APPENDIX F: ENVIRONMENTAL IMPACT ASSESSMENT:

TABLE OF CONTENTS

IMPACT ASSESSMENT METHODOLOGY
SECTION A: IMPACTS ASSOCIATED WITH THE PROPOSED HOUSING
DEVELOPMENT AND ASSOCIATED INFRASTRUCTURE
1. Impacts that may Result from the Planning and Design Phase
2. Impacts That May Result From the Construction and Operational Phases
(a) Loss of vegetation and biodiversity due to construction activities
(b) Impacts on Topography11
(c) Impacts on Geology and Soils
(d) Impact on Air Quality14
(e) Impacts on Heritage Resources
(f) Social and Economic Impacts
Social and Economic Impacts during the Construction Phase
Social and Economic Impacts Associated With Operational Phase
(g) Visual and Aesthetic Impacts27
(h) Traffic
3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING PHASE 30
SECTION B: ASSESSMENT OF CUMULATIVE IMPACTS
SECTION c: ASSESSMENT OF THE No-Go OPTION

This assessment of environmental and social impacts considers all components of the proposed housing development project on the following plots of land in Postmasburg:

- » Portion of the Remainder of ERF 1
- » Remainder of ERF 3604
- » ERF 3666 (Portion of ERF 3604)
- » Erf 3618 (Portion of ERF 3604)
- » ERF 3665 (Portion of ERF 3604)
- » Remainder of ERF 1249 (Portion of ERF 1),
- » ERF 3664 (Portion of ERF 3604)
- » Remainder of ERF 763 (Portion of ERF 1)

A realistic estimate of 185 housing units could be accommodated on the land available to Transnet. The footprint for the housing development is up to 16 hectares in extent. Infrastructure typically associated with such a development considered in this assessment includes, inter-alia:

- » Up to 185 housing units (two and three bedroom units);
- » New access roads (internal and to the development) and upgrade of existing access roads;
- » Carports;
- » Fencing;
- » Elevated water tanks;
- » A water tower and pump station;
- » Electrical infrastructure and cabling;
- » Water Supply pipes;
- » Storm Water Pipes; and
- » Sewerage reticulation system (sewage pipes).

A recreational facility (the details of which are currently being determined) will also be developed. The development of the housing units are described according to its life-cycle i.e.:

- » Planning Phase
- » Construction Phase:
- » Operation Phase
- » Decommissioning Phase (not applicable at this stage)

» Planning Phase:

Prior to development of the residential units in Postmasburg, Transnet is currently in process of obtaining the following approvals/ permits/ documents necessary for the project:

- Engineering Design
- Environmental Authorisation
- Re-zoning of the Land (from "transportation" to "residential") and Approval of the building plans by the Local Municipality
- Way leaves will be obtained before constructing near or over any existing services.

» Construction Phase:

Construction of the housing development is expected to take place over a 16 month period and will include the following:

- Development of a temporary Contractors Camp & Laydown area (1 hectare in extent)
- o Earthworks:

Earthworks will include clearing of vegetation, levelling of surfaces, excavation for the drains, road box cuts, terrace and the levelling of the playing fields and the fill to the north western corner of the development site. Excavated material to be properly stockpiled and re-used where necessary. / disposed of at a suitable disposal facility as per standard Transnet waste management practices. Imported material is to be sourced from the existing borrow pit (on condition that the borrow pit has the necessary approvals in place) located approximately 3 km west of the town of Postmasburg. From the generally flat nature of the site it is anticipated that cuts and fills will be low, i.e. of the order 1-2 metres.

o <u>Terracing:</u>

Terracing will be required for the north-western area of the development. Terracing will require fill material to raise the localised low spot and slope the entire area towards the proposed road for drainage purposes. Topsoil removal up to 150 mm below natural ground level is to be removed to a topsoil stockpile. In-situ material is to be compacted. Fill material is to be placed in 150 mm thick layers and compacted to final terrace level. Topsoil to be replaced and evenly spread across the terrace

• Trenching and backfilling:

Trenches will be excavated to a depth to achieve at least 600 mm of cover to soffit of the pipe. Minimum depth for small diameter pipes to be 1000 mm

and minimum width of trench to be 750 mm. Trenches to be backfilled with bedding sand before pipes are placed in trenches.

o Landscaping:

Landscaping will be required on the sidewalks after service trenches have been backfilled.

o <u>Site Rehabilitation</u>:

All construction work areas will be re-instated and construction waste and equipment removed, prior to hand-over to Transnet. The area will be rehabilitated/vegetated.

» Operation Phase:

The housing units are planned to be ready for occupation in 2017. During the operational phase, the houses will be maintained by the Transnet employees / home owners. Limited activities will include waste management and maintenance of buildings as and when required. Refuse bins will be placed in the designated areas for collection by the Local Municipality.

» Decommissioning Phase:

The housing development is not intended to be decommissioned. The lifespan of the houses can extend indefinitely to service Transnet employees. The intention is for Transnet staff take over ownership of the houses.

The following comprehensive specialist reports are contained in Appendix D:

- » Social impact assessment (including interviews)
- » Noise impact assessment
- » Traffic Impact Statement

The sections below provide an impact assessment of the housing development under the following sections:

- » Section A: Impacts Associated with proposed housing development
- » Section B: Assessment of Cumulative Impacts
- » Section C: Assessment of the No-Go Alternative

IMPACT ASSESSMENT METHODOLOGY

Direct, indirect and cumulative impacts of the issues identified through the basic assessment were assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - the lifetime of the impact will be of a very short duration (0–1 years) assigned a score of 1;
 - the lifetime of the impact will be of a short duration (2-5 years) assigned a score of 2;
 - medium-term (5–15 years) assigned a score of 3;
 - * long term (> 15 years) assigned a score of 4; or
 - permanent assigned a score of 5;
- The magnitude, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the status, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be *mitigated*.

The **significance** is calculated by combining the criteria in the following formula:

- S = (E + D + M)P
- S = Significance weighting
- E = Extent
- D = Duration
- M = Magnitude
- P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),</p>
- » 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

SECTION A: IMPACTS ASSOCIATED WITH THE PROPOSED HOUSING DEVELOPMENT AND ASSOCIATED INFRASTRUCTURE

1. Impacts that may Result from the Planning and Design Phase

Alternative (preferred alternative)

No environmental impacts are anticipated that may result from the planning and design phase of the proposed housing development and associated infrastructure.

2. Impacts That May Result From the Construction and Operational Phases

(a) Loss of vegetation and biodiversity due to construction activities

The site for the proposed housing development is located in an urban area within the town of Postmasburg. The site is not in a pristine state and currently vacant land, with bare, exposed soils in most areas and scattered alien vegetation. The ground cover comprises of bare soils due to the area being historically used for houses in some parts (with old foundations present in some areas). The site falls within the Savannah biome. Originally, the site would have been characterised by Kuruman Thornveld vegetation. No intact, significant areas containing Thornveld vegetation worth conserving where identified on the site. No protected plant or animal species were identified to occur on the site. The site currently comprises of a combination of bare, exposed soils, patches of disturbed grasses and scattered alien vegetation. The vegetation and trees that are scattered on the site comprises of alien species including:

- » Eucalyptus globulus (Blue Gum Trees);
- » Prosopis glandulosa (commonly called Prosopis or Mesquite Trees);
- » Schinus molle (Pepper tree),
- » Opuntia ficus-indica (Prickly pear); and
- » *Grevillea robusta* (Australian silky oak).

The site is flat and there are no drainage lines or other aquatic features present on or within 500m of the site. No flora or fauna species of conservation concern occur on the site. No wildlife or game occurs on the site. The proposed development will be undertaken within a disturbed environment. Due to the resultant lack of biodiversity, and habitats, few animals are expected to be found in the area to be developed.

Overall, the site is not considered highly sensitive in terms of flora, fauna and biodiversity.

Despite, the site not being highly sensitive in terms of biodiversity, the construction of the housing development will result in loss of vegetation which does occur on the site (majority of which is alien vegetation) due to clearing of vegetation cover, excavations (cut and fills between 1 - 2m) for the foundations of the houses, digging of trenches for the associated infrastructure such as water pipes, sewer pipes, electrical cables etc. The construction process will result in ground cover and vegetation loss. However, the vegetation comprises of alien vegetation, which is suitable for removal. Alien invasive species may thrive and natural habitat could be lost. An appropriate alien species management plan must be developed and implemented for the project site. The impact associated with vegetation removal will be negative and of a low significance with mitigation.

In the long term, environmental degradation could occur due to the use of the land and houses by residents. Should the open areas and infrastructure such as sewage pipelines within and linked to each household not be maintained, potential contamination and environmental degradation could occur. It is possible to protect the remaining environment (vegetation, soil, possibly animals) though proper maintenance activities during the operational life of each house. This would be the responsibility of the individual home owners or occupiers. The impact will be negative and of a low significance with and without mitigation

Nature: Loss of vegetation and biodiversity due to the construction activities.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (2)
Magnitude	Minor (6)	Low (3)
Probability	Probable (3)	Unlikely (2)
Significance	Medium (33)	Low (12)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Impact Tables Summarising Impacts on vegetation and biodiversity

Mitigation

- » An appropriate alien species management plan must be developed and implemented for the site, prior to construction.
- » Alien vegetation that occurs on the development footprint to be removed from the site, prior to construction, and monitored during and after the construction phase.
- » No collection of plants or plant parts to be allowed by construction personnel.
- » During construction, prohibit vegetation disturbance outside the development footprint.
- » Should the contractor encounter any plant or animal species which they are uncertain or concerned about, an environmental specialist to be consulted in this regard.
- » Once construction is complete, all construction work areas will be rehabilitated and construction waste and equipment removed, prior to hand-over to Transnet.
- » During landscaping, lawns and outside areas for each house to be vegetated using indigenous plant/ tree and/or grass species.
- » Plant indigenous trees along the boundaries of the development and in open spaces (such as any play grounds/ crèches) are recommended to provide ecosystem services and to act as natural wind breaks.
- » Consider the addition of vegetated open spaces between clusters of houses, to benefit from the habitat and ecosystem services which plants provide.
- » Prohibit the burning of fires during construction. Fires may be allowed within fire-safe demarcated areas, if required.
- » If the construction camp or lay down area must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.
- » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- » Construction site should be properly demarcated and no unauthorized persons should be allowed onto the site.
- » All construction vehicles should adhere to a low speed limit to prevent collisions with any animal species.

Cumulative Impacts

The addition of the proposed housing development within a growing and existing residential area has the potential to result in cumulative negative impacts on the vegetation in the area. Considering that Postmasburg is an urban area, the cumulative negative impacts on vegetation will be low.

Residual Impacts

The area is not highly sensitive and with mitigation, there will be very little residual impacts on the terrestrial environment.

Nature: Environmental degradation in the long term, due to the use of the houses by residents.

	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)

Duration	Long-term (4)	Long-term (2)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, partially	

Mitigation

- » No herbicides should be used and if vegetation clearing needs to take place, this should be done by hand.
- » Maintain open spaces and gardens and prune trees.

Cumulative Impacts

The addition of the proposed housing development within a growing and existing residential area has the potential to cause cumulative environmental degradation within the urban area. Considering that Postmasburg is an urban area, the cumulative negative impacts on the environmental will be low.

Residual Impacts

The area is not highly sensitive and with mitigation, there will be very little residual impacts on the terrestrial environment.

Implications for Project Implementation

- » Mitigation measures included in the EMPr to reduce or avoid negative impacts on vegetation and biodiversity must be implemented.
- » Alien invasive species may thrive and natural habitat could be lost. An appropriate alien species management plan must be developed and implemented for the project site.
- » After decommissioning takes place if no rehabilitation takes place the area will be aesthetically unpleasing and indigenous vegetation will not reestablish. An appropriate rehabilitation plan must be developed and implemented for the site, prior to decommissioning.
- » The design of the housing development to consider addition of vegetated open spaces between clusters of houses, to benefit from the habitat and ecosystem services which plants provide.

(b) Impacts on Topography

The proposed housing developments will not impact the local topography as it is a very small area and the site is located in a relatively flat area. As the area is already heavily impacted by residential development the impact on topography is considered to be of low significance without further mitigation.

(c) Impacts on Geology and Soils

<u>Geology:</u>

The geological map of the general area within which the site occurs indicates that the site is underlain by a mantle of colluvium overlying residual calcrete soils and residual dolomite which in turn is overlying hardpan calcrete and dolomite of the Campbell Rand Formation, Ghaap Group. In some of the trial pits the upper colluvial layer is absent and the residual soil extends from surface. Fill was only found in TP8 from 0.0 to 0.35 metres below ground level. In summary the following generalised ground conditions can be expected (depth to base of layer):

- » 0.0-0.15m: Loose silty SAND with gravel. Colluvium.
- » 0.15-1.45m: Loose to very dense silty sand with gravel or silty sandy gravel. residual calcrete/residual dolomite.
- » +1.45m: Hardpan calcrete/soft rock dolomite.

A geotechnical study was commissioned by Transnet undertaken by and indicated that the site is underlain by dolomitic terrain. However due to the preliminary nature of the report and the pre-feasibility stage of the project, the investigation into the dolomitic stability has not yet been completed. A geophysics gravity survey is recommended by the geotechnical engineer as well as follow up percussion drilling be done before the dolomitic area designation can be determined in accordance with NHBRC recommendations. The trial pits and DCP results have however shown the ground conditions to be competent, the site is already in use for housing, and light, single storey housing units are planned. Thus normal foundations in accordance with the deemed-to-satisfy rules of SANS 10400 have been allowed for at this stage. This will be confirmed with the results of the dolomitic survey before drawings are issued for construction. The geological impacts will consist of foundation excavations and soil and grading activities to construct the houses and associated infrastructure. There will be no impact on any geological structures below the alluvium.

Soils:

The soil type for the site is defined as AG111 soil type (shallow soils with underlain by hard or weathering rock). The soil profile of the site is characterised by slightly moist greyish brown loose intact silty fine grained sand. The soils on the site are sensitive to erosion by wind or water. The ground cover on the site comprises of bare soils due to the area being historically used for houses in some parts (with old foundations present in some areas). This makes the site susceptible to erosion by wind or water.

As a worst case scenario, it is assumed that the development footprint (16 hectares in extent) will be cleared of vegetation, which can result in bare areas which can trigger soil erosion. Construction and use of access roads has the potential to cause soil erosion if not managed correctly. By compacting soil, vehicles destroy the vegetation (e.g. grass) and prevent future growth. The bare soil therefore may become eroded. The housing development may lead to erosion. This impact is considered to be of moderate significance without mitigation.

The use of chemicals (such as oil or fuel) during construction and operations can result in soil contamination, although limited and which can be controlled. With the use of soil erosion management measures, the construction and operation of the houses and associated infrastructure is likely to have a low impact on soils.

Nature: Soil erosion during and after the construction phase due to decreased vegetation

cover and increased water run-off.			
	Without mitigation	With mitigation	
Extent	Regional (3)	Local (1)	
Duration	Permanent (5)	Short-term (2)	
Magnitude	High (8)	Moderate (6)	
Probability	Definite (5)	Probable (3)	
Significance	High (80)	Medium (30)	
Status	Negative	Negative	
Reversibility	Low	Low	
Irreplaceable loss of	Yes	Yes	
resources?			
Can impacts be	Yes	Yes	
mitigated?			
Mitigation:			
» Care must be taken with the ground cover during and after construction on the site. If			
it is not possible to retain a good plant cover during construction technologies should			

Impact	Tables	Summarising	Impacts	on Soils
mpaoe	100	e anna ionig	mpaoto	011 00110

be employed to keep the soil covered by other means, i.e. straw, mulch, erosion control mats, etc., until a healthy plant cover is again established. Care should also be taken to control and contain storm water run-off.

- » A stormwater management plan to control and manage water from the roads and the housing infrastructure to be compiled by the appointed contractor before the onset of construction .Grading of the site is required after construction to ensure free flow of runoff and to prevent ponding of water.
- » Adhere to the specification outlined in the geotechnical report/ survey.
- » Implement measures to effectively contain and allow settling prior to its discharge of any stormwater arising at the construction site.
- » Construction of anti-erosion berms on access roads.
- » Ensuring that stockpiles are well managed (such as covering them stock piles) to minimise erosion thereof/ soil loss.
- » Ripping of compacted soil to promote re-vegetation of tracks and other areas surrounding the gabion structure that have been compacted.
- » Rehabilitate the construction site by establishing it with indigenous grasses and trees.
- » Re-vegetation of the site must be undertaken after decommissioning.

Cumulative Impacts:

Little with the necessary mitigation in place

Residual Impacts:

Little with the necessary mitigation in place

Nature: Contamination and degradation of the soil due to spillages of oil, petrol, diesel and other contaminants used by vehicles and equipment on the site or stored on the site (during construction).

	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Medium (36)
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of	Yes	Yes
resources?		
Can impacts be	Yes	
mitigated?		

Mitigation:

- » Construction vehicles and equipment must be serviced regularly and maintained in a good running condition.
- Drip trays to be placed under construction vehicles when parked for extended periods.
 Drip trays must be emptied and maintained on a regular basis.
- » Spill kits must be kept at appropriate locations on-site during construction.

Cumulative Impacts:

Low, with the necessary mitigation in place

Residual Impacts:

Spillages of contaminants will have a long residual effect on the natural resources, specifically to the soil and vegetation.

Implications for Project Implementation

- » A geophysics gravity survey is recommended by the geotechnical engineer as well as follow up percussion drilling to be done before the dolomitic area designation can be determined in accordance with NHBRC recommendations. The trial pits and DCP results have however shown the ground conditions to be competent, and the site is already in use for housing, and light, single storey housing units are planned. Thus normal foundations in accordance with the deemed-to-satisfy rules of SANS 10400 have been allowed for at this stage. This must be confirmed with the results of the dolomitic survey before drawings are issued for construction.
- The bare soils on the site are susceptible to erosion. Care must be taken with the ground cover during and after construction on the site. If it is not possible to retain a good plant cover during construction, technologies should be employed to keep the soil covered by other means, i.e. straw, mulch, erosion control mats, etc., until a healthy plant cover is again established.
- » Care should also be taken to control and contain storm water run-off. A storm water management plan must be compiled and implemented.
- » Rehabilitate the construction site by establishing it with indigenous grasses.
- » Erosion control measures must be utilised during construction, operations, decommissioning and rehabilitation of the site.
- » Re-vegetation of the site must be undertaken after decommissioning.

(d) Impact on Air Quality

Dust is often generated during construction activities associated with site clearance, excavation, demolition, cement mixing as well as through the use of construction vehicles on gravel/unpaved roads. Construction activities and material stockpiling can also result in the generation of dust. Dust can be exacerbated during windy conditions. The impact of the construction activities leading to air pollution is regarded as having a low to moderate significance without mitigation.

Apart from dust, other sources of air pollution include exhaust fumes from construction vehicles and equipment, poor waste management procedures, burning of general or construction waste, odour from poor management of temporary latrines and runaway fires.

These activities can result in an impact on the air quality on site and greater urban area (Postmasburg). The increase in vehicular emissions produced by vehicles owned by residents could to some extent contribute to air pollution during the operational phase of the proposed housing development. This is however expected to be very limited. Due to the site being located in an urbanised area, background air pollution is already fairly moderate due to road traffic and surrounding industrial and residential activities.

Nature: Dust generation and odour during the construction and operational phase.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (2)
Magnitude	Minor (6)	Low (3)
Probability	Probable (3)	Unlikely (2)
Significance	Medium (33)	Low (12)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Impact Table Summarising Impacts on Air Quality

Mitigation

- » Apply dust control measures, such as spraying water on surfaces / use of products such as dustex, during the construction phase and under windy conditions / when dust problems arise.
- » The use of vegetation cover (plants, grasses/ trees) is a good way to protect the soils and reduce bare soils being carried by wind and causing dust.
- » Planting vegetation / grasses to be undertaken immediately after construction where soil has been exposed.
- » Minimisation of the surface area exposed to wind erosion during construction.
- » Maintenance of vehicles and other driven machinery in use to ensure that no smoke is emitted from exhausts.
- » Prevention of burning of cleared vegetation and wastes/refuse.
- » Regular emptying and appropriate disposal of latrine content from chemical toilets used during construction.

Cumulative Impacts

Low, with the necessary mitigation in place

Residual Impacts

Low, with the necessary mitigation in place

Implications for Project Implementation

» It is essential that dust and odour control is managed, especially during the construction of the housing development.

(e) Impacts on Heritage Resources

SAHRA was consulted at the start of the Basic assessment process and requested to inform the developer if any heritage studies will be required. SAHRA confirmed that no Heritage or Palaeontological Impact Assessment is required for this project. SAHRA advised that it is unlikely that any significant impacts on heritage resources will result from the construction of the proposed housing development as the area has already been highly impacted. SAHRA Archaeology, Palaeontology & Meteorites (APM) Unit had no objection to the proposed development on the condition that if any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, fossils or other categories of heritage resources are found during development activities, SAHRA APM Unit (Katie Smuts/Colette Scheermeyer 021 462 4502) must be alerted immediately, and a professional archaeologist and/or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.

Nature: The potential damage or loss of below and above ground heritage sites/remains/		
fossils due to the construction activities.		
	Without mitigation With mitigation	
Extent	Extent Local (1) Local (1)	
Duration	n Permanent (5) Permanent (5)	
Magnitude	Minor (2)	Minor (2)
Probability	robability Unlikely (1) Unlikely (1)	
Significance	Low (8)	Low (8)
Status (positive or	Negative	Neutral
negative)		
Reversibility	No	No
Irreplaceable loss of	No, but in some cases, yes	No

Impact Table Summarising Impacts on Heritage Resources

resources?		
Extent	Local (1)	Local (1)

Mitigation:

- If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, fossils or other categories of heritage resources are found during development activities, SAHRA APM Unit (Katie Smuts/Colette Scheermeyer 021 462 4502) must be alerted immediately, and a professional archaeologist and/or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.
- » If concentrations of archaeological materials are exposed then all work must stop in the affected area for an archaeologist to investigate.
- » If any human remains or any other concentrations of archaeological heritage material are exposed during construction, all work must cease in the affected area and it must be reported immediately to the nearest museum/archaeologist or the Northern Cape Heritage Authority and the South African Police Services (for human remianes).
- » A systematic and professional investigation must be undertaken. Sufficient time should be allowed to investigate and to remove or collect such material. Specific recommendations will follow from the investigation.

Cumulative impacts:

Where any archaeological contexts occur, the impacts are once-off permanent destructive events. Infrastructure development may lead to spatially extended impacts in the vicinity. Minimal archaeological traces mean that cumulative impacts would be negligible.

Residual impacts:

None

(f) Social and Economic Impacts

In summary, the main social and economic impacts relate to:

- » Employment creations
- » Infrastructure development
- » Economic benefits to the local municipality
- » Social nuisances (mainly during construction) such as noise and traffic congestion.

These impacts are discussed and assessed below.

Social and Economic Impacts during the Construction Phase

The key social impacts associated with the construction phase include:

- » Creation of employment and business opportunities and opportunity for skills development and on-site training.
- » Nuisances associated with construction such as noise, traffic, influx of job seekers into the area.

Creation of employment and business opportunities during the construction phase

The construction phase of the housing development is expected to take approximately 16 months to complete. A percentage of the wage bill will be spent in the local economy represents a significant opportunity for the local economy and businesses in Postmasburg. The wage bill associated with the construction phase is estimated to be in the region of R 4.3 million. Assuming that each house employs ~ 15 people during construction (including sub-contractors), the total number of construction workers required to complete 38 houses every 3 months would be in the region of 550 workers. Based on experience with other construction projects, approximately 50% of workers will fall within the low-skilled category, 30% in the medium-skilled category and 20% in the high-skilled worker category.

The majority of low and semi-skilled employment opportunities are likely to be available to local residents in the area, specifically residents from Postmasburg. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a positive social benefit in an area where employment opportunities for low skilled workers are limited. However, in order to maximize the benefits for the local community the proponent will need to demonstrate a commitment to local employment targets. A percentage of the medium and high-skilled opportunities are also likely to be available to local residents in the area.

The local service industry will also benefit from the proposed development. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site. This will create opportunities for local catering, cleaning, laundry, security etc. companies.

In addition, the skilled workers and project managers are likely to be accommodated off-site in Postmasburg. This will create opportunities for local hotels, B&Bs, guest farms and people who want to rent out their houses. Interviews with officials from the Tsantsabane Local Municipality indicated that the municipality supported the proposed housing development. The proposed development also supports the objectives set out in the NC PGDS and the SDM and TLM IDP's, specifically the creation of employment and economic development opportunities. The proposed

development will also create opportunities to support SMMEs and co-operation between the public and private sector in the Northern Cape Province.

Impact Table summarizing positive social and economic impacts during the construction phase

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	With Enhancement
Extent	Local – Regional (2)	Local – Regional (3)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (32)	Medium (36)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of	N/A	N/A
resources?		
Can impact be enhanced?	Yes	

Enhancement:

Employment

- Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and lowskilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- » Where feasible, efforts should be made to employ local contactors that are compliant with Black Economic Empowerment (BEE) criteria.
- » Before the construction phase commences the proponent and its contractors should meet with representatives from the TLM to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- » The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should seek to develop a database of local companies, specifically BEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- The TLM, in conjunction with the local Chamber of Commerce and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.
- » Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

Cumulative impacts:

Opportunity to up-grade and improve skills levels in the area.

Residual impacts:

Improved pool of skills and experience in the local area.

Nuisances and social threats associated construction activities

The short-term social nuisances impacts associated with the construction activities include noise, dust and safety and security related impacts. These impacts are linked to linked movement of construction vehicles, specifically large trucks, the operation of machinery, such as cement mixers, compressors, hammering, etc. These activities have the potential to impact on the local residents living in Die Stasie, which is located adjacent to the site. The activities also have the potential to impact on Traffic Department (staff and members of the public).

An increase in the number of people in one area may also be associated with an increase in crime. The construction phase of the proposed project could result in negative impacts on the safety of the public, especially on the more vulnerable sectors of the community such as the poor, farm or smallholding owners and the elderly. Further safety concerns during the construction phase relate to children accessing the construction site, unauthorised entry to the construction site, and the movement of heavy vehicles or machinery in close proximity to existing residential areas and on roads used by large numbers of pedestrians. Without proper planning and care, certain construction activities could also have a negative impact on neighbouring and surrounding business and economic activities. These could potentially include impacts such as damage to property or services that supply the businesses, requiring access through properties, privacy of neighbouring facilities, restricting access to sites, construction traffic, dust, fumes and noise generation.

The following mitigation measures should be implemented:

Impact Table summarizing negative social impacts during the construction phase

Nature: Potential noise, dust and safety impacts associated with construction related activities			
	Without Mitigation	With Mitigation	
Extent	Local (3)	Local (2)	
Duration	Short Term (2)	Short Term (2)	
Magnitude	Moderate (6)	Low (4)	
Probability	Probable (3)	Probable (3)	
Significance	Medium (33)	Low (24)	
Status	Negative	Negative	
Reversibility	Yes	Yes	
Irreplaceable loss of resources?	No	No	
Can impact be mitigated?	Yes	Yes	

Mitigation:

- » Construction working hours should be confined to between 06h00 and 18h00.
- » Construction activities over weekends should only be permitted between 08h00 and 13h00 on Saturdays.
- » No construction related activities should be permitted on Sundays and Public Holidays.
- » The contractor must ensure that all damage caused to local roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor.
- » Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- » All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits.
- » Ensure safe and secure public transport access points.
- » Display of danger warning signs and no public access sign at all potential access roads and paths.
- » Prevention of access to any excavations areas.
- » Locking or locking away of any dangerous plant, equipment, material or substance when not supervised or in use.

- Where possible, the movement of construction workers should be confined to the work site to avoid any potential for impact from this variable in proximate residential areas.
- » Continue and extend any current HIV/AIDS awareness and support programmes to the construction work-force for this development.
- » Construction waste to be managed on a daily basis and disposed of correctly.

Cumulative impacts:

No cumulative impacts expected as impacts to be contained in a single area and linked to specific activity, the construction of the Transnet housing project

Residual impacts:

Impact on the quality of life of the local residents during construction period only. No residual impacts likely after completion of construction phase.

Social and Economic Impacts Associated With Operational Phase

The key social issues affecting the operational phase include:

- » Creation of accommodation facilities for Transnet employees.
- » Positive fiscal contribution of the housing development project to the local economy.
- » Creation of employment and business opportunities to service the new houses.
- » Impact on capacity of existing services and infrastructure.

Creation of accommodation facilities of Transnet employees

The findings of the SIA indicate that the rapid, mining-linked expansion of the town of Postmasburg over the last 3-5 years has resulted in a severe shortage of housing and accommodation in the town. As a result accommodation is scarce and the costs for rentals are extremely high. This was confirmed by local community representatives. Transnet realizes this shortage of housing, and this housing development project is an attempt to cater for the social needs for Transnet's employees, given that Transnet has a piece of land available to convert into houses. The proposed housing project therefore partially addresses the critical shortage of housing in Postmasburg. In doing so it represents a positive social benefit for the Transnet employees who will be accommodated in the houses to be built. Failure to provide accommodation would result in a negative social impact for Transnet's staff due to the severe shortage of accommodation and the high rental costs. Failure by Transnet to provide accommodation of its staff would also, in all likelihood, jeopardize their expansion programme, which in turn, would impact negatively on the mining sector and the economic development of the area as a whole.

Impact Table summarizing the impact associated with creation of accommodation for Transnet employees

Nature: Creation of accommodation for Transnet employees		
	Without Mitigation (This assumes that no houses provided by Transnet)	With Enhancement (Enhancement assumes houses provided by Transnet)
Extent	Local-Regional (3)	Local – Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	Medium (51)	High (65)
Status	Negative	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	Yes

Enhancement:

» The housing development to be constructed in line with the relevant legislation/ standards such as the Building Regulations.

Cumulative impacts:

Creation of accommodation for Transnet employees removes pressure that would have potential been created if no accommodation had been provided. Therefore positive cumulative impact for local housing market.

Residual impacts:

Yes, if no housing provided. Residual impact on local housing market and rental prices

Benefit to the local economy

The proposed Transnet expansion programme will accommodate at least 185 Transnet employees who will be earning a monthly wage, a portion of which will be spent in Postmasburg and the Tsantsabane Local Municipality. This will benefit the local economy and local businesses in Postmasburg. The 185 households will also create potential employment opportunities in the form of work for cleaners and gardeners. If one assumes that 50 % of the household employ a cleaner/gardener, this would create in the region of 100 new employment opportunities.

The establishment of 185 houses will broaden the rates base of the Tsantsabane Local Municipality, which will represent a benefit the local economy. With proper management a broader rates base and increased revenue from sale of water and electricity should assist the Tsantsabane Local Municipality to address some of the challenges associated with the growth of Postmasburg over the last 3-5 years, specifically the challenges facing the lower income areas in the town. The contribution of the Transnet housing project to the rates base should also be seen within the context of the contribution by other the housing projects in the area initiated by the mining sector (Anglo American and Asmang).

Impact tables summarizing benefit to the local economy during the operation phase

Nature: Creation of employment and business opportunities during the operational phase				
	Without Mitigation	With Enhancement (Enhancement measures for individual households not realistic)		
Extent	Local – Regional (2)	Local – Regional (2)		
Duration	Long Term (4)	Long Term (4)		
Magnitude	Low (4)	Low (4)		
Probability	Probable (3)	Probable (3)		
Significance	Medium (30)	Medium (30)		
Status	Positive	Positive		
Reversibility	N/A	N/A		
Irreplaceable loss of resources?	N/A	N/A		
Can impact be enhanced?	Yes	Yes		

Enhancement :

» Maintain communication with the local municipality on issues related to rates, services and maintenance activities such as waste collection.

Cumulative impacts:

Opportunity to create opportunities for employment and improve skills levels in the area.

Residual impacts:

Improved pool of skills and experience in the local area.

Impact on local services and capacity of the Tsantsabane Local Municipality

The findings of the SIA indicate that rapid, mining related growth in Postmasburg over the last 3-5 years has impacted on local services. In addition, the capacity and ability of the TLM to manage the increased pressure on services such bulk water reticulation, sewage treatment, waste collection and disposal, maintenance of roads etc. was identified as a key issue of concern. The TLM also identifies the capacity of the TLM as a key issue. While there have been no major service delivery related protests in the town to date, the conditions on the ground for such protests are in place. The local station commander also indicated that while there had been not xenophobia related incidents in Postmasburg, the conditions for such incidents were in place.

In addition to the services provided by the TLM, the rapid growth of Postmasburg has also impacted on other key community services, such as schools, police, hospitals, clinics and emergency services. The findings of the SIA indicate that there is limited space in schools, specifically schools in Newtown and Boichoko. Information provided by the local station commander at the Postmasburg Police Station indicates that they do not have sufficient staff and vehicles to effectively police the area. In addition to the lack of capacity the rapid growth of the informal areas has also made policing difficult due to poor access in these areas. Similar capacity challenges face the local emergency services in Postmasburg. The rapid growth of the town over the last 3-5 years has also been accompanied by a number of social problems, such as an increase in crime, use of drugs, alcohol abuse, and prostitution.

As indicated above ~ 700 new houses have been built in last 2-3 years and a further are 3 300 planned. While the scale of the Transnet housing project may appear to relatively small when compared to the housing projects associated with the mining sector it will also contribute to the pressure on the existing services in the town.

Nature: The rapid expansion of Postmasburg has placed pressure on existing services and			
the capacity of the TLM			
	Without Mitigation	With Enhancement (Assumes increased capacity of TLM etc. and additional resources)	
Extent	Local-Regional (3)	Local – Regional (3)	

Impact table summarizing impacts on local services and capacity

Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (52)	Medium (52)
Status	Negative	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	Yes

Enhancement:

- » The municipality has established a Development Forum with representatives from the larger mining companies. The forum was referred to as Tsasamba. It is recommended that Transnet liaise with the local municipality and become involved in the Tsasamba initiative.
- » It is recommended that Transnet interact with other key stakeholders in Postmasburg including:
 - o Chamber of Commerce;
 - o South African Police;
 - o Representatives from the local schools in the town.
- The aim of the interactions should be to identify ways in which Transnet can contribute to addressing the current challenges facing the town as a result of the rapid growth over the last 3-5 years.

Cumulative impacts:

Negative, decreasing quality of services and impact on local economy and residents. Positive, improved quality of services and capacity and positive impact on local economy

Residual impacts:

Positive, improved quality of services and capacity and positive impact on local economy.

Implications for Project Implementation

- » Local contractors should be provided an opportunity to be included in a list of possible local suppliers and service providers for the construction phase of the project.
- » Social benefits in terms of training, skills development and the use of local labour should thus be aspired to. These skills can be transferable to other employment sectors and would result in further sustainable benefits.

The Local Municipality and community representatives and neighbouring property » owners should be kept informed of the progress, decisions taken with regards to the development and construction schedules.

(g) Visual and Aesthetic Impacts

Disturbance of the environment during the construction phase would lead to temporary landscape scarring and negative visual impacts; although this is expected to be rectified once the construction phase has been completed. Although the houses would be clearly visible, there are also already established residential developments located in close proximity to the site. It is anticipated that it would, over time, blend in with the rest of the environment, gradually changing the sense of place perception. Designing of walls, roofs and buildings in such a manner to blend in with the natural environment could mitigate this impact. The houses will be single-storey, which fits into the existing urban landscape.

Once in place, the housing development will have an aesthetic/visual impact very similar to that of the surrounding environment. This impact can only be mitigated through careful selection of the design features. Whether interested and affected parties would perceive the change as an aesthetically positive or negative impact was not confirmed, as no such issues were raised during the public participation process to date.

place.		
	Without Mitigation	With Mitigation
Extent	Local 1	Local
Duration	Long term 4	Long term 4
Magnitude	Minor 4	Low 2
Probability	Probable 3	Improbable 2
Significance	Medium 30	Low 14
Status	Neutral	Neutral
Reversibility	Recoverable 3	Recoverable 3
Irriplaceable loss of	No	No
resource?		
Can impacts be	Yes	
mitigated?		
Mitigation:		

Nature: Potential visual impact of the housing development on visual receptors and sense of

- Keep disturbed areas to a minimum.
- No clearing of land to take place outside the demarcated footprint. »
- Landscaping features can be used to ensure the project blends into the existing residential area. Indigenous trees and vegetation to be planted to improve the aesthetics

of the development site.

» Utilise existing roads and tracks to the extent possible. Where new roads are required, they should be two-track gravel roads, maintained to prevent dust plumes and erosion.

Cumulative impacts:

There are other housing developments in Postmasburg. Considering the need for housing in the area, the visual impacts will be of a medium significance.

Residual impacts:

Providing that the site is rehabilitated to its current state / improved, after decommissioning, the visual impact will also be removed.

(h) Traffic

A traffic study is attached to Appendix D of the Basic Assessment Report. The following roads will be predominantly used to convey traffic volumes to and from the proposed residential development:

- » R385
- » R325
- » Stasie Street
- » 8th Avenue

The 2 intersections that are likely to be impacted the most by the traffic volumes generated by development of the project and additional houses in the area, namely:

- » the R325 and R385 Intersection and
- » the R385 and Stasie Street Intersection

The proposed residential development will have two access points, both off the main arterial, the R385. One access to the proposed development will be taken at Stasie Street. Another access will be taken at 8th Avenue. The construction workforce for the proposed residential development is therefore expected to generate approximately 37 vehicles per hour during the AM and PM peak periods, which is considered negligible impact in traffic capacity terms.

During the operational phase, a realistic approach would be to assume that 60% of the workers that will reside in the proposed Transnet residential development will commute to work on foot and that 40% of the workers will use private vehicles for external travel. Based on this reasonable assumption, the proposed residential development will then be expected to generate a total of 82 two way trips in both the AM and PM peak hours (21 vehicles per hour entering the development and 61

vehicles per hour leaving the development during the AM peak hour and vice versa during the PM peak hour). The proposed construction and operation of the new proposed residential development will generate negligible volumes of traffic on the surrounding road network. The impact of the development on traffic will have a low significance.

Nature: Traffic congestion and road safety risks due to construction and operation of the			
housing development			
	Without mitigation	With mitigation	
Extent	Local (1)	Local (1)	
Duration	Permanent (5)	Permanent (5)	
Magnitude	Minor (2)	Minor (2)	
Probability	Unlikely (1)	Unlikely (1)	
Significance	Low (8)	Low (8)	
Status (positive or	Negative	Neutral	
negative)			
Reversibility	No	No	
Irreplaceable loss of	No, but in some cases, yes	No	
resources?			
Extent	Local (1)	Local (1)	

Impact Table Summarising Impacts on Traffic & Roads

Mitigation:

- » It is recommended, from a safety standpoint, that pedestrian crossings be installed at the main R385 / R325 intersection when this intersection is upgraded to alleviate this road safety risk.
- » It is also recommended that a Traffic Management Plan be implemented to ensure adequate safety and precautionary measures be adhered to during the construction phase.
- » The streets within the housing development will need to be surface with sidewalks and formalised controls and road markings will be required. This will improve internal traffic conditions.

Cumulative impacts: None

Residual impacts: None

Implications for Project Implementation

» It is recommended, from a safety standpoint, that pedestrian crossings be installed at the main R385 / R325 intersection when this intersection is upgraded to alleviate this road safety risk.

- » It is also recommended that a Traffic Management Plan be implemented to ensure adequate safety and precautionary measures be adhered to during the construction phase.
- » The streets within the housing development will need to be surface with sidewalks and formalised controls and road markings will be required. This will improve internal traffic conditions.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING PHASE

The impacts during the decommissioning of the houses (if it will occur) will be similar to impacts of the construction phase as discussed in this assessment. Decommissioning activities will disturb soils and vegetation and could scar the landscape. Through proper site rehabilitation and re-vegetation the impacts of rehabilitation of the biophysical environment will be could be positive. The social impacts associated with final decommissioning are likely to be limited. With mitigation, the impacts are assessed to be low (negative).

SECTION B: ASSESSMENT OF CUMULATIVE IMPACTS

This Basic Assessment includes an assessment of the cumulative impacts associated with all housing developments in the broader area.

Impacts that are considered to have potential cumulative impacts include:

- » Environmental nuisances (noise, dust, traffic and air quality)
- » Environmental degradation
- » Visual; and
- » Anticipated future developments and impact on local services such as electricity, water and sanitation.

Environmental Nuisances (Noise, Dust, Traffic and Air Quality)

There have been similar housing developments in Postmasburg. Additional traffic on the roads that is commonly used by the local people and also the surrounding industries (including the proposed development) may cause inconveniences. Construction activities that will be on-going can have incremental effects in terms of noise and dust generation. This has implications in terms of the deterioration of air quality and environmental degradation due to and after construction activities. The impact of these nuisances on the environment during the construction and operational phases has already been assessed in the preceding sections. These impacts are however considered to be of medium significance with effective implementation of mitigation measures.

Environmental degradation

Increase in the urban population is linked to environmental degradation. Should the housing development not be well managed and maintained. One of the areas of concern is increase in waste generated. Land degradation and soil erosion is also linked to the built environment. Individual households will have a responsibility to look after and manage their houses and the environmental within each stand.

Visual Impacts and Change in the Landscape character

Cumulative visual impacts from the surrounding residential and industrial developments in the area, when considered collectively are not extreme. In order to avoid any offensive visual issues, the mitigation measures proposed in tis impact assessment and in the Draft Environmental Management Programme must be implemented. The housing development and the associated infrastructure will significantly change the existing visual character of the area. The impact on the visual character / urban landscape is also considered to be insignificant.

The overall cumulative impacts of the proposed housing development by Transnet will be of an acceptable level. It is the conclusion of the Environmental Assessment Practitioner that housing development is a social need identified by Transnet, for the well-being of their employees. The environmental impacts associated with the housing development can be managed to acceptable levels.

SECTION C: ASSESSMENT OF THE NO-GO OPTION

The No-Go Option (the option to not develop the houses) will result in no negative environmental impacts occurring on the biophysical environment (i.e. biodiversity and/soils) at the identified site, nor any positive social and economic impacts on Transnet employees and the local economy. There is a clear need for provision of housing in the Postmasburg area due to mining activities and associated railway network in the areas. The "no-go option" will limit the potential for other growth and development projects in the area. Socio-economic problems such as homelessness, overcrowding in homes and establishments of informal settlements will continue. The negative impacts of the no-go option are expected to outweigh the identified negative impacts associated with the proposed housing development. Furthermore, considering that the land is currently vacant and not utilised for any productive outcomes, the no-go option is not preferred.