



**APPLICATION FOR WASTE MANAGEMENT LICENSE:
BASIC ASSESSMENT REPORT (BAR) IN TERMS OF NEMA**

**PROPOSED DECOMMISSIONING AND CLOSURE OF THE FE-
CR WASTE DISPOSAL FACILITY AT TRANSALLOYS (Pty) Ltd
IN EMALAHLENI (WITBANK), NKANGALA DISTRICT
MUNICIPALITY, MPUMALANGA PROVINCE**

**MARCH 2022
(DRAFT)**



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- Company profile: HydroScience
- Curriculum vitae (Environmental Assessment Practitioner): Ms Paulette Jacobs
- Qualification: Ms Paulette Jacobs
- Professional affiliations: Ms Paulette Jacobs (SACNASP, EAPASA WISA, IAIAsa)
- NEMWA project list

Appendix B: Photographs & layouts

- Photographs
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- WUL 16/2/7/B100/B175 for Section 21 (a), (g) & (j) and amendment
- WML 12/9/11/L261/6 for Mn slimes and slag dump and variation
- AEL 17/04/AEL/MP312/11/05 for Category 4

Appendix D: Specialist studies

- Promap, Aerial LiDAR Survey, Transalloy Volumes, 27 November 2020.
- Knight Piesold Consulting, Transalloys, eMalahleni, Geotechnical Investigation, Report No. KHH2359, 12 December 2016.
- Artesium Consulting Services, Transalloys Fe-Cr TSF Geochemical waste assessment, Reference 2021-00048 V3, 6 September 2021.
- Marius van Biljon, 2021. Geohydrological assessment of the Ferrochrome slimes dam at Transalloys (Pty) Ltd. Report No: MvB075/21/A069. September 2021
- Archaetnos Culture & Cultural Resource Consultants, 2021. Letter for HIA exemption request: Proposed decommissioning and closure of the Fe-Cr Waste Disposal Facility at Transalloys (Pty) Ltd in eMalahleni (Witbank) within Nkangala District Municipality, Mpumalanga Province. 4 October 2021.
- Durand, JF, 2021. Exemption from further palaeontological assessments. October 2021.
- Redco, 2021. Transalloys (Pty) Ltd. FeCr Slimes Facility. Closure design report. Project TA007. September 2021

Appendix E: Public participation

- Newspaper notice (Witbank News & Middelburg Observer)
- Notification (emails)
- Contact details of Interested and Affected Parties (confidential)
- Comments received from Interested and Affected Parties
- Comments received from Interested and Affected Parties on draft BAR

Appendix F: Management

- Emergency Preparedness and Response Procedures / Plan (EPRP)
- Storm Water Management Plan

LIST OF ACRONYMS AND ABBREVIATIONS AND DEFINITIONS

AIS	Alien and Invasive Species Regulations (2014)
AQSR	Air Quality Sensitive Receptors
BAR	Basic Assessment Report
Biodiversity	Diversity of genes, species and ecosystems on earth, and the ecological and evolutionary processes that maintain this diversity.
BPG	Best Practice Guidelines
CAPEX	Capital Expenditure
CARA	Conservation of Agriculture Resources Act, 1983 (Act 43 of 1983)
CBA	Critical Biodiversity Area (terrestrial and aquatic areas required to meet biodiversity targets for ecosystems, species or ecological processes, as identified in a systematic biodiversity plan)
CBD	Central Business District (centre of a town/city)
CRSA	Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) – Section 24 relates to environment
CSIR	Council for Scientific and Industrial Research
DFFE	Department of Forestry, Fisheries & Environment (national authority responsible for environmental protection and implementation of NEMA)
DOL	Department of Labour
DTI	Department of Trade and Industry
DWS	Department of Water and Sanitation (national authority responsible for water protection and implementation of NWA, custodian of South Africa's water resources)
EAP	Environmental Assessment Practitioner (independent consultant administering NEMA processes on behalf of applicant)
EAPASA	Environmental Assessment Practitioner Association of South Africa
ECA	Environment Conservation Act, 1989 (Act 73 of 1989) – preceded NEMA
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment (process required in terms of NEMA to obtain authorisation for listed activities)
EMF	Environmental Management Framework
EMPr	Environmental Management Programme/Plan
EO	Environmental Officer

EPRP	Emergency preparedness and response procedures
ERAP	Emergency Response Action Plan
ESA	Ecological Support Area (terrestrial and aquatic areas that are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of one or more Critical Biodiversity Areas; or in delivering ecosystem services.
GCL	Geosynthetic Clay Liner
GIS	Geographic Information System
GNR	Government Notice Regulation (notices published in Government Gazette in terms of already promulgated laws, legislated by government)
GNR 324	Amendment of GNR 985 - Listing 3 deals with activities requiring environmental authorisation due to sensitive locations
GNR 325	Amendment of GNR 984 - Listing 2 deals with activities requiring environmental authorisation due to expected higher environmental impact – requires full EIA (scoping and EIA)
GNR 326	Amendment of GNR 982 - EIA regulations – procedures / requirements
GNR 327	Amendment of GNR 983 - Listing 1 deals with activities requiring environmental authorisation due to expected lower environmental impact – requires Basic Assessment only
GPS	Global Positioning System
GV	Guideline Value
HCS	Hazardous Chemical Substance
HIA	Heritage Impact Assessment
IAIA	International Association of Impact Assessment
IBA	Important Bird (and Biodiversity) Area – of international significance for conservation of birds as identified by BirdLife International.
I&APs	Interested and Affected Parties (as identified during the Public Participation Process)
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
LC	Leachable Concentration
LCT	Leachable Concentration Threshold
Listed Activities	Activities identified in terms of NEMA Sections 24 and 24D, which require environmental authorisation prior to commencement due to their potential environmental impacts. See GNR 324, 325, 326, 327

mamsl	Metres Above Mean Sea Level
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
Mn	Manganese
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards (13 March 2009 and 24 December 2009)
NDCR	National Dust Control Regulations (1 November 2013)
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998) – overarching environmental legislation in South Africa
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NFEPA	National Freshwater Ecosystems Priority Area
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
NWA	National Water Act, 1998 (Act 36 of 1998)
OHSA	Occupational Health and Safety Act, 1993 (Act 85 of 1993)
OPEX	Operational Expenditure
PCD	Pollution Control Dam
PM	Particulate Matter
PM₁₀	Particulate Matter with an aerodynamic diameter of < 10um also referred to as thoracic particulates
PM_{2.5}	Particulate Matter with an aerodynamic diameter of < 2.5um
PM₁₀ & PM_{2.5}	Determine the potential for human health risks
PPE	Personal Protective Equipment
PPP	Public Participation Process
PRECIS	National Herbarium Pretoria (PRE) Computerised Information System
QDGC	Quarter Degree Grid Cell
SACNASP	South African Council for Natural Scientific Professions (body for the registration of professional natural scientists)

SAHRA	South African Heritage Resources Agency (authority responsible for implementation of NHRA)
SAHRIS	South African Heritage Resources Information System (electronic system onto which reports are loaded for comments from SAHRA)
SANBI	South African National Biodiversity Institute
SABS	South African Bureau of Standards
SANS	South African National Standards
SDF	Spatial Development Framework
SHEQ	Safety, Health, Environment & Quality
SoE	State of the Environment Report
SWMP	Storm Water Management Plan
TC	Total Concentration
TCT	Total Concentration Threshold
TSP	Total Suspended Particulate – assess nuisance dust effects
US EPA	United States Environmental Protection Agency
WCMR	Waste classification and Management Regulations
WDF	Waste Disposal Facility
WHO	World Health Organisation
WISA	Water Institute of Southern Africa
WUL	Water Use License

1 ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

1.1 Details

Company:	HydroScience CC
Registration Number:	2008/056910/23 14 March 2008
Postal address:	P.O. Box 1322 Ruimsig 1732
Email address:	paulette@hydroscience.co.za
Telephone number:	+ 27 (0) 82 850 5482
Fax number:	+ 27 (0) 86 692 8820
Contact person:	Ms Paulette Jacobs I.D. 680526 0104 08 4
Professional registration (Paulette Jacobs):	South African Council for Natural Scientific Professions (SACNASP): 400005/07 Environmental Assessment Practitioner Association of South Africa (EAPASA): 2020/357
Membership (Paulette Jacobs):	Water Institute of Southern Africa (WISA): 24906 International Association of Impact Assessment South Africa (IAIAsa): 5266

1.2 Experience and expertise

HydroScience CC was established in 2008 after Ms Paulette Jacobs acted as an independent consultant (sole proprietor) since 2000. HydroScience is an environmental, water and waste management solutions provider. Refer to Appendix A for a company profile.

Ms Paulette Jacobs obtained her qualifications from the Rand Afrikaans University in Johannesburg in 1990 and has been in the water, waste and environmental field for the last 30 years, first in research for seven (7) years at the Council for Scientific and Industrial Research (CSIR) and since then in consulting (Pulles, Howard and De Lange Water Quality Management Consultants, SRK Consulting, sole proprietor, HydroScience). Refer to Appendix A for Curriculum Vitae of Ms Paulette Jacobs. Ms Paulette Jacobs assisted Department of Water Affairs and Forestry (now Department of Water and Sanitation, DWS) to compile the Best Practice Guidelines (BPG) for water resource protection in the mining industry and has successfully completed many Water Use Licence (WUL) Applications in terms of the National Water Act (NWA), 1998 (Act 36 of 1998) as well as Environmental Impact Assessments (EIA) in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) as

amended for the industrial, retail, commercial/business and residential sectors to obtain environmental authorisations, Atmospheric Emissions Licenses (AEL) and Waste Management Licenses (WML) over the last 20 years. Refer to Appendix A for a project list of applications for WML.

1.3 Supporting information

Appendix A contains:

- Company profile: HydroScience
- Curriculum vitae (Environmental Assessment Practitioner): Ms Paulette Jacobs
- Qualification: Ms Paulette Jacobs
- Professional affiliations: Ms Paulette Jacobs (SACNASP, EAPASA, WISA, IAIAsa)
- NEMWA project list

1.4 Assumptions, limitations, disclaimer and copyright

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information at the time of compilation (September 2021 – February 2022). The report is based on survey and assessment techniques which are limited by time (one day on site) and budgetary constraints relevant to the type and level of investigation undertaken (Basic Assessment Process) and HydroScience and its staff / representatives reserve the right to modify aspects of the report if and when new information may become available from changes in legislation, on-going research or further work in this field, or pertaining to this investigation.

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Project description information contained in this report is based on information supplied by the client or client appointed sources. It has been assumed that the information provided to HydroScience is correct. Environmental data contained in this report is based on information supplied by specialists in their respective fields, as well as existing available information from official sources pertaining to the area in question (maps and reports published by the relevant government department and agencies). It has been assumed that the information from these specialists or official sources is correct. HydroScience has therefore not checked or verified historical/existing information provided for correctness. HydroScience accepts no responsibility for incomplete or inaccurate data supplied by others (the client and external sources). Where gaps or obvious errors have been identified, these are noted for consideration by the applicant and/or authority.

Transalloys (Pty) Ltd is responsible for the implementation of recommendations and HydroScience cannot and will not take responsibility for its actions or lack thereof.

1.5 Declaration of independence

I, **Paulette Jacobs**, declare that –

- I act as an independent environmental, water and waste consultant in this investigation;
- I have expertise in water, waste and environmental management, including knowledge of the relevant Acts, Regulations and any guidelines that have relevance to the investigation;
- I have performed the work relating to this investigation in an objective manner, even if this results in views and findings that are not favourable to any party involved;
- I have included the specialist studies provided to me in Appendices as well as summarised findings and recommendations in this report;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential to influence this investigation, unless access to that information is protected by law, in which case it will be indicated that such information exists;
- I do not have any vested interest (either business, financial, personal or other) in the investigation other than fair remuneration for work performed; and
- I will provide the parties with access to all information at my disposal regarding the investigation, whether such information is favourable or not.



Signature: Paulette Jacobs

2 APPLICANT / PROPONENT

2.1 Details

Company:	Transalloys (Pty) Ltd
Registration Number:	2007/004433/07
Postal address:	P.O. Box 856 eMalahleni 1035
Physical address:	Old Clewer Road (R572) eMalahleni
Telephone number:	+ 27 (0) 13 693 8000 / 8078
Fax number:	+ 27 (0) 13 659 7473 / 7173
Contact person:	Mr Ephraim Monyemoratho Cellular number: 013 693 8078 Email address: ephraimm@transalloys.co.za

3 PROPERTY

3.1 Details

Province:	Mpumalanga
District Municipality:	Nkangala
Local Municipality:	eMalahleni Environmental and Waste Management Contact: Ms Tsibiso Mashiloane (Secretary) Telephone number: 073 925 1231 / 013 690 6451 Email address: environmental@emalahleni.gov.za NkabindeE@emalahleni.gov.za
Ownership:	Transalloys (Pty) Ltd 2007/004433/07 Title deed: T9949/2008 (registered 1 July 2008)
Land use:	Industrial – Ferro-Alloy (Manganese)
Surrounding land uses:	Agriculture, residential, industrial and mining
Farm & portions:	Farm: Schoongezicht 308 JS Portions: Remaining extent of portion 24
SG numbers:	TOJS00000000030800024
Size:	Remaining extent of Portion 24: 112.2585ha Fe-Cr waste disposal facility (WDF): 1.6ha
GPS:	25° 53' 23.33" South & 29° 07' 21.25" East
Surrounding towns:	Clewer: 1.5km south Kwa-Guqa: 4km north east eMalahleni: 20km east
Roads & access:	N4 highway between Pretoria and Nelspruit (Mbombela): 1.5 km north N4 via the Mathews Phosa Street (Clewer) off-ramp. R104, left onto R572 - Old Clewer Road, Transalloys entrance right WDF on right of entrance road before plant.

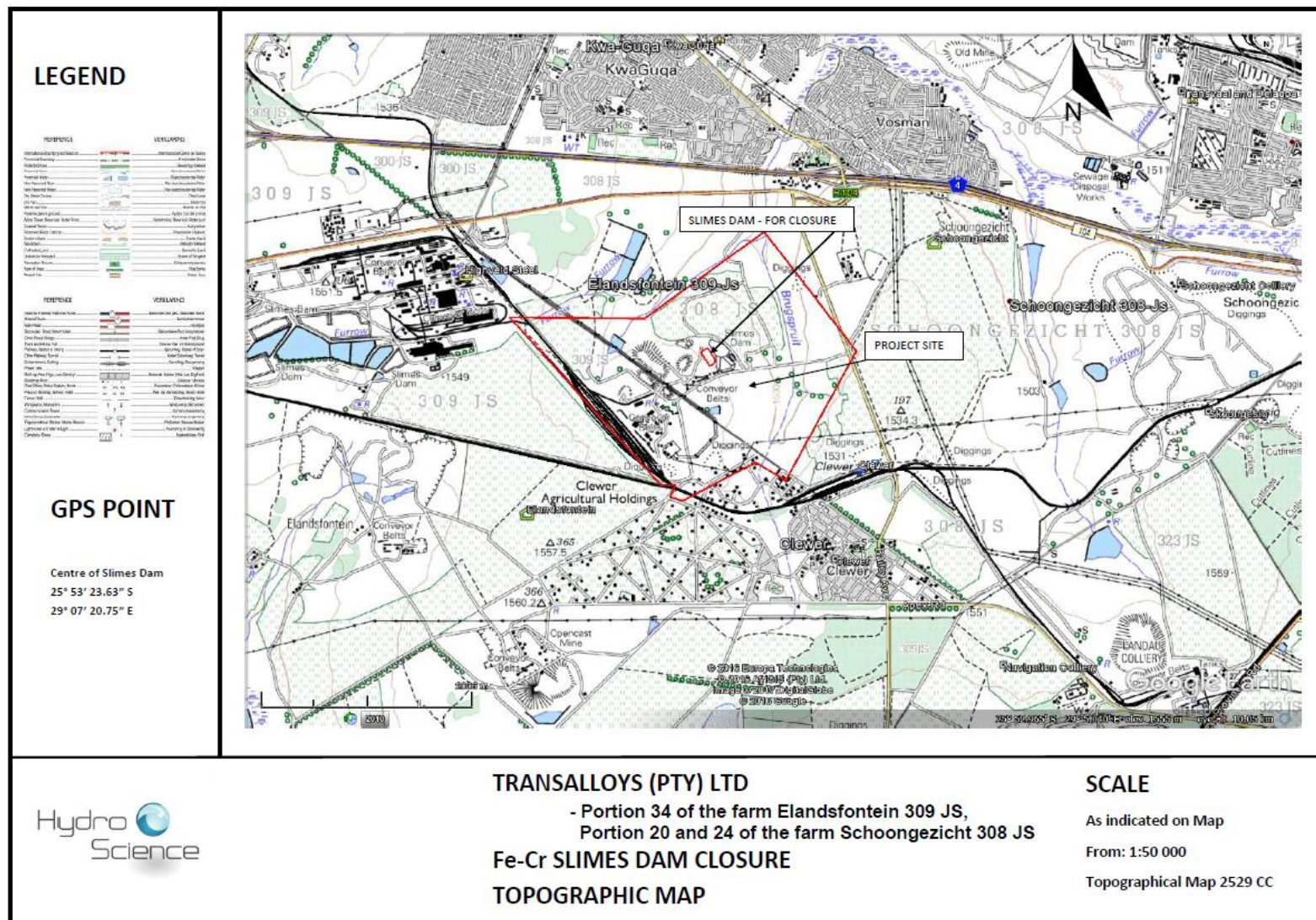


Figure 3-1: Transalloys locality

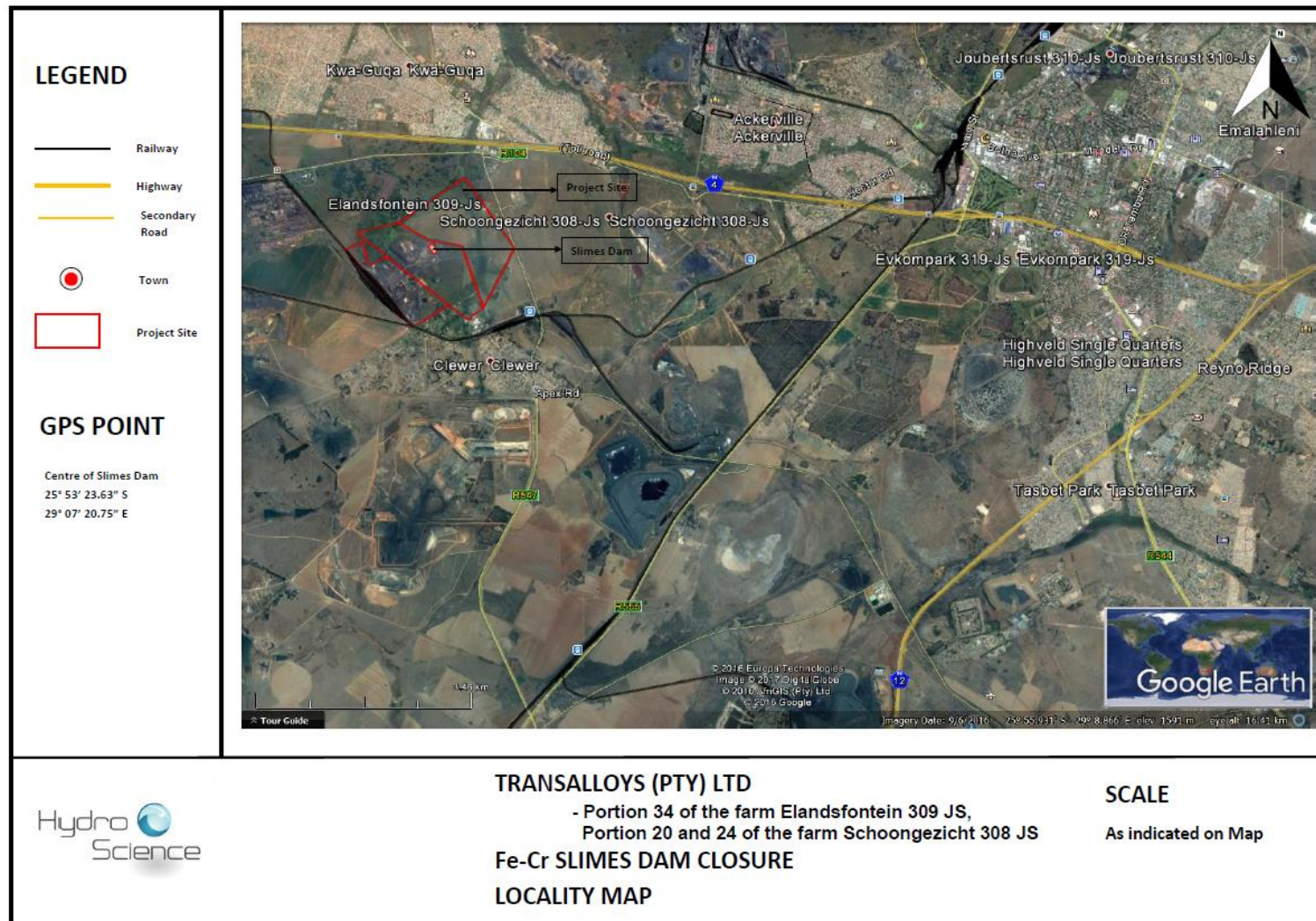


Figure 3-2: Locality of Transalloys property and FeCr WDF on the property

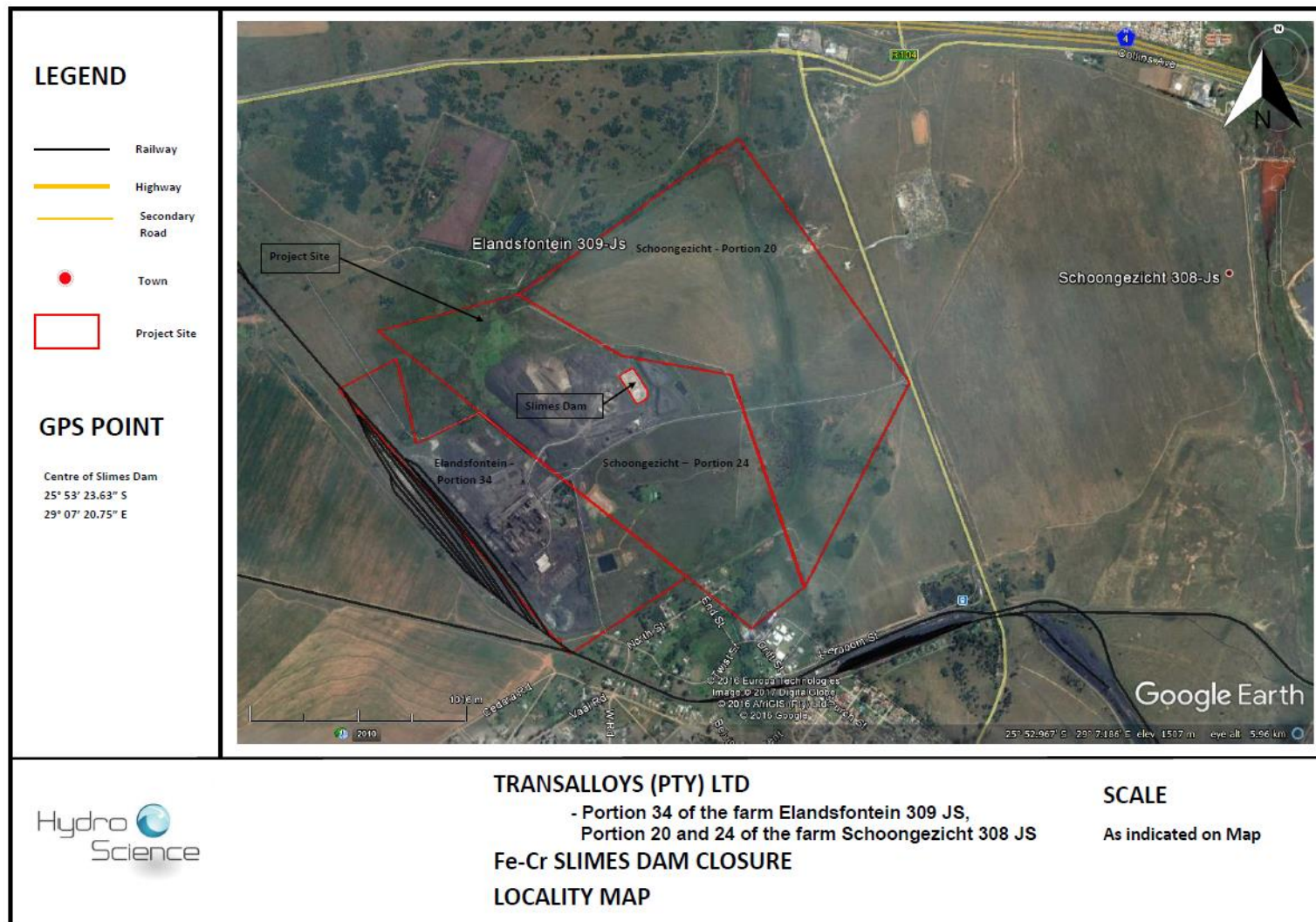


Figure 3-3: Fe-Cr WDF on the Transalloys property

4 PROJECT

4.1 Description

Title:	Proposed Decommissioning and Closure of the Fe-Cr Waste Disposal Facility at Transalloys (Pty) Ltd in eMalahleni (Witbank) within Nkangala District Municipality, Mpumalanga Province
Historical context:	The Fe-Cr WDF was established in 2006/7 when material was reprocessed historically (by the previous operator: pre-2008). A separate storage and disposal facility was required for the Fe-Cr material which was produced then. This Fe-Cr facility has not been operated / used by Transalloys (Pty) Ltd for disposal for more than ten (10) years.
Legal status quo:	The Fe-Cr facility had a Section 20 permit (Permit number 12/9/11/P4 dated 26 June 2007) issued in terms of the Environment Conservation Act (ECA), 1989 (Act 73 of 1989), as amended.
Previous application:	An application (Ref: 12/9/11/L73488/6) and Basic Assessment was conducted in 2017, with the final Basic Assessment Report (BAR) submitted to the Competent Authority (Department of Forestry, Fisheries & Environment (DFFE)) in July 2017 for a decision. The decision probed a further need for the revision of the civil designs for the Fe-Cr facility. Due to the considerable time that has lapsed prior to a final decision being made on the application, the applicant considered it necessary to reapply for the decommissioning of the facility and provide stakeholders and interested and affected parties with a further opportunity to participate in the application process.
Purpose of application / process:	To obtain a waste management license (WML) for the decommissioning and closure of the Fe-Cr WDF as part of Transalloys' on-going rehabilitation of its site to minimise potential future impacts on the environment.
Reason for decommissioning & closure:	Since Transalloys has not been producing Fe-Cr for the last 20 years, the Fe-Cr facility is not required to remain active. Transalloys (Pty) Ltd intends to decommission and/or permanently close this facility as it currently remains an environmental liability.

Closure objective:	To create a long-term stable landscape (prevent erosion, subsidence & collapse) with little to no maintenance. To prevent or minimise adverse long-term environmental impacts.
Waste material volume and footprint:	Refer to Promap Aerial LiDAR Survey, 2020. <u>Volume:</u> 42 978.9 m ³ <u>Footprint area:</u> 1.6ha
Location:	Centre: 25° 53' 23.33" South & 29° 07' 21.25" East Corners: 25° 53' 20.24" South; 29° 07' 21.05" East 25° 53' 21.31" South; 29° 07' 18.90" East 25° 53' 21.90" South; 29° 07' 18.63" East 25° 53' 26.45" South; 29° 07' 21.45" East 25° 53' 25.99" South; 29° 07' 22.79" East 25° 53' 25.08" South; 29° 07' 23.56" East 25° 53' 23.97" South; 29° 07' 23.49" East
Waste material character:	<u>Waste Classification and Management Regulations: GNR 634 of 23 August 2013:</u> Type 3 waste due to Total Concentration Threshold (TCT) 0 exceedances for Barium (Ba), Hexavalent Chrome (CrVI) and Manganese (Mn) as well as Chromium (Cr) and Hexavalent Chromium (CrVI) exceedances for the Leachable Concentration Threshold (LCT) 0. <i>The Leachable Concentration (LC) represents the mobile component of the material that can impact groundwater quality. Therefore, manage with care, due to the presence of hexavalent chromium (see below).</i>
Existing design and infrastructure:	<u>Material:</u> Fines section: particles < 150 um Coarse section: particles 150 um – 25mm <u>Lining:</u> Enviromat X800 Geosynthetic clay liner 1mm HDPE liner taken over starter wall Impermeable compacted liner, modified with 7% OPC (150mm) Base preparation layer (150mm in-situ rip and re-compact) 150 mm soil protection layer <u>Water management:</u> Stormwater diversion trench Effluent trench (HDPE lined drain) Penstock with concrete decant pipe Return water dam and pump

	<p><u>Other:</u> Slurry delivery pipeline (no longer functional) 6m wide started wall 100mm diameter perforated leakage detection pipe Gravel leachate collection 150mm leakage detection layer (gravel and drainage pipes) 300mm leachate collection layer (drainage pipes with valves)</p>
Hexavalent Chromium:	<p>Chromium(VI), Cr(VI), chromium 6 refers to chemical compounds that contain the element chromium in the +6 oxidation state (thus hexavalent). Virtually all chromium ore is processed via hexavalent chromium, specifically the salt sodium dichromate. Industrial uses of hexavalent chromium compounds include chromate pigments in dyes, paints, inks, and plastics; chromates added as anticorrosive agents to paints, primers, and other surface coatings; and chromic acid electroplated onto metal parts to provide a decorative or protective coating.</p>
Human health risk of Cr(VI):	<p>Inhaled hexavalent chromium is recognized as a human carcinogen. Workers who are exposed to hexavalent chromium are at increased risk of developing lung cancer, asthma, or damage to the nasal epithelia and skin.</p>
Toxicity of Cr(VI):	<p>Hexavalent chromium compounds are genotoxic carcinogens resulting in mutagenic damage in the body. Ingestion of chromium(VI) through drinking water has been found to cause cancer in the oral cavity and small intestine.¹ It can also cause irritation or ulcers in the stomach and intestines, and toxicity in the liver. Liver toxicity shows the body's apparent inability to detoxify chromium(VI) in the Gastro-Intestinal tract where it can then enter the circulatory system.</p>
Water quality status quo:	<p>Artesium (2021) indicates that the latest available hydrochemical data from March 2019 to June 2021, shows no Chromium or Hexavalent Chromium detected in the groundwater or surface water monitoring points in the Burgspruit downstream of the Fe-Cr facility.</p>
Financial - Capital layout:	<p>R20 million</p>
Protection of existing liner	<p>HDPE 1.0 mm generally carry a 10-year warrantee although many liners have proven to last must longer than the warranty period. It is therefore critical that the current exposed liner be covered (Redco, 2021).</p>

<p>Cover material:</p>	<p>Refer to Knight Piesold Consulting report, 2016. The cover and capping material will be sourced from the potential cover and capping borrow pit area identified on the Transalloys property (east of the plant infrastructure towards the Brugspruit).</p> <p><u>Soil required for cover:</u> Fine-grained impermeable soil to prohibit surface water inflow.</p> <p><u>Soils found:</u></p> <ul style="list-style-type: none"> • Colluvial soil that varies from fine- to coarse-grained. • Residual sandstone soil: coarse-grained of variable distribution and thickness. • Residual shale: fine-grained with low coefficient of permeability. <p><u>Availability and suitability:</u> Residual shale is suitable for capping material. Area of availability: 25 000m² Volume available: 50 000m³ Remove colluvium cover (1 – 2.4m) and discard.</p>
<p>Closure activities and design (Redco, 2021):</p>	<ul style="list-style-type: none"> • Seal/demolish existing penstocks. <ul style="list-style-type: none"> ○ Grout at inlet and outlet pipes before reshaping. • Reshape slopes to reduce the outer slope angle and create a free draining landform that covers the existing HDPE lined drain but remain within the lined boundary. <ul style="list-style-type: none"> ○ Top area to slope at a gradient of 5% and 11% for the North and South sections, respectively to allow free draining of surface water run-off to the new peripheral collector drain. ○ The slopes on the east side will be reshaped to a slope of 20% (1V:5H) and run-off will be collected in an earth drain running along the eastern side of the WDF. • Import and place 300mm slag layer over reshaped material to act as capillary break layer. • Install a Geosynthetic Clay Layer (GCL) with a hydraulic conductivity or permeability of 2.56×10^{-11} m/s to function as an impermeable layer preventing ingress of storm water into the rehabilitated WDF. <ul style="list-style-type: none"> ○ Leakage rate of 2.3224 l/ha/day which is below 15 l/ha/day as recommended by the Technical Advisory Practice Note: Capping Closure of Waste Management Facilities and Pollution Point Sources. • Import and place 300mm compacted soil (6 kN/m²) layer with a hydraulic conductivity or

	<p>permeability of 1.17×10^{-09} m/s over GCL - ensure sufficient confined pressure on GCL. This relatively low permeability of the cover material placed over the GCL would greatly reduce the volume of the ingress of run-off / recharge penetrating up to the GCL in the final installed capping, especially along the slopes.</p> <ul style="list-style-type: none"> • Place 300mm growth medium (topsoil) layer - partially mixed with coarser material to reduce erodibility. <ul style="list-style-type: none"> ○ Long term stability was evaluated by determining the soil quality and erosion potential of the capping layer. ○ Suitable soil for erosion protection and vegetation growth (growth medium) was obtained from the Knight Piesold study (see cover material details). • Establish (seed with) indigenous vegetation (not deep-rooted species, i.e. grasses) at 20kg/ha after soil amelioration. Include following species: <ul style="list-style-type: none"> ○ Eragrostis tef ○ Melinis repens ○ Enneapogon cenchroides ○ Heteropogon contortus ○ Cynodon dactylon ○ Chloris gayana ○ Digitaria eriantha ○ Eragrostis curvula ○ Hyparrhenia hirta • Install storm water management and drainage infrastructure. <ul style="list-style-type: none"> ○ Two (2) peripheral drains to convey water around the reshaped WDF. ○ The watershed line is located in the South West corner of the rehabilitated facility. ○ The top of the WDF is reshaped to a 6% gradient from the east to the west. ○ Run-off from the top will be collected in an earth drain, Drain 1, running along the west side and north side of the rehabilitated facility. ○ Run-off is considered clean and will be discharged at the north east corner of the facility. ○ The east and south run-off will be conveyed via an earth drain, Drain 2, along the south and east side of the facility and will intersect drain 1 and discharge at the north east corner. ○ Run-off will therefore be conveyed via two earth drains (Drain 1 and Drain 2). ○ Runoff from the rehabilitated FeCr WDF can be regarded as clean and can therefore be discharged to the receiving environment.
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- To continue monitoring the discharge from the underdrainage system, the discharge pipes currently located through the HDPE lined starter wall will be extended and discharge into a HDPE half pipe which will convey dirty water to the existing PCD.
- Once no seepage is visible, the drainage pipe will be closed (cut off along the rehabilitated slope and plugged using a cementitious grout) and no dirty water is expected to be discharged from the facility.

GLC Material specification (Redco, 2021)

		M A R V (min average roll value)		Factory QC Test Frequency (m ²)	
Geotextile Cover Layer	PP nonwoven, white	g/m ²	200	4 000	ASTM D5261
Geotextile Carrier Layer	PP slit film, woven	g/m ²	110	4 000	ASTM D5261
	PP nonwoven, white	g/m ²	N/A		
	Composite	g/m ²	N/A		
Bentonite Layer (bentonite mass at 0% moisture content)	Quality	Montmorillonite content > 75 %, Sodium Cation Na ⁺ > 60 %			
	Sodium Bentonite Powder	g/m ²	3 700	4 000	ASTM D5993
	Swell Index (minimum)	ml/2 g	≥ 24	35 tonnes	ASTM D5890
GCL Mass per Unit Area		g/m ²	4 010	4 000	ASTM D5993
Bonding Process		Needlepunched and Thermal Lock™			
Grab Strength	MD	N	600	4 000	ASTM D4632
	XD	N	600		
CBR Burst	Strength	N	1 400	20 000	ISO 12236
	Elongation	%	≥ 15		
Hydraulic Conductivity (maximum)		m/s	≤ 2.56 x 10 ⁻¹¹	25 000	ASTM D5887
Index Flux (pre-hydration thickness 4.5 mm)		m ³ /m ² /s	6.0 x 10 ⁻⁹	25 000	ASTM D5887
Peel Strength (excl Edge Treatment)		N/m	> 360	4 000	ASTM D6486
Edge Treatment		800 g/m ² x 300 mm self-sealing bentonite edge enhancement			
Roll Size (standard)	width x length	m	5.35 x 40	1 % tolerance on width and length	
	diameter	cm	58	Nominal	
	Average roll mass	kg	1 040	Typical	

Final landform (Redco, 2021):

Reshape the slopes and top area covering the existing lined drain. Fill the top to create a sloped surface towards the west. Top area to slope at a gradient of 5% and 11% for the North and South sections, respectively to allow free draining of surface water run-off to the new peripheral collector drain. Slope eastern slope to a gradient of 20%. Cover entire reshaped dump, including the new toe drain, with topsoil and vegetation to reduce erosion and create a long term free draining landscape.

The reshaping will cover the exiting HDPE lined peripheral drain but will remain within the HDPE lined boundaries of the facility.

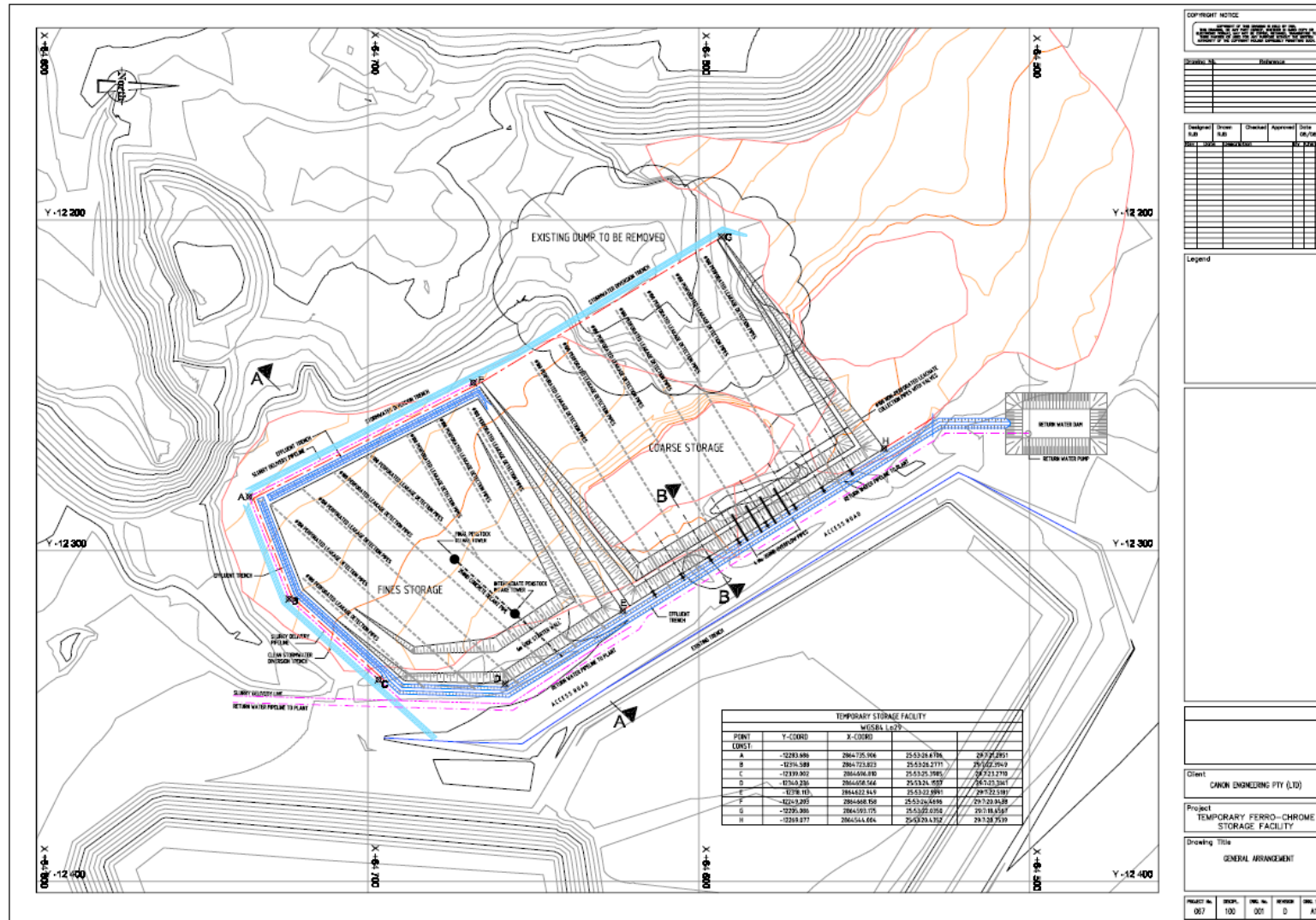


Figure 4-1 Design (Transalloys)

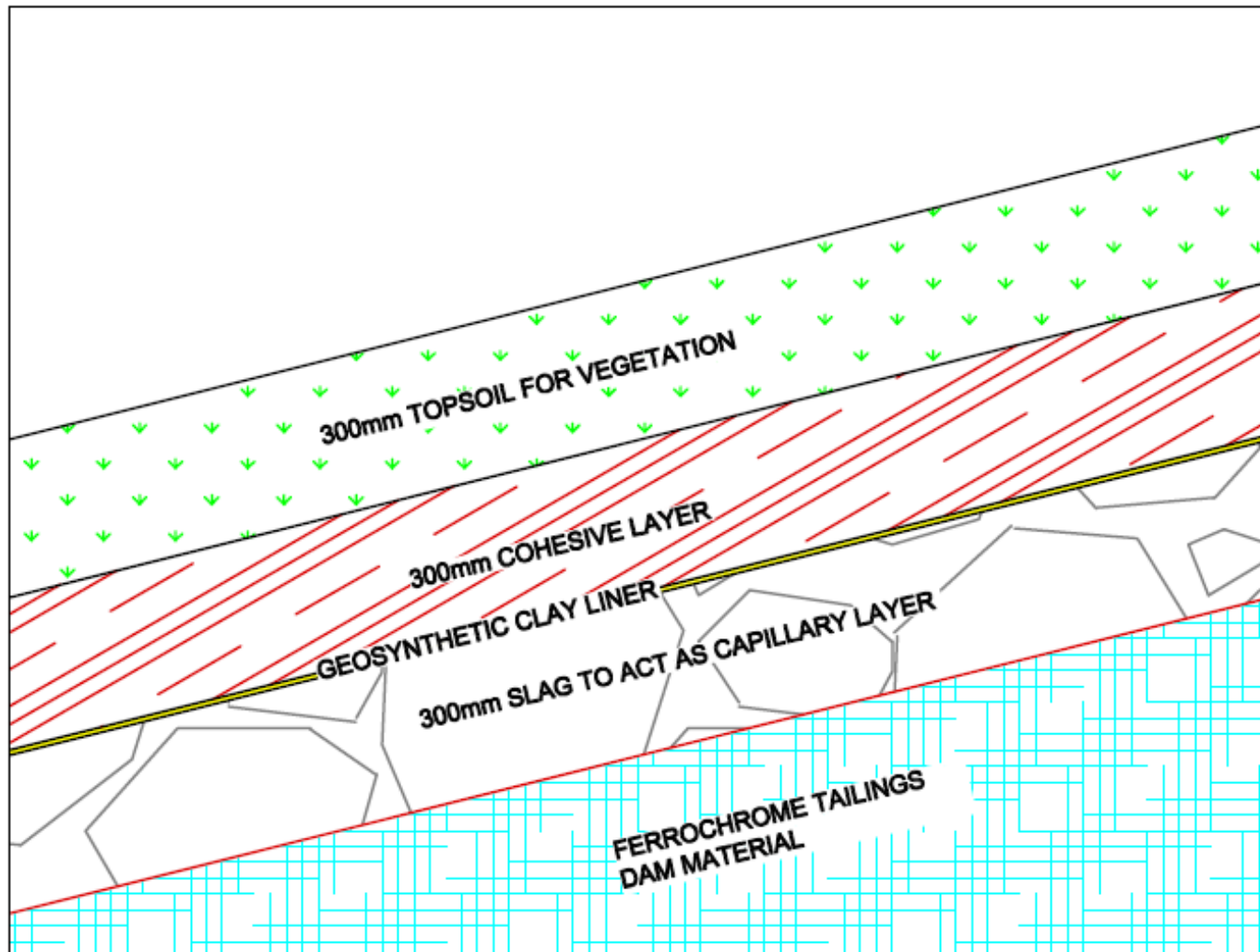


Figure 4-2 Proposed capping (Redco, 2021)

Table 4-1: Engineering parameters (Redco, 2021)

Parameter:	Unit:	Waste material:	Cover material: (TP114 & TP 155)
Internal effective friction angle	Phi °	43.2	36.5
Cohesion	[kPa]	3	5
Material passing 5mm	%	97	52
Unit weight of water (λ_w)	kN/m ³	10	10
Specific gravity (G)		2.175	2.640 & 2.567
Degree of saturation (S)		0.53	0.490 & 0.420
Void ratio (e)		0.93	0.600 & 0.670
Solid unit weight (λ_w)	kN/m ³	13.8	18.3 & 17

Slope stability for 1V:5H slope on south east corner (Geostudio, Slope/W a 2D analysis, 2018 version)

4.2 Screening

The DFFE screening tool was not used to generate a screening report since decommissioning and closure is not listed on the classification. However, the following is known about the site:

Aspect:	Sensitivity:	Requirement from other recent studies conducted on the site:
Environmental Management Framework (EMF)		Olifants EMF: EMF for Olifants and Letaba Rivers Catchment Areas – Zone A Highveld / Energy Hub Area
		Air Quality Priority Area Highveld Priority Area Project (decommission, close, cover and cap) will impact air quality positively (dust reduction)
Agricultural	High & Medium	The project area has been used for industrial purposes for many years (> 13 years). Sections of the Transalloys property (non-operational areas) are still used for agricultural purposes (livestock).
Animal	Low	Industrial site with industrial and human activity not allowing animals to naturally occur.
Aquatic biodiversity	Low	Industrial site. Brugspruit & Brugspruit tributary > 500m away
Civil aviation	Medium	8 -15 km of civil aviation aerodrome. No impact on project. Project has no impact on aerodrome > 8km away.
Plant	Medium	The site, a WDF, is void of vegetation.
Defence	Low	No impact.
Terrestrial biodiversity	Very high	Vulnerable ecosystem.

Aspect:	Sensitivity:	Requirement from other recent studies conducted on the site:
		Industrial site which is developed and operational and therefore no ecosystem present / remaining on site.
Archaeological and Cultural Heritage	Very high	<p>Grade II (provincial) Heritage site: The old Clewer Railway Station, dating back to the days of the NZASM Railway in the 1890's. The site is located 1.6km south-east of the WDF site.</p> <p>Grave yard: The grave yard was identified in 2015 during the larger site assessment. It is located 500m east of the WDF site.</p> <p>No impact – closure of existing WDF.</p> <p>See Appendix D5, Archaetnos exemption letter</p>
Palaeontology	Very high	<p>Shale and sandstone of the Vryheid Formation of the Ecca Group of the Karoo Supergroup underlie the study site. The sedimentary rocks of the Vryheid Formation are highly fossiliferous in places. The uppermost part of the underlying rocks is highly weathered, however, which diminishes the possibility of finding fossils of good quality in the study area.</p> <p>No impact – closure of existing WDF. See palaeontological assessment exemption in Appendix D</p>

4.3 Need and desirability

Addressing need and desirability is a way of ensuring sustainable development. Therefore, the project must be ecologically sustainable and socially and economically justifiable.

Economic Investment or Capital Layout:	R20 million
Jobs created:	25 jobs
Need & desirability	Since Transalloys has not been producing Fe-Cr for the last 20 years, the Fe-Cr facility is not required to remain active. Transalloys (Pty) Ltd intends to decommission and/or permanently close this facility as it currently remains an environmental liability.
Fatal flaws:	No fatal flaws were identified.
Protection of existing liner:	HDPE 1.0 mm generally carry a 10-year warrantee although many liners have proven to last much longer than the warranty period. It is therefore critical that the current exposed liner be covered (Redco, 2021).

5 LEGAL FRAMEWORK

5.1 Constitution of the Republic of South Africa (CRSA)

The Constitution of the Republic of South Africa (CRSA), 1996 (Act 108 of 1996) places a duty on the State to protect the environment. Section 24 states that:

“Everyone has the right

- a. to an environment that is not harmful to their health or well-being; and
- b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
 - i. prevent pollution and ecological degradation;
 - ii. promote conservation; and
 - iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The right in the CRSA is given effect in several articles of national legislation including the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) as amended.

5.2 National Environmental Management Act (NEMA)

The National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) as amended is the overarching environmental legislation in South Africa.

5.2.1 Sustainable development

The principle of Sustainable Development has been established in the CRSA and given effect by the NEMA. Section 1(29) of NEMA states that sustainable development means the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations. Thus, Sustainable Development requires that:

- The disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied.
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied.
- That the disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied.
- That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner.
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.
- Negative impacts on the environment, on people’s environmental rights be anticipated; and, prevented, and where they cannot altogether be prevented, are minimised and remedied.

Duty of care is addressed in Section 28 of the NEMA.

In terms of sustainable development:

- ***The disturbance of ecosystems, loss of biological diversity and the disturbance of landscapes and sites that constitute the nation’s cultural heritage are avoided since the project entails the closure of an existing WDF.***

- ***Pollution and degradation of the air environment in an Air Quality Priority Area (Highveld Priority Area) will be reduced through the closure of an existing WDF (reduction in dust).***
- ***Pollution and degradation of the water environment will be reduced through the closure of an existing WDF.***
- ***Waste cannot be avoided in an industrial process but this waste material is of a historical nature and no longer produced and therefore the facility needs to be closed.***
- ***Potential negative impacts identified will be managed through the Environmental Management Programme (EMPr) – see Section 10.***

5.2.2 NEMA regulations

Government Notice Regulation (GNR) 982, 983, 984 and 985 of 4 December 2014 contain the latest regulations pertaining to Environmental Impact Assessment (EIA) under sections 24(5), 24M and 44 of the NEMA. These were amended / updated on 7 April 2017 under GNR 324, 325, 326 & 327.

GNR 982 as amended / updated in GNR 326 stipulate requirements in terms of processes to be followed and information to be included in documentation.

The activity identified for this project, which requires a WML, is contained in GNR 921 as amended in terms of NEMWA and requires a Basic Assessment Process (Category A).

5.3 National Environmental Management: Biodiversity Act (NEMBA)

5.3.1 Commitment to biodiversity conservation

Although South Africa became a signatory to the Convention of Biological Diversity in 1998, the more recent enactment of national legislation has affirmed our country's commitment to biodiversity and conservation as required in the CRSA. The National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004) has been promulgated by the South African President and was published in the Government Gazette in June 2004 (Volume 467; No. 26426). One of the objectives of this Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and to ensure the sustainable use of indigenous biological resources.

The Act, in protecting biodiversity, deals with:

- the protection of threatened ecosystems and species;
- the control of alien invasive species;
- the control of genetically modified organisms; and
- regulates bioprospecting.

As with NEMA, NEMBA incorporates and gives effect to international agreements relating to biodiversity.

5.3.2 Protection of threatened ecosystems and species

Ecosystems that are Critically Endangered, Endangered or Vulnerable can be listed in terms of Section 52 of the Act as threatened ecosystems at both national and provincial level. For example, Critically Endangered ecosystems are defined in the Act as being 'ecosystems that have undergone severe degradation of ecological structure, function or composition as a result

of human intervention and are subject to an extremely high risk of irreversible transformation'. Importantly, any land-use change application occurring within an ecosystem listed as Critically Endangered or Endangered will automatically require environmental authorisation.

The terrestrial biodiversity theme indicates a vulnerable ecosystem. The WDF is however, void of vegetation.

Threatened or Protected Species Regulations of 2013 (GNR388 of 2013): Part 2 of NEMBA provides for listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival. In February 2007, the Minister of Environmental Affairs and Tourism published a list of Critically Rare, Endangered, Vulnerable and Protected Species, according to Section 56(1) of the Act, which was updated again in 2013.

5.3.3 Control of alien invasive species

The list of alien and invasive species is intended to provide a legal framework to manage and control alien species that are considered invasive and that have the potential to threaten biodiversity, water resources and agricultural potential. NEMBA has identified all species that should be considered as alien or invasive species, as well as the restricted activities relating to each species. It is required by law (from 1 October 2014), for landowners to investigate the type and extent of alien invasive species growing on their property and to implement an effective control and eradication management plan.

116.26km² of tertiary catchment B11 is covered under alien invasive vegetation (EMF, 2009). Alien and invasive species are found on the Transalloys property. Refer to Alien and Invasive Species Regulations, 2014 (GNR598). An alien invasive eradication programme has been established by Transalloys to control alien and invasive vegetation.

5.4 National Environmental Management: Waste Act (NEMWA)

5.4.1 General

In terms of the National Environmental Management: Waste Act (NEMWA), 2008 (Act 59 of 2008), the following is relevant to Transalloys in general:

- DEA's Draft guidelines on the Separation of Waste at Source, 2018.
- GNR 926 of 29 November 2013. National Norms and Standards for the Storage of Waste. The storage of waste material on site has to comply with these Norms and Standards.
- GNR1093 of 11 October 2017. National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, Screening or Bailing of General Waste.
- GNR 634 of 23 August 2013. Waste Classification and Management Regulations (WCMR). Refer to Waster classification done by Artesium Consulting Services, Reference 2021-00048 V3, dated 6 September 2021.
- GNR 635 of 23 August 2013. National Norms and Standards for the Assessment of Waste for landfill disposal.
- GNR331 of 2 May 2014. National Norms and Standards for the remediation of contaminated land and soil quality.
- WML 12/9/11/L261/6 for Mn slimes and slag dump. See Appendix C for copy of WML.

- Section 20 permit, Permit number 12/9/11/P4 dated 26 June 2007, issued in terms of the Environment Conservation Act (ECA), 1989 (Act 73 of 1989), as amended for the Fe-Cr WDF.

5.4.2 Listed activities applicable for this project

The following listed activities require a WML for this project:

GNR & Date	Activity Number and Description	Project Description
GNR 921 of 2013	Activity A(14): The decommissioning and closure of a facility for a waste management activity listed in Category A or B of this schedule.	Proposed Decommissioning and Closure of the Fe-Cr Waste Disposal Facility at Transalloys (Pty) Ltd in eMalahleni (Witbank) within Nkangala District Municipality, Mpumalanga Province

5.5 National Environmental Management: Air Quality Act (NEMAQA)

In terms of the National Environmental Management: Air Quality Act (NEMAQA), 2004 (Act 39 of 2004), the following is relevant to Transalloys in general:

- Location within Highveld Priority Area in terms of air quality.
- Existing AEL 17/04/AEL/MP312/11/05 as amended in 2019 and valid to 2024 (see Appendix C for copy of AEL)
 - Category 4: Metallurgical Industry.
 - Existing sub-categories:
 - Category 4.6: Basic Oxygen Furnaces in steel making industry
 - Category 4.9: Ferro-alloy Production with Mn using heat
 - Category 4.11: Agglomeration Operations – production of pellets or briquettes
 - Category 4.20: Slag Processes
 - New sub-category added in terms of environmental authorisation 1/3/1/16/1N-272 dated 30 August 2021:
 - Category 4.5: Sinter Plants (relates to this application and process) – agglomeration of fine ores using heat

5.6 National Water Act (NWA)

5.6.1 Water uses

The National Water Act (NWA), 1998 (Act 36 of 1998) Section 21 defines water use as:

- taking water from a water resource.
- storing water.
- impeding or diverting the flow of water in a watercourse.
- engaging in a stream flow reduction activity contemplated in section 36.
- engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1).
- discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.
- disposing of waste in a manner which may detrimentally impact on a water resource.

- (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.
- (i) altering the bed, banks, course or characteristics of a watercourse.
- (j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.
- (k) using water for recreational purposes.

The project does not trigger any new water uses. Transalloys has an existing Water Use License (WUL) for Section 21 (a), (g) & (j).

5.6.2 Legal requirements

The NWA states in Section 22 (1) that a person may only use water –

- (a) without a licence –
 - (i) if that water use is permissible under Schedule 1;
 - (ii) if that water use is permissible as a continuation of an existing lawful use; or
 - (iii) if that water use is permissible in terms of a general authorisation issued under section 39;
- (b) if the water use is authorised by a licence under this Act; or
- (c) if the responsible authority has dispensed with a licence requirement under subsection (3).

Transalloys has a Water Use License (WUL), Licence 16/2/7/B100/B175 for Section 21 (a), (g) & (j). See Appendix C for copy of WUL.

5.7 Conservation of Agricultural Resources Act (CARA)

Conservation of agricultural potential:

The aim of the Conservation of Agricultural Resources Act (CARA), 1983 (Act 43 of 1983) is to provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

To achieve this aim, the following objectives are included:

- To provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land;
- The combating and prevention of erosion and weakening or destruction of the water sources, and
- The protection of the vegetation and the combating of weeds and invader plants.

Combating weeds and invader plants:

In 1984, regulations were passed in terms of the CARA, regulations declaring about 50 species “weeds” or “invader plants”. On 30 March 2001, the Minister of Agriculture promulgated an amendment to these regulations. This amendment then contained a more comprehensive list of species that are declared weeds and invader plants dividing them into three (3) categories. These categories are as follows:

- Category 1: Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible.
- Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30m of the 1:50 year flood line of any watercourse or wetland.
- Category 3: Declared invader species that may remain, but must be prevented from spreading. No further planting of these species is allowed.

In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien invasive vegetation species on their properties. An alien invasive eradication programme has been established by Transalloys to control alien and invasive vegetation.

5.8 National Heritage Resources Act (NHRA)

5.8.1 Legislation

The National Heritage Resources Act (NHRA), 1999 (Act 25 of 1999) requires protection of the following cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years;
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography;
- c. Objects of decorative and visual arts;
- d. Military objects, structures and sites older than 75 years;
- e. Historical objects, structures and sites older than 60 years;
- f. Proclaimed heritage sites;
- g. Grave yards and graves older than 60 years;
- h. Meteorites and fossils; and
- i. Objects, structures and sites of scientific or technological value.

The national estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance;
- b. Places to which oral traditions are attached or which are associated with living heritage;
- c. Historical settlements and townscapes;
- d. Landscapes and features of cultural significance;
- e. Geological sites of scientific or cultural importance;
- f. Archaeological and paleontological importance;
- g. Graves and burial grounds;
- h. Sites of significance relating to the history of slavery; and
- i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.).

The Fe-Cr WDF area is within an existing operational area. Grade II heritage site (Clewley Railway Station) is 1.6km away and the grave yard is located 500m from the WDF and no impacts are anticipated with the closure project. Refer to Appendix D5 – Archaeology exemption letter

5.9 Other documents

The following documents were also considered:

- Department of Environmental Affairs (DEA), 2017. Integrated Environmental Management Guideline. Guideline on need and desirability. ISBN 978-0-9802694-4-4.
- DEA, 2017. Public participation guideline in terms of NEMA, 1998 EIA regulations. ISBN 978-0-9802694-2-0.
- Olifants Environmental Management Framework (EMF).
- Emalahleni Local Municipality Solid Waste Management by-laws, No. 2632, 13 January 2016.
- Emalahleni Local Municipality Noise Control by-laws, No. 2632, 13 January 2016.

- Emalahleni Local Municipality Air Quality Management by-laws, No. 2760, 21 September 2016.
- Emalahleni Spatial Development Framework (SDF).
- Emalahleni Land Use Scheme, 2020.

5.10 Supporting information

Appendix C contains copies of the existing licenses:

- WUL 16/2/7/B100/B175 for Section 21 (a), (g) & (j)
- WML 12/9/11/L261/6 for Mn slimes and slag dump
- AEL 17/04/AEL/MP312/11/05 for Category 4

6 ENVIRONMENTAL SETTING

6.1 Socio-economic Overview

Province:	Mpumalanga
District:	Nkangala District Municipality (NDM)
Local municipality:	eMalahleni
Spatial:	<p>The eMalahleni Local Municipality is strategically located in terms of the provincial context and transport network. It is situated in close proximity to the City of Johannesburg, City of Tshwane and Ekurhuleni Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways.</p> <p>The southern areas of the eMalahleni Local Municipality form part of the region referred to as the Energy Mecca of South Africa, due to its rich deposits of coal reserves and power stations. The southward road and rail network connect the eMalahleni area to the Richards Bay and Maputo harbours, offering export opportunities for the coal reserves.</p> <p>In terms of the overall spatial structure, the eMalahleni Local Municipality can be described as a rural area, consisting of large farms, dispersed urban settlements, coal mines and power stations. A dominating feature in terms of the spatial structure is the transport network; specifically the N4 freeway and adjacent railway line which transverse the area from east to west and constitute the Maputo Corridor. The point of convergence of the N4 and N12 freeways and the railway lines that run parallel to these roads is a focal point in the spatial structure. eMalahleni town and its extensions have developed in a linear pattern along these freeways and railway lines, with the Central Business District (CBD) located north of the convergence point. There are various secondary roads in the area which provide strong north-south linkages. The dams and rivers in the area are also significant form-giving elements in the spatial structure. The rich coal deposits and coal mines throughout the area pose physical constraints to settlement development and expansion.</p> <p>The development pattern of the municipal area can be described as fragmented, due to the following attributes:</p> <ul style="list-style-type: none"> • The previous dispensation of separate development based on race; • Large areas within the municipal area are undermined or have mining rights. A good example of this is the area between the eMalahleni CBD and Kwa-Guqa, which resulted in the physical separation of these areas;

	<ul style="list-style-type: none"> • The Eskom power lines on the boundaries and within Kwa-Guqa hampers urban development within Kwa-Guqa; • Wetlands in the area between the eMalahleni CBD and Kwa-Guqa which pose a constraint to development in this area; • The Witbank Dam and Olifants River east of eMalahleni pose natural barriers for development in an easterly direction; and • The two freeways (N4 and N12) divide the eMalahleni urban areas in three (3) separate parts and hamper traffic flow between these areas.
<p>Demographics:</p>	<p><u>Area:</u> 2 677.67 km²</p> <p>Statistics South Africa: Population was 395 466 in 2011. Population was 455 228 in 2016. This represents a 3.2% growth rate per annum giving an estimate of 500 343 people in 2019. Population of 707 530 estimated for 2030. Households increased from 119 874 in 2011 to 150 420 in 2016 with household size declining from 3.3 to 3 over the same period. This is the third largest population in the province.</p> <p>Youth (15 – 34 years) make up 43.1% of population. Males are 52.9% of the population. Females are 47.1% of the population.</p> <p>(eMalahleni.gov.za)</p>
<p>Education:</p>	<p>25.5% increase in 20+ population from 2011 to 2016. No schooling declined from 14% (1996) to 5% (2016). Primary schooling declined from 20% (1996) to 10% (2016). Secondary schooling declined from 35% (1996) to 34% (2016). Matric increased from 18% (1996) to 37% (2016). Post matric declined from 10% (1996) to 8% (2016). Only one (1) satellite university in eMalahleni.</p> <p>(eMalahleni.gov.za)</p>
<p>Employment:</p>	<p>Unemployment decreased from 27.3% (2011) to 25.4% (2015) and then increased to 26.6% (2016). Poverty headcount deteriorated from 8% (2011) to 10.9% (2016).</p> <p>(eMalahleni.gov.za)</p>

<p>Health:</p>	<p>Top three (3) causes of death:</p> <ol style="list-style-type: none"> 1. Influenza & pneumonia 2. Tuberculosis 3. Other external causes of accidental injury <p>HIV prevalence rate was measured at 40.7% in 2013, the 9th highest of municipal areas in the province.</p> <p>(eMalahleni.gov.za)</p>
<p>Economy:</p>	<p>Population growth rate is higher than economic growth rate. This has a negative implication on GDP per capita, infrastructure, service delivery and job creation.</p> <p>eMalahleni contributes 45.9% of the economy of NDM (2019 Provincial Municipal Profile Report by Department of Economic Development & Tourism).</p> <p>eMalahleni is the biggest economic contributor to NDM and the second largest in the Province (after Mbombela) with 18% contribution to Provincial GDP in 2018.</p> <p>Economy was R66 billion in 2018.</p> <p>Sectors contributing (2017):</p> <ul style="list-style-type: none"> • Mining: 55% • Trade 9.1% • Community services: 8.9% • Finance: 7.9% <p>Projected GDP is 0.9% between 2018 and 2023.</p> <p>(eMalahleni.gov.za)</p>
<p>Land uses:</p>	<ul style="list-style-type: none"> • <u>Mining</u>: Coal mining is mainly conducted by opencast techniques, high extraction underground operations and conventional board-and-pillar underground operations. The coal mines provide essential fuel to the local power stations as well as to the domestic and international markets. Numerous abandoned mining operations are located towards the west and north-west of Witbank. • <u>Power stations</u>: Several large coal-fired power stations including Arnot, Hendrina, Komati, Duhva, Matla, Kriel and Kendal. These stations are all supplied from local feeder mines. Large ash disposal operations are associated with each power station. • <u>Industrial</u>: Although eMalahleni was traditionally known for coal mining and electricity production, other industries have also developed in the town, making eMalahleni a prominent industrial node. This includes metallurgical enterprises such as the production of steel, chrome and vanadium. Industries include Silicon Smelters, Glencore, Char Technologies, Bushveld Vanchem, Ferrobank Industrial area, Evraz Highveld, Ferrometals.

	<ul style="list-style-type: none"> • <u>Agricultural</u>: Crop cultivation & livestock farming. Both dryland and irrigated farmlands, with many areas in the southern and central portions producing high yields of maize. Irrigation farming of diverse crops, the largest of which is the Loskop Dam Irrigation Scheme. Intensive farming in the form of piggeries and cattle feed lots. 54.99km² of tertiary catchment B11 is under irrigation (EMF, 2009). • <u>Urban</u>: Witbank, Clewer & Kwa-Guqa
<p>Transalloys' operations:</p>	<p><u>Production processes and products</u>: The Transalloys plant manufactures silico-manganese (Si-Mn) and medium carbon ferromanganese (Fe-Mn) through processing in submerged arc furnaces. Medium carbon Fe-Mn is mainly used for alloying, especially in the manufacture of hot dipped strip and is also an important ingredient in welding rod coatings. Si-Mn combines both the deoxidation and alloying functions, which are the purposes of adding manganese to steel.</p> <p><u>Structures and infrastructure</u>: Transalloys has the following plants or process units:</p> <ul style="list-style-type: none"> • Raw material handling (railway lines and trucks, equipment, storage areas/bunkers, etc.) • Electrical furnaces for smelting and chemical reactions • Cooling systems for furnaces and compressors • Filter plant for handling dust from furnaces (baghouses) • Pelletizing plant (2) for pelletization of furnace dust from filter plant • Briquetting Plant for briquetting of ore fines, alloy fines and baghouse dust • Hot metal ladles • Alloy casting – bed casting (casting machines no longer in use) • Crushers and Screening plants (4) for sizing and separating final products • Transalloys Metal Recovery (TMR) plant and waste management facilities <ul style="list-style-type: none"> ○ Slag dump ○ Mn slimes dam ○ Fe-Cr slimes dam (not currently in use and subject of this project) • Sorting, packaging and despatch.
<p>Transalloys' socio-economic contribution:</p>	<p>Approximately R3 million is dispersed annually by Transalloys on training, social upliftment, donations and bursaries.</p> <p>More than R600 million is distributed to support industries and suppliers for the operation of Transalloys, annually.</p>
<p>Economic Investment for project:</p>	<p>R20 million</p>

Job creation:	Transalloys employs over 300 people of which 75% is black. The new project will create another 25 jobs.
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6.2 Biophysical Environment Overview

Access:	<p>N4 between Pretoria and Nelspruit (Mbombela) is located 1.5 km north of Transalloys. From the N4 take the Mathews Phosa Street (Clewer) off-ramp. Transalloys entrance is on the right along the Clewer road.</p>
Services:	<p><u>Electricity:</u> Transalloys operations utilises 33kV electricity sourced directly from Eskom. Electricity supplied to the administration building, clinic and laboratory is from the solar power plant completed (2020/21).</p> <p><u>Water:</u> Transalloys is supplied (via pipeline) with municipal water from Emalahleni local municipality (via Witbank Dam) for its domestic (workers) and industrial uses.</p> <p><u>Sewage:</u> Sewage effluent feeds into a septic tank from which sludge is emptied with a honey sucker (for off-site disposal) and the overflow feeds into one (1) HDPE line oxidation pond which is licenced.</p>
Climate:	<p>Highveld climatic region.</p> <p><u>Precipitation:</u> Dry cold winters and warm summers with thunderstorms. Annual rainfall, which falls mainly during summer, varies between 550 and 800 mm. Precipitation occurs as showers and thunderstorms mainly from October to March with maximum events occurring in November, December and January. Rainstorms are often violent (up to 80 mm can occur in one day) with severe lightning and strong winds, sometimes accompanied by hail. Frost can be expected to occur between May and mid-September, with an average of 58 frost days per annum.</p> <p>Mean Annual Precipitation (MAP): 687 mm/annum Mean Annual Evaporation (MAE): 1 597 mm/annum (WR90) Mean Annual Runoff (MAR): 22.9 million m³/annum (WR2005)</p> <p><u>Temperature:</u> The annual mean temperature is 15°C. The highest average maximum daily temperatures occur during November to March ranging from 25.2°C to 27.5°C. June, July and August can be regarded as the coldest months with the average minimum temperatures ranging from 5.0°C to 6.0°C. Monthly minimum: -2.3°C (July) Monthly maximum: 33.4°C (December)</p> <p><u>Wind:</u> The prevailing wind direction throughout the year is from the northwest. Storm winds, however, usually blow from the southeast with the strongest winds occurring in the late winter and early spring. Calm conditions (wind speeds <1 m/s) occur approximately 7.4% of the time.</p>

<p>Topography:</p>	<p>Mpumalanga Highveld region.</p> <p>The average elevation is 1 500 meters above mean sea level (mamsl). The topography is defined as moderately undulating plains, and the landscape consists of gently rolling hills with scattered trees and grassland. Slopes on the site and the surrounding topography determine the natural flow of the surface runoff, specifically storm water.</p> <p>Transalloys is located on natural topographic high ground (spur), which is bounded on the western and eastern sides by two tributaries of the Brugspruit. The two tributaries confluence approximately 1.3 km northeast of the site and then the stream flows northwards towards Driefontein.</p> <p>The Transalloys plant is located between 1 538 to 1 501 mamsl sloping from west to east towards the Brugspruit over a distance of 1.88km. The Fe-Cr WDF site is located at 1 540mamsl.</p>
<p>Surface water environment:</p>	<p><u>Water Management Area (WMA):</u> 4 Olifants (54 550 km²)</p> <p><u>Sub-catchment:</u> Upper Olifants River (12 285 km²). Klipspruit drains into Olifants River above Loskop Dam (before Olifants/Wilge confluence). The Upper Olifants River catchment comprises the drainage areas of the Olifants River, Klein Olifants River and Wilge River with tributaries down to the Loskop Dam. The headwaters of these rivers are located along the Highveld Ridge in the Secunda-Bethal area and the rivers then flow in a northerly direction towards Loskop Dam. The major tributaries are the Steenkoolspruit, Klein Olifants River, Wilge River and Elands River.</p> <p><u>Catchment area:</u> 376 km²</p> <p><u>Quaternary catchment:</u> B11K</p> <p><u>Dams:</u> The natural rivers and streams have been extensively dammed with the result that the stream flow is now highly regulated. The major impoundments upstream of Loskop Dam include Witbank Dam, Middelburg Dam, Bronkhorstspruit Dam and Premiere Mine Dam. Many smaller farm dams and water supply structures associated with the mining operations have also been constructed in the catchment.</p> <p><u>Streams / rivers:</u> The Brugspruit and its western tributary runs through the Transalloys property. The Brugspruit is a tributary of the Klipspruit.</p> <p><u>Wetlands:</u> Valley bottom wetland with a channel, valley bottom wetland without a channel, hillslope seepage wetland feeding a water course and 2 hillslope seepage wetlands not feeding a water course were found on the Transalloys site (Ixhaphozi Enviro, 2012).</p> <p><u>Legal:</u> Transalloys has a WUL 16/2/7/B100/B175 for Section 21 (a), (g) & (j) water uses in terms of the NWA. No changes required for this license in terms of this project.</p>

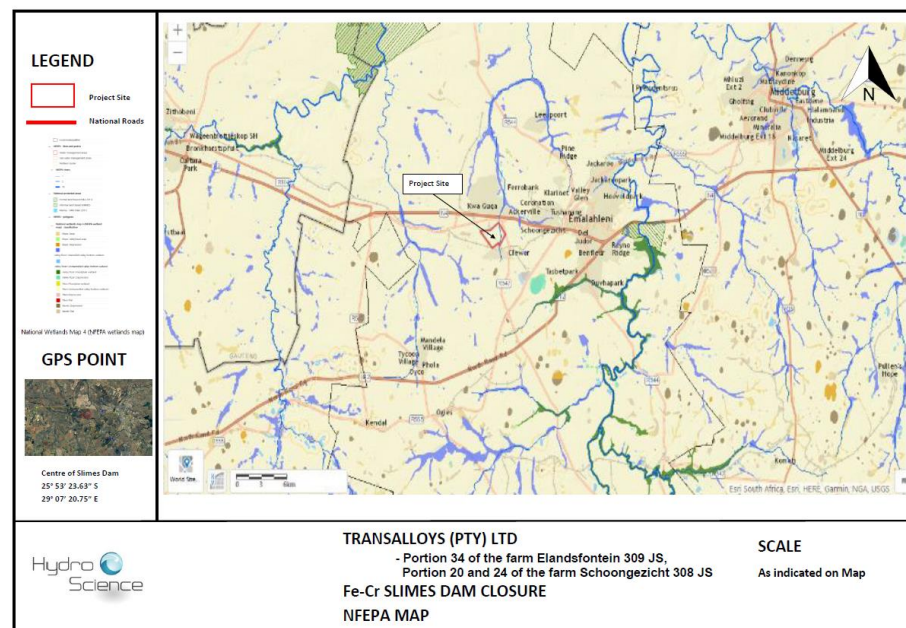
Water requirements: Transalloys utilises approximately 27 000 m³/month of water. Water is used in the operations for:

- domestic purposes by workers (drinking, food preparation in canteen, ablution),
- cooling purposes (furnaces, compressors and slag),
- reprocessing of slag (TMR plant),
- transport (slimes from TMR plant reprocessing to Mn slimes dam), and
- dust suppression (roads, raw material area).

Water sources: Water for domestic and cooling purposes is sourced from the municipal water supply. Water in the waste management circuit (waste processing, slimes transport & deposition) is recycled in a closed circuit via a penstock in the Mn slimes dam and a Return Water Dam (RWD). Captured storm water is also used, for dust suppression and quenching.

Storm water: Storm water is controlled by contour drains and cut off trenches that will separate clean and dirty water. Storm water drains around the waste disposal area direct any rain water flow to the RWD. Storm water drains around the plant direct runoff to the Pollution Control Dam (PCD).

Water quality: Artesium (2021) indicates that the latest available hydrochemical data from March 2019 to June 2021, shows no Chromium or Hexavalent Chromium detected in the groundwater or surface water monitoring points in the Burgspruit downstream of the Fe-Cr facility. The surface water shows no impact from the waste management facilities (MvB Consulting, 2021).



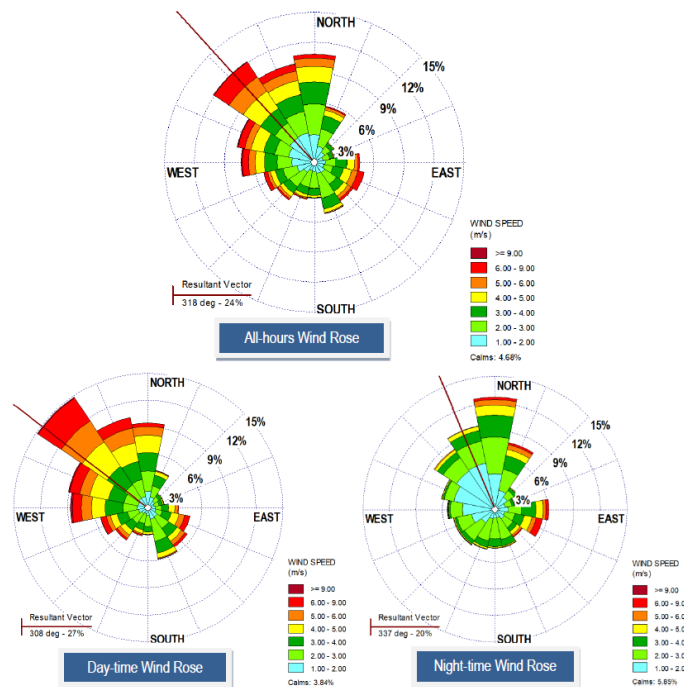
Air environment:

Highveld Priority Area: National air pollution hotspot in terms of Section 18(1) of the NEMAQA on 23 November 2007.

Wind directions and speed (Mamadi & Company, 2021):

Periodic (24 hours) and day-time wind fields show strong winds from North West, North-north West & North with strong but less frequent winds from East and West. Night-time wind fields show strong winds from North, East and North-north east.

Wind speed: 3m/s



Legal: Transalloys has an AEL 17/04/AEL/MP312/11/05 for Category 4 (Metallurgical Industry) in terms of the NEMAQA. No changes required for this license in terms of this project.

Existing impacts on air quality (Mamadi & Company, 2021):

- Mining
- Industrial
- Agriculture
- Domestic fuel combustion
- Vehicle tailpipe emissions
- Open areas (wind erosion)

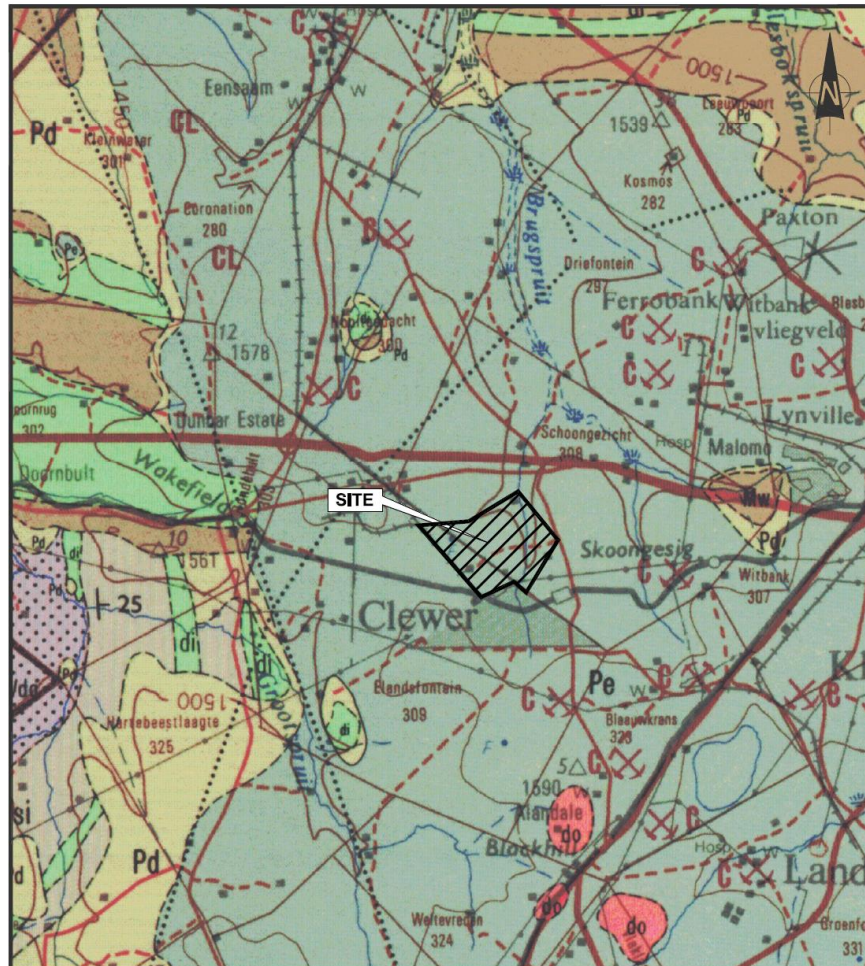
<p>Waste management:</p>	<p><u>Location:</u> The waste management area is located north-east of the Transalloys plant on the remainder portions 20 and 24 of the farm Schoongezicht 308 JS.</p> <p><u>Deposition:</u> Deposition is land building.</p> <p><u>Waste types:</u> Four (4) different types of industrial waste were identified namely:</p> <ul style="list-style-type: none"> • slag waste resulting from processing at Transalloys plant (current arising's which gets reprocessed upon cooling) • slag (coarse waste) from reprocessing at the TMR plant deposited on the same footprint as the original slag; • Mn slimes (fines from reprocessing of slag deposited on a Mn slimes dam of 6ha; and • historic Fe-Cr slimes on a Fe-Cr slimes dam (subject of this project). <p><u>Reprocessing:</u> All historically stockpiled Fe-Mn and Si-Mn slag have been reprocessed and only new slag arising's from the Transalloys plant is processed at the TMR plant. The overall objective of the TMR plant is to concentrate metal from the relatively low-grade slag from Transalloys' main plant. Reclaimed metals are returned to the Transalloys plant. The operation may be seen as an environmental clean-up since potentially hazardous or harmful metals are removed from the waste produced and deposited by Transalloys. A reduced quantity of waste requires disposal and the waste requiring disposal is of a less hazardous nature. A secondary effect of reprocessing is that fine material, which with time would have been transported elsewhere by wind and/or rain, is concentrated in a slimes dam.</p>
<p>Archaeology & Cultural Heritage (Archaetos, 2021)</p>	<p><u>Grade II (provincial) Heritage site.</u> The old Clewer Railway Station, dating back to the days of the NZASM Railway in the 1890's. The site is located 1.6km south-east of the Fe-Cr WDF.</p> <p><u>Grave yard:</u> The grave yard was identified in 2015 during the larger site assessment. It is located 500m east of the site.</p> <p>This project is for the decommissioning and closure of an existing WDF.</p>
<p>Palaeontology (Durand, 2021)</p>	<p>Shale and sandstone of the Vryheid Formation of the Ecca Group of the Karoo Supergroup underlie the study site. The sedimentary rocks of the Vryheid Formation are highly fossiliferous in places. The uppermost part of the underlying rocks is highly weathered, however.</p> <p>The fossils that occur in the Vryheid Formation are mostly that of leaf and stem imprints of plants such as <i>Glossopteris</i>, lycopods, ferns, horsetails, conifers, cordaitaleans and ginkgoaleans. Rare fossils of silicified and coalified wood, insects, bivalves, conchostrachans and fish scales also occur in this formation.</p>

Geology
(Knight
Piesold
Consulting,
2016)

The site is underlain by shale, sandstone, gritstone, and conglomerate of the Ecca formation, Karoo Supergroup.

Large quartzitic sandstone outcrops were observed directly west of the river.

Refer to MvB Consulting, 2021, MvB075/21/A069 in Appendix D for detail on geology.




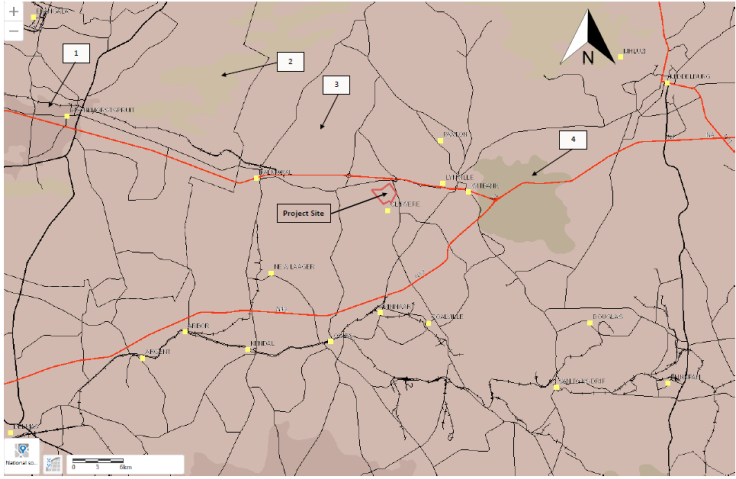

GEOLOGICAL LEGEND:
 d : Dolerite of the Waterberg Group.
 Pe : Shale, shaly sandstone, grit, sandstone, conglomerate and coal of the Ecca Formation, Karoo Supergroup.
 Pd : Tillite and shale of the Dwyka Formation, Karoo Supergroup.
 Mw : Sandstone, quartzitic in places, conglomerate of the Wilgerivier Formation, Waterberg Group.
 Vsi : Shale, carbonaceous in places of the Silverton Formation, Pretoria Group.

REFERENCE MAP
 1:250 000 SCALE
 GEOLOGICAL SERIES
 SHEET: 2528 PRETORIA
 NOT TO ORIGINAL SCALE

Knight Piesold
 CONSULTING

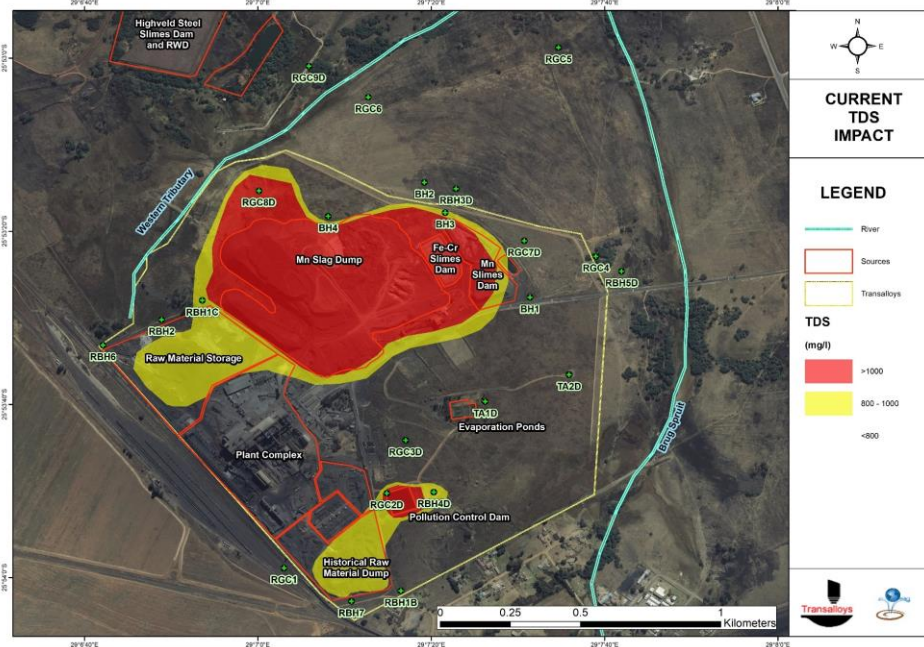
TRANSALLOYS, MIDDELBURG
 GEOTECHNICAL INVESTIGATION
 GEOLOGY MAP

PROJECT NO: 30200047/04
 FIGURE NO 2
 SCALE N.T.S.

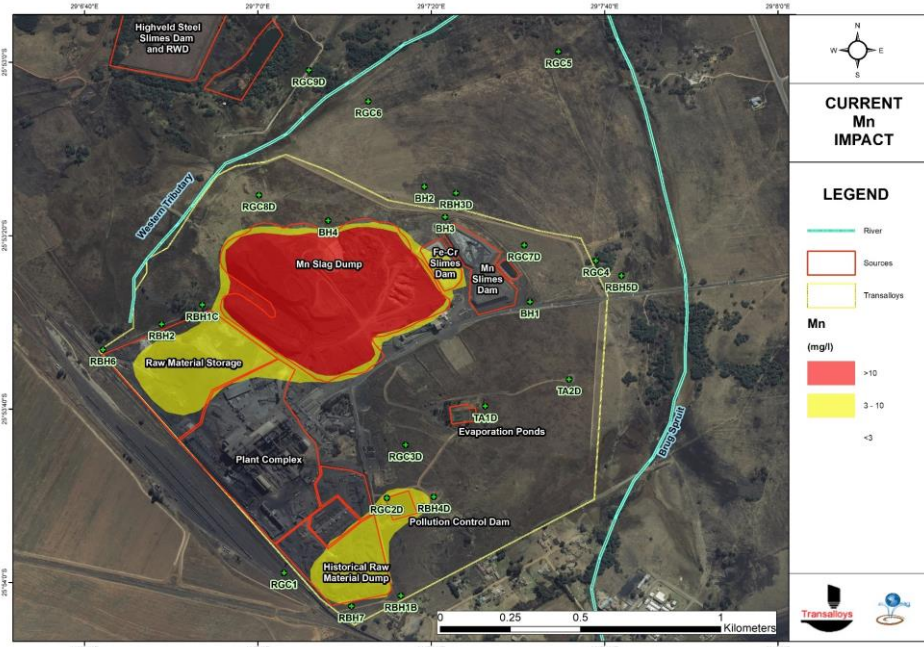
<p>Soil</p>	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>LEGEND</p> <p>Soil Description</p> <ol style="list-style-type: none"> 1. Red and yellow soils with low to medium base status. 2. Non soil land classes 3. Freely drained, structureless soils 4. Association of Classes 13 and 14. Undifferentiated shallow soils and land classes <p> Project Site Towns National Roads </p>  <p>GPS POINT</p> <p>Centre of Slimes Dam 25° 53' 23.63" S 29° 07' 20.75" E</p> </div> <div style="width: 65%; text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 30%;">  </div> <div style="width: 40%; text-align: center;"> <p>TRANSALLOYS (PTY) LTD - Portion 34 of the farm Elandsfontein 309 JS, Portion 20 and 24 of the farm Schoongezicht 308 JS Fe-Cr SLIMES DAM CLOSURE DETAILED SOILS MAP</p> </div> <div style="width: 25%; text-align: right;"> <p>SCALE As indicated on map</p> </div> </div> </div>
<p>Groundwater environment</p>	<p>Refer to MvB Consulting, 2021, MvB075/21/A069 in Appendix D.</p> <p>Aquifers:</p> <ul style="list-style-type: none"> • Shallow weathered aquifer (0 – 16m, average depth of 9m used in model) with recharge from rainfall and surface water sources. Low yielding aquifer due to low hydraulic conductivity. Groundwater quality in undisturbed areas is good due to the dynamic recharge from rainfall, however, this aquifer is more likely to be impacted by surface contaminant sources. Transmissivity = 0.48 m²/day. Hydraulic conductivity = 0.08 m/day. • Deeper fractured aquifer. The primary porosity of the Ecca Group rocks does not allow significant groundwater flow in this aquifer and no dykes were detected. An average depth of 50m was used in the model. Groundwater quality is generally poorer due to a concentration of salts and less dynamic recharge from rainfall. Transmissivity = 0.55 m²/day. Hydraulic conductivity = 0.03 m/day <p>Boreholes: 34 boreholes exist on site of which 12 are located around the waste disposal area. S indicate shallow (\pm 10 – 15m) and D indicate deep (\pm 30 – 60m) boreholes. RGC01 is the background borehole.</p> <p>Pathway: Groundwater flow mimics topography and is towards the surface water sources (Brugspruit and tributary). Groundwater (and contaminant) movement is slow due to low aquifer parameters.</p> <p>Receptors: The Brugspruit and its tributary are the only receptors since there are no groundwater users downstream of Transalloys prior to these receptors. The risk within these streams is primarily to livestock drinking the water.</p> <p>Sources and groundwater impacts: Waste disposal facilities have impacted on the groundwater quality, considering background water quality. The impacts are, however, largely contained within the footprint areas of the waste body.</p>

Fe-Cr WDF impact on groundwater: The Fe-Cr WDF is considered of a lower risk as a contaminant source to the groundwater environment since it is lined. With an estimated seepage volume of 0.05 m³/day, it only contributes 0.02 kg/day to the TDS load. Based on previous studies, the Fe-Cr WDF is not considered a significant source of contamination and does not contribute significantly to the impact on the groundwater. The impacts from the surrounding waste management facilities overshadows any impact from the Fe-Cr WDF.

Current overall impact (TDS): Remain within Transalloys boundaries.

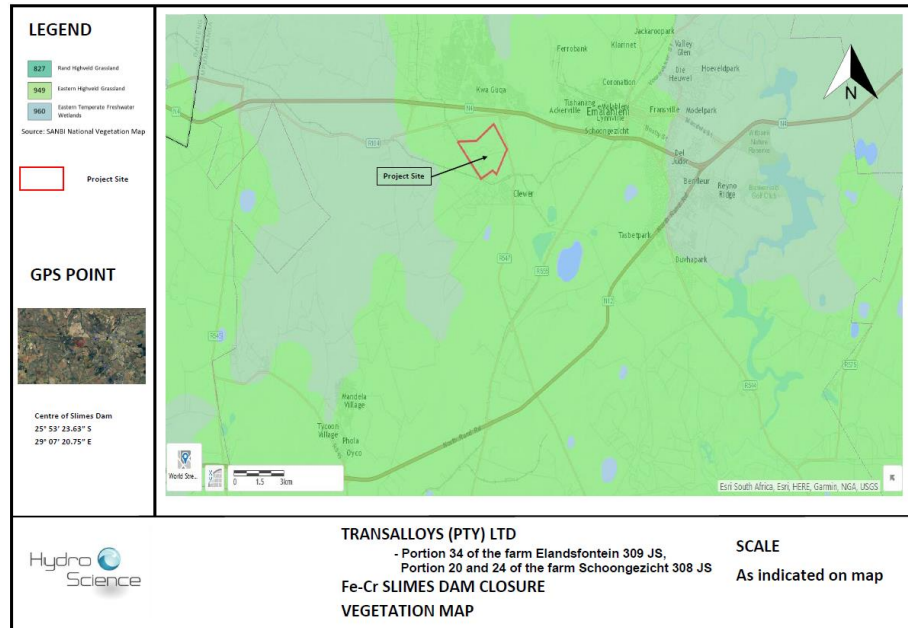


Current Transalloys specific impact (Mn): Remain within Transalloys boundaries.



Vegetation

The vegetation on site generally comprises Savannah Grassland, while trees and shrubs are limited to the river area.



6.3 Supporting information

Appendix D contains copies of the specialist studies.

7 ALTERNATIVES CONSIDERED

7.1 Land use alternative

The project is for closure of an existing WDF in its current location.

7.2 Alternative location

The project is for closure of an existing WDF in its current location.

7.3 Alternative layout

The project is for closure of an existing WDF in its current location.

7.4 No-go alternative

The no-go alternative is the only feasible alternative. The no-go alternative would be to not proceed with the project, i.e. the decommissioning and closure of the Fe-Cr WDF. In this case, the Fe-Cr WDF will remain open but unused and remain an environmental liability.

7.5 Alternative closure options

Golder and Associates, report 12614856-12207-1, July 2013 considered the following closure options (Redco, 2021):

7.5.1 Option 1

Objective: To create a long-term stable landscape with limited, but preferably no maintenance that will facilitate an eventual “walk away from” when required.

The desired land form will be created as follows:

- Import available slag from the adjacent slag area to fill the airspace in the upper surface pools and paddocks areas. These voids will be filled to create a convex top, termed a ‘whaleback’. The whalebacking will provide a “naturally” free draining surface; and
- Import benign soil to be placed and shaped on the existing outer slopes to create a uniform 1:5 slope that integrates with the whalebacked slag on the upper surface. This will increase the dam footprint area by 7-15m from the current perimeter.

Install an impermeable cover onto the created profile as follows:

- Geotextile Bidim A8;
- 2mm HDPE liner;
- Pozi-drain drainage layer;
- 500mm Topsoil cover; and
- Vegetation cover.

This design prevents contact between surface water and the underlying waste material. Run-off from the rehabilitated facility will be clean for release to the receiving environment.

7.5.2 Option 2

This option allows for limited upper surface modification, still allowing runoff to drain towards the existing centre drainage penstocks. The shaped surface will be lined with a single HDPE liner to prevent contact between the surface water and the underlying waste material. Since the water from the penstock will be clean, it can discharge to the surrounding environment.

This cover will also prevent the ingress of rainfall into the waste material that could accumulate on the facility bottom liner. As the bottom liner drains will be closed-off at closure, the accumulated water will not be able to drain.

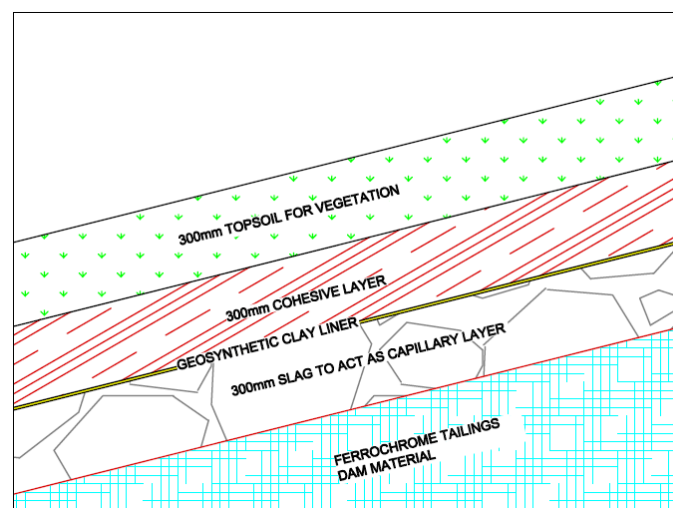
Soil will be imported to be placed and shaped on the outer slopes to achieve a side slope of 1:5 and provide a smooth and stable surface for the impermeable cover consisting of:

- Geotextile Bidim A8 (Over entire dam);
- 2mm HDPE liner (Over entire dam);
- Pozi-drain Drainage layer (Only on slopes);
- 500mm Topsoil cover (Only on slopes); and
- A Vegetation cover (Only on slopes).

7.5.3 Redco preferred closure option

- Seal existing penstocks.
- Reshape slopes to reduce the outer slope angle and create a free draining landform.
- Import and place 300mm slag layer over reshaped material to act as capillary break layer.
- Install a Geosynthetic Clay Layer (GCL) with a hydraulic conductivity or permeability of 2.56×10^{-11} m/s to function as an impermeable layer preventing ingress of storm water into the rehabilitated WDF.
- Import and place 300mm compacted soil (6 kN/m²) layer with a hydraulic conductivity or permeability of 1.17×10^{-09} m/s over GCL - ensure sufficient confined pressure on GCL.
- Place 300mm growth medium (topsoil) layer - partially mixed with coarser material to reduce erodibility.
- Establish (seed with) indigenous vegetation (not deep-rooted species, i.e. grasses) at 20kg/ha after soil amelioration.
- Install storm water management and drainage infrastructure.

Refer to detail in Section 4.



8 PUBLIC PARTICIPATION PROCESS

8.1 Summary

Newspaper notice:	<p>Newspaper: Witbank News Date: 2022-03-11 Page: 14</p> <p>Newspaper: Middelburg Observer Date: 2022-03-11 Page: 10</p> <p>Refer to Appendix E for tear sheets.</p>
Site notices:	<p>Date placed: 8 March 2022 Size of notices: 800 X 600 mm Number of notices placed: 4 Size & wording: Figure 8-1. Location: Figure 8-2 & 8-3.</p>
Interested and Affected Parties (I&APs):	<p>Number of surrounding properties: 28 Number of property owners: 9 Number of people emailed: 68 in total including:</p> <ul style="list-style-type: none"> • Local municipality (10) • District municipality (2) • Province (12) • National (4) • DALRRD (2) • DMR (2) • DWS (3) • SAHRA` • Eskom • Other (22)
Comments received:	<u>Draft BAR</u> : Awaiting
Comments relate to:	Registration and requesting copies of document for review. <u>Draft BAR</u> :

8.2 Introduction

The Public Participation Process (PPP) aims to provide all Interested and Affected Parties (I&APs) with clear, accurate and comprehensible information about the project for the proposed decommissioning and closure of the Fe-Cr WDF at Transalloys (Pty) Ltd in eMalahleni (Witbank) within Nkangala District Municipality, Mpumalanga Province. In addition, the process seeks to provide I&APs with the opportunity to indicate their viewpoints on issues and concerns about the proposed project.

This process, therefore, enhances transparency and accountability in decision-making, as it allows all I&APs to suggest ways of avoiding, reducing or mitigating potential negative impacts,

as well as enhance positive impacts of the proposed project. All inputs from the I&APs are considered in the planning process. Consequently, clear recording of all issues and concerns raised have been maintained in a comments and response register. This register has been updated when new issues or concerns were raised.

This section provides a methodical description of the PPP followed. It also contains a complete record of public notices, details of all registered I&APs and all communications to and from I&APs pertaining to the application.

8.3 Approach

The aim of the PPP is not only to adhere to the required legislation, but also to give as many stakeholders and I&APs as possible, an opportunity to be actively involved in this process.

The PPP has been carried out in accordance with Chapter 6 of the NEMA and in support of the EIA Regulations of 2014 as amended. Based on these Regulations, published in terms of Sections 39 to 44 of GNR 982 amended in GNR 326 of NEMA, the following steps were undertaken:

- Potential I&APs were identified through obtaining and updating Transalloys' latest stakeholder database, windeed searches, conducting a visit to the area, through site notices placed (Figures 8-1 – 8-3) as well as through placing notices in the Witbank News and Middelburg Observer;
- A stakeholder register was compiled in terms of Regulation 42 that includes national, provincial and local authorities, government departments, organisations, as well as landowners that may have an interest;
- I&APs were given more than a month to register and raise concerns (October – November 2021) which included 30 days to review the draft BAR (15 March – 14 April 2021). A hard copy was made available at the Kwa-Guqa Library (Witbank Library currently closed), Clewer Post Office and Transalloys reception. A soft copy was made available upon request. Any concerns that have been raised by I&APs were acknowledged, noted and addressed (Table 8-3 – 8-4) by the EAP where possible;
- A recorded summary of concerns raised by I&APs, as well as the responses from the EAP, were kept throughout the entire process.

8.4 Public awareness

8.4.1 Site Notices

Site notices, measuring 800 mm x 600 mm, were placed at locations where these would be most visible. The notices were placed as follows:

- At the main security entrance to Transalloys: 25° 53' 27.4" South; 29° 07' 38.6" East
- At the entrance gate providing access to the Waste Management Area: 25° 53' 30.2" South; 29° 07' 21.7" East
- At the service entrance gate: 25° 53' 46.0" South; 29° 07' 12.1" East
- At the plant entrance: 25° 53' 40.7" South; 29° 07' 05.7" East

Each notice contained details regarding the applicant (Transalloys (Pty) Ltd), the nature of the activity (decommissioning and closure of Fe-Cr WDF), and the contact details of the EAP (See Figure 8-1). The placement of the site notices was recorded by taking photographs of the

placed notices on site, as well as by recording the GPS coordinates of these positions. See Figures 8-2 – 8-3. These notices remained on the site for the duration of the process.

8.4.2 Newspaper Notice

A detailed newspaper notice was placed in the Witbank News (10 March 2022) and Middelburg Observer (11 March 2022). The newspapers are distributed as follows:

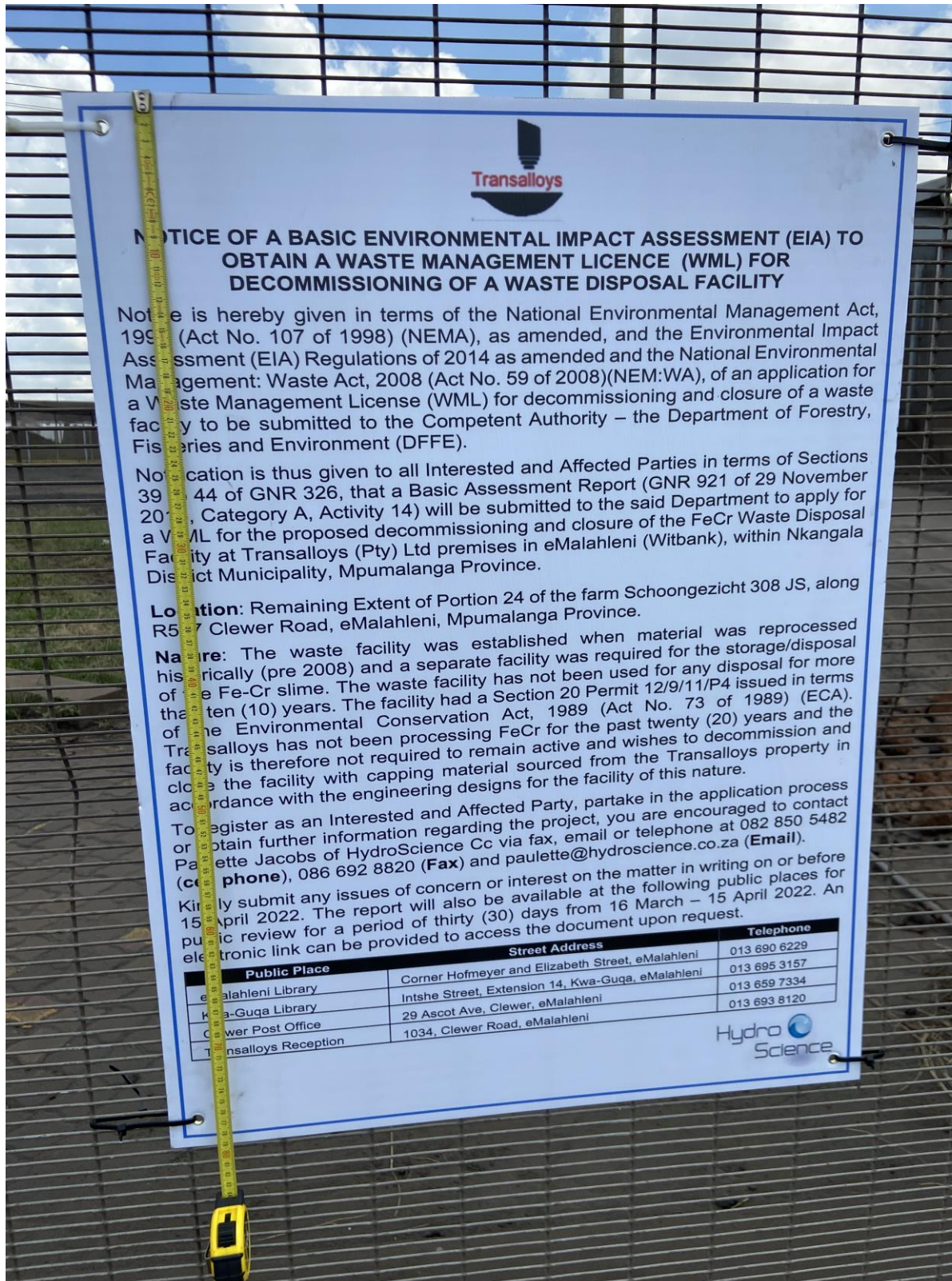
Witbank News: 25 000 copies per week to:

- Witbank
- Middelburg
- Ogies
- Phola
- Kriel
- Van Dyksdrift
- Kendal Power Station
- Wonderfontein
- Arnot
- Pullenshope
- Groblersdal
- Marble Hall
- Loskop
- Bronkhorstspruit
- Stoffberg

Middelburg Observer:

- Middelburg
- Belfast
- Hendrina
- Komati Power Station
- Wonderfontein
- Arnot
- Pullenshope
- Witbank
- Groblersdal
- Marble Hall
- Loskop
- Stoffberg

The aim of placing a notice in the local newspapers was to create a greater awareness of the project and to invite a broader spectrum of I&APs to register and be part of the process.



NOTICE OF A BASIC ENVIRONMENTAL IMPACT ASSESSMENT (EIA) TO OBTAIN A WASTE MANAGEMENT LICENCE (WML) FOR DECOMMISSIONING OF A WASTE DISPOSAL FACILITY

Notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, and the Environmental Impact Assessment (EIA) Regulations of 2014 as amended and the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)(NEM:WA), of an application for a Waste Management License (WML) for decommissioning and closure of a waste facility to be submitted to the Competent Authority – the Department of Forestry, Fisheries and Environment (DFFE).

Notification is thus given to all Interested and Affected Parties in terms of Sections 39 and 44 of GNR 326, that a Basic Assessment Report (GNR 921 of 29 November 2021, Category A, Activity 14) will be submitted to the said Department to apply for a WML for the proposed decommissioning and closure of the FeCr Waste Disposal Facility at Transalloys (Pty) Ltd premises in eMalahleni (Witbank), within Nkangala District Municipality, Mpumalanga Province.

Location: Remaining Extent of Portion 24 of the farm Schoongezicht 308 JS, along R517 Clewer Road, eMalahleni, Mpumalanga Province.

Nature: The waste facility was established when material was reprocessed historically (pre 2008) and a separate facility was required for the storage/disposal of the Fe-Cr slime. The waste facility has not been used for any disposal for more than ten (10) years. The facility had a Section 20 Permit 12/9/11/P4 issued in terms of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA). Transalloys has not been processing FeCr for the past twenty (20) years and the facility is therefore not required to remain active and wishes to decommission and close the facility with capping material sourced from the Transalloys property in accordance with the engineering designs for the facility of this nature.

To register as an Interested and Affected Party, partake in the application process or obtain further information regarding the project, you are encouraged to contact Paulette Jacobs of HydroScience Cc via fax, email or telephone at 082 850 5482 (cell phone), 086 692 8820 (Fax) and paulette@hydrosience.co.za (Email).

Kindly submit any issues of concern or interest on the matter in writing on or before 15 April 2022. The report will also be available at the following public places for public review for a period of thirty (30) days from 16 March – 15 April 2022. An electronic link can be provided to access the document upon request.

Public Place	Street Address	Telephone
eMalahleni Library	Corner Hofmeyer and Elizabeth Street, eMalahleni	013 690 6229
Kwa-Guqa Library	Intshe Street, Extension 14, Kwa-Guqa, eMalahleni	013 695 3157
Clewer Post Office	29 Ascot Ave, Clewer, eMalahleni	013 659 7334
Transalloys Reception	1034, Clewer Road, eMalahleni	013 693 8120

Figure 8-1: Wording and size of notices placed



At the main security entrance to Transalloys: 25° 53' 27.4" South; 29° 07' 38.6" East



At the entrance gate providing access to the Waste Management Area:
25° 53' 30.2" South; 29° 07' 21.7" East



Figure 8-2: Notices placed

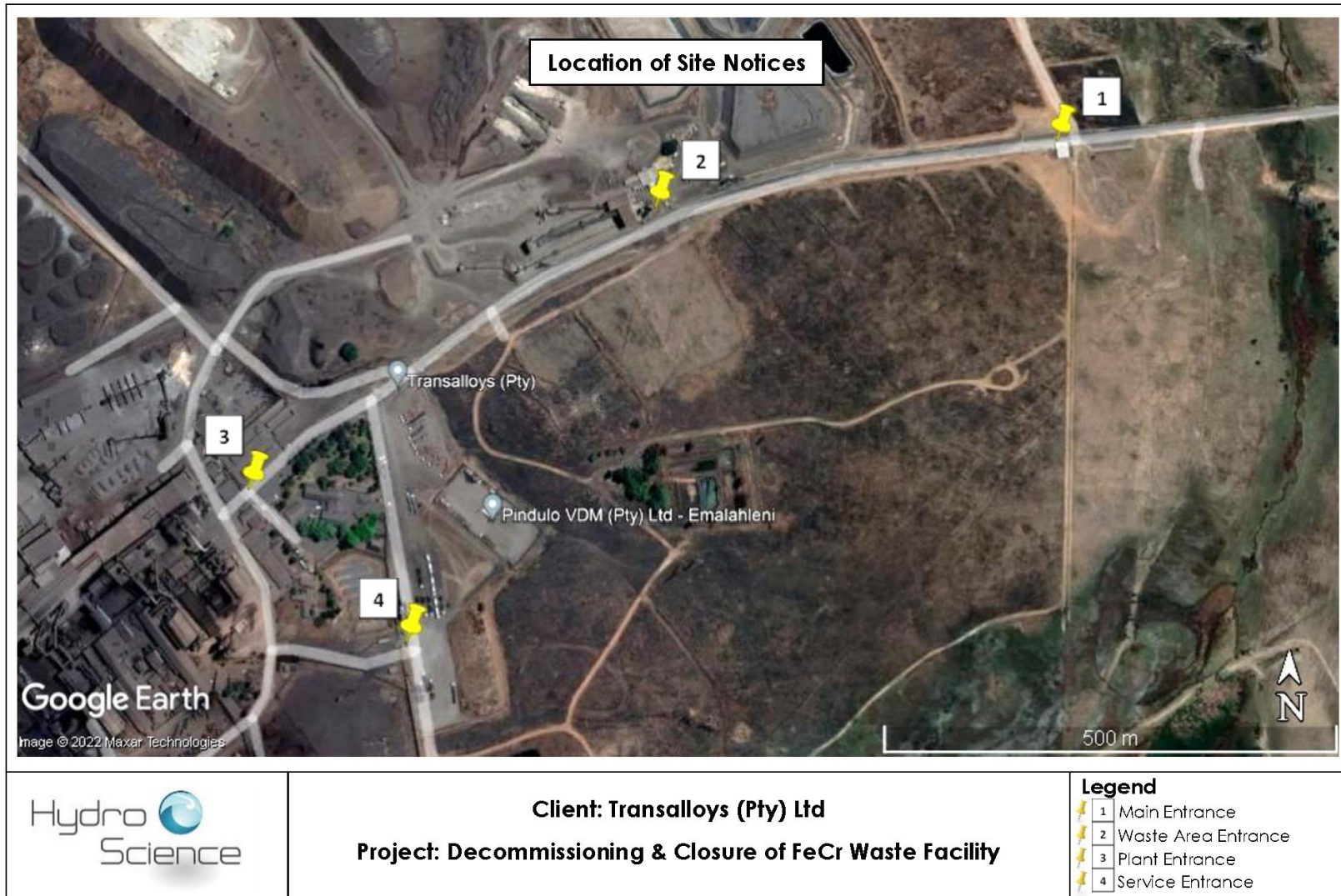


Figure 8-3: Aerial view of location of site notices

8.5 Comments and Response Register

Any concerns that were raised by I&APs during the process were recorded and addressed by the EAP where possible (see Table 8-3). All proof of communication can be seen in Appendix E.

Furthermore, all registered I&APs were given an opportunity to comment in writing (16 March – 15 April 2022), on the draft BAR before its submission to the competent authority, Department of Forestry, Fisheries and Environment (DFFE), in April / May 2022

8.6 BAR Submission

The draft BAR was made available for public review at the Kwa-Guqa Public Library (Witbank Library currently closed), the Clewer Post Office and Transalloys' reception (hard copy) and electronically upon request from 16 March – 15 April 2022. All I&APs have therefore been given an opportunity to comment on this document. Once the period for comments lapsed, all comments made were included in the comments and response register.

After submission of the draft BAR to the authorities, during the public review period, the authorities were also afforded an opportunity to submit their comments to be addressed in the final BAR.

The final BAR (including all supporting documentation) will be submitted to DFFE for consideration. A decision will be provided by DFFE in terms of their considerations and findings and if authorised / licensed, conditions of the authorisation/license will be provided.

Table 8-1: List of I&APs

Direct neighbours:

- Anglo Operations (Pty) Ltd
- Transnet Ltd
- Cusa (Pty) Ltd
- Evraz Highveld Steel & Vanadium
- Emerald Sky Trading 706 (Pty) Ltd
- SANRAL
- Magnificent Makaring
- Other individuals in Clewer

Authorities:

- Local authority - eMalahleni
- District authority - Nkangala
- Provincial authority – MDARDLEA
- National authority – DFFE
- DMR
- DWS
- SAHRA
- DALRRD

Others:

- National African Federated Chamber of Commerce (NAFCOC)
- NUMSA
- Solidariteit
- Clewer residents
- Others

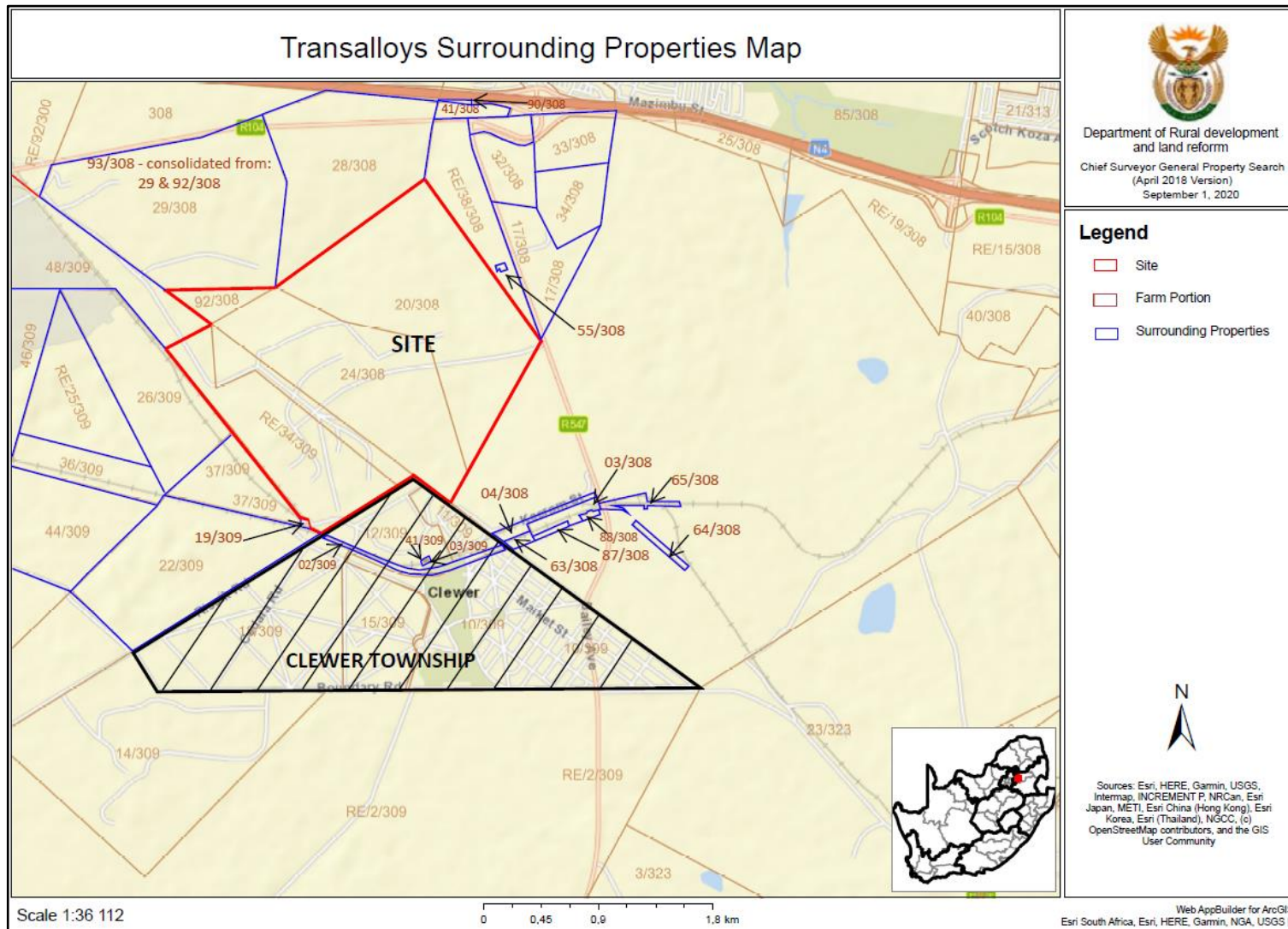


Figure 8-4: Transalloys surrounding properties

Table 8-3: Comments and responses

Entity / Person:	Date:	Comment:	Response:
Evraz Highveld Ms Thia Oberholzer	2022-03-02	Requested to be registered as an I&AP for the project at hand to partake in the process and requested a copy of the BAR.	Registered on the stakeholder database and provided with the electronic copy of the BAR on 2022-03-15.
DALRRD Directorate: Land and Soil Management (LSM) Frans Mashabela (Resource auditor)	2022-03-07		
Jennifer Kock (Chair) Transalloys Waste Monitoring Committee Transalloys Mn Slag Users Association	2022-03-07		
Comments on Draft BAR			
Clewer Post Office Kwa-Guqa Library		A hard copy placed for public access and review for a period of 30 days starting from 16 March 2021 – 15 April 2022.	Copies of the BAR were collected and reviewed to ascertain whether there were any comments recorded following the public participation period.
Transalloys reception		A hard copy placed at the Transalloys reception for public access and review for a period of a month starting from 16 March 2021 – 15 April 2022.	

9 IMPACT ASSESSMENT

9.1 Methodology

The significance of the adverse environmental impacts identified were assessed in terms of their:

- Duration;
- Extent;
- Probability; and
- Severity.

The above was used to determine the significance of an impact without any mitigation, as well as with mitigation.

Nature of an impact: An impact's nature can be positive (+) or negative (-).

Consequence: Considers duration, extent and severity

Consequence = duration + extent + severity

Table 9-1: Environmental risk and impact assessment criteria

DURATION (D)		
Immediate	Less than 1 month	1
Short-term	2 – 12 months (decommissioning & closure)	2
Life of project	Closed Fe-Cr facility	3
Post-closure	Time of rehabilitation and for re-establishment of natural systems	4
Residual	A permanent impact (100 years or more)	5
EXTENT (E)		
Site specific	Site of the proposed work (Fe-Cr WDF)	1
Local	Site and immediate surroundings (Transalloys property)	2
Regional	Municipal area (eMalahleni)	3
Provincial	Provincial area (Mpumalanga)	4
National	Republic of South Africa	5
PROBABILITY (P)		
Rare	<5% probability of occurrence – may occur in exceptional circumstances	1
Unlikely	15% - 6% probability of occurrence – could potentially occur at some time	2
Possible	45% - 16% chance of occurrence – might occur at some time	3
Likely	65% - 46% probability of occurrence – will probably occur in most circumstances	4
Almost Certain	90% - 66% probability of occurrence – is expected to occur	5
Definite	100% - will occur	6
SEVERITY (S)		
Catastrophic (critical)	Total change in area of direct impact, relocation not an option, death, toxic release off-site with detrimental effects, irreversible loss, huge financial loss	6

Significant (High)	> 70% change in area of direct impact due to loss of significant aspect, extensive injuries, long term loss in capabilities, off-site release to high extent, major financial implications	5
Serious	50 – 70% long-term loss, extensive rehabilitation / restoration / treatment required, high financial impact, still restricted in extent	4
Moderate (medium)	20 – 49% change, medium term loss in capabilities, rehabilitation / restoration / treatment required, on-site release with outside assistance, medium financial impact	3
Minor	10 – 19% change, short term impact that can be absorbed, on-site release, immediate containment, low financial implications	2
Insignificant (low)	< 10 % change in the area of impact, no financial implications, localised impact, a small percentage of population	1

[Duration (D) + Extent I + Severity (S)] x Probability (P) = Impact Significance (IS)

IMPACT SIGNIFICANCE (IS)		
Impact Significance	IS score range	Description
Low (L)	<15	The impact is minor or insubstantial; it is of little importance to any stakeholder and can easily be rectified.
Moderate Low (ML)	16 – 45	The impact is limited in extent, even if the intensity is major; the probability will only be likely, the impact will not have a significant impact considered in relation to the bigger picture; no major material effect on decisions and will require only small-scale management intervention bearing moderate costs.
Moderate High (MH)	46 – 70	The impact is significant to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High (H)	71 <	The impact could render options controversial or the entire project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in project decision-making.

9.2 Impact Assessment Ratings

The impacts and associated significance ratings for the Fe-Cr WDF status quo (no-go option) and decommissioning and closure are detailed in Tables 9.1, 9.2 and 9.3.

The planning phase activities are considered to be of a negligible impact significance as these typically involve desktop assessment and site inspections.

Table 9-2: No-go (status quo) - Impacts and Significance for the Fe-Cr WDF

Aspect and Description		Impact Rating (before mitigation)							Impact Rating (after mitigation)						
Aspect	Description	Nature of Impact (Positive/Negative)	Spatial Scope/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (Positive/Negative)	Spatial Scope/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
TOPOGRAPHY & AESTHETICS	Stand out in the landscape	N	2	3	2	7	6	42 Moderate Low	N	2	3	2	7	6	42 Moderate Low
SURFACE WATER – Pollution	Seepage/leachate from the WDF reaching the surface water via the groundwater; Storm water runoff polluted	N	4	3	5	12	1	36 Moderate Low	N	2	3	5	10	1	10 Low
GROUNDWATER – Pollution	Seepage/leachate from the WDF reaching the groundwater; Liner deterioration/damage	N	2	3	5	10	1	30 Moderate Low	N	2	3	5	10	1	10 Low
SOIL - Pollution	Seepage/leachate from the WDF contaminating the underlying soil	N	1	3	3	7	1	21 Moderate Low	N	1	3	3	7	1	7 Low
AIR QUALITY – Polluting or decreasing the quality of the air	Particulate matter, dust and airborne particles being airborne; Erosion	N	2	3	4	9	5	45 Moderate Low	N	2	3	4	9	5	45 Moderate Low
HEALTH – degradation in health	Inhalation / ingestion of emissions / dust and/or water	N	2	3	4	9	5	45 Moderate Low	N	2	3	4	9	5	45 Moderate Low
SOCIO-ECONOMIC	Environmental liability & risk; Cost of operation and leachate treatment	N	2	3	4	9	6	54 Moderate High	N	2	3	4	9	6	54 Moderate High

Aspect and Description		Impact Rating (before mitigation)						Impact Rating (after mitigation)							
Aspect	Description	Nature of Impact (Positive/ Negative)	Spatial Scape/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (Positive/Negative)	Spatial Scape/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
ARCHAEOLOGY & CULTURAL HERITAGE	Sites within 3km: Grave yard on Transalloys property. Grade II Heritage Site (Clewer Railway Station).	N	2	3	2	7	1	7 Low	N	2	3	2	7	1	7 Low

Impact statement on the Fe-Cr WDF:

Assessment of the latest available hydrochemical data (March 2019 - December 2019) detected no Cr or Cr (VI) Hexavalent Chromium in the groundwater or surface water monitoring localities downstream of the Fe-Cr WDF (Artesium, 2021). It is difficult to isolate the impacts from the Fe-Cr WDF, but the groundwater quality in the closest monitoring boreholes was compared to the water in the Fe-Cr WDF return water dam (RWD, S14) and the drain from the Fe-Cr WDF to the RWD (S15). These were considered source water (with a TDS of 900 mg/l, no detectable Mn, Cr or Cr(VI)) and therefore representative of the seepage currently emanating from the Fe-Cr WDF. There is no clear indication that the Fe-Cr WDF or its RWD is impacting on the groundwater. This is most likely due to both facilities being lined. A detailed waste assessment and review of the groundwater monitoring data concluded that the Fe-Cr WDF is not considered a significant source of contamination and does not contribute significantly (if at all) to the impact on the groundwater (and therefore also surface water) (MvB Consulting, 2021). **However, as long as the facility is not properly closed, it remains an environmental liability and potential pollution source for water and air.**

MvB Consulting modelled the impact if the Fe-Cr WDF is unlined (worst-case scenario, in case the lining deteriorates or is damaged). The modelling results indicated that the Fe-Cr WDF will impact on groundwater quality even in the absence of other impacts (MvB Consulting, 2021).

A 100-year period was used to calculate Cr (VI) transport. The analysis assumed free leakage from the system in the future when the synthetic liner has degraded with time. Cr (VI) will be transported 34 m in the weathered aquifer and 15 m in the fractured aquifer. If no artificial gradient is caused, the Cr (VI) would likely never reach the Brugspruit and its tributary as the main receptors. The risk assessment indicated that there could be a future impact within a 250 m zone from the Fe-Cr WDF site should the liner degrade in the future. (Artesium, 2021). **Degradation or damage to the existing liner and subsequent pollution of groundwater are real possibilities, if the facility is not closed.**

Cumulative impact (MvB Consulting, 2021):

Surface water pathway and receptors: The Brugspruit and its tributary which runs through the Transalloys property are the receptors. The Brugspruit is a tributary of the Klipspruit. The risk is primarily to livestock drinking the water.

Groundwater pathway and receptors: Groundwater flow mimics topography and is towards the surface water sources (Brugspruit and its tributary). The Brugspruit and its tributary are the only receptors since there are no groundwater users downstream of Transalloys prior to these receptors.

Water contamination sources: WDF have impacted on the groundwater quality, considering background water quality. The impacts are, however, largely contained within the footprint areas of the waste bodies and the contamination plume does not extend beyond the Transalloys site boundaries. The impacts from the surrounding WDF overshadows any potential impact from the Fe-Cr WDF.

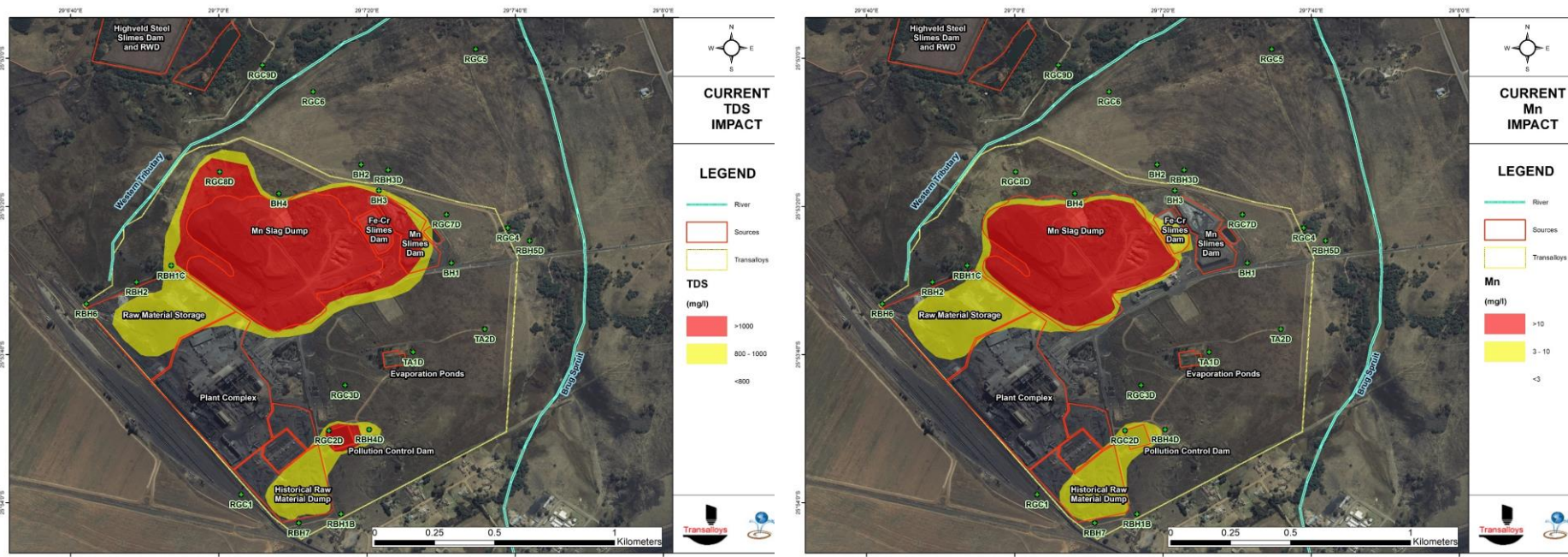


Figure 9-1: Current cumulative impact: Left for overall TDS and right for Transalloys specific Mn

Table 9-3: Decommissioning and Capping (construction phase) - Impacts and Significance

Aspect and Description		Impact Rating (before mitigation)							Impact Rating (after mitigation)						
		Nature of Impact (Positive/Negative)	Spatial Scape/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (Positive/Negative)	Spatial Scape/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Aspect	Description														
SURFACE WATER – Pollution	Seepage from the WDF reaching the surface water via the groundwater	N	4	3	5	12	1	12 Low	N	2	3	5	10	1	10 Low
GROUNDWATER – Pollution	Seepage from the WDF reaching the groundwater	N	2	3	5	10	1	10 Low	N	2	3	5	10	1	10 Low
SOIL - Pollution	Seepage from the WDF contaminating the underlying soil	N	1	3	3	7	1	7 Low	N	1	3	3	7	1	7 Low
AIR QUALITY – Polluting or decreasing the quality of the air	Particulate matter, dust and airborne particles flying through the air.	N	2	3	4	9	5	45 Moderate Low	P	Positive impact due to dust elimination through capping.					
HEALTH – degradation in health	Inhalation / ingestion of emissions / dust and/or water	N	2	3	4	9	5	45 Moderate Low	P	Positive impact due to dust elimination through capping.					
SOCIO-ECONOMIC	Environmental liability; Cost	P	Positive impact due to removal of a potential contamination source. Temporary increase in expenditure but long-terms reduction in cost												
ARCHAEOLOGY & CULTURAL HERITAGE AS WELL AS PALAEOLOGY	Sites within 3km: Grave yard on Transalloys property. Grade II Heritage Site (Clewer Railway Station).	N	Positive impact due to dust elimination through capping.												

Table 9-4: Closure and Rehabilitation (operational phase) - Impacts and Significance

Aspect	Description	Nature of Impact (Positive/Negative)	Spatial Scope/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)		Nature of Impact (Positive/Negative)	Spatial Scope/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
TOPOGRAPHY & AESTETICS	Visibility in landscape	P	Positive impact due to facility blending in with natural surroundings.													
SURFACE WATER – Pollution	Runoff; Free-draining	P	Positive impact due to no contact of surface water with material													
GROUNDWATER – Pollution	Seepage from the WDF reaching the groundwater	P	Positive impact due to material isolation through encapsulation. From a geohydrological perspective, the encapsulation of a waste body effectively removes the facility as a contaminant source as contaminated seepage into the groundwater will no longer take place (MvB, 2021).													
SOIL - Pollution	Seepage from the WDF contaminating the underlying soil	P	Positive impact due to material isolation through encapsulation.													
AIR QUALITY – Polluting or decreasing the quality of the air	Particulate matter, dust and airborne particles flying through the air.	P	Positive impact due to dust elimination through closure.													
HEALTH – degradation in health	Inhalation / ingestion of emissions / dust and/or water	P	Positive impact due to dust elimination through closure.													
SOCIO-ECONOMIC	Environmental liability; Cost	P	Positive impact due to removal of a potential contamination source. Cost reduction													
ARCHAEOLOGY & CULTURAL HERITAGE AS WELL AS PALAEOLOGY	Sites within 3km: Grave yard on Transalloys property. Grade II Heritage Site (Clewer Railway Station).	P	Positive impact due to dust elimination through closure.													

10 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

10.1 Compliance with legislation

Section 24N of NEMA as per GNR 326 of 7 April 2017 – Appendix 4

Requirement:	In this document:
1(1) (a) EAP details and expertise	Section 1 and Appendix A
1(1) (b) Description of aspects covered	Section 4 - Project description
1(1) (c) Map	Figures 3-1, 3-2, 3-3
1(1) (d) Impact management outcomes	Section 10.2 – Purpose of EMPr
1(1) (f) Proposed impact management actions to achieve above	Section 10.8 & Table 10.1
1(1) (g) Method of monitoring implementation	Section 10.8 & Table 10.1 Section 10.9
1(1) (h) Frequency of monitoring	Section 10.8 & Table 10.1 Section 10.9
1(1) (i) Responsibility	Section 10.4 – Responsibility
1(1) (j) Time periods	Section 10.8 & Table 10.1
1(1) (k) Compliance monitoring	Section 10.8 & Table 10.1 Section 10.9
1(1) (l) Program for reporting on compliance	Section 10.8 & Table 10.1 Section 10.9
1(1) (m) Environmental awareness plan	Section 10.8 & Table 10.1

10.2 Purpose

The purpose of the Environmental Management Programme (EMPr) is to ensure that undue or reasonably avoidable adverse impacts of the project are prevented, that impacts which cannot be prevented are managed to reduce their significance and that the positive benefits of the project are enhanced.

The EMPr will therefore:

- Define the various measures to be taken during the life of the project (decommissioning and closure) in order to enhance positive and minimise/reduce adverse environmental impacts and meet the performance specifications;
- Define the actions needed to implement these measures;
- Describe how this will be achieved; and
- Allocate responsibilities.

EMPrs are important tools for ensuring that the management actions/measures arising from the EIA are clearly defined and implemented through all phases of the project.

10.3 Alterations

As EMPrs should remain dynamic and flexible, certain conditions may require the EMPr to be revised. These conditions may include the following:

- Changes in legislation;
- Published/gazetted norms and standards;
- Occurrence of unanticipated impacts or impacts of greater significance, intensity and extent than anticipated;
- Conditions in environmental authorisation or WML which do not form part of the EMPr;
- Inadequate mitigation measures, i.e. where the level of an environmental parameter is not conforming to the required level despite the implementation of the mitigation measure; and
- Secondary impacts which occur as a result of the mitigation measures.

10.4 Outcome

The impact management aims to achieve the following:

- To prevent adverse impacts – this is not possible on an industrial site and the Fe-Cr WDF is an existing facility which can impact the environment.
- To minimise negative impacts where they cannot be prevented – the closure of the existing Fe-Cr WDF will reduce potential impacts from the facility through preventing contact of water and wind with the Fe-CR waste material.
- To enhance positive impacts – the capping and closure of the Fe-Cr WDF has an overall positive impact in terms of aesthetics / visual (stable and sustainable landform that blends into the natural surroundings), air quality (no more dust from the facility), pollution prevention (free-draining and prevention of contact between material and water), erosion prevention (vegetation cover) and water management (no contact of surface water with underlying waste material and no leachate from waste material into underlying aquifer due to liner/capping).
- No leachate produced from this facility after closure.
- No impact on surface water quality from this facility after closure.
- No treatment of leachate or surface runoff from the facility required any longer.
- Release of runoff to the receiving environment without treatment and without impact.
- No impact on groundwater quality from this facility after closure.

10.5 Responsibility

The applicant and property owner, Transalloys (Pty) Ltd. will be responsible for the implementation of all mitigation and management measures as well as the compliance with this EMPr. During the decommissioning and covering phase, Transalloys (Pty) Ltd will delegate its responsibilities to the Contractor appointed for this. Each Contractor involved in the project will comply with the EMPr and will therefore appoint a Contractor's Representative (the title may vary), who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr) and conditions of authorisations/licences.

The Contractor's representative can be:

- The site agent;
- Site engineer;

- A dedicated environmental officer (EO); or
- An independent consultant.

The Contractor will ensure that the Contractor’s Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that he/she can interact effectively with other site contractors, labourers, the Environmental Control Officer (ECO), authorities and the public. The Contractor’s Representative will ensure that all sub-contractors working under the Contractor abide by the requirements of the EMPr as well as WML that may be issued.

In the event of the Contractor appointing an EO, or officers, their primary role will be to coordinate the environmental management activities of the Contractor on site. The EO may also be required to perform the following roles:

- Support the ECO in the monitoring and execution of the EMPr by maintaining a permanent presence on site;
- Inspect the site as required to ensure adherence to the management actions of the EMPr and authorisations/licences;
- Complete Site Inspection Forms on a regular basis (e.g. daily or weekly);
- Provide inputs to the regular (e.g. monthly) environment report to be prepared by the ECO;
- Liaise with the team on issues relating to implementation of, and compliance with, the EMPr and authorisations/licences;
- Maintain a record of environmental incidents (impacts, legal transgressions etc.) as well as corrective and preventive actions taken; and
- Maintain a public complaints register in which all complaints are recorded.

The conditions of the WML and EMPr must be brought to the attention of all persons (employees, workers, consultants, contractors etc.) associated with the undertaking of these activities and Transalloys (Pty) Ltd must take such measures that are necessary to bind such persons to the conditions thereof (contracts with penalties for non-compliances).

Transalloys (Pty) Ltd can further enforce this by running workshops with all employees in order to raise environmental awareness. These workshops should cover aspects such as fire prevention, strict use of ablution facilities and general duty of care. A pamphlet can be handed out on socially acceptable and environmentally responsible conduct such as water conservation, waste management etc.

Entity:	Responsible Person:	Contact details:
Transalloys (Pty) Ltd	Mr Theo Morkel (General Manager)	082 336 3665
	Mr Ephraim Monyemoratho (Environmental Manager)	013 693 8078
Environmental Control Officer (ECO)	To be appointed	Unknown
Main Contractor (to be appointed)	Environmental Officer	Unknown
Sub-contractor (to be appointed)	Environmental Officer	Unknown

10.6 Activities that require management

The following activities are activities that could cause potential impacts if not managed properly or if no mitigation measure is implemented:

- Poor management of water;
- Poor waste management;
- Random events such as fire / explosion / strikes / pandemics etc;
- Creating conditions for alien invasive species to breed or grow;
- Capping and sourcing of cover material.

10.7 Potential Impacts

10.7.1 Positive impacts of project

Positive impacts are associated with the closure of the Fe-Cr WDF:

- **Topography:** The Fe-Cr WDF will now have a stable sustainable landform with appropriate slopes, which blends in with the surroundings.
 - Slag from slag dump to the west will be used to fill the airspace in the upper surface pools and paddocks areas;
 - A convex top (termed “whaleback”) will therefore be created by filling the voids to ensure a free draining surface;
 - Benign soil (sourced from borrow pits on the property) will be used to cover and shape the existing outer slopes of the Fe-Cr WDF;
 - A uniform 1:5 slope will be created;
 - Dam footprint area will increase by 7 – 15m from the current perimeter.
- **Aesthetics:** The Fe-Cr WDF will no longer look like a WDF due to the more natural sloping topography that blends in with the surroundings as well as the vegetation covering the area.
- **Flora (vegetation):** The Fe-Cr WDF which was void of vegetation will now be covered with vegetation, which will establish, improve, become dense and grow over time and become self-sustainable.
- **Air quality:** The Fe-Cr WDF will be capped / covered and no dust from water of wind erosion will be possible. Therefore, a reduction in dust, a reduced impact on air quality and health.
- **Water quality:** The Fe-Cr WDF will now be free draining and runoff can be released to the environment (unpolluted). Also a reduction of leachate and reduced risk to ground- and surface water quality.
- **Socio-economic:** A “walkaway situation:
 - no more operational cost;
 - reduced pollution risk to air, soil, groundwater and surface water;
 - stable, sustainable and vegetated landform which blends with the surrounding non-operational areas on the Transalloys property;
 - no requirement for leachate collection and treatment; and
 - no requirement for storm water management (capturing and treatment) since the facility is free draining and the runoff is released into the receiving environment.

10.7.2 No-go impacts

- **Socio-economic:**
 - Cost associated with keeping the facility operational (water management and treatment) though it is no longer used for disposal;
 - Requirement for treatment of leachate and runoff from the facility;
 - Environmental liability; and
 - Non-compliance with legislation in the long-term.
- **Topography and aesthetics:** Visibility of WDF;
- **Air quality:**
 - Increased potential for dust from the facility as it becomes more dry and fine particles can become airborne;
 - Continued impact on air quality from dust; and
 - Continued health risk from dust and particle ingestion / inhalation.
- **Soil, surface – and groundwater:**
 - Potential for soil, surface – and groundwater pollution as underlying liner will deteriorate or be damaged with time due to exposure to the natural elements (water, wind and sun) and may become compromised and lead to polluted leachate finding its way into the underlying soil and groundwater; and
 - Cr (VI) pollution risk

10.8 Management measures

Dedicated measures have been identified to manage the impacts identified above. Transalloys (Pty) Ltd is responsible for the implementation of recommendations and mitigation/management measures and HydroScience cannot and will not take responsibility for the actions of Transalloys (Pty) Ltd or lack thereof.

Table 10-1: Identified potential impacts and proposed management measures for the decommissioning and closure of the Fe-Cr WDF

1. Environmental Awareness Training

Objectives:				
<ul style="list-style-type: none"> • Inform employees, landowners, contractors and visitors of any environmental risk which may result from their presence, work or activities, and • Inform employees, landowners, contractors and visitors of the manner in which the identified possible risks must be dealt with in order to avoid pollution or degradation of the environment and health and safety hazards. 				
Management Outcome: All on-site staff, contractors and visitors are aware of and understand the individual responsibilities in terms of this EMPr.				
Responsible person for implementation and monitoring: Environmental Manager and ECO				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> • All staff, contractors and visitors must receive environmental awareness training; • All new staff coming onto site must receive environmental awareness training; • All staff are made aware of the conditions and controls linked to the Environmental Authorisation (EA), Water Use License (WUL), Waste Management License (WML), Atmospheric Emissions License (AEL) and within the EMPr; • The responsible operator of vehicle / equipment / machinery must have the required training to make use of the spill kit in emergency situations; • All staff, contractors and visitors are made aware of their individual roles and responsibilities in achieving compliance with the EA, WUL, WML, AEL and EMPr; • The Contractor must erect and maintain information posters at key locations on site; 	<p>Presentations should be as visual as possible - it can include posters, power point presentations, videos or any other material that will assist in the training.</p>	<p>Environmental awareness training must be continuous and as soon as new staff members or contractors start on site.</p> <p>Environmental posters / signage must be on site at all times and must be visible / readable.</p>	<p>As and when required</p>	<p>Photos</p> <p>Attendance Register</p> <p>Training material</p> <p>Induction video</p>

<ul style="list-style-type: none"> • Environmental awareness training should include the following: <ul style="list-style-type: none"> i. Description of significant environmental impacts, actual or potential, related to their work activities; ii. Mitigation measures to be implemented when carrying out specific activities; iii. Emergency preparedness and response procedures (EPRP); iv. Procedures to be followed when working near or within sensitive areas; v. Water usage and conservation; vi. Solid waste management procedures; vii. Sanitation procedures. • A record of all environmental awareness training courses undertaken as part of the EMPr must be available; • Educate workers on the dangers of open and/or unattended fires; • An attendance register of all staff, contractors or visitors that received environmental awareness training must be kept; • Course material must be available and presented in all appropriate languages; • Environmental training and topics can form part of the induction or Toolbox Talks. 				
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2. Rain and Stormwater Runoff Management

Management Outcome: An effective system of storm water run-off control is implemented and impacts to the environment caused by storm water and wastewater discharges during capping are avoided.				
Potential Impacts:				
<ul style="list-style-type: none"> • Pollution of downstream watercourse (Brugspruit and its tributary) • Erosion and siltation 				
Responsible person for implementation and monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> • Appropriate pollution control is in place to prevent discharge of water potentially containing polluting matter or visible suspended solids; • Runoff from the site is strictly controlled, and contaminated water is collected (drains) and stored (RWD) for treatment / reuse; • All spillages of hydrocarbons must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriately licensed waste disposal facility (keep safe disposal certificate). • The existing channel for water conveyance around the Fe-Cr WDF will be covered during rehabilitation. A new peripheral earth channel around the Fe-Cr WDF will be constructed to convey clean run-off water to the environment and the potentially contaminated water, expected from the underdrainage pipes will be conveyed via a half pipe channel to the PCD until such time that no seepage is observed whereafter it will be closed permanently (Redco, 2021). • The stormwater drain will be covered with a vegetated topsoil cover layer to prevent erosion (Redco, 2021). • Run-off from the rehabilitated WDF will be conveyed along a peripheral earth drain. • Run-off is considered clean and will discharge into the environment at the North East corner of the facility. 	Contaminated storm water from the Fe-Cr WDF will be diverted to the existing RWD. Refer to Appendix F for Storm Water Management Plan (SWMP).	Measures already in place and to be checked during activities.	Continuous	<p>Photos</p> <p>Monitoring of Fe-Cr WDF RWD</p> <p>Monitoring of groundwater (boreholes)</p> <p>Monitoring of surface water (Brugspruit & tributary)</p>



Leachate collection



Leachate and storm water channeling around perimeter of Fe-Cr
WDF



Leachate and storm water channeling towards collection facility



Leachate and storm water collection facility (RWD)

Based on the permissible velocities as indicated in the Drainage Manual – 5th Edition – Table 5.6 for Mean annual rainfall of between 600 and 700 mm, the permissible flow velocities range from 0.6 to 0.8 m/s. The calculated flow velocities in Drain 1 and 2 is 0.6 m/s which is lower than the permissible flow velocities for clay content less than 6% and therefore no erosion in the drains are expected (Redco, 2021).

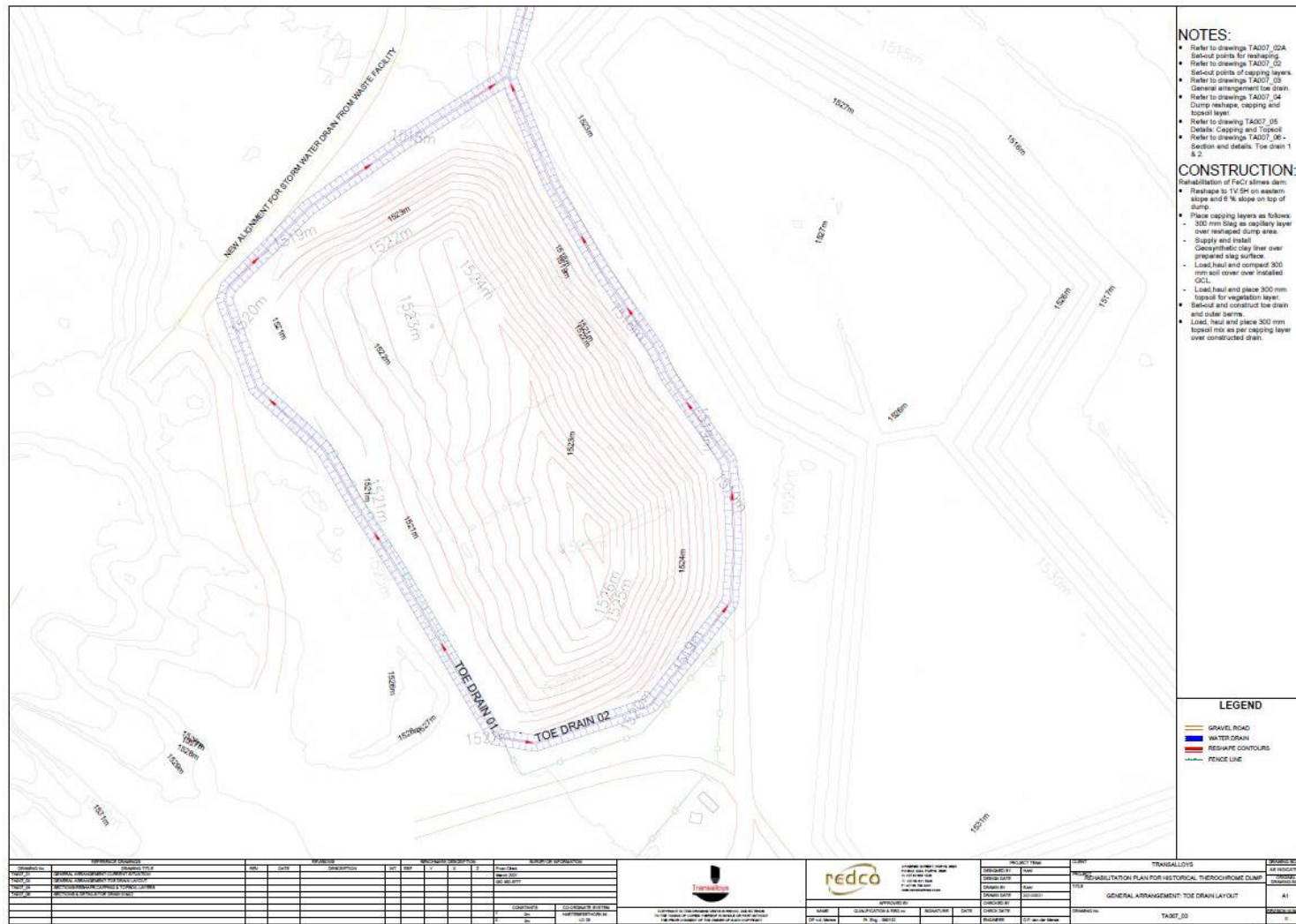


Figure 10-1: Stormwater management design after closure (Redco, 2021)



Figure 10-2: Stormwater management drainage after closure (Redco, 2021)

3. Solid Waste Management

Management Outcome: Wastes are appropriately stored, handled and safely disposed of at a licensed waste facility.				
Potential Impacts:				
<ul style="list-style-type: none"> • Pollution of soil due to inappropriate waste handling and spillage • Establishment of Alien Invasive Plant Species 				
Responsible person for implementation: Contractor during capping				
Responsible person for monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<u>General:</u> <ul style="list-style-type: none"> • All measures regarding waste management must be undertaken using an integrated waste management approach for the entire property and operation. • A suitable position must be found and clearly demarcated for waste collection and storage. <u>Prevention of waste:</u> <ul style="list-style-type: none"> • Material (such as for GLC) storage areas should be safe, secure and weather-proof to prevent damage to material (resulting in waste generation) and theft. Area with impermeable base or in sealed containers. • Due to the movement of people, there will be litter production and higher probability of littering. Therefore, there should be on-site signs raising the awareness of the impacts of littering on the natural environment and weekly litter patrols to collect litter. • Train staff/contractors to operate in an environmentally responsible manner (closing of taps for water conservation, reporting spills, no littering etc.). • No planned maintenance or servicing of vehicles / machinery / equipment on site (only in workshops). If emergency maintenance is required to on-site vehicles, machinery and/or equipment, drip trays and / or absorbent mats will be placed 	Existing Integrated Waste Management	Measures are in place and must be controlled during capping.	Continuously	Photos Documents Waste reporting to Department of Forestry, Fisheries & Environment (DFFE)

<p>underneath the vehicles / machinery / equipment where maintenance work is conducted to prevent grease/oil spillages impacting the environment or generating waste (contaminated soil).</p> <p><u>Reduction / minimisation of waste:</u></p> <ul style="list-style-type: none"> • Reduce waste quantities and disposal costs through a reduction in the materials ordered and brought to site for use in capping. • Engage with the supply chain to supply products and materials that use minimal packaging. <p><u>Reuse / recycling of waste:</u></p> <ul style="list-style-type: none"> • Separate / sort / segregate waste for collection and recycling - use clearly marked bins for material separation / sorting. Make sure that contractors are aware of the placement of the bins and their responsibility to separate / sort materials. • Though no special disposal methods are required for non-hazardous waste, non-biodegradable refuse such as glass bottles, plastic bags, etc., must be stored in suitable containers to allow for recycling and emptied on an as-required basis for recycling purposes. <p><u>Waste handling on site:</u></p> <ul style="list-style-type: none"> • Separate / segregate / sort waste into different containers. • Collect waste in suitable containers (drums / skips / bins on site). • Waste containers should be marked, or colour coded to indicate which types of waste can be disposed to it. Staff to be trained in this regard to segregate waste. • Ensure sufficient containers are available for storage of waste prior to removal off site to prevent overflow and littering on the site and surroundings. • Ensure no litter, refuse, waste and rubble generated on the premises will be placed, dumped or deposited on this site, adjacent or surrounding sites or properties. • The waste collection and storage site must be maintained in a clean and orderly fashion. • Waste must be disposed, as soon as possible to a municipal transfer station, skip or on a licensed WDF. Waste must not be allowed to stand on site to decay, resulting in malodours and 				
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<p>attracting pests. Empty containers regularly and waste should not be stored on site in excess of 30 days.</p> <ul style="list-style-type: none"> • Waste collection bins with secure covers (scavenger and weatherproof) must be used to prevent fauna entering the container. Waste containers must not be left standing without a cover as this may attract fauna to inspect the skip and possibly cause death or injury to the fauna. • Waste may not be burnt on site. • Hazardous waste must be stored separately from general waste on an impermeable surface within a bund wall and disposed of at a licensed hazardous waste site if not recycled. • Comply with the Norms and Standards for Waste Storage (GNR 926 of 29 November 2013). <p><u>Waste removal & disposal:</u></p> <ul style="list-style-type: none"> • Companies that transport the waste must be registered / licenced to do so. • Site must be easily accessible for trucks picking up or dropping off the containers / skips. • Remove waste from site for recycling or disposal to a WDF on a regular basis (at least weekly or when container is full). • No burning or burying of waste. • Any hazardous waste will be stored and handled according to the relevant legislation and only disposed to the licensed WDF. <p><u>Documentation:</u></p> <ul style="list-style-type: none"> • Report on the quantities of different waste streams managed (disposed, reuse, recycling, energy recovery). • Ensure copies of all waste manifests (safe disposal certificates) are kept, showing responsible handling, transport and disposal. • Include measure in contract that will ensure contractors are required to clean their work area after capping phase. 				
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4. Emergency Procedures

Management Outcome: Ensure emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.				
Responsible person for implementation and monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> The EPRP must deal with accidents, potential spillages, emissions and fires / explosions in line with relevant legislation. All staff must be made aware of emergency procedures as part of environmental awareness training; The relevant local authority's fire department must be made aware of a fire as soon as it starts. In the event of emergency mitigation measures being necessary to contain the spill or leak, it must be implemented as per the section below - Hazardous Substances. 	EPRP (Appendix F)	Continuous.	Continuous	Photos Documentation Incident & accident reporting

5. Hazardous Substances

Management Outcome: Safe storage, handling, use and disposal of hazardous substances.				
Potential Impacts:				
<ul style="list-style-type: none"> Contamination of soil or watercourse due to leaks/ spills 				
Responsible person for implementation: Contractor during capping; Environmental Manager during closure				
Responsible person for monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> Since Fe-Cr is a hazardous substance, efforts should be made to not disturb material during capping. Hydrocarbons (oil, grease and fuel) associated with vehicles, / machinery and equipment is also hazardous substances. All hazardous substances will be stored in suitable containers as defined in the Method Statement provided by the supplier. Containers will be clearly marked to indicate contents, quantities and safety requirements. All storage areas will be bunded. The bunded area will be of sufficient capacity to contain a spill / leak from the stored containers (110% of container capacity). An Alphabetical Hazardous Chemical Substance (HCS) control sheet will be drawn up and kept up to date on a continuous basis. All hazardous chemicals that will be used on site will have Material Safety Data Sheets (MSDS); All employees working with HCS will be trained in the safe use of the substance and according to the MSDS; Employees handling HCS must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment (PPE) must be available. Ensure that hydrocarbons are stored in appropriate storage tanks or in bowsers. 		During capping.	Continuous	Photos Incident reporting Groundwater monitoring

<ul style="list-style-type: none"> • The tanks / bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks / bowsers (110% statutory requirement plus an allowance for rainfall). • The floor of the bund must be sloped, draining to a separator. • Provision must be made for re-fuelling by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. • All empty dirty drums must be stored on a drip tray or within a bunded area. • No unauthorised access into the hazardous substances' storage areas shall be permitted. • No smoking must be allowed within the vicinity of the hazardous storage areas. • Adequate fire-fighting equipment must be made available at all hazardous storage areas. • An appropriately sized spill kit kept on-site relevant to the scale of the activity involving the use of hazardous substance must be available at all times. • The responsible operator must have the required training to make use of the spill kit in emergency situations. • In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act (Act 59 of 2008) and the Norms and Standards for waste storage (GNR 926 of 29 November 2013). 				
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6. Alien invasive vegetation

Management Outcome: Eradication of alien invasive vegetation				
Potential impacts: Encroachment and establishment of alien invasive vegetation due to disturbance and soils brought in.				
Responsible person for implementation and monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> Removal and disposal of alien invasive plant species to be conducted as required by law - Alien Invasive Species Regulations 2014 (NEMBA Act 10 of 2004) Alien invasive control and eradication plan. 	Physical removal Approved treatment	Continuously	On-going	Photos Progress on plan

7. Site Preparation – Capping

<p>Objective: Long-term stable landscape with little to no maintenance.</p> <p>The cover placed onto the modified outer slopes of the WDF must fulfil the following functions (Redco, 2021):</p> <ul style="list-style-type: none"> • Protect the integrity/stability of the modified outer slope; • Limit the ingress of air and water into material to reduce the risk of seepage arising from the footprint area of the WDF; • Separate the deposited residue from uncontaminated surface runoff from the outer slopes of the WDF; • Contribute to the aesthetic appeal of the rehabilitated WDF; • Render the rehabilitated facility maintenance free and meet the engineering criteria for physical stability. The facility may not deteriorate, erode or collapse under wind / water, frost / thaw, human activity, earthquakes etc.; and • Create safe water flows to allow contaminated water to be collected and treated using proven techniques where they are available. 				
<p>Management Outcome: Impacts on the environment are minimised when disturbance is limited to the existing WDF footprint and demarcated area.</p>				
<p>Potential Impacts:</p> <ul style="list-style-type: none"> • Activities may lead to displeasing aesthetics, such as the storage of cover materials and the use and storage of machines / vehicles / equipment • Pollution of soil and groundwater due to spills from equipment / machinery / vehicles on site 				
<p>Responsible person for implementation: Contractor during capping; Environmental Manager during closure</p> <p>Responsible person for monitoring: Environmental Manager</p>				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> • A Method Statement must be provided by the contractor prior to any on-site activity that includes: <ul style="list-style-type: none"> ○ overnight vehicle / machinery parking areas; ○ stockpile areas; ○ equipment cleaning areas (workshop); ○ eating and ablution facilities (use existing); ○ waste management; ○ access route. • Remain with demarcated area (site footprint); • Site is located on previously disturbed areas; 	Area identified. The Fe-CR WDF within the waste management area	Before and during capping	Daily	Photos

<ul style="list-style-type: none"> • If possible, no temporary facilities or portable toilets to be setup due to existing facilities available; • No staff / contractors to be accommodated on the property; • Signs (safety) have been erected throughout the waste management area; • Housekeeping should be done daily. • All soil material used for capping will be sourced from a borrow pit on the Transalloys property. • Vehicles / machinery / equipment used on, or entering the site, must be maintained and serviced to ensure no emissions of smoke or fumes. No idling. • The GCL once covered, will not be exposed to UV and therefore the risk of UV breakdown is eliminated. • Long-term performance of GLC exceed 300 years (Redco, 2021). • A pilot mixture of topsoil will be tested for the correct particle size distribution before and then continuously during placement to ensure that an erosion resistant layer is placed (Redco, 2021). 				
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Table 10-1: Factors of safety of interface shear GLC (Redco, 2021)

Density of cover material	17 kN/m ³
Depth of cover material	0.6m
Maximum length of slope between anchors	40m
Angle of slope	11 ^o
Friction angle of fill material	36.5 ^o
Internal friction of X800 GLC	25 ^o
Cohesion factor	0
Calculated factor of safety	2.93 is above the target factor of safety of 1.5 – geosynthetic clay liner (GCL) is acceptable

8. Borrow pits for capping material – soil & topography

Investigation: Geotechnical investigation (Knight Piesold, 2016) to identify possible borrow pit areas for suitable cover material.				
Management Outcome: Impacts on the environment are minimised during sourcing of fine-grained impermeable soil material for cover.				
Potential Impacts: Capping material requires a fine-grained impermeable soil to prohibit the flow of surface water into the dump. Such material needs to be sourced from site (excavated areas) or off-site (cost). An area of 25 000m ² (2.5ha) will be disturbed to obtain 50 000m ³ of material for capping.				
Responsible person for implementation: Contractor during capping Responsible person for monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> No groundwater was intercepted in the twelve (12) test pits excavated and there is therefore no risk of the pits collapsing. Residual shale soil found on site (TP4, TP10, TP11, TP12) was identified as suitable to utilise for the capping material. Borrow pits will be demarcated (chevron tape) during sourcing of material (excavation) to ensure visibility for safety. Vehicles transporting material must be limited to one path to reduce compaction of soil, which increases surface runoff. Embankments and/or diversion drains must be established around excavation areas and stockpiles to divert surface runoff away from the lowest lying points and excavations to avoid ponding and prevent sediments/fine soil particles from washing away. Soil removed and not destined to be used for cover will be stockpiled to be used during rehabilitation. Stockpiling of material should be in the same sequence as what it was removed in. Borrow pits will be filled and rehabilitated once material required has been taken. Topsoil will be replaced to ensure the re-establishment of vegetation. 	Area identified.	Before and during capping	Daily	Photos

9. Communication

Management Outcome: Proper communication with landowners, neighbours and the public				
Responsible person for implementation and monitoring: Environmental Manager				
Impact Management Actions	Implementation		Monitoring	
	Method of Implementation	Timeframe for Implementation	Frequency	Evidence of Compliance
<ul style="list-style-type: none"> Notify landowners, neighbours and councillors at least 7 days before capping activities start. Keep a complaints register on site. A notice board should be visible at the security entrance with the contact information of the Emergency Contact. 	Telephone calls Emails Notifications/ Posters	Continuously	Continuously	Photos Emails Signed attendance registers

10.9 Monitoring programme

10.9.1 Surface Water Monitoring

Surface water monitoring will continue as is currently the case. Drinking water is monitored on a monthly basis. Transalloys has sixteen (16) existing surface water monitoring points as part of its monitoring programme. Their positions are indicated on Figure 10-1 and they include:

- Environmental monitoring points in natural water courses:
 - On Brugspruit (eastern tributary), upstream of Transalloys' operations in Clewer (S1)
 - On Brugspruit (eastern tributary), along Transalloys access road at the bridge (S2)
 - Western tributary at raw material storage area on Transalloys' property (S3)
 - Western tributary before confluence but past Transalloys' operation (S4)
 - Confluence of two streams - Brugspruit confluence at N4 (S5)
- Industrial water monitoring points:
 - S6 – S9 in plant area
 - Pollution Control Dam (S10)
 - Evaporation Pond (S11)
 - S12 – S16 around WDF, with S14 being the Fe-Cr WDF RWD and S15 being the drain between the Fe-Cr WDF and its RWD.

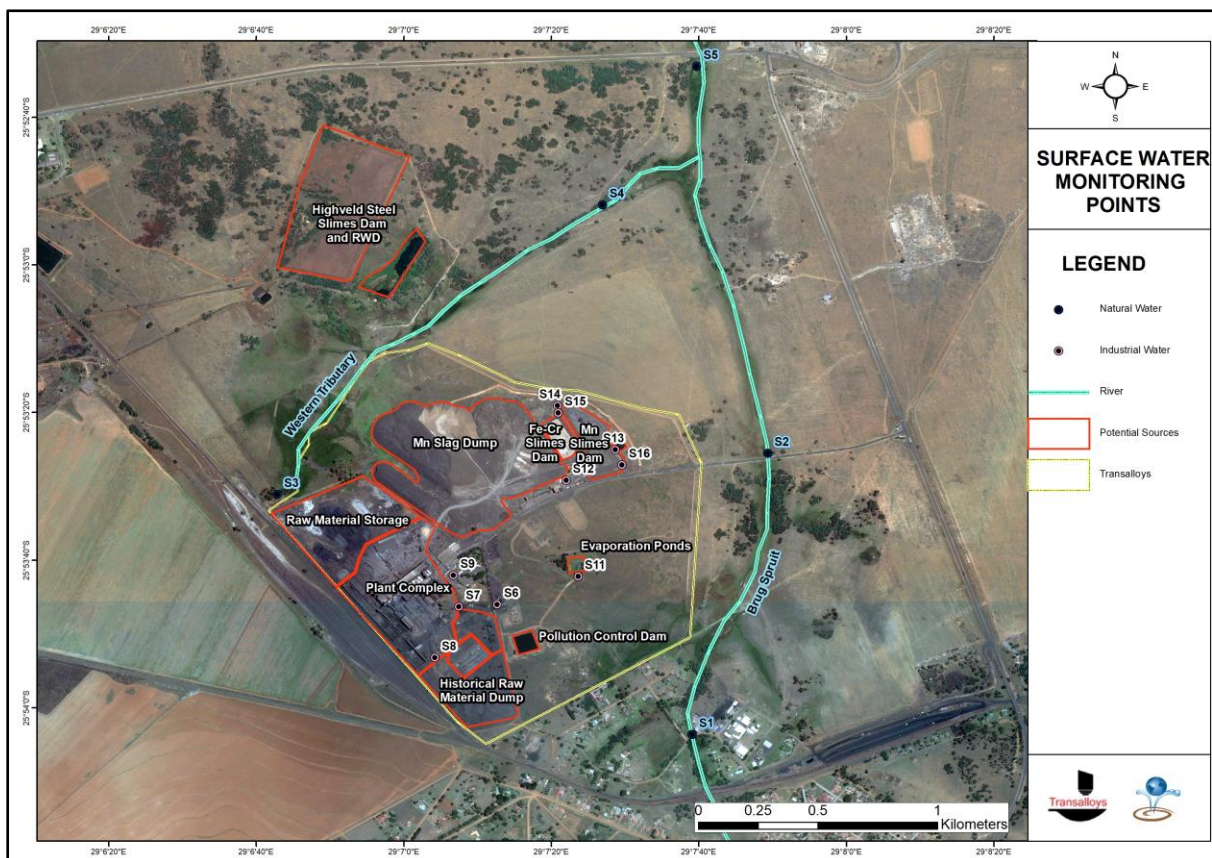


Figure 10-1: Transalloys' surface water monitoring points (MvB Consulting, 2021)

Biomonitoring is conducted at five (5) points (Figure 10-2):

- On Brugspruit (eastern tributary), upstream of Transalloys operations in Clewer (TRANS1 – same as S1)
- On Brugspruit (eastern tributary), along Transalloys access road at the bridge (TRANS2 – same as S2)
- On Brugspruit (eastern tributary), before confluence (TRANS3)
- Western tributary before confluence at Transalloys’ plant (TRANS4)
- Confluence of two streams - Brugspruit confluence at N4 (TRANS5 – same as S5)

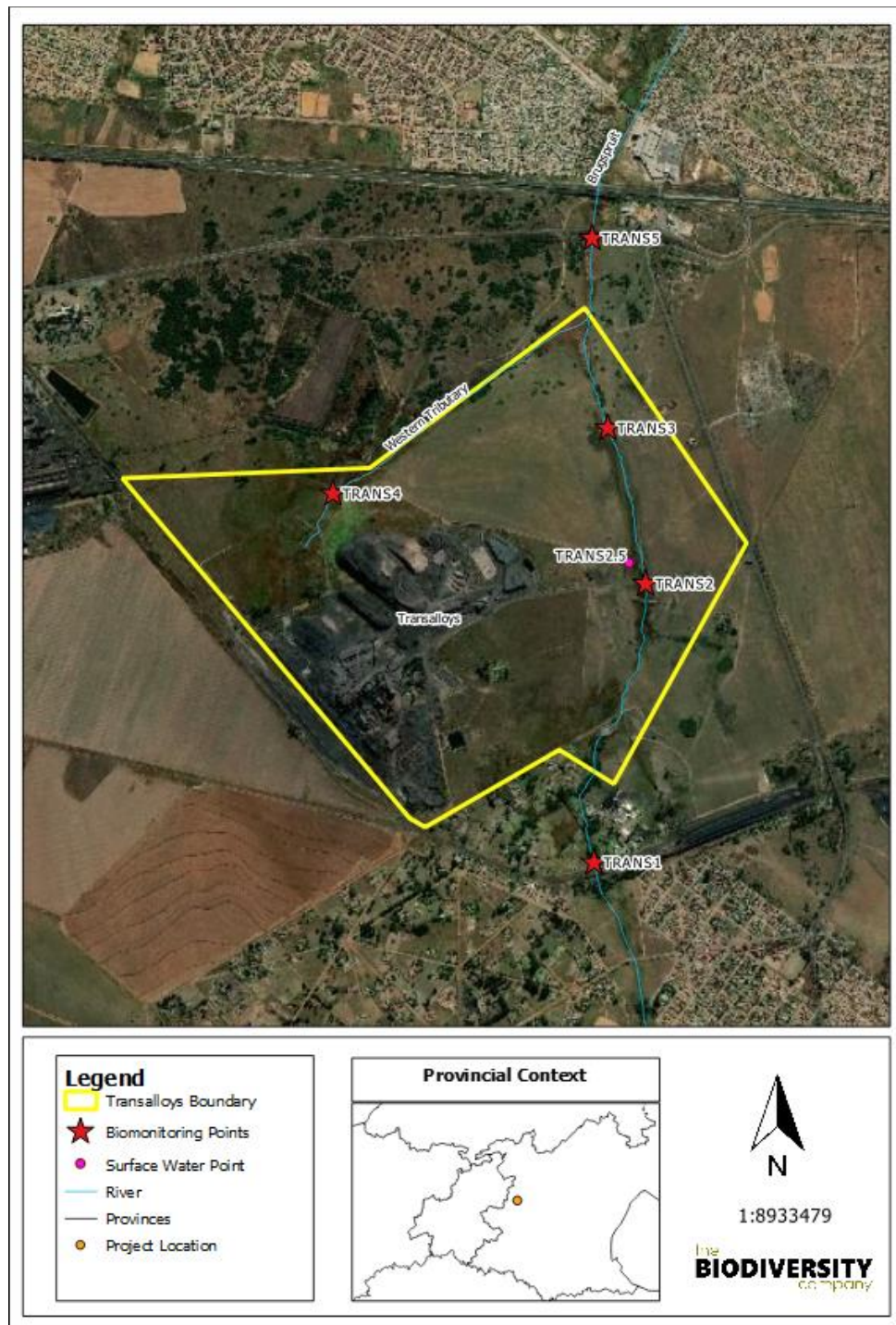


Figure 10-2: Transalloys’ biomonitors points (TBC, 2021)

10.9.2 Groundwater Monitoring

Groundwater monitoring will continue as is currently the case. Transalloys has thirty four (34) existing groundwater monitoring points (some monitor shallow (S) and deep (D)) as part of its monitoring programme. Their positions are indicated on Figure 10-3 and they include:

- Boreholes around the raw material storage area (RBH1C, RBH2 & RBH6)
- Boreholes around the historical raw material dump (RGC1, RBH1A, RBH1B & RBH7)
- Boreholes around the PCD and evaporation pond (RGC2S, RGC2D, RBH4S, RBH4D, RGC3S, RGC3D, TA1S, TA1D, TA2S, TA2D)
- Boreholes around WDF (BH1, BH2, BH3, BH4, RGC7S, RGC7D, RBH3D, RGC8S, RGC8D)
- Boreholes off and downstream of the property and operations (RGC4, RGC5, RBH5S, RBH5D, RGC6, RGC9S, RGC9D)

Of specific importance to the Fe-Cr WDF and monitoring after closure is BH2, BH3 and RBH3D directly downgradient of the facility and RGC5 and RGC6 further downgradient towards the surface water sources. Groundwater quality should not be impacted or improve due to the closure of the Fe-Cr WDF since the facility will be capped thereby reducing the contact of the material with storm and rain water.

Additional monitoring for the project: An additional monitoring borehole should be drilled immediately downstream from the Fe-Cr WDF not further than 25m from the facility for early detection of any potential leakages. It is further recommended to seal BH3 after closure of the larger facility to prevent groundwater abstraction from this borehole (Artesium, 2021).

The discharge from the underdrainage system, the discharge pipes currently located through the HDPE lined starter wall, will be extended and discharge into a HDPE half pipe which will convey dirty water to the existing PCD. Once no seepage is visible, the drainage pipe will be closed (cut off along the rehabilitated slope and plugged using a cementitious grout) and no dirty water is expected to be discharged from the facility (Redco, 2021).

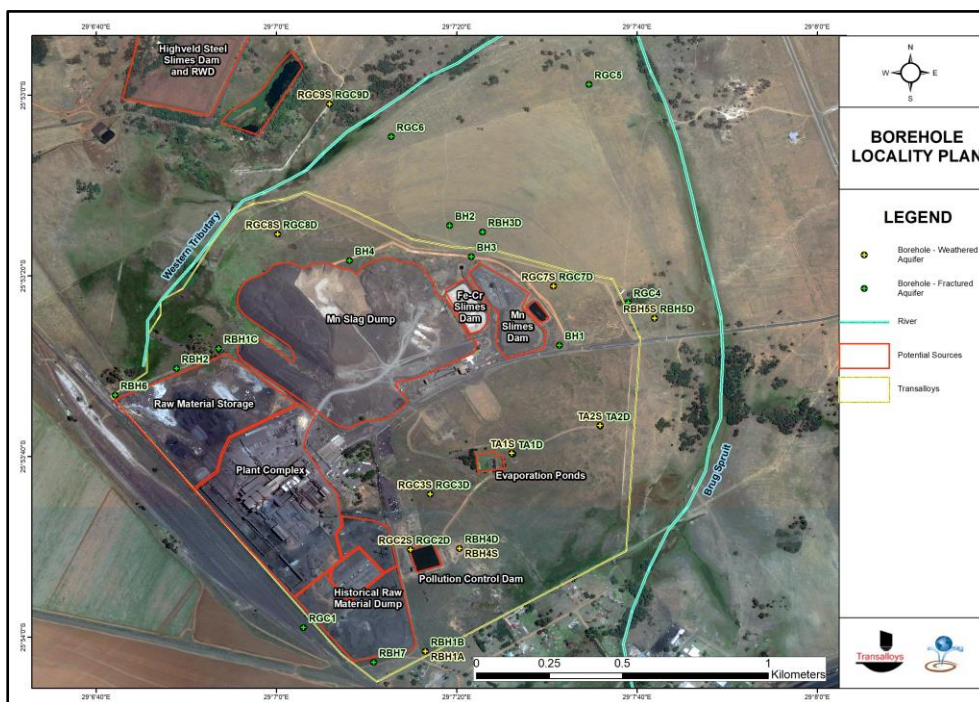


Figure 10-3: Transalloys' groundwater monitoring points (MvB Consulting, 2021)

10.9.3 Air Monitoring

Air monitoring will continue as is currently the case. Plant emissions monitoring (not relevant to this project) is conducted as per legislation requirements. Transalloys has seven (7) existing air monitoring points as part of its monitoring programme for dust and PM₁₀ (dust buckets). Elementary analysis of the dust fallout is also conducted at least twice a year though not a legal requirement. Their positions are indicated on Figure 10-4 and they include:

- Residential
 - Clewer Creche
 - Clewer Primary School
- Non-residential
 - Historical Dump
 - PCD
 - Slimes Dam
 - Transalloys Main Entrance
 - FPP – Stand Block

Transalloys further has two (2) E-samplers, one at the Truck Stop and one at Clewer Primary School. Their positions are also indicated on Figure 10-4.



Figure 10-4: Transalloys' dust and PM₁₀ monitoring points (Skyside, 2021)

10.9.4 Other monitoring

Site inspections: The site will be inspected monthly after capping to check for the following by completing a site inspection checklist / form:

- Theft / vandalism / damage
- Liner / cover integrity – damage by humans or weather or vegetation, compromising the liner integrity.
- Vegetation establishment on cover – growth, areas requiring reseeding or re-establishment of vegetation due to bare patches.

- During capping, the site engineer for the contractor will inspect to ensure layers of covering are placed in the correct order and thicknesses as per design engineering specifications. After completion, the site engineer will sign a completion of works and drawings to confirm.

Environmental incident register: Accurate and up-to-date records will be kept (by the EO or other appointed contractor's representative) of all malfunctions / actions resulting in non-compliance with the EMPr, environmental authorisation or license condition. Transalloys has a standard incident reporting report.

Complaints register: Complaints will be recorded in a complaints register (name, contact details, date, details of complaint) and investigated as is currently the case. After investigation, a formal response will be provided to the complainant and measures taken to rectify the situation will be recorded in the complaints register. A complaints register is already kept on the Transalloys (Pty) Ltd site. Transalloys also has an environmental hotline (0800 212 009) to log complaints. The hotline is manned 24/7 by an external service provider. The service is fully outsourced. Email is transalloys@hotline.co.za.

Occupational Health and Safety Act (OHSA) compliance as is currently the case:

- Register to indicate that all the employees and contractors have been informed as to their rights under the Act; and
- Accident records as per the Act - reported to the Department of Trade and Industry (DTI) and the Department of Labour (DOL).

Transalloys (Pty) Ltd will also, within 24 hours, ensure that the relevant authorities (DFFE, MDARDLEA, NDM, DWS, DOL, DTI etc.) are notified of the occurrence or detection of any incident which has the potential to cause, or has caused pollution of the environment, health or safety risks or which is a contravention of the EMPr, or any environmental authorisation or license condition. Transalloys (Pty) Ltd is then to submit an action plan indicating measures, which will be taken to:

- Correct the impacts resulting from the incident;
- Prevent the incident from causing any further impact; and
- Prevent a recurrence of a similar incident.

10.9.5 Additional monitoring and recording required for project

Compliance with EMPr and environmental authorisation / WML - appoint an Environmental Control Officer (ECO) for the capping phase.

An additional monitoring borehole should be drilled immediately downstream from the Fe-Cr WDF not further than 25m from the facility for early detection of any potential leakages.

During capping, the site engineer for the contractor will inspect to ensure layers of covering are placed in the correct order and thicknesses as per design engineering specifications. After completion, the site engineer will sign a completion of works and drawings to confirm.

10.10 Record keeping and reporting

All monitoring records are kept for at least five (5) years.

Review monitoring programme every two (2) years).

11 CONCLUSIONS & RECOMMENDATIONS

Transalloys is an ISO 14001:2015 certified operational site complying with the requirements of this standard, with all the necessary access control, security and management measures in place required by an industrial site for storm water management, emergency management and waste management.

The decommissioning and closure of the Fe-Cr WDF at Transalloys is required since the facility is no longer used for disposal (has not been used for the last 10 years) and remains an environmental liability until closed. The facility is inactive / non-operational and can be decommissioned since Transalloys does not produce Fe-Cr any more. Closing the facility will significantly reduce any potential erosion or air pollution (dust) or water pollution from the facility and emphasises the need for the project.

No alternatives were considered since it is an existing facility to be closed.

The following will remain the same:

- Land use: Land use will remain industrial since other industrial operations associated with Transalloys (Pty) Ltd will continue.
- Noise: Noise will remain due to industrial operations associated with Transalloys (Pty) Ltd continuing.
- Safety & security: Safety and security measures will remain in place due to industrial operations associated with Transalloys (Pty) Ltd continuing.
- Water management and monitoring: Water management and monitoring measures will remain in place. The underlying liner established during the construction of the Fe-Cr WDF will also remain in place to protect the soil and groundwater from any potential contamination.

Not proceeding with the project has the following adverse impacts:

- Socio-economic:
 - Cost associated with keeping the facility operational (water management and treatment) though it is no longer used for disposal (cost but no benefit);
 - Requirement for treatment of leachate and runoff from the facility;
 - Environmental liability; and
 - Non-compliance with legislation in the long-term.
- Topography and aesthetics: Visibility of WDF.
- Air quality:
 - Increased potential for dust from the facility as it becomes more dry and fine particles can become airborne;
 - Continued impact on air quality from dust; and
 - Continued health risks from dust and particle ingestion / inhalation.
- Soil, surface – and groundwater:
 - Potential for soil, surface – and groundwater pollution as underlying liner will deteriorate or be damaged with time due to exposure to the natural elements (water, wind and sun) and may become compromised and lead to polluted leachate finding its way into the underlying soil and groundwater; and
 - Cr (VI) pollution risk

Positive impacts are associated with the closure of the Fe-Cr WDF:

- Topography: The Fe-Cr WDF will now have a stable sustainable landform with appropriate slopes, which blends in with the surroundings.
 - Slag from slag dump to the west will be used to fill the airspace in the upper surface pools and paddocks areas;

- A convex top (termed “whaleback”) will therefore be created by filling the voids to ensure a free draining surface;
- Benign soil (sourced from borrow pits on the property) will be used to cover and shape the existing outer slopes of the Fe-Cr WDF;
- A uniform 1:5 slope will be created;
- Dam footprint area will increase by 7 – 15m from the current perimeter.
- Aesthetics: The Fe-Cr WDF will no longer look like a WDF due to the more natural sloping topography that blends in with the surroundings as well as the vegetation covering the area.
- Flora (vegetation): The Fe-Cr WDF which is void of vegetation will with closure be covered with vegetation, which will establish, improve, become dense and grow over time and become self-sustainable.
- Air quality: The Fe-Cr WDF will be capped / covered and no dust from water of wind erosion will be possible. Therefore, a reduction in dust, a reduced impact on air quality and health.
- Water quality: The Fe-Cr WDF will now be free draining and runoff can be released to the environment (unpolluted). Also a reduction of leachate and reduced risk to ground- and surface water quality.
- Socio-economic: A “walkaway” situation:
 - no more operational cost;
 - reduced pollution risk to air, soil, groundwater and surface water;
 - stable, sustainable and vegetated landform which blends in with the surrounding non-operational areas on the Transalloys property;
 - no requirement for leachate collection and treatment; and
 - no requirement for storm water management (capturing and treatment) since the facility is free draining and the runoff is released into the receiving environment.

The decommissioning and closure of the Fe-Cr WDF will therefore not adversely impact the socio-economic or biophysical environment to such an extent that it cannot be mitigated or managed (Section 10 of this report). Impacts of the decommissioning and closure of the Fe-Cr WDF were found to be positive or unchanged.

Transalloys has a monitoring programme in place for environmental aspects such as surface water, groundwater and air which will alert to any impact to implement additional management measures timeously.

Artesium (2021) indicates that the latest available hydrochemical data from March 2019 to June 2021, shows no Chromium or Hexavalent Chromium detected in the groundwater or surface water monitoring points in the Burgspruit downstream of the Fe-Cr facility. It is difficult to isolate the impacts from the Fe-Cr WDF, but the groundwater quality in the closest monitoring boreholes was compared to the water in the Fe-Cr WDF return water dam (RWD, S14) and the drain from the Fe-Cr WDF to the RWD (S15). These were considered source water (with a TDS of 900 mg/l, no detectable Mn, Cr or Cr(VI)) and therefore representative of the seepage currently emanating from the Fe-Cr WDF. There is no clear indication that the Fe-Cr WDF or its RWD is impacting on the groundwater (and therefore surface water). This is most likely due to both facilities being lined.

A detailed waste assessment and review of the groundwater monitoring data concluded that the Fe-Cr WDF is not considered a significant source of contamination and does not contribute significantly (if at all) to the impact on the groundwater (and therefore also surface water) (MvB Consulting, 2021).

However, as long as the facility is not properly closed, it remains an environmental liability and potential pollution source for water and air.

MvB Consulting (2021) modelled the impact if the Fe-Cr WDF is unlined (worst-case scenario, in case the lining deteriorates or is damaged). The modelling results indicated that the Fe-Cr WDF will impact on groundwater quality even in the absence of other impacts (MvB Consulting, 2021).

Artesium (2021) used a 100-year period to calculate Cr (VI) transport. The analysis assumed free leakage from the system in the future when the synthetic liner has degraded with time. Cr (VI) will be transported 34 m in the weathered aquifer and 15 m in the fractured aquifer. If no artificial gradient is caused, the Cr (VI) would likely never reach the Brugspruit and its tributary as the main receptors. The risk assessment indicated that there could be a future impact within a 250 m zone from the Fe-Cr WDF site should the liner degrade in the future.

Degradation or damage to the existing liner and subsequent pollution of groundwater are real possibilities, if the facility is not closed. A 250m groundwater buffer from the Fe-Cr WDF is recommended by Artesium (2021) to prohibit pumping of groundwater and influencing the existing groundwater pollution plume.

Redco (2021) set the following closure objectives in terms of the engineering design:

- Prevent or minimise adverse long-term environmental impacts;
- Create a self-sustaining natural ecosystem or alternate land use;
- Protect the environment, public health and social economic aspects by using safe and responsible closure practices;
- Reduce or eliminate adverse environmental effects once Transalloys ceases operations;
- Reduce the need for long-term monitoring and maintenance by establishing effective physical and chemical stability of disturbed areas;
- Provide a basis in order to determine accurate costs for site closure provisioning which include demolition and disposal of fixed plant or infrastructure, and completing of civil rehabilitation and remedial works;
- Satisfy internal and external stakeholder requirements for closure planning and cost provision;
- Identify and document the legal requirements, liabilities, commitments, completion criteria for closure and assumptions made in developing the plan;
- Provide the basis for the ongoing review of closure concepts and closure provisioning;
- Identify opportunities of progressive rehabilitation and cost savings through synergies with existing or planned developments;
- Identify further research, investigations or clarification of closure concepts to ensure closure is achievable and effective and optimum use of available resources and technology are made;
- Ensure through a consultative process that the plan developed is technically achievable, agreed to and followed during the operating life to minimize reworking and life-of-plant costs;
- Provide a tool for the input by I&APs and the development of agreed post operational completion criteria and/or land use objectives; and
- Identify possible sustainable alternative post closure uses for current infrastructure.

11.1 EAP Opinion

It is the opinion of the EAP that the project may continue since it is an existing industrial operation with all the necessary management measures and water and air quality monitoring already in place and the project will only have positive impacts if implemented based on engineering designs.

11.2 Conditions

The project can be authorised under the following conditions:

- Compliance with EMPr.
- Continue with monitoring as per existing monitoring programmes (surface water, groundwater, air) in EMPr with additional monitoring as recommended by Artesium (2021).
- An additional monitoring borehole should be drilled immediately downstream from the Fe-Cr WDF not further than 25m from the facility for early detection of any potential leakages. It is further recommended to seal BH3 after closure of the larger facility to prevent groundwater abstraction from this borehole (Artesium, 2021).
- Compile a construction quality assurance plan so as to minimise the risk of reduced performance and maintain the design objectives (Redco, 2021).
- The operational phase may further influence the performance of the barrier system and should be addressed in the operation and maintenance plan and confirmed by monitoring (as per Section 10.9) over the short and long term (Redco, 2021).
- Quality assurance and assurance as per the Redco, 2021 recommendations (Section 6 of the Redco report) including test pad and dry density and moisture content tests, thickness of layers, GLC, repairs, patching etc.
- Survey upon completion and produce as-built drawings signed off by the engineer for submission to the authorities.

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