

# 1 IMPACT ASSESSMENT

## 1.1 Hydrology

Table 1: Hydrological impact assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Net result of earthworks and construction</p> <p><b>Impacts:</b> Vadose zone soils and subsequent groundwater table:</p> <ul style="list-style-type: none"> <li>Poor quality seepage and runoff from construction vehicles parked on site.</li> <li>Poor quality or uncontrolled runoff from construction sites.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-16)</b></p>	<ul style="list-style-type: none"> <li>Ensure service vehicles are parked in designated areas, with drip trays placed under the vehicles. Vehicles are to be pre-inspected for leakages before entering the site.</li> <li>Keep the site clean of all general and domestic wastes.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Negligible (0) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-6)</b></p>
Construction	<p><b>Aspect:</b> Net result of earthworks and construction</p> <p><b>Impacts:</b> Disturbing vadose zone during soil excavations/construction activities.</p>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-35)</b></p>	<ul style="list-style-type: none"> <li>Only excavate areas that apply to the project area.</li> <li>Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils.</li> <li>Cover excavated soils with a temporary liner to prevent contamination.</li> <li>Retain as much indigenous vegetation as possible.</li> <li>Exposed soils are to be protected using a suitable covering or revegetating.</li> </ul>	<p><b>Duration:</b> Short-term (-3) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Negligible (0) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-8)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Earthworks</p> <p><b>Impacts:</b> Surface water contamination and sedimentation from the following activities:</p> <ul style="list-style-type: none"> <li>Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e., bad weather); and</li> <li>Alteration of natural drainage lines due to cable trenches, powerline and pylon construction and internal access road construction.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-35)</b></p>	<ul style="list-style-type: none"> <li>Install a temporary cut-off trench to contain poor-quality runoff (if observed).</li> <li>Cover soil stockpiles with a temporary liner to prevent contamination.</li> <li>Construct temporary silt traps at drainage points to allow sediment settlement from runoff.</li> <li>Return the drainage line to the previous geometry after construction and ensure sufficient measures are taken to divert water around the working area.</li> <li>Stormwater management interventions as specified in the EMPr must be implemented.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Negligible (0) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Low (-15)</b></p>
Construction	<p><b>Aspect:</b> Plant on-site during construction</p> <p><b>Impact:</b> Water quality impacts due to:</p> <ul style="list-style-type: none"> <li>Spillage of fuels and chemicals.</li> <li>Construction equipment and vehicles.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-10)</b></p>	<ul style="list-style-type: none"> <li>Clean up spillages immediately.</li> <li>Keep chemicals in bunded areas.</li> <li>Keep vehicles and equipment clean.</li> </ul>	<p><b>Duration:</b> Immediate (-1) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Negligible (0) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-4)</b></p>
Construction	<p><b>Aspect:</b> Site clearing and preparation</p> <p><b>Impact:</b> Increased runoff altering flow regimes of receiving watercourses due to vegetation removal; and compacting of soil.</p>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-35)</b></p>	<ul style="list-style-type: none"> <li>Vegetation clearing is to be limited to what is essential.</li> <li>Retain as much indigenous vegetation as possible.</li> <li>Compact the site footprint only and minimise the working area.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Negligible (0) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-6)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Operations	<p><b>Aspect:</b> Site activities</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>There is a potential for some erosion if there are storm events.</li> <li>Hydrocarbon/oil spillages onto soils have the potential to contaminate the soils.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-35)</b></p>	<ul style="list-style-type: none"> <li>Keep the site clean of all general and domestic wastes.</li> <li>All development footprint areas to remain as small as possible, and vegetation clearing to be limited to what is essential.</li> <li>Retain as much indigenous vegetation as possible/re-vegetate.</li> <li>Have fuel/oil spill clean-up kits on site.</li> <li>Exposed soils are to be protected using a suitable covering or sandbags or berms to control erosion.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-14)</b></p>
Operations	<p><b>Aspect:</b> Runoff</p> <p><b>Impact:</b> Increased runoff due to compacted surfaces from the proposed site onto the surrounding soils may cause higher velocities and frequency of occurrence and sediment transport to the nearby streams.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>	<p>Release structures for stormwater runoff from the site must dissipate energy and disperse flow to ensure minimal impact on the receiving environment.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Negligible (0) <b>Probability:</b> Improbable (-1)</p> <p><b>Significance: Low (-6)</b></p>
Operations	<p><b>Aspect:</b> The net result of earthworks and development</p> <p><b>Impact:</b> Potential sedimentation several months after the site has been constructed. It is anticipated that the sediment load will decrease with time to pre-construction levels.</p>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Medium (-35)</b></p>	<ul style="list-style-type: none"> <li>Release structures for stormwater runoff from the site should incorporate silt traps to allow for the settlement of sediments.</li> <li>Silt traps are to be regularly cleaned.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-12)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
	<p><b>Aspect:</b> Site operations</p> <p><b>Impact:</b> Water quality impacts due to chemical spills, vehicle pollutants, fuel and oil spillages and leaks.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Highly Probable (-4)  <b>Significance: Low (-28)</b></p>	<ul style="list-style-type: none"> <li>Implementation of a SWMP to keep clean water away from dirty areas.</li> <li>Demarcated dirty areas to be limited to roads, parking areas and chemical storage areas.</li> <li>Spills are to be cleaned up immediately.</li> <li>Vehicles and equipment are to be regularly maintained and cleaned.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)  <b>Significance: Low (-14)</b></p>
<i>Operations</i>	<p><b>Aspect:</b> Catchment modification</p> <p><b>Impact:</b> Erosion due to change in topography, land use and vegetation removal.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Highly Probable (-4)  <b>Significance: Moderate (-32)</b></p>	<ul style="list-style-type: none"> <li>Design the SWMP to ensure that the velocities of stormwater runoff flow are kept to a minimum.</li> <li>Design release structures to dissipate stream power.</li> <li>Include erosion protection measures such as rip rap in release structures.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)  <b>Significance: Low (-14)</b></p>
<b>Cumulative</b>	<p>The largest impact will be sedimentation of the river due to construction site runoff, slight increases in runoff may occur, but water will flow off of the panels and will either contribute to runoff or infiltrate into the soil. As noted in the operational section above increased sedimentation may still occur once construction activities have ceased but will alleviate as the operational activities continues. Considering the sub-catchment conceptual hydrological cycle and the activities associated with the site and surroundings, no impacts are expected in terms of the hydrological cycle.</p>			

## 1.2 Freshwater

Table 2: Freshwater impact assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
<i>Pre-construction</i>	<p><b>Aspect:</b> Potentially inappropriate planning of stormwater management for the project</p> <p><b>Impact:</b> Alteration of hydrology and geomorphology of receiving freshwater ecosystems and resulting degradation of freshwater habitat through poor stormwater design.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-48)</b></p>	<ul style="list-style-type: none"> <li>The SWMP compiled for the development must ensure that the stormwater drainage inputs to the freshwater ecosystems mimic the current baseline as far as possible (refer to 7.1.2).</li> <li>Stormwater features must be vegetated with indigenous obligate and facultative species suitable for seasonal saturation. This will assist with energy dissipation and prevent sedimentation and erosion as well as improve habitat provision.</li> <li>Rip rap must be placed on all outlet structures and indigenous vegetation established to bind the soil of the bed, to prevent erosion and assist with energy dissipation. This will also promote diffuse flow and decrease the velocity of water released downgradient towards the drainage lines. At no point must erosion or gully formation be allowed as this will have an impact on the water dispersal which could potentially reduce the extent and functionality of the riparian systems in the long-term;</li> <li>With regards to concrete works for the outlet structures (including concrete aprons, reno mattresses, gabions, headwalls, etc., as applicable), see control measures related to concrete works below. These must ideally be constructed during the drier winter months to reduce the potential for impacts on downgradient freshwater ecosystems.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Clearing of vegetation and terrain levelling (bulk earthworks) within the catchments of the drainage lines.</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Transformation of vegetation associated with freshwater ecosystems as well as associated habitat and ecosystem services as a result of indirect impacts;</li> <li>Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; and</li> <li>Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles;</li> <li>Earthworks and the associated disturbed soil could be potential sources of sediment, which may be transported in runoff into the downgradient freshwater ecosystem areas. This is particularly pertinent in this project areas as the soils are prone to erosion;</li> <li>Exposure of soil, leading to increased runoff, and erosion, and thus increased sedimentation of the freshwater ecosystems;</li> <li>Increased sedimentation of the freshwater ecosystems, leading to smothering of the vegetation and aquatic biota associated with the freshwater ecosystems; and</li> <li>Proliferation of alien and/or invasive vegetation as a result of disturbances.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4) <b>Significance:</b> Moderate (-40)</p>	<ul style="list-style-type: none"> <li>All construction and site clearing should ideally take place during the dry season to limit potential impacts to downgradient drainage lines as a result of construction activities.</li> <li>All development footprint areas to remain within the approved development area and vegetation clearing to be limited to approved footprints.</li> <li>Where clearing of vegetation at a large scale (i.e. in the solar panel array footprints) is to be undertaken, blocks of vegetation must be systematically cleared of vegetation to avoid the creation of large volumes of dust and to control stormwater runoff during construction.</li> <li>All vegetation removed as part of the site clearing activities (specifically where large areas need to be cleared) must be transported from the construction site (may not be stockpiled) and disposed of at a registered waste disposal facility.</li> <li>During and after clearing regular spraying of non-potable water or the use of chemical suppressants, that are approved for use near freshwater ecosystems must be implemented to reduce dust and to ensure no smothering of vegetation within the adjacent freshwater ecosystems occurs from excessive dust settling. It is recommended that a suitably qualified specialist be consulted for approval of the product and conditions for use.</li> <li>The freshwater ecosystems and their 20m development exclusion buffers must be strictly maintained as no-go areas. No construction vehicles, nor construction personnel or vehicles may traverse through these freshwater ecosystems.</li> <li>Existing roads must be utilised to gain access to sites.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Medium (-3) <b>Significance:</b> Low (-24)</p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
			<ul style="list-style-type: none"> <li>All vehicle re-fuelling is to take place in specifically designated re-fuelling areas that must be located outside of the GN4167 ZoR.</li> <li>No vegetation may be removed from the 20m development exclusion buffer surrounding the freshwater ecosystems where no infrastructure is planned, as this vegetation provides a natural buffer zone around the freshwater ecosystems which plays a role in dispersing surface runoff into the freshwater ecosystems, and thus prevents sedimentation and erosion thereof.</li> </ul>	
<b>Construction</b>	<p><b>Aspect:</b> Construction of surface infrastructure associated with the proposed development within the catchments of the drainage line reaches e.g. solar panel arrays and other associated infrastructure</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Earthworks and excavations could be potential sources of sediment, which may be transported as runoff into the downgradient freshwater ecosystem areas;</li> <li>Disturbances of soils leading to increased alien vegetation proliferation within the terrestrial buffer zone surrounding the freshwater ecosystems, with the potential to affect the freshwater habitat;</li> <li>Altered runoff patterns within the local catchment of the freshwater ecosystems, potentially leading to increased erosion and sedimentation of the receiving freshwater environment;</li> <li>Potential impacts on the water quality of surface water runoff (when present) which</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4) <b>Significance:</b> Moderate (-40)</p>	<ul style="list-style-type: none"> <li>Regular spraying of non-potable water or the use of approved chemical dust suppressants, that are approved must be implemented to reduce dust and to ensure no smothering of vegetation within the adjacent freshwater ecosystems occurs from excessive dust settling.</li> <li>During excavation activities, topsoil must be stockpiled separately from other material outside the delineated extent of the freshwater ecosystems and their associated 20m development exclusion buffer.</li> <li>Suitable drainage must be ensured within construction areas (including contractor laydown areas, material storage facilities, etc.) in order to ensure that water does not pond or drain in a concentrated manner into the downgradient freshwater ecosystems,</li> <li>Silt traps or placing hay bales downgradient of the construction footprint should be installed to ensure no sediment laden or concentrated runoff generates from the construction footprint;</li> <li>Fresh concrete and cement mortar must not be mixed near the freshwater ecosystems; and</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Medium (-3) <b>Significance:</b> Low (-24)</p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
	<p>may potentially enter the downgradient freshwater ecosystems and contamination of soils due to concrete casting; and</p> <ul style="list-style-type: none"> <li>Potential of backfill material entering the freshwater ecosystems, increasing the sediment loads therein.</li> </ul>		<ul style="list-style-type: none"> <li>All excavated areas must be backfilled to the natural ground level with excavated material where possible.</li> </ul>	
<b>Construction</b>	<p><b>Aspect:</b> Installation of the powerline towers (support structures) and stringing of the proposed powerline across the respective drainage lines.</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Disturbances of soil leading to potential impacts to the freshwater ecosystem vegetation, increased alien vegetation proliferation in the footprint areas, and in turn to altered freshwater ecosystem habitat;</li> <li>Mixing of concrete for tower supports which if transported by runoff or dumped into the drainage lines could be harmful to biota and freshwater habitat; and</li> <li>Altered runoff patterns, leading to increased erosion and sedimentation of the freshwater ecosystems.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4) <b>Significance:</b> Moderate (-36)</p>	<ul style="list-style-type: none"> <li>When the powerline is strung between the support structures, no vehicles may indiscriminately drive through the drainage lines.</li> <li>The construction footprint must be limited to the pit area. The area must be rehabilitated after the completion of the construction phase, including Alien Invasive Plant (AIP) control undertaken until basal vegetation cover is achieved.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2) <b>Significance:</b> Low (-14)</p>
<b>Construction</b>	<p><b>Aspect:</b> Development and construction of new roads within the immediate catchments of freshwater ecosystems, involving:</p> <ul style="list-style-type: none"> <li>Site preparation prior to construction activities including movement of construction equipment / vehicles within the freshwater ecosystems and removal of vegetation;</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4) <b>Significance:</b> Moderate (-40)</p>	<ul style="list-style-type: none"> <li>For the proposed internal access roads the construction footprint must be limited to a 10m wide construction Right of Way (ROW) that includes the road footprint.</li> <li>Any removed vegetation must be stockpiled outside of the delineated boundary of the drainage lines and their associated 20m buffer area.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2) <b>Significance:</b> Low (-14)</p>



Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
	<ul style="list-style-type: none"> <li>Ground-breaking, excavations and concrete works in the catchments of the drainage lines.</li> </ul> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Earthworks and exposure of soil could result in sedimentation of the freshwater ecosystems, which may be transported as runoff into the downgradient freshwater ecosystem areas and may smother vegetation associated with the freshwater ecosystem areas; and</li> <li>Proliferation of alien and/or invasive vegetation as a result of disturbances.</li> </ul>		<ul style="list-style-type: none"> <li>Reno-mattresses or riprap must be installed at the outlet side of any culvert structures to ensure energy dissipation and prevent concentrated runoff into the downgradient freshwater buffer area. The reno mattress/riprap must be installed flush with the culvert outlet.</li> <li>The disturbed part of the construction RoW outside of the road footprint must be revegetated with suitable indigenous vegetation to prevent the establishment of alien vegetation species and to prevent erosion from occurring.</li> </ul>	
<i>Operation</i>	<p><b>Aspect:</b> Operational presence of a solar PV development within the catchments of the respective drainage lines.</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Permanent alteration of patterns and timing of flows and recharge to the receiving drainage lines due to the levelling or parts of their catchments and the permanent removal of vegetation from the solar PV footprints that could alter the hydrological regimes of the drainage lines and cause degradation of riparian habitat;</li> <li>Altered runoff patterns in the catchment of the drainage lines that could lead to creation of erosion within the buffer areas and within the drainage lines themselves.</li> </ul>	<p><b>Duration:</b> Long-term (-4)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Moderate (-6)  <b>Probability:</b> Highly Probable (-4)  <b>Significance:</b> Moderate (-44)</p>	<ul style="list-style-type: none"> <li>The maintenance of a 20m development exclusion area (buffer) around all freshwater ecosystems is critical to buffering the drainage lines from the effects of the loss of vegetation cover and long term alteration of infiltration and resultant runoff capacity of parts of the catchments of the drainage lines within the solar array footprint.</li> <li>As detailed for pre-construction above, it is critical that an operational SWMP be developed and implemented;</li> </ul>	<p><b>Duration:</b> Long-term (-4)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Low (-4)  <b>Probability:</b> Moderate (-3)  <b>Significance:</b> Low (-27)</p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Operation	<p><b>Aspect:</b> Operational maintenance of the development (including washing of panels and the maintenance of the power line, especially in the vicinity of the drainage lines).</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Disturbance to soil and ongoing erosion as a result of periodic maintenance activities; and</li> <li>Altered water quality (if surface water is present).</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4) <b>Significance:</b> Moderate (-44)</p>	<ul style="list-style-type: none"> <li>Maintenance activities must be confined to the developed footprint of the solar energy facility which must be fenced off to prevent accidental access into the adjacent freshwater ecosystems (riparian zones).</li> <li>A formal waste management and disposal system must be implemented at the solar energy facility.</li> <li>No indiscriminate movement of construction equipment through the drainage lines must be permitted during standard operational activities or maintenance activities;</li> <li>Should erosion be noted in the footprint of the arrays that may potentially impact on a freshwater ecosystem, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation.</li> <li>The surface infrastructure areas must be inspected to ensure that no concentrated runoff from these areas form erosion gullies leading to erosion and sedimentation of the receiving freshwater ecosystems. Should these impacts be noted, these gullies/preferential flow paths must be infilled with in situ material and appropriately stabilised and/or revegetated.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Moderate (-3) <b>Significance:</b> Low (-27)</p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Operation	<p><b>Aspect:</b> Operational stormwater control management of stormwater attenuation facilities on the development sites.</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Potential pollutants and toxicants entering the downgradient drainage lines if attenuation facilities are not properly maintained;</li> <li>Potential changes to the water retention pattern, timing and flows within the downgradient drainage lines if attenuation facilities are not properly maintained and thereby become ineffective; and</li> <li>Potential exacerbation of existing erosion and development of new erosion, along with concomitant increased sedimentation within the downgradient drainage lines as a result of the increased stormwater discharge causing increased scour and velocity if the attenuation features are not maintained.</li> </ul>	<p><b>Duration:</b> Long-term (-4)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Moderate (-6)  <b>Probability:</b> Highly Probable (-4)  <b>Significance:</b> Moderate (-44)</p>	<ul style="list-style-type: none"> <li>Regular inspection of the stormwater outlet structures must be undertaken (specifically after large storm events) in order to monitor the occurrence of erosion. If erosion has occurred, it must immediately be rehabilitated through stabilisation of the embankments and revegetation.</li> <li>All channels and open swales must be regularly cleaned, and all outlet structures (if any) checked to ensure there is no debris/blockages.</li> </ul>	<p><b>Duration:</b> Long-term (-4)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Low (-4)  <b>Probability:</b> Low (-2)  <b>Significance:</b> Low (-18)</p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Operation	<p><b>Aspect:</b> Operation and maintenance of the proposed internal access roads located on the development sites in the catchments of the drainage lines (where applicable).</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Concentrated runoff from the road crossings leading to erosion and subsequent sedimentation of the freshwater ecosystems (increase in the sediment load) and turbulent flows when surface water is present.</li> <li>Litter and spills (e.g. oils, hydrocarbons) could be washed off the road surface by stormwater and could pollute downgradient areas, including the downgradient drainage lines.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Medium (-3) <b>Significance:</b> Low (-27)</p>	<ul style="list-style-type: none"> <li>Unnecessary disturbances on the margins of the newly developed roads must be avoided.</li> <li>Stormwater runoff from the roads must be monitored, to ensure it does not result in erosion of the freshwater ecosystems.</li> <li>During periodic maintenance activities of the roads, monitoring for erosion must be undertaken.</li> <li>Should erosion be observed, caused by the road crossings/instream infrastructure, the area must be rehabilitated.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2) <b>Significance:</b> Low (-14)</p>

<b>Decommissioning</b>	<p><b>Aspect:</b> Removal of all surface infrastructure from the project area.</p> <p><b>Impact:</b> Disturbance of soil and vegetation that established within the decommissioning area.</p>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4) <b>Significance:</b> Moderate (-36)</p>	<ul style="list-style-type: none"> <li>▪ No indiscriminate movement of construction equipment in the freshwater ecosystems and buffer zones surrounding the freshwater ecosystems may be permitted. Use must be made of the existing roads during the decommissioning phase.</li> <li>▪ All surface infrastructure must be decommissioned. All materials must be removed from the freshwater ecosystems (where applicable) and may be stored/ stockpiled temporarily outside of the delineated extent of the freshwater ecosystems, whereafter it must be removed from site and disposed of at a registered disposal facility.</li> <li>▪ High flood peaks from the decommissioning footprint areas can be mitigated by ensuring that no concentrated runoff from the surface infrastructure area and subsequent cleared area enters the freshwater ecosystems. The velocity of surface water flow from these areas must be reduced by ensuring that the vegetation in the buffer area surrounding the freshwater ecosystems is intact or by the strategic placement of silt traps of hay bales as a means to obstruct flow but still allow flow to percolate at a reduced velocity and encourages a diffuse flow pattern. In this regard it is recommended an alien and invasive plant species management plan be implemented during the decommissioning phase to specifically prevent the spread of any such species into the sensitive ecological areas.</li> <li>▪ Areas where surface infrastructure have been decommissioned and removed must be suitably compacted/ripped and revegetated to ensure that no erosion occurs which may contribute to the sediment load of the freshwater ecosystems.</li> <li>▪ Should erosion gullies be noted, these areas must be rehabilitated by infilling them with</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2) <b>Significance:</b> Low (-14)</p>
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Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
			<p>suitable soil and ensuring the area is vegetated. The increased surface roughness will discourage concentrated flow paths to develop and ensure diffuse flow patterns.</p> <ul style="list-style-type: none"> <li>▪ Should road crossings be decommissioned, road footprint areas within a freshwater feature must be levelled to the same level and shape as that of the upstream and downstream reaches. This will ensure a continuous bed level and prevent any concentration of surface flow from occurring;</li> <li>▪ Channel banks associated with the freshwater ecosystems must be suitably rehabilitated (shaped end revegetated) to prevent any erosion from occurring.</li> <li>▪ All bare areas in the investigation area, specifically where vegetation was initially cleared for surface infrastructure components must be ripped and be revegetated within suitable indigenous vegetation species.</li> <li>▪ Follow up revegetation must take place where initial revegetation is not successful.</li> <li>▪ Post-closure monitoring of the freshwater ecosystems (for a period of 3 years), with specific mention of the invasion of alien vegetation species) is recommended to be undertaken.</li> </ul>	

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
<b>Cumulative</b>	<p>Freshwater ecosystems within the wider area of the wider Sekhukhuneland area and in the context of the Steelpoort-Dwars River platinum mining belt are under continued threat due a variety of factors primarily related to increasing mining activities which are responsible for transformation of large areas of land, including freshwater ecosystems. Other land uses which, in the long term, may prove to be unsustainable include communal ranging of livestock, as well as urban expansion typically result in transformative impacts on freshwater ecosystems. Development of renewable energy infrastructure, including solar energy facilities can also form part of the cumulative impact on freshwater ecosystems. Other factors such as existing linear infrastructure (roads and railways) as well as climate change also exert impacts on the freshwater ecosystems in the wider area.</p> <p>The development of the TFC Solar Phase 1 development has already been authorised, and although construction has not commenced, TFC Solar intends to develop both Phase 1 and Phase 2 in order to acquire 100MW of power. Assuming that the Phase 1 development sites are constructed, these will exert a further impact on the freshwater ecosystems within the study area, considering factors such as the change in vegetation cover, as well as potential risks to the sediment balance and pattern flow and timing of water in the landscape associated with the development and the formalisation of certain of the EDLs on the Phase 1 Site 5.</p> <p>Should the development of the TFC Solar Phase 2 Solar Development impact freshwater resources, this will result in a cumulative impact on the freshwater ecosystems in a wider area, especially at a quaternary catchment or smaller catchment area level. It is however notable that increased sediment inputs are at least partially offset by the reduction in sediment input created by the De Hoop Dam that is located along the Steelpoort River upstream of the development site. The implementation of mitigation measures to avoid impacts will negate the creation of a significant cumulative impact.</p>			

### 1.3 Biodiversity

Table 3: Botanical impact assessment (Site 2B)

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses of conservation important and protected species (individuals, stands, populations) as well as habitat that is associated with plants of conservation importance.</p>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> Very High (-10)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: High (-85)</b></p>	<ul style="list-style-type: none"> <li>Apply for and secure all relevant permits from DFFE and LEDET for protected plant species that occur on the site prior to any activity being undertaken. No protected plant species may be affected, removed, excavated, relocated, or impacted in any manner, except under a valid permit granted by the relevant authority and under the supervision of the appointed ECO.</li> <li>The ECO should delegate and oversee the final walkdown to identify and geolocate protected plant species for permitting purposes.</li> <li>Develop and execute a Search and Rescue operation for certain plants/trees as per recommendations from the Final Walkdown Report. These plants should be relocated to a secure, suitable, and appropriate location, taking care to duplicate existing habitat conditions as far as possible. It should be noted that the transportation and relocation process of protected plant species is also subject to permitting requirements; this process should be guided by the ECO and executed by a suitable ecological specialist.</li> </ul>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> High (-8)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>



Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses and deterioration, of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ restricted habitat types.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>	<ul style="list-style-type: none"> <li>All development areas must be demarcated, and no personnel or construction vehicle shall be allowed to access neighbouring properties for any purpose whatsoever.</li> <li>Under no circumstances shall any natural area on neighbouring properties (outside the development site footprints) be impacted, degraded, cleared, or affected in any manner.</li> <li>The use of locally indigenous plant species for landscaping purposes is strongly recommended. Under no circumstances shall exotic and invasive plants be used for landscaping purposes.</li> <li>Rehabilitation of areas where construction activities have been finalised, must be prioritised.</li> </ul>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-60)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Depletion of local diversity and loss of rare species or communities.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Develop and implement a biodiversity monitoring programme to establish long-term trends of floristic and faunal diversity patterns and the latent and immediate effects of the project on these receiving environments.</li> </ul>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-48)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Deterioration and changes to untransformed habitat in the surrounds, with specific reference to sensitive habitat types and habitat types of limited representation on a local scale.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>	<ul style="list-style-type: none"> <li>Develop and implement a biodiversity monitoring programme to establish long-term trends of floristic and faunal diversity patterns and the latent and immediate effects of the project on these receiving environments.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-52)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Disruption of important ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-52)</b></p>	<ul style="list-style-type: none"> <li>▪ Stormwater management must aim to ameliorate destructive erosion events that will result in further deterioration of the drainage channels.</li> <li>▪ Erosion control must be prioritized, notably during the planning phase where slopes, runoff from paved and tarmac areas and stormwater control measures need to be highlighted and planned to prevent erosion of surrounding natural areas.</li> <li>▪ Ensure the implementation of erosion control measures on the perimeter of the development, aimed at avoiding exacerbation of the existing erosion patterns.</li> <li>▪ No painting or marking of rocks or vegetation (trees) to identify locality or other information shall be allowed, as it will disfigure the natural setting. Marking shall be done by steel stakes with tags, if required. All temporary markings will be removed upon completion of the construction.</li> <li>▪ Collection of branches, wood (dead or alive), shrubs or any vegetation for fire making purposes is strictly prohibited.</li> <li>▪ Prevent all open fires on site.</li> <li>▪ The irresponsible use of welding equipment, oxy-acetylene torches, and other naked flames, which could result in veld fires, or constitute a hazard should be guided by safe practice guidelines.</li> <li>▪ The burning of general waste material is not to be allowed.</li> <li>▪ Provide demarcated fire-safe zones, facilities, and suitable fire control measures.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Low (-27)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Introduction of exotic and invasive species to the area, or exacerbating the spread of existing infestations.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>An AIP Management Programme should be developed and implemented with the onset of the construction phase. The aim of this programme should include <i>inter alia</i> the identification, control, and eradication of invasive plants from the site and immediate surrounds through a responsible, yet effective, management strategy that might involve a combination of physical removal methods and application of chemical treatments. The Environmental Officer shall compile relevant action plans to deal with the presence of alien and invasive species.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-8) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-28)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Exacerbated decline in the aesthetic appeal of the landscape.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-26)</b></p>	<ul style="list-style-type: none"> <li>Provide temporary and suitable on-site ablation, sanitation, litter and waste management and hazardous materials management facilities until such time that adequate permanent and operational facilities can be provided. Abluting anywhere other than in provided ablations shall not be permitted. Under no circumstances shall use of the veld for ablation purposes be permitted.</li> <li>A periodic (at least annual) clean-up of the surrounding natural environment should be undertaken to remove litter and prevent unwanted deterioration of the surrounding natural environment.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-16)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Inappropriate harvesting of natural resources and exacerbation of pressure on natural resources due to increased human encroachment, accessibility to the site, also considering changes in land use of surrounding areas that are not compatible to conservation efforts.</p>	<p><b>Duration:</b> Long-term (-4)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> High (-8)  <b>Probability:</b> Highly Probable (-4)  <b>Significance: Moderate (-56)</b></p>	<ul style="list-style-type: none"> <li>Under no circumstances shall any natural area on neighbouring properties (outside the development site footprints) be impacted, degraded, cleared, or affected in any manner.</li> <li>Cleared vegetation and debris that has not been utilised must be collected and disposed through an appropriate manner.</li> </ul>	<p><b>Duration:</b> Medium-term (-3)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Low (-4)  <b>Probability:</b> Low (-2)  <b>Significance: Low (-16)</b></p>

Table 4: Botanical impact assessment (Site 3B and 3C)

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses of conservation important and protected species (individuals, stands, populations) as well as habitat that is associated with plants of conservation importance.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-56)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses and deterioration, of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/restricted habitat types.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-60)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Depletion of local diversity and loss of rare species or communities.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-44)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Deterioration and changes to untransformed habitat in the surrounds, with specific reference to sensitive habitat types and habitat types of limited representation on a local scale.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-44)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Disruption of important ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-52)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Low (-27)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Introduction of exotic and invasive species to the area, or exacerbating the spread of existing infestations.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Moderate (-45)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Improbable (-1)</p> <p><b>Significance: Low (-11)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Exacerbated decline in the aesthetic appeal of the landscape.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Moderate (-39)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-16)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Inappropriate harvesting of natural resources and exacerbation of pressure on natural resources due to increased human encroachment, accessibility to the site, also considering changes in land use of surrounding areas that are not compatible to conservation efforts.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-56)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-16)</b></p>

Table 5: Botanical impact assessment (Site 4B)

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses of conservation important and protected species (individuals, stands, populations) as well as habitat that is associated with plants of conservation importance.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-56)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses and deterioration, of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/restricted habitat types.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-75)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-55)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Depletion of local diversity and loss of rare species or communities.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-44)</b></p>



Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Deterioration and changes to untransformed habitat in the surrounds, with specific reference to sensitive habitat types and habitat types of limited representation on a local scale.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Disruption of important ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-26)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-18)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Introduction of exotic and invasive species to the area, or exacerbating the spread of existing infestations.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Exacerbated decline in the aesthetic appeal of the landscape.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-28)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Inappropriate harvesting of natural resources and exacerbation of pressure on natural resources due to increased human encroachment, accessibility to the site, also considering changes in land use of surrounding areas that are not compatible to conservation efforts.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-56)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-16)</b></p>

Table 6: Botanical impact assessment (Site 5B)

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses of conservation important and protected species (individuals, stands, populations) as well as habitat that is associated with plants of conservation importance.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-40)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Losses and deterioration, of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/restricted habitat types.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Improbable (-1)</p> <p><b>Significance: Low (-9)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Depletion of local diversity and loss of rare species or communities.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site B</li> </ul>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Deterioration and changes to untransformed habitat in the surrounds, with specific reference to sensitive habitat types and habitat types of limited representation on a local scale.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Permanent (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Improbable (-1)</p> <p><b>Significance: Low (-8)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Disruption of important ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Improbable (-1)</p> <p><b>Significance: Low (-9)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Introduction of exotic and invasive species to the area, or exacerbating the spread of existing infestations.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-52)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-18)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Exacerbated decline in the aesthetic appeal of the landscape.</p>	<p><b>Duration:</b> Permanent (-5) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-22)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-14)</b></p>
Construction	<p><b>Aspect:</b> Construction activities and vegetation clearing</p> <p><b>Impact:</b> Inappropriate harvesting of natural resources and exacerbation of pressure on natural resources due to increased human encroachment, accessibility to the site, also considering changes in land use of surrounding areas that are not compatible to conservation efforts.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>	<ul style="list-style-type: none"> <li>Refer to mitigation measures proposed for Site 2B.</li> </ul>	<p><b>Duration:</b> Medium-term (-3) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Minor (-2) <b>Probability:</b> Improbable (-1)</p> <p><b>Significance: Low (-7)</b></p>

Table 7: Cumulative botanical impact (all sites)

### Cumulative

- Available information on existing and planned renewable energy projects within a 30 km radius, indicates that, apart from the authorised Phase 1 part of the Samancor PV Project, no other projects or activities are identified. The brief conclusion is therefore that the anticipated cumulative effects of this project on biodiversity attributes from a regional perspective are considered of low importance and significance. The proposed development will utilise, to a large extent, habitat that already exhibit moderate to high levels of deterioration and disturbance.
- Minor portions of highly sensitive habitat are proposed for development.
- The proposed sites do not comprise geographically isolated greenfield areas that are situated within larger expanses of natural and untransformed habitat; it therefore does not constitute a 'thin end of the wedge' in natural habitat/ areas.
- The proposed project sites are situated in proximity to a commercial and industrial centre (Steelpoort) that is characterised by significant levels of transformation, fragmentation, and deterioration. The activity is therefore considered consistent with current land uses within an area that is already (ecologically) compromised to an extent, although being cognisant of the presence of several sensitive and conservation important plants and animals that persist.
- In comparison with significant increases in industrial, and specifically mining related activities noted in the wider region, the contribution to habitat and species losses from this project are considered marginal. It is particularly evident, from a regional perspective, also with specific reference to mining activities immediately adjacent to Site 2B, that mining, probably, constitutes the most significant and devastating activity on natural and sensitive resources on a regional scale.

## 1.4 Avifauna

*Table 8: Avifaunal impacts*

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
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<b>Construction</b>	<p><b>Aspect:</b></p> <ul style="list-style-type: none"> <li>▪ Construction of the solar power facility (including all associated infrastructure) utilising the current layout.</li> <li>▪ Construction of the proposed power lines.</li> </ul> <p><b>Impact:</b> Direct transformative impact on natural habitat related to construction of solar panel arrays, cable trenching and internal access roads, as well as other construction-related activities including uncontrolled movement of vehicles and other construction machinery. The impact would relate to the loss of habitat for the current bird species inhabiting/visiting the development site and surrounding area, in particular in the context of priority species/SCC.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>▪ Clearing of vegetation to be completed in a phased manner.</li> <li>▪ No unauthorised fires are to be allowed on the site.</li> <li>▪ During the establishment (construction) of the power line servitudes in areas of residual natural vegetation, especially within riparian corridors, clearing of vegetation must be limited to what is technically required and woody vegetation within drainage lines that is below the minimum clearance distance to the lines must not be indiscriminately felled.</li> <li>▪ Construction activities must not encroach beyond the development footprint.</li> <li>▪ Construction staff must not enter any areas of residual woodland or other natural habitat outside of the development footprint.</li> <li>▪ In the context of construction phase environmental management, edge effect control must be implemented to ensure no further degradation and potential loss of avifaunal habitat outside of the proposed project footprint area. An ECO must monitor and mitigate any edge effects throughout the construction phase. Special attention must also be paid to potential increase and spread of AIPs.</li> <li>▪ No collection or hunting of any fauna species is to be allowed by personnel during the construction phase, especially with regards to avifaunal SCC (if encountered and not part of a rescue/relocation plan).</li> <li>▪ No commencement of construction (especially vegetation clearing and bulk earthworks) for the solar power site on Phase 1 Site 4 and Phase 2 Site 4C and its surrounds must occur within the designated 350m buffer around the Wahlberg's Eagle nest until such time as the Wahlberg's Eagles have left the area on their northward migration in April and before their arrival in August, as stipulated in the EA Amendment for the Phase 1 Solar Development.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-55)</b></p>
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Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
			<ul style="list-style-type: none"> <li>It is also important that vehicular access into the buffer area along the new access road to Site 4 continue to be restricted to authorised personnel (e.g. security) only and that no general construction personnel / construction vehicle access into the buffer area be permitted. Access to the parts of Site 4 and 4C outside of the buffer must be along the newly created access road, and no access routes must be created from the areas to the south and east of Site 4 / 4C.</li> </ul>	
Operation	<p><b>Aspect:</b> Operation of the solar power facility utilising the current layout.</p> <p><b>Impact:</b> Permanent transformative impact on natural vegetation that would lead to the relate to the loss of habitat for the current bird species inhabiting/visiting the development site and surrounding area.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-55)</b></p>	<ul style="list-style-type: none"> <li>Retention of residual natural vegetation on the parts of the Phase 2 (and Phase 1) development sites that do not fall within the solar array or other infrastructure footprint.</li> <li>Active protection of sensitive habitats through fencing off from public access – in the context of Phase 2 this would include the riparian zones of the drainage lines located between sites 3B/C and 4C and drainage lines located between the Site 2B development compartments and the fringing non-development buffer areas.</li> <li>It is recommended that low vegetation be retained or allowed to become re-established under the arrays to protect the underlying soil from erosion and to aid in the control of stormwater management to prevent edge effects on residual areas of avifaunal habitat adjacent to the development site boundaries from materialising.</li> <li>Powerline servitudes must not be cleared of all woody vegetation and only woody vegetation infringing on the required clearance area around the lines must be felled.</li> <li>Maintenance of the integrity of the 350m Wahlberg’s Eagle nest buffer throughout the lifespan of the proposed development and the restriction of access (other than security personnel access) into this buffer area.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-55)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
	<p><b>Aspect:</b> Development (operation) of the solar PV arrays utilising the current layout, as well as the development of powerlines.</p> <p><b>Impact:</b> Bird fatalities due to collisions with overhead power lines or with PV panels.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> High (-8) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Moderate (-42)</b></p>	<ul style="list-style-type: none"> <li>Monitoring of the solar arrays for bird fatalities must occur at regular intervals during the operational phase of the development, in line with the BLSA Birds and Solar Energy Guideline.</li> <li>Anti roosting spikes / diverters should be fitted to the solar panels, if required.</li> <li>Placing of bird flight diverters along the spans of the power line crossing the drainage lines or located within 100m each side of the drainage line riparian zones.</li> <li>Operational lighting at the solar facility must be limited to low level security lighting and no floodlighting must be utilised.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-24)</b></p>
<b>Cumulative</b>	<p>The development, in particular of solar arrays that will result in large-scale transformation of residual natural vegetation and habitats forms part of a wider trend of transformation of natural habitat in the wider area. The wider area is characterised by mining operations, human settlements and undeveloped land that is used for livestock grazing. The Phase 1 Tubatse Solar development has been authorised and as such transformation of large areas of residual woodland habitat has been permitted to occur in the near future. As such the Phase 2 development, in particular the transformation of untransformed woodland habitat associated with the Phase 2 solar arrays is considered a cumulative impact on avifauna in the wider area at a local level. Both development phases viewed together would also constitute a cumulative impact through which increasing loss of habitat and resultant loss on avian diversity and abundance is occurring in the area.</p> <p>In a cumulative impact context specific to solar power developments, the approval, or application for solar developments within a 30km radius of the development site. No approved or proposed solar developments are located within a 30km radius other than the associated Phase 1 development, thus the development will not be responsible for a cumulative impact in this context.</p>			

## 1.5 Heritage and Palaeontology

Table 9: Heritage and palaeontological assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Impact on burial grounds and graves.</li> </ul>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> High (-8)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-70)</b></p>	<ul style="list-style-type: none"> <li>Implement a chance to find procedures in case where possible heritage finds are uncovered.</li> <li>An appropriately qualified heritage practitioner/ archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.</li> <li>All burial grounds and graves should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines.</li> <li>TFC001, TFC004, TFC005, Site 2-1 and Site 2-2 to be avoided.</li> <li>If this is not possible, it is recommended that the structures at TFC001, TFC004, TFC005 and Site 2-2 be investigated through test excavation to determine if there are graves. If it is found to be graves these graves including the graves at Site 2-2 must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of Section 36 of the NHRA and its regulations as well as the National Health Act and its regulations.</li> </ul>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Minor (-2)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-40)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Impact on archaeological sites.</li> </ul>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Moderate (-6)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-60)</b></p>	<ul style="list-style-type: none"> <li>Site locality TFC002-1 – TFC002-8’s structures are of low significance, but to be avoided given the potential for infant burial and unmarked graves.</li> <li>It is recommended that the possibility of still born burials are investigated through a stakeholder engagement process. If it is found that there are still born burials present the remains must be relocated after completion of a detailed grave relocation process, that includes a thorough stakeholder engagement component, adhering to the requirements of Section 36 of the NHRA and its regulations as well as the National Health Act and its regulations.</li> <li>Monitoring during site clearing in a 20m radius from the identified archaeological sites TFC003 and Site 2-4 through the implementing of an archaeological watching brief.</li> <li><i>Refer to further mitigation for burial grounds and graves above.</i></li> </ul>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Minor (-2)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-40)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Impact on palaeontological resources.</li> </ul>	<p><b>Duration:</b> Permanent (-5)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Minor (-2)  <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-40)</b></p>	<ul style="list-style-type: none"> <li>The ECO for this project must be informed that the Magaliesberg Formation has a high palaeontological sensitivity.</li> <li>If palaeontological heritage is uncovered during surface clearing and excavations the Chance Find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/Project Manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out.</li> <li>Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Minor (-2)  <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-10)</b></p>

## 1.6 Visual

Table 10: Visual impact assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
<b>Construction</b>	<p><b>Aspect:</b> Construction of the solar power plant utilising the current layout – i.e. developing all five of the development sites.</p> <p><b>Impact:</b> Direct transformative impact on natural habitat related to construction of solar panel arrays, cable trenching and internal access roads, as well as other construction-related activities including uncontrolled movement of vehicles and other construction machinery. The impact would relate to the transformation of currently uncopied land parcels on which natural vegetation is present which could cause a visual impact.</p>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-50)</b></p>	<ul style="list-style-type: none"> <li>▪ Clearing of vegetation to be completed in a phased manner.</li> <li>▪ Construction activities must not encroach beyond the development footprint.</li> <li>▪ Dust suppression must be applied to areas of cleared vegetation in very windy conditions and especially along construction access routes.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Definite (-5)</p> <p><b>Significance: Moderate (-40)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
<i>Operation</i>	<p><b>Aspect:</b> Operation of the solar power plant utilising the current layout - i.e. developing all five of the development sites.</p> <p><b>Impact:</b> Permanent transformative impact on natural vegetation on the five development sites with the development of solar arrays and associated power lines, that would permanently alter parts of the landscape as viewed from surrounding receptor locations. This visual change could lead to perceptions of visual intrusion and impact.</p>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Low (-36)</b></p>	<ul style="list-style-type: none"> <li>▪ The existing altered visual baseline of the landscapes into which the developments would be located, and their location directly adjacent to existing areas of visual change due especially to urban or infrastructural development is a strong mitigating factor.</li> <li>▪ Retention of residual natural vegetation on the parts of the five development sites that do not fall within the solar array or other infrastructure footprint.</li> <li>▪ As the structures supporting the panels could create cumulative glint and glare if these are metallic and reflective, the consideration of non-reflective material for such supports is recommended.</li> <li>▪ For the proposed powerlines, it is recommended that the monopole power line tower be used (as opposed to the steel lattice tower) in order to reduce the visibility of power line towers.</li> </ul>	<p><b>Duration:</b> Long-term (-4) <b>Scale:</b> Local (-2) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-20)</b></p>
<i>Cumulative</i>	<p>According to the South African Renewable Energy EIA Application Database (REEA, 2023) this project is the only proposed renewable energy project within a 30 km radius, thus no other renewable project will form part of cumulative impacts on the receiving environment. Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. With the proposed solar development being the only one within a 30km radius and the nearest proposed facilities being 75 km to the west and 80 km to the east, the cumulative impact is considered sequential due to the facilities situated quite a distance from each other. Furthermore, with the moderately low viewer incidence, the cumulative visual impacted is expected to be of moderately low significance.</p>			



## 1.7 Social

Table 11: Social impact assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Danger to proximate residents (Mohlakwana, Matholeng, Stocking, Steelpoort Town) through increased road traffic, dust and potential noise.</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> High (-8)  <b>Probability:</b> Highly Probable (-4)  <b>Significance: Moderate (-48)</b></p>	<ul style="list-style-type: none"> <li>Road signage, maintaining speed limits, watering down of the road during dry periods and the acknowledgement of free roaming cattle must be addressed.</li> <li>A policy on Contractor Health and Safety for the duration of their work on site, must apply, and be monitored.</li> <li>In addition, a Contractor's Code of Conduct (especially in terms of respecting local by-laws and specific practical community concerns on which agreement may be reached), should be applied for the duration of the construction period.</li> <li>Regular information sharing discussions with the Contractors must be pursued, giving residents an opportunity to voice concerns and grievances throughout the duration of the project construction.</li> <li>In addition, it is vitally important that a formal grievance management system be put in place (and should remain throughout the life of the plant).</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> Low (-4)  <b>Probability:</b> Medium (-3)  <b>Significance: Low (-24)</b></p>

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction	<p><b>Aspect:</b> Construction activities</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Contractors, the influx of people and potential job creation will result in the proliferation of social ills and issues such as crime, prostitution, alcohol consumption, abuse, the spread of HIV/AIDs etc.</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> High (-8)  <b>Probability:</b> Highly Probable (-4)  <b>Significance: Moderate (-48)</b></p>	<ul style="list-style-type: none"> <li>The Developer needs to be actively involved in the prevention of social ills associated with Contractors.</li> <li>Communication with local communities is also an important tool that will assist in monitoring such a situation.</li> <li>Formal grievance system to be maintained throughout project.</li> <li>Due to the concentration of a workforce in the area over the construction period, the Contractor must implement an HIV/ AIDS Awareness Programme, annually on site.</li> <li>Strict penalties must be built into tenders to deal with issues such as petty crime, stock theft, fence cutting, trespassing etc.</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Local (-2)  <b>Magnitude:</b> Moderate (-6)  <b>Probability:</b> Low (-2)  <b>Significance: Low (-20)</b></p>
Construction	<p><b>Aspect:</b> Construction activities</p> <p><b>Impacts:</b> Local job creation opportunities</p>	<p><b>Duration:</b> Short-term (+2)  <b>Scale:</b> Local (+2)  <b>Magnitude:</b> High (+8)  <b>Probability:</b> Medium (+3)  <b>Significance: Moderate (+36)</b></p>	<ul style="list-style-type: none"> <li>All labour (skilled and unskilled) and Contractors must be sourced locally where possible.</li> <li>Job creation expectations will have to be well managed via management systems and communication mechanisms that regularly informs the local community (on site and at local community centres) of the progress and job/ skills needs at the development site.</li> <li>A formal job application process must be communicated (should this be a requirement). It is expected that the Contractor will have a Human Resource Procedure/ Policy in place in order to respond to Local labour legislation.</li> <li>A formal grievance system to be maintained throughout the project</li> <li>A Community Liaison Officer must be appointed to deal with the employment of local labour and to interface between the Contractor and the local community.</li> <li>The principles of equality, BEE, gender equality and non-discrimination must be implemented.</li> </ul>	<p><b>Duration:</b> Short-term (+2)  <b>Scale:</b> Local (+2)  <b>Magnitude:</b> High (+8)  <b>Probability:</b> High (+4)  <b>Significance: Moderate (+48)</b></p>

## 1.8 Dust and Emissions

Table 12: Dust and emission impact assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction and Decommission/ Closure & Rehab	<p><b>Aspect:</b> Construction activities (site clearing; excavations, drilling, operation of vehicles, equipment etc.)</p> <p><b>Impacts:</b></p> <ul style="list-style-type: none"> <li>Dust and emissions during construction.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Moderate (-6) <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Moderate (-36)</b></p>	<ul style="list-style-type: none"> <li>The retention of a natural buffer (with a minimum width of 15-20m) comprising of natural vegetation (i.e. the natural trees and shrubs that are present on the development sites) along the boundary of each site would assist with dust mitigation.</li> <li>Dust must be suppressed on construction site and during the transportation of material during dry periods by the regular application of water. Water used for this purpose to be used in quantities that will not result in run-off generation.</li> <li>Loads to be covered to avoid loss of material in transport, especially if material is transported off site.</li> <li>Speed limit of 40km/hr to be set for all vehicles travelling over exposed areas.</li> <li>During the transfer of materials, drop heights should be minimised to control the dispersion of mater being transferred.</li> <li>Equipment used by the Contractor must be maintained in good working order to prevent smoke emissions.</li> <li>Chemical toilets must be provided and cleaned on a regular (weekly) basis.</li> </ul>	<p><b>Duration:</b> Short-term (-2) <b>Scale:</b> Site (-1) <b>Magnitude:</b> Low (-4) <b>Probability:</b> Medium (-3)</p> <p><b>Significance: Low (-21)</b></p>

## 1.9 Waste

Table 13: Waste impact assessment

Phase	Aspect and Impact	Without Mitigation	Mitigation	With Mitigation
Construction and Decommission/ Closure & Rehab	<p><b>Aspect:</b> Construction activities</p> <p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble, existing redundant infrastructure and hazardous waste (used oil, cement and concrete etc.).</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Low (-4)  <b>Probability:</b> Highly Probable (-4)</p> <p><b>Significance: Low (-28)</b></p>	<ul style="list-style-type: none"> <li>Adequate rubbish bins and waste disposal facilities must be provided on site and at the construction camp.</li> <li>The construction site must be kept clean and tidy and free from rubbish.</li> <li>Recycling/re-use of waste must be encouraged.</li> <li>No solid waste must be burned on site.</li> <li>Bins must be provided to all areas that generate waste e.g. worker eating and resting areas and the camp site. General refuse and construction material refuse must not be mixed.</li> <li>Should rubble be required as a raw material for the construction, it must be taken to a designated stockpile area - which must be approved by the ECO.</li> <li>Spoil material must be hauled to a designated spoil site. No spoil material must be pushed down slope or discarded on site.</li> <li>The Municipality has one licensed landfill site situated at Apel. The site is a general waste facility, no hazardous waste is allowed, therefore all the waste generated during construction and operational phase must be disposed at the Malogeng Landfill site in Apel.</li> <li>The life span for the solar module is 30 years. As the panels are classified a hazardous waste, the disposal of the panels will be according to waste legislation and waste disposal followed by TFC to a licenced hazardous waste facility. The waste will not be disposed of into any landfills within the Sekhukhune District Municipality and no additional burden will be placed on these landfills.</li> </ul>	<p><b>Duration:</b> Short-term (-2)  <b>Scale:</b> Site (-1)  <b>Magnitude:</b> Low (-4)  <b>Probability:</b> Low (-2)</p> <p><b>Significance: Low (-14)</b></p>

