Visual Compliance Statement for the Proposed 221km KTE Water Pipeline Development and Kenhardt Expansion, Orange River, Kenhardt, Northern Cape

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) (AS AMENDED).

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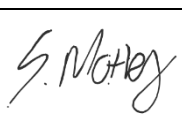
	Signature:	
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LIST OF ABBREVIATIONS

Abbreviation	Description
EIA	Environmental Impact Assessment
EnviroAfrica	EnviroAfrica NC

Abbreviation	Description
ETC	Eco Thunder Consulting (Pty) Ltd
VAC	Visual Absorption Capacity
VCS	Visual Compliance Statement

GLOSSARY LIST

Glossary Item	Description
Aesthetic Value	Aesthetic value is the emotional response derived from the experience of the environment with its natural and cultural attributes. The response can be either to visual or non-visual elements and can embrace sound, smell and any other factor having a strong impact on human thoughts, feelings, and attitudes (Ramsay, 1993). Thus, aesthetic value encompasses more than the seen view, visual quality, or scenery, and includes atmosphere, landscape character and sense of place (Schapper, 1993).
Aesthetically significant place	A formally designated place visited by recreationists and others for the express purpose of enjoying its beauty. For example, tens of thousands of people visit Table Mountain on an annual basis. They come from around the country and even from around the world. By these measurements, one can make the case that Table Mountain (a designated National Park) is an aesthetic resource of national significance. Similarly, a resource that is visited by large numbers who come from across the region probably has regional significance. A place visited primarily by people whose place of origin is local is generally of local significance. Unvisited places either have no significance or are "no trespass" places. (after New York, Department of Environment 2000).
Aesthetic impact	Aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Mere visibility, even startling visibility of a Project proposal, should not be a threshold for decision making. Instead a Project, by its visibility, must clearly interfere with or reduce (i.e. visual impact) the public's enjoyment and/or appreciation of the appearance of a valued resource e.g. cooling tower blocks a view from a National Park overlook (after New York, Department of Environment 2000).\0
Cumulative Effects	The summation of effects that result from changes caused by a development in conjunction with the other past, present, or reasonably foreseeable actions.
Landscape Character	The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, woods, trees, water bodies, buildings, and roads. They are generally quantifiable and can be easily described.
Landscape Impact	Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced (Institute of Environmental Assessment & The Landscape Institute 1996).

Glossary Item	Description
Study area	For the purposes of this report this Project the study area refers to the proposed Project footprint / Project site as well as the 'zone of potential influence' (the area defined as the radius about the centre point of the Project beyond which the visual impact of the most visible features will be insignificant) which is a 5,0km radius surrounding the proposed Project footprint / site.
Project Footprint / Site	For the purposes of this report the Project site / footprint refers to the actual layout of the Project as described.
Sense of Place (Genius loci)	Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. A genius locus literally means 'spirit of the place'.
Sensitive Receptors	Sensitivity of visual receptors (viewers) to a proposed development.
Visibility	The area from which Project components would potentially be visible. Visibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation, and distance.
Visual Exposure	Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion and visual acuity, which is also influenced by weather and light conditions.
Visual Impact	Visual effects relate to the changes that arise in the composition of available views because of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity available views because of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.
Visual Intrusion	The nature of intrusion of an object on the visual quality of the environment resulting in its compatibility (absorbed into the landscape elements) or discord (contrasts with the landscape elements) with the landscape and surrounding land uses.
VAC	VAC is defined as the landscape's ability to absorb physical changes without transformation in its visual character and quality. The landscape's ability to absorb change ranges from low- capacity areas, in which the location of an activity is likely to cause visual change in the character of the area, to high-capacity areas, in which the visual impact of development will be minimal (Amir & Gidalizon 1990).
Worst-case Scenario	Principle applied where the environmental effects may vary, for example, seasonally or collectively to ensure the most severe potential effect is assessed.

1 Background

1.1 Scope and Objective of the Specialist Study

Eco Thunder Consulting (Pty) Ltd (ETC) was commissioned by EnviroAfrica NC (EnviroAfrica) as the lead consultant to manage the Visual Compliance Statement (VCS) for the establishment of the Proposed 221km Pipeline Development and Expansion. The VCS focuses on the potential impact of the physical aspects of the proposed development (i.e., form, scale, and bulk), and their potential impact within the local landscape and receptor context.

The scope of the Visual Compliance study for the proposed upgrade and expansion of the KTE Water Pipeline includes:

- **Construction of a raw water abstraction pump station at the Orange River**, utilising floating platforms to minimise physical and visual intrusion.
- **Installation of a 221km water pipeline**, varying in diameter from 750mm to 800mm, designed to traverse diverse terrains while maintaining a low visual profile.
- **Development of multiple storage reservoirs and a water treatment plant**, each designed to integrate into the local topography and minimise visual impact.
- **Analysis of visual integration** of these structures within the varied landscapes of the Northern Cape, from semi-arid scrublands to developed agricultural zones.

1.2 Specialist Details

ETC is a privately owned company fully owned by women. We specialise in a wide range of specialised studies, including visual impact assessments, air quality impact assessments, noise impact assessments, socio-economic impact assessments, socio-economic research, economic development planning, development program design and implementation, as well as community trust management. Our expertise extends to conducting VIAs across Africa and optimising projects in the environmental sector. Our work encompasses landscape characterisation studies, end-use studies for quarries, and computer modelling and visualisation.

Based across South Africa, Eco Thunder has built a reputation as a leading authority on the conditions, needs, and assets of communities associated with independent power generation facilities. Additionally, ETC actively implements development programs in energy communities, ensuring a comprehensive understanding of how to drive positive social impact.

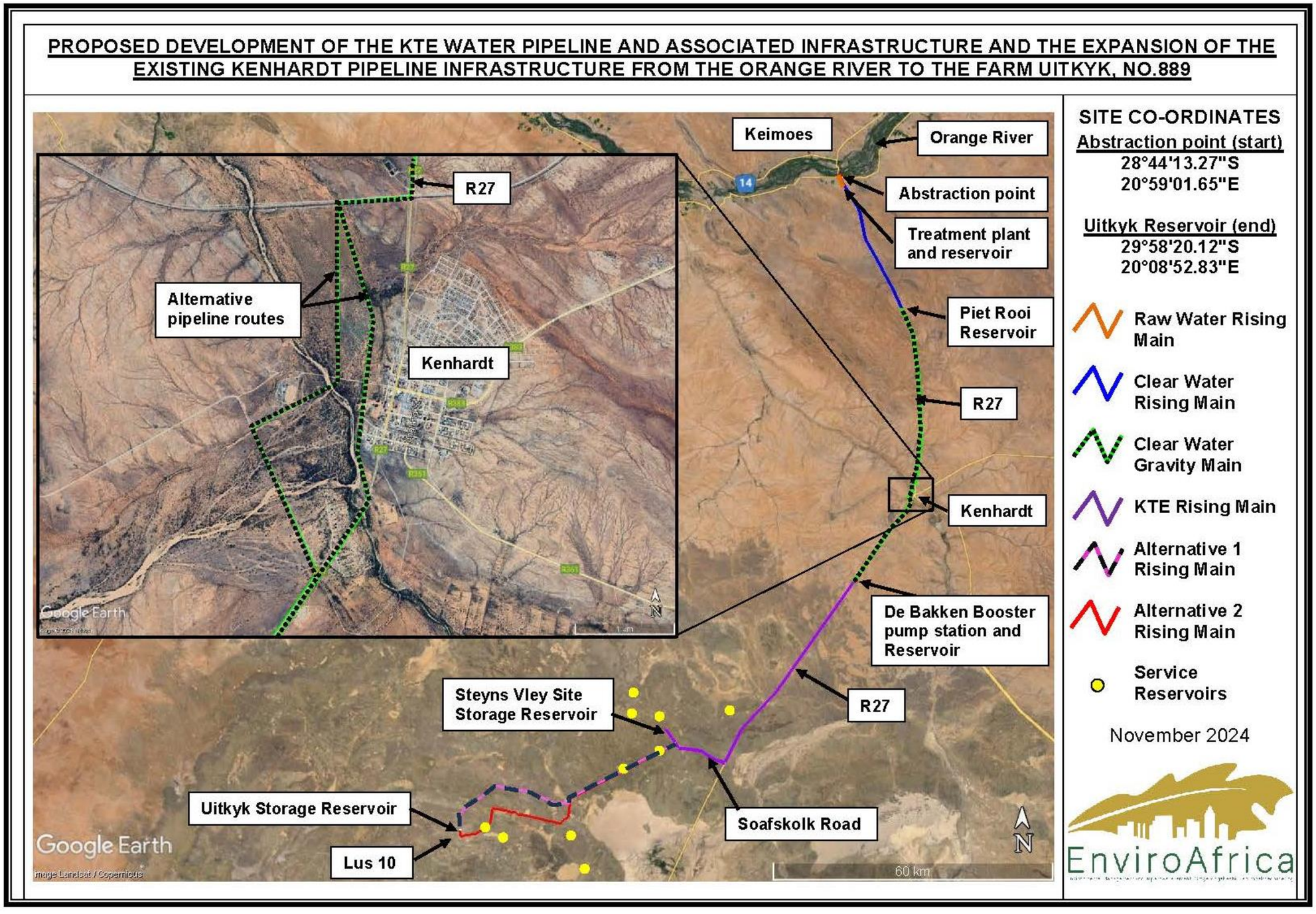


Figure 1: Locality Map

2 Project Information

2.1 Project Description

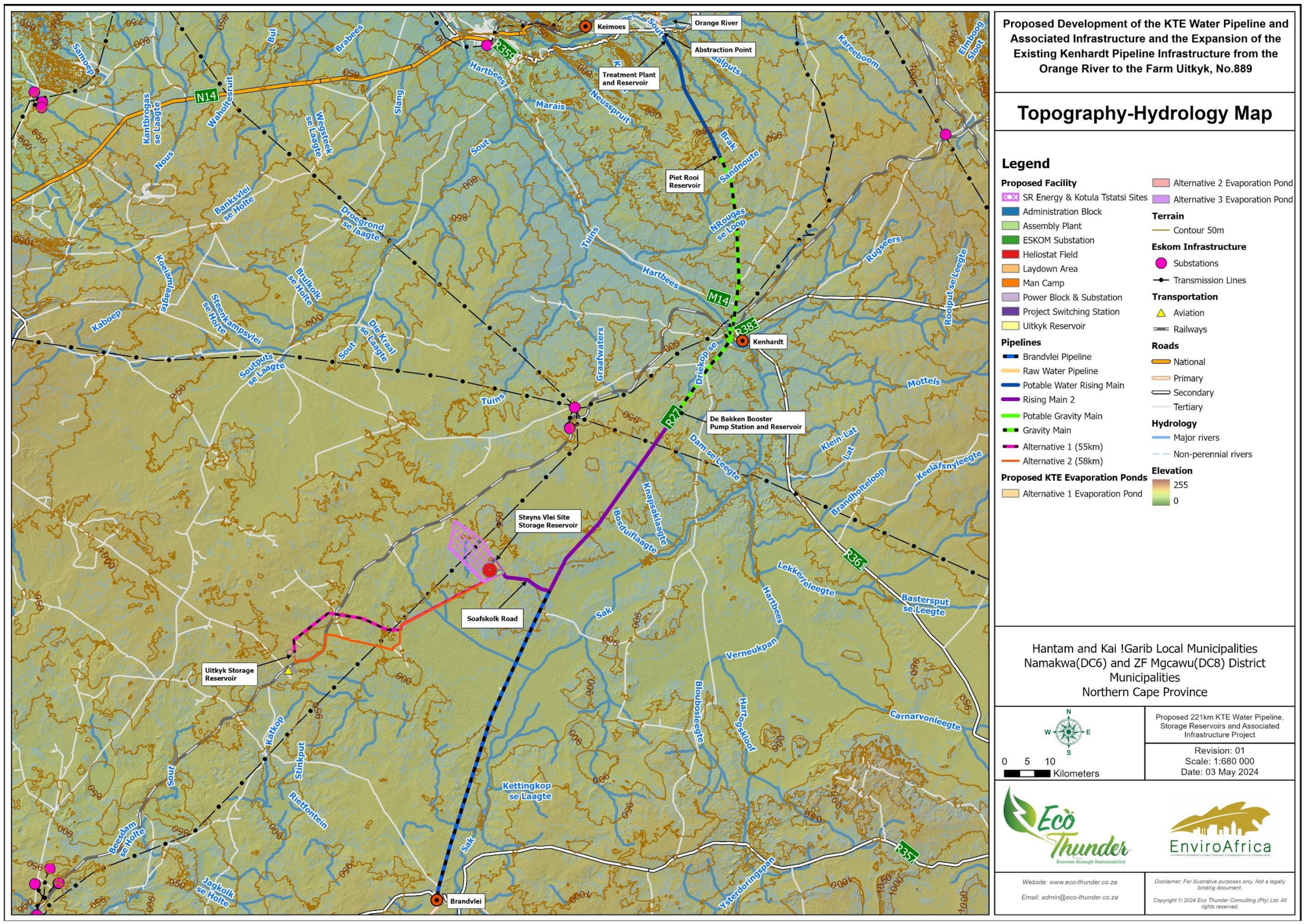
The GEOSS_KTE_BVi Project, spearheaded by Kotulo Tsatsi Energy (Pty) Ltd, involves the construction of a 221 km long water pipeline extending from the Orange River near Keimoes in the Northern Cape to a hydrogen production facility on Farm Uitkyk No. 889. This ambitious project includes a 3.10 km, 800 mm diameter raw water rising main to Lennertsville where a 30 Megalitre/day water treatment facility and a 10 Megalitre storage reservoir will be built. From Lennertsville, potable water is pumped through a 750 mm rising main to additional reservoirs across the route, culminating in a final 30 Megalitre reservoir at the hydrogen production site. Here, water undergoes further purification through reverse osmosis and electrode ionization, critical for green hydrogen production. Alongside its primary purpose, the pipeline facilitates water supply to renewable energy plants and nearby communities, enhancing local infrastructure and environmental management through strategic evaporation ponds for waste management. This infrastructure not only supports green hydrogen production but also provides critical utility services to the area, promoting sustainable regional development.

2.2 Project Site and Study Area

The proposed site for the Proposed 221km Pipeline Development and Expansion. project spans a strategic and expansive area from the abstraction point at the Orange River, running southward through the Northern Cape to the Uitkyk Reservoir. This route runs within the boundaries of the Kai! Garib and Hantam Local Municipalities, a region known for its vast, open vistas and minimal vegetation, which characterises the arid yet scenic landscape. Situated along the infrastructural corridor of the R27 and Soafskolk Road reserves, the site facilitates essential connectivity between various towns including Kenhardt and Brandvlei, enhancing logistical operations for the water pipeline system.

This project falls under Ward 3 of the Hantam Local Municipality, part of the broader Namakwa District, making it pivotal for regional water management and infrastructure development. Surrounding communities such as Upington, Loxtonvale, and Eksteenkuil are integral to the project’s community engagement and environmental assessments.

Proposed Development of the KTE Water Pipeline and Associated Infrastructure and the Expansion of the Existing Kenhardt Pipeline Infrastructure from the Orange River to the Farm Uitkyk, No.889



Proposed Development of the KTE Water Pipeline and Associated Infrastructure and the Expansion of the Existing Kenhardt Pipeline Infrastructure from the Orange River to the Farm Uitkyk, No.889

Topography-Hydrology Map

Legend

Proposed Facility
- SR Energy & Kotula Tstatsi Sites
- Administration Block
- Assembly Plant
- ESKOM Substation
- Heliostat Field
- Laydown Area
- Man Camp
- Power Block & Substation
- Project Switching Station
- Uitkyk Reservoir

Pipelines
- Brandvlei Pipeline
- Raw Water Pipeline
- Potable Water Rising Main
- Rising Main 2
- Potable Gravity Main
- Gravity Main
- Alternative 1 (55km)
- Alternative 2 (58km)

Proposed KTE Evaporation Ponds
- Alternative 1 Evaporation Pond
- Alternative 2 Evaporation Pond
- Alternative 3 Evaporation Pond

Terrain
- Contour 50m

Eskom Infrastructure
- Substations
- Transmission Lines

Transportation
- Aviation
- Railways

Roads
- National
- Primary
- Secondary
- Tertiary

Hydrology
- Major rivers
- Non-perennial rivers

Elevation
255
0

Figure 2: Topographical-Hydrological Map

3 Identification of Potential Issues

On 14 March 2024, a comprehensive site visit was conducted by ETC, along with representatives from EnviroAfrica and other environmental specialists. This visit was crucial in assessing the proposed route for the Proposed 221km Pipeline Development and Expansion stretching from the Orange River to the Uitkyk Reservoir, Northern Cape. The primary goal was to closely examine the visual aspects of the site, ensuring a thorough understanding of the landscape's characteristics and potential challenges. This hands-on evaluation allowed the team to directly observe the site's topography, existing vegetation, proximity to infrastructure, and general land use, which are critical in shaping the project's design and implementation strategies. The findings from this visit are crucial for identifying specific issues that could influence the visual integrity of the development.

3.1 Visual Observations From Site

The site visit provided essential insights into the visual dynamics along the proposed route of the Proposed 221km Pipeline Development and Expansion, from the Orange River to the Uitkyk Reservoir in the Northern Cape.

- **Visual Absorption Capacity (VAC):** Given that the pipeline will be underground, the VAC along the proposed route is assessed as High. This favourable assessment is primarily due to the minimal visual obstruction that an underground installation offers. The terrain's varying topography, including flat and undulating sections, plays a less critical role in visual obstruction when infrastructure is subterranean. Similarly, the sparse and low vegetation typical of the semi-arid Northern Cape, while offering minimal natural screening, is less of a concern for an underground pipeline. The semi-arid conditions, which imply slower site recoverability, are mitigated by the reduced surface disturbance of underground construction.
- **Visual Intrusion:** The visual intrusion of the KTE Water Pipeline project is rated as Low, given the underground nature of the installation. Existing roads and scattered infrastructure in the area indicate that the region already accommodates various elements of industrial and transportation-related development. However, because the pipeline will be installed below ground, its presence is not expected to alter the landscape visibly. This setup significantly reduces the potential for visual disruption, allowing the natural visual harmony of the semi-arid environment to remain largely intact. Effective restoration strategies post-construction will be crucial to ensure that any temporary disturbances during the construction phase are adequately addressed to restore the landscape to its original state.

3.2 Identified Issues

During the site assessment for the Proposed Project, several issues were identified that could potentially impact the visual harmony of the pipeline installation. Addressing these issues effectively is essential to ensure the project's sustainability and acceptance within the local and broader context.

- **Natural Vegetation:** The region is characterised by sparse natural vegetation typical of the semi-arid Northern Cape, which offers limited visual screening. The preservation and enhancement of this existing vegetation around key construction access points and above-ground infrastructure are critical for mitigating visual impacts and enhancing the site's natural aesthetic appeal.
- **Topography:** The route's varying topography includes flat areas and undulating terrains. While the pipeline will be underground, the construction process may temporarily impact these landscapes. Utilising the natural depressions and contours of the land to minimise visibility during construction activities and facilitate quicker recovery post-construction will help reduce the visual footprint of the development.
- **Existing Infrastructure:** The pipeline's proximity to existing infrastructure such as roads, local communities, and visible towns and rural settlements emphasises the need for strategic placement and thoughtful design to integrate seamlessly with existing elements. Special consideration is required to ensure that construction activities and any temporary above-ground installations do not disrupt the current usage patterns and visual aesthetics of these infrastructures.

The identification of these issues forms a crucial foundation for the planning and design phases of the project. By proactively addressing each identified challenge, the project can be tailored to respect the local landscape, ensuring that visual impacts are minimised.

3.3 Site Photos

Photograph 1: Access Road along the Proposed Development Area

Photograph 2: Intact Fence Lines along the Proposed Development Area.

Photograph 3: Access Road including Existing Eksom Infrastructure along the Proposed Development Area.

Photograph 4: Landscape View along the Proposed Development Area.

Photograph 5: Gravel Road View along the Proposed Development Area

Photograph 6: Railway surrounding the Development Area

Photograph 7: Intact Infrastructure along the Proposed Development Area.

Photograph 8: Water Infrastructure along the Development Area.

Figure 3: Proposed Development Site Photos

4 Visual Impact Statement and Conclusion.

Building on the detailed observations outlined in the previous sections, this section addresses the visual influence and expected visual impacts of the Proposed 221km Pipeline Development and Expansion.

4.1 Visual Influence

The proposed Project is strategically designed to utilise an underground operational approach within a wide-ranging area from the Orange River to Uitkyk Reservoir in the Northern Cape. The design aims to minimise visual impacts and integrate effectively with the semi-arid landscape and existing developments, ensuring a harmonious blend with the regional landscape character. The project's approach leverages the inherent VAC of the landscape, which can assist with accommodating the infrastructure with minimal visual disruption.

- **Existing Visual Context:** An extensive review of the area's existing visual context, which includes natural landscapes and scattered infrastructural elements, confirms the project's potential to harmonise with the regional character. Strategic use of the underground installation enhances visual integration and mitigates potential impacts.
- **Visibility and Exposure:** The project places special emphasis on minimising visibility from multiple vantage points. The underground placement of the pipeline is optimised to reduce visual intrusions, leveraging the landscape's features to seamlessly integrate the development into its surroundings.

The proposed Project utilises a strategic approach to visual integration, which involves using restoration strategies that reflect the natural environment and employing landscaping strategies that enhance visual buffering. These efforts are supported by the area's characteristics—its semi-arid landscape and sparse vegetation—which provide a natural backdrop that supports the subtle integration of infrastructure elements like the water pipeline.

4.2 Expected Visual Impacts

The Proposed 221km Pipeline Development and Expansion is anticipated to have minimal visual impacts, which have been carefully considered throughout the planning and design phases. The key negative impacts include:

- **Alteration of Landscape Character:** The introduction of construction activities can temporarily alter the visual character of the natural landscape, especially in areas that are otherwise characterised by vast, open, and natural vistas.
- **Local Land Use:** The introduction of construction sites can alter the visual and functional character of land use in the vicinity temporarily.
- **Dust and Construction Impact:** Construction activities typically generate dust and debris, which can have a temporary but significant visual impact on the local environment.

- **Nighttime Lighting:** The limited use of lighting for security and operational purposes during the construction phase can introduce light pollution to an area that may previously have experienced low levels of artificial light. This can disrupt the natural nighttime environment and potentially affect both wildlife and the local community's enjoyment of starlit skies.

To mitigate the visual impacts identified, the Proposed 221km Pipeline Development and Expansion will need to employ a range of strategies. These include comprehensive restoration plans that utilise native vegetation for recovery post-construction, alongside sensitive siting and underground placement of the pipeline to minimise visibility. Construction management practices are rigorously implemented, featuring dust suppression techniques and limiting operations to daylight hours to reduce disturbances. Controlled lighting is designed to minimise light pollution, and community engagement ensures that the project aligns with local aesthetic values. All temporary structures and debris are promptly removed post-construction to restore the site's visual integrity.

4.3 Conclusion

It can be concluded that the Proposed 221km Pipeline Development and Expansion can be authorised, provided it is carefully integrated with the existing natural and anthropogenic elements of the Northern Cape region. The project must be thoughtfully designed to coexist with minimal infrastructural developments such as minor roads and isolated agricultural activities, ensuring it does not create unnecessary visual intrusions. The strategic use of the high VAC enhances the project's ability to minimise visual impacts.

The cumulative visual impact of the project, while minimal due to its scope and nature, must be effectively managed through best practice methods. These include employing dust suppression techniques to minimise airborne particulates during construction, limiting construction activities to daylight hours to reduce light pollution, selecting construction materials that blend seamlessly with the surrounding environment, and conducting all operations in a manner that minimises visual impacts to the broader area.

The report has rigorously assessed the existing visual conditions and the project's compatibility with the landscape. The potential visual impacts, inherent to the nature of infrastructure projects such as this, must be effectively mitigated through careful design, strategic placement, and ongoing conscientious management throughout the project's lifecycle.

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