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28 June 2013

BACKGROUND INFORMATION DOCUMENT

PROPOSED DARVILL WASTEWATER TREATMENT WORKS UPGRADE, MSUNDUZI LOCAL MUNICIPALITY (KZ225), UMGUNGUNDLOVU DISTRICT MUNICIPALITY (DC22), KWAZULU NATAL

DEA Ref No: 14/12/16/3/3/3/84

Dear Interested and Affected Parties

Notice is given in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998), as amended; the Environmental Impact Assessment Regulations as published in Government Notice No. R. 543 of 2010, considering Government Notice No. R. 544 and R. 545 and the National Environment Management: Waste Act, 2008 with intent to commence a Basic Assessment process. Afzelia Environmental Consultants (Pty) Ltd (AEC) made an application for downscaling of the EIA process to the National Department of Environmental Affairs (DEA) for the EIA process to be downgraded from a scoping/full EIA process to a basic assessment process. The DEA granted permission for the application on the 13 May 2013 (Appendix A). AEC has been appointed by Hatch-Goba (Pty) Ltd on behalf of Umgeni Water to conduct an environmental assessment in the form of a Basic Assessment for the proposed Darvill Wastewater Treatment Works (WWTW) Upgrade.

1. BACKGROUND

The WWTW was constructed in the mid-1950s and commissioned in 1958 with an initial design capacity of 27ML/d. It has since been upgraded to a full Biological Nutrient Removal plant with a capacity of 65ML/d. Along with the steady increase in the hydraulic load over the years, a 33% increase in the organic load has been observed since 2008. This increase in the organic load has put a strain on the capacity of the plant to treat and effectively remove nutrients. In addition the Darvill WWTW's license for effluent discharge was reviewed by the Department of Water Affairs and since 2010 the plant's discharge limit for NH3 was decreased from 10mg/l to 6mg/l. Since the unit processes are currently operating above their design capacity, the effects of high organic and hydraulic loads have left the plant unable to meet the discharge standards. The plant therefore has to be upgraded, with changes proposed for the Head of Works, the biological process, sludge digestion and disposal, and tertiary treatment. It is anticipated that the upgrade will allow the plant to treat a further 35ML/d, bringing the total capacity to 100ML/d.

In conjunction with the upgrade project as illustrated in Appendix C, Umgeni Water (UW) proposes the installation of an electricity co-generation plant. The gas from the two anaerobic digesters currently on site will be used to generate electricity. Currently, sludge is fed into the digesters at a rate of 25 000kg/day, and rich methane-rich gas is emitted during the digestion process. This methane-rich gas, currently emitted into the air, will be used to generate electricity through a process referred to as co-generation and is expected to yield 800-1000kW of electricity. The electricity generated will be used at the WWTW. There is no proposed export of electricity generated on the site into the grid outside of the WWTW.

2. PROJECT DESCRIPTION

The Head of Works

The existing Head of Works consists of an inlet channel with a side channel weir discharging to the storm dam. The single inlet channel divides into two channels with coarse screens, each of which feed two mechanical fine screens (4 mechanical fines screens in total) complete with screenings transportation and treatment equipment. The flow from each of the two streams feed two vortex type grot removal systems with submersible pumps and air and water lance facilities. There is currently a project aimed at upgrading the side channel storm weir to better control discharges to the storm dam.

The works currently has four 5.0m diameter vortex type grit removal systems with submersible pumps for grit removal to a mechanical grit classifier and treatment system. We estimate that the total grit removal capacity of the plant to be in the order of 480 Ml/day.

Anticipated activities in this unit

- Replacing the existing 12mm front raked bar screens with fine screens (either 6mm or 3mm apertures);
- Refurbish and install the existing 12mm screens as coarse screens to protect the proposed new fine screens;

- Decommission the existing Vortex Flow Grit Removal Systems;
- Construct a new Fat, Oil, Grease and Grit removal plant. It is anticipated that the plant will consist of a rectangular reactor with approximately 30 minutes hydraulic retention time (Nominally 40m X 20m X 7m deep) with grit hoppers, diffused air floatation system with a surface scraper bridge.

Primary Treatment

- The works currently has two 28.0m diameter and a one 40.0 diameter primary settling tanks which gives and approximate surface area of 2 500m^2. At an up-flow rate of 2.0 m/hr, this gives a treatment capacity of approximately 120 Ml/day.

Anticipated activities in this unit

- An additional 40m diameter primary settling tank with a surface area of 1 250m^2 is likely.

Biological Treatment

- The biological treatment process stage currently consists of a nominally 3 500m^3 anaerobic / anoxic reactor and three aerobic reactors with a total volume of approximately 19 600m^3. Aeration to support biological processes is achieved with 15 X 75kW surface aerators.

Anticipated activities in this unit

- The construction of a new aerobic reactor (nominally 100m X 60m X 7m deep);
- Conversion of the existing aerobic reactor to an anaerobic / anoxic reactor;
- Construction of a blower house to provide air supply for a fine bubble diffused air aeration system.

Secondary Treatment

The design of the secondary settling process stage is based on the assumption that the flow will be balanced prior to the biological treatment phase and that the forward flow will be limited to 110% of the Average Dry Weather Flow (ADWF).

Based on an up flow rate of 1m^3 / m^2 / hr, the total surface area required for settling is 5 500m^2. Currently the plant has a total of 4 800m^2 in five 35m diameter settling tanks (960m^2 each). Assuming that an additional 35m diameter settling tank is provided (consistency) resulting a total settling tank area of 5 760m^2. It is recommended that to allow for some redundancy in the system for maintenance a second additional tank should be provided.

The surface flux for the proposed secondary settling tank configuration is 4.3kg/m^2.hr with one tank out of commission for maintenance. This is less than the limiting flux of 5 kg / m^2 / hr.

It is anticipated that two 35m diameter secondary settling tanks complete with mechanical half bridge scrapers and return activated sludge systems will be constructed for this purpose.

Tertiary Treatment

Currently disinfection is achieved with chlorine gas and occurs in one of the old humus tanks which have been converted into a chlorine contact tank. An extension to the chlorination system is inevitable. The manner of extending the gas chlorination system has not yet been finalised, but details will be provided within the impact assessment process.

Sludge Handling and Disposal

In terms of sludge handling and disposal, UW intends on embarking on, the installation of an electricity co-generation process (Combined Heat and Power – CHP). The source of the biofuel for the process will be the methane-rich digester gas from the anaerobic digesters at the WWTW.

At present, a portion of the gas is used to heat the influent to the anaerobic digesters and the remaining portion of gas is flared to the atmosphere. With the installation of the CHP process, all of the methane –rich gas will be used to generate electricity (1MW).

The installation of the CHP process to recover the gas and generate electricity would therefore automatically take over a portion of the electricity load at WWTW. Preliminary estimates based on digester gas flow rates and power consumption records for the WWTW are given below. All of the electricity generated will be used at the WWTW (i.e. no power will be exported).

With the upgrade of the plant and increase in the capacity of the plant it is expected that sludge generated will increase. Current methods of disposal of sludge may be insufficient and require revision. A Feasibility study was conducted with the aim of finding an effective option which

considers the management and disposal of sludge produced at the Darvill WWTW. In the feasibility Report, Goba considered six options for the upgrade and extension of the sludge treatment facilities at the Darvill WWTW.

These options are as follows:

Option 1: Blending gravity thickened primary sludge with mechanically thickened waste activated sludge, co-digestion in the egg shaped digesters and disposing of on the exiting sludge lands.
Option 2: Blending gravity thickened primary sludge with mechanically thickened waste activated sludge, co-digestion in egg shaped digesters, mechanical dewatering of the digested sludge and disposal through fluidized bed incineration.
Option 3: Blending gravity thickened primary sludge with mechanically thickened waste activated sludge, co-digestion in egg shaped digesters, mechanical dewatering of the digested sludge and disposal via air drying and composting.
Option 4: Blending gravity thickened primary sludge with mechanically thickened waste activated sludge, co-digestion in egg shaped digesters, mechanical dewatering of the digested sludge and disposal to landfill.
Option 5: Blending gravity thickened primary sludge with mechanically thickened waste activated sludge, co-digestion in egg shaped digesters, mechanical dewatering the of digested sludge and disposal to farmlands.
Option 6: Blending mechanically dewatered primary sludge with mechanically dewatered waste activated sludge and incinerating in a fluidized bed incinerator.

Although the final report is pending the outcome of sludge characterisation, the first drafts have made the recommendation to proceed with option 3. The works required for the successful implementation of option 3 include the following:

- Refurbish the existing Gravity Thickeners and provide picket fence rotating bridge
- Construct a new sludge treatment building with mechanical thickening of the waste activated sludge
- Construct a new sludge sump for blending thickened primary and waste activated sludge and a new digester feed pump station
- Construct two new "Egg-Shaped" digesters. Note that only one is required for the 100 MLD upgrade and a second when the plant is further upgraded to 120 MLD.
- New Sludge treatment building and digester sludge dewatering plant
- Composting facility

The electricity to be generated at the site is summarised in Table 1.

Table 1: Current and Estimated Electricity Usage & Generation (kWh/week)

Current Average Electricity Usage (kWh/week)	Estimate of gross Total Electricity to Generated (kWh/week)	Estimate of gross Total Electricity to Generated (kWh/week)
230 000	174 000*	+ 168 000 recoverable thermal energy

** 1.2MW output, assuming that the digesters at Darvill are well operated to allow for a steady minimum gas supply of 390m³/h and 80% utilization of CHP process.*

3. SITE LOCATION

The proposed WWTW upgrade will be carried out on the existing WWTW site located in Hayfields/Sobantu, Msunduzi Local Municipality (KZ225), Umgungundlovu District Municipality (DC22), KwaZulu-Natal. A locality map and an aerial map have been attached in Appendix B.

The geographical co-ordinates of the proposed development site are indicated in Table 2 below:

Table 2: Coordinates of the proposed development site (centre of the site)

Latitude /Longitude	Degrees	Minutes	Seconds
South	29°	36'	02.60"
East	30°	25'	49.61"

The site is surrounded by Glenwood to the north, Lincoln Meade to the south, and Sobantu to the west. The town of Sobantu and the WWTW is separated by the Msunduze River. The proposed site is approximately 2km from the New England Landfill site.

4. LEGAL FRAMEWORK

The proposed upgrade is considered to have moderately to highly significant impacts on the environment; the listed activities for the abovementioned project are captured in the EIA Regulations (2010) promulgated in terms of the National Environmental Management Act (NEMA) under Government Notices No. 544 and 545.

Table 3 provides a summary of the potential listed activities within NEMA which are likely to apply to the project.

Table 3: NEMA Listed activities applicable to the project

NEMA EIA Regulations (2010) GN 544 and 545 (as applicable)	
Government Notice & Listed Activity	**Description**
544(11)	The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
544(18)	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving; (a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (b) occurs behind the development setback line.
544(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 [new, or amendment of, an existing] 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.
544(37)	The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: (b) the throughput capacity of the facility or infrastructure will be increased by 10% or more- Excluding where such expansion: (i) Relates to transportation of water, sewage or storm water within a road reserve of (ii) Where such expansion will occur within urban area but further than 32 metres from watercourse,

	measured from the edge of the watercourse.
544(39)	The expansion of: (i) canals; (ii) channels; (iii) bridges; (iv) weirs; (v) bulk storm water outlet structures; within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.
544(40)	The expansion of: (iii) buildings by more than 50 square metres (iv) infrastructure by more than 50 square metres within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.
545(4)	The construction of facilities or infrastructure for the refining, extraction or processing of gas, oil or petroleum products with an installed capacity of 50 cubic metres or more per day, excluding facilities for the refining, extraction or processing of gas from landfill sites.

The abovementioned activities contained in Listing Notice 1 and 2 of the Regulations promulgated in terms of the National Environmental Management Act (GN R. 544 and 545, 2010) are overall subject to a Basic Assessment.

Table 4 provides a summary of the potential listed activities within NEMA which are likely to apply to the project.

Table 4 NEMWA Listed activities applicable to the project

NEMWA Waste Management Licence Requirements (GN 718)		
Category & Listed Activity	**Description**	**Comments**
A (19)	The expansion of facilities or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of pollution, effluent or waste.	This relates to the increased liquid waste throughput in the facility.
A (10)	The processing of waste at biogas installations with a capacity to process in excess of five tons per day of bio-degradable waste.	The facility is likely to be considered a biogas installation; clarity will be obtained from the DEA in this regard.
A (18)	The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity).	Construction of infrastructure for activity A (10).
B (2)	The reuse and recycling of hazardous waste.	Sludge is classified as hazardous waste, and the cogeneration process would comprise recovery or reuse.
B (3)	The recovery of hazardous waste including the refining, utilisation or co-processing of waste at a facility with a capacity to process more than 500kg of hazardous waste per day excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises or unless the Minister has approved re-use guidelines for the specific waste stream.	More than 500kg of sludge would be used in the cogeneration process.
B (4)	The biological, physical or physico-chemical treatment of hazardous waste at a facility that has the capacity to receive in	The digestion process would comprise a biological, physical or physico-chemical

	excess of 500 kg of hazardous waste per day.	treatment of hazardous waste.
B (11)	The construction of facilities for activities listed in Category B of this Schedule (not in isolation to associated activity).	Construction of infrastructure for activity B (2), (3), and (4).

The abovementioned activities contained in Listing A and B GN718 promulgated in terms of the (NEMWA) are overall subject to a Basic Assessment.

A motivation in terms of Regulation 20(4) was provided to the DEA, for permission to apply Basic Assessment instead of Scoping and Full EIA to the application. The DEA confirmed that the application could be subjected to a Basic Assessment process. The reasons for downgrading to a Basic Assessment are as follows:

- The impacts will be properly scoped within the Basic Assessment process
- Specialist study will be carried out at a level appropriate to the project and process
- Interested and Affected Parties would be afforded sufficient opportunities to participate in the process
- The risks to the environment as a result of the downgrading are minimal
- The impact assessment process requires urgent completion in order to avoid ongoing and future negative impacts

The detailed motivation can be provided to IAPs on request.

All of the above Listed Activities will therefore be applied for through a Basic Assessment process.

5. INVITATION TO PARTICIPATE

You have been identified as a potential Interested and Affected Party (I&AP) in this process and are invited to participate in the above process by registering yourself with Afzelia.

Should you wish to be kept informed during the impact assessment process, then it is important that you register as an I&AP. Please then complete the form attached in Appendix D and hand deliver, email, fax or post it to AEC by the **22nd July 2013.** Press notices, flyers and roadside notices were erected in the vicinity of the proposed development route to notify the general public of the environmental impact assessment process.

APPENDIX A: APPROVAL LETTER OF DOWNGRADE FROM DEA

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA
Private Bag X 447· PRETORIA · 0001· Fedsure Building · 315 Pretorius Street · PRETORIA
Tel (+ 27 12) 310 3911 · Fax (+ 2712) 322 2682

DEA Reference: 14/12/16/3/1/5
Enquiries: Fiona Grimett
Tel: 012 395 1793 **Fax:** 012 320 7539 **E-mail:** fgrimett@environment.gov.za

Mr Wolfgang Kanz
Afzelia Environmental Consultants
PO Box 37069
OVERPORT
4067

Fax: 086 692 2547
Tel: 031 303 2835

PER FACSIMILE / MAIL

Dear Mr Kanz

APPLICATION FOR DOWNSCALING OF THE EIA PROCESS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, EIA REGULATIONS 2010 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008: FOR THE PROPOSED DARVILL WASTEWATER TREATMENT WORKS UPGRADE, MSUNDUZI MUNICIPALITY, KWAZULU-NATAL PROVINCE

Your letter dated 22 March 2013 requesting to downgrade from scoping and environmental impact assessment process to a basic assessment process, and this Department's acknowledgement letter thereof dated 22 April 2013, refer.

The Department has evaluated the request and has decided, in terms of Regulation 20(4) of GN. R. 543, to grant permission for a basic assessment process instead of a scoping and environmental impact assessment process to be applied to the application, provided that all of the listed activities are adequately assessed in the BAR and all specialists studies required are submitted as part of the BAR.

Note that the latest BAR format released from this Department must be used for all applications submitted from 1 September 2012. Should you fail to make use of this latest approved template, your BAR risks being rejected.

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.

Yours sincerely

Mr Mark Gordon
Chief Director: Integrated Environmental Authorisations
Department of Environmental Affairs
Letter signed by: Mr Coenrad Agenbach
Designation: Acting Director: Integrated Environmental Authorisations
Date: 13/05/2013

APPENDIX B: LOCALITY MAP AND AERIAL MAP

Afzelia Environmental Consultants

Darvill Waste Water Treatment Works Aerial Map

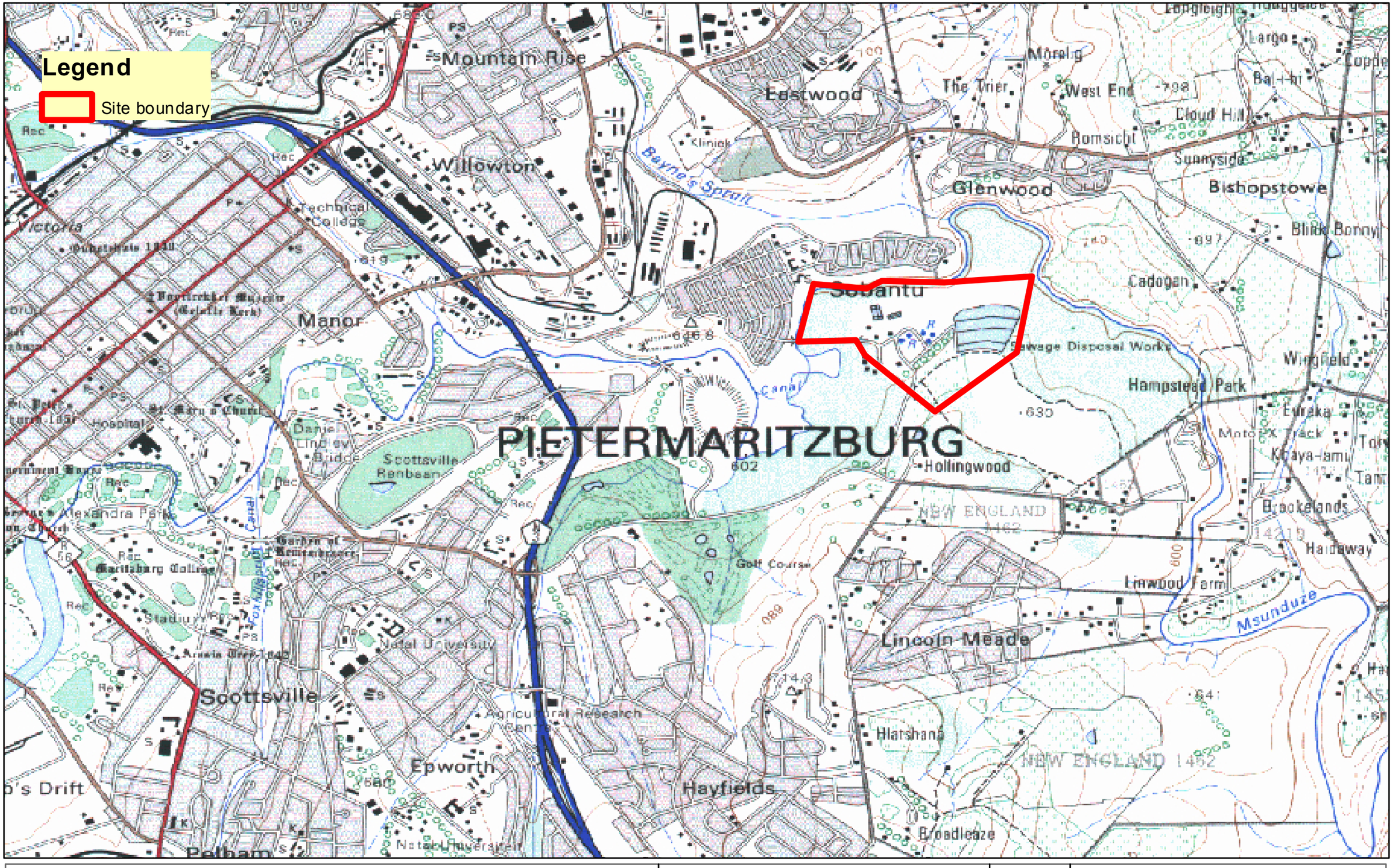
Scale 1:25 000 (A3 Map)

0 100 200 400 600 Meters

N

PO Box 37069 OVERPORT 4067
Tel: 031 303 2835
Fax: 031 312 0896
Email: brian@afzelia.co.za

CK 2005/071211/23 Date:19/02/2013



Darvill Waste Water Treatment Works Locality Map

Scale 1:25 000 (A3 Map)

0 0.25 0.5 1 1.5 Kilometers

N

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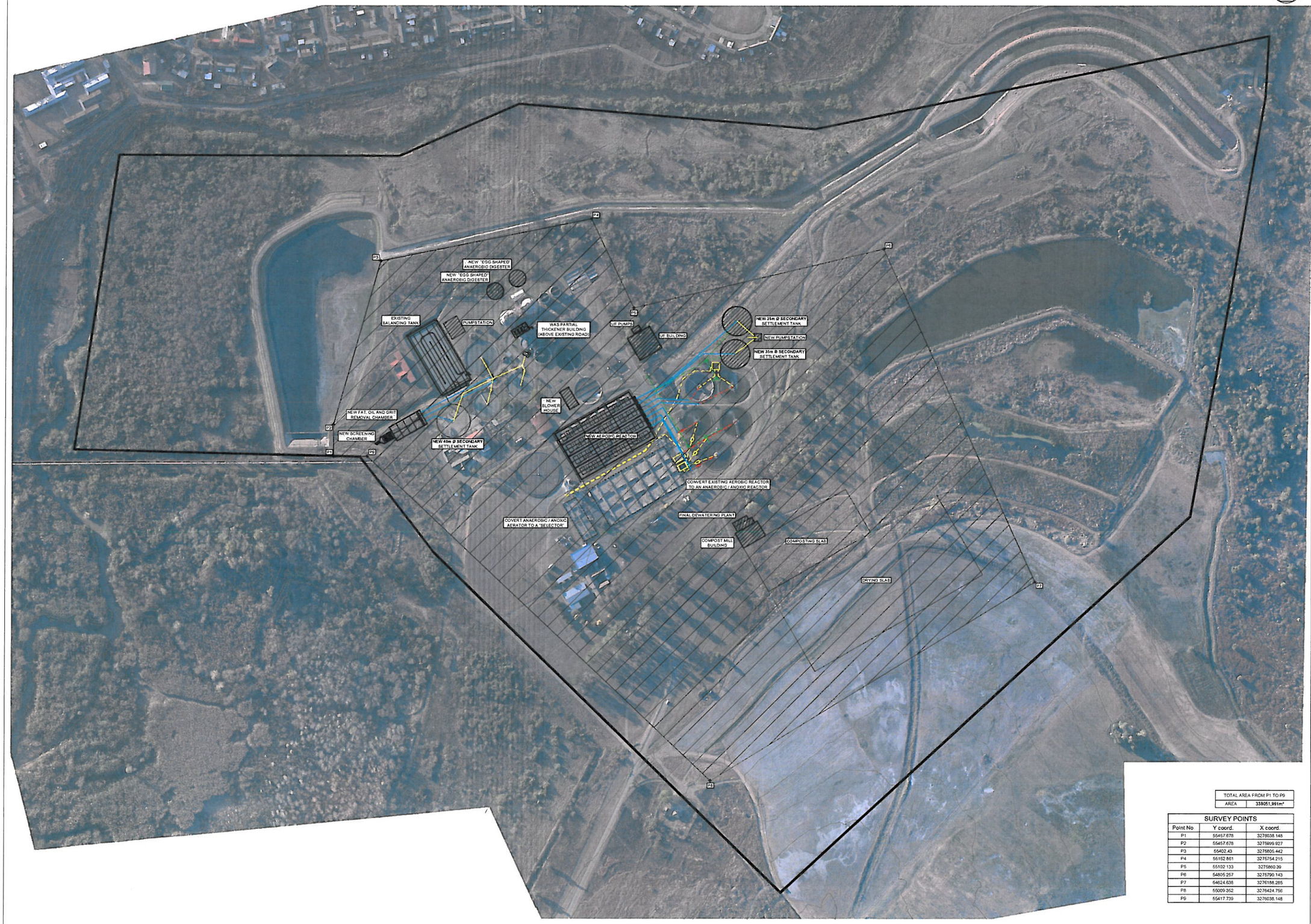
Tel: 031 303 2835
Fax: 031 312 0896
Drawn by: Brian Mafela
Email: brian@afzelia.co.za

CK 2005/071211/23 Date:19/02/2013

APPENDIX C: DESIGN LAYOUT



SITE LAYOUT
SCALE 1:1500

TOTAL AREA FROM P1 TO P9	
AREA	338051,991m²

SURVEY POINTS		
Point No	Y coord.	X coord.
P1	55457.678	3276038.148
P2	55457.678	3275999.927
P3	55402.43	3275805.442
P4	55152.861	3275754.215
P5	55102.133	3275660.39
P6	54805.257	3275790.143
P7	54624.636	3276188.285
P8	55009.352	3276424.756
P9	55417.739	3276038.148

REFERENCE DRAWINGS

DRAWING No.	TITLE/DESCRIPTION	SOURCE
[illegible]	SURVEY EXTENT	GOBA

NOTES:

REV	DATE	DESCRIPTION	NAME	SIGNATURE
				APPROVED
A	2013/12	INTERNAL REVIEW		

CONSULTING ENGINEER APPROVAL

CONSULTING ENGINEER DRAWING No. 1053/03/

DESIGNED	[illegible]	DRAWN	[illegible]
CHECKED	[illegible]	CIVIL ENGINEER	
STRUCTURAL ENGINEER		MECHANICAL ENGINEER	
ELECTRICAL ENGINEER		CO-ORDINATING ENGINEER	

APPROVED: _____ PROJECT MANAGER _____ DIRECTOR

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www.boschstemele.co.za
REGIONAL OFFICES IN
CAPE TOWN • EAST LONDON • PORT ELIZABETH • JOHANNESBURG

UMGENI WATER APPROVAL

ENGINEERING SERVICES			
	NAME	SIGNATURE	DATE
DESIGN ENGINEER			
ENGINEERING MANAGER	ALAN WOOLCOTT		
OPERATIONS			
	NAME	SIGNATURE	DATE
MAINTENANCE MANAGER	[illegible]		
AREA MANAGER	[illegible]		
ASSET MANAGER	[illegible]		
GENERAL MANAGER	[illegible]		

312 BURGER STREET
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TEL. (033) 341 1111
UMGENI WATER - AMANZI
Managing Water for Life

DARVILL SPW EXTENSIONS

SURVEY EXTENT

FILE No.	SCALE	SHEET SIZE	SHEET
AJ10665A/DARMU/PSP/	AS SHOWN	A0	1 OF 1
CONTRACT No. 2012/053	DRAWING No. I-A08-CIV-UI0665A-001		REVISION A

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APPENDIX D: REGISTRATION FORM

PROPOSED DARVILL WASTEWATER TREATMENT WORKS UPGRADE, MSUNDUZI LOCAL MUNICIPALITY (KZ225), UMGUNGUNDLOVU DISTRICT MUNICIPALITY (DC22), KWAZULU NATAL (DEA Ref No: 14/12/16/3/3/3/84)

Title:	First name:	Surname:	Initials:
Organisation:		Designation:	
Postal Address:			
Postal Code:			
Tel No:		Cell No:	
Fax No:		E-mail:	

I, the registered owner / representative of the property / organisation known as:

Hereby verify that a Background Information Document of the above development has been circulated to me and would like to be registered as an Interested and Affected Party for the abovementioned development. The concerns expressed by me in the below text should be addressed in the Environmental Assessment.

Please provide more information regarding the project (Specify):

Please add the following persons to your list of interested and affected parties:

Name:	Organisation:
Telephone:	
Postal Address:	
Name:	Organisation:
Telephone:	
Postal Address:	

Signed at _____ this ____ day of _____ 2013

Signature_____

PLEASE SEND THIS REGISTRATION FORM AND ANY ADDITIONAL COMMENTS TO:

Environmental Assessment Practitioners:	Afzelia Environmental Consultants cc
Contact person:	Mr Andrew Batho or Ms Elaine Govender
Postal address:	PO Box 37069, OVERPORT, Durban
Postal code:	4067
Telephone:	+27 (0)31 303 2835
Fax:	+27 (0)86 962 2547 / +27 (0)31 312 0896
Website:	www.afzelia.co.za
E-mail:	andrew@afzelia.co.za or elaine@afzelia.co.za

Thank you for your participation!