



Report

Visserspan Solar PV Project 3 Basic Assessment Report: Socio-economic Specialist Report



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1 Introduction

1.1 Project background

EnviroAfrica CC has been appointed by Ventura Renewable Energy (Pty) Ltd, (Ventura) to undertake the EIA application process for the proposed Visserspan Solar PV Facility Project, to be developed on the farm Visserspan some 8 km north-west of Dealesville in the western Free State province (Figure 1-1). As part of the application for an environmental authorisation, a basic assessment report (BAR) is required since, although it is for a large scale solar photovoltaic (PV) facility capable of generating of more than 20MW but less than 100MW of electricity, the proposed development falls within renewable energy development zone 5 and therefore, GN. 350 of 2017 applies.

There are four phases to the project, 1, 2 3 and 4, each of which will be the subject of a separate BAR application. The phases are adjacent to each other, all on the farm Visserspan (Figure 1-2) and will be developed in turn, starting with 1 and ending with 4, should Ventura win all four projects in the next round of renewable energy bidding.

This report constitutes the *draft* socio-economic impact assessment (SIA) specialist report for Project 3.

Due to their proximity to each other, the bulk of the information is common to all. For purposes of efficiency, the introductory sections of the report are common to all four projects, the summary project description below is divided into four sections, the baseline is common to all and where there are differences these are highlighted in separate sub-sections, while the impact assessment will be divided into the four projects, and the mitigation measures likewise.

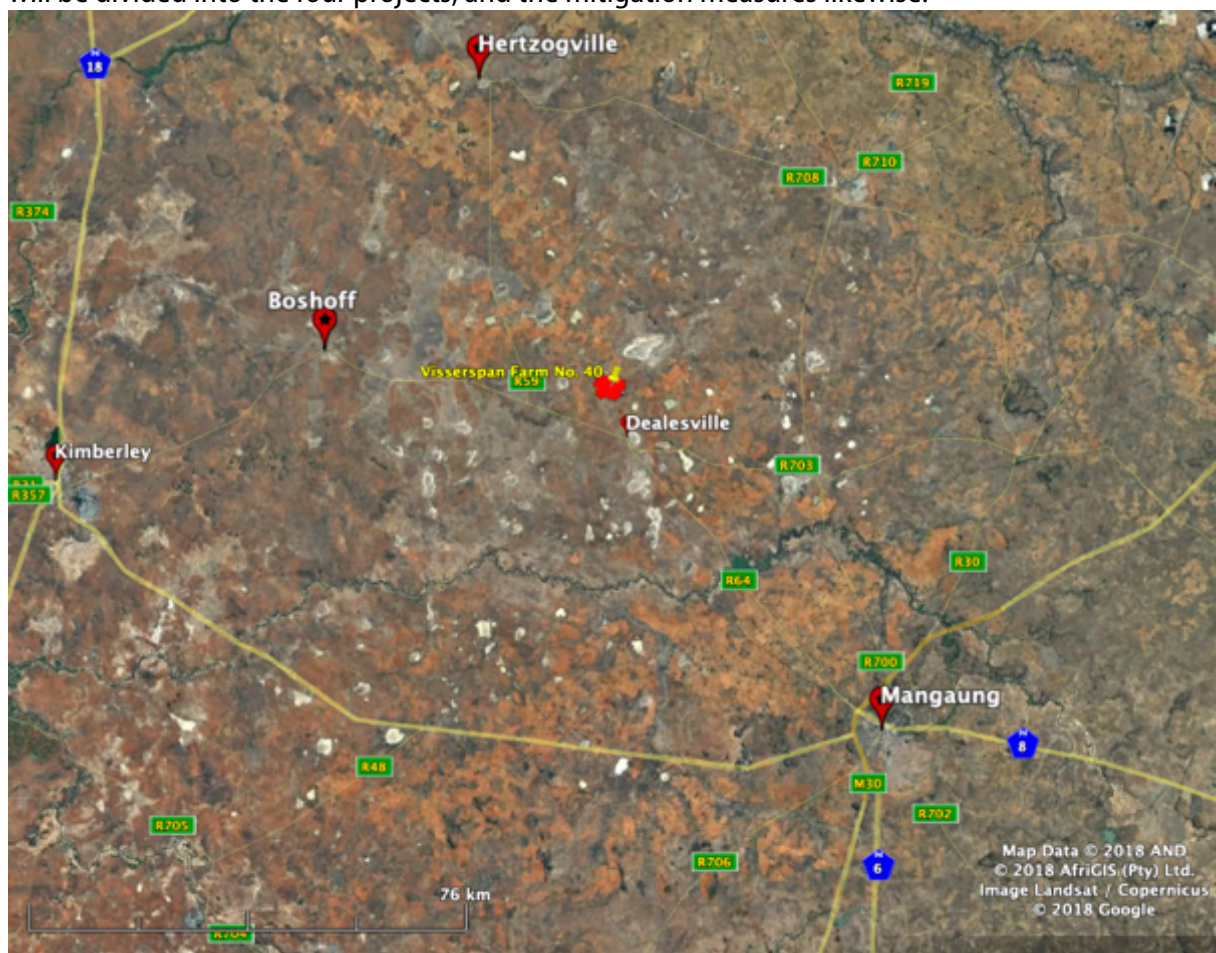


Figure 1-1: Locality map showing location of the proposed developments on the farm Visserspan, Free State.

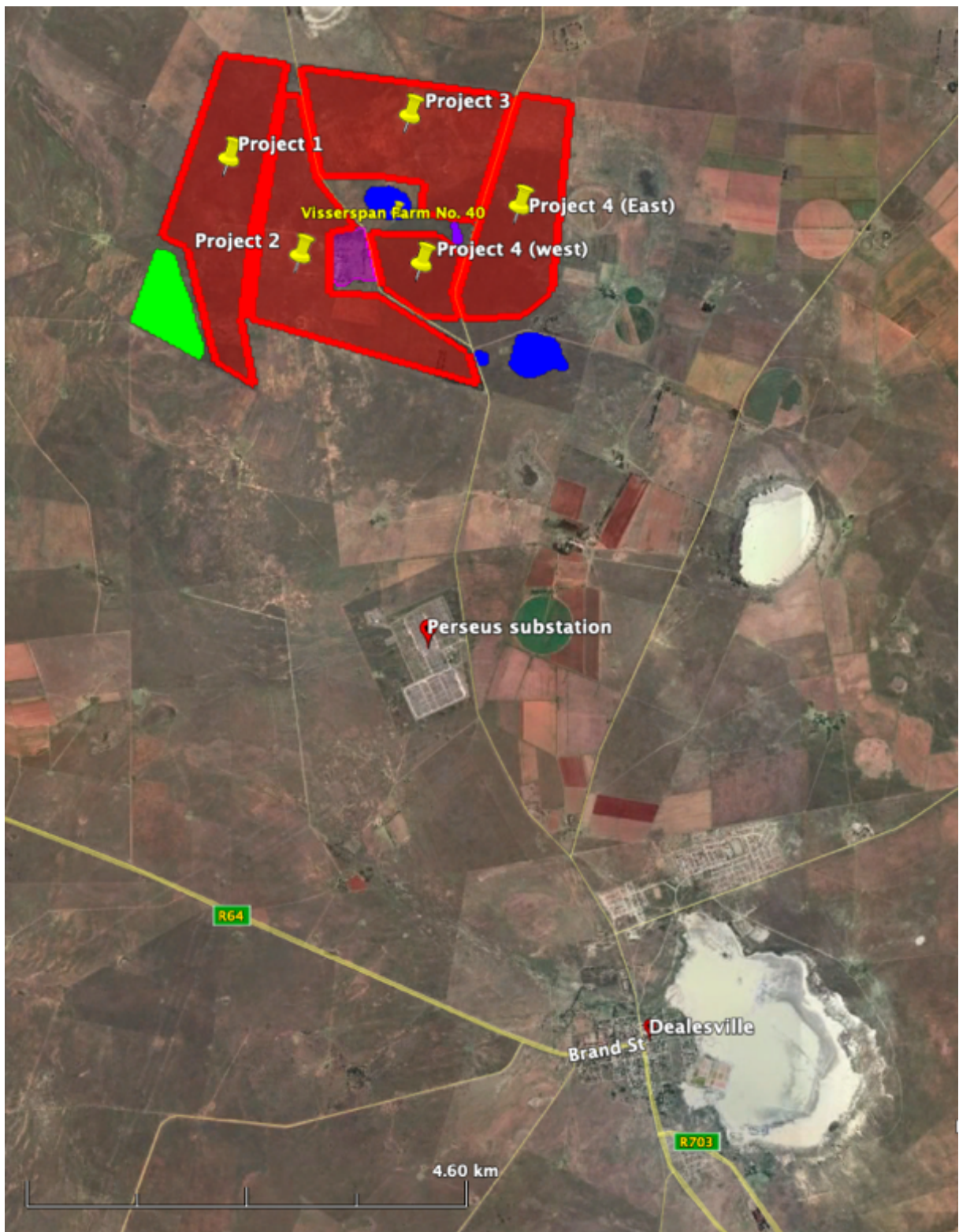


Figure 1-2: Site plan of the four proposed solar PV projects on Visserspan farm No. 40, and nearby landmarks

1.2 Approach

The approach was guided by the DEA's Guidelines for Social Impact Assessment (SIA) as part of its general EIA Guidelines as published on its website.

Baseline Data Collection

The project information on which this report is based was conceptual only; neither layout nor any design drawings were made available. This is to a large degree a consequence of the Department of Energy's IPP renewables bidding rounds process, such that not all proposed projects will be developed; hence developers are reluctant to spend large sums in the planning and design phase before the bidding process but must have their permissions in place in order to submit a bid. However, the design options for solar PV arrays are limited and projects have a high degree of commonality; only the layouts hold significant potential for variation.

Data sources consulted to compile the socio-economic baseline include internet sources (e.g. IEC Demarcation website), but mostly provincial and local government reports and publications, namely the Integrated Development Plan (IDP) and provincial development planning documents, as well as previously conducted Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs) (e.g. The Wind and Solar SEA (CSIR 2015) conducted in the study area (the study area comprised the entire country).

A two-day site visit was conducted, during which attempts were made to meet with and talk to neighbouring landowners (very few were available, some of them are not resident on their farms). Visits were also made to Tokologo Local Municipality (TLM) in Boshoff and to the L... District Municipality (LDM) in Welkom, but in both locations the relevant officials (Municipal Managers and the LDM Environmental Health Manager) were not available for interviews. Submissions by stakeholders made to EnviroAfrica have been shared with the SE specialist to ensure all relevant issues are captured in this analysis.

Information thus obtained was evaluated to establish status quo socio-economic conditions and trends, institutional structures and potential change processes present in the study area.

To date no other draft specialist reports for these four projects have been shared with this author, hence overlapping issues may be raised but cannot be assessed in this report. The following issues are thus expected to be handled in the impact assessment sections of other reports:

- Visual impact and sense of place (Visual specialist report)
- Dust (Air quality specialist report)
- Effect of sterilisation of soil on agriculture (Land capability specialist report)
- The significance of the effects of dust on agricultural crops is therefore not assessed in this draft report.

Impact Assessment

The impact assessment methodology follows the general guidelines for BAR level impact assessment, and is described at the start of the impact assessment section of this report. Interviews and correspondence with registered stakeholders and other informants, as well as information about the area made available to the author and sourced on the internet, solar PV BARs for other projects in the Free State and Northern Cape, as well as discussions with colleagues informed the evaluation of significance. Socio-economic impacts tend to be highly subjective, reflecting the value sets of different groups of stakeholders at different scales (neighbours, local, regional, national) who may have very different or even opposing interests in a proposed project, hence the assessor's task is a difficult one. Typically it is local stakeholders that bear the negative impacts of a project while the benefits accrue at a wider regional and national scale.

Proposed mitigation measures will be incorporated to assess the significance of impacts.

Mitigation and management plan

The mitigation measures for all impacts with a significance of Medium or High are then collated into a social mitigation management plan that will be incorporated into the Project environmental management programme report (EMPR).

2 Project Description

For the purposes of this report, a summary of the projects, on the basis of the author's understanding of the conceptual information available at the time of writing. Images showing the location of each project are included at the end of the report text, before the appendices.

2.1 Conceptual design features common to Projects 1 - 4

Each of the four projects will comprise a solar photovoltaic (PV) array in which the PV 'tables' will be raised approximately 500 mm above ground level and will have single axis tracking systems ie the tables can tilt but they cannot swivel. Arrays will be oriented east-west, while tables will be orientated to the north to maximize exposure to the sun. The maximum height of any structure will be 3 m above ground level, generally the arrays will rise to 2,4 m.

Proposed associated infrastructure includes a fenced construction staging area, location currently undetermined, a perimeter fire access road and fence, maintenance shed/s, switch panel, DC-AC inverter stations; LV to MV transformer stations on concrete pads, and office buildings, all within the proposed development site footprint. Powerlines within the site will be underground to a sub-station on the southern part of the farm, from which connection to the national power grid at Perseus will be by overhead powerline. Some of this infrastructure will be shared by/ common to all four projects, but it is not known exactly what the configuration and layout will be. The grid connection is close by at Eskom's Perseus substation, 3 km south of the proposed development site, and the largest substation in the country. *The new sub-station to be built is not part of this application; it will be the subject of a separate BAR in due course.*

All vegetation must be cleared under the panels and the panels will need to be cleaned approximately every four months, depending on dust levels in the region. Presently wet-cleaning is proposed, the amount of water required being unknown. Water will be supplied from existing boreholes on the farm. Cleaning is done manually due to the delicate nature of the panels' surface, access by 'cherry-pickers' or by rope. The feasibility of dry-cleaning is being investigated. Other than cleaning, there are very few operational functions requiring labour and operating costs are extremely low.

Construction will entail grubbing and clearing, followed by some levelling of the site's ground surface, that is, earthworks preparation will be required. The construction of access roads, security fencing, array mounting racks on concrete slabs, fitting of tables, supporting facilities and transmission lines will follow.

If all four projects are developed, essentially the entire Visserspan farm will be converted to solar PV arrays and associated infrastructure, with the exception of three small areas excluded from the development footprint due to ecological/ biodiversity sensitivity and the area around the farm house (Figure 3-4). The order in which the four projects will be developed, if they are all developed at all, is unknown, since their development is dependent on each project's winning a government renewable energy bidding process.

The total investment if the four projects are developed will be some R1,2 billion. Each project will generate about 60 employment opportunities through the construction phase, with a projected

value of R150 million over nine (9) months. Over 60% of the construction phase benefit/ value is likely to accrue to previously disadvantaged individuals (PDIs) and between 40% and 60% of employees will be sourced locally. Operational phase employment amounts to some 20 permanent (direct) jobs, and about 3 indirect ie secondary opportunities for contracting. Because the projects will be subject to a competitive bid process information about the value of permanent employment and the amount that will accrue to PDIs is confidential information. In any event, the Department of Energy is likely to impose a 40% PDI threshold on bidders.

2.2 Project 3

Proposed Project 3 occupies the north-central portion of the farm, located at 28°35'18.93"S, 25°44'30.53"E (estimated central point) and takes up most of the southern boundary of the farm. It will comprise 213 ha.

2.3 Project Alternatives:

Due to proximity to the Eskom Perseus substation, consent use of land (the sub-region is part of renewable energy development zone (REDZ) 5 under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)), the proximity of other renewable energy developments and proposed developments, alternative sites do not exist. The facility is not a public amenity, but the generation of electricity by renewable means from the facility meets a national SIP goal for the public good.

However, secondary alternatives that will be considered include alternative PV technology, layout options, and the option of not proceeding with the proposed development at all (the No-Go option). They will all be considered in the Draft Basic Assessment Report (DBAR), but only the present conceptual proposal and the No-Go option are considered in this report due to lack of information of detailed project planning.

3 Baseline

3.1 Defining the Project affected area (PAA)

The baseline description is directed to describing the socio-economic characteristics of the project affected area (PAA). Typically the PAA is defined as a nested hierarchy of 'circles' radiating out from the development site, the radius of each circle linked to the nature of the environment (how impacts might propagate), administrative unit configuration (how activities are controlled), the nature of anticipated impacts and of receptors therein, that is, whether impacts will directly affect receptors, or indirectly. The nested hierarchy for the purposes of this analysis is thus more-or-less as follows (the PAA can never be precisely defined, nor are impacts manifest at uniform distances, so the 'circles' may actually be peculiarly shaped polygons):

- 0,0 – 0,5 km: potentially directly affected, eg by air quality, noise, water (competition for groundwater), visual intrusion (solar panels instead of countryside) and light (glare off panels);
- 0,5 – 10 km: indirect effects – local economic effects, increased pressure on infrastructure and services in Dealesville, the closest town;
- >10 km: indirect effects - regional economic effects, with social consequences: local municipality (Boshoff) and district municipality (Hertogville, Bultfontein, Soutpan, Welkom) level

The description will start, however, at the broadest level that is common to all four projects, and proceed to the immediate surrounds of each project.

3.2 District socio-economic profile

3.2.1 Lejweleputswa District Municipality and Tokologo Local Municipality

The Lejweleputswa District Municipality's (approved) 2018-2019 local development plan (LDP) is a mine of information on the district and its constituent local municipalities, and the profile provided here is largely taken from that document, which sourced the bulk of its baseline data for the year 2015 from the IHS Global Insight Regional eXplorer 2015¹ (Lejweleputswa, 2018²).

Lejweleputswa District Municipality is situated in the mid-western part of the Free State province, with an estimated geographic area of about 31 930 km² (Local Government Handbook, 2013). The district borders the North-West province to the north, Northern Cape province to the west, Fezile Dabi District Municipality to the north-east, Thabo Mofutsanyane District Municipality to the east, Mangaung Metro and Xhariep District to the south. It contains 22.9% of the Free State province's population, down from 26.7 % in 1996 (IHS Global Insight, 2015).

The District is made up of five local municipalities, namely; Matjhabeng, Tokologo, Tswelopele, Nala and Masilonyana. The Visserspan solar farm proposal falls within Tokologo Local Municipality (LM), the capital town of which is Boshoff in the centre of the municipality, with Hertzogville in the north and Dealesville in the south-east. Tokologo comprises a geographic area of 9,326 km² and is the most sparsely populated of the District municipalities, with only 57% of its population classified as 'urban' (Ingle 2007)³. The 2003 IDP reported that the rerouting of the main Bloemfontein-Kimberley road from the R64 via Dealesville and Boshoff to going via Petrusburg depressed the economies of these two towns 'severely' (Ingle 2007).

Visserspan farm lies about 8 km north-west of Dealesville.

Table 3-1: Economic and demographic indicators, Lejweleputswa District Municipality (Lejweleputswa, 2018)

¹ The IHS is a subscription-based service that consolidates socio-economic data from a wide range of regional databases for southern Africa, but the high cost of subscription puts it beyond the direct reach of this project report

² Lejweleputswa District Municipality (2018) 2018-2019 Approved Local Development Plan LDM, Welkom, 2018.

³ Ingle M (2007) Economic Profile: Tokologo Local Municipality. Background paper for Free State Premier's study of SMMEs in the Free State. Centre for Development Support, February 2007

Indicators	2005	2014
1. Total population	634 514	630 912
- Population growth rate	-1.1%	-0.1%
- Males	48.20%	50.51%
- Females	51.80%	49.49%
2. Economic Indicators		
• Dominant sector share of regional total (Tertiary)	51%	52%
• GDP-R	4.2%	1.5%
• GDP-R per capita	R49,714	R45,560
• Growth forecast	-1.7%	0.2%
3. Tourism		
• Domestic tourists by bednight	796 784	402 845
• International tourists by bednight	299 321	1 174 754
• Total tourism spending as a % of GDP	3.0%	3.2%
• Growth in total tourism	-0.9%	6.4%
4. Labour		
• Economically active population	40.9%	37.8%
• Unemployment rate	30.3%	40%
• Male unemployment	22%	35.8%
• Female unemployment	41.3%	45.8%

Demographic profile

Lejweleputswa District had a total population of 630 912 in 2014 (calculated from the base of 626 265 recorded in the 2011 census (Lejweleputswa, 2018))⁴. While the Free State province's 2011 population registered a slight increase over the 1996 census, LDM's population declined by 10,9% over the same period. The gender break-down reported for 2014 was 51.0% male, 49.0% female (Lejweleputswa, 2018: Economic Profile).. This reflects a positive employment situation (many districts in South Africa where work opportunities are extremely poor have seen a net exodus of males), though the relative proportions are variable across local municipalities. The age cohort distribution saw significant shifts between 2001 and 2011, with more young people of working age (+18 < 35) in 2011, suggesting a young, energetic District population for which the provision of youth employment will be a critical issue (Lejweleputswa, 2018). Over the period the 0-14 year old bracket stayed fairly constant (dropped by 1%) while the elderly – 65+ years – increased from 4.1% to 5.0% of the population. An interesting statistic shown is that in 2011 **60,9%** of persons in the District had *never* married (up from 53.2% in 1996).

Average household size in LDM declined from 4.4 in 1996 to 3.4 in 2011 (household size is remarkably constant across Free State province).

Education levels generally translate into skills levels and have a direct correlation with employment potential, given that modern economies require certain education levels as a prerequisite for employment. Fully 60.8% of persons aged 20 years and older have below matric level education in Lejweleputswa, although with positive increases between 2005 and 2014 of persons completing matric (Lejweleputswa, 2017)⁵. The number of persons with matric increased from 19.5% in 2005 to 26.1% in 2014. Persons with a qualification higher than matric stood only at

⁴ It is noteworthy that the LDM's IDP 2018 has different demographic statistics presented in two different sections: those in the District Demographic Profile, report the 2011 national census, while those in the District Economic Profile report the HIS Global Insight Regional eXplorer 2015. Should there be slight variations in numbers reported here, it is because two different parts of the IDP were used as the basis for this profile.

⁵ Lejweleputswa (2018) Lejweleputswa District Municipality Annual Report 2017-2018.

8.2% in 2014. All this translates into limited skills with limited employment opportunities. The rest of the municipalities in Lejweleputswa follow a more or less similar pattern (Lejweleputswa, 2017). The LDM's 2018-2019 IDP does not, curiously, present statistics about the income levels of its inhabitants, but some such stats are available for Tokologo LM via the Municipal Demarcation Board's 2018 municipal capability assessment (MDB, 2018)⁶. This report, using 2011 census data, shows that Tokologo has, at 10.2%, a significantly lower proportion of people *with no income* than the country as a whole (13.4%), but it has a relatively greater proportion (41.3%) of persons earning in the lowest annual income bracket (R1 – R19,600/annum) while the upper income earners are sparse (5.7% earning R153,801 – R614,000 versus national 8.2%; 0.5% versus national 1.2% earning >R614,000). Tokologo's inhabitants are thus poorer overall than the national average, but more of them have *some* income than is the case nationally.

This seems to run counter to the employment situation in the area. The unemployment trend for the period 1996 – 2011 has shown an interesting curve: from 1996's 26.2% it rose to 44.8% before coming down to an official 36.5% in 2011. The *Global Insight, Regional Explorer 2013* however had it at 36.7% in 2005, rising to 40% in 2014, resulting in the percentage of the population comprising "economically active" sliding from 40.9% to 37.8% over the period (Lejweleputswa, 2018), that is, more people have given up looking for work. LDM in 2011 had the worst unemployment rate in the Free State, attributed largely to mine closures (Lejweleputswa, 2018). Whatever the precise figures are, the employment situation is dire, and the rise in 'community services' is the only sector that has shown an increase in employment figures over the 2001 – 2011 decade: 'community services' in this context is probably a surrogate for government employment, which saw a sharp increase over the President Zuma era starting 2009.

The differences in employment by gender are stark: of the total number of employed blacks (who comprise by far the bulk of the population), only 38.3% are female, while of the unemployed (and economically active), females comprise 56.5% of the unemployed, while far more females are not economically active (95612, versus 75419 males). Youth unemployment too is hugely problematic, standing at 36.5% for the District (although that is down from the 44.8% recorded for 2001).

The LDM IDP does not report on the health status, particularly HIV/AIDS prevalence rates of its inhabitants. StatsSA 2018 estimates⁷ were therefore consulted for information: for 2018, an estimated 13.1% of the total South African population was HIV positive, and approximately one-fifth of South African women in their reproductive ages (15–49 years) were HIV positive.

Disturbingly, the only age group amongst which HIV prevalence has declined since 2002 is the youth aged 15–24 (from 6.7% in 2002 to 5.5% in 2018). These increases are in spite of the roll-out of the world's biggest ARV (anti-retroviral) programme. Stats SA does not in the Release break down the prevalence rates by province, but a 2019 article in Timeslive⁸ states that HIV prevalence rates in South Africa are higher than thought, and gives a figure of 21.3% for the Free State against a national rate of about 17%, the lowest rate of 10% in the Western Cape and the highest provincial rate of 24% in KwaZulu-Natal. Ironically, the success of the ARV programme may be the reason for the higher prevalence rates, since people with AIDS are living longer, hence their positive status is added to the prevalence rate although they may be out of danger.

Tokologo's share of the District population was 5.27% in 2005, reducing to 4.54% in 2014, a change of -1.6%. Over the decade Tokologo saw sharp declines in population from 2007 to 2010, but it has stabilised at its present level of 28,643 persons since then. The Demarcation Board's 2018 municipal capability assessment reported that Tokologo's population declined by 34.5% over the 2001-2011 decade between national censuses.

⁶ Municipal Demarcation Board (MDB, 2018) Municipal Capability Assessment 2018 Tokologo FS182

⁷ Stats SA (2018) Midyear Population Estimates 2018. Statistical Release P0302. Embargoed until 23 July 2018 11:00.

⁸ <https://www.timeslive.co.za/news/south-africa/2019-05-27-half-a-million-adults-in-johannesburg-are-hiv-positive-new-study/>

While Tokologo has one of the worst performing GDPs, its *youth* unemployment rate, at 27.5%, is the lowest in the District. Tokologo's personal income tax payers contributed R27 million to the fiscus in 2014, but the low proportion of income tax payers in the TLM at 4.5 persons per 100 residents is well below the national rate of 6.5 tax payers per 100 residents (MDB, 2018). This reflects the income levels reported above, where the bulk of the TLM's population are low income earners, hence escaping the tax net.

Economy

The mining sector (mostly gold around Welkom in Matjhabeng LM) contributed a dominant 42.9% to District gross domestic product (GDP) in 2012 (down from 46.5% in 1996), followed a long way away by community services at 20.4% (UP from 14.1% in 1996), trade at 11.7% (UP from 10.0% in 1996), finance at 10.6% (steady from 10.0% in 1996), transport at 6.6% and agriculture at 5.5% in 2012 (declined from 7.0% in 1996). The mining sector has been on a downward trend as a result of closure of many of shafts as a result of high costs of production and recent declines in world commodity prices. While the value of almost all sectors across all municipalities in the District has been declining since 2005, 'community services' has been growing, although its relative contribution to growth has shrunk, possibly due to government's austerity measures in recent years, implemented to reduce the government wage bill (Lejweleputswa, 2018).

While agriculture's contribution to GDP may be minor, its contribution to employment is significant it employs over 88,000 people in the District (7.51%), although mining is responsible for 17.3% of District employment. Agriculture is significant particularly with respect to employment of unskilled and low-skilled labour. Agriculture is the biggest employer in Tokologo at 38.9%, followed by community services at 13.3% and trade at 8.6%; electricity is a distant 0.11%.

At the level of Tokologo LM, however, agriculture is the biggest contributor to GDP at 24.6%, with mining a close second at 21.6%, almost equalled by 'community services' at 20.7% ('community services' is largely a surrogate name for government services). Electricity, despite the presence near Dealesville of the country's largest sub-station Perseus, contributes a mere 2.9% to Tokologo's economy (Lejweleputswa, 2018). A glance at the agricultural potential and use map (Figure 3-1) shows that the dominant type of agriculture in Tokologo is 'extensive' agriculture, that is, grazing livestock and other uses of natural veld such as game hunting. Contrast this with the bands of 'intensive' agriculture – that is, arable land and crop production – that dominate further north in the District, although there is a band of 'intensive' agriculture that appears as a mosaic around Dealesville in the far south-east of the District.

The seat of the Tokologo LM is Boshoff, a small pleasant town some 50 km west of Dealesville on the R64. While Boshof was primarily an agricultural supply town, it now also has a tourism sector due to the development of a number of hunting farms in the area. The R138 million economy of Tokologo LM was stable but not growing in 2007 (Ingle, 2007), and its *per capita* GVA (gross value-added) was actually declining (compared with 1996), that is, its citizens were becoming poorer. However, Tokologo at that time was doing considerably better than most other Free State local municipalities (Ingle, 2007).

Ingle (2007) reports on a provincial index of multiple deprivation (PIMD) developed by the HSRC with Oxford University. The index's computation revealed that Tokologo LM's municipal wards were average with respect to income and material deprivation compared with other Free State LMs, they compared favourably insofar as employment was concerned, the health picture was fairly mixed, but *education performance was extremely poor*. The Gini coefficients for Tokologo however, pointed to increasing income inequality (Ingle, 2007); however, this was a national and indeed international trend.

Governance arrangements

The demarcation process in the Free State has over the years acknowledged a lack of capacity to perform certain functions as initially envisaged in the Local Government: Municipal Structures Act of 1998. Some of the functions as indicated in the Act were performed at local level, but over time some local municipalities were confirmed as having alack capacity to perform some functions, therefore the provincial MEC for Local Government made adjustments in the separation of functions, so that the District took on additional functions. Local municipalities have thus become very much simply service providers to their ratepayers (as per the table below). In 2005 Tokologo was regarded as a 'low-capacity' municipality and the Free State department of local government dispatched a municipal support team to assist it (Ingle 2007). This was evident in Boshof at the Tokologo LM where the Municipal Manager's Personal Assistant said (to the author) that the LM did not have anything to do with the IDP, that this was a District product and would have to be sourced and discussed at District level. In 2018 the Demarcation Board (Demarcation Board, 2018) describes it as a B3 municipality, that is, it has a "relatively small population and a significant proportion of urban population but with no large town as core". Dealesville's office of the TLM thus comprises only payments of municipal bills, no other functions are provided there.

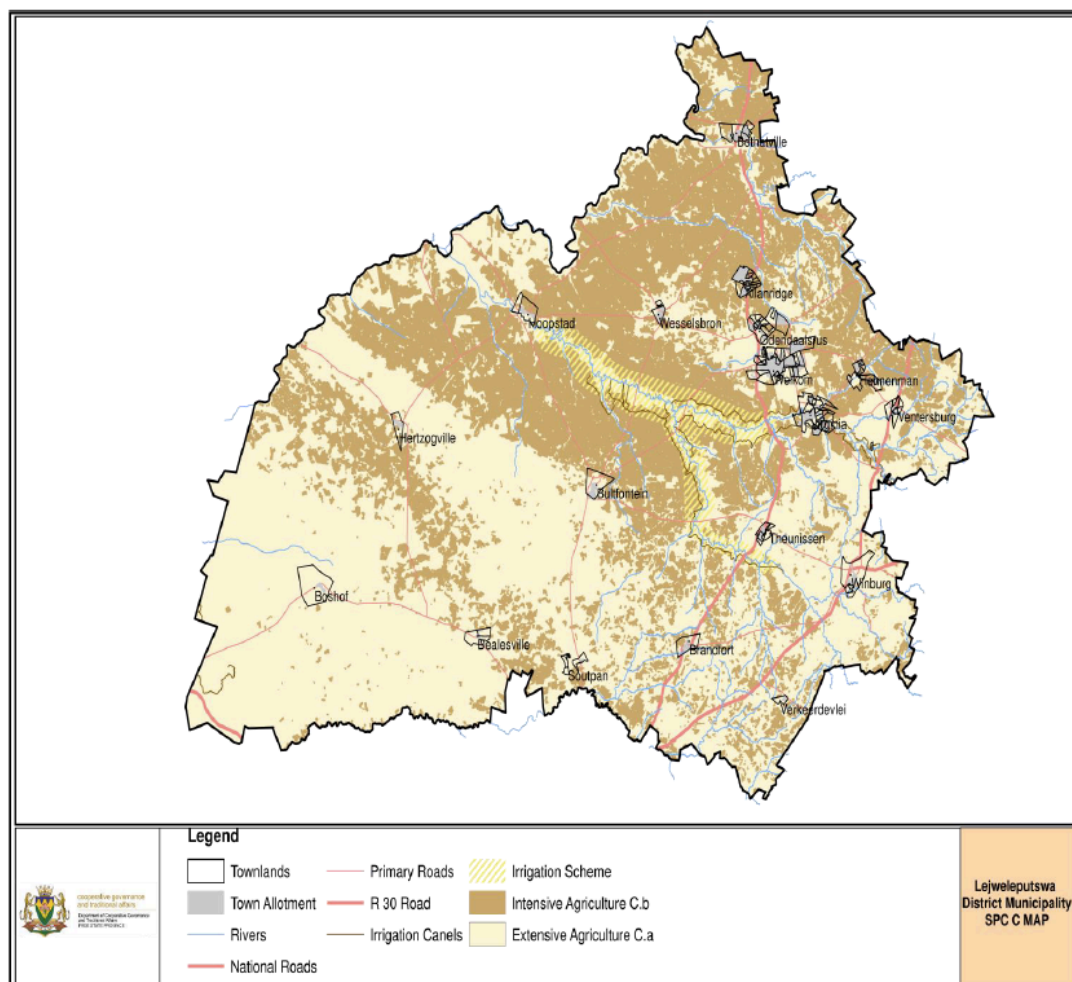


Figure 3-1: Agricultural potential and land use in Lejweleputswa DM

Table 3-2: Key powers and functions of District and Local Municipalities in the Free State Province

District: Key powers and functions	Local: Powers and functions
Integrated planning	Trading regulations
Municipal health services	Billboards and display of advertisements in public places

Firefighting services (in 2 LMs)	Firefighting services
Municipal public transport (policy development)	Municipal public transport
Fresh produce markets	Fresh produce markets
Cemeteries, funeral parlours and crematoria (policy)	Cemeteries, funeral parlours and crematoria (by-laws)
Local tourism	Local tourism
Municipal airports	Municipal airports (except 2 LMs)
Municipal abattoirs (policy development)	Municipal abattoirs (by-laws)
Solid waste disposal sites	Refuse removal dumps and waste
Local sport facilities	Potable water
Air pollution	Air pollution
Environmental health	Electricity regulation
Municipal roads	Local amenities
	Sanitation
	Childcare facilities
	Fencing and fences

Source: (Lejweleputswa, 2018)

Economic development planning

As is clear from the lists of powers and functions above, spatial (physical) and economic planning are done at the level of the District, with LMs merely executing plans issued by the District. The District IDP has adopted the United Nations' Millenium Development Goals as the broad goal of its economic development strategies and plans (Lejweleputswa 2018). Policies concerning economic diversification are part of this, and they are driven from the national government, cascading down through the provinces to the district administrations.

The District IDP is instructive with respect to how Dealesville features from a District perspective and in the District's plans. Dealesville is seen as falling within the Medium economic potential class, Medium in urban growth potential and Medium human development needs class, as are the majority of local municipalities in the District (Lejweleputswa 2018: pg 66/280). Dealesville is thus seen to be by no means the worst off municipality in the District: Welkom, by contrast, is classified as Very High with respect to human development needs (but then the entire IDP appears to be skewed towards Welkom, which is the seat of the District Municipality).

Solar Energy Hub

In terms of national energy planning, the LDM falls within the Kimberley REDZ (Renewable Energy Development Zone). The purpose of the REDZs, linked to power transmission corridors, is to give effect to the Department of Energy's Integrated Resource Plan (IRP), which identifies an increasing role for renewable energy generation in order to bring down the country's carbon footprint. The IRPs are revised and re-issued every year or two. To facilitate roll-out of renewable energy and meet the ambitious targets set in the IRPs, various economic incentives have been initiated to encourage investment in renewable energy, notably the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). Evident from policy is that solar power requires a greater subsidy than the other forms of renewable energy.

A Phase 1 Wind and Solar Strategic Environmental Assessment (SEA), completed by the Council for Industrial and Scientific Research (CSIR) in 2015, identified eight REDZs in South Africa. The SEA set out to identify areas in the country that are best suited for wind and solar PV energy projects, based on a holistic assessment of technical, strategic planning, environmental and socioeconomic criteria (the report is available for download on the CSIR REDZ website). These were gazetted for implementation by the Minister of Environmental Affairs, in February 2018 (CSIR, 2019)⁹. The

⁹ CSIR REDZ website <https://redzs.csir.co.za> (homepage) as on 15 December 2019

Kimberley REDZ was positioned clearly because of the location of the Perseus substation, the biggest in the country and a key link in the Central powerline corridor (see Figure 3-2). The powerline corridors with which the REDZ are associated were identified in the Electricity Grid Infrastructure SEA completed in 2016 and gazetted as powerline corridors in February 2018. A Phase 2 REDZ SEA, completed in late September 2019, identified two additional REDZ; the SEA was focused on identifying mined out areas close to centers of demand that would be suitable for solar PV development. In this way, the combination of the REDZs and power corridors provides strategic guidance to Eskom on where to prioritise investment in grid infrastructure (CSIR, 2019).

The Lejeweletputswa IDP states that an area suitable for a solar power development and carbon credits is situated in the south of Lejeweletputswa and continues further into Xhariep (to the west). The primary purpose of the Solar Energy Hub strategy is to use the space and natural abundance of sunshine associated with the Free State Province and to capitalise on the carbon credit opportunities to be unlocked by means of planning (Final Draft Free State Provincial Spatial Development Framework 2014, as reported in Lejeweletputswa 2018)). From the perspective of the District, the solar energy projects at Dealesville and Boshof should be promoted to expand into a solar energy hub for the south-western part of the district. The said towns are also indicated as solar energy nodes on the district spatial development framework (SDF) map (Lejeweletputswa 2018).

Farms in the vicinity of Dealesville have proved particularly popular as locations for solar PV proposals (Figure 3-3), presumably because of the presence of the Perseus substation there and the relatively low value of agricultural land in the immediate area.

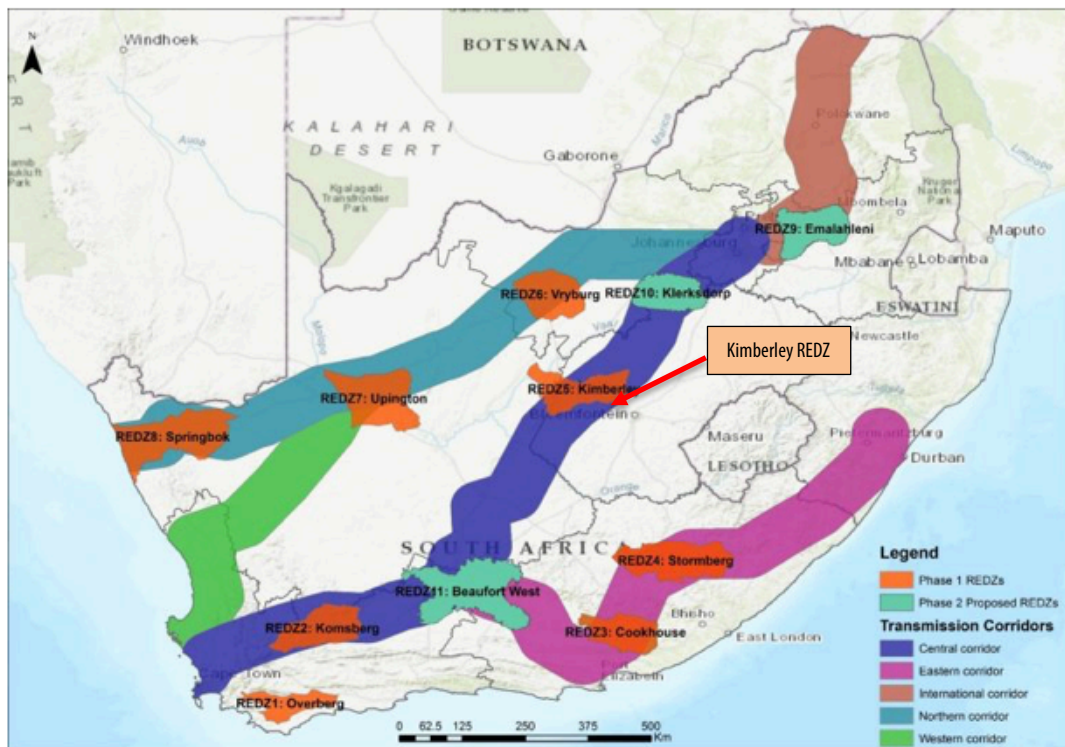


Figure 3-2: Phase 1 and Phase 2 REDZ and the associated power transmission corridors identified in SEAs 2015 and 2019 [Source: CSIR REDZ website <https://redzs.csir.co.za>, as at 15/12/2019]

Synopsis

- The Lejeweletputswa District Municipality (LDM) is the active local authority for spatial planning and economic development planning, while the local municipalities under it function primarily as service centers for their ratepayers;
- The population of the District and all its constituent municipalities has been declining since 1996;

- Over 60% of the economically active population of the District has education levels below matric, and only 8.2% have a qualification higher than matric; this situation translates into limited skills levels with limited employment potential in a sophisticated economy;
- The LDM economy has tended to less diversity over the past 15 years. It is dominated by mining, then community services and trade, and has effectively been in recession for over a decade (with the exception of 2013 when 0.8% growth was recorded);
- Tokologo's economy, on the other hand, is dominated by agriculture, with mining and community services running a close second and third, respectively;
- Unemployment is high at about 37%, with women particularly badly hit;
- Youth unemployment is at its lowest in Tokologo LM, however;
- Agriculture is the biggest employer in Tokologo at 38.9%, followed by community services at 13.3% and trade at 8.6%; electricity is a distant 0.11%.
- The development of a solar energy hub in the south-western portion of the DM is promoted by the LDM, and supported by the targeted local municipalities;
- Solar PV development in this sub-region is consistent with national and provincial government plans for diversification of energy sources and modes of production (private sector investment in independent power production)
- However, LDM also sees the potential for agricultural growth and is promoting an agri-growth strategy throughout its area;
- The south-western part of the District has the lowest agricultural value because it is mostly suited to natural veld usage, that is livestock grazing and game hunting, while arable land and cropping is concentrated to the north and west;
- A considerable number of solar PV projects have been approved or applied-for in the vicinity of Dealesville. The potential exists for landscape and lifestyle transformation in the district.

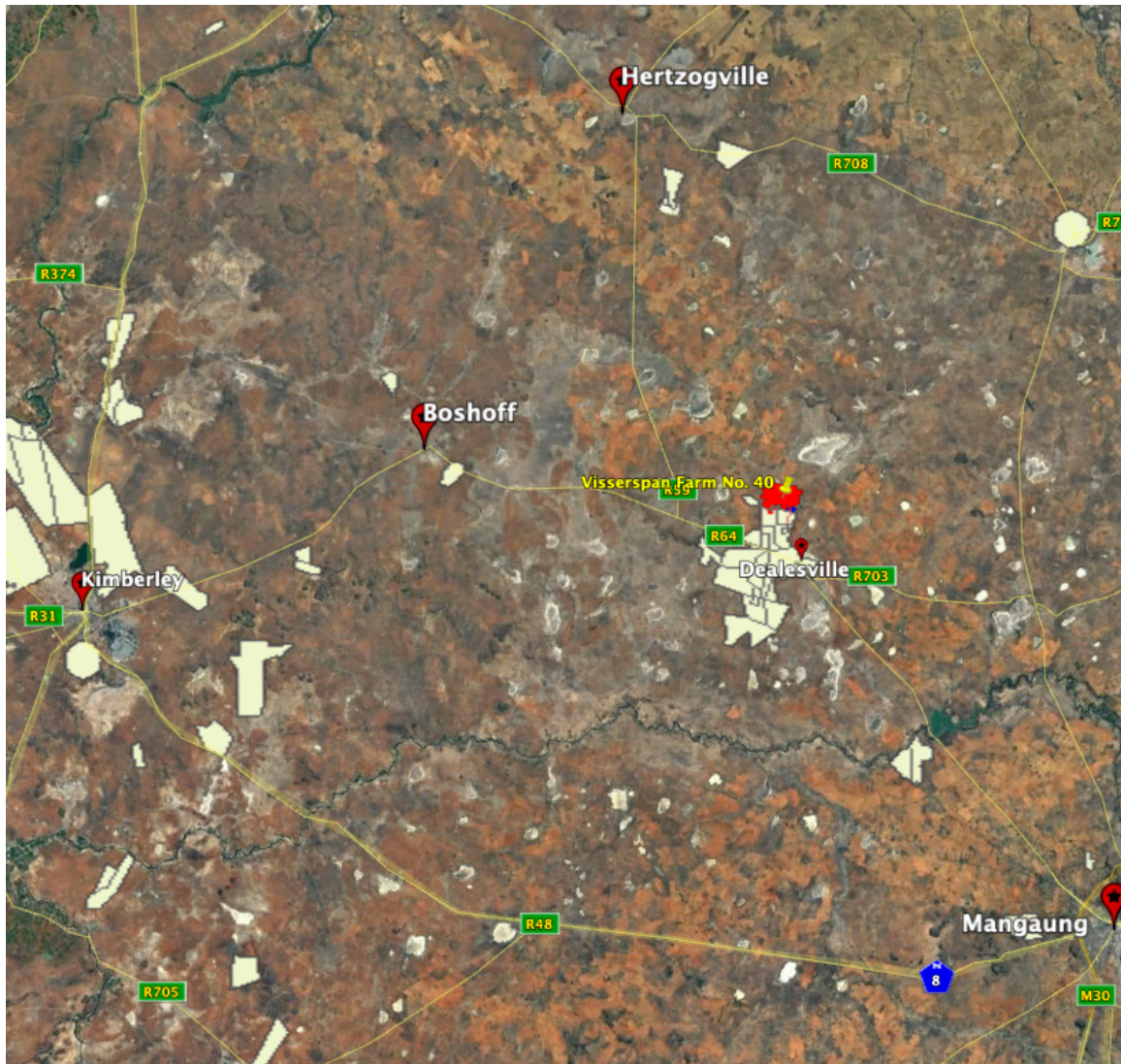


Figure 3-3: Approved and applied-for solar PV projects in the Kimberley REDZ area (shown as cream blocks)
 [Source: CSIR REDZ website <https://redzs.csir.co.za>, as at 15/12/2019]

3.2.2 Dealesville

Dealesville is a small town 8 km south of Visserspan, 69 m west of Mangaung and 55 km east of Boshof on the R64. The town consists of two townships, namely Dealesville and Tshwaraganang, separated by vacant land. The surroundings comprise irrigation and stock farms and a large saltpan immediately east of the town. The main economic activities are farming, community services and small salt works (Ingle, 2007). The municipality owns relatively large portions of commonage (200 ha) land used for agricultural purposes, but available for future expansion. The town was originally an agricultural supply depot and BKB is still one of its main businesses; the town functions now as a service center for local residents, providing only the most essential services. In 2002 there were 31 businesses in the town, 3 'industries', 3 schools and 2 clinics (Ingle 2007). The physical state of the town suggests decline: poorly maintained and boarded-up buildings are common along the main streets, and Tshwaraganang township is full of people all day long: the employment rate is high (40% or more).

There is a water problem in the town due to damage to a bulk water pipeline that Tokology LM has not had repaired.

Its population in 2002 was almost 1,200 persons but it has shown a declining trend over the past 15 years.

Tokologo LM maintains a small office in Dealesville that is staffed from Boshof and that is only for payment of municipal bills.

As at 2007, three land reform projects had been settled around Dealesville (Ingle, 2007), of which a property adjacent to Visserspan was one: Wesselsbron Trust (see 3.3 for details) on the farm Rooirand.

3.3 Immediate surroundings

Figure 3-4 shows the location of the neighbouring farms by name, while Table 3-3 presents details of ownership and principal land use. *[The elements relevant to the particular project being discussed are highlighted in colour in the table.]*

Key elements to note are that:

- Project 3 occupies the wide north-central portion of the farm, with its east and west boundaries being the district roads, and Project 4 east and south of it; hence only its northern boundary abuts another property, namely Wesselbron Trust land (a land claim settlement with no residents on it)
- *Mainstream*, immediately south of Visserspan is the site of an approved solar PV project; while it was given environmental approval seven years ago, it has not yet developed due to delays in the IPP bid rounds, the next of which is expected to take place in May 2020;
- All the farms in this area are cattle grazing farms, with the exception of *Melsetters* where some pivot irrigation (watered from boreholes) is still practiced;
- Good potential arable land is located west and east of the Visserspan area but is not adjacent to it (this has relevance to potential effects of dust and effects on prices of high-value farmland).

3.3.1 Attitudes to the project

As indicated in the table above, the majority of neighbouring landowners and residents have (as in November 2019) a positive attitude to the proposed Visserspan developments. However, a large number of farmers (31) in the broader Dealesville farming community, including two immediate neighbours, have signed a letter protesting the potential transformation of the area by solar PV projects, and objecting in particular to the Visserspan proposals. The letter of objection has been submitted to EnviroAfrica as part of the statutory, pre-application stakeholder engagement process that kicked off during November 2019.

3.4 Sensitivity of the site in relation to the proposed activity

The primary sensitivities appear to be:

- Preservation of the integrity of existing social structures and sense of place:

Existing social structures provide a socio-economic safety net for vulnerable community members, while also serving to maintain social cohesion through the practice and implementation of local cultural norms, beliefs and values. Farming communities are inherently conservative and usually exhibit fairly strong social cohesion, even if they simultaneously are highly stratified/ hierarchical with profound distinctions between wealthy owners and much poor employees.

The letter of objection to the Visserspan developments referred to above reflects this tradition, rooted as it is in an objection to transformation of the lifestyles and character of the area.

- Preservation and growth of physical and economic wellbeing:

The asset classes, or capital, available to community members in the Tokologo Local Municipality (NLM) (e.g. productive farms, infrastructure, and bulk services) must be protected, while asset classes currently in short supply need to be developed (e.g. income for the poor, improved education, and improved health). Such protection and development is vital in controlling and ultimately alleviating poverty and vulnerability. Moreover, jeopardizing physical and economic

safety will serve to undermine existing social structures. The agricultural potential of Visserspan farm is, however, low.¹⁰

- The wellbeing of the poor and vulnerable people groups:

Unemployment runs high in the District and in the Tokologo local municipality, with women being particularly badly affected. Dealesville mirrors this broader reality.

Both District and Local Municipality administrations have a constitutional mandate to care for their poor and vulnerable citizens. Moreover, any development which fails to consider and/or attempt to improve the plight of the poor and vulnerable runs the risk of exacerbating local poverty and/or local animosity towards said development.

¹⁰ Van der Waals JH (2020) Draft BA Report: Soil, Land Use and Agricultural Potential Survey Proposed Visserspan Solar Facility Project No. 1, on Visserspan Farm No. 40, Tokologo Local Municipality, Free State Province. Report prepared by Terrasoil Science for EnviroAfrica, Helderberg, 10 January 2020.

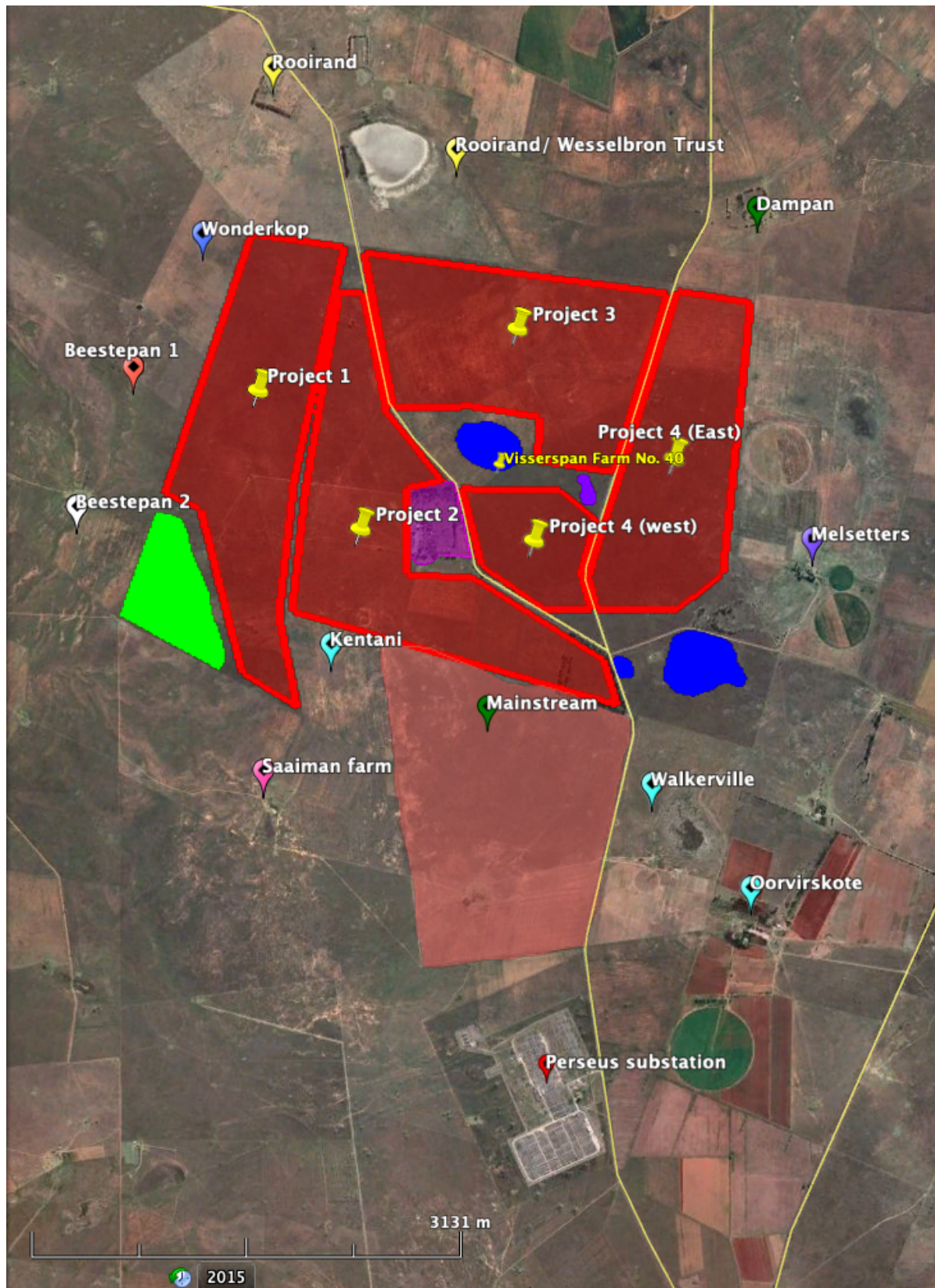


Figure 3-4: Proposed project site and neighbouring farms

Table 3-3: Details of immediate neighbours to proposed project site Visserspan farm

Farm Name	Position	Owner	Residential status	Land use	Remarks
Visserspan	-	Chrisalta Trust	Foreman Paul lives with mother in farmhouse;	Cattle	Dries Nel, farm manager, says farming activities will not be

		(CD Bredenkamp)	Farm Manager Dries Nel lives in Dealesville	ranching	affected due to availability of additional grazing land on farm Dampan. Positive in terms of job creation and economic injection into Dealesville.
Dampan	NE Adj Project 4 East	Chrisalta Trust (CD Bredenkamp)	No residents.	Cattle ranching	Bredenkamp lives in Bultfontein. Signed lease for the solar project, <i>Ergo</i> , in favour.
Rooirand	N; NW Adj Project 1, 3	Wesselbron Trust	Caretaker Jan lives in NW corner of Rooirand (portion west of district road)	Grazing	Community Trust with about 20 owners, of which one, Mr Andries, lives in Dealesville; remainder live around Welkom
Wonderkop	W Adj Project 1	Van Zyl	None	Grazing	
Beestepan 1	W Adj Project 1	Wonderkop Trust (Pierre Greyling)	None	Cattle ranching	Also owns farm Perseus S of Visserspan
Beestepan 2	W Adj Project 1	3 Star Trust (Stanley Robertson)	None	Cattle ranching	
Unnamed small strip of land bordering Visserspan	W Adj Project 1	Leon Badenhorst	Lives on Kalkpit, a Greyling farm some distance W of Visserspan		Badenhorsts are positive (not directly impacted), citing job creation and economic benefits to Dealesville
Saaiman	S Adj Project 1,	K Saaiman	unknown	Cattle ranching	<i>Signed letter protesting solar PV projects</i>
Kentani	S Adj Project 2	Christiaan van der Watt		Grazing; a bit of cropping	Walkerville, Kentani and Oorvirkote owned by C van der Watt
Mainstream	S Adj Project 2	Unknown	None	Leased for grazing	Approved solar PV project , will be submitted in next IPP bidding round
Walkerville	SE Adj no-go area	Christiaan van der Watt	Resident on Oorvirkote		Oorvirkote is not adjacent to and is SE of Visserspan. Van der Watts very in favour of project; already dealt with Maintstream and wondering why taken so long.
Melsetters	E Adj Project 4 East	C (Tokman) Carstens	Resident		<i>Signed letter protesting solar PV projects</i>



Figure 3-5: Dealesville scenes: (L) derelict museum; (C) Tokologo LM office; (R) typical town church



Figure 3-6: Dealesville (L) Township; (R) BKB agricultural goods dealer, a fixture of any Free State farming town



Figure 3-7: (L) Visserspan farmhouse from south-east; (R) outbuildings (over 100 years old)



Figure 3-8: Visserspan neighbours: (L) Rooirand abandoned farmhouse; (R) Dampan (NE of Visserspan)

4 Impact Assessment

4.1 Identification of impacts

Potential impacts are identified by the specialist from other reports on the same type of subject, energy sector guidelines and general experience. This 'technical' identification is supplemented by inputs from the stakeholder engagement/ public participation process. The preoccupations of stakeholders who registered with the public participation process, as revealed through emailed submissions to EnviroAfrica, are focused on the following:

- Availability of and eligibility for jobs
- Availability of linked economic opportunities (may be termed 'new business sales, multiplier effects and economic stimulation')
- Loss of farming land
- Loss of farming community way of life
- Loss of value of remaining/ surrounding farms
- Cumulative impacts of solar PV projects

All the solar PV EIAs examined focus on the same set of potential impacts as laid out above (albeit perhaps differently phrased), and a few additional ones:

- Noise, dust, visual intrusion and other nuisance effects resulting in reduction in environmental quality
- Disruption of local social structures as a result of the construction work force and in-migration of job seekers for the 9-month construction period
- Health, safety and security of local residents (which includes issues connected to 'social disruption')
- Visual and land use patterns alteration impact and change in sense of space and other spatial considerations (closely linked to the 'loss of farming community way of life' listed above)

The CSIR, in a strategic assessment of the potential socio-economic impacts of shale gas field development in the Karoo¹¹, emphasized the interrelated complexity of social and economic factors and impacts, and cautioned that outcomes could vary tremendously across space and time ie it is difficult to draw definitive conclusions for any particular project (Atkinson *et al*, 2016). Impacts must be considered in relation to the project phase/s in which they may occur, that is, planning, construction, operation and decommissioning. In this case, the planning phase involves no intrusive field work and minimal field presence, hence from a socio-economic perspective it has minimal impacts, therefore will be disregarded in this report. Decommissioning also is not really planned for in such projects, the likelihood being of their being refurbished and their lifespan extended beyond the initially planned 25 years, hence the impacts of decommissioning will be considered only at a conceptual level. Detailed decommissioning planning will be done much later towards the end of the operating life of the project. *This report will thus focus on the construction and operations phases of the project.*

The impacts are discussed in the tables below per development phase for 'all 4 projects' where (1) the impact will occur for each project and the significance of the impact for each of the four projects will, due to the information available and in the judgement of this author, not be substantively different; and/ or (2) where the impact will occur for each project and there is insufficient information for making a distinction between the projects.

¹¹ Atkinson, D., Schenk, R., Matebesi, Z., Badenhorst, K., Umejesi, I. and Pretorius, L. (2016) Impacts on Social Fabric. In Scholes, R., Lochner, P., Schreiner, G., Snyman-Van der Walt, L. and de Jager, M. (eds.). 2016. Shale Gas Development in the Central Karoo: A Scientific Assessment of the Opportunities and Risks. CSIR/IU/021MH/EXP/2016/003/A, ISBN 978-0-7988- 5631-7, Pretoria: CSIR. Available at <http://seasgd.csir.co.za/scientific-assessment-chapters/>

4.2 Constraints and limitations

The following constraints and limitations apply:

The assessment of social impact significance is primarily qualitative: although quantitative information may be utilized, significance is so closely tied to social values – of which there may be competing sets – that the assessment must necessarily be fundamentally qualitative. The assessment is nonetheless based on a consideration of the likely magnitude of impacts combined with expert judgement, unless otherwise specified.

The assessment only considers the impacts of the proposed project and the no-go option and does not make comparisons with other solar energy projects except insofar as cumulative impacts of the four projects plus others approved in the vicinity is considered.

The nature of the renewables bidding process – and the timing of the next round of bidding – is such that it is not possible to specify, for the purposes of cumulative impact assessment, exactly which of the Visserspan projects and of other approved projects in the Dealesville will finally be developed, and in what sequence they will be developed. The timing of implementation can also not be clarified. Hence much of the discussion in cumulative impacts is speculative.

4.3 Impact significance methodology

To substantiate assessment findings and allow for comparison, identified environmental issues or impacts were rated in accordance with the criteria listed in the *Guideline Document on EIA Regulations*, Department of Environmental Affairs and Tourism (DEAT, 1998). Each impact is described in terms of the source and receptor of the impact, the nature or character of the impact and the phase of the project in which it is likely to occur. Impact significance is then rated by means of applying numerical values to five criteria that further detail the nature of the impact, and the probability of occurrence. It is important to bear in mind that this is a *subjective* rating scale, that is, that the numbers assigned have no *mathematical* validity.

Significance of impacts for each project phase, with and without mitigation, is assessed, based on the applicability of mitigation measures and the likelihood of their succeeding to 'make a difference'.

Table 4-1: Significance Rating Matrix

RATING SCALE					
CRITERIA	1	2	3	4	5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low	Low	Medium	High	Very high
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probably	Definite
ENVIRONMENTAL SIGNIFICANCE = (MAGNITUDE + EXTENT + REVERSIBILITY + DURATION) x PROBABILITY					
TOTAL SCORE	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
SIGNIFICANCE RATING	Very low	Low	Medium	High	Very High

4.4 Impact assessment

The impact assessment of each 'preferred' project is presented in Table 4-2 below. Each impact is given a unique reference number, so that its mitigation (where applied) can be tracked and audited once the project/s is/ are implemented. The details of the scores assigned for significance rating are included in the table in **Appendix 1**.

Note that impact ratings shown in shades of GREEN are positive impacts, which do not generally fit very easily into the significance rating matrix and are rated qualitatively.

4.5 No-Go Option assessment

Should none of the Visserspan projects proceed, there will be no impacts to consider, and both the life styles and present sense of place will continue, uninterrupted:

- Grazing will continue to be the land use on the Visserspan farm;
- The two residents on the farm will continue as before;
- No new jobs will be created and Dealesville will continue in its economically depressed state;
- Visserspan will not contribute to the development of a renewable energy generation industry in the area, so that the objections of 31 farmers to the proposals will be rendered void;
- The farm Melsetter will experience no particular impacts;
- There will be no increased danger to motorists, due to glare off the panels, on the district roads passing through Visserspan;
- Visserspan will not contribute to increased competition for water in the area;
- There will be no visual impacts on neighbouring residents (farmers and farm labour).

Table 4-2: Socio-economic impact assessment

Impact No.	Impact description	Mitigation measures	Significance: No Mitigation	Significance with Mitigation
CONSTRUCTION PHASE: ALL 4 PROJECTS				
C-G-1	<p>Job creation: The construction phase of each project will generate about 60 jobs over 9 months. Although this is a relatively small number of jobs, it is a greater number of jobs than have been created in Dealesville for some time and any job creation is significant in relation to local levels of unemployment. Over 60% of the construction phase benefit/ value is likely to accrue to previously disadvantaged individuals (PDLs) and between 40% and 60% of employees will be sourced locally.</p> <p>Local people are desperate for employment opportunities, as indicated by the several CVs already submitted via EnviroAfrica in response to the stakeholder engagement process. However,</p>	<ul style="list-style-type: none"> Reserve all unskilled jobs for local community members. Implement a training programme to upskill local and regional candidates for longer-term employment in the operation of the solar PV array. 	Medium	Medium
C-G-2	<p>Linked economic opportunities: new business sales, multiplier effects and economic stimulation/ development of locally-owned support industries to respond to construction-related activities</p> <p>It is anticipated that the solar PV developments will generate opportunities for local business development and contracting in Dealesville. In reality, this is a locally unfamiliar technology requiring (1) mostly sophisticated, hi tech materials and manufacturing so that all but the base components will be imported (2) highly precise, skilled technicians to assemble and install the panels and associated infrastructure. Few materials and construction skills that are applicable are likely to be available in the immediate area, and most of the skilled labour and material inputs will come from elsewhere.</p> <p>Accommodation and restaurant establishments in the town will benefit directly: the professional and skilled workforce is likely to be billeted in Dealesville, and the increase in patronage of these establishments is likely to require hiring additional staff, additional purchases of goods in the town, etc. Dealesville is close enough to the proposed site that entire workforce could be bussed there daily, and if most of the unskilled workforce is recruited from Dealesville, there will be no need to have a site accommodation camp, so that all the benefits of accommodating a construction workforce will accrue to Dealesville. Moreover, the construction workforce will have disposable income some of which will be spent in the town. All this will increase the amount of money circulating in the local economy.</p> <p>Some nearby and adjacent farmers are keen for solar development in the area since they see it as an important economic injection into the area and perceive opportunities for themselves to benefit through contracting or land sales. Others, mostly further afield but two adjacent farmers, perceive only the potential negative impacts of disruption to farming practices eg more dust, and loss of value of adjoining farms.</p>	<ul style="list-style-type: none"> Develop procurement procedures that have an area of focus on enhancing local procurement, such as via: <ul style="list-style-type: none"> Making basic civil engineering – land clearance, road construction, earthworks – contracts available to local contractors Develop training programs for local construction workers (the sequential development of the four projects will create a time span suitable for doing so) in precision construction techniques. Do not develop a construction camp on site, but accommodate all the construction workforce in Dealesville and farm accommodation, and bus workers to site. This will increase the spend of wages in the town and will have other social benefits (see C-G-4 impacts mitigation) 	Medium	Medium

Impact No.	Impact description	Mitigation measures	Significance: No Mitigation	Significance with Mitigation
C-G-3	Opportunity cost of loss of farming land Visserpan farm is currently used for veld-grazed cattle ranching in combination with contiguous farm Dampan. According to the farm manager the development of the solar PV projects will have minimal effect on their ranching operations due to the availability of additional capacity on Dampan and nearby farms. The loss of 200 ha per project of farming land will thus have little impact, and the opportunity cost is low due to its limited land capability.	No mitigation required.	Very low	Very low
C-G-4	Health, safety and security			
C-G-4.1	<ul style="list-style-type: none"> <i>Noise, dust and other nuisances due to construction</i> There will be increased traffic on the 8-km road from Dealesville to Visserspan. A low impact on Tshwaraganang township is anticipated, due to the tar road past the township and set-back of the township from the road; there are very few residents on farms along the 8 km stretch of road, and no dwellings closer than 0,5 km to the road, so dust and road noise effects will be minimal; there are no residents in immediate vicinity of Visserspan (the closest resident at Rooirand (N of Visserspan Project 1) and the Carstens family at Melsetters farm € are at least 1 km away from the nearest Visserspan boundary. Moreover, dust storms at certain times of the year are common in this region, largely due to agricultural practices. 	<ul style="list-style-type: none"> No technical mitigation measures should be necessary to address social impacts during the construction phase A complaints register/ grievance mechanism should be maintained at the Contractor's site office, such that the date, nature of complaint and target date for dealing with it are recorded. Inform all neighbours and local landowners of the existence of a complaints register/ grievance mechanism, and disseminate information about grievance procedures and contact details for the responsible Project personnel. This register must be made available to the public liaison committee (proposed under C-G4.2) for regular inspection. 	Medium	Very Low
C-G-4.2	<ul style="list-style-type: none"> <i>Social disruption due to influx of workers from other places</i> This issue is raised in every social impact assessment, but, to the best of this author's knowledge, very little post-facto research in South Africa has been conducted, if any, to establish whether this actually occurs and, if it does, whether it is of significant dimensions. The CSIR (Atkinson <i>et al</i>, 2016) noted that the "social disruption thesis became accepted as 'conventional wisdom', but "an increasing body of work has emerged that has challenged the findings reported", and that communities may become more resilient and adaptable over time". In this case, the small construction workforce for each project is not regarded as sufficient to generate significant social disruption, especially if unskilled and semi-skilled jobs are reserved for local and Tokologo LM residents, and if the benefits of having increased employment accrue to Dealesville by integrating the construction workforce into the life of the town. On the other hand, the District IDP and the Municipal Demarcation Board's assessment of Tokologo municipal capacity (MDB, 2018) indicate the the TLM has limited capacity to deal with service provision challenges, let alone wider social change processes. The CSIR notes, however, that "proactive company initiatives may well strengthen local social institutions" (Atkinson <i>et al</i>, 2016). It is also widely assumed that in these circumstances an increase in the HIV/AIDS 	<ul style="list-style-type: none"> Reserve unskilled and semi-skilled construction jobs for local and Tokologo Local Municipality residents; If any 'outside' construction workers have to be brought in, give them housing subsidies for renting accommodation in Dealesville, and bus them to site every day Draw up a <i>code of conduct</i> for project workers that governs how they conduct themselves both on-site and off-site at after-hours times, and that prohibits gender violence. In the site's induction material, include a section on HIV/AIDS, information on how to deal with the risks, on sexual etiquette and gender violence while in the area Work with the Tokologo LM to ensure local clinics can cope with the limited influx of construction workers, and has HIV/AIDS awareness programmes in place and free condoms to dispense. Work with ward councillors to develop relationships with grassroots women's organizations and conduct awareness-raising sessions with them to warn of the potential social risks, and means to combat them 	Low	Very Low

Impact No.	Impact description	Mitigation measures	Significance: No Mitigation	Significance with Mitigation
	infection rate will result from increased disposable income being used to engage the services of sex workers. HIV-AIDS prevalence in South Africa has stabilized at levels that continue to merit vigilance and the rigorous application of HIV/AIDS awareness campaigns, testing procedures and ARV administration where necessary.	<ul style="list-style-type: none"> A complaints register/ grievance mechanism should be maintained at the Contractor's site office, such that the date, nature of complaint and target date for dealing with it are recorded. This register must be made available to the public liaison committee (proposed under C-G4.1) for regular inspection. Community complaints may also be channelled through the Committee, and resolution of complaints verified. 		
C-G-4.3	<ul style="list-style-type: none"> <i>Pressure on social services and bulk infrastructure</i> due to influx of workers and job-seekers <p>The number of workers likely to come from elsewhere and the short period of the construction phase of each project is unlikely to result in undue pressure on services and bulk infrastructure. Even with respect to water – Dealesville has had an ongoing problem with bulk supplies –there should be no significant addition to the problem, and the development may in fact motivate the TLM to have the pipeline repaired.</p>	<ul style="list-style-type: none"> The project proponent will be responsible for ensuring that all workers have adequate water supplies for their personal needs, be they resident in Dealesville or elsewhere The project proponent will work with Tokologo LM to resolve any service issues should they become apparent during each project's construction phase 	Low	Very Low
C-G-4.4	<ul style="list-style-type: none"> <i>Damage to farm property/ loss of livestock</i> due to negligent and/or criminal behaviour by members of the construction work force. 	<ul style="list-style-type: none"> Accommodating the construction workforce in Dealesville will almost eliminate predation pressure on neighbouring lands All temporary and permanent workers must as a part of their contract sign a <i>Code of Conduct</i> that will forbid trespassing on private land, removal of any goods from private property, poaching, collecting firewood and killing any animals in the vicinity of the project, in addition to the measures against socially disruptive behaviour described above. 	Low	Low/ Very Low
C-G-4.5	<ul style="list-style-type: none"> <i>Increased risky social behaviour</i> (eg sex work, alcohol-fueled violence and drug abuse) which is associated with increased levels of disposable income within a cash-poor, high unemployment area <p>The same remarks as for C-G4.2 apply.</p>	<ul style="list-style-type: none"> All temporary and permanent workers must as a part of their contract sign a <i>Code of Conduct</i> that will give clear guidelines on socially acceptable behaviour, in addition to the measures against socially disruptive behaviour described above. 	Low	Very Low
CONSTRUCTION PHASE: PROJECT 3				
	<p>Project 3 is bounded on two sides by district roads, while to the north it abuts Wesselbron Trust land with no residents on it. The present residents of the Visserspan farmhouse will remain on the farm and the current foreman will continue in his job, hence they will not suffer any losses due to the project. Project 3 is thus not expected to have any significant, unique socio-economic impacts.</p> <p>Cumulative impacts linked to its development are discussed below under Cumulative Impacts.</p>			

OPERATIONS PHASE: ALL 4 PROJECTS				
O-G-1	<p>Job creation: The operations phase of each project will generate no more than 20 jobs (including panel cleaning). Although this is a small number of jobs, any job creation is significant in relation to local levels of unemployment and income, and will mean more money circulating in the local economy.</p> <p>While many of these jobs will require skills that are not presently available locally (this is relatively new technology in South Africa generally and in this region in particular), the opportunity will be there for capacity building and skills improvement in this area.</p>	<ul style="list-style-type: none"> A skills development programme must be developed to optimize the opportunities for local residents to get jobs in the PV projects. Other measures pertaining to recruitment procedures will also apply here 	Medium	Medium
O-G-2	<p>Loss of value of remaining/ surrounding farms</p> <p>A letter of petition against the proposed Visserspan developments by 31 local farmers asserts that surrounding property values will fall due to the solar development, and that property prices of properties affected by the Perseus substation, including those with powerlines routed across them, were negatively influenced.</p> <p>A search of farming properties for sale in the Dealesville area, compared with farm prices in the vicinity of other rural towns (Boshof, Hertzogville, Bultfontein) in the District¹², revealed that farm prices are highly variable across the District (R5,6000/ha – R38,000/ha), the variability apparently closely linked to the proportion of arable land on the property, the existence of water rights (borehole or surface), and the degree of development of infrastructure on the property. Prices around Hertzogville and Bultfontein – in the maize belt proper – are considerably higher than Dealesville values generally. A 2015 article in Farmers Weekly¹³ that reviewed farmland price trends in the Free State and North-west provinces noted that land prices had steadily increased over 50 years in spite of prolonged droughts, etc. The article stated that average grazing land value in the Free State had moved from R800/ha in 2001 to R5,000 in 2013, while an arable value of R6000/ha had increased to R37,500 – R50,000/ha in 2013. The current farm prices in Dealesville and other western Free State municipalities remain entirely consistent with that analysis, that is, the information sourced does not support the contention that land values have dropped. However, this may also be an artefact of the fact that very few solar arrays have actually been developed in the Free State.</p> <p>Listed on the same website under the area 'Dealesville' is a farm with 100 ha developed as a solar PV array – the 17-year remaining solar contract only is on sale for R64 million (amounting to R31000/ha although the land is not included); the farmland is available separately for sale at R37,013/ha. This is the only information involving a solar array that was found for South Africa as a whole, and googling 'the effects of solar PV on land prices' yielded no relevant results.</p> <p>Given the dearth of solar PV projects yet actually developed in the region, it cannot be asserted</p>	<ul style="list-style-type: none"> Do not develop all the projects, or do not develop them in short succession Substantially reduce the area of Visserspan to be developed as solar PV arrays, leaving a substantial buffer around all borders of the farm Leave a large buffer around all borders of the farm Screen the developments from neighbours by planting thick, tall <i>spekboom</i> barrier hedges. These would have the added benefit of sequestering carbon, thus adding to the project's benefits. Monitor the potential effects on surrounding property values with the assistance of an independent valuer. If it is independently confirmed that value reductions have taken place and they cannot be mitigated, then this information can be used as a basis for negotiation and/or mediation between the applicant and neighbouring land owners focused on compensation 	Medium	Unrated, no mitigation possible

¹² <https://www.privateproperty.co.za/for-sale/free-state/southern-free-state/dealesville/dealesville/T2363030>, on 11 December 2019

¹³ Coleman A (2015) Buying agricultural land – know your market. Article in Farmers Weekly 07 October 2015

	with any confidence what the effects on surrounding property prices will be.			
O-G-3	Loss of farming community way of life Each Visserspan project, each occupying some 200 ha of land, will within and of itself have minimal effect on the farming way of life of the general area, given that no residents will be displaced by any of the four projects, and only grazing land will be lost. However, this impact will develop in time as more projects come on stream, it will not happen instantaneously, hence it is included under the <i>cumulative</i> impacts of the <i>operational phase</i> of the solar PV project.	As above	Medium	Low
O-G-4	Social disruption due to influx of workers from other places The very small operating workforce required for each project (and the degree of overlap, that is, sharing of operating functions between the four projects that will result in a reduction in the total number of workers is not known) is not regarded as sufficient to generate significant social disruption, especially if some functions are outsourced to local businesses eg. panel cleaning services. It is widely assumed that in these circumstances an increase in the HIV/AIDS infection rate will result from increased disposable income being used to engage the services of sex workers. HIV-AIDS prevalence in South Africa has stabilized and there is no particular evidence to support this contention, given the low numbers of construction workers involved and the opportunities to secure jobs for local residents.	<ul style="list-style-type: none"> If any 'outside' construction workers have to be brought in, give them housing subsidies for renting accommodation in Dealesville, and bus them to site every day Draw up a code of conduct for project workers that governs how they conduct themselves both on-site and off-site at after-hours times. Reserve unskilled and semi-skilled construction jobs for local and Tokologo Local Municipality residents; Set up a recruitment office in Dealesville, invite all interested parties to pre-register in a system that captures their skill sets and establishes their eligibility for employment, then rotate piecemeal jobs between all suitable, registered candidates. A Dealesville/ Tokologo public liaison committee (with the participation of the Local Municipality, the Dealesville Chamber of Commerce and other prominent local citizens) that periodically reviews project employment records to verify that fair, equitable practices are being followed, will provide a necessary 'audit' function to circumvent problems of corruption that may arise. It will also ensure the transparency that the developer will need to demonstrate good intentions and practice. The Committee will also be the body through whom community complaints are channelled and resolution thereof verified. 	Low	Low
OPERATIONS PHASE: PROJECT 3				
O-P3-1	Health, safety and security			
O-P3-1.1	<ul style="list-style-type: none"> <i>Increased safety risk of driving on Dealesville – Hertzogville district road</i> : Project 3 will share boundaries with both branches of the district road passing through Visserspan, but due to the north-facing orientation of the panels, it is only on the NW-SE/ West branch that Project 3 may result in there being glare off the panels that may disturb and disrupt the vision of drivers travelling southwards on this road. The visual impact assessment however evaluates the significance of this potential 	<ul style="list-style-type: none"> Increase the set-back from the road boundaries and plant a <i>spekboom</i> hedge along them, to visually shield the site. This will also reduce the risk of fires spreading from the road verges into the solar field, and <i>vice versa</i>. 	Medium	Low

	impact to be Moderate/ Medium to Low ¹⁴ .			
DECOMMISSIONING PHASE: ALL PROJECTS				
D-G-1	Loss of local employment and income as a result of the project being decommissioned	<ul style="list-style-type: none"> In consultation with all stakeholders including local government, at least five years before decommissioning, develop a closure plan that addresses job losses and local economic losses Develop a detailed site rehabilitation plan as part of the closure plan, making provision for local contracting in the execution of this plan. 	Medium	Medium
D-G-2	Land available for development by new occupiers/ owners Each solar array field of approximately 200 ha will become available for new land uses	<ul style="list-style-type: none"> Enforce high rehabilitation standards so that the land that is made available to new occupiers/ owners is in a good state when handed over. 	Medium	Medium
CUMULATIVE IMPACTS				
Cu-1	Job creation Socio-economic benefit to the local community as a consequence of the combined temporary employment opportunities created by multiple renewable energy projects,	<ul style="list-style-type: none"> Develop training programs for local construction workers (the sequential development of the four projects will create a time span suitable for doing so) in precision construction techniques 	Medium	Medium
Cu-2	New business sales, multiplier effects and economic stimulation In addition to the creation of 20 permanent jobs per project, the development of locally-owned support industry will over the longer term be mildly stimulated by the creation of about 3 indirect opportunities per project, that is, 12 opportunities overall due to Visserspan alone. How many opportunities will arise due to the implementation of other PV projects in the Dealesville area cannot be projected due to the high degree of uncertainty concerning the number of projects that will eventually be developed. The constraints on local economic benefits due to skills issues have been highlighted. These opportunities may therefore include accommodation for permanent employees, and some of the more basic maintenance functions, including panel cleaning: the latter will create opportunities particularly for the employment of women, a vulnerable social group. However, due to the low level of requirement overall, the consequent economic development is not expected to be sufficient to transform Dealesville's economy, and the significance will be at best moderate.	<ul style="list-style-type: none"> Develop procurement procedures such that tenders for basic civil engineering works and maintenance (eg panel cleaning) are available to local contractors, and they are made aware of them 	Medium	Medium
Cu-3	Influx of workforce and consequent socially disruptive changes The cumulative impacts of the larger construction workforces as solar PV projects are developed may be expected to disturb the local social fabric with consequent socially disruptive effects. However, the four Visserspan projects will be developed in sequence, so Visserspan will only ever be responsible for a maximum of perhaps 60 persons to the local population, and this only very temporarily – 9 months. This will not accumulate to a long-term socially disruptive phenomenon unless other solar projects develop simultaneously in the vicinity of Dealesville.	<ul style="list-style-type: none"> Draw up a code of conduct for operations phase workers that governs how they conduct themselves both on-site and off-site at after-hours times. The Dealesville/ Tokologo public liaison committee set up during construction will continue operating, meeting periodically to review project employment and operating records to verify that fair, equitable practices are being followed. This will provide a 	Medium	Medium

¹⁴ Lategan S C (2020) Visserspan PV Facility Project 1, Farm 40, Dealesville, Free State: Visual Assessment for consideration in the Basic Assessment. Report prepared for EnviroAfrica, Helderberg, 10 February 2020

	Moderate social changes and social disruption might then ensue, but will be partially reversed when construction ends, due to the smaller workforce required for operations.	necessary 'audit' function to ensure the transparency that the developer will need to demonstrate good intentions and practice. • The Committee will also be the body through whom community complaints are channelled and resolution thereof verified.		
Cu-4	National energy security and reduction of carbon footprint The IRP and independent power producers' renewables programmes are designed to improve the country's energy security and, importantly, to reduce the per capita carbon footprint, as part of the country's international obligations in terms of climate change agreements. These impacts become positively significant as solar projects accumulate and will accrue at a national scale. Local communities gain no specific linked benefit.	There is no further enhancement for this benefit.	Medium	Unrated, no mitigation/enhancement possible
Cu-5	Opportunity cost of loss of farming land and veld Visserpan farm is currently used for veld-grazed cattle ranching. While the loss of 200 ha per project of low-capability land will thus have little impact, the opportunity cost of loss of farming land will increase as the number of solar PV projects developed in the Dealesville area grows. In combination with changes in land values and the displacement of farmers due to the changes in land use, the likelihood is that this area will become overall less suited to agricultural land uses, and the economic habits in the area will change. Dealesville may lose its status as an agricultural supply and service centre as businesses find it increasingly difficult to sustain their turnover, and close their local branches. This will further drive farm arrays will almost certainly have a negative effect on tourism to hunting farms, the majority of which are a bit further west towards Boshof on the R64. Wildlife and hunter tourists come to Africa to see wilderness/ wild places, they will not want to see large swathes of land covered in industrial scale hardware	There is no mitigation for this impact.	Medium	Unrated, no mitigation/enhancement possible
Cu-6	Cumulative impact: loss of farming community way of life The impact of the Visserpan projects on the way of life of the rural community will obviously increase as each additional project is developed, until the entire approximately 1000 ha Visserpan farm is developed. To this must be added an unknown number of other previously approved solar PV projects in the Dealesville area that may be implemented. While no farm residents will be directly affected ie no farmers will be displaced, and only cattle grazing veld will be sacrificed, visually, the sense of place – the nature of the rural landscape - will change and will change substantially if all 4 Visserpan projects as well as the others already approved in the Dealesville area (Figure 3-3.) are implemented. Already a number of farming landowners are no longer resident on their farms; instead they live in nearby towns (Dealesville, Bultfontein, Hertzogville). Farming activities will be progressively displaced as more solar projects are implemented, and there can be little doubt that it will change the nature of the landscape and of the local towns, particularly Dealesville. Community perceptions of the area will change in consequence. A number of farmers are likely to attempt to sell and move elsewhere, this in an area where successive generations are still continuing to farm, even when the owner/ farmer does not live on the farm full-time. The displacement of farming families will change the nature	National and provincial government need, with the assistance and collaboration of solar array developers, to support local government in drawing up and implementing social change strategies, to guide these major changes in local economies such that their potentially positive outcomes are optimized, and their negative impacts are minimized. Farming in the region should not be neglected, but its development enhanced alongside renewable energy development. Synergies between the two need to be sought and enhanced.	High	Unrated, no mitigation/enhancement possible

	of these small towns as well, as they move elsewhere to find new opportunities.			
Cu-7	Cumulative disruption of social structures and population changes may be a consequence of the trends described above, not of construction workforces as such. The operational workforces will be very small, so they will not themselves constitute a significant force acting on social structures. However, land use changes that may cause displacement of farm-owning families and their employees will serve to change existing social capital. This trend will add to the regional loss of population, since the numbers of persons employed in solar arrays is less than the numbers employed by agriculture.	As above.	High	Medium
Cu-8	Competition for water Solar panels have to be cleaned with water due to the delicate nature of the panel surface film (dry-cleaning is not advised). While the amount of water required for this 4-monthly exercise is not known, it can be projected that over 1000 ha of solar panels will use a significant quantity of water that will, in this area, be supplied by boreholes. All the farms in this area rely on water supply from boreholes. The Visserspan arrays could cause a depression in the water table as water is abstracted, resulting in increased competition for groundwater through this area.	Water supply to the Visserspan projects is to be designed to be sustainable, that is, not to have a noticeable impact on the sub-regional water table.	Medium	Medium
Cu-D-9	Decommissioning: Loss of local employment and income as a result of the project being decommissioned The individual project losses will accumulate into significant numbers of people around Dealesville losing their employment and livelihood. They will however by then have acquired skills that will position them well for employment in other renewable energy projects in the country, though this may well require displacement from the area.	The project proponent, local government, labour representatives and local communities will, at least five years before decommissioning, establish a closure committee that will develop a strategy to minimize job losses and economic impacts, seeking alternative economic sectors for development in the Dealesville area.	Medium	Medium
Cu-D-10	Decommissioning: Land available for development by new occupiers/ owners Eventually about 1000 ha of solar array field will again become available for new land uses. The land will have been levelled to various extents, therefore it may be suitable for cultivation, or for unknown land uses. This will present an opportunity for creative economic development thinking in the area.	Enforce high rehabilitation standards so that the land that is made available to new occupiers/ owners is in a good state when handed over.	Medium	Medium

5 Socio-economic impact mitigation and management

- The mitigation and management measures laid out in the impact assessment can be summarized as follows:
- Maximise positive impacts through tendering, procurement and employment policies;
- Set targets for use of local labour
- Implement a training programme to upskill local and regional candidates for longer-term employment in the operation of the solar PV arrays;
- Use local sub-contractors where possible;
- Establish a community liaison committee for the project that will have an auditing function on socio-economic issues, hence also enhancing transparency in the operations;
- Implement an HIV/AIDS awareness programme for all construction and operations phase workers from the outset of the project;
- Integrate the construction workforce into the Dealesville community by lodging the outsiders in the town and surrounding farm houses;
- All employees are to sign a Code of Conduct that lays out fireable offences such as gender violence, trespassing and poaching on neighbouring lands;
- Implement measures to assist and, if needed, fairly compensate potentially affected surrounding landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced;
- Draw up a fire management plan prior to construction in agreement with neighbouring land owners;
- Maintain close liaison with local municipal and other stakeholders involved in socio-economic development to enhance capacity to deliver services and economic development programmes
- Monitor the potential effects on surrounding property values with the assistance of an independent valuer. If it is independently confirmed that value reductions have taken place and they cannot be mitigated, then this information can be used as a basis for negotiation and/or mediation between the applicant and neighbouring land owners focused on compensation.
- At least five years before decommissioning, the project proponent will, with local government, labour representatives and local community representatives, establish a closure committee that will develop a strategy to minimize job losses and economic impacts, seeking alternative economic sectors for development in the Dealesville area.

6 Concluding Statement

This author has no strong opinion, from a socio-economic point of view, as to whether the Visserspan solar PV projects should be permitted, either singly or together.

The following factors in favour of a positive decision on Project 3 are observed:

- The proposals are aligned with the State's energy security, energy generation and carbon footprint policies and plans;
- The proposed projects are aligned with spatial plans for the sub-region in which they are proposed
- The nation will benefit from enhanced energy security and reduced carbon footprint
- The land to be developed is relatively low capacity, low value grazing land, will have no significant effect on present grazing activities linked to the property
- The development of Project 3 will in itself have no discernible effect on broader farming life styles in the area, especially since there are no residents living adjacent to Project 3.
- The significantly poor portion of the Dealesville community and residents will benefit from job opportunities offered by one or more of the projects, even though the number of jobs on offer will be limited
- Developmental opportunities will be afforded to the Tokologo Local Municipality, particularly Dealesville itself, by means of the increased circulation of money, generated by each project and collectively by the four solar PV projects, in the local economy.

The following factors supporting a negative decision are observed:

- Other economic opportunities for local communities will be limited because this is new, sophisticated technology of which economically active residents in the area have little experience. Economic displacement may thus be equally likely as economic benefit.
- The cumulative effect of a large number of solar PV array developments in the Dealesville area will negatively affect the landscape quality, 'sense of place' of the sub-region and tourism activities in some parts.
- The Dealesville community's interests are not uniform nor unified: there is a significant body of farmers who are opposed to solar PV development in the area on the basis of its potential to reduce property values, reduce the land area available for productive farming, and disrupt the farming lifestyles that have prevailed here for generations. But there is another group of farmers who are in favour of the development because it will bring new business opportunities.

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APPENDIX 1: IMPACT SIGNIFICANCE RATING TABLE

IMPACT ASSESSMENT VISSERSPAN SOLAR PV: PROJECT 3								
CONSTRUCTION PHASE		Magnitude	Extent	Duration	Reversibility	SUM	Probability	Significance
COMMON TO ALL PROJECTS								
C-G-1	Job creation	3	2	2	1	8	5	40
	With mitigation	3	2	2	1	8	5	40
C-G-2	Economic opportunities	3	2	2	1	8	4	32
	With mitigation	3	2	2	1	8	4	32
C-G-3	Opportunity cost of loss of farming land	1	1	4	1	7	2	14
	No mitigation possible					0		0
C-G-4.1	Noise, dust and other nuisances	3	2	2	1	8	4	32
	With mitigation	2	2	2	1	7	2	14
C-G-4.2	Social disruption due to influx of workers	2	2	2	1	7	3	21
	With mitigation	1	2	2	1	6	2	12
C-G-4.3	Pressure on social services and bulk infrastructure due to influx of workers	2	2	2	1	7	3	21
	With mitigation	1	2	2	1	6	2	12
C-G-4.4	Damage to farm property/ loss of livestock	3	2	2	3	10	3	30
	With mitigation	1	2	2	3	8	2	16
C-G-4.5	Increased risky social behaviour	2	2	2	1	7	3	21
	With mitigation	1	2	2	1	6	2	12
PROJECT 3: NO UNIQUE IMPACTS ANTICIPATED						0		0
OPERATIONS PHASE: COMMON TO ALL PROJECTS								
O-G-1	Job creation	2	2	4	1	9	5	45
	With mitigation	2	2	4	1	9	5	45

O-G-2	Loss of value of remaining/ surrounding farms	3	3	5	5	16	2	32
	No mitigation possible					0		0
O-G-3	Loss of farming community way of life	2	2	5	5	14	3	42
	With mitigation	1	2	5	5	13	3	39
O-G-4	Social disruption due to influx	2	2	4	3	11	2	22
	With mitigation	1	2	4	3	10	2	20
PROJECT 3								
O-P3-1.1	Increased safety risk of driving on both branches of Dealesville-Hertzogville district road	3	2	4	1	10	4	40
	With mitigation	2	2	4	1	9	3	27
DECOMMISSIONING PHASE: COMMON TO ALL PROJECTS								
D-G-1	Loss of local employment and income	3	2	5	5	15	4	60
	With mitigation	2	2	5	5	14	4	56
D-G-2	Land available for development by new occupiers/ owners	2	1	5	1	9	5	45
	No mitigation possible	2	1	5	3	11	4	44
CUMULATIVE IMPACTS								
Cu-1	Job creation	3	2	4	3	12	3	36
	With mitigation	4	2	4	3	13	3	39
Cu-2	New business sales, multiplier effects and economic stimulation	2	2	4	3	11	3	33
	With mitigation	3	2	4	3	12	3	36
Cu-3	Influx of workforce and consequent socially disruptive changes	3	2	4	3	12	3	36
	With mitigation	2	2	4	3	11	3	33
Cu-4	National energy security and reduction of carbon footprint	3	4	4	4	15	4	60
	No mitigation possible					0		0

Cu-5	Opportunity cost of loss of farming land and veld	3	2	5	3	13	4	52
	No mitigation possible					0		0
Cu-6	Cumulative impact: loss of farming community way of life	4	3	5	5	17	4	68
	Mitigation not possible					0		0
Cu-7	Cumulative disruption of social structures and population changes	3	3	5	5	16	4	64
	With mitigation	2	3	5	5	15	3	45
Cu-8	Competition for water	4	2	5	5	16	3	48
	With mitigation	3	2	5	5	15	3	45
Cu-D-9	Decommissioning: loss of employment and incomes	3	3	4	5	15	4	60
	With mitigation	2	3	4	5	14	4	56
Cu-D-10	Decommissioning: land available for development	3	2	4	5	14	4	56
	No mitigation necessary							0