

APPENDIX: **H**



Impact Assessment

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EKO GROUP (PTY) LTD trading as Eko Environmental

Reg no. 2017/311178/07

VAT No. 4020225811

IMPACT ASSESSMENT:

CONSTRUCTION OF CHICKEN BROILER HOUSES ON
PORTION 78 OF FARM MEZEG 77, RAMOTSHERE
MOILOA LOCAL MUNICIPALITY, NORTH-WEST

August 2019

Applicant:

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1. Assessment methodology

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence x Overall Likelihood.

1.1 Determination of Consequence

Consequence analysis is a mixture of quantitative and qualitative information and the outcome can be positive or negative. Several factors can be used to determine consequence. For the purpose of determining the environmental significance in terms of consequence, the following factors were chosen: Severity/Intensity, Duration and Extent/Spatial Scale. Each factor is assigned a rating of 1 to 5, as described in the tables below.

Determination of Severity

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment (Table 1).

Table 1: Rating of severity

Type of criteria	Rating				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant / Harmful	Great / Very harmful	Disastrous / Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance / Easily reversible	Low cost to mitigate	Substantial cost to mitigate / Potential to mitigate impacts / Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate / Little or no mechanism to mitigate impact / Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g. remedial action takes place (Table 2).

Table 2: Rating of Duration

Rating	Description
1: Low	Almost never / almost impossible
2: Low-Medium	Very seldom / highly unlikely
3: Medium	Infrequent / unlikely / seldom
4: Medium-High	Often / regularly / likely / possible
5: High	Daily / highly likely / definitely

Determination of Extent/Spatial Scale

Extent refer to the spatial influence of an impact be local (extending only as far as the activity, or will be limited to the site and its immediate surroundings), regional (will have an impact on the region), national (will have an impact on a national scale) or international (impact across international borders) (Table 3).

Table 3: Rating of Extent / Spatial Scale

Rating	Description
1: Low	Immediate, fully contained area
2: Low-Medium	Surrounding area
3: Medium	Within Business Unit area of responsibility
4: Medium-High	Within Mining Boundary area
5: High	Regional, National, International

Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarised below, and then dividing the sum by 4 (Table 4).

Table 4: Example of calculating Overall Consequence

Consequence	Rating
Severity	Example 4
Duration	Example 2
Extent	Example 4
SUBTOTAL	Example 10
TOTAL CONSEQUENCE:(Subtotal divided by 4)	Example 3.3

Likelihood

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described and in Tables 5 and 6.

Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect or impact, is undertaken (Table 5).

Table 5: Rating of frequency

Rating	Description
1: Low	Once a year or once / more during operation / LOM
2: Low-Medium	Once / more in 6 Months
3: Medium	Once / more a Month
4: Medium-High	Once / more a Week
5: High	Daily

Determination of Probability

Probability refers to how often the activity/event or aspect has an impact on the environment (Table 6).

Table 6: Rating of probability

Rating	Description
1: Low	Almost never / almost impossible
2: Low-Medium	Very seldom / highly unlikely
3: Medium	Infrequent / unlikely / seldom
4: Medium-High	Often / regularly / likely / possible
5: High	Daily / highly likely / definitely

Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarised below, and then dividing the sum by 2 (Table 7).

Table 7: Example of calculating the overall likelihood

Consequence	Rating
Frequency	Example 4
Probability	Example 2
SUBTOTAL	Example 6
TOTAL LIKELIHOOD (Subtotal divided by 2)	Example 3

Determination of Overall Environmental Significance

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of LOW, LOW-MEDIUM, MEDIUM, MEDIUM, MEDIUM-HIGH or HIGH, as shown in the table below (Table 8).

Table 8: Determination of overall environmental significance

Significance or Risk	Low	Low-Moderate	Moderate	Moderate-High	High
Overall Consequence X Overall Likelihood	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritisations and decision making process associated with this event, aspect or impact (Table 9).

Table 9: Description of the environmental significance and the related action required.

Significance	Low	Low-Moderate	Moderate	Moderate-High	High
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to the company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Impact Assessment:

1. Geology and soil

The geology of the area consists of Pretoria shale, slate, hornfels and quartzite with diabase sills in certain areas (Mucina and Rutherford, 2006). The sediments are of the Pretoria Group which also may consist of carbonates, volcanic rocks, breccias and diamictites (Mucina and Rutherford, 2006).

Red-yellow apedal soils dominate the landscape and are freely draining soils (Mucina and Rutherford, 2006). They may have a high base status with some vertic or melanic clays (Mucina and Rutherford (2006). There are no known dunes and the soil is generally deep (> 300 mm) (Mucina and Rutherford, 2006). The soil is considered to be of intermediate suitability for arable agriculture in regions where the climate may permit agriculture (Mucina and Rutherford, 2006).

It is not expected that the proposed project will have an impact on the geology of the area as the only excavations will include foundations for the proposed chicken broiler houses. However, the following impacts may occur on soil as a result of the construction and operational phase of the activity:

- Loss of topsoil during construction,
- A change in soil characteristics as a result of the disturbance of the soil,
- Contamination of soil due to spillage, leakage of sewer pipes and pollution.

Alternatives	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Site Alternative								
Preferred Alternative (Mezeg 77)	4	5	3	4	4	4	4	16
MITIGATED	2	2	1	1.67	2	4	3	5
Alternative 2	No other site alternative considered							
Electrical facilities & services								
Preferred Alternative (Municipal Electricity, Preferred)	2	1	3	2	3	2	2.5	5
MITIGATED	1	1	1	1	1	5	3	3
Alternative 2 (Solar Power)	2	1	3	2	3	2	2.5	5
MITIGATED	1	1	1	1	1	5	3	3
Water supply								
Preferred Alternative (Groundwater supply).	3	3	2	2.7	3	5	4	10.7
MITIGATED	1	1	2	1.33	2	5	3.5	4.7

Alternative 2 (Municipal water).	3	3	2	2.7	3	5	4	10.7
MITIGATED	1	1	2	1.33	2	5	3.5	4.7

It was determined from the impact assessment that the impact without mitigation will be Moderate. There will be a definite loss in topsoil due to the construction of the chicken layer houses. If mitigation measures are implemented and topsoil is stored correctly and not used during construction the impact will be Low - Moderate.

The significance of the impact of the electrical alternatives has been evaluated as the same which is Low – Moderate. The use of groundwater will have a low significance as the applicant already makes use of groundwater and wishes to do the same for this proposed project. The significance of the electrical alternatives will be Low – Moderate before mitigation and Low with mitigation. The significance of the impacts for water supply will be Moderate before mitigation and Low after mitigation.

Proposed Mitigation:

- Topsoil will be removed before construction and stockpiled appropriately and in such a manner to prevent any loss thereof. Topsoil will not be used for any construction purposes and will be used at an alternative location where it can be utilised effectively.
- Topsoil will then be used during the rehabilitation and construction of a storm water system for the site.
- Gravel and dolerite to be used during construction will be acquired from a commercial source. In the event that the applicant will mine the material on site a mining permit will have to be obtained before mining.
- Construction equipment will be maintained and drip trays will be used to prevent spillages of petrochemical products which may cause contamination of soil. Any hazardous substances on the site will be stored in a bunded area which consists of an impermeable floor with walls which will have the capacity to contain 110% of the volume of the substance stored therein.

2. Climate

The study area falls within the summer rainfall region and the average annual rainfall is roughly 439mm per year. The average maximum day temperatures for the study area range from 19.4 °C in June to 30.8°C in January. The lowest temperatures occur during July when an average of 0.6°C is reached during the night (SA Explorer accessed 10/08/2019)..

It is not expected that the proposed construction of chicken broiler houses area will have any impact on the climate in the area.

3. Land use

The proposed site is currently vacant with no existing infrastructure. The proposed site has historically been used for grazing of livestock and for cultivation of crops and the current vegetation is degraded.

Potential impacts on the land use of the site:

- The land use and characteristics of the land will change from being an open space to an area containing buildings (i.e. the chicken broiler houses and associated infrastructure).

Alternatives	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Site Alternative								
Preferred Alternative (Mezeg 77)	3	5	2	3.3	3	5	4	10.7
MITIGATED	2	5	2	3	1	5	3	9
Alternative 2	No other site alternative considered							
Electrical facilities & services								
Preferred Alternative (Municipal Electricity, Preferred)	2	5	2	3	3	5	4	12
MITIGATED	2	2	1	1.7	2	5	3.5	5.8
Alternative 2 (Solar Power)	2	5	2	3	3	5	4	12
MITIGATED	2	2	1	1.7	2	5	3.5	5.8
Water supply								
Preferred Alternative (Groundwater supply).	2	5	2	3	3	5	4	12
MITIGATED	2	2	1	1.7	2	5	3.5	5.8
Alternative 2 (Municipal Water Supply).	2	5	2	3	3	5	4	12
MITIGATED	2	2	1	1.7	2	5	3.5	5.8

There will be a definite impact on the land use of the site as the land is going to be transformed. It is important to note however, that the proposed site was used for livestock or cultivation and that the indigenous vegetation has already been transformed. The significance of the impacts will be Moderate if no mitigation is implemented. With mitigation the significance of the impact can be Low - Moderate.

The proposed site already receives electricity from the municipality and the infrastructure for municipal supply is already in place. When looking at solar supply there is no existing infrastructure. In addition the

proposed site already has an existing borehole for water use and wishes to make use of existing groundwater for this proposed project.

Proposed mitigation:

- The area should be kept clean of littering and other pollutants during construction and operation phase to minimise littering on the surrounding environment.
- Buildings should be constructed in a manner in which it is in line with the surrounding environment and should not cause unnecessary obstruction. Buildings, and the site, should also be maintained during operation as to not have a negative aesthetic impact.

4. Plant and Animal life

The site is located within the Zeerust Thornveld biome that is characterised by Deciduous, open to dense short thorny woodland, dominated by Vachellia and Senegalia species with herbaceous layer of mainly grasses on deep, high base-status and some clay soils on plains and lowlands, also between rocky ridges of the Dwarsberg-Swartruggens Mountain Bushveld.

The proposed site does not contain any wetlands or drainage lines but a channel was identified to the north of the proposed site in the watercourse and ecological assessment undertaken by Oasis Environmental Specialists, see specialist report in appendix B of BAR report. The report makes a recommendation of moving the proposed layout slightly to the south-east in order to accommodate the required buffer zone away from this channel. This recommendation was considered and adhered to.

The site does not form part of an Important Bird Area (IBA) or a Strategic Water Source Area (SWSA). There are also no National Protected Areas Expansion Strategy (NPAES) Focus Areas near the site. The area around the site does not contain any formal or informal protected areas, refer to ecological report in appendix B.

Potential impacts on vegetation and animals:

- Transformation of the land,
- Loss of approximately 4ha of vegetation of the Zeerust Thornveld
- The growth and spreading of alien plant species,
- Fires made on the site by employees may result in the loss of vegetation of the surrounding environment,
- Destruction of habitat and loss of animal life.

Refer to the Ecological Impact Assessment attached in Appendix B.

Alternatives	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Site Alternative								
Preferred Alternative (Mezeg 77)	3	5	2	3.3	4	5	4.5	15
MITIGATED	2	3	1	2	2	5	3.5	7
-	No other site alternative considered							
Electrical facilities & services								
Preferred	3	5	2	3.3	4	5	4.5	15

Alternative (Municipal Electricity, Preferred)								
MITIGATED	2	3	1	2	2	5	3.5	7
Alternative 2 (Solar Power)	3	5	2	3.3	4	5	4.5	15
MITIGATED	2	3	1	2	2	5	3.5	7
Water supply								
Preferred Alternative (Groundwater Supply).	3	5	2	3.3	4	5	4.5	15
MITIGATED	2	3	1	2	2	5	3.5	7
Alternative 1 (Municipal water supply).	3	5	2	3.3	4	5	4.5	15
MITIGATED	2	3	1	2	2	5	3.5	7

There will be a definite impact on vegetation and animal life (if any) as the site will be transformed and indigenous vegetation will be removed during the construction phase. However, as indicated by Mr. Schrijvershof in the ecological report the proposed development does not overlap with any threatened ecosystems and/or protected areas. Taking into consideration that the vegetation on the site will be removed the significance of the impacts will be Moderate without mitigation and Low-Moderate with the implementation of mitigation measures.

The proposed site already receives municipal electricity and groundwater and the client wishes to make sue of current services for this project instead of installing additional service infrastructure.

Proposed mitigation:

- No animals will be harmed and/or killed on the site. If any animals are encountered they will be relocated from the site.
- No endangered or protected plant species (if any) will be harmed and/or removed on the site. If any such plants are encountered they will be transplanted from the site to areas which will not be disturbed.
- Vegetation will not be removed from areas where construction will not occur (if any).
- Alien plant species will be removed before seeding to prevent the spread of these plants to the surrounding environment. Alien vegetation should be controlled throughout the lifetime of the project.
- Open fires will not be permitted on the site.

5. Surface Water

The proposed site does not contain any wetlands or drainage lines but a channel was identified to the north of the proposed site in the watercourse and ecological assessment undertaken by Oasis Environmental Specialists, see specialist report in appendix B of BAR report. The channel is classified

as an 'A' section channel which are those that do not have baseflow and convey surface runoff immediately after a storm event and are not associated with a riparian zone. This channel was found to be in a moderately modified (Category C) state due to the landscape transformation within the non-marginal zone and the presence of alien invasive plants.

The report makes a recommendation of moving the proposed layout slightly to the south-east in order to accommodate the required buffer zone away from this channel. This recommendation was considered and adhered to.

The site does not form part of an Important Bird Area (IBA) or a Strategic Water Source Area (SWSA). There are also no National Protected Areas Expansion Strategy (NPAES) Focus Areas near the site. The area around the site does not contain any formal or informal protected areas, refer to ecological report in appendix B.

Potential impacts which might occur on surface water:

- Storm water may become contaminated because of spillages and mismanagement of petrochemical substances during construction.
- The proposed development may affect the quantity of water draining to the surface water resources due to the buildings and structures acting as obstructions for the flow of water.

Alternatives	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Site Alternative								
Preferred Alternative (Mezeg 77)	3	3	3	3	4	5	4.5	13.5
MITIGATED Alternative	2	2	2	2	2	5	3.5	7
	No other site alternative considered							
Electrical facilities & services								
Preferred Alternative (Municipal Electricity, Preferred)	3	3	3	3	4	5	4.5	13.5
MITIGATED Alternative 2 (Solar Power)	2	2	2	2	2	5	3.5	7
MITIGATED Alternative 1 (Municipal)	2	3	1	2	2	5	3.5	7
Water supply								
Preferred Alternative (Groundwater Supply).	3	5	2	3.3	4	5	4.5	15
MITIGATED Alternative 1 (Municipal)	2	3	1	2	2	5	3.5	7
Preferred Alternative (Municipal)	3	5	2	3.3	4	5	4.5	15

water supply).								
MITIGATED	2	3	1	2	2	5	3.5	7

The proposed site does not contain any steep slopes and the topography is mostly flat. During the construction phase of the proposed project there might be some potential impacts on surface water as drainage of water might be blocked by temporary trenches and/or berms. Furthermore, there will be machinery and vehicles on site which may result in leakages of petrochemical substances which may contaminate storm water.

During the operational phase the infrastructure will be completed and will result in storm water being kept on site and not being allowed to drain naturally into the surrounding environment. The significance of the impacts on surface water will be Moderate if no mitigation measures are implemented and Low - Moderate with the implementation of mitigation measures.

It must be mentioned though that the applicant already receives electricity from the municipality and that the infrastructure for municipal supply is already in place. When looking at solar supply there is no existing infrastructure. In addition the applicant already has an existing borehole for water use and wishes to make use of existing groundwater for this proposed project.

Proposed mitigation:

- An adequate storm water management system will be implemented during construction to accommodate runoff during rain events as well as to divert the water around the development to the surrounding drainage basins. Storm water management systems will be maintained, repaired and cleaned regularly to ensure its functionality and to prevent impacts from occurring on downstream surface water resources.
- Once construction is completed, all open natural slopes must be re-vegetated to prevent soil erosion from occurring which might lead to siltation of surface water resources.
- Any hazardous substances permanently stored on site will be stored in a bunded area with a capacity to contain 110% of the volume of the substance. The bunded area will have a controlled outlet from which rain water collected therein can be drained and managed as hazardous waste.
- Spillages of hazardous substances will be cleaned by removing the spill and contaminated soil and disposing of it as hazardous waste.
- The site will be kept clean and tidy to prevent general waste and littering from occurring in the surrounding surface water resources.
- Any incidents on surface water resources during construction will be reported to the relevant authorities within 24 hours of the incident.

6. Groundwater

The proposed site is underlain by the Karst aquifer Belt hydrological region which is known for moderate to high yielding aquifers that are found within the Chuniesport Group of rocks. The relatively nearby town of Zeerust utilises groundwater from the karst aquifers.

- Contamination as a result of spillages of hazardous substances.
- Incorrect storage of waste products on the site may result in the contamination of the groundwater.

- Potential impact on the groundwater quantity as groundwater will be abstracted during and for the development. The applicant must remain within the water abstraction limits as designated in the water use right.
- The development of the chicken layer houses will induce surface runoff and therefore reduce infiltration. Lower infiltration will lead to lower groundwater recharge.
- Deep excavation on the site may extend beyond the water table which will result in an impact on groundwater. However, it is not expected that this impact will occur as the proposed area is not known for shallow aquifers.

Alternatives	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Site Alternative								
Preferred Alternative (Mezeg 77)	3	3	3	3	3	5	4	12
MITIGATED Alternative	2	1	1	1.3	1	5	3	4
No other site alternative considered								
Electrical facilities & services								
Preferred Alternative (Municipal Electricity, Preferred)	No Impact							
MITIGATED Alternative 2 (Solar Power)	No Impact							
MITIGATED								
Water supply								
Preferred Alternative (Groundwater Supply).	2	3	2	2.3	2	5	3.5	8.2
MITIGATED Alternative 1 (Municipal water supply).	1	2	1	1.3	1	5	3.5	4
MITIGATED	2	3	1	2	2	5	3.5	7

The potential impacts that might occur will occur as a result of contamination of groundwater from spillages and mismanagement of hydrocarbons and potentially hazardous substances. Due to the volumes of potentially hazardous substances being used on the site it is not expected that there is a significant risk of contamination of groundwater. The proposed project will impact infiltration of water and thus the recharge of groundwater as the concrete structures and infrastructure will result in a greater runoff velocity of surface water from the site and less time for water to seep. The footprint of the project is small though and the impact on infiltration rates is expected to be minimal. The significance of

Alternative 2 (Solar Power)	No Impact							
MITIGATED								
Water supply								
Preferred Alternative (Groundwater supply).	No Impact							
MITIGATED								
Alternative 1 (Municipal water supply).	No Impact							
MITIGATED								

There will be a daily increase in emissions and dust to the atmosphere during construction at the proposed site. There will therefore be an impact on the atmosphere as well as elevated noise levels during construction. The overall impact of the location alternative (Mezeg 77) will be Moderate -Low before mitigation. With the relevant mitigation the effects will be Low.

Lastly it must be mentioned that most of the impacts related to air quality and noise will be temporary in nature and is associated with the construction phase. The impacts during the operational phase are minimal apart from the elevated noise levels and emissions associated with chicken broiler houses. It must be further stated that recent technological advancements made it the design and maintenance of chicken broiler houses further reduces the noise levels and emissions associated with this activity.

Proposed mitigation:

- Dust suppression should be implemented on the site to reduce emissions of dust from the site, especially after the clearance of vegetation from the site.
- Construction activities, especially activities contributing to dust emissions should be avoided during windy conditions.
- Construction vehicles and machinery will be equipped with the necessary silencers to reduce noise levels during construction. Vehicles and equipment will also be serviced and maintained to reduce emissions to the atmosphere.
- Vehicles movement and speeds at which vehicles travel on the site will be kept to a minimum.
- Waste will not be burned on site and open fires during construction will not be permitted.
- Construction activities contributing to elevated noise levels will be restricted to normal working hours.

8. Archaeological and Cultural Resources

Mr Tobias Coetzee indicated that there were no stone age, iron age, historical remains or signs of skeletal remains or graves present on site, please refer to Phase 1 AIA in appendix B. No sites of heritage importance were noted in the area that is proposed for this development. The potential archaeological impact on the site is therefore considered to be low.

Potential impacts on archaeological and paleontological resources:

- Unearthing and destruction of palaeontological significant artefacts/fossils.

Alternatives	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Site Alternative								
Preferred Alternative (Mezeg 77)	4	3	3	3.3	3	5	4	13.3
MITIGATED Alternative	2	1	1	1.3	1	5	3	4
Alternative	No other site alternative considered							
Electrical facilities & services								
Preferred Alternative (Municipal Electricity, Preferred)	No additional Impact							
MITIGATED Alternative 2 (Solar Power)	No additional Impact							
MITIGATED Alternative 2	No additional Impact							
Water supply								
Preferred Alternative (Groundwater supply).	No additional Impact							
MITIGATED Alternative 2 (Municipal water supply).	No additional Impact							
MITIGATED Alternative 2	No additional Impact							

Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).

Mr Tobias concluded, that from a heritage point of view, development may proceed on the demarcated portion, subject to the conditions, recommendations and approval by the South African Heritage Resources Agency.

The significance of impacts occurring on the preferred location (Mezeg 77) will be Moderate without mitigation and Low with mitigation.

The aesthetic impact at the site will be Moderate and can be reduced to a Low impact rating if the correct mitigation and management measures are implemented.

Proposed mitigation:

- Buildings should be monitored throughout the project and maintenance (i.e. painting, fixing trimmings) should be done regularly to prevent the site from having a negative aesthetic impact.
- The site should be cleaned of any waste regularly to minimise the negative visual impact.

10. Demographics and Regional socio-economic structure

Ramotshere Moiloa Local Municipality has 30.37% of unemployment, with 69.63% of the population employed in the formal and informal sectors. The percentage of economically active people in the municipality is 20.15%, with 79.85% of the population not being economically active. The main sectors of employment and economic activity are retail trade and services in the terrestrial sector. The rural areas are characterised mostly by small scale/subsistence agriculture, game farming, and a few active mines, while manufacturing and services sectors are located in towns.

Design, construction, operation and recycling initiatives of the development may generate new job opportunities in most job sectors.

The development will have a positive impact on the socio-economics of the area. Direct and indirect jobs will be created during the construction phase. These jobs will include the building of the structures and infrastructure. Indirect jobs include the small businesses in the area which will provide building material to the applicant..

CONCLUSION AND MOTIVATION FOR PROPOSED ALTERNATIVES

The proposed construction and development of chicken broiler houses on portion 78 the farm Mezeg 77, Ramotshere Moiloa Local Municipality, North-West

The development involves the construction of 8 chicken broiler houses on Portion 78 of the Farm Mezeg 77 which is located in the Ramotshere Local Municipality north-east of Zeerust. The total size of development will be approximately 4 ha. The development will require the installation of services such as electricity and water. The proposed site already receives electricity and is host to a registered borehole for groundwater for the proposed chicken houses. In this assessment alternatives were identified and assessed. The preferred alternatives were chosen based on certain factors:

- All variables like current property owners, geology, surface and groundwater, air quality, plant & animal life, archaeological and cultural significance and visual exposure were taken into account during the assessment process.
- Lowest clearance of vegetation if possible.
- Proposed development will create job opportunities during the construction period with future jobs becoming available once the project is completed.
- Development will increase chicken supply to surrounding towns. The applicant has secured future contractual obligations that would need to be fulfilled.
- Development will have a positive contribution towards the socio-economic and economic spheres of Ramotshere Moiloa Local Municipality.
- Not fatal flaws were identified during this study.

The ecological study done by Mr. Joppie Schrijvershof also indicated that the ecological value of the preferred site is low.

Based on the above findings the proposed development of chicken layer houses on portion 78 of farm Mezeg 77 should be considered.

Technological alternatives

It was determined that the preferred technological alternatives should be implemented based on the following:

Electricity

Although solar power has a lower carbon footprint, as coal is not utilised to generate the electricity, the capital cost of installing such an energy supply is very expensive on a site of this size. Solar electricity also requires high maintenance which will also be costly. The applicant has limited funds for this project and is already receiving electricity from the local municipality. The implementation of solar power and the maintenance costs associated with it will result in the cost of the project being elevated which could potentially make it unfeasible.

Sewerage

No sewage is expected to be produced for this project as it involved the construction and operation of chicken broiler houses for the production of poultry. During the operation phase the chicken broiler houses will produce manure. Such manure is to either be utilised by the farmer or his neighbours or will be sold.

Water supply

An alternative to using groundwater is for the applicant to make use of municipal water. However, this will require to applicant to install the infrastructure which is very costly considering the location of the proposed development making such an alternative unfeasible.

Based on the above findings it is proposed that the preferred alternatives be implemented for the project.

Impacts associated with the proposed project as indicated in the Impact Assessment:

The likelihood of the expected impacts actually occurring will be small and limited if all the recommended mitigation measures are implemented throughout all the phases of the project.

Impacts associated with the Construction Phase will be temporary of nature and local if all mitigation measures are implemented. If the area is properly levelled, storm water is diverted around the site and all potentially hazardous substances are managed appropriately, the likelihood of the potential impacts occurring will be low.

In conclusion, if all the recommended measures are implemented, the significance of the impacts expected to be associated with the proposed buildings will be low.

Discussion on the 'no-go' alternatives:

No environmental impact will occur if the no-go alternative is decided on. The opportunity to create employment opportunities and make a positive contribution to the socio-economic situation of the area will be lost.

After consideration of the Impact Assessment the following conclusions are drawn:

Proposed site:

The vegetation on the site is of low ecological value and no protected or endangered species were identified where the proposed construction will take place. Should all the mitigation factors be implemented the environmental impact will be low.

The following assessments were done for this proposed development and will be attached in Appendix B:

1. Ecological assessment
2. Phase 1 Archeological Impact Assessment
3. Water assessment

These assessments provided the means to reaching the following conclusions pertaining to infrastructure for the proposed development on portion 79 of the farm Mezeg 77, Ramotshere Moiloa Local Municipality, North-West:

The following mitigation measures should be taken into account:

- That the site must be levelled and all vegetation and topsoil removed from the site.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).

Construction Phase:

1. Ensure that all stockpiles are well managed and have measures such as to minimise the mobilisation of sediments by the use of sand bags, hessian sheets, etc.;
2. Dumping of any excess rubble, building material or refuse must be prohibited within riparian habitats;
3. Dumping of materials must only take place at designated and properly managed areas;
4. Make use of existing infrastructure such as existing roads as to minimise impacts;
5. Construction activities (excavations, etc.) must take place within the low flow period of the channel;
6. The area which will be impacted on by the proposed development should be fenced off and no people or vehicles should be allowed into the natural areas surrounding the construction area; and
7. Building material, ablution facilities or construction vehicles should not be stored in areas containing natural vegetation but the disturbed areas adjacent to the study area should be used.

Operational phase:

1. Should any signs of erosion be found, remedial action such as backfilling, compaction and re-vegetation must be taken immediately to avoid exacerbation of the erosion;
2. No stockpiling of any materials may take place adjacent to the channel;
3. Ensure that all stockpiles are well managed and have measures to minimise the mobilisation of sediments such as the use of sand bags, hessian sheets, etc.;
4. Erosion control measures must be implemented in areas sensitive to erosion and where erosion has already occurred such as edges of slopes, exposed soil etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells which are used in the protection of slopes;
5. Do not allow surface water or storm water to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place;
6. It is crucial that the contamination of the surface waters through deleterious effluents and runoff water be avoided;
7. Maintenance of stormwater drains must be undertaken as sensitively as possible to prevent adverse impacts to the environment and any watercourses;
8. Any disturbed areas should be rehabilitated in line with the rehabilitation guidelines, this includes the clearing of alien vegetation, following the guidelines of a suitable alien invasive plant management plan;
9. The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological;

10. Any pump stations will need to be fenced/secured to prevent unauthorized access by humans/wildlife which could cause damage to infrastructure and cause accidental malfunction and/or spillage of untreated waste water;
11. The pump station will need to be placed within a suitably lined, impermeable bunded area with the capacity to hold untreated waste water in an emergency and provide for sufficient time for maintenance staff to address any faults/ problems. This is to limit the risk of untreated waste material (sewage or sludge) overflowing in the event of any leakage or accidental spillage;
12. Protect as much indigenous vegetation as possible; and
13. Mitigation measures must be implemented with a suitable EMPr.

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