the project could pose a security risk to local inhabitants, possibly bring disease and increase the risk of veld fires	Moderate	Limiting construction working hours to between 6-am and 6-pm within 1 km of human settlement to prevent noise impacts. No housing of people on site, except for a night watchman at the hard parks and office areas. Housing of workers in surrounding towns. Providing transport to and from the site, to ensure that workers leave the area. Ensuring that no open fires are started on site and providing gas cooking facilities. No sourcing contractors/vehicles that have worked in areas of recent foot-and-mouth outbreaks or ensuring careful disinfection of such vehicles. Respond to farmers' complaints of theft and assist in prosecution if necessary.
	Increase in vehicular traffic along the route	Low	Existing roads should be maintained and stakeholders must be consulted with in regards to the proposed activities and resultant increase in traffic.
	Cumulative impacts:		
	Decline in aquatic habitats due to flow modification	Moderate	The walkway, together with diversions and culverts should be dismantled and rehabilitated immediately after use so that flows can return to normal.
Decommissioning / Closure Phase	***Direct impacts:***		
	Dust generation, disturbing neighbouring farmers, impact on agriculture, plants and animals	Low	Reduce vehicle traffic over roads that have been recently watered, or ripped to ensure that pneumatic compaction does not occur. Only disturb vegetation within the walkway area.
	Possibility of seeding washing away and alien establishment in rehabilitated area	Moderate	Reseeding to be undertaken at the end of the dry/onset of the wet season. Grazing not allowed on rehabilitated areas for at least two years thereafter. Undertake follow-up control of any alien invasive plants. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Water quality deterioration - sedimentation	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
	Disturb farmers and fauna with noise (e.g. livestock and fauna may become stressed by the construction process)	Low	Equipment and machinery must be maintained and operational hours must be controlled to be predominantly in the day time. Environmental induction training to address correct conduct and keeping noise levels minimal.
	Indirect impacts:		
	Altered / decreased land capability as a result of soil compaction and erosion	Moderate	Cultivated soils must be ripped to a depth of no less than 1 m on agricultural soils. Rehabilitate the walkway before the end of September so crops can be planted in time. On uncultivated areas the soils must be ripped to a depth of not less than 500. Draw up an agreement with landowners to compensate them in the event of diminished crop production. Undertake rehabilitation at the end of the dry season, and before the wet season.
	Cumulative impacts:		
	Water quality impacts on aquatic habitats due to mobilisation of sediments	Moderate	Reseeding and earthworks to be undertaken at the end of the dry/onset of the wet season. Undertake follow-up control of any alien invasive plants. Monitor turbidity and suspended solids downstream of the site. Following removal of the rock-fill, the soil should be replaced and landscaped to follow the natural landscape profile. Rapid re-vegetation of the bare soil areas should be encouraged.
No-go option			
Construction Phase	***Direct impacts, Indirect impacts and Cumulative impacts***		
	Heritage	Very Low (Positive)	If the no-go alternative is pursued, then the construction related impacts will not be realised. There will not be the potential for construction workers in the area to impact on any heritage resources, however it is just as possible for any other people passing by to do the same.
	Palaeontological impacts	Very Low (Positive)	If a dragline walkway is not constructed, then the construction-related impacts will not be realised. There will be no potential for any palaeontological resources to be disturbed by the project, however the disturbance by other activities in the area is still possible. In addition, these alternate activities may not be as controlled as the proposed walkway construction and may not take the appropriate actions in light of palaeontological discoveries.
	Terrestrial ecology	Very Low (Positive)	If the no-go alternative is pursued, then the construction-related impacts will not be realised. This will leave the soil, vegetation and fauna in their current state.

Activity	Impact summary	Significance	Proposed mitigation
			Although the no-go option has more positive implications on the terrestrial ecology than the construction of the dragline walkway would, the walkway is positive in that its construction will result in monitoring programmes and the removal of alien vegetation. In addition, much of the area on which the proposed dragline walkway routes are situated is currently heavily impacted by approved mining activities. Much of the remaining un-impacted areas are planned to be mined in the near future.
	Aquatic ecology	Low (Positive)	If the no-go alternative is pursued, there will be no construction related impacts. This will leave the aquatic and wetland soils, vegetation and fauna in their current state. Although the no-go option has more positive implications on the terrestrial ecology than the construction of the walkway would, the walkway is positive in that its construction will result in monitoring programmes ensuring the health of the aquatic systems.
	Surface water & wetlands	Very Low (Positive)	If the no-go alternative is pursued, then the construction-related impacts will not be realised. There will be no impacts on surface water related to increased erosion and the resultant water turbidity, or the compaction of soils resulting in depletion of wetland habitats.
	Nuisance impacts	Low (Positive)	Perusing the no-go option would mean that the nuisance impacts associated with construction (such as noise and traffic) will not occur.
	Socio-economic impacts	Moderate	Pursuing the no-go alternative in this case means that the positive socio-economic benefits that would come with the job creation, skills transfer and support of the local economy from the dragline walkway construction, would not be realised. In addition, the dragline walkway construction will make future jobs in mining at the iMpunzi and Tweefontein Opencast Operations possible.
Operation Phase	***Direct impacts, Indirect impacts and Cumulative impacts:***		
	Socio-economic impacts	High	Pursuing the no-go alternative in this case means that the positive socio-economic benefits that would come with the job creation, skills transfer and support of the local economy from the mining that the dragline relocation would support. In addition, the positive effect of additional electricity generation that would come with the coal abstraction, would not be realised.
Decommissioning / Closure Phase	***Direct impacts, Indirect impacts and Cumulative impacts:***		
	As no dragline walkway would be constructed if the no-go option would be followed, no decommissioning or closure activities would need to be undertaken.		

A complete impact assessment in terms of Regulation 22(2)(i) of GN R.543 must be included as Appendix F.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

All of the proposed dragline crossing alternatives are temporary structures that will be in place for only a few weeks. The approaches to the crossings will be constructed and the material for the stream channel crossings will be stockpiled near the crossings, i.e. on the completed approaches. The stream channel crossings will be constructed only once they are required and will be removed first to ensure the walkway crossings through the stream channels are in place for the shortest possible time. The dragline can cross a river in less than 2 hours and the walk can be delayed should there be any risk of flooding of the walkway due to rain in the catchment area. It is proposed to design storm water structures for the winter flow in the rivers with a 1 in 10 year recurrence interval.

Alternative A (preferred alternative) **Route 1A**

Route 1A is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of loss or fragmentation of natural/indigenous vegetation, compaction of wetland soils (influencing the ability for vegetation to reinstate and recover on disturbed areas), water quality impacts as a result of erosion and a decline in healthy or suitable wetland and riparian habitats. The moderate negative impacts include deterioration of habitats, flow impoundment and concentration, water quality deterioration, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The Present Ecological Status (PES) of this route's river crossing (Olifants River Crossing 1) and wetland crossings are ranked as "C to D" or Moderately to Largely Modified. The Ecological Importance and Sensitivity (EIS) of the watercourse crossing is ranked as "C" or Moderate. The south most section of wetland to be crossed is located in the Van Dyksdrift South Pit, which is proposed to be mined out.

The wetland footprint impact of this route is 1171 m.

With the high amount of existing disturbance in the study area, the impacts from the proposed temporary development will be moderate to low after mitigation, however there are high impacts associated with rehabilitation as this watercourse crossing option may not be fully rehabilitated due to the nature of the river channel.

This particular river crossing is difficult to undertake due to the river channel consisting of sandstone outcrops. It should be noted that it is likely that the material used to undertake the crossing of the dragline will remain behind in the river. It will also not be possible to re-instate vegetation that has been damaged during the construction/rehabilitation work. For this reason, this alternative is not favoured from an engineering and rehabilitation perspective.

Alternative B **Route 1B**

Route 1B is a temporary dragline walkway route. This route will be constructed using the method statement provided and rehabilitated accordingly.

No high ranking impacts are associated with this alternative, but moderate impacts exist which include the compaction of soils (influencing the ability for vegetation to reinstate and recover on disturbed areas), altered or decreased land capabilities, an increase of people in the area (possibly resulting in increased crime rates and spread of disease). As this route option does not cross a river or many wetlands, the impacts associated with aquatic environments, flow and sedimentation in watercourses are very low. The wetland section that the route does cross is ranked with a PES of "C" or Moderately Modified and an EIS of "C" or Moderate. This section of wetland is located in the Van Dyksdrift South Pit, which is proposed to be mined out.

The wetland footprint impact of this route is 143 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

Although this alternative has few to no serious negative impacts and can be easily rehabilitated, the crossing of the RBCT railway line is not ideal and could result in this alternative not being feasible. Further investigation of this route would need to be undertaken to determine whether it is a viable alternative.

Alternative C **Route 1C**

Route 1C is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of loss or fragmentation of natural/indigenous vegetation, compaction of wetland soils (influencing the ability for vegetation to reinstate and recover on disturbed areas), water quality impacts as a result of erosion and a decline in healthy or suitable wetland and riparian habitats. The moderate negative impacts include deterioration of habitats, flow impoundment and concentration, water quality deterioration, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route's wetlands crossing is ranked as "C to D" or Moderately to Largely Modified. The EIS of the wetland crossings is ranked as "C" or Moderate. The south most section of wetland to be crossed is located in the Van Dyksdrift South Pit, which is proposed to be mined out.

The wetland footprint impact of this route is 2277 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be moderate and low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

Additional Alternative **Route 2A**

Route 2A is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of water quality impacts and sedimentation and decline in habitats. The moderate negative impacts include loss of individuals of threatened plants, habitat fragmentation and loss, loss of wetlands, alteration of water flow and quality, erosion altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route's river crossing (Olifants River Crossing 1) and wetland crossing is ranked as "D" or Largely Modified. The EIS of the watercourse crossing is ranked as "C" or Moderate.

The wetland footprint impact of this route is 1611 m.

With the high amount of existing disturbance in the study area, the impacts from the proposed temporary development will be moderate to low after mitigation, however there are high impacts associated with rehabilitation as this watercourse crossing option may not be fully rehabilitated due to the nature of the river channel.

This particular river crossing is difficult to undertake due to the river channel consisting of sandstone outcrops. It should be noted that it is likely that the material used to undertake the crossing of the dragline will remain behind in the river. It will also not be possible to re-instate vegetation that has been damaged during the construction/rehabilitation work. For this reason, this alternative is not favoured from an engineering and rehabilitation perspective.

Additional Alternative **Route 2B**

Route 2B is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of loss or fragmentation of natural/indigenous vegetation, habitat fragmentation or loss, loss of wetlands, interruption of migration routes, compaction of wetland soils, water quality impacts and

sedimentation. The moderate negative impacts include loss of red data, endemic or protected species, erosion, deterioration of habitats, flow impoundment and concentration, water quality deterioration, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route's river crossing (Olifants River Crossing 2) and wetland crossing is ranked as "C or D" or Moderately to Largely Modified. The EIS of the watercourse crossing is ranked as "B/C or C" or High/Moderate or Moderate.

The wetland footprint impact of this route is 297 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be moderate and low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

Additional Alternative **Route 3A**

Route 3A is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of compaction of wetland soils, decline in marginal and riparian habitats and water quality impacts and sedimentation. The moderate negative impacts include loss or fragmentation of natural/indigenous vegetation, loss of red data, endemic or protected species, erosion, deterioration of habitats, interruption of migration routes, flow impoundment and concentration, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route's river crossing and wetland crossing at the Steenkoolspruit River Crossing 1 is ranked as "C or D" or Moderately to Largely Modified. The PES of this route's river crossing and wetland crossing at the Tweefonteinspruit River Crossing is ranked as "E, D and B" or Seriously Modified, Largely Modified and Largely Natural. The EIS of both watercourse crossings are ranked as "B/C or C" or High/Moderate or Moderate.

The wetland footprint impact of this route is 1273 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be moderate and low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

Additional Alternative **Route 3B**

Route 3B is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of deterioration of habitats, compaction of wetland soils, decline in marginal and riparian habitats and water quality impacts and sedimentation. The moderate negative impacts include loss or fragmentation of natural/indigenous vegetation, loss of red data, endemic or protected species, erosion, interruption of migration routes, flow impoundment and concentration, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route's river crossing and wetland crossing at the Steenkoolspruit River Crossing 2 is ranked as "C or D" or Moderately to Largely Modified. The PES of this route's river crossing and wetland crossing at the Tweefonteinspruit River Crossing is ranked as "E, D and B" or Seriously Modified, Largely

Modified and Largely Natural. The EIS of both watercourse crossings are ranked as “B/C, C and D” or High/Moderate, Moderate or Low/Marginal.

The wetland footprint impact of this route is 1218 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be moderate and low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

Additional Alternative **Route 3E**

Route 3E is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of water quality impacts and a decline in marginal and riparian habitats. The moderate negative impacts include deterioration of habitats, wetland habitat alteration, flow impoundment, loss or fragmentation of natural/indigenous vegetation, loss of red data, endemic or protected species, erosion, interruption of migration routes, flow impoundment and concentration, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route’s river crossing and wetland crossing at the Steenkoolspruit River Crossing 1 is ranked as “C or D” or Moderately to Largely Modified. The PES of this route’s river crossing and wetland crossing at the Tweefonteinspruit River Crossing is ranked as “E, D and B” or Seriously Modified, Largely Modified and Largely Natural. The EIS of both watercourse crossings are ranked as “B/C, C and D” or High/Moderate, Moderate or Low/Marginal.

The wetland footprint impact of this route is 1989 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be moderate and low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

Additional Alternative **Route 3F**

Route 3F is a temporary dragline walkway route. It should be noted that this statement is based on a walk undertaken during the winter months. If the dragline is relocated during the summer months the impacts could be more significant.

The high negative impacts identified with this proposed dragline walkway are that of deterioration of habitats, wetland habitat alteration, flow impoundment, decline in marginal and riparian habitats. The moderate negative impacts include loss or fragmentation of natural/indigenous vegetation, loss of red data, endemic or protected species, erosion, interruption of migration routes, altered or decreased land capabilities and an increase of people in the area (possibly resulting in increased crime rates and spread of disease). The PES of this route’s river crossing and wetland crossing at the Steenkoolspruit River Crossing 2 is ranked as “C or D” or Moderately to Largely Modified. The PES of this route’s river crossing and wetland crossing at the Tweefonteinspruit River Crossing is ranked as “E, D and B” or Seriously Modified, Largely Modified and Largely Natural. The EIS of both watercourse crossings are ranked as “B/C, C and D” or High/Moderate, Moderate or Low/Marginal.

The wetland footprint impact of this route is 672 m.

With the high amount of existing disturbance in the study area the impacts from the proposed temporary development will be moderate and low to very low after mitigation, especially considering the effectiveness of rehabilitation for these type of developments. The impacts to

agriculture, soils, fauna and flora can be rehabilitated while the impacts to humans and heritage features can be avoided. The total duration of the impact and rehabilitation should not exceed 2 years.

No-go alternative (compulsory)

The no-go alternative comprises of not undertaking the construction of the proposed dragline walkways. The positive implications of pursuing the no-go alternative are not disturbing terrestrial and aquatic ecology, not affecting the surface water of the area and not having any nuisance effects such as noise and altering land potentials. All of these positive impacts have been ranked as low and very low. Negative impacts associated with the no-go alternative have greater implications than the positive effects. Without this project going ahead, employment opportunities associated with these activities will not be created (moderately to highly negative). The lack of job creation as a result of pursuing the no-go option has a moderate significance but at a local spatial scale. It would also have a greater impact extending beyond the period of construction of the walkways to include the life of the mines that it will excavate (as not pursuing this activity will result in less coal being abstracted) The lack of additional coal abstraction as a result of pursuing the no-go option has a high significance and a regional/provincial spatial scale as it would have far reaching implications. Is has also been rated as having a medium term duration and a definite occurrence. Efficient coal abstraction for electricity generation is of national importance and is critical to the economy of the country.

There are no mitigation measures to not pursuing the dragline walkway construction and operation activity as the landscape would remain as it currently is if the dragline walkways were not constructed.

SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES ✓

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

Please refer to the EMPr for a full list of the mitigation measures proposed.

Is an EMPr attached?	YES ✓

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

Konrad Krüger

NAME OF EAP

SIGNATURE OF EAP

DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

REFERENCES

1. Bamford, M., 2012, Palaeontological Impact Assessment for Majuba Underground Coal Gasification Project, Mpumalanga, Mpumalanga: Royal HaskoningDHV.
2. Ferrar, A.A. & Lötter, M.C., 2007, Mpumalanga Biodiversity Conservation Plan Handbook, Mpumalanga Tourism and Parks Agency, Nelspruit.
3. Kyle, J. & Costello, M., 2006, "Comparison of measured and simulated motion of a scaled dragline excavation system", Mathematical and Computer Modelling 44, 816 – 833.
4. Mucina, L., Hoare, D.B., Lotter, M.C., du Preez, P.J., Rutherford, M.C., Scott-Shaw, R., Bredenkamp, G.J., Powrie, L.W., Scott, L., Camp, K.G.T., Cilliers, S.S., Bezuidenhout, H., Mostert, T.H., Siebert, S.J., Winter, P.J.D., Burrows, J.E., Dobson, L., Ward, R.A., Stalmans, M., Oliver, E.G.H., Siebert, F., Schmidt, E., Kobisi, K., & Kose, L., 2006, 'Grassland Biome', in L. Mucina & M.C. Rutherford (eds)., The Vegetation of South Africa, Lesotho and Swaziland, South African National Biodiversity Institute, Pretoria.
5. Soil Classification Working Group, 1991, "Soil Classification: A Taxonomic System for South Africa", Memoirs on the Agricultural Natural Resources of South Africa No. 15, Department of Agricultural Development, Pretoria.
6. South Africa, Republic, 1996, Constitution of the Republic of South Africa, Act No. 108 of 1996, Government Printer, Pretoria.
7. South Africa, Republic, 1989, Environment Conservation Act, Act No. 73 of 1989, Government Gazette 10154, Government Printer, Pretoria.
8. South Africa, Republic, 1998, National Environmental Management Act, Act No. 107 of 1998, Government Printer, Pretoria.
9. South Africa, Republic, 1998, National Environmental Management Act: Air Quality, Act No. 39 of 2004, Government Gazette 32816, Government Printer, Pretoria.
10. South Africa, Republic, 1998, National Environmental Management Act: Biodiversity Act, Act No. 10 of 2004, Government Gazette 26436, Government Printer, Pretoria.
11. South Africa, Republic, 1998, National Environmental Management Act: Waste Act, Act No.59 of 2008, Government Gazette 32000, Government Printer, Pretoria.
12. South Africa, Republic, 1998, National Heritage Resources Act, Act No. 25 of 1999, Government Gazette 19974, Government Printer, Pretoria.
13. South Africa, Republic, 1998, National Water Act, Act No. 36 of 1998, Government Gazette 19182, Government Printer, Pretoria.
14. South Africa, Republic, 1993, Occupation Health and Safety Act, Act No. 85 of 1993, Government Printer, Pretoria.
15. Statistics South Africa (StatsSA), Municipalities – eMalahleni, viewed 23 October 2013, from http://beta2.statssa.gov.za/?page_id=993&id=emalahleni-municipality-2

Gina Martin
Environmental Scientist

Konrad Krüger
Project Manager

for Jones & Wagener

6 May 2014

Document source: D:\Alljobs\D424_AtcomDragline\Reports\BAR Impunzi\DBAR_iMpunzi(DEA)\D424-01_BAR-DEA-iMpunzi_r1_GMkk_20140506.docx
Document template: Normal.dotm

APPENDIX A

MAPS

APPENDIX B

PHOTOGRAPHS

APPENDIX C

FACILITY ILLUSTRATION(S)

APPENDIX D

SPECIALIST REPORTS (INCLUDING TERMS OF REFERENCE)

APPENDIX E

PUBLIC PARTICIPATION

APPENDIX F

IMPACT ASSESSMENT

APPENDIX G

ENVIRONMENTAL MANAGEMENT PROGRAMME

APPENDIX H

DETAILS OF EAP AND EXPERTISE

APPENDIX I

SPECIALISTS' DECLARATION OF INTEREST

APPENDIX J

ADDITIONAL INFORMATION

REPORT CHECKLIST

Job no:	
	6 May, 2014
Our Ref:	D424-01_BAR-DEA-iMpunzi_r1_GMkk_20140506

ITEM	AUTHOR	REVIEWER	CORRECTED	COMMENTS
GENERAL				
Report number registered				
Correct template				
STRUCTURE				
Document approval record				Author, review, revision etc.
Revision / issue register				
Synopsis				
Table of contents				
References				
Sign and counter sign				
Appendices				
Drawings				
CONTENT				
Purpose				
Nature of the project				
Project information				Location, geology, topography
Engineering basis				Design, codes, assumptions etc
Analysis/Calculations/Review				
Discussions				
Recommendations				
Follow-up work required?				
Conclusions				
REVIEW				
Fulfils brief & purpose?				
Clarity?				Figures and tables?
Supporting data complete?				Forest & trees covered?
Recommendations logical?				Consistent with site conditions?
Recommendations practical?				Practicality
APPROVAL				
SIGNATURE				
DATE				

REPORT COPIES					
TYPE	CD	PDF	HARDCOPY	COMMENTS	COMPLETED Date / Initials
Client		1	3		
Original	1		1	Unbound	
Archive Copy			1	Ring bound	
File Copy			1	Ring bound	
Project Manager					
Other					