

Riparian Delineation

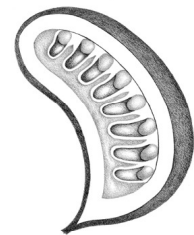
*PROPOSED AGGREGATE QUARRY OPERATION
LOCATED ON PORTION 16 OF THE FARM HERMANUS KRAAL
EZAKHENI DISTRICT OF LADYSMITH, KWAZULU- NATAL*



Susan Carter-Brown
BSc Hon Environmental Science

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www.afzelia.co.za*

A. Background to the assessment

The client is in the process of submitting an application to the Department Minerals and Energy to obtain a mining permit for a site located on Portion 16 of the Farm Hermanus Kraal No. 1186, Ezakheni District of Ladysmith. As such, an environmental screening exercise has been undertaken to determine the potential environmental impacts of the proposed activities, and to recommend necessary mitigation measures. The Riparian Delineation report will inform the environmental screening process.

The Hermanspruit stream is located to the north of the proposed aggregate quarry site. This watercourse runs down the Hermanspruit Valley in the west, and into the Klip River to the east. The Hermanspruit is outside the boundary of the proposed mining site, however it is in close proximity to the site and therefore has the potential to be impacted upon during mining activities.



Photograph 1. Note the Hermanspruit stream flowing near the northern boundary of the mining site.

Afzelia Environmental Consultants were appointed to conduct the necessary riparian and wetland investigations. The scope of work for the study includes:

- Determination of the riparian and wetland boundaries;
- Consideration of the potential impacts the mining activities may have on the system; and
- Provision of recommendations and mitigation measures to reduce impacts identified.

The following definitions from the National Water Act (Act No. 36 of 1998) are relevant -

Riparian habitat - *“Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of the adjacent land areas”.*

Wetland - “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land, in normal circumstances, supports or would support vegetation typically adapted to life in saturated soil”.

Riparian areas and wetlands perform a number of functions that are of value to society, and as such, are protected by provincial and national legislation.

B. Specialist team

This report has been prepared independently of influence or prejudice by any parties. The following specialists were involved in the compilation of the report:

Table 1. Ladysmith Quarry project team

Specialist	Qualifications and Experience	Role
Susan Carter-Brown	<i>BSc Honours, Environmental Science</i> Susan has attended various courses on wetland assessment (Tools for Wetland Delineation, Pretoria 2010; WET-Health and WET-EcoServices, Rhodes University 2010). She has been involved in wetland and riparian assessments since February 2011 and is a member of the KZN Wetland Forum.	Susan conducted the fieldwork and compiled the report.
Wolfgang Kanz	<i>MSc Range and Forage Resources</i> Wolfgang's interest lies in vegetation dynamics, with specific expertise in grassland science and savannah ecology. He is involved in all facets of the Environmental Impact Assessment, including specialist consulting (<i>inter alia</i> biodiversity assessments, ecological screenings, roads and pipeline assessments) and managing the EIA process. Wolfgang has attended courses on stormwater management, effluent management, and riparian management.	Wolfgang reviewed the report and provided guidance where necessary.

C. Riparian Delineation

The riparian delineation was conducted as per the procedures described in ‘A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas – Edition 1’ (Department of Water Affairs, 2005). Riparian delineation considers the indicators used in wetland delineation, such as:

- *Hydrology* – the distribution and movement of water through a system.
- *Vegetation* – plant species have varying tolerances to different moisture regimes. The presence, composition and distribution of specific hydrophytic plants within a system can be used as an indication of wetness and allow for inference of riparian / wetland characteristics.
- *Geomorphology* - prolonged saturation of soil has a characteristic effect on soil morphology, affecting soil matrix chroma and mottling in particular. The hue, value and chroma of soil samples obtained at varying depths can be visually interpreted with the aid

of the Munsell Colour Chart and the interface between wetland and non-wetland zones verified.

However, when delineating riparian systems, emphasis is placed predominately on *topography; vegetation; alluvial soils and deposition of material.*

Firstly, in order to investigate the extent of riparian and wetland systems on Portion 16 of the Farm Hermanus Kraal, the area was subjected to a thorough desktop analysis.

Secondly, on the 3rd November 2011, a site visit was conducted in the company of the client. In-field procedures to delineate the system were performed: vegetation sampling, soil sampling (using auger and Munsell Colour Chart), and topography assessment. The site was traversed and auger sample points taken at intervals. Auger points and various observation points were logged using a Garmin GPS 60. See photographs of the site below.



Photograph 2. From the Hermanspruit, looking back towards the mining site.



Photograph 3. Looking west, upstream.



Photograph 4. Looking east, downstream.
Note the clearly evident macro-channel embankment.

D. Limitations and Assumptions

It is difficult to apply pure scientific methods within a natural environment without limitations, and the consequent need to make assumptions. The following constraints may have affected this assessment:

- A Garmin GPS 60 was used in the mapping of significant points on-site. The accuracy of the GPS was affected by the availability of corresponding satellites which was, at times, impaired by dense vegetation and cloud cover. Accuracy ranged from 4 to 9m.
- A Munsell Soil Colour Chart was used to assess soil morphology. This tool requires that a *dry* sample of soil be assessed. However, due to in-field time constraints, wet soil samples were assessed. Wet samples would have consistently lower values than dry soils; and this is taken into consideration.

E. Results

A map of the delineated riparian zone is found in Appendix A.

The mining site was operational in the 1950's, at which time the stream bank was subjected to minor earthworks. During the 50-odd years the mine was abandoned, riparian vegetation recovered well and the Hermanspruit appears to be in a stable, natural state. However, the past earthworks have formed a defined macro-channel embankment, which clearly delineates the boundary of the stream (see photograph 3 above).

No wetlands exist within the immediate mining site, however the access road traverses a wetland relic area. This wetland area is deemed to be a 'relic' as the system has been highly modified by cultivation and the functional health compromised. See the photographs below.



Photograph 5. Wetland totally transformed by cultivation.



Photograph 6. Access road through wetland area.

F. Potential impacts of mining activities on the Hermanspruit

The following potential impacts are relevant:

- Increased pollutants from mining equipment (e.g. petrochemical spillage, washing of vehicles and equipment in stream)
- Staff cleaning and washing in Hermanspruit
- Contamination of stream from portable toilets
- Increased litter / dumping into system from mining staff
- Disturbance of riparian fauna during blasting and general mining activities (e.g. transport vehicles)
- Stormwater runoff causing siltation of Hermanspruit with mining fines
- Removal of indigenous riparian vegetation
- Increased invasion of alien vegetation
- Compaction of natural areas by haul vehicles

G. Conclusions and Recommendations

The Hermanspruit is currently in a stable condition, and no wetland areas occur within the mining area. In order to safeguard the riparian habitat, it is recommended that the Hermanspruit be afforded a 30m buffer from the edge of the macro-channel embankment. See the map of the buffered stream in Appendix A.

Apart from two points where the access road marginally intrudes into the buffer, the mining site is found entirely outside the buffered riparian zone and therefore no mining activities will encroach near the stream. Site management should ensure that staff do not litter within the riparian habitat; and no washing of staff or vehicles / equipment should take place within the stream. The Hermanspruit should remain a 'No-Go' zone throughout all phases of the project.

No riparian vegetation may be removed from the Hermanspruit buffer zone. Moreover, portable toilets must be located more than 50m from the stream.

The Environmental Management Plan should include measures to avoid the spillage of petrochemicals. The impacts of blasting are difficult to mitigate and riparian fauna will be disturbed for a finite period while mining occurs. Haul vehicles must adhere to access roads and designated turning circles at all times to avoid further compaction of the natural areas.

In order to avoid siltation of the Hermanspruit with stormwater runoff from the mining site, sandbags should be placed at two locations within the riparian buffer zone, as indicated on the map in Appendix B and photographs below. The sandbags should be positioned along the contour such that they filter stormwater runoff before it enters the stream.



Photograph 6 and 7. Areas where sandbags and diversion berms are to be located.

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Upon decommissioning of the mining site, if the access road no longer serves a purpose, it should be ripped and hydro-seeded with appropriate, robust wetland species.

Please direct any questions or queries to –
Susan Carter-Brown
Afzelia Environmental Consultants
P O Box 95, Hilton, 3245
Tel: 033 343 2031
Fax: 033 343 2033
Email: susan@afzelia.co.za

APPENDIX A Riparian delineation

APPENDIX B Map showing positioning of sandbags and diversion berms