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Forzando North Coal Mine: Basic Assessment Report for Proposed Photo-Voltaic Facility

Report

Version – Draft for I&AP Review

May 2012

Total Coal South Africa (Pty) Ltd

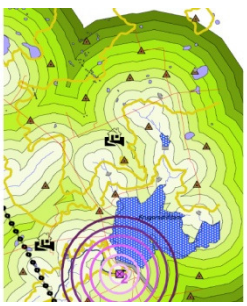
GCS Project Number: 11-625

Client Reference: Forzando North PV Facility

NEAS Reference Number: DEA/EIA/0000991/2012

DEA Reference Number: 14/12/16/3/3/1/452

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DOCUMENT ISSUE STATUS

Report Issue	**Draft for I&AP Review**		
GCS Reference Number	**11-625**		
Client Reference	**Proposed Photo-Voltaic Facility**		
Title	**Forzando North Coal Mine: Basic Assessment Report for the Proposed Photo-Voltaic Facility**		
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Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.

2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

3. Where applicable **tick** the boxes that are applicable in the report.

4. An incomplete report may be returned to the applicant for revision.

5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

6. This report must be handed in at offices of the relevant competent authority as determined by each authority.

7. No faxed or e-mailed reports will be accepted.

8. The report must be compiled by an independent environmental assessment practitioner.

9. Unless protected by law, all information in the report will become public information on receipt by the competent

authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

- Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	**YES**	

If YES, please complete the form entitled "Details of specialist and declaration of interest" for appointment of a specialist for each specialist thus appointed:
Any specialist reports must be contained in Appendix D.

Please refer to Annexure D for the details of the specialist and the declaration of independence. These have been attached with the specialist reports.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail[1]:

Introduction:
TCSA has the intention to construct a Solar facility within the mining right boundaries of Forzando Coal Mine and to supply 9.5 MWp of electricity to the Eskom national power grid. They have opted for a "green" option which requires the installation of the Solar facility and connection through a 33kV power line to the proposed Eskom substation next to the Solar facility. The substation will be constructed and permitted by Eskom in a separate process.

Motivation for the Project:
Currently approximately 90% of South Africa's electricity is generated from coal fired power plants, making fossil fuel power generation one of the biggest contributors to climate change on the continent.

This can change if other renewable forms of electricity generation [such as the proposed Solar Facility] are embraced as alternative power sources to help reduce the anthropogenic impact of fossil fuel on climate change. Due to the importance of the proposed facility being an alternative to electricity generated by coal, feeding additional power into the national Eskom electricity grid with a renewable source of power supply, and the limited waste production during the construction and operational phases, it is recommended by the Environmental Assessment Practitioner (EAP) that the proposed facility be authorised and approved.

Project Description:
The Facility will be situated on remaining extent of farm Geluk 226 IS, approximately 400 metres south east of the existing railway loop. Power generated will be supplied to the National Grid for Eskom. The Solar facility will require the following:

- Access roads:
  - The existing farm road is not tarred but is a compacted gravel road that enters the facility from the north along the existing railway loop and conveyor. This road will be graded and

[1] Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.

used as the maintenance road to the proposed facility.

- Within the facility an internal service road will be constructed with a width of 3m on top of a geotextile layer that will avoid contamination of used material. The length of the internal service road will be approximately 1150m.

- Power Lines:
  - The proposed facility will supply the Eskom national electrical grid with max 9.5 MWp of electricity. The power connection utilises electrical inverters and transformers which are typically supported on aggregate compacted material, concrete pads and / or (where mounted on skids or containers) spread footings or drilled piers
  - Substations typically include transformers or switchgears supported on pads, piers, or footings; and in some cases, poles and frames with significant overturning moments supported on drilled piers. ***Please Note: The substation will be constructed and permitted by Eskom in a separate process.***
  - The Substation will be located at the South of the plant. The Eskom project is referred to as a 33/88kV Substation. The substation will connect the plant to a HV overhead line. The substation will connect to the HV line through an 88kV line. All the transformers protection 33kV MV cubicles are connected to one MV ring. The MV ring is connected to the Main Medium Voltage Switchgear (MMVS) located in the Interconnection cabin inside the Solar plant. The MMVS is connected through a 33kV underground cable to the Substation, also inside the Solar plant perimeter. ***Please Note: The substation will be constructed and permitted by Eskom in a separate process.***
  - Auxiliary services will be feed through an 11kV line. This MV line will be connected to the MV metering panel for auxiliary services located in the Interconnection Cabin.

- Solar Facility:
  - TCSA has in conjunction with a subsidiary designed two possible Solar facilities which will be used as the final options for the facility. The options are the same in size and would not exceed 20ha in size and will not exceed 10MW of electricity generation capacity.

  - The two options for the Solar facility will be based on two different technologies to optimise the generation capacity of the solar facility. The two options and the corresponding layouts are described as T0™ Tracker System (PV) and a C7™ Tracker System (CPV). Refer to Layouts in Appendix C and G.
- Maintenance Buildings:
  - Maintenance buildings for the facility will be small, light steel framed buildings with shallow spread footings and a concrete slab. Substations will typically house transformers, switchgears and inverters and will be constructed of light sheet metal supported on pads, piers, or footings.

Environmental Authorisation:

The Solar Facility is located within the surface rights of the applicant, and for this purpose an environmental investigation and application process in terms of the Environmental Impact Assessment (EIA) regulations under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) must be undertaken. The proposed activity triggers listed activity No. 1, 11 and 23 of Regulation 544 of the NEMA and therefore requires that a Basic Assessment (BA) Report be submitted to the relevant government department.

In terms of the Environmental Impact Regulations published in terms of Section 24(5) of the NEMA, authorisation is required from the National Department of Environmental Affairs (DEA) in consultation with the Mpumalanga Provincial Department of Economic Development, Environment and Tourism (MDEDET). The DEA is regarded to be the competent authority for environmental authorisation for all power generation facilities as electricity is to be fed into the Eskom national (electricity) grid, and all

applications will be sent to the DEA for review and approval.

A Basic Assessment Application for the Solar Facility was submitted to the DEA on the 27th of January 2012. The location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Dorstfontein is another TCSA operation). After submission of the BA Application, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North. This operation is located approximately 25 kilometres east of the Dorstfontein East Coal Mine.

As a result of changing the location, an additional BA application is required to be submitted to the DEA.

In terms of NEMA the activities associated with the proposed facility requires authorisation in terms of section 24 as promulgated in regulations 543, 544, 545 and 546 of 18 June 2010 (as amended on 30 July 2010). the following (please see table overleaf) activities are triggered by the proposed development:

NEMA ACTIVITY	APPLICABILITY TO DEVELOPMENT
REGULATION 544 OF 18 JUNE 2010	
GNR 544 of 18 June 2010 (activity 1): the construction of facilities or infrastructure for the generation of electricity where: i. the electricity output is more than 10 megawatts but less than 20 megawatts; or ii the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.	The installation of a Solar facility to supply the national grid for Eskom with 9.5 MWp (approximately 8MWac) of electricity through a 33kV power line connection. The area to be covered by the facility will be approximately 19.5 hectares.
GN 544 of 18 June 2012 (activity 11): The construction of: Infrastructure or structures covering 50m2 or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction occurs behind the development setback line,	The 19.5ha area is located close to two waterbodies on the mine property. The waterbody to the North east is approximately 30m from the closest Solar panel. The waterbody to the East is approximately 100m from the facility.

GNR 544 of 18 June 2010 (activity 23): the transformation of undeveloped, vacant or derelict land to- i. residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares; or ii. residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares,- except where such transformation takes place- i. for linear activities; or ii. for purposes of agriculture or a-forestation, in which case activity 16 of notice 545 applies. [activity 23 amended by GN r660 of 30 July 2010]	The installation of a solar facility (photovoltaïc (T0tm) or commercial photovoltaic) (CPVtm) to supply the national grid for Eskom with 9.5 MWp of electricity through a 33kV power line connection. The facility will be situated on remaining extent of farm Geluk 226 is, approximately 400 metres south east of the existing railway loop. The area to be covered by the facility will be approximately 19.5 hectares.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity

and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

Two options were investigated for the location of the Solar facility. Originally the location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Option 1). On further consideration of this option, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North (Option 2).

Due to the planned plant infrastructure and access road development proposed for Dorstfontein East and the related dust generation, Option 1 was not deemed a feasible option for the proposed facility. Dust generation and / or construction activities will affect the proper functioning and maintenance of the photo-voltaic panels. It is for this reason that the only feasible site for the location of the proposed facility is Option 2.

- Option 1

A Basic Assessment Application for the Solar Facility was submitted to the DEA on the 27th of January 2012. The location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Dorstfontein is another TCSA operation). After submission of the BA Application, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North. This operation is located approximately 25 kilometres east of the Dorstfontein East Coal Mine (the original facility location).

The reason for changing the location of the proposed facility was as a result of concerns raised over dust emissions that could result from new developments proposed (access road and plant infrastructure) for the Dorstfontein East Coal Mine on the farm Welstand 55 IS. The future activities proposed for the Dorstfontein East Mine will have an impact on the proposed solar panels to be installed at the new facility with regards to the dust generated by the future developments.

The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris remains on the surface of the panels. This is needed in order to ensure proper functionality of the Solar Facility.

- Option 2

The second location for the proposed facility is the remaining extent of the farm Geluk 226 IS which is within the surface mining rights area of Forzando North. This is the preferred option for the location of the facility and possibility of dust and dust generation impacting on the facility and the functioning thereof will be minimal.

The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris is on the surface of the panels to insure proper functionality. Option 2, as a result of less dust generation, is the preferred option.

- No-go Option

The greatest positive aspect of the Solar Facility for the Forzando North Coal Mine lies in the supply of electricity to the Eskom national power grid. Electricity supplied to communities in this area is mostly received from coal fired power stations. TCSA have investigated green solutions to power generation and would like to help generate electricity in a manner that does not cause adverse effects to the natural environment while at the same time ensuring that there is enough electricity to meet the surrounding power demands. If the construction and operation of the Solar Facility is not approved, no additional green energy will be going into the Eskom grid to aid Eskom with meeting national power demands.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.
List alternative sites, if applicable.

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1[2] (preferred or only site alternative)	26 °	11.278 ‘	29 °	21.106 ‘
Alternative S2 (if any)	26 °	15.548‘	29 °	32.205 ‘
Alternative S3 (if any)				

In the case of linear activities:

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1 (preferred or only route alternative)				
• Starting point of the activity				
• Middle/Additional point of the activity				
• End point of the activity				
Alternative S2 (if any)				
• Starting point of the activity				
• Middle/Additional point of the activity				
• End point of the activity				
Alternative S3 (if any)				
• Starting point of the activity				
• Middle/Additional point of the activity				
• End point of the activity				

N/A

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

[2] “Alternative S..” refer to site alternatives.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[3] (preferred activity alternative)	195000 m² (19.5 ha)
Alternative A2 (if any)	195000 m² (19.5 ha)
Alternative A3 (if any)	

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative)	
Alternative A2 (if any)	
Alternative A3 (if any)	

N/A

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Alternative A1 (preferred activity alternative)	
Alternative A2 (if any)	
Alternative A3 (if any)	

5. SITE ACCESS

Does ready access to the site exist?	YES
If NO, what is the distance over which a new access road will be built	

Describe the type of access road planned:

An access road already exists – maintenance roads consist of compacted earth where possible, or gravel, as necessary for access to the facility by pickup trucks and similar light maintenance traffic. An existing farm road will be utilised for access to the facility. The existing farm road is a compacted gravel road and enters the facility from the north along the existing railway loop and conveyor.

[3] "Alternative A.." refer to activity, process, technology or other alternatives.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

Please refer to Section 6 for the access road indicated on the site plan in relation to the proposed site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

(DUE TO THE FACT THAT ALTERNATIVE SITE 1 (S1) IS NOT DEEMED A FEASIBLE OPTION FOR THE PROPOSED SITE, A SITE PLAN HAS BEEN PROVIDED IN APPENDIX A FOR THE ALTERNATIVE SITE 2 (S2), PREFERRED, ONLY FEASIBLE ALTERNATIVE SITE FOR THE PROPOSED FACILITY.)

The site or route plans must indicate the following:

6.1 the scale of the plan which must be at least a scale of 1:500;

6.2 the property boundaries and numbers of all the properties within 50 metres of the site;

6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;

6.4 the exact position of each element of the application as well as any other structures on the site;

6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;

6.6 all trees and shrubs taller than 1.8 metres;

6.7 walls and fencing including details of the height and construction material;

6.8 servitudes indicating the purpose of the servitude;

6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):

- rivers;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.10 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and

6.11 the positions from where photographs of the site were taken.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Please refer to Appendix B for the full site report.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 200 000 000
What is the expected yearly income that will be generated by or as a result of the activity?	R 20 000 000
Will the activity contribute to service infrastructure?	Yes
Is the activity a public amenity?	No
How many new employment opportunities will be created in the development phase of the activity?	55
What is the expected value of the employment opportunities during the development phase?	R 7 920 000
What percentage of this will accrue to previously disadvantaged individuals?	% 60
How many permanent new employment opportunities will be created during the operational phase of the activity?	20
What is the expected current value of the employment opportunities during the first 10 years?	R 19 000 000
What percentage of this will accrue to previously disadvantaged individuals?	% 60

9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

NEED:		
1.	Was the relevant provincial planning department involved in the application?	Yes
2.	Does the proposed land use fall within the relevant provincial planning framework?	Yes
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:	
	Motivation for the development: Currently approximately 90% of south African electricity is generated from coal fired power plants, making fossil fuel power generation one of the biggest contributors to climate change in the continent. This can change if other renewable forms of electricity generation such as the proposed Solar facility are embraced as alternative power sources to help reduce the anthropogenic impact by use of fossil fuel on climate change. due to the importance of the proposed facility being an alternative to the anthropogenic effect on climate change (coal fired power plants), feeding the national Eskom electricity grid with a renewable source of power supply, and the limited waste production during the construction and operational phases, it is	

	recommended by the Environmental Assessment Practitioner (EAP) that the proposed facility be authorised and approved Other positive implications of establishing a solar energy facility on the site would include: • assisting the government in reaching their set targets for renewable energy sources; • potential to harness and utilise good 'green' energy resources at mining site; • promotion of clean, eco-friendly renewable energy in South Africa; and • creation of local employment and business opportunities in the local area through new and exciting technologies. Benefits of renewable (solar) energy in the south Africa, published by the National Energy Regulator of South Africa (NERSA), in march 2009 include: • increased energy security for the country as coal supplies begin to become scarce in the future; • resource saving; • exploitation of significant renewable energy resource; • pollution reduction; • climate friendly development (anti-anthropogenic effect); • support for international agreements for change to renewable energy; • employment creation; • acceptability to society; • support to new industrial sector; and • Protecting the natural foundations of life for future generations and climatic conditions.

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	Yes	
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	Yes	
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	Yes	
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		
	N/A		
5.	Will the proposed land use / development impact on the sense of place?		No
6.	Will the proposed land use / development set a precedent?		No
7.	Will any person's rights be affected by the proposed land use / development?		No
8.	Will the proposed land use / development compromise the "urban edge"?		No
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	Yes	
2.	Explain: Currently approximately 90% of South Africa's electricity is generated from coal fired power plants, making fossil fuel power generation one of the biggest contributors to climate change on the continent. This will benefit all of society in assisting Eskom meet the electricity demand. This can change if other renewable forms of electricity generation [such as the proposed Solar Facility] are embraced as alternative power sources to help reduce the anthropogenic impact of fossil fuel on climate change. Due to the importance of the proposed facility being an alternative to electricity generated by coal, feeding additional power into the national Eskom electricity grid with a renewable source of power supply, and the limited waste production during the construction and operational phases, it is recommended by the Environmental Assessment Practitioner (EAP) that the proposed facility be authorised and approved.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	Yes	
4.	Explain: It will lead to job creation in renewable energy whereby the living standards of the people will be enhanced. The employees will be empowered through training programs on renewable energy and the facility functioning and maintenance procedures and requirements. Indirectly, benefits will emanate from the economic spin-offs of the project. Investment in the mining sector is important as it brings with it investment in infrastructure, results in creation of job opportunities and generates many other economic spin-offs. Benefits to the Forzando North Coal Mine project location include meeting socio-economic requirements for the local economies and communities by providing renewable power generation in the form of electricity generated from the proposed facility and creating awareness in the local communities on renewable sources of power production as opposed to traditional methods such as coal fired power plants.		

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and related regulations.	Department of Environmental Affairs	27 November 1998 18 June 2010
Constitution of South Africa, 1996 (Act No. 108 of 1996)	National or Relevant Delegated Provincial Government	11 October 1996
Electricity Regulation Act, 2006 (Act No. 4 of 2006)	Department of Environmental Affairs and the National Energy Regulator of South Africa	6 may 2006
National Heritage Resources Development Act, 1999 (Act No. 25 of 1999)	south African heritage resources agency	28 April 1999
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Mpumalanga Department of Economic Development, Environment and Tourism	31 may 2004
Conservation of Natural Resources Act, 1983 (Act No. 43 of 1983)	National or Relevant Delegated Provincial Government	1 June 1984
Conservation of Natural Resources Act, 1983 (Act No. 43 of 1983)	National or Relevant Delegated Provincial Government	25 may 1984

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	Yes [redacted]
If yes, what estimated quantity will be produced per month?	Approximately 100 m^3 (construction waste mainly spoil and vegetation removal)

How will the construction solid waste be disposed of (describe)?

By use of the existing contracting specialist waste removal company for the Forzando North Coal Mine and disposed of at a registered facility.

Where will the construction solid waste be disposed of (describe)?

As Above

Will the activity produce solid waste during its operational phase?	[redacted] No

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

N/A

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation? No

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility? No

If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? No

If yes, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on site? No

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility? No

If yes, provide the particulars of the facility:

Facility name:	N/A		
Contact person:	N/A		
Postal address:	N/A		
Postal code:	N/A		
Telephone:	N/A	Cell:	N/A

E-mail:	N/A	Fax:	N/A

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

N/A

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	No
If yes, is it controlled by any legislation of any sphere of government?	
If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.	

If no, describe the emissions in terms of type and concentration:

N/A

11(d) Generation of noise

Will the activity generate noise?	No
If yes, is it controlled by any legislation of any sphere of government?	
If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.	

If no, describe the noise in terms of type and level:

N/A

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

	The activity will use minimal water. Solar arrays (panels) will be cleaned using compressed air and distilled water purchased for the maintenance of the proposed facility. Water will be sourced from Forzando North Coal Mine.

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate

the volume that will be extracted per month:

Does the activity require a water use permit from the Department of Water Affairs? [redacted] No

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Photo-voltaic technology (T0™) or Concentrated photovoltaic technology (C7™) use photo-voltaic cells to convert solar radiation into electricity. Both technologies produce zero emissions and the operational Solar facility does not require water during the power production cycle. It also helps to reduce the anthropogenic impact on climate change resulting from the use of fossil fuels. The proposed Solar facility is a safe facility and the technology used for the conversion of solar radiation into electrical power can be installed quickly at the proposed facilities' site. The electricity produced will be fed into the national electricity grid for use by Eskom through a tie connection to the national power grid.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

N/A

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):	N/A

(DUE TO THE FACT THAT ALTERNATIVE SITE 1 (S1) IS NOT DEEMED A FEASIBLE OPTION FOR THE PROPOSED SITE, A SITE / AREA / PROPERTY DESCRIPTION HAS BEEN PROVIDED BELOW FOR THE ALTERNATIVE SITE 2 (S2), PREFERRED, ONLY FEASIBLE ALTERNATIVE SITE FOR THE PROPOSED FACILITY.)

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:

All specialist reports must be contained in Appendix D.

Please refer to Annexure D for the details of the specialist and the declaration of independence. These have been attached with the specialist reports.

Property description/physical address:	Remaining extent of farm Geluk 226 is, within the mining rights boundary of the Forzando North Coal Mine. About 400 metres south of the existing railway loop at the Forzando North Coal Mine.
	(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.
	N/a (the proposed facility is a 19.5 hectare area in the remaining extent of farm Geluk 226 IS)
	In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning:	Agriculture

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

Is a change of land-use or a consent use application required?	NO
Must a building plan be submitted to the local authority?	NO

Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

Please refer to Appendix A for the locality map indicating the proposed location of the Solar Facility.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

	1:50 – 1:20

Alternative S2 (if any):

	1:50 – 1:20

Alternative S3 (if any):

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

The site of the proposed facility at Forzando North is situated on a gentle (1:40) north-facing slope. The proposed site is located on landforms of undulating plains and / or low hills. The proposed Solar facility is located on the remaining extent of the farm Geluk 226 IS and has a gradual slope towards the south west.

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	NO	NO	
Dolomite, sinkhole or doline areas	NO	NO	
Seasonally wet soils (often close to water bodies)	NO	NO	
Unstable rocky slopes or steep slopes with loose soil	NO	NO	
Dispersive soils (soils that dissolve in water)	NO	NO	

Soils with high clay content (clay fraction more than 40%)	NO	NO	[redacted]
Any other unstable soil or geological feature	NO	NO	
An area sensitive to erosion	NO	NO	

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

If any of the boxes marked with an "E "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area
5.2 Low density residential
5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.2.3 RAILWAY LINE [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.3.3 AGRICULTURE
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building

5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "N "are ticked, how this impact will / be impacted upon by the proposed activity?

The railway, line which is located within 500 metres of the proposed Solar facility, will not be impacted on by the proposed Solar facility. The railway line is used for the transport of coal mined from the Forzando North Coal Mine to the Richard's Bay coal terminal for export. The existing railway loop is an extension of the national / Richard's Bay coal terminal railway line and exists purely for the transport of coal and the associated use by the Forzando North Coal Mine. Due to the nature of the proposed Solar facility no impacts have been predicted on the existing railway line.

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:	N/A
If YES, specify:	

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	
If YES, specify:	

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?	NO
If YES, explain:	N/A

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:	N/A
Will any building or structure older than 60 years be affected in any way? Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

SECTION C: PUBLIC PARTICIPATION

(**Please note**: Public participation was conducted for the original BA (location of the Solar facility at Dorstfontein east coal mine). As a result of the location of the proposed facility being changed, the PPP for the new location (Forzando North Coal Mine) will be conducted during the thirty (30) day public comment period of the Draft Basic Assessment Report. Once the comment period is over, both I&AP databases (Forzando and Dorstfontein) will be updated and combined as one database for the purpose of the proposed facility. This will be done in order to inform all I&AP's identified during the original PPP conducted and the PPP to be undertaken as a result of moving the location of the proposed facility).

Please refer to Appendix G for public participation carried out for the proposed facility.

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and
  (ii) any alternative site mentioned in the application;

(b) giving written notice to—
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  (v) the municipality which has jurisdiction in the area;
  (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  (vii) any other party as required by the competent authority;

(c) placing an advertisement in—
  (i) one local newspaper; or
  (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;

(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not

be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and

(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—

(i) illiteracy;

(ii) disability; or

(iii) any other disadvantage.

(**Pleases Note**: Site Notices and advertisements for the new location proposed for the Solar facility for the Forzando North Coal Mine will be done so during the thirty (30) day public comment period for the Draft Basic Assessment Report. Please refer to Appendix G for a copy of the site notices erected and advertisement for the original proposed location at the Dorstfontein east coal mine).

Please refer to Appendix G for the Public Participation Process followed.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

(a) indicate the details of the application which is subjected to public participation; and

(b) state—

(i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;

(ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;

(iii) the nature and location of the activity to which the application relates;

(iv) where further information on the application or activity can be obtained; and

(iv) the manner in which and the person to whom representations in respect of the application may be made.

(**Pleases Note**: Site Notices and advertisements for the new location proposed for the Solar facility for the Forzando North Coal Mine will be done so during the thirty (30) day public comment period for the Draft Basic Assessment Report. Please refer to Appendix G for a copy of the site notices erected and advertisement for the original proposed location at the Dorstfontein east coal mine).

Please refer to Appendix G for the Public Participation Process followed and information supplied to all I&APs through the content included into the advertisements and the site notices.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the

manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

(**Pleases Note**: Site Notices and advertisements for the new location proposed for the Solar facility for the Forzando North Coal Mine will be done so during the thirty (30) day public comment period for the Draft Basic Assessment Report. Please refer to Appendix G for a copy of the site notices erected and advertisement for the original proposed location at the Dorstfontein east coal mine).

Please refer to Appendix G for the Public Participation Process followed and placement of the advertisements and site notices.

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

Please refer to Appendix G for the Public Participation Process followed.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

No comments have been received from any I&AP's to date. Any comments received during the 30 day review period will be included into the Stakeholder Engagement Report (Appendix G).

6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to provide input.

List of authorities informed:

- National Department of Environmental Affairs (DEA);
- Mpumalanga Department of Economic Development Environment and Tourism (MDEDET); AND
- National Department of Water Affairs (DWA) to be contacted during authority comment period for the Draft Basic Assessment Report period.

List of authorities from whom comments have been received:

- DEA – competent authority
- Other authorities to be contacted during the draft basic assessment review period

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority. Proof of any such agreement must be provided, where applicable.

Has any comment been received from stakeholders?	■ No

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

N/A

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

To date, no Issues have been raised by the Interested And Affected Parties (I&APs); but the process will continue during the draft BAR review phase for I&APs

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Annexure E):

N/A

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

Due to dust generation that is likely to result from the planned plant infrastructure and access road development alternative site 1 (s1) on portion 13 of farm Welstand 55 (situated within the Dorstfontein east coal mines mining rights boundary), this site 1 (s1) is not deemed a feasible option for the proposed facility. Dust generation and / or construction activities will affect the proper functioning and maintenance of the solar panels. For this reason the only feasible site for the proposed facility is site 2 (s2) on the remaining extent of farm Geluk 226 IS within the mining rights boundary of the Forzando North Coal Mine, (preferred and only site alternative) expected impacts have only been given for the preferred and only site alternative.)

Alternative (preferred alternative)

Direct impacts:

- Construction Phase:
  - Impacts on the Soil Resource:
    - Loss of the soil resource in an area used for cultivation; and
    - Increased erosion due to increased surface run-ff.
  - Impacts to the Land Use and the Land Capability:

        - Due to the existing Agricultural Activities taking place on the proposed 19.5 ha project area, the proposed activity will cause a loss in agricultural resources and cultivated land. The impact will be limited as the area proposed is small in relation to the existing activities.
    - Impacts to Flora:
        - Removal of natural vegetation.
    - Impacts on Fauna:
        - Destruction of natural habitats; and
        - Poaching and hunting of animals.
    - Impacts to Surface Water:
        - Contamination of nearby surface water resources.
    - Impacts to Groundwater:
        - Contamination of groundwater resources.
    - Impacts to Air Quality:
        - Increased dust generation.
    - Impacts to Visual Aspects:
        - Negative impacts on the visual aspects of the surrounding area.
    - Impacts to Noise:
        - Increased noise levels.
- Operational Phase:
    - Impacts on the Soil Resource:
        - Increased Erosion.
    - Impacts on Flora:
        - Increase in alien vegetation in the footprint area.
    - Impacts on Visual Aspects:
        - Negative impacts on the visual quality and character of the surrounding area.
    - Socio-economic impacts:
        - These are positive impacts resulting from the proposed project. This project can lead to the education of the community of renewable energy sources.

Please refer to Table 7.2 and Table 7.3 of Appendix G for the impacts associated with the proposed development and the proposed mitigation measures.

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

The proposed Solar Facility, PV (T0^{tm}) or CPV (C7^{tm}), will convert solar radiation (sunlight energy) into electrical (electricity) power through exposure to sunlight during daylight hours by solar panels consisting of groups of solar radiation sensitive cells within the 19.5 hectare (ha) project area on the remaining extent of farm Geluk 226 IS within the mining rights area of the Forzando North Coal Mine. Depending on the solar array technology the panels will face in a predominantly northerly direction and tilt automatically to obtain maximum solar radiation, receiving exposure during daylight hours. This energy captured by the solar panels will be converted to electrical power through the use of inverters and transformers and distributed to the Eskom (national) electricity grid.

This facility will produce minimal solid construction waste approximately one hundred (100) metres cubed (m^3), consisting mostly of spoil and vegetation removed during construction activities and no waste water will be produced. During operational phase the proposed facility will use no water whereby panels will be cleaned with compressed air and distilled water purchased for the maintenance and operation of the facility, produce no waste water and produce no emissions of greenhouse gases into the atmosphere. These attributes to this type of electricity power generation facility makes it a renewable and eco-friendly form of power production contesting the anthropogenic effects on global warming, ozone depletion and climate change from conventional power generation facilities such as coal fired power plants.

Alternative A (preferred alternative)

(Due to the planned plant infrastructure and access road development and related dust generation at alternative site 1 (S1) on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal Mine's mining rights boundary, the alternative site 1 (S1) is not deemed a feasible option for the proposed facility as dust generation and / or construction activities will affect the proper functioning and maintenance of the solar panels. For this reason the only feasible site for the proposed facility is site 2 (S2) on the remaining extent of farm Geluk 226 IS within the mining rights boundary of the Forzando North Coal Mine (preferred and only site

alternative)).

No-go alternative (compulsory)

The greatest positive aspect of the Solar Facility for the Forzando North Coal Mine lies in the supply of electricity to the Eskom national power grid. Electricity supplied to communities in this area is mostly received from coal fired power stations. TCSA have investigated green solutions to power generation and would like to help generate electricity in a manner that does not cause adverse effects to the natural environment while at the same time ensuring that there is enough electricity to meet the surrounding power demands. If the construction and operation of the Solar Facility is not approved, no additional green energy will be going into the Eskom grid to aid Eskom with meeting national power demands.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

- Vegetation removal will be done in compliance with the approved EMP for the Forzando North Mine;
- Construction activities and vegetation removal should be limited to the designated footprint areas only;
- Footprint should be clearly demarcated and defined by fences;
- Vehicles should use existing access roads only;
- The footprint area is located within agricultural activities and as such, limited natural vegetation will be disturbed during clearing activities;
- A Environmental Control Officer (ECO) should be appointed to monitor the construction phase of the project;
- The approved measures to manage erosion as per the approved EMP for the Forzando North Mine will be implemented;
- Surrounding agricultural land should be left as-is and allow the continuing of agricultural activities surrounding the proposed site without disturbance from the proposed activity;
- Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%;
- Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness;
- The approved measures to manage erosion as per the approved EMP for the Forzando North Mine will be implemented;
- All employees will be made aware of all environmental issues during induction, and must continuously be updated of all new issues;
- Clean and dirty water systems should be implemented prior to the commencement of construction activities as per the existing approved EMP for the Forzando North Coal Mine;

- Trenches will be constructed around the footprint area in order to divert and transport any dirty water from the facility to the dirty water system of the Forzando North Mine;
- No structures should be permanently positioned within any watercourse;
- Dust generation should be addressed as described in the Forzando North approved EMP, dust suppression methods should be implemented for heavy vehicles;
- Spillage of diesel and oil from construction vehicles:
    - All spillages will be cleaned up immediately.
    - Spill kits need to be made available at all times on site.
- Employees and contractors are to be made aware of the impacts of such spillages on the receiving environment during induction and talk topics.

Is an EMPr attached?	YES	

The EMPr must be attached as Appendix F.

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s) / Locality Map

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Stakeholder Engagement Report **(will be submitted with the final bar)**

Appendix F: EMPr

Appendix G: Basic Assessment Report

WATER • ENVIRONMENTAL • EARTH SCIENCES • GIS

63 Wessel Road Rivonia 2128 PO Box 2597 Rivonia 2128 South Africa

Forzando North Coal Mine: Basic Assessment Report for the Proposed Solar Facility

Report

Version – Draft for I&AP Review

May 2012

Total Coal South Africa (Pty) Ltd

GCS Project Number: 11-625

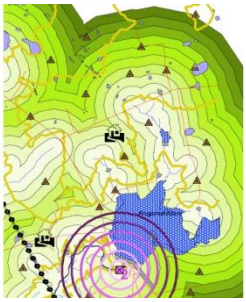
Client Reference: Proposed Solar Facility

NEAS Reference Number: DEA/EIA/0000991/2012

DEA Reference Number: 14/12/16/3/3/1/452

TOTAL




Forzando North Coal Mine: Basic Assessment Report for the Proposed Solar Facility

Report
Version – Draft for I&AP Review

May 2012
Total Coal South Africa (Pty) Ltd

11-625

DOCUMENT ISSUE STATUS

Report Issue	Draft for I&AP Review		
GCS Reference Number	11-625		
Client Reference	Proposed Solar Facility		
Title	Forzando North Coal Mine: Basic Assessment Report for the Proposed Solar Facility		
	Name	**Signature**	**Date**
Author	Michael Philpot Jaco Viviers		May 2012
Document Reviewer	Tanja Bekker		May 2012
Director	Ferdi Pieterse		May 2012

EXECUTIVE SUMMARY

Project Background:

Forzando Coal Mines (FCM) is owned by Total Coal South Africa (TCSA) (74%) and Mmakau Mining (26%), its Black Economic Empowerment Partner. The mine is an outsourced operation with underground mining and coal processing conducted by contractors with TCSA retaining general management and marketing control.

The FCM operation is divided into a North and South Coal Mine. The Forzando North Coal Mine (Forzando North) is situated within the Magisterial District of Bethal, under the jurisdiction of the Steve Tshwete Local Municipal Council in the Mpumalanga province. Forzando North is located on various portions of the following farms:

- Bankpan 225 IS;
- Koppie 228 IS;
- Weltevreden 193 IS;
- Geluk 226 IS; and
- Halfgewonnen 190 IS.

The towns of Bethal and Witbank are located about 25km to the south and about 55km to the northwest of the operation respectively. The Bethal - Hendrina Provincial road (R38) passes approximately 6km to the southeast of the operation and the Richards Bay rail line passes about 3km to the south west.

Forzando North is an underground mining operation, exploiting the No. 4 Lower coal seam. Mining currently occurs in 4 sections and the total coal reserve area is approximately 1 741ha. Forzando North has been developed in a phased manner. Several coal seams have been identified as suitable for mining in the area. The Run of the Mine (ROM) coal is being beneficiated into two products, export coal and metallurgical coal (for local use). The estimated coal reserves amount to approximately 28 070 million tons which translates into 19.6 million tons of potential ROM at 70% extraction.

Project Description:

TCSA has the intention to construct a Solar facility (PV) within the mining right boundaries of Forzando Coal Mine and to supply max 9.5 MWp of electricity to the Eskom National power grid. They have opted for a “green” option which requires the installation of the Solar facility and connection through a 33kV power line to the proposed Eskom substation next to the Solar facility. The substation will be constructed and permitted by Eskom in a separate process.

The Facility will be situated on remaining extent of farm Geluk 226 IS, approximately 400 metres south east of the existing railway loop, and power will be supplied to the National Grid for Eskom.

The Solar Facility is located within the surface rights of the applicant, and for this purpose an environmental investigation and application process in terms of the Environmental Impact Assessment (EIA) regulations under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) must be undertaken. The proposed activity triggers listed activity No. 1, 11 and 23 of Regulation 544 of the NEMA and therefore requires that a Basic Assessment (BA) Report be submitted to the relevant government department.

In terms of the Environmental Impact Regulations published in terms of Section 24(5) of the NEMA, authorisation is required from the National Department of Environmental Affairs (DEA) in consultation with the Mpumalanga Provincial Department of Economic Development, Environment and Tourism (MDEDET). The DEA is regarded to be the competent authority for environmental authorisation for all power generation facilities as electricity is to be fed into the Eskom National (electricity) grid, and all applications will be sent to the DEA for review and approval.

Public Participation:

Section 54(1) of the NEMA requires that public participation (PPP) be conducted for listed activities under Regulation 544 of the Act. Public participation has been conducted for the EIA processes on Forzando North regarding mining operations. The PPP were also initiated for the Solar facility from the start of the project when the project was located at Dorstfontein East Coal Mine. All interested and affected parties (I&AP's) were identified via this process and a stakeholder database was generated. Due to the change in locality the stakeholder database from Forzando Coal Mine will be included with the current database to ensure that all stakeholders from Dorstfontein East Coal Mine and Forzando Coal Mine are included in the process.

There have been no I&AP registrations received for the proposed Solar facility up to the draft submission of the Basic Assessment Report to I&APs for comment. Also, no comments were received from any I&APs during the first phases of PPP conducted. Any I&AP's who continue to register will be added to this database. The complete database was and will be used for I&AP identification for the proposed Solar Facility required for the new locality at Forzando North Mine. All I&AP's on the database were contacted either via post, fax and/or e-mail as stipulated in Section 54(2) (b) of the NEMA.

Site notices were placed at various locations surrounding the first proposed area as stipulated in Section 54(2) (a) of the NEMA. An advertisement was also placed in the Witbank News newspaper in order to ensure that all I&AP's were made aware of the proposed Solar facility being applied for. Due to the change in locality the notification process to advertise and put up site notices will be reinitiated on instruction from the DEA. On advice from the DEA this will continue during the I&AP comment period on the draft BAR.

Purpose of this Report:

The proposed activity triggers listed activity No. 1, 11 and 23 of Regulation 544 of the NEMA and therefore requires that a Basic Assessment (BA) Report be submitted to the relevant government department.

A Basic Assessment Application for the Solar Facility was submitted to the DEA on the 27th of January 2012. The location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Dorstfontein is another TCSA operation). After submission of the BA Application, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North. This operation is located approximately 25 kilometres east of the Dorstfontein East Coal Mine (the original facility location).

The reason for changing the location of the proposed facility was as a result of concerns raised over dust emissions that could result from new developments proposed (access road and plant infrastructure) for the Dorstfontein East Coal Mine on the farm Welstand 55 IS. The future activities proposed for the Dorstfontein East Mine will have an impact on the proposed solar panels to be installed at the new facility with regards to the dust generated by the future developments. The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris remains on the surface of the panels. This is needed in order to ensure proper functionality of the Solar facility. As a result of the change of location of the proposed facility, a new BA is to be compiled and submitted to the Department.

This report serves as the draft Basic Assessment Report for the proposed Solar facility on Forzando Coal Mine.

Motivation for the Proposed Facility:

Currently approximately 90% of South Africa's electricity is generated from coal fired power plants, making fossil fuel power generation one of the biggest contributors to climate change on the continent.

This can change if other renewable forms of electricity generation (such as the proposed Solar facility) are embraced as alternative power sources to help reduce the anthropogenic impact of fossil fuel on climate change. Due to the importance of the proposed facility being an alternative to electricity generated by coal, feeding additional power into the national Eskom electricity grid with a renewable source of power supply, and the limited waste production during the construction and operational phases, it is recommended by the Environmental Assessment Practitioner (EAP) that the proposed facility be authorised and approved.

Identified Impacts:

The proposed location of the Solar facility is within the approved Forzando North Mining Area. The Solar facility location is currently being used for agricultural activities and as a result, the natural environment is already disturbed. As a result of the proposed locality being disturbed by both agricultural and mining activities, impacts associated with the Solar facility are low. The following environmental aspects will be impacted by the proposed development during the various project phases:

- **Construction Phase:**
  - Impacts on the Soil Resource:
    - Loss of the soil resource in an area used for cultivation; and
    - Increased erosion due to increased surface run-ff.
  - Impacts to the Land Use and the Land Capability:
    - Due to the existing Agricultural Activities taking place on the proposed 19.5 ha project area, the proposed activity will cause a loss in agricultural resources and cultivated land. The impact will be limited as the area proposed is small in relation to the existing activities.
  - Impacts to Flora:
    - Removal of natural vegetation.
  - Impacts on Fauna:
    - Destruction of natural habitats; and
    - Poaching and hunting of animals.
  - Impacts to Surface Water:
    - Contamination of nearby surface water resources.
  - Impacts to Groundwater:
    - Contamination of groundwater resources.
  - Impacts to Air Quality:
    - Increased dust generation.
  - Impacts to Visual Aspects:

        - Negative impacts on the visual aspects of the surrounding area.
    - Impacts to Noise:
        - Increased noise levels.
- **Operational Phase:**
    - Impacts on the Soil Resource:
        - Increased Erosion.
    - Impacts on Flora:
        - Increase in alien vegetation in the footprint area.
    - Impacts on Visual Aspects:
        - Negative impacts on the visual quality and character of the surrounding area.
    - Socio-economic impacts:
        - These are positive impacts resulting from the proposed project. This project can lead to the education of the community of renewable energy sources.

The implementation of the management measures proposed to mitigate the negative environmental impacts will drastically reduce the magnitude of each impact on both the project and the surrounding area. No significant or long terms impacts have been identified during this study as the facility will be constructed in an area already approved mining area. Section 7 of this report details all of the environmental impacts identified and provides management measures to further reduce the extent of these impacts.

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IV. GLOSSARY OF TERMINOLOGY

Aerobic: Having molecular oxygen (O^2) present.

Anaerobic: Not having molecular oxygen (O^2) present.

Auditing: A systematic and objective assessment of an organisation's activities and services conducted and documented on a periodic basis.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Catchment: All the land area from mountaintop to seashore which is drained by a single river and its tributaries.

Debushing: Clearing of the site of bush and undergrowth vegetation, but not including the removal of tree stumps.

Destumping: The removal of tree stumps.

Environment: A place where living, non-living and man-made features interact, and where life and diversity is sustained over time.

Environmental Impact: A change resulting from the effect of an activity on the environment. It can be either desirable or undesirable. Impacts may be the direct consequence of an organisation's activities or may be indirectly caused by them.

Environmental Impact Assessment: An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and which may significantly affect the environment. The EIA includes an evaluation of alternatives, as well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures for enhancing the positive aspects of the proposal, and environmental management and monitoring measures.

Environmental issue: A concern felt by one or more parties about some existing, potential

or perceived environmental impact.

Evaporation: The change by which any substance (such as water) is converted from a liquid state into and carried off in vapor.

Groundwater: Subsurface water in the zone in which permeable rocks, and often the overlying soil, are saturated under pressure equal to or greater than atmospheric. Inland wetlands: Fresh water (non-tidal) wetlands that can often be likened to a basin filled with soil which has an impervious layer that retains water.

Interested and affected parties: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, NGOs and the general public.
Monitoring: A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.

Natural vegetation: All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.

Negative impact: A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, or by causing nuisance).

Positive impact: A change which improves the quality of life of affected people or the quality of the environment.

Pollution: The result of the release into air, water or soil from any process or of any substance, which is capable of causing harm to man or other living organisms supported by the environment.

Protected Plants: Plant species officially listed on the Protected Plants List (each province has one), and which may not be removed or transported without a permit to do so from the relevant provincial authority.

Red Data Species: Plant and animal species officially listed in the Red Data Lists as being rare, endangered or threatened.

Rehabilitation: Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat. Rehabilitation does not necessarily reestablish the pre-disturbance condition, but does involve establishing geological and hydrologically stable landscapes that support the natural ecosystem mosaic.

Runoff: The total water yield from a catchment including surface and subsurface flow.

Significant impact: An impact can be deemed significant if consultation with the relevant authorities and other interested and affected parties, on the context and intensity of its effects, provide reasonable grounds for mitigating measures to be included in the environmental management report. The onus shall be on the proponent to include the relevant authorities and other interested and affected parties in the consultation process. Present and potential future, cumulative and synergistic effects should all be taken into account.

Soil saturation: The soil is considered saturated if the water table or capillary fringe reaches the soil surface.

Subsoil: The soil horizons between the topsoil horizon and the underlying parent rock.

Topsoil: The upper soil profile irrespective of the fertility appearance, structure, agriculture potential, fertility and composition of the soil, usually containing organic material and which is colour specific.

Transplanting: The removal of plant material and replanting the same plants in another designated position.

Veld: Unimproved areas of natural vegetation.

Watercourse: A geomorphological feature characterized by the presence of a stream flow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water.

Waterlogged: Soil or land saturated with water long enough for anaerobic conditions to develop.

V.ABBREVIATIONS

BAR:	Basic Assessment Report
BEE:	Black Economic Empowerment
BBBEE:	Broad Based Black Economic Empowerment
BID:	Background Information Document
DEA:	Department of Environmental Affairs
DEAT:	Department of Environmental Affairs and Tourism
DMR:	Department of Mineral Resources
DWA:	Department of Water Affairs
EIA:	Environmental Impact Assessment
EMP:	Environmental Management Plan
I&AP:	Interested and Affected Party
IWULA:	Integrated Water Use License Application
MDEDET:	Mpumalanga Department of Economic Development, Environment and Tourism
MPRDA:	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA:	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA:	National Water Act, 1998 (Act No. 36 of 1998)
SEP:	Stakeholder Engagement Process
WMA:	Water Management Area
WULA:	Water Use Licence Application

1 INTRODUCTION

1.1 Project Background

Forzando Coal Mines (FCM) is owned by Total Coal South Africa (TCSA) (74%) and Mmakau Mining (26%), its Black Economic Empowerment Partner. The mine is an outsourced operation with underground mining and coal processing conducted by contractors with TCSA retaining general management and marketing control.

The FCM operation is divided into a North and South Coal Mine. The Forzando North Coal Mine (Forzando North) is situated within the Magisterial District of Bethal, under the jurisdiction of the Steve Tshwete Local Municipal Council in the Mpumalanga province (Figure 1.1).

Forzando North is located on various portions of the following farms:

- Bankpan 225 IS;
- Koppie 228 IS;
- Weltevreden 193 IS;
- Geluk 226 IS; and
- Halfgewonnen 190 IS.

The towns of Bethal and Witbank are located about 25km to the south and about 55km to the northwest of the operation respectively. The Bethal - Hendrina Provincial road (R38) passes approximately 6km to the southeast of the operation and the Richards Bay rail line passes about 3km to the south west.

Forzando North is an underground mining operation, exploiting the No. 4 Lower coal seam. Mining currently occurs in 4 sections and the total coal reserve area is approximately 1 741ha. Forzando North has been developed in a phased manner. Several coal seams have been identified as suitable for mining in the area. The Run of the Mine (ROM) coal is being beneficiated into two products, export coal and metallurgical coal (for local use). The estimated coal reserves amount to approximately 28 070 million tons which translates into 19.6 million tons of potential ROM at 70% extraction.

TCSA has the intention to construct a Solar facility within the mining right boundaries of Forzando Coal Mine and to supply max 9.5 MWp of electricity to the Eskom National power grid. They have opted for a “green” option which requires the installation of the Solar facility and connection through a 33kV power line to the proposed Eskom substation next to

the Solar facility. The substation will be constructed and permitted by Eskom in a separate process.

Figure 1.1 Locality of the Forzando North Coal Mine

1.2 Project Description

The Facility will be situated on remaining extent of farm Geluk 226 IS, approximately 400 metres south east of the existing railway loop, and power will be supplied to the National Grid for Eskom.

The Solar facility is located within the surface rights of the applicant, and for this purpose an environmental investigation and application process in terms of the Environmental Impact Assessment (EIA) regulations under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) must be undertaken. The proposed activity triggers listed activity No. 1, 11 and 23 of Regulation 544 of the NEMA and therefore requires that a Basic Assessment (BA) Report be submitted to the relevant government department.

In terms of the Environmental Impact Regulations published in terms of Section 24(5) of the NEMA, authorisation is required from the National Department of Environmental Affairs (DEA) in consultation with the Mpumalanga Provincial Department of Economic Development, Environment and Tourism (MDEDET). The DEA is regarded to be the competent authority for environmental authorisation for all power generation facilities as electricity is to be fed into the Eskom national (electricity) grid, and all applications will be sent to the DEA for review and approval.

A Basic Assessment Application for the Solar facility was submitted to the DEA on the 27th of January 2012. The location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Dorstfontein is another TCSA operation). After submission of the BA Application, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North (Figure 1.2). This operation is operation located approximately 25 kilometres east of the Dorstfontein East Coal Mine (the original facility location).

The reason for changing the location of the proposed facility was as a result of concerns raised over dust emissions that could result from new developments proposed (access road and plant infrastructure) for the Dorstfontein East Coal Mine on the farm Welstand 55 IS. The future activities proposed for the Dorstfontein East Mine will have an impact on the proposed solar panels to be installed at the new facility with regards to the dust generated by the future developments. The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris remains on the surface of the panels. This is needed in order to ensure proper functionality of the Solar facility. As a result of the change of location of the proposed facility, a new BA is to be compiled and

submitted to the Department.

1.3 Property Description

The Solar facility is proposed to be located on the remaining extent of farm Geluk 226 IS. This property falls within the approved mining area for the Forzando North Coal Mine mining rights area. Please refer to Table 1.1 below for a description of the above mentioned property. Please refer to Figure 1.2 for a map indication the location of the proposed facility.

Table 1.1 Property description for the area proposed for the Solar facility

Farm name and number	Portion number	Title deed number	Owner on title deed	Surveyor - General code
Geluk 226 IS	Remaining extent	T18885/2005	Total Coal South Africa (Pty) Ltd	T0IS000000000022600000

Figure 1.2 Locality of the proposed Solar facility

1.4 Environmental Assessment Practitioner for the Basic Assessment Process

GCS (Pty) Ltd (GCS) has been appointed by TCSA, in compliance with the requirements of the NEMA and relevant regulations to undertake the required environmental authorisation process for the proposed Solar facility required for the Forzando North Coal Mine.

GCS has highly experienced staff, and undertakes the management and compilation of EIAs and EMPs. GCS prides itself on integrity, independence, impartiality and skills in assisting with complex projects. GCS has no vested interest in the project or the outcome of the applications, and has declared itself independent in compliance with EIA regulations. GCS will be responsible for project management, authority liaison, and the compilation of all necessary documentation.

The applicant for this project is TCSA. Please refer to Table 1.1 below for the details of the applicant. The details pertaining to the Environmental Assessment Practitioner (EAP) compiling the Basic Assessment have also been included in this table.

Table 1.2 Applicant and EAP Contact Details

Name of person	Organisation	Contact details
Applicant: Mr. William Seabi (Environmental Co-ordinator)	Total Coal South Africa (Pty) Ltd	8th Floor JHI House 11 Cradock Avenue 2196 P.O Box 2344 Saxonworld 3132 Tel: 011 441 6857 Fax: 011 441 6850 william.seabi@coal.total.co.za

Name of person	Organisation	Contact details
EAP: Jaco Viviers (Project Manager)	GCS (Pty) Ltd	63 Wessel Road P.O. Box 2597 Rivonia 2128 Tel: (011) 803 5726 Fax: (011) 803 5745 jaco@gcs-sa.biz

1.5 Objectives in terms of the Authorisation Process

1.5.1 General Objectives for the required Environmental Authorisation Process

The objective of the environmental authorisation process is to comply with all legislation relevant to the proposed project, thereby striving to reach a sustainable development solution. This BA Report has been complied in compliance with the NEMA Regulations (GN No. 543 of 18 June 2010) with the following objectives in mind:

- To provide an opportunity for the applicant, authorities and interested and affected parties (I&APs) to exchange information and express their views and concerns regarding the proposed project;
- To provide a brief project description;
- Describe the baseline environmental conditions prior to the proposed construction activities;
- To assess the nature of the proposed project operation within the receiving environment;
- To identify potential impacts of the proposed Solar facility;
- Describe the project methodology, including the environmental processes which must be adhered to;
- Propose the most appropriate approach and procedures to plan and the develop the proposed Solar facility;
- Detail the views and concerns of relevant authorities and I&APs and the public participation process followed;
- To focus the specialist studies on relevant impacts, issues and concerns; and
- Describe the nature and extent of the environmental impacts that may occur as a

result of the proposed project.

1.5.2 Environmental Assessment Legislative Objectives

An initial legal overview was conducted for the proposed Facility to establish all legal obligations and duties in terms of various environmental legislations. This review (Basic Assessment) was done in order to establish if all legal duties imposed by the different sets of legislation were taken into consideration and are adhered to for the proposed Facility.

1.5.3 Environmental Process Objectives

In order to mitigate potentially negative impacts and to identify any potential fatal flaws that may render the project environmentally unacceptable, GCS has adopted an integrated, step-by- step process to identify issues and concerns and to thoroughly investigate these issues. The specialist environmental investigations undertaken for the establishment of the Forzando North Coal Mine (the area in which the facility will be situated) were conducted for the following project phases:

- Planning and design phase;
- Construction phase;
- Operational phase; and
- Decommissioning phase.

Since the location of the proposed Solar facility is within the approved footprint area for infrastructure within the Forzando North mine area, these specialist studies will also be relevant to the Solar facility required. To ensure that the negative impacts are identified and mitigated during the early stages of the project and that the positive impacts are maximised, it will be necessary for the environmental study to meet the following aims:

- Follow the guideline documents as outlined by the NEMA;
- Provide input to ensure that the most technical feasible, and environmentally feasible options are selected;
- Ensure that the impacts are identified early through investigations to minimise environmental damage and maximise benefit where possible;
- Compile a BA Report (i.e. this report) that will identify, evaluate and address the potential impacts;
- Provide ongoing environmental input into the project planning and development, especially as this forms the first phase of future mining development in the project;
- Conduct thorough specialist investigations that will allow the project team to develop an understanding of the environmental issues to be dealt with;
- Compile an EMP that will limit the significance of the negative impacts and

maximise the positive aspects where possible; and

- Ensure that all relevant I&APs/ Stakeholders are consulted and involved throughout the project (public process will be conducted for the new proposed locality at the Forzando North Coal Mine during the thirty (30) day public comment period for the draft Basic Assessment Report after which both I&AP databases (Forzando and Dorstfontein) will be updated and incorporated together as one database for the purpose of the proposed facility).

1.6 Evaluation of the Impact Assessment Process and Reports

For the environmental authorisation process in terms of NEMA required, the BA Report must be evaluated and approved by the DEA with consultation from the MDEDET.

In terms of the NEMA regulations, once the Basic Assessment is assessed, DEA will issue a Record of Decision (RoD) regarding the proposed activities applied for. The RoD will state if the activities are authorised and, if so, what the conditions of the authorisation are.

1.7 Purpose of this Report

The proposed activity triggers listed activity No. 1, 11 and 23 of Regulation 544 of the NEMA and therefore requires that a Basic Assessment (BA) Report be submitted to the relevant government department.

A Basic Assessment Application for the Solar facility was submitted to the DEA on the 27th of January 2012. The location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Dorstfontein is another TCSA operation). After submission of the BA Application, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North. This operation is operation located approximately 25 kilometres east of the Dorstfontein East Coal Mine (the original facility location).

The reason for changing the location of the proposed facility was as a result of concerns raised over dust emissions that could result from new developments proposed (access road and plant infrastructure) for the Dorstfontein East Coal Mine on the farm Welstand 55 IS. The future activities proposed for the Dorstfontein East Mine will have an impact on the proposed solar panels to be installed at the new facility with regards to the dust generated by the future developments. The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris remains on the surface of the panels. This is needed in order to ensure proper functionality of the Solar facility.

This report serves as the updated Basic Assessment for the proposed Solar facility as a result of the change of location of the project area.

2 INFRASTRUCTURE REQUIREMENTS AND FACILITY DESCRIPTION

TCSA has the intention to construct a Solar facility within the mining right boundaries of Forzando Coal Mine and to supply max 9.5 MWp of electricity to the Eskom National power grid. They have opted for a "green" option which requires the installation of the Solar facility and tie-in connection to the proposed Eskom substation next to the Solar facility. The substation will be constructed and permitted by Eskom in a separate process.

The Solar Facility will consist of a ground mounted solar array supported on many small, lightly loaded foundations (foundations for electrical equipment; maintenance roads; and small maintenance buildings). The design service and operational life of the facility is 25 to 30 years. The goal of design of the facility is to prevent excessive maintenance and safeguard power production at the lowest possible construction cost.

Foundations of the facility are typically small and support very little weight loads. Load pressures on the foundations are mostly due to wind. Important aspects for the design of the foundations include:

- Near surface soil properties,
- Expansiveness,
- Frost pressure, and
- Similar behaviour of the environmental effects on the foundations.

Long term differential vertical movement must not exceed 5 centimetres (cm) over 10 metres (m) in 30 years. Where possible, it will be desirable to use the land in its natural state a far as possible to limit extensive earthwork and / or any compaction or treatment of in situ soils. Clearing and grubbing techniques are typically required and topsoil will be left in place except where foundations, roads, and other areas are to be graded.

TCSA has in conjunction with a subsidiary designed two possible Solar facilities which will be used as the final options for the facility. The options area the same in size and would not exceed 20ha in size and will not exceed 10MW of electricity generation capacity.

The two options for the Solar facility will be based on two different technologies to optimise the generation capacity of the Solar facility. The two options and the corresponding layouts are described as T0^{TM} Tracker System (PV) and a C7^{TM} Tracker System (CPV), refer to Figures 2.1 and Figure 2.2 for the layouts of the Tracker Systems respectively.

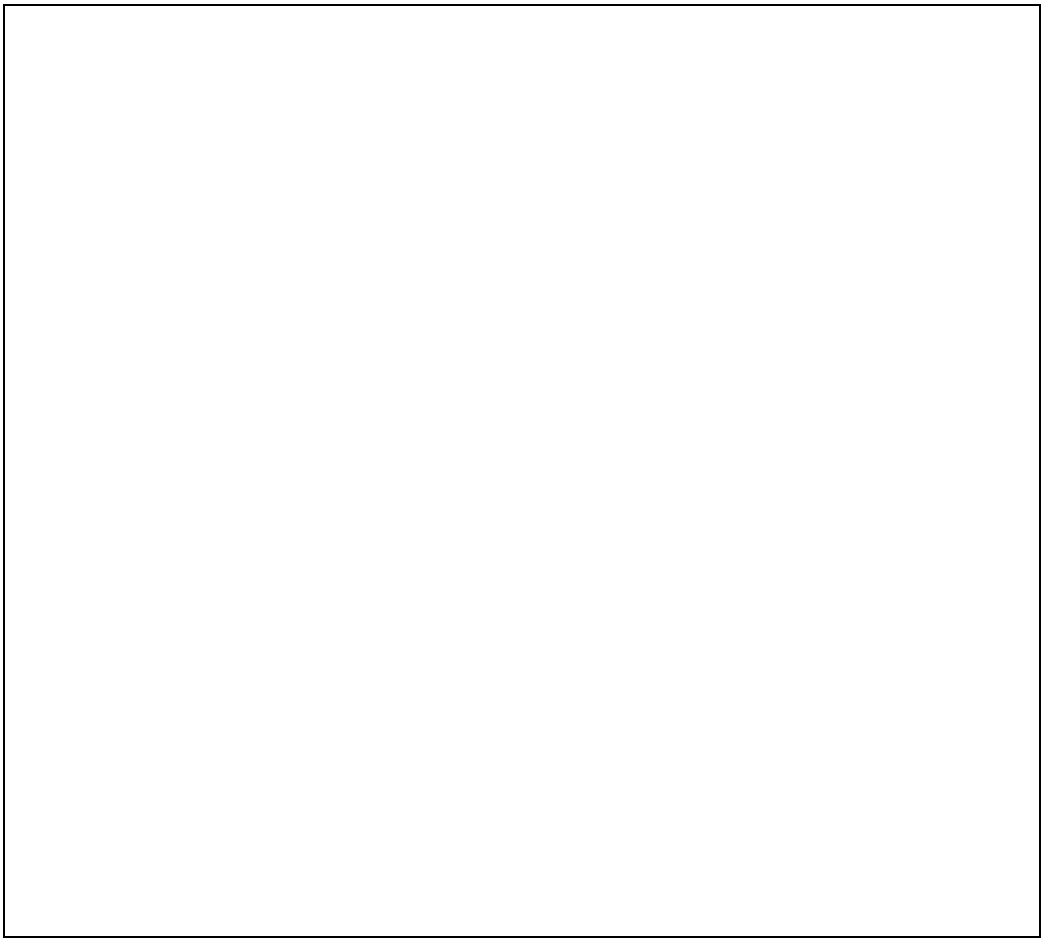


Figure 2.1 PV / T0™ Tracker System Layout on Forzando North

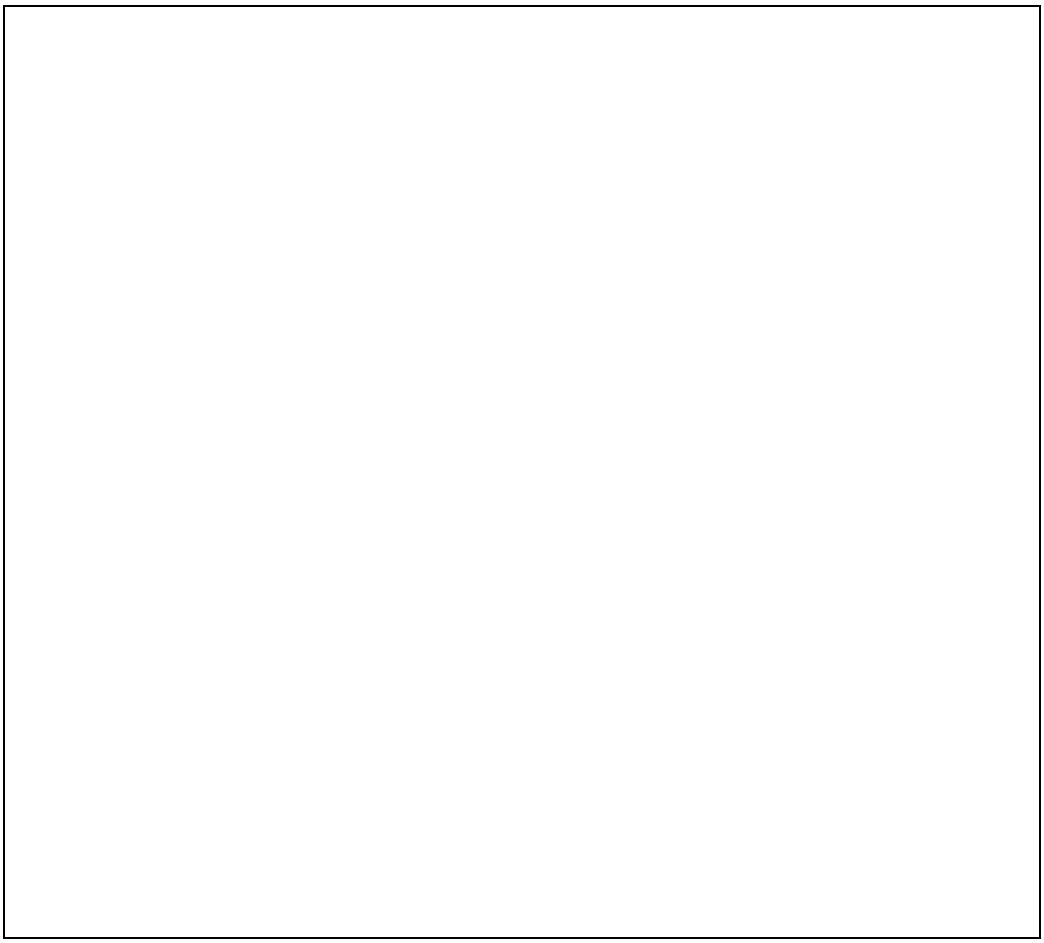


Figure 2.2 CPV / C7™ Tracker System Layout on Forzando North

2.1 Technology

2.1.1 PV / T0™ Tracker System

The T0™ Tracker system consists of an optimized single-axis tracker, consisting of PV modules attached to North-South oriented rectangular torque tubes. The PV modules are physically mounted to the galvanized steel torque tube by the means of clips insuring ground connection from the module frames to the T0 structure. Each tube is supported by a set of piers placed in the ground in a concrete foundation or depending on the soil conditions directly rammed (driven piers). The specific design contains 33 T0 Tracker™.

The design would also range within the following heights:

- Maximum: 1.50 meters
- Minimum: 1.20 meters (center piers)

The photovoltaic panels will be installed on a SunPower T0 Tracker™. The supports of the frame will be fixed on top of the steel piers. The design contains 5836 piers (1524 heavy & 4312 light) and 33 drive piers. The T0 Tracker™ begins operation at sunrise and ends operation at sunset in the horizontal orientation, and there are never any shadows that fall upon the PV modules.

The SunPower T0 Tracker™ combines a revolutionary single-axis design with SunPower high-efficiency solar panels to deliver the most energy per acre of land by minimizing shading and grouping trackers closer together.

The SunPower T0 Tracker™ technology is a patented system that maximizes solar exposure to photovoltaic (PV) cells by utilizing an electric tracking mechanism. The torque tubes are driven through the central drive strut, by an industrial linear actuator and a gear motor, monitored with a programmable microprocessor-based controller.

Information on design referenced from the Sunpower Design Proposal Reports for the T0 Tracker™ System at Forzando North.

Please refer to Figure 2.3 for a typical illustration of the type T0^{tm} Tracker of Solar facility proposed.

Figure 2.3 Typical illustration of the Type (T0^{tm} Tracker) of facility proposed

2.1.2 CPV / C7™ Tracker System

Named for its ability to concentrate the sun's energy by 7 times, the SunPower® C7^{tm} Tracker delivers the lowest levelized cost of electricity (LCOE) for utility scale deployment available today. The SunPower C7^{tm} Tracker combines a horizontal single-axis tracker with rows of parabolic mirrors, reflecting light onto the world's highest-efficiency silicon solar cells powered by the unique, patented SunPower® Maxeon™ cell technology.

The design contemplates the following heights, relative to the external perimeter of the structure/cross struts that supports the mirrors :

- Maximum: 3.20 meters (with tilt angle 75°)
- Minimum: 0.50 meters (with tilt angle 75°)

The mirrors and photovoltaic cells will be installed on a SunPower C7 Tracker™. The supports of the frame will be fixed on top of the steel piers. The pier foundations depend on the soil conditions. The required diameter and depth of the cast-in-place concrete pier foundations, or the length inside the soil of the driven piers, will be determined by the magnitude of the lateral and vertical loads of the piers. Pier lateral and vertical design loads have been calculated for a variety of wind directions and upper frame (the one that holds the mirrors) orientations. The current design contains 3750 piers.

In the system, each receiver is positioned closer to the mirror than the focal line which widens the flux band and maximizes cell efficiency. A single tracker consists of two torque tubes driven by a center-mounted actuator. There are 10 cross-struts supporting 54 mirrors mounted on each torque tube; an additional cross-strut is mounted on the southern end to support one 0.5m mirror for each row. This southern overbuild is necessary for horizontal single-axis trackers due to non-zero solar zenith angles.

Each torque tube can support 6 rows of mirrors, positioned symmetrically to the centerline. Each mirror is coupled with a receiver mounted on the convex side of the mirror. This procedure allows maintaining a proper alignment during assembly as well as making it easier. In addition, the mirror becomes a structural part of the concentrator, allowing to reduce the overall metallic structure. The position of the receiver is such that, seen from above and in a horizontal position, it remains hidden by the mirror surface, optimizing the concentration while freeing more space for the mirrors to track the sun. The design contains 85.500 mirrors.

Each of the C7™ row has its own TMACTM microprocessor-controlled motor drive. The controller performs sun angle calculations each second of the day, and operates the drive to position the PV modules at an optimal orientation in order to maximize the PV module exposure the sun. The design makes provision for 750 motors.

Information on design referenced from the Sunpower Design Proposal Reports for the C7 Tracker™ System at Forzando North.

Figure 2.4 C7 Tracker System™ for Forzando North

2.2 Access Road

Maintenance roads consist of compacted earth where possible, or gravel, as necessary for access to the facility by pickup trucks and similar light maintenance traffic. An existing farm road will be utilised to as far as possible to gain access to facility. The existing farm road is not tarred but is a compacted gravel road that enters the facility from the north along the existing railway loop and conveyor. This road will be graded and used as the maintenance road to the proposed facility.

Within the facility an internal service road will be constructed with a width of 3m on top of a geotextile layer that will avoid contamination of used material. The length of internal service road will be approximately 1150m.

2.3 Power lines

The proposed facility will supply the Eskom National Electrical Grid with max 9.5 MWp of electricity. The power connection utilises electrical inverters and transformers which are typically supported on aggregate compacted material, concrete pads and / or (where mounted on skids or containers) spread footings or drilled piers (please refer to Figure 2.3 for a typical illustration of the inverter and transformer equipment proposed to provide the power line connection with electricity). Substations typically include transformers or switchgears supported on pads, piers, or footings; and in some cases, poles and frames with significant overturning moments supported on drilled piers.

2.3.1 Eskom Substation

Please Note: The substation will be constructed and permitted by Eskom in a separate process.

The Substation will be located at the South of the plant, refer to Figure 2.1 and Figure 2.2. The Eskom project is referred to as a 33/88kV Substation. The substation will connect the plant to a HV overhead line. The substation will connect to the HV line through an 88kV line. All the transformers protection 33kV MV cubicles are connected to one MV ring. The MV ring is connected to the Main Medium Voltage Switchgear (MMVS) located in the Interconnection cabin inside the Solar plant. The MMVS is connected through a 33kV underground cable to the Substation, also inside the Solar plant perimeter.

Auxiliary services will be feed through an 11kV line. This MV line will be connected to the MV metering panel for auxiliary services located in the Interconnection Cabin.

Figure 2.3 Illustration of the proposed Inverters and Transformers to be installed

2.4 Water Supply

The proposed facility will not require water. The solar arrays consisting of the Photo-Voltaic cells will be cleaned on a regular basis using compressed air and distilled water. The distilled water and compressed air will be purchased for the facility by the mine. No waste water will be produced from the construction or operation of the proposed Solar facility.

2.5 Waste Management

About 100 m^3 of solid waste will be produced during construction of the Solar facility. This waste will consist mostly of spoil material and vegetation removed during the clearing and construction activities.

No waste water will be produced during the construction of the proposed facility. All solid waste produced will be removed and disposed at a licensed facility by the existing contracted waste removal company for Forzando North.

2.6 Maintenance Buildings

Maintenance buildings for the facility will be small, light steel framed buildings with shallow spread footings and a concrete slab. Substations will typically house transformers, switchgears and inverters and will be constructed of light sheet metal supported on pads, piers, or footings

3 OVERVIEW OF APPLICABLE LEGISLATION

3.1 The Constitution of South Africa, 1996 (Act No. 108 of 1996)

Section 24 of the Constitution holds the environmental clause in terms of the rights of the citizens of South Africa where it states that:

Everyone has the right:

a) To an environment that is not harmful to their health or wellbeing, and
b) To have an environment protected for the benefit of present and future generations through reasonable legislative and other measures that-
    I. Prevent pollution and ecological degradation;
    II. Promote conservation; and
    III. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Every development action must take place in such a manner that this right of present and future generations is still protected.

3.2 National Environmental Management Act, 1998 (Act No. 107 of 1998)

EIA regulations promulgated in terms of NEMA identify certain activities, which require authorisation from the competent environmental authority, in this case the DEA in consultation with the MDEDET, before commencing. The NEMA Regulations were revised and altered in June 2010. The revision of the listed activities is as follows:

- The old Regulation 386 is now the Environmental Impact Assessment Regulations No. GNR. 544 Listing Notice 1 of 2010; and
- The Regulation 387 is now the Environmental Impact Assessment Regulations No. GNR. 545 Listing Notice 2 of 2010.

Activities listed in Regulation No. GNR. 544 require a Basic Assessment, while those listed in Regulation No. GNR. 545 require Scoping and a full Environmental Impact Assessment. The proposed Solar facility required for the Forzando North Mine requires the listing of two (2) activities in terms of GNR 544, which requires that a Basic Assessment be undertaken. These relevant activities are described in Table 2.1 below.

Table 3.1 Listed activities relating to the proposed Solar facility

Listed Activity (GNR. 544)	Description
GNR 544 of 18 June 2010 (Activity 1)	The construction of facilities or infrastructure for the generation of electricity where: i. The electricity output is more than 10 megawatts but less than 20 megawatts; or The output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.
GNR 544 of 18 June 2010 (Activity 11)	The construction of: Infrastructure or structures covering 50m2 or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction occurs behind the development setback line,
GNR 544 of 18 June 2010 (Activity 23)	The transformation of undeveloped, vacant or derelict land to- i. Residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares; or ii. Residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares,- except where such transformation takes place- i. For linear activities; or ii. For purposes of agriculture or aforestation, in which case Activity 16 of Notice R545 applies. [Activity 23 amended by GN R660 of 30 July 2010]

3.3 Electricity Regulation Act, 2006 (Act No. 4 of 2006)

The Electricity Act establishes a national regulatory framework for the electricity supply industry such as Mining. The Act makes provision for the National Energy Regulator to be the custodian and enforcer of the national electricity regulatory framework, National Energy Regulator of South Africa (NERSA). NERSA is to provide for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The Act also provides for matters connected therewith.

3.4 Conservation of Natural Resources Act, 1983 (Act No. 43 of 1983)

The purpose of the Act [Section 2(2)] is to provide for the conservation of the natural agricultural resources of the Republic of South Africa. This is done through the maintenance of the production potential of land, by the combating and prevention of erosion and weakening and destruction of the water resources, and by the protection of vegetation and

the combating of weed and invader plant species.

The activities and mitigating measures implemented as part of the life span of the Solar facility will have to ensure that the above provisions are met.

3.5 Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)

In broader terms, the Conservation of Agricultural Resources Act (CARA) refers to predominately to the conservation of areas currently utilised for agriculture, including cultivated land and land used for grazing; water resources (including wetlands and rivers); and the control and spread of alien invasive species. Although no permit will be required in terms of CARA, management of the impacts of the project on agricultural land, water resources and alien vegetation will be necessary in the form of a construction phase EMP.

3.6 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The Act provides for the good management of the national estate (those heritage resources which are of cultural significance or other special value, including places, buildings, graves and burial grounds, historical settlements, archaeological and paleontological sites, landscapes and natural features of cultural significance etc, for the present community and future generations) so that it may be conserved for future generations.

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY AND PROCESS

The Forzando North Coal Mine (Forzando North) is situated within the Magisterial District of Bethal, under the jurisdiction of the Steve Tshwete Local Municipal Council in the Mpumalanga province. The operation lies directly north-east of the town of Bethal. The competent authority for this area is the MDEDET. The competent authority responsible for authorising of the proposed project will be the DEA with consultation from the MDEDET.

4.1 Environmental Authorisation in terms of the NEMA

Environmental Authorisation is a requirement in terms of Section 24 of the NEMA for listed activities as promulgated under Government Notice Regulation (GNR) 543, 544 and 545 of 18 June 2010. The activities that are relevant to the proposed development as determined during the feasibility investigations are:

GNR 544 of 18 June 2010 (Activity 1); The construction of facilities or infrastructure for the generation of electricity where:

I. The electricity output is more than 10 megawatts but less than 20 megawatts; or
II. The output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.

GNR 544 of 18 June 2010 (Activity 11); The construction of: Infrastructure or structures covering 50m2 or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction occurs behind the development setback line,

GNR 544 of 18 June 2010 (Activity 23); The transformation of undeveloped, vacant or derelict land to-

I. Residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares; or
II. Residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares,-

Except where such transformation takes place-

I. For linear activities; or
II. For purposes of agriculture or a-forestation, in which case Activity 16 of Notice R545 applies.

[Activity 23 amended by GN R660 of 30 July 2010]

4.2 Environmental Process to be followed

The environmental legislative timeframes for the environmental authorisation process under the NEMA are provided for in Regulation 544 of 18 June 2010 and illustrated in Table 4.1 below.

Table 4.1 Basic Assessment Process under the NEMA

Step	Actions	Who	Time	Timeframes applicable to the PV Facility	
1	Compile Notice of Intent and Submit	Applicant / Consultant	Not Prescribed	Original BA application for the Proposed location at the Dorstfontein East Coal Mine submitted to the DEA on the 30 January 2012	Public Participation Process
2	Competent Authority Acknowledge Receipt	Authority	14 days	19 days (application submitted 27 January 2012 – acknowledgement received 14 February 2012)	
3(a)	Alternative analysis indicated a new site	Applicant / Consultant	N/A	Initial site visit for the new location at the Forzando North Coal Mine conducted on the 2 March 2012	
3(b)	Submission of new application form	Applicant / Consultant	N/A	Basic Assessment application submitted on the 15 March 2012 – DEA	
3(b)(i)	Competent Authority Acknowledge Receipt	Authority	N/A – Authority determined that the reference number associated with the project remains effective.	9 days (application submitted on the 15 March 2012 – DEA acknowledgement received 23 March 2012)	
4(a)	Compilation of Basic Assessment Report and Placement in Public Domain for Comment	Consultant	30 days	Submit for Public review on the 4 June 2012	

4(a)(i)	If applicable, amend reports / provide additional information	Applicant / Consultant	Not Prescribed	Within timeframes	
4(b)	Submit report to relevant authority for review	Authority	30 days from acceptance or receipt of additional information	Will be submitted at the end of June 2012	
4(c)	Competent authority may request additional information	Authority	Not prescribed	During the Authority Comment period	
4(d)	Submission of additional information and authority decision	Authority	30 days from acceptance of receipt	30 days from the receipt of the additional information from the authorities	
5	Notify I&APs of decision and appeal provisions	Applicant / Consultant	5 days from decision		
6	If applicable, consider and respond to appeals received	Minister / MEC	Up to 90 days		

4.3 Environmental Basic Assessment Process

The methodology followed for the BA process for the proposed Solar facility is outlined in Government Notice Regulation 544 of 18 June 2010, promulgated in terms of Section 24 of the NEMA.

Public Consultation is a continuing process throughout the authorisation process and is in compliance with Section 54 of GNR 543 of 18 June 2010. All impacted and affected parties (I&AP's) were identified via the public process for the original proposed locality at the Dorstfontein East Coal Mine and a complete stakeholder database was generated. There have been no I&AP registrations received for the original proposed facility and as such the existing Dorstfontein East Coal Mine I&AP database was utilised for the participation process and updated for the proposed project as no comments were received. This complete database will be updated to include the Forzando North Coal Mine I&AP database during the thirty (30) day public comment period for the draft Basic Assessment report. This will be incorporated and updated to include the Dorstfontein East database and be used for

I&AP consultation for the proposed Solar facility required for the Forzando North Coal Mine on instruction from the DEA.

The database of all I&APs and the consultation process was further extended through the distribution of Background Information Documents (BIDs) (sent out on the 13th of February 2012), an advertisement was placed in the local Witbank News Newspaper on the 10th of February 2012, and site notices placed in the local area surrounding the mine on the 14th of February 2012. New advertisements and site notices will be placed during June 2012.

The Basic Assessment Process allowed for impacts to be identified in relation to the proposed activities. The identified impacts allowed for the focusing of specialist investigations, of which the findings can then be addressed in the BA and Environmental Management Plan (EMP).

The Basic Assessment (BA) is compiled to demonstrate that the potential and expected impacts associated with the proposed Solar facility which have been considered and understood in terms of all the components and phases of the project.

Specialist investigations were undertaken to determine the environmental impacts and their associated significance during the authorisation of the Forzando North Mining area. In the BA, mitigating measures have been investigated and are proposed for the significant impacts identified. These mitigating measures have to be of such a nature that they assist in avoiding the impacts, or where the impacts cannot be avoided, they will help assisting in mitigating or managing the identified impacts. The details for these mitigation measures are discussed in the EMP.

The public consultation process will continue throughout the project, allowing I&AP's an opportunity to raise concerns and issues as well as to communicate information in terms of the BA process. It will also allow the I&AP's to determine if the issues raised during the Impact Assessment Phase have been sufficiently incorporated in the EMP document.

4.4 Environmental Management Plan (EMP)

The function of the EMP is to indicate the policies, practical measures and programmes that need to be implemented in order to avoid, mitigate or manage the identified impacts.
Mitigating measures for all phases of the proposed Facility needs to be included in the EMP.
These mitigating measures will be tied to certain environmental, economic and social objectives and goals.

5 ALTERNATIVE ASSESSMENT AND PROJECT MOTIVATION

5.1 Site Alternatives

Two options were investigated for the location of the Solar facility. Originally the location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Option 1). On further consideration of this option, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North (Option 2).

Due to the planned plant infrastructure and access road development proposed for Dorstfontein East and the related dust generation, Option 1 was not deemed a feasible option for the proposed facility. Dust generation and / or construction activities will affect the proper functioning and maintenance of the solar panels. It is for this reason that the only feasible site for the location of the proposed facility is Option 2.

5.1.1 Option 1

A Basic Assessment Application for the Solar facility was submitted to the DEA on the 27th of January 2012. The location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Dorstfontein is another TCSA operation). After submission of the BA Application, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North. This operation is located approximately 25 kilometres east of the Dorstfontein East Coal Mine (the original facility location).

The reason for changing the location of the proposed facility was as a result of concerns raised over dust emissions that could result from new developments proposed (access road and plant infrastructure) for the Dorstfontein East Coal Mine on the farm Welstand 55 IS. The future activities proposed for the Dorstfontein East Mine will have an impact on the proposed solar panels to be installed at the new facility with regards to the dust generated by the future developments.

The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris remains on the surface of the panels. This is needed in order to ensure proper functionality of the Solar facility.

5.1.2 Option 2

The second location for the proposed facility is the remaining extent of the farm Geluk 226 IS which is within the surface mining rights area of Forzando North. This is the preferred option for the location of the facility and possibility of dust and dust generation impacting on the facility and the functioning thereof will be minimal.

The proposed panels for the conversion of solar radiation to electrical power need to be cleaned regularly to insure no debris is on the surface of the panels to insure proper functionality. Option 2, as a result of less dust generation, is the preferred option. Please refer to Appendix B of the Report for the initial Site Assessment Report on the Forzando North Site.

5.2 Conventional Power Supply versus Proposed Solar Facility Power Generation

The proposed PV Facility will convert solar radiation (sunlight energy) into electrical (electricity) power through the exposure of photo-voltaic panels (consisting of groups of solar radiation sensitive cells) to sunlight during daylight hours.

The proposed project will incorporate thousands of photo-voltaic panels that will be arranged into groups of strings (arrays) depending on the Tracker technology that will be chosen. These arrangements will be done so within a 19.5 hectare (ha) footprint area on the remaining extent of farm Geluk 226. Solar arrays will face in a northerly direction and tilt automatically to obtain maximum solar radiation, receiving exposure during daylight hours. The energy captured by the solar panels will be converted to electrical power through the use of inverters and transformers and distributed to the Eskom (national) electricity grid.

This facility will produce minimal solid construction waste approximately 100 (one hundred) m^3, consisting mostly of spoil and vegetation removed during construction activities. The use of this form of energy generation will also not produce any waste water. During operational phase, the proposed facility will use no water. Panels will be cleaned using compressed air and distilled water purchased for the maintenance and operation of the facility. The facility is called a “green” facility as it produces no waste water or emissions of greenhouse gases into the atmosphere. The attributes to this type of electricity power generation facility makes it a renewable and eco-friendly form of power production contesting the anthropogenic effects on global warming, ozone depletion and climate change from conventional power generation facilities such as coal fired power plants.

5.3 No go option

The greatest positive aspect of the Solar facility for the Forzando North Coal Mine lies in the supply of electricity to the Eskom national power grid. Electricity supplied to communities in this area is mostly received from coal fired power stations. TCSA have investigated green solutions to power generation and would like to help generate electricity in a manner that does not cause adverse effects to the natural environment while at the same time ensuring that there is enough electricity to meet the surrounding power demands. If the construction and operation of the Solar facility is not approved, no additional green energy will be going into the Eskom grid to aid Eskom with meeting national power demands.

5.4 Motivation for the project

Currently approximately 90% of South Africa's electricity is generated from coal fired power plants, making fossil fuel power generation one of the biggest contributors to climate change on the continent.

This can change if other renewable forms of electricity generation (such as the proposed Solar facility) are embraced as alternative power sources to help reduce the anthropogenic impact of fossil fuel on climate change. Due to the importance of the proposed facility being an alternative to electricity generated by coal, feeding additional power into the national Eskom electricity grid with a renewable source of power supply, and the limited waste production during the construction and operational phases, it is recommended by the Environmental Assessment Practitioner (EAP) that the proposed facility be authorised and approved.

6 BASELINE ENVIRONMENTAL DESCRIPTION

This section of the report provides a description of the current environmental baseline conditions of the project area as observed by specialists during the environmental field investigations conducted for the authorising of the Forzando North Coal Mine Infrastructure and mine workings.

The Solar facility falls within the boundaries of the Forzando North mining rights area on the remaining extent of farm Geluk 226 IS, and as result, the same specialist investigations are be relevant to this project.

6.1 Geology

Information supplied in this section is sourced from the Forzando North EMP which briefly outlines the geological conditions of the project area.

The Karoo Supergroup, within the Olifants Catchment, compromises the Ecca Group and Vryheid Formations. The total thickness of these sediments ranges from 0 – 100m. The project area is situated within the Highveld coal seam. The area is underlain by coal-bearing sandstones and siltstones of the Vryheid Formation which rest either conformably on diamictites and associated glaciogenic sediments of probable Dwyka age, or uncomformably on basement rocks of the Basement Granite. The Ecca sediments overlie the Dwyka Group (please refer to Figure 6.1 for the general geology of the study area).

In the northern section of the area, where the basement is relatively shallow, the pre-Karoo topography defines a northeast-southwest trending palaeovalley. In the south, the sediments of the Vryheid Formation and the basement are separated by several tens of meters of Dwyka tillite and sandstones.

Mining is currently proceeding at a depth of about 90m, which could increase to a maximum depth of 120m. During late Jurassic times, the Karoo strata were intruded by transgressive dolerite dykes/sills resulting in the displacement of seams and the de-vitalisation of coal in certain areas. Over the greater part of the area, dolerite sills lie below the coal-bearing sediments, either within the Dwyka or on the basement horizon.

6.1.1 Presence of Dykes and Sills

During late Jurassic times the Karoo strata were intruded by transgressive dolerite dykes/sills resulting in the displacement of seams and the de-vitalisation of coal in certain areas. Over the greater part of the area, dolerite sills lie below the coal-bearing

sediments, either within the Dwyka or on the basement horizon. The identified dolerite dykes in the vicinity of Forzando Mine are shown in Figure 6.1 (Total Coal Mine plans, 2007).

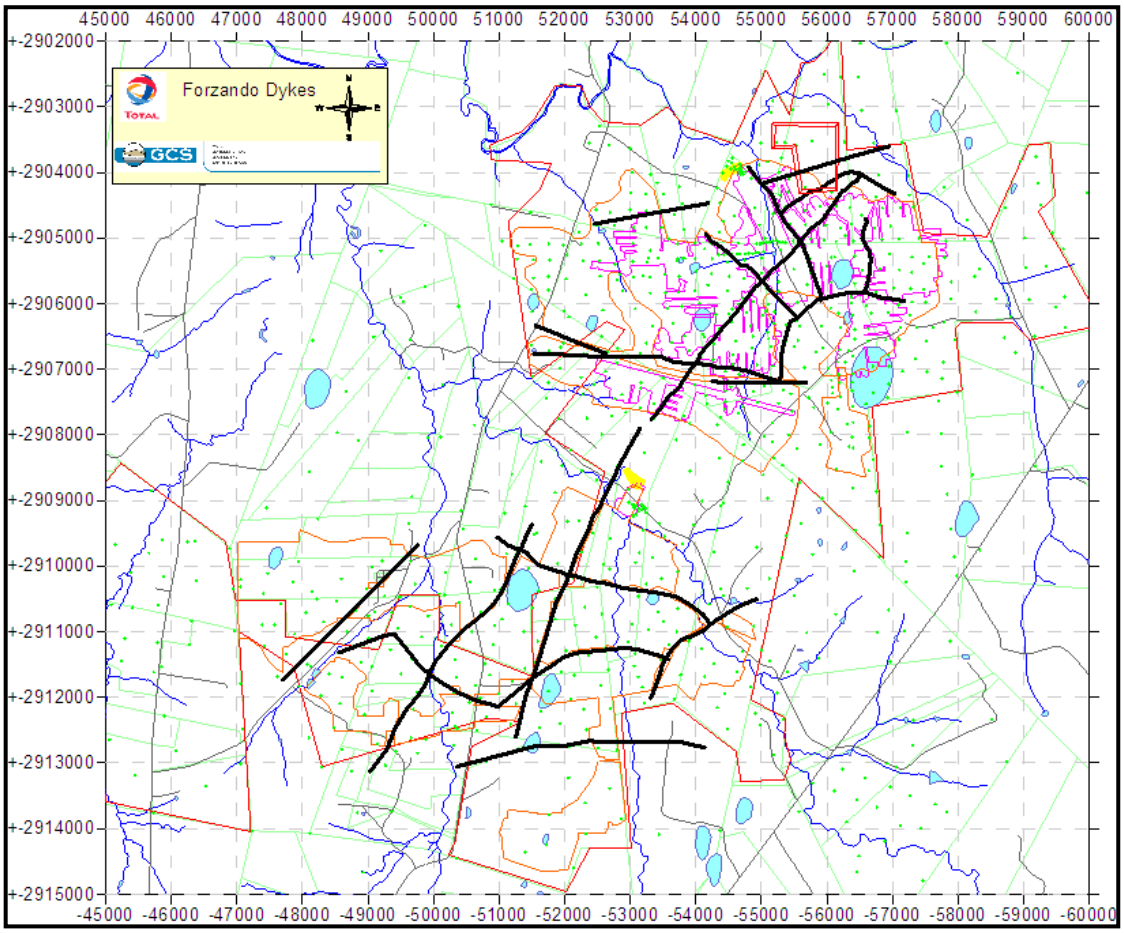


Figure 6.1 Identified dykes at the Forzando Mine

Figure 6.2 General Geology of the study area

6.2 Climate

Existing Information below relates to the climate of the Forzando North area. The following information is supplied by Simon Gear from SDG Consulting.

The DCM is located in the "Highveld" climatic region of South Africa, which has a warm, mild, summer rainfall climate. There are four (4) distinct seasons. A well-formed overland anticyclonic high-pressure system in winter maintains dry air over the region and sharp frosts occur. It is generally warm during the day in all seasons, but it can get cold at night in winter. Spring is heralded by an increase in wind and rising of daily temperature highs. Summer is the rainy season, while in autumn a fairly rapid drop in daily minimum temperatures is experienced.

6.2.1 Precipitation

No long term weather datasets was available for the site in question. As a result, Bethal was selected as an acceptable proxy in consultation with the South African Weather Services (SAWS). The mine is in South Africa's summer rainfall region with an annual average rainfall of 711mm per year. Rain peaks early in the season, in November, and then again in January, while the winter months are characterised by a long and very dry period. Please refer to Figure 6.2 for the annual rainfall graph for the region.

Rain in the region has an impact on the amount of water that would be required for dust suppression. Even the addition of a small amount of moisture can have a dramatic effect on the reduction of potential dust emissions. Similarly, a long spell without rain will necessitate intervention in the form of dust control measures in order to manage impacts on the surrounding environment. These will be particularly necessary during the months from April to October. Please refer to Figure 6.2.

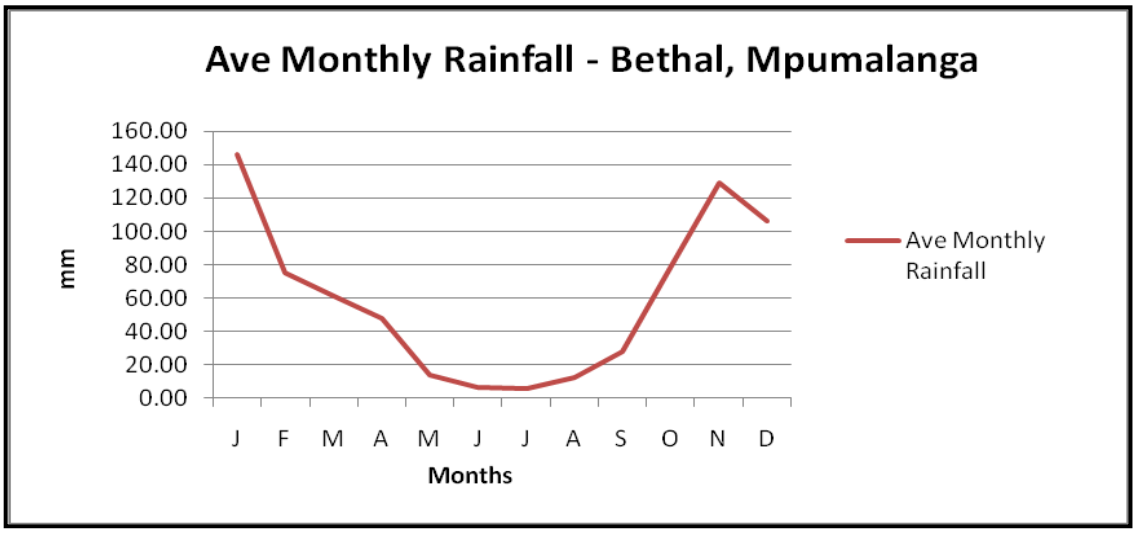


Figure 6.3 Annual monthly rainfall - Bethal, Mpumalanga (SAWS, 1990 - 2007)

6.2.2 Temperature

The warmest period is December / January, when maximum temperatures average above 25°C, while June is the coldest with daytime temperatures averaging 16.5°C and overnight temperatures frequently dropping below freezing (please refer to Figure 6.3). The winter period is also very dry with little or no rainfall and relative humidity dropping below the 40% mark.

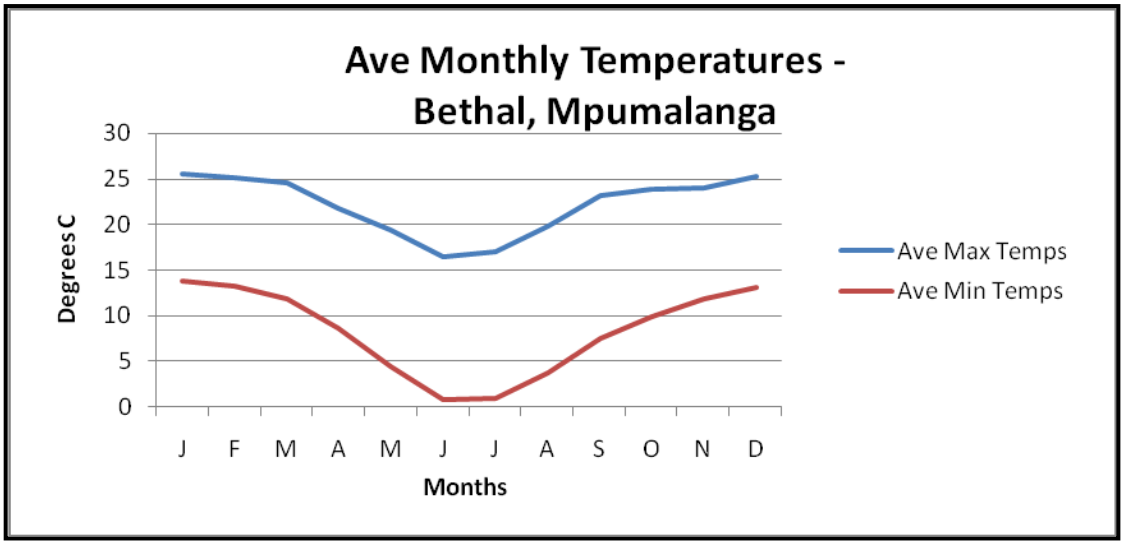


Figure 6.4 Average monthly temperatures - Bethal, Mpumalanga (SAWS, 1990 - 2007)

6.2.3 Winds

Winds are predominantly north-westerly or north-easterly with a weakening of the north-easterly component in the period February to May. Strongest wind speeds are recorded in late winter, during the period July / August (please refer to Figure 6.4). More than half the data shows periods of calm (wind <0.5m.s-1). It is likely that the south-westerly component is under represented in the above data as it shows as more dominant in the dataset that is used for the dispersion modelling (Witbank, SAWS, 2006).

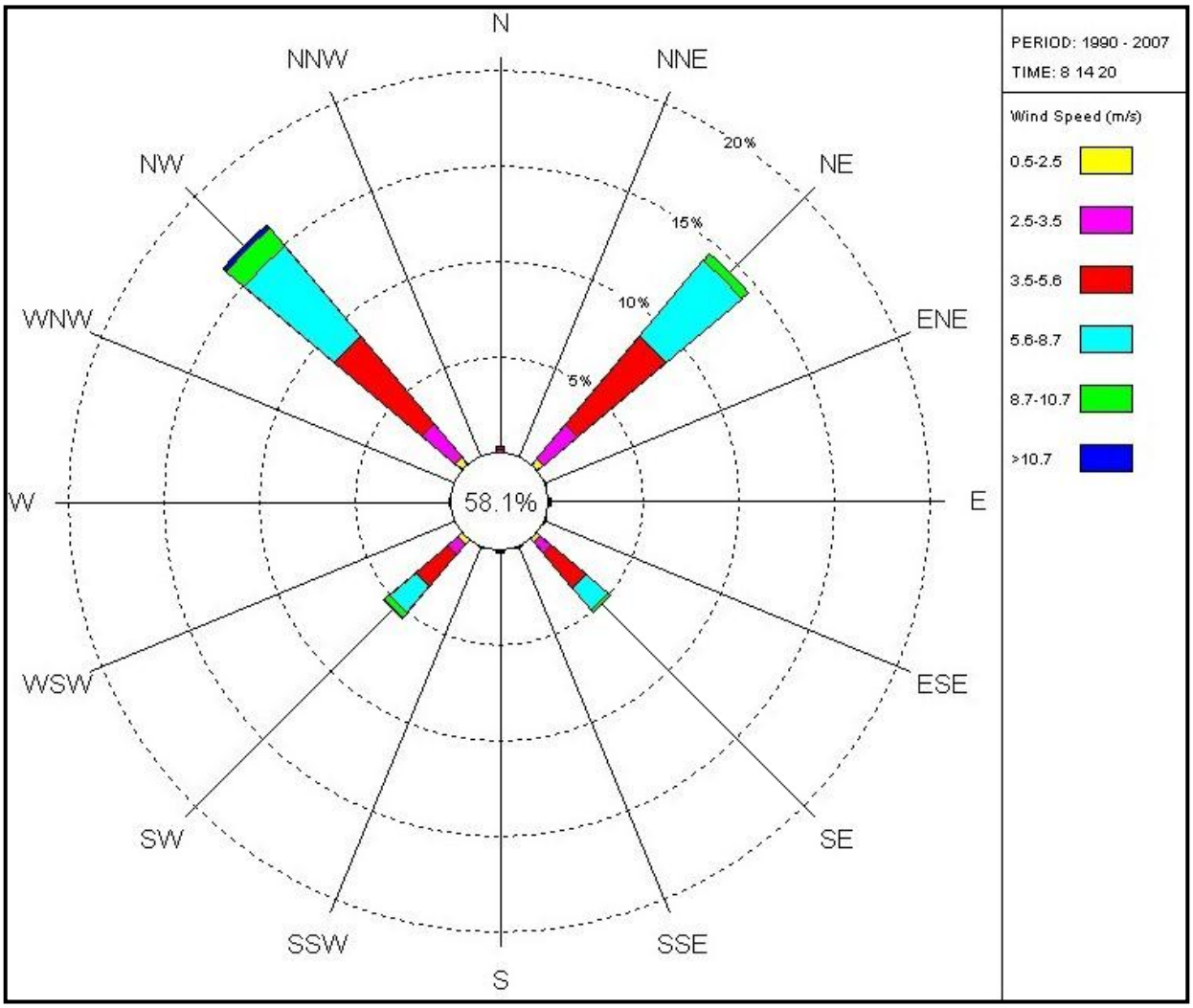


Figure 6.5 Annual average wind speed and direction - Bethal, Mpumalanga (SAWS, 1990 - Figure 2007)

6.3 Topography

The project area is situated on a gentle (1:40) north-facing slope. The elevation varies between 1 580 meters above mean sea level (mamsl) along the Olifants River and 1 640 mamsl along the southern boundary of the mine. Surface runoff is therefore from south to north and towards the tributary streams (Figure 6.5).

The proposed Solar facility is located on the remaining extent of the farm Geluk 226 IS and has a gradual slope towards the south west.

Figure 6.6 Topography at Forzando North

6.4 Soils Land Use and Land Capability

The Soils, Land Use and Land Capability Assessment were conducted by Marine Pienaar from TerraSoils. Refer to Appendix D for the full report.

6.4.1 Land Type Identified

The land type identified on site is found in landscapes where the slope is between 0 and 5% and slope length between and 500 and 1000 m. The soil forms in this land type are mainly dystrophic and/or mesotrophic with only small areas of red soils occurring. These soils in this area are derived from the weathering of shale and sandstone. The data obtained from the land type maps correlate well with the soil forms identified on site.

6.4.2 Soil Classification

Three different soil forms are present in the proposed development area i.e. soils of the Bloemdal, Clovelly and Hutton forms. All the soil forms are characterised by red or yellow-brown apedal horizons underlying the orthic A-horizon. The area is dominated by the Clovelly soil form. The Bloemdal soil form occurs in a very small section of 0.1 hectare on the north-eastern corner of the site and show signs of wetness in the B2-horizon underlying the red apedal B1-horizon. Outside the site boundaries on the north-eastern corner, the soil profiles become progressively wetter towards a wetland area.

However, the site boundaries do not include any soils of wetland capability. The only limiting factor to soil productivity on site is soil depth in some areas. The soil depth is restricted by the presence of a rocky sub-surface layer consisting of gravel and weathering rock. Below follows a description of each of the soil forms present on site:

Table 6.1 Soil Classification

SUMMARY OF SOIL FORMS IDENTIFIED ON SITE			
SOIL FORM	MAP COLOUR	AREA (ha)	% OF STUDY AREA (%)
Hutton		4.2	21.0
Clovelly		15.7	78.5
Bloemdal		0.1	0.5
TOTALS		20	100.0

Refer to Figure 6.7 for the Soil Classification map.

Hutton soil form (5 ha or 23.8% of the baseline study area):

The Hutton soil form consists of an orthic A horizon on a red apedal B horizon overlying unspecified material. The Hutton profiles on the eastern side of the site are 1200mm deep while that on the western side is about 800mm deep. Hutton soils deeper than 500mm are generally good for crop production should the climate of the area permit this.

The red apedal B1-horizon has more or less uniform "red" soil colours in both the moist and dry states and has weak structure or is structureless in the moist state. This horizon develops in well-drained, oxidizing environments that produce coatings of iron oxides (hematite) on the soil particles, causing the red colours of the horizon.

The range of red colours that is a key identification tool in differentiating between a red apedal and yellow-brown apedal is defined by the Soil Classification Working Group Book, 1991. Some of the defining red soil colours identified on the sites are 10 R 3/4 and 2.5YR 4/8. Textures are sandy to sandy-loam in the topsoil and medium to fine sandy-loam in the subsoil. Structure is weak blocky (dominant) or apedal in all horizons.

Bloemdal soil form (0.1 ha or 0.5% of the baseline study area):

The Bloemdal soil form consists of an orthic A-horizon overlying a red apedal B1-horizon and has unspecified material with signs of wetness underneath the B1-horizon. The unspecified material with signs of wetness indicates periods of intermittent or prolonged water saturation in the profile. This is by definition not a wetland soil but indicate that the soil becomes progressively wetter towards the north-eastern corner and that it is likely that soil outside the study site in this area may have some wetland potential. The Bloemdal soil profile is 1200mm deep and has good crop production potential. The red colour of the red apedal horizon is 10R 4/6.

Clovelly soil form (15.9 ha or 75.7% of the study area):

Soils of the Clovelly soil form were found on a total of 15.9 ha (or 75.7% of the study site). Texture is fine sandy to sandy-loam for all horizons and profiles were not shallower than 550mm and some were deeper than 1200mm. The high to moderate quality orthic A and yellow-brown apedal B-horizons are suitable materials for crop production.

The Clovelly form has an orthic A horizon overlying a yellow-brown apedal B1-horizon with unspecified material underneath the apedal horizon. The unspecified material does not have any signs of wetness. The orthic A-horizon is either between 100mm and 300mm deep or absent due to crop cultivation practices.

The yellow-brown apedal horizon has more or less uniform "yellow-brown" soil colours in both the moist and dry states (7.5 YR 6/8; 7.5 YR 7/8 and 5 YR 6/8) and is structureless in the moist state. This horizon develops in a well-drained oxidizing environment, but with different mineral-chemical coatings (goethite) on soil particles than those of the red apedal horizon.

Figure 6.7 Soil Classification for Solar panel site at Forzando North

6.4.3 Land Capability

Following the classification system detailed in Section 7.1 of Annexure D, the soil and land

types identified in the study area could be classified into one land capability class i.e. land with Class II arable land capability (21 ha). The study site is suitable for crop cultivation of all crops adapted to the climatic conditions or crops that are able to finish their growth and production cycles before the occurrence of frost.

Land in Class II has some limitations that reduce the choice of plants or require moderate conservation practices. It may be used for cultivated crops, but with less latitude in the choice of crops or management practices than Class I. The limitations are few and the practices are easy to apply. Limitations may include singly or in combination the effects of:

- Gentle slopes;
- Moderate susceptibility to wind and water erosion;
- Less than ideal soil depth;
- Somewhat unfavourable soil structure and workability;
- Slight to moderate salinity or sodicity easily corrected but likely to recur;
- Occasional damaging flooding;
- Wetness correctable by drainage but existing permanently as a moderate limitation;
- Slight climatic limitations on soil use and management; and
- Limitations may cause special soil-conserving cropping systems, soil conservation practices, water-control devices or tillage methods to be required when used for cultivated crops.

6.5 Flora

The project area corresponds to the Grassland Biome of South Africa known as the Mesic Highveld Grassland. The project area is situated in the ecological type known as the Eastern Highveld grassland. The area is described as having slight to moderate undulating plains which includes some low hills and pan depressions.

The vegetation is described as short dense grassland dominated by the usual Highveld grass composition (Mucina and Rutherford, 2006) and scattered rocky outcrops with wiry, sour grasses and some woody species. Nearly 44% of the grassland has been transformed by cultivation, plantations, mines, and urbanisation and the building of dams.

Mining and agriculture are the main activities occurring in the area that have impacted on the vegetation. The area to the east of the mine where the new PV Facility is proposed to be located is currently used extensively for the cultivation of maize, and as a result no natural vegetation exists.

6.5.1 Alien Weeds and Invader Species

The vegetation occurring on the site has been severely disturbed by agricultural practices and grazing. As a result various invader and exotic species have become evident by their presence on the mining area. The following alien weeds and invader species, as listed in Table 5.1 and Table 5.2, have been identified on site during previous site visits.

These species mainly invade sites of severe human disturbance and have been classified as ruderal (waste places) and agrestral (cultivated land) weeds. The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA), has divided these declared weeds and invader into three (3) categories, which determines the actions that are required against these weeds.

Category 1 plants are prohibited plants that will no longer be tolerated in rural or urban areas, except with the permission of the executive officer. These plants may not be planted or propagated, nor be transported or be allowed to disperse.

Category 2 plants have been proven to have the potential to become invasive, but due to their beneficial properties, CARA has made certain provisions for Category 2 plants to be retained in special areas demarcated for that purpose. They may not occur within 30m from the 1:50 year flood line of a water course or wetland areas. Seeds or propagative material may only be sold to, and acquired by, land users of areas demarcated for the growing of that species or for the establishment of a biocontrol reserve.

Category 3 plants have been proven to have the potential to become invasive, but most of them are popular ornamental or shade trees that will take a long time to replace. Category 3 plants will not be allowed anywhere, except in biological control reserves, unless they where there before the CARA regulations came into effect. They may not occur within 30 m from the 1:50 year flood line of water courses or wetlands. Cuttings or seeds of these plants may not be planted, propagated, imported, bought, sold or traded in any way.

Table 6.2 Alien, Weeds and Invasive plant species

Scientific Name	Common Name	Category

Scientific Name	Common Name	Category
Argemone ochroleuca	White Flowered Mexican Poppy	1
Cirsium vulgare	Scotch Thistle	1
Cuscuta campestris	Common Dodder	1
Datura stramonium	Common Thorn Apple	1
Salix babylonica	Weeping willow	2
Solanum elaeagnifolium	Silverleaf Bitter Apple	1
Xanthium spinosum	Spiny Cocklebur	1

Table6.3 Weed Species

Scientific Name	Common Name
Alternanthera pungens	Paperthorn
Amaranthus viridis	Slender Amaranth
Asclepias fruticosa	Shrubby Milkweed
Bidens formosa	Cosmos
Bidens pilosa	Blackjack
Conyza bonariensis	Flax-Leaf Fleabean
Concolvulus sp.	Bindweed
Cyperus esculentus	Yellow Watergrass
Euphorbia heterophylla	Wild Poinsettia
Gomphrena celasioides	Bachelors Button
Hybiscus trionum	Bladder Weed
Hypochaeris radicata	Hairy Wild Lettuce
Ipomoea carnea subs fistulosa	Morning Glory bush
Oxalis latifolia	Red Garden Sorrel
Papaver aculeatum	Wild Poppy
Schkuria pinnata	Dwarf Marigold
Solanum retroflexum	Nightshade
Tagetus minuta	Khakiweed
Taraxacum officinales	Common Dandelion
Tragopogon dubius	Yellow Goat's Beard
Verbena bonariensis	Purple Top
Vica sativa	Broad Leaved Purple Verch

6.5.2 Endangered and Rare Species

Two plant species, *Gladiolus robertsonia* and *Nerine gracilis*, have published distributions, which overlap with the area within which FCM is located, but have not been identified on site.

6.6 Fauna

Animal life in the project area is dependent on the soil, plant and water resources of the vicinity. It is these basic biophysical resources that afford suitable habitat and food to the range of fauna that exist there.

The fact that mining and farming dominates in the project area has affected the potential diversity and number of animals present. It should be noted that the lands used for cultivation provides food and shelter for many animals and birds and should not be underestimated in terms of their contribution to the heterogeneity of the landscape and biodiversity of the area.

6.6.1 Commonly Occurring species

6.6.1.1 Mammals

The only mammals identified on site during the site visits where the Yellow mongoose (*Cynictis penicillata*), cattle grazing in the maize fields and dogs from the nearby settlement.

6.6.1.2 Avifauna

Mpumalanga is highly diverse in bird life, with over 567 birds recorded within the province. Of these, about 71 are Red Data species. The birds identified on site are listed below in Table 5.3 (overleaf).

Table6.4 Avifauna species list

Spp	Scientific Name	Common Name	Conservation Status
758	*Acridotheres tristis*	Common Myna	Locally Abundant Resident
102	*Alopochen aegyptica*	Egytian Goose	Common Resident
108	*Anas erythrorhyncha*	Red-Billed Teal	Common Resident
107	*Anas hottentota*	Hottentot Teal	Common Resident
112	*Anas smithii*	Cape Shoveler	Locally abundant near endemic
104	*Anas undulate*	Yellow billed Duck	Common Resident
60	*Anhinga rufu*	African Darter	Common Resident
716	*Anthus cinnamomeus*	African Pipit	Common Resident
415	*Apus caffer*	White rumped Swift	Intra-African Migrant
416	*Apus horus*	Horus Swift`	Uncommon Resident
62	*Ardea cinerea*	Grey Heron	Common Resident
94	*Bostrychia hagedash*	Hadeda Ibis	Common Resident
71	*Bubulcus ibis*	Cattle Egret	Common Resident
149	*Buteo vulpinus*	Steppe Buzzard	Common Palearctic Migrant
338	*Chlidonias hybrida*	Whiskered Tern	Common Resident
83	*Ciconia ciconia*	White Stork	Common Palearctic Migrant
664	*Cisticola juncidis*	Zitting Cisticola	Common Resident
677	*Cisticola tinniens*	Levaillants's Cisticola	Common Resident
348	*Columba livia*	Rock Dove	Common Resident
870	*Crithagra atrogularis*	Black-throated Canary	Common Resident
67	*Egretta garzetta*	Little Egret	Common Resident
68	*Egretta intermedia*	Yellow-Billed Egret	Uncommon/ Locally Common Resident
127	*Elanus caeruleus*	Black -shouldered Kite	Common Resident
826	*Euplectus afer*	Yellow-crowned Bishop	Common Resident
828	*Euplectus axillaris*	Fan-tailed Widowbird	Common Resident
832	*Euplectes progne*	Long-tailed Widowbird	Common Resident
228	*Fulica cristata*	Red-knobbed Coot	Common Resident
520	*Hirundo albigularis*	White-throated Swallow	Local Breeding Migrant

526	*Hirundo cucullata*	Greater-striped Swallow	Common Palearctic Migrant
528	*Hirundo spilodera*	South African Cliff-Swallow	Local Breeding Migrant
518	*Hirundo rustica*	Barn Swallow	Common Palearctic Migrant
732	*Lanius collaris*	Common Finch	Common Resident
727	*Macronyx capensis*	Cape Longclaw	Endemic
713	*Motacilla capensis*	Cape Wagtail	Common Resident
803	*Passer melanurus*	Cape Sparrow	Common Resident
58	*Phalacrocorax africanus*	Reed Cormorant	Common Resident
55	*Phalacrocorax lucidus*	White Breasted Cormorant	Common Resident
116	*Plectropterus gambensis*	Spur-winged Goose	Common Resident
93	*Plegadis fulcinellus*	Glossy Ibis	Common Resident
814	*Ploceus velatus*	Southern Masked Weaver	Common Resident
6	*Podiceps cristatus*	Great Crested Grebe	Locally Common
821	*Quelea Quelea*	Red Billed Quelea	Very Common Resident
534	*Riparia cincta*	Banded Martin	Intra-African Migrant
533	*Riparia paludicola*	Brown Throathed Martin	Common Resident
596	*Saxicola torquatus*	African Stonechat	Common Resident
81	*Scopus umbretta*	Hammerkop	Common Resident
759	*Spreo bicolor*	Pied Starling	Common Endemic
355	*Streptopelia senegalensis*	Laughing Dove	Common Resident
354	*Streptopelia semitorqvota*	Cape Turtle Dove	Common Resident
8	*Tachybaptus ruficollis*	Little Grebe	Common Resident
91	*Threskiornis aethiopicus*	African Sacred Ibis	Common Resident
266	*Tringa glareola*	Wood Sandpiper	Common non breeding Palearctic Migrant
258	*Vanellus armatus*	Blacksmith Lapwing	Common Resident
860	*Vidua macroura*	Pin Tailed Whydah	Common Resident

6.6.1.3 Insects

During the brief site visit, no invertebrates were recorded.

6.6.2 Endangered or Rare Species

A total of 76 mammals have distribution patterns within the area of the mine. Of these, nine (9) are considered red data species. These species include:

- The rough haired golden mole;
- The South African hedgehog;
- The Pangolin, the Water Rat;
- The Honey Badger;
- The Striped Weasel;
- The African Wild Cat;
- The Aardvark; and
- The Oribi.

None of these red data species were however noted during the site visit. Table 5.4 lists the data species that have distribution patterns within the area of the mine:

Table6.5 Red data species

Scientific Name	Common Name
MAMMALS	
Chrysospalax villosus	Rough haired golden mole
Atelerix frontalis	Hedgehog
Manis temminckii	Pangolin
Dasymys incomtus	Water rat
Mellivora capensis	Honey badger
Poecilogale albinucha	Striped weasel
Felis libyca	African Wild cat
Orycteropus afer	Aardvark
Ourebia ourebi	Oribi
REPTILES	
Lamprophis fuscus	Yellow bellied house snake
Homoroselaps dorsalis	Striped harlequin snake

BUTTERFLIES	
Poecilimitis aureus	
Spialia paula	

The Marsh Sylph (Metisella meninx) Butterlfy was identified on site. The Marsh Sylph is a wetland species and has been identified as vulnerable.

6.7 Surface Water (Hydrology)

The Forzando North colliery is situated in the Upper Olifants River catchment on the western side of an unnamed tributary of the Olifants River. The mining area is situated in quaternary catchment B11A.

The Forzando North area is drained by a number of south-north streams that vary from non-perennial to perennial flow. These streams generally flow in a northerly direction towards the Olifants River. The Olifants River flows from east to west in the northern part of the study area. The closest stream (a non-perennial stream) to the proposed PV Facility location is approximately 200 metres to the east. This stream drains to the north east into the existing Forzando North Coal Mine's approved clean and dirty water management system for the mine (please refer to Figure 5.6).

6.7.1 Surface water users

The portion of the Olifants River catchment upstream of Forzando has largely escaped mining and related industrial development experienced by most of the remainder of the catchment area. The upstream catchment area is primarily utilised for agricultural activities as evidenced by the good water quality recorded at the mine site.

Water use within the catchment comprises the following:

- Agriculture;
- Industry (primarily related to the opencast and underground coal mining as well as power generation by means of coal fired power stations);
- Domestic, primarily related to water abstracted from Witbank dam for supply to urban area related to Witbank; and
- Recreation on Witbank dam.

Figure 6.8 Surface water features near the proposed PV Facility

6.7.2 Normal dry weather flow

The dry weather flows in the Olifants River and its tributary are reflected by the flow, which occurs 70% of the time during the driest three months of the year. The value was calculated to be 227 600m^3/month for the Olifants River and 4 700m^3/month for the tributary.

6.8 Ground Water

6.8.1 Groundwater Use

Historical data indicates a relatively high density of groundwater users within the Bethal region but the volumes exploited were low due to low aquifer yields. The average borehole yield is about 0.7 l/s.

Groundwater is predominately used for domestic purposes and some stock watering.

The occurrence of two springs has also been identified in the project area:

- A spring used for domestic water supply exists at a kraal east of the unnamed stream. The spring is reported to provide sufficient water for several families.
- A second spring occurs at the head of the unnamed stream, forming the uppermost dam of a series of small dams occurring along the unnamed stream.
- A third spring occurs in the gravel road immediately south of the railway bridge.

6.8.2 Groundwater Quality

Groundwater quality was assessed in order to obtain an idea of the mining and ambient groundwater quality and current status. During 2008, all boreholes showed fairly good quality water, except for FNGW2 which may be affected by the pollution control dam, situated upslope from the borehole. Chemical results for FNGW2 indicate high levels of potassium and manganese, but only for the first three quarters. The fourth quarter results indicate water of good quality.

Groundwater quality was has been assessed continually on a annual quarterly basis conducted by the monitoring department from GCS (Pty) Ltd. Forzando North Coal Mine has a total of seven (7) boreholes indicated in table 6.5 below. From the third quarter monitoring report results (July – September 2011) it can be said that borehole water levels can be influenced by mining or anthropogenic activities (dewatering) or seasonal fluctuations. All Forzando North borehole water levels decreased in the third quarter 2011 (Figure 4), probably as a result of no rainfall recharge in the region in the dry winter months.

Table 6.6 Forzando North Boreholes and positions

Points	Latitude (S)	Longitude (E)	Groundwater Locations	Monitoring Status	Monitoring Frequency
FNGW1	-26.24075	29.5475	Close to Olifants River	Level recorded & sampled Sep. Water clear	
FNGW2	-26.24326	29.54856	Down-gradient of the pollution dams	Level recorded & sampled Sep. Water black & smelly	
FNGW6	-26.25111	29.53855	In close proximity to the west gate		Levels QUARTERLY
FNGW7	-26.25608	29.54712	Adjacent of the discard dump (South side)	Level recorded Sep. Sampled Sep. Water clear	Samples QUARTERLY
FNGW8	-26.25276	29.55078	Down slope of the discard dump		
FNGW9	-26.23872	29.52658	Near Forzando North West entrance		
FNGW10	-26.25563	29.52079	Along road to Forzando North		

6.9 Wetlands

Information provided by the existing Forzando North EMP and Dieter Kassier from WCS (Pty) Ltd and maps provided by GCS.

As is the case with virtually the entire Mpumalanga Highveld, the study area has been extensively impacted by agriculture (cultivation of maize) and coal mining. The existing Forzando North mining operations are located in the north-eastern corner of the study area and the new proposed Solar facility is located about 400 metres south-east of the existing railway loop on the remaining extent of farm 226 IS (please refer to Figure 5.11). Large parts of the remainder of the study area are under cultivation or have been recently cultivated, resulting in large scale removal and alteration of the natural vegetation on site. The only remaining areas of natural vegetation on site are associated with the wetlands, as well as the koppie to the north of the site. The extensive transformation of the study area is further illustrated by the Mpumalanga Biodiversity Conservation Plan terrestrial biodiversity assessment for the area, which classes most of the site as having "no natural habitat remaining" while the natural grasslands associated with the wetlands on site are classified as "least concern".

6.9.1 Wetland Delineation and Classification

Use was made of 1:50 000 topographical maps, 1:10 000 orthophotos and Google Earth Imagery to create digital base maps of the study area onto which the wetland boundaries could be delineated, refer to Figure 6.11. A desktop delineation of suspected wetland areas was undertaken by identifying rivers and wetness signatures on the digital base maps. All identified areas suspected to be wetlands were then further investigated in the field. Wetlands were identified and delineated according to the delineation procedure as set out by the "A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas" document, as described by DWAF (2005) and Kotze and Marneweck (1999).

Using this procedure, wetlands were identified and delineated using the Terrain Unit Indicator, the Soil Form Indicator, the Soil Wetness Indicator and the Vegetation Indicator. For the purposes of delineating the actual wetland boundaries use is made of indirect indicators of prolonged saturation, namely wetland plants (hydrophytes) and wetland soils (hydromorphic soils), with particular emphasis on hydromorphic soils. It is important to note that under normal conditions hydromorphic soils must display signs of wetness (mottling and greying) within 50cm of the soil surface for an area to be classified as a wetland (A practical field procedure for identification and delineation of wetlands and riparian areas, DWAF). The delineated wetlands were then classified using a hydro-geomorphic classification system based on the system proposed by Brinson (1993), and

modified for use in South African conditions by Marneweck and Batchelor (2002).

The National Water Act, 1998 (Act No. 36 of 1998), defines wetlands as follows: "Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

The presence of wetlands in the landscape can be linked to the presence of both surface water and perched groundwater. Wetland types are differentiated based on their hydro-geomorphic (HGM) characteristics; i.e. on the position of the wetland in the landscape, as well as the way in which water moves into, through and out of the wetland systems.

Approximately 57.2% of the Forzando North study area is considered to be wetland, covering an area of approximately 216.75 hectares. Two hydro-geomorphic wetland types, channelled valley bottom wetlands and hillslope seepage wetlands, were identified within the study area, while two pans are also located in the general vicinity of the study area.

Figure 6.9 Wetlands surrounding the proposed Solar facility site

6.9.2 Channeled valley bottom wetlands

Channelled valley bottom wetlands make up approximately 20% of the wetland areas on Forzando Coal Mine, consisting of the valley bottom wetland associated with the Olifants River, as well as two unnamed tributaries of the Olifants River that traverse the study area.

The Olifants River flows across the northern portions of the site roughly in a south westerly direction. This channelled valley bottom wetland displays some of the characteristics of a floodplain wetland with the presence of one or two backwaters that are assumed to be flooded by the river when flows overtop the channel bank. The channel is fairly deeply incised, with the river in some areas flowing on bedrock (sandstone). The koppie located to the north of the study area on the northern banks of the Olifants River associated with the harder, more resistant rhyolite and granite formations acts as a key-point and confines flows within the Olifants River somewhat, resulting in the upstream reaches of the valley bottom wetland being broader and more prone to flood flows overtopping the channel banks.

The valley bottom wetland associated with the stream flowing past below the existing Forzando mining operations is a narrow channelised wetland bordered on both sides by hillslope seepage wetlands. Towards the confluence with the Olifants River the stream channel starts anastomosing and the wetland becomes considerably wider, with some areas of active head-cut erosion within the wetland. It is speculated that this portion of the wetland was formed in the past due to the results of sediment deposition on a small outwash plain which is now being eroded out due to altered flows within the wetland (resulting from altered run-off patterns within the upstream catchment as well as possibly altered rainfall patterns).

The second tributary of the Olifants River flowing across the site is also deeply incised in places and flowing on bedrock (sandstone) in these areas. Towards the eastern boundary of the study site active head-cut erosion was observed within the valley bottom wetland in an area which is largely unchannelled. Continued erosion and the formation of a deeply incised channel through this portion of the wetland could result in a lowering of the water table within the wetland and partial desiccation of the wetland perimeter.

6.9.3 Hillslope seepage wetlands

Hillslope seepage wetlands make up just more than 80 % of the wetland areas on Forzando Coal Mine. As mentioned previously, the sandy soils typical of the areas underlain by sandstone are ideal for the formation of hillslope seepage wetlands. The sandy soils allow easy infiltration of rain water into the soil, where the presence of an aquiclude such as a

hard or soft plinthic horizon within the soil profile prevents deeper infiltration of rainwater and leads to the formation of a shallow perched water table. Where this perched water table extends into the top 50cm of the soil profile, the area typically supports plants adapted to life in saturated soils, i.e. wetland plants. Large portions of the hillslope seepage wetlands on site have been cultivated in the past, with the edges of many of the seep zones also currently still under cultivation. This has resulted in the removal of virtually all natural vegetation within these areas, with those areas that were cultivated in the past and then subsequently left to re-vegetate now being characterised by secondary grassland and large numbers of weeds. The hillslope seepage wetlands immediately alongside the valley bottom wetlands have to some degree escaped the disturbances of agricultural activities on site.

6.10 Sensitive Landscapes

This report will refer to sensitive sites as any watercourse, ecological significant area, wetland area and agricultural area that are sensitive to deterioration in ecological and environmental status due to potential negative impacts caused by proposed projects and developments and therefore the areas identified will be addressed in those respective sections (please see Figure 5.12 for the sensitivity of the surrounding environment near the proposed Solar facility).

Figure 6.10 Environmental Sensitivity of surrounding landscape

6.11 Air Quality

Air quality information for the specific area in which Forzando (North and South) is located is not available. However, typically dust fall rates recorded within the area are within the "slight" range, below 210mg/m2/day, varying between 90mg/m2/day and 126mg/m2/day. Based on the above information it can be stated that low dust fall levels occur in the area.

Dust fall rates typically increase during winter and early spring when high wind speeds are frequently recorded and little rainfall experienced. It is therefore anticipated that an increase in dust fall could result during winter and spring having an impact on the Photo-Voltaic Cell functionality. This is clearly evident from dust fall rates recorded by other mining operations in the regions, eg, Landau Schoongezicht, Greenside, Bank, Kleinkopjie, Kriel and Goedehoop collieries.

Based on experience gathered in the analysis of a number of dust fall data sets in the area it is expected that baseline dust fall levels would be in the "slight" to "moderate" range (below 500mg/m^2/day).

On average "slight" dust fall rates are expected at local farm dwellings where ploughing activities are not conducted in the vicinity of these dwellings.

6.12 Cultural and Historical

Information supplied by Anton von Vollenhoven. No significant sites where observed close to the proposed Solar facility site.

6.13 Noise

Forzando is located within rural area, primarily surrounded by farming areas. The railway line located about 3km to the south west of the mine site and approximately 40 metres to the west of the proposed Solar facility site. Along with the plant activities and railway line to the west could be regarded as a source of background noise. However, most of the area surrounding the mine site could be relatively tranquil, representing a typical rural area characterised by farming.

6.14 Visual

The Solar facility is located remotely from any substantial population settlement or any major thoroughfares. As a result, the deterioration in aesthetic quality will only be witnessed by the persons located in close proximity of the mine site and proposed Solar facility. Furthermore, the infrastructure related to the mine is limited in height and does

not involve any facility to a height of greater than approximately 50m. The proposed Solar facility is to be less than five metres in height.

The site of Forzando North is situated on a gentle (1:40) north-facing slope. The elevation varies between 1 580 meters above means sea level (mamsl) along the Olifants River and 1 640mamsl along the southern boundary of the mine. The proposed Solar facility is located on the remaining extent of the farm Geluk 226 IS and has a gradual slope towards the south west. The undulating nature of the surrounding landscape is effective in concealing the Solar facility from the surrounding area at present. Please see the Figure 5.13 overleaf of the visual receptors susceptible to visual view of the proposed Solar facility.

Figure 6.11 Visual view shed of the proposed Solar facility

6.15 Socio-Economic

All information supplied was sourced from the Municipal Demarcation Board and reflects the results of the 1996 and 2001 South African census. The Solar facility site is situated in the Gert Sibande District Municipality (DC30) and the Govan Mbeki Local Municipality (MP307) please see Figure 6.14 for the District and Local Municipalities boundaries with reference to the proposed facility.

The total population of the Govan Mbeki Local Municipality is 221 747 people and 51.5% of the total population reside in the central Greater Secunda Complex, 21.6% reside in Bethal/eMzinoni, 14.1% reside in Leandra/ Lebohang and 12.8% stay in rural hinterland. There is a huge socio-economic gap between the previous white areas and the previous disadvantaged township areas.

Population density in the Municipality is 74.9 people per km^2 which is higher than the District population density of 28.6 people per km^2. The annual growth rate in the area is 1.1%. Govan Mbeki is highly urbanised. 82% of the population is located in urban areas with only 18% residing in rural areas. There is a relatively well balanced gender distribution within the municipal jurisdiction with men comprising 51% and women 49% of the total population. 68% of the total population falls within the working age group of 20-65. 40% of the economically active population is unemployed. This equates to a dependency ratio of 1:3.6 which is lower than the District's dependency ratio of 1:5.

Within the Govan Mbeki Local Municipality, 5.5% of the population are employed within the Mining Industry, 5.0% of the population is employed in Community Services, and 74% are in an undetermined industry.

Figure 6.12 District and Local Municipalities boundaries

7 PUPLIC PARTICIPATION PROCESS

Please note: The BA that was submitted and acknowledged by the DEA placed the proposed Solar facility location on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal Mine. After submission of the BA, TCSA required that the location of the proposed Solar facility be changed to the remaining extent of farm Geluk 226 IS within the mining rights area of the Forzando North Coal Mine.

Public participation was conducted for the original BA assessment (location of the Solar facility at Dorstfontein East Coal Mine). As a result of the location of the proposed facility being changed, the PPP for the new location (Forzando North Coal Mine) will be conducted during the thirty (30) day public comment period of the draft Basic Assessment Report as suggested by the DEA. Once the comment period is over, both I&AP databases (Forzando and Dorstfontein) will be updated and combined as one database for the purpose of the proposed facility. This will be done in order to inform all I&AP's identified during the original PPP conducted and the PPP to be undertaken as a result of moving the location of the proposed facility.

7.1 Purpose of the Public Participation Process

Public Participation Process (PPP) is a requirement of the BA and EMP process and ensures that all relevant I&APs are consulted and involved in the project. The process ensures that all stakeholders have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures for a complete comprehensive environmental study.

The purpose of PPP and the engagement process is to:

- Introduce the proposed project;
- Explain the final BA and draft EMP and PPP processes to be undertaken;
- Determine and record public issues and concerns;
- Provide opportunities for public input and gathering of local knowledge;
- Inform a broad range of stakeholders about the project and the environmental process to be followed;
- Establish lines of communication between stakeholders and the project team;
- Identify all the significant issues in the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent environmental impacts, associated with the proposed Facility.

7.2 Public Participation Methodology

7.2.1 List of Consulted Authorities

In terms of the Environmental Impact Regulations published in terms of Section 24(5) of the NEMA, authorisation is required from the National Department of Environmental Affairs (DEA) in consultation with the Mpumalanga Provincial Department of Economic Development, Environment and Tourism (MDEDET).

The DEA is regarded to be the competent authority for this application. All power generation facilities requiring authorisation, that will generate electricity which will be fed into the Eskom national (electricity) grid, need to be authorised by the DEA.

7.2.2 Identification of I&APs

The existing list of I&APs/Stakeholders from Forzando and Dorstfontein Coal Mines has been updated by GCS through information received pertaining to the authorising process undertaken for the Forzando North mining operations. In order to obtain a more comprehensive list for the Solar facility, site notifications and advertisements were placed to identify more stakeholders within the local municipal area. Any I&APs that registered were then added to the existing stakeholder database.

7.2.3 Notification of Stakeholders

7.2.3.1 Emails, Registered Mail and Fax Notification of the Proposed Facility

All stakeholders registered on the Forzando (TCSA) Public Participation database have been notified via telephonic communication, fax, e-mail and / or registered mail in order to ensure that all I&APs were notified of the proposed Solar facility.

7.2.3.2 Site Notices Erected

Three A2 laminated site notices were placed at various locations around the project area. The site notices were placed at the following locations:

- At the entrance to the DCM (Seam no. 2) mining area (please refer to Figure 7.1);
- At the entrance to the Dorstfontein East Mine (please refer to Figure 7.2); and
- At the main intersection between the R544 and R547 main roads (please refer to Figure 7.3).

Site notices will be replaced during the comment period for I&APs on the draft BAR.

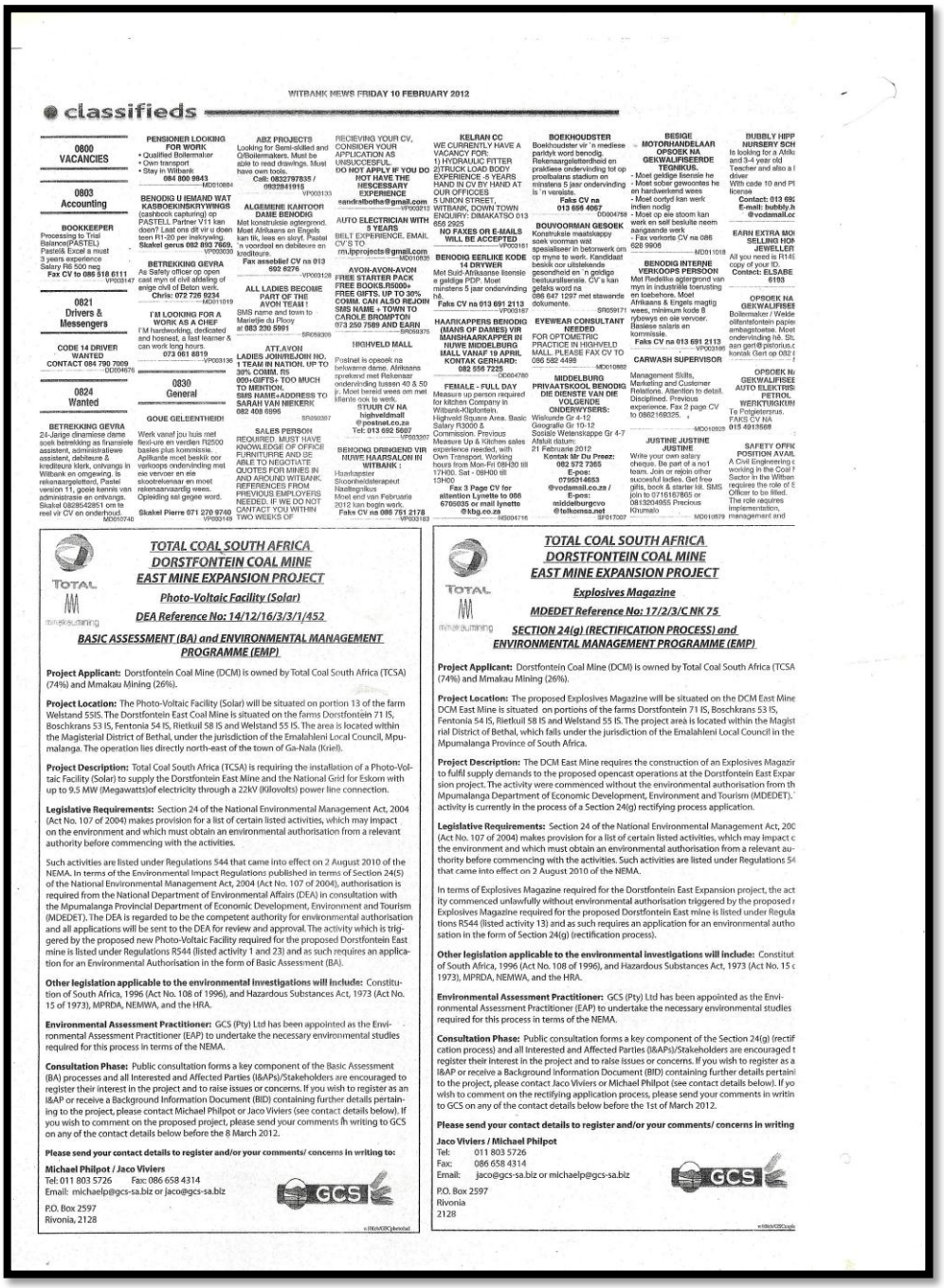
Figure 7.1 Site Notice at the Entrance to the DCM No. 2 Seam Mining Area

Figure 7.2 Site Notice at the Entrance to the TCSA Dorstfontein East Mine

Figure 7.3 Site Notice at the Main Intersection of the R544 and R547

7.2.3.3 Media Advertisements

Advertisements regarding the project in terms of the required legislated procedures were placed in the Witbank News newspaper on the 10 February 2012. Please refer to Figure 7.4 below for a copy of the advertisement placed in the newspaper. Notification of the change in n locality will be advertised during the draft BAR review phase.



WITBANK NEWS FRIDAY 10 FEBRUARY 2012

classifieds

TOTAL COAL SOUTH AFRICA
DORSTFONTEIN COAL MINE
EAST MINE EXPANSION PROJECT
Photo-Voltaic Facility (Solar)
DEA Reference No: 14/12/16/3/3/1/452
BASIC ASSESSMENT (BA) and ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

Project Applicant: Dorstfontein Coal Mine (DCM) is owned by Total Coal South Africa (TCSA) (74%) and Mmakau Mining (26%).

Project Location: The Photo-Voltaic Facility (Solar) will be situated on portion 13 of the farm Welstand 55IS. The Dorstfontein East Coal Mine is situated on the farms Dorstfontein 71 IS, Boschkrans 53 IS, Fentonia 54 IS, Rietkuil 58 IS and Welstand 55 IS. The area is located within the Magisterial District of Bethal, under the jurisdiction of the Emalahleni Local Council, Mpumalanga. The operation lies directly north-east of the town of Ga-Nala (Kriel).

Project Description: Total Coal South Africa (TCSA) is requiring the installation of a Photo-Voltaic Facility (Solar) to supply the Dorstfontein East Mine and the National Grid for Eskom with up to 9.5 MW (Megawatts)of electricity through a 22kV (Kilovolts) power line connection.

Legislative Requirements: Section 24 of the National Environmental Management Act, 2004 (Act No. 107 of 2004) makes provision for a list of certain listed activities, which may impact on the environment and which must obtain an environmental authorisation from a relevant authority before commencing with the activities.

Such activities are listed under Regulations 544 that came into effect on 2 August 2010 of the NEMA. In terms of the Environmental Impact Regulations published in terms of Section 24(5) of the National Environmental Management Act, 2004 (Act No. 107 of 2004), authorisation is required from the National Department of Environmental Affairs (DEA) in consultation with the Mpumalanga Provincial Department of Economic Development, Environment and Tourism (MDEDET). The DEA is regarded to be the competent authority for environmental authorisation and all applications will be sent to the DEA for review and approval. The activity which is triggered by the proposed new Photo-Voltaic Facility required for the proposed Dorstfontein East mine is listed under Regulations R544 (listed activity 1 and 23) and as such requires an application for an Environmental Authorisation in the form of Basic Assessment (BA).

Other legislation applicable to the environmental investigations will include: Constitution of South Africa, 1996 (Act No. 108 of 1996), and Hazardous Substances Act, 1973 (Act No. 15 of 1973), MPRDA, NEMWA, and the HRA.

Environmental Assessment Practitioner: GCS (Pty) Ltd has been appointed as the Environmental Assessment Practitioner (EAP) to undertake the necessary environmental studies required for this process in terms of the NEMA.

Consultation Phase: Public consultation forms a key component of the Basic Assessment (BA) processes and all Interested and Affected Parties (I&APs)/Stakeholders are encouraged to register their interest in the project and to raise issues or concerns. If you wish to register as an I&AP or receive a Background Information Document (BID) containing further details pertaining to the project, please contact Michael Philpot or Jaco Viviers (see contact details below). If you wish to comment on the proposed project, please send your comments in writing to GCS on any of the contact details below before the 8 March 2012.

Please send your contact details to register and/or your comments/ concerns in writing to:

Michael Philpot / Jaco Viviers
Tel: 011 803 5726 Fax: 086 658 4314
Email: michaelp@gcs-sa.biz or jaco@gcs-sa.biz

P.O. Box 2597
Rivonia, 2128

TOTAL COAL SOUTH AFRICA
DORSTFONTEIN COAL MINE
EAST MINE EXPANSION PROJECT
Explosives Magazine
MDEDET Reference No: 17/2/3/C NK 75
SECTION 24(g) (RECTIFICATION PROCESS) and ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

Project Applicant: Dorstfontein Coal Mine (DCM) is owned by Total Coal South Africa (TCSA (74%) and Mmakau Mining (26%).

Project Location: The proposed Explosives Magazine will be situated on the DCM East Mine DCM East Mine is situated on portions of the farms Dorstfontein 71 IS, Boschkrans 53 IS, Fentonia 54 IS, Rietkuil 58 IS and Welstand 55 IS. The project area is located within the Magist rial District of Bethal, which falls under the jurisdiction of the Emalahleni Local Council in the Mpumalanga Province of South Africa.

Project Description: The DCM East Mine requires the construction of an Explosives Magazir to fulfil supply demands to the proposed opencast operations at the Dorstfontein East Expar sion project. The activity were commenced without the environmental authorisation from th Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET). activity is currently in the process of a Section 24(g) rectifying process application.

Legislative Requirements: Section 24 of the National Environmental Management Act, 200 (Act No. 107 of 2004) makes provision for a list of certain listed activities, which may impact c the environment and which must obtain an environmental authorisation from a relevant au- thority before commencing with the activities. Such activities are listed under Regulations 54 that came into effect on 2 August 2010 of the NEMA.

In terms of Explosives Magazine required for the Dorstfontein East Expansion project, the act ity commenced unlawfully without environmental authorisation triggered by the proposed Explosives Magazine required for the proposed Dorstfontein East mine is listed under Regula tions R544 (listed activity 13) and as such requires an application for an environmental autho sation in the form of Section 24(g) (rectification process).

Other legislation applicable to the environmental investigations will include: Constitut of South Africa, 1996 (Act No. 108 of 1996), and Hazardous Substances Act, 1973 (Act No. 15 c 1973), MPRDA, NEMWA, and the HRA.

Environmental Assessment Practitioner: GCS (Pty) Ltd has been appointed as the Envi- ronmental Assessment Practitioner (EAP) to undertake the necessary environmental studies required for this process in terms of the NEMA.

Consultation Phase: Public consultation forms a key component of the Section 24(g) (rectif cation process) and all Interested and Affected Parties (I&APs)/Stakeholders are encouraged t register their interest in the project and to raise issues or concerns. If you wish to register as a I&AP or receive a Background Information Document (BID) containing further details pertaini to the project, please contact Jaco Viviers or Michael Philpot (see contact details below). If yo wish to comment on the rectifying application process, please send your comments in writin to GCS on any of the contact details below before the 1st of March 2012.

Please send your contact details to register and/or your comments/ concerns in writing

Jaco Viviers / Michael Philpot
Tel: 011 803 5726
Fax: 086 658 4314
Email: jaco@gcs-sa.biz or michaelp@gcs-sa.biz

P.O. Box 2597
Rivonia
2128

Figure 7.4 Newspaper Advert placed in the Witbank News

7.2.3.4 Distribution of the Background Information Documents (BIDs)

Background Information Documents (BIDs) were distributed to all I&APs/Stakeholders via e-mail, fax and/or post by GCS. The BIDs was made available in English. The BIDs included details of the proposed projects as well as the BA and draft EMP purpose, requirements and process. It also included relevant contact details and a comment/registration sheet. I&APs/Stakeholders were invited to register and send responses by fax, telephone or e-mail to GCS.

7.2.4 Issues and Response Trails

No issues or responses have been received since the distribution of the BIDs, the placement of the advertisement and the erecting of the site notices.

8 IMPACT ASSESSMENT

Associated with the proposed Solar facility, are negative and positive environmental, and social impacts. These impacts are summarised in **Error! Reference source not found.** and **Error! Reference source not found.** and discussed briefly below.

8.1 Impact Assessment Methodology

The impacts are assessed according to their occurrence and severity. The ranking scales used can be seen in Table 8.1.

Occurrence

- Probability of occurrence (how likely is it that the impact may occur?), and
- Duration of occurrence (how long may it last?).

Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?), and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?)

In order to assess each of these factors for each impact, the following ranking scales were used:

Table 8.1 Ranking Scale Used for Impact Assessment

Probability:=P	***Duration:=D***
5 – Definite/don't know	5 – Permanent
4 – Highly probable	4 - Long-term (ceases with the operational life)
3 – Medium probability	3 - Medium-term (5-15 years)
2 – Low probability	2 - Short-term (0-5 years)
1 – Improbable	1 – Immediate
0 – None	
Scale:=S	***Magnitude:=M***
5 – International	10 - Very high/don't know
4 – National	8 – High
3 – Regional	6 – Moderate
2 – Local	4 – Low
1 – Site only	2 – Minor
0 – None	

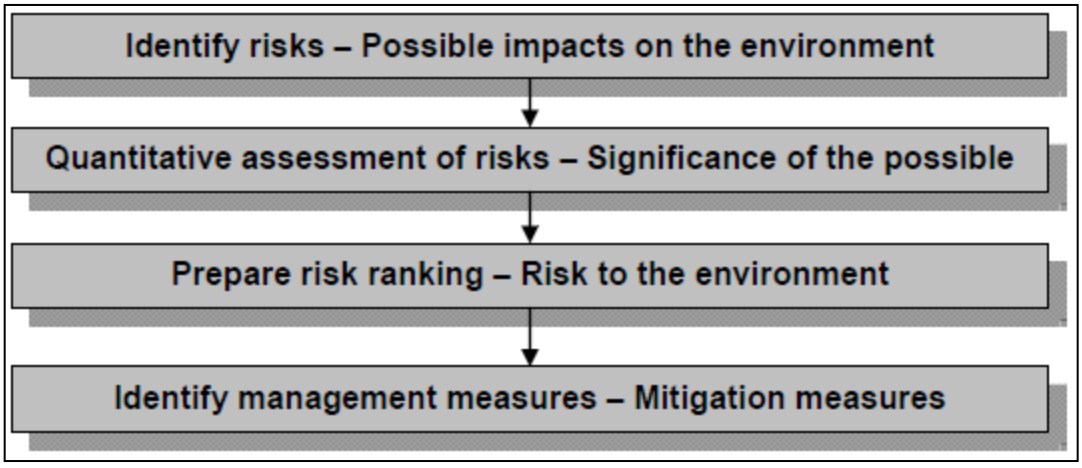
Once the above factors had been ranked for each impact, the environmental significance of each was assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value is 100 significance points (SP). Environmental effects were rated as either of high, moderate or low significance on the following basis:

- More than 60 significance points indicated high (H) environmental significance.
- Between 30 and 60 significance points indicated moderate (M) environmental significance.
- Less than 30 significance points indicated low (L) environmental significance.

The following process will be followed:



Risk relating to the Solar facility will be done so in the following phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning / Rehabilitation Phase.

8.2 Construction Phase

It should be noted that the construction area falls within the existing approved mining rights area for Forzando North. The impacts to the natural environment will be limited due to the proposed construction area having already been extensively impacted on by agricultural activities. The construction of the proposed facility will have the potential to

impact on vegetation and may result in the loss of agricultural resources. The removal of soil could lead to increased run-off which may result in impacts on nearby surface water resources. The proposed construction activities will also have the potential to lead to increased alien and / or invasive plant species and increased dust generation for the project area.

Please refer to Table 7.2 for the construction phase impact assessment with associated management measures to be implemented. All relevant Management Measures already approved in the Forzando North EMP will also apply to the Solar facility.

8.3 Operational Phase

The operational phase of facility will have very little impact on the receiving environment as a result of its location within the Forzando North Mining Area.

Please refer to Table 7.3 for the operational phase impact assessment and mitigation measures compiled for the operation of the Solar facility. All relevant Management Measures approved in the Forzando North EMP will also apply to operation of the Solar facility.

8.4 Decommissioning / Rehabilitation Phase

The mine will be required to apply for a Closure Certificate according to Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). Section 43 (1) of the MPRDA stated that:

- "the holder of a … mining right …remains responsible for any environmental liability, pollution or ecological degradation, and the management thereof, until the Minister has issued a closure certificate to the holder concerned".

It is therefore assumed that all environmental impacts will be successfully addressed and managed at this phase. When the decision is taken to decommission the mine, the activities below will be implemented:

- Recovery of all saleable infrastructure;
- Demolition of all buildings and structures;
- Ripping of all compacted areas, which will be followed with amelioration and vegetation should self succession not take place;
- Amelioration and vegetation of all disturbed areas where necessary;
- Maintenance of all re-vegetated areas up until such areas initiate succession and create a sustainable cover;

- Monitoring of key environmental variables (i.e. soils, vegetation, groundwater, surface water and air quality) in order to demonstrate stability of rehabilitated areas;
- Weed management by local people for three (3) years after closure, limited to areas disturbed by mining or included in the mining area; and
- Monitoring will be undertaken for three (3) years after closure or up until such time all areas create a sustainable cover and ecosystem.
- Although it is assumed that all impacts will be managed and rehabilitated by the above objectives, some residual impacts will however still be present.

It should be noted that if the proposed facility no longer be of use to the Forzando North Coal Mine in the future, the client may wish to leave the Solar facility's infrastructure for use by the local and district municipalities as well as Eskom electricity (national) grid use.

8.4.1 Infrastructure Removal

All infrastructures (including the Solar facility and its associated infrastructure) may / or may not be removed (TCSA may wish to leave the Solar facility's infrastructure for use by the local and district municipalities as well as use by Eskom for the national electricity grid). Should the need for the Solar facility not be identified, the entire facility will be removed and rehabilitated. Foundations will be removed to a depth of 1m below surface. All material recovered from the demolition of buildings and/or structures will either be transported to a permitted disposal site, sold as scrap or made available to the local community as building materials (provided they are in a satisfactory condition following demolition).

Table8.2 Construction Phase Impacts and Mitigation Measures

POTENTIAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
POTENTIAL ENVIRONMENTAL IMPACTS (Construction Phase)														
Impacts to Soil														
Loss of the Soil Resources in an area used for cultivation.	Clearing of the footprint area, construction of the Solar facility Infrastructure and the powerline.	6	5	1	4	48	M	Topsoil must be managed according to the approved EMP for the Forzando North Coal Mine. Topsoil will be stripped to 400mm or up until hard rock is reached. Topsoil will be stockpiled for later use in the rehabilitation of the final land form. Topsoil and subsoil are to be stockpiled separately in the vicinity of the source of the soil and be clearly identifiable. Any stockpile higher than 1.5m must be equipped with engineered erosion control measures (i.e. terraces).	4	3	1	3	24	L
Increased erosion due to increased surface run-off.	Clearing of the footprint area, construction of the Solar facility Infrastructure and the powerline.	8	3	1	4	48	M	The management measures used to manage erosion as per the approved EMP for Forzando North Coal Mine will be implemented for the PV Facility. Vegetation establishment in disturbed areas will be undertaken as soon as practically possible and only if self succession does not establish. Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) will be implemented. Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%. Areas	6	2	1	3	27	L

								where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness. Soil replacement and the preparation of a seedbed to facilitate the re-vegetation program to limit potential erodibility should be implemented.						
Impacts to Land Use and Land Capability															
Due to the existing Agricultural Activities taking place on the proposed 19.5 ha project area, the proposed activity will cause a loss in agricultural resources and cultivated land. The impact will be limited as the area proposed is small in relation to the existing activities.	Clearing of the footprint area.	2	4	1	5	35	M	Surrounding agricultural land should be left as-is and allow the continuing agricultural activities surrounding the proposed site to continue without disturbance from the proposed activity. This will be done as the proposed facility is located in a small surface area (19.5 ha).	2	4	1	4	28	L
Impacts on Flora															
Removal of Natural Vegetation.	Clearing of the footprint area.	6	4	1	5	55	M	Vegetation removal will be done in compliance with the approved EMP for the Forzando North Mine. Construction activities and vegetation removal should be limited to the designated footprint areas only. The footprint area is located within agricultural activities and as such, limited natural vegetation will be disturbed during clearing activities.	2	4	1	3	21	L
Impacts on Fauna															
Destruction of natural habitats.	Clearing of the footprint area, construction of the Solar facility Infrastructure and the powerline.	4	4	2	3	30	L	Due to the high level of mechanisation of the existing mining infrastructure and workings, most, if not all animal species have relocated from the area of disturbance and found alternative habitats in the vicinity. The footprint area for the Solar facility is a small area and amounts to 19.5Ha. The footprint area is already disturbed by agricultural activities.	2	4	2	2	16	L

Poaching and hunting of animals.	Clearing of the footprint area, construction of the Solar facility Infrastructure and the powerline.	4	2	1	3	21	L	Due to the activities during construction, the amount of people in the project area will increase. This could lead to a potential for poaching and hunting of animals on the proposed Solar facility site. Fines will be implemented for poaching and hunting of animals. All employees will be made aware of all environmental issues during induction, and must continuously be updated of all new issues	2	2	1	1	5	L
Impacts to Surface Water															
Contamination of nearby surface water resources.	Clearing of the footprint area, construction of the Solar facility Infrastructure and the powerline.	6	2	2	4	40	M	Clean and dirty water systems should be implemented prior to the commencement of construction activities as per the existing approved EMP for the Forzando North Coal Mine. The Solar facility falls within the mining area. Forzando North operates in accordance with GN 704 for clean and dirty water separation. Trenches will be constructed around the footprint area in order to divert and transport any dirty water from the facility to the dirty water system of the Forzando North mine.	4	2	2	3	24	L
Impacts to Groundwater															
Contamination of groundwater resources.	Construction of the Solar facility Infrastructure and the powerline.	6	2	1	4	36	M	All spillages will be cleaned up immediately. Spill kits need to be made available at all times on site. Employees and contractors are to be made aware of the impacts of such spillages on the receiving environment during induction and talk topics.	4	2	1	2	14	L
Impacts to Air Quality															
Increased dust generation.	Clearing of the footprint area, upgrade of the access road and construction of the pipeline	4	2	1	5	35	M	The Solar facility footprint is located within the Forzando North Mining area. Dust generation will be addressed as described in the Forzando North approved EMP.	4	2	1	3	21	L

Impacts to Visual Aspects														
Negatively impact on the visual aspects of the surrounding area.	Clearing of the footprint area, upgrade of the access road and construction of the pipeline, Construction of the Solar facility Infrastructure and the powerline.	6	2	1	5	45	M	The footprint area is situated with the Forzando North mining footprint area. The area is already disturbed in terms of visual aspects as the surrounding area is also dominated by mining activities. The footprint area is currently being used for agricultural purposes. As a result, there is no natural aesthetic value in the area.	4	2	1	4	28	L
Impacts to Noise														
Increased noise levels.	Clearing of the footprint area, upgrade of the access road and construction of the pipeline, Construction of the Solar facility Infrastructure and the powerline.	6	2	1	5	45	M	The Solar facility footprint is located within the Forzando North Mining area. Noise generation will be addressed as described in the Forzando North approved EMP.	4	2	1	4	28	L

Table 8.3 Operational Phase Relating to the Operational Phase

POTENTIAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
POTENTIAL ENVIRONMENTAL IMPACTS (Operational Phase)														
Impacts on Soils														
Increased erosion.	Operation of the Solar facility.	6	4	1	5	55	M	The re-establishment of natural vegetation will be encouraged. Should re-establishment of vegetation not take place, re seeding options will be investigated. Where disturbed areas cannot be re-vegetated during the life of operations, appropriate measures will be taken to control wind erosion. Draw up and implement a plan to monitor possible erosion in the area. Re-vegetate areas if soils are exposed for longer than 18 months. The re-establishment of natural vegetation will be encouraged. Should re-establishment of vegetation not take place, re seeding options will be investigated. Where disturbed areas cannot be re-vegetated during the life of operations, appropriate measures will be taken to control wind erosion. Draw up and implement a plan to monitor possible erosion in the area. Re-vegetate areas if soils are exposed for longer than 18 months. To avoid soil erosion, it will be a good practice to design storm water canals into which the water from the panels can be channelled. These canals should reduce the speed of the water and allow the water to drain slowly into the land. Another important measure is to avoid stripping land surfaces of existing vegetation by only allowing vehicles to travel on existing roads and not create new roads.	4	4	1	3	27	L

Soil Compaction	Operation of the Solar facility. Increased activity in the project area.	8	5	2	3	45	M	The most effective mitigation will be the minimisation of the project footprint by using the existing roads in the area and not create new roads to prevent other areas also getting compacted.	4	3	1	3	24	L
Impacts on Flora														
Increase in alien vegetation in the footprint area.	Operation of the Solar facility.	8	4	1	5	65	H	The Forzando North Mine will establish and implement a regular weed-control programme to eradicate existing invader plants and to prevent new invasions during ongoing electricity production operation and decommissioning. A weed eradication strategy will be investigated and implemented. Draw up an eradication and spread prevention programme as well as monitoring plan for invader species. Monitoring of weeds will be undertaken on a six monthly schedule and this may be extended monthly in the summer seasons if required.	4	4	1	4	36	M
Impacts on Visual Aspects														
Possible negative impacts on the visual quality and character of the surrounding rural landscape	Operation of the Solar facility.	4	4	2	2	20	L	• Due to the fact that the Solar facility is located within the Forzando North Mining rights boundary there will be little impact on the visual character and quality of the surrounding landscape as it is already dominated by mine related infrastructure and workings.	4	4	2	1	10	L
Impacts on Socio-Ecomonic Aspects (It should be noted that these impacts are viewed as positive on the local communities and the economy														
Education community on renewable energy sources.	Operation of the Solar facility.	6	4	2	3	36	M	Awareness should be raised of the power production facility and the nature of the renewable resource. This can be done via media, lectures and workshops to give more information to the local community on the understanding and importance of this renewable form of electricity production.	6	4	2	4	48	+M

9 CONCLUSION

Project Description:

Total Coal South Africa (TCSA) has proposed to install a Solar facility to supply the National Grid for Eskom with max 9.5 MWp of electricity through a 33kV power line connection. The Facility is proposed to be situated on the remaining extent of the farm Geluk 226 IS which is situated approximately 400 metres south east of the existing railway loop at Forzando North. In terms of the NEMA, a basic assessment is required for the authorising of the facility. This report serves as the Basic Assessment Report (BAR) for the construction of the proposed Solar facility.

Project Alternatives:

Two options were investigated for the location of the Solar facility. Originally the location of the proposed facility was to be on portion 13 of farm Welstand 55 IS within the Dorstfontein East Coal mining area (Option 1). On further consideration of this option, TCSA proposed the locality of the facility be relocated to the remaining extent of farm Geluk 226 IS within the surface mining rights area of Forzando North (Option 2).

Due to the planned plant infrastructure and access road development proposed for Dorstfontein East and the related dust generation, Option 1 was not deemed a feasible option for the proposed facility. Dust generation and / or construction activities will affect the proper functioning and maintenance of the photo-voltaic panels. It is for this reason that the only feasible site for the location of the proposed facility is Option 2.

Environmental Impacts:

The proposed location of the Solar facility is within the approved Forzando North Mining Area. The Solar facility location is currently being used for agricultural activities and as a result, the natural environment is already disturbed. As a result of the proposed locality being disturbed by both agricultural and mining activities, impacts associated with the Solar facility are low. The following environmental aspects will be impacted by the proposed development during the various project phases:

- **Construction Phase:**
  - Impacts on the Soil Resource:
    - Loss of the soil resource in an area used for cultivation; and
    - Increased erosion due to increased surface run-ff.
  - Impacts to the Land Use and the Land Capability:
    - Due to the existing Agricultural Activities taking place on the proposed 19.5 ha project area, the proposed activity will cause a

loss in agricultural resources and cultivated land. The impact will be limited as the area proposed is small in relation to the existing activities.

- Impacts to Flora:
  - Removal of natural vegetation.
- Impacts on Fauna:
  - Destruction of natural habitats; and
  - Poaching and hunting of animals.
- Impacts to Surface Water:
  - Contamination of nearby surface water resources.
- Impacts to Groundwater:
  - Contamination of groundwater resources.
- Impacts to Air Quality:
  - Increased dust generation.
- Impacts to Visual Aspects:
  - Negative impacts on the visual aspects of the surrounding area.
- Impacts to Noise:
  - Increased noise levels.

- **Operational Phase:**
  - Impacts on the Soil Resource:
    - Increased Erosion.
  - Impacts on Flora:
    - Increase in alien vegetation in the footprint area.
  - Impacts on Visual Aspects:
    - Negative impacts on the visual quality and character of the surrounding area.
  - Socio-economic impacts:
    - These are positive impacts resulting from the proposed project. This project can lead to the education of the community of renewable energy sources.

The implementation of the management measures proposed to mitigate the negative environmental impacts will drastically reduce the magnitude of each impact on both the project and the surrounding area. No significant or long terms impacts have been identified during this study as the facility will be constructed in an area already approved mining area.

Recommendation:

It is recommended that this application be approved as the Solar facility is a renewable power generation facility that will feed into Eskom's national electricity grid.

10 REFERENCES

- Proposal Design Report for T0 Tracker™ System from Sunpowercorp, April 2012
- Proposal Design Report for C7 Tracker™ System from Sunpowercorp, April 2012
- TerraSoils, 2012: Soils, Landuse and Land Capabillity Assessment, Marine Pienaar