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DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED BULK FUEL STORAGE EXPANSION PROJECT

Anglo American Thermal Coal: Isibonelo Colliery

2013/02/20

Quality Management

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Prepared by	Jared O'Brien	Jared O'Brien		
Signature				
Checked by	Janna Bedford- Owen	Janna Bedford- Owen		
Signature				
Authorised by	Janna Bedford- Owen	Janna Bedford- Owen		
Signature				
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Client

Anglo American Thermal Coal: Isibonelo Colliery
Location: 26° 20’ 41.32’’ S 29° 16’ 00.67’’ E

Private Bag X701
Trichardt
2300

Contact details:
Environmenal Co-ordinator
Kenneth Mokoena
017 620 2714
kenneth.mokoena@angloamerican.com

www.angloamerican.co.za

Consultant

Project Manager

Janna Bedford-Owen

Tel: 011 361 1371
Fax: 086 556 6336
Email: Janna.Bedford-Owen@WSPgroup.co.za

www.wspenvironmental.co.za

Lead Consultant

Jared O'Brien
Klicka här för att ange text.
Klicka här för att ange text.
Klicka här för att ange text.
Klicka här för att ange text.
Klicka här för att ange text.

Tel: 011 361 1380
Fax: 086 505 3939
Email: Jared.OBrien@WSPgroup.co.za

www.wspenvironmental.co.za

Registered Address

WSP Environmental (Pty) Ltd
WSP House, Bryanston Place Office Park, 199 Bryanston Drive, Bryanston, 2021.
www.wspenvironmental.co.za

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EXECUTIVE SUMMARY

PROJECT BACKGROUND

Isibonelo Colliery (IC) is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel near the northern margin of the Highveld coalfield of the Mpumalanga province. IC is an operational open-cast coal mine which utilizes the dragline strip-mining method as a primary means of removing the coal from the coal seams encompassed in the Highveld coalfield. In order to operate the mine on a daily basis the following equipment and infrastructure is required: Marion drag-lines, overburden drills, hydraulic shovels and diesel-drive 150-tcoal haulers which are used during the conventional opencast-mining process.

In order to operate the said machinery, equipment and infrastructure, IC is required to store a large volume of fuel on-site. IC currently consumes 30 cubic meters (m^3) of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply was determined as optimal.

Therefore, IC identified a need to expand their current fuel tank storage capacity. The onsite storage comprises two 83 m^3 diesel above ground storage tanks (AST), located near the pit workshop, and two 14 m^3 petrol underground storage tanks towards the main offices, totalling 194 m^3. IC is proposing the installation of an additional four 83 m^3 diesel AST near the existing AST site, thus bringing the total storage capacity on site to 526 m^3.

LEGAL FRAMEWORK

In accordance with National Environmental Management Act (No. 107 of 1998) as amended (NEMA) Environmental Impact Assessment Regulations (EIA) 2010, Government Notice Regulation (GNR.) 543 and 544, the undertaking of certain listed activities requires environmental authorisation. The activity associated with the installation of the fuel storage tanks within the mine lease area, requires environmental authorisation in the form a Basic Assessment (BA) Process. In addition, the proposed Bulk Fuel Storage Expansion (BFSE) project requires an Air Emissions License (AEL) in accordance with Section 21 of the National Environmental Management: Air Quality Act (No. 39 of 2004; NEM: AQA) and as such an AEL application (AEL) will be submitted in conjunction with the BA report to the Mpumalanga Department of Economic Development, Environment and Tourism (DEDET), for consideration.

Furthermore, as the proposed project is located in a mine lease area, IC are required to undertake an Environmental Management Programme Report (EMPR) Amendment process in line with the Mineral and Petroleum Resource Development Act (No 28 of 2002) (MPRDA).

WSP discussed the above mentioned legislative triggers with the authorising departments telephonically and over email (including the DEDET, the Department of Mineral Resources (DMR) and the Department of Environmental Affairs). It was concluded that the applicant is required to undertake a BA process in line with NEMA EIA (2010) Regulations of 2010 (clarification detailed in **Appendix B**). WSP received an acceptance letter from the Mpumalanga DEDET to continue with a BA process on the 23rd of October 2012.

In order to accommodate the identified legal requirements, the authorisation processes were aligned as far as possible, that is to say the BA process was completed to fulfil the requirements of NEMA and NEM:AQA, while an EMPR Amendment was completed to fulfil the requirements of the MPRDA.

Please note that the above aligned process was successfully completed for another project in the IC mine lease area as agreed to by the respective authorising departments being DEDET and Mpumalanga DMR.

The BA, AEL and the EMPR Amendment processes will be completed concurrently and submitted together to the competent authorities (DEDET and DMR respectively) for consideration or as supporting documentation where relevant.

IMPACT ASSESSMENT

The potential environmental impacts associated with the proposed project were determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental impacts. The impact assessment included all phases of the project, with specific emphasis on construction, operational, closure and rehabilitation in mind. The following environmental aspects were considered during the impact assessment rating for both the biophysical and socio-economic impacts (refer to **Section 7** for the detailed impacts rating):

- Topography;
- Soil;
- Air;
- Surface & Ground water;
- Land use;
- Flora & Fauna;
- Noise;
- Visual Aspects;
- Waste Management;
- Traffic;
- Cultural & Heritage Impacts;
- Health & Safety;
- Traffic; and
- Employment.

In summary, the impact on air quality, water quality and health & safety are considered the most notable potential impacts which may result from the proposed project. However, the impact mitigation measures contained within the EMPR will aid in reducing the environmental and social impacts (refer to **Appendix D**).

BASIC ASSESSMENT

The environmental impact of the proposed project was determined by identifying the environmental aspects followed by completion of an environmental impact assessment to assess the significance of potential environmental impacts. The impact assessment included all phases of the project, including construction/installation, operation, closure and rehabilitation with specific emphasis on construction/installation and operation phases.

The assessment of the biophysical and socio-economic environment revealed that there are no environmental fatal flaws or significant negative impacts associated with the BFSE project, and potential impacts can be minimised by implementing mitigation and management measures prescribed in the project EMPR.

WSP is of the opinion that the proposed BFSE project will be authorised due to the minimal foreseen environmental impact and due to the significant positive impact which the additional fuel storage capacity will have on Isibonelo mining operations.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Anglo American Thermal Coal: Isibonelo Colliery (IC) is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel near the northern margin of the Highveld coalfield of Mpumalanga (**Figure 1**).

IC was established as an opencast operation to supply Sasol's Synthetic Fuel (SSF) plant located in Secunda. In November 2003 construction work began and the first coal was supplied to SSF in July 2005. IC primarily utilizes the dragline strip-mining method as a means of coal removal from the coal seams encompassed in the Highveld coalfield.

Bituminous coal seams hosted by the sedimentary strata in the IC Mining Licence area include, from the base up, the No 1, 2, 3, 4 and 5 seams. Only the No 4 seam is presently considered to be economically viable, with an average opencast depth of 40 m and a thickness of 5,6 m. In order to operate the mine on a daily basis the following equipment and infrastructure is required: Marion drag-lines, overburden drills, hydraulic shovels and diesel-drive 150-tcoal haulers which are used during the conventional opencast-mining process. The extracted coal is then delivered to the primary in-pitsizing plant, after which it is conveyed along a surface conveyor to a bunker. The coal in the bunker is then presented to the Sasol overland conveyor system.

In order to operate the said machinery, equipment and infrastructure, IC is required to store a large volume of fuel on-site. IC currently consumes 30 cubic meters (m^3) of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply was determined as optimal.

At present, the onsite storage comprises two 83 m^3 above ground diesel storage tanks (AST), located near the pit workshop (**Figures 2 and 3**), and two 14 m^3 petrol underground storage tanks towards the main offices, totalling 194 m^3 (offering a five day supply).

Therefore, IC identified a need to expand their current diesel tank storage capacity in order to accommodate the above mentioned corporate supply chain management strategy. The Bulk Fuel Storage Expansion (BFSE) project proposes the installation of an additional four 83 m^3 diesel AST near the existing AST site, thus bringing the total storage capacity on site to 526 m^3.

1.1.1PROJECT LOCATION

As mentioned above, IC is situated in the Mpumalanga Province (which is located on the North Eastern portion of South Africa), between the towns of Kinross, Secunda, Bethal and Kriel, within the Gert Sibande and Nkangala District, and the Govan Mbeki and Emalehleni Local Municipalities respectively.

The BFSE is proposed on Portion 28 of the farm Aangewys 81 IS, Mpumalanga (**Figures 2**) and has the following general surveyor code:

- TOIS00000000008100028.

The land uses in the area comprise of agricultural activities, industrial complexes, power generation facilities, as well as mining.

Figure 1 outlines the position of the proposed project (topographical map), **Figure 2** represents the Portion and Farm on which the BFSE project is to be located and **Figure 3** is a satellite image of the proposed BFSE project area.

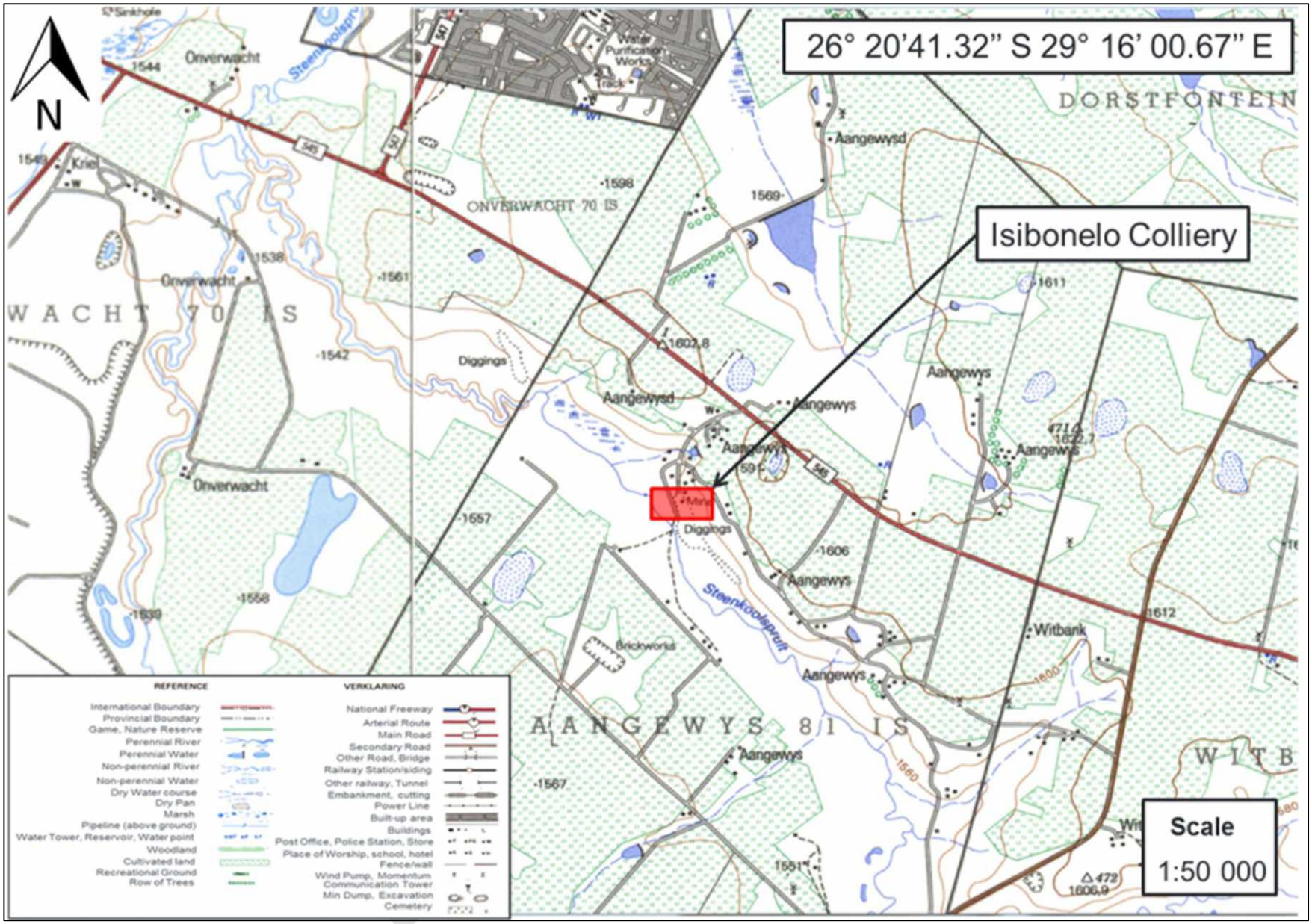

Figure 1: Isibonelo Colliery topographical locality map (WSP library, 2012)

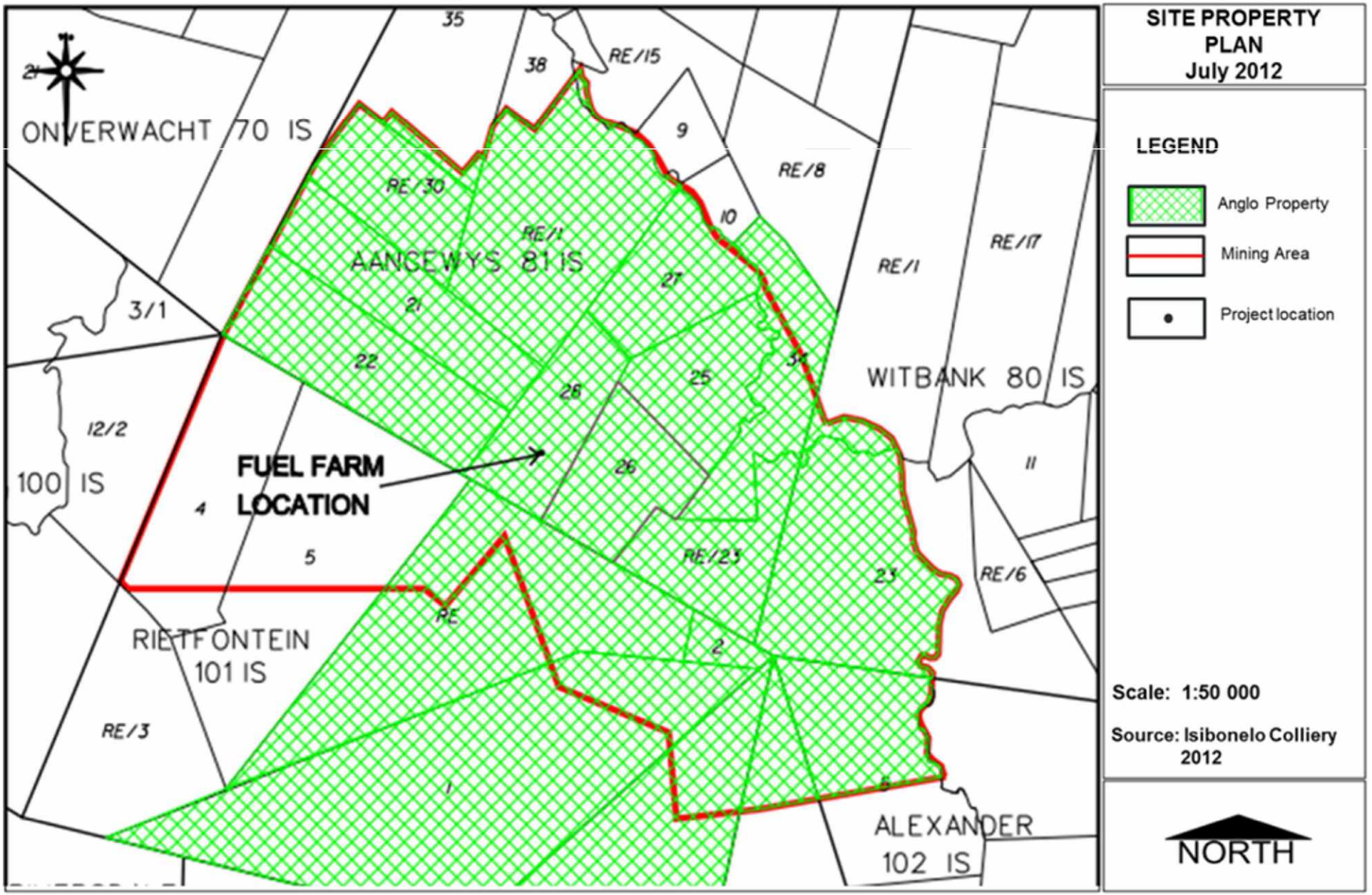

Figure 2: Farm/Portion map of the Isibonelo Colliery (Isibonelo Image Library, 2012)

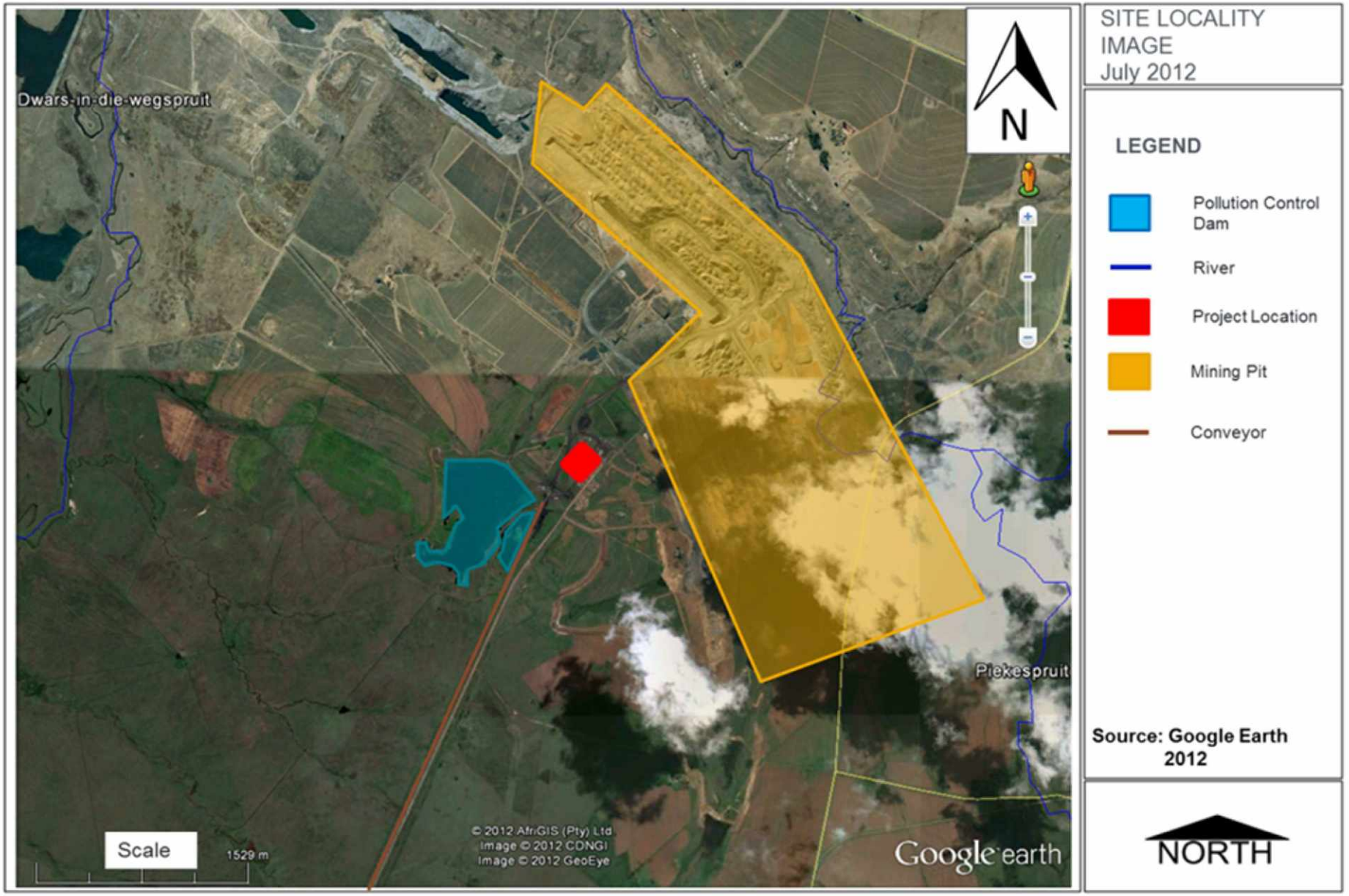

Figure 3: Isibonelo Colliery proposed project location satellite image (Google Earth, 2012)

1.2 TERMS OF REFERENCE

The BFSE project proposes the installation of an additional four 83 m^3 diesel ASTs adjacent to the existing AST site, thus bringing the total storage capacity on site to 526 m^3.

The proposed activity is a scheduled activity in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (Government Notice (GN): R543, GN. R544 and GN: R545), and is subject to the Environmental Authorisation, in the form of a Basic Assessment (BA) Process, from the Mpumalanga DEDET prior to commencement.

The proposed project will trigger an activity included in the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM: AQA) thus requiring the issuing of an Air Emissions license (AEL). It must be noted that WSP is responsible for compiling, undertaking and submitting the AEL in conjunction with the aforementioned BA process. The AEL Application form will be submitted to the Mpumalanga DEDET, along with the BA and supporting documentation, for consideration / authorisation.

Furthermore, as the project occurs within IC's Mine Lease, IC are required to undertake an Environmental Management Programme Report (EMPR) Amendment process in line with the Mineral and Petroleum Resource Development Act (No 28 of 2002) (MPRDA). The EMPR will be submitted to the Mpumalanga DMR, along with the BA and supporting documentation, for consideration / authorisation.

WSP Environment and Energy (WSP) was appointed by IC as the independent environmental assessment practitioner (EAP) to facilitate an integrated environmental authorisation process (BA, AEL and EMPR Amendment processes) as mentioned above..

This Basic Assessment Report (BAR) documents the BA process and includes:

- A review of all relevant legislation, including all national environmental and mining legislation (**Section 2**);
- The approach and methodology adopted for the environmental authorisation process (**Section 3**);
- Motivation for the project development, overview of the stakeholder consultation process; comprehensive project description and the assessment of alternatives for the proposed project (**Section 4**);
- An assessment of the baseline environmental conditions (**Section 5**);
- Air Quality Impact Assessment (AQIA) (**Appendix G**);
- Compilation of an AEL application (**Appendix G**);
- Environmental issues, potential impacts and proposed mitigation measures (**Section 7**); and
- Conclusion (**Section 8**).

The following activities, which form part of the said BA process, have been undertaken:

- Submission of an application form to undertake a BA process to the Mpumalanga Department of Economic Development, Environment and Tourism (submitted on 24 July 2012);
- Submission of an AEL application form to Mpumalanga DEDET in order to obtain an AEL (submitted on 07 July 2012);
- Compilation of the draft BAR and accompanying documentation;
- Stakeholder engagement process (undertaken for the duration of the project);
- Compilation of a draft AQIA and AEL (contained in **Appendix G**);
- The compilation of a draft EMPR (contained in **Appendix D**); and
- The public review of the draft BAR, the draft EMPR and the AQIA report.

1.3 PROJECT PROPONENT

The applicant for the proposed BFSE project is Anglo American Thermal Coal: Isibonelo Colliery. The relevant details are as follows (**Table 1**):

Table 1: Project Proponent Details

Project Applicant	Anglo American Thermal Coal: Isibonelo Colliery
Company Registration	Anglo Operations Limited
Contact person:	Kenneth Mokoena
Postal Address:	PO Box 61587, Marshalltown, Johannesburg, South Africa.
Telephone:	011 620 2714
E-mail:	kenneth.mokoena@angloamerican.com

1.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP were appointed by IC to undertake the function of an independent EAP to facilitate the environmental authorisation processes (refer to **Table 2** for EAP contact details). WSP Environmental (Pty) Ltd is a leading South African environmental consultancy with a broad range of expertise and over 20 years' experience in the regional environmental market. While we form part of WSP Group Ltd, a global engineering and environmental multi-consultancy, we are also committed to transformation in our operational region, with 26% Broad Based Black Economic Empowerment (BBBEE) ownership and having achieved Level 3 BBBEE in South Africa. As part of a global business we provide the regional marketplace with a dynamic blend of local and global expertise.

We pride ourselves on our reputation for delivery and technical excellence and provide a broad range of environmental and technical related services across a range of economic areas including the industrial, mining, financial, tourism and public sectors. Refer to WSP's Capability Statement in **Appendix A**.

Table 2: Environmental Assessment Practitioner Details

Contact	WSP Environment and Energy (EAP)	WSP Environment and Energy (EAP)
Contact person:	Janna Bedford-Owen	Jared O'Brien
Physical address:	WSP House Bryanston Place 199 Bryanston Drive Bryanston Sandton 2021	WSP House Bryanston Place 199 Bryanston Drive Bryanston Sandton 2021
Postal Address:	PO Box 5384 Rivonia 2128	PO Box 5384 Rivonia 2128
Telephone:	011 361 1371	011 361 1396
Fax:	086 55 66 336	086 505 3939
E-mail:	Janna.bedford-owen@wspgroup.co.za	Jared.OBrien@wspgroup.co.za

2 GOVERNANCE FRAMEWORK

In terms of Section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996) (Constitution), everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while prompting justifiable economic and social development. The needs of the environment, as well as affected parties, should thus be integrated into overall project management in order to fulfil the requirements of Section 24 of the Constitution.

Environmental legislation applicable to the proposed BFSE project is further detailed in the subsections below.

2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998), AS AMENDED

The NEMA is South Africa's overarching environmental legislation and has, as its primary objective, to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith (Government Gazette, 1998).

The Act provides for the right to an environment that is not harmful to the health and well-being of South African citizens; the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (Government Gazette, 1998).

The NEMA ensures that specific activities are designed and implemented in a sustainable and environmentally friendly manner, thereby assisting in achieving South Africa's constitutional goal for a better quality of life for all now and in the future. Therefore, it is essential that industries (including mines) improve the efficiency and use of resources, and improve on the level of integration of social, economic and governance systems.

The amended NEMA environmental impact assessment (EIA) regulations were published on 18 December 2010 in Government Gazette No. 33306, Government Notice Regulation (GNR) 543, 544, 545 and 546.

The EIA Regulations provide three categories of listed activities which require environmental authorisation prior to construction:

- GNR.544 identifies activities that would require environmental authorisation in the form of a BA process prior to the commencement of that activity. A BA activity is perceived pose less potential impact than an EIA activity.
- GNR.545 identifies activities that would require environmental authorisation in the form of a Scoping and EIA process prior to the commencement of that activity.
- GNR.546 relates to identified activities that would require environmental authorisation prior to the commencement of that activity in specific identified geographical areas only.

The NEMA activities applicable to the proposed project are outlined in GNR 544 and (refer to **Table 3**) require an environmental authorisation in the form of a BA process prior to commencement.

Table 3: NEMA listed activities (NEMA, as amended)

Legislation and Notice Number	Activity description	Relevance to the Project
NEMA, GNR.544, Activity 28	The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply	The proposed project involves the expansion of an existing dangerous good storage facility. The expansion (increased capacity) thus requires an AEL as it exceeds the 500m^3 threshold stipulated in the NEM: AQA scheduled activities hence the requirement for a BA process.
NEMA, GNR.544, Activity 42	The expansion of facilities for the storage, or storage and handling, of a dangerous good, where the capacity of such storage facility will be expanded by 80 cubic metres or more.	The proposed expansion will result in a total capacity increase of approximately 332m^3, thus exceeding the 80m^3 threshold, and therefore this listed activity is relevant to the project.

Therefore BA process is required in accordance with the NEMA EIA Regulations and GNR 544 and 543. The provincial department responsible for the authorising the BFSE will be the Mpumalanga DEDET (ref no: 17/2/3N-184) (**Appendix B1**: Acknowledgement letter and email communication).

2.2 National Environmental Management Air Quality Act (No. 39 of 2004)

The NEM:AQA states the following as its primary objective: "To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government, for specific air quality measures, and for matters incidental thereto.

Whereas the quality of ambient air in many areas of the Republic is not conducive to a healthy environment for the people living in those areas, let alone promoting their social and economic advancement, whereas the burden of health impacts associated with polluted ambient air falls most heavily on the poor, whereas air pollution carries a high social, economic and environmental cost that is seldom borne by the polluter, and whereas atmospheric emissions of ozone-depleting substances, greenhouse gases and other substances have deleterious effects on the environment both locally and globally, and whereas everyone has the constitutional right to an environment that is not harmful to their health or well-being, and whereas everyone has the constitutional right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources.

And whereas minimisation of pollution through vigorous control, cleaner technologies and cleaner production practices is key to ensuring that air quality is improved, and whereas additional legislation is necessary to strengthen the Government's strategies for the protection of the environment and, more specifically, the enhancement of the quality of ambient air, in order to secure an environment that is not harmful to the health or well-being of people."

The NEM: AQA contains specific scheduled activities that require an AEL in order to prevent pollution, promote conservation, and secure ecological sustainable development. The BFSE project proposes the combined storage of 526 m^3 of diesel and Subcategory 2.2 of Section 21 in the NEM:AQA (as tabulated in **Table 4**) requires AEL be obtained from the local authority prior to commencement of the said activity. As noted in GNR 544 listed activity 28 (**Section 2.1** above), a BA process is required in order to obtain an AEL. Therefore, the AEL and BA process will be undertaken concurrently.

Table 4: NEM: AQA listed activity, Section 21, Sub-category 2.2

Activity	Description of Listed Activity	Project Relevance
2.2	"Storage and handling of petroleum products – applicable to all permanent immobile liquid storage tanks larger than 500 cubic meters cumulative tankage capacity at a site."	The proposed expansion will result in a total capacity of approximately 526 m^3 exceeding the 500 m^3 threshold, and therefore, this listed activity is relevant to the project.

The competent authority responsible for issuing the AEL is the Mpumalanga DEDET.

2.2.1Highveld Priority Area

The Minister of Environmental Affairs and Tourism formally declared the eastern part of Gauteng and western part of Mpumalanga an air pollution hotspot, to be known as the "the Highveld Priority Area", a national air pollution hotspot in terms of Section 18(1) of the NEM:AQA . By declaring a priority area, authorities recognise that Air Quality within these areas are generally regarded as being poor, and frequently meet or exceed ambient air quality standards.

The Highveld Priority Area extends from the eastern parts of Gauteng, to Middelburg in the north and the edge of the escarpment in the south and east. Major towns occurring within this region include Witbank, Middelburg, Secunda, Standerton, Edenvale, Boksburg, Benoni and Balfour. The area incorporates portions of the Gauteng and Mpumalanga Provinces. The area is contained within 1 metropolitan municipality (Ekurhuleni) and 3 district municipalities (Sedibeng, **Gert Sibande** and **Nkangala**) and more specifically 9 local municipalities: Lesedi Local Municipality (Sedibeng); **Govan Mbeki Local Municipality** (GertSibande); Dipaleseng Local Municipality (GertSibande); Lekwa Local Municipality (GertSibande); Msukaligwa Local Municipality (GertSibande); PrixleykaSeme Local Municipality (GertSibande); Delmas Local Municipality (Nkangala); **eMalahleni Local Municipality** (Nkangala); and Steve Tshwete Local Municipality (Nkangala).

The IC is located within the Gert Sibande and Nkangala District, and the Govan Mbeki and Emalehleni Local Municipalities respectively and therefore falls within the boundaries of the Highveld Priority area. This implies that authorities may impose measures on IC and other mines and industries within this area in order to allow for the improvement of the Air Quality.

2.3 MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT (NO. 28 OF 2002)

The main objective of the MPRDA is to recognise the sovereignty of the State over all the mineral and petroleum resources in South Africa and to promote equitable access to the country's resources. The MPRDA also allows for previously disadvantaged persons to enter the minerals and petroleum industry and benefit from the exploitation of the country's minerals.

The Act ensures that holders of existing and new mining and production rights contribute towards the social-economic development of the areas in which they operate, promoting economic growth, employment and advance the social and economic welfare of all South Africans. The IC has a Social and Labour Plan which was developed in order to meet the objectives of the MPRDA as well as other relevant legislation.

Although IC has a mining right under the MPRDA and an approved EMPR, the activities proposed by the BFSE are not included therein. In accordance with section 102 (amendment of rights, permits, programmes and plans) of the MPRDA, an EMPR amendment is required. This process includes assessing the baseline project area, identifying anticipated environmental and socio-economic impacts and developing mitigation measures to alleviate any potential negative impacts associated with the project, and report submission to the competent authority. Part 3, Sections 49 – 52 of the MPRDA further defines the reporting requirements when undertaking an EMPR amendment process. To ensure a diligent environmental authorisation process is completed, the said statutory requirements will be incorporated into the process and all resulting reports.

The Mpumalanga DMR will be the competent authority responsible for authorisation the EMPR amendment process in accordance with the MPRDA. The MPRDA process has been combined with the NEMA BA process for the proposed project in order to streamline the process.

2.4 MINE HEALTH AND SAFETY ACT (NO. 29 OF 1996)

The Mine Health and Safety Act (No. 29 of 1996) as amended in 2008 aims to provide for protection of the health and safety of employees and other persons at mines.

The proposed BFSE project will be located within the IC lease area and, as such, IC need to ensure that this Act and subsequent amendment regulations are adhered to on site by employees, contractors, sub-contractors and visiting personnel. This is especially pertinent during the construction phase.

2.5 HAZARDOUS SUBSTANCES ACT (NO 15 OF 1973)

The object of the Act is inter alia to 'provide for the control of substances which may cause injury or ill health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances; for the control of electronic products; for the division of such substances or products into groups in relation to the degree of danger; for the prohibition and control of such substances.'

In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity, and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule.

Dangerous substances contained on-site during the construction phase of the proposed project will need to be managed in accordance with the Act and material safety data sheets (MSDS) will need to accompany all dangerous goods (hydrocarbon fuels, cleaning chemicals, paints, etc.).

2.6 Occupational Health and Safety Act (ACT 85 OF 1993)

The Occupational Health and Safety Act (OHSA) was created to provide for the health and safety of persons at work, and for the health and safety of persons in connection with the use of plant and machinery. The OHSA aims to protect people (other than the employee) against hazards to their health and safety arising out of or in connection with activities of persons at work. The OHSA also called for the establishment of an advisory council for occupational health and safety to provide for matters connected therewith. The OHSA has been amended and updated to included pertinent matters which have arisen following its promulgation. Some amendments, which may be relevant to the proposed installation of underground tanks, include:

- The Electrical Installation Regulations, 2009, published in Government Gazette (GG) No. 31975 dated 6 March 2009;

- Amendment to the Hazardous Chemical Substances Regulations, 2008, Government Notice No. R.683 of 27 June 2008;
- The Construction Regulations and Safety Standards contained therein, 2003 (GG 25207 18 July 2003);
- General Safety Regulations (GG 25128 25 June 2003);
- Hazardous Chemical Substances Regulations (GG25130 both 25 June 2003); and
- Major Hazard Installation Regulations (GG 22506, 30 July, 2001).

2.6.1 Major Hazardous Installation Regulations

Any installation or quantity of substance on the site of, or under the control of the company, that could cause a major incident is regulated by the Major Hazard Installation Regulations. These Regulations impose registration requirements as well as a number of obligations aimed at minimising the risk associated with hazardous installations and/or substances. The risks covered by the Regulations are risks that affect the public and employees.

The term “major hazard installation” means an installation where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily; or where any substance is produced, processed, used, handled or stored in such a form and quantity that it has the potential to cause a major incident. A “major incident” means an occurrence of catastrophic proportions, resulting from the use of plant or machinery, or from activities at a workplace.

The flash point of diesel is relatively low (> 55°C), the proposed and existing tanks will be completely bunded not within close proximity to sensitive receptors. Therefore, the proposed BFSE is not considered a major hazard installation.

3 APPROACH AND METHODOLOGY

The following methodology has been undertaken for the BAR for the proposed BFSE project at IC.

As the proposed BFSE project will require an environmental authorisation in terms of the NEMA, NEM: AQA and the MPRDA, and in an effort to minimise the duplication of processes, WSP proposed the alignment of the authorisation processes as far as possible and undertook (following confirmation from the Mpumalanga DEDET) the compilation of a BAR according to the NEMA, an EMPR in line with the MPRDA and NEMA and an AEL according to the NEM: AQA and NEMA.

The tasks undertaken for the BA, AEL and EMPR processes consisted of the following:

- Submission of a BA application form to undertake a BA process to DEDET (submitted on 26 March 2012, reference number: 17/2/3N-160);
- Submission of an AEL application as part of BA process, to DEDET (submitted on 07 July 2012);
- Stakeholder engagement process (undertaken for the duration of the project);
- Compilation of an AQIA report and associated Air Quality Management Plan (AQMP);
- Compilation of a BAR, AEL and EMPR as well as all accompanying documentation;
- Public review of draft reports for a period of 40 days for comment from registered stakeholders as well as relevant government departments;
- Authorisation may be received from the Mpumalanga DEDET and the Mpumalanga DMR for the project; and
- All stakeholders will be informed of the collective Department's decision for the proposed project.

WSP followed the BA process as required by the NEMA. Please refer to **Figure 4** for an illustration of the BA process according to NEMA.

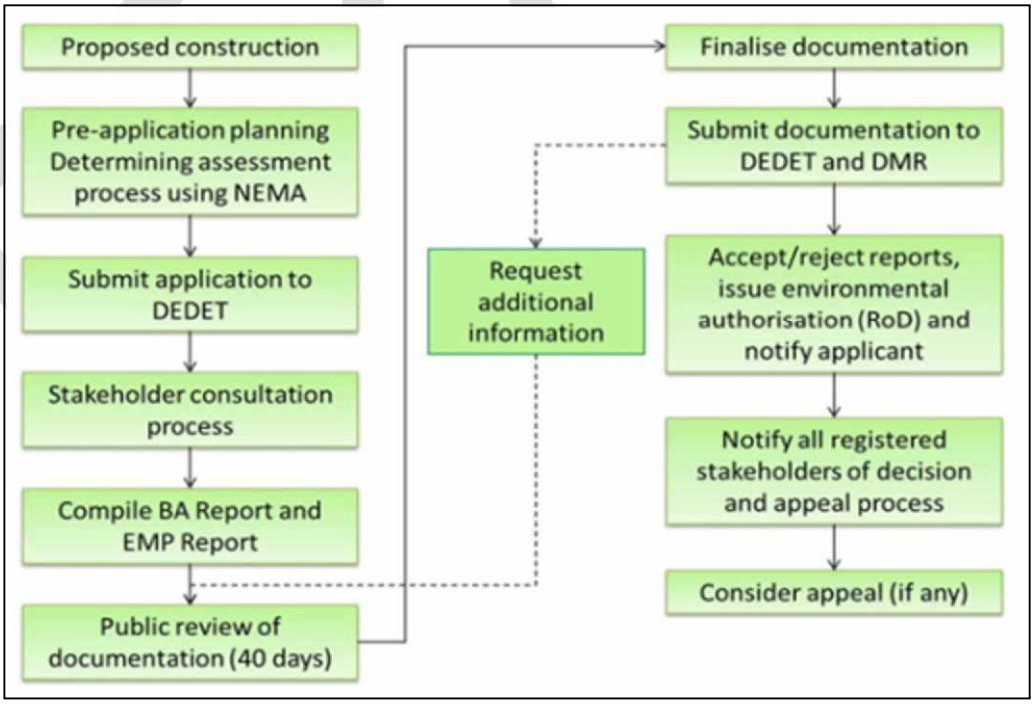

Figure 4: BA Process according to the NEMA

3.1 AUTHORITY CONSULTATION

WSP, as part of the environmental authorisation process, consulted various authorities who are responsible for the following tasks:

- Acknowledging the proposed approach to the authorisation process;
- Responsible for reviewing the draft reports, and
- Issuing of environmental authorisation.

As previously indicated the Mpumalanga DEDET is responsible for the review and authorisation of the BA and AEL processes and the Mpumalanga DMR is responsible for the authorisation of the EMPR amendment process.

As previously discussed, WSP used both telephonic and email correspondence to verify the way forward for the project (**Appendix B**).

Following confirmation from the Mpumalanga DEDET, WSP conducted a combined process whereby a BA process, an AEL process and an EMPR process was completed in order to fulfil the NEMA, the NEM: AQA and the MPRDA, as per the respective authorising departmental requirements. The following report submissions will be completed in order to satisfy the needs of each authorising department as per their respective statutes:

- Draft BA Report, AEL and EMPR to all commenting authorities for public review (40 days minimum);
- Submission of Final BA Report, AEL and EMPR to:
  - DEDET for consideration under NEMA and NEM: AQA; and
  - Mpumalanga DMR for consideration under MPRDA.

The authorities on receipt of the reports will be allowed a duration of 40 days at which point WSP will consolidate the comments and issues received (if any) and subsequently submit the final reports for authorisation.

3.2 STAKEHOLDER CONSULTATION PROCESS

3.2.1 Objectives of the Stakeholder Consultation Process

The NEMA Section 56 has been a very important component for the environmental authorisation process for the proposed project. A full stakeholder consultation process was undertaken from the onset of the project to ensure that the widest range of stakeholders was adequately and effectively consulted. WSP utilised and expanded Isibonelo Colliery's existing stakeholder database. All issues and concerns that were raised have been included in this report.

The objectives of stakeholder engagement were/are as follows:

- To ensure an open and transparent BA and consultation process;
- To identify and inform stakeholders of the proposed BFSE project and associated environmental authorisation process;
- Establish an on-going line of communication between the stakeholder and the project team (IC and WSP);
- Provide an opportunity for stakeholders to raise their issues, concerns and questions and ensure that these are considered in the environmental authorisation process;
- Ensure that stakeholders have an opportunity to make a meaningful contribution towards decision making by the lead authority; and
- Compile an issues trail of all issues, concerns and questions raised during the stakeholder consultation process.

The stakeholder consultation process was conducted from the onset of the project and is further detailed in the subsections (**Section 3.2.2**) below.

3.2.2 Stakeholder Consultation Process

Stakeholder database

IC has an existing stakeholder database listing the surrounding land owners and interested and affected parties (I & AP's) / stakeholders, which WSP updated in order to ensure a comprehensive notification process for the BFSE project. WSP contacted each one of the stakeholders on the database to inform them of the project and verify contact details. WSP did further field work in order to include the mines employees, municipal ward councillors, adjacent landowners, as well as the general public in the surrounding vicinity of the mine in the stakeholder database (Refer to **Appendix C1** for the project stakeholder database).

Site Notices

The NEMA EIA Regulations require that a site notice be fixed at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is to be undertaken and on any alternative sites. Six site notices were placed at the following locations (refer to **Figure 5**):

- Site Notice 1- Main entrance to IC offices;
- Site Notice 2- Trichardt (Intersection of Barney Molokwane & unnamed road);
- Site Notice 3- Emalahleni Local Municipality (Quintin Street, Kriel, South Africa);
- Site Notice 4- IC Reception notice board;
- Site Notice 5- Intersection of the R547 and the R580; and
- Site Notice 6- Intersection of R547 and the "Holfontein" road.

The purpose of the site notices was to notify the public of the project and to invite stakeholders to register or attend the public meeting. Refer to **Appendix C2** for a copy of the site notice placed and photographs of the placement locations.

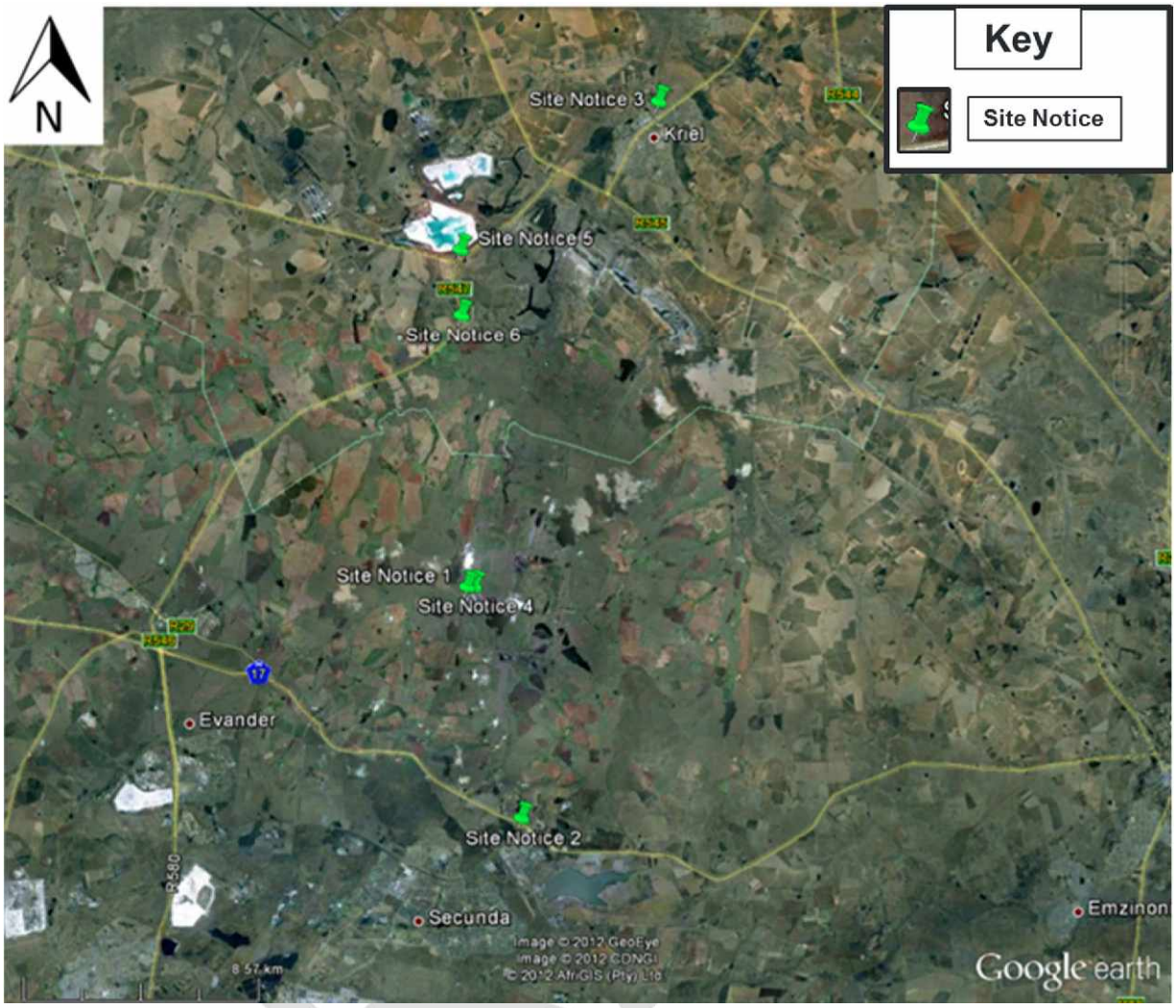

Figure 5: Locations of Site Notices (Source: Google Earth, 2012)

Background Information Documents

The NEMA EIA Regulations require that written notice be given to the:

- Owners and occupiers of adjacent land;
- Municipal ward councillors;
- Municipality; and
- Any organ of state having jurisdiction in respect of any aspect of the activity.

The purpose of the background information document (BID) was to provide background information on the proposed project, outlining the environmental process and providing an opportunity for registration of other stakeholders. Representatives from WSP were escorted by the IC Environmental Co-ordinator on 20 July 2012 to meet with the landowners and communities surrounding IC. The notification letters (refer to **Appendix C4** for a copy of the letter) were faxed and emailed to stakeholders as well as potential stakeholders that were identified in the area on the 20th of July 2012.

Stakeholders which could not be reached for an interview were sent the background information document via email and fax. Furthermore, if an email address or fax number was not available, WSP sms'd the stakeholders with basic project and contact details should a stakeholder wish to receive more detail. A copy of the BID and

the distribution lists are contained in **Appendix C3**. Proofs of all emails, fax's and sms's sent to stakeholders are available upon request.

Advertisements

The NEMA EIA Regulations require that an advertisement be placed in either a local newspaper or a Government Gazette. To ensure that the stakeholder consultation process was comprehensive, two advertisements were placed, one in a local newspaper and one in a national newspaper, thereby ensuring that a wide range of people were informed about the project. Refer to **Appendix C5** for a copy of the newspaper advertisement.

The proposed project was advertised through the press in the following newspapers:

- A national newspaper, namely the Sowetan - on 18 July 2012; and
- A local newspaper, namely the Ridge Times - on 20 July 2012.

Authorities Consultation

WSP discussed the environmental authorisation requirements of the BFSE project with the Mpumalanga DEDET and the DEA both telephonically and via email. WSP requested clarity on the authorisation requirements from the DEA who stated that the project requires a BA process. WSP had submitted an application to undertake a Scoping and EIA process, in the interim to ensure the project registration with the Mpumalanga DEDET, and subsequently received an acknowledgement of receipt. WSP after the said clarification with the DEA submitted an amended environmental BA application and DEDET were informed of the amended process to be undertaken. Project information, in the form of a BID, was sent to the authorities in order to ensure that they were adequately informed of the project. All discussions, questions, concerns and issues were documented and included in **Appendix C6**.

Issues Trail

An issues trail was been developed for the duration of the project detailing the outcomes of all engagement and consultation with authorities and stakeholders. This issues trail records the below and is provided within **Appendix C6**:

- List of all issues raised;
- Record of who raised the issues;
- Record of where the issues were raised; and
- Response to the issues (given by the project team).

Please note that no comments or issues have been received from the public to date. The issues trail will remain in place for the duration of the public review period.

Issues Summary

Please refer to **Appendix C6** which details the comments made, by whom the comments were made, what the source the issues was received via, and what the response was from the project team to each recorded issue.

Public Review

The draft BAR and EMP is currently on public review for a period of 40 days from **01 March 2013 until 09 April 2013** at the following venues:

- IC Reception Office (26° 24' 34.17" S 29° 12' 16.53" E);
- Bethal Public Library (Danie Nortje road, Bethal);
- Secunda Public Library (Lourens Muller Street, Secunda 2302); and
- WSP's website (www.wspenvironmental.co.za).

3.3 ENVIRONMENTAL IMPACT RATING

The environmental impact rating was undertaken according to the WSP Risk Assessment Methodology and is detailed in **Section 7** of this report.

3.4 ENVIRONMENTAL MANAGEMENT PROGRAMME

The draft EMP was developed and provides the actions for the management of identified environmental impacts emanating from the proposed project as well as a detailed outline of the implementation programme to minimise and/or eliminate the anticipated environmental impacts. The draft EMPr (which is a separate report contained in **Appendix D**) provides strategies to be used to address the roles and responsibilities of environmental management personnel on-site and a framework for environmental compliance and monitoring.

The draft EMP includes the following for the construction, operational and closure phases for the proposed project (in accordance with section 51 of the MPRDA):

- Details and expertise of the person/s who prepared the draft EMP;
- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in the BAR;
- A detailed description of the aspects of the activity that are covered by the draft EMP;
- An identification of the persons who will be responsible for the implementation of the measures;
- Mechanisms for monitoring compliance against the draft EMP;
- Measures to rehabilitate the environment affected by the undertaking of the proposed activity to its natural or predetermined state;
- Time periods within which the measures included in the draft EMP must be implemented;
- Process for managing any environmental damage or pollution as a result of the proposed activity;
- An environmental awareness plan; and
- Where applicable, closure plans and objectives.

4 PROJECT DESCRIPTION

4.1 PROJECT MOTIVATION

The mineral mined at IC is a coal deposit suitable for conversion into synthetic fuel by Sasol. Currently, the mine is producing coal at a rate of five million tons per annum. IC utilizes the dragline strip-mining method as a primary means of removing the coal from the coal seams encompassed in the Highveld coalfield. In order to operate the mine on a daily basis the following equipment and infrastructure is required: Marion drag-lines, overburden drills, hydraulic shovels and diesel-drive 150-tcoal haulers which are used during the conventional opencast-mining process. In order to operate the said machinery, equipment and infrastructure, IC is required to store a large volume of fuel on-site. IC currently consumes 30 m^3 of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply was determined as optimal. Therefore, IC identified a need to expand their current fuel tank storage capacity.

4.2 PROJECT DESCRIPTION

IC have an existing fuel storage area (red zone on **Figure 3**), located to the west of the opencast operations, which serves to store fuel which is required by equipment, machinery and various other tools and components which are utilised on the mine daily.

The current onsite storage comprises two 83 m^3 diesel AST's, located near the pit workshop, and two 14 m^3 petrol underground storage tanks towards the main offices, totalling 194 m^3. IC is proposing the installation of an additional four 83 m^3 diesel AST near the existing AST site, thus bringing the total storage capacity on site to 526 m^3.

The length, breadth and height of the proposed project area which will be utilised for the additional 4 fuel tanks, is 19.3 m, 17 m and 3.8 m, respectively and the proposed tanks will occupy an approximate area of 328.1 m^2. IC appointed Petroleum Solutions (PS) to develop detailed design drawings for the proposed BFSE project (Refer to **Appendix E**). PS compiled one overview map which indicates the location of the existing tanks as well as the proposed tanks. PS have also compiled additional maps which provide more detail of each design component of the proposed tanks, including the following:

- IC Layout;
- General Arrangement – proposed tanks (040112-G-002);
- Existing Tank Plan Layout (4260-C-190); and
- Tank and fuel specifications.

Refer to **Appendix E** for a copy of the site plan (and associated design drawings) for the proposed BFSE project and for a copy of the photographs from the proposed site.

4.3 ALTERNATIVES

The alternatives took into account locality and the type of storage tanks. Various alternatives have been considered during the feasibility stage of the project including both location and fuel tank design alternatives. WSP have documented the benefits and the shortcomings of the various alternatives below.

4.3.1 Location

4.3.1.1 Preferred Alternative A

Alternative A is the preferred alternative. The preferred location of the proposed fuel storage tanks is indicated in **Figure 6**. The area on which the activity is proposed has a very flat gradient (refer to **Figure 6**), making the site ideal for the proposed storage requirements. The preferred site is currently utilised for diesel storage and therefore the land use would remain unchanged. At present, the mine storage capacity comprises two 83 m^3 diesel AST's (adjacent to the project area proposed for the BFSE) and two 14 m^3 petrol underground storage tanks, totalling 194 m^3. The addition of the proposed tanks will increase the AST storage facility capacity (refer to **subsection 4.3.1.2 – 4.3.1.4** for site alternatives).

The utilisation of an already developed site is considered the preferred alternative in terms of reducing the environmental impact of the project. The preferred site is not grassed due to regular vehicle movement, as well as other activities taking place directly adjacent to the existing tanks therefore the installation of the proposed tanks alongside the existing tanks will not result in the further loss of grass/vegetation cover. Although this notion (developed site vs. undeveloped site) is applicable to the BFSE project, this cannot be assumed for all sites.

In addition, the existing infrastructure in terms of pipelines, power, emergency equipment availability, etc. make the use/upgrade of the existing facility the most financially feasible alternative. The installation of supporting infrastructure to service a new fuel storage area would result in the need for further development and thus potentially result in unnecessary environmental degradation. The existing road between the bulk fuel storage area and the mine workshop ensure that additional road infrastructure will not be required which again would result in the development on vacant (potentially undisturbed) land.

The existing IC Storm water management plan can be adapted to incorporate the additional tank infrastructure. The existing stormwater drainage infrastructure, which captures the potentially contaminated water within the BFSE area, can be extended to include the additional tanks. This is considered the more feasible alternative when compared to the alternative of developing a new fuel storage area potentially requiring the installing of completely new storm water infrastructure to manage the dirty water runoff. The existing bulk fuel storage site is also isolated from any admin offices or any form of residences thus lowering potential Occupational Health and Safety risks.

The alternative involves the installation of all the additional fuel storage tanks in Area 2 (refer to **Figure 7**) which is considered the most feasible alternative.

Figure 6: Gradient Profile (Google earth, 2012)

4.3.1.2 Alternative B

This location alternative involves the installation of the tanks on either side of the existing ASTs (two tanks in Area 1 and two tanks in Area 2). Alternative B was the second preferred alternative behind Alternative A (**sub-section 4.4.2**). Areas 1 and 2 detailed in **Figure 7** represent the two areas storage areas considered. Area 1 contains existing infrastructure, which would need to be relocated to facilitate the proposed BFSE. This factor led to alternative B not being feasible in comparison to Alternative A. In addition, the alternative would result in the requirements for further support infrastructure (such as piping) which raised the cost of development.

4.3.1.3 Alternative C

This alternative involves the installation of the tanks on the other side of the mine dirt road. The Alternative C site is represented as Area 3 in **Figure 7.** This alternative C is not deemed feasible as it would require below and/or above ground pipes to transfer the diesel across to the main fuel pumps which may lead to an increased potential for spills / leaks resulting in environmental degradation. In addition, Area 3 was earmarked for

equipment storage by the IC land surveyor prior to the consideration of the BFSE project. In order to mitigate against the need to construct additional piping and pumps to transfer the fuel to the mining vehicle re-fuelling area, IC would require the installation of an additional vehicle re-fuelling area/infrastructure. The cost associated with the development of Alternative C (area 3) was extensive in comparison to Alternatives A and B, and was therefore not considered feasible.

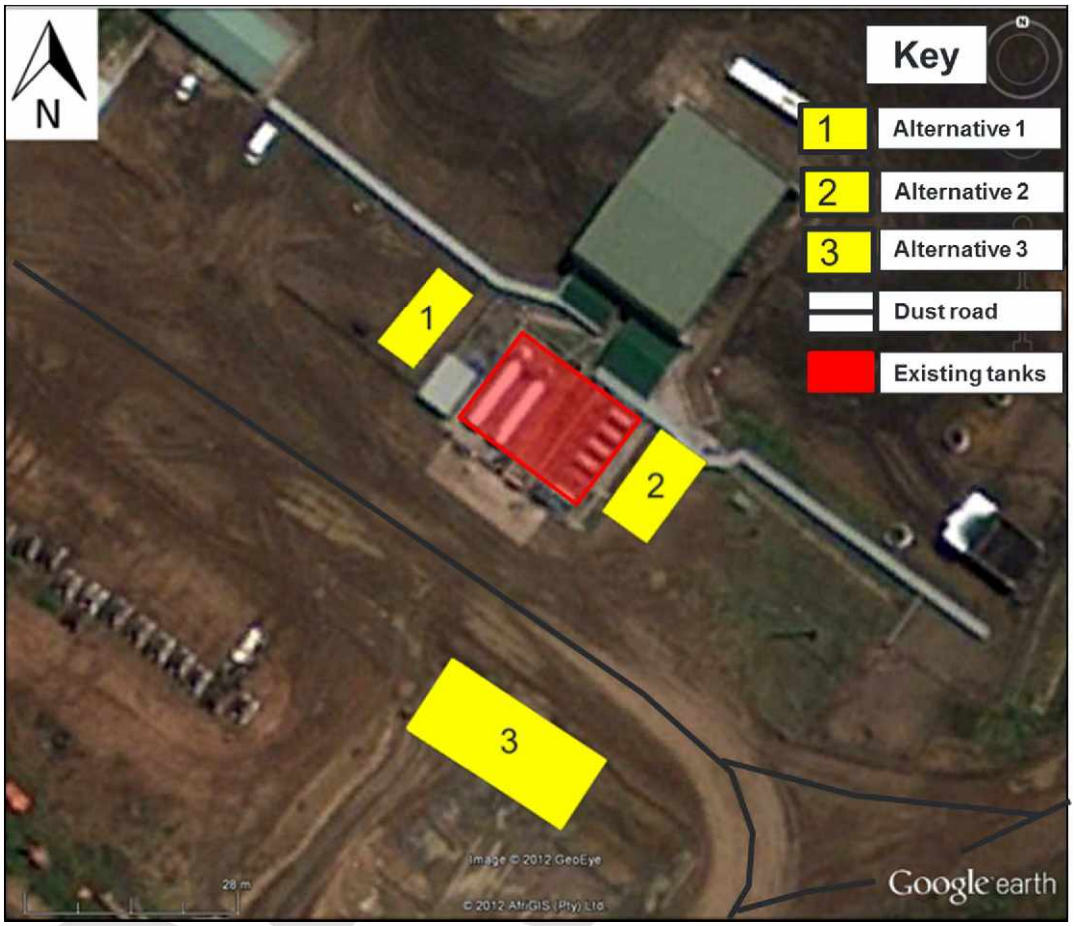

Figure 7: Site Alternatives (Google Earth, 2012)

4.3.2Tank Type

IC considered various tank designs (in consultation with both Shell, Petroleum Solutions and Design Services) including aboveground storage tanks, T-68 type container storage tanks and underground storage tanks. The following documents were consulted:

- Leak Detection and Automatic Tank Gauge System Hardware Standards (Shell Retail Network Engineering); and
- Underground Storage Tank (UST) Design Specifications (Shell Retail Network Engineering).

Please note that the information consulted in the feasibility phase is not limited to the list above.

The documents indicated above, are standardised Shell documents, which indicate Shell's intention to ensure environmental integrity through implementation of various procedures and best available technology where practical (the documents can be provided upon request).

4.3.2.1 Above Ground Fuel Storage Tank

The installation of new above ground fuel storage tanks and the extension of the existing bund and piping infrastructure is considered the preferred alternative due to the expansion (refer to **Figure 9**) rather than new stand-alone infrastructure. The existing concrete bund will be extended to accommodate the addition fuel storage tanks. The alternative will result in a consolidated fuel storage area and is considered the most cost effective of all the alternatives. Furthermore, the maintenance of the above ground fuel storage tanks is considered the most practical and risk free activity when compared to the T-68 and underground tank alternative (detailed in the sections below).

4.3.2.2 Underground Fuel Storage Tank

The installation of underground bulk fuel storage tanks was considered by IC. However, several driving factors led to this alternative being deemed unfeasible and as such was not considered further.

Some of the driving factors included the need for excavation and associated equipment use during the construction phase, along with the need for storage space to accommodate soil stockpiles. Furthermore, underground tanks are difficult to maintain and leak detection may not be effectively implemented resulting in soil and / or ground water contamination. In addition, monitoring and regular inspection of tank integrity is not possible unless the system is unearthed, meaning that the monitoring systems used for leak / contamination detection will only alert the management once such has occurred i.e. reactive remediation of environmental incidents instead of proactive prevention.

In addition to the above the costs associated with the construction and operation of the USTs is higher than the preferred Alternative A.

4.3.2.3 T-68 Container

IC considered the installation of a T-68 shipping container (refer to **Figure 8**) adjacent to the existing fuel storage area. This tank design ensures that all fuel is contained within the container, in other words self-contained. The container would be transported to IC as a complete article (the container serves as a bund) thus requiring limited action in terms of the installation / construction phase. This alternative was initially considered a reasonable alternative and assessed further. Following further investigation the alternative was considered less feasible due to the need for additional piping and pumping infrastructure, as well as concerns raised regarding the re-fuelling and operational procedures required to ensure the secondary containment is not breached. In order to mitigate against the risk, an additional bund may have been required leading to a further cost escalation. This alternative was therefore discarded by the engineering and IC project team. Please refer to **Appendix E** for a detailed design drawing of the tank alternative.

Figure 8: The preferred tank alternative

4.3.3'No-go' Alternative

Should the proposed BFSE project not be authorised, the mine will remain subject to the reliability / punctuality of the fuel supplier, the volatility of international fuel supply market, fluctuating fuel prices and environmental factors such as rainfall events which may for example render fuel delivery unsafe. The impact on the operational efficiency of the IC will impact on the profitability of the mine itself in terms of continued supply the cessation of mining operations due to the said factors and situations surrounding fuel supply at the IC could result in the disruption of the SSF operations. Therefore potential downstream impacts are potential risks. The socio-economic implications will be negative as the lack of fuel may lead to the loss of employment (at IC as well as at operations reliant on the supply) and a decrease in the Gross National Product of South Africa.

On examination of the discussion points described above, the 'no-go' alternative is not considered to be a reasonable/preferable alternative.

5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.1 CLIMATE

The IC is situated in the Govan Mbeki Local Municipality. The Govan Mbeki municipality is situated in a subtropical climate zone, where rainfall occurs in the summer months between September and May. Throughout the region, 95% of the rainfall is received during the summer six months, October to March, but the month of maximum precipitation is either January or February. The western portions of the municipality can receive between 600-800mm/year and the eastern portion can receive between 800-1000mm/year (Refer to **Figure 10** for a rainfall map of the Mpumalanga province). In summer, temperatures range from as high as 40 degree Celsius during the day to 10 degree Celsius in the evenings. Winters are milder and temperatures usually vary between 20 degrees Celsius during the day and 10 degree Celsius in the evenings. Frost does occur, but apart from light frost which may occur from May to August, the period during which ordinary frosts may be expected is less than 30 days per year (Govan Mbeki IDP, 2007). The strongest winds blow from the southwest and northwest in winter and from the east and northwest in summer (Radyn et al, 2010). **Table** 5 below is a summary of climatic conditions recorded at the Bethal weather station (23 km's ESE of project location) in Mpumalanga.

Table 5: Climatic conditions for Isibonelo Colliery (Radyn et al, 2010)

Month	Average Rainfall (mm)	Max Rainfall 24 hrs (mm)	Mean Monthly Temperature (°C)	Ave Daily Temp (°C)	
				Max	Min
Jan	146	90 (11/1935)	19.5	25.8	13.2
Feb	75	96 (09/1953)	19.2	25.4	13.0
Mar	61	90(07/1949)	18.0	24.5	11.4
Apr	48	64(01/1964)	15.2	22.1	8.1
May	14	66(23/1936)	11.7	19.6	3.8
Jun	7	30(01/1942)	8.4	16.9	0.0
Jul	6	35(03/1943)	8.5	17.1	0.2
Aug	13	29(08/1983)	11.5	20.1	2.9
Sept	28	48(29/1973)	14.8	23.1	6.5
Oct	78	65(28/1956)	17.2	24.5	9.9
Nov	129	96(14/1959)	18.0	24.5	11.4
Dec	106	117(26/1940)	19.0	25.4	12.7
Annual	711	117(26/12/1940)	15.1	22.5	7.7

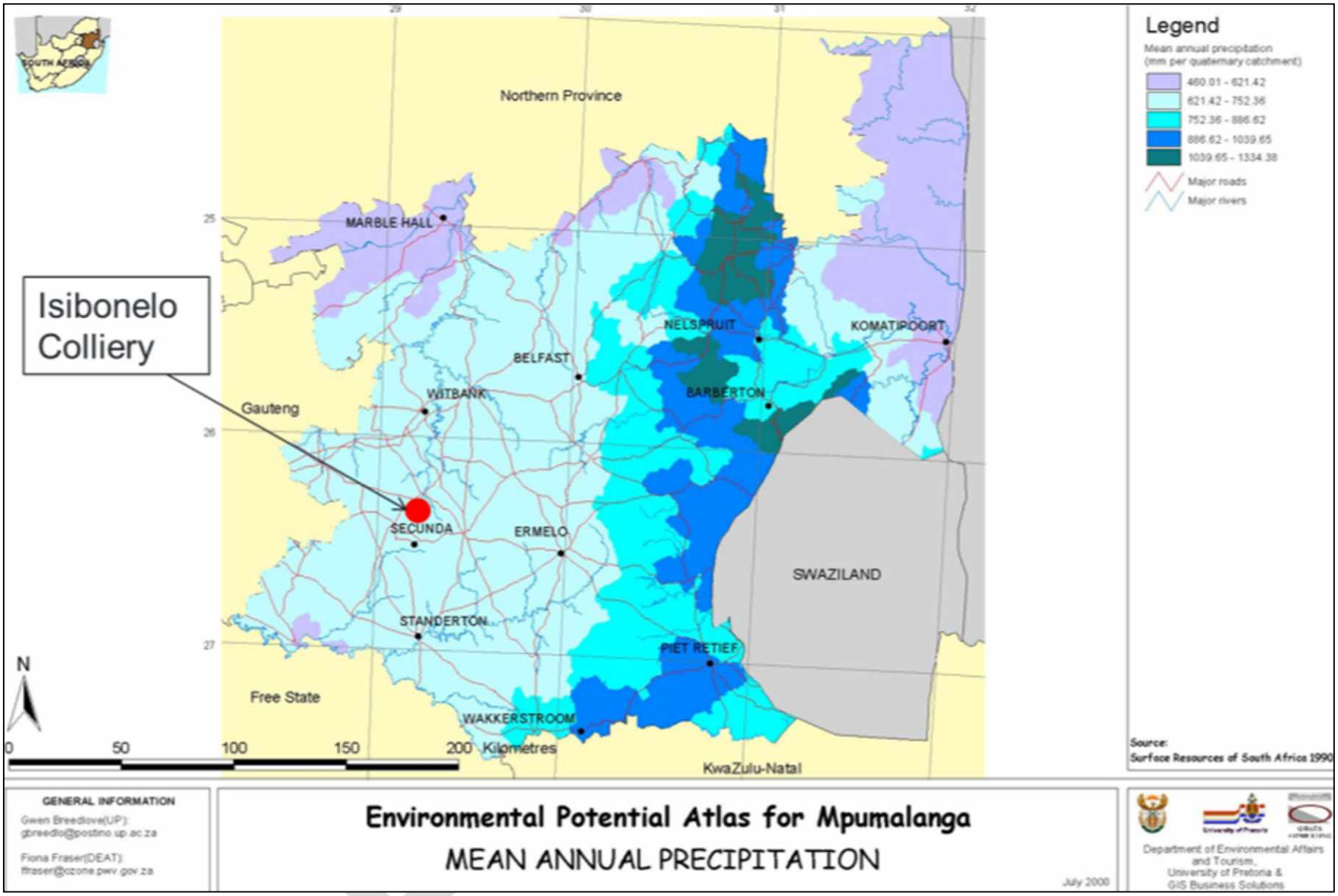

Figure 9: Mpumalanga provincial rainfall map (DEAT, 2000)

5.2 TOPOGRAPHY

The proposed development is situated at an altitude of 1582 metres above sea level. The project area is classified within the plains and hills terrain group category and the terrain type is described as slightly irregular, undulating plains and hills. Slopes do not exceed 5° (8%) (Bredenkamp *et al.* 2000).

Figure 11 illustrates a cross profile of the mining area from the north east side of the mine lease area to the south west side of the mine lease area. The gradient profile represented on **Figure 11** portrays slopes no greater than 1.8% thus illustrating an area of a relatively flat gradient. The red arrow in the centre of the satellite image on **Figure 11** represents the existing Tank Farm (proposed project location). The depression on the right hand side of the gradient profile graph represents the South mining pit. According to the gradient profile the slope decreases gradually from the natural environment south west of the mine to the south mining pit on the north east side of the proposed project location.

The project location selected is the preferred alternative due to the gentle gradual gradient amongst other factors. There are various benefits associated with a gentle slope when considering the location of a fuel farm which include the following:

- If a spill had to occur, the gentle slope would ensure that the extent of the spill is restricted to a small soil surface area thus minimising the resulting environmental degradation.
- The slope is not conducive to erosional activity or high velocity surface water flow which will reduce the migration of greases and residues associated with the fuel tanks.
- The stability of the fuel tanks is highly dependent on the topography of the land. The construction of a fuel farm upon a steeper slope would result in further earth works/excavations to ensure the surface on which the tanks are placed is sufficiently level.
- The refuelling of the trucks and other vehicles which require the fuelling point daily, require a level surface on which to drive to ensure the safety of the driver and surrounding workers.

The topography was thus considered a significant influence in the site selection process during the project feasibility investigation.

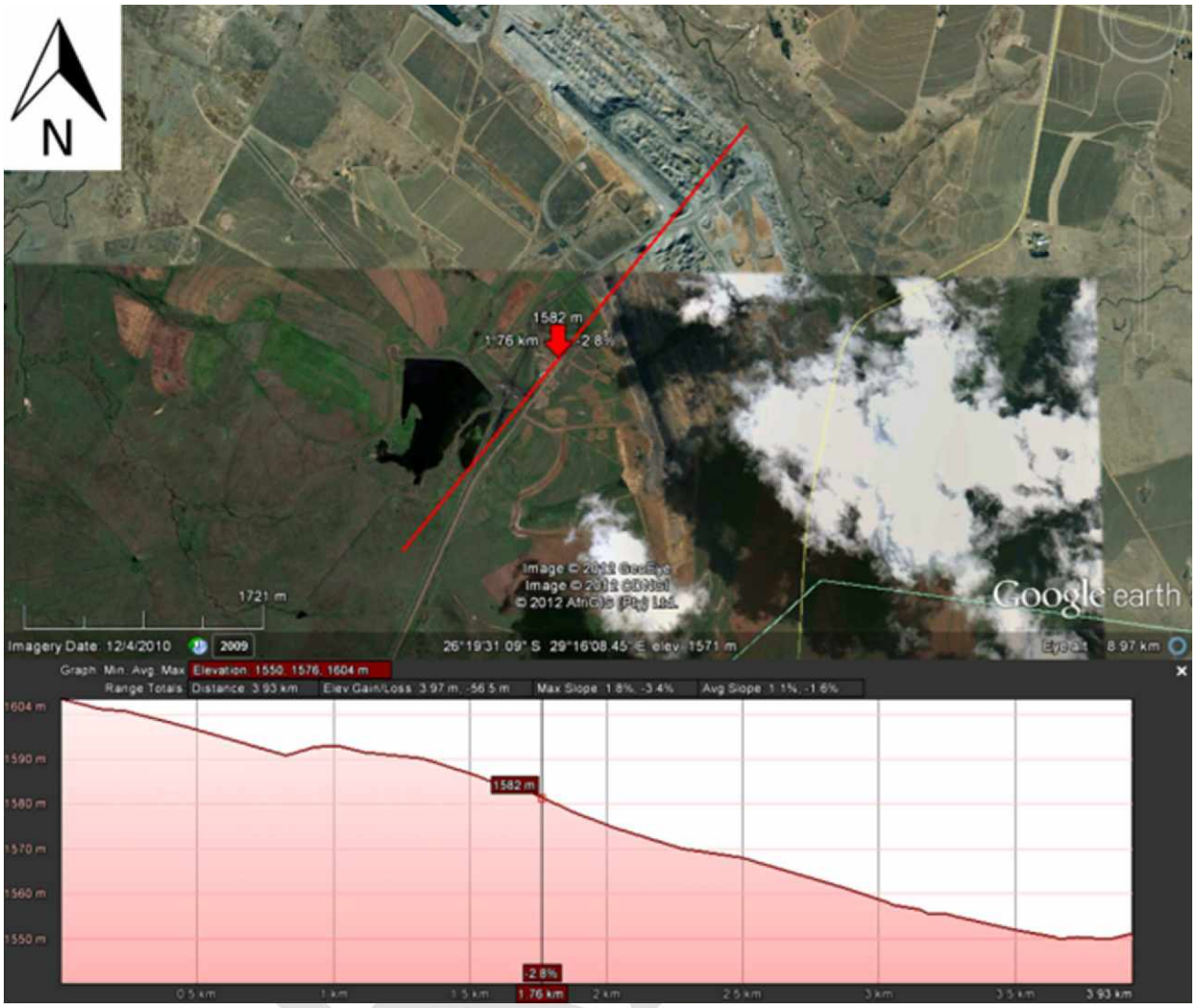

Figure 10: Gradient Profile of mining area (Google earth, 2012)

5.3 GEOLOGY

The geology of the greater project area comprises mainly sedimentary lithologies belonging to the Karoo Supergroup. Sandstone and sand/siltstone intervals of the Vryheid Formation rest unconformably on a pre-Karoo basement, which consist mostly of granite, with gabbro.

The general lithological profile, up to, and including the deepest mineable coal seam, consists of:

- Soft overburden;
- Hard overburden;
- No.5 coal seam;
- Inter burden; and
- No.4 coal seam.

The lithology below the No.4 coal seam comprises primarily sandstone and non-economical thin coal seams (The No.3 coal seam and the No.2 coal seam). Dolerite sills and dykes occur sporadically over the region (Muller *et al*. 2001). **Figure 12** represents the geology of the Mpumalanga province. As previously stated the IC

currently mine the No. 4 seam of coal. The installation/construction of the Fuel Storage tanks will not impact on the geology in the area as the maximum depth of the Fuel tanks is 0.4 metres and the maximum depth of the bund valve is 1.2 metres below ground level (refer to **Appendix E** for a detailed design drawing).

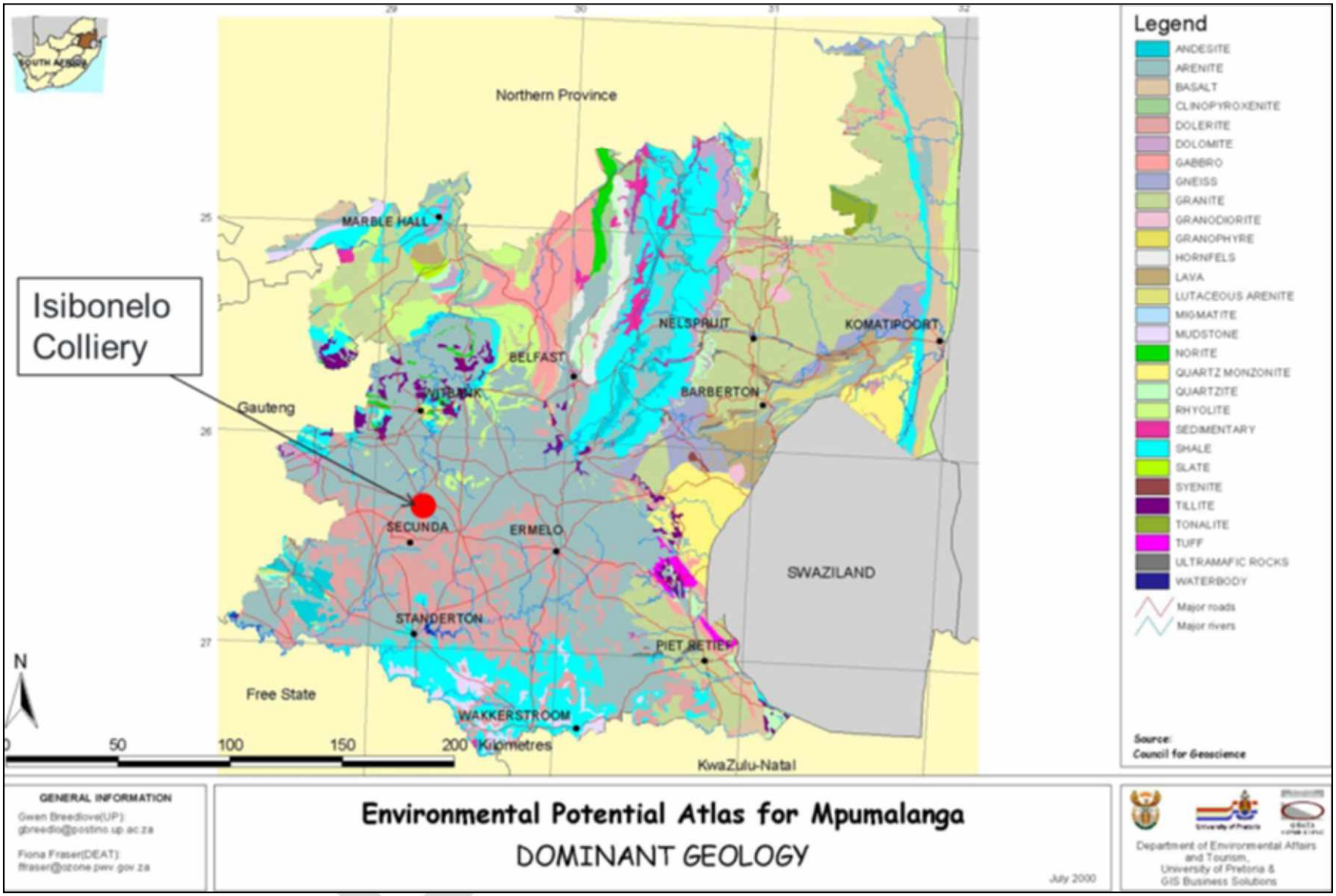

Figure 11: The dominant geology of the Mpumalanga Province (DEAT, 2000)

5.4 SOIL, LAND USE AND LAND CAPABILITY

Geological, climate and topographical parameters are responsible for the formation of the two broad soil patterns occurring in the mine lease area. Red to yellow and greyish, more sandy soils are found towards the north-eastern section of the mine lease area. In the south-western section (proposed project area), black and red strongly structured, vertic soils are present.

Most of the cultivated areas are situated on the more sandy soils along the north-eastern boundary while most of the grassland is associated with the vertic soils along the south-western boundary. Most of the surveys performed in 2000 were conducted in the grassland areas on clayey soils (Bredenkamp et al. 2000). It should be noted that the proposed project location is situated within the IC mine lease area and is therefore primarily dedicated to the mining operations of the IC. Furthermore, surrounding land-uses include industrial complexes, power generation facilities, mining and agricultural activities.

The following soil types occur at the proposed Bulk Fuel Storage project site:

- Avalon/Bainsvlei; and
- Clovelly (Marneweck, G. 2001).

Figure 13 represents the soil types found in and around the IC mine lease area. It should be noted that the location of the BFSE project indicated on the map is the approximate location of the proposed project area.

Avalon, Bainsvlei and Clovelly soils each have their own erodibility Index's which are indicated in **Table 6**. The erodibility Index's of all the soils which make up the IC mine lease area have been included in **Table 6** however, the soil types which are bolded comprise the area on which the project is proposed namely, Avalon, Bainsvlei and Clovelly soils. According to **Table 6**, the erosional index of the Clovelly soil type is considered Low to Moderate whereas the erosional index of the Bainsvlei and Avalon soil types is considered Moderate to High.

The ground area on which the project is proposed will be covered with a cement base in order to secure the bulk fuel storage tanks. The secure base will mitigate against the possibility of a spillage on-site. This being said, the footprint of the tank infrastructure will not be exposed to any form of erosion however, the area surrounding the bulk fuel storage area is subject to a large amount of vehicle traffic thus the surrounding area may be impacted upon in terms of soil erosion. The area surrounding the existing bulk fuel storage area (within a +/-70 metre radius) is currently exposed to the weather thus the project will not lead to an increase in the erodibility of the soil in the project area when considering the current state of the site. Mitigation measures have been included in the EMPR to combat the potential soil erosion (**Appendix D**).

Table 6: Soil erosion indices (Radyn et al, 2010)

Soil Form	Erodibility Index
Hutton/**Clovelly**/Griffin	**Low to Moderate**
Pinedene/Bloemdale	Moderate
Glencoe/Dresden	Moderate
Sepane	Moderate to High
Bainsvlei/Avalon	**Moderate to High**
Westleigh/Longlands	High
Glenrosa/Mispah/Mayo	Moderate
Valsrivier	High
Swartland/Sterkspruit	Moderate
Kroonstad	High
Rensburg/Bonheim	High

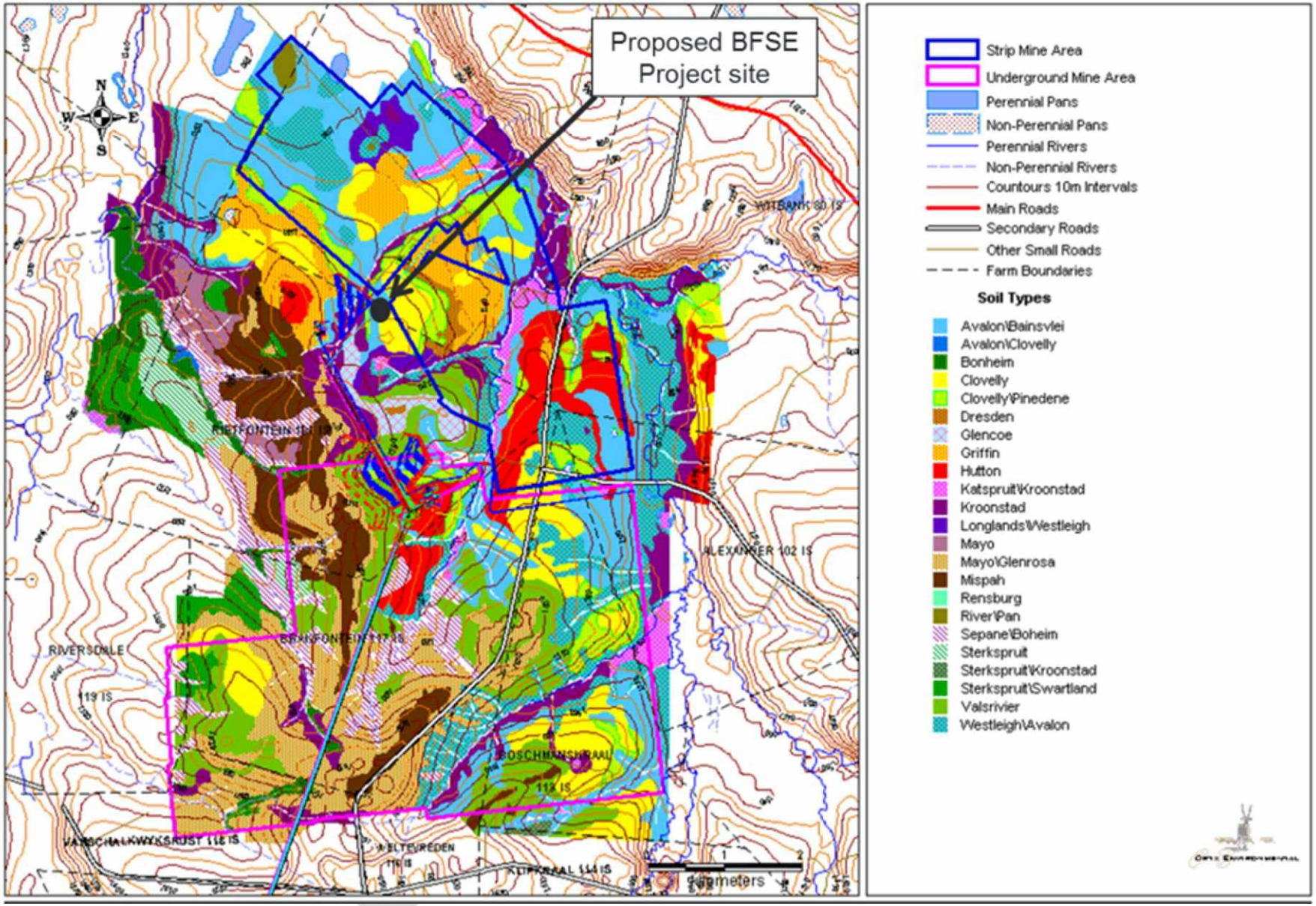

Figure 12: Soil types (Groundwater Consulting Services, 2000)

“The soil potential in the area is impacted upon by mining activities as well as by unsuitable agricultural activities and the use of pesticides which inflict negative impact on the quality and arability of the soil” (IDP, 2007). The land capability of the entire mine lease area, within which the proposed fuel storage tanks will be constructed/installed includes (please note that **Figure 14** represents the pre-mining land use capabilities of the land on which the IC is located):

- Wetland areas;
- Natural veld;
- Arable land; and
- Grazing areas (Marneweck, G. 2001).

The proposed BFSE project is to be located in an mine lease area, more specifically in an area which is currently utilised for the storage of fuels. Considering the land area directly adjacent to the existing fuel storage tanks has been disturbed by the use of heavy vehicles and machinery as portrayed in **Figures 6** and **7**, the land capability is expected to be low and suited to mining operations. The installation of the fuel storage tanks will prevent the use of the land on which the fuel storage tanks will be positioned until such point that the existing and proposed fuel tanks are decommissioned, remediated and rehabilitated.

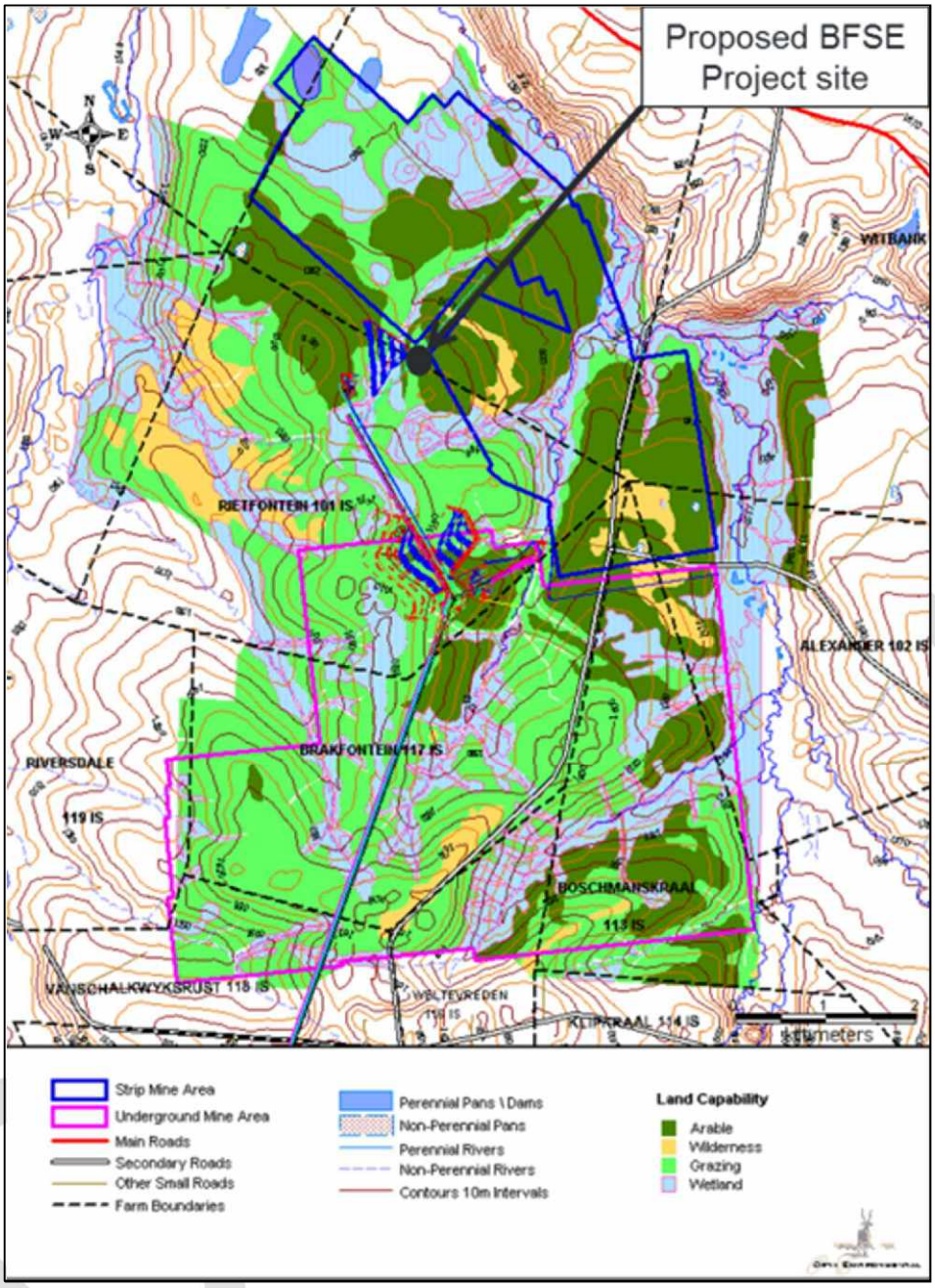

Figure 13: Land Capability (Oryx Environmental, 2000)

5.5 FLORA AND FAUNA

Results obtained from the vegetation study conducted in 2001, by Ecotrust Environmental Services, as well as further literature review indicated the presence of two major vegetation communities, namely the Themeda triandra grassland and Riparian vegetation type. The two communities represent the major part of the IC mining area; the remainder being classified as cultivated lands, old fields, pastures and exotic stands. According to **Figure 15**, the proposed BFSE project is located upon Cultivated Land and Pastures. However, please note that **Figure 15** is a representation of the pre-mining environment hence although the land was previously considered of arable potential the present condition of the land, on which the current fuel tanks are located as well as the land on which the proposed fuel storage tanks are to be located, is not considered of arable

potential due to mining activities (refer to **Appendix E** for a representation of the current condition of the proposed project area).

Physiognomic homogeneity is a characteristic of the Themeda triandra grassland and the natural grassland vegetation in the greater study area (IC mine lease area) and is therefore regarded as a single community. Grass species predominate the IC mine lease area and the slight variation in species composition is generally determined by a combination of environmental conditions.

Please note that the BFSE project will have no impact upon any river or wetland system as its located within the dirty water area within the mine. Furthermore, none of the identified flora species are present on the BFSE area thus there will be no impact created by the project regarding flora. The IC (in terms of their entire operations) have an alien invasive plant or weed management procedure / policy (refer to IIMS/OP 1.036 of the EMS) as well as a Biodiversity Action Plan which endeavour to create awareness around the protection of biodiversity in and around the mine lease area.

Figure 15 represents the vegetation types found in and around the IC pre-mining lease area. It should be noted that the location of the fuel farm indicated on the map is considered an approximate location.

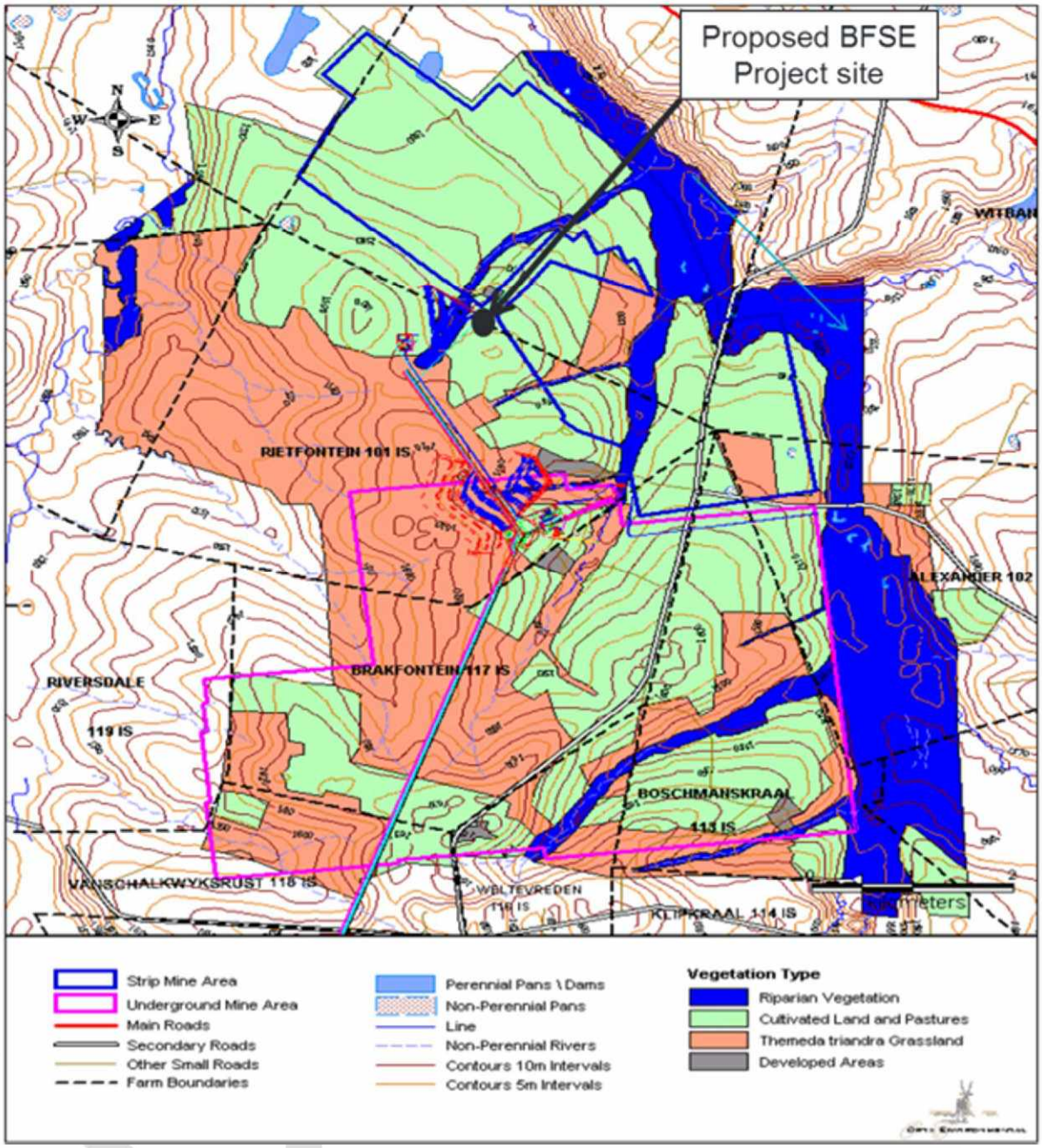

Figure 14: Pre-mining vegetation (Oryx Environmental, 2000)

Small mammals such as mongoose, grey duiker and rodents naturally occur in the region surrounding the mine lease area. Yellow mongooses have been seen on the site on numerous occasions and the presence of Marsh owls *Asio capensis* in the wetland systems suggests that rodents occur. Cape clawless otters *Aonyx capensis* and water mongoose (*Atilax paludinosus*) occur in the area. Otter scats have been seen on numerous occasions and identified as those of the Cape Clawless otter (*Aonyx capensis*). A few amphibians are also likely to occur in the wetlands and a list of these plus those mammals likely to be associated with the wetlands is given in **Table 7**. Grass owls *Tyto capensis* are also likely to occur in the area although none have been seen during site surveys which were undertaken in 2001. Reptiles likely to be associated with the wetlands include the Common brown water snake (*Lycodonomorphos rufulus*) and the Egyptian cobra (*Naja haje*). Numerous species of waterbirds including teals and ducks are common in the open water habitats associated with depressions and oxbows on the floodplains.

Table 7: Provisional list of mammal and amphibian species likely to be associated with or occur in the wetlands of the general mine lease area (Marneweck, 2001)

SCIENTIFIC NAME	COMMON NAME
Mammals	
Crocidura mariquensis	Swamp musk shrew
Cynictis penicillata	Yellow mongoose
Atilax paludinosus	Water mongoose
Cryptomys hottentotus	Common molerat
Otomys angoniensis	Angoni vlei rat
Otymys irroratus	Vlei Rat
Amphibians	
Xenopus laevis	Common platanna
Bufo gutturalis	Gutteral toad
Tomopterna natalensis	Natal sand frog
Phrynobatrachus natalensis	Common puddle frog
Cacosternum boettgeri	Common caco
Kassina senegalensis	Bubbling kassina

It must be noted that the fauna species listed in **Table 7** occur in the general region and therefore may or may not be present on the proposed development site at any given time. The proposed site may also contain species which have not been listed above as the Marneweck study, conducted in 2001, may contain limitations.

The entire mine lease area is fenced which restricts the access of larger fauna, however smaller mammals, birds, amphibians, etc may be present in the mine lease area. In the case of the discovery of an animal(s) in or around the proposed project area (including protected species), the Biodiversity Action Plan should be consulted. Although these species may be present, the likelihood of them occurring within the active mining area (adjacent to the mining pit and blasting areas) is minimal. The faunal impacts associated with the BFSE project are minimal and discussed further in **Section 7**.

5.6 HYDROLOGY

The baseline hydrology of the study area was obtained from the Kriel South Strip Mine EMPR (2001) compiled by Oryx Environmental and made available by the IC. The BFSE project will not impact on any river or wetland systems, as previously noted however, the following baseline hydrological assessment describes the current condition of the surrounding river and wetland systems.

5.6.1 Catchment Description

The IC mine lease area is located in the upper reaches of the Olifants River catchment within quaternary sub-catchment B11C / B11D of the Limpopo-Olifants primary drainage region (refer to **Figure 16** & **17**). The proposed project is located in quaternary sub-catchment B11C.

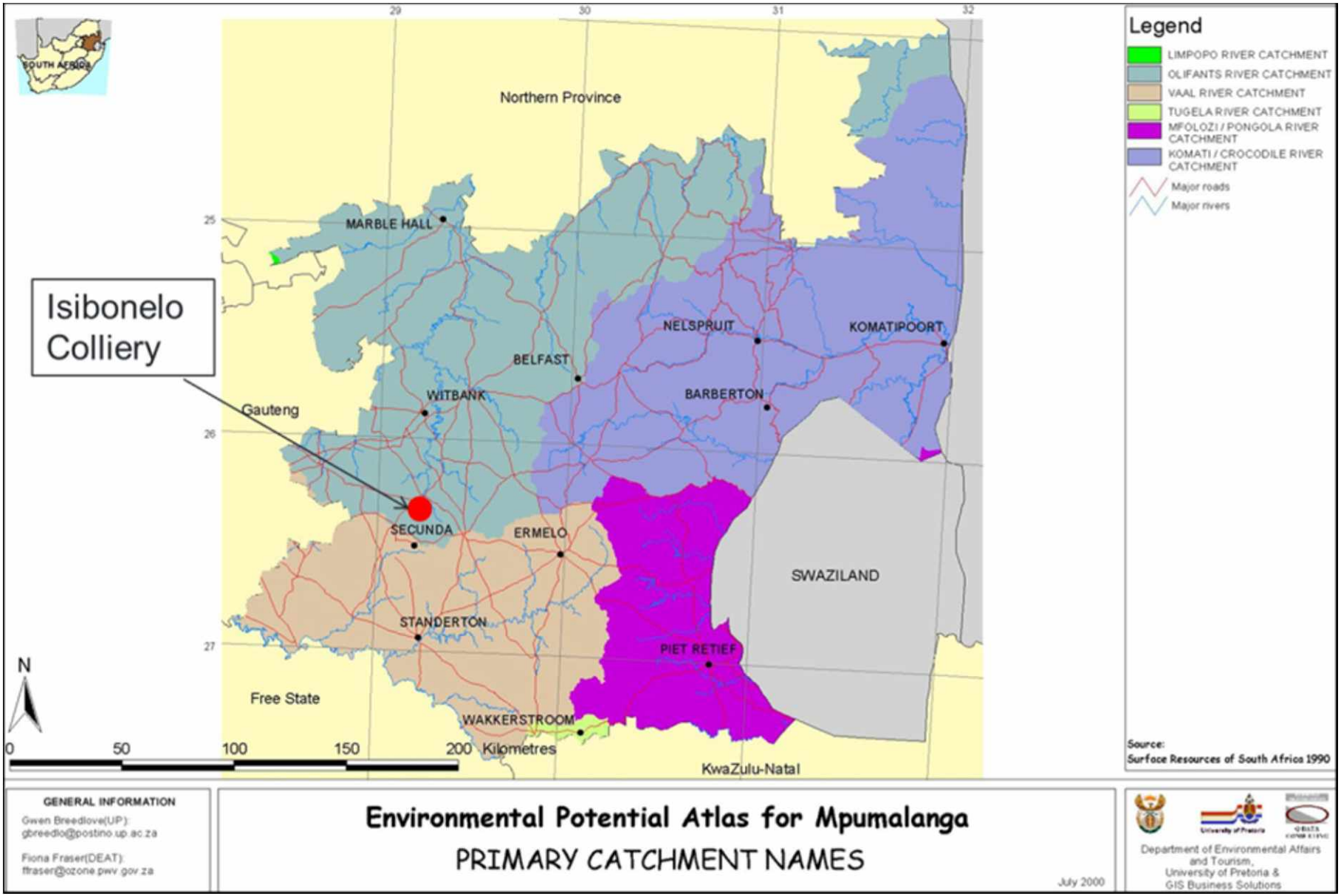

Figure 15: Mpumalanga primary catchments (DEAT, 2000)

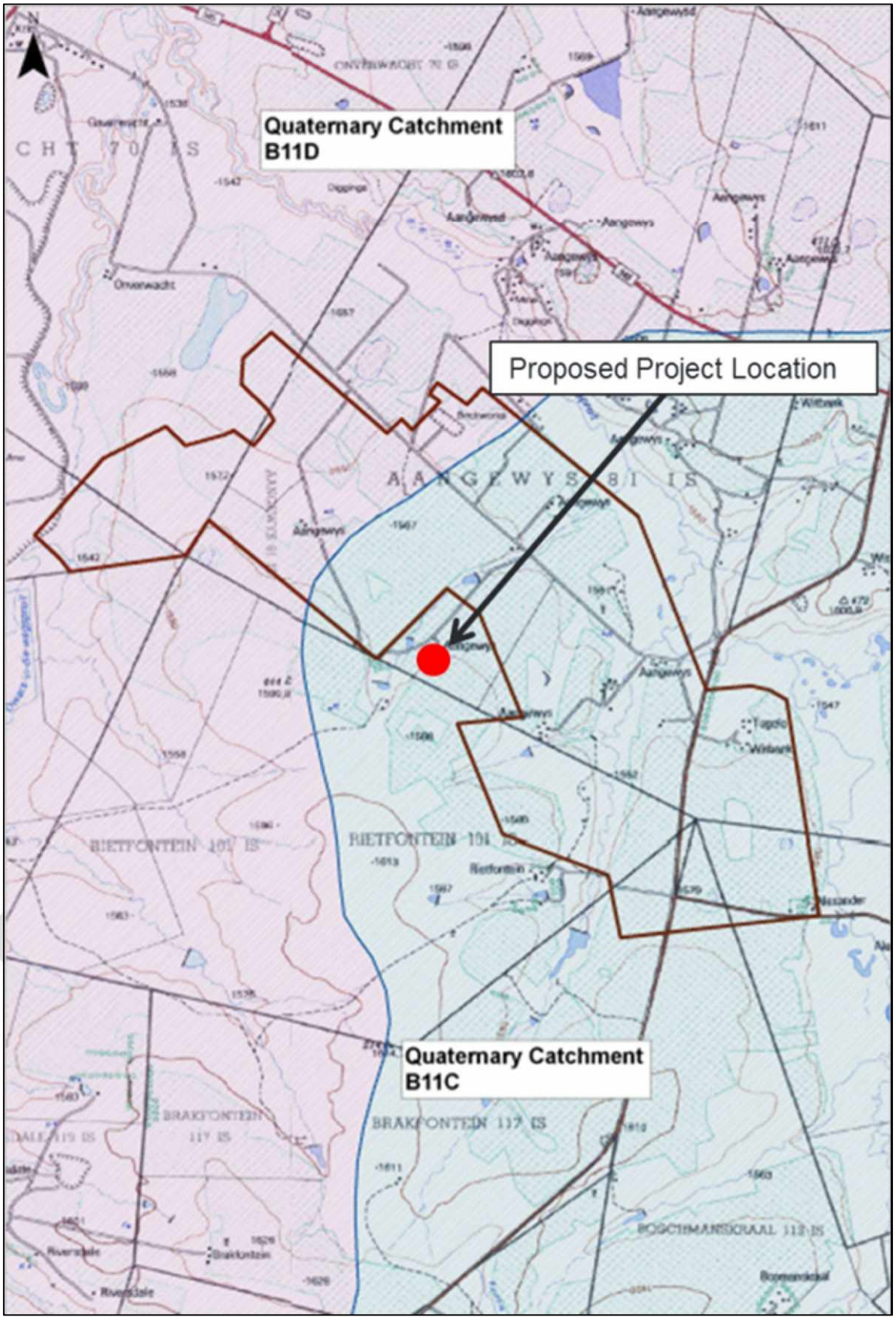

Figure 16: Quaternary Catchment Plan (Radyn et al, 2010)

The following rivers surround the project area and ultimately the IC mine lease area:

- The Piekespruit which is located approximately 2.7 km's east of the proposed fuel storage tanks (at its nearest point). This watercourse confluences with the Steenkoolspruit approximately 2.7 km's east of the proposed BFSE project location (**Figure 18**).
- The Steenkoolspruit which is located approximately 2.08 km's to the north east of the proposed fuel storage tanks (at its nearest point). The Steenkoolspruit flows in a general northerly direction, confluencing with the Olifants 29km north of the site in the vicinity of Tweefontein/Phoenix. The Olifants River flows into Witbank dam, which in turn flows into the Loskop dam. Thereafter the river flows through Mpumalanga and the central part of the Kruger National Park to Mozambique.
- The Dwars-in-die-wegspruit which is located approximately 3.62 km's to the west north west of the proposed fuel storage tanks (at its nearest point); and
- An unnamed tributary (originating from the Dwars-in-die-wegspruit) which is located approximately 2.06 km's to the south west of the proposed fuel storage tanks (at its nearest point). It should be noted that only the tributaries which are considered relevant are depicted in **Figure 18**.

In addition, a Pollution Control Dam (PCD) is located approximately 500 metres to the west of the proposed BFSE project location however the dam is used for "dirty" runoff water from the south pit and therefore not a natural body of water.

The proposed BFSE project will occur within the existing dirty water management system of the IC (please refer to **sub-section 5.6.2** for a detailed description) thus mitigating against the possible contamination of clean stormwater runoff from the natural area surrounding the active mining area.

Figure 17: Surface drainage map (Google Earth, 2012)

Refer to **subsection 5.6.3** for a detailed description of the surface water management infrastructure indicated in **Figure 18**.

5.6.2 Current IC Surface Water Management

IC have several stormwater diversion channels (SWDC) (refer to the red line on **Figure 19**), located to the north west, west south west and south west of the opencast operations, which serves to prevent clean water from the natural environment entering the south mining pit. The clean water is subsequently discharged into the DeBeerspruit which flows to the north east of the mining area.

The existing SWDC is located in an area proposed for future mining and in order to continue mining operations and to ensure that the clean water is diverted away from the south pit; a new SWDC is required to the west of the existing SWDC which is indicated in blue on **Figure 19**. The proposed SWDC is currently undergoing a environmental authorisation process. The yellow line indicated on **Figure 19,** represents a separate phase of the proposed surface stormwater diversion system, which is presently undergoing construction. Until both the phases of the proposed stormwater management system are constructed, the existing SWDC (indicated in red

on **Figure 19**) will be utilised to ensure clean stormwater is diverted away from the IC mining areas. The active mining area (including the proposed project area indicated in orange on **Figure 19**) is considered a dirty water area and as such is diverted to the PCD. The dirty water contained within the mining pit is collected within a sump (within the pit) and subsequently pumped from the pit into the said PCD (Vaskop dam).

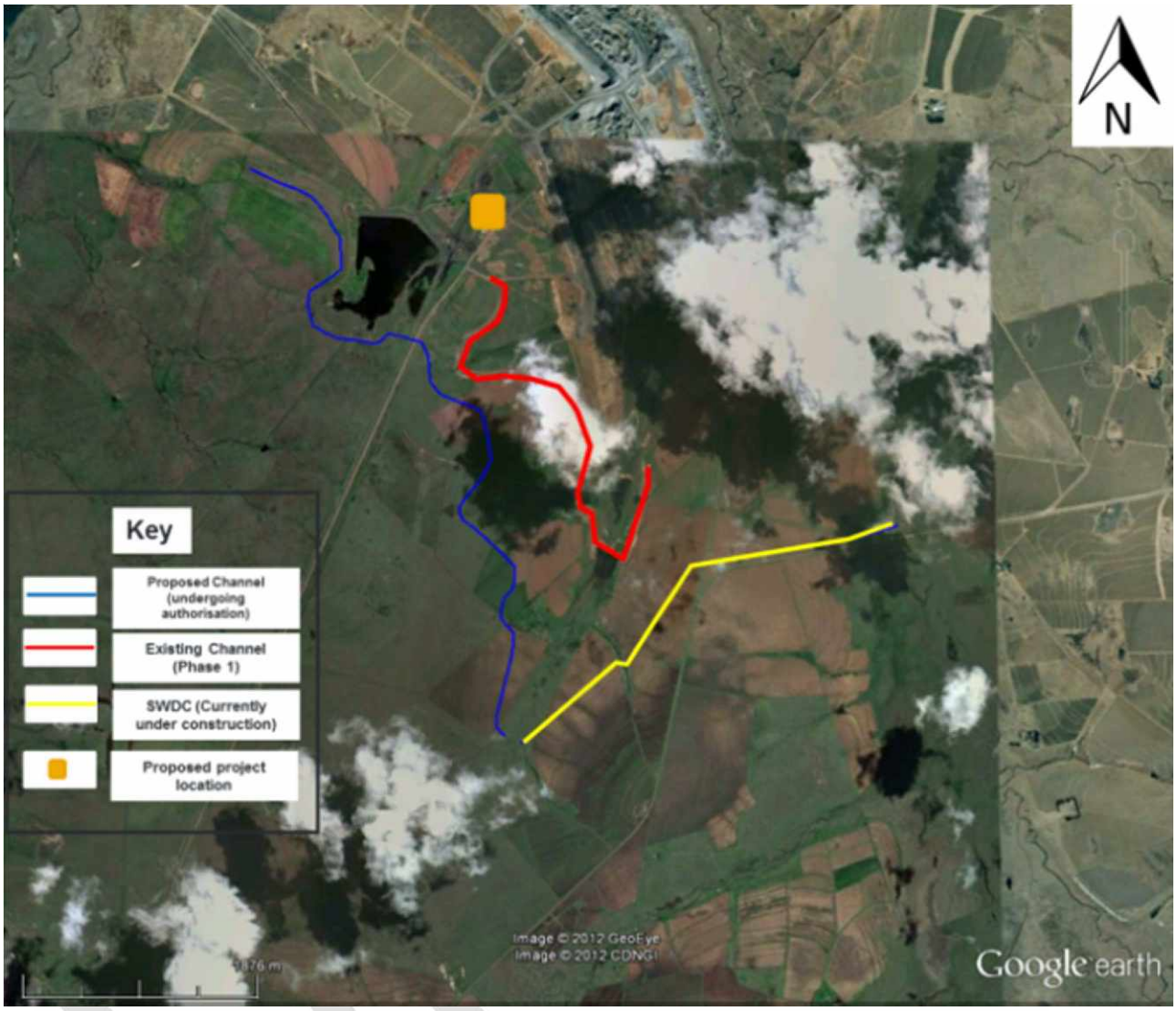

Figure 18: IC Stormwater Management System (current and proposed)

5.7 GROUNDWATER

5.7.1 Baseline Description

The baseline groundwater information of the study area was obtained from the Kriel South Strip Mine EMPR (2001) compiled by Oryx Environmental and made available by the IC.

The study area is characterised by three different aquifer types: A shallow perched aquifer (approximately 1m – 8m thick), a shallow weathered zone Karoo aquifer (approximately 5m – 18m thick) and a deep Karoo aquifer (approximately 30 – 180m thick). The hydraulic conductivity for the study area is estimated at 0.3m/day.

The boreholes drilled as part of the 2001 project indicated a groundwater depth between 1.6m and 21.1m below ground level (bgl) (an average of 10.73m bgl). These had a yield of between 0.001l/s to 0.599l/s with an average yield of 0.17 l/s.

The background ground water quality, prior to the IC development, indicated EC, selected metals, pH and sulphates are within legislated levels not indicating any mining impacts. The BFSE project will require both new and existing tanks to be housed within a bunded area. Therefore, significant ground water impacts are not anticipated (refer to **Section 7** for further detail on the impacts rating).

5.7.2 Groundwater Monitoring

5.7.2.1 IC Monitoring Boreholes

A total of 10 boreholes are monitored to determine IC's present ground water quality. The locations of these are indicated in **Figure 20** and a description of each borehole location is provided in **Table 8**. All the boreholes are monitored on a quarterly basis.

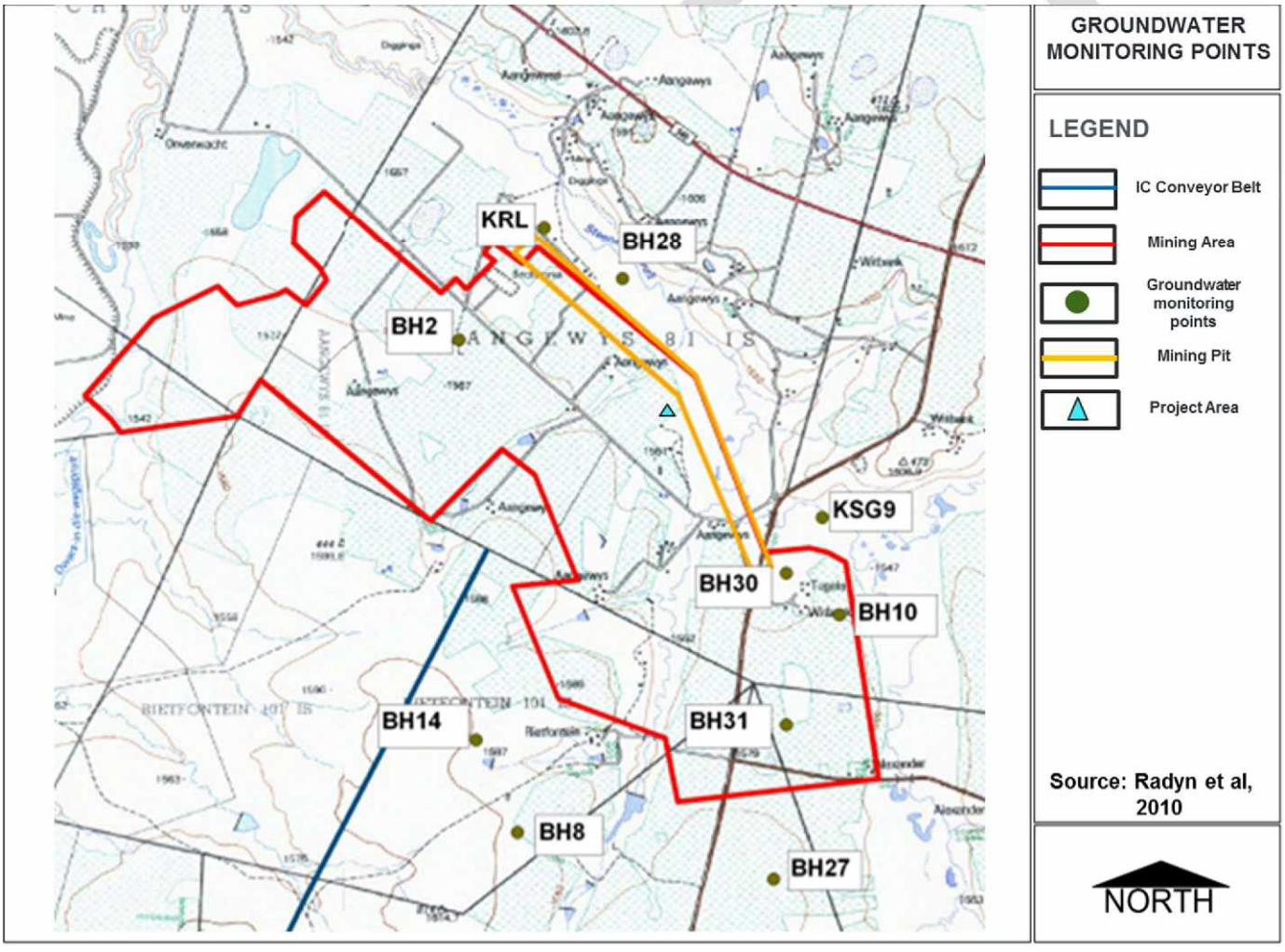

Figure 19: Groundwater Monitoring Points (Radyn et al, 2010)

Table 8: Boreholes location descriptions (Radyn et al, 2010)

Borehole Name	Location	Sampling Frequency
BH 14	Borehole is situated east of the explosive magazine and the topography slopes down towards the Unnamed Tributary.	Quarterly
BH8	This borehole is in an eragrostis field south of Montedi at the start of the Unnamed Tributary.	Quarterly
BH 31	This borehole is situated in the wetland near the crossroads to Simbali, and the topography slopes towards the De Beerspruit.	Quarterly
BH 10	This borehole is situated behind Pieterse's house (adjacent landowner), next to the canal and the topography slopes towards the Unnamed Tributary.	Quarterly
BH 30	This borehole is situated near Pieterse's kraal in the vlei and the topography slopes towards Emfuleni.	Quarterly
BH 2	This borehole is situated on the road to the Colliery. The topography slopes towards the pit and the Steenkoolspruit.	Quarterly
BH 28	This borehole is situated between the berm and the DWAE weir, in the wetland next to the Steenkoolspruit.	Quarterly
BH 27	This borehole is situated on high ground between maize fields. During future expansion of the pit into this direction, it will come into play and will then serve as monitoring borehole for mining operations.	Quarterly
KSG 9	This borehole is situated next to BH30, in the wetland near to the pit.	Quarterly
KRL	This borehole is situated north of the pit, next to the wetland and in the direction of the Colliery.	Quarterly

5.7.2.2 Groundwater levels

The water levels of most of the identified boreholes (**Table 8**) at IC show a slightly rising trend on the short-term. The exceptions are the boreholes near the eastern vlei areas (KSG9 and BH31). However, the general trend is sideways over the long term. Please refer to **Figure 21** for a borehole water level line graph which represents average date obtained from 2005 until 2008.

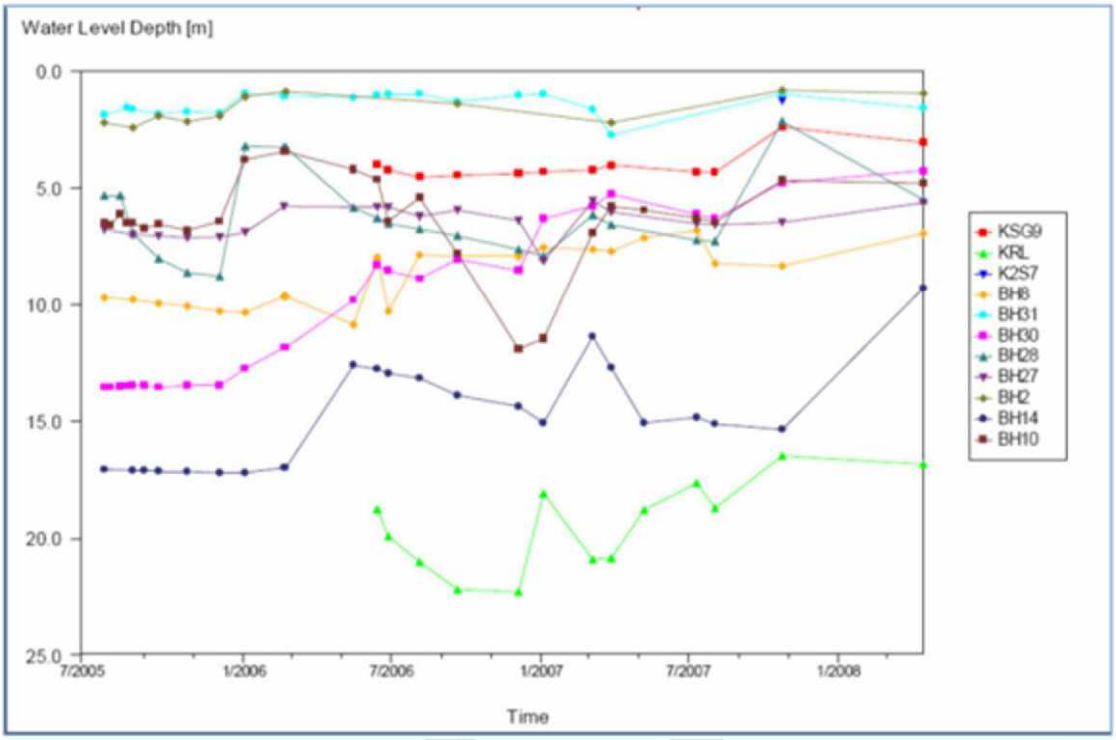

Figure 20: Monitoring Borehole levels (Radyn et al, 2010)

5.7.2.3 Groundwater Quality

When compared to the SANS 241 standards guideline, the borehole water quality, as represented in **Table 9**, remains generally compliant (please note that the values indicated were recorded between 2006 and 2008). An impact in the ground water quality at BH 30 is visible in terms of electrical conductivity (EC), as this borehole is immediately downstream of the opencast pits. Please note that the water quality indicators presented in **Table 9** represent the water quality at various points around the mine and not necessarily the groundwater quality below the proposed project location. The proposed project has not been identified as a daily contributor to groundwater degradation however, in the case of a fuel spill at the site, an impact on groundwater may result. WSP has compiled mitigation measures to prevent a fuel spill and/or manage a spillage event in order to minimise the overall environmental impact of the project.

Table 9: Groundwater Quality (Average between March 2006 and April 2008) (Radyn et al, 2010)

Borehole Name	Average EC (mS/m)	Average pH (pH Units)	Average SO_4 (mg/l)	Average Fe Soluble (mg/l)	Average Al Soluble (mg/l)
BH 14	87.80	7.41	9.40	0.18	0.10
BH8	51.80	7.92	2.60	0.38	0.26
BH 31	67.80	7.66	85.80	0.62	0.15
BH 10	39.40	6.92	2.00	1.26	0.03
BH 30	205.20	8.05	18.40	0.17	0.10
BH 2	37.40	7.64	20.60	0.222	0.04
BH 28	58.40	7.36	40.20	0.17	0.03
BH 27	74.25	7.08	38.25	0.03	0.02
KSG 9	84.75	7.50	72.00	0.10	0.03

5.7.2.4 Groundwater Monitoring Programme

IC conduct monitoring activities on a monthly and quarterly basis. The groundwater quality is sampled quarterly along with surface water quality and the water balance, whereas groundwater levels, mine dewatering, crusher water consumption, dust suppression water usage and the dirty water level are monitored on a monthly basis (refer to **Table 10**). The results are then analysed and information is generated in the form of time series plots, compliance reports and maps, trend reports and maps and thematic maps (amongst other reports).

Table 10: Summary of water monitoring programme (Radyn et al, 2010)

Issue	Aspect	Purpose	Responsible Person	Sampling Method	Frequency
Groundwater Quality	Groundwater quality	To determine any increase in pollution levels caused by seepage	Environmental department (co-ordinator)	Grab sample	Quarterly
Groundwater levels	Groundwater levels	To determine any impact on groundwater quantity due to mining activities	Environmental department (co-ordinator)	High integrity dip meter (non-stretchable material)	Monthly
Surface water Quality	All surface water sampling points	Determine the effectiveness of pollution control structures	Environmental department (co-ordinator)	Grab sample	Quarterly
Water balance	Mine dewatering	Water balance	Environmental department (co-ordinator)	Flow meter	Monthly
	Crusher consumption	Determine the consumption of water by the crusher	Plant manager	Flow meter	Monthly
	Water used for dust suppression	Determine dust suppression consumption	Mine department	Flow meter	Monthly
	Determine water level in Dirty Water dam	To calibrate water balance and manage flood risk	Environmental department (co-ordinator)	Survey	Monthly
	Update and manage water balance	Manage affected water to minimise overtopping risk	Environmental department (co-ordinator)	-	Quarterly

5.8 AIR QUALITY

Sources of air quality impacts such as dust generation resulting from IC activities may include the dragline strip-mining method, blasting, stockpiling and hauling of coal on a daily basis. The potential impacts are nullified according to the existing authorised IC EMPR.

IC currently have two 83 m^3 diesel tanks and two 14 m^3 petrol tanks on site which do contribute upon the regional air quality. The construction/installation and operation of the proposed bulk fuel storage tanks will have a further impact on the regional air quality. The resulting impact is a cumulative impact due to the combined impact of the existing tanks and the proposed tanks. During the operation of the existing and proposed fuel storage tanks the level of fuel in the tanks will decrease as the tank/s is/are used to fill a vehicle and/or a piece

of equipment. During the tank re-fuelling process a pocket of contaminated air (known as the bulk head) is released through a valve in order to release the pressure in the tank/s. The air released from the tank/s will contribute to various pollutant concentrations within the atmosphere, such as Volatile Organic Compounds (VOC's). In order to reduce the said impact, WSP is in the process of compiling an AQMP which is designed to minimise the negative impact on air quality (AQIA report contained in **Appendix G**). The AQMP will be incorporated into IC's EMPR which will be audited on a two year basis to ensure its effectiveness.

5.9 REGIONAL SOCIO-ECONOMIC STRUCTURE

According to the 2001 EMPR, the district comprises a number of population centres including Embalenhle, Evander, Kinross, Leandra, Lebohang, Secunda and Trichardt. Approximately 80% of the population are classified as urban and 20% as non-urban. The majority of households (42%) are resident in the township of Embalenhle. Secunda is the next most populous town, comprising 27% of the households in the district. Highveld Ridge had an estimated total population of 167 284 in 1999. The population lives in 44 340 households with an average household size of 3.8 people. This is a relatively low family size and reflects the young age of the urban centres in the District, in which large family structures have not had time to develop.

Unemployment in the Highveld Ridge is high but still far below the unemployment rate of the province. Some 28 305 people were classed as unemployed in 1999, made up of 11 382 males and 16 923 females. This represents 25% of the total economically active population. The proposed project will create employment, but the employment opportunity will be limited to qualified individuals. The employment created by the project will be in the form of temporary employment which will come to an end on completion of the construction phase of the BFSE project. It is important to note that employment opportunities will be limited and will be guided by the Anglo American labour plan which will detail the terms and conditions under which temporary employment will occur (The labour Plan is available upon request).

6 SPECIALIST STUDY

6.1 Air Quality Impact Assessment

WSP were appointed by IC to undertake an AQIA (including an AQMP) for the proposed storage tanks farm and associated AEL. **Refer to Appendix G2 for the full AQIA**.

The AQIA consisted of a baseline assessment, calculation of the existing and proposed tanks emissions and dispersion modelling. The dispersion modelling included three scenarios:

- Scenario 1: Modelling of emissions associated with the existing tanks;
- Scenario 2: Modelling of emissions associated with the proposed tanks; and
- Scenario 3: Modelling of cumulative emissions from the existing and proposed tanks.

All scenarios considered Total Volatile Organic Compound (TVOC) emissions and benzene emissions. Both the long-term (annual average) and worst case (hourly average) TVOC and benzene concentrations were compared to the benzene annual average ambient standard. The aim of this comparison was to show that if all concentrations (long-term and worst case) were below the stringent annual standard, then the impact from emissions associated with the existing and proposed tanks on the receiving environment would be minimal. In addition, the calculated cumulative emission rate for TVOC was compared to the emission rate limit permitted in the NEM: AQA Listed Activities, Category 2, Subcategory 2.2: Storage and Handling of Petroleum Products, which indicated the cumulative emission rates of TVOC were well below the permitted emission rate.

The findings from Scenario 1 (existing tanks) dispersion modelling indicated that both the annual average (long-term) and hourly average (worst-case) TVOC and benzene concentrations indicated full compliance with the annual benzene standard, with concentrations remaining low at all receptors.

The findings from Scenario 2 (proposed tanks) dispersion modelling indicated that both the annual average and hourly average TVOC and benzene concentrations indicated full compliance with the annual benzene standard, with concentrations remaining low at all receptors.

The findings from Scenario 3 (cumulative tanks) dispersion modelling indicated:

- Annual average TVOC concentrations associated with the cumulative emissions from the tanks remained low at all receptors, with no exceedences of the annual benzene standard predicted, while the worst-case hourly average concentrations were slightly elevated, although still indicated full compliance with the annual benzene standard; and
- Annual average and worst-case hourly average benzene concentrations remained significantly low at all receptors, indicating full compliance with the annual benzene standard.

The predicted concentrations when compared to the concentrations associated with existing emissions, the proposed tank emissions TVOCs and C6H6 concentrations are slightly elevated, although the cumulative concentrations indicate full compliance, with no exceedences of the annual benzene standard predicted.

In summary, the cumulative impacts of emissions from the storage tanks facility are considered low, with little impact on the receiving environment predicted. Based on the findings of this assessment, the expansion of the tanks farm at IC can be approved.

7 ENVIRONMENTAL IMPACT ASSESSMENT

7.1 INTRODUCTION

The environmental impact of the proposed project was determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental impacts. The impact assessment included all phases of the project, with specific emphasis on construction, operational and closure with rehabilitation in mind.

7.2 METHODOLOGY

The potential environmental impacts of the proposed BFSE project were evaluated according to their severity, duration, extent and significance of the impact, and include the cumulative impact. The WSP Risk Assessment Methodology was used for the ranking of the impacts.

This system derives environmental significance on the basis of the consequence of the impact on the environment and the likelihood of the impact occurring. Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact. Likelihood considers the frequency of the activity together with the probability of an environmental impact occurring. The following tables (**Table 11** to **Table 18**) describe the process in detail:

- Consequence

Table 11: Assessment and Rating of Severity

Rating	Description
1	Negligible / non-harmful / minimal deterioration (0 – 20%)
2	Minor / potentially harmful / measurable deterioration (20 – 40%)
3	Moderate / harmful / moderate deterioration (40 – 60%)
4	Significant / very harmful / substantial deterioration (60 – 80%)
5	Irreversible / permanent / death (80 – 100%)

Table 12: Assessment and Rating of Duration

Rating	Description
1	Less than 1 month / quickly reversible
2	Less than 1 year / quickly reversible
3	More than 1 year / reversible over time
4	More than 10 years / reversible over time / life of project or facility
5	Beyond life of project of facility / permanent

Table 13 Assessment and Rating of Extent

Rating	Description
1	Within immediate area of activity
2	Surrounding area within project boundary
3	Beyond project boundary
4	Regional / provincial
5	National / international

Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact.

Table 14: Determination of Consequence

Determination of Consequence (C)	(Severity + Duration + Extent) / 3

- Likelihood

Table 15: Assessment and Rating of Frequency

Rating	Description
1	Less than once a year
2	Once in a year
3	Quarterly
4	Weekly
5	Daily

Table 16: Assessment and Rating of Probability

Rating	Description
1	Almost impossible
2	Unlikely
3	Probable
4	Highly likely
5	Definite

Likelihood considers the frequency of the activity together with the probability of the environmental impact associated with that activity occurring.

Table 17 Determination of Likelihood

Determination of Likelihood (L) =	(Frequency + Probability) / 2

- Environmental Significance

Environmental significance is the product of the consequence and likelihood values.

Table 18: Determination of Environmental Significance

Environmental Significance (Impact) = C × L	Description
L (1 – 4.9)	Low environmental significance
LM (5 – 9.9)	Low to medium environmental significance
M (10 – 14.99)	Medium environmental significance
MH (15 – 19.9)	Medium to high environmental significance
H (20 – 25)	High environmental significance. Likely to be a fatal flaw.

7.3 KNOWLEDGE GAPS AND ADEQUACY OF PREDICTIVE METHODS

7.3.1Knowledge Gaps

The environment that is likely to be affected by the proposed BFSE project was assessed and the BAR has covered all prevailing conditions of the environmental impacts identified, including cumulative impacts. It is believed that the environment is well understood. Hence, no knowledge gaps exist in terms of the current state of the environment, BAR and draft EMPR.

7.3.2 Adequacy of Predictive Methods

Due to the nature of the environment, the local conditions of the area, as well as the professional expertise, it is believed that the predictive methods that have been proposed in the BAR and EMP are suitable and without limitations.

7.4 ENVIRONMENTAL IMPACT ASSESSMENT

A BA process has been undertaken for the proposed BFSE project and has included both the potential biophysical and socio-economic impacts that may impact on the natural and social environment.

The EIA methodology (and associated numeric ratings) as per the WSP Risk Assessment Methodology is provided in **Section 7.2** above, with the actual ratings that were undertaken included in **Appendix F**. To ensure that there is a clear linkage between the impact assessment tables in this section and the rating tables contained in **Appendix F**, unique reference numbers have been assigned for each impact description.

The impact assessment for both the biophysical and socio-economic impacts is outline in **Table 19**.

Table 19: Impacts rating summary

Ref No.:	Impact Description	Phase	Significance	
			WoM	WM
Topography				
TO1	Temporary disturbance of ground level as a result of stockpiling excavated soil and building material.	Construction	Low (-)	Low (-)
TO2	Permanent altering of the ground level due to excavation activities.	Construction & Operation	Low (-)	Low (-)
Soil				
S1	Potential compaction and erosion of soils removed and stockpiled during excavation activities.	Construction	Low to Medium (-)	Low (-)
S2	Loss of topsoil due to erosion of exposed areas following excavation or stockpiling.	Construction	Low to Medium (-)	Low (-)
S3	Loss of soil fertility due to contamination and exposure to erosion.	Construction & Operation	Low to Medium (-)	Low (-)
S4	Contamination of soils resulting from incorrect storage/handling and disposal of hazardous waste materials.	Construction & Operation	Low to Medium (-)	Low (-)
S5	Potential hydrocarbon spillages from the refuelling of equipment, machinery and vehicles may lead to contamination of the soil in and around the site.	Construction & Operation	Low to Medium (-)	Low (-)
S6	Mismanagement and / or incorrect storage of hazardous chemicals (fuel substances, etc.) resulting in soil contamination.	Construction	Medium (-)	Low (-)
S7	Potential hydrocarbon spillages resulting from a leakage caused by a fracture/crack or rupture in the fuel storage tanks may lead to contamination of the soil in and around the site area.	Construction & Operation	Low to Medium (-)	Low (-)
Air				
A1	Increased dust generation due to excavations and soil stockpiles.	Construction	Medium (-)	Low (-)
A2	Increased dust generation due to the use of dirt roads.	Construction & Operation	Medium (-)	Low (-)
A3	Emissions from incorrectly maintained vehicles and machinery may contribute to local air pollution.	Construction	Medium (-)	Low (-)

Ref No.:	Impact Description	Phase	Significance	
			WoM	WM
A4	The release of polluted air during each refuelling cycle.	Operation	Medium (+) to High	Medium (+) to High
Surface & Ground water				
SG1	Potential hydrocarbon spillages from equipment, machinery and vehicle storage may lead to the contamination of surface water and ground water.	Construction & Operation	Medium (-)	Low (-)
SG2	Potential hydrocarbon spillages resulting from a leakage caused by a fracture/crack or rupture in the fuel storage tanks may lead to contamination of surface and groundwater.	Construction & Operation	Low to Medium (-)	Low (-)
SG3	Incorrect disposal of hazardous and non-hazardous materials or waste could contaminate surface and ground water resources.	Construction	Medium (-)	Low (-)
SG4	Runoff containing suspended solids, sediments and fuel residue may contaminate surface water resources.	Construction & Operation	Low to Medium (-)	Low to Medium (-)
Land use				
LU1	Loss of agricultural land use resources due to the construction of the Fuel Storage tanks.	Construction and Operation	Low (-)	Low (-)
Flora & Fauna				
FF1	Fauna may be disturbed / killed by construction workers during the construction phase.	Construction	Low (-)	Low (-)
FF2	Fauna may come into contact with fuel/residue which may cause illness and/or death.	Construction & Operation	Low (-)	Low (-)
FF3	Soil compaction or contamination may limit vegetation growth or hamper re-establishment following mine closure.	Construction & Operation	Low (-)	Low (-)
Noise				
N1	Noise from construction vehicles and equipment and contractors could be a nuisance to the surrounding landowners and residents.	Construction	Low to Medium (-)	Low (-)
N2	Noise from construction vehicles and equipment and contractors could be a nuisance to the fauna in the vicinity.	Construction	Low to Medium (-)	Low to Medium (-)
Visual Aspects				
VA1	The construction of the bulk fuel storage tanks will have an impact on the	Construction &	Low to Medium	Low to Medium

Ref No.:	Impact Description	Phase	Significance	
			WoM	WM
	aesthetic appeal of the landscape.	Operation	(-)	(-)
VA2	Visual impact associated with construction vehicles on site.	Construction	Low (-)	Low (-)
Waste Management				
WM 1	The incorrect storage of hazardous waste materials may contaminate the surrounding environment.	Construction & Operation	Medium (-)	Low (-)
WM 2	The general waste created by on-site workers may cause pollution in the form of litter.	Construction	Medium (-)	Low (-)
Traffic				
T1	Construction vehicles may result in a minimal increase in traffic congestion on the roads surrounding the mine.	Construction	Low to Medium (-)	Low (-)
T2	In the event of a vehicle accident on surrounding roads, the resulting obstacle will result in a reduced traffic flow.	Construction	Low to Medium (-)	Low (-)
Cultural & Heritage Impacts				
CH1	Potential discovery of an artefact during site excavation	Construction	Low (-)	Low (-)
Health & Safety				
HS1	Contractors may be injured on-site, if the appropriate safety measures are not in place.	Construction	Medium (-) to High	Low to Medium (-)
HS2	In the case of a diesel explosion/fire, injuries and/or deaths may result.	Construction & Operation	Medium (-)	Medium (-)
HS3	In the case of a construction vehicle accident, the driver and pedestrians may be injured or killed.	Construction	Medium (-) to High	Medium (-)
Employment				
E1	The activity may result in short term employment during construction.	Construction	Medium (+)	Medium (+)
E2	Temporary employment may be created during operational phase of the bulk fuel storage tanks.	Operation	Medium (+)	Medium (+)
E3	Training may be supplied to employees during the construction phase.	Construction	Medium (+)	Medium (+)
E4	Increased economic well-being in the region.	Construction & Operation	Medium (+)	Medium (+)

7.5 SUMMARY OF IMPACTS

Following the environmental impacts risk assessment undertaken as per the results indicated in **Table 19,** the impacts related to Air Quality and Health & Safety have been recorded as the most significant impacts which may result from the proposed project. The high significance rating can be attributed to the inherent hazardous nature of fuel (diesel). All the impacts tabulated in **Table 19** have the potential to cause an impact on the environment however the degree of environmental disturbance will depend on the significance rating based on the WSP risk rating methodology. Each of the impacts have been considered and appropriate mitigation measures have been devised in order to avoid, minimise and/or mitigate against the potential environmental impacts which may result from the project.

8 CONCLUSION

IC propose to construct/install bulk fuel storage tanks, adjacent to the existing fuel storage tanks on the IC mine lease area, which is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel near the northern margin of the Highveld coalfield of Mpumalanga. The project forms part of IC's corporate supply chain management strategy to mitigate against diesel fuel supply risk/shortage. The project will ensure that a 10 day fuel supply is realised.

The proposed BFSE project involves the expansion of fuel storage tanks by a volume greater than 80m^3 and thus a BA process in accordance with NEMA EIA (2010) Regulations and an AEL according to the NEM: AQA is required before the activity can commence. Furthermore, as the proposed activity does not form part of the existing EMPR, an EMPR amendment process in accordance with the MPRDA is required to include management measures to mitigate the anticipated negative environmental and socio-economic impacts that may occur during the construction, operation and closure phases of the proposed BFSE project. As a result an EMPR has been developed in conjunction with this BAR (contained in **Appendix D**). The BA, AEL / EMPR Amendment process was undertaken in an independent and holistic approach in accordance with the NEMA, NEM: AQA and the MPRDA.

This report provides a detailed description of the proposed project, description of the stakeholder consultation process, baseline environment, potential environmental impacts and related management measures associated with the proposed construction/installation and operation of the bulk fuel storage tanks at IC. The purpose of the BAR is to identify activities that may cause environmental and socio-economic occurring as a result of the proposed project. The impacts of the proposed BFSE project were evaluated as part of the BA process in order to determine the environmental significance. An impact assessment was undertaken for the biophysical and socio-economic environments. From the assessment, it is evident that the project is associated with potential biophysical impacts/risks aswell as socio-economic impacts. The overall impact of the project on the environment is considered low to moderate.

The following is a summary of the main potential environmental impacts (and affected environments) which may take place as a result of the proposed BFSE project, if not managed appropriately:

- Soil;
- Air;
- Surface & Ground water;
- Waste Management; and
- Health and safety.

Any impacts are expected to be avoided but if an accident or incident does occur, adequate mitigation measures will be applied to the situation to restore the environment to an acceptable level. IC will uphold a high standard of maintenance and monitoring of the proposed BFSE project, coupled with the implementation of recommendations provided in the EMPR (refer to **Appendix D**).

The EMPR indicates the mitigation measures which have been developed, to satisfy the requirements of the MPRDA, the NEMA, and the NEM: AQA to minimise the negative impacts and promote positive impacts associated with the project, thereby ensuring that the project is undertaken in a sustainable manner. The construction, operation and closure phases of the project should be undertaken in line with the EMPR, which has been developed in conjunction with the BAR, to ensure that no significant negative impacts occur on the biophysical and socio-economic aspects of the immediate, local, regional and global environments which surround the proposed project.

From the outcome of BAR process, it is the view of the EAP that the BFSE project is required and considered preferable to ensure the uninterrupted mining activities of IC. The project may have a minimal positive impact on the socio-economic environment in the region, in the form of additional temporary job opportunities and skills development.

9 REFERENCES

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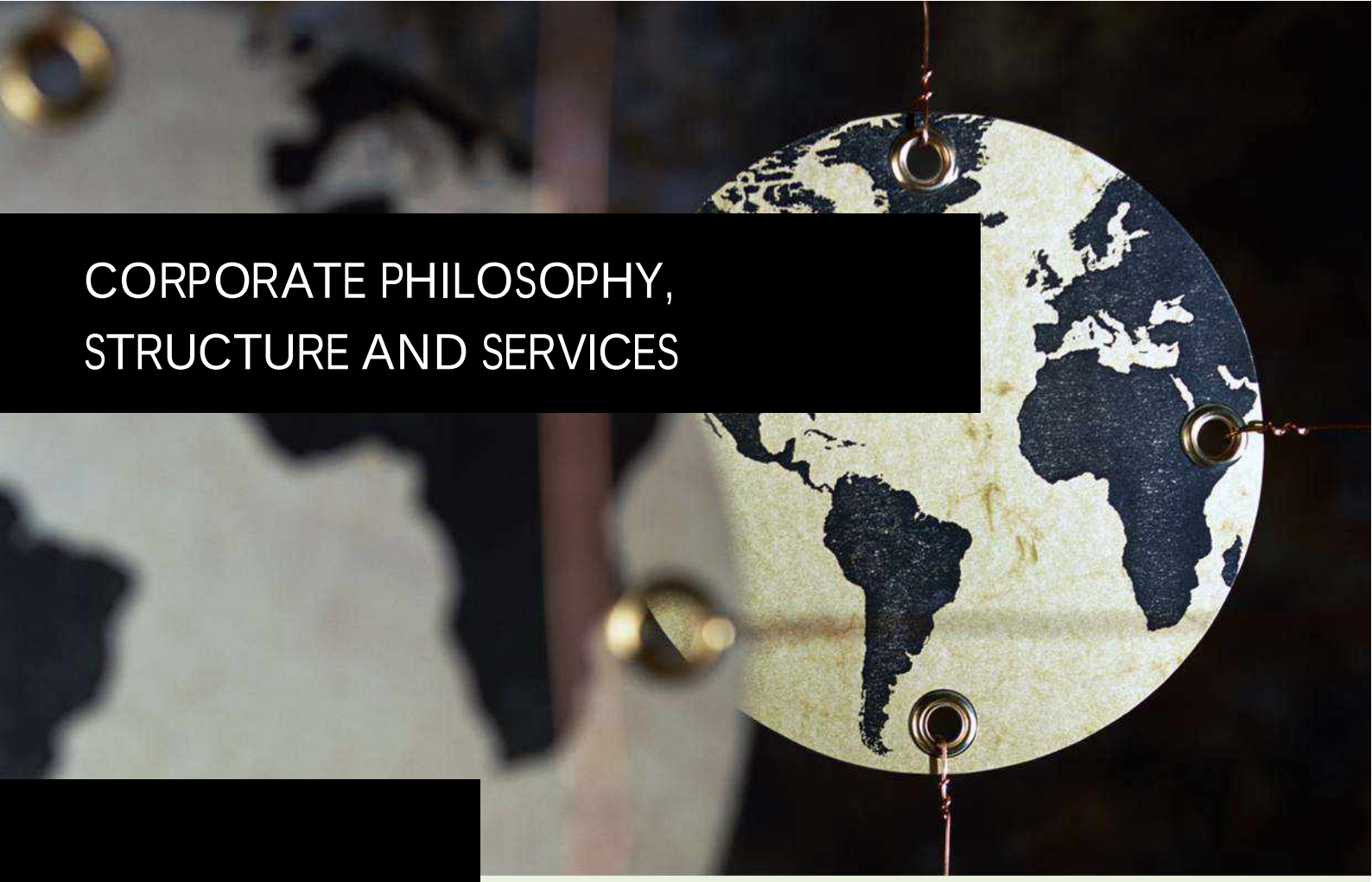
10 APPENDICES

APPENDIX A – WSP Capability Statement

WSP Environment & Energy
Capability Statement

UNITED
BY OUR
DIFFERENCE

WSP
ENVIRONMENT
& ENERGY



CORPORATE PHILOSOPHY, STRUCTURE AND SERVICES

Our Vision

Our vision is to provide an independent, innovative and professional service whereby we strive to achieve a balance between environmental protection, social desirability and economic development.

WSP Environment & Energy (WSP) is a leading South African environmental consultancy with a broad range of expertise and over 20 years experience in the regional environmental market. Whilst we are operated by WSP Environmental Ltd, a global environment and energy consultancy listed on the London Stock Exchange (WSP Group plc), we are also committed to transformation in our operational region having achieved Level 4 BEE compliance in South Africa. As part of a global business we provide the regional marketplace with a dynamic blend of local and global expertise.

WSP's Environment and Energy has offices in Durban, Cape Town, Johannesburg and Pietermaritzburg. WSP is owned by WSP Group Africa Ltd, a 900-member strong subsidiary of WSP Group plc, an international FTSE 250 management, engineering and built environment consultancy, with 10,000 employees worldwide, which is listed on the London Stock Exchange. As part of WSP Group, we have access not only to a broad range of environmental and sustainability specialists, but to leading international engineers across the full range of disciplines: energy, electrical, civil, and structural, among others.

WSP has received a number of international awards for our contribution to sustainable development including the Acquisitions Monthly Environmental Advisor of the Year Award for 2010, and the Winner of the 2009 and 2010 Big Tick Award for Climate Change, awarded by the Prince of Wale's Business in the Community charity, based upon our global climate change consulting services to clients.

Business in the Community AWARDS 2010 Big Tick re-accreditation

BARCLAYS COMMERCIAL GREEN LEADERS BUSINESS NATIONAL FINALIST 2008

ACQUISITIONS MONTHLY AWARDS 2010

We've signed The Copenhagen Communiqué www.copenhagencommunique.com

Our Values

Trust

Sharing and Supporting

Pride and Passion

Sustainability

Innovation

By incorporating our principles of Trust, Sharing and Support, Pride and Passion, Sustainability and Innovation into our day to day operations, we are able to deliver an independent, insightful and professional service to our clients to achieve a balance between environmental protection, social desirability and economic development.

Stronger regulatory control, market pressures, stakeholder awareness and global concerns, have caused businesses to adopt an innovative, proactive approach to the evaluation of environmental issues. The provision of sound environmental advice is therefore becoming an essential ingredient for progressive business management and success. By fully understanding our clients business, associated operations and requirements, and combining this knowledge with our strong legal and technical competence we are able to provide our clients with sound strategic advice and improved environmental performance.

We pride ourselves on our reputation for delivery and technical excellence and provide a broad range of environmental and energy related services across a range of economic arenas including the industrial, mining, financial, tourism and public sectors.

STAFF WELFARE

Creating the optimum social and environmental framework for staff is essential if we are to attract and retain the intellectual capital that sets our business apart from our competitors. We actively promote capacity building through staff and knowledge transfers between our international offices.

OUR SERVICES

WSP brings to the South African marketplace a dynamic blend of local expertise and global cutting-edge technology. Being part of a large global company, we are also able to draw on considerable international resources and expertise accumulated over many years.

We have a well established team of environmental scientists and our team can provide a range of environmental solutions to businesses in the following fields:

- Air Quality Management
- Asbestos Surveys
- Climate Change Adaptation and Mitigation Strategies
- Contaminated Land and Remediation
- Corporate Social Responsibility
- Due Diligence, Compliance and Liability Audits
- Energy Efficiency and Management
- Energy Project Development and Investment
- Environmental Engineering
- Environmental Management Systems
- Environmental Project Management
- Human Health and Ecological Risk Assessment
- Environmental Toxicology
- Environmental Training
- Geotechnical Investigations
- Groundwater Monitoring and Modelling
- Integrated Environmental Management
- Public Participation Programs
- Renewable Energy
- Surface Water Hydrology
- Sustainability Management Systems
- Sustainability Reporting
- Sustainable Solutions
- Waste Engineering
- Waste Management, Waste Characterisation and Delisting

WSP

There is a growing awareness that if an organisation or project is to succeed in the 21st century it will need to meet new challenges by working in partnership with key stakeholders and integrating social and environmental factors into business decisions alongside the more traditional economic issues. We deliver proactive sustainability solutions, offering real business benefits, which include reducing operating costs, protecting corporate reputations and meeting stakeholder aspirations in society.

CORPORATE SUSTAINABILITY

Our key capabilities and services include the following:

- Corporate Sustainability Strategy, Reporting and Verification
- Benchmarking Tools (e.g. Sustainability Assessment Technique)
- Sustainability and Value Management Systems
- Corporate Governance and Communicating with Stakeholders (King and Turnbull Reports)
- Community Enhancement and Corporate Citizenship
- Teambuilding and Employee Volunteering Programmes
- Green Procurement
- Energy Efficiency, Renewable Energy and Climate Change Strategies
- Waste Management and Eco-labelling
- Local, Regional and National Strategy Planning (e.g. Local Agenda 21 policy and plans)

Our Sustainability Assessment Technique (SAT) is designed to visually represent the assessment, and superimposed onto it are the impacts associated with a development. Used throughout the project life cycle, it will identify the threats and opportunities associated with the development.

WSP

A changing climate threatens those businesses that cannot adapt in an efficient manner. How businesses adapt can influence the longevity and profitability of your business. WSP assesses the climate change risk to business using holistic outlook taking into account economic, social and environmental factors. Incorporating business resilience, resistance and continuity plans will ensure your business can react positively to a business interruption and will be in a far better position to prevent, survive, prosper and gain an advantage over less prepared competitors.

CLIMATE CHANGE ADAPTATION AND MITIGATION STRATEGIES

WSP offers an integrated approach to business climate risk management, utilising global expertise across all spheres. Our offering can be adapted to meet the needs of your business.

Our basic capabilities include the following:

- Climate Risk and Opportunity Assessments
- Detailed Carbon Inventory Analyses
- Business Adaptation Strategy
- Assisting with Carbon Disclosure Project (CDP) responses
- Renewable Energy and Energy Efficiency
- Carbon finance services:
  - Assisting with access to specialised finance for sustainable energy investments.
  - Carbon Credit projects (Kyoto CDM, voluntary market etc.)
  - Supporting client transactions via carbon offset market.

FOOTPRINTING SERVICES

Responding to climate change can be best perceived as a journey, starting with Greenhouse Gas (GHG) inventory and acquiring an understanding your organisation's climate change risks. Further development of this response includes exploring the broader environmental impacts of products and embedding sustainability of one's of climate change specialists, but experts across various environmental disciplines, including sustainability, toxicology, ecology and waste management. WSP are specialists in the field of footprinting – from life cycle assessments for Apple's Macbook laptops, water footprinting for GlaxoSmithKline, ecological footprinting for the City of London or carbon emissions modelling for the South African recycled oil industry, we have a proven track record in developing solutions to our clients' sustainability needs.

WSP's footprinting services include:

- Comprehensive Product Life Cycle Assessment (LCA)
- End-to-End Carbon Footprinting and Carbon Labelling (PAS2050 methodology)
- Water Footprinting
- Ecological Footprinting

WSP

Understanding energy usage and potential efficiency gains within a business or industry sector is becoming increasingly important in a world of tightening legislative requirements and increased pressure from governments and business shareholders to lower carbon emissions resulting from production processes. We are able to operate in close co-operation with the WSP Energy Africa group and Green Buildings Business of WSP, and in house engineering teams to provide energy advice on efficiency options in line with the needs of individual business requirements.

ENERGY MANAGEMENT AND EFFICIENCY

Our integrated services include:

- Energy risk analysis
- Process alternatives assessment
- Business, industry or country specific assessments of energy efficiency potential
- Development of solution implementation plans

Specialist services offered by WSP Green Building Services include:

- Sustainability in the built environment consultants
- Consulting to professional team to assist in designing sustainable buildings
- Facilitate and administer Green Star accreditation process
- Architectural, urban and engineering background

WSP

Integrated Environmental Management (IEM) covers all aspects of environmental management in the project life cycle, from planning and design, to construction, operations, decommissioning and closure.

INTEGRATED ENVIRONMENTAL MANAGEMENT

We offer environmental services appropriate to all project phases such as:

- Risk assessments and fatal flaw analyses
- Scoping studies
- Route/site/process alternatives assessment
- Public participation programmes
- Environmental impact assessments
- Environmental management plans
- Environmental management programmes
- Environmental monitoring of construction and operational activities
- Closure plans

Our studies are all conducted according to the regulatory frameworks of the countries in which we operate, so that we can obtain regulatory approval for our clients. Internationally funded projects are carried out in the manner specified by the lending agency and to world standards of best environmental practice.

In particular, we have experience in the following business sectors:

- Mining
- Infrastructure development (power lines, pipelines, roads, telecommunications)
- Building construction
- Manufacturing
- Industry
- Eco-tourism
- Water development projects
- Waste disposal
- Community development

WSP

Public participation involves a process resulting in improved decision-making. The process should lead to a joint effort by stakeholders, technical specialists, the authorities and the proponent who work together to produce more informed decisions.

Strong and independent facilitation, coupled with the necessary empathy for people's concerns, is required during meetings with stakeholders. At times, it is necessary to direct stakeholder concerns to the authorities rather than to the proponent.

STAKEHOLDER ENGAGEMENT

WSP offers comprehensive stakeholder engagement services, which include the following:

- Design of public participation processes
- Identification of stakeholders
- Compilation and maintenance of stakeholder databases
- Co-ordination and facilitation of public meetings, stakeholder workshops, multi-sectoral meetings and Open Houses/Days
- Compilation of proceedings of meetings and verification of issues
- Compilation of issues trails
- Liaison with authorities, clients and stakeholders to facilitate negotiations
- Report compilation detailing public participation process on projects

WSP

WSP provides strategic advice and operational support to a range of clients across five continents. We strongly believe that our team is at the forefront of Environmental Systems (EMS) in a way, which integrates environmental issues into existing business systems and operations.

ENVIRONMENTAL MANAGEMENT SYSTEMS AND TRAINING

In particular we can offer the following services:

- Raising awareness and providing information on the full range of EMS approaches and recognised standards (e.g. EMAS, ISO 14001:2004 series, OHSAS 18000 etc)
- Advanced training for EMS implementation and auditing
- System design, gap analysis and implementation on specific projects including the development of procedures
- Auditing throughout the development of an EMS and identification of the potential for system improvement and pre-preparation audits
- Development and review of legal registers
- Software based implementation tools and training
- Supply chain management protocols and coaching programmes
- Certified EMS Implementation Training Course
- Certified EMS Internal Auditors Training Course

Our EMS Team can draw on experience of EMS work across a broad range of economic sectors including: construction, manufacturing (e.g. BMW), mining, financial services, government agencies and departments and office based organisations.

The Air Quality Unit (AQU) offers in-depth experience in all phases of air quality management, from calculation of emissions inventories, developing and implementing monitoring programs, air quality modelling in support of Environmental Impact Assessments or permit applications to designing pollution abatement strategies and emission control systems.

AIR QUALITY MONITORING AND DISPERSION MODELLING

State of the art equipment, coupled with strategic modelling and risk assessment techniques enable WSP to evaluate problems accurately and engineer workable solutions to complex and potentially costly environmental issues.

Our core air quality management services include:

- Source, fence line and ambient air quality monitoring
- Air emissions inventories
- Atmospheric source-dispersion modelling
- Meteorological monitoring and data analysis
- Best practical available technology assessment
- Pollution controls system and cost-benefit analysis
- Quantitative health risk assessments for hazardous air pollutants
- Occupational health and safety monitoring
- Greenhouse emissions and carbon footprinting

The Contaminated Land Unit (CLU) in WSP offers consulting services, ranging from site assessment and investigation through to risk assessment, and contracting services ranging from environmental remediation and on-going monitoring to regulatory compliance and sign-off. At present, clean-up contracts can be planned as procured services via a tender process with WSP CLU acting as consultants or on the basis of a turnkey design and supply project.

LAND RESTORATION AND GROUND ENGINEERING

CONSULTING SERVICES:

- Contaminated land and geohydrological assessments
  - Desk top and feasibility studies
  - Full ground investigations
  - Design, implementation and management of groundwater monitoring systems
  - Soil and groundwater sampling and monitoring for organic and inorganic contaminants
  - Geohydrological and contaminant plume modelling
- Human health and risk assessment
  - Quantitative and qualitative risk assessment
  - Source, release mechanism, pathway receptor relationships
  - Determination of the need for remediation
  - Determination of site-specific remediation, goals and targets
  - Waste management
- Waste management strategy development
  - Waste classification, hazard rating and delisting
  - Landfill site assessment and investigation
  - Waste treatment option assessments
- Surface water hydrology
  - Surface water management plans
  - Runoff modelling
  - Water balances
  - Floodline assessments
  - Water licensing and water use registrations
  - Reserve determination
- Geotechnical investigations
  - Infrastructure and development
  - Foundation design engineering

CONTRACTING SERVICES:

WSP offers a full service remediation business, local and international, with a solution driven approach to remediation projects of all sizes and types.

We have a track record in negotiated settlements of environmental contamination issues and provide an integrated technical, financial, legal and environmental service to ensure the right solution.

Services include:

- Site investigations
- Land option appraisals
- Commercial risk evaluation
- Material classification and treatment studies
- Technical and financial feasibility studies
- Laboratory and field trials
- Risk-based remediation design
- Regulatory authority consultation
- Remediation contracting

WSP

LIABILITY TRANSFER

The outsourcing of environmental liabilities using Active Transfer™ allows a business to eliminate environmental liabilities without losing control of its assets. WSP is partnered with Willis and is capable of providing risk management, environmental engineering and financial modelling to provide a cost effective and permanent solution.

DUE DILIGENCE, COMPLIANCE AND PRE-ACQUISITION AUDITING

As southern Africa becomes more and more part of the 'Global Village', increased awareness of environmental liabilities facing business and the risks associated with sub-standard environmental performance, will intensify. Our auditing services are designed to assess all the environmental risks and liabilities associated with commercial and industrial businesses and their assets, including identifying any latent environmental damage, regulatory non-compliance and third party liabilities.

ENVIRONMENTAL FINANCE

WSP advises on business and project risks presented by environmental and operational issues. Using quantitative techniques favoured by financial analysts, models and forecasts are generated to assess, for example, the cost of environmental liabilities, asset impairment issues, or the impacts of future regulation and policy on the project or business enterprise.

We can therefore quantify risk, whether adverse or positive, in monetary terms and develop financial tools that when integrated with technical solutions from other parts of the business, lead to the development of a total risk management solution. This manifests itself in the implementation of strategies ranging from basic control measures through to elaborate financing tools, such as captive insurance and alternative risk transfer (ART).

The WSP is utilising its expertise in environmental sustainability and the built environment to provide consulting advice to clients on optimal planning / urban design for sustainable outcomes. WSP, along with traffic engineers, housing specialists and economists, have been involved with the development of Local Area Plan (LAP) projects for various municipalities within South Africa.

SUSTAINABLE MASTERPLANNING

Our client offerings within this field include:

- Environmental guidance from conceptual planning to detailed design.
- Development Risk Assessment, Including 'No-go' Options.
- Strategic Environmental Impact Assessment & Identification of opportunities.
- Development Parameters Assessment.
- Integrated Assessment GIS and Mapping.
- Land-use management (LUMs) advice.
- Project implementation plans.

WSP

CONTACT US:

WSP has offices located in Johannesburg, Durban, Pietermaritzburg and Cape Town.

JOHANNESBURG OFFICE:

WSP House, Bryanston Place Office Park
199 Bryanston Drive
Bryanston, 2021
South Africa
P O Box 5384
Rivonia 2128, RSA
Tel +27 (0)11 361 1380
Fax +27 (0)11 361 1381

E-mail: wspe@wspgroup.co.za

DURBAN OFFICE:

WSP House, 1 on Langford
Langford Road
Westville 3629
South Africa
P O Box 1442
Westville 3630, RSA
Tel +27 (0)31 240 8860
Fax +27 (0)31 240 8861

E-mail:wsped@wspgroup.co.za

CAPE TOWN OFFICE:

3rd Floor
35 Wale Street
Cape Town 8001
South Africa
P.O. Box 2613
Cape Town 8000, RSA
Tel +27 (0)21 481 8700
Fax +27 (0)21 481 8799

E-mail: wspe@wspgroup.co.za

PIETERMARITZBURG:

Suite 7B
Cascades Office Park
21B Cascades Crescent
Cascades 3202
PO Box 689
Hilton 3245, RSA
Tel: +27(0)33 347 5391
Fax: +27(0)33 347 5391

E-mail:wsped@wspgroup.co.za

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WSP

APPENDIX B – Authority Correspondence

APPENDIX B1 – Provincial correspondence

Your ref: 17/2/3N-184
Our ref: 29750

27 July 2012

Dineo Tswai / Marth Seshweni
Directorate: Environmental Impact Management
Mpumalanga Department of Economic Development, Environment and Tourism
Pavillion Centre
Corner of Botha and Northey Streets
Witbank
Mpumalanga

Dear Madams,

Application Form: Environmental authorisation process (es) for the proposed Bulk Fuel Expansion project at Anglo American Thermal Coal: Isibonelo Colliery.

WSP Environment and Energy submitted a Basic Assessment Application form to the department on 24 July 2012. However, WSP received acknowledgment of receipt for a Scoping and EIA process on 26 July 2012. WSP hereby formally request amendment of this acknowledgement of receipt letter to reflect the correct process (a Basic Assessment) so as to ensure future communications and submissions are dealt with by the department accordingly.

Please find attached herewith a copy of the communications between WSP and the National Department of Environmental Affairs where the process required for the bulk fuel expansion project was confirmed.

Should you have any queries, please do not hesitate to contact the undersigned

Yours faithfully

Janna Bedford-Owen
Senior Consultant
Tel: 011 361 1371
Email: janna.bedford-owen@wspgroup.co.za

WSP Environmental (Pty) Ltd
WSP House
Bryanston Place
199 Bryanston Drive
Bryanston, 2021
Tel: +27 (0)11 361 1380
Fax: +27 (0)11 361 1381
http://www.wspenvironmental.co.za
Reg. No: 1995/08790/07

WSP Group plc
Offices worldwide

MPUMALANGA PROVINCIAL GOVERNMENT

Building No. 4
No. 7 Government Boulevard
Riverside Park Extension 2
Nelspruit
1200
South Africa

Private Bag X 11215
Nelspruit, 1200
Tel: 013 766 4004
Fax: 013 766 4614
Int: +27 13 766 4004
Int: +27 13 766 4614

Department of Economic Development, Environment and Tourism

Litiko Letekutfutfukiswa Kwetemnotfo, Simondzwo netekuVakasha | Umnyango WezokuThutfukiswa KuMnotfo, iBhodluko nezamaVakasha | Departement van Ekonomiese Ontwikkeling, Omgewing en Toerisme

Enquiries: Martha Seshweni ,Cnr Botha & Northey Str, Pavillion Building Witbank, 1035, Tel: 013 690 2595
Email: mmseshweni@mpg.gov.za
Reference: 17/2/3N-184

Attention: Janna Bedford-owen
WSP Environmental & Energy
199 Bryanston Drive
Bryanston
2191

Fax no: 086 556 6336

Dear Sir

BASIC ASSESSMENT REPORT: PROPOSED EXPANSION OF THE BULK FUEL STORAGE CAPACITY ON PORTION 28 OF THE FARM AANGEWYS 81 IS, MPUMALANGA PROVINCE.

We confirm having received the final Basic Assessment Report which was submitted by you in respect of the abovementioned application on 15 October 2012.

The Department will notify the applicant and yourself of its decision in respect of the application within 30 days.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

Sincerely

Ms. Dineo Tswai
DD: ENVIRONMENTAL IMPACT MANAGEMENT **DATE:** 2012/10/23

APPENDIX B2 – National Department clarification correspondence (DEA)

O'Brien, Jared

From: Garth Batchelor <GBatchelor@mpg.gov.za>
Sent: 29 June 2012 03:34 PM
To: Franz Scheepers
Subject: Fwd: Activity Clarification - BA vs Scoping and EIA in a mining area
Attachments: 29750_DEDET Ref No_June 2012.PDF; Final Signed Application.pdf; Header

Hi Franz
wat se advies kan jy vir my gee oor hierdie navraag?
Dankie byvoorbaat
Garth

>>> "O'Brien, Jared" <Jared.Obrien@WSPGroup.co.za> 2012/06/26 04:07 PM >>>
Good Afternoon Garth,

Please can you follow up with a matter which was brought to the attention of Dineo on the 8th of June 2012. Please refer to the following email which was sent to Dineo on the said date. I have attached the application submitted to the DEDET and the letter of acceptance from the DEDET for your reference.

"Good Day Dineo / Martha,

I have a query regarding the listed activities under NEMA GNR 544 and 545. I have a project which is the expansion of a bulk fuel storage area by 332 cubic metre putting the total site capacity over 500 Cubic metres. Therefore the applicant is required to obtain an AEL under NEM:AQA.

My query is regarding the two listed activities in GNR 544 and 545 respectively, namely:

- NEMA GNR 545 Activity 28: Commencing of activity, which requires an atmospheric emissions license in terms of Section 21 of the NEM:AQA, except where such commencement requires a BA in terms of GNR 544 of 2010.
- NEMA GNR 544 Activity 42: The expansion of facilities for the storage, or storage and handling, of a dangerous good, where such storage will be expanded by 80 cubic metres or more.

My question is that both activities are relevant to the project, but I would like verification that the latter (GNR 545 Activity 42) is in fact NOT relevant as the project is already captured by GNR 544 Activity 28.

We had submitted an application stating a Scoping and EIA process was required and I would also like your assistance in determining what procedures need to be followed in order to withdraw / amend that application to reflect the correct process – a Basic Assessment.

We are willing to make the journey to Witbank to discuss the project in more detail and ensure clarification is achieved before proceeding further, and your assistance in the matter would be hugely appreciated!

Kind Regards"

Jared O'Brien
Assistant Consultant

WSP Environment & Energy South Africa
WSP House, Bryanston Place, 199 Bryanston Drive, Bryanston, 2191
Tel: +27 11 361 1396 | Mobile: +27 84 951 2164 | www.wspgroup.co.za

---

From: Bedford-Owen, Janna
Sent: 08 June 2012 12:49 PM
To: dtswai@mpg.gov.za; dtswai@wit.mpu.gov.za; mmseshweni@mpg.gov.za

Cc: O'Brien, Jared
Subject: Activity Clarification - BA vs Scoping and EIA in a mining area.
Importance: High

Good Day Dineo / Martha,

I have a query regarding the listed activities under NEMA GNR 544 and 545. I have a project which is the expansion of a bulk fuel storage area by 332 cubic metre putting the total site capacity over 500 Cubic metres. Therefore the applicant is required to obtain an AEL under NEM:AQA.

My query is regarding the two listed activities in GNR 544 and 545 respectively, namely:

- NEMA GNR 545 **Activity 28**: *Commencing of activity, which requires an atmospheric emissions license in terms of Section 21 of the NEM:AQA, except where such commencement requires a BA in terms of GNR 544 of 2010.*
- NEMA GNR 544 **Activity 42**: *The expansion of facilities for the storage, or storage and handling, of a dangerous good, where such storage will be expanded by 80 cubic metres or more.*

My question is that both activities are relevant to the project, but I would like verification that the latter (GNR 545 Activity 42) is in fact NOT relevant as the project is already captured by GNR 544 Activity 28.

We had submitted an application stating a Scoping and EIA process was required and I would also like your assistance in determining what procedures need to be followed in order to withdraw / amend that application to reflect the correct process – a Basic Assessment.

We are willing to make the journey to Witbank to discuss the project in more detail and ensure clarification is achieved before proceeding further, and your assistance in the matter would be hugely appreciated!

Kind Regards,

Janna Bedford-Owen
Senior Environmental and Sustainability Consultant

WSP Environment & Energy South Africa
WSP House, Bryanston Place, 199 Bryanston Drive, Bryanston, 2191
Tel: +27 11 361 1371
Fax: +27 86 556 6336
Mobile: +27 82 302 8331
Email: Janna.Bedford-Owen@WSPGroup.co.za
Website: www.wspenvironmental.co.za

O'Brien, Jared

From: Garth Batchelor <GBatchelor@mpg.gov.za>
Sent: 02 July 2012 12:12 PM
To: O'Brien, Jared
Subject: Fwd: IQ/12/0299: Activity Clarification - BA vs Scoping and EIA in a mining area
Attachments: Fwd: Activity Clarification - BA vs Scoping and EIA in a mining area; Activities and Timelines.docx

Jared,
here is a response to your query from Mr franz Scheepers of DEA.
Thanks
dr G.R. Batchelor

>>> "Franz Scheepers" <fscheepers@environment.gov.za> 2012/07/02 08:26 AM >>>
Garth

Further to the e-mail below and based on the information provided, the following:

-
The proponent incorrectly quoted the listing notices and activities... This is causing the confusion.

-
Activity 28 of GNR 544 will be triggered as this is the expansion of an existing dangerous good storage facility, the expansion (increased capacity) requires requiring an AEL: The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.

-
Activity 42 of GNR 544 will be triggered. "The expansion of facilities for the storage, or storage and handling, of a dangerous good , where the capacity of such storage facility will be expanded by 80 cubic metres or more."

-
Activity 26 of GNR 545 WILL Not be triggered: Commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), except where such commencement requires basic assessment in terms of Notice of No. R544 of 2010.

-
A BAR will be required based on the information provided and NOT a S&EIr.

Franz Scheepers
Deputy Director:
IEM Policy and Regulatory Support
Tel (012) 310 3459

Cell: 082 332 3367
Fax (012) 310 3688

APPENDIX C – Stakeholder Engagement

APPENDIX C1 – Stakeholder Database

List of stakeholders (contact details are not included for confidentiality reasons)		
Surename	**First Name/s**	**Postal Address**
Theron	Danie & Dalène	Klipkraal, P.O.Box 119, Trichardt. 2300
Beukes	Ryno & Igna	Klipkraal, P.O.Box 119, Trichardt. 2300
De Wet	Francois	Brakfontein, P.O.Box 119, Trichardt. 2301
De Wet	Unknown	Klipkraal, Trichardt
van Niewenhuisen	Christine	Unknown
Dunn	Henry & Marlene	Aangewys, P.O. Box 452, Bethal.
Van Rensburg	Nic/Annelie	Witbank, P.O. Box 452, Bethal.
Leach	Marius	Witbank, P.O. Box 452, Bethal.
van der Merwe	B.J.J.	Witbank, P.O. Box 452, Bethal.
PIETERSE	H.J.	Witbank, P.O. Box 67, Bethal.
van der Merwe	Pieter	Aangewys, P.O.Box 452, Bethal

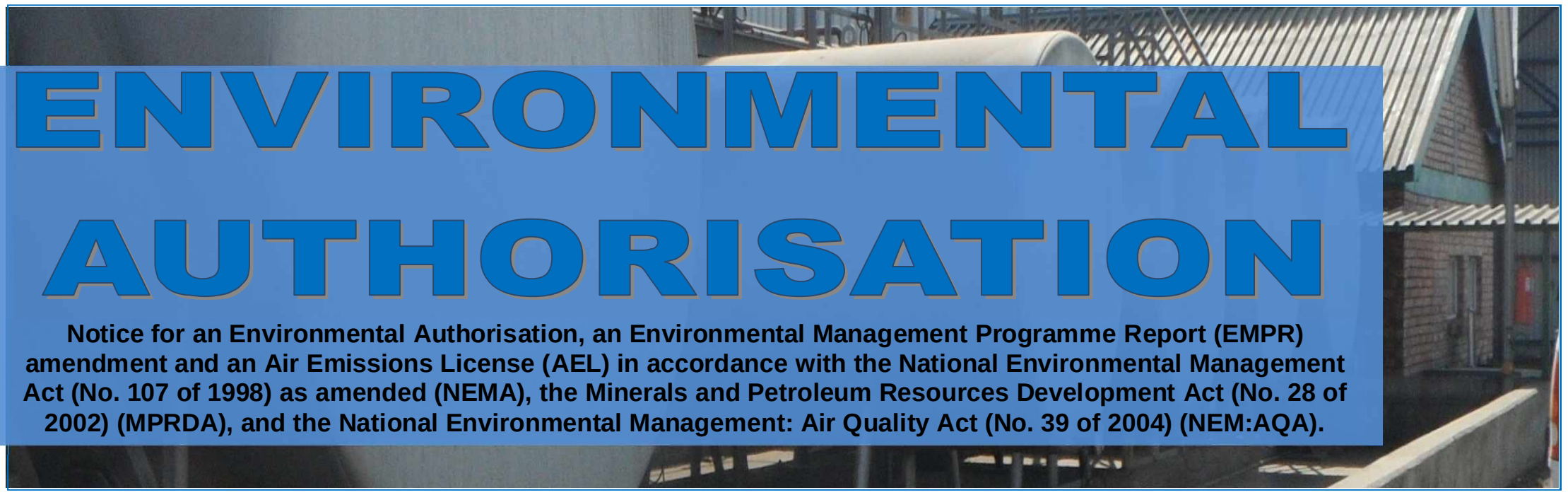
van der Merwe	L.C.	Witbank, P.O. Box 67, Bethal.
Greyling	Nelius	Rietfontein, P.O. Box , Jo'burg ??
Geyser	Frans	PO Box 2143, kinross, 2270
Schwartz	T	Rietfontein, P.O. Box ,
Venter	J.D.P.	Alexander, P.O. Box 78, Bethal
van der Westhuizen	Deon	Witrand
du Toit	D.S.	Rietfontein, P.O. Box 2192, Bethal
van Rensburg	M.M. J	RG 1, P.O.Box 1467, Bethal
Holtzhausen	Gerhard	Aangewys, P.O. Box 557, Bethal
Holtzhausen	Johan	Aangewys, P.O. Box 557, Bethal
Potgieter	Stoffel	Aangewys, P.O. Box 557, Bethal
Swart	Wessel	Aangewys, P.O. BOX 779, Bethal
De Wet	Gawie & Kobie	PO Box 53, trichard, 2300
Maboye	Advent	Unknown

Seger	Kurt	Unknown
Du Plessis	Jacques	Unknown
Grant	Mirie	Unknown
Huyzers	Tian	Unknown
Marais	Hennie	Unknown
Unknown	Nico & Deonie	Unknown
Turn2god (organisation)	N/A	Unknown
Charter	Tommy	Unknown
Swartz	H	Unknown
Boloka	Maphuti	Unknown
Mahlangu	Petros (ward councilor 26)	Unknown
Mbuku	Zingisa (Ward councilor 27)	Unknown
Grobler	Marilize	Unknown
Schosand	Maggie	Unknown

Muller	B	P O BOX 19, KINROSS
Unknown	Etiene	Unknown
Nussey-Vos	Gail	Unknown
Botes	Antoon	Unknown
Smit	Cobus	Unknown
Steffens	A	Unknown
Smook	Dakus	Unknown
Khumazo	Nkosikhona Winterboy	Unknown
Klills	Steve	Unknown
Unknown	Eric	Unknown
Malaza	J	Unknown
Blaauw	B	Unknown
Wandrag	Janco	Unknown
Unknown	Wimpi	Unknown

Unknown	Ivensley	Unknown
Marais	Coert	Langsloot, Kinross
Lande (Acting Unit Manager- Kriel Library)	Jewery H	P O Box 3, Emalehleni, 1035
Torien	J	Unknown
Jacques	Du Plessis	Sasol
Fourie	Thys	Unknown
Cronje	Paul	Sasol
Van Staden	J.M.F.	Tweedraai, Trichardt
Charter	William	Unknown
Schoeman (Chief Land & Rights Officer) Sasol Mining Rights and Properties	Hennie	PO Box 699, Trichardt, 2300

APPENDIX C2 – Site Notice Placement



ENVIRONMENTAL AUTHORISATION

Notice for an Environmental Authorisation, an Environmental Management Programme Report (EMPR) amendment and an Air Emissions License (AEL) in accordance with the National Environmental Management Act (No. 107 of 1998) as amended (NEMA), the Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA), and the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA).

Proponent: Anglo American Thermal Coal: Isibonelo Colliery
Project Proposed Location: Portion 28 of Aangewys 81 IS, Mpumalanga
Independent Environmental Assessment Practitioner:
WSP Environment and Energy | PO Box 5384 | Rivonia, 2128

Environmental Authorisation Processes for the proposed Fuel Storage Expansion project at Isibonelo Colliery

Isibonelo Colliery (IC) is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel. In order to operate machinery, equipment and infrastructure IC are required to store a large volume of fuel on-site. IC currently store 194 m^3 of fuel onsite and consumes 30 cubic meters (m^3) of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply has been determined as optimal. Therefore, IC identified a need to expand their current diesel tank storage capacity

IC propose the installation of an additional four 83 m^3 tanks thus bringing the total to 526 m^3. The proposed tanks will be located directly adjacent to the existing tanks.

The project involves listed activities contained in the NEMA, with specific reference to the 2010 Environmental Impact Assessment Regulations, Government Notice Regulation (GNR.) 543 and 544 (NEMA), the NEM: AQA and the MPRDA. In accordance with NEMA, the undertaking of certain listed activities requires environmental authorisation. The activities associated with the Fuel Storage Expansion project are listed below:

- GNR 544, Activity 28: The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply; and
- GNR 544, Activity 42: The expansion of facilities for the storage, or storage and handling, of a dangerous good, where the capacity of such storage facility will be expanded by 80 m^3 or more.

In addition, the proposed Fuel Storage Expansion Project requires an AEL in accordance with Section 21 (Subcategory 2.2) of the NEM: AQA.

Therefore, applications to complete a Basic Assessment and AEL process have been submitted to the Mpumalanga Department of Economic Development, Environment and Tourism in order to obtain environmental authorisation prior to activity commencement.

Furthermore, as the proposed project is located in a mine lease area, IC is required to undertake an EMPR Amendment process, according to the MPRDA. The Mpumalanga Department of Mineral Resources will be the authorising department.

In order to ensure that you are registered as a Stakeholder or would like to participate and find out more about the project, please submit your name, contact information and interest in the matter to Jared O'Brien by 20 August 2012.

What is stakeholder engagement?

A process in which potential stakeholders are informed about the project and given an opportunity to comment on, or raise issues relevant to the proposed activities.

Who are stakeholders?

Any person, group of persons or organisation interested in and / or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Public Meeting

All stakeholders will be notified of the date, venue and time of the public meeting should a public meeting be required.

For more information contact:

Jared O'Brien | Tel: 011 361-1396 | Fax: 086 505 3939 | Email: Jared.OBrien@WSPgroup.co.za

Isibonelo Colliery Site Notice Photo's

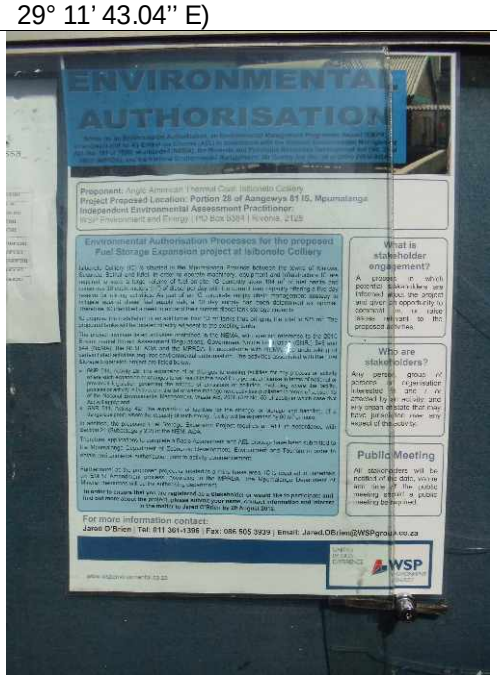
Site A (Intersection of Barney Molokwane Street & R580 - 26° 29' 04.30'' S 29° 13' 33.41" E)

Site B (Isibonelo Reception -26° 24' 34.30'' S 29° 12' 16.49'' E)

Site C (Entrance to Isibonelo Colliery - 26° 24’ 34.90’’ S 29° 12’ 07.06’’ E)

Site D (Intersection of the R547 & the unnamed road leading to the Colliery office - 26° 19’ 20.40’’ S 29° 11’ 39.22’’ E)

Site E (Intersection of the R547 & the R580- 26° 18' 00.99'' S 29° 11' 43.04'' E)



Site F (Emalahleni Local Municipality Notice Board - 26° 14' 50.81'' S 29° 15' 47.88'' E)

APPENDIX C3 – Background Information document

ENVIRONMENTAL AUTHORISATION PROCESSES FOR THE PROPOSED FUEL STORAGE EXPANSION PROJECT AT ISIBONELO COLLIERY

BACKGROUND INFORMATION DOCUMENT

Project Description

Isibonelo Colliery (IC) is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel. Anglo Coal (now known as Anglo American Thermal Coal) committed itself to establishing Isibonelo Colliery, an opencast operation, to supply Sasol's Synthetic Fuel (SSF) plant in Secunda. In November 2003 construction work began and the first coal was supplied to SSF in July 2005. IC utilizes the dragline strip-mining method as a primary means of removing the coal from the coal seams encompassed in the Highveld coalfield.

Bituminous coal seams hosted by the sedimentary strata in the IC Mining Licence area include, from the base up, the No 1, 2, 3, 4 and 5 seams. Only the No 4 seam is presently considered to be economically viable, with an average opencast depth of 40 m and a thickness of 5,6 m. In order to operate the mine on a daily basis the following equipment and infrastructure is required: Marion drag-lines, overburden drills, hydraulic shovels and diesel-drive 150-tcoal haulers which are used during the conventional opencast-mining process. The extracted coal is then delivered to the primary in-pitsizing plant, after which it is conveyed along a surface conveyor to a bunker. The coal in the bunker is then presented to the Sasol overland conveyor system.

In order to operate the said machinery, equipment and infrastructure, IC are required to store a large volume of fuel on-site. IC currently consumes 30 cubic meters (m^3) of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply has been determined as optimal. Therefore, IC identified a need to expand their current diesel tank storage capacity.

The current storage area comprises two 83 m^3 diesel tanks and two 14 m^3 petrol tanks, totalling 194 m^3. IC is proposing the installation of an additional four 83 m^3 tanks thus bringing the total up to 526 m^3.

The existing diesel storage tanks are located at the following co-ordinates: 26° 19' 41.11"S 29° 15' 57.97"E (refer to locality map A & B). The proposed tanks will be located adjacent to the existing storage facility (refer to locality map A & B).

Legal framework

The project involves listed activities contained in the National Environmental Management Act (No. 107 of 1998), as amended (NEMA), with specific reference to the Environmental Impact Assessment Regulations 2010, Government Notice Regulation (GNR.) 543 and 544, the National Environmental Management: Air Quality Act (No. 39 of 2004; NEM: AQA) and the Mineral and Petroleum Resources Development Act (No. 28 of 2002; MPRDA).

In accordance with the NEMA, the undertaking of certain listed activities requires environmental authorisation. The activities associated with the Fuel Storage Expansion project are listed below:

- GNR 544, Activity 28: *The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply*; and
- GNR 544, Activity 42: *The expansion of facilities for the storage, or storage and handling, of a dangerous good, where the capacity of such storage facility will be expanded by 80 cubic metres or more*.

In addition, the proposed Fuel Storage Expansion Project requires an Air Emissions License (AEL) in accordance with Section 21 of the NEM: AQA:

- Section 21, *Subcategory 2.2*.

Therefore, applications to complete a Basic Assessment and AEL process have been submitted to the Mpumalanga Department of Economic Development, Environment and Tourism in order to obtain environmental authorisation prior to activity commencement.

Furthermore, as the proposed project is located in a mine lease area, IC is required to undertake an Environmental Management Programme Report (EMPR) Amendment process, according to the MPRDA, and the Mpumalanga Department of Mineral Resources will be the authority responsible for authorisation of the said EMPR Amendment.

Stakeholder Consultation Process

The purpose of stakeholder engagement is to consult with interested and affected parties in the public and private sectors in the decision-making process on projects which may affect them. The process aims to develop and maintain open channels of communication between the project team and stakeholders. This process provides stakeholders with the opportunity to express their views and concerns regarding the proposed project through project correspondence. The environmental assessment practitioner documents the views and concerns of stakeholders, and makes the project team and relevant authority aware of issues that need to be considered during the compilation and evaluation of the potential risks and impacts associated with the project.

Who is a Stakeholder?

Any person, group of persons or organisation interested and/or affected by the proposed development.

Register your interest by completing and returning the Registration and Comments Form attached herewith.

Purpose of this Document

This background information document (BID) introduces all stakeholders to the proposed project. This document forms part of the environmental authorisation process undertaken as a component of the stakeholder consultation process and is intended to provide stakeholders with adequate information to comment on the project.

The BID details the project, the environmental authorisation process, the role of stakeholders in the process as well as to encourage stakeholders to comment on the project, ask questions and raise issues that should be included in the project documents. Aside from this document, at various stages of the environmental authorisation process, information and reports will be made available for stakeholders to comment on.

WSP Environment and Energy (WSP) has been appointed by Anglo American Thermal Coal: Isibonelo Colliery as the independent environmental assessment practitioner (EAP) to undertake the environmental authorisation process for the project and to facilitate stakeholder engagement.

To become a registered stakeholder and ensure all comments and queries regarding this project are accurately documented and addressed, please forward your contact details and comments by the 20 August 2012 on the attached *response sheet* to:

Consultant: Jared O'Brien
Company: WSP Environment and Energy
Address: P.O. Box 5384, Rivonia, 2128
Tel: 011 361 1396
Fax: 086 505 3939
Email: Jared.OBrien@wspgroup.co.za

What does the Environmental Authorisation Process consist of?

Stakeholder Engagement

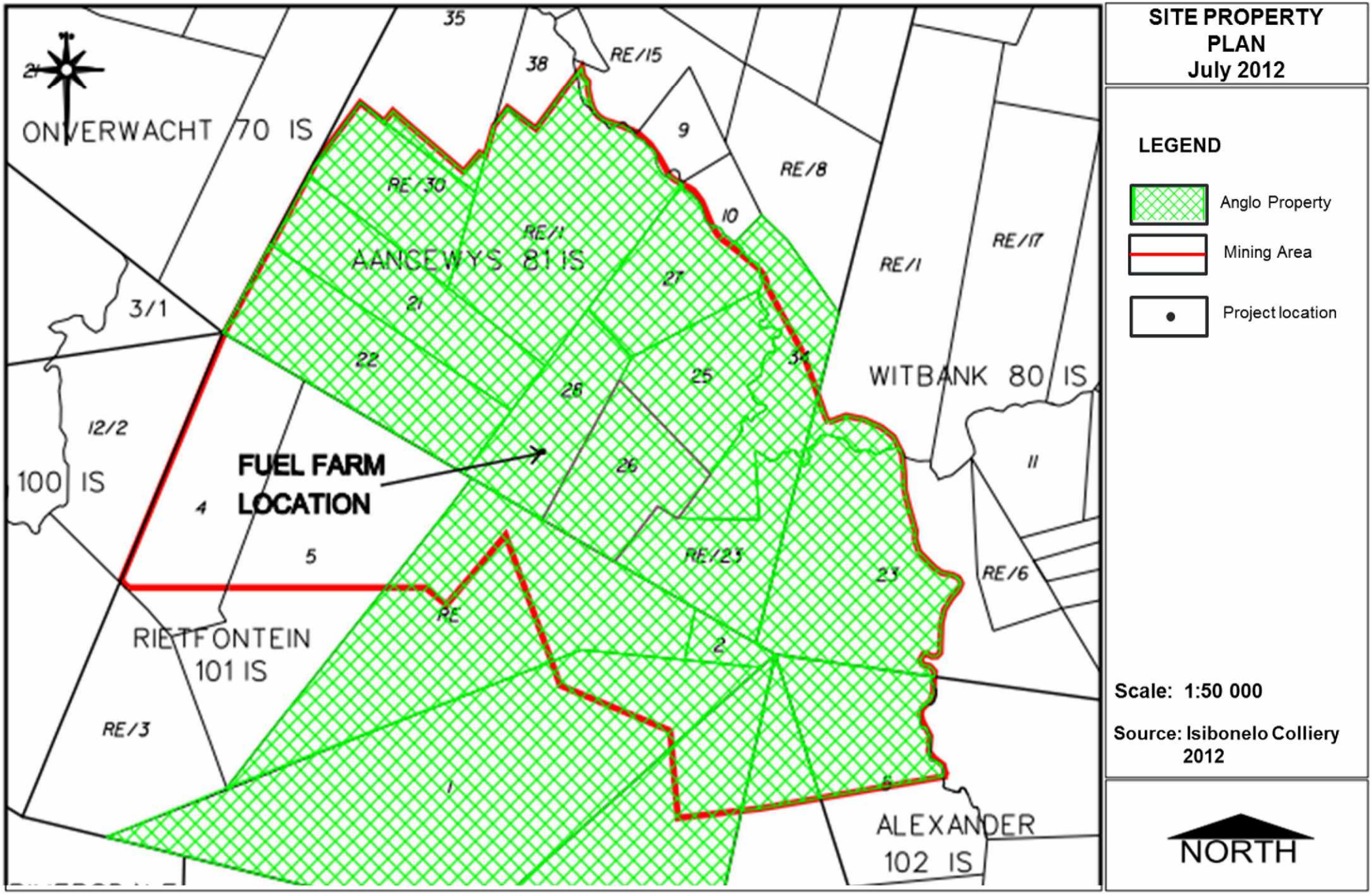
The first steps are to notify the public and previously identified stakeholders of the proposed project and invite all stakeholders to a public meeting through the following mediums:

- Newspaper advertisements:
  - The Ridge; and
  - The Sowetan.
- Site notices in and around the project area;
- Written notification letters to surrounding landowners and municipal ward councillors; and
- Distribution of the BID to surrounding landowners and registered stakeholders.

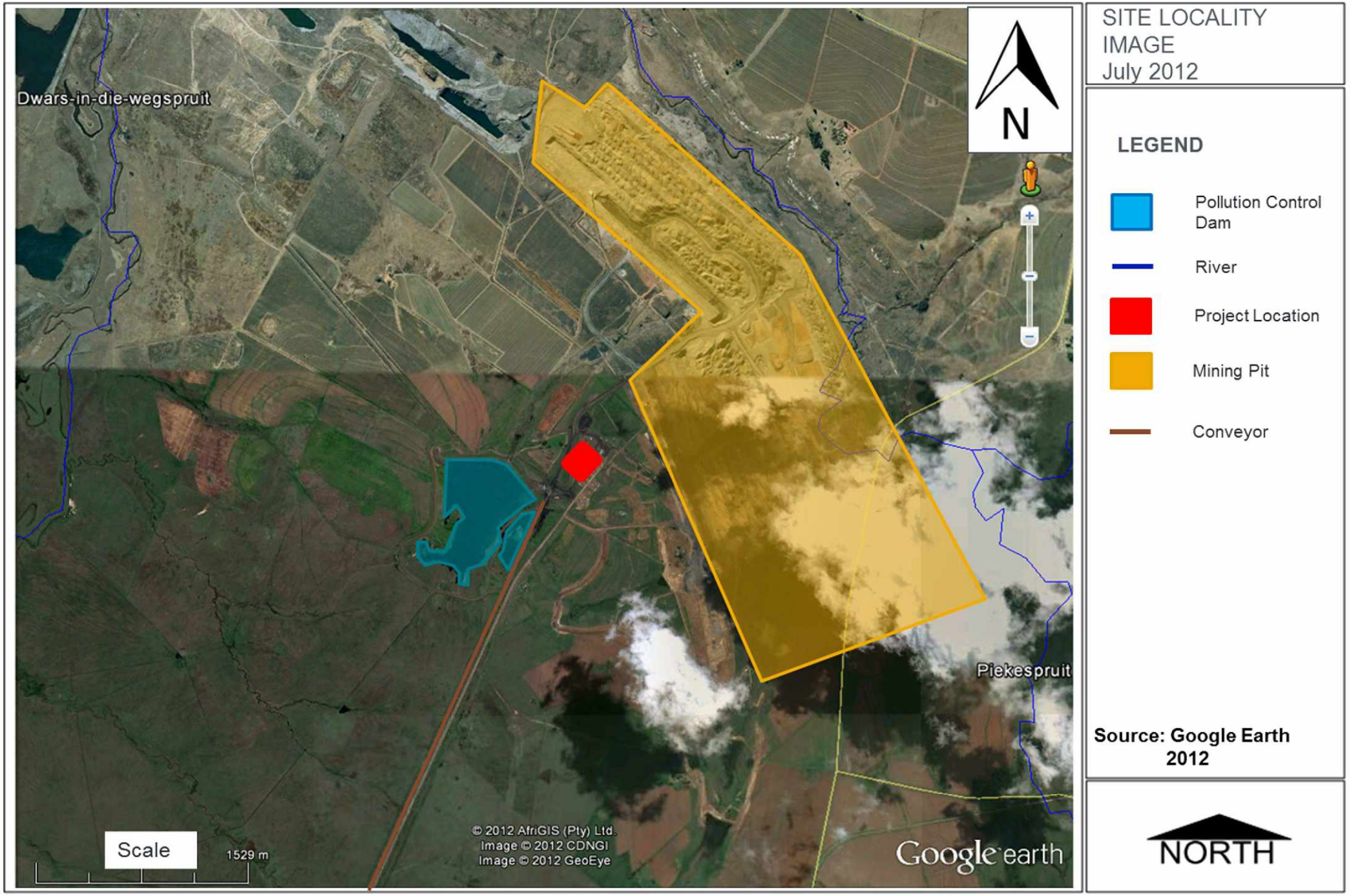
BA Report and EMPR Amendment Report

WSP will compile a draft BA Report and a draft EMPR (inclusive of the AEL application) which will be made available to stakeholders for review / comment for a period of 40 days. Thereafter, WSP will include and respond to all comments received during the public review period prior to finalising and submitting the reports to the Mpumalanga DEDET and the Mpumalanga DMR for consideration / authorisation.

Locality Map A



Locality Map B



Registration and Comments Sheet

To be a registered stakeholder and ensure all comments and queries regarding this project are accurately documented and addressed please forward your comments and contact details with the attached response sheet to:

Jared O'Brien
WSP Environmental (Pty) Ltd
Address: P.O. Box 5384, Rivonia, 2128
Tel: 011 361 1396
Fax: 086 505 3939
Email: Jared.OBrien@WSPgroup.co.za

Please insert your personal details below:

Name:	
Organisation & Designation:	
Address:	
Tel:	
Fax:	
E-mail:	

Please list your interest in the project and comments below:

WSP

BID Distribution Register (Surrounding Landowners)

PROJECT:	Bulk Diesel Storage Expansion Project
LOCATION:	Isibonelo Colliery
DATE:	20/07/2012

Name	Company	Contact Details	Signature
MIRIE GRANT	SASOL MINING	Tel: 017 613 5450 Fax: Cell: 082 538 0087 E-mail: mirie.grant@sasol.com	Grant.
T. CHARTER	SWARTFONTEIN FARM. P.O. BOX 18 TRICHARDT 2300.	Tel: Fax: Cell: 0722865582 E-mail:	T. Ch
H. Swart	AGG Rietfontein	Tel: Fax: Cell: 0716385054 E-mail:	
ACTING 2IC MANAGER JERRY H/LANDE	ELMC P. O BOX 3 EMALAHLENI 1035	Tel: 017-648-6200 Fax: 017-648-4746 Cell: 082-4440471 E-mail: KrielLibrary@yahoo.com	

Name	Company	Contact Details	Signature
H. Dunn	Witbank SOIS	Tel: 0825713763 Fax: Cell: E-mail: dunnhb@yahoo.com	
J Toerien	Alexander Farm	Tel: Fax: Cell: 0829090600 E-mail: toerien@vodamail.co.za	JP Toerien
Christian Van Nieuwenhuizen	Private	Tel: Fax: Cell: 0824963306 E-mail:	
ERIC		Tel: Fax: 071 553 7696 Cell: E-mail:	ERIC
Thys Louw.	Syferfontein 115	Tel: Fax: 0761234371 Cell: E-mail:	

APPENDIX C4 – Notification letter

Reference no: 29750

23 July 2012

To Whom It May Concern,

Environmental Authorisation Processes for the proposed Fuel Storage Expansion project at the Isibonelo Colliery

WSP Environmental and Energy (WSP) has been appointed to undertake the function of independent environmental assessment practitioner to facilitate the stakeholder engagement process and undertake the required environmental authorisation.

IC currently consumes 30 cubic meter (m^3) of diesel per day with the current tank capacity offering a 5 day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply has been determined as optimal. The current capacity comprises two 83 m^3 diesel tanks and two 14 m^3 petrol tanks, totaling 194 m^3. IC is proposing the installation of an additional four 83 m^3 tanks thus bring the total to 526 m^3 and meeting the 10 day supply need. The proposed tanks will be located directly adjacent to the existing tanks.

The project involves listed activities contained in the National Environmental Management Act (No. 107 of 1998), as amended (NEMA), with specific reference to the Environmental Impact Assessment Regulations 2010, Government Notice Regulation (GNR.) 543 and 544 (NEMA), the National Environmental Management: Air Quality Act (No. 39 of 2004; NEM: AQA) and the Mineral and Petroleum Resources Development Act (No. 28 of 2002; MPRDA). In accordance with NEMA, the undertaking of certain listed activities requires environmental authorisation. The activities associated with the Fuel Storage Expansion project are listed below, and require a Basic Assessment (BA) process be completed.

In addition, the proposed Fuel Storage Expansion Project requires an Air Emissions License (AEL) in accordance with the NEM: AQA. Furthermore, as the proposed project is located in a mine lease area, IC is required to undertake an Environmental Management Programme Report (EMPR) Amendment process according to the MPRDA.

Please find attached the background information document which contains additional information regarding the Bulk Fuel Expansion project.

If you would like to register as a stakeholder, please submit your details to Jared O'Brien by 20 August 2012.

Should you have any questions, please do not hesitate to contact the undersigned.

Regards,

Jared O'Brien
Consultant
Tel: 011 361 1396
Fax: 086 505 3939
Email: Jared.Obrien@wspgroup.co.za

WSP Environmental (Pty) Ltd
WSP House
Bryanston Place
199 Bryanston Drive
Bryanston, 2021
Tel: +27 (0)11 361 1380
Fax: +27 (0)11 361 1381
http://www.wspenvironmental.co.za
Reg. No: 1995/08790/07

WSP Group plc
Offices worldwide

APPENDIX C5 – Newspaper Advertisements

NOTICE OF ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED FUEL STORAGE EXPANSION PROJECT AT THE ISIBONELO COLLIERY

Notice is hereby given in terms of the National Environmental Management Act (No. 107 of 1998), as amended (NEMA), with specific reference to the Environmental Impact Assessment (EIA) regulations 2010, Government Notice Regulation (GNR.) 543 & 544, the National Environmental Management: Air Quality Act (No. 39 of 2004; NEM:AQA), as well as the Mineral and Petroleum Resources Development Act (No. 28 of 2002; MPRDA) with the intent to increase the fuel storage capacity at the Isibonelo Colliery (IC).

DESCRIPTION AND LOCATION

IC is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel. In order to operate the mine IC are required to store a large volume of fuel on-site. IC currently consumes 30 cubic meters (m^3) of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against fuel supply risk, a 10 day supply was determined as optimal. Therefore, IC identified a need to expand their current fuel storage capacity from 194 m^3 to 526 m^3, through the addition of four 83 m^3 aboveground storage tanks.

The proposed tanks will be located directly adjacent to the existing tanks.

ENVIRONMENTAL APPLICATION

The proposed project involves undertaking the following listed activities contained in the NEMA EIA Regulation:

- GNR 544, Activity 28; and
- GNR 544, Activity 42.

In addition, the proposed Fuel Storage Expansion Project requires an Air Emissions License (AEL) in accordance with Section 21 of the NEM: AQA:

- Section 21, Subcategory 2.2.

Therefore, applications to complete a Basic Assessment and AEL process have been submitted to the Mpumalanga Department of Economic Development, Environment and Tourism in order to obtain environmental authorisation prior to activity commencement.

Furthermore, as the proposed project is located in a mine lease area, IC is required to undertake an Environmental Management Programme Report Amendment (EMPR) process according to the MPRDA. The Mpumalanga Department of Mineral Resources will be responsible for authorising the EMPR Amendment process.

NAME OF PROPONENT

Anglo American Thermal Coal: Isibonelo Colliery

ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP Environmental (Pty) Ltd

Contact Person:

Jared O'Brien
Consultant
Tel: 011 361 1396
Fax: 086 505 3939
Email: Jared.OBrien@wspgroup.co.za
Address: PO Box 5384, Rivonia, 2128.

REGISTER AS A STAKEHOLDER

To register as a stakeholder, please submit your name, contact information and interest in the matter to Jared O'Brien within 30 days of the publication of this advertisement.

WSP

9070 Car Sales, Used

EASY BUYS NO BANKS OWN FINANCE

Corolla Professional
Merc Benz C230
Toyota Corolla 160i
VW Polo
Ford Fiesta 1.4
Merc Benz C180
Mazda 323
Honda Civic 1.8
Nissan 1 Ton + Canopy

011 763 2716
083 760 7403

9500 Tyres, Wheels & Mags

TYRES – SHOCKS
BEST PRICES – (011) 837-5541

9640 Vehicles Wanted

Cars and Bakkies wanted for cash. We will give you more:
072 307 8657

11010 Legal Notices

NOTICE OF ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED FUEL STORAGE EXPANSION PROJECT AT THE ISIBONELO COLLIERY

Notice is hereby given in terms of the National Environmental Management Act (No. 107 of 1998), as amended (NEMA), with specific reference to the Environmental Impact Assessment (EIA) regulations 2010, Government Notice Regulation (GNR.) 543 & 544, the National Environmental Management: Air Quality Act (No. 39 of 2004; NEM:AQA), as well as the Mineral and Petroleum Resources Development Act (No. 28 of 2002; MPRDA) with the intent to increase the fuel storage capacity at the Isibonelo Colliery (IC).

DESCRIPTION AND LOCATION
IC is situated in the Mpumalanga Province between the towns of Kinross, Secunda, Bethal and Kriel. In order to operate the mine IC are required to store a large volume of fuel on-site. IC currently consumes 30 cubic meters (m^3) of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against fuel supply risk, a 10 day supply was determined as optimal. Therefore, IC identified a need to expand their current fuel storage capacity from 194 m^3 to 526 m^3, through the addition of four 83 m^3 aboveground storage tanks.
The proposed tanks will be located directly adjacent to the existing tanks.

ENVIRONMENTAL APPLICATION
The proposed project involves undertaking the following listed activities contained in the NEMA EIA Regulation:
* GNR 544, Activity 28; and
* GNR 544, Activity 42.
In addition, the proposed Fuel Storage Expansion Project requires an Air Emissions License (AEL) in accordance with Section 21 of the NEM: AQA:
* Section 21, Subcategory 2.2.
Therefore, applications to complete a Basic Assessment and AEL process have been submitted to the Mpumalanga Department of Economic Development, Environment and Tourism in order to obtain environmental authorisation prior to activity commencement. Furthermore, as the proposed project is located in a mine lease area, IC is required to undertake an Environmental Management Programme Report Amendment (EMPR) process according to the MPRDA. The Mpumalanga Department of Mineral Resources will be responsible for authorising the EMPR Amendment process.

NAME OF PROPONENT
Anglo American Thermal Coal: Isibonelo Colliery

ENVIRONMENTAL ASSESSMENT PRACTITIONER
WSP Environmental (Pty) Ltd
Contact Person:
Jared O'Brien
Consultant
Tel: 011 361 1396
Fax: 086 505 3939
Email:
Jared.OBrien@wspgroup.co.za
Address: PO Box 5384, Rivonia, 2128.

REGISTER AS A STAKEHOLDER
To register as a stakeholder, please submit your name, contact information and interest in the matter to Jared O'Brien within 30 days of the publication of this advertisement.

WSP

11090 Court Orders

IN THE MAGISTRATES COURT FOR THE DISTRICT OF MANZINI HELD AT MANZINI
CASE NO: 2776/12
In the ex-parte application of:
Hamilton Senzo Nxumalo Applicant
In re:
Hamilton Senzo Nxumalo Plaintiff
AND
Sibongile Ruth Nxumalo (Born Dlamini) Defendant
EDICTAL CITATION
TO: Sibongile Ruth Nxumalo (Born Dlamini), an adult Swazi female of Ngwane Park, in the District of Manzini Swaziland, whose whereabouts are unknown but believed to be around Nelspruit in the Republic of South Africa.
Take notice that by summons sued out of this court you have been called upon to give notice, within twenty-one (21) days after publication hereof, to the Clerk of the Court for the Magistrate's Court for The District of Manzini and to the Plaintiff's Attorney of your intention to defend in an action wherein Hamilton Senzo Nxumalo of Nkambeni and currently resident at Gwamile Voctim, Matsapha claims:
1. Restoration of conjugal rights
Failing Which
2. A final decree of divorce
3. Costs of suit
4. Further and/or alternative relief
Take notice further that if you fail to give such notice, judgement may be granted against you without further reference to you.
Dated at Mbabane this 19th day of June 2012.
Robinson Bertram
(Applicants Attorney)
Ingcongwane Building
Gwamile Street
Mbabane
Maseko/cd/N.4V
TO: The Clerk of the court
Manzini

IN THE HIGH COURT OF ZIMBABWE HELD AT BULAWAYO CASE NO: H.C REF CASE NO: H.C 716/12
In the matter between:
Siboneleni Ncube (Nee Zondo) Applicant
AND
Remias Mlungisi Ncube Respondent
TO: Remias Mlungisi Ncube (believed to be resident in Johannesburg)
Take notice that Siboneleni Ncube has issued a summons for divorce against you in the High Court of Zimbabwe sitting at Bulawayo under matter H.C 716/12, in which she claims;
1. A decree of Divorce
2. Custody of the minor children
3. An order awarding Stand 7484 Cowdray Township to your minor children and
4. Cost of suit
Further take notice that if you want to oppose any of the Plaintiff's claims, you are required to enter an appearance to defend the action, with the Assistant Registrar at the Bulawayo High Court, within 14 days from the date of publication of this summons and to serve a copy of your notice of appearance upon the Plaintiff's legal practitioners of record at the address given below.
Should you fail to enter an appearance to defend in the matter and place stated above, the Plaintiff will set the matter down for hearing as an unopposed matter and judgement will be given against you in terms of the draft order
Dated at Bulawayo this day of 2012.
Assistant Registrar High Court of Zimbabwe
James, Moyo-Majwabu and Nyoni
Applicants Legal Practitioners
2nd Floor, Exchange Building
L. Takawira Avenue/Main Street
Bulawayo (MR MOYO-MAJWABU/mc)

11210 Tenders

TRANSNET

TENDER NUMBER TRE12-KLP-18K-0313

1. TENDER DESCRIPTION: Supply MOBILE DEVICES FOR TRANSNET RAIL ENGINEERING, KILNER PARK
Transnet Rail Engineering, a division of Transnet SOC Limited invites interested parties to tender for the above mentioned services.
Tender documents may be collected at the reception desk of the TRE Head Office in 160 Lynette Street, Kilnerpark, Pretoria
Tender Issue Date: 17 July 2012
Tender Closing Date: Punctually at **10H00** on Tuesday, **07 August 2012** in the Tender Box at 160 Lynette Street, Kilnerpark. The tender box is accessible Monday to Sunday from **06H00 to 20H00.**
GPS Co-ordinates S25 43.29' E 28 16.18'
Telephone, e-mail, facsimile and late tenders will not be considered. Tenders may only be submitted on the tender documentation that is issued.
Option Date: 13 November 2012
Tender side Briefing: N/A
Contact Person, admin:
Jacqueline Moroana at
(012) 391 1543 or
Jacqueline.moroana@transnet.net
Cost per Tender: R300.00 non – refundable
Bank Details: Account holder is Transnet Rail Engineering, **account number** 411111884, **Branch code** 010545, Standard Bank of South Africa **(Deposit slip to be provided when collecting tender documents).**
Please use the tender number as your reference.

Royal Bafokeng Nation
TRADITIONAL COUNCIL ELECTIONS

NOMINATIONS: 30 June 2012
Time: 08 am - 12 pm

(Meeting will be held across all Regions to nominate Candidates)

VOTING: 21 July 2012
Time: 07 am - 06 pm

WHO CAN VOTE:

All Bafokeng from 18 Years
(Proof of Identity required: ID, Driver's Licence or Passport)

Enquiries: elections@bafokeng.com
Tel: (014) 566 1285

CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY

City of Joburg Property Company SOC Ltd (Reg No 2000/017147/07) - a property agent of the City of Johannesburg Metropolitan Municipality hereby invites interested parties to submit proposals for the Sale and optimal Development of fixed properties.

Proposals for the sale and optimal development of fixed properties RFP:10/2012,11/2012,12/2012,13/2012,14/2012,15/2012

Proposal Number	RFP: 10/2012, 11/2012, 12/2012, 13/2012, 14/2012, 15/2012
Proposal Description	Proposals for the Sale and optimal Development of fixed properties
Document Availability	18 July 2012
Document Cost	R1000.00 (non-refundable)
Briefing Session (non-compulsory)	No Briefing session
Closing Date	07 September 2012 at 12:00pm
Address	City of Joburg Property Company SOC Ltd, 1st Floor, Forum 2, Braam Park, 33 Hoofd Street, Braamfontein, Johannesburg
Enquiries	Tenders@jhbproperty.co.za

No	Property Description	Zoning	Size
1	Erf 582 Pimville RFP 10/2012	Residential	9 582m²
2	Portion 1 of Erf 221 Craighall RFP11/2012	Residential 3	2 333m²
3	Erf 53 Alan Manor RFP12/2012	Residential 3	18 179m²
4	Erf 53 Kibler Park RFP 13/2012	Residential 3	4 940m²
5	Erf 502 Sandringham RFP 14/2012	Residential 3	4 760m²
6	Erven 198 and 199 Suideroord RFP 15/2012	Public Garage and Special for Hotel	8 809m²

Please note the following conditions of submission:
a. No late proposals will be considered.
b. The City of Joburg Property Company SOC Ltd reserves the right not to accept any proposals or to withdraw the call for proposal.

Joburg
a world class African city

City of Joburg
Property Company SOC Ltd

Helen Botes
Managing Director
1st Floor, Forum 2,
Braam Park
33 Hoofd Street
Braamfontein,
Johannesburg

P.O. Box 31565
Braamfontein
2017

Contact details
Client Servicing Unit
Tel: (010) 219 9000
Fax: (010) 219-9400
www.jhbproperty.co.za

www.busintuli.co.za

EHLANZENI DISTRICT MUNICIPALITY

NOTICE NO. 01/2012-13

NOTICE OF CHANGE IN BANKING DETAILS

Notice is hereby given that Ehlanzeni District Municipality's banking details have changed from First National Bank to Standard Bank of South Africa with effect from 01 July 2012.

The primary banking account details are as follows:

Account Name	:	Ehlanzeni District Municipality
Account Number	:	063395622
Type of Account	:	Business Current Account
Name of Bank	:	Standard Bank of South Africa
Name of Branch	:	Nelspruit
Branch Code	:	052852

Any further queries are to be directed to the Chief Financial Officer, Mr. W. Khumalo at Tel. 013-759 8513,

or

Municipal Manager
Adv. H. Mbatha
Ehlanzeni District Municipality
8 Van Niekerk Street
Nelspruit, 1200
P.O. Box 3333
Nelspruit, 1200

NOTICE OF ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED FUEL STORAGE EXPANSION PROJECT AT THE ISIBONELO COLLIERY

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NAME OF PROPONENT

Anglo American Thermal Coal: Isibonelo Colliery

ENVIRONMENTALASSESSMENT PRACTITIONER

WSP Environmental (Pty) Ltd
Contact Person:
Jared O'Brien
Consultant
Tel: 011 361 1396
Fax: 086 505 3939
Email: Jared.OBrien@wspgroup.co.za
Address: PO Box 5384, Rivonia, 2128.

REGISTER AS A STAKEHOLDER

To register as a stakeholder, please submit your name, contact information and interest in the matter to Jared O'Brien within 30 days of the publication of this advertisement.

WSP

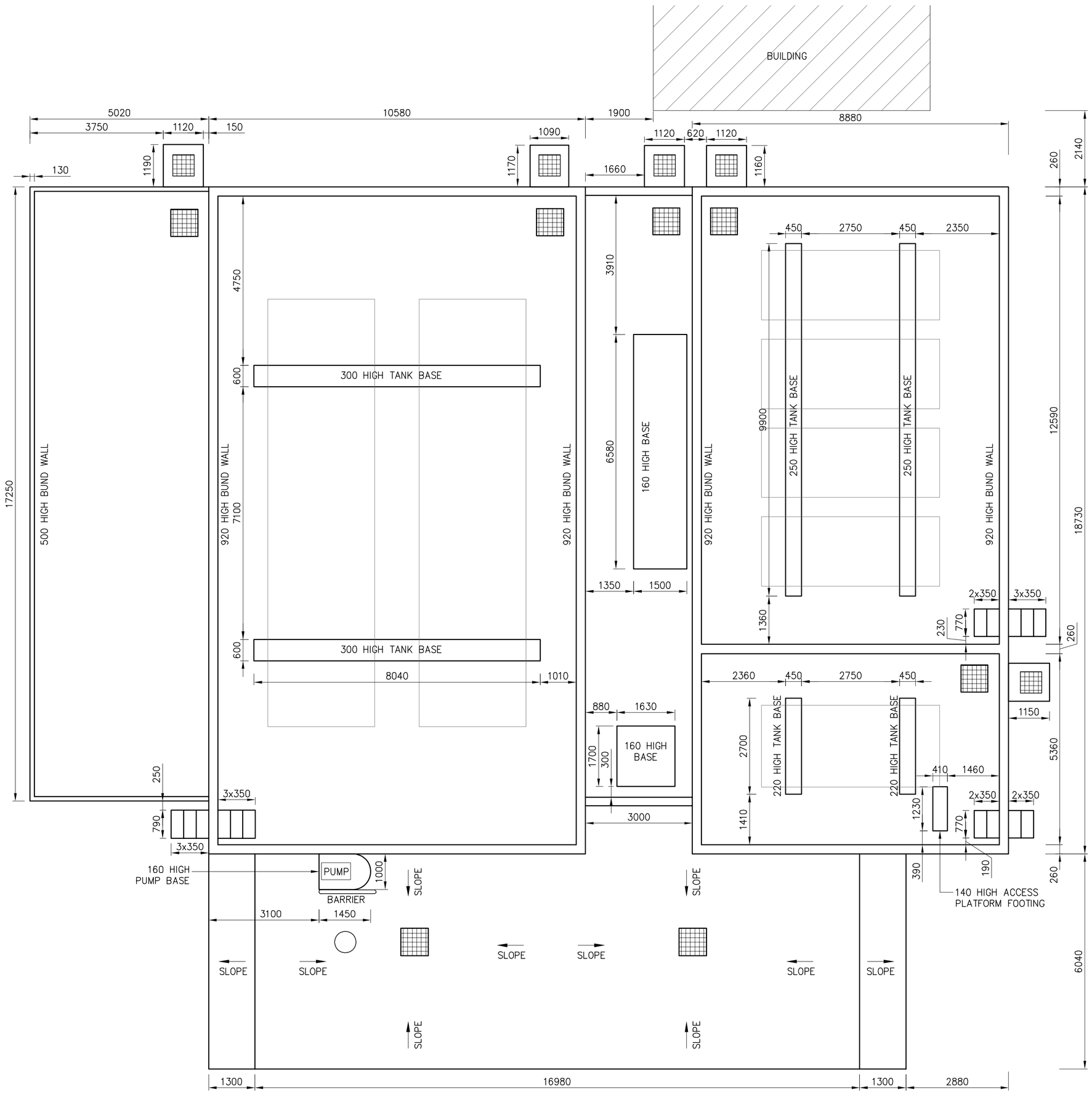
APPENDIX C6 – Issues Trail

Issues Trail

Issue and Concerns	Commentator	Organisation	Source	Response
Stakeholder Consultation				
No issues received to date	**N/A**	**N/A**	**N/A**	**N/A**

APPENDIX D – EMPR

APPENDIX E – Site Plans & Site Photographs



AS BUILT

Preferred Tank Alternative Design Drawing

No.	DATE	REVISION	APPR.
0	02/07/2010	AS BUILT	AR

APPROVAL	NAME	SIGNATURE	DATE
DESIGN	AR		
DRAWN	RD		
DESIGN CHECKED	AR		
DRAWING CHECKED	AR		
ENCON APPROVAL	AR		
CLIENT APPROVAL	.		
AS BUILT			

Consulting Engineers
Encon Engineering Projects (Pty) Ltd.
P.O. BOX 11434
ERASMUSKLOOF
0048
TEL. (012) 347 5013
FAX. (012) 347 8031
mail@encon.co.za

CLIENT

PROJECT
ANGLO SHELL
INSTALLATION TAKEOVER

SECTION
CIVIL

TITLE
ISIBONELO
EMV SITE
PLAN LAYOUT

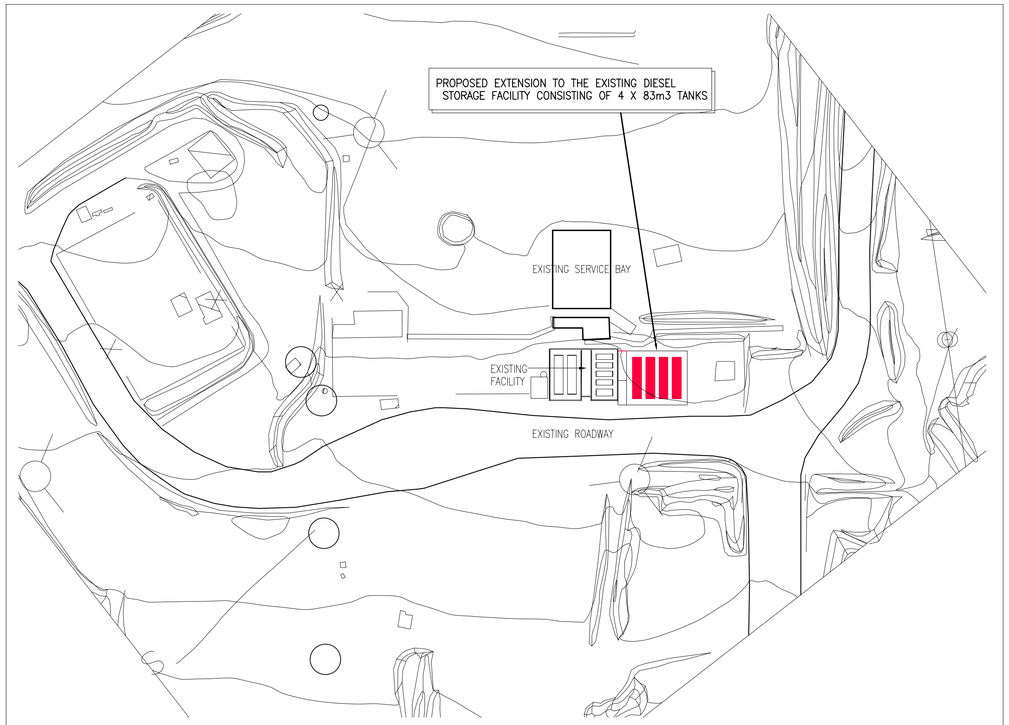
SCALE	1:75 ON A1	PRELIMINARY	.	CONSTRUCTION	.
CAD No.		TENDER	.	AS BUILT	X

ENCON Drg. No. 4260–C–190

REVISION No. 0

Preferred Tank Alternative Layout Drawing

A1 DO NOT SCALE - IF IN DOUBT ASK



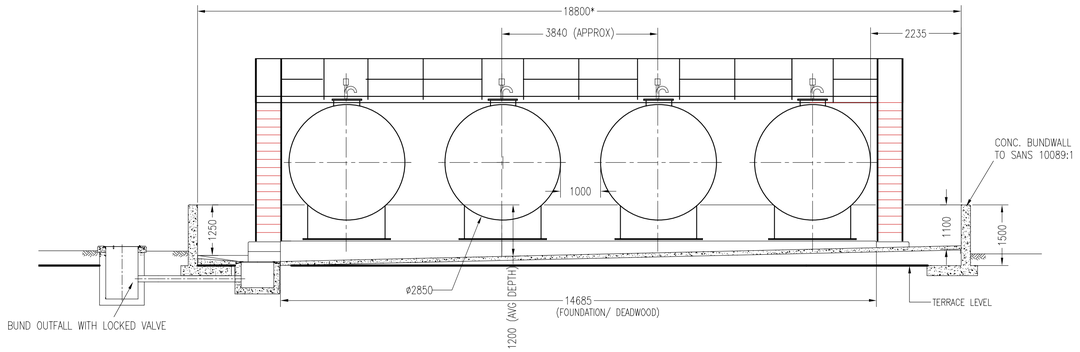
PART PLOT PLAN SHOWING THE LOCATION OF THE NEW TANKS

SCALE 1 : 125

DRG. No.	REFERENCE DRAWINGS
040112-G-001	PLOT PLAN
040112-G-002	GENERAL ARRANGEMENT & KEY PLAN (THIS DRAWING)
040112-C-001	GENERAL CIVIL DETAIL
040112-C-002	GENERAL CIVIL ARRANGM'T (INCL. FOUNDATIONS)
040112-C-003	BUNDWALL AND REINFORCING DETAIL
040112-C-004	SLAB DETAIL AND REINFORCING
040112-C-005	DRAINAGE DETAIL (SEP. PIT & SAND TRAP) INCL. LONG SECTION
040112-C-006	REINFORCING MESH DETAIL
040112-M-001	GENERAL MECHANICAL DETAIL
040112-M-002	PIPE PLAN AND SECTIONS
040112-M-003	TANK ACCESSWAY & STAIRS

PARTICULAR NOTES

1. ALL WORK TO COMPLY WITH N.B. REGULATIONS AND RELEVANT S.A.B.S. (SANS) CODES OF PRACTICE
2. READ FIGURED DIMENSIONS IN PREFERENCE TO SCALING
3. ALL REINFORCED CONCRETE WORK TO ENGINEERS SPECIFICATIONS
4. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORK
5. SETTING OUT TO BE CONFIRMED AND APPROVED BY CLIENT/ ENGINEER PRIOR TO CONSTRUCTION
6. ONLY WORK FROM CONSTRUCTION ISSUE DRAWINGS MUST BE UNDERTAKEN.



TYPICAL SECTION ON THE TANKS AND THE BUND AREA

SCALE 1 : 125

SUMMARY OF DIESEL BUND CAPACITY CALCULATION

BUND AREA = 18.8m x 16.5m = 310.2m2

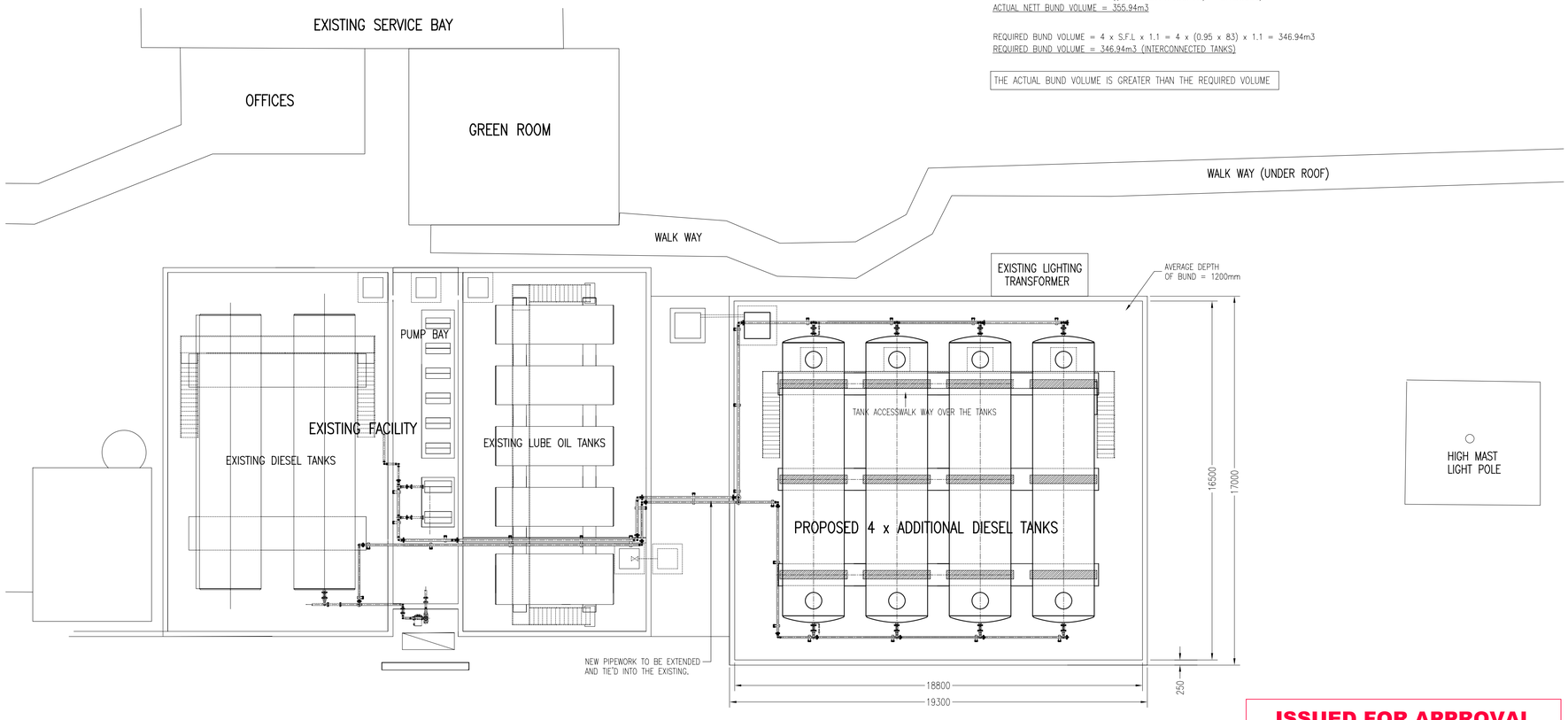
AVG DEPTH OF THE BUNDWALL = 1200mm

TOTAL CAPACITY OF THE DEAD WOOD = 16.3m3

ACTUAL NETT BUND VOLUME = ((BUND AREA x AVG. HT) – DEADWOOD)
ACTUAL NETT BUND VOLUME = 355.94m3

REQUIRED BUND VOLUME = 4 x S.F.L x 1.1 = 4 x (0.95 x 83) x 1.1 = 346.94m3
REQUIRED BUND VOLUME = 346.94m3 (INTERCONNECTED TANKS)

THE ACTUAL BUND VOLUME IS GREATER THAN THE REQUIRED VOLUME



ENLARGED PLAN VIEW SHOWING THE GENERAL ARRANGM'T

SCALE 1 : 125

ISSUED FOR APPROVAL

CONTROLLED COPY

PUMP AND TANK INSTALLATION NOTES

All procedures and equipment used must be in accordance with the Occupational Health and Safety Act and Regulations of South Africa

Installation to comply with all provisions contained in in the following specifications and coded of practice:

1. National Building Regulations and Standards Act No. 103 of 1977
2. SABS 0400 (See Fire notes)
3. SANS 1089 2004 (SABS 089 Part 3)
4. SANS 10108 (SABS 0108), SABS 089 Part 2 and SABS 1109
5. SANS 10131 2004 (SABS 0131 Part 2)
6. Registration to Local Municipal By–Law, Regulations and Requirements
7. All Basil Read Standards and Safety codes of practice shall apply
8. Emergency Stop – SABS 089 Part 3 Section 14.7
9. Symbolic Safety Signs – SABS 1186 Part 1
10. Pipework to ANSI B39.19 (API 5L Grd B)
11. Fittings to ANSI B16.9

FIRE NOTES:

Provision of fire fighting equipment to be according to National Building Regulations.

Extinuishers to be provided:

– Forecourt 1 x 9kg dry chemical powder type to each pump island

Hydraulic hose reel with 30m of 25mm dia rubber hose & 5mm dia shut off nozzel & 50mm leading with pressure gauge

Fire extinguisher to be hung on purpose made boards & together with FHR are to be located in postions approved by the Fire Inspector.

Fire hydrant with 65mm instantaneous coupling and isolating valve. Signage to Regulations.

Emergency stop stations are to be positioned on each pump island and symbolically marked

THE FOLLOWING IS TO BE DONE IN COMPLIANCE WITH LOCAL FIRE DEPATMENTS REGULATIONS :

1. 'NO SMOKING' sign to be installed
2. 'NO NAKED FLAMES' sign to be installed
3. No diesel is to be supplied until the site is registered with the Local Fire Department.
4. Pump island to be no less 150mm high, and the pump no less than 300mm away from sides of the pump island.
5. Fire Emergency By–Laws are to be complied with; Section 35 (Sub Section 1) and Section 77 (Sub Section 1).
6. HAZCHEM notices are to be prominently displayed.
7. Installation contractor to certify that the facility is in accordance with the statutes above.
8. Master electrician shall certify and issue a Certificate of Compliance in accordance with the Regulations.

KEY PLAN SCALE 1 : 5000

GENERAL NOTES

1. SETTING OUT TO BE CONFIRMED AND APPROVED BY CLIENTS PROJECT ENGINEER PRIOR TO CONSTRUCTION
2. ONLY WORK FROM CONSTRUCTION ISSUE DRAWINGS MUST BE UNDERTAKEN.
3. ALL DIMENSIONS MARKED THUS (*) ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

THIS DRAWING IS ISSUED FOR:-

CLIENTS APPROVAL	●	FABRICATION	
INFORMATION		CONSTRUCTION	
COMMENTS		REFERENCE	
TENDER		AS BUILT	
AIA APPROVAL			

SIGNED:..... DATE: .....

ISSUED FOR APPROVAL

No.	DATE	AMENDMENT	APPR'D
0.2	14/07/2010	REVISED No. OF TANKS	
0.1	13/07/2010	ORIGINAL ISSUE FOR APPROVAL	
0.0	02/07/2010	ORIGINAL ISSUE FOR COMMENTS	

cad file name: 040112-G-002.dwg

client/ customer: AngloAmerican THERMAL COAL — ISIBONELA COLLIERY

consultant/departmental
Petroleum Solutions
PETROLEUM SOLUTIONS & DESIGN SERVICES
P.O. BOX 25999
MONUMENT PARK 0105
TEL/FAX: 012 347 3775
Email: petroso@mweb.co.za

discipline: GENERAL

customer: ANGLO AMERICAN ISIBONELO COLLIERY

project number: P 040112

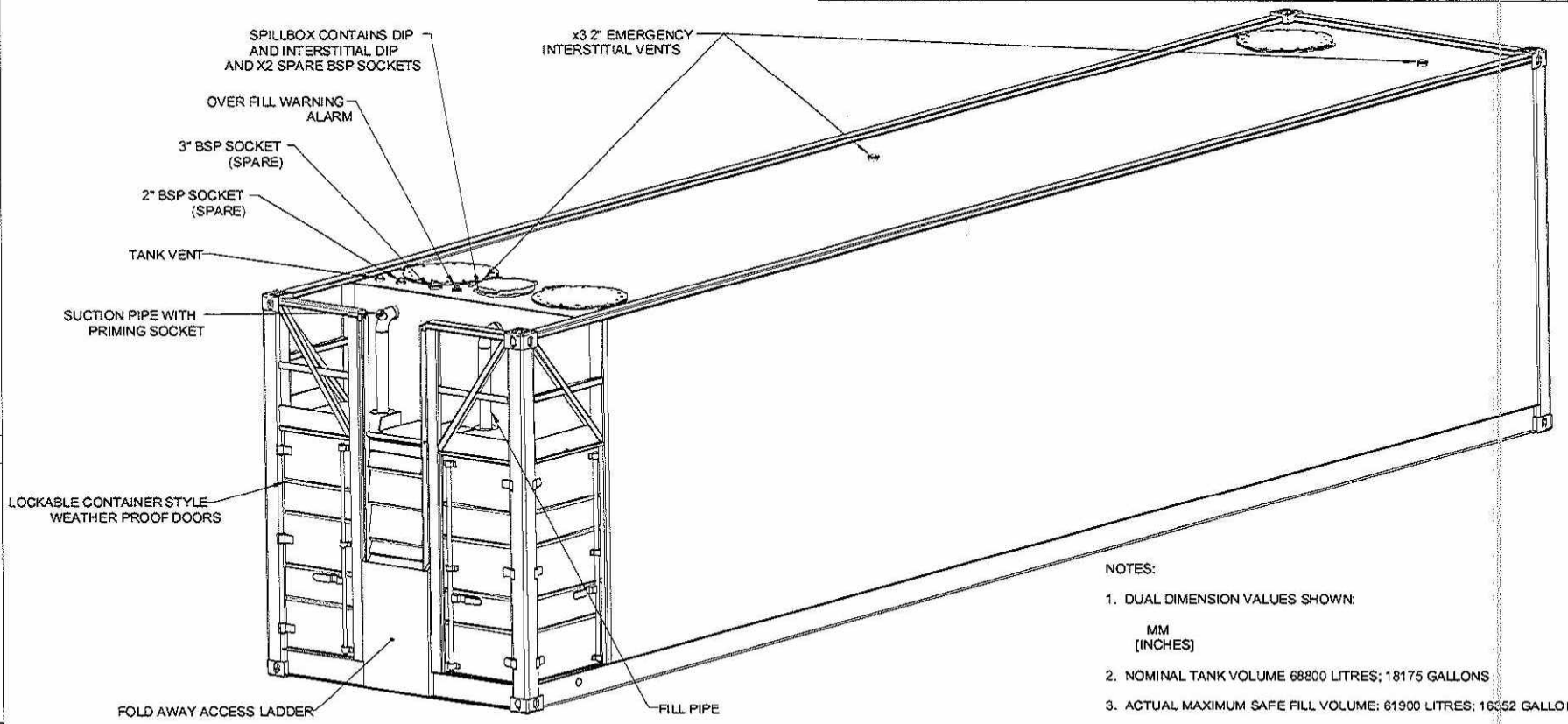
drawing title: PROPOSED EXTENSION GENERAL ARRANGEMENT

ref.no: G100	designed: N. CHAMBERLIN
scale: AS SHOWN ON A1 PLOT 1:1	drawn: PSDS
date: 23/08/2010	checked: HvH
type number:	
drawing number: 040112-G-002	revision: REV 0.2

T-68 Container Alternative

DRAWING NO	DO NOT SCALE
T-C68-GA01	
USED ON	

ISSUE	DATE	DESCRIPTION	APPROVED	ZONE
01	17-Jun-08	ORIGINAL ISSUE	TRANSTANK	ALL



NOTES:

1. DUAL DIMENSION VALUES SHOWN:

   MM
   [INCHES]

2. NOMINAL TANK VOLUME 68800 LITRES; 18175 GALLONS
3. ACTUAL MAXIMUM SAFE FILL VOLUME: 61900 LITRES; 16352 GALLONS
4. MAX PERMITTED FILL LEVEL: 2353 mm; 92.6" FROM TANK FLOOR.
5. TANK TARE MASS: 14260 KG; 31372 LBS

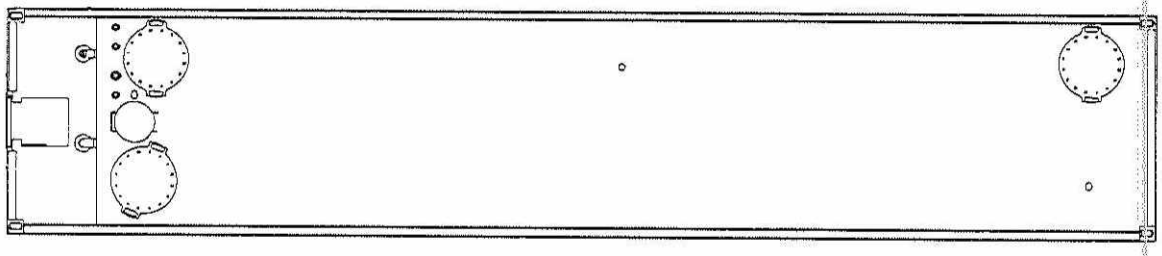
PART: T-C68-A02	FINISH: PRIME WITH UNIVERAL ETCH PRIMER PAINT WITH POLY-U-400 POLYURETHANE GLOSS PAINT COLOUR: BRILLIANT WHITE	TOLERANCES: ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE ALL TOLERANCES TO BE AS FOLLOWS: 0 ± 2 0.0 ± 0.5 0.00 ± 0.1 ANG ± 0.5 ° DRAWN TO AS1100	DRAWN: DESIGN TEAM — DATE: 17-Jun-08 DESIGN/CHECKED: DESIGN TEAM — DATE: 17-Jun-08 APPROVED: TRANSTANK — DATE: 17-Jun-08 CONFIGURED: DOCUMENT CONTROLLER — DATE: 17-Jun-08	TRANSTANK
MATERIAL: REFER COMPONENTS	CONFIDENTIAL This document and all information contained within it remains the property of TRANSTANK PTY LTD and specified parties deemed by TRANSTANK Pty Ltd. No part of this document may be copied without explicit consent of TRANSTANK PTY LTD ©TRANSTANK PTY LTD 2001			TITLE: T-68 GENERAL ARRANGEMENT DRAWING NO: T-C68-GA01 SCALE 3:100 — APPR MASS: — SHT 1 OF 2 — ISS: 01 SHEET SIZE: A3

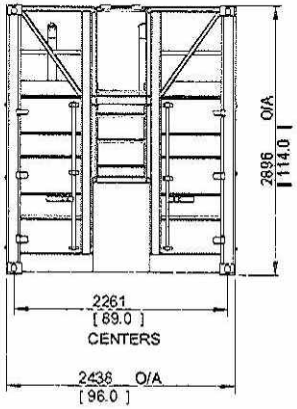
T-68 Container Alternative

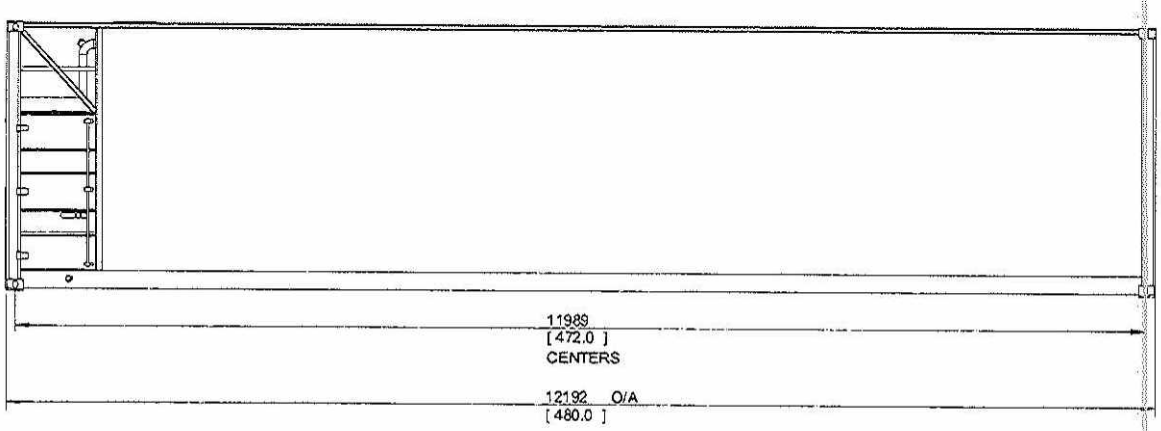
DRAWING NO					
T-C68-GA01					
USED ON					

DO NOT SCALE

ISSUE	DATE	DESCRIPTION	APPROVED	ZONE
01	17-Jun-08	ORIGINAL ISSUE	TRANSTANK	ALL







PART: T-C68-A02

MATERIAL: REFER COMPONENTS

FINISH:
PRIME WITH UNIVERAL ETCH PRIMER
PAINT WITH POLY-U-400
POLYURETHANE GLOSS PAINT
COLOUR: BRILLIANT WHITE

TOLERANCES:
ALL DIMENSIONS IN MM

UNLESS STATED OTHERWISE ALL TOLERANCES TO BE AS FOLLOWS:

0 ± 2
0.0 ± 0.5
0.00 ± 0.1
ANG ± 0.5 °

DRAWN TO AS1100

DRAWN	DESIGN TEAM	DATE 17-Jun-08
DESIGN/CHECKED	DESIGN TEAM	DATE 17-Jun-08
APPROVED	TRANSTANK	DATE 17-Jun-08
CONFIGURED	DOCUMENT CONTROLLER	DATE 17-Jun-08

TRANSTANK

TITLE
T-68 GENERAL ARRANGEMENT

	DRAWING NO T-C68-GA01		SHEET SIZE A3
SCALE 1:50	APPR MASS:	SHT 2 OF 2	ISS: 01

Isibonelo Colliery Site Photo's

	
North	North East
	
East	South East
	
South	South West

West

APPENDIX F – Impacts Rating Table

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
Topography										
TO1	Temporary disturbance of ground level as a result of stockpiling excavated soil and building material.	2.0	2.0	1.0	1.7	1.0	2.0	1.5	**2.5**	
		2.0	1.0	1.0	1.3	1.0	2.0	1.5		**2.0**
TO2	Permanent altering of the ground level due to excavation activities.	2.0	5.0	1.0	2.7	1.0	2.0	1.5	**4.0**	
		2.0	1.0	1.0	1.3	1.0	2.0	1.5		**2.0**
Soil										
S1	Potential compaction and erosion of soils removed and stockpiled during excavation activities.	3.0	3.0	1.0	2.3	2.0	3.0	2.5	**5.8**	
		2.0	2.0	1.0	1.7	2.0	2.0	2.0		**3.3**

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
S2	Loss of topsoil due to erosion of exposed areas following excavation or stockpiling.	3.0	3.0	1.0	2.3	4.0	3.0	3.5	8.2	
		2.0	2.0	1.0	1.7	3.0	2.0	2.5		4.2
S3	Loss of soil fertility due to contamination and exposure to erosion	3.0	3.0	1.0	2.3	4.0	3.0	3.5	8.2	
		2.0	2.0	1.0	1.7	3.0	2.0	2.5		4.2
S4	Contamination of soils resulting from incorrect storage/handling and disposal of hazardous waste materials	3.0	3.0	1.0	2.3	4.0	4.0	4.0	9.3	
		2.0	1.0	1.0	1.3	2.0	2.0	2.0		2.7
S5	Potential hydrocarbon spillages from the refuelling of equipment, machinery and vehicles may lead to contamination of the soil in and around the site.	3.0	3.0	1.0	2.3	4.0	4.0	4.0	9.3	
		2.0	1.0	1.0	1.3	3.0	2.0	2.5		3.3
S6	Mismanagement and / or incorrect storage of hazardous chemicals (fuel substances, etc.) resulting in soil contamination.	3.0	3.0	2.0	2.7	4.0	4.0	4.0	10.7	
		2.0	1.0	1.0	1.3	3.0	2.0	2.5		3.3
S7	Potential hydrocarbon spillages resulting from a leakage caused by a fracture/crack or rupture in the fuel storage tanks may lead to contamination of the soil in and around the site area.	4.0	4.0	2.0	3.3	2.0	2.0	2.0	6.7	
		2.0	2.0	1.0	1.7	1.0	2.0	1.5		2.5
Air										
A1	Increased dust generation due to excavations and soil	3.0	1.0	3.0	2.3	5.0	4.0	4.5	10.5	

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
[illegible]	stockpiles.	1.0	1.0	2.0	1.3	3.0	2.0	2.5		**3.3**
A2	Increased dust generation due to the use of dirt roads.	3.0	1.0	3.0	2.3	5.0	4.0	4.5	**10.5**	
		1.0	1.0	2.0	1.3	3.0	2.0	2.5		**3.3**
A3	Emissions from incorrectly maintained vehicles and machinery may contribute to local air pollution.	3.0	2.0	4.0	3.0	4.0	3.0	3.5	**10.5**	
		2.0	2.0	2.0	2.0	2.0	2.0	2.0		**4.0**
A4	The release of polluted air during each refuelling cycle.	3.0	3.0	3.0	3.0	5.0	5.0	5.0	**15.0**	
		3.0	3.0	3.0	3.0	5.0	5.0	5.0		**15.0**

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
Surface & Ground water										
SG1	Potential hydrocarbon spillages from equipment, machinery and vehicle storage may lead to the contamination of surface water and ground water.	4.0	3.0	3.0	3.3	3.0	3.0	3.0	**10.0**	
		2.0	2.0	1.0	1.7	2.0	2.0	2.0		**3.3**
SG2	Potential hydrocarbon spillages resulting from a leakage caused by a fracture/crack or rupture in the fuel storage tanks may lead to contamination of surface and groundwater.	4.0	3.0	3.0	3.3	2.0	2.0	2.0	**6.7**	
		2.0	2.0	1.0	1.7	1.0	2.0	1.5		**2.5**
SG3	Incorrect disposal of hazardous and non-hazardous materials or waste could contaminate surface and ground water resources.	4.0	3.0	2.0	3.0	4.0	3.0	3.5	**10.5**	
		2.0	2.0	1.0	1.7	2.0	2.0	2.0		**3.3**
SG4	Runoff containing suspended solids, sediments and fuel residue may contaminate surface water resources.	3.0	2.0	3.0	2.7	4.0	3.0	3.5	**9.3**	
		2.0	2.0	2.0	2.0	3.0	2.0	2.5		**5.0**
Land use										
	Loss of agricultural land use resources due to the	1.0	2.0	1.0	1.3	2.0	5.0	3.5	**4.7**	

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
LU1	Loss of agricultural land use resources due to the construction of the Fuel Storage tanks.	1.0	2.0	1.0	1.3	2.0	5.0	3.5		4.7
Flora & Fauna										
FF1	Fauna may be disturbed / killed by construction workers during the construction phase.	3.0	3.0	1.0	2.3	2.0	2.0	2.0	4.7	
		1.0	1.0	1.0	1.0	2.0	2.0	2.0		**2.0**
FF2	Fauna may come into contact with fuel/residue which may cause illness and/or death.	2.0	2.0	1.0	1.7	2.0	3.0	2.5	4.2	
		1.0	1.0	1.0	1.0	2.0	2.0	2.0		**2.0**
FF3	Soil compaction or contamination may limit vegetation growth or hamper re-establishment following mine closure.	2.0	2.0	1.0	1.7	2.0	3.0	2.5	4.2	
		2.0	2.0	1.0	1.7	2.0	3.0	2.5		**4.2**
Noise										
N1	Noise from construction vehicles, equipment and contractors could be a nuisance to the surrounding landowners and residents.	2.0	1.0	2.0	1.7	5.0	2.0	3.5	5.8	
		1.0	1.0	1.0	1.0	5.0	2.0	3.5		**3.5**
N2	Noise from construction vehicles and equipment and contractors could be a nuisance to the fauna in the vicinity.	3.0	1.0	2.0	2.0	5.0	3.0	4.0	8.0	
		2.0	1.0	1.0	1.3	5.0	3.0	4.0		5.3

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
Visual Aspects										
VA1	The construction of the bulk fuel storage tanks will have an impact on the aesthetic appeal of the landscape.	2.0	3.0	2.0	2.3	5.0	3.0	4.0	9.3	
		2.0	3.0	2.0	2.3	5.0	3.0	4.0		9.3
VA2	Visual impact associated with construction vehicles on site.	2.0	1.0	1.0	1.3	2.0	3.0	2.5	**3.3**	
		2.0	1.0	1.0	1.3	2.0	3.0	2.5		**3.3**
Waste Management										
WM1	The incorrect storage of hazardous waste materials may contaminate the surrounding environment.	4.0	3.0	2.0	3.0	4.0	4.0	4.0	**12.0**	
		2.0	2.0	1.0	1.7	2.0	2.0	2.0		**3.3**
WM2	The general waste created by on-site workers may cause pollution in the form of litter.	3.0	2.0	2.0	2.3	5.0	4.0	4.5	**10.5**	
		1.0	1.0	1.0	1.0	3.0	2.0	2.5		**2.5**
Traffic										
T1	Construction vehicles may result in a minimal increase in traffic congestion on the roads surrounding the mine.	2.0	1.0	3.0	2.0	5.0	4.0	4.5	9.0	
		1.0	1.0	2.0	1.3	4.0	3.0	3.5		**4.7**
	In the event of a vehicle accident on surrounding	4.0	1.0	3.0	2.7	2.0	4.0	3.0	8.0	

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
T2	roads, the resulting obstacle will result in a reduced traffic flow.	3.0	1.0	3.0	2.3	1.0	3.0	2.0		**4.7**
Cultural & Heritage Impacts										
CH1	Potential discovery of an artefact during site excavation	4.0	2.0	1.0	2.3	2.0	2.0	2.0	**4.7**	
		2.0	1.0	1.0	1.3	2.0	2.0	2.0		**2.7**
Health & Safety										
HS1	Contractors may be injured on-site, if the appropriate safety measures are not in place.	5.0	5.0	1.0	3.7	5.0	4.0	4.5	**16.5**	
		3.0	3.0	1.0	2.3	4.0	2.0	3.0		**7.0**
HS2	In the case of a diesel explosion/fire, injuries and/or deaths may result.	5.0	5.0	1.0	3.7	4.0	4.0	4.0	**14.7**	
		4.0	4.0	1.0	3.0	4.0	3.0	3.5		**10.5**
HS3	In the case of a construction vehicle accident, the driver and pedestrians may be injured or killed.	5.0	5.0	3.0	4.3	4.0	4.0	4.0	**17.3**	
		4.0	3.0	3.0	3.3	4.0	3.0	3.5		**11.7**
Employment										
E1	The activity may result in short term employment	2.0	1.0	4.0	2.3	5.0	4.0	4.5	**10.5**	

BIOPHYSICAL ENVIRONMENT										
		A	B	C	D	E	F	G	(DxG)	(DxG)
Ref No.	Impact Description	Severity	Duration	Extent	Consequence (A+B+C)/3	Frequency	Probability	Likelihood (E+F)/2	Environmental Significance (Without Mitigation)	Environmental Significance (With Mitigation)
E1	during construction.	2.0	1.0	4.0	2.3	5.0	4.0	4.5		**10.5**
E2	Temporary employment may be created during operational phase of the bulk fuel storage tanks.	3.0	3.0	4.0	3.3	5.0	3.0	4.0	**13.3**	
		3.0	3.0	4.0	3.3	5.0	3.0	4.0		**13.3**
E3	Training may be supplied to employees during the construction phase.	4.0	1.0	4.0	3.0	4.0	3.0	3.5	**10.5**	
		4.0	1.0	4.0	3.0	4.0	4.0	4.0		**12.0**
E4	Increased economic well-being in the region.	2.0	3.0	3.0	2.7	5.0	4.0	4.5	**12.0**	
		2.0	3.0	3.0	2.7	5.0	4.0	4.5		**12.0**

APPENDIX G1 - Completed AEL Application Form

APPENDIX G2 – Air Quality Impact Assessment Report

UNITED BY OUR DIFFERENCE

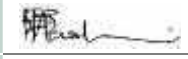
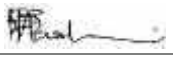
WSP

BULK FUEL STORAGE EXPANSION: AIR QUALITY IMPACT ASSESSMENT

Anglo American Thermal Coal: Isibonelo Colliery

February 2013

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	DRAFT 1	DRAFT 2	REPORT	
Date	22 January 2013	04 February 2013	15 February 2013	
Prepared by	P. Mashilo	P. Mashilo	P. Mashilo	
Signature				
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Authorised by			S. Doel	
Signature				
Project number	29750			
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BULK FUEL STORAGE EXPANSION: AIR QUALITY IMPACT ASSESSMENT

Anglo American Thermal Coal: Isibonelo Colliery

2013/02/15

Client

Anglo American Thermal Coal
Isibonelo Colliery, Trichardt
Mpumalanga

Consultant

Patricia Mashilo
WSP House
Bryanston Place, 199 Bryanston Drive
Bryanston
2021
South Africa

Tel: +27 11 361 1380
Fax: +27 11 361 1381

www.wspgroup.co.za

Registered Address

WSP Environment & Energy South Africa
1995/008790/07
WSP House, Bryanston Place, 199 Bryanston Drive, Bryanston, 2191, South Africa

WSP Contacts

Bradley Keiser
Bradley.Keiser@WSPGroup.co.za

Sean Doel
Sean.Doel@WSPGroup.co.za

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Executive Summary

Isibonelo Colliery proposes to expand their current diesel tank storage capacity located in Trichardt near Secunda, known as the Bulk Fuel Storage Expansion (BFSE) project. The project proposes the installation of an additional four 83 m^3 diesel storage tanks near the existing tanks farm, thus bringing the total storage capacity on site to 577 m^3. Isibonelo required an air quality impact assessment (AQIA) to be performed in order to assess the impact of the proposed expansion of the tanks farm on the receiving environment and human health. Due to the total storage capacity exceeding 500m^3, Isibonelo also requires an Atmospheric Emissions Licence (AEL) for the expansion of their tanks farm.

WSP Environment and Energy (WSP) were appointed by Anglo Thermal Coal to undertake the abovementioned air quality impact assessment for the proposed storage tanks farm and associated AEL.

The AQIA consisted of a baseline assessment, calculation of the existing and proposed tanks emissions and dispersion modelling. The dispersion modelling included three scenarios:

- Scenario 1: Modelling of emissions associated with the existing tanks;
- Scenario 2: Modelling of emissions associated with the proposed tanks; and
- Scenario 3: Modelling of cumulative emissions from the existing and proposed tanks.

All scenarios considered Total Volatile Organic Compound (TVOC) emissions and benzene emissions. Both the long-term (annual average) and worst case (hourly average) TVOC and benzene concentrations were compared to the benzene annual average ambient standard. The aim of this comparison was to show that if all concentrations (long-term and worst case) were below the stringent annual standard, then the impact from emissions associated with the existing and proposed tanks on the receiving environment would be minimal. Additionally, the calculated cumulative emission rate for TVOC was compared to the emission rate limit permitted in the NEM:AQA Listed Activities, Category 2, Subcategory 2.2: Storage and Handling of Petroleum Products, which indicated the cumulative emission rates of TVOC were well below the permitted emission rate.

The findings from Scenario 1 (existing tanks) dispersion modelling indicated:

- Both the annual average (long-term) and hourly average (worst-case) TVOC and benzene concentrations indicated full compliance with the annual benzene standard, with concentrations remaining low at all receptors.

The findings from Scenario 2 (proposed tanks) dispersion modelling indicated:

- Both the annual average and hourly average TVOC and benzene concentrations indicated full compliance with the annual benzene standard, with concentrations remaining low at all receptors.

The findings from Scenario 3 (cumulative tanks) dispersion modelling indicated:

- Annual average TVOC concentrations associated with the cumulative emissions from the tanks remained low at all receptors, with no exceedences of the annual benzene standard predicted, while the worst-case hourly average concentrations were slightly elevated, although still indicated full compliance with the annual benzene standard;
- Annual average and worst-case hourly average benzene concentrations remained significantly low at all receptors, indicating full compliance with the annual benzene standard.

Regarding the predicted concentrations, when compared to concentrations associated with existing emissions, the proposed tank emissions TVOCs and C_6H_6 concentrations are slightly elevated, although the cumulative concentrations indicate full compliance, with no exceedences of the annual benzene standard predicted.

Cumulative impacts of emissions from the storage tanks facility are low, with little impact on the receiving environment predicted. Based on the findings of this assessment, the expansion of the tanks farm at Isibonelo Colliery can be approved.

1 Introduction

Anglo American Thermal Coal (Anglo) currently operates the Isibonelo Colliery (Isibonelo) in the Mpumalanga Province near Trichardt, Secunda. Isibonelo has identified a need to expand their current diesel tank storage capacity in order to accommodate the corporate supply chain management strategy. The Bulk Fuel Storage Expansion (BFSE) project proposes the installation of an additional four 83 m^3 diesel storage tanks near the existing tanks farm, thus bringing the total storage capacity on site to 577 m^3. Isibonelo requires an air quality impact assessment (AQIA) to be performed in order to assess the impact of the proposed expansion of the tanks farm on the receiving environment and human health. Due to the total storage capacity exceeding 500m^3, Isibonelo will require an Atmospheric Emissions Licence (AEL) for the expansion of their tanks farm.

WSP Environment and Energy (WSP) have been appointed by Anglo to conduct an AQIA for the proposed bulk fuel storage through the compilation of an emissions inventory, air dispersion modelling and assessment and management techniques going forward as well as the associated Atmospheric Emissions Licence. This report details the findings of the assessment.

1.1 Terms of Reference

The AQIA aims to identify potential air quality impacts associated with the proposed plant, providing guidance for mitigation and (where necessary) scope for further study. The following is a summary of the scope of work performed by WSP:

- A baseline air quality assessment for the area, providing background to the study in terms of site location; site specific pollutant sources and receptors; and existing meteorological conditions;
- The compilation of an emissions inventory to identify emission sources and quantify emissions on site;
- The development of a dispersion model which will be used to support the impact assessment findings;
- Evaluation of predicted pollutant levels against relevant standards;
- Impact assessment and recommendations (if necessary) for mitigation and management of air quality onsite; and
- Application for Atmospheric Emissions Licence.

1.2 Rational for the Study

Anglo Thermal coal is proposing to expand the storage tanks farm at Isibonelo Colliery through the installation of four extra diesel tanks. All permanent immobile liquid storage tanks larger than 500 m^3 cumulative tankage capacity at a site are listed activities, according to the published Listed Activities (NEM: AQA 2004: Act No. 39 of 2004) Category 2: Petroleum Industry, The Production of Gaseous and Liquid Fuels as well as Petrochemicals from Crude Oil, Coal, Gas or Biomass, Subcategory 2.2: Storage and Handling of Petroleum Products.

The total capacity of cumulative tanks at Isibonelo is above the 500 m^3 capacity threshold as stipulated in Subcategory 2.2: Storage and Handling of Petroleum Products, therefore an air quality impact assessment is required, with the associated Atmospheric Emission License (AEL) for the storage and handling of petroleum products. Due to the tanks throughput exceeding 5000 m^3 per annum, the storage tanks must be fitted with vapour recovery units; and with the liquids having a vapour pressure less than 14 kPa, the fixed roof tanks must be vented to atmosphere.

1.3 Air Quality Consultant

Patricia Mashilo is an air quality consultant with a National Diploma in Environmental Sciences obtained from the Tshwane University of Technology. Currently in her seventh year of air quality consulting, she has worked on numerous projects in South Africa.

1.4 Declaration of Independence

I hereby declare that I am fully aware of my responsibilities in terms of the National Environmental Management Act 2006 EIA Regulations and that I have no financial or other interest in the undertaking of the proposed activity other than the imbursement of consultants fees.

Name: Patricia Mashilo

Company: WSP Environmental (Pty) Ltd

Signature: 

2 Air Quality Legal Overview

Air quality limits and thresholds are fundamental to effective air quality management, providing the link between the potential source of atmospheric emissions and the user of that air at the downwind receptor site. Air quality standards are enforceable by law whilst guidelines are used primarily as an indication of the level of impact. Ambient air quality standards indicate safe daily exposure levels for the majority of the population, including the very young and the elderly, throughout an individual's lifetime.

The National Environmental Management: Air Quality Act 39 of 2004 (NEM:AQA), which repeals the Atmospheric Pollution Prevention Act of 1965, came into effect on 11 September 2005, initially with exclusions of certain sections such as the licensing of listed activities. However, the Atmospheric Pollution Prevention Act has now been repealed in full as discussed below. Key features of the new legislation include:

- Decentralising air quality management responsibilities;
- Requiring significant emission sources to be identified, quantified and addressed;
- Setting ambient air quality targets as goals for driving emission reductions;
- Recognising source-based (command and control) measures in addition to alternative measures, including market incentives and disincentives, voluntary programmes and education and awareness;
- Promoting cost optimised mitigation and management measures;
- Stipulating air quality management planning by authorities, and emission reduction and management planning by sources;
- Providing for access to information and public consultation.

The Act introduces a system based on ambient air quality standards and corresponding emission limits to achieve them. Two significant regulations stemming from NEM:AQA have been promulgated in this regard, namely:

- **GNR 248** on 31 March 2010 (Government Gazette 33064) National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) List of Activities which result in Atmospheric Emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage.
- **GNR 1210** on 24 December 2009 (Government Gazette 32816) National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) National Ambient Air Quality Standards.

2.1 Listed Activities

The main pollutants of concern from the Isibonelo storage facility include Total Volatile Organic Compounds (TVOC). According to the NEM:AQA listed activities, VOC emissions from the storage tanks are regulated under Category 2:Petroleum Industry, the production of gaseous and liquid fuels as well as petrochemicals from crude oil, coal, gas and biomass; Subcategory 2.2: Storage and Handling of Petroleum Products (Table 1), whilst storage vessel specifications for liquids are presented in Table 2. Benzene emissions are regulated in terms of the NEM:AQA ambient air quality standards (Table 3).

Table 1: Category 2: Petroleum Industry. Subcategory 2.2: Storage and handling of petroleum products (NEM:AQA)

Description:	Petroleum product storage tanks and product transfer facilities, except those used for liquefied petroleum gas.		
Application:	All permanent immobile liquid storage tanks larger than 500 cubic meters cumulative tankage capacity at a site.		
Substance or mixture of substances		**Plant status**	**mg/Nm^3 under normal conditions of 273 Kelvin and 101.3kPa (daily average).**
Common name	**Chemical symbol**		
Total volatile organic compounds from vapour recovery/destruction units (Thermal treatment)	N/A	New	150
		Existing	150
			g/Nm^3 under normal conditions of 273 Kelvin and 101.3kPa (daily average).
Total volatile organic compounds from vapour recovery/destruction units (Non-thermal treatment)	N/A	New	40
		Existing	40

At present the current storage farm comprises of two 83 m^3 diesel tanks, four 14 m^3 lube oil tanks and one 23 m^3 used oil tank totalling a volume capacity of 245 m^3. The proposed bulk fuel storage capacity consisting of four 83 m^3 diesel tanks will have a storage capacity of 332 m^3. Therefore, the total storage capacity onsite will be approximately 577 m^3, triggering the need for an Atmospheric Emissions Licence (AEL).

Within Subcategory 2.2: Storage and Handling of Petroleum Products, it is specified that petroleum liquids should be stored in tanks/vessels of different types depending on the liquid's vapour pressure. These specifications are presented in Table 2 below.

Table 2: Storage vessel specifications for liquids with different vapour pressures

True vapour pressure of contents at storage temperature	Type of tank or vessel
Up to 14 kPa	Fixed roof tank vented to the atmosphere.
Above 14 kPa up to 91 kPa	External floating roof tank with primary and secondary rim seals for tank diameter larger than 20m, *or* fixed roof tank with internal floating deck fitted with primary seal, *or* fixed roof tank with vapour recovery system.
Above 91 kPa	Pressure vessel.

Subcategory 2.2 requires that facilities with a throughput greater than 5000 m^3 per annum are equipped with a vapour recovery unit and that the loading of liquids with a vapour pressure of 14kPa and above is via bottom loading with the vent pipe connected to a gas balancing line. The current throughput at Isibonelo tanks farm is greater than 5000 m^3, indicating that the vapour recovery unit should be installed, although the liquids have a lower vapour pressure indicating that the tanks should have a fixed roof vented to the atmosphere.

2.2 National Ambient Air Quality Standards

Air Quality standards and guidelines are specified in the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA), SANS 69 Framework for setting and implementing national ambient air quality standards as well as SANS 1929:2005 Ambient Air Quality - Limits for Common Pollutants. The priority pollutants as defined by the Act are Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Particulate matter (PM_{10}), Ozone (O_3), Benzene (C_6H_6), Lead (Pb) and Carbon monoxide (CO). The legislated standard for ambient air quality relating to Isibonelo is benzene, as presented in Table 3.

Table 3: National Ambient Air Quality Standards for Benzene

Benzene (C_6H_6)			
Averaging Period	**Concentration (µg/m^3)**	**Frequency of Exceedence**	**Compliance Date**
Annual	10	0	Immediate – 31/12/2014

3 Project Background

Anglo proposes to install diesel tanks at their Isibonelo Colliery near Trichardt in the Mpumalanga Province. The Bulk Fuel Storage Expansion (BFSE) project proposes the installation of an additional four 83 m^3 diesel storage tanks near the existing tanks farm, thus bringing the total storage capacity on site to 577 m^3. Seven tanks exist which include two (2) diesel storage tanks, each with a capacity of 83 m^3 and four (4) lube oil tanks each with a capacity of 14 m^3.

3.1 Locality and Study Area

The Isibonelo Colliery is situated in the Mpumalanga Province (which is located on the North Eastern portion of South Africa), between the towns of Kinross, Secunda, Bethal and Kriel, within the Gert Sibande District Municipality and the Govan Mbeki Local Municipality.

The Bulk Fuel Storage Expansion is proposed on Portion 28 of the farm Aangewys 81 IS. Land use in the area comprises agricultural activities, industrial complexes, power generation facilities, as well as mining. Figure 1 indicates the location of Isibonelo Colliery tanks farm and the mining area.

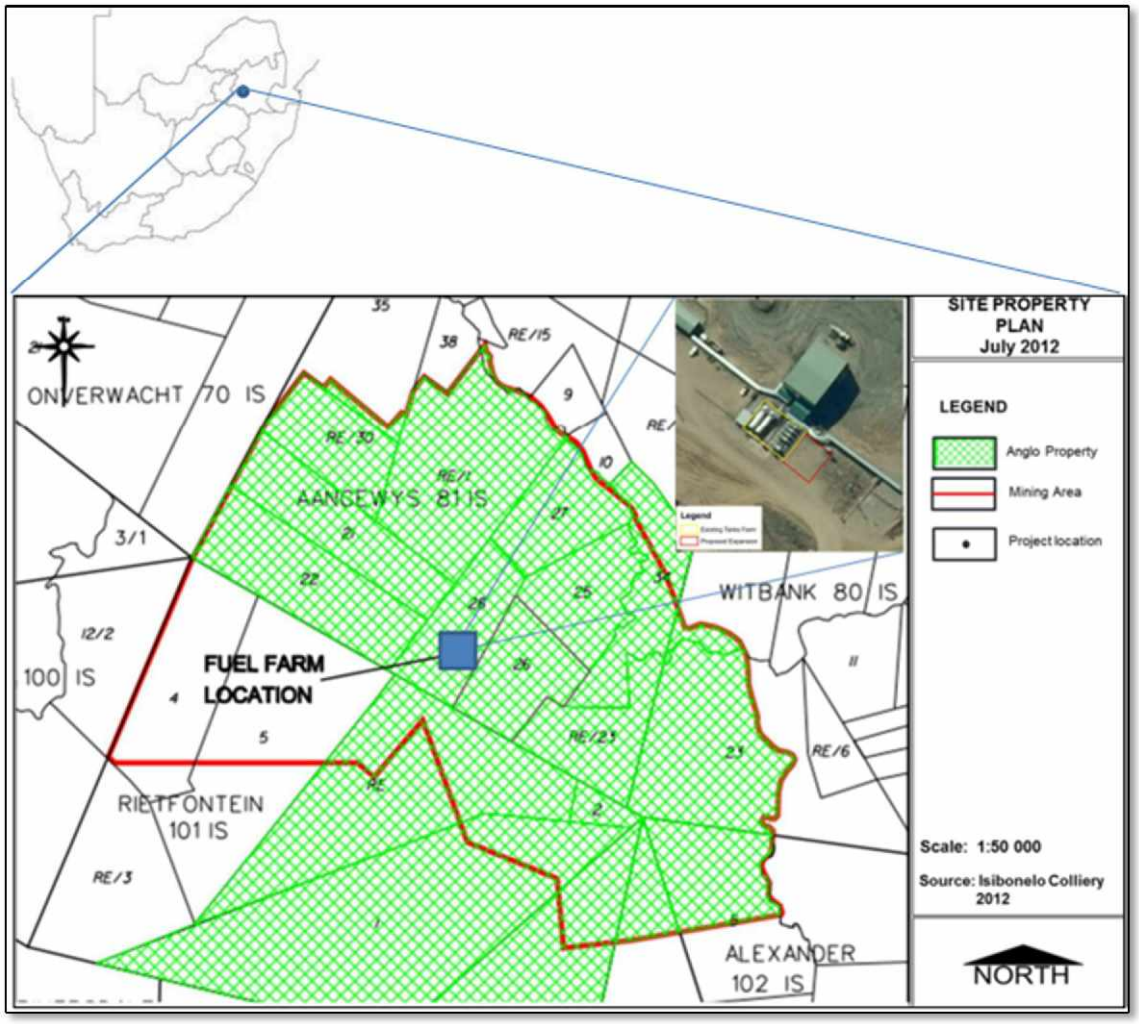

Figure 1: Location of the Isibonelo Colliery and the proposed bulk fuel storage expansion

3.2 Project Overview

The Isibonelo Colliery was established as an opencast operation to supply coal to Sasol's Synthetic Fuel (SSF) plant located in Trichardt, Secunda. In November 2003 construction work began and the first coal was supplied to SSF in July 2005. Isibonelo primarily utilizes the dragline strip-mining method as a means of coal removal from the coal seams encompassed in the Highveld coalfield.

Bituminous coal seams hosted by the sedimentary strata in the Isibonelo Mining Licence area include, from the base up, the No 1, 2, 3, 4 and 5 seams. Only the No 4 seam is presently considered to be economically viable, with an average opencast depth of 40 m and a thickness of 5.6 m. In order to operate the mine on a daily basis the following equipment and infrastructure is required: Marion drag-lines, overburden drills, hydraulic shovels and diesel-drive 150-tcoal haulers which are used during the conventional opencast-mining process. The extracted coal is then delivered to the primary in-pit sizing plant, after which it is conveyed along a surface conveyor to a bunker. The coal in the bunker is then delivered to the Sasol overland conveyor system.

In order to operate the said machinery, equipment and infrastructure, Isibonelo is required to store a large volume of fuel on-site. Isibonelo currently consumes 30 m^3 of diesel per day with the current tank capacity offering a five day reserve for mining activities. As part of an IC corporate supply chain management strategy to mitigate against diesel fuel supply risk, a 10 day supply was determined as optimal.

At present, the onsite storage comprises two 83 m^3 above ground diesel storage tanks, located near the pit workshop, four 14 m^3 lube oil tanks and one 23 m^3 used oil tank totalling 245 m^3 (offering a five day supply). Isibonelo has two more 14 m^3 petrol underground storage tanks towards the main offices, although these petrol tanks were excluded from the AQIA, since they are located approximately 12 km away from the tank farm.

Isibonelo identified a need to expand their current diesel tank storage capacity in order to accommodate the above mentioned corporate supply chain management strategy. The Bulk Fuel Storage Expansion Project proposes the installation of an additional four 83 m^3 diesel above-ground storage tanks near the existing tanks farm, thus bringing the total storage capacity on site to 577 m^3.

4 Methodology

4.1Air Quality Impact Assessment

4.1.1 Modelling Software

Atmospheric dispersion modelling mathematically simulates the transport and fate of pollutants emitted from a source into the atmosphere. Sophisticated software with algorithms that incorporate source quantification, surface contours and topography, as well as meteorology can reliably predict the downwind concentrations of these pollutants.

Version 4.2 of the Atmospheric Dispersion Modelling System (ADMS) dispersion model was chosen for this assessment, based on previous experience. Cambridge Environmental Research Consultants (CERC) have developed ADMS to offer a practical dispersion model that simulates a wide range of buoyant and passive releases to the atmosphere, whether individually or in combination. It is recognised as a leading dispersion model in the UK, European Union (EU), Asia, Australasia, the Middle East and South Africa, drawing on the latest plume dispersion mathematics and based on a solid GIS platform (ArcView 3.3 & ArcGIS 9.2). The software is currently endorsed by the Climate Research Group (operating from the University of the North-West, University of KwaZulu-Natal & University of Cape Town) and used by most metro councils in South Africa. Output for criteria pollutants has been extensively validated against field data sets in the EU and the American Standard Test Methods. The model handles multiple point, line, area and volume sources to produce long- and short-term scenarios for comparison with measured values (in the case of an existing plant), guidelines, standards and objectives. The interface requires detailed geographic data, sequential meteorological data, efflux and emission parameters to produce optimal output; the preparation of which for this investigation is described in the following sections.

4.1.2 GIS Input

The modelling domain selected for this campaign is 3,000m x 3,000m, with the tank farm as the centre point; covering an approximate area of 900 ha. Table 4 presents the modelling domain coordinates.

Table 4: Modelling Domain coordinates

Domain Point	x Coordinate (m)	y Coordinate (m)
North-Western Point	25069.45	-2911713.11
North-Eastern Point	28069.45	-2911713.11
South-Western Point	25069.45	-2914713.11
South-Eastern Point	28069.45	-2914713.11

Terrain has the potential to inhibit the dispersion of pollutants, especially during periods of stable conditions during which temperature inversions are prevalent. Complex terrain was not included in the modelling as the terrain in the vicinity of the tanks farm is of a flat nature.

4.1.3 Meteorological Input

Meteorological conditions affect how pollutants emitted into the air are directed, diluted and dispersed within the atmosphere, and therefore incorporation of reliable data into an air quality impact assessment is of the utmost importance.

In order to run long-term dispersion models (annual), at a minimum a full year's data is required. Meteorological data for 2009, 2010, 2011 and 2012 was obtained from the Secunda Weather Station, located approximately 20 km south-south-west of the proposed Isibonelo tanks farm. Data from this station is considered to be representative of the prevailing meteorological conditions in the Isibonelo area. Meteorological data for 2009, 2011 and 2012 were excluded due to missing parameters required in the modelling calculations, which resulted in fewer met lines used in the model, as well as slightly lower overall data recovery percentages when compared to 2010. Rainfall data from March 2011 to July 2012 was missing due to the faulty gauge recording inadequate data for modelling purposes.

For modelling purposes, cloud cover is required, which is not monitored at the Secunda Station. Therefore cloud cover data was sourced from the SAWS Ermelo Station, which is located approximately 75 km south-east of the Isibonelo tanks farm. Figure 2 illustrates the meteorological data path, while Table 5 presents the statistical summary of the data used to generate the wind roses.

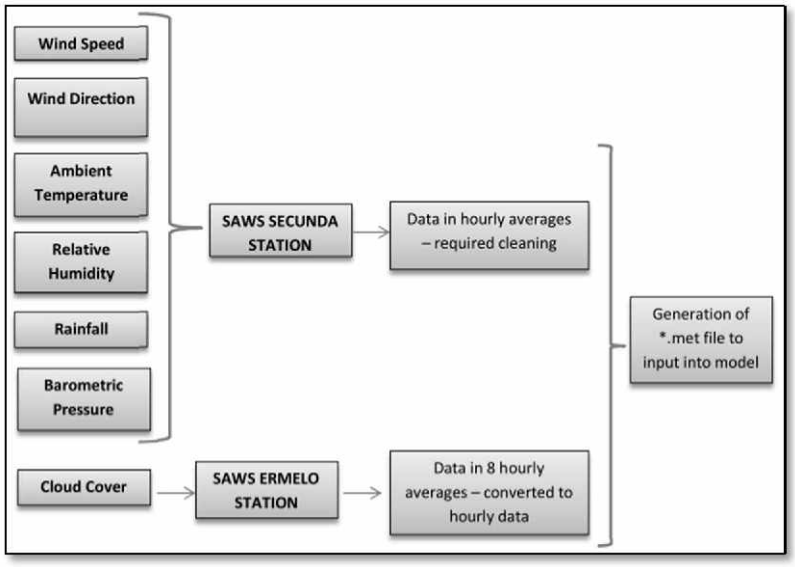

Figure 2: Meteorological data path

Table 5: Meteorological data availability for Secunda for 2010

Met Data	Total Met Lines	Total Used	Data Availability (%)	Inadequate Data	Met Lines with Calm Conditions
2010	8760	7800	89.0	30	930

Table 6 presents the meteorological lines used in the dispersion model.

Table 6: Statistics regarding meteorological data used in the dispersion model

Met Data	Total Met Lines	Met Lines Used	% Met Used	Calm Conditions	% Calms	Inadequate Data
2010	8760	7800	89	930	10.6	30

4.1.4 Pollutant Source Input: Emissions Inventory

An accurate emissions inventory and calculation of emission rates is imperative to produce an accurate, complete predictive dispersion model (EPA, 1998). In the quantification of emissions from the existing and proposed storage tanks at Isibonelo Tanks Farm, use was made of the TANKS Model. TANKS model is a Windows-based computer software program that estimates Volatile Organic Compound (VOC) and Hazardous Air Pollutant (HAP) emissions from fixed- and floating-roof storage tanks. TANKS is capable of calculating individual component emissions from known mixtures and estimating emissions from crude oils and selected refined petroleum products using liquid concentration HAP profiles supplied with the program (EPA, 1999).
Figure 3 below presents the location of the existing and proposed storage tanks at the Isibonelo Colliery.

Figure 3: Location of existing and proposed storage tanks

4.1.4.1 Existing Storage Tanks

The US EPA's TANKS 4.0.9 model was used to calculate an emission estimate for the Isibonelo tanks. The TANKS model is applicable for emissions from organic liquids in storage tanks and is based on the AP42 emission factors. Data input includes the storage tank dimensions, physical characteristics, contents and locations. An emissions report is generated for each chemical stored in the tank at various timescales. Both breathing and working losses are accounted for in the estimate.

The TANKS model was run for the storage tanks at the Isibonelo tanks farm for both existing and proposed scenarios. The data input parameters applied to each existing tank are provided in Table 7 below. Data has been reported in the specific units required for input to the TANKS model as this is a requirement of the local authorities.

Table 7: Data input parameters for the existing tanks into TANKS model

	TANK 1	TANK 2	TANK 3	TANK 4	TANK 5	TANK 6	TANK 7
Mixture name	*Diesel*	*Diesel*	*Lube Oil*	*Lube Oil*	*Lube Oil*	*Lube Oil*	*Used Oil*
Shell height (ft)	2.63	2.63	2.63	2.63	2.63	2.63	2.63
Shell Diameter (ft)	9.4	9.4	9.4	9.4	9.4	9.4	9.4
Working Volume (gal)	21926.3	21926.3	3698.4	3698.4	3698.4	3698.4	6075.9
Turnovers per year	198	198	8.7	8.7	8.7	8.7	-
Net throughput (gal per year)	4339026.74	4339026.74	32301.6	32301.6	32301.6	32301.6	2217724.8
Is the Tank heated?	No	No	No	No	No	No	No
Roof colour	Silver	Silver	Silver	Silver	Silver	Silver	Silver
Roof condition	Good	Good	Good	Good	Good	Good	Good
Shell condition	Good	Good	Good	Good	Good	Good	Good

The dimensions for each tank used as input for the dispersion model are presented in Table 8. The flow rate from the tank vents was calculated using the US EPA's gas volumetric flow rate equation presented below:

$$Flow\ rate = \left(\left(\frac{\pi}{4}\right) \times (diameter^2)\right) \times average\ wind\ speed$$

Table 8: Tank parameters used in the dispersion model

Storage tanks	Diesel Tanks (Tanks 1 – 2)	Lube oil Tanks (Tanks 3 – 6)	Used Oil Tank (Tank 7)
Height of release (m)	0.8	0.8	1
Diameter of release (m)	2.87	2.87	2.7
Flow rate (m³/s)	15.3	15.3	13.5
Temperature (°C)	Ambient	Ambient	Ambient

Table 9 below presents the emission rates for the existing tanks as input into the dispersion model. At present the total volatile organic compounds emissions from the existing storage tanks at Isibonelo Colliery are lower than the limit in the NEM:AQA Listed Activities Category 2:Petroleum Industry, subcategory 2.2: Storage and Handling of Petroleum Products. The total VOCs emissions are calculated as 0.00325 g/m³ from the existing tanks, remaining below the 40 g/Nm³.

Table 9: Emission rates from the existing tanks at Isibonelo used as input for the dispersion model

Tank Name	TVOC (g/s)	Benzene (g/s)	Toluene (g/s)	Ethylbenzene (g/s)	Xylene (g/s)	Other Components (g/s)
Diesel Tank 1	1.919E-02	1.762E-04	3.604E-04	3.510E-05	7.335E-05	1.854E-02
Diesel Tank 2	1.919E-02	1.762E-04	3.604E-04	3.510E-05	7.335E-05	1.854E-02
Lube Oil Tank 1	1.582E-06	-	-	-	-	-
Lube Oil Tank 2	1.582E-06	-	-	-	-	-
Lube Oil Tank 3	1.582E-06	-	-	-	-	-
Lube Oil Tank 4	1.582E-06	-	-	-	-	-
Used Oil Tank 1	9.916E-03	9.105E-05	1.827E-05	1.866E-04	3.797E-05	9.579E-03
Total Emissions	**0.048299**	**0.000443**	**0.000739**	**0.000257**	**0.000185**	**0.046665**

4.1.4.2 Proposed Storage Tanks

The data input parameters in TANKS model applied to each proposed diesel tank are provided in Table 10. The emission rates as input into ADMS are presented in Table 11. The total VOC emissions calculated from the proposed tanks is 0.00557 g/Nm³, remaining below the emission limit of 40 g/Nm³ in NEM:AQA Listed Activities for non-thermal total volatile organic compounds from vapour recovery or destruction units for new plants.

Table 10: Data input parameters for the proposed diesel tanks into TANKS model

Tank Properties	TANK 1	TANK 2	TANK 3	TANK 4
Mixture name	*Diesel*	*Diesel*	*Diesel*	*Diesel*
Shell height (ft)	2.63	2.63	2.63	2.63
Shell Diameter (ft)	9.4	9.4	9.4	9.4
Working Volume (gal)	21926.3	21926.3	21926.3	21926.3
Turnovers per year	198	198	198	198
Net throughput (gal per year)	4339026.7	4339026.7	4339026.7	4339026.7
Is the Tank heated?	No	No	No	No
Roof colour	Silver	Silver	Silver	Silver
Roof condition	Good	Good	Good	Good
Shell condition	Good	Good	Good	Good

Table 11: Emission rates of the proposed diesel tanks at Isibonelo used as input for the dispersion model

Tank Name	TVOC (g/s)	Benzene (g/s)	Toluene (g/s)	Ethylbenzene (g/s)	Xylene (g/s)	Other Components (g/s)
Diesel Tank 1	2.125E-02	1.952E-04	4.022E-04	3.941E-05	8.256E-05	2.053E-02
Diesel Tank 2	2.125E-02	1.952E-04	4.022E-04	3.941E-05	8.256E-05	2.053E-02
Diesel Tank 3	2.125E-02	1.952E-04	4.022E-04	3.941E-05	8.256E-05	2.053E-02
Diesel Tank 4	2.125E-02	1.952E-04	4.022E-04	3.941E-05	8.256E-05	2.053E-02
Total Emissions	**0.08500**	**0.00078**	**0.00161**	**0.00016**	**0.00033**	**0.08212**

4.1.5 Modelling Scenarios

In order to calculate the impact of emissions associated with the operation of the bulk fuel tank storage at Isibonelo, various scenarios were modelled (Table 12). The scenarios considered the emissions from the existing storage tanks, the proposed storage tanks, and the impact of cumulative emissions (existing and proposed tanks). These scenarios were modelled with unadjusted 2010 meteorological data.

Table 12: Summary of modelling scenarios

Scenario	Met Data	Sources Included
Scenario 1	2010	Existing storage tank emissions
Scenario 2	2010	Proposed storage tank emissions
Scenario 3	2010	Cumulative emissions: Existing and Proposed tank emissions

For compliance purposes, TVOCs and Benzene (C_6H_6) were compared to the relevant emission limits and standards. Modelling results from the scenarios listed above are included as tables indicating concentrations at sensitive receptors, predicted exceedences at receptors, long-term concentration isopleths, short-term worst case scenario isopleths and exceedence isopleths (where applicable).

Construction for the proposed tanks farm was excluded from this assessment. The main focus of the study was to identify the impact of the existing and proposed storage tanks on the receiving environment.

4.1.5.1 Statistical Modelling Descriptions

For the purposes of this investigation, various statistical outputs were generated, as described below:

- Long-Term Scenario

  The long-term scenario refers to an annual concentration, which is calculated by averaging all hourly concentrations. The calculation is conducted for each grid point within the modelling domain, which are used to create the plume outputs, while the actual long-term concentration at each receptor point are presented in a results table.

- Worst-case Scenario

  The worst-case scenario refers to the 100^{th} percentile concentration (P100), which is the maximum concentration predicted at any grid point within the modelling domain. The worst case concentration at a point occurs only once per annum. In terms of the graphical representation of the P100 results as concentration isopleths, it must be noted that these images represent the worst-case concentrations at all grid points. However, in practice the worst-case concentrations will not occur simultaneously across the model domain and hence the P100 images do not depict a 'worst-case contaminant plume' but rather the distribution of worst case concentrations.

- Predicted Number of Exceedences

  The predicted number of exceedences indicates the number of exceedences expected at a single point. This prediction is not a worst-case scenario, but rather indicates the total number of times / occurrences that the standard is exceeded at a given point (grid cell). As an example, an hourly exceedence prediction considers all hourly concentrations (8,760 values when using a single year of met data) at a single point, and predicts the number of hours that would exceed the hourly standard.

4.1.6 Receptor Identification

Receptors are identified as areas that may be negatively impacted on due to emissions from the Isibonelo tanks farm. Examples of receptors include, but are not limited to residential areas, schools, shopping centres, hospitals and office blocks. The sensitive receptors identified in the area surrounding the Isibonelo tanks farm are presented in Table 13 and Figure 4.

Table 13: Sensitive receptors surrounding the Isibonelo Tanks Farm

Receptor ID	Receptor Description	Direction from nearest Tanks Farm boundary	Distance from Tanks Farm boundary (m)
Receptor1	Industrial	N	13
Receptor2	Industrial	NNW	108
Receptor3	Industrial	SW	145
Receptor4	Industrial	SW	436
Receptor5	Residential	SSE	880

Figure 4: Map indicating the location of sensitive receptors surrounding Isibonelo Tanks Farm

5 Assumptions and Limitations

Various assumptions were made and limitations experienced during this assessment, as indicated below:

Limitations

- There was no onsite meteorological station at Isibonelo; therefore meteorological data was sourced from the nearest South African Weather Services Station in Secunda located approximately 20 km south-west of Isibonelo Colliery. It is assumed this meteorological data is representative of meteorological conditions at the Isibonelo tanks farm, ;
- Cloud cover is not measured at the Secunda station; therefore cloud cover was obtained from the South African Weather Station in Ermelo, located approximately 73km south-east of Isibonelo tanks farm;
- For modelling purposes, only 2010 meteorological data was included in the model due to the limitations of the meteorological data obtained in the years 2009, 2011 and 2012.

Assumptions

- It was assumed that the emissions inventory, as provided by and approved by Anglo, is representative of reality;
- The properties of Residual Oil No. 6 were assumed to be representative of the properties of the chemicals in the existing storage tanks, with the vapour pressure of the oil being less than 0.5 psia and a density of less than 1000 kg/m^3.

6 Baseline Assessment

6.1 Climate and Atmospheric Dispersion

Isibonelo Colliery is situated in the Govan Mbeki Local Municipality within the Gert Sibande District Municipality in Mpumalanga Province of South Africa. The Govan Mbeki municipality is situated in a subtropical climate zone, where rainfall occurs in the summer months between September and May. Throughout the region, 95% of the rainfall is received during the summer months, October to March, but the month of maximum precipitation is generally in either January or February. The western portions of the municipality can receive between 600 – 800 mm/year and the eastern portion can receive between 800 – 1000 mm/year. In summer, temperatures range from as high as 40 °C during the day to 10 °C in the evenings. Winters are milder and temperatures usually vary between 20 °C during the day and 10 °C in the evenings. Frost does occur, but apart from light frost which may occur from May to August, the period during which ordinary frosts may be expected is less than 30 days per year (Govan Mbeki IDP, 2007). The strongest winds blow from the south-west and north-west in winter and from the east and north-west in summer.

Transport of pollutants is dependent on the state of the atmosphere (i.e. the stability regime) and circulation of air. Atmospheric transport within the area occurs both vertically and horizontally. Vertical transport is primarily due to deep convection. This convection transports air and any air pollutants contained therein from the surface into the upper atmosphere. Vertical motion is eventually inhibited due to the absolutely stable layers found preferentially at ~700 hPa, ~500 hPa and ~300 hPa on no-rain days. These stable layers trap pollutants at lower atmospheric levels and so influence the transport of pollutants over the whole of Southern Africa (Cosijn and Tyson, 1996; Garstang et al., 1996).

On a more local scale, like that of the Govan Mbeki Local Municipality, vertical motion and hence dispersion of pollutants is inhibited by surface inversions that form during the night predominantly during winter. These inversions are a result of radiational cooling at the surface and are most pronounced just before sunrise. In the presence of sunlight the inversions begin to break down through convective heating and the height of the mixed layer is increased, allowing for dispersion of pollutants trapped at lower levels (Cosijn and Tyson, 1996; Tyson and Preston-Whyte, 2000).

In terms of horizontal transport, local winds may transport pollutants within the vicinity of their source. These include: anabatic and katabatic winds, valley and mountain winds, and mountain-plain and plain-mountain winds (Tyson and Preston-Whyte, 2000). On a larger scale, various synoptic systems affect atmospheric circulation over the Emalahleni local municipality as well as circulation over the whole of Southern Africa. These systems include: continental highs, ridging highs, westerly lows, westerly waves and easterly waves, which transport air and any pollutants contained within over larger distances (Garstang et al., 1996; Tyson et al., 1996).

6.2 Meteorological Overview

6.2.1 Local Wind Field

Wind roses are useful for illustrating the prevailing meteorological conditions of an area, indicating wind speeds and directional frequency distributions. In the following wind roses, the colour of the bar indicates the wind speed while the length of the bar represents the frequency of winds *blowing from* a certain direction (as a percentage). For the purposes of this meteorological overview, meteorological data for 2010 was used.

In the Secunda area, winds are predominantly from the north-north-east (10.7% of the time), north-east (10.1% of the time) and north (6.6% of the time), as illustrated in Figure 5. South-west and north-west winds are also evident, occurring 6% of the time. Very few winds originate from the south-east. Wind speeds are moderate to strong, with winds regularly exceeding 5 m/s from most directions, particularly the south-westerly directions. Calm conditions were recorded 9% of the time. Figure 6 presents the wind class frequencies in 2010. During 2010, most winds recorded were between 2 – 3 m/s (31.6% of the time).

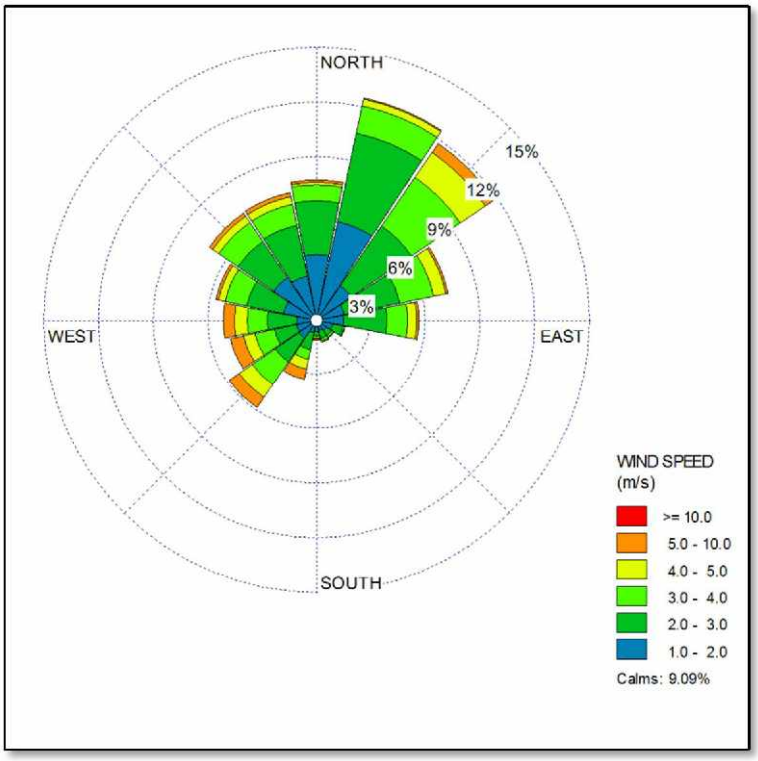

Figure 5: Surface wind rose plot for Secunda for 2010

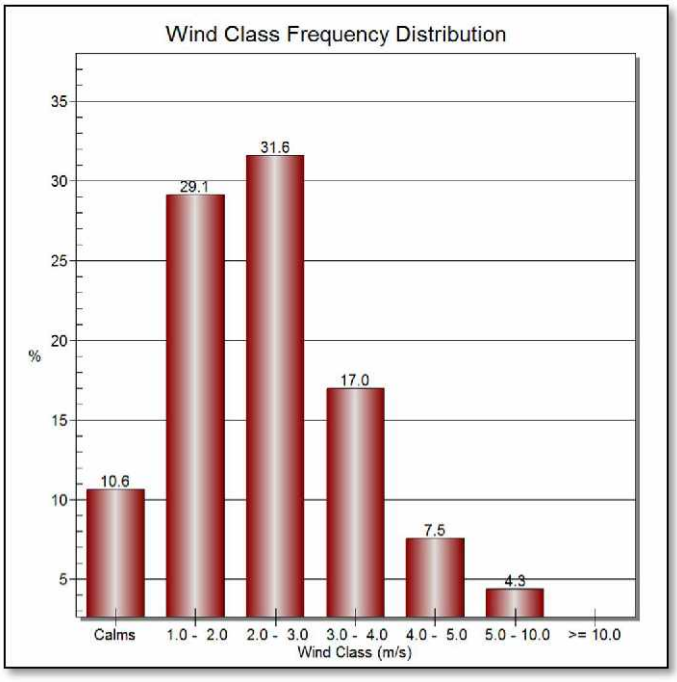

Figure 6: Wind class frequencies for Secunda for 2010

Seasonal variations in winds at Secunda are depicted in Figure 7. During summer (December to February) winds predominantly originate from the north-east (16% of the time) reaching wind speeds ranging between 5 – 10 m/s, north-north-east and east-north-east directions. In autumn (March – May), predominant winds originated from the north-north-east (13% of the time) and north-east (12% of the time). Few winds originate from the western sectors with less or no flow from the southern sectors. Winds from the westerly sector

increase in autumn when compared to summer months, with wind speeds reaching 5 m/s. Winter months (June – August) indicate winds predominantly from the north-north-east, occurring 14% of the time, north-east and south-west directions. The stronger winds are experienced mainly from the south-west with wind speeds ranging between 5 and 10 m/s. In spring (September to November), stronger north-westerly winds are experienced.

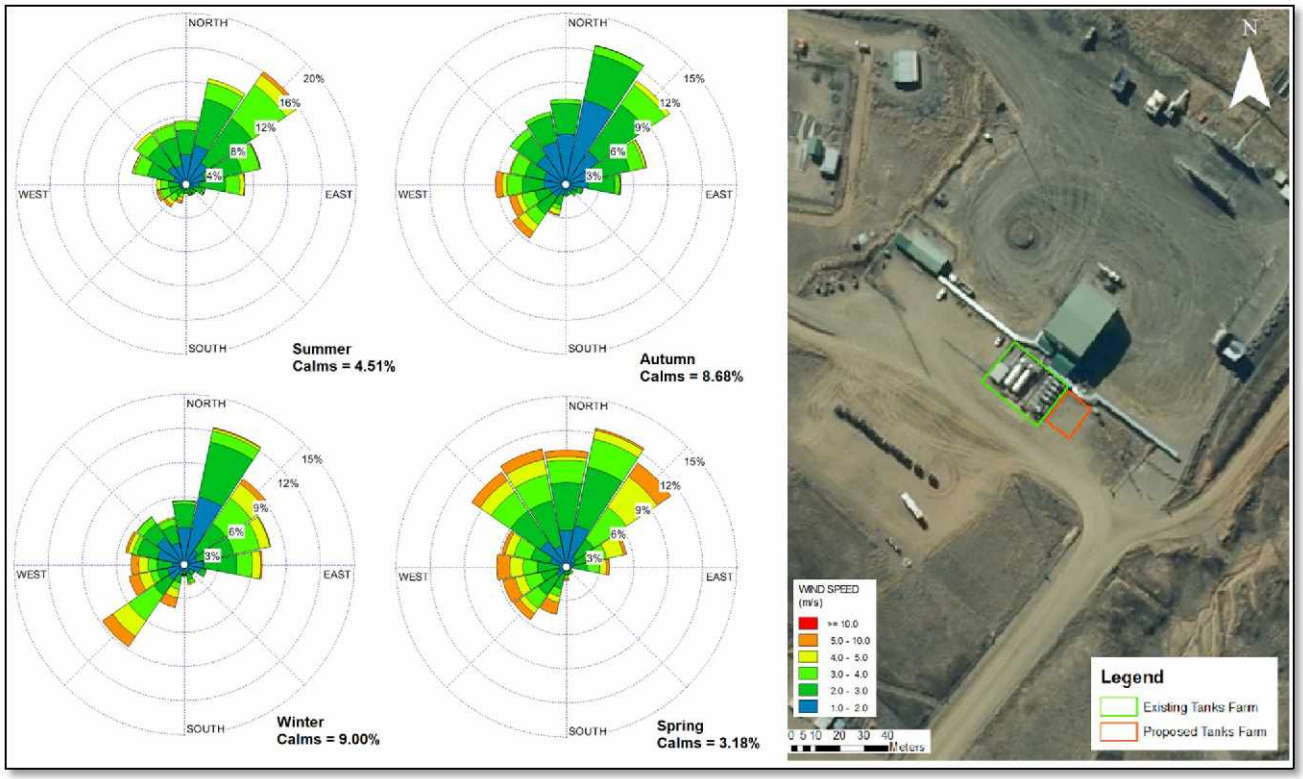

Figure 7: Seasonal surface wind rose plots for Secunda for 2010

Diurnal variations in winds at Secunda are depicted in Figure 8. Night-time winds (18:00 - 00:00) are characterized by winds originating from the north-east and north-north-east. In the early hours of the morning (00:00 – 06:00) the winds originate predominantly from the north-north-east (22% of the time), north-east (15% of the time) and north. During night-time, the winds are slow, with the majority of wind speeds between 1 – 2 m/s. Daytime winds originating from the north-north-east, north-west, north-east and north-north-west are predominant during the hours of 06:00 and 12:00. In the afternoon (12:00 – 18:00) the winds predominantly originate from the west (11% of the time), south-west and west-south-west, with wind speeds reaching 10 m/s. An increase in wind speeds is recorded from the south-west direction, especially during the afternoon, with the majority of winds between 3 – 4 m/s.

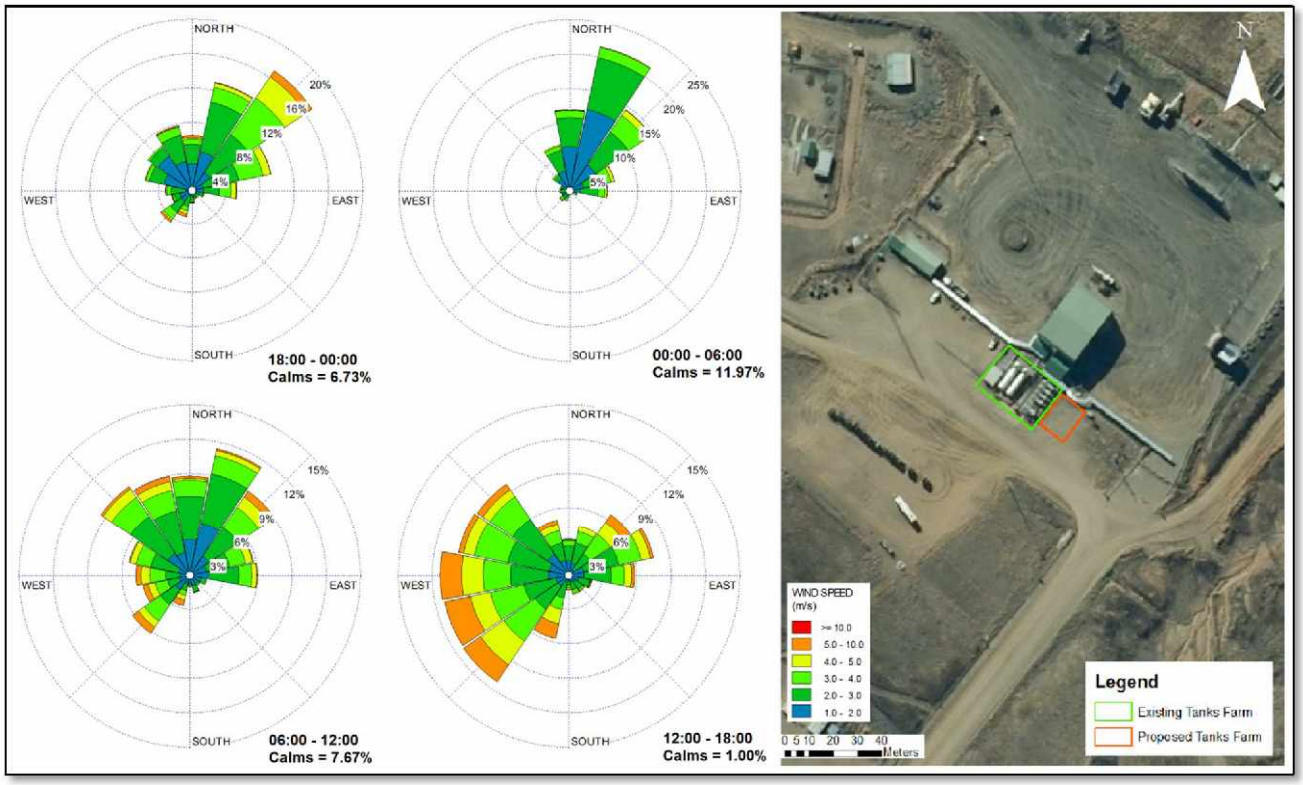

Figure 8: Diurnal surface wind rose plots for Secunda for 2010

6.2.1.1 Temperature

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume is able to rise), and determining the development of the mixing and inversion layers.

The maximum temperature recorded at Secunda during 2010 was 32.8 °C in October. The minimum recorded temperature was -7.4°C in June. Average temperatures remain relatively stable throughout the year, with an average summer temperature of around 20 °C and an average winter temperature of around 10 °C. The monthly temperature trends for 2010 are presented in Figure 9.

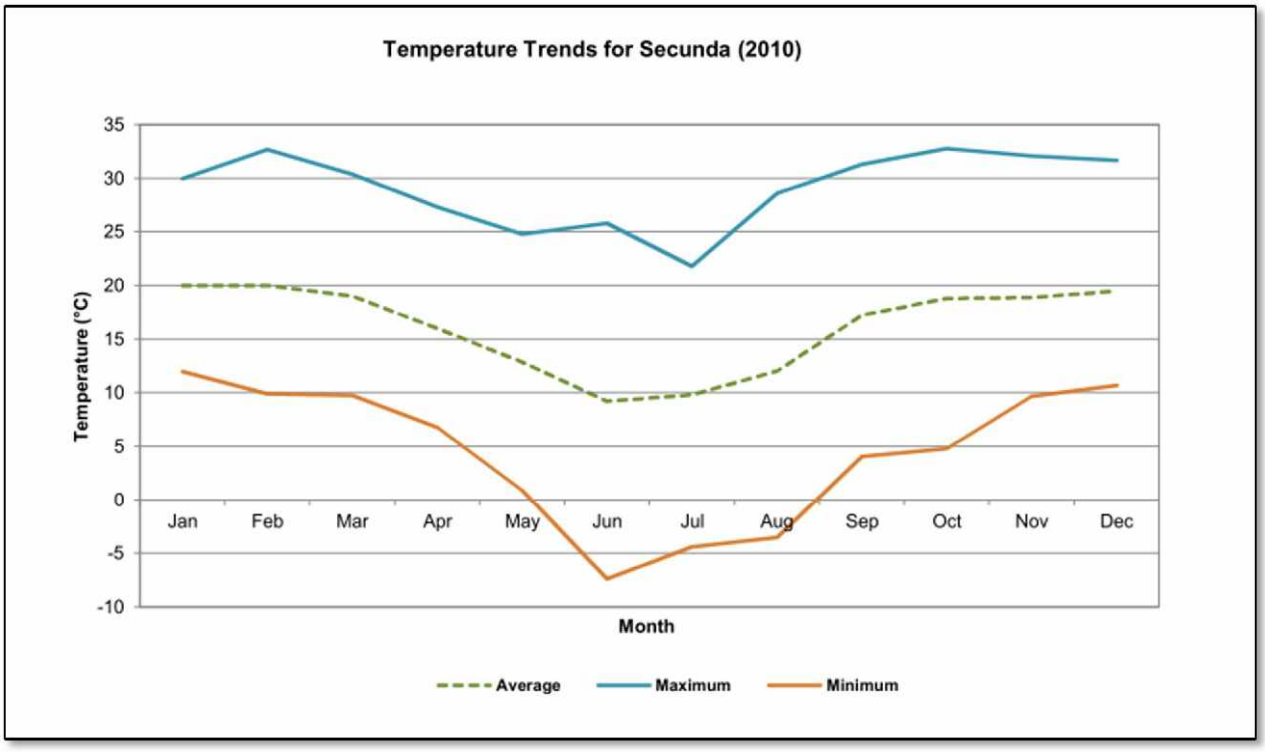

Figure 9: Hourly average temperature for Secunda for the period of 2010

6.2.1.2 Rainfall

Rainfall is important to air pollution studies since it represents an effective removal mechanism of atmospheric pollutants, thereby improving the air quality situation in high rainfall areas. Monthly rainfall recorded at the SAWS Secunda Station is illustrated in Figure 10 with the total monthly rainfall levels in Table 14.

In Secunda, rainfall predominantly occurs during the summer months. The total rainfall for 2010 was recorded as 919.8 mm. The highest rainfall level (219 mm) was recorded during the month of December. In January and December (months of high rainfall levels), it is possible that the VOCs emissions are removed and the air pollution within the mining area is improved. Air pollution during the winter months could be potentially more severe due to the low rainfall.

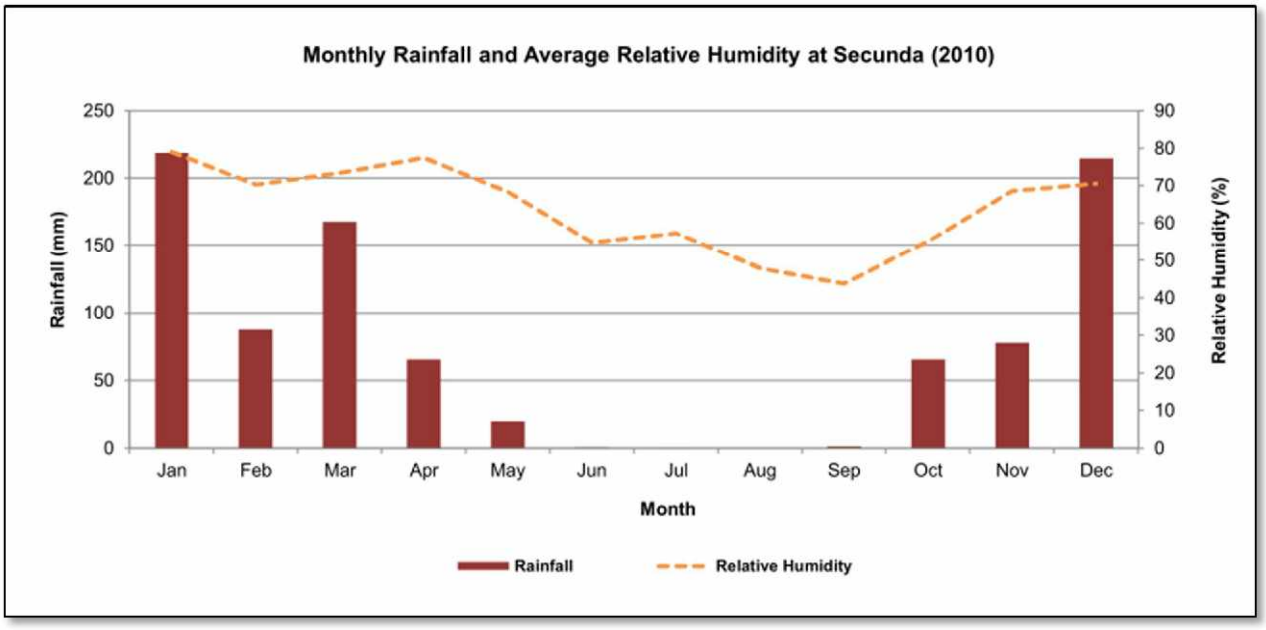

Figure 10: Monthly rainfall in relation to relative humidity recorded in Secunda for 2010

Table 14: Total monthly rainfall and relative humidity for Secunda for 2010

Month	Rainfall	Relative Humidity
January	219.0	79.0
February	87.6	70.3
March	167.6	73.5
April	65.4	77.5
May	20.0	68.3
June	0.6	54.8
July	0.2	57.3
August	0.0	47.9
September	1.4	43.8
October	65.4	55.1
November	77.8	68.6
December	214.8	70.6
Total	**919.8**	**-**

7 Air Quality Impact Assessment

6.1 Dispersion Modelling

For the purpose of this study, three scenarios were modelled, as described in Section 4.1.5. Long-term scenarios were run to predict the annual average concentrations of criteria pollutants, as health risks are primarily based on long-term exposure to pollutants. In addition, the long-term run also collates and calculates statistics for worst-case short-term concentrations, to assess the potential exceedences of standards for various criteria pollutants.

7.1.1 Existing Emissions

Emissions from the existing tanks at Isibonelo were modelled to indicate the contribution of emissions from the tanks farm and the potential impact of these on the receiving environment.

7.1.1.1 Total Volatile Organic Compounds Concentrations

The long-term TVOC concentrations are compared with the NEM:AQA annual standard for benzene. TVOC concentrations are low at all receptors, remaining below the annual benzene standard of 10 µg/m^3 (Table 15). TVOCs are not comprised entirely of benzene, but compliance of total VOCs with the benzene standard essentially indicates compliance of benzene concentrations with the standard. The highest annual average TVOC concentration predicted is 0.214 µg/m^3 at Receptor 3, south-south-west of the Isibonelo's Tanks Farm. The hourly average concentrations remain low at all receptors, with all worst-case concentrations still remaining below the long-term (annual) benzene standard, with the highest concentration predicted at Receptor 1 (4.5 µg/m^3), although still remaining compliant with the benzene standard.

Table 15: TVOC concentrations at receptor points from the existing tanks

Receptor Point	Long-Term TVOCs Concentrations (µg/m^3)	P100 Hourly TVOCs Concentrations (µg/m^3)
Receptor1	0.059	4.478
Receptor2	0.037	3.030
Receptor3	0.214	3.080
Receptor4	0.118	2.147
Receptor5	0.035	1.153
LT denotes Long Term Averages (Annual Average) *P100 Hourly denotes Worst-case Hourly (Highest Hourly)*		

Figure 11 presents the modelled outputs for long-term TVOC concentrations, while Figure 12 presents the worst case hourly average TVOC concentrations. Annual average concentrations indicate that emissions will disperse north-north-east and south-west corresponding to the prevailing wind directions in the area, with the highest concentrations occurring towards the Receptor 3 location. The worst-case hourly average plot indicates highest concentrations will occur in close proximity to the tanks farm.

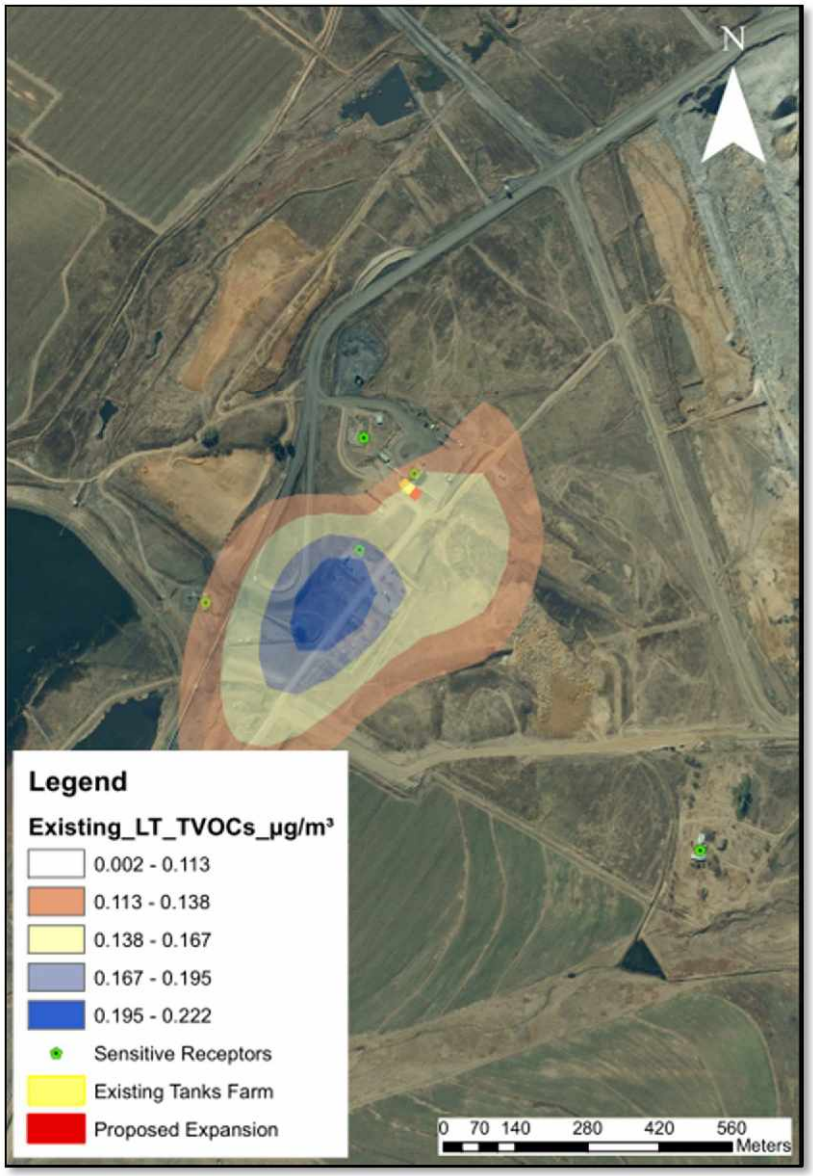

Figure 11: TVOC emissions from the existing tanks farm indicating ambient annual average concentrations (Long-Term)

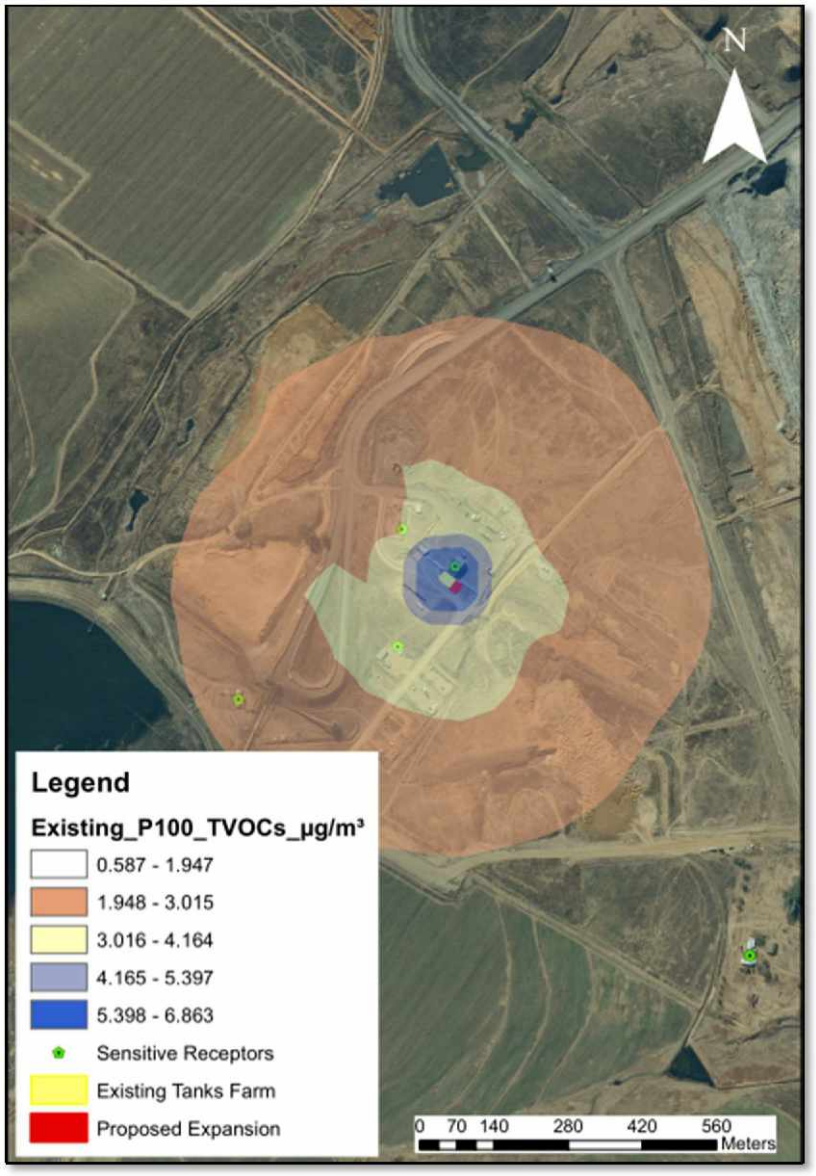

Figure 12: TVOC emissions from the existing tanks farm indicating ambient hourly average concentrations (Worst-case)

7.1.1.2 Benzene (C_6H_6) Concentrations

Benzene concentrations are compared to the South African National annual average Ambient Air Quality Standard for benzene (10 µg/m^3). Table 16 presents the tabular results for benzene concentrations for each specified receptor point, while Figure 13 and Figure 14 present the annual average results and worst-case hourly average graphical outputs of modelled benzene concentrations, respectively. Annual average concentrations are low at all sensitive receptors, with Receptor 3 recording the highest benzene concentration of 0.002 µg/m³, remaining well below the annual benzene standard. No exceedences of the annual benzene standard were predicted. The worst-case hourly average concentrations were low at all receptor points, remaining well below the benzene annual standard.

Table 16: Benzene concentrations at receptor points from the existing tanks

Receptor Point	Long-Term C_6H_6 Concentrations (µg/m^3)	Predicted Number of Exceedences / Annum (NAAQS: Hourly Standard: 10 µg/m^3)	P100 Hourly C_6H_6 Concentrations. (µg/m³)
Receptor1	0.0005	0	0.0411
Receptor2	0.0003	0	0.0278
Receptor3	0.0020	0	0.0283
Receptor4	0.0011	0	0.0197
Receptor5	0.0003	0	0.0106
LT Denotes Long-Term Averages (Annual Average) *P100 Hourly denotes Worst-case Hourly (Highest Hourly)*			
No Exceedences of Annual C_6H_6 Standard (10 µg/m^3) at receptors			

Annual average concentrations indicate that emissions will disperse in a south-westerly direction corresponding to the prevailing wind directions in the area, with the highest concentrations occurring towards the Receptor 3 location. The hourly average (P100) plot indicates predicted worst-case concentrations will occur mainly at the source, having little impact on the surrounding environment.

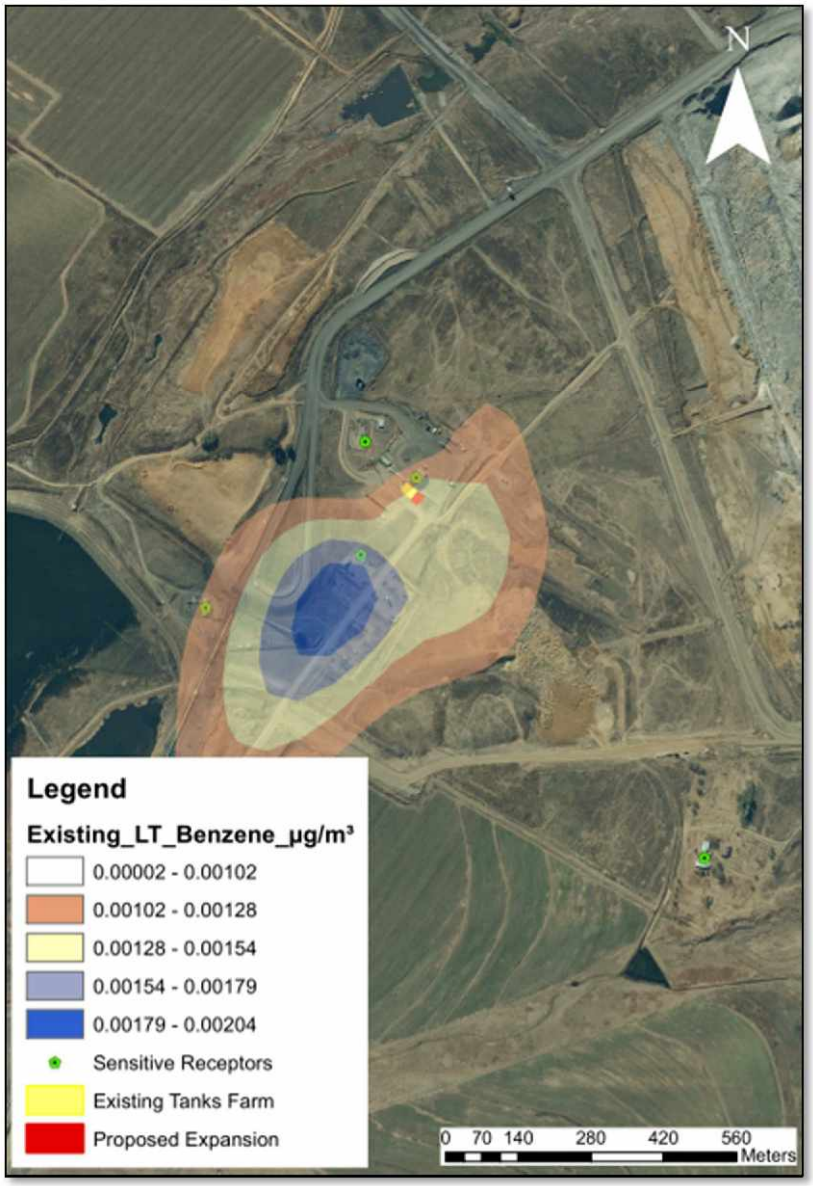

Figure 13: Benzene emissions from the existing tanks farm indicating ambient annual average concentrations (Long-Term)

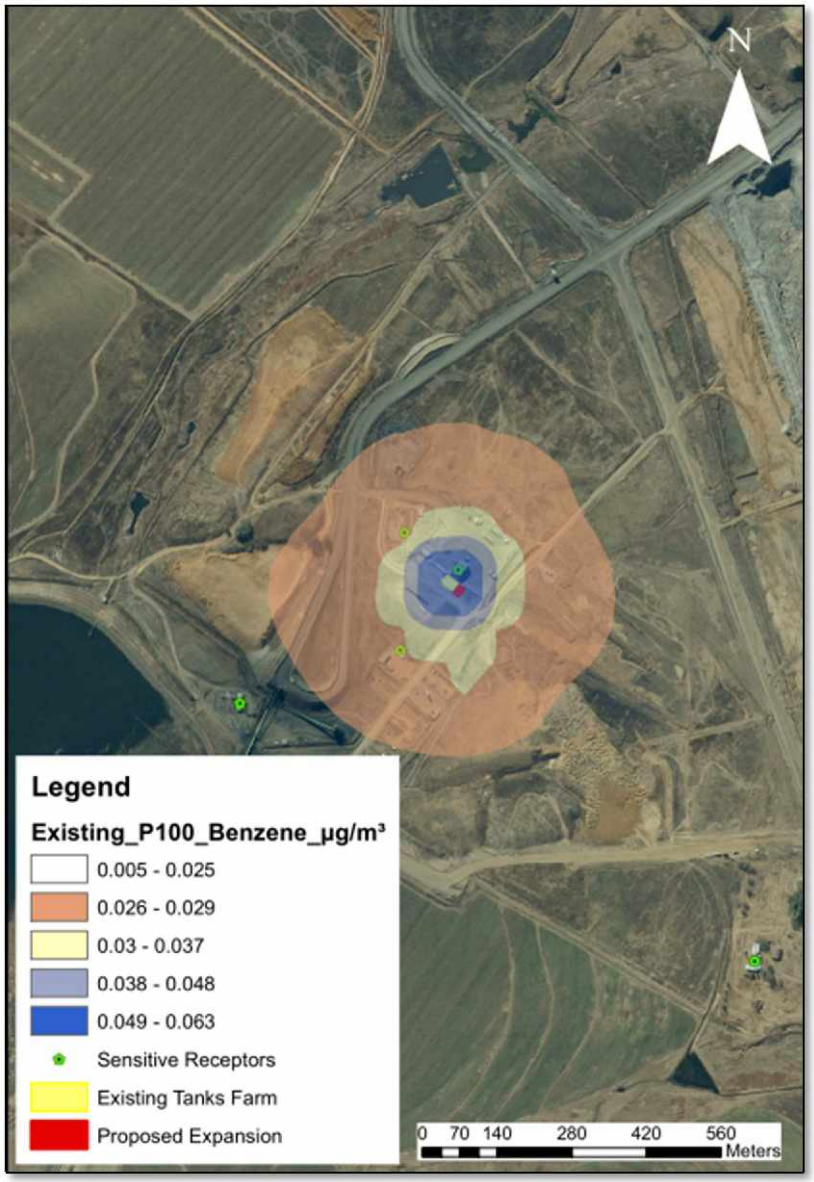

Figure 14: Benzene emissions from the existing tanks farm indicating ambient hourly average concentrations (Worst-case)

7.1.2 Proposed Emissions

Isibonelo proposes to expand their tanks farm with four 83 m³ diesel tanks. The emissions from these tanks were modelled to identify the contribution of the emissions to the existing conditions and the potential impact on the receiving environment.

7.1.2.1 Total Volatile Organic Compounds Concentrations

Table 17 presents the contribution of TVOC concentrations from the proposed tanks at each receptor point. The long-term TVOC concentrations are compared with the NEM:AQA annual standard for benzene. TVOCs are not comprised entirely of benzene, but compliance of total VOCs with the benzene standard essentially indicates compliance of benzene concentrations with the standard. TVOC concentrations are low at all receptors, remaining below the annual benzene standard of 10 µg/m^3. The highest predicted annual average concentration of 0.321 µg/m^3 was predicted at Receptor 3. The worst-case hourly average TVOC concentrations were predicted to be low at all receptors, remaining below the annual benzene standard. The highest hourly predicted concentration occurs at Receptor 3, due to the north-east winds experienced.

Table 17: Proposed TVOC concentrations at receptor points

Receptor Point	Long-Term TVOCs Concentrations (µg/m^3)	P100 Hourly TVOCs Concentrations (µg/m^3)
Receptor1	0.019	3.806
Receptor2	0.062	4.491
Receptor3	0.321	5.447
Receptor4	0.185	3.601
Receptor5	0.063	2.026
LT denotes Long Term Averages (Annual Average) *P100 Hourly denotes Worst-case Hourly (Highest Hourly)*		

Figure 15 presents the modelled outputs for long-term TVOC concentrations from the proposed fuel bulk expansion storage facility and Figure 16 represents the worst-case hourly average concentrations from the proposed diesel tanks. Annual average concentrations indicate that emissions will disperse north-east and south-west, with the highest concentrations occurring towards the Receptor 3 location. The hourly average plot indicates highest concentrations will occur mainly at the source, potentially impacting on both Receptors 1 and 3, although these concentrations remain compliant.

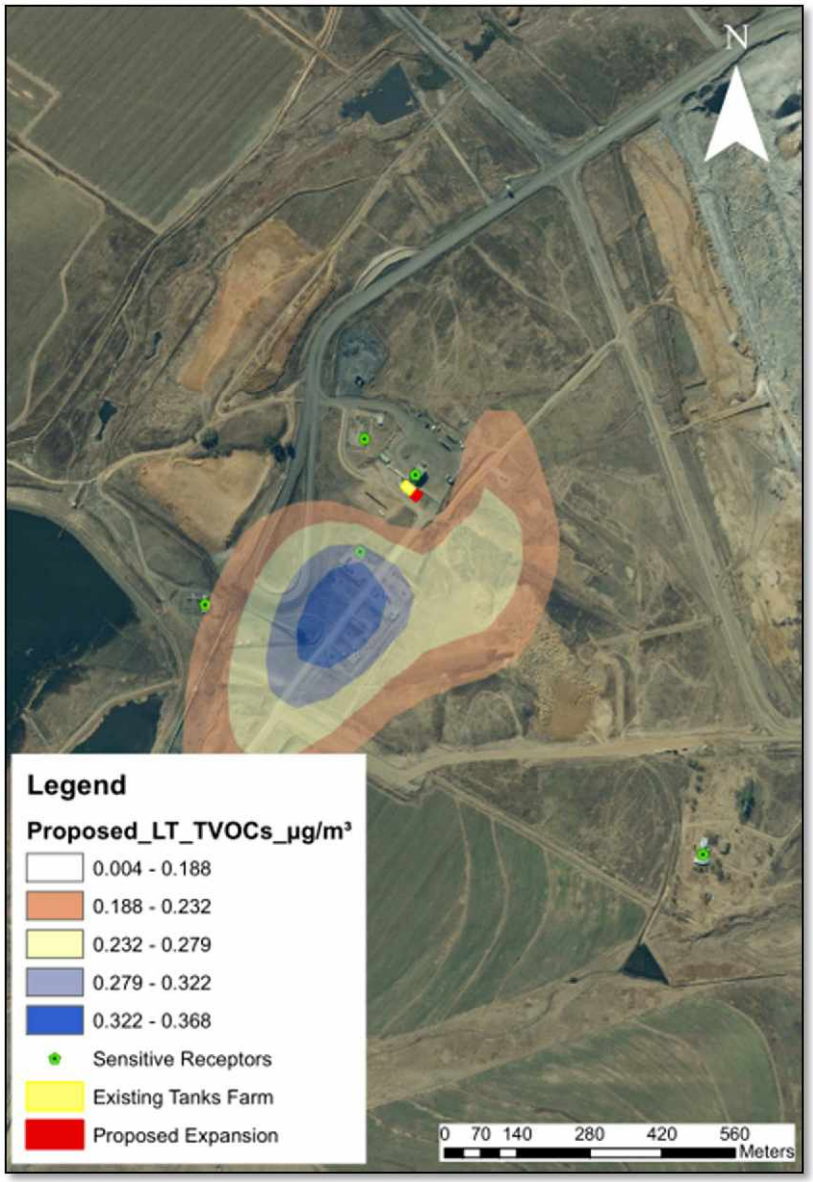

Figure 15: TVOC emissions from the proposed diesel tanks indicating ambient annual average concentrations (Long-Term)

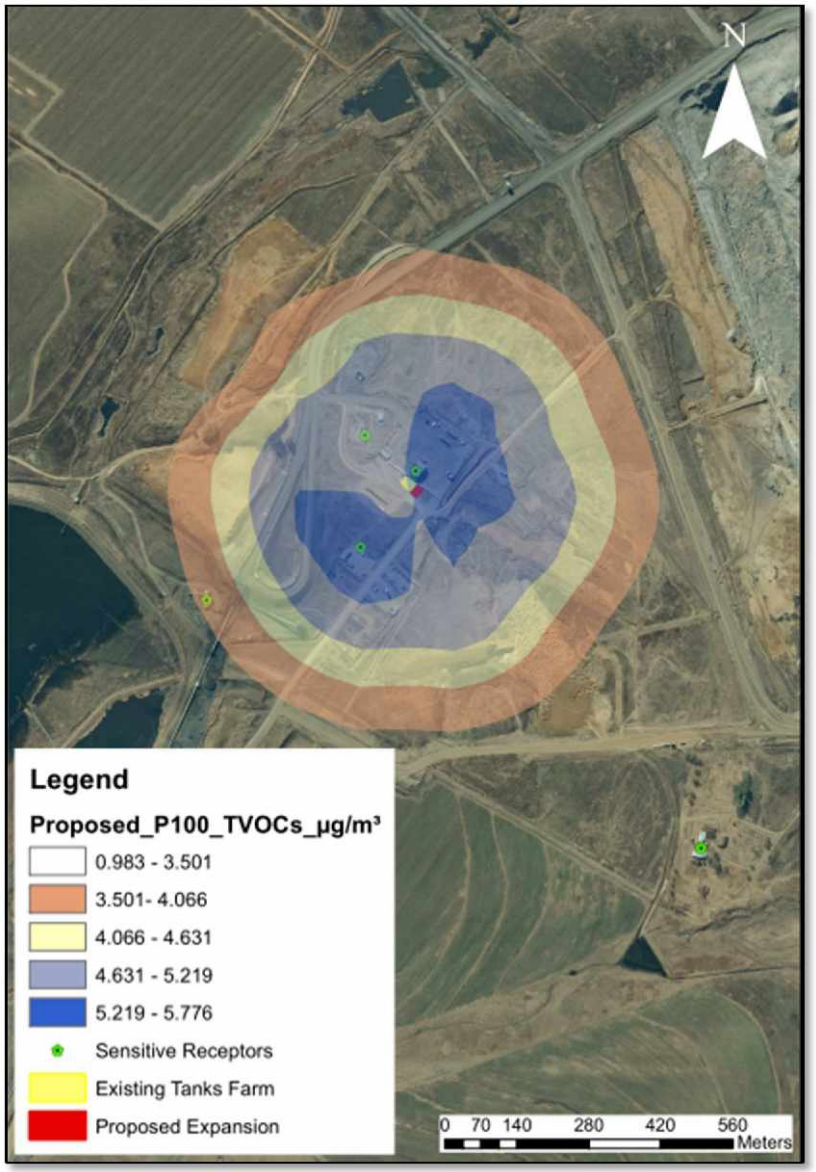

Figure 16: TVOC emissions from the proposed tanks indicating ambient hourly average concentrations (Worst-case)

7.1.2.2 Benzene (C_6H_6) Concentrations

Benzene concentrations are compared to the South African National annual average Ambient Air Quality Standard of 10 µg/m^3. Table 18 presents the tabular results for benzene concentrations from the proposed tanks for each specified receptor point, while Figure 17 presents the graphical outputs of the modelled annual average benzene concentrations and Figure 18 indicates the hourly average model results. Long-Term annual average benzene concentrations predicted are low at all sensitive receptors, with no exceedences of the annual benzene standard being predicted. The highest long-term concentration of 0.0029 µg/m^3 was predicted to occur at Receptor 3. The worst-case hourly average predicted concentrations were low at each receptor point, remaining below the annual benzene standard of 10 µg/m³.

Table 18: Proposed Benzene concentrations at receptor points

Receptor Point	Long-Term C_6H_6 Concentrations (µg/m^3)	Predicted Number of Exceedences / Annum (NAAQS: Hourly Standard: 10 µg/m^3)	P100 Hourly C_6H_6 Concentrations (µg/m³)
Receptor1	0.0002	0	0.0350
Receptor2	0.0006	0	0.0413
Receptor3	0.0029	0	0.0500
Receptor4	0.0017	0	0.0332
Receptor5	0.0006	0	0.0186
LT Denotes Long-Term Averages (Annual Average) *P100 Hourly denotes Worst-case Hourly (Highest Hourly)*			
No Exceedences of Annual C_6H_6 Standard (10 µg/m^3) at receptors			

Annual average concentrations indicate that emissions will disperse towards the north-easterly and south-westerly directions, corresponding to the prevailing wind directions in the area, with the highest predicted concentrations occurring towards the Receptor 3 location. The plume indicates an area of highest concentrations away from the tanks farm; this is due to the stronger north-easterly winds and the associated length of time for the benzene emissions to reach the ground level (the breathing zone). The worst-case hourly average isopleth indicates the proposed tanks benzene emissions will have a very localised impact area, although these concentrations remain compliant.

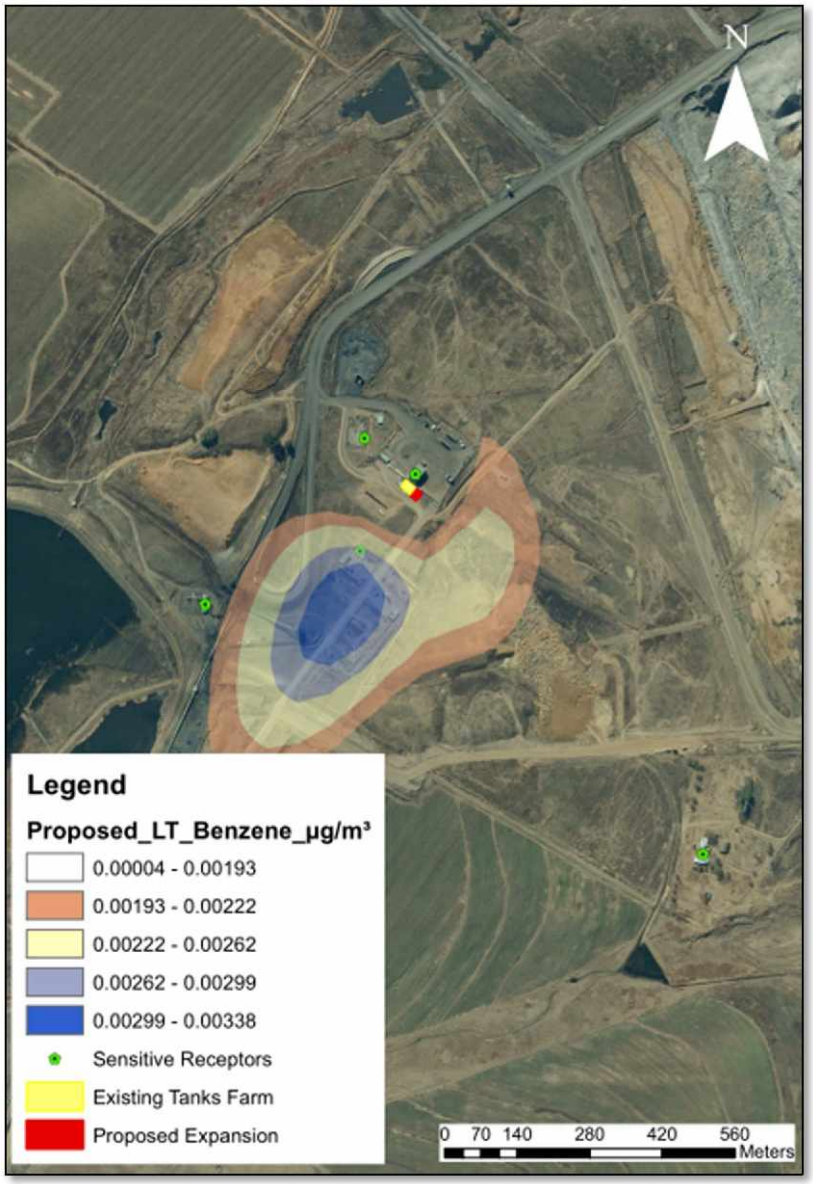

Figure 17: Benzene emissions from the proposed tanks indicating the ambient annual average concentrations (Long-Term)

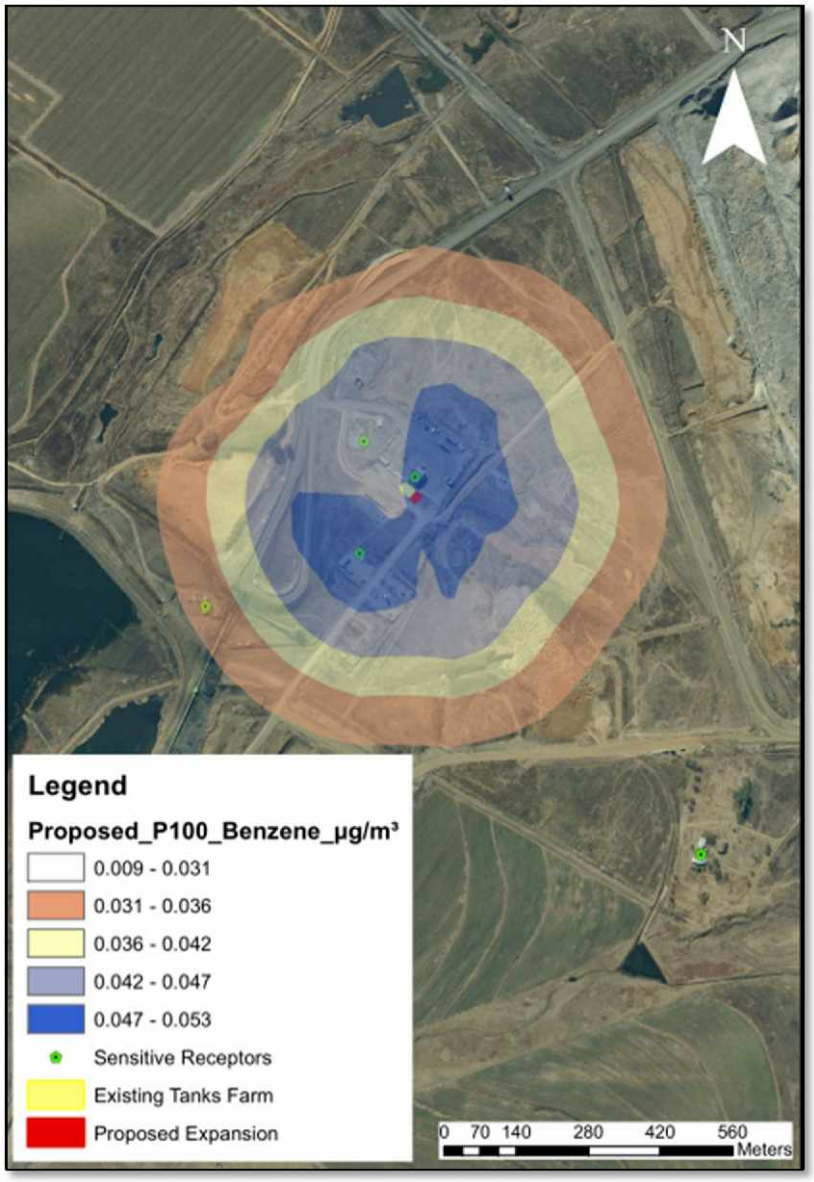

Figure 18: Benzene emissions from the proposed tanks indicating the ambient hourly average concentrations (Worst-case)

7.1.3 Cumulative Emissions

The existing and proposed tank emissions were modelled to provide an indication of the cumulative concentrations from the tanks farm and to identify the cumulative impact on the receiving environment.

7.1.3.1 Total Volatile Compounds Concentrations

Table 19 presents the contribution of TVOC concentrations from the existing and proposed tanks at each sensitive receptor point. Annual average TVOC concentrations were below the SANS annual standard of benzene (10 µg/m^3) at all sensitive receptor points, with the highest long-term concentration of 0.530 µg/m^3 predicted at Receptor 3. The worst-case hourly average concentrations indicate compliance with the annual benzene standard, with highest short-term concentrations being predicted at Receptor 3 (7.9 µg/m^3), still remaining compliant with the annual standard.

Table 19: Cumulative TVOC concentrations at receptor points

Receptor Point	Long-Term TVOCs Concentration (µg/m^3)	P100 Hourly TVOCs Concentrations (µg/m^3)
Receptor1	0.076	4.342
Receptor2	0.098	7.480
Receptor3	0.530	7.879
Receptor4	0.301	5.646
Receptor5	0.098	3.144
LT denotes Long Term Averages (Annual Average) *P100 Hourly denotes Worst-case Hourly (Highest Hourly)*		

Figure 19 presents the modelled outputs for long-term annual average TVOC concentrations and Figure 20 represents the worst case hourly average TVOC concentrations for cumulative conditions. The annual average (long-term) isopleth indicates that emissions will disperse towards the south-westerly direction, with the highest concentrations occurring towards the Receptor 3 location. The worst-case hourly average isopleth indicates emissions will have a localised impact, with little impact on the receiving environment.

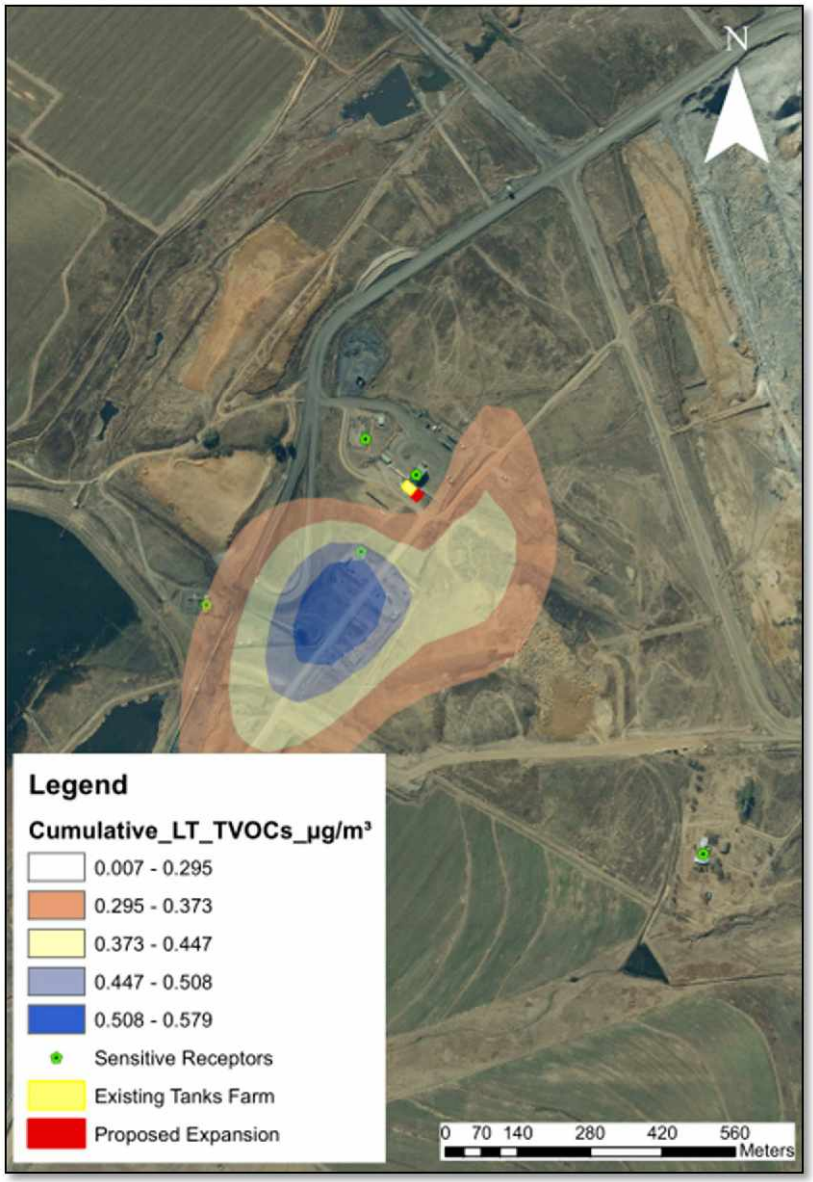

Figure 19: TVOC emissions from the cumulative tanks emissions indicating ambient annual average concentrations (Long-Term)

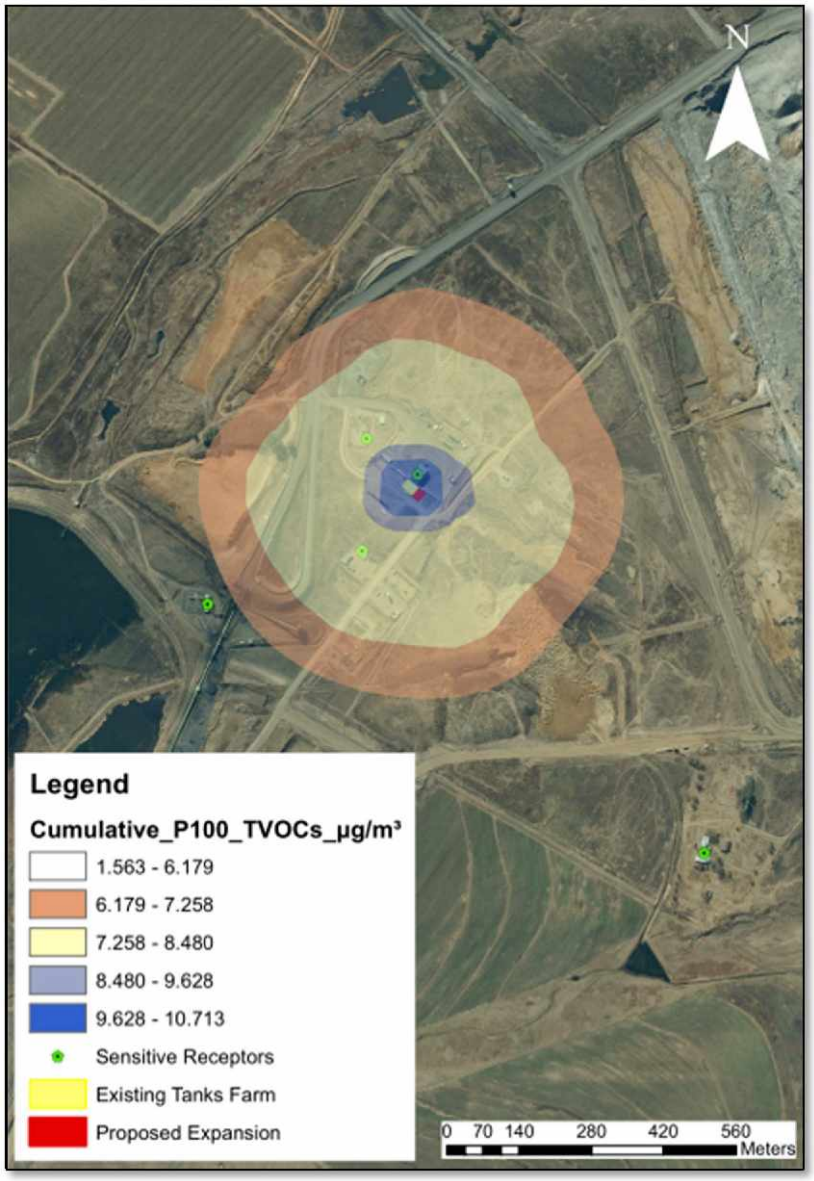

Figure 20: TVOC emissions from the cumulative tanks emissions indicating ambient hourly average concentrations (Worst-case)

7.1.3.2 Benzene (C_6H_6) Concentrations

Benzene concentrations are compared to the South African National annual average Ambient Air Quality Standard of 10 µg/m³. Table 20 presents the tabular results for benzene concentrations for each specified receptor point, while Figure 21 presents the graphical output of the modelled annual average results predicted from cumulative conditions, with the worst-case hourly modelled results presented in Figure 22. Long-term annual average predicted benzene concentrations are low at all sensitive receptors, remaining well below the annual average benzene standard. The worst-case hourly average concentrations were predicted to be low at all sensitive receptor points, with no exceedences predicted and a maximum concentration occurring at Receptor 3 (0.072 µg/m^3), remaining well below the annual average standard.

Table 20: Cumulative Benzene concentrations at receptor points

Receptor Point	Long-Term C_6H_6 Concentrations (µg/m^3)	Predicted Number of Exceedences / Annum (NAAQS: Hourly Standard: 10 µg/m^3)	P100 Hourly C_6H_6 Concentrations (µg/m^3)
Receptor1	0.001	0	0.040
Receptor2	0.001	0	0.069
Receptor3	0.005	0	0.072
Receptor4	0.003	0	0.052
Receptor5	0.001	0	0.029
LT Denotes Long-Term Averages (Annual Average) *P100 Hourly denotes Worst-case Hourly (Highest Hourly)*			
No Exceedences of Annual C_6H_6 Standard (10 µg/m^3) at receptors			

Annual average concentrations indicate that emissions will disperse predominantly towards the south-west corresponding to the prevailing wind directions in the area, with the highest concentrations occurring towards the Receptor 3 location. The worst-case hourly average plot indicates emissions will have a localised impact around the tanks, although all concentrations remain compliant with the annual standard.

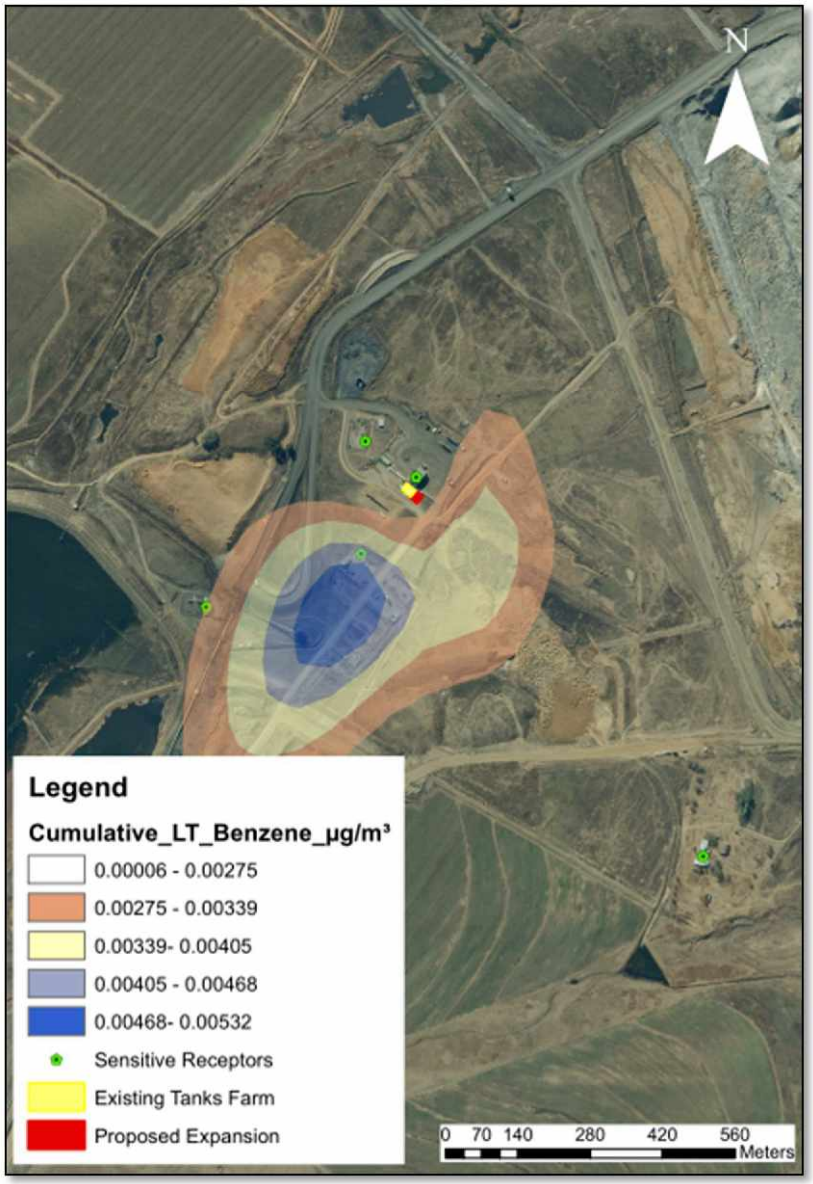

Figure 21: Benzene emissions from the existing and proposed tank facilities indicating annual average concentrations (Long-Term)

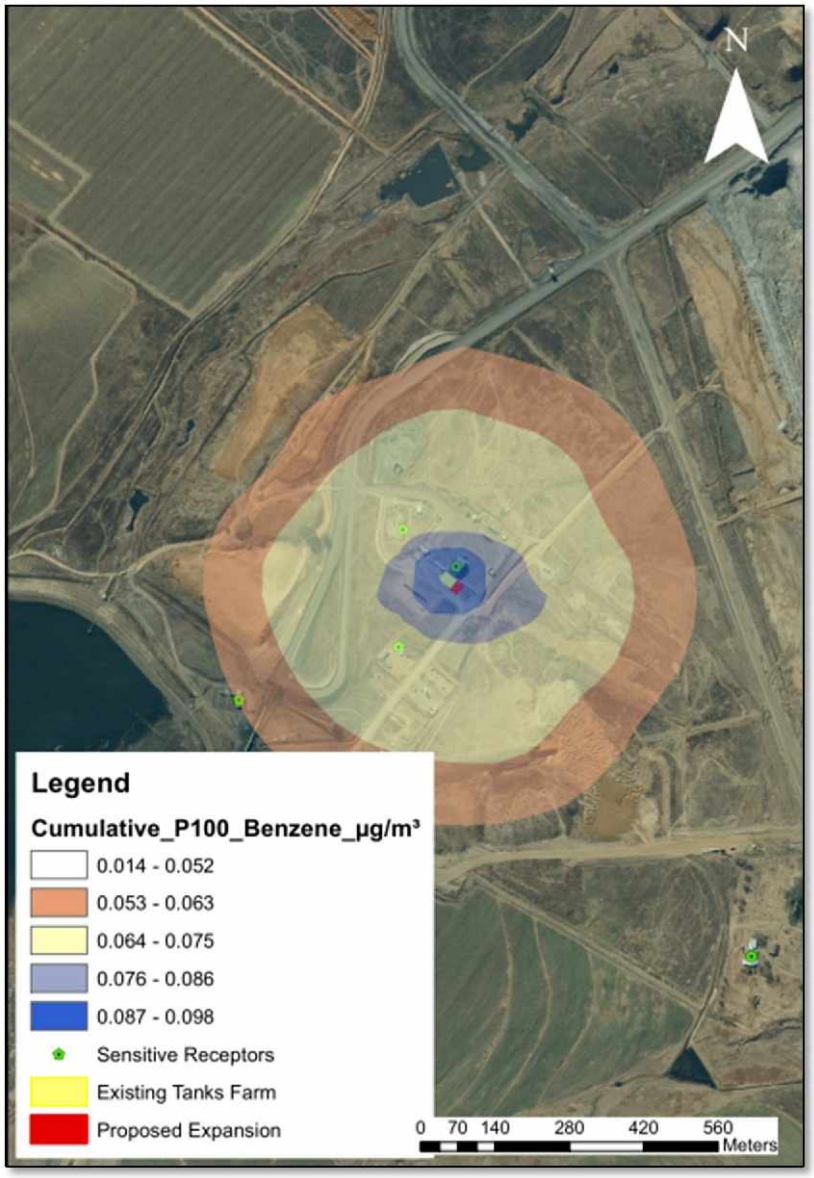

Figure 22: Benzene emissions from the existing and proposed tank facilities indicating hourly average concentrations (Worst-case)

8 Conclusions and Recommendations

Isibonelo Colliery proposes to expand their current diesel tank storage capacity located in Trichardt near Secunda, known as the Bulk Fuel Storage Expansion (BFSE) project. The project proposes the installation of an additional four 83 m^3 diesel storage tanks near the existing tanks farm, thus bringing the total storage capacity on site to 577 m^3. Isibonelo required an air quality impact assessment (AQIA) to be performed in order to assess the impact of the proposed expansion of the tanks farm on the receiving environment and human health. Due to the total storage capacity exceeding 500m^3, Isibonelo also requires an Atmospheric Emissions Licence (AEL) for the expansion of their tanks farm.

WSP Environment and Energy (WSP) were appointed by Anglo Thermal Coal to undertake the abovementioned air quality impact assessment for the proposed storage tanks farm and associated AEL.

The AQIA consisted of a baseline assessment, calculation of the existing and proposed tanks emissions and dispersion modelling. The dispersion modelling included three scenarios:

- Scenario 1: Modelling of emissions associated with the existing tanks;
- Scenario 2: Modelling of emissions associated with the proposed tanks; and
- Scenario 3: Modelling of cumulative emissions from the existing and proposed tanks.

All scenarios considered Total Volatile Organic Compound (TVOC) emissions and benzene emissions. Both the long-term (annual average) and worst case (hourly average) TVOC and benzene concentrations were compared to the benzene annual average ambient standard. The aim of this comparison was to show that if all concentrations (long-term and worst case) were below the stringent annual standard, then the impact from emissions associated with the existing and proposed tanks on the receiving environment would be minimal. Additionally, the calculated cumulative emission rate for TVOC was compared to the emission rate limit permitted in the NEM:AQA Listed Activities, Category 2, Subcategory 2.2: Storage and Handling of Petroleum Products, which indicated the cumulative emission rates of TVOC were well below the permitted emission rate.

The findings from Scenario 1 (existing tanks) dispersion modelling indicated:

- Both the annual average (long-term) and hourly average (worst-case) TVOC and benzene concentrations indicated full compliance with the annual benzene standard, with concentrations remaining low at all receptors.

The findings from Scenario 2 (proposed tanks) dispersion modelling indicated:

- Both the annual average and hourly average TVOC and benzene concentrations indicated full compliance with the annual benzene standard, with concentrations remaining low at all receptors.

The findings from Scenario 3 (cumulative tanks) dispersion modelling indicated:

- Annual average TVOC concentrations associated with the cumulative emissions from the tanks remained low at all receptors, with no exceedences of the annual benzene standard predicted, while the worst-case hourly average concentrations were slightly elevated, although still indicated full compliance with the annual benzene standard;
- Annual average and worst-case hourly average benzene concentrations remained significantly low at all receptors, indicating full compliance with the annual benzene standard.

Regarding the predicted concentrations, when compared to concentrations associated with existing emissions, the proposed tank emissions TVOCs and C_6H_6 concentrations are slightly elevated, although the cumulative concentrations indicate full compliance, with no exceedences of the annual benzene standard predicted.

Cumulative impacts of emissions from the storage tanks facility are low, with little impact on the receiving environment predicted. Based on the findings of this assessment, the expansion of the tanks farm at Isibonelo Colliery can be approved.

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WSP House
Bryanston Place, 199 Bryanston Drive
Bryanston
2021
South Africa
Tel: +27 11 361 1380
Fax: +27 11 361 1381
www.wspgroup.co.za

WSP Environment & Energy
Tel: 011 361 1380
Fax: 086 505 3939
www.wspenvironmental.co.za

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