WATER USE LICENCE APPLICATION SUMMARY

NAME OF APPLICANT:

Cato Ridge Development Company Limited

PROJECT:

Cato Ridge Land Development and Release Project

Compiled by:

Silindile Sibiya

DRAFT WULA SUMMARY REPORT

Zutari (Pty) Ltd

Signature:
Date: 25 August 2023

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List of Acronyms and Abbreviations

Term	Description
CMS	Catchment Management Strategy
CVB	Channel Valley Bottom
CRDC	Cato Ridge Development Company Limited
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioners
ECA	Environmental Conservation Act
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programmes
ES	Ecological Sensitivity
PFS	Pre-Feasibility Study
GQM	Groundwater Quality Management
HGM	Hydrogeomorphic
I&APs	Interested and Affected Parties
IAIAsa	International Association for Impact Assessment South Africa
IAP	Invasive Alien Plants
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IHI	In stream Habitat Integrity
IWMSA	Institute of Waste Management of Southern Africa
IWUL	Integrated Water Use Licence
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MWWTW	Mini Wastewater Treatment Works
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NWA	National Water Act (Act No. 36 of 1998)
NEMWA	National Environmental Management Waste Act (Act No 59.2008)
NWRS	National Water Resource Strategy
PES	Present Ecological State
PPP	Public Participation Process
SACNASP	South African Council for Natural Scientific Professions
SBR	Sequencing Batch Reactor
SWMP	Storm Water Management Plan
TDS	Total Dissolved Solids
UVB	Unchanneled Valley Bottom
VEGRAI	Riparian Vegetation Response Assessment Index
WQ	Water Quality
WQA	Water Quality Assessments
WTP	Water Treatment Plant

1. Applicant details

Table 1: Applicant details

Contact Details	
Company Name	Cato Ridge Development Company Limited (CRDC)
Responsible Person	Mr Werner Botha
Position	Property Manager
Postal Address	24 Impala Road Chislehurston Johannesburg 2196
Telephone	011 779 1000/082 411 1656
Email	wernerb@feralloys.co.za
DWS Ref. No	WU26945

2. Person submitting application

Table 2: Environmental Assessment Practitioner

Company/Consultant Name	Zutari (Pty) Ltd	
Responsible Person	Roshantha Kolapen	
Company Registered address	Riverwalk Office Park, 41 Matroosberg Rd Ashlea Gardens, Ext 6 Pretoria 0081	
Postal Address	P.O. Box 74381 Lynnwood Rid 0040	
Telephone	+27 (0) 12 427 2170 / +27 (0) 12 427 2904	
Facsimile	+27 (0) 86 556 0521	
Email	Roshantha.Kolapen@zutari.com / Siphamandla.Mzolo@zutari.com	
Professional Affiliation	Roshantha Kolapen	• South African Council for Natural Scientific Professions (SACNASP) • International Association for Impact Assessment South Africa (IAIAsa)
	Michele Muller	• Professional Natural Scientist, South African Council for Natural Scientific Professions • Member, Water Institute of South Africa (SACNASP) • Member, Institute of Waste Management of Southern Africa
	Siphamandla Mzolo	• International Association for Impact Assessment South Africa (IAIAsa

3. Background and purpose

The Cato Ridge Development Company Ltd (CRDC), a wholly owned subsidiary of Assmang (Pty) Limited (Assmang), proposes to release a portion of its land in the Cato Ridge area for the development of a light industrial, logistics, commercial, warehousing and distribution precinct. The proposed Cato Ridge Land Development and Release Project (The Project) is located within the Cato Ridge area, in the eThekwini Metropolitan Municipality, KwaZulu Natal.

The Project would entail the development of a 351-ha light industrial, logistics, commercial, warehousing and distribution precinct including roads, electricity, water, sewer, wastewater treatment, and stormwater services and the lease or sale of serviced industrial sites to third-party end-users for development and use. The study area (project site) is a greenfield site, comprising of individual land parcels, and currently these land parcels are vacant. CRDC is the landowner and is responsible for caretaking of and managing these land parcels.

The applicant, CRDC, who is the current landowner must obtain an IWUL for the construction of bulk infrastructure required to service a three-phase light industrial, commercial and logistics precinct with bulk service connections. Serviced industrial/commercial erven would be sold or leased to end-users either individually or collectively. To construct and operate the bulk infrastructure as per the phased approach, the project requires an IWUL to authorise the proposed water uses in terms of the NWA.

The following water uses are triggered by the project in terms of the National Water Act (Act 36 of 1998):

- Section 21 (c) & (i): Impeding or diverting the flow of water in a watercourse; and/ or Altering the bed, banks, course or characteristics of a watercourse;
- Section 21 (f): Discharging waste or water containing waste into a water resource;
- Section 21 (g): Disposing of waste in a manner that may detrimentally impact on a water resource.

There is no Existing Lawful Use (ELU) for the proposed development site.

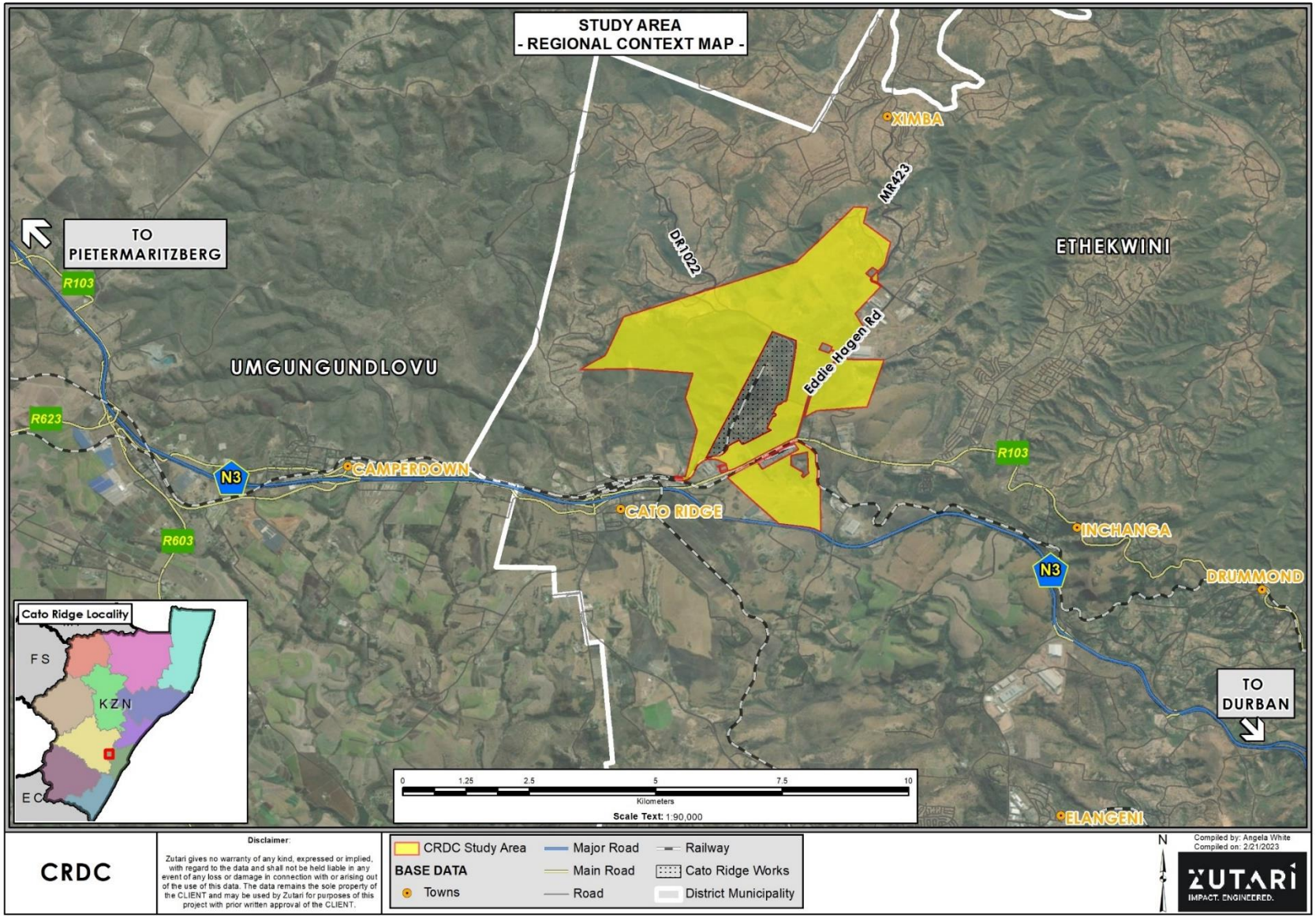


Figure 1: Regional context of the study area

4. Location of water uses

The project in respect of which this water use licence application is submitted is located in the KwaZulu-Natal Province, near Cato Ridge. The water uses will take place on various farm portions as described on Table 3. The project falls within the Pongola Mtamvuna water management area which forms part of the U20L and U60C quaternary catchment.

Table 3: Property details

Property description	Title Deed number	Owner
Portion 41 of Farm (852) Uitkomst and Doornrug	*818/198*	Assmang Limited No.1935/007343/06
Portion 0 of Farm (852) Uitkomst and Doornrug	1048/1986	Assmang Limited No.1935/007343/06
Portion 27 of Farm (851) Riet Vallei	1420/1980	Assmang Limited No.1935/007343/06
Portion 25 of Farm (851) Riet Vallei	1420/1980	Assmang Limited No.1935/007343/06
Portion 26 of Farm (851) Riet Vallei	1420/1980	Assmang Limited No.1935/007343/06
Portion 29 of Farm (852) Uitkomst and Doornrug	T4349/1922	Assmang Limited No.1935/007343/06
Portion 26 of Farm (852) Uitkomst and Doornrug		Assmang Limited No.1935/007343/06
Remaining Extent of Erf 50 (Cato Ridge)	T7409/1960	Assmang Limited No.1935/007343/06
Portion 40 of Farm (852) Uitkomst and Doornrug		Assmang Limited No.1935/007343/06
Remining Extent (29) of Farm (852) Uitkomst and Doornrug	T7405/1960	Assmang Limited No.1935/007343/06

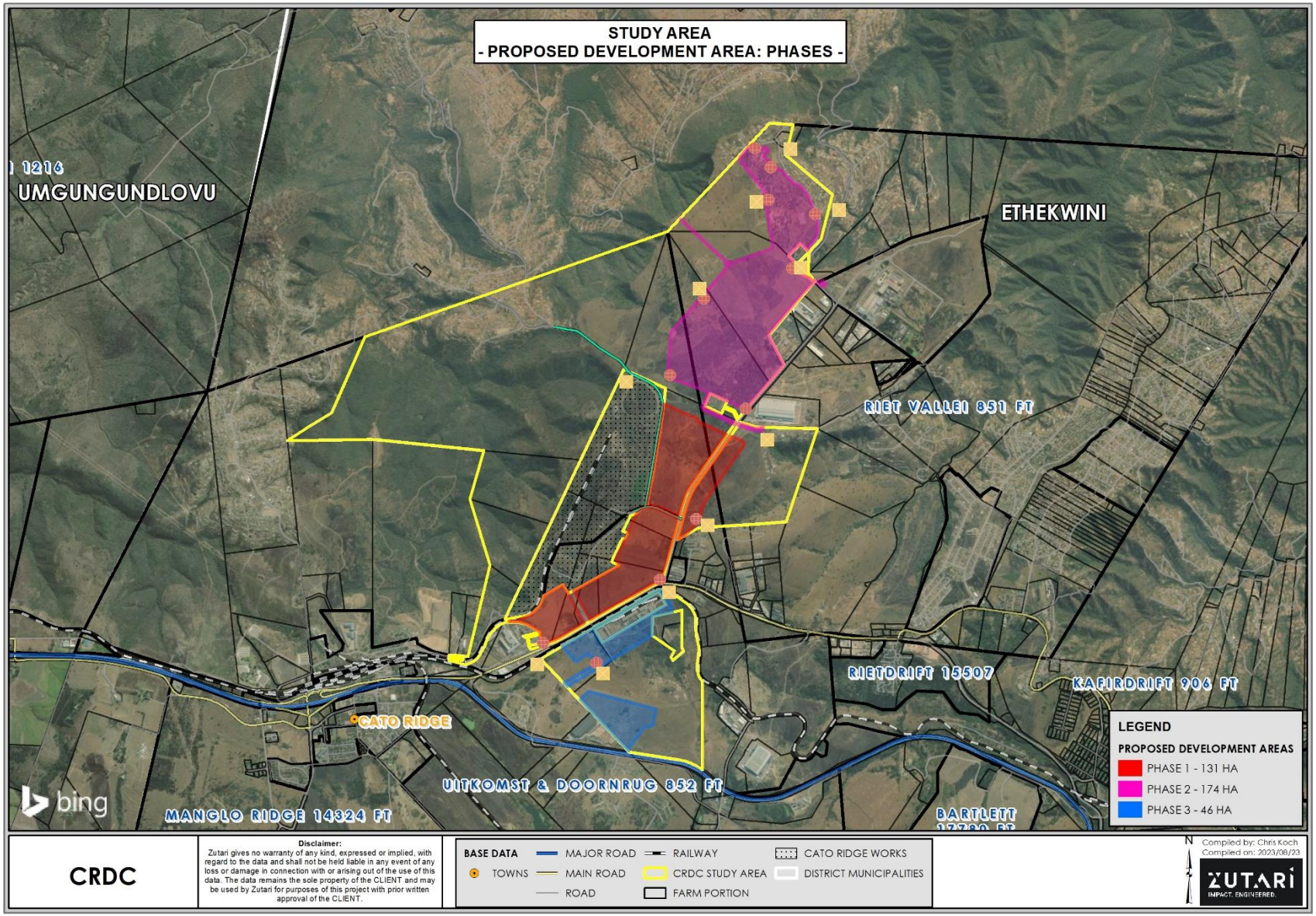


Figure 2: Proposed development area

5. Administrative documents and technical reports submitted by applicants

5.1 Administrative documents

The following administrative documents will be submitted in support of this application:

- Letter of appointment
- Title deed/s of properties
- Invoice of application fee
- Applicants ID Copy

5.2 Reports and other technical documents

Table 4: Reports and other technical documents

Report Title	Compiler	Date of Report
Hydropedology Assessment	GCS Water and Environment (Pty) Ltd	April 2023
Wetland and Aquatic Assessment	Eco-Pulse Environmental Consulting Services	March 2023
Hydrology	Nature Stamp	March 2023
Geohydrology	Geo-measure Group (Pty) Ltd	March 2023
Biodiversity Offset	Eco-Pulse Environmental Consulting Services	June 2023
Geotechnical	Zutari, previously Aurecon South Africa	February 2020
Flood line Study	Zutari, previously Aurecon South Africa	October 2019
Engineering Design Report	Kantey & Templer (Pty) Ltd	October 2022
Stormwater Management Plan	Kantey & Templer (Pty) Ltd	April 2023

6. Project Description

The Project will entail the development of a 351-Hectare (ha) light industrial, logistics, commercial, warehousing and distribution precinct including roads, electricity, water, sewers, wastewater treatment, and stormwater services and the lease or sale of serviced industrial sites to third-party end-users for development and use. The development would be undertaken in three phases, the first 131-ha would be developed over the first 10 years known as Phase 1, 174-ha developed over the 11-20-year horizon as Phase 2 and the remaining 46-ha in the 21–25-year period as Phase 3 (note that Phase 3 may also be sold off and developed alongside Phase 1 in the initial period). The applicant wishes to obtain an Integrated Water Use License (IWUL) to authorise the establishment of bulk infrastructure required to service the full extent of this mixed land use development.

Table 5: Triggered Water Uses

Section 21 water uses (NWA)		
Water use	**Purpose**	**Details**
Section 21 (c) & (i): Impeding or diverting the flow of water in a watercourse; and/ or altering the bed, banks, course or characteristics of a watercourse.	Infrastructure located within 500m of a regulated area (wetland)	Stormwater pipelines, channels and manholes
		Raw water pipelines
		Internal streets
		Overhead powerlines
		Sewer pipelines
		Stormwater attenuation ponds
		Mini Wastewater Treatment Works (i.e., an onsite sewage treatment plant) (MWWTW); and
		Treated sewage water (effluent) discharge point and erosion protection structures

Section 21 water uses (NWA)		
Water use	**Purpose**	**Details**
	Infrastructure within the wetlands, drainage lines and 33m buffer of the drainage lines	Erosion protection structures (stormwater discharge points and effluent discharge point)
Section 21 (f): Discharging waste or water containing waste into a water resource	Treated sewage water (effluent) discharge point	Effluent discharged into a drainage line
Section 21 (g): Disposing of waste in a manner that may detrimentally impact on a water resource	Treating sewage Storage of sludge	Mini Wastewater Treatment Works (MWWTW)
		Pumps and Sump stations

7. Methods statement (only for c and i activity) and mining method/ industrial process

All developers (ultimate sites/Erf owners or tenant) will be responsible for their own stormwater design and attenuation infrastructure. This standard condition will be included in all Purchase or Rental Agreements for each site/Erf. The stormwater design and stormwater management plan must be submitted to the eThekwini Municipality for approval.

There are six discharge points within the watercourses, please refer to Appendix I of IWWMP for construction method statement.

Table 6: Discharge points

Point Number	Description	Description	Watercourse
1	SEDM01	Effluent Discharge Point	Drainage line R3
2	SWDM01	Stormwater discharge point, plus stormwater pipeline	Unchanneled Valley Bottom (W24)
3	SWDM02	Stormwater discharge point, plus stormwater pipeline	Seep (W23)
4	SWDM03	Stormwater discharge point, plus stormwater pipeline	Unchanneled Valley Bottom (W12)
5	SWDM04	Stormwater discharge point, plus stormwater pipeline	Unchanneled Valley Bottom (W07)
6	SWDM05	Stormwater discharge point, plus stormwater pipeline	Seep (W01)

Construction methodology was developed by Kantey & Templer (Pty) Ltd, and below is a proposed methodology for construction across watercourses:

- Remove topsoil and stockpile for later use.
- Excavate trench for pipe or culvert to the design level.
- Construct storm water diversion berms where required.
- Place temporary diversion pipe if required to divert water.
- Place bedding, lay pipes, place and compact selected fill over the pipeline.
- Backfill to specification.
- Construction of gabions
- Construction of headwalls.
- Construction of swales.
- Dress backfill, topsoil and re-vegetate all exposed areas.
- Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of soils.

8. Stormwater Management Plan

According to Kantey & Templer, the stormwater runoff will be discharged via five outlets into the watercourses as shown in the water use table (refer Table 8). Where the stormwater outlets discharge into the drainage line or wetland buffer, they will be managed with the construction of a headwall with dissipater blocks, a gabion structure to dissipate the flow and erosion protection measures. Five stormwater attenuation ponds will flow into the drainage line or wetlands buffer area.

A standard condition will be incorporated in all Purchase or Rental Agreements for each erf/stand that the Developer/ Landowner/ Tenant will be responsible to submit a stormwater management plan to the eThekwini Municipality for approval. This shall include:

A stormwater design to attenuate the infrastructure into attenuation ponds or attenuation within the hardstands/ parking area. Other local on-site attenuation may be considered which includes grass-lined drains and swales, storm water infiltration systems undulations, landscaping etc. The attenuation area will be designed for a 1 in 50-year event.

- A throttling manhole will be designed and sized accordingly at the attenuation outlet to cater for the pre and post stormwater flows.
- Stormwater reticulation pipelines, channels, energy dissipation measures etc.
- Erosion protection where required.
- Details of the stormwater discharge tie in point from each site into the new bulk Municipal road stormwater system.
- All internal stormwater pipes will be gravity reticulated via the sub-catchments across the site.

Road stormwater run-off

Stormwater from the roads and surface channels will be collected through inlets and piped across or parallel to the roads', within the road reserve, to points where the water will be discharged into attenuation ponds, in an efficient, safe and environmental acceptable manner. Refer to Appendix A and Appendix F of IWWMP for details of the stormwater reticulation system, proposed attenuation ponds and stormwater management plan.

Each attenuation pond will be designed accordingly and constructed with throttling manholes at the outlets to restrict the outlet flow in the event of a heavy storm. The design will cater for the pre and post stormwater flows from the roads prior to discharging into the valleys and low lying areas.
The attenuation ponds will be dry and will only be a temporary storage in the event of heavy rainfall. The discharge from the attenuation pond will be restricted by the throttling manhole.
The velocity and energy of the stormwater discharge will be reduced when entering the stormwater attenuation ponds due to:

- the volume of the pond which must be vegetated.
- dissipator blocks at the inlet headwall.
- Gabion baskets/ rip rap at the inlet to prevent erosion.

At discharge points the following must apply:

- Grass lined open drains will be installed which will assist in retaining sediment and reduce the velocity of the flows.
- Where applicable concrete channels or concrete pipes will be installed from the attenuation pond outlets which will be directed within the existing road network to avoid further impact on the environment.
- The drains and stormwater pipe network will prevent flooding of houses and reduce the safety risk within the area.
- Where there are no structures or erf/stands the outlet will discharge directly onto the site with erosion protection where deemed necessary.
- The design measures incorporated will take measures into account to reduce the impact on disturbing the biodiversity in the area. Where possible, stormwater discharge points will be directed to follow areas that have already been disturbed by the existing road footprint.
- Where possible, the stormwater will discharge into an open area to allow water to dissipate before entering into the river systems.

9. Rehabilitation Plan

To help guide wetland rehabilitation and management efforts Eco-Pulse have highlighted key impacts to wetlands associated with the study area and have given an indication of the nature of rehabilitation and

management efforts required to prevent further degradation of these watercourses during the development operational phase (Table 7). This table should be used to guide further investigations into wetland rehabilitation and management opportunities. Ultimately a wetland rehabilitation and management plan should be compiled for the prosed development.

Table 7: Recommended rehabilitation and management efforts for wetlands within the study area (Eco-Pulse, 2023)

Wetland unit	Priority for rehab efforts	Reason for priority rating	Recommended rehabilitation and management efforts
W01	Low	Limited notable impacts are likely to worsen during the operational phase of the proposed development.	Ongoing IAP clearing.
W07	Low	Limited notable impacts are likely to worsen during the operational phase of the proposed development.	Ongoing IAP clearing.
W11	Medium	Notable IAP pressure that is likely to worsen rapidly/	Ongoing IAP clearing.
W12	High	Wetland is set to receive stormwater and package treatment plant inputs. This could worsen erosion along the existing incised central drain. Without rehabilitation the effluent discharged into this unit will enter the existing drain and quickly flow downstream without receiving any secondary treatment known to be associated with well-vegetated wetlands characterised by the diffuse flow. The likelihood of the package sewerage treatment plant affecting the water quality of the wetland and watercourses downstream of the wetland is therefore significantly higher if no onsite rehabilitation takes place.	Structural interventions at strategic locations along the existing drainage channel promote diffuse flow along the wetland. Ongoing IAP clearing.
W14	High	The lower reaches of this wetland have experienced notable disturbance due to sand mining activity. The poorly vegetated and unnaturally steepened nature of the wetland in its current state leaves the unit susceptible to notable erosion impacts due to additional stormwater flows into the watercourse during the development operational phase.	Shaping and revegetation of highly disturbed wetland areas. Ongoing IAP clearing.
W15	Medium	Notable IAP pressure that is likely to worsen rapidly/	Ongoing IAP clearing.
W23	Medium	Notable IAP pressure that is likely to worsen rapidly/	Ongoing IAP clearing.
W24	Medium	Notable IAP pressure that is likely to worsen rapidly/	Ongoing IAP clearing.
W42	Medium	Notable IAP pressure that is likely to worsen rapidly/	Ongoing IAP clearing.

10. Water Uses applied for

The application includes the following water uses.

Table 8: Water uses applied for

Water use(s) activities	Purpose	Capacity/ Volume (m^3, tonnes and/or m^3/annum)/ dimension	Property Description	Co-ordinates
Section 21 c & i: Impeding or diverting the flow of water in a watercourse Altering the bed, banks, course, or characteristics of a watercourse				
Construction and operation of a Mini Wastewater Treatment Works and associated infrastructure internal roads, underground power lines, access and internal roads and water pipelines within 500m of a wetland regulated area associated with Cato Ridge development.	All Stormwater pipeline within development footprint, situated within 500m of a regulatory area	Pipe size: 450mm diameter Pipe size: 600mm diameter Pipe size: 750mm diameter	Portion 26 of the Farm Uitkomst and Doornrug 852 (26/852) Remainder 29 of the Farm Uitkomst and Doornrug 852 (RE/29/852) Portion 41 of the Farm Uitkomst and Doornrug 852 (41/852) Portion 25 of the Farm Riet Vallei 851 FT (25/852) Remaining Extent of Farm Riet Vallei 851 FT (RE/851	**29°43'50.2"S 30°36'23.4"E**
	All water pipeline within development footprint, situated within 500m of a regulated area	200mm dimeter and throughput of 50l/s	Remainder of ERF 50 Cato Ridge FT Portion 41 of the Farm Uitkomst and Doornrug 852 Remainder of ERF 50 Cato Ridge Portion 40 of the Farm Uitkomst and Doornrug 852 Portion 25 of the Farm Riet Vallei 852	**29°43'46.8"S 30°36'20.0"E**
	All internal streets within development footprint, situated within 500m of a regulated area	20m width (including reserve), 3.5m width single lane	Portion 27 of the Farm Riet Vallei 851	**29°41'2.65"S 30°37'40.42"E**
	Overhead powerline within development footprint, situated within 500m of a regulated area		Remainder of ERF 50 Cato Ridge	**29°43'17.67"S 30°36'52.33"E**

Water use(s) activities	Purpose	Capacity/ Volume (m^3, tonnes and/or m^3/annum)/ dimension	Property Description	Co-ordinates
	Sewer pipeline within development footprint, situated within 500m of a regulated area	300mm diameter and throughput of 3l/s	Portion 26 of the Farm Uitkomst and Doornrug 852	29°43'50.2"S 30°36'23.4"E
	Stormwater attenuation ponds within 500m of a regulated area Total area - 5 ponds: 1 238m^2	268m^2	Remainder of ERF 50 Cato Ridge FT	29°43'43.00"S 30°36'27.83"E
		175m^2	Remainder 29 of the Farm Uitkomst and Doornrug 852 (RE/29/852)	29°43'49.30"S 30°36'45.18"E
		270m^2	Remainder of ERF 50 Cato Ridge FT	29°43'22.87"S 30°37'7.76"E
		350m^2	Portion 41 of the Farm Uitkomst and Doornrug 852	29°43'3.88"S 30°37'21.93"E
		175m^2	Portion 25 of the Farm Riet Vallei 851 FT	29°43'3.88"S 30°37'23.21"E
	Mini Wastewater Treatment Works within 500m regulated are of a wetland	Design capacity: 2ML	Remainder of ERF 50 Cato Ridge FT	29°43'19.70"S 30°37'5.70"E
	Treated sewage water (effluent) discharge points and erosion protection structures within wetland		Remaining Extent of the Farm Uitkomst and Doornrug 852 FT (RE/852)	29°43'26.28"S 30°37'11.86"E
Infrastructure within the wetland, drainage line and 33m buffer of the drainage lines	Erosion protection structure (for stormwater discharge points)		Portion 174 of Farm Riet Vallei 851 FT (RE/851)	29°41'03.46"S 30°37'53.91"E
			Portion 33 of the Farm Riet Vallei 851 FT (26/851)	29°41'22.74"S 30°38'12.05"E
			Remainder of the Farm Riet Vallei 851 FT 851 (RE/851)	29°41'41.50"S 30°37'58.20"E
			Portion 29 of the Farm Riet Vallei 851 FT 851 (29/851)	29°42'36.90"S 30°37'46.88"E
			Portion 41 of the Farm Uitkomst and Doornrug 852 FT (41/852)	29°43'04.70"S 30°37'25.35"E
			Portion 29 of the Farm Uitkomst and Doornrug 852 FT (29/852)	29°43'52.83"S 30°36'47.76"E
			Portion 26 of the Farm Uitkomst and Doornrug 852 FT (29/852)	29°43'50.20"S 30°36'23.43"E

Water use(s) activities	Purpose	Capacity/ Volume (m^3, tonnes and/or m^3/annum)/ dimension	Property Description	Co-ordinates
	Erosion protection structure (for effluent discharge point)		Remaining Extent of the Farm Uitkomst and Doornrug 852 FT (RE/852	29°43'26.47"S 30°37'11.42"E
Section 21(f)				
Discharging of treated sewage water through a pipe into a watercourse	Treated sewage water from Mini Wastewater Treatment Works: discharge point	731 277.5m^3 /annum	Remaining Extent of the Farm Uitkomst and Doornrug 852 FT (RE/852)	29°43'26.28"S 30°37'11.86"E
Section 21(g)				
Disposing of water containing waste within a watercourse	Mini Wastewater Treatment Works (MWWTW)	731 277.5m^3 /annum	Remainder of ERF 50 Cato Ridge FT	29°43'19.70"S 30°37'5.70"E
	Pump and Sump station 1 20m x 15m=300 m^2		Portion 27 of the Farm Riet Vallei 851 FT (27/851)	29°41'4.78"S 30°37'45.74"E
	Pump and Sump station 2 15m x 10m=100m^2		Remainder of ERF 50 Cato Ridge FT	29°43'42.41"S 30°36'28.56"E
	Pump and Sump station 3 7.5m x 5m=37.5m2		Remainder 29 of the Farm Uitkomst and Doornrug 852 (RE/29/852)	29°43''48.84"S 30°36'45.49"E
	Pump and Sump station 4 10m x 6m=60m^2		Portion 41 of the Farm Uitkomst and Doornrug 852 (41/852)	29°43'04.02"S 30°37'20.22"E

11. Description of the Environment

11.1 Climate

Cato Ridge is situated in a transitional zone between the coastal and interior regions of the country. The climate in the area is classified as a subtropical highland climate according to the Köppen-Geiger classification system. This means that the area experiences mild to warm temperatures throughout the year, with the average temperature in January being around 26°C, and in July around 20°C, Temperatures rarely exceed 35°C. Rainfall is variable and distributed throughout the year but with a marked drier winter season (May, June, July and August), with annual rainfall between 700 and 1000mm.

The weather patterns in Cato Ridge are largely influenced by the topography of the area which is situated on a plateau at an elevation of around 780m above mean sea level, which means that temperatures can be slightly cooler than the surrounding areas. The prevailing winds are the northwest and southeast winds, which bring cool and moist air from the ocean during the summer months, and the north-easterly winds, which bring warm and dry air from the interior during the winter months.

11.1.1 Rainfall

Based on the Geohydrological Investigation undertaken by Geomeasure in 2023, the rainfall findings are summarised as follows.

Rainfall in the area is variable and long-term data has revealed that the KwaZulu Natal coastal region and its immediate hinterland is subject to cyclic “wet and dry” periods. Research suggests cyclic rainfall patterns can be attributed to the El-Nino effect and in wet cycles the rainfall can exceed 1300 mm/annum whilst the total rainfall in the dry cycle could be less than 400 mm/annum.

Although rainfall is generally steady and low medium intensity, high intensity rainfall does occur when cut-off lows develop along the coast. Rainfall data measures by the automated weather station which is managed by Messrs EnvironNgaka on behalf of Assmang Cato Ridge Works (ACRW) shows the variable rainfall events, as shown on Graph 1 below which shows recorded rainfall from March 2007 till February 2023.

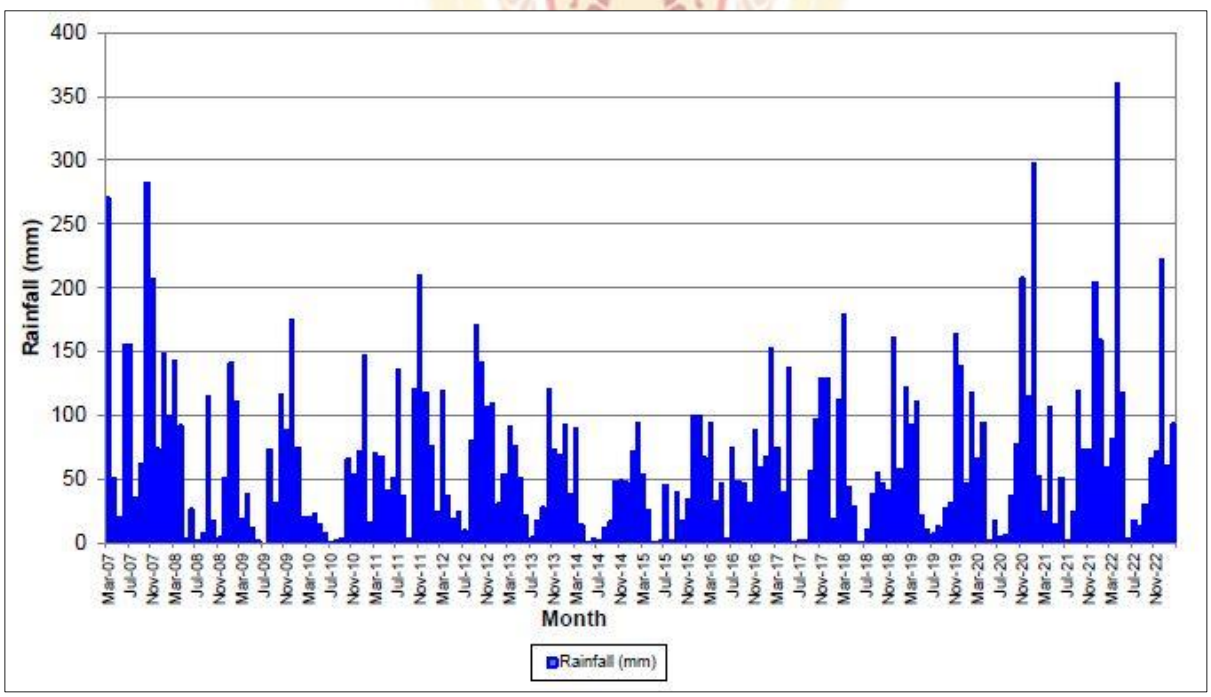


Figure 3:Assmang monthly rainfall date - March 2007 to February 2023 (Geo-measure Group, 2023)

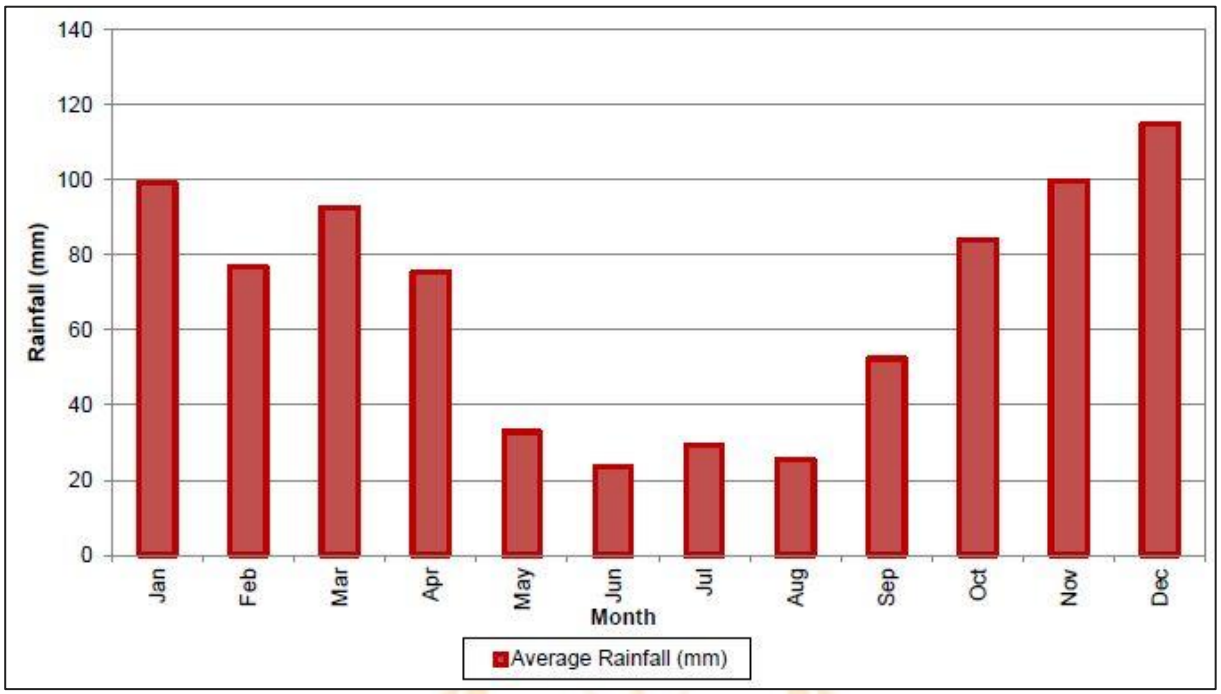


Figure 4: Assmang average monthly rainfall - March 2007 to February 2023 (Geo-measure Group, 2023)

Rainfall in the region occurs in the summer months (mostly December to February), with a mean annual precipitation of 726 mm (observed from rainfall station 0239518 W & 0239673 A). The reference potential evaporation (ETo) is approximately 1667 mm (A-pan equivalent, after Schulze, 2011) and the mean annual evaporation is between 1300 – 1400 mm, which exceeds the annual rainfall. This suggests a high evaporative demand and a water limited system. Summers are warm to hot and winters are cool. The mean annual temperature is approximately 21.5 ºC in summer and 13.8 ºC in the winter months.

11.2 Hydrological Assessment

In May 2023 Nature Stamp was appointed to undertake the Hydrological Assessment for the study area. The following findings are extracted from the Hydrological Assessment Report.

The CRDC site is located primarily within Quaternary Catchment U20J, within the catchment area of the Mswathi River, and falls under the uMvoti to uMzimkhulu Water Management Area (WMA). The site is located at the upper reach of the catchment and has no defined watercourses. This site drains towards the Umsunduzi system which is heavily modified. The site is dominated by thornveld with some area of invaded bush. A quarry is located directly south of the proposed site.

Rainfall in the region occurs in the summer months (mostly December to February), with a mean annual precipitation of 726 mm (observed from rainfall station 0239518 W & 0239673 A). The reference potential evaporation (ETo) is approximately 1667 mm (A-pan equivalent, after Schulze, 2011) and the mean annual evaporation is between 1300 – 1400 mm, which exceeds the annual rainfall. This suggests a high evaporative demand and a water limited system. Summers are warm to hot and winters are cool. The mean annual temperature is approximately 21.5 ºC in summer and 13.8 ºC in the winter months.

11.2.1 Catchment

The Camperdown area surveyed has soils derived from Natal Group Sandstone. These deposits give rise to abrasive, fine-grained, often shallow, sandy soils which are grey or bleached in colour.

Contour lines (1 meter) and the Alos Palsar 12.5-meter DEM were used to derive the surface terrain. The soils and geology were obtained from GIS layers obtained from eThekwini and national databases and site samples. The site is situated close to the catchment divide at the top of small un-named tributaries. The majority of runoff from the site would flow towards the north-eastern extent of the property. The site has a gentle slope with undulating terrain.

This site is dominated by Ngongoni veld, and this occurs within the sub-escarpment savanna biome. The desktop analysis revealed that the area is largely transformed, with the possibility for some flagged fauna and flora (e.g., red data species and endangered wildlife) being found from the C-plan, SEA and MINSET databases. However, this does not necessarily mean that rare or endangered species will occur in the area of interest.

The project area is situated within the upper reaches of the Quaternary Catchment U20L, U20J and U60C. Watercourses identified within the project area comprise the seeps, unchanneled valley bottom wetlands, mountain headwater streams, mountain streams and one transitional river, which feeds into the Sterkspruit River (in the case of watercourses located within Quaternary Catchment U60C) and uMgeni river (for the watercourses located within Quaternary Catchment U20J and U20L) further downstream. Several minor farm dams occur along many of the onsite watercourse. Two major dams are located along the major rivers which drain the study area (i.e., the uMgeni and Sterkspruit, respectively).

Input from the Flood Assessment

Zutari conducted a floodline assessment during the Pre-feasibility phase of the project (i.e., 2019), and the following information is from the floodline assessment report.

The 1:50 and 1:100-year flood extent was derived using the Rational Method and compared with the Alternative Rational Method. Future conditions, assuming the new development comprises 50% of the area. An additional 15% for increase was included to account for climate change circumstances. These findings were then used to determine other relevant input parameters required to complete the flood line model in HEC-RAS.

The results showed the development (refer to Figure 5 is outside of flood areas and thus the risk of flooding on the development is minimal.

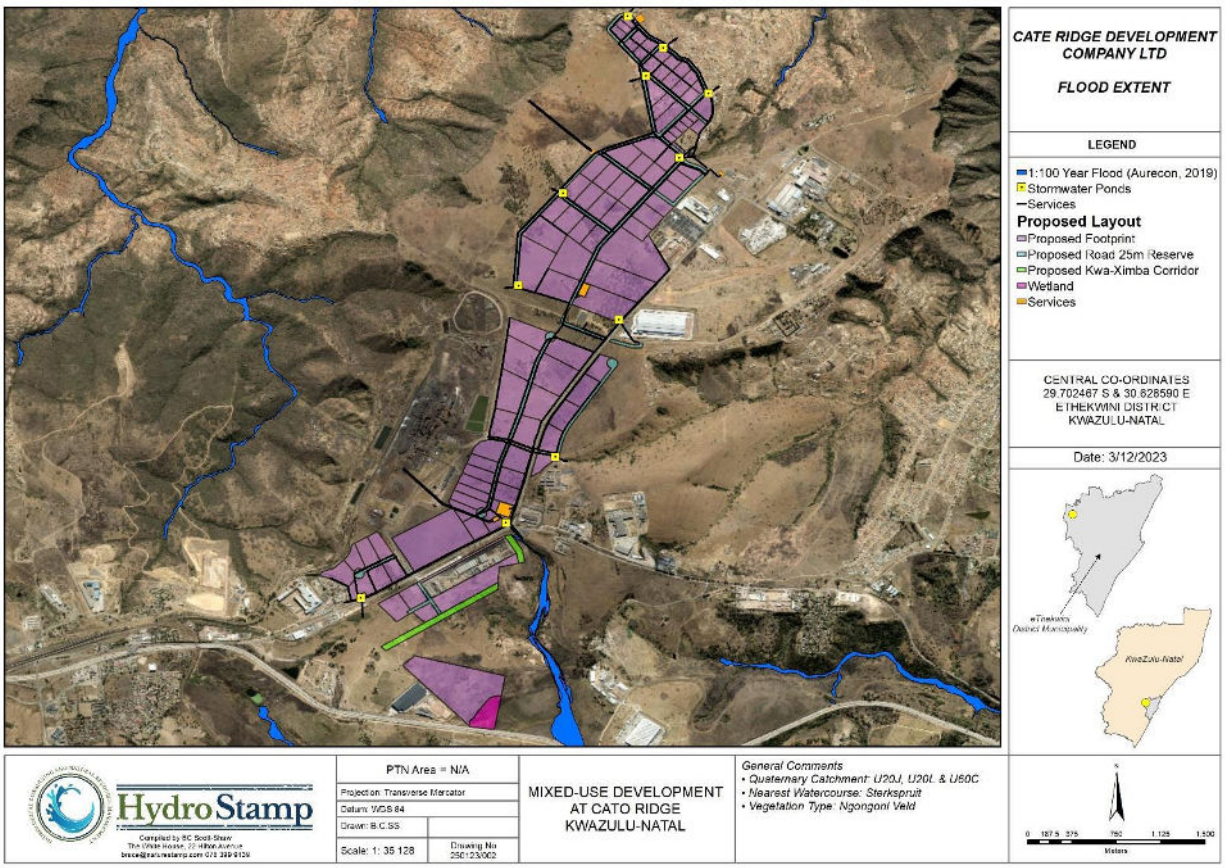


Figure 5: 1:100-year flood extent derived for the CRDC (Nature Stamp, 2023*)*

11.2.2 Impact on Upstream and Downstream Users

An investigation of the upstream and downstream users was undertaken for the overall system. Cognisance of proposed developments was also considered, even those that would not be directly impacted upon but could if transfers were implemented. The proposed stormwater discharge points are directed towards the Sterkspruit to the south (tributary of the Umlazi river) and of the Mshwathi system to the northeast (tributary of the Umngeni). This system has a significant amount of users. No abstractions were identified close to the site. The following abstractions and dams are registered downstream of these two systems:

Dam:

- Reg No. 21192120 – Inanda Dam – 241 700 000 m^3 – QC U20L - Mgeni – Dept of Water Affairs
- Reg No. 21071475 – Shongweni Dam – 3 700 000 m^3 – QC U60C - Mlazi – Umgeni Water
- Reg No. 21171768 – Kavchell Dam – 25 000 m^3– QC U60C - Sterkspruit – Berriman DE
- Reg No. 21155786 – Uitkomst & Doornrug Dam – 190 000 m^3 – QC U60C – Sterkspruit trib – Albert Goswell
- Reg No. 21170000 – Uitkomst & Doornrug Dam 1 – 2 500 m^3 – QC U60C – Sterkspruit trib – Trigoni
- Reg No. 21170000 – Uitkomst & Doornrug Dam 2 – 2 000 m^3 – QC U60C – Sterkspruit trib – Trigoni
- Reg No. 21171802 –Doornrug Dam 1 – 600 m^3 – QC U60C – Sterkspruit trib – Guthrie
- Reg No. 21179421 – NPC Dam 1 – 5 000 m^3 – QC U60A – Sterkspruit – Sterkspruit Aggregates
- Reg No. 21179421 – NPC Dam 2 – 8 000 m^3 – QC U60C – Sterkspruit – Sterkspruit Aggregates

Dam:

- Reg No. 21184870/1 – Borehole – 2 000 m^3 – Sterkspruit Catchment
- Reg No. 21179421/1 – Borehole – 2 000 m^3 – Sterkspruit Catchment
- Reg No. 21179421/2 – Borehole – 2 000 m^3 – Sterkspruit Catchment
- Reg No. 21179421/3 – Borehole – 2 000 m^3 – Sterkspruit Catchment ss

Given the catchment analysis, it is clear that this system is somewhat stressed and the highest priority water users are the potable users, the community and the environment. The water use would not change as it would be connected to municipal infrastructure. The quantity of the net discharge of water on the system is the same as the pre-development state. However, there is an increased risk of increased storm water discharge affecting the downstream environments (sediment discharge and contaminants). This must be managed through stormwater management.

11.3 Geohydrology

11.3.1 Geology

A Geohydrological Investigation was undertaken by Geomeasure in 2023 and the summary of the baseline information is presented below.

According to the 1: 250 000 Geological Map, 2930 Durban, the study area is underlain by sub-horizontally bedded Sandstone of the Natal Group that rests on the massive granite gneiss of the Maphumulo Suite of the Natal Structural and Metamorphic Province as well as Dwyka of the Karoo Sequence. The formations have subjected to severe tectonic activity associated with the breakup of the Gondwana and North, Northwest and Northeast trending displacements faults occur in the region. “Title bocks” formed this activity and have resulted in repetition of geological formations in the coastal region and numerous Jurassic dolerite dykes and sills have intrusion into planes of weakness within the host rock formations.

11.3.1.1 Natal Group

The Natal Group comprises sub-horizontally bedded layers of pink and purple, medium and fine-grained arkosic and argillaceous sandstone with subordinate layers of off-white orthoquartzite and lenses or maroon shale. The dip range is 5° – 15° east to southwest.

11.3.1.2 Maphumulo Suite

The granite gneiss of this stratigraphic unit comprises light grey, pink and white – to coarse-grained granite gneiss, which contained numerous pegmatite and quartz veins.

11.3.2 Geohydrology and ambient groundwater quality

11.3.2.1 Natal Group

The Natal Group represents a secondary or fractured rock aquifer which comprises a sub-horizontally bedded widely jointed "brittle" rock mass of about 40 - 60 m thick. This formation has negligible primary porosity and permeability and most groundwater storage and movement occur within joints, fractures or bedding planes within the rock mass.

Groundwater recharge within this elevated and exposed study area is totally rainfall dependent and can only gain access into the rock mass via the joints and fractures in the rock mass. Recharge is, however, limited to remnant pore-water absorbed by the sandy subsoils, which is not lost to the atmosphere via evaporation or evapotranspiration. This recharge would be minimal and is estimated to be less than 2 % of MAP.

In areas of intense fracturing, which is normally associated with "brittle deformation" of the rock mass in close proximity to faults or dolerite intrusions, the joints are often dilated and "clean" and these localised, highly permeable zones offer preferential groundwater flow paths which enhance recharge and rock mass permeability. Under ideal conditions borehole yields of up to 10 litres per second (l/s) can be obtained within these discrete fractured zones.

The sustainability of these aquifers is a factor of rainfall recharge and aquifer through-flow. However, in this study area, aquifer through-flow is insignificant due to the elevated and isolated nature of the geohydrological environment.

The KwaZulu-Natal Hydrogeological Map in "The Storm Water Management Plan compiled by K&T (2023) with the objective to propose methods (structural controls) for managing runoff flows to prevent detrimental impacts on receiving waters, considering both quality and quantity of stormwater runoff. A series of stormwater channels, headwall, gabion and reno mattress structures have been designed and strategically located to direct flow into attenuation ponds (Figure 9). *Characterisation and Mapping of the Groundwater Resources KwaZulu-Natal Province Mapping Unit 2*" January 1995, which was prepared for the former Department of Water Affairs and Forestry (DWAF) by Groundwater Consulting Services, depicts this as an area of poor groundwater development potential with expected borehole yields ranging from 0.5 to 1 l/s. Mean EC values range from 30 to 100 millisiemens per metre (mS/m), and although the groundwater generally meets most of the recommended limits of the SABS 241:2015 Standards for Drinking Water, the water is often slightly acidic and may contain high levels of iron and manganese, which detracts from the suitability of this source for domestic and industrial use.

The groundwater gradient on the plateau area is very mild and mirrors the surface topography. This gradient is influenced by the bedding of the formations and proximity to the edge of the escarpment where localised steep gradients and changes in regional flow direction may occur.

11.3.2.2 Maphumulo Granite Gneiss

Unweathered granite gneiss is usually quite massive and as a result, this formation is considered a marginal secondary or fractured rock aquifer.

The unconformable sandstone/granite contacts are generally quite "tight" but as a result of the significant age difference (>1000 million years) between these stratigraphic units, isolated thin zones of weathering occur sporadically below this contact zone to offer inter-granular storage and enhanced permeability. Boreholes drilled to intersect this contact zone usually produce yields ranging from 0.1 to 0.3 l/s.

Geological reconnaissance carried out in the Nagle Dam/Reservoir Hills transfer tunnel has also shown that the granite/dolerite contact zones are generally quite tight due to "welding".

The groundwater gradient in this stratigraphic unit normally mirrors the surface topography and a spring line occurs at the foot of the sub-vertical cliff faces where the sandstone/granite contacts daylight.

11.4 Hydropedology

In April 2023 CRDC commissioned GCS Water & Environmental Consultants to conduct the hydropedology assessment for the project, and the baseline findings are presented below.

11.4.1 Morphology and Soils

The various soil types typically present in the shoulder, mid-sloe and valley positions of the study area (referred to as soil hillslope), are due to sub-surface geology, weathered products, level of saturation, soil texture and slope position as shown in **Error! Reference source not found.**. The terrain in the study is moderately sloping (due to undulating hills), with soil depth in the order of 600 mm to > 2 200 mm typically with clay content in the range of 15% to 60%.

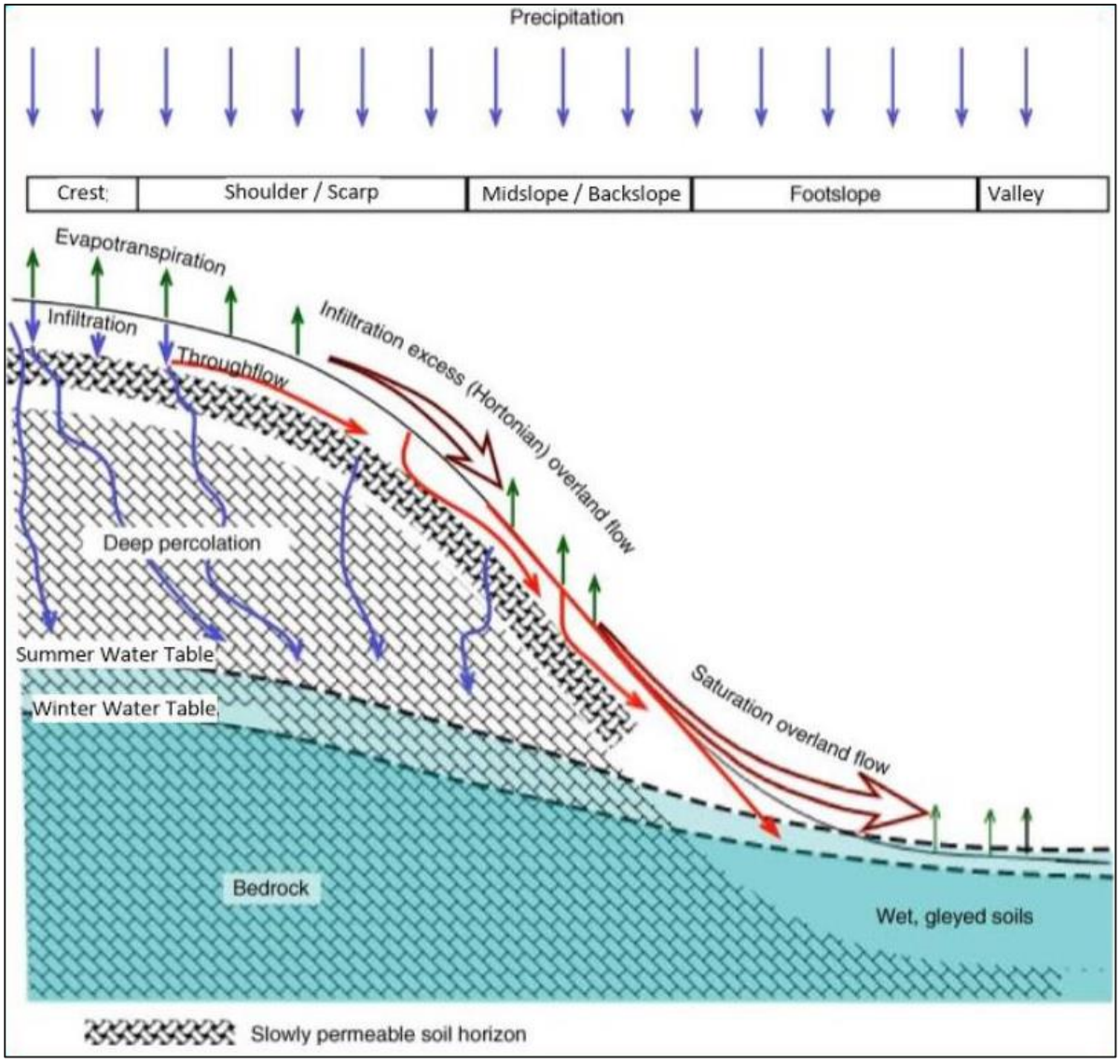


Figure 6: Land morphology concept (GCS Water and Environmental, 2023)

As per the WR2012 soil data for the area, the erodibility of the soils for the area are considered medium. These soils are generally red and yellow, dystrophic/mesotrophic, apedal soils with plintic subsoils (plintic soils comprise > 10% of land type, red soils comprise <33% of lant type).

11.4.1.1 Specific site conditions

The site is characterized by shallow and deep loamy-sandy soils, as well as occurrences of shallow rock and rock outcrops was noted. Soils associated with the Swartland, Glenrosa, Mispah and Clovelly types were encountered, with the Glenrosa type being the dominant soil form identified. The Clovelly soil type was typically

encountered on flat plateau areas, and nearing rock outcrops the Mispah soil. It is clear from the soil investigation that overland runoff is the dominant flow path associated with the project site.

According to the available data for the study area, it is expected that the area is characterised by loam to silty soil types. From the samples acquired on site, the expected permeability of the soils is on the order of 0.25 cm/hour to 1.3 cm/hour.

11.4.2 Conceptual hydrological flow processes

The hydrological processes associated with the land types and suspected soil types in the project area are discussed concerning the numbered arrows as presented in *Figure 7* below.

The study area is primarily characterised by responsive (shallow) soils of the Swartland and Glenrosa types. However, in some areas (in flattened areas or areas where there have been significant hills wash) shallow/deep recharge soils of the Clovelly type were observed:

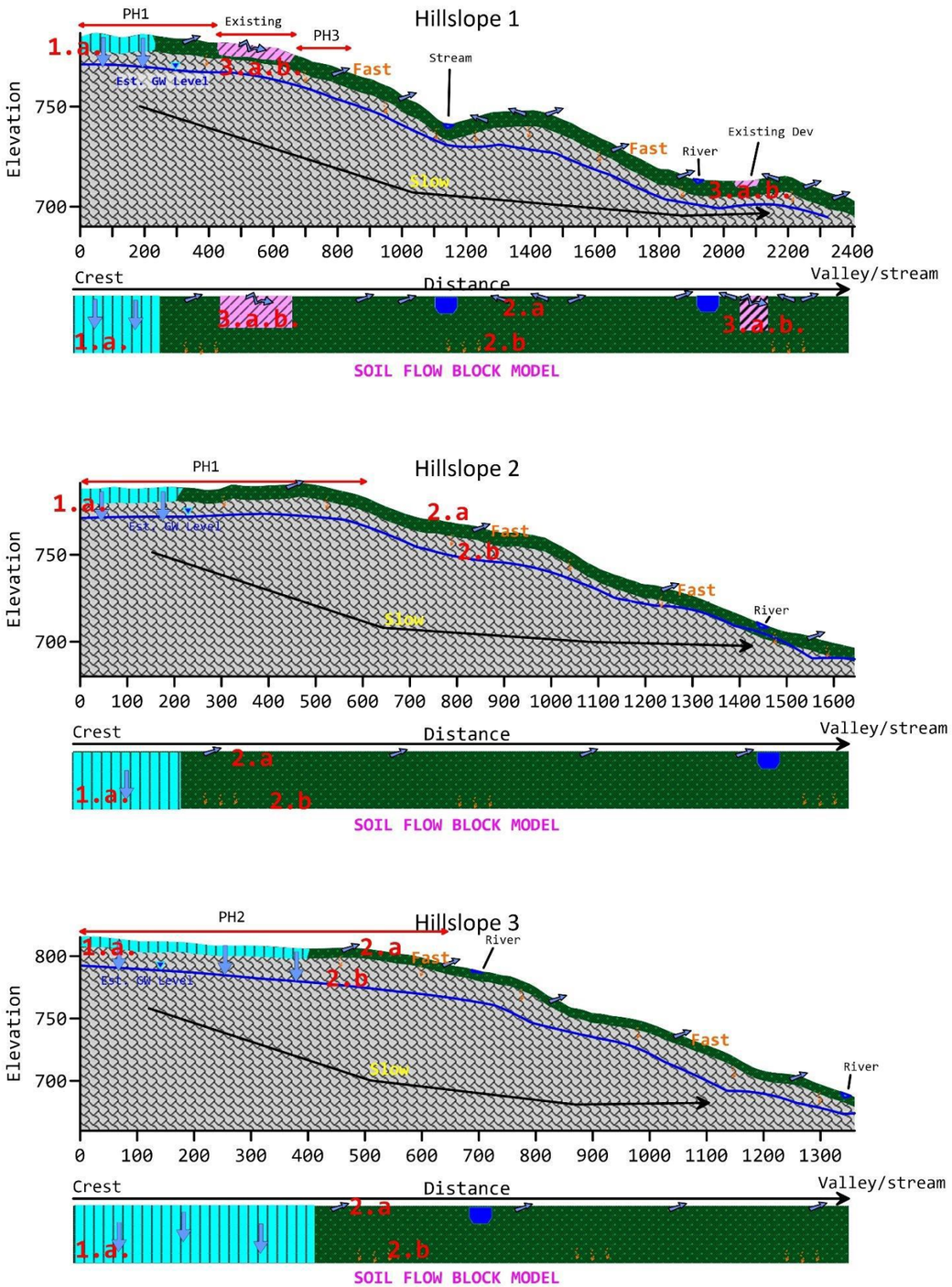
- Vertical flow through and out of the profile into the underlying bedrock is the dominant flow path. These soils are deep and freely drained and are experiencing the leaching of nutrients to underlying soil horizons.
- Recharge to the regional groundwater table is expected to occur via the saturated soils and will follow the hydraulic head associated with the regional water table.

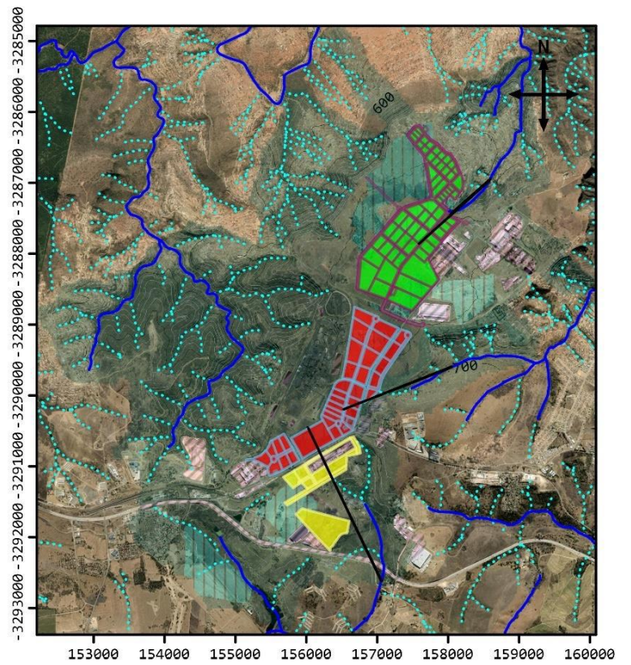
On the crest to footslope position of the project area (typically hillslopes 1, 2 and 3) responsive (shallow) soils occur. For responsive soil types, the following is likely:

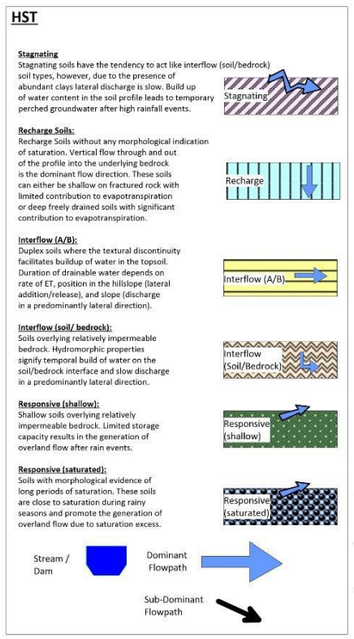
- In responsive soils, the build-up of water is expected in the B and upper A horizons after rain and overland discharge and minor lateral seepage are expected (due to saturation excess).
- Secondary vertical seepage to deeper soil zones from the saturated B horizon is expected. At the transition from one soil type to the other (upstream to downstream) overland flow may take place during wet seasons.

Some areas (typically Hillslope 1) have been developed, and here stagnating water conditions are expected (i.e., the soils have been compacted and altered):

- Stagnating soils tend to act like interflow (soil/bedrock) soil types, however, due to the presence of abundant clays lateral discharge is slow. A build-up of water content in the soil profile leads to temporary perched groundwater after high rainfall events.







GCS Water & Environmental Consultants

CLIENT:

ZUTARI IMPACT. ENGINEERED.

PROJECT:

Cato Ridge Development

DRAWING TITLE:

Conceptual Hillslope Flow Processes

Drawn By:	H. Botha (MSc, PriSciNat)
Project No.	22-1129-PED01
Date	18/04/2023
Projection	WGS84 - LO29
Scale	As indicated
Drawing No.	Report Figure

Figure 7: Conceptualisation of hydrological soil flow process (*GCS Water and Environmental, 20*

11.5. Wetland and Aquatic Ecosystems

Eco-Pulse Environmental Consulting Services was appointed to undertake the Wetland and Ecosystem Impact Assessment during 2022. The summary and findings of the study are provided below.

11.5.1 Watercourses

Wetlands within the 500m radius of the proposed project as well as watercourses (streams and rivers) were mapped at a desktop level using digital imagery and 5m elevation contour data. The mapped watercourses were then classified according to their Hydrogeomorphic (HGM) type in terms of the national wetland/rive. The following watercourse units were delineated and classified:

- Twenty-Six (26) Mountain Headwater Streams
- Two (2) Mountain Streams
- Six (6) Seep Wetlands
- Five (5) Unchanneled Valley-Bottom Wetlands

The delineated watercourses are presented in Figure 8 below.

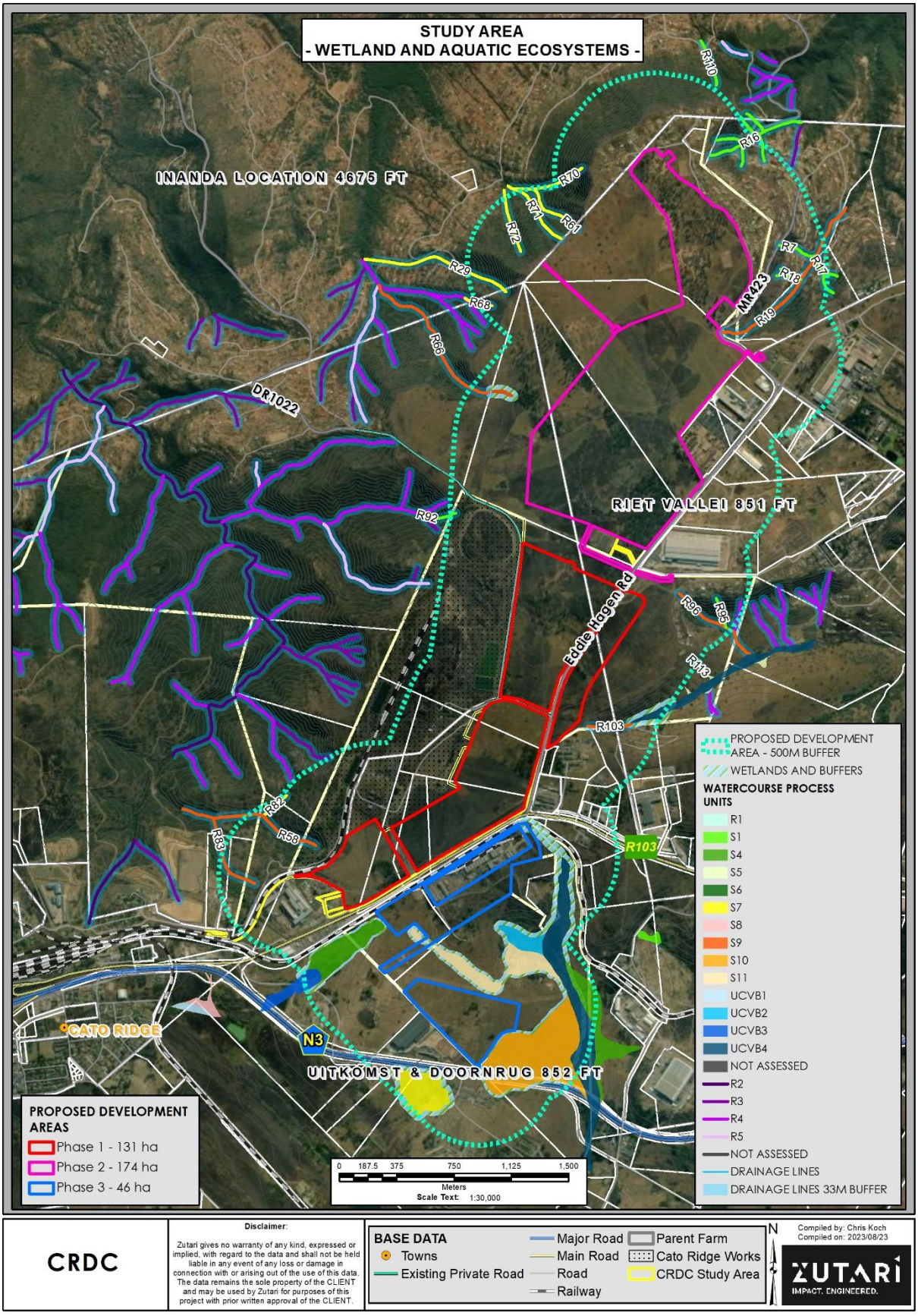


Figure 8: Delineated watercourses

11.5.2 Present Ecological State (PES)

The wetland PES was assessed using the WET-health (Macfariana et al., 2020) assessment method and tool at rapid 1B assessment level. Refer to Table 9 for summary of the PES for each delineated wetland.

Based on the outcomes of the PES assessment along with infield observations, the main sources of impacts to unchanneled valley bottom wetlands include artificial drainage linked to historical agriculture which has affected hydrology, and to a lesser extent the vegetation and geomorphology of these systems. Impacts on geomorphological processes of wetlands are primarily associated with increased runoff volumes and velocities from watercourse catchment areas. This is linked to reduced catchment vegetation basal cover and an increase in hardened catchment surface areas (buildings, roads etc.). This has resulted in the initiation of erosion and the formation of channels in systems that were historically unchanneled. Where old drains occur in valley bottom wetlands, these have increased rates of wetland erosion and incision. Many valley-bottom wetlands are also associated with small farm dams. These dams have altered natural water movement and sediment accumulation regimes. They also cause a reduction in watercourse connectivity as they act as impeding structures. Alteration to hydrology and geomorphology associated with the aforementioned impacts either result in complete loss or degradation of indigenous vegetation cover through erosion, sedimentation, infilling and deep flooding allowing for encroachment or, in most cases, severe infestation of invasive alien plants (IAPs), which have markedly reduced the integrity of the vegetation across small to large portions of these unchanneled valley bottom wetlands.

Major sources of impacts on the integrity of seeps are overgrazing and over burning by local communities, which has resulted in reduced surface water infiltration, increased runoff, and increased likelihood of erosion, as well as a reduction in plant species diversity and vegetative cover. As with the unchanneled valley bottom wetlands, drainage linked with historical agriculture is negatively affecting the hydrology of these systems by creating concentrated flow paths and reducing the residence time of water flowing through these systems. Sand mining is also a major issue in some of the seeps assessed, especially those seeps underlain by Natal Group Sandstone to the east of the site. Collectively these disturbances and impacts have resulted in the loss of indigenous vegetation cover in some areas, with woody IAPs such as *Acacia mearnsii*, *Eucalyptus sp*, *Lantana camara* and *Rubus cuneifolius* colonising disturbed areas prolifically.

Table 9: Summary of the PES assessment for each of the delineated wetland HGM units

HGM Unit	HGM Type	Hydrology	Geomorphology	Water Quality	Vegetation	Combined PES Score (%)	Combined Ecological Category
		PES Score (%)					
W01	Seep	61%	81%	94%	60%	73%	C
W07	UCVB	78%	85%	65%	67%	74%	C
W11	Seep	52%	81%	62%	46%	59%	D
W12	UCVB	56%	67%	68%	36%	57%	D
W14	Seep	49%	50%	68%	38%	51%	D
W15	Seep	67%	75%	65%	54%	66%	C
W23	Seep	52%	81%	62%	46%	59%	D
W24	UCVB	41%	61%	66%	23%	47%	D
W42	UCVB	56%	74%	67%	45%	60%	C

11.5.3 Stream Present Ecological State (PES)

The Index of Habitat Integrity (IHI) was used to obtain the stream PES (ecological condition).

Stream PES assessments were largely desktop-based (based on examination of aerial imagery (Google Earth Imagery © 2020 and 2021) due to lack of accessibility and / or time constraints. Stream units in the study area assessed at a rapid desktop-level were broadly grouped into one of two categories namely:

- Mountain Headwater Streams / Mountain Streams with upstream catchments that were largely degraded (R16, R19, R3).
- Mountain Headwater Streams / Mountain Streams with upstream catchments that were largely intact (R103, R58, R66, R83, R96, R61, R70, R82).

The results of the rapid desktop-based IHI assessment show that the assessed stream units range from 'poor' / 'severely modified' condition to 'good' / 'largely-natural' condition ('D' to 'B' PES Category) (Table *9*).

The most prominent sources of impacts for streams within the project area include increased erosion/sedimentation, altered flow regimes and alien plant invasion. These impacts are largely linked to residential and commercial development, tree plantations and farming and the consequences associated with these activities (i.e. an increase in hardened surfaces in their upstream catchments leading to increased runoff and erosion, artificial stormwater inputs and artificial impoundment [in-stream] associated with small farm dams contributing to altered hydrology, and lastly clearing and degradation of indigenous vegetation both within the catchment and the riparian zone of units assessed). These impacts have modified streams and rivers along the northern periphery of the project area to a moderate or severe degree. The remainder of the streams assessed (just less than half) are considered to be largely natural. These include streams that occur within the centre of the northern portion of the property, which remain largely untouched. The precipitous topography and lack of accessibility are likely contributing factors to their better condition. Streams within the south-eastern-most portion of the project area are likewise relatively intact due to the absence of any major developments within their upstream catchments.

Table 10: summary for the river units assessed based on examination of aerial imagery at a desktop level

Units	HGM	Instream Habitat Integrity	Riparian Habitat Integrity	Combined Habitat Integrity	PES	Key impact
R16 R19 R3	Mountain Headwater Stream/ Mountain Stream	58% (poor)	56% (poor)	57% (psoor)	**D: Severely Modified**	Key impacts to these streams include altered hydrology with increased water inputs from stormwater discharge in the catchment as well as increased surface runoff in the catchment associated with hardened surfaces leading to erosion. The vegetation of these streams has been heavily impacted by IAP invasion with most of the vegetation cover dominated by invasive trees and shrubs with limited remnant indigenous species present. Rubbish dumping and point source pollution from untreated effluent are also potential impacts experienced across
R103, R58, R66, R83, R96, R61, R70	Mountain Headwater Stream/ Mountain Stream	88% (good)	82% (good)	86% (good)	**B: Largely Natural**	Minimal key impacts associated with these streams, with their upstream catchments largely untransformed aside from a few dirt roads or some grazing taking place potentially.

11.5.4 Wetland Ecological Importance and Sensitivity (EIS)

The EIS ratings for the assessed wetland process unit groups are presented in Table 11 below. Key outcomes include:

Seep wetland process unit group S11 are considered to have a moderate EIS rating which can be largely attributed to their moderately high to high importance in terms of biodiversity maintenance and their minimally impacted state which allows them to contribute to certain regulating services as well as provisioning services within their catchment context.

Due to their largely degraded state and limited regulation and provisioning services importance scores, wetland process unit groups S4, S9 and UCVB3 were rated as having limited overall EIS. Seeps were also typically considered to be of low overall sensitivity to changes in flood regimes, sediment input patterns, and were not deemed to host intolerant or dependent biota. Therefore, the general sensitivity of the two seep wetland process unit groups (S4 and S9) was limited.

Seep wetland process unit group S10, and valley bottom wetland process unit groups UCVB2 and UCVB4 were all rated as being of High EIS. This score was driven by the biodiversity maintenance importance scores associated with wetlands in these groups. These wetlands belong to a critically endangered ecosystem type according to the latest national biodiversity assessment, with these units being in at least 'fair' ecological condition. These wetland units are also associated with large intact or semi-intact buffer areas, making them ecologically viable wetland ecosystems with the ability to contribute towards meeting regional, provincial, and national ecosystem conservation targets.

Table 11: Summary of EIS scores and overall EIS rating for wetland process unit groups.

Process Unit	S4	S9	S10	S11	UCVB2	UCVB3	UCVB4
Biodiversity Maintenance	2.20	2.00	3.30	2.70	3.00	0.50	2.50
Regulating functions	0.90	1.20	1.70	1.60	1.80	1.50	2.40
Provisioning Services	1.80	1.50	2.20	2.20	1.20	0.70	0.90
Ecological Importance	2.20	2.00	3.30	2.70	3.00	1.50	2.50
Ecological Sensitivity	0.90	0.90	0.90	0.90	1.70	1.70	1.70
Combined EIS Score	1.65	1.45	2.75	2.15	2.85	1.35	2.35
Combined EIS Category	**Low**	**Low**	**High**	**Mod**	**High**	**Low**	**High**

11.5.5 Stream Ecological Importance and sensitivity (EIS)

For this assessment, EIS was based on rating the importance and sensitivity of riparian and in-stream biota (including fauna and flora) and habitat using both desktop and on-site indicators. A summary of the results of the EIS assessment for process units R2 – R5 is shown in Table 12. Key outcomes include:

- Mountain Headwater Streams and Mountain Streams associated with Process Units R3 were assigned a **'Low' EIS** rating, driven by their poor ecological condition and low habitat diversity.
- Mountain Headwater and Mountain Streams in Process Unit R4 were assigned a **'Moderate'** EIS rating due to their largely natural condition and the high likelihood that these streams play host to threatened plant species. These intact watercourse networks also likely act as important wildlife migration corridors, with buffers around these units remaining largely intact.

Table 12: Summary of EIS for the stream Process Units

Variables	Scores (Out of 4) and rating	
	R3	**R4**
Rare and endangered species	0.0 (None)	1.0 (Low)
Unique species (endemic, isolated, etc.)	0.0 (None)	1.0 (Low)
Intolerant species sensitive to flow/water quality modifications	0.0 (None)	1.0 (Low)
Species/taxon richness	1.0 (Low)	1.0 (Low)
Diversity of habitat types	1.0 (Low)	1.0 (Low)
Refugia for biota	1.0 (Low)	1,5 (Moderately Low)
Sensitivity to flow changes	2.0 (Moderate)	2.0 (Moderate)
Sensitivity to flow related water quality changes	2.0 (Moderate)	2.0 (Moderate)
Migration route/corridor (instream and riparian)	1.0 (Low)	2.0 (Moderate)
Importance of conservation and natural areas	0.0 (None)	2,0 (Moderate)
EIS Score	1.0	1.3
EIS Rating	Low	Mod

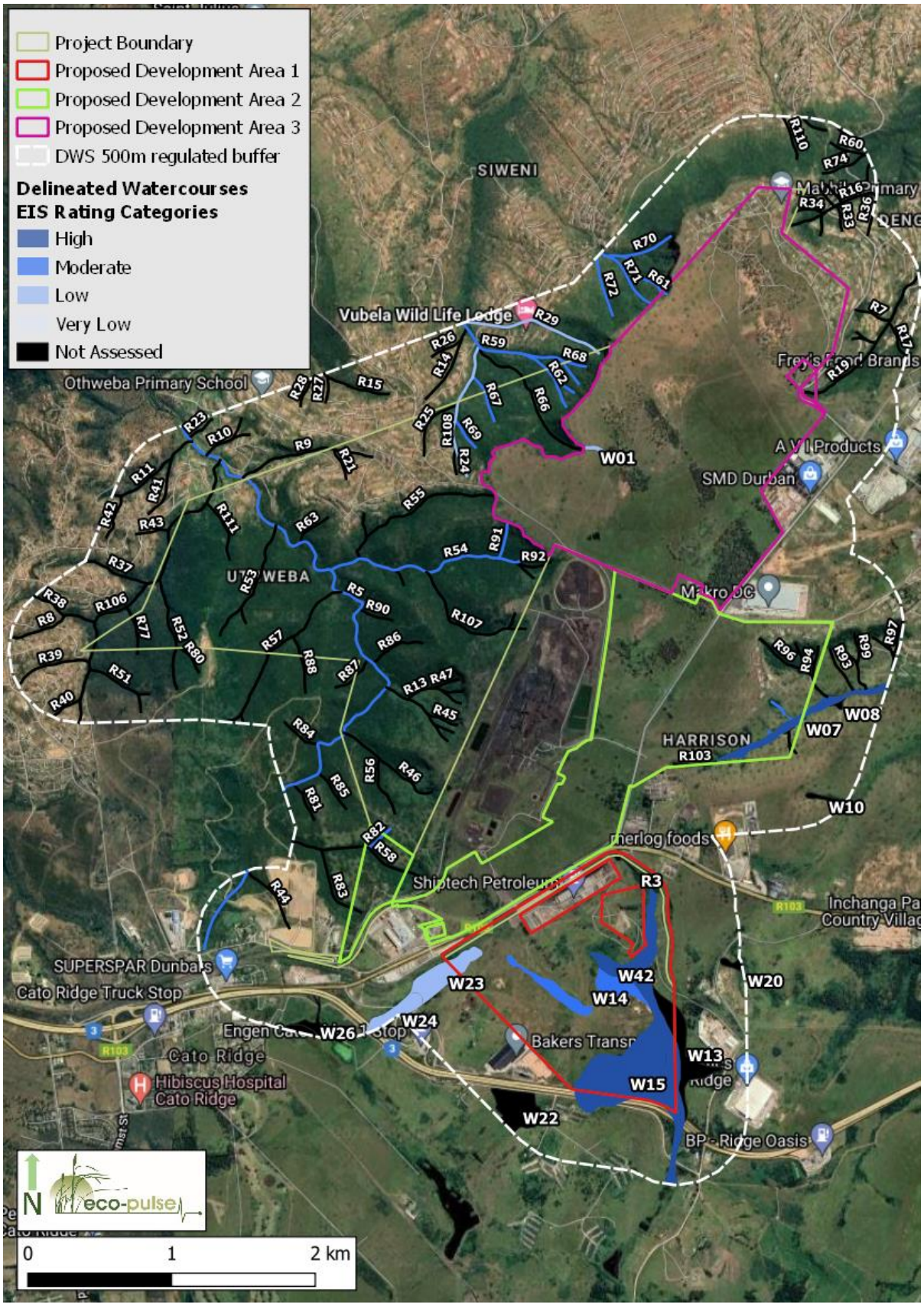


Figure 9: Delineated and classified watercourses (rivers and wetlands) in the study area and their relative EIS ratings from 'Very Low' to 'High' (Eco-Pulse Environmental Consulting Services, 2022)

11.6 Recommended Ecological Category (REC) & Management Objectives (RMOs)

The recommended ecological category (REC) is the target or desired state of resource units required to meet water resource management objectives and quality targets. It is determined through the consideration of the PES, EIS and realistic opportunities to improve the PES that is driven by the context / setting.

Based on this matrix the catchment context, the REC for all watercourse HGM units assessed ranges from a 'B' to a 'D' PES with the RMO being to 'maintain' the current PES and functioning of most watercourses assessed, which can be achieved through careful management of catchment sediment, erosion, flow, and water quality impacts/risks and by avoiding direct impacts to the watercourses. Some onsite wetlands will likely require rehabilitation interventions to improve their current PES and functioning by one class through a combination of careful management of their catchments in terms of sediment, erosion, flow, and water quality impacts/risks and through targeted rehabilitation interventions within their catchment and the watercourse units themselves.

12. Impacts and mitigation measures

The potential impacts and mitigation measures that are expected from the proposed activities are presented in *Table 13*.

Table 13: Summary of impacts and mitigation measures

Potential Impact	Pre-mitigation Impact Significance	Proposed mitigation	Post-mitigation Impact Significance
Wetland and Aquatic Ecosystem			
Direct physical loss or modification of wetland and/ or aquatic habitat associated with the onsite watercourses	Minor - Negative	• No areas outside the construction footprint may be cleared and stripped of vegetation. • The outer edges of the construction site must be demarcated using a high visibility barrier / fencing. • The demarcation must be signed off by the project ECO. • Construction staff should be made aware of the location and extent of all watercourses in the vicinity of the proposed development. These should be considered strict no-go zones for the duration of onsite works	Negligible - negative
Alteration of hydrological and geomorphological processes (erosion and sediment).	Minor - Negative	• Limit the duration of construction to reduce the risk of prolonged sedimentation and erosion impacts occurring. • Implement and adhere to buffer zones for wetlands and riparian areas. • Address potential erosion and sedimentation risks on site through the implementation of Best Management Practices (BMPs) in erosion and sediment control.	Minor - negative
Impacts to water quality	Negligible - negative	• Address potential spill and pollution risks on site through the implementation of Best Management Practices (BMPs) in spill and pollution control and hazardous substances management. • Rehabilitate any spill related impacts as soon as practically possible in accordance with an 'Aquatic Contingency Plan'	Negligible - negative
Impacts to ecological connectivity and/or ecological disturbance impacts.	Minor - Negative	• Implement and adhere to buffer zones for wetlands and riparian areas. • Implement road/pipeline Method Statement to specification. • Prohibit poaching or collection of plants and biota from natural areas, including riparian areas and wetlands.	Negligible - negative

Potential Impact	Pre-mitigation Impact Significance	Proposed mitigation	Post-mitigation Impact Significance
Hydropedology			
Impact on soil interflow, soil structure & land capability, and soil quality	Minor - negative	• Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. • Cover excavated soils with a temporary liner to prevent contamination. • Retain as much indigenous vegetation as possible. • Existing roads should be used as far as practical to gain access to the site, and crossing watercourses in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles. • Have emergency fuel & oil spill kits on site.	Negligible - negative
Impact on soil quality	Minor - negative	• Ensure the sewer system is monitored for leakages. • Routine visual inspections of sewer infrastructure and resident parking areas for signs of soil contamination	Negligible - negative
Impact on primary surface water receivers: **Non-perennial stream** **Wetland units**	Minor - negative	• Install a temporary cut-off trench to contain poor-quality runoff (if required). • Routine (monthly) inspections of all sewer-related infrastructure (hydraulic monitoring) • Ensure that stormwater systems conveying water to the nearby river are fitted with silt and oil traps, as well as that surface drains, are isolated from any potential surface pollution sources.	Negligible - negative
Impact on perched water table Dewatering	Minor - negative	• Discharge dewatered / rainwater collected into the nearby stream. May require authorisation. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination)	Negligible - negative
Hydrological			
Increase in Surface Runoff	Moderate - negative	• Manage storm water on site (the post development discharge should equal the pre-development discharge). This can be done through attenuation structures below significant impervious areas/disturbed areas, silt traps and water storage structures. • Stop activities during and immediately after rainfall events until accumulated water has dissipated and soils have become stable.	Minor - negative
Geohydrological			
Accidental spillage emanating from the sewage pipelines, pumpstations and MWWTW	Moderate - negative	• Design of the MWTW, pipeline network and pump station connections must be undertaken by a competent engineer.	Minor - negative

Potential Impact	Pre-mitigation Impact Significance	Proposed mitigation	Post-mitigation Impact Significance
		• Adequate training of any staff who may work on the MWTW, pipeline network and pump station connections infrastructure.	
Impact on downstream water uses, should treated water does not meet the recommended discharge water quality	Minor - Negative	• Routine monitoring • Emergency protocol of all spills or event that could deteriorate water quality • Routine auditing and maintenance	Negligible - negative

13. Water demand and water supply

12.1 Water demand

The water demand for the project was determined using the following guideline documents:

- Red Book - Guidelines for Human Settlement Planning and Design
- SANS 1200 – Standardized Specification for Civil Engineering Construction
- Local Municipal Standards

Table 14: Average daily demand for each phase

Phase	Total Average Daily Demand (Ml/d) (Includes 25% allowance for losses)
Phase 1	1.96
Phase 2	2.40
Phase 3	0.63
Total	**4.99**

It is anticipated that the project would require the proposed upgrades as follows:

Phase 1

- Based on the present eThekweni Municipality spreadsheet the total theoretical water demand is estimated at 8,331 Ml/day. This includes losses of 25%.
- The current storage is 28 Ml/day which will accommodate the 1.96 Ml/day. The eThekweni Planning Department have also confirmed that the reservoir will be able to supply this demand (i.e., 1.96 Ml/day). The reservoir is not part of the application.
- Reverse Osmosis Plant: The Assmang Cato Ridge Manganese Reverse Osmosis plant planned to be implemented in July 2024 will further reduce the water demand by 32m^3/hr or 0.77 Ml/day.
- No bulk infrastructure will need to be upgraded for the proposed Phase 1 development.

Phase 2

It is proposed to develop Phase 2 into two sections which are as follows:

- The first section of Phase 2 will include up to the high point of the site which is approximately 400 metres off the southern section of Phase 2.
  - As there is sufficient water supply in the area it is proposed that this southern section of Phase 2 is developed in conjunction with Phase 1.
  - The first section of Phase 2 is programmed to be unlocked in 18 months and will be phased in over 10 years.
- The second section of Phase 2 will include the balance of Phase 2 from the high point northwards and will only be unlocked after the service infrastructure has been completed in the Cato Ridge area.
  - The northern portion of Phase 2 will be implemented over 11 to 20 years.

Phase 3

- Phase 3 will be implemented over 21 to 25 years.

12.2 Water supply

Provide details of source of water and water availability e.g. dam yield analyses, Borehole analyses, assurance of supply etc. The water supply must address or show how the water demands of the intended activities will be met from the supply options considered.

It is anticipated that potable water will be sourced from the existing water reticulation system which is managed by eThekwini Municipality. Potable water is supplied to this area from Umgeni Water sources, via eThekwini Metro and is via a metered connection. This potable water is used for domestic purposes only and is not used to dilute sewage or added in significant amounts to the process. It is expected that a total of 2 kl of potable water will used on the site for domestic and chemical make- up purposes. This amounts to 0,1% of the

wastewater flow. After numerous discussions with eThekwini Municipality, they agreed that there is sufficient water demand capacity to supply Phase 1 of the development. The water required to meet the demand of the project is presented in Table *14* above and discussed in detail in the Pre-feasibility Report for the Provision of Civil Engineering Water Services (included as part of this application).

eThekwini Municipality is planning to upgrade the current bulk water reticulation system to allow for an additional water demand that would supply the north of Phase 2 & 3 of the development. This proposed upgrade does not form part of this application. The time frames as to when the upgrade will be implemented are not available at this stage. The proposed bulk water reticulation upgrade is summarised in the Pre-feasibility Report for the Provision of Civil Engineering Water Services (included as part of this application).

12.3 Water Balance

The water balance for the Cato Ridge site is presented in Figure *10* and shows the following inclusions:

- A large portion of water is from rainfall and would fall on the construction and operation area;
- Light industry footprint (311ha) and road area (34ha) have the largest contributing area;
- Water falling on roofs would be considered clean water and water falling on roads will be considered dirty water (since the site in industrial in nature);
- Drinking water would be sourced from the municipality; and
- Sewage will be collected via a pipeline network using sumps and pumpstations. A 2ML MWWTW would be used to treat this sewage until it can be connected to the municipal trunk sewer.

Table 15: Water balance for the proposed development

Facility name	Water In		Once off storage	Water Out	
	Water stream	**Quantity (m^3/annum)**	**Quantity (m^3)**	**Water Stream**	**Quantity (m3/annum)**
Rainfall (roads)		244800			1 401 840
Rainfall (Light industry)		2 239 200			1 095 984
Rainfall (Maintenance)		64 800			50 976
Municipal supply		373 200	**Storage tank -Light Industry** **(Does not form part of the current application)**		2799
				2ML Modular WTP	203 720
					159 272
					7 408
4 boreholes (testing)	**Groundwater**				
Streamflow	**River**				
Total		**2 922 000**			**2 922 000**

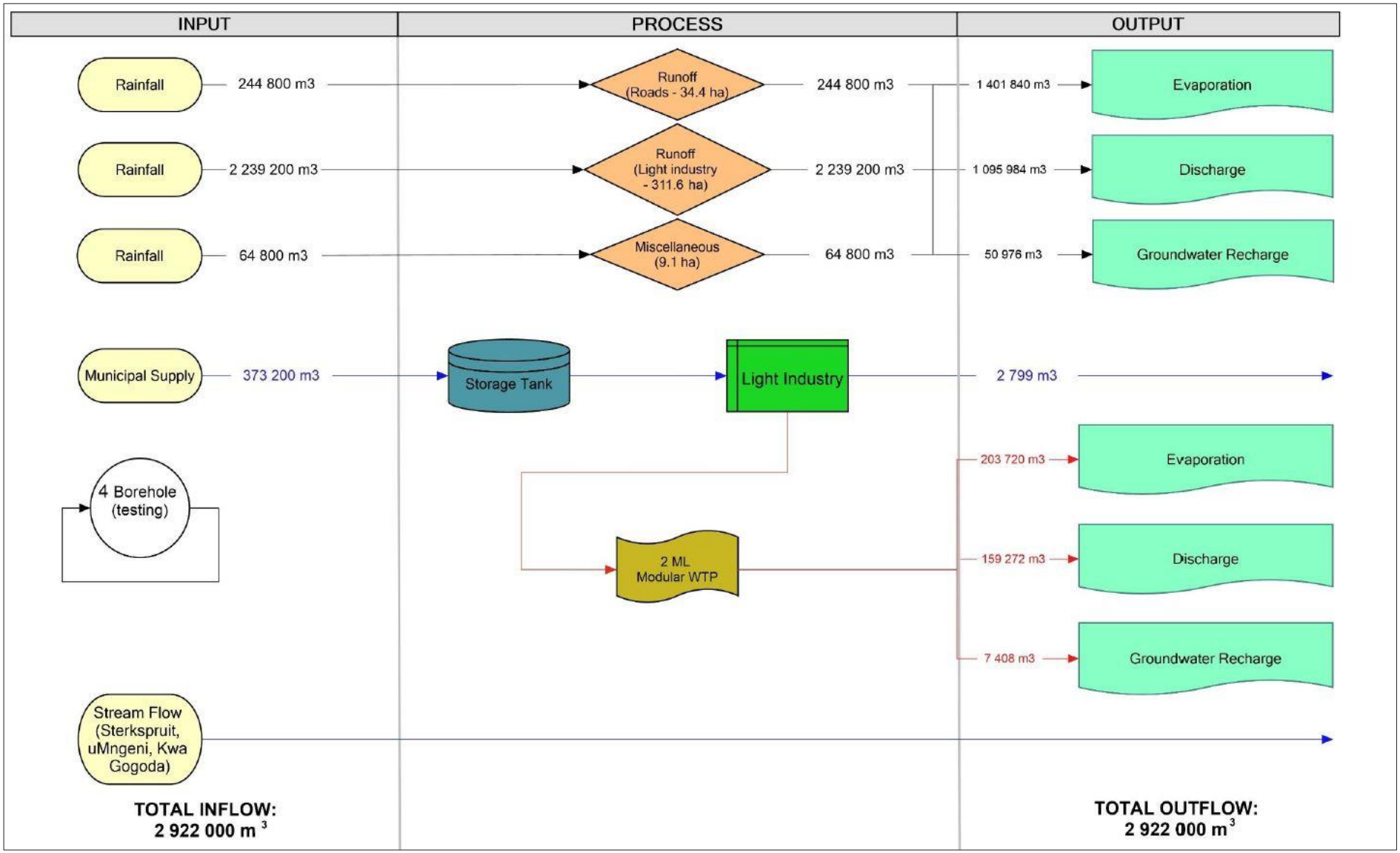


Figure 10: Water balance for the proposed development (Kantey and Templer, 2023)

Table 16: Balance for the Wastewater Treatment Works at full design capacity (Kantey and Templer, 2022)

Input		Output	
	Quantity (l/d)		**Quantity (l/d)**
Raw sewage	1 996 500	Final effluent	1 998 500
Potable Water	2000	Liquid in sludge cake	1500
Sodium hypochlorite solution	1500		2 000 000
Total	**2 000 000**		**2 000 000**

Table 17: Solids balance the Wastewater Treatment Works at full design capacity (Kantey and Templer, 2022)

Input		Output	
	Quantity		**Quantity (m3/annum)**
Screenings (0.008 m^3/Mld)	0.016m^3/d	**Screenings**	0.016 m^3/d
Grit (0.034 m^3/Mlld)	0.068 m^3/d	**Grit**	0.06 m^3/d
Activated sludge production	220 kg/d	**Waste Sludge**	220/d

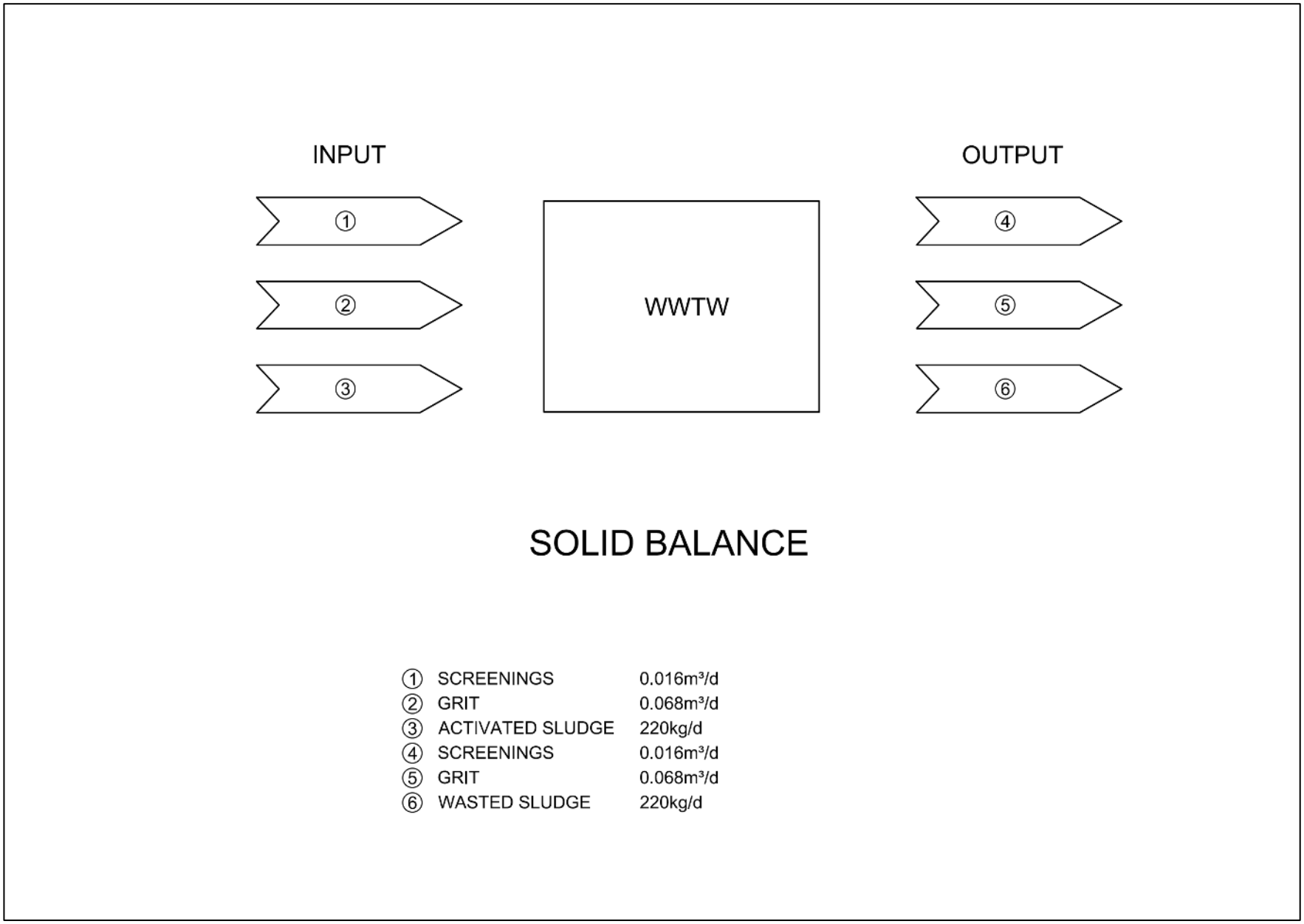


Figure 11: Solids Balance

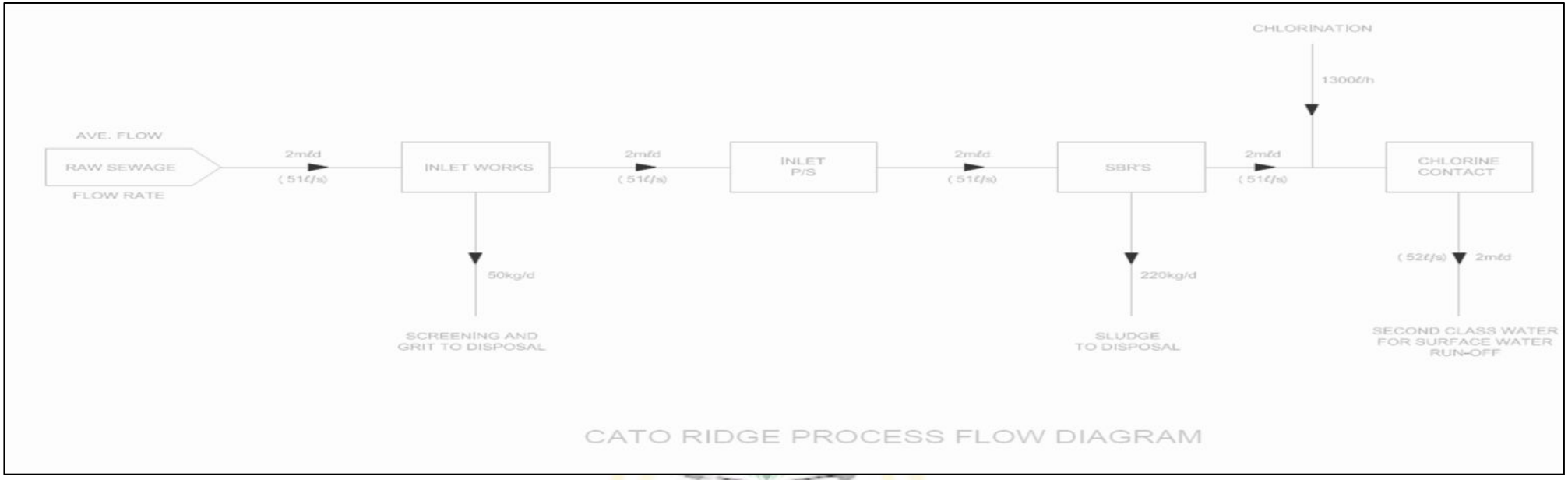


Figure 12: Wastewater Treatment Works Process Flow Diagram

14. Public participation

(To be updated once PPP has been completed)

Consultation with the public forms an integral component of the WULA process. This process enables Interested and Affected Parties (IA&Ps) (e.g., directly affected landowners, national, provincial and local authorities, local communities), to raise concerns and comment on the proposed activity. The project's Public Participation Process (PPP) is being conducted in parallel with the NEMA EA process.

Table 18: Outcome of the public participation

Person who commented	Comments (support or object)	Reasons for objection	Applicant's response to the objection

15. Other authorisations applicable to the activity

Environmental Authorisation has been applied for, currently in the decision-making process.

16. Section 27 (1)

The requirements contained in Section 27(1) of the National Water Act, 1998 (Act 36 of 1998) have been considered and are discussed further below.

a) Existing lawful water uses

Existing Lawful Water Uses*:*

An existing lawful water use (ELWU) is a water use which has taken place any time during a period of two years before the date of the commencement of the NWA, 1998. This allows any water use that lawfully took place to continue until such time as it can be converted into a license. No ELWUs have been identified for the proposed project.

Unlawful water uses:

This is a new development, and no unlawful water uses have been identified.

b) Need to redress the results of past racial and gender discrimination

According to the Draft Economic Study (2022) for the proposed project, CRDC intends to address the past racial and gender discrimination in the following ways:

- Employment creation:
  - Employment of more than 23 000 annually throughout the KwaZulu -Natal provincial economy;
- During construction phase, an estimated 344 new formal Small, Medium and Micro-Enterprise (SMME) opportunities may be created. The Black-owned SMMEs could potentially represent 73.14% of new formal SMME opportunities;
- An estimated 458 new formal SMME opportunities during the operational phase.

Note, the financial information presented is based on estimations. The actual values could vary, once the final end users of the site are confirmed. For purposes of the Environmental Impact Assessment process, the above information has been developed by the Macro-Economic specialist.

c) Efficient and beneficial use of water in the public interest

Although the Project construction will potentially impact on wetlands, they will implement a stormwater management plan to divert clean water away from the dirty area and prevent dirty water from entering clean water areas.

The Project will not abstract any water from water resources, therefore it is not anticipated that there will be significant impact on water quantity. The development will be reliant on municipal water provision.

d) Socio-economic impact

i) Of water use or uses if authorised:

(i) If the water uses are authorised, the following benefits are expected to realise (refer to the Draft Economic Study, 2022):

- R10.0 billion capital investment during its construction phase (5- to 25 years);
- Stimulate more than 30 644 temporary employment opportunities throughout the KwaZulu-Natal provincial economy;
- Stimulate more than R8.6 billion in additional GDP economy-wide;
- During the project's construction phase, more than 23 000 new employment opportunities could be sustained annually throughout the KwaZulu-Natal provincial economy at the project's maturity (initial data suggests that operational revenue at the project's maturity could reach R10.5 billion per annum at 2022 prices);
- On-site jobs could represent up to 60% of jobs created;
- During the operational phase, 18 182 sustained additional formal jobs would be created, as follows:
  - 4 194 skilled formal jobs
  - 9 819 semi-skilled formal jobs
  - 4 169 low-skilled formal jobs
- The project could also stimulate new enterprise development, increased fiscal taxation (R2.5 billion annual taxation throughout the provincial economy and more than R402 million in property taxes) and require investment into social amenities; and
- Improved livelihoods could stimulate the need for social amenities and other property market development opportunities such as retail, residential and services projects.

ii) Of the failure to authorise water use or uses:

Should the licence not be granted, the jobs referred to in d (i) will not be created.

e) Any catchment management strategy applicable to the relevant water resource

The proposed project falls within quaternary catchments U60C, U20J and U20L under Pongola-Mtamvuna Water Management Area. In accordance with Chapter 2 of the NWA, part 2 requires every Catchment Management Agency (CMA) to develop a Catchment Management Strategy (CMS) for the water resources within its water management area.

The catchment management strategy for the Pongola- Mtamvuna WMA has not yet been developed. However, the Umvoti to Mzimkulu catchments reserve determination of water resources is applicable.

f) Likely effect of the water use to be authorized on the water resource and on other water users.

All watercourses (rivers, streams and wetlands) within 500m of the proposed development project were mapped at a desktop level using available digital imagery and 5m elevation contour data. All mapped watercourses were then classified in terms of their Hydrogeomorphic (HGM) type in accordance with the national wetland and river classification. This led to the desktop delineation and classification of the following watercourse units:

- Twenty-Six (26) Mountain Headwater Streams;
- Two (2) Mountain Streams;

- Six (6) Seep Wetlands; and
- Five (5) Unchanneled Valley-Bottom Wetlands.

The most prominent sources of impacts for streams within the project area include increased erosion/sedimentation, altered flow regimes and alien plant invasion. These impacts are largely linked to residential and commercial development, tree plantations and farming and the consequences associated with these activities (i.e. an increase in hardened surfaces in their upstream catchments leading to increased runoff and erosion, artificial stormwater inputs and artificial impoundment [in- stream] associated with small farm dams contributing to altered hydrology, and lastly clearing and degradation of indigenous vegetation both within the catchment and the riparian zone of units assessed). These impacts have modified streams and rivers along the northern periphery of the project area to a moderate or severe degree. The remainder of the streams assessed (just less than half) are considered to be largely natural.

g) Class and the resource quality objectives of the water resource

The NWA describes the Resource Water Quality Objectives (RWQO) as "clear goals related to the quality of the relevant water resources". RWQO are descriptive or quantitative, spatial, or temporal and allow the catchment aspiration to inform the water quality component of the gazetted resource quality objectives for a specific catchment area. The RWQO provide greater detail than the resource quality objectives and these details form the basis of water quality management and reserve determination.

These RWQO are applicable upon the date of approval by the Minister, unless otherwise specified in the relevant government gazette.

The proposed project services infrastructure and MSTP falls within the Quaternary Catchments U60C, U20J and U20L.

Table 19: Resource Classes per UIA and Ecological Categories per Biophysical Nodes (DWS, 2017)

Integrated Unit of Analysis (IUA)	Water Resource Class for IUA	Biophysical Node Name	Quaternary Catchment	River Name	Ecological Category to be maintained	Natural (Mean Annual Runoff (MAR (million m^3/a)	Ecological Water Requirement (EWR) as % of natural MAR 1)
U2-4	II	U20J-04488	U20J	Mswati	B	7.3	21.8
U6-1	III	U60C-04556	U60C	Sterkspruit	D	9.3	16.1
U2-5	III	(U20L04435) Mg_1_EWR5	U20L	uMgeni	D	583.66	21.20

h) Investments already made and to be made by the water user in respect of the water use in question

As per the Economic study (2022), the total capital investment of approximately R10.0 billion would be set aside for the construction phase of the project (5 to 25 years).

i) Strategic importance of the water use to be authorised

The development will enable the following strategic intent:

- Creating Sustainable jobs: it is anticipated that up to 60% of on-site jobs will be created with more that 23 00 new employment opportunities in the operational phases. The proposed project will create 18 182 sustained additional formal jobs. The job status will be as follows :
    - 4 194 skilled formal jobs.

    - 9 819 semi-skilled formal jobs.
    - 4 169 low-skilled formal jobs.
- Contribution to the GDP: the proposed project will stimulate more than R58.6 billion in additional GDP economy-wide.
- Business development: The project could also stimulate new enterprise development, increased fiscal taxation (R2.5 billion annual taxation throughout the provincial economy and more than R402 million in property taxes) and require investment into social amenities.
- Increased livelihoods: will stimulate the need for social amenities and other property market development opportunities such as retail, residential and services projects.

j) The quality of water in the water resource which may be required for the Reserve and for meeting international obligations

The DWS has set out specific water quality limits for the water resources in the region, and it is expected that construction and operation activities should not compromise the determined water quality parameters. Reserve is defined by the DWS (2017, p. 4) as "the quantity and quality of the water required to satisfy the basic human needs by securing a basic water supply and to protect the aquatic ecosystem in order to secure ecologically sustainable development and use of the relevant water resource". This section of the report will only focus on the water quality. The water quality limits as set out by the DWS for the quaternary catchment are shown by Table 20 below.

The study area is located within the upper reaches of DWS quaternary catchments U20L, U20J and U60C. The watercourses within the study area comprise seeps, unchanneled valley bottom wetlands, mountain headwater streams, mountain streams and one transitional river, which ultimately feed into the Sterkspruit River (in the case of watercourses located in Quaternary Catchment U60C) and the uMgeni river (for those watercourses located with Quaternary Catchment U20J and U20L) further downstream. There are several minor farm dams along many of the onsite watercourses. Two major water supply dams, namely Inanda Dam and Shongweni Dam are located along the major rivers which drain the study area (i.e., the uMgeni and Sterkspruit, respectively).

Table 20: U60C, U20L and U20J Quaternary , uMgeni EWR 2-Ecospec and Thresholds of Potential

River: uMngeni		Present Ecological Status (PES): C/D
Monitoring site: RMG001		Category
Water quality	EcoSpecs metrics	TPC
Inorganic salts[(a)]		
MgSO4	The 95th percentile of the data must be ≤ 16 mg/L.	The 95th percentile of the data must be 13 – 16 mg/L.
Na2SO4	The 95th percentile of the data must be ≤ 20 mg/L.	The 95th percentile of the data must be 16 – 20 mg/L.
$MgCl_2$	The 95th percentile of the data must be ≤ 15 mg/L.	The 95th percentile of the data must be 12 – 15 mg/L.
$CaCl_2$	The 95th percentile of the data must be ≤ 21 mg/L.	The 95th percentile of the data must be 17 – 21 mg/L.
NaCl	The 95th percentile of the data must be ≤ 45 mg/L.	The 95th percentile of the data must be 36 – 45 mg/L.
$CaSO_4$	The 95th percentile of the data must be ≤ 351 mg/L.	The 95th percentile of the data must be 280 – 351 mg/L.
Physical variables		
Electrical Conductivity	The 95th percentile of the data must be ≤ 30 mS/m.	The 95th percentile of the data must be 24 – 30 mS/m.

River: uMngeni **Monitoring site: RMG001** Water quality	EcoSpecs metrics	Present Ecological Status (PES): C/D Category TPC
pH	The 5th percentile of the data must be 6.5 – 8.0, and the 95th percentile 8.0 – 8.8	The 5th percentile of the data must be < 6.3 and > 7.8, and the 95th percentile must be < 8.2 and > 8.6
Temperature[(b)]	Small deviation from the natural temperature range.	Initiate baseline monitoring for this variable.
Dissolved oxygen[(b)]	The 5th percentile of the data must be ≥ 7.0 mg/L.	The 5th percentile of the data must be 7.2 – 7.0 mg/L. Initiate baseline monitoring for this variable.
Turbidity[(b)]	Vary by a small amount from the natural turbidity range; minor silting of instream habitats acceptable	Initiate baseline monitoring for this variable.
Nutrients		
Total Inorganic Nitrogen (TIN-N)	The 50th percentile of the data must be ≤ 0.85 mg/L.	The 50th percentile of the data must be 0.68 – 0.85 mg/L.
PO_4-P	The 50th percentile of the data must be ≤ 0.075 mg/L.	The 50th percentile of the data must be 0.06 – 0.075 mg/L.
Response variables		
Chl-*a* phytoplankton[(b)]	The 50th percentile of the data must be <20 µg/L.	The 50th percentile of the data must be 16 – 20 µg/L.
Chl-*a* periphyton[(b)]	The 50th percentile of the data must be ≤ 52.5 mg/m^2.	The 50th percentile of the data must be 42 – 52.5 mg/m^2.
Toxics		
Ammonia (NH_3-N)	The 95th percentile of the data must be ≤ 0.1 mg/L.	The 95th percentile of the data must be 0.08 – 0.1 mg/L.
Aluminium	The 95th percentile of the data must be ≤ 0.02 mg/L (Chronic Effects Value (CEV) value for pH > 6.5).	The 95th percentile of the data must be 0.016 – 0.020 mg/L.
Mercury	The 95th percentile of the data must be ≤ 0.000 525 mg/L.	The 95th percentile of the data must be 0.000 42 – 0.000 525 mg/L.
Other toxics[(b)]	The 95th percentile of the data must be within the TWQR as stated in DWAF (1996c) or the A category boundary as stated in DWAF (2008b).	An impact is expected if the 95th percentile of the data exceeds the TWQR as stated in DWAF (1996c) or the upper limit of the A category boundary as stated in DWAF (2008b).

k) Probable duration of any undertaking for which a water use is to be authorised

The CRDC's Land Development and Release Project is expected to be unlocked over 25 years.

The MSTP will only be operated (including effluent discharge) until municipal infrastructure is introduced (which is expected in 2032). The MSTP will then be decommissioned and rehabilitated.

17. Declaration by the applicant with signature confirming that the information submitted is correct

Document Control						
Project name		Cato Ridge Land Development and Release Project				
Document number		Click or tap here to enter text.	**Project number**		1001556	
Client		Cato Ridge Development Company Limited				
Client contact		Werner Botha	**Client reference**		TBC	
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier (if required)**	**Approver**
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A	2023/08/16	Report for Client Review	S Mzolo	W Botha C Magalhaes		R Kolapen
1	2023/08/25	Draft Report for Public Comment	S Mzolo			R Kolapen
Current revision		**1**				

Approval			
Author signature	siphamandla Mzolo Signed by siphamandla Mzolo, siphamandla.mzolo@zutari.com 25/08/2023 10:25:25(UTC+02:00) SIGNFLOW	Approver signature	Roshantha Kolapen Signed by Roshantha Kolapen, Roshantha.Kolapen@zutari.com 25/08/2023 10:27:12(UTC+02:00) SIGNFLOW
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[END OF WATER USE LICENCE APPLICATION SUMMARY]