



63 Wessel Road, Rivonia, 2128 PO Box 2597, Rivonia, 2128 South Africa

Tel: +27 (0) 11 803 5726 **Fax:** +27 (0) 11 803 5745 **Web:** www.gcs-sa.biz

Ecological Consolidation Report associated with the Matla Coal Mine

Report

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23 January 2017

Exxaro - Matla Coal

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Author	Alvar Koning		
Document Reviewer	Estie Retief		
Unit Manager			
Director			

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EXECUTIVE SUMMARY

GCS water and environmental consultants (Pty) Ltd (GCS) was appointed by Exxaro Coal (Exxaro) to compile an Ecological Consolidation Report for their Matla Operation.

Exxaro Matla Coal (Matla) is an existing coal mine located approximately 50km south east of Witbank in the Mpumalanga Province. The mine is situated in the Magisterial District of Kriel, within the eMalahleni Local Municipality, which forms part of the Nkangala District Municipality (**Figure 1.1**). Matla supplies coal to the Eskom owned Matla Power Station. Although Matla belongs to the Exxaro group, the mine is an Eskom funded operation, referred to as a “captive mine” with a defined cost-plus coal supply contract with Eskom. Matla is fully mechanised underground mine comprising of Mine 1, 2, 3, Plant Area, Central Engineering Workshops and the Central Offices.

Matla has obtained a number of environmental authorizations for various projects and initiatives over the years of operations. The Matla Management team has decided to consolidate all environmental authorizations (EMP's and IWUL's) in order to achieve the following:

- Better management of the various legal requirements set out in each authorization,
- Improvement in the management of the costs associated with the implementation of the legal requirements and
- To avoid duplications in compliance related matters and ensure all reporting requirements are met.

Matla has the following authorizations in place and to which this scope of consolidation is applicable to:

Environmental Management Plans:

- Matla EMP - Existing operations: Mine 1, Mine 2 and Mine 3;
- Matla Water Treatment Plant; and
- Matla Mine 1 New Shaft.

Integrated Water Use Licenses:

- Matla EMP - Existing operations: Mine 1, Mine 2, Mine 3 and Crushing and Screening Plant;

- Matla Water Treatment Plant;
- Matla Mine 1 New Shaft; and
- Matla River Diversion

The following objectives needs to be achieved:

- All IWULs to be consolidated into one document;
- All EMPs to be consolidated into one document;
- Integrated Water and Waste Management Plan (IWWMP) to be updated;
- Review of Regulation 704 Audit and incorporate the latest design changes into the IWWMP;
- Update macro water balance with the new ground water balance;
- Update groundwater and surface water monitoring program;
- Summarize the current water quality results for the last 2 years and evaluate the results with trend lines and provide recommendations;
- Review all existing information from completed various environmental specialist studies and include in the consolidated document (EMP/ IWUL);
- Undertake a gap analysis of current authorized activities and identify any new activities that require authorization (including a review of the list of properties that are still relevant for listed activities or have been sold and are no longer part of the Matla Mining Rights);
- Include a Section 27 motivation for activities that have already commenced but require authorization;
- Complete and submit applicable license forms for any new identified activities as per legal requirements;
- Submit a brief application report for any new activities identified which requires authorization;
- Plan and undertake a public participation process for the consolidated documents and updates and
- Submit completed documents to the relevant authorities for review and approval (Department of Mineral Resources (DMR)/ Department of Environmental Affairs (DEA) / Department of Water and Sanitation (DWS).

The aquatic assessments reviewed for this report, indicated that, in terms of water quality, that pH and Dissolved Oxygen was the only limiting factors on occasion at selected sites.

Habitat integrity at all sites were indicated as having a limiting factor on the aquatic ecosystem.

The Present Ecological State of all sites in terms of the aquatic macroinvertebrates were found to be seriously modified state (Class E). In terms of the fish assemblage, it was found to be in a critically modified state (Class E). PES at the sites sampled for the Brine Ponds and WWTW ranged from an ecological class B (Moderately Impaired) to an ecological class D (Seriously Impaired). Pan 1 & 2 class B, Blesbokspruit, class C, Rietspruit, ecological class C/D, and Pan 3 and Mine Pan, ecological class D.

The vegetation communities assessed during the Matla Coal Brine Ponds and Waste Water Treatment works was found to be largely impacted on by agricultural and grazing impacts. The vegetation communities ranged from being in a low sensitivity class, to a medium - high sensitivity class.

The faunal habitat assessment found that the faunal habitat ranged from low, to medium - high.

CONTENTS PAGE

1	INTRODUCTION	7
2	SCOPE OF WORK	9
4	METHODOLOGY	11
5	WETLAND AND AQUATIC ASSESSMENT	11
5.1	INTRODUCTION	11
5.2	WATER QUALITY	16
5.3	INTEGRATED HABITAT ASSESSMENT SYSTEM	16
5.4	AQUATIC MACROINVERTEBRATE ASSESSMENT	17
5.5	FISH ASSEMBLAGE INTEGRITY INDEX	17
5.6	WETLAND ASSESSMENT	18
6	TERRESTRIAL ECOLOGY	20
7	REFERENCES.....	23

LIST OF FIGURES

Figure 1.1	Locality Plan	8
Figure 6.1	Vegetation associated with the study area	21

LIST OF TABLES

Table 5.1	Survey site locations - 2006	13
Table 5.2	Survey site locations - 2013	13

LIST OF APPENDICES

APPENDIX A	ERROR! BOOKMARK NOT DEFINED.
APPENDIX B.....	ERROR! BOOKMARK NOT DEFINED.

1 INTRODUCTION

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The following reports were consulted in the compilation of this report:

- Ecological and Wetland Assessment - Matla (Ecosun, 2006);
- Matla No1 Shaft - Wetland and associated Terrestrial Ecological Assessment (Golder, 2008);
- Aquatic Biomonitoring Report for the Matla River Diversion (Golder, 2013);
- Preliminary Terrestrial Biodiversity Impact Assessment for the proposed Water Treatment Plant & Brine Ponds for Exxaro Matla Coal, Mpumalanga Province (BEC, 2011);
- Biodiversity Action Plans & Biodiversity Monitoring Recommendations for the proposed Stopping of Underground Works at Matla Colliery, Mpumalanga Province (BEC, 2014);
- Strategic Terrestrial Biodiversity Impact Assessment for the proposed Stopping of Underground Works at Matla Colliery, Mpumalanga Province (BEC, 2014);
- Specialist Study - AQUATIC ECOSYSTEMS Environmental Impact Assessment for the Proposed Brine Pond Disposal Facility and Water Treatment Plant, EXXARO Matla Colliery, Mpumalanga (WCS, 2011);
- Wetland Delineation and Assessment for the Proposed New Opencast Pits and Stopping of Underground Workings at Matla Colliery (WCS, 2011);
- Wetland Delineation and Assessment for the Proposed Matla Colliery Water Treatment Plant (WCS, 2011)

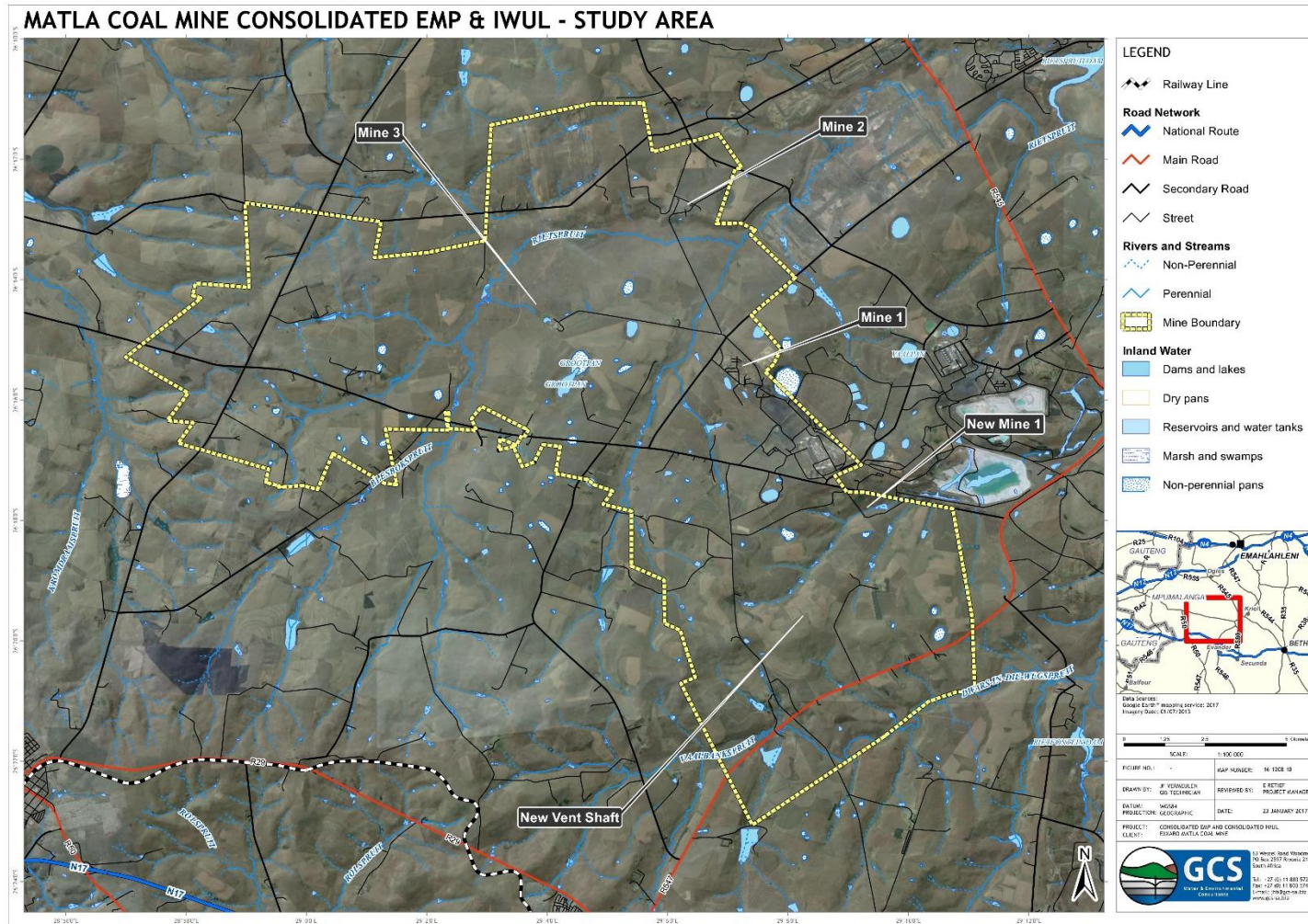


Figure 1.1 Locality Plan

2 SCOPE OF WORK

Matla has obtained a number of environmental authorizations for various projects and initiatives over the years of operations. The Matla Management team has decided to consolidate all environmental authorizations (EMP's and IWUL's) in order to achieve the following:

- Better management of the various legal requirements set out in each authorization,
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 - Plan and undertake a public participation process for the consolidated documents and updates and
 - Submit completed documents to the relevant authorities for review and approval (Department of Mineral Resources (DMR)/ Department of Environmental Affairs (DEA) / Department of Water and Sanitation (DWS).

4 METHODOLOGY

The following methodology was derived in order to meet the objectives of this report:

- All previous reports conducted associated with the Matla Coal Operations as referenced in the Introduction were reviewed for this assessments;
- Aquatic, Wetland and Terrestrial Ecological Reports were used in compiling this consolidated report; and
- The results obtained during those assessments were used and no additional fieldwork was conducted.

5 WETLAND AND AQUATIC ASSESSMENT

5.1 Introduction

The Matla Coal field is situated in the Blesbokspruit / Rietspruit River Catchment area, which forms part of the Upper Olifants River Catchment, within quaternary catchment B11E in the Mpumalanga Province . As a result of the proposed expansion of high extraction mining activities west of the current No. 2 and No. 3 mine workings, Matla Coal Mine has diverted the Rietspruit within an area covering approximately 1 324 ha. The mining of the No. 4 seam is by underground short wall total extraction mining and covers the area to the west of the existing workings, underlying a low level floodplain. Approximately 590 ha of the area that is being undermined have been described as wetlands (Golder report 11642-6037-1). The subsidence of these wetlands and changes to ground and surface water flow were identified as two of the main impacts of the mining activities. As open cast mining would have completely destroyed the ecological integrity of the study area, short wall mining techniques combined with a river diversion with control release of water through the wetland were implemented as a way of mitigation (Golder Report 11613447-12099-1, 2013).

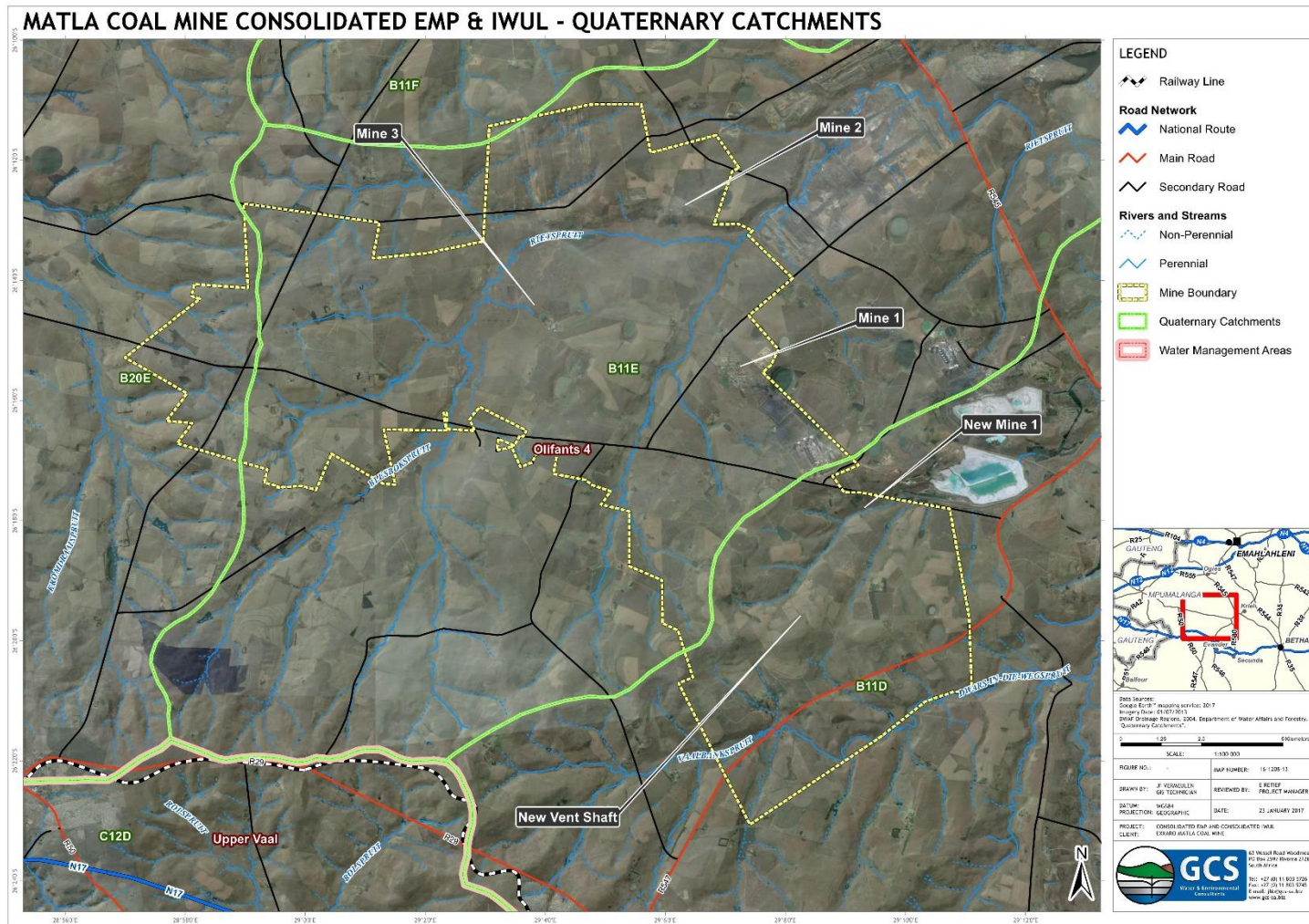


Figure 5.1 Quaternary catchment

The following sites were assessed during the 2006 and 2013 aquatic biomonitoring surveys:

Table 5.1 Survey site locations - 2006

Site	Description	Longitude	Latitude
Matla 2	Open water located downstream of the development	-26.24316	29.00976
Matla 3	Located within a farm dam downstream of the proposed development	-26.26605	29.0159
Matla 4	Wetland system with open water located at a bridge upstream of the proposed development	-26.27283	29.03977
Matla 5	Channelled wetland system located at a bridge upstream of the proposed development	-26.24963	29.04222

Table 5.2 Survey site locations - 2013

Site	Description	Longitude	Latitude
MAT 1	The site is located at the outlet of the upper dam on the Kortlaagte farm. The river diversion enters and exits this dam	-26.24304	29.00843
MAT 2	The site is located at the lower dam on the Kortlaagte farm. The river diversion passes above the inlet of the dam	-26.24316	29.00976
MAT 3	The site is located on the R580 where an unnamed tributary of the Rietspruit flows under the road	-26.26605	29.0159
MAT 4	The site is located on the R580 where the Blesbokspruit passes under the road	-26.27283	29.03977
MAT 5	The site is located at the confluence of the Rietspruit and Blesbokspruit Rivers	-26.24963	29.04222
MAT 6	The site is located in an open wetland area of the Rietspruit where an unnamed tributary joins from the north-west. This site is downstream of the diversion	-26.2208	29.06614
MAT 7	The site is located in the Matla river diversion at Bridge 10	-26.23933	29.05917



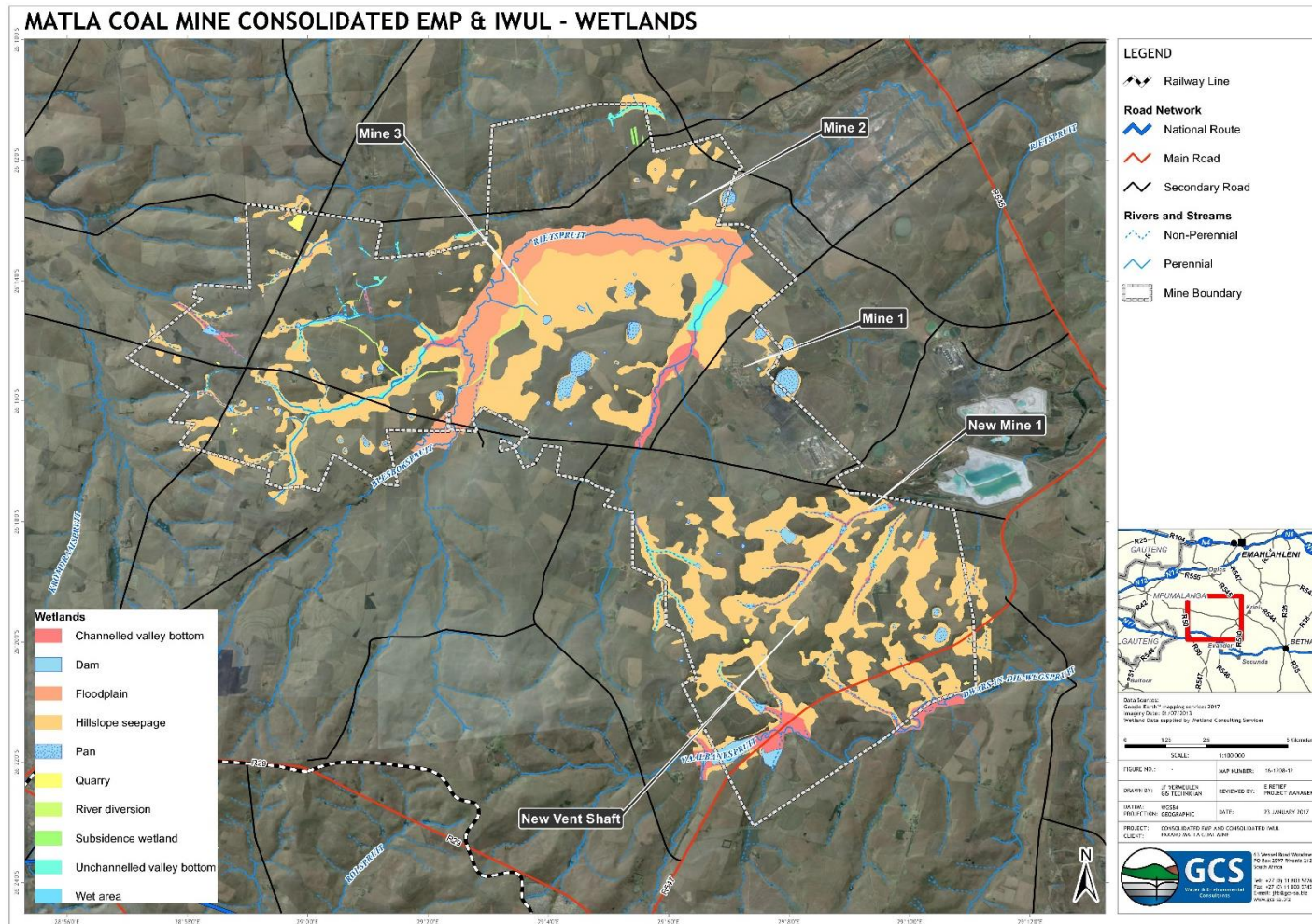


Figure 5.2 Wetlands associated with the study area

5.2 Water Quality

During the aquatic assessment associated with the Matla River Diversion conducted during the 2006 Assessment it was found that Matla 3 had a relatively high pH (8.8). The elevated pH found at Matla 3 may be due to the excessive plant growth observed during the study area. However, the elevated pH was not regarded as a limiting factor for aquatic health (Ecosun Report, 2006)

Elevated pH values were recorded at MAT 2 and MAT 3 during the 2013 assessment (8.6 and 9.0 respectively). Historically MAT4 showed elevated levels of pH. These elevated levels could be due to general geomorphology, land uses and rainfall patterns associated with the Highveld (Golder Report 11613447-12099-1, 2013).

The Total Dissolved Salts (TDS), during both surveys were under the South African Water Quality Guidelines (SAWQG, 1996) and will not have a limiting effect on aquatic biota.

During the 2006 survey it was found that the oxygen availability at site Matla 3 might have a limiting effect on aquatic biota. This could be attributed to the fact that the site was situated in a shallow farm dam, with a high plant biomass. There exists a natural diel variation in dissolved oxygen associated with the 24-hour cycle of photosynthesis and respiration by aquatic biota (Ecosun, 2006). During the 2013 assessment conducted by Golder (Golder Report 11613447-12099-1, 2013), MAT 2 and MAT 3 showed that oxygen availability at these sites were below adequate levels and is a reason for concern.

5.3 Integrated Habitat Assessment System

The following could be derived from the results obtained from 2008 to 2013 surveys:

Habitat availability at all sites were recorded to be poor. Site MAT 7 and MAT 5 were adequate during the February 2009 and January 2013 surveys, respectively. It can be concluded that habitat availability at the sampling site will have a limiting effect on aquatic biota.

5.4 Aquatic Macroinvertebrate Assessment

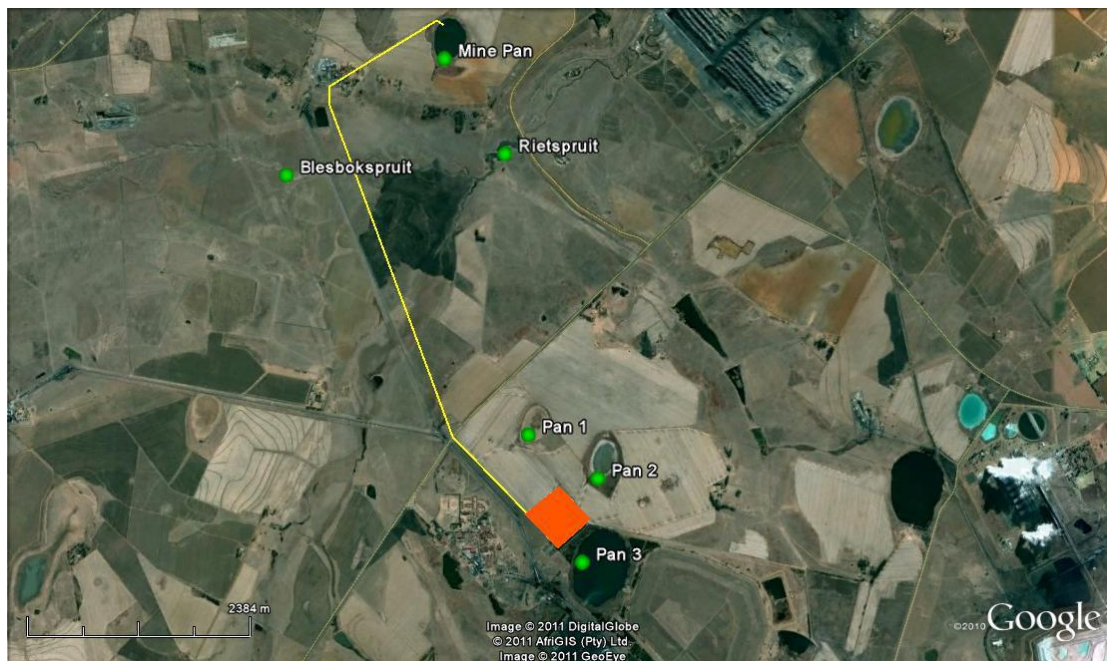
The Present Ecological State (PES) recorded at the sampling sites from the period 2008 to 2013 showed that the sites were all in a seriously modified state Ecological Class E. If one considers the historical data collected at the same sites from the same season and all year round, it can be seen that since sampling commenced in March 2008, the biotic integrity of the river diversion and associated rivers has remained seriously modified. The study area falls within the Upper Highveld

Due to the anthropogenic influences, namely farming and roads (culverts) within the upper catchment, the system is severely altered. Alterations include channelization and riparian habitat disturbance. These disturbances will have an effect on the overall integrity of the study area.

5.5 Fish Assemblage Integrity Index

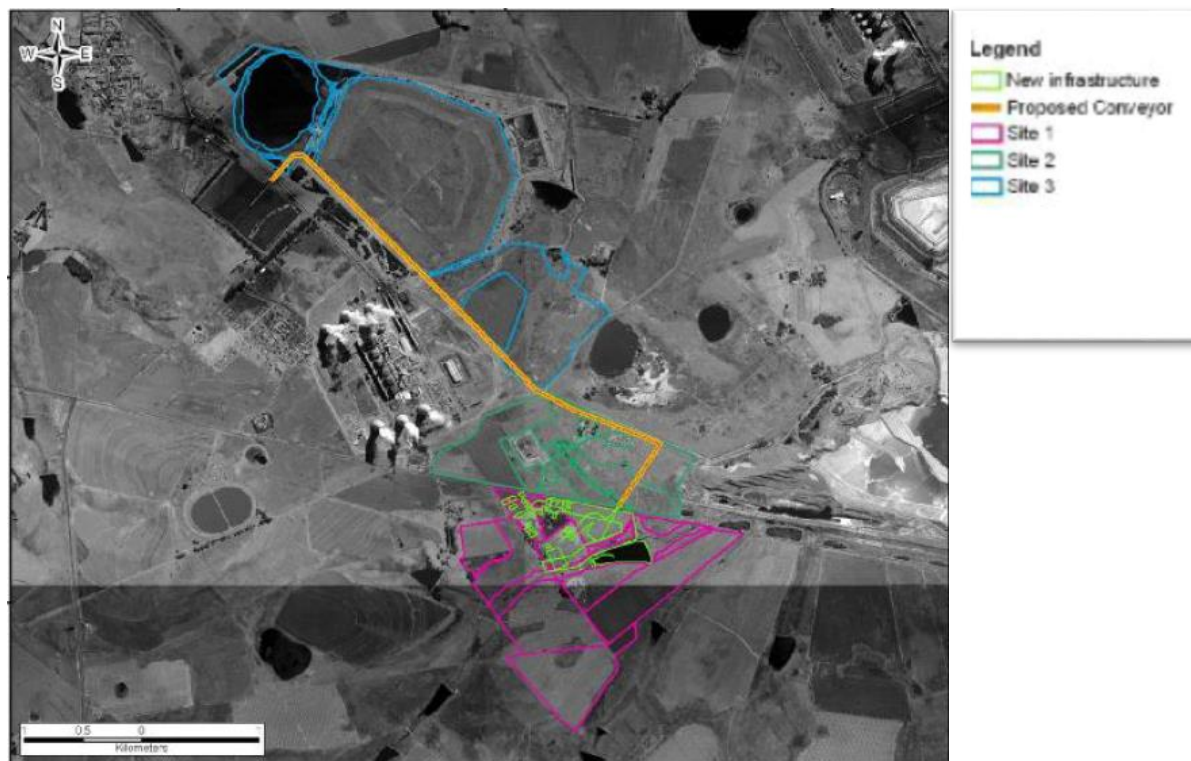
Based on the FAIL results biotic integrity throughout the entire project area ranged from largely to critically modified. During the January 2013 survey, only one indigenous fish species was recorded at site MAT2. However, this site is a small dam and thus low fish diversity is expected as there is no connection to the surrounding water courses. Furthermore, biotic integrity at sites MAT3 and MAT4 located upstream of the diversion, were largely to seriously modified. This may be attributed to the standing pools of water with minimal to no flow. Site MAT3, located on the R580 illustrated the greatest diversity with 5 species being observed. Sites MAT4, MAT6 and MAT7 had 4 species observed.

During the assessment conducted by Wetland Consulting Services (Localities below) it was found that the Present Ecological State (PES) ranged from an ecological class B (Moderately Impaired) to an ecological class D (Seriously Impaired). Pan 1 & 2 class B, Blesbokspruit, class C, Rietspruit, ecological class C/D, and Pan 3 and Mine Pan, ecological class D (Wetland Consulting Services, Report 687/2011).

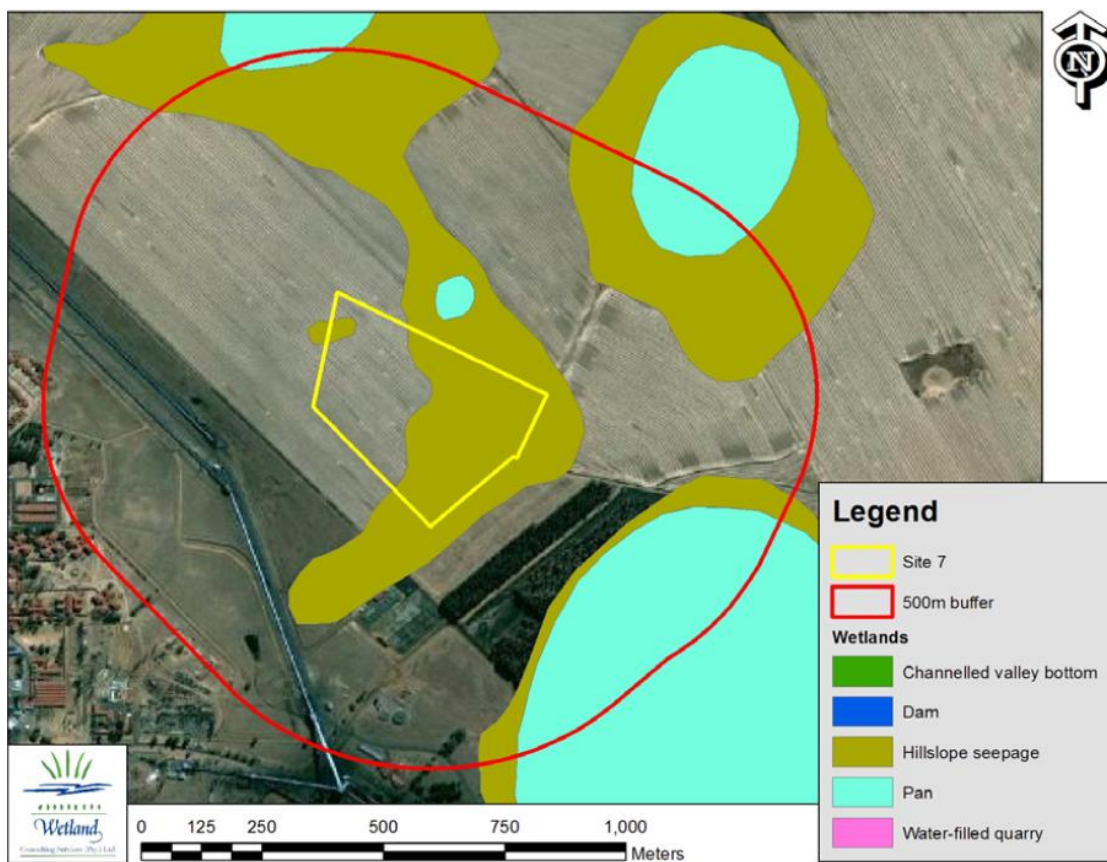
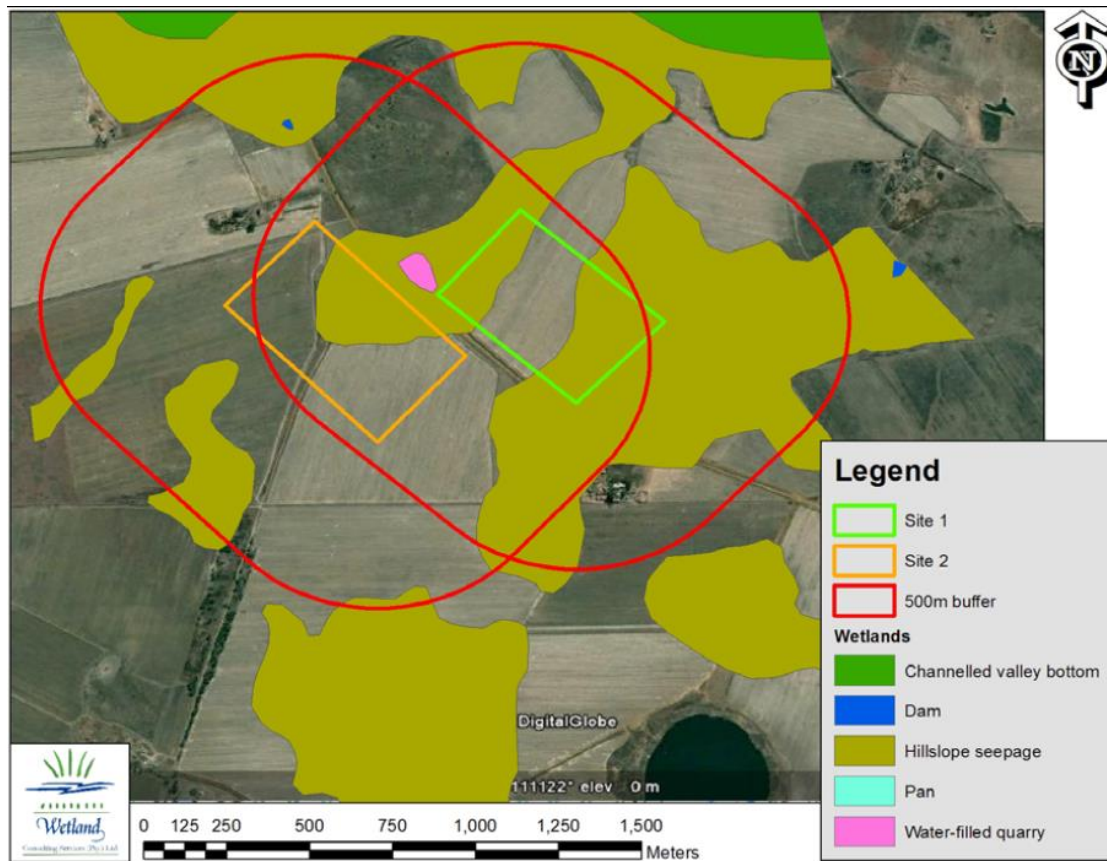


5.6 Wetland Assessment

During the wetland assessment conducted by Golder Associates Report 10749, 2008 the wetlands (localities below) had a Present Ecological State C (Moderately Modified).



During the wetland assessment conducted by Wetland Consulting Services, 2011 for the proposed WWTW for the Matla Colliery (localities below)



The Present Ecological State (PES) of these wetlands ranged from largely modified (Ecological Class D) and seriously modified (Ecological Class E).

6 TERRESTRIAL ECOLOGY

The study area is situated approximately 2.5km north of Matla Power Station, 14km west of Kriel and 17km north of Kinross. The proposed area is located within a portion of the farm Vaalpan 68-IS, immediately east of the Matla Coal Mine complex, comprising approximately 27.8ha. The study area is located in the Mesic Highveld Grassland Bioregion, more specifically identified by Mucina and Rutherford as the Eastern Highveld Grassland. The Eastern Temperate Freshwater Wetlands vegetation type is also situated in close proximity to the study area. This is an important vegetation type and is categorised as Vulnerable. A species richness of 236 plant taxa were recorded during the field investigations (refer Appendix 2). This recorded species diversity is regarded representative of the regional ecological types that is spatially represented in the study area. The grassland physiognomy (within areas of natural/ habitat) of the region is reflected by a well-developed and diverse herbaceous layer, comprising of 114 forbs, 49 grass species and 15 geophytes. Although the wetlands of the study area are likely to be more diverse as indicated in this report, the 23 sedge species recorded in this habitat type indicates that most of the wetlands comprises relatively natural habitat. The absence of a diverse shrub or tree component (other than exotic species) reflects the grassland physiognomy. The floristic diversity comprises 58 plant families, dominated by Poaceae, Asteraceae, Cyperaceae and Fabaceae.

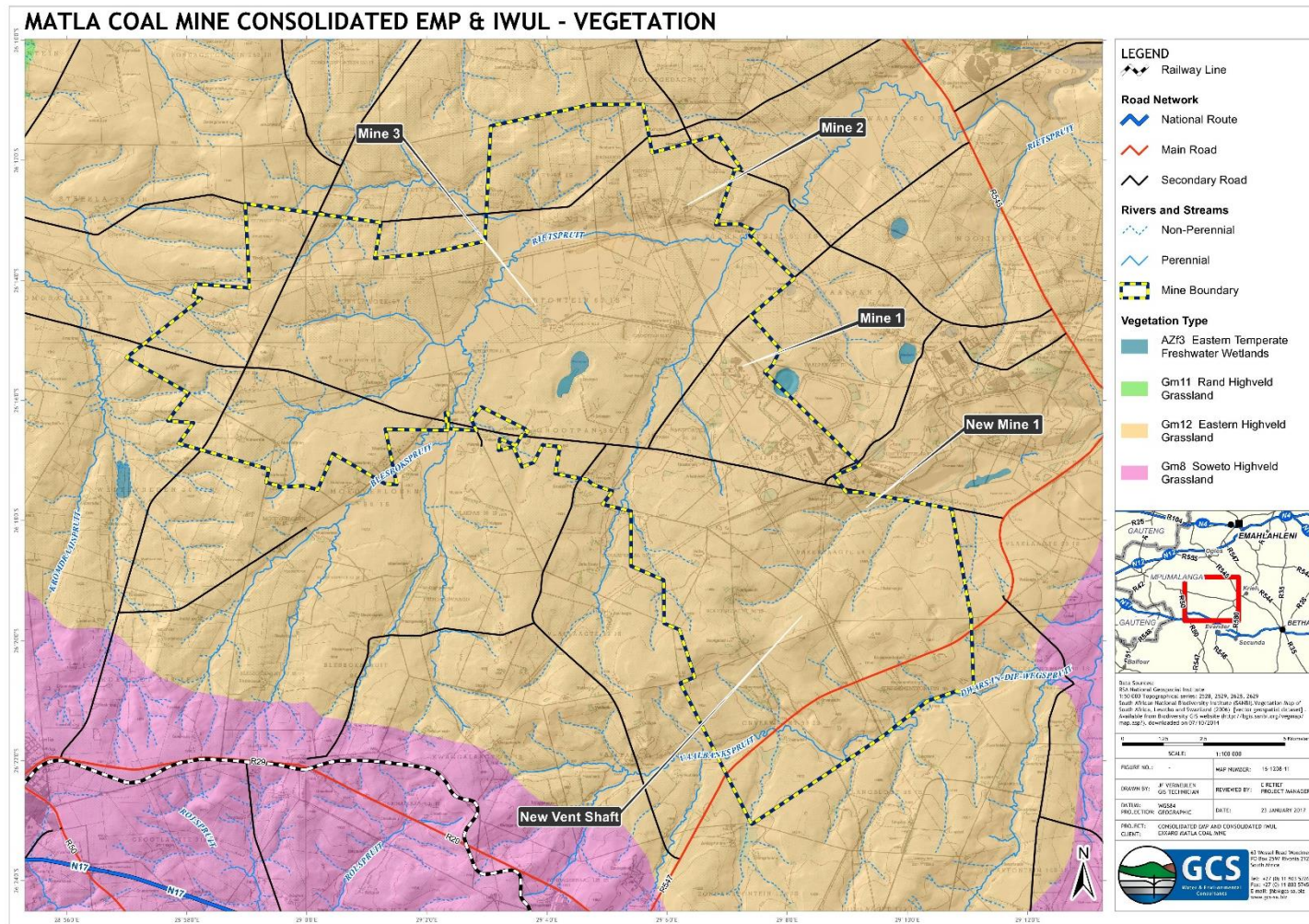


Figure 6.1 Vegetation associated with the study area

The vegetation communities assessed during the Matla Coal Brine Ponds and Waste Water Treatment works was found to be largely impacted on by agricultural and grazing impacts. The vegetation communities ranged from being in a low sensitivity class, to a medium - high sensitivity class.

The faunal habitat assessment found that the faunal habitat ranged from low, to medium - high.

7 CONCLUSION

The following conclusions could be reached:

- The aquatic assessments reviewed for this report, indicated that, in terms of water quality, that pH and Dissolved Oxygen was the only limiting factors on occasion at selected sites;
- Habitat integrity at all sites were indicated as having a limiting factor on the aquatic ecosystem;
- The Present Ecological State of all sites in terms of the aquatic macroinvertebrates were found to be seriously modified state (Class E). In terms of the fish assemblage, it was found to be in a critically modified state (Class E). PES at the sites sampled for the Brine Ponds and WWTW ranged from an ecological class B (Moderately Impaired) to an ecological class D (Seriously Impaired). Pan 1 & 2 class B, Blesbokspruit, class C, Rietspruit, ecological class C/D, and Pan 3 and Mine Pan, ecological class D;
- The vegetation communities assessed during the Matla Coal Brine Ponds and Waste Water Treatment works was found to be largely impacted on by agricultural and grazing impacts. The vegetation communities ranged from being in a low sensitivity class, to a medium - high sensitivity class; and
- The faunal habitat assessment found that the faunal habitat ranged from low, to medium - high.

8 REFERENCES

Aquatic Biomonitoring Report for the Matla River Diversion (Golder, 2013).

Biodiversity Action Plans & Biodiversity Monitoring Recommendations for the proposed Stoooping of Underground Works at Matla Colliery, Mpumalanga Province (BEC, 2014);

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Specialist Study - AQUATIC ECOSYSTEMS Environmental Impact Assessment for the Proposed Brine Pond Disposal Facility and Water Treatment Plant, EXXARO Matla Colliery, Mpumalanga (WCS, 2011).

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