

PROPOSED BULK WATER SUPPLY SYSTEM ONSEEPKANS, ONSEEPKANS SETTLEMENT, KHAI MA MUNICIPALITY, NORTHERN CAPE

DEPARTMENT OF ENVIRONMENTAL AND NATURE CONSERVATION
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FINAL BASIC ASSESSMENT REPORT

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PROPOSED BULK WATER SUPPLY SYSTEM ONSEEPKANS, ONSEEPKANS SETTLEMENT, KHAI MA MUNICIPALITY, NORTHERN CAPE

PREPARED FOR:

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EXECUTIVE SUMMARY

Introduction

The purpose of the project is to replace the existing and damaged earth canal with a centralised pump system. The system will provide water to the existing 370ha registered water user's along the canal, including 118ha of emerging farmers.

The centralised pump system will consist of a river pump station at the village of Viljoensdraai, from where water will be pumped to a storage reservoir (earth dam). Electricity, produced by a Solar Photo Voltaic (SPV) Generator, will be used to offset own consumption which is a form of net-metering. The SPV system will be connected to the ESKOM grid. The SPV Generator will produce just enough electricity for the pump station. No surplus energy will be generated or wasted. From the reservoir, water will be distributed to the different irrigation areas. This system will deliver irrigation water under pressure (2 Bar), which will enable farmers to use more efficient irrigation practices such as micro and drip irrigation, instead of flood irrigation. They will not only use less water, but will also be able to produce higher income crops such as vineyard.

Another advantage of the system is that it can be extended to accommodate further developments. An additional 200ha is currently planned as a separate project.

The proposed development is located on Farm No. 88, Erf 730 and Farm No. 209, Onseepkans.

- Pump and filter station:

Water will be pumped from the pump station with 4 x centrifugal pumps. The total flow rate will be approximately 2400m³/h, pumped at a pressure of 7,5 Bar. Water will be filtered through automatic self-cleaning disc filters.

Provision is made for an additional 2 pumps. These additional pumps will supply extra bulk water for future developments.

- Dam:

An earth dam will be constructed at an elevation approximately 60m higher than the pump station. The dam will have a footprint of approximately 3ha, with a storage capacity of 75,000m³.

Due to the elevation of the dam, water supplied to the irrigation areas will be constantly under pressure.

- Main Pipelines, to and from the dam:

Water will be pumped from the pump station to the dam through a 1000mm GRP pipe. The pipe will be approximately 2200m long, and will be installed subsurface.

Water will be supplied from the dam to the irrigation areas through a 800mm GRP pipe, approximately 1800mm long, also installed subsurface.

- Solar Photo Voltaic (SPV) generator:

A 1MW SPV generator will be constructed to supply electricity to the pump and filter station. The footprint for the SPV generator will be approximately 2ha.

ESKOM will install a 1MVA connection point. A 33kV overhead line will be constructed between the ESKOM connection point and the 1MW SPV generator, as well as between the ESKOM point and the pump station.

- Distribution pipelines:

UPVC pipes will be laid in the footprint of the existing canal. An Environmental Authorisation (Department of Environment and Nature Conservation reference: NC/BA/38/NAM/KHA/ONS1/2013, granted on 2014-04-24) has been obtained for this part of the work.

Environmental Requirements

The National Environmental Management Act (NEMA, Act 107 of 1998), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority based on the findings of an Environmental Assessment. NEMA is a national act, which is enforced by the Department of Environmental Affairs (DEA). According to the regulations of Section 24(5) of NEMA, authorisation is required for the following:

Government Notice R983 (Listing Notice 1):

1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where-

- (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or
- (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare; excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.

9: The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water;

- (i) with an internal diameter of 0,36 metres or more; or
- (ii) with a peak throughput of 120 litres per second or more; excluding where:
 - a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or
 - b) where such development will occur within an urban area.

11: The development of facilities or infrastructure for the transmission and distribution of electricity;

- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or
- inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.

12: The development of;

- (i) canals exceeding 100 square metres in size;
- (ii) channels exceeding 100 square metres in size;
- (iii) bridges exceeding 100 square metres in size;
- (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size;
- (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size;
- (vi) bulk storm water outlet structures exceeding 100 square metres in size;
- (vii) marinas exceeding 100 square metres in size;
- (viii) jetties exceeding 100 square metres in size;
- (ix) slipways exceeding 100 square metres in size;
- (x) buildings exceeding 100 square metres in size;
- (xi) boardwalks exceeding 100 square metres in size; or
- (xii) **infrastructure or structures with a physical footprint of 100 square metres or more;**

where such development occurs;

- (a) within a watercourse;
- (b) in front of a development setback; or

(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

13: The **development** of facilities or infrastructure for the **off-stream storage of water**, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.

19: The **infilling** or **depositing** of any material of more than **5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from;**

- (i) a watercourse;
- (ii) the seashore; or
- (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater

but excluding where such infilling, depositing, dredging, excavation, removal or moving;

- (a) will occur behind a development setback;
- (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or
- (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.

27: The **clearance of an area** of 1 hectares or more, but less than 20 hectares of **indigenous vegetation**, except where such clearance of indigenous vegetation is required for;

- (i) the undertaking of a linear activity; or
- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

45: The **expansion of infrastructure** for the **bulk transportation of water or storm water** where the existing infrastructure;

- (i) has an internal diameter of 0,36 metres or more; or
- (ii) has a peak throughput of 120 litres per second or more; and
 - (a) where the facility or infrastructure is expanded by more than 1000 metres in length; or
 - (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;

excluding where such expansion:

- (aa) relates to transportation of water or storm water within a road reserve; or
- (bb) will occur within an urban area.

Government Notice R985 (Listing Notice 3): Activity No:

2: The **development of reservoirs** for bulk water supply with a capacity of more than 250 cubic metres.

Northern Cape

- I. In an estuary;
- II. In a protected area identified in terms of NEMPAA, excluding conservancies;
- iii. Outside urban areas, in:
 - a) National Protected Area Expansion Strategy Focus areas;
 - b) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;
 - c) Sites or areas identified in terms of an International Convention;
 - d) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
 - e) Core areas in biosphere reserves;
 - f) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;
 - g) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.

12: The **clearance of an area** of 300 square metres or more of **indigenous vegetation** except where such clearance of vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

Northern Cape

- i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
- ii. Within critical biodiversity areas identified in bioregional plans;
- iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas.
- iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning

14: The **development of**;

- (i) canals exceeding 10 square metres in size;
- (ii) channels exceeding 10 square metres in size;
- (iii) bridges exceeding 10 square metres in size;
- (iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size;
- (v) weirs, where the weir, including infrastructure and water surface area exceeds 10 square metres in size;
- (vi) bulk storm water outlet structures exceeding 10 square metres in size;
- (vii) marinas exceeding 10 square metres in size;
- (viii) jetties exceeding 10 square metres in size;
- (ix) slipways exceeding 10 square metres in size;
- (x) buildings exceeding 10 square metres in size;
- (xi) boardwalks exceeding 10 square metres in size; or
- (xii) infrastructure or structures with a physical footprint of 10 square metres or more;

where such expansion or expansion and related operation occurs;

- (a) within a watercourse;
- (b) in front of a development setback; or
- (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;

Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the harbour.

Northern Cape

- i. In an estuary;
- ii. Outside urban areas, in:
 - a) A protected area identified in terms of NEMPAA, excluding conservancies;
 - b) National Protected Area Expansion Strategy Focus areas;
 - c) World Heritage Sites;
 - d) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;
 - e) Sites or areas identified in terms of an International Convention;
 - f) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
 - g) Core areas in biosphere reserves;
 - h) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;
 - i) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.

Site Description

According to the Biodiversity Assessment (**Appendix D2**), the following vegetation was encountered:

Extraction point - Most of the riparian zone along the Orange River neighbouring Onseepkans can be described as degraded and even transformed in places. Thickets are still found, but large portions of the riparian zone is dominated by dense stands of the common reed *Phragmites australis*, which often forms almost single species stands. *Phragmites australis* is the dominant semi-aquatic macrophyte along the whole of the Orange River.

At the point where the extraction point will be located the riparian zone is very narrow and the vegetation dominated by *Phragmites*. Alien invader species like the *Prosopis glandulosa* (Mesquite tree), *Nicotiana glauca* (Wild tobacco), *Datura stramonium* (Thorn apple) and *Ricinus communis* (Castor-oil plant) were also observed. No protected tree species was observed in the vicinity of the proposed new extraction point.

Solar (SPV) site - The site is located within one of the sheet washed plains found in between rocky outcrops associated with Eastern Gariep Plains Desert vegetation type. The vegetation was dominated by a low grassy bottom stratum (reaching approximately 0.5 m) including, *Stipagrostis*-, *Enneapogon*- species and *Schmidtia kalahariensis*. The middle stratum (0.5-1m) consists of a very sparse short to medium shrubby layer, dominated by the hardy shrub *Petalidium setosum* and *Euphorbia gregaria*. Other shrub species encountered included *Sisyndite spartea*, *Aptosimum spinescens* and *Zygophyllum microcarpum*.

No other features of significance or protected tree species were encountered on the site and its immediate surroundings.

Reservoir (earth dam) site - the site is likely to be covered by Eastern Gariep Rocky Desert vegetation type, the vegetation is in fact a continuation of the sheet washed vegetation associated with Eastern Gariep Plains Desert. The species composition is almost identical to that described for the solar site, although *Euphorbia gregaria* might be slightly more prominent on this site.

The only additional feature of interest was the presence of two low individuals of *Boscia foetida* (protected in terms of the NCNCA), that was encountered to the west of the proposed site. However, it should be fairly simple to avoid these features by moving the site slightly to the east.

Pipeline and overhead cables - The proposed pipeline and overhead cables route follow existing roads. The vegetation from the river to almost at the solar site can be described as disturbed and impacted as a result of grazing practices and urban associated activities (being located right next to a small settlement).

The vegetation encountered between the solar- and reservoir site is the same low grassy bottom stratum (reaching approximately 0.5 m) with a sparse short to medium shrubby over layer as encountered at both the solar and reservoir sites.

According to the Freshwater Assessment (**Appendix D1**), there are a number of drainage lines and small ephemeral streams draining from the south into the Orange River within the study area. The lower lying alluvial soils along the Orange River have been cultivated and if the ephemeral streams transect the irrigated areas they are canalised through the agricultural fields. The ephemeral streams are visible in the landscape due to the relatively wide sandy beds and, in some instances, by vegetation associated with the river beds and riparian zones. The river beds are typically sandy with shrubs and trees aligning the riparian zones.

The Orange River however dominates the surrounding landscape, and displays braided features with secondary channels that are only active during high flow events. The riparian vegetation in terms of species composition within the channel is still natural and consists largely of common *Phragmites australis* reeds along the river banks in the wetbank and lower wetbank zone and large trees (*Acacia Karoo*) in the upper wet and lower dry banks.

The South African side (southern bank) of the Orange River has been developed and cultivated to within the riparian zone. Vineyards in particular have been established in the riparian zone, resulting in many of the

indigenous riparian trees and shrubs being removed in these areas. Some invasive alien plants such as *Arundo donax* (Spanish reed) and *Prosopis glandulosa* (mosquito bush) have invaded these disturbed areas.

The existing irrigation canal is situated parallel to the river between the riparian zone and the mountain outcrop in the area of the proposed new abstraction point

According to the Heritage Impact Assessment (**Appendix D3**), there was only one Stone Age archaeological find within the assessment area, and no living heritage recognised on the proposed development footprints, except for the proposed pipeline development which runs through a nearby settlement. No archaeological remains/objects were detected on the proposed development sites which include the OSK Pump station, OSK Pipeline, OSK Reservoir and the OSK Solar farm. Onseepkans, however, has a rich living heritage in terms of historical Catholic Missionary activities in the area; this was the reason for the establishment of Onseepkans.

Need and Desirability

There was a need for a bulk water irrigation system which will provide the following:

- Water provided under pressure, supporting more efficient irrigation systems such as micro and drip irrigation. System will provide water at a minimum pressure of 2 Bar,
- Possibilities for further expansions. This system will supply water for 370ha, but have surplus capacity in the pump station, rising main pipeline and dam to supply water for an additional 200ha,
- The system should not have additional operational cost (electricity, etc) compared to the current canal system. The 1MW SPV generator will generate enough electricity to drive the pump and filterstation.

The activity is expected to provide temporary employment for approximately 100 people during the construction phase (90% previously disadvantaged) and 10 permanent job opportunities (90% previously disadvantaged).

Conclusion

The overall environmental impact is expected to be low (negative), with the following mitigation measures proposed:

Freshwater

- Construction activities should be kept to a minimum within the Phragmites zone of the riparian area.
- Material (infill) should not be sourced from the riparian zones;
- Excess excavated material should not be dumped into the riparian zones;
- Existing dumped material along the maintenance road should be removed and placed back into the trench as backfilling. This should be done in such a way as not to bulldoze non disturbed areas or to widen the existing road;
- The exotic trees currently growing in the riparian zones should be cut and the stumps treated with herbicide to prevent re-growth;
- Where possible the ephemeral streams previously cut off from the Orange River by the trench should be reconnected with the river; and
- Appropriate construction methods should be deployed to ensure the prevention of erosion of the filled-in trenches during flood events which would prevent the need to undertake repetitive infilling of eroded areas once construction is completed.
- The riparian zone areas should be re-planted with Phragmites in the areas where Phragmites has been removed. This can be done to digging sods out and replanting it in the affected area.
- The design of the pump house and inlet pipes must be done in such a way as to minimize the amount of infrastructure that needs to be placed in the rocky river banks. This could be achieved by the creation of a sump area for the inlets with a pump house some distance away from the actual inlet and riparian zone.

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- The design of the inlet sump should be such that an attempt is made to prevent the siltation of the sump and therefore minimise the need to clean the inlet sump.
- Alien vegetation should be removed from the disturbed areas along the pipeline and road that are within or adjacent to the riparian zone and the areas should be kept clear of alien invasive vegetation. No material should be disposed into the riparian zone. The maintenance road should not be widened into the riparian zones. Erosion should be prevented especially in the upper reaches of the pipeline where steep slopes down to the river occur.

Botanical

- All construction must be done in accordance with an approved construction and operational phase Environmental Management Plan (EMP), which must be developed by a suitably experienced Environmental Assessment Practitioner.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and the Biodiversity study recommendations as well as any other conditions which might be required by the Department of Environmental Affairs.
- An integrated waste management system must be implemented during the construction phase. All rubble and rubbish (if applicable) must be collected and removed from the site to a Municipal approved waste disposal site.
- All invasive alien vegetation should be removed from all associated footprints within the various construction sites.
- All efforts must be made to protect mature indigenous trees within the proposed final footprint (and any other protected species that might be encountered on site).
- Permits must be obtained for the removal of any protected species which might be encountered.
- Indiscriminate clearing of areas must be avoided (all remaining areas to remain as natural as possible).
- All topsoil (the top 15-20 cm at all excavation sites), must be removed and stored separately for re-use for rehabilitation purposes. The topsoil and vegetation should be replaced over the disturbed soil to provide a source of seed and a seed bed to encourage re-growth of the species removed during construction.
- Once the construction is completed rehabilitation must be implemented.

Heritage

In the event that indicator(s) of heritage resources are identified, the following actions should be taken immediately:

- All construction within a radius of at least 20m of the indicator should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource.
- This area must be marked using clearly visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.
- A guard should be appointed to enforce this no-go area if there is any possibility that it could be violated, whether intentionally or inadvertently, by construction staff or members of the public.
- No measures should be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone, ceramics or stone.
- If a heritage practitioner has been appointed to monitor the project, s/he should be contacted and a site inspection arranged as soon as possible.
- If no heritage practitioner has been appointed to monitor the project, SAHRA or Dr. D. Morris must be contacted at the SAHRA head office or at the McGregor museum.
- The South African Police Services should be notified by a SAHRA staff member or an independent heritage practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not.

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- All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.
- Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.
- We recommend the appointment of a Stone Age Specialist if any large finds of stone tools are discovered during construction.

Considering all the information, it is not envisaged that this proposed development will have a significant negative impact on the environment, and the environmental and socio-economic benefits are expected to outweigh any negative impacts.

It is therefore recommended that this application be authorised with the necessary conditions of approval as described throughout this BAR.