APPENDIX F

Impact Assessment

TURN180
ENVIRONMENTAL CONSULTANTS

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DRAFT IMPACT ASSESSMENT

THE PROPOSED DEVELOPMENT OF A FILLING STATION AND AGRICULTURAL RELATED SALES AND STORAGE AREA ON THE REMAINING EXTENT OF THE FARM OUTSPAN 1960, BLOEMFONTEIN, FREE STATE

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Site Information:

Farm / Erf Name	: Outspan
Farm Number	: 1960
Farm Portion	: RE
21 Digit Surveyors Code	: F00300000000196000000
District	: Bloemfontein
Municipality	: Mangaung Metropolitan Municipality
Site coordinates (Centre of site)	: 29° 4'16.49"Sand 26° 8'34.75"E

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	Insignificant change / deterioration	Moderate change / deterioratio	Significant change / deterioratio	Very significant change / deterioration	Disastrous change / deterioration

Type of criteria	Rating				
	1	2	3	4	5
and quality, waste production, fauna and flora)	or disturbance	n or disturbance	n or disturbance	or disturbance	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	1 Month
2: Low-Moderate	1 – 3 Months
3: Moderate	More than 3 Months
4: Moderate-High	5 – 10 Years
5: High	More than 10 Years

Determination of Extent/Spatial Scale

Extent refers to the spatial influence of an impact, be it contained to the immediate surroundings (site), extending to the surrounding area, 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 (site)
2: Low-Moderate	Surrounding Area
3: Moderate	Regional
4: Moderate-High	National
5: High	International

Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarised below, and then dividing the sum by 3 (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 3)	Example 3.3

1.2. Determination of 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 / once during construction
2: Low-Moderate	Once / more in 6 Months
3: Moderate	Once / more a Month
4: Moderate-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-Moderate	Very seldom / highly unlikely
3: Moderate	Infrequent / unlikely / seldom
4: Moderate-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

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

1.3. 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-MODERATE, MODERATE, MODERATE-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	Maintain current	Implement monitoring.	Improve managemen	Implement significant

Significance	Low	Low-Moderate	Moderate	Moderate-High	High
	management measures. Where possible improve.	management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Investigate mitigation measures and improve management measures to reduce risk, where possible.	t measures to reduce risk.	mitigation measures or implement alternatives.

2. Environmental Impact Assessment

Geology and Soil

The following impacts may occur on the soil as a result of the construction and operational phases of the activity:

- Loss of topsoil during initial land preparation.
- A change in soil characteristics as a result of the disturbance of the soil.
- Contamination of soil due to littering and spillage of petrochemical substances.

It should be noted that there will be no impact on geology, as the development will not involve any blasting or deep excavation.

1. Loss of topsoil								
Outspan 1960 (Preferred Location Alternative)								
Potential Impact Description:	During the initial stages of vegetation clearance, removal of topsoil and levelling of site, some topsoil may be lost due to incorrect storage thereof or wind and/or water erosion.							
Duration of Impact:	During the construction phase.							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	2	2	2.33	2	1	1,5	3.495
With Mitigation	2	1	1	1.33	1	1	1	1.33
Mitigation Measures	• Topsoil that is removed should be stockpiled to be used for levelling and in gardens. • No topsoil may be used for construction purposes. • Clearance of the site and removal of topsoil will be limited to the area under construction. • Appropriate storm water management measures should be implemented in order to avoid erosion.							

	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	No impact							
With Mitigation	No impact							
Mitigation Measures	None							
Can the Impact be reversed	Yes, the impact can be reversed. However, it is highly unlikely that the impact will have a significant effect on topsoil loss with or without mitigation. The reversing of topsoil loss involves the sourcing of topsoil from other areas.							
Will the impact cause irreplaceable loss of resource	No, topsoil can be sourced from various sources at high expense. If mitigation measures are followed correctly it is anticipated that there will be a minimal to insignificant loss of topsoil during construction.							
Cumulative Impacts	None							

2. Change in soil characteristics as a result of disturbance of the soil	
Outspan 1960 (Preferred Location Alternative)	
Potential Impact Description:	Construction activities and movement of construction vehicles can lead to compaction of soil, which can cause changes to the natural storm water drainage patterns and water infiltration rates. The construction of an impermeable material over the soil (paving and concrete) can remove an area's ability to support vegetation and can also damage the natural drainage characteristics.
Duration of Impact:	During construction and operational phases

	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	4	4	4	10.64
With Mitigation	2	2	1	1.66	2	4	3	4.98
Mitigation Measures	• Implement appropriate storm water management measures to compensate for the removal of the area's natural drainage patterns. • Keep the footprint of the site as small as practicable possible in order to limit the impact. • Topsoil stockpiles should be kept small in order to prevent compaction of stored topsoil.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	4	5	4.5	11.97
With Mitigation	2	2	1	1.66	3	5	4	6.64
Mitigation Measures	• Maintain appropriate storm water management measures that were implemented during construction to compensate for the removal of the area's natural drainage patterns. • Keep the footprint of the site as small as practicable possible in order to limit the impact – no extension of the initial site footprint.							
Can the impact be reversed	No. Soil compaction and change in natural drainage patterns cannot be avoided during construction and operation of this development. If rehabilitation occurs, then this impact may be reversed. However, it is not anticipated that this development will be decommissioned and rehabilitated.							
Will the impact cause irreplaceable loss of resource	No. It is not anticipated that this development will lead to significant loss of soil. However, it will lead to changes in the soil characteristics (compaction of soil and changes in drainage patterns).							

Cumulative Impacts	Changes in the natural drainage patterns of this site can lead to changes in the drainage patterns of the entire area.

3. Contamination of soil								
Outspan 1960 (Preferred Location Alternative)								
Potential Impact Description:	During construction, construction vehicles and/or machinery can have leaks of petrochemical substances which can contaminate the soil. During operation, petrol and diesel will be stored in underground tanks at the filling station. These tanks can leak and contaminate the soil. The workshop area will also have a wash bay. Contaminated water from the wash bay can also contaminate the soil.							
Duration of Impact:	During the construction and operational phases							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	2	1	1.66	3	4	3.5	5.81
With Mitigation	1	1	1	1	2	4	3	3
Mitigation Measures	• Spillages of petrochemical substances will be cleaned immediately, and the contaminated soil will be disposed of as hazardous waste. • Drip trays will be placed underneath immobile construction vehicles and/or machinery. • Vehicles and construction machinery will be serviced regularly.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	4	3	2	3	3	5	4	12
With Mitigation	2	2	1	1.66	2	5	3.5	5.81

Mitigation Measures	• Spillages of petrochemical substances will be cleaned immediately, and the contaminated soil will be disposed of as hazardous waste. • Potentially hazardous substances relating to the filling station will be stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance. • Tanks will be inspected for leaks regularly. If leaks are recorded, they will be repaired. • The wash bay will be equipped with an oil separator. No contaminated water will be allowed to drain into the soil.
Can the impact be reversed	Yes. If contamination of soil occurs, it can be reversed by the correct cleaning procedures.
Will the impact cause irreplaceable loss of resource	No. It is not anticipated that this development will lead to significant loss of soil. However, it can lead to contamination of soil.
Cumulative Impacts	There are other activities in the area, including agricultural activities, which can also contribute to soil contamination. This activity can therefore contribute to an already worsening soil quality in the area.

Summary of impacts				
	Construction		**Operational**	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Loss of topsoil.	3.495	1.33	None	None
2. Change in soil characteristics as a result of disturbance of the soil.	10.64	4.98	11.97	6.64

3. Contamination of soil.	5.81	3	12	5.81
Grand Average Total:	6.648 (Low - Moderate)	3.103(Low)	11.985 (Moderate)	6.225(Low-Moderate)
The overall environmental significance indicates that the impact on Soil and Geology will be LOW during the construction phase and LOW-MODERATE during the operational phase with mitigation.				

Note that the development will require the site to be cleared of vegetation, topsoil removed and the site levelled. A filling station and an agricultural sales and storage area will then be constructed on the site. It is not anticipated that this development will undergo decommissioning and/or closure and that the site will be rehabilitated. Therefore, this development is permanent and will have an impact on soil. There will be no impact on geology, as no deep excavations or blasting will occur.

Anticipated impacts of this development on Soil and Geology include loss of topsoil, changes in the characteristics of the soil and contamination of soil.

The impact of loss of topsoil is expected to be LOW during the construction phase (with and without mitigation), with no expected impact during the operational phase. The impact is expected to be LOW because minimal topsoil will be removed during construction. Topsoil which is removed will be stockpiled and returned during levelling and/or used in gardens. Storm water management measures will be implemented in order to avoid erosion and consequent loss of soil. No topsoil will be removed again during the operational phase.

The impact of changes in the soil characteristics is expected to be borderline between LOW and LOW-MODERATE with a rating of 4.98, during the construction phase with the correct mitigation and management measures. During the operational phase the impact is expected to be LOW-MODERATE with mitigation, as the development will have a permanent impact on the characteristics of the soil. Without mitigation this impact will be MODERATE during both phases, due to the relatively large area of soil which will be compacted and sealed (due to paving and concrete). Therefore, it is important that the footprint of the site be kept as small as practicable possible in order to limit the impact and that storm water management measures are implemented and maintained in order to compensate for the removal of the natural drainage patterns.

The impact of contamination of soil is expected to have a rating of LOW during the construction phase and a rating of LOW – MODERATE during the operational phase, with the correct mitigation and management measures. The impact during the operational phase is expected to be higher due to the storage of hazardous substances in the form of petrol and diesel in underground tanks at the filling station. These tanks have the potential to leak and contaminate the soil. There will also be a wash bay during the operational phase which can lead to contamination of soil. However, if the correct mitigation and management measures are followed, this impact can be reduced from MODERATE without mitigation to LOW – MODERATE.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

The only cumulative impacts that are expected are that changes in the natural drainage patterns on site may have an impact on the drainage patterns of the entire area. Also, contamination of soil on site may add to the worsening condition of the soil in the area due to the surrounding land uses.

<u>Proposed mitigation:</u>

- Topsoil will be removed during the construction phase (land preparation and levelling) if necessary and will be stockpiled appropriately and in such a manner to prevent any loss thereof. This topsoil will then be used for levelling and/or in the gardens. No topsoil will be used for construction purposes.
- Topsoil stockpiles must be kept small in order to prevent compaction of the stored topsoil.

- Soil loss through erosion will be reduced by implementing storm water management practices.
- Equipment and machinery on site 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.
- Any spills of hazardous substances will be cleaned immediately by disposing of the affected soil as hazardous waste.
- Storage tanks will be inspected regularly for leaks and if leaks are detected, they will be fixed immediately.
- The wash bay which will be present on site during the operational phase will have an oil separator to ensure that no contaminated water drains into the soil.

Climate

The following impacts may occur on the climate as a result of the construction and operational phases of the activity:

- There will be no impact on climate for the study area, as the proposed site is small, and the construction and operational activities proposed will not impact upon the climate.
- The cumulative impact of numerous activities such as agricultural activities and vehicle exhaust fumes may impact on the microclimate but will also have an insignificant effect on climate on the larger scale as these activities are only limited to a small area.

1. Climate changes								
Outspan 1960 (Preferred Location Alternative)								
Potential Impact Description:	Due to the size and the activities proposed, the development will not have any effect on the climate.							
Duration of Impact:	None							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**

Without Mitigation	No Impact							
With Mitigation	No Impact							
Mitigation Measures	None							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	No Impact							
With Mitigation	No Impact							
Mitigation Measures	None							
Can the impact be reversed	There will be no need to reverse any impacts as the activity will have no effect on the climate							
Will the impact cause irreplaceable loss to resource	There are no impacts on climate.							
Cumulative Impacts	There is the possibility that a cumulative effect on the climate can occur. The surrounding land use consists of agricultural activities and homesteads which may lead to some emissions, along with vehicle emissions from the surrounding roads. However, this cumulative impact is not expected to be significant.							

The impact of the development (Preferred Alternative) on the climate will be small to insignificant as no climate changing factors are large enough to change the climate in the area.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be a small cumulative impact on a larger scale due to the surrounding land uses. However, this cumulative impact is not expected to be significant.

Proposed mitigation:

- None

Land Use

The following impacts may occur on the land use and characteristics of the land as a result of the construction and operational phases of the activity:

- The potential to use the land for other activities will be lost.

1. Loss of potential to use land for other activities	
	Outspan 1960 (Preferred Location Alternative)

Potential Impact Description:	Currently the property where development is planned is vacant and not being used for anything. The proposed development will take away the ability of the land to be used for other activities. However, according to the Ecological Assessment (Van Rensburg, 2019) the site has already been greatly disturbed and modified. Thus, the potential of the land to be used for anything else is low.							
Duration of Impact:	During the construction and operational phases							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	3	2	2.33	4	1	2.5	5.825
With Mitigation	1	2	1	1.33	4	1	2.5	3.325
Mitigation Measures	• Keep construction activities within development boundaries to limit disturbance to surrounding land use.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	5	2	3	5	5	5	15
With Mitigation	1	5	1	2.33	4	5	4.5	10.485
Mitigation Measures	• Keep operational activities within development boundaries to limit disturbance to surrounding land use.							
Can the impact be reversed	No. It is not anticipated that the development will be decommissioned, and that rehabilitation will take place. The development will be permanent.							

Will the impact cause irreplaceable loss to resource	No. Even though the potential to use the land for other activities will be taken away, most likely permanently, the site is small and degraded and the impact will be small on the larger scale.
Cumulative Impacts	The development will contribute to cumulative impacts, as the surrounding area is also mostly developed.

Summary of impacts				
	Construction		**Operational**	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Loss of potential to use land for other activities.	5.825	3.325	15	10.485
Grand Average Total:	5.825 (Low-Moderate)	3.325 (Low)	15 (Moderate - High)	10.485 (Moderate)
The overall environmental significance indicates that the impact on Land Use will be LOW during the construction phase and MODERATE during the operational phase with mitigation.				

The footprint to be developed will only be 8.87 ha, which is relatively small. The development which will consist of a filling station and an agricultural related sales and storage area will be a permanent development for which decommissioning and rehabilitation is not expected. Therefore, the impact of loss of land to use for other activities is unavoidable.

The impacts on the land use will be LOW -MODERATE during the construction phase and MODERATE-HIGH during the operational phase, without mitigation. The impact of loss of land has a relatively high impact rating as destruction of land and redevelopment thereof is unavoidable. The reasons why the land use impacts are considered MODERATE-HIGH during the operational phase is because the site will be used for more than

10 years. The impacts can be lowered to LOW during the construction phase and MODERATE during the operational phase if correct mitigation measures are implemented, as the site is small and degraded with minimal potential to be used for other activities.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be cumulative impacts, as the surrounding area is also developed and this has led to the loss of land.

Proposed mitigation:

Impacts on land use are unavoidable as land will be lost during development. However, the footprint of the site is small.

- Keep construction and operational activities within the development boundaries to limit disturbance to the surrounding area.

Vegetation and Animal Life

The following impacts may occur on the vegetation and animal life as a result of the construction and operational phases of the activity:

- Loss of natural occurring vegetation (Bloemfontein Dry Grassland).
- Establishment of alien invasive plant species.
- Destruction of habitat and loss of animal species.

1. Loss of natural occurring vegetation (Bloemfontein Dry Grassland)

	Outspan 1960 (Preferred Location Alternative)							
Potential Impact Description:	The development will require the site to be cleared of vegetation. This can lead to a loss of natural occurring vegetation. According to the Ecological Assessment (Van Rensburg, 2019) the vegetation type is classified as Vulnerable. However, only patches of natural vegetation remain, and the site has been disturbed. Although, two protected species were identified on site.							
Duration of Impact:	During construction phase							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	4	5	2	3.66	4	1	2.5	9.15
With Mitigation	3	5	1	3	3	1	2	6
Mitigation Measures	• Obtain the necessary permits to remove all identified protected species before construction. • Clearance of vegetation will be limited to the area under construction.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	No Impact							
With Mitigation	No Impact							
Mitigation Measures	There will be no further impact on natural occurring vegetation during the operational phase, as the entire site will be completely cleared and paved during construction. The surrounding area is also mostly developed and does not consist of natural vegetation.							
Can the impact be reversed	No. It is not anticipated that the development will be decommissioned, and that rehabilitation will take place. The development will be permanent. If the site is to be rehabilitated in future, natural vegetation should re-establish.							

Will the impact cause irreplaceable loss to resource	As it is not anticipated that the development will be decommissioned, and that rehabilitation will take place, loss of natural occurring vegetation will be permanent. If the site is to be rehabilitated in future, natural vegetation should re-establish.
Cumulative Impacts	A cumulative impact may occur, as the surrounding area has also been cleared of natural occurring vegetation for development.

2. Establishment of alien invasive plant species.								
	Outspan 1960 (Preferred Location Alternative)							
Potential Impact Description:	The development will require the site to be cleared of vegetation. This, along with construction activities will disturb the site and may lead to the establishment of invasive alien species.							
Duration of Impact:	During construction and operational phases							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	3	4	3.5	9.31
With Mitigation	2	2	1	1.66	3	4	3.5	7
Mitigation Measures	• Establishment of alien vegetation should be monitored and removed on a regular basis. • Construction activities should be confined to the development footprint to limit disturbance.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	2	5	3.5	9.31
With Mitigation	2	2	1	1.66	2	5	3.5	5.81

Mitigation Measures	• Regular removal of alien vegetation during site maintenance and inspection.
Can the impact be reversed	Yes. With regular removal of alien vegetation, the impact can be reversed.
Will the impact cause irreplaceable loss to resource	No. The establishment of alien vegetation will not lead to a loss of natural vegetation as the site will already be cleared. And with regular removal of alien vegetation, the chance of complete take-over is minimal.
Cumulative Impacts	There may be a cumulative impact as disturbance in the surrounding area has already led to the encroachment of alien vegetation in the area.

3.Destruction of habitat and loss of animal species.	
	Outspan 1960 (Preferred Location Alternative)
Potential Impact Description:	The development will lead to the clearance of vegetation and the transformation of suitable habitat for fauna, which may lead to the loss of animal species. Construction activities may also chase away or lead to the accidental killing of animals. However, according to the Ecological Assessment (Van Rensburg, 2019) the survey indicated that mammal activity on the site is quite low. The site is isolated, situated within small holdings and degraded and therefore it is unlikely that any species of concern will occur on the site.
Duration of Impact:	During construction and operational phases
	Construction phase

	Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
Without Mitigation	2	4	2	2.66	4	1	2.5	6.65
With Mitigation	2	4	1	2.33	3	1	2	4.66
Mitigation Measures	• If any animals are found on site, they should be relocated. • No open fires will be allowed. • No hunting of animals may take place.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	4	2	2.66	2	5	3.5	9.31
With Mitigation	2	4	1	2.33	1	5	3	6.99
Mitigation Measures	• If any animals are found on site, they should be relocated. • No open fires will be allowed. • No hunting of animals may take place.							
Can the impact be reversed	No. It is not anticipated that the development will be decommissioned, and that rehabilitation will take place. The development will be permanent. Therefore, suitable habitat for animals will be permanently removed.							
Will the impact cause irreplaceable loss to resource	No. No animals will be killed. Animals found on site will be relocated. However, suitable habitat for these animals will be permanently removed.							
Cumulative Impacts	There may be a cumulative impact, as the surrounding area is also developed and suitable habitat for animals have been removed.							

Summary of impacts				
	Construction		Operational	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Loss of natural occurring vegetation (Bloemfontein Dry Grassland)	9.15	6	None	None
2. Establishment of invasive alien plant species.	9.31	7	9.31	5.81
3. Destruction of habitat and loss of animal species.	6.65	4.66	9.31	6.99
Grand Average Total:	8.37 (Low – Moderate)	5.887 (Low - Moderate)	9.31 (Low-Moderate)	6.4 (Low – Moderate)
The overall environmental significance indicates that the impact on Vegetation and Animal Life will be LOW - MODERATE during the construction phase and the operational phase with the correct mitigation.				

The development will require natural vegetation to be cleared. According to the Ecological Assessment (Van Rensburg, 2019) the vegetation (Bloemfontein Dry Grassland) can be classified as Vulnerable according to the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004) and two protected species could be identified on site. However, the site is considered to be largely transformed and only patches of natural vegetation remain. Also, due to the site being isolated, within small holdings and degraded, it is unlikely that any animal species of concern will occur here.

Anticipated impacts of this development on Vegetation and Animal Life include loss of natural occurring vegetation, establishment of invasive alien species and destruction of habitat and loss of animal species.

The impact of loss of natural occurring vegetation at the preferred location alternative during construction is expected to be LOW-MODERATE, without mitigation. This is can be slightly lowered with mitigation, but it will still remain in the LOW-MODERATE category. Even though the site is in a degraded condition, two protected plant species were observed on site and the vegetation type can be classified as Vulnerable. There will be no impact during the operational phase, because the entire site will be cleared and mostly paved during the construction phase and therefore there will be no more loss of vegetation.

The impact of establishment of invasive alien plant species is also expected to be LOW – MODERATE during the construction phase, with and without mitigation. It is also expected to be LOW-MODERATE during the operational phase. The rating for both phases is the same, as both phases will disturb the site which may lead to the establishment of invasive species. With the correct mitigation this impact can be slightly lowered, but it will still remain in the LOW-MODERATE category, as the vegetation on site is classified as Vulnerable.

The impact of destruction of habitat and loss of animal species is expected to have a LOW – MODERATE rating during the construction and operational phases without mitigation. By implementing the correct mitigation, this can be lowered to LOW during the construction phase. Even though the loss of habitat will be permanent, it should be noted that the site is small, isolated, situated within small holdings and degraded, and it is unlikely that many animal species, especially Threatened or Red Listed species will occur here.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be cumulative impacts, as the surrounding area is also developed and cleared of vegetation, which has contributed to the loss of natural occurring vegetation, the establishment of invasive species and the loss of animals in the area.

Proposed mitigation:

- Clearance of vegetation will be limited to the area under construction.
- Establishment of alien vegetation should be monitored and removed on a regular basis
- Removal of alien plants must adhere to the Alien and Invasive Species Regulations.
- Obtain the necessary permits to remove all identified protected species before construction.
- No hunting will occur of animals that are present.
- No fires will be allowed on site.
- If any animals are found on site, they should be relocated.

Surface Water

The following impacts may occur on the surface water as a result of the construction and operational phases of the activity:

- Contamination of nearby surface water resources through spillage of petrochemical substances.

1. Contamination of nearby surface water resources through spillage of petrochemical substances.	
	Outspan 1960 (Preferred Location Alternative)
Potential Impact Description:	According to the Ecological Assessment (Van Rensburg, 2019) a longitudinal, poorly defined channel is present on site, but this is most likely an artificial modification due to road construction of storm water ditches. Even though there are no surface water features on site or within 100 m of the site, there are some other surface water resources in the vicinity which can be contaminated through dirty runoff from site during rainfall events (petrochemical spills). These resources include a

	waterbody, which could possibly be a pond or wetland, approximately 340 m southeast of the proposed site.
Duration of Impact:	During construction and operational phases

	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	3	2	2.33	2	4	3	6.99
With Mitigation	1	1	1	1	1	4	2.5	2.5
Mitigation Measures	• Construction vehicles and machinery should be serviced regularly to prevent any leaks. • Drip trays should be placed underneath immobile vehicles and machinery. • Any spills of hazardous substances should be cleaned immediately by removing the contaminated soil and disposing of it as hazardous waste. • Appropriate storm water measures such as channels and/or culverts should be constructed around the construction site to prevent clean storm water from entering the site during rainfall events and dirty storm water from leaving the site.							

	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	3	2	2.33	3	5	4	9.32
With Mitigation	1	1	1	1	2	5	3.5	3.5
Mitigation Measures	• Potentially hazardous substances relating to the filling station will be stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance. • Any spills of hazardous substances should be cleaned immediately by removing the contaminated soil and disposing of it as hazardous waste.							

	• The storm water measures that were implemented during the construction phase should be maintained around the operational area to prevent clean storm water from entering the site during rainfall events and dirty storm water from leaving the site. • Dirty storm water may not leave the operational area and enter natural drainage lines. This water must first go through oil separators before leaving the site.
Can the impact be reversed	Yes, the impact can be reversed by implementing the correct clean-up procedures.
Will the impact cause irreplaceable loss to resource	No.
Cumulative Impacts	There may be cumulative impacts due to the surrounding areas also being developed and potentially causing contamination of the surrounding water resources. However, this is expected to be low, as the identified waterbody is situated in a vacant field close to a homestead. The waterbody is not surrounded by much development.

Summary of impacts				
	Construction		**Operational**	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Contamination of nearby surface water resources through spillage of petrochemical substances	6.99	2.5	9.32	3.5

Grand Average Total:	6.99 (Low-Moderate)	2.5 (Low)	9.32 (Low-Moderate)	3.5 (Low)
The overall environmental significance indicates that the impact on Surface Water will be LOW during the construction phase and the operational phase with the correct mitigation.				

According to the Ecological Assessment (Van Rensburg, 2019) a longitudinal, poorly defined channel is present on site which can be a drainage line but is most likely an artificial modification. The vegetation along this channel is dominated by terrestrial species and it can therefore be concluded that this channel does not form part of a continuous watercourse and is isolated without any significant function. There are no other watercourses and/or wetlands on the site or within 100 m of the site. There is a waterbody, which is possibly a wetland or a pond, located approximately 340 m southeast of the site. However, the slight slope of the site indicates that runoff from the site drains in a western direction, away from the waterbody.

Anticipated impacts of this development on Surface Water will include contamination of nearby surface water resources through spillage of petrochemical substances.

The impact of contamination of nearby surface water resources through spillage of petrochemical substances is expected to have a LOW – MODERATE rating during the construction phase, without mitigation. Although, with the correct mitigation measures, the impact can be lowered to LOW. During the operational phase this impact is expected to have a higher rating, as the operational phase will include the bulk storage of hazardous substances. This impact can be lowered to LOW with the correct mitigation measures. There are no surface water features on site and the runoff from the site will not drain towards the waterbody situated 340 m away from the site. However, it is still important that an adequate storm water management system is implemented and maintained in order to prevent possible contamination.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be cumulative impacts, as the surrounding area is already developed and may contribute to potential contamination of surface water resources. However, this is expected to be low, as the identified waterbody is situated in a vacant field close to a homestead. The waterbody is not surrounded by much development.

Proposed mitigation:

- Appropriate storm water measures such as channels and/or culverts should be constructed around the construction site to divert storm water around the site and into natural drainage lines and also to prevent clean storm water from entering the site during rainfall events and dirty storm water from leaving the site.
- Dirty storm water may not leave the operational area and enter natural drainage lines. This water must first go through oil separators before leaving the site.
- The site should be levelled in order to prevent any ponding occurring on site.
- Potentially hazardous substances relating to the filling station will be stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.
- Any spills of hazardous substances should be cleaned immediately by removing the contaminated soil and disposing of it as hazardous waste.

Groundwater

The following impacts may occur on the groundwater as a result of the construction and operational phases of the activity:

- Contamination as a result of spillages of hazardous substances.
- The development may induce surface runoff and therefore reduce infiltration. Lower infiltration will lead to lower groundwater recharge.

1. Contamination as a result of spillages of hazardous substances.								
	Outspan 1960 (Preferred Location Alternative)							
Potential Impact Description:	Hazardous substances from construction vehicles and machinery can seep into the groundwater and cause contamination during the construction phase. During operation, diesel and petrol will be stored in underground tanks which may leak and contaminate the groundwater resource.							
Duration of Impact:	During construction and operational phases							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	3	4	3.5	9.31
With Mitigation	2	2	1	1.66	2	4	3	4.98
Mitigation Measures	• Construction vehicles and machinery should be serviced regularly to prevent any leaks. • Drip trays should be placed underneath immobile vehicles and machinery. • Any spills of hazardous substances should be cleaned immediately by removing the contaminated soil and disposing of it as hazardous waste. • Quarterly water sample analysis must be conducted on the monitoring borehole in order to test for groundwater contamination.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	4	4	2	3.33	3	5	4	13.32
With Mitigation	3	3	1	2.33	2	5	3.5	8.155
Mitigation Measures	• Potentially hazardous substances relating to the filling station will be stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.							

	• Underground storage tanks should be inspected regularly for leaks and if any are detected they should be fixed immediately. • Any spills of hazardous substances should be cleaned immediately by removing the contaminated soil and disposing of it as hazardous waste.
Can the impact be reversed	Yes, the impact can be reversed by limiting the number of spillages and immediate clean-up of any hazardous substances. Any contamination to the aquifer itself as a result of hazardous substances infiltrating into the water can be remedied by natural attenuation if the aquifer isn't contaminated any further.
Will the impact cause irreplaceable loss to resource	No.
Cumulative Impacts	There may be a cumulative impact in conjunction with the surrounding land uses which can also contribute to contamination of the groundwater.

2. Induced surface runoff causing lower infiltration to the aquifer as a result of the development	
	Outspan 1960 (Preferred Location Alternative)
Potential Impact Description:	Clearance of vegetation and levelling of the site during construction may lead to water from rainfall events obtaining high flow velocities as there are no natural obstacles (vegetation) slowing down the flow of water. These high flow velocities won't allow water to seep into the ground and recharge the aquifer. During the operational phase the same will happen due to the site being paved.
Duration of Impact:	During construction and operational phases

	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	2	2	2	3	4	3.5	7
With Mitigation	1	1	1	1	2	4	3	3
Mitigation Measures	• Clearance of vegetation for this development is unavoidable and permanent. Therefore, the footprint of the site should be kept as small as practicable possible in order to limit the impact.							

	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	2	2	2	3	5	4	8
With Mitigation	1	1	1	1	2	5	3.5	3.5
Mitigation Measures	• Clearance of vegetation for this development is unavoidable and permanent. Therefore, the footprint of the site should be kept as small as practicable possible in order to limit the impact.							

Can the impact be reversed	Yes, through proper storm water management water can be diverted to surrounding areas that are not paved.
Will the impact cause irreplaceable loss to resource	No
Cumulative Impacts	None. Although the majority of the surrounding area is also developed, most of the area is not completely paved and still contains natural groundcover.

Summary of impacts				
	Construction		Operational	
Potential Impacts	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
1. Contamination as a result of spillages of hazardous substances.	9.31	4.98	13.32	8.155
2. Induced surface runoff causing lower infiltration to the aquifer as a result of the development	7	3	8	3.5
Grand Average Total:	8.155 (Low – Moderate)	3.99 (Low)	10.66 (Moderate)	5.8275 (Low – Moderate)
The overall environmental significance indicates that the impact on Groundwater will be LOW during the construction phase and LOW – MODERATE during the operational phase with the correct mitigation				

It is planned that the development makes use of municipal water during the construction and operational phases. If any groundwater is to be used during construction and operation (other than for gardening or domestic use), the necessary licenses will be applied for. The precise depth of the water table is unknown. However, construction and operational activities may cause possible contamination of the aquifer.

Anticipated impacts of this development on Groundwater will include contamination as a result of spillages of hazardous substances and induced surface runoff causing lower infiltration to the aquifer as a result of the development.

The impact of contamination as a result of spillages of hazardous substances is expected to be LOW - MODERATE during the construction phase and MODERATE during the operational phase, without mitigation. Due to the use of heavy machinery and construction vehicles, spills during the

construction phase may seep into the water table. During the operational phase, hazardous substances in the form of petrol and diesel will be stored in underground tanks at the filling station. These tanks have the potential to leak and contaminate the aquifer. With the correct mitigation measures, the impact can be reduced to LOW during the construction phase and to LOW – MODERATE during the operational phase. The aquifer is deep-seated (90 – 110 meters below ground level), making it difficult for contaminants to reach that depth. However, the first 30 meters below ground level consists of mainly red sand which has high permeability and it is estimated that contaminants can spread as fast as 2 m/day if it comes in contact with the groundwater (Van Wyk 2019).

The impact of induced surface runoff causing lower infiltration to the aquifer as a result of the development is expected to have a LOW – MODERATE rating during both the construction and operational phases, without mitigation. The clearance of vegetation is permanent, and almost the entire footprint of the site will be paved. The development will also be present on the site for more than 10 years, as it is planned that the development will be permanent. However, if the footprint of the site is kept as small as practicable possible, the impact can be lowered to LOW, as the surrounding landscape still contains plenty areas that are not paved where groundwater recharge can take place.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be some cumulative impacts regarding contamination of the aquifer, as the surrounding land uses may also contribute towards possible contamination.

<u>Proposed mitigation:</u>

- Hazardous substances will be stored inside a bunded area with an impermeable surface which has the capacity to store more than 110% of the volume of the substance.
- Spillages of hydrocarbons will be prevented by using drip trays and a clean-up procedure will be implemented to clean any hydrocarbon spills as soon as possible.
- Storage tanks will be inspected on a regular basis. If any leaks are detected, they will be fixed immediately.
- No water will be abstracted from groundwater for use for construction activities.
- Clearance of vegetation for this development is unavoidable and permanent. Therefore, the footprint of the site should be kept as small as practicable possible in order to limit the impact.
- Quarterly water sample analysis must be conducted on the monitoring borehole in order to test for groundwater contamination.

Air Quality and Noise

The following impacts may occur on the air quality and noise levels as a result of the construction and operational phases of the activity:

- Generation of dust and emissions due to construction and operational activities.
- Generation of noise due to construction and operational activities.

It should be noted that impacts on air quality and noise will mostly be due to construction activities and will be temporary in nature. Any emissions and noise during the operational phase will be associated with normal traffic and human movement.

1. Generation of dust and emissions due to construction and operational activities.	
	Outspan 1960 (Preferred Location Alternative)
Potential Impact Description:	Construction activities such as clearing the land of vegetation, removing topsoil and movement of construction vehicles may lead to dust generation. There may also be some emissions from construction vehicles and vehicles during the operational phase. However, this is expected to be insignificant. During operation, the site will be paved and there will not be any dust generation.
Duration of Impact:	During the construction and operational phases

	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	2	2	2.33	4	4	4	9.32
With Mitigation	2	1	1	1.33	2	4	3	3.99
Mitigation Measures	• Speed limits should be enforced on construction vehicles in order to limit dust generation. • Effort will be made to limit construction activities during very windy conditions. • If dust generation proves to become problematic, dust control measures will be investigated (such as water spraying).							

	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	1	2	2	1.66	1	5	3	4.98
With Mitigation	1	1	1	1	1	5	3	3
Mitigation Measures	The only emissions during the operational phase will be those associated with normal traffic. This impact is unavoidable. It is not anticipated that there will be any dust generation, as the area will be paved.							

Can the impact be reversed	Yes. The only significant impact will occur during the construction phase and will be temporary in nature.
Will the impact cause irreplaceable loss to resource	No

Cumulative Impacts	A cumulative impact can occur as there are surrounding land uses, such as agriculture, which can contribute towards dust generation.

2. Generation of noise due to construction activities.								
	Outspan 1960 (Preferred Location Alternative)							
Potential Impact Description:	Construction activities such as clearing the land of vegetation, constructing buildings and infrastructure and movement of construction vehicles may lead to noise generation. Increased traffic and human movement during the operational phase will also contribute to increased noise levels.							
Duration of Impact:	During the construction and operational phases							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	4	4	4	10.64
With Mitigation	2	2	2	2	3	4	3.5	7
Mitigation Measures	• Construction will be limited to daytime working hours to limit any disturbance to neighbouring landowners.							
	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	1	1	2	1.33	1	5	3	3.99

With Mitigation	1	1	1	1	1	5	3	3
Mitigation Measures	The only noise during the operational phase will be those associated with normal traffic and human movement. This impact is unavoidable.							
Can the impact be reversed	No. The development is permanent and noise due to construction activities, traffic and human movement is unavoidable. However, the impact during the construction phase is temporary and the impact during the operational phase will be Low.							
Will impact cause irreplaceable loss to resource	No							
Cumulative Impacts	There may be some cumulative impacts as there are surrounding activities, such as traffic that also contribute to noise.							

Summary of impacts				
	Construction		Operational	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Generation of dust due to construction activities.	9.32	3.99	4.98	3
2. Generation of noise due to construction activities.	10.64	7	3.99	3
Grand Average Total:	9.98 (Low-Moderate)	5.495 (Low – Moderate)	4.485 (Low)	3 (Low)
The overall environmental significance indicates that the impact on Air Quality and Noise will be LOW – MODERATE during the construction phase and LOW during the operational phase with the correct mitigation.				

This development will include the construction of a general business area and a filling station and the impact on air quality and noise during the construction phase will be associated with construction activities such as clearance of vegetation, movement of vehicles and construction of infrastructure and buildings. The impacts during the operational phase will be those associated with normal traffic and human movement. This impact is not expected to be significant.

Anticipated impacts of this development on Air Quality and Noise will include generation of dust and emissions due to construction and operational activities and generation of noise due to construction and operational activities.

The impact of generation of dust and emissions due to construction and operational activities is expected to be LOW-MODERATE during the construction phase without mitigation, as there are numerous activities during the construction phase that may generate dust and the site is

surrounded by homesteads and other businesses. This impact can be slightly lowered with the correct mitigation, but will remain in the LOW-MODERATE category. During the operational phase, the impact is expected to be LOW, as the only emissions will be those associated with vehicle emissions. It is not expected that this impact will be significant. It is also not anticipated that there will be any dust generation during the operational phase, as the entire site will be paved.

The impact of generation of noise due to construction and operational activities is expected to be MODERATE without mitigation, as construction activities may generate nuisance noise and the site is surrounded by homesteads and other businesses. This impact can be lowered to LOW - MODERATE with the correct mitigation, such as only working during normal daylight working hours. During the operational phase, the impact is expected to be LOW, as the only noise will be those associated with normal traffic and human movement. It is not expected that this impact will be significant, as the surrounding area is already developed and the site is situated next to a road that is already busy with traffic.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be some cumulative impacts regarding generation of dust, as there are some surrounding land uses that may also generate dust, such as agricultural activities. However, this is expected to be insignificant, as this land use in this area is minimal and most of the area consists of homesteads and businesses. There may also be a cumulative impact on noise, as the surrounding activities, such as traffic may also contribute towards noise.

Proposed mitigation:

- Speed limits should be enforced on construction vehicles in order to limit dust generation.
- Effort will be made to limit construction activities during very windy conditions.
- If dust generation proves to become problematic, dust control measures will be investigated (such as water spraying).
- Construction will be limited to daytime working hours to limit any disturbance to neighbouring landowners.

Archaeological, Palaeontological and Cultural Resources

The following impacts may occur on the archaeological, palaeontological and cultural resources as a result of the construction and operational phases of the activity:

- The potential grave on site may be damaged by construction and/or operational activities.
- There may be accidental unearthing, damage and/or loss of heritage and/or palaeontological resources as a result of construction or operational activities.

It should be noted that this is not expected to happen, as long as a buffer zone is maintained around the potential grave. No other heritage and/or palaeontological resources of significant value were observed.

1. Loss of culturally/palaeontological significant resources	
	Outspan 1960 (Preferred Location Alternative)
Potential Impact Description:	According to the Heritage Impact Assessment (Rossouw, 2019) there was no aboveground evidence of historically significant structures, rock art, prehistoric structures or clearly marked graves. Historical maps also showed no evidence of buildings, homesteads or associated structures on the site. **"**However, one isolated feature, which resembles a rubble dump, but what could also be the remnants of an informal grave, has been recorded**". I**t is also still possible that culturally or palaeontological significant resources may be accidentally unearthed during construction.
Duration of Impact:	During the construction phase and operational phase

	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	2	1	2	3	1	2	4
With Mitigation	2	2	1	1.66	2	1	1.5	2.49
Mitigation Measures	• A buffer zone of at least 5m must be maintained around the potential grave. • If any significant heritage or paleontological resources are discovered during construction, work must stop immediately, and a specialist must be contacted. • SAHRA will also be notified should traces of any palaeontological/archaeological heritage be found during construction							

	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	2	1	2	1	4	2.5	5
With Mitigation	2	2	1	1.66	1	4	2.5	4.15
Mitigation Measures	• A buffer zone of at least 5m must be maintained around the potential grave. **It should be noted that it is highly unlikely that other palaeontological/archaeological heritage will be unearthed during operation, as no excavation activities will take place.**							

Can the impact be reversed	No. Once an artefact has been unearthed or damaged it cannot be replaced. However, it is not anticipated that this will happen.
Will the impact cause irreplaceable loss to resource	No. The site has been identified as having insignificant paleontological resources and no evidence of archaeological material or historically significant structures were identified. The activities planned for the site also have little to no chance of unearthing any significant heritage resources.

Cumulative Impacts	None

Summary of impacts				
	Construction		**Operational**	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Loss of culturally significant resources	4	2.49	5	4.15
Grand Average Total:	4 (Low)	2.49 (Low)	5 (Low – Moderate)	4.15 (Low)
The overall environmental significance indicates that the impact on Archaeological, Palaeontological and Cultural Resources will be LOW during the construction and operational phase with the correct mitigation.				

The Heritage Impact Assessment (Rossouw, 2019) indicated that "The site is located within an outcrop area of moderately sensitive sedimentary rocks of the Adelaide Subgroup. However, no outcrops were observed during the inspection of the site which indicated that the underlying geology is capped by well-developed superficial deposits that are largely made up of (palaeontologically sterile) Quaternary wind-blown sands and residual soils" (Rossouw, 2019). There was no aboveground evidence of historically significant structures, rock art, prehistoric structures or graves. Historical maps also showed no evidence of buildings, homesteads or associated structures on the site. **"**However, one isolated feature, which resembles a rubble dump, but what could also be the remnants of an informal grave, has been recorded**".** It is also still possible that culturally or palaeontological significant resources may be accidentally unearthed during construction.

Anticipated impacts of this development on Archaeological, Palaeontological and Cultural Resources include the loss of culturally/palaeontological significant resources.

The impact of loss of culturally significant resources is expected to be LOW during the construction phase, with and without mitigation. The impact is expected to be LOW as there will be no activities that will require deep excavations and thus the chances of unearthing any culturally/paleontologically significant resources are minimal. The impact on the potential grave on site is expected to be very low if a buffer zone of at least 5m is maintained around the feature (Rossouw, 2019).

The impact on the potential grave during operation is expected to be LOW-MODERATE without mitigation, as there will be constant human movement on site which could lead to damage to the grave. However, this can be lowered to LOW, if a buffer zone of at least 5m is maintained around the grave. The chances that any other palaeontological/archaeological heritage will be unearthed during operation is highly unlikely, as no excavation activities will take place.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

It is not expected that there will be any cumulative impacts.

Proposed mitigation:

- A buffer zone of at least 5m must be maintained around the potential grave.
- If any significant heritage or paleontological resources are discovered during construction, work must stop immediately, and a specialist must be contacted.
- SAHRA will also be notified should traces of any palaeontological/archaeological heritage be found during construction

Aesthetics

The following impacts may occur on the aesthetics as a result of the construction and operational phases of the activity:

- Negative aesthetic impact due to construction and operational activities.

1. Negative aesthetic impact								
	Outspan 1960 (Preferred Location Alternative)							
Potential Impact Description:	Construction activities such as clearance of vegetation and construction of buildings and infrastructure may have a negative aesthetic impact. However, construction activities are temporary. During the operational phase, there may also be a negative aesthetic impact, as the site will be permanently developed from its natural setting to a commercial setting.							
Duration of Impact:	During the construction and operational phases.							
	Construction phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	3	3	2	2.66	2	4	3	7.98
With Mitigation	2	3	1	2	2	4	3	6
Mitigation Measures	• Clearance of vegetation and other construction activities will be limited to the area under construction. • The site will always be kept clean and neat by correct housekeeping and waste disposal.							

	• Any spills and/or leakages should be cleaned immediately in the correct manner.

	Operational Phase							
	Severity	**Duration**	**Extent**	**Consequence**	**Probability**	**Frequency**	**Likelihood**	**Significance**
Without Mitigation	2	5	2	3	1	5	3	9
With Mitigation	1	5	1	2.33	1	5	3	6.99
Mitigation Measures	• Operational activities will be limited to the operational area. • The site will always be kept clean and neat by correct housekeeping and waste disposal. • Any spills and/or leakages should be cleaned immediately in the correct manner.							
Can the impact be reversed	No. The development is permanent and there will be a permanent aesthetic impact, as decommissioning and rehabilitation is not anticipated.							
Will the impact cause irreplaceable loss to resource	Yes. The aesthetic impact will be permanent. However, the impact is not expected to be high.							
Cumulative Impacts	There may be a cumulative impact, as the surrounding area is also developed, which has contributed to negative aesthetics in the area.							

Summary of impacts				
	Construction		**Operational**	
Potential Impacts	**Without Mitigation**	**With Mitigation**	**Without Mitigation**	**With Mitigation**
1. Negative aesthetic impact	7.98	6	9	6.99

Grand Average Total:	7.98 (Low - Moderate)	6 (Low - Moderate)	9 (Low – Moderate)	6.99 (Low – Moderate)
The overall environmental significance indicates that the impact on Aesthetics will be LOW - MODERATE during the construction and operational phases with the correct mitigation.				

The proposed development will have a negative aesthetic impact during the construction and operational phases, especially on passing motorists, as the site is located next to the R64 road.

The negative aesthetic impact of this development is expected to be LOW - MODERATE during both the construction and operational phases, with and without mitigation. An aesthetic impact is unavoidable, as the development will be permanent, and no rehabilitation is planned. The site is also located next to a busy road (R64), which increases the impact. However, the aesthetic impact caused by construction activities is temporary. The impact can also be slightly lowered if the site footprint is not increased and if the site is kept clean and neat through the correct waste disposal and housekeeping. It should be noted that the site is already disturbed, and the natural vegetation is degraded.

As mentioned earlier in the report, there are no feasible location alternatives due to the applicant owning the property. This property is also in the ideal location for the development to serve the entire area (Bainsvlei and Groenvlei agricultural holdings) and will be the only one in the immediate vicinity. In terms of environmental suitability, the proposed site has no natural watercourses within 100 m of the site and falls within a degraded area according to the Free State Biodiversity Management Plan (2015).

There are also no layout alternatives due to traffic regulations in the provision of the proposed internal street. Also, as mentioned earlier, there is no feasible technological alternative because as far reasonably possible, the best technology will be utilised to limit and / or prevent impact on the environment.

There may be a cumulative impact on aesthetics, as the surrounding area is also disturbed due to development.

Proposed mitigation:

- Clearance of vegetation and other construction activities will be limited to the area under construction.
- The footprint of the operational area may not be increased.
- The site will always be kept clean and neat by correct housekeeping and waste disposal.
- Any spills and/or leakages should be cleaned immediately in the correct manner.

Demographics and Regional Socio-economic Structure

The development will have a positive impact on the demographics and socio-economic structure of the surrounding areas. The development will create multiple jobs during construction and during the operational phase of the project. At least 75 new permanent employment opportunities will be created during the operational phase and 60% if this will accrue to previously disadvantaged individuals.

3. Conclusion

From the Impact Assessment it can be concluded that there are no impacts that are expected to have a HIGH or unacceptable rating. The most significant impacts associated with this proposed development include the impacts on Soil (due to possible spillages of dangerous substances), Land Use, Groundwater (due to storage of dangerous substances), Noise (during construction) and Aesthetics. However, with the correct mitigation and management measures as discussed above, none of the impacts on these aspects are expected to be above MODERATE.