

**SCOPING PHASE REPORT:**  
**General Landfill Site and A Hazardous Waste  
Storage Facility in Lephalale, Limpopo Province**  
**Surface Water Resources Assessment Report**

*For:*



Unit 25 Sunninghill Office Park  
4 Peltier Road  
Sunninghill  
2157

Tel: 0861 44 44 99  
Fax: 0861 62 62 22

[nkhensani@envirolution.co.za](mailto:nkhensani@envirolution.co.za)  
[www.envirolution.co.za](http://www.envirolution.co.za)

*By:*

Wetland Consulting Services (Pty) Ltd

Wetland Consulting Services (Pty.) Ltd.  
PO Box 72295  
Lynnwood Ridge  
Pretoria  
0040

Tel: 012 349 2699  
Fax: 012 349 2993  
Email: [info@wetcs.co.za](mailto:info@wetcs.co.za)



**Reference 461A/2008**



## APPROVAL

| COMPILED BY:           | CHECKED BY:              | APPROVED BY:             |
|------------------------|--------------------------|--------------------------|
| NAME:<br>Bhuti Dlamini | NAME:<br>Allan Batchelor | NAME:<br>Allan Batchelor |
| DATE:<br>January 2009  | DATE:<br>January 2009    | DATE:<br>January 2009    |

## DISTRIBUTION LIST

| AGENCY, ORGANISATION OR PERSON | NO. OF COPIES |
|--------------------------------|---------------|
| Envirolution Consulting        | 1             |
|                                |               |
|                                |               |
|                                |               |

## REVISION

| DATE     | No. | DESCRIPTION OF REVISION OR AMENDMENT | INITIAL    |
|----------|-----|--------------------------------------|------------|
| 27/01/09 | 1   | Scoping recommendations              | B. Dlamini |
|          |     |                                      |            |



## DOCUMENT SUMMARY DATA

**PROJECT:** Scoping Phase Report: General Landfill Site and A Hazardous Waste Storage Facility in Lephalale, Limpopo Province

**CLIENT:** Envirolution Consulting  
Unit 25 Sunninghill Office Park  
4 Peltier Road  
Sunninghill  
2157

**CONSULTANT:** Wetland Consulting Services (Pty) Ltd.

**CONTACT DETAILS:** Allan Batchelor  
PO Box 72295  
Lynnwood Ridge  
0040  
Telephone number: (012) 349 2699  
Fax number: (012) 349 2993  
E-mail: [allanb@wetcs.co.za](mailto:allanb@wetcs.co.za)



## **INDEMNITY AND CONDITIONS RELATING TO THIS REPORT**

---

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and Wetland Consulting Services (Pty.) Ltd. and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although Wetland Consulting Services (Pty.) Ltd. exercises due care and diligence in rendering services and preparing documents, Wetland Consulting Services (Pty.) Ltd. accepts no liability, and the client, by receiving this document, indemnifies Wetland Consulting Services (Pty.) Ltd. and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by Wetland Consulting Services (Pty.) Ltd. and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.



## **DECLARATION OF INDEPENDENCE**

### **Declaration**

#### **Independent Specialist Consultant**

I, Allan Batchelor, Pr.Sc.Nat. Registration Number 400092/06, representing Wetland Consulting Services (Pty) Ltd in my capacity as director, declare that we

- Act as independent specialist consultants, in this application, in the field of wetland ecology, delineation and classification.
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2006;
- Have, and will have no vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006; and
- Will provide the competent authority with access to all the information at our disposal regarding the application, whether such information is favourable to the applicant or not.

Wetland Consulting Services (Pty) Ltd

**Name of Company**

Allan Batchelor

**Name of Specialist Consultant**

**Signature of Specialist Consultant**

2009/01/14

**Date**

## TABLE OF CONTENTS

|           |  |           |
|-----------|--|-----------|
| <b>1.</b> | <b>BACKGROUND INFORMATION</b>                            | <b>1</b>  |
| <b>2.</b> | <b>APPROACH</b>  | <b>3</b>  |
| <b>3.</b> | <b>LIMITATIONS</b>                                       | <b>3</b>  |
| <b>4.</b> | <b>RATIONALE</b>   | <b>3</b>  |
| <b>5.</b> | <b>SELECTION CRITERIA</b>                                | <b>5</b>  |
| <b>6.</b> | <b>FINDINGS</b>  | <b>6</b>  |
| 6.1       | Wetland and riparian zone delineation                    | 6         |
| 6.2       | Site selection   | 8         |
| <b>7.</b> | <b>SCOPING PHASE RECOMMENDATIONS FOR EIA PHASE</b>       | <b>10</b> |
| 7.1       | Potential Impacts associated with site 1 & 2             | 10        |
| 7.2       | Plan of Study associated with site 1 & 2                 | 11        |
| <b>8.</b> | <b>REFERENCES</b>  | <b>13</b> |
| <b>9.</b> | <b>APPENDIX 1: IMPACT RATING METHODOLOGY (1 &amp; 2)</b> | <b>14</b> |

## LIST OF FIGURES

|  |    |
|--|----|
| Figure 1 Map showing the location and numbering of the five proposed sites.....  | 2  |
| Figure 2 Map showing the desktop delineated wetlands and/or riparian zones within and surrounding the study area .....   | 7  |
| Figure 3 Sensitivity analysis showing the relationship between the sites and the 100m (high risk), 500m (possible risk) and > 500m (low risk) buffer zones with respect to the surface water resources and the proposed sites..... | 9  |
| Figure 4 Map showing the candidate sites for selection for the proposed landfill site.....   | 12 |

## LIST OF TABLES

|  |    |
|--|----|
| Table 1: Proposed landfill sites .....                               | 1  |
| Table 2: Selection criteria and assessment procedure.....            | 5  |
| Table 3: Risk assessment categories.....                             | 8  |
| Table 4 Risk assessment and sensitivities of the proposed sites..... | 10 |

# 1. BACKGROUND INFORMATION

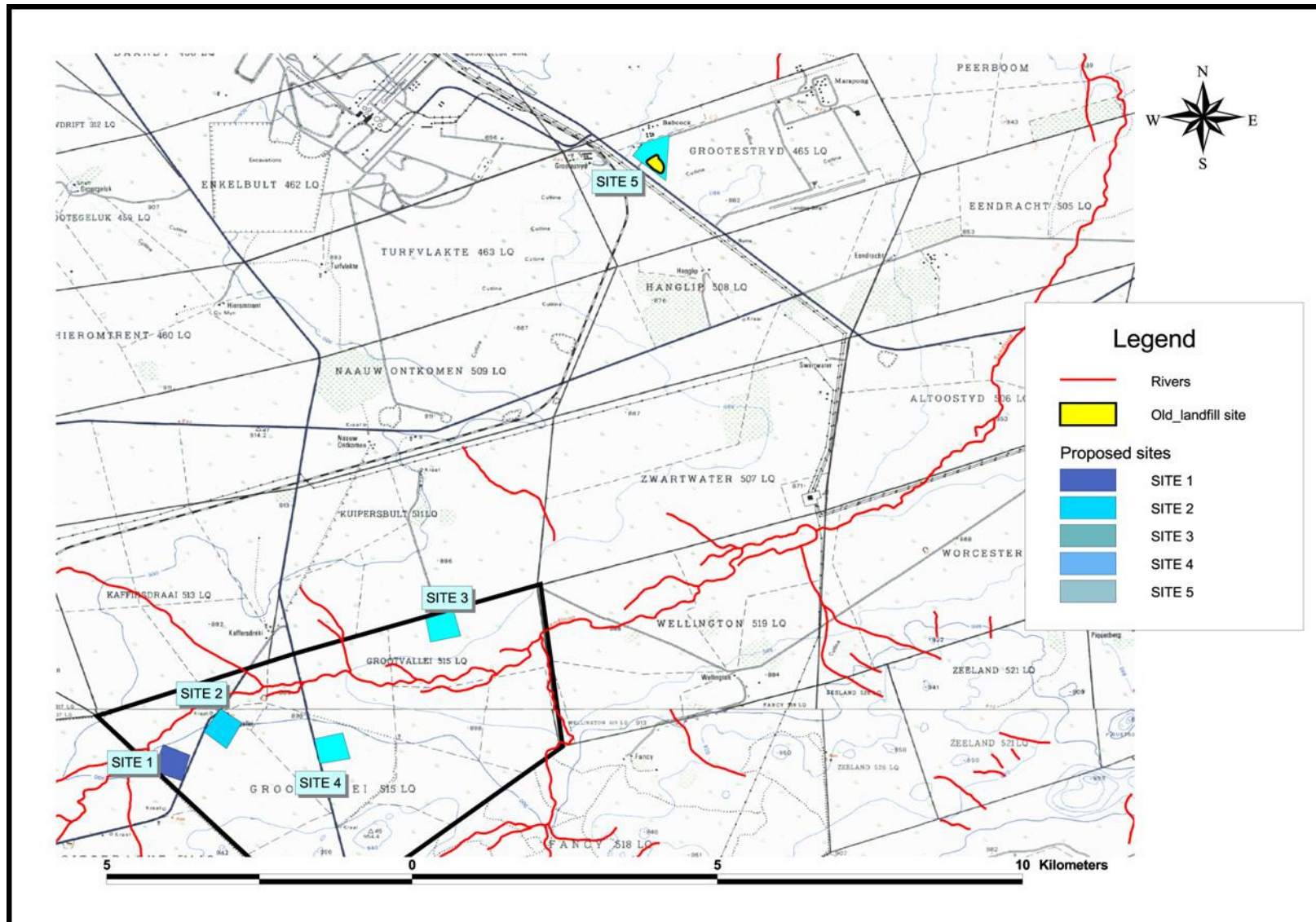
Wetland Consulting Services (Pty) Ltd. was appointed by Envirolution Consulting to undertake a surface water resources and wetland assessment study for the proposed General landfill site and A Hazardous Waste storage facility in Lephalale, Limpopo Province.

The study site is located to the west of Lephalale Town within 30km radius of Medupi Power Station in the vicinity of the existing Matimba Power Station. This document aims to provide a brief descriptive map of the wetlands and riparian areas within the study area, based on a desktop assessment, with the purpose of informing the site selection process for the proposed landfill site. The full wetland assessment and impact assessment report will follow at a later stage, once a specific site has been chosen for the proposed general and hazardous waste landfill.

Five potential landfill sites of approximately 20 ha in extent were identified on the basis that they are owned by Eskom and as well as accessibility. These sites are located around and within the vicinity of the approved Medupi and existing Matimba Power stations. The location and extent of the study sites are indicated in the table below (Table 1) and illustrated in Figure 1.

**Table 1:** Proposed landfill sites

|   |           |
|---|-----------|
| GROOTVALLEI FARM  | 1. SITE 1 |
|   | 2. SITE 2 |
|   | 3. SITE 3 |
|   | 4. SITE 4 |
| MATIMBA PS (AROUND<br>OLD LANDFILL SITE)<br>GROOESTRYD FARM | 5. SITE 5 |



**Figure 1** Map showing the location and numbering of the five proposed sites.



## **2. APPROACH**

Use was made of 1:50 000 topographical maps, Google Earth imagery and 1:10 000 orthophotos to create a digital base map of the study area onto which the wetland and riparian area boundaries were delineated using ArcView 3.2 and ArcGIS 9.2. Use was made of wetness and greenness signatures and drainage lines visible on the Google Earth imagery and the 1:10 000 orthophotos to delineate wetland and riparian areas (Thompson et al, 2002). Some limited ground truthing of the delineated wetland and riparian areas boundaries was also undertaken during the site visit in November 2008.

## **3. LIMITATIONS**

The delineation provided in this report is based on desktop mapping for the purpose of site selection and therefore the accuracy of the boundaries provided is very low. A detailed delineation using DWAF, 2005 delineation procedure will be required for the selected sites for detail analysis. The watercourse and its associated riparian zone has not been defined as required by National Water Act. This will be undertaken as part of a detailed analysis once the site is selected.

## **4. RATIONALE**

Wetlands and riparian zones are regarded as sensitive areas and are afforded a degree of protection in the National Water Act (Act 36 of 1998) and in terms of the National Environmental Management Act (Act 107 of 1998). These systems play an essential role in the stability and biodiversity of ecosystems as well as the functioning of the hydrological cycle. They perform a number of functions depending on the nature of the landscape in which they occur; these functions include water quality improvements, biodiversity supports, maintenance of ecological processes, flood attenuation and stream flow regulation.

The Department of Water Affairs and Forestry (DWAF) Environmental Best Practice Specifications Series (DWAF, 2005), states the following:

- Do not locate any reservoir, dam or depot for any substance which causes or is likely to cause pollution within the 1:100 year floodline, or within a horizontal distance of 100m (whichever is greater) of a watercourse, drainage line or identified wetland.
- Do not dump waste of any nature, or any foreign material into any drainage line or wetland.
- Do not allow the use of any drainage line or wetland for swimming, bathing, or the cleaning of clothing, tools or equipment.
- Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or wetlands.
- Otherwise clean, but silt laden water may be discharged overland, provided no erosion is resultant from this discharge.
- Ensure that no stormwater is allowed to enter any drainage installation for the reception, conveyance, storage and / or treatment of sewage.
- Ensure that water passing through vehicle wash bays and workshops passes through oil baffles / oil traps / oils separators before passing into conservancy tanks.
- Treat all oil sludge collected in the said traps, including sump liners, as hazardous waste.
- Take special care during rainy periods to prevent the contents of sumps and drip trays from overflowing or overloading.

It is therefore against this background that these areas (wetland and riparian zones) require protection, management and sustainable use while maintaining their environmental integrity.

## 5. SELECTION CRITERIA

The following selection criteria (Table 2) was proposed and provided to us by Envirolution Consulting to identify the areas suitable for landfill sites which have a low risk to the surface water resources (watercourses<sup>1</sup>).

**Table 2:** Selection criteria and assessment procedure

| Potential landfill sites | Scores | Risk assessment (sensitivity)                |
|--------------------------|--------|--|
| high                     | 2      | Low risk                                     |
| medium                   | 1      | Possible risk (mitigation measures required) |
| low                      | 0      | High risk                                    |

### Definitions:

#### Low risk:

- There is no watercourse traversing the area or within a specified distance (500 m) from the source or possible source of pollution or any other impacts.

General Authorisation refers to using water without a licence for water use without significant degradation (low risk). Government Notice No. 398 of March 2004 indicates that General Authorisations do not apply to any wetland or any water resource within a distance of 500 metres upstream or downstream from the boundary of any wetland, therefore 500 metres can be used as a specified distance. In this particular instance, this means that if proposed activity falls within 500 metres from the edge of a water resource then it poses a possible risk but if it falls outside this range then it poses a low risk.

<sup>1</sup> Watercourse means –

- a river or spring;
- a natural channel in which water flows regularly or intermittently;
- a wetland, lake or dam into which, or from which, water flows; and
- any collection of water which the Minister may, by notice in the *Gazette*, declare to be a water course, and a reference to a water course includes, where relevant, its bed and banks.

(Definition taken from the National Water Act, Act 36 of 1998)

#### Possible risk:

- There is a watercourse traversing the area within 500m of the proposed activity and the footprint of the proposed activity falls within the specified distance of 500 metres from the watercourse.

There are therefore suspected possible risks and/or impacts to the watercourse that will require further investigations. Mitigation measures, a monitoring plan (including quarterly inspections) are required and must be put in place to assess/monitor the changes and improvement associated with the proposed activity. An authorisation in terms of the National Water Act is or maybe required prior to commencement any activity.

#### High risk:

There is a watercourse traversing the area of the proposed activity and the footprint of the proposed activity falls within the specified distance of 100 metres (Best Practise Guideline (DWAf, 2005) and it is also associated with one or all of the following:

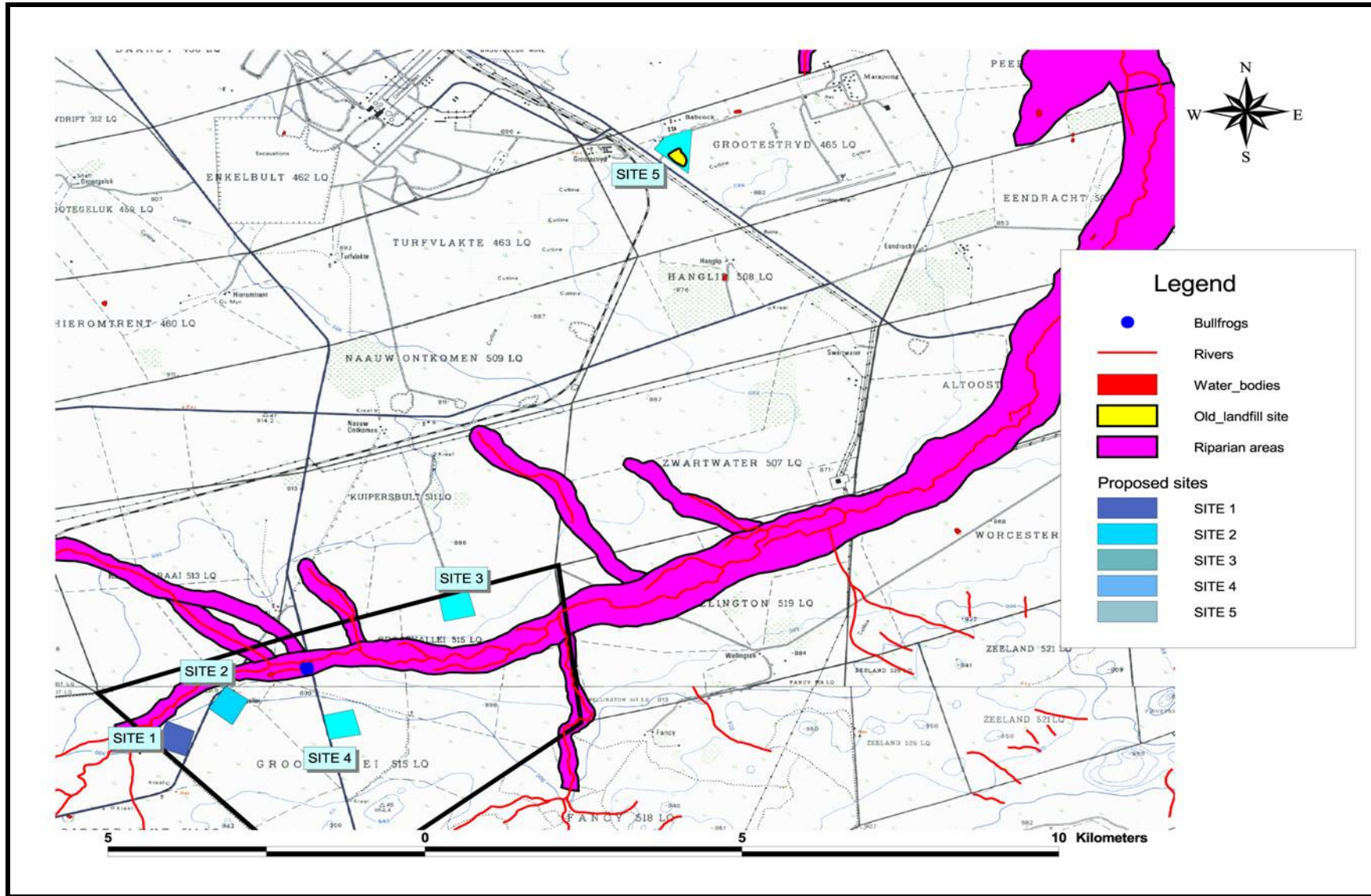
- A watercourse or wetland occurs within the direct footprint of the proposed landfill site;
- Watercourses that support endangered or red data species and also other associated biodiversity features;
- Headwaters (source or spring) and watercourses used for direct human consumption.
- Shared watercourses i.e. watercourses of international importance that drains to different countries.
- Any water watercourse that has been declared by the Minister by notice in the Gazette as of National Importance thus it protection in vital.

An authorisation in terms of the National Water Act is definitely required prior to commencement of any activity, including comprehensive investigations of the issues associated with the watercourses and projected impacts.

## 6. FINDINGS

### 6.1 *Wetland and riparian zone delineation*

The distribution of wetland and riparian zones associated with the drainage lines in relation to the proposed sites is depicted in Figure 2. The final extent of the provisionally delineated wetlands and riparian zones will be further investigated in the field in the next phase of the project, once a site for the proposed landfill has been selected.



**Figure 2** Map showing the desktop delineated wetlands and/or riparian zones within and surrounding the study area

The relationship between the sites preliminarily identified as possible landfill sites and the sensitivities of the sites based on Best Practice Guidelines (DWAF, 2005) and the conditions on the General Authorisation notice (refer to Table 3), are depicted in Figure 3. Should these be used to inform the site selection process then this would reduce the potential landfill sites to those occurring beyond the 100m (possible risk) and 500m (low risk) buffers, as shown below.

**Table 3:** Risk assessment categories

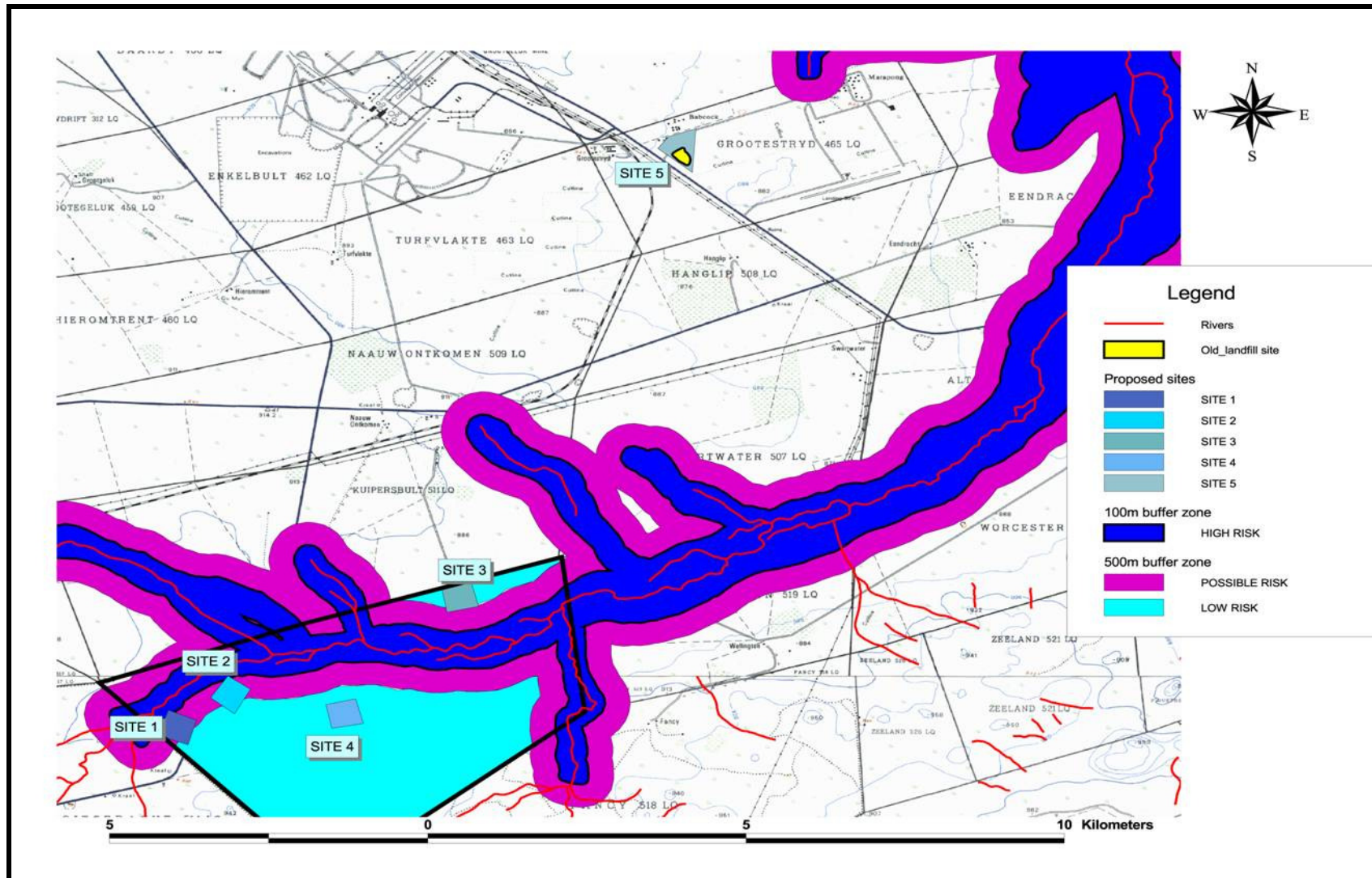
| Selection Range (buffers) – footprint of the landfill site | Risk assessment (sensitivity)                |
|--|--|
| > 500m   | Low risk                                     |
| 100m – 500m  | Possible risk (mitigation measures required) |
| <100m  | High risk                                    |
|  | High risk                                    |

## 6.2 Site selection

From a surface water resources perspective, the landfill site should be selected so that there are no significant impacts to any of the water resources on site (Best Practice Guidelines (DWAF, 2005)). Where impacts to the water resources are unavoidable, these impacts will need to be successfully mitigated so as to prevent degradation of the water resource. Where mitigation is impossible or unlikely to be successful, this should be considered as the fatal flaw (from a water resources perspective) for that particular site, and another, more suitable site would need to be found.

*In this context using the proposed selection criteria above and its definitions thereafter and the results are illustrated in Table 4 and in a sensitivity map in Figure 3.*





**Figure 3** Sensitivity analysis showing the relationship between the sites and the 100m (high risk), 500m (possible risk) and > 500m (low risk) buffer zones with respect to the surface water resources and the proposed sites

**Table 4** Risk assessment and sensitivities of the proposed sites

| SITE                   | RISK ASSESSMENT/<br>SENSITIVITY | EXPLANATIONS   |
|------------------------|---------------------------------|--|
| SITES<br>1 and 2       | 1 (Possible Risk)               | The site falls between 100m and 500m buffer in the area marked as of possible risk. Further investigations and detailed assessments (including impact assessment and mitigation measures) will be required. As there is a confirmed population of Bullfrogs ( <i>Pyxicephalus adspersus</i> ) observed on site the buffer strip might be required for foraging purposes. |
| SITES<br>3, 4 and<br>5 | 2 (Low Risk)                    | No drainage line traverses the site and it falls outside 500m buffer zone within the area of LOW RISK.   |

Based on the wetland assessment, sites 3, 4, and 5 fall within the areas marked as being of LOW RISK (Figure 4), implying that these sites are most suitable (from a wetland perspective) for selection for the proposed landfill site especially sites 4 and 5 being the furthest from the watercourse. However, should results from other specialist reports indicate that sites 1 and/or 2 be considered for selection, then a detailed assessment including impact assessment and mitigation measures will be required for these sites as they fall within the area of POSSIBLE to HIGH RISK. These sites (Sites 1 & 2) are also possibly used by the observed population of bullfrogs for foraging (herpetologist input will be required with this regard).

## 7. SCOPING PHASE RECOMMENDATIONS FOR EIA PHASE

### 7.1 Potential Impacts associated with site 1 & 2

As part of the impact assessment phase (EIA) of the surface water resources assessment, all potential impacts expected during the construction, operational, decommissioning and closure phases of the project will be identified and assessed based on an impact significance rating scale (Appendix 1). Some of the potential impacts expected to arise from the landfill site project phase include:

- Loss of wetland vegetation and habitat supporting various biodiversity features ;
- Increased sediment movement off the site, particularly during the construction phase
- Deterioration of water quality due to oxidation and leaching of pyritic material during storage on the site, releasing low pH, high metal and pollutant rich discharges into the surface waters and wetlands;
- Erosion at storm water discharge points associated with hardened surfaces within the landfill site ;
- Deterioration of water quality due to release of storm water associated with hardened surfaces within the landfill site into the wetlands;



- Soil compaction underneath hardened surface areas and areas traversed by trucks and heavy machinery; and increase in erosive power downstream of the site
- Decrease in wetland/riparian extent downstream of the landfill site due to concentration of flows (hardened surfaces) and increase in erosion

## **7.2 Plan of Study associated with site 1 & 2**

Following on from the desktop assessment, a site visit will be undertaken to ground truth all potential and desktop delineated wetland areas within the affected area (Site 1 and 2) and verify the existence and extent of all wetland areas. Wetland boundaries will be delineated using both soil wetness indicators (mottling and gleying) and vegetation indicators according to the method prescribed in the document “*A practical field procedure for identification and delineation of wetland and riparian areas*” (DWAF, 2005). During the site visit, information regarding impacts on and condition of the wetlands will be collected enabling an evaluation of both the ecological health (PES) and the ecological importance and sensitivity (EIS) of the wetlands.

Based on the information collected in the field and experience from working on other EIA and EMP processes, potential impacts will be identified and appropriate mitigation measures recommended where the impact on the wetlands is unavoidable. Where applicable, suitable management measures will also be recommended. Should Sites 1 and 2 be selected, then the findings of the study will be collated and a surface water resources assessment report will be compiled, which will also include appropriate sections for inclusion in the EMP.

***However, for this particular project, it is understood that site 5 is likely to be selected based on different specialist input received for the site selection phase. In the context of surface water resources, considering the site selection process and recommendations above (section 6.2) unlike site 1 and 2, Site 5 will not require a detailed assessment as recommended in the approach to the EIA phase in sections 7.1 and 7.2 above. It should also be noted that at the time of writing this report, a detailed layout plan of the landfill site’s associated infrastructure (including water supply, electricity and access roads (routes) were not provided). Should these be found or planned to traverse and/or interfere with the (watercourses<sup>2</sup>) and the associated sensitive areas as mapped in Figure 3 above then sections 7.1 and 7.2 will be applicable and required for these services in the EIA phase.***

---

<sup>2</sup> Watercourse means –

- (e) a river or spring;
  - (f) a natural channel in which water flows regularly or intermittently;
  - (g) a wetland, lake or dam into which, or from which, water flows; and
  - (h) any collection of water which the Minister may, by notice in the *Gazette*, declare to be a water course, and a reference to a water course includes, where relevant, its bed and banks.
- (Definition taken from the National Water Act, Act 36 of 1998)

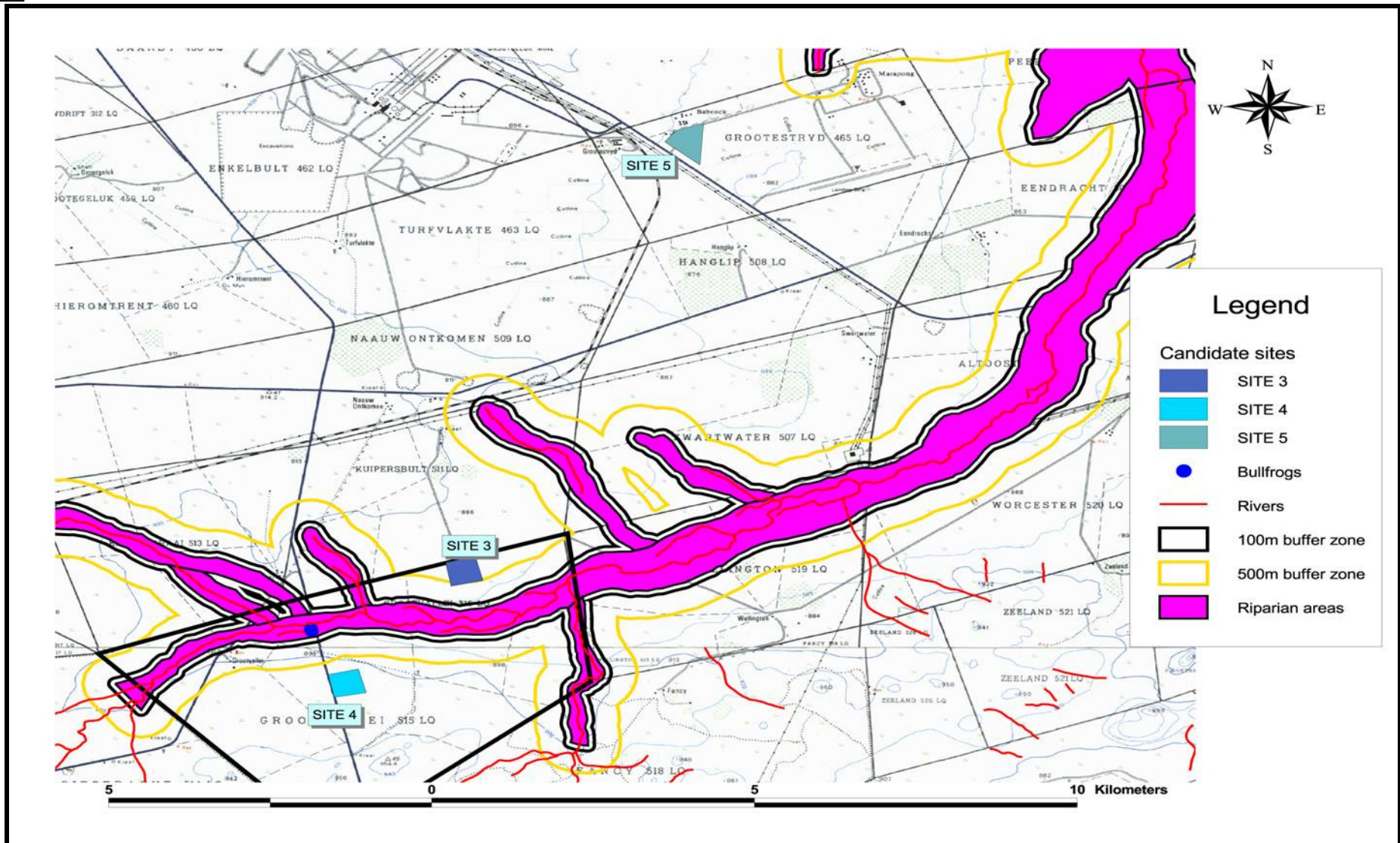


Figure 4 Map showing the candidate sites for selection for the proposed landfill site.

## 8. REFERENCES

- Department of Water Affairs and Forestry, 2005. *A practical field procedure for identification and delineation of wetland and riparian areas*. DWAF, Pretoria.
- Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Operation Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.
- Department of Water Affairs and Forestry. 1999a. *Resource Directed Measures for Protection of Water Resources*. Volume 4. Wetland Ecosystems Version 1.0, Pretoria.
- Department of Water Affairs and Forestry. 1999b. *Resource Directed Measures for Protection of Water Resources*. Volume 1. River Ecosystems Version 1.0, Pretoria.
- Government Notice No. 398, Department of Water Affairs and Forestry, March 2004. General Authorization in Terms of Section 39 of the National Water Act, 1998 (Act 36 of 1998)
- Thompson, M., Marneweck, G., Bell, S., Kotze, D., Muller, J., Cox, D. and Clark, R. 2002. *A pilot project for the determination of methods for the National Wetland Inventory*. Wetland Inventory Consortium (Geospace, Wetland Consulting Services, INR and CSIR) for the Department of Environmental Affairs and Tourism, Pretoria.

## 9. APPENDIX 1: IMPACT RATING METHODOLOGY (1 & 2)

To ensure uniformity, the assessment of potential impacts will be addressed in a standard manner so that a wide range of impacts is comparable. For this reason a clearly defined rating scale is provided to assess the impacts associated with investigation. Each impact identified will be assessed in terms of probability (likelihood of occurring), extent (spatial scale), intensity (severity) and duration (temporal scale). To enable a scientific approach to the determination of the impact significance (importance), a numerical value will be linked to each rating scale. The sum of the numerical values will define the significance. The following criteria will be applied to the impact assessment for the landfill site and associated infrastructure EIA and draft EMP (Only for site 1 and 2).

### Probability

| Category   | Rating | Description  |
|------------|--------|--|
| Definite   | 3      | More than 90 percent sure of a particular fact or of the likelihood of that impact occurring |
| Probable   | 2      | 70 to 90 percent sure of a particular fact or of the likelihood of that impact occurring     |
| Possible   | 1      | 40 to 70 percent sure of a particular fact or of the likelihood of that impact occurring     |
| Improbable | 0      | Less than 40 percent sure of a particular fact or of the likelihood of that impact occurring |

### Extent

| Category      | Rating | Description                        |
|---------------|--------|------------------------------------|
| Site          | 1      | Immediate project site             |
| Local         | 2      | Up to 5 km from the project site   |
| Regional      | 3      | 20 km radius from the project site |
| Provincial    | 4      | Provincial                         |
| National      | 5      | South African                      |
| International | 6      | Neighbouring countries/overseas    |

### Duration

| Category        | Rating | Description           |
|-----------------|--------|-----------------------|
| Very short-term | 1      | Less than 1 year      |
| Short-term      | 2      | 1 to 5 years          |
| Medium-term     | 3      | 5 to 10 years         |
| Long-term       | 4      | 10 to 15 years        |
| Very long-term  | 5      | Greater than 15 years |
| Permanent       | 6      | Permanent             |

### Intensity

| Category  | Rating | Description   |
|-----------|--------|---|
| Very low  | 0      | Where the impact affects the environment in such a way that natural, cultural and social functions are not affected                 |
| Low       | 1      | Where the impact affects the environment in such a way that natural, cultural and social functions are only marginally affected     |
| Medium    | 2      | Where the affected environment is altered but natural, cultural and social function and processes continue albeit in a modified way |
| High      | 3      | Where natural, cultural or social functions or processes are altered to the extent that they will temporarily cease                 |
| Very high | 4      | Where natural, cultural or social functions or processes are altered to the extent that they will permanently cease                 |

### Significance Rating

| Score   | Significance Rating |
|---------|---------------------|
| 2 – 4   | Low                 |
| 5 – 7   | Low to Moderate     |
| 8 – 10  | Moderate            |
| 11 - 13 | Moderate to High    |
| 14 – 16 | High                |
| 17 – 19 | Very High           |