Prepared for

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RIV301-00183/51

PROPOSED DECOMMISSIONING OF CHROME DIRECT DUST (CDR) FACILITY
WETLAND DELINEATION AND ASSESSMENT REPORT

Rev	Description	Date
A	Issued in Draft	14 June 2021

Knight Piésold CONSULTING

Specialist Reports and Reports on Specialist Processes - Checklist		
	NEMA Regulations (2014) – Appendix 6	**Reference to section in report**
1	A specialist report or a report on a specialised process prepared in terms of these Regulations must contain -	
(a) i	The person who prepared the report; and	Section 1.2
(a) ii	The expertise of that specialist to compile a specialist reports including a curriculum vitae;	Annexure A
(b)	A declaration that the specialist is independent in a form as may be specified by the competent authority	Next page
(c)	An indication of the scope of, and the purpose for which the report was prepared	Section 1.1
(d)	Duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 2.2
(e)	Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 2.0
(f)	The specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	Section 5.0
(g)	An identification of any areas to be avoided, including buffers	Section 5.5
(h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Figure 5-3
(i)	Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.0
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 6.0
(k)	any mitigation measures for inclusion in the EMPr	Section 7.0
(l)	any conditions for inclusion in the environmental authorisation;	Section 6.0
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8.0
(n)	A reasoned opinion -	
(i)	whether the proposed activity, activities or portions thereof should be authorised;	Section 9.0
(ii)	if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 9.0

(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report	No consultation was undertaken as part of the study
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	No consultation undertaken as part of the study
(q)	any other information requested by the competent authority.	None

Declaration of Independence by Specialist

I, Neal Neervoort, in my capacity as specialist Aquatic Ecologist hereby declare that we –

- Act as independent consultants
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the Environmental Management Act, 2002 (No 5 of 2002);
- Have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Management Act, 2002 (No 5 of 2002);
- Will provide the competent authority with access to all information at our disposal regarding the application, whether such information is favourable to the applicant or not;
- Based on information provided to us by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of our professional ability; and
- Undertake to have our work peer reviewed on a regular basis by a competent specialist in the field of study for which we are registered.

14/06/2021

Neal Neervoort
Aquatic Ecologist
SACNASP Reg. No. 115316

Date

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ABBREVIATIONS

BAR	Basic Assessment Report
CDR	Chrome Reduction Dust
Cm	centimeter
DWAF	Department of Water Affairs and Forestry
EIS	Ecological Importance and Sensitivity
EMC	Ecological Management Class
GDARD	Gauteng Department of Agriculture and Rural Development
HGM	Hydrogeomorphic Unit
M	Meter
MAP	Mean Annual Precipitation
MAR	Mean Annual Run-off
MFC	Middelburg Ferrochrome
NWA	National Water Act
NBA	National Biodiversity Assessment
NFEPA	National Freshwater Ecosystem Priority Area
PES	Present Ecological State
SACNASP	South African Council of Natural Scientific Professions
WMA	Water Management Area
WWTW	Wastewater Treatment Works

1. INTRODUCTION

The Samancor Middelburg Ferrochrome (MFC) facility, situated in Middelburg, Mpumalanga, was established in 1964 to produce Ferrochrome for use in the production of steel.

A process known as Chrome Direct Reduction (CDR) was undertaken at MFC, whereby chrome ore is brought into contact with finely divided coal at high temperature. During the CDR process a dust is produced as waste, which is captured with water sprays producing a slimes material of high moisture content. Within the period between 1990 to the year 2000, MFC disposed of this CDR dust, known as CDR slimes, at a constructed disposal area located to the west of the MFC production facility. The CDR Slimes facility is licensed in terms of water use 21 (g) of the National Water Act, and the facility has been out of commission since the year 2000.

MFC wishes to apply for the formal decommissioning / closure of this facility in line with legislation. There are no intentions to use the facility in the future. MFC propose to remove the material currently in the CDR facility and fully rehabilitate the footprint area.

Knight Piésold (Pty) Ltd was appointed by Samancor Middelburg Ferrochrome to undertake the Wetland Delineation and Assessment Report for the existing Chrome Direct Reduction area, as part of the Basic Assessment Report (BAR).

1.1 TERMS OF REFERENCE

The terms of reference for the study included the following:

- Review and collation of existing wetland information and published data (e.g. NFEPA and NBA)
- Undertake a one-day site visit to delineate all wetlands within 500 m from the CDR slimes facility
- Undertake a wetland functional assessment of identified wetland and/or wetland groupings
- Undertake a present ecological state (PES) assessment of all wetlands identified within the study area
- Undertake an ecological importance and sensitivity (EIS) assessment of all wetlands identified within the study areas using the Rountree *et al.* 2013 methodology
- Compilation of maps to accompany the wetland specialist report
- Compilation of a detailed wetland delineation report and identify potential impacts of the CDR slimes facility decommissioning on the identified wetlands.

1.2 DETAILS OF SPECIALIST

Neal Neervoort is a Senior Aquatic / Environmental Scientist at Knight Piésold's Head Office in Sandton. He has 12 years of working experience as a registered professional scientist (SACNASP: 115316) in the Environmental Management and Aquatic Science fields. He has an aquatic ecology background as a Wetland Assessment Practitioner and DWS: SASS 5 Accredited Practitioner. Neal has been involved in various aquatic specialist studies as part of Environmental Processes and standalone projects. In the Environmental Management field, he has experience across Africa implementing Water Monitoring Programmes, Air Quality Monitoring Programmes, Environmental Compliance Audits, Water Use Licence Applications, Scoping Studies and Environmental Impact Assessments.

1.3 CV OF THE SPECIALIST

A summarised CV of the specialist is attached as Annexure A to this report.

2.0 METHODOLOGY

2.1 DESKTOP ASSESSMENT AND LITERATURE REVIEW

A comprehensive desktop assessment and literature review of all available information was conducted. Available datasets were utilised to identify any wetland of importance or sensitivity within the project area.

2.2 FIELD SURVEY

A once off field survey was undertaken for this study on the 4th of June 2021 to conduct the wetland assessment for the project. The project area was walked to confirm any possible wetland areas within the project area and associated buffer zone of 500 m.

2.3 WETLAND ASSESSMENT

2.3.1 WETLAND DELINEATION AND CLASSIFICATION

During the field investigation, wetlands were identified and delineated according to the delineation procedure set out by "*A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas*", described by the Department of Water Affairs and Forestry (DWAF), 2005.

The delineation of the actual wetland boundaries used indirect indicators of prolonged saturation such as wetland plants (hydrophytes) and wetland soils (hydromorphic soils) with emphasis on the hydromorphic soils. According to the DWAF 2003 field procedure, soils at 50 cm from the surface should indicate signs of wetness (mottling and gleying).

To determine the boundaries of the wetland, soil samples were taken starting with the wettest part of the wetland and proceeding outwards at regular intervals to check for the soil wetness and vegetation indicators. Each sampling point was sampled at a depth of 0-10 cm and at 40-50 cm.

Wetlands were classified using a Munsell Soil Colour Chart, including the use of soil and vegetation characteristics used in the delineation of wetlands and the determination of wetland zones (Kotze *et al*., 1994).

The information recorded in the field was used as input into the Wetland Assessment Tools:

- WET-Health is an Excel based tool that formulates the appropriate information to determine the health of the wetland system. A score is provided for hydrology, geomorphology and vegetation to present the wetland with a Present Ecological State (PES) based on the scoring as per Table 2-1 below
- WET-Eco Services is another Excel based tool that provides us with the services that the wetland offers in terms of various aspects such as biodiversity. The services potential of the wetland can be assessed before and after mitigation to determine the efficiency of the recommended mitigation measures.

The WET-Health approach is to quantify the impact of human activity or clearly visible impacts on wetland health and then to convert the impact scores to a Present State. The impact scores takes into consideration the following:

- Extent: The proportion of the wetland and/or its catchment affected by a given activity (expressed as a percentage)
- Intensity: The degree to which wetland characteristics have been altered within the affected area. The intensity is measured on a scale of 0-10 with a score of 0 representing no impact or deviation from natural, and a score of 10 representing complete transformation from natural
- Magnitude: The magnitude is calculated by an area-weighted impact score such as the intensity of the impact scaled by its extent. The magnitude of the impact is expressed on a scale of 0-10 by multiplying the intensity by the extent of the impact:

Magnitude = Extent / 100 x Intensity

The impact score and the integrity score of each of the WET-Health components (hydrology, geomorphology and vegetation) is produced as a single Present State as summarised in the table below:

Table 2-1: Summary of impact scores and health category associated with changes

Description	Impact Score Range	Health Category
Unmodified, natural	0-0.9	A
Largely Natural. Slight change from natural	1-1.9	B
Moderately modified.	2-3.9	C
Largely modified	4-5.9	D
Greatly / Seriously modified	6-7.9	E
Critically modified	8-10	F

2.3.2 ECOLOGICAL IMPORTANCE AND SENSITIVITY

The Ecological Importance and Sensitivity (EIS) score was formulated according to the guidelines (DWAF, 1999). The EIS provides a guideline for the determination of the Ecological Management Class (EMC), Table 2-2 below. A series of 10 determinants were assessed for the EIS on a scale of 0 to 4, where 0 indicates no importance and 4, a high importance.

Table 2-2: Interpretation of Median Scores for the Ecological Importance and Sensitivity Categories

Ecological Importance and Sensitivity Category (EIS)	Range of Median	Recommended Ecological Management Class
Very high: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these wetlands is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	>3 and <=4	A
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these wetlands may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	>2 and <=3	B
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and <=2	C

Ecological Importance and Sensitivity Category (EIS)	Range of Median	Recommended Ecological Management Class
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	>0 and <=1	D

3.0 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations were applicable to the study:

- The wetland assessment was based on Google Earth imagery as well as the accuracy of the handheld GPS unit used to delineate wetlands in the field, resulting in the delineated wetland boundaries being accurate to about 10-20 m on the ground
- The delineation of wetland and verification of wetlands were limited to the project area and associated 500 m buffer
- The wetland impact assessment forms part of the BAR for the proposed closure / decommissioning of the CDR facility and no other associated impacts from the MFC operation
- The wetland assessment was undertaken in July 2021. Although considered the dry season, wetland features of both vegetation and soils were considered in the delineation process.

4.0 SITE DESCRIPTION

Samancor Middelburg Ferrochrome is located to the east of Middelburg Town in Mpumalanga. The project area (CDR site) is located to the west of the Vaalbankspruit and is located on the farm Middelburg town and Townlands no 287 JS near Middelburg. Figure 4-1 shows the locality of the CDR site area in relation to the MFC area.

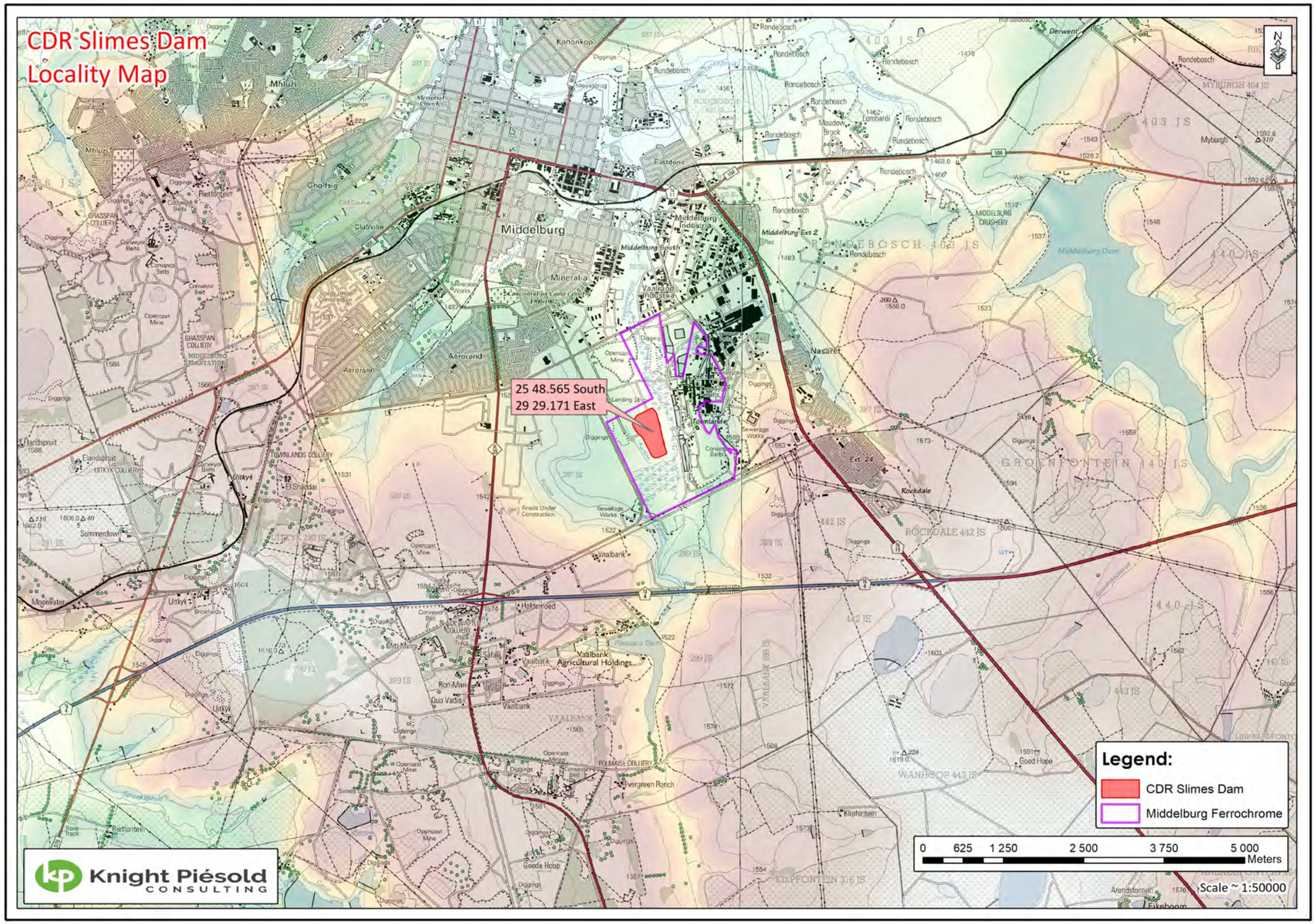

Figure 4-1: General Locality of the CDR Facility

4.1 General Site Characteristics

4.1.1 CATCHMENT

The project area falls within the Olifants Water Management Area (WMA) and Primary Catchment A2 and more specifically in Quaternary Catchment B12D. The catchment is drained by the Vaalbankspruit which originates to the south and flows through the MFC area north where it joins the Klein Olifants River in Middelburg. The Pienaars Dam is located upstream of the project area.

An unknown tributary is located to the south to the project area that flows from west to east joining the Vaalbankspruit.

Table 4-1: Catchment Details

Water Management Area	Olifants
Quaternary catchment	B12D
Level 1 Ecoregion	Highveld
Level 2 Ecoregion	11.02
Rivers	Vaalbankspruit
Mean Annual Precipitation (MAP) mm	702.7
Mean Annual Run-off (MAR) in mm	38.1
Catchment Surface Area km^2	362.3

4.1.2 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS AND NATIONAL BIODIVERSITY ASSESSMENT

The National Freshwater Ecosystem Priority Areas (NFEPA) was initiated by various project partners to identify and set implementation measures to protect freshwater ecosystems. The NFEPA project includes wetlands, rivers, lakes and estuaries. The National Biodiversity Assessment (NBA, 2018) is the primary tool for monitoring and reporting on biodiversity aspects (Figure 4-3).

The NFEPA project allowed for identifying various important freshwater ecosystems within South Africa. Theses ecosystems are categorised as Freshwater Ecosystem Priority Area (FEPA). The available spatial data for FEPA indicated two unchanneled valley bottom wetlands fall within the project area seen in Figure 4-2 below.

4.1.3 MPUMALANGA BIODIVERSITY ASSESSMENT

The Mpumalanga Biodiversity Assessment, 2015 shows the area around the CDR facility as other natural areas with sections to the north as Critical Biodiversity Areas – Irreplaceable. The CDR facility is classified as moderately modified – old lands. The other natural areas as per Figure 4-5 overlaps with the desktop-based wetland areas identified and confirmed during the site visit.

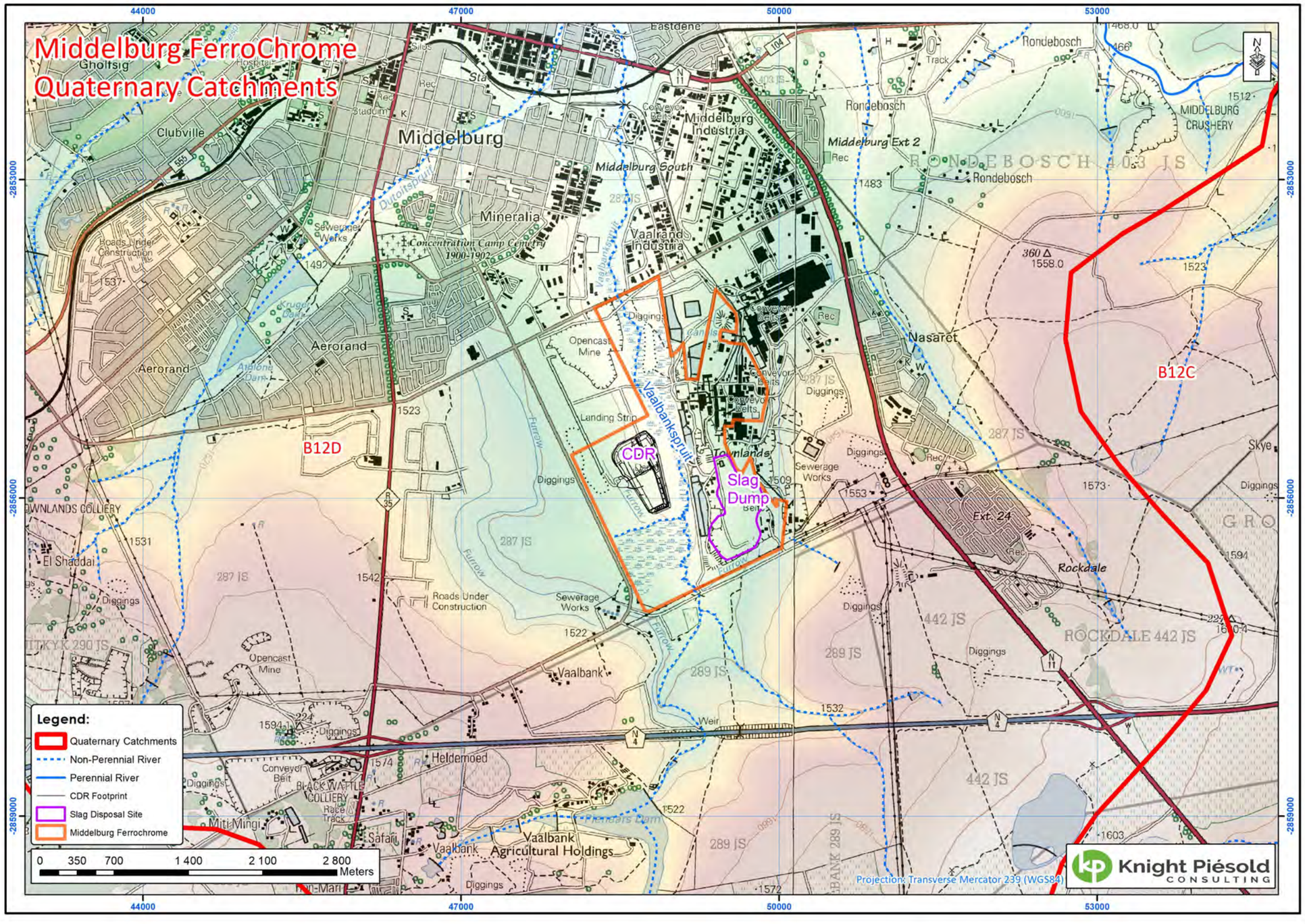

Figure 4-2: Quaternary Catchments

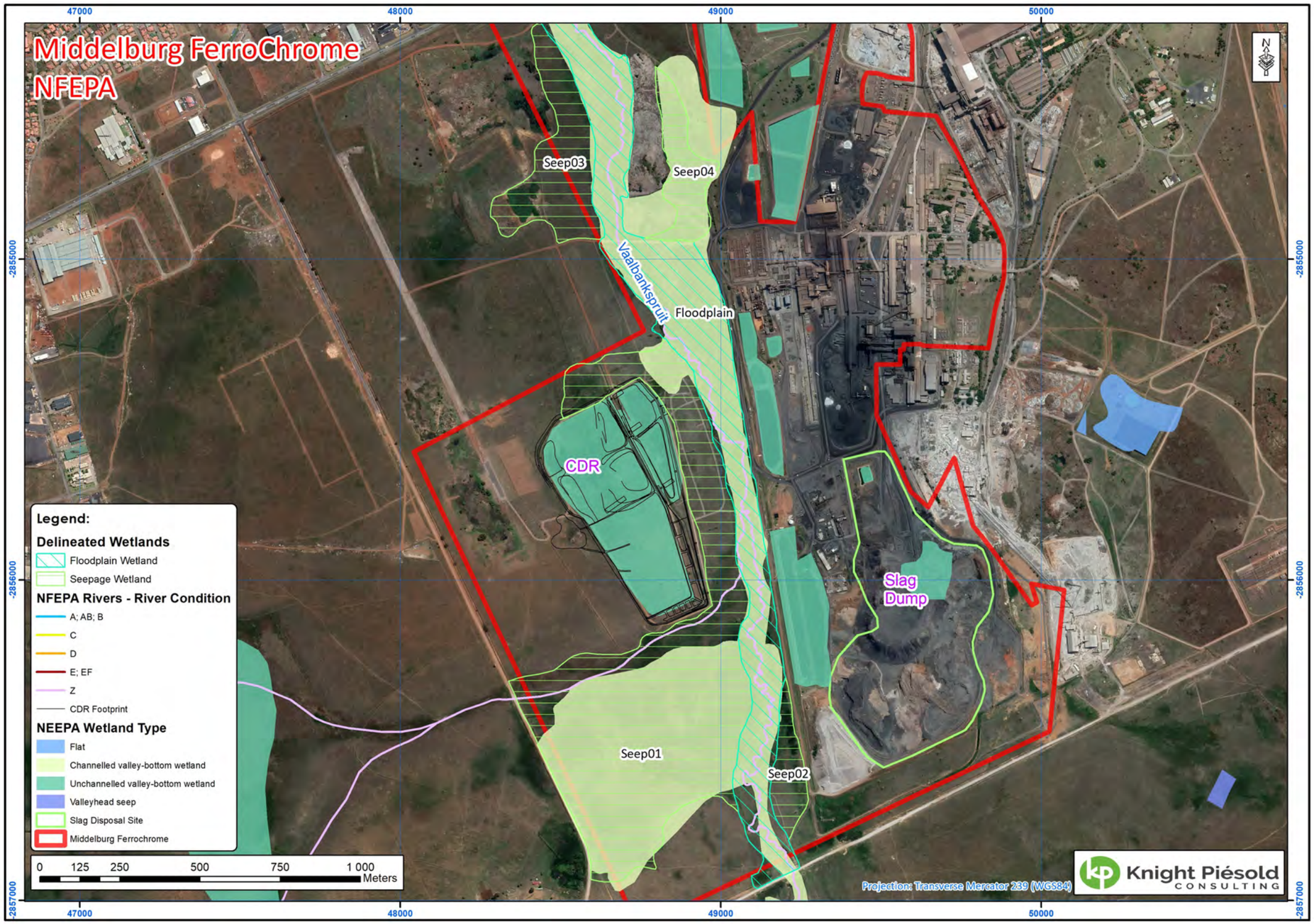

Figure 4-3: NFEPA Areas associated with the CDR facility

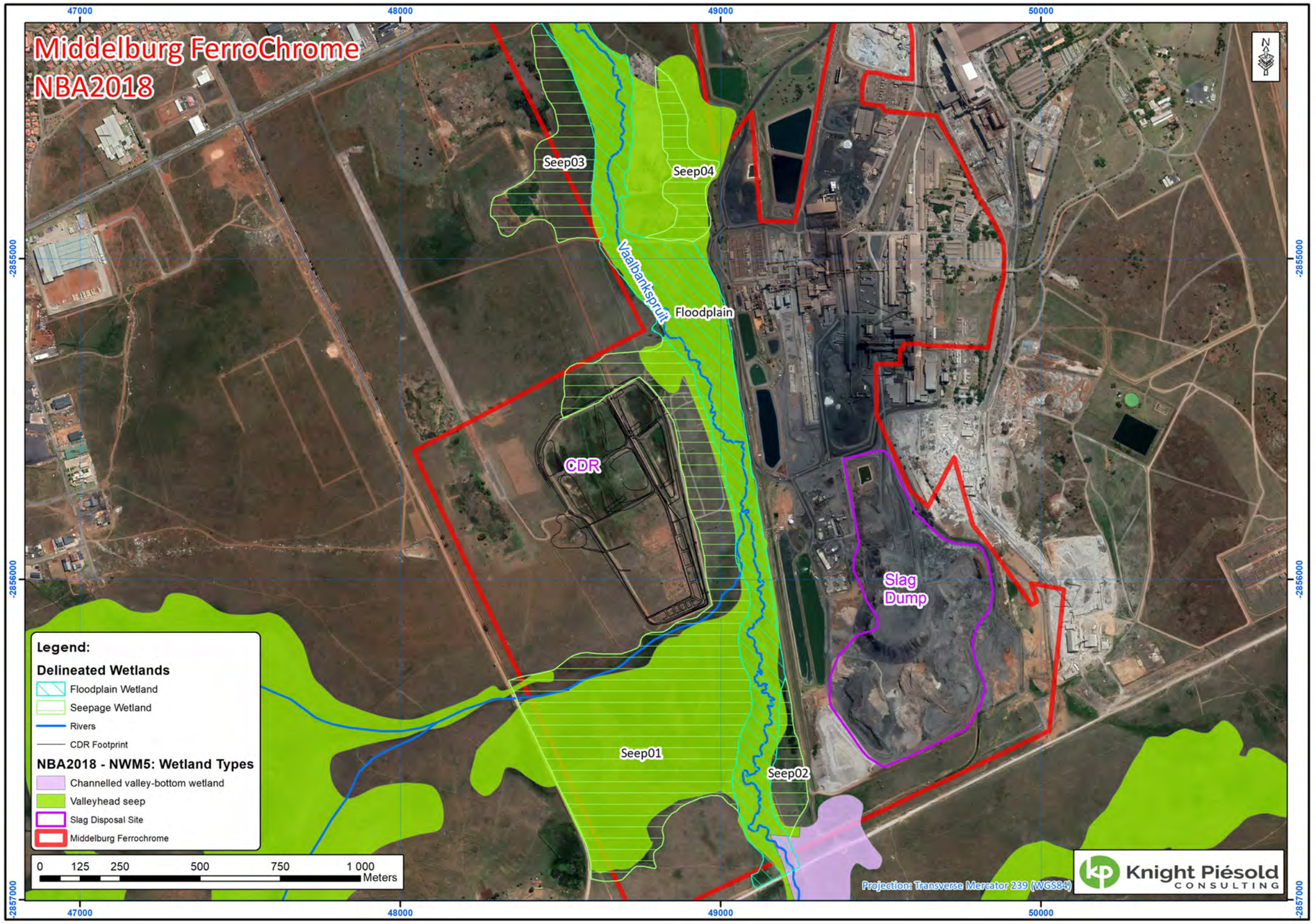

Figure 4-4: NBA 2018 – NWM 5 Wetland Types

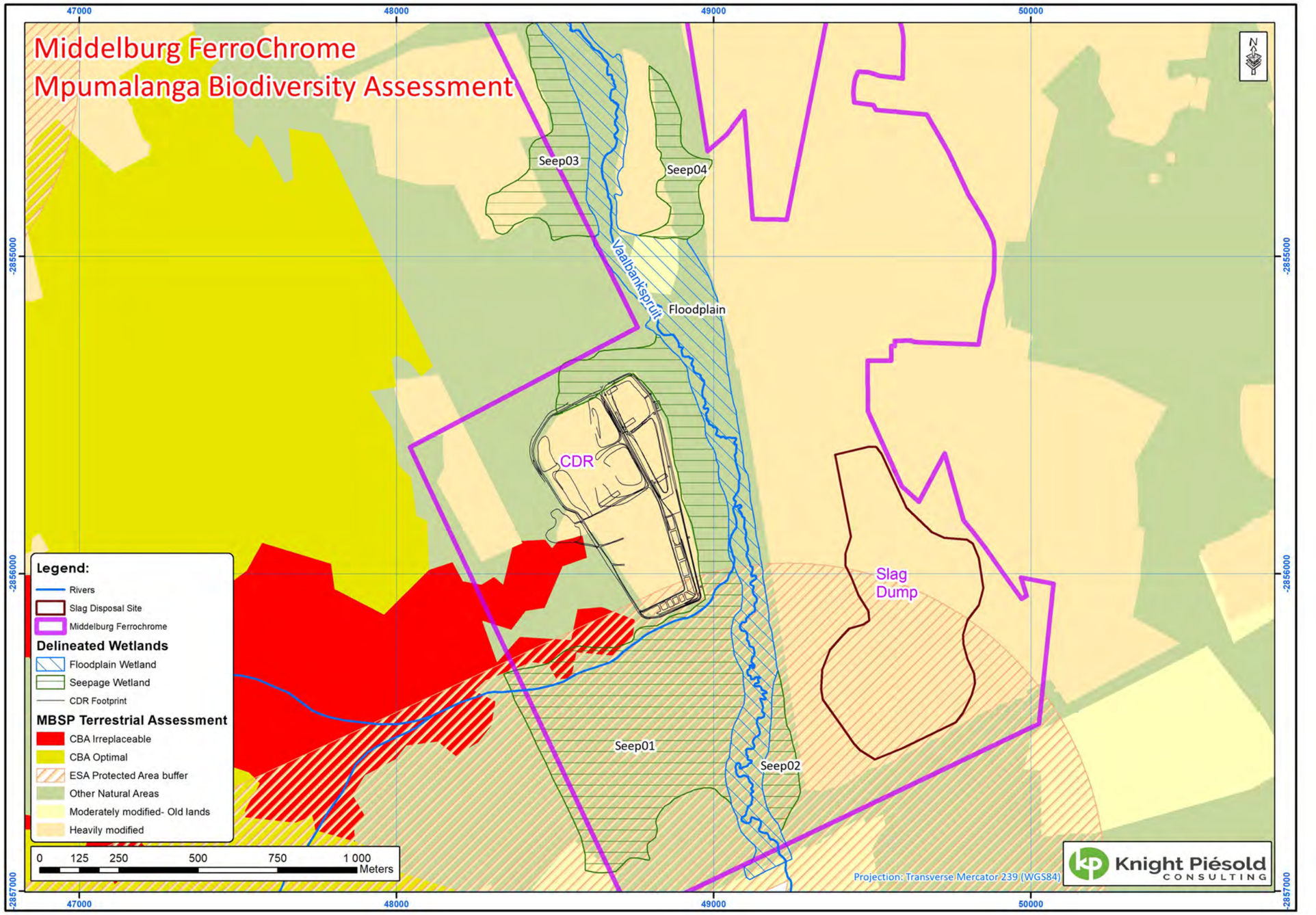

Figure 4-5: Mpumalanga Biodiversity Assessment

5.0 WETLAND DELINEATION AND ASSESSMENT

The National Water Act, Act 36 of 1998, defined wetlands as follows: “Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

Within the 500 m buffer zone around the project area, two different Hydrogeomorphic (HGM) units were identified during the survey as illustrated in the figures below.

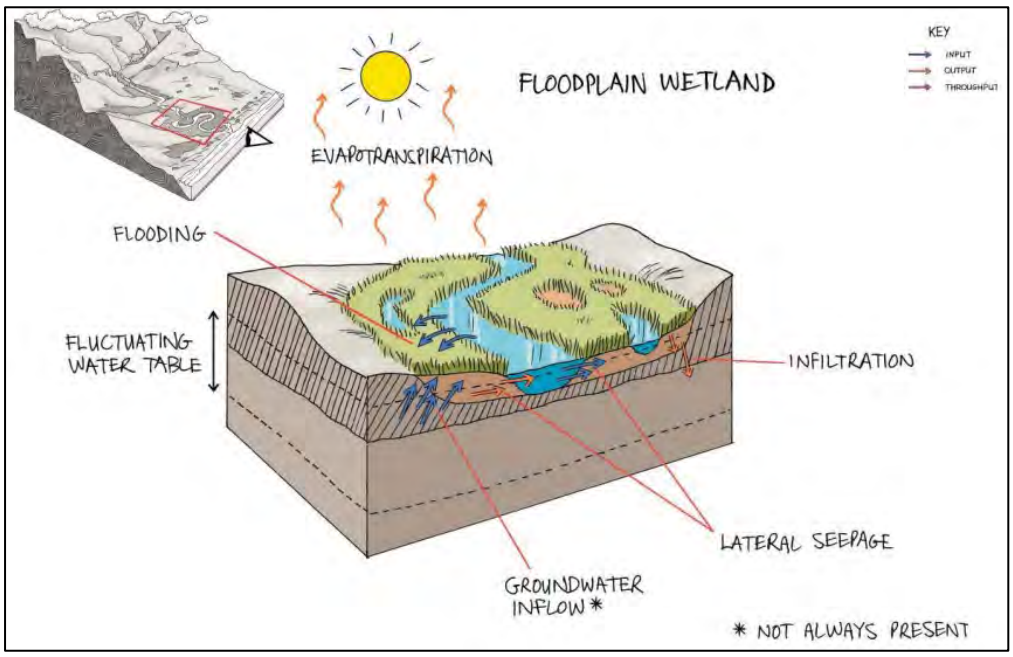

Figure 5-1: Conceptual illustration of a Floodplain Wetland (SANBI, 2013)

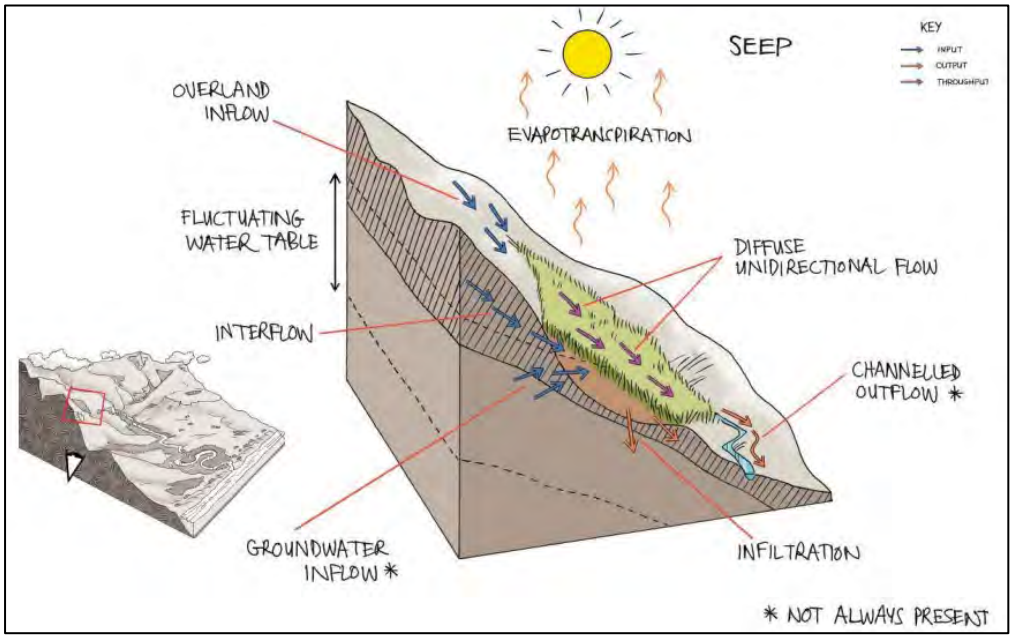

Figure 5-2: Conceptual illustration of a Seep wetland (SANBI, 2013)

The table below and Figure 5-3 indicate the HGM units identified and their relative sizes.

Table 5-1: Summary of HGM Units Identified

No	HGM Unit	Description	Size (Ha)
1	Seep 1	Located to the south of the CDR project area. The seep wetland receives water from the upstream catchment and water discharge from the Wastewater Treatment Works (WWTWs). The water then seeps towards the Vaalbankspruit downgradient	51.62
2	Seep 2	Small seep located at the south-eastern corner of the MFC project area that receives surface water run-off diverted around the MFC area	3.28
3	Seep 3	Small seep located to the north-east that receives runoff from the upstream area	10.73
4	Seep 4	Seep area north of the CDR project area that receives ground- and surface water from the upgradient catchment	5.26
5	Floodplain	The floodplain wetland stretches on the banks of the Vaalbankspruit that receives water during high rainfall events when the channel is overtopped. The floodplain wetland also receives water from the upgradient seepage wetlands and groundwater	37.53

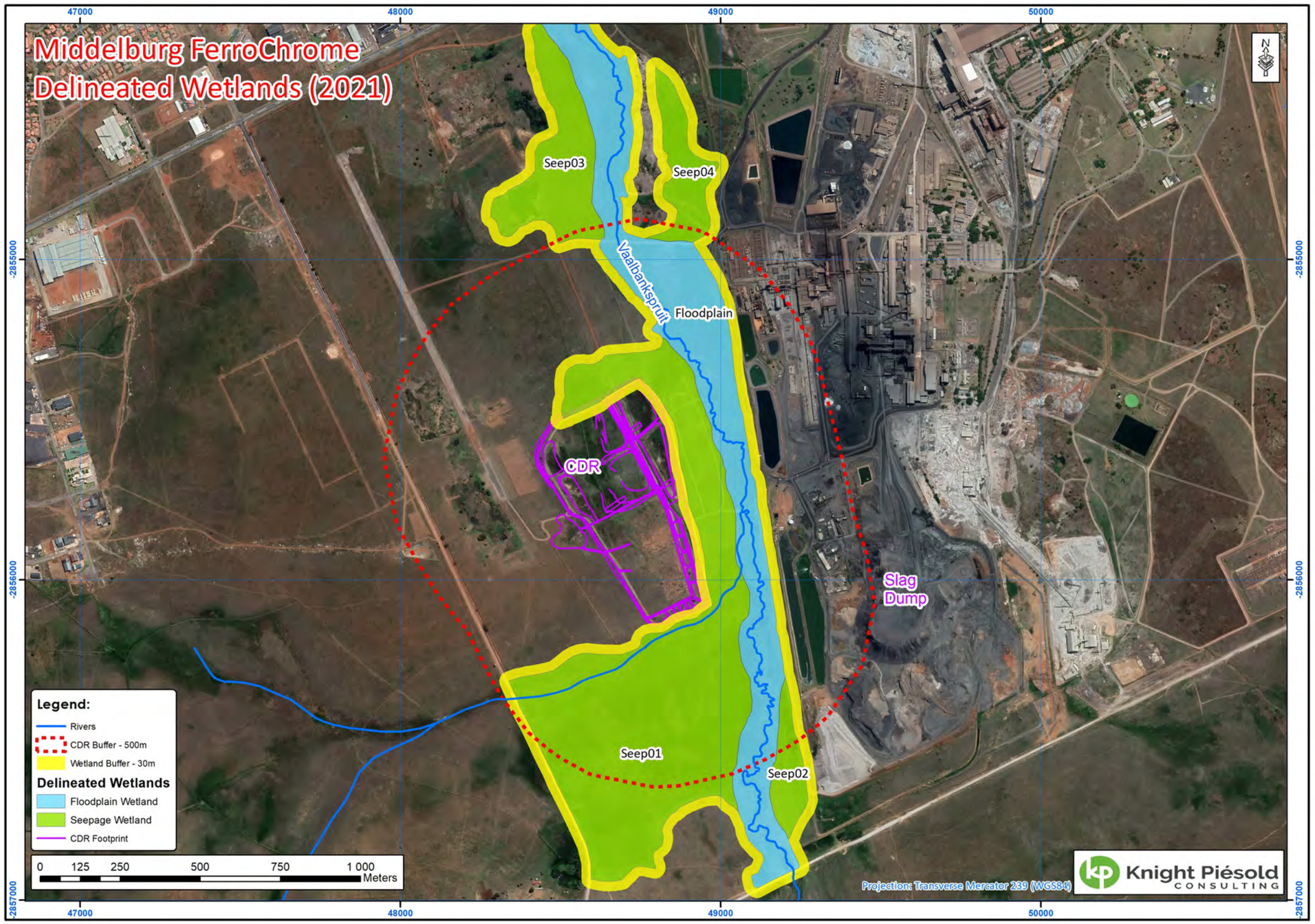

Figure 5-3: Delineated Wetland Areas

5.1 WETLAND UNIT – SEEP 1

The wetland unit is the largest wetland system area with 51.62 Ha identified during the delineation process. The wetland is located to the south of the project area maintained by overland inflow, interflow and groundwater inflow from the upgradient catchment. The catchment area to the west drains towards the Vaalbankspruit. The WWTW located on the south-west corner of the MFC area discharges its final effluent into the receiving environment which creates a constant inflow of surface water. The wetland is characterised by loamy soils.

Plate 1: Seep Wetland Unit 1

5.2 WETLAND UNIT – SEEP 2

The wetland unit is located to the south-eastern corner of the MFC operational area which receives overland inflow from the upstream stormwater channel that drains into the wetland area. The wetland is relatively small (3.28 hectares). The seep extends from the edge of the MFC property towards the Vaalbankspruit.

Plate 2: Wetland Unit -Seep 2

5.3 WETLAND UNIT – SEEP 3

Located to the north of the CDR project area, the seep falls just within the 500 m buffer around the project area. The area upgradient of the seep has previously been excavated or utilised causing surface water to collect and sypher through the wetland towards the Vaalbankspruit. The seep (10.73Ha) receives overland inflow and interflow from the upgradient area.

Plate 3: Wetland Unit Seep 3

5.4 WETLAND UNIT – SEEP 4

The seep wetland is located on the northern corner between the MFC process area fence and to the east of the Kloof Dump. The seep receives surface water inflow from surface water run-off from the MFC areas and some seepage and/or overspill from the dams on the Columbus Steel property.

Plate 4: Wetland Unit – Seep 4

5.5 WETLAND UNIT – FLOODPLAIN

The floodplain area is located on the banks of the Vaalbankspruit and extends from the south to the north of the MFC area. The Vaalbankspruit deposits sediments on the floodplain wetland during time of high flow or floods, the Pienaars Dam is located upstream of the wetland which could attribute to the sediments deposited during these high peak events.

The floodplain wetland is dominated by *Phragmites australis* (common reed) due to the availability of sediments on the banks and within the channel. The wetland is characterised by loamy /clayey soils being saturated throughout the year with the seep wetlands playing a role in providing interflow and overland flow to the floodplain wetland.

Plate 5: Floodplain Wetland

5.6 PRESENT ECOLOGICAL STATE OF WETLANDS

No activities are currently taking place on the western portion of the greater MFC area where the CDR facility is located. The wetlands have not been disturbed in recent times with the operation of the CDR facility halted in the year 2000. The wetlands have adapted to the environmental changes that have occurred upgradient in the catchment.

The wetlands within the CDR project area have not been altered significantly from the reference conditions, although some wetlands have been created by activities such as the WWTW discharge of the past years. The wetlands within the project area have not deteriorated due to these activities and the Present Ecological State is a Moderately modified state, with a PES category of C.

Table 5-2: Present Ecological State for Each HGM Unit

Wetland HGM Unit	Hydrology	Geomorphology	Vegetation	Overall PES
SEEP Wetland 1	C	C	B	**C (Moderately Modified**
SEEP Wetland 2	C	C	B	**C (Moderately Modified**
SEEP Wetland 3	C	C	B	**C (Moderately Modified**
SEEP Wetland 4	C	C	C	**C (Moderately Modified**
Floodplain Wetland	D	C	C	**C (Moderately Modified**

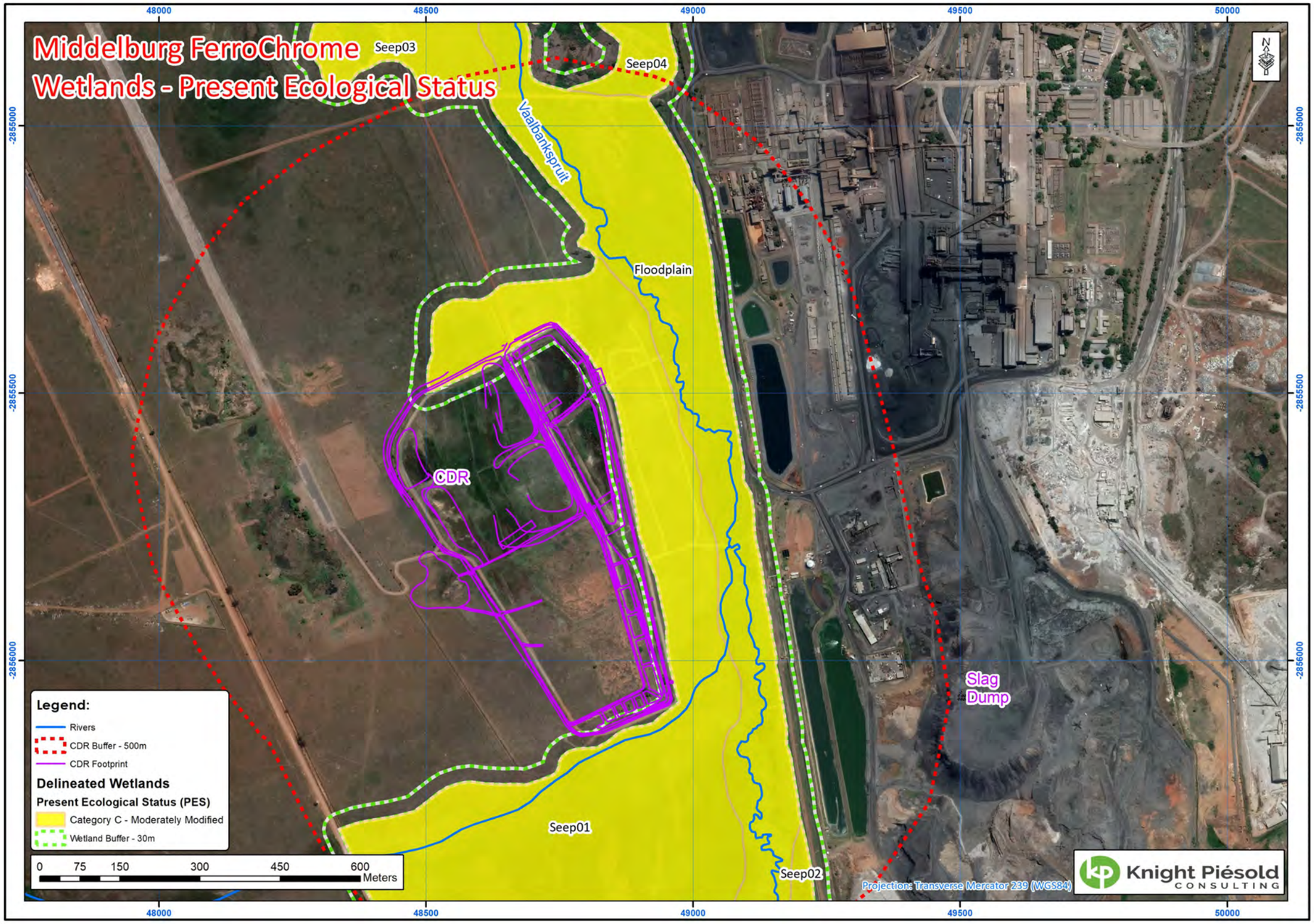

Figure 5-4: Wetland Present Ecological State

5.7 ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS) ASSESSMENTS

According to the DWAF 1999, “ecological importance" of a water resource is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. "Ecological sensitivity" refers to the system’s ability to resist disturbance and its capability to recover from disturbance once it has occurred. The Ecological Importance and Sensitivity provides a guideline for determination of the Ecological Management Class (EMC).

The EIS was conducted according to the DWAF guidelines (1999) for the HGM units found in the wetland system. Results for the EIS are presented in Table 5-3 below.

Table 5-3: EIS for the wetland units

Determinant	Seep Wetland 1	Seep Wetland 2	Seep Wetland 3	Seep Wetland 4	Floodplain Wetland
PRIMARY DETERMINANTS					
Rare & Endangered Species	1	1	1	1	2
Populations of Unique Species	1	1	1	1	1
Species/taxon Richness	1	1	1	1	2
Diversity of Habitat Types or Features	1	1	1	1	2
Migration route/breeding and feeding site for wetland species	1	1	1	1	1
Sensitivity to Changes in the Natural Hydrological Regime	2	2	2	2	2
Sensitivity to Water Quality Changes	1	1	1	1	4
Flood Storage, Energy Dissipation & Particulate/Element Removal	3	2	2	2	3
MODIFYING DETERMINANTS					
Protected Status	0	0	0	0	0
Ecological Integrity	2	1	1	1	3
TOTAL	13	11	11	11	20
MEDIAN	1	1	1	1	2
OVERALL ECOLOGICAL SENSITIVITY AND IMPORTANCE	**Low/Marginal**	**Low/Marginal**	**Low/Marginal**	**Low/Marginal**	**Moderate**
Ecological Management Class	**D**	**D**	**D**	**D**	**C**

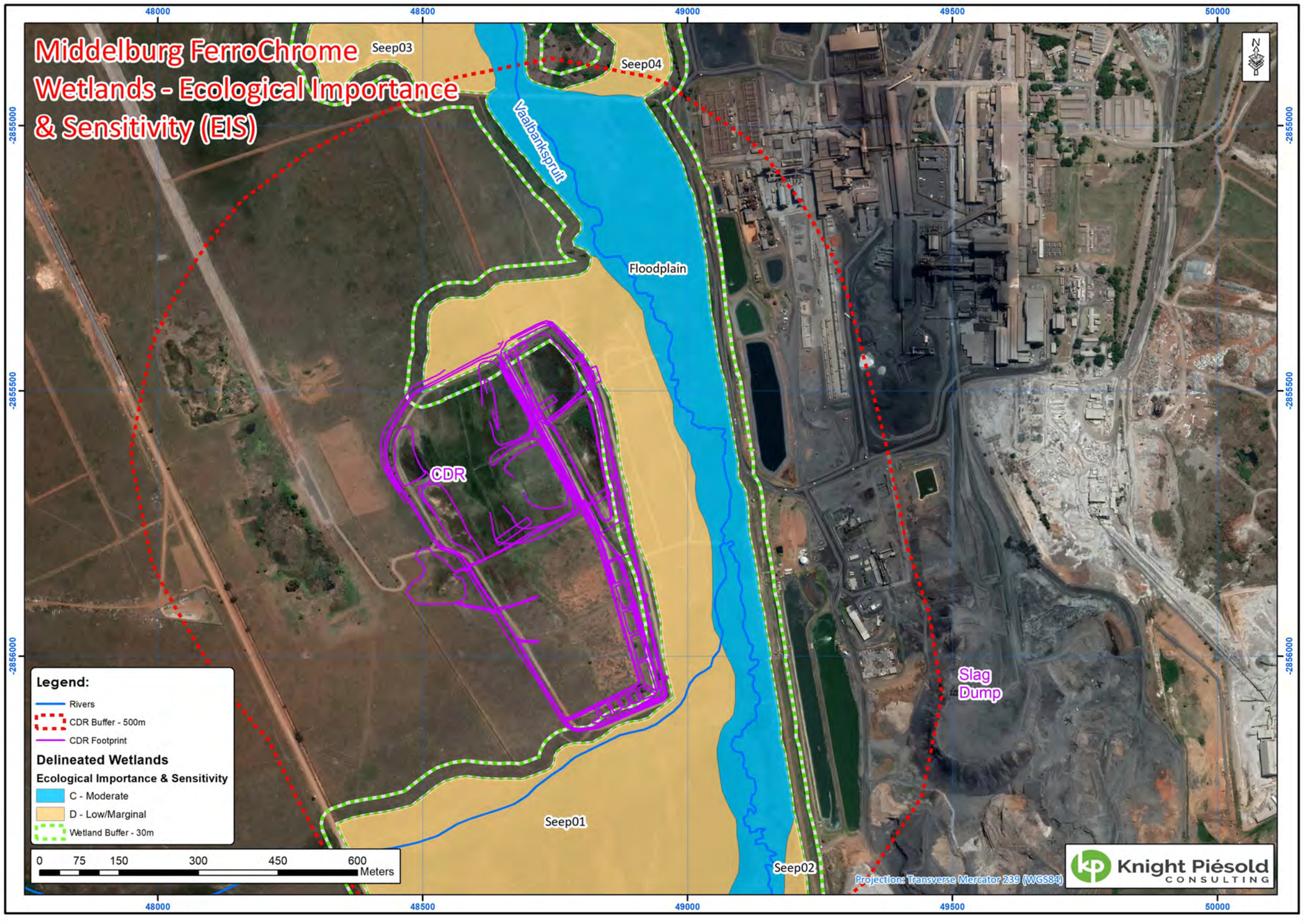

Figure 5-5: Wetland EIS

5.8 WETLAND FUNCTIONAL ASSESSMENT

Wetlands are regarded as important components of the landscape in which they occur, as they are associated with a number of functions that are of value to society. These functions include water quality improvement, flood attenuation and biodiversity support.

To determine the function of the wetland, the broader catchment should be taken into consideration as the catchment plays a major role in the functionality of the wetland system. WET-EcoServices was used to assess the ecosystem services for the affected wetland systems. Based on the HGM unit identified, the position of the wetland within the landscape and the way the water flows, a representative functional assessment was undertaken for Seep 1 and the floodplain wetland.

5.8.1 SEEP WETLAND

Seep wetlands like other wetland types, support plants and associated insects, birds and small mammals adapted to the seasonal moisture regime. Wetlands of this nature are predominantly associated with the sandstone derived soils in the catchment and typically reflect presence of shallow interflow and overland inflow.

Seep wetlands, as seen in the figure below, also play a role in nitrate, phosphate and toxicant removal contributing to water quality improvement. Due to the average slope of 0.2% across the Seep wetland, the overland inflow is significantly slowed down assisting in erosion control in the catchment and reducing the possibility of sediment being washed into the floodplain wetland.

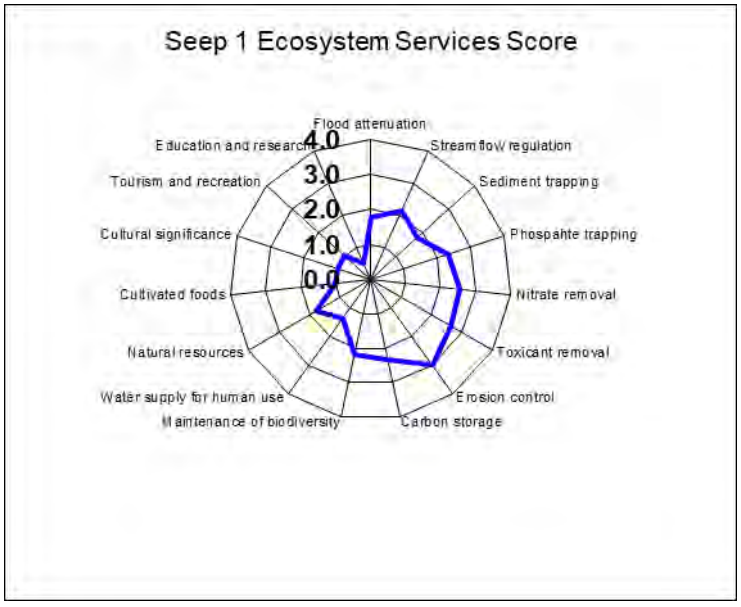

Figure 5-6: Seep 1 Ecosystem Services

5.8.2 FLOODPLAIN WETLAND

Floodplain wetlands are a depositional surface formed by an alluvial river. Alluvial river channels are self-formed features meaning that they are shaped by magnitude and frequency of the floods that they experience and the ability of these floods to erode, deposit and transport sediment. The deposition of the sediment plays a role in erosion control and sediment trapping within the channel associated with the floodplain wetland.

The floodplain wetland also assists with the improvement of water quality as it tends to trap phosphate and remove nitrate and toxicants within the wetland.

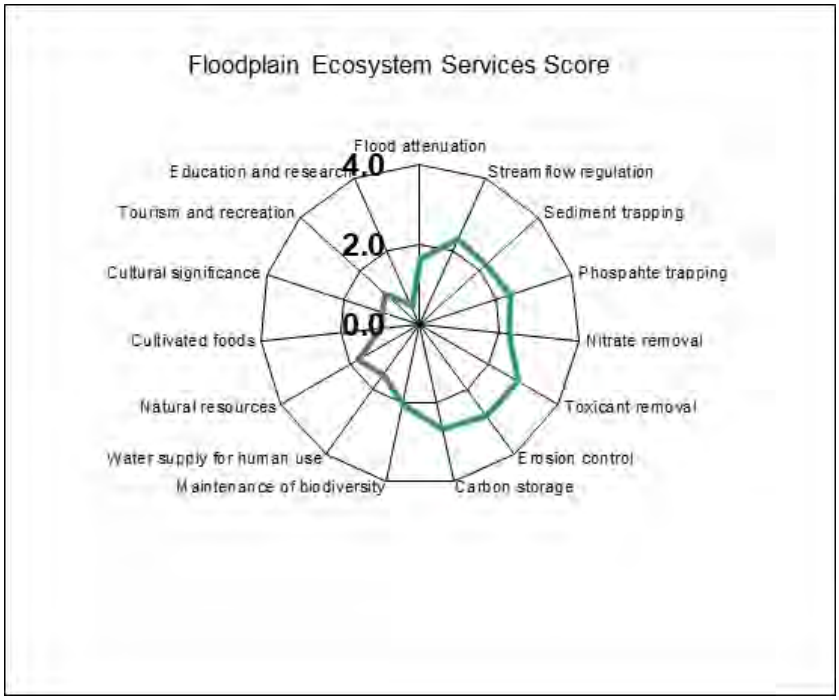

Figure 5-7: Floodplain Wetland Ecosystem Services

5.9 WETLAND BUFFER ZONES

The Buffer Zone Guidelines for Wetlands, Rivers and Estuaries as well as the Gauteng Department of Agriculture and Rural Development (GDARD) requirements for biodiversity assessments guidelines were applied to determine an appropriate buffer zone around the delineated wetlands. A 30m wetland buffer is recommended to the northern side of the Seep 1 wetland. Due to the limitation on the working corridor, it is recommended that the wetland buffer to the south and east of the CDR facility is demarcated by physical barriers next to the access roads around the CDR facility to ensure that no construction activities occur within the wetland areas. The current access roads serve as a natural buffer around the wetland. The implementation of the buffer zone will also assist that no activities encroach on the wetland areas and impact on the wetlands. Figure 5-3 show the delineated wetlands with the appropriate 30m buffer zone.

6.0 IMPACT ASSESSMENT

6.1 IMPACT ASSESSMENT METHODOLOGY

An impact is essentially any change to a resource or receptor brought about by the presence of the proposed project component or by the execution of a proposed project related activity. The purpose of impact assessment is to identify and evaluate the likely significance of the potential impacts on identified receptors and resources according to defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise, reduce or compensate for any potential adverse environmental effects, and to report the significance of the residual impacts that remain following mitigation.

6.1.1 DEFINING THE NATURE OF THE IMPACT

The terminology used to define the nature of an impact is detailed in the table below.

Table 6-1: Impact Nature

Term	Definition
Positive (+)	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative (-)	An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.
Direct impact (D)	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g., between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect impact (I)	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g., in-migration for employment placing a demand on resources).
Cumulative impact (C)	Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.

6.1.2 SIGNIFICANCE RATING SYSTEM

The significance of potential impacts has been determined using the rating scheme as described below.

Significance of Environmental or Social Impact = Consequence x Probability

The consequence of an impact can be derived from the following factors:

Severity / Magnitude - the degree of change brought about in the environment

Reversibility - the ability of the receptor to recover after an impact has occurred

Duration - how long the impact may be prevalent

Spatial Extent - the physical area which could be affected by an impact.

The severity, reversibility, duration, and spatial extent are ranked using the prescribed methodology obtained from the EAP and then the overall consequence is determined by adding up the individual scores and multiplying it by the overall probability (the likelihood of such an impact occurring). Once a score has been determined, this is checked against the significance descriptions.

6.2 WETLAND IMPACT ASSESSMENT

The proposed removal of the CDR facility will have a positive impact on the wetland units identified during the assessment. The CDR facility is currently classified as a Type 3 waste and the removal of the waste will benefit the wetland units in the long term. The removal of the waste and rehabilitation of the area could improve the ecological state of the wetland units and water quality within the Vaalbankspruit. The impact is rated as moderate with no mitigation measures required.

The removal of waste will be done by heavy machinery and trucks that will haul the slimes to the existing slag dump facility within the MFC area. The trucks will use established roads that will cross the floodplain wetland; however, no negative impact is envisaged, as the road is existing and currently in-use. It is however recommended that the road conditions crossing the wetland be monitored and maintained during the duration of the removal process.

7.0 MITIGATION MEASURES

The following mitigation measures are proposed for the removal of the CDR facility associated to the delineated wetlands areas:

- A 30m wetland buffer is recommended to the northern side of the Seep 1 wetland. Due to the limitation on the working corridor, it is recommended that the wetland buffer to the south and east of the CDR facility is demarcated by physical barriers next to the access roads around the CDR facility to ensure that no construction activities occur within the wetland areas. The current access roads serve as a natural buffer around the wetland. Figure 5-3 shows the delineated wetlands and associated buffer zones
- The access road to be used by the trucks hauling the CDR material to the existing slag facility needs to be monitored and maintained to ensure that the haulage will not impact on the floodplain wetland
- Surface water run-off from the CDR facility should be controlled and contained within the CDR return water dams during construction. No spillage or release from the return water dams should be allowed
- A rehabilitation / closure plan should be established and implemented to ensure that the area is rehabilitated to not impact on the wetland areas
- Trucks and heavy machinery should not be allowed to use any other access roads to cross the wetland area except for the existing road.

8.0 MANAGEMENT MEASURES

The wetland specialist recommends that the following management measures be implemented to protect the wetlands:

- Demarcate the wetland and working areas during construction to ensure that no construction activities occur within these areas
- Designate a re-fuelling area and prohibit refuelling within close proximity to any watercourse
- Store hazardous materials in a hazardous material zone with a bunded area and oil trap
- Implement the stormwater management system recommended to attenuate flood peak events
- Once all material is removed, check drainage lines of the rehabilitated slimes dam footprint to ensure that it is free draining and institute corrective action if unnecessary impoundment or scouring is identified.

9.0 CONCLUSION

Knight Piésold (Pty) Ltd was appointed by Samancor Middelburg Ferrochrome to undertake the Wetland Delineation and Assessment Report for the existing Chrome Direct Reduction area, as part of the Basic Assessment Report (BAR). A site visit was undertaken by the professional Aquatic Scientist of Knight Piésold to assess and delineate the wetlands within 500 m of the CDR facility.

The wetland delineation identified two HGM units namely Seep and Floodplain wetlands within the 500 m radius of the facility. The activity of the decommissioning of the CDR facility will not take place within any wetland areas. It is envisaged that the decommissioning will have a positive long term impact on the associated wetlands as it could improve the wetland functioning due to the removal of slimes material.

A 30m wetland buffer is recommended to the northern side of the Seep 1 wetland. Due to the limitation on the working corridor, it is recommended that the wetland buffer to the south and east of the CDR facility is demarcated by physical barriers next to the access roads around the CDR facility to ensure that no construction activities occur within the wetland areas. The current access roads serve as a natural buffer around the wetland. It is the professional opinion of the registered specialist that the proposed project and activities should proceed with the recommended mitigation and monitoring measures to be implemented.

10. REFERENCES

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11. CERTIFICATION

This report was prepared and reviewed by the undersigned.

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Approval that this document adheres to the Knight Piésold Quality System: AB

APPENDIX A

Specialist CV