COMPLIANCE STATEMENT FOR KTE ORANGE RIVER PIPELINE AND ASSOCIATED INFRASTRUCTURE, NORTHERN CAPE

PREPARED FOR

ENVIROAFRICA

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+27 83 387 6243

www.dsafrica.co.za

johan@dsafrica.co.za

Rorich Crescent

Bloemfontein

Directors:
Prof Johan Van Tol
Prof George Van Zijl
Dr Darren Bouwer

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BACKGROUND TO THE STUDY

EnviroAfrica tasked Digital Soils Africa (Pty) LTD (DSA) to undertake an Agricultural Compliance Statement for the planned KTE Orange River pipeline and associated infrastructure. The Agricultural Compliance Statement will form part of the Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014. As per GN960 of 2019, read with Section 24(5)(a) of the NEMA, Environmental Screening Reports (ESR) were generated for the application using the National Web-based Screening Tool. The ESR classifies the area as having Medium sensitivity for the Agricultural theme. The majority of the development is 'linear', and a compliance statement is deemed sufficient according to GN320 of 2020.

The Compliance Statement is reported according to the protocol for the specialist assessment and minimum report content requirements for the environmental impacts on agricultural resources (GN320 of 2020).

The study site stretches from Neilersdrif (Lennetsville) through Kenhardt and stops in Brandvlei, in the Northern Cape Province. The study area consists of 3 sites namely:

- The pipelines' route from Neilersdrif (Lennetsville) to Brandvlei
- Evaporation ponds and Uitkyk reservoirs, and
- The proposed SR energy and Kotula Tsatsi sites.

The pipeline route from Neilersdrif (Lennetsville) to Brandvlei along R27. The evaporation pond, Uitkyk reservoir and proposed SR energy & Kotula Tsatsi sites connects with the pipelines 70 km south-west of Kenhardt and 60 km of Brandvlei.

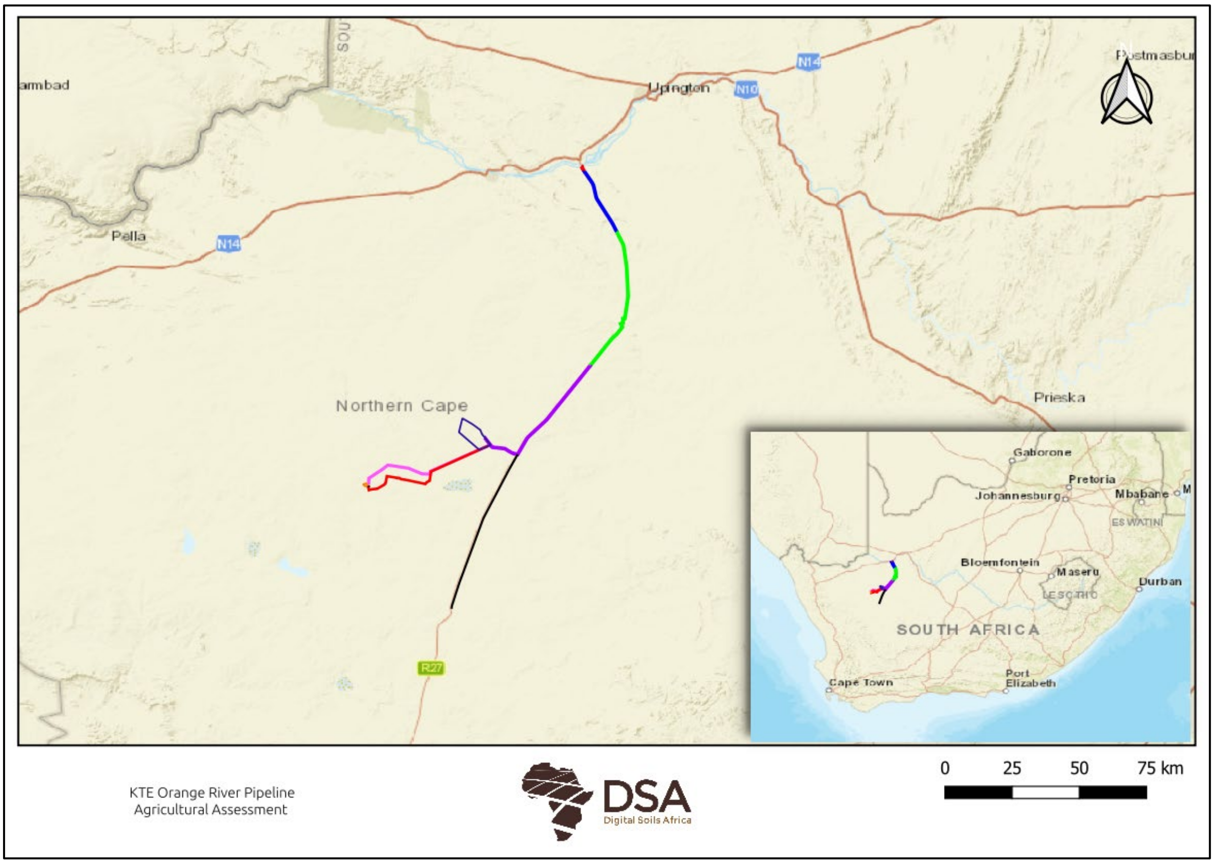


FIGURE 1: LOCATION OF THE STUDY AREA IN THE NORTHERN CAPE PROVINCE.

ENVIRONMENTAL SCREENING TOOL

Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

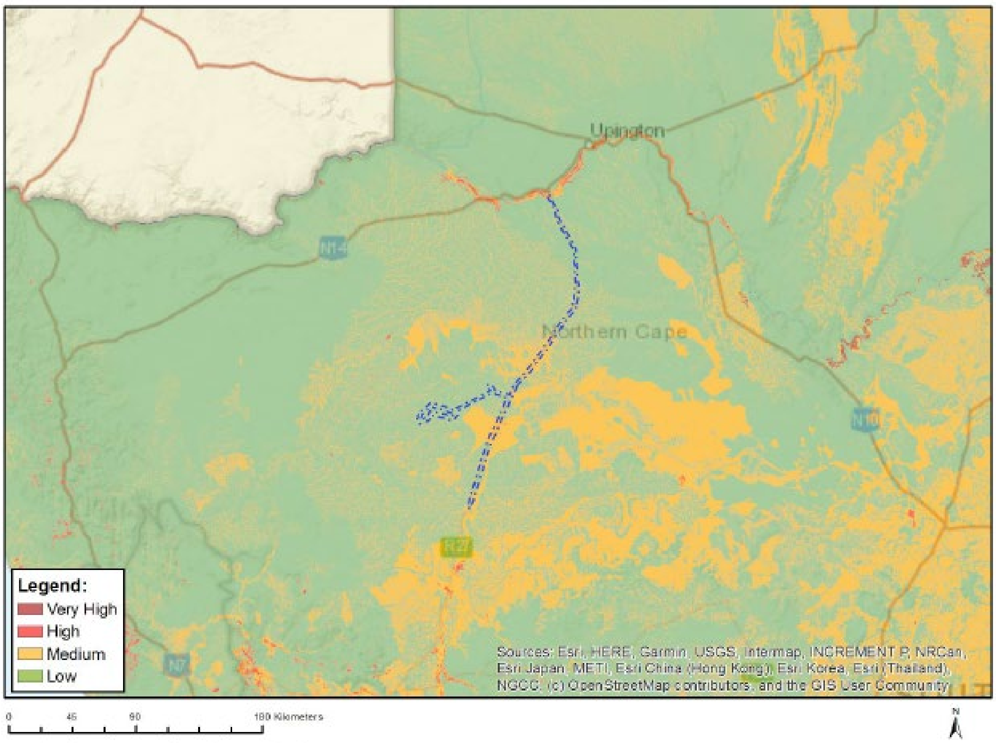
All cultivated land is considered a high sensitivity, while irrigation and unique crops, are considered very high sensitivity, irrespective of the land capability. The land use in the screening tool is based on the South African Nation Land Cover (SANLC, 2014). Meanwhile, there have been two more updated versions of the South African National Land Cover (2018 and 2020).

According to the Department of Agriculture, Forestry and Fisheries (2017), land capability is defined as the most intensive long-term use of land for purposes of rainfed farming determined by the interaction of climate, soil, and terrain. The following weight was given to each attribute when calculating the Land Capability:

Land capability = Climate (40%) + Terrain (30%) + Soil (30%)

According to the National Web based Environmental Screening Tool, the agricultural sensitivity for the pipelines, evaporation pond, Uitkyk reservoir and proposed SR energy & Kotula Tsatsi sites is classified as medium agricultural sensitivity (Figure 2, Figure3. Figure 4, and Figure 5). Similarly, the land capability (DAFF, 2017) classifies the soils as having a medium to low land capability for all the sites (Figure 6, Figure 7, Figure 8, and Figure 9). There are some cultivated crops on a very small portion at the initial injection (northern part) of the pipelines (Figure 10). However, there are no cultivated crops on the rest of the study sites (Figure 11, Figure 12, and Figure 13).

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



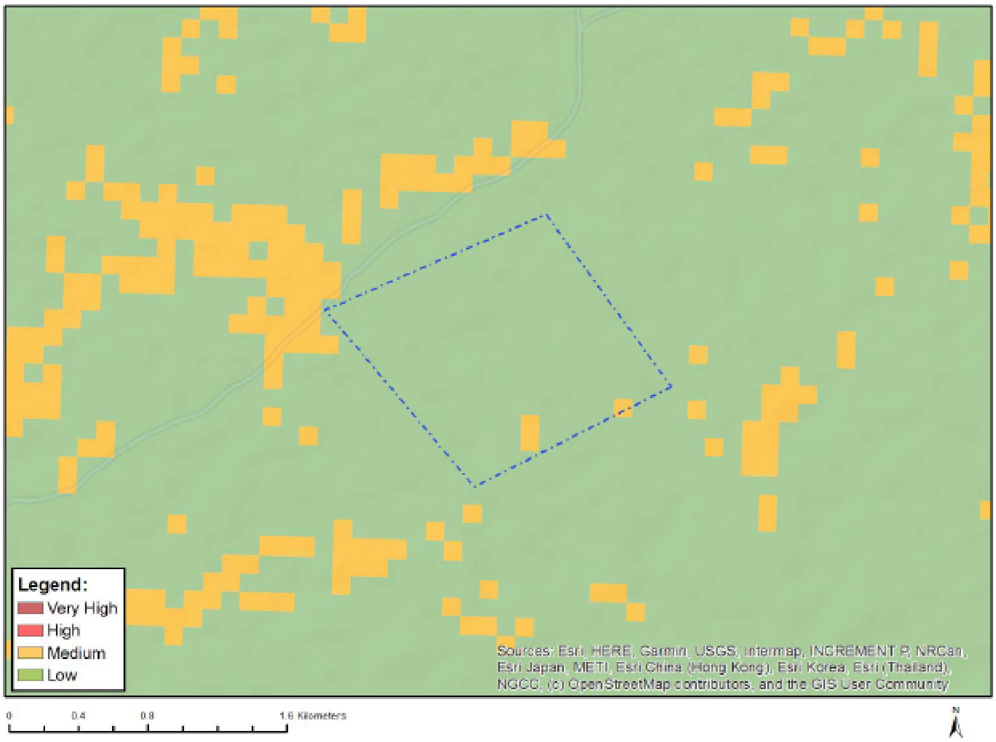
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

FIGURE 2: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR THE ORANGE RIVER PIPELINES.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



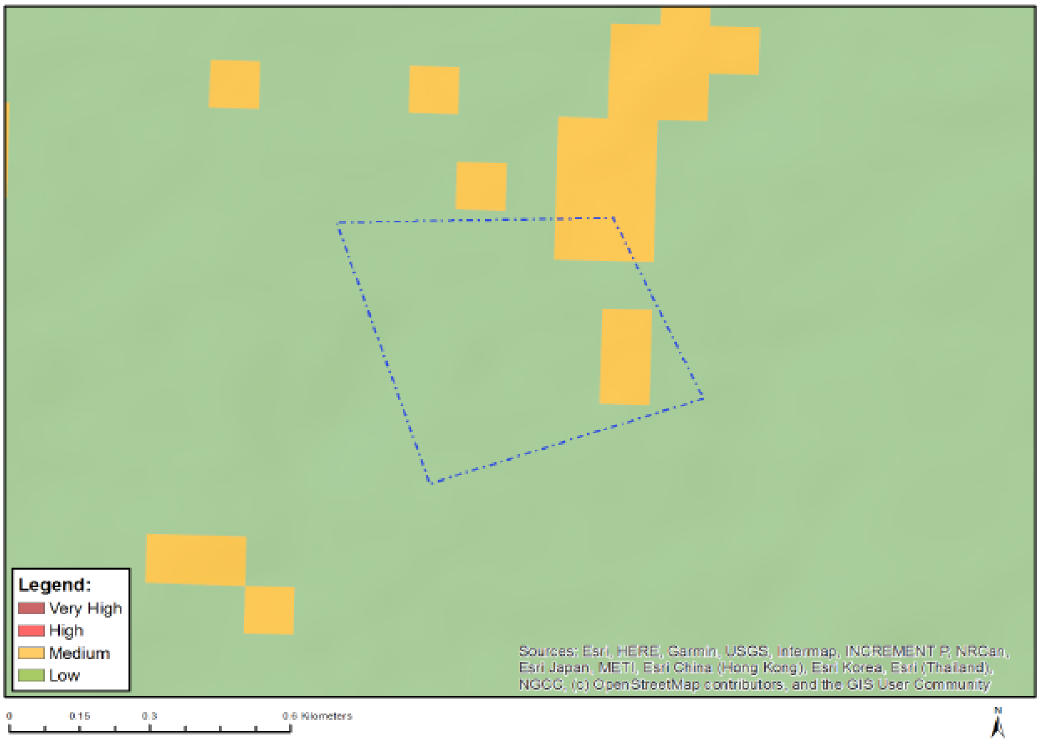
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

FIGURE 3: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR EVAPORATION PONDS.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



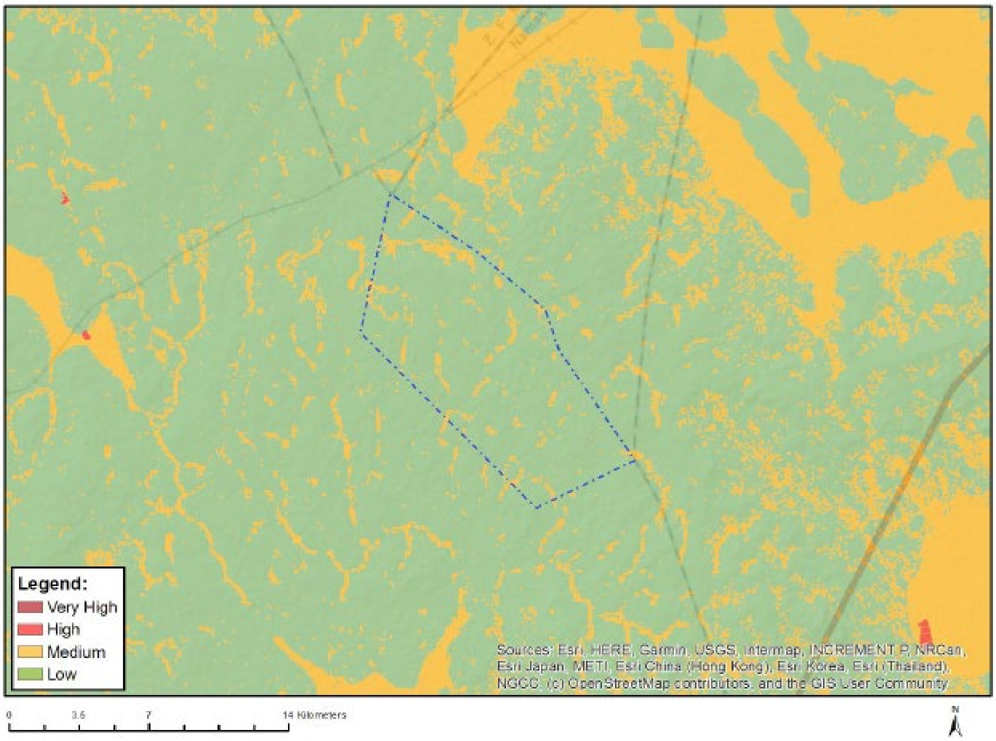
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

FIGURE 4: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR UITKYK RESERVOIR.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

FIGURE 5: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR PROPOSED SR ENERGY AND KOTULA TSATSI SITES.

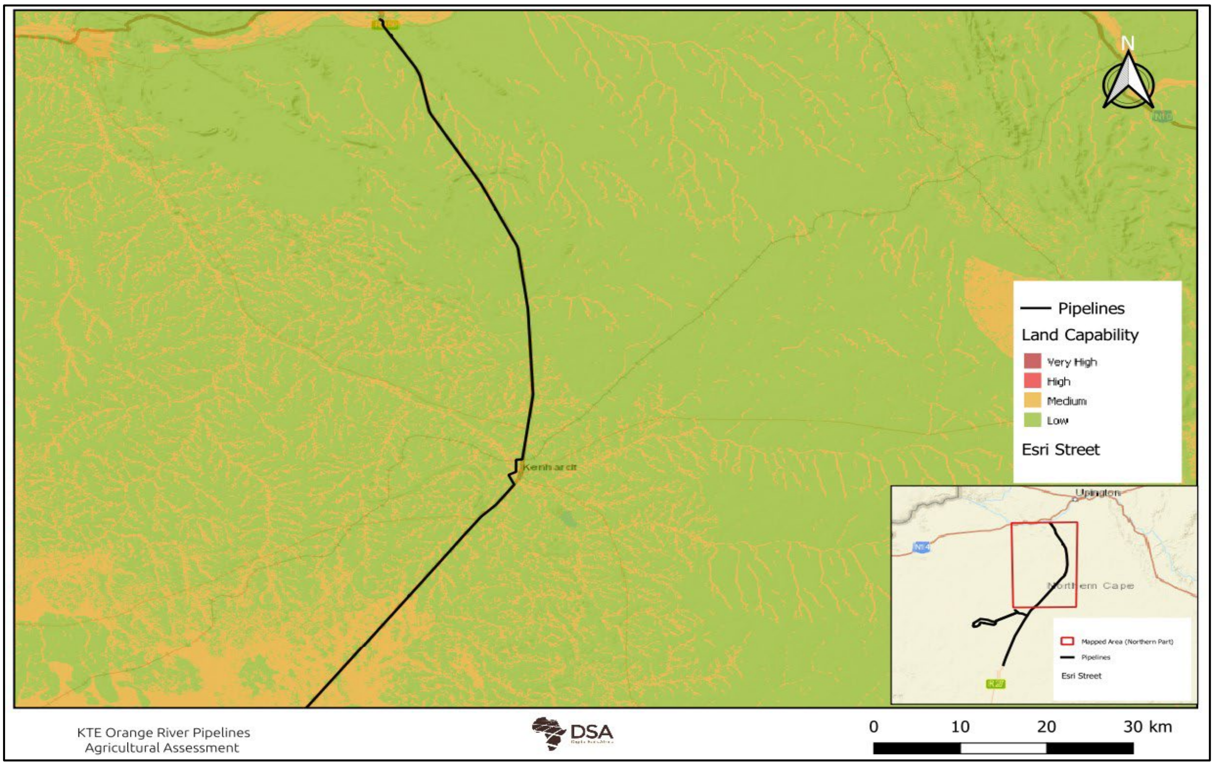


FIGURE 6 THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL FOR ORANGE RIVER PIPELINES (NORTHEN PART).

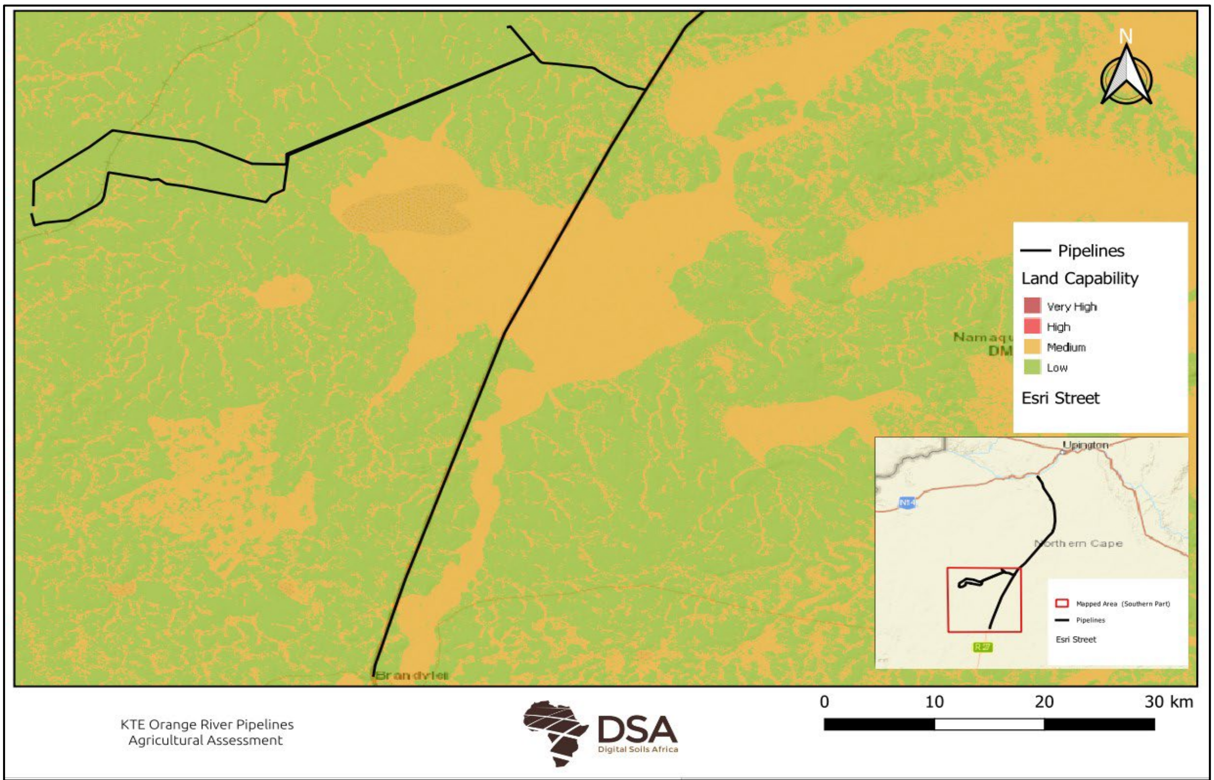


FIGURE 7: THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL FOR ORANGE RIVER PIPELINES (SOUTHERN PART).

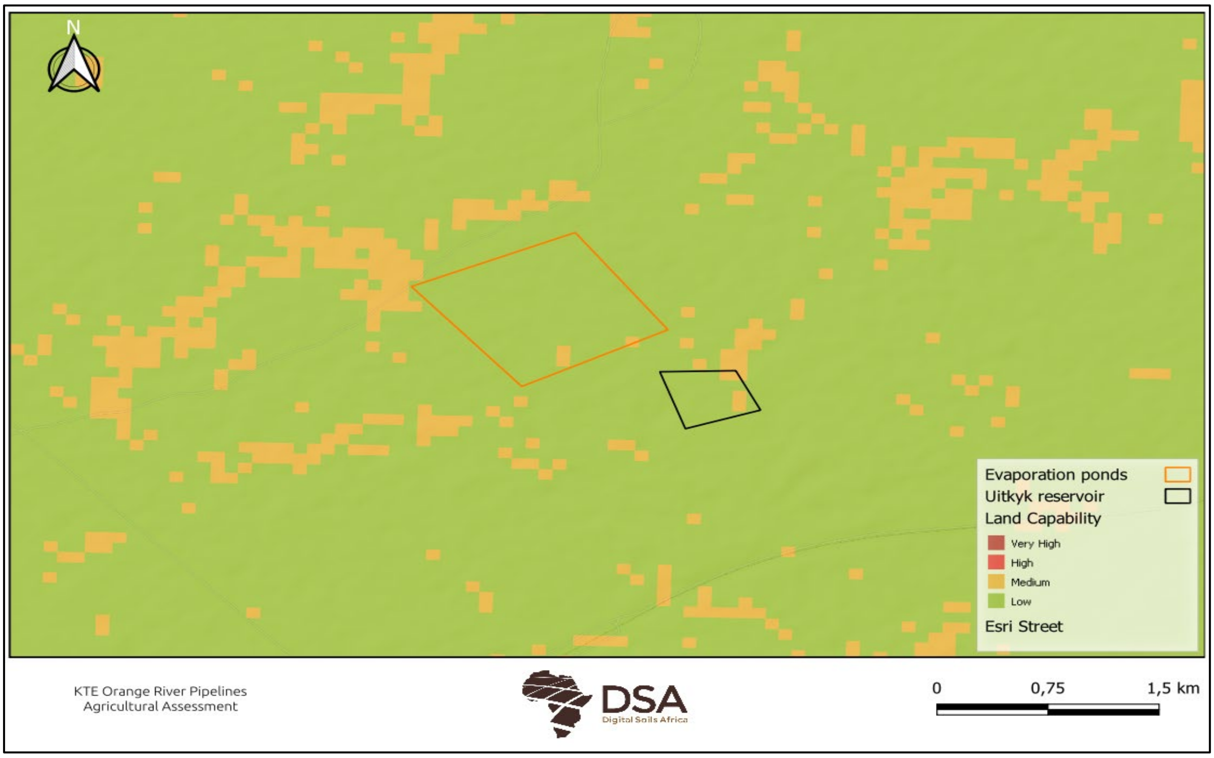


FIGURE 8: THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL FOR EVAPORATION PONDS AND UITKYK RESERVOIR.

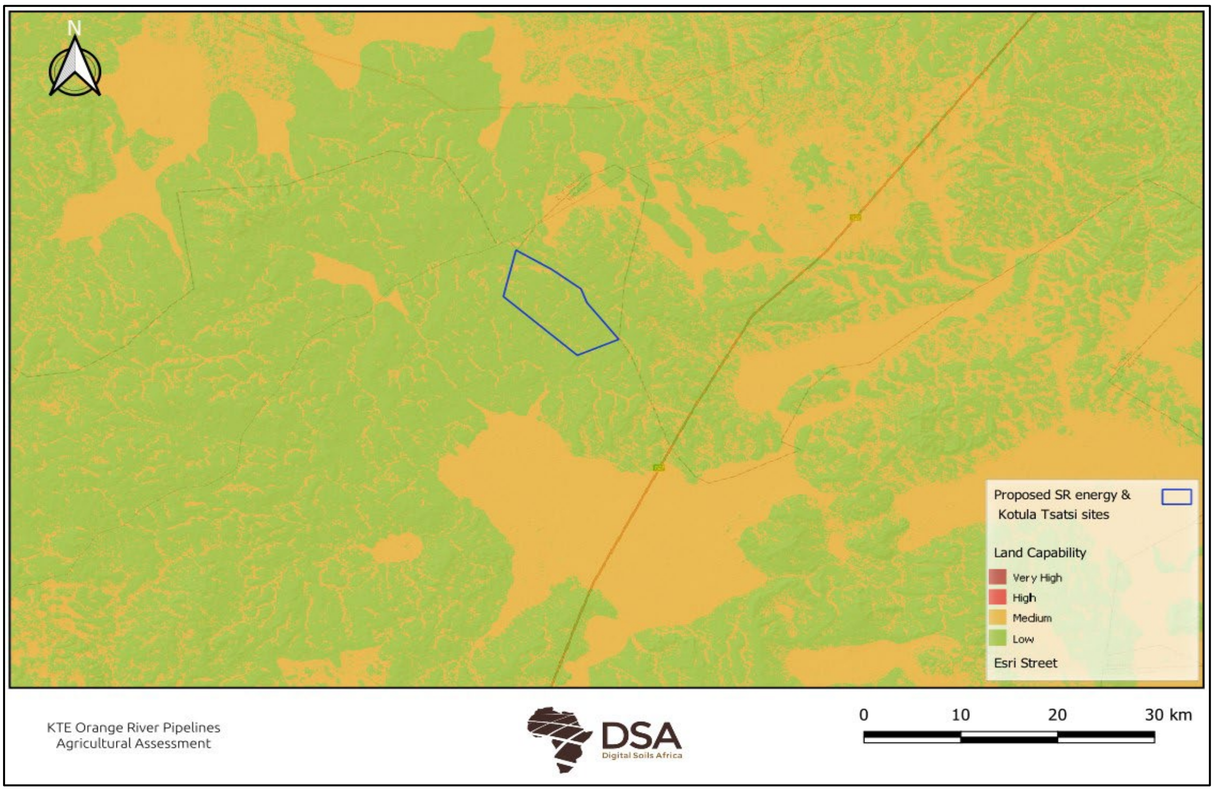


FIGURE 9: THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL FOR PROPOSED SR ENERGY AND KOTULA TSATSI SITES.

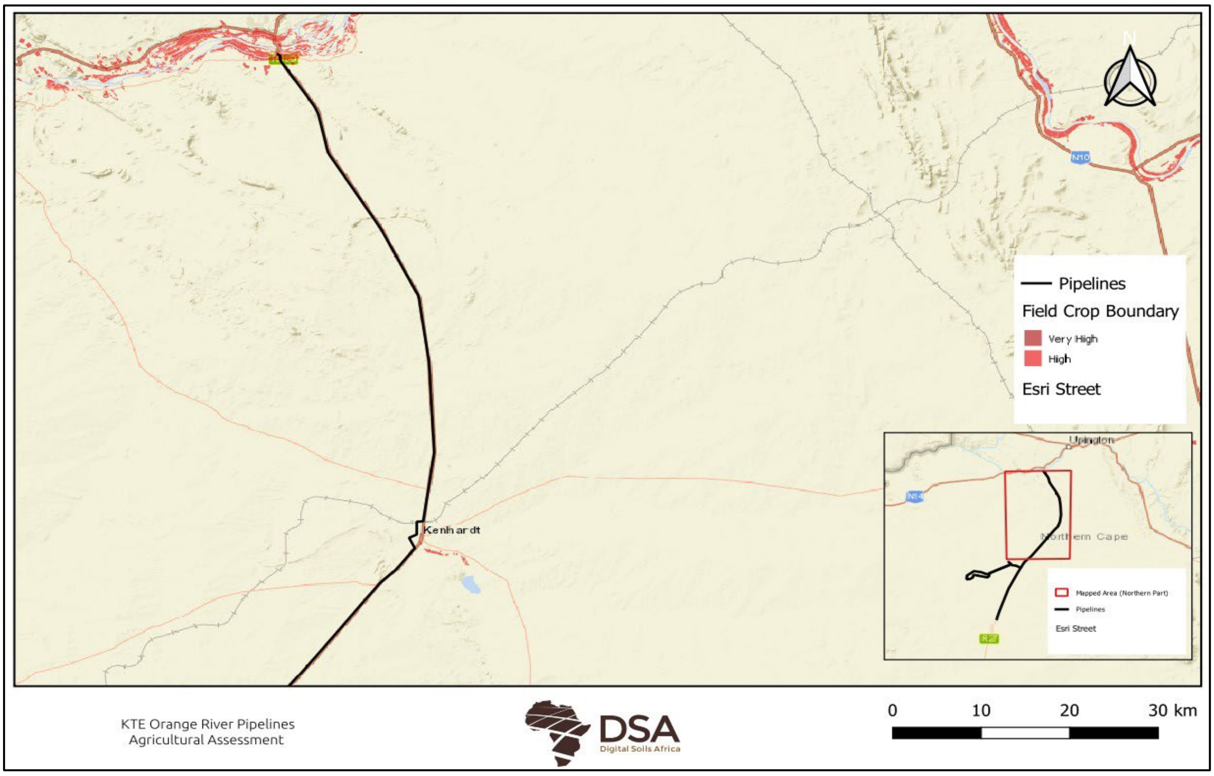


FIGURE 10: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL FOR THE ORANGE RIVER PIPELINES (NORTHERN PART).

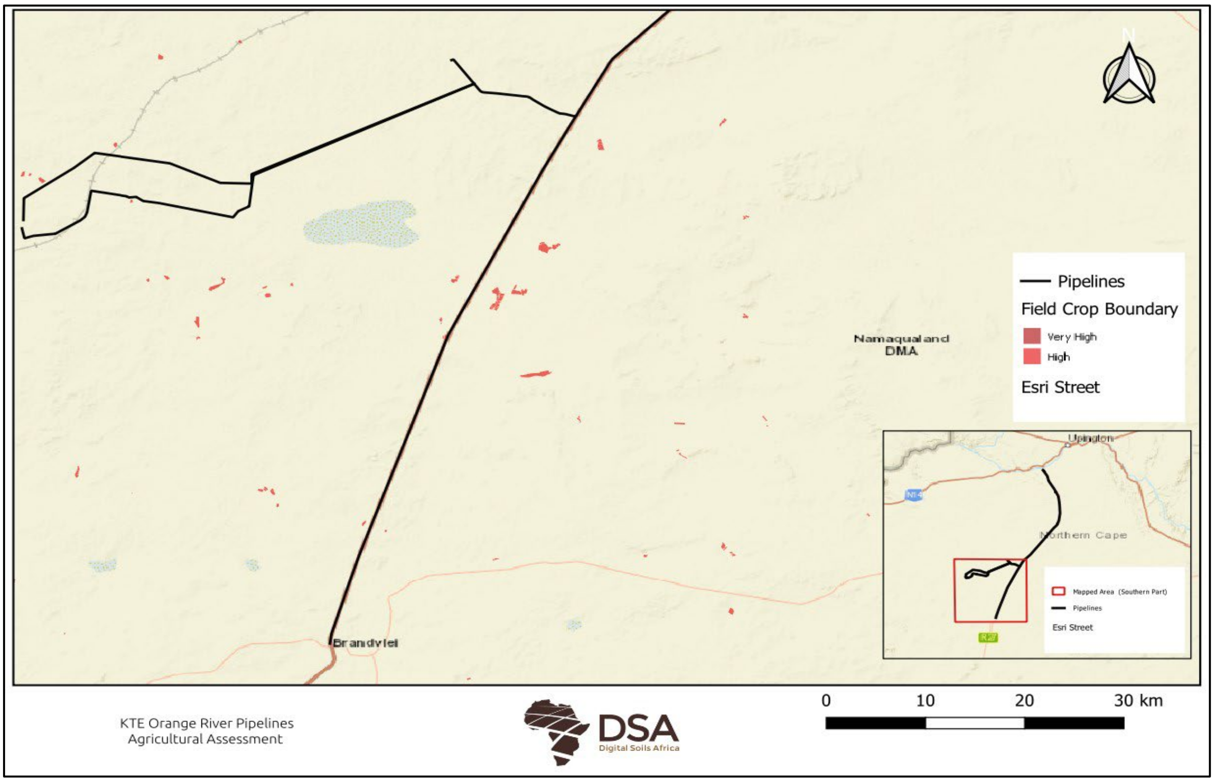


FIGURE 11: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL FOR ORANGE RIVER PIPELINES (SOUTHERN PART).

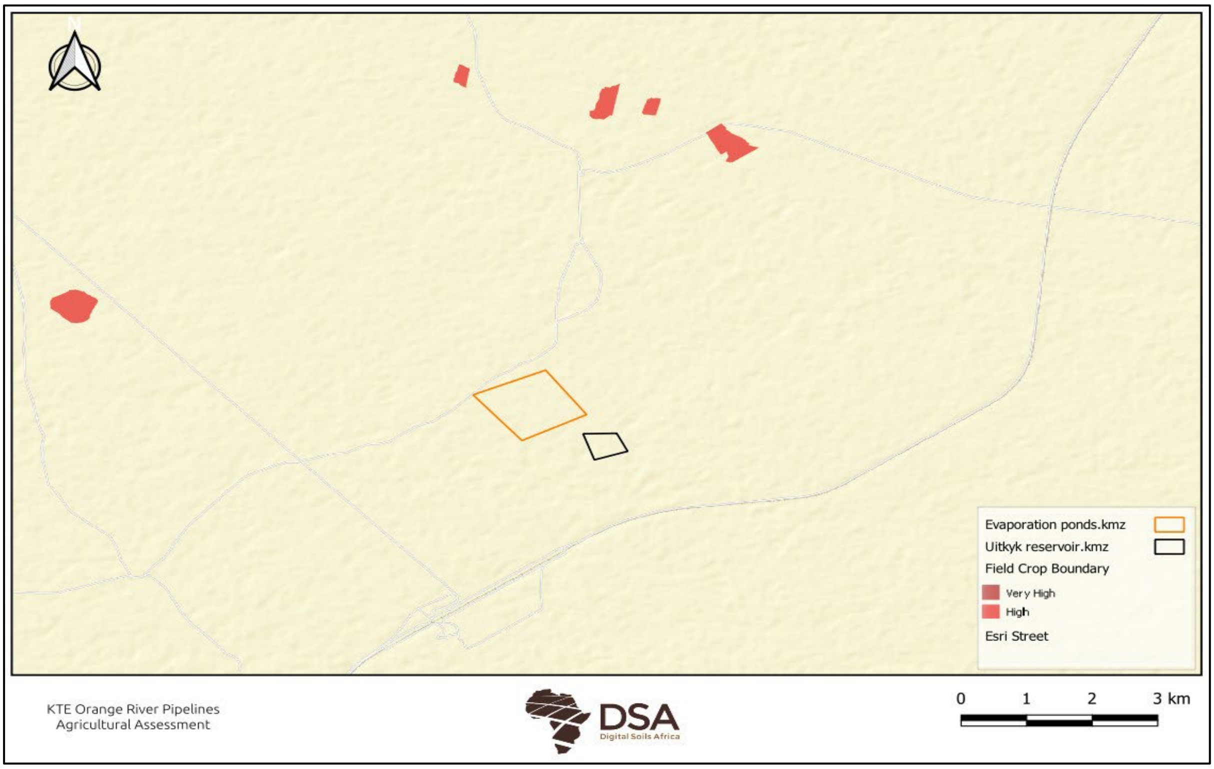


FIGURE 12: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL FOR EVAPORATION PONDS AND UITKYK RESERVOIR.

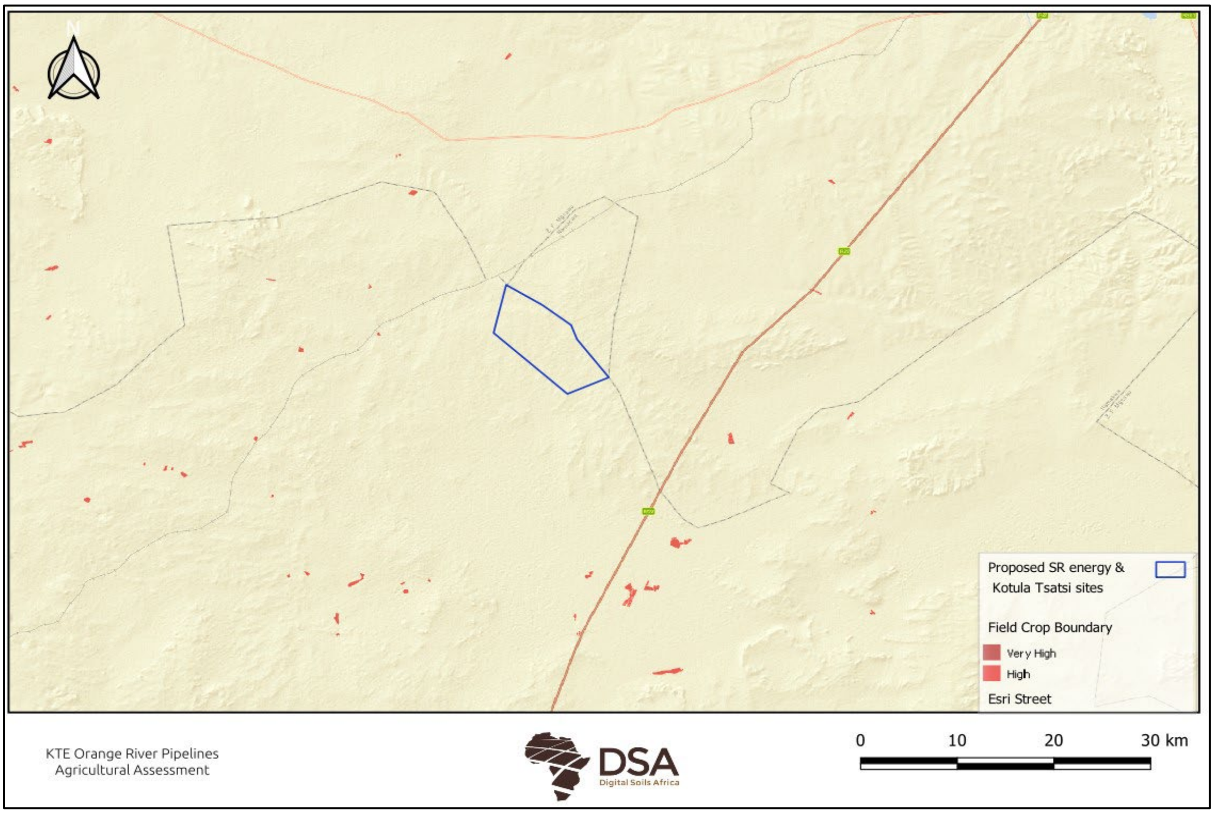


FIGURE 13: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL FOR PROPOSED ST ENERGY AND KOTULA TSATSI SITES.

Preservation and Development of Agricultural Land Framework Act (PD-ALF) is in the process of being published. The new statutory framework will replace the Subdivision of Agricultural Land Act, Act 70 of 1970.

Protected Agricultural Area, as in the draft framework, is defined as *"an agricultural land use zone, protected for purposes of food production and ensuring that high potential and best available agricultural land are protected against non-agricultural land uses in order to promote long-term agricultural production and food security."*

A large portion of study area is not situated in a Protected Agricultural Area, however, the small portion at the initial injection of the pipeline (northern part) is located within Protected Agricultural Area (Figure 14).

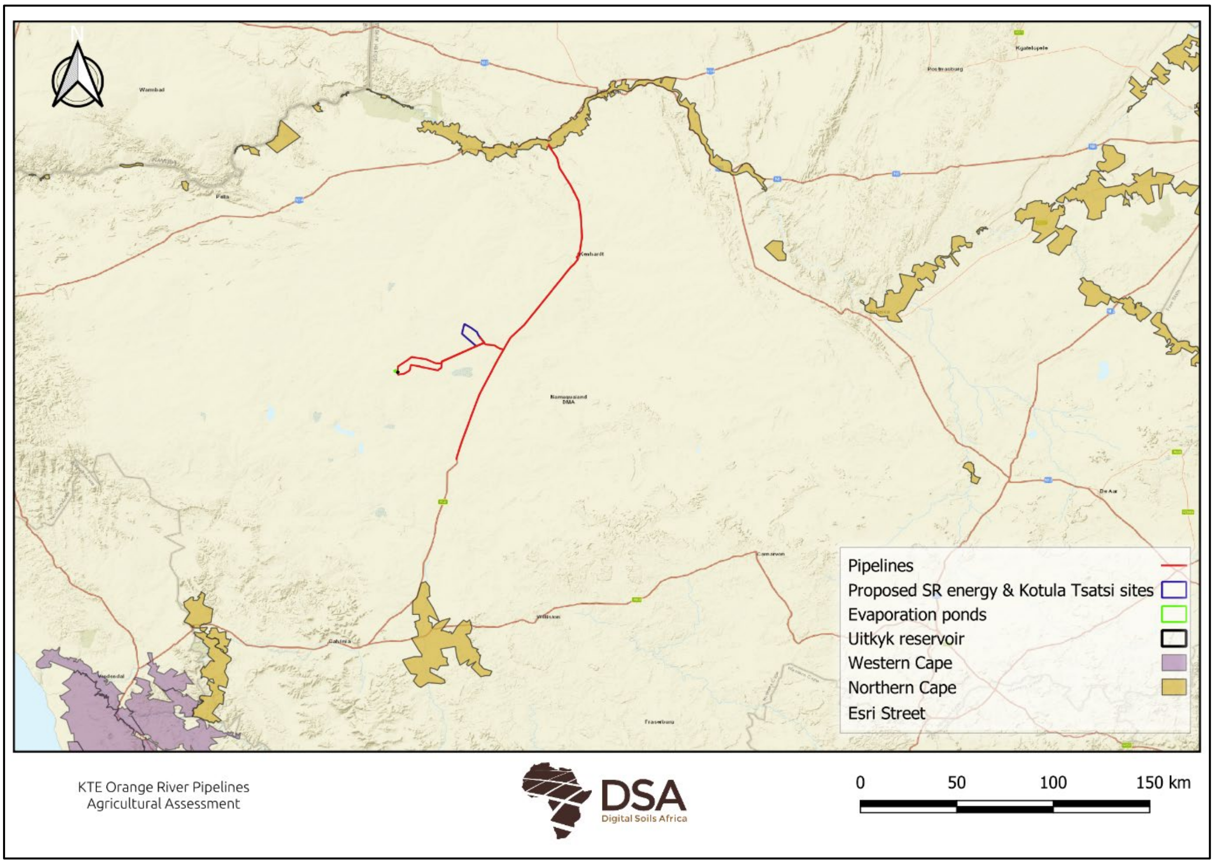


FIGURE 14: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

As per the protocol, Terms of Reference applicable to an "Agricultural Compliance Statement" is as follows:

- The compliance statement must be prepared by a soil scientist or agricultural specialist registered with the SACNASP (**pg. 45**);
- The compliance statement must:
- be applicable to the preferred site and proposed development footprint **(pg. 7)**;
- confirm that the site is of "low" or "medium" sensitivity for agriculture**(pg. 44)**;
- indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site **(pg. 44)**.
- The compliance statement must contain, as a minimum, the following information:
- contact details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment including a curriculum vitae **(pg. 45);**
- a map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool **(pg. 8-11)**;
- confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities **(pg. 44);**
- a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development **(pg. 44)**;
- any conditions to which the statement is subjected **(pg. 44)**;
- in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase **(not applicable).**
- where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr **(not applicable)**;
- and a description of the assumptions made and any uncertainties or gaps in knowledge or data **(pg. 17)**.

APPROACH AND ASSUMPTIONS

It is assumed that the data used in the desktop is correct. A site visit was conducted on the 9 and 10^{th} of March. The aim of the site visit was to confirm the low to medium agricultural sensitivity and the land use as depicted in the screening tool.

RESULTS

CLIMATE CAPABILITY

Kenhardt has a desert climate and there is not much rainfall all year long. The climate here is classified as BWh by the Köppen-Geiger. The mean yearly temperature recorded in Kenhardt is 20.7 °C as per the available data. The precipitation level on a yearly basis amount to 191 mm as per the meteorological records. The study site is located within an arid zone (Figure 18).

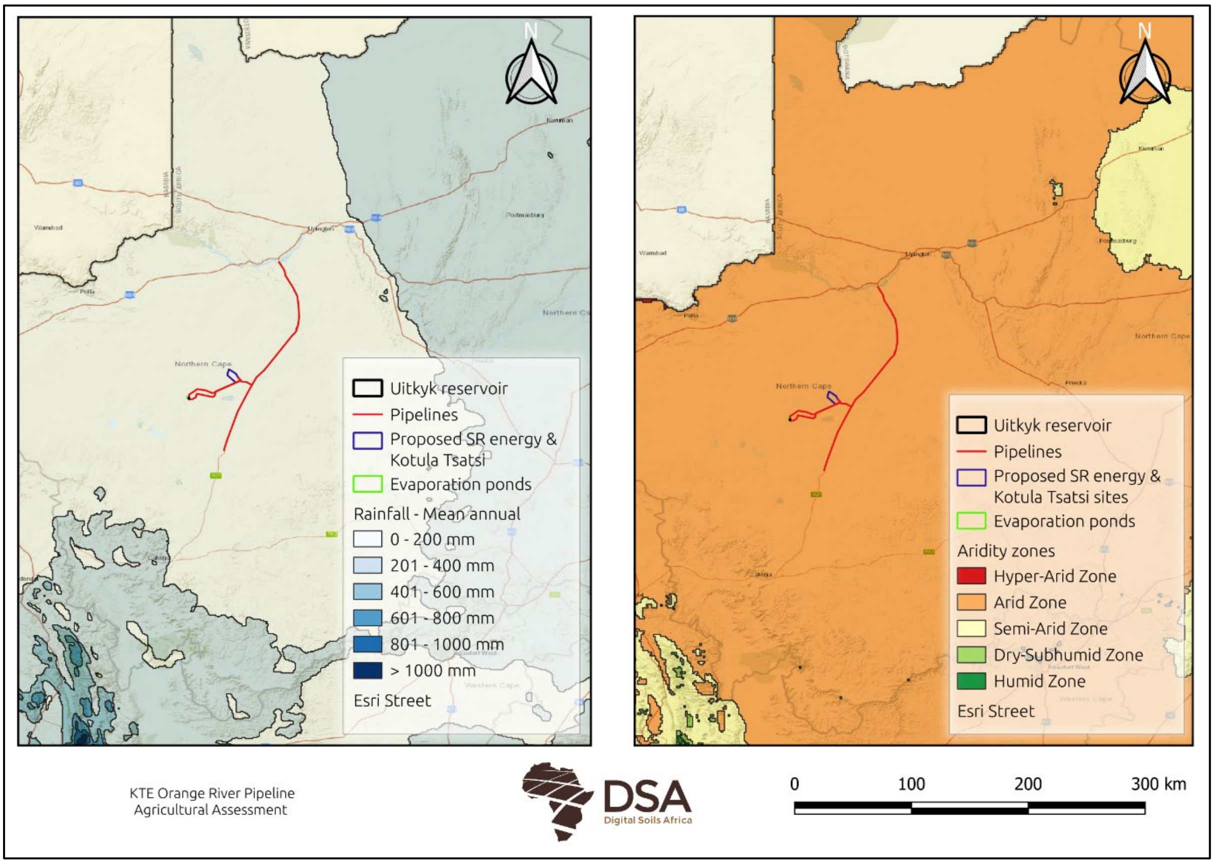


FIGURE 15: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

TABLE 1: CLIMATIC PROPERTIES OF KENHARDT, NORTHERN CAPE (CLIMATE-DATA.ORG).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C	27.9 °C	27.7 °C	25.4 °C	20.5 °C	16.3 °C	12.4 °C	12.3 °C	14.2 °C	18 °C	22.1 °C	24.5 °C	26.8 °C
Min. Temperature °C	20.2 °C	20.4 °C	18.3 °C	14.1 °C	10.1 °C	6.3 °C	5.9 °C	6.8 °C	9.7 °C	13.7 °C	15.9 °C	18.4 °C
Max. Temperature °C	34.6 °C	34.2 °C	31.9 °C	26.8 °C	22.8 °C	19 °C	19.1 °C	21.5 °C	25.6 °C	29.4 °C	31.7 °C	33.9 °C
Precipitation / Rainfall mm	31	25	32	22	12	7	5	4	5	13	15	20
Humidity (%)	27%	29%	33%	40%	42%	46%	40%	33%	26%	23%	22%	24%
Rainy days (d)	3	4	4	3	1	1	1	1	1	1	2	2
avg. Sun hours (hours)	12.2	11.6	10.8	9.8	9.1	8.6	8.8	9.4	10.3	11.3	12.0	12.4

Climate capability is the highest weighted factor (40%) in the calculation of land capability (DAFF, 2017), and it is used in the screening tool to determine agricultural sensitivity. Soil capability (30%) and Terrain capability (30%) contribute the remaining considerations. The climate capability consists of 9 values, with 1 being the lowest value and 9 being the highest value (There is however no evaluation value of 1 & 2).

The Climate capability is determined by the following factors:

- Moisture supply capacity (50%)
- Physiological capacity (20%)
- Climatic constraints (30%)

The climate capability, according to the Department of Agriculture, Forestry and Fisheries, 2017, is a value of 3 (Figure 19). This is considered a low climate capability.

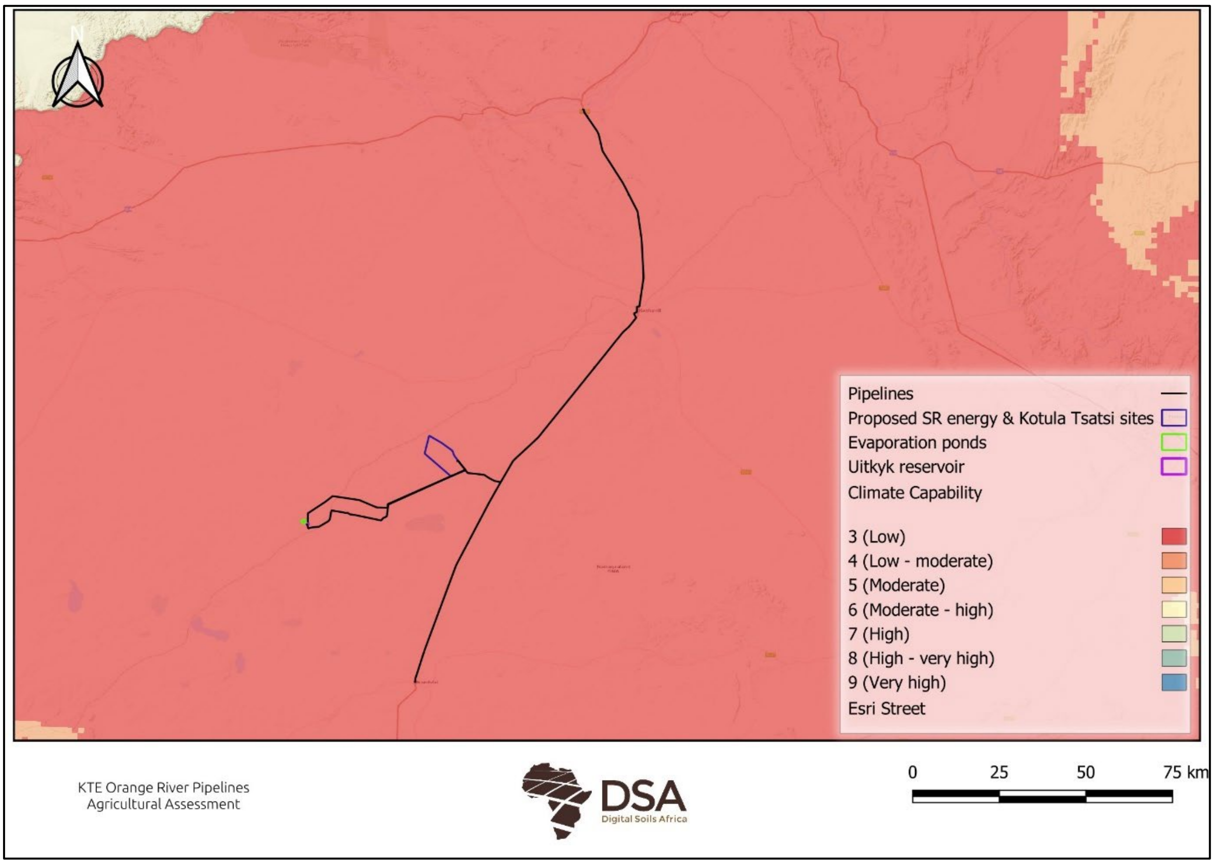


FIGURE 16: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

SOIL

LAND TYPE

A land type is an area that can be demarcated at a scale of 1:250 000 with similar soil forming factors and, therefore, soil distribution patterns. A land type does, therefore, not represent uniform soil polygons, but rather, information regarding the occurrence of different soils on different terrain units can be obtained from the land type inventory. Land type data was used to calculate soil capability (DAFF, 2017) and, therefore, was indirectly used in the screening tool to estimate agricultural sensitivity.

The northern part of the pipelines is comprised of Af, Ah, Ia, Ib, and Ic land types (Figure 17). The southern part of the pipelines is comprised of Ia and Fc land types (Figure 17). The evaporation ponds, Uitkyk reservoir, proposed SR energy, and Kotula tsatsi sites comprise of the Fc land type (Figure 17). The Af land type qualifies as freely drained, red, and eutrophic apedal soils comprising >40% of the land type (yellow soils comprise <10%) with dunes. The Ah land type qualifies as freely drained, red, and eutrophic apedal soils comprising >40% of the land type (red and yellow soils each comprise >10%). The Ia land type qualifies as deep alluvial soils comprising >60% of land type, and Ib land types qualifies as rock outcrops comprising >60% of land type, while Ic land type qualifies as rock outcrops comprising >80% of land type. The Fc land type qualifies as shallow soils (Mispah and Glenrosa forms) that usually predominate with lime throughout much of the landscape.

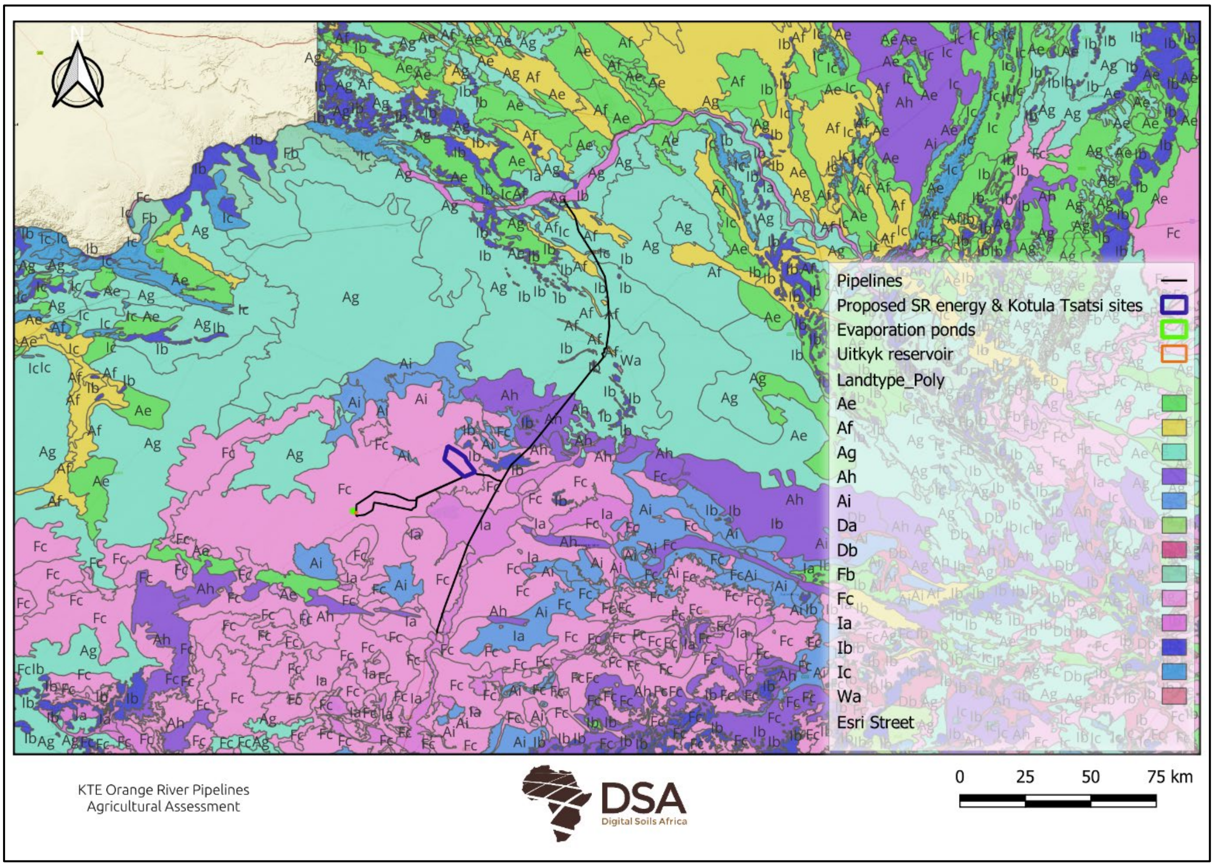


FIGURE 17: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

SOIL CAPABILITY

The Soil capability consists of 9 values, with 1 being the lowest value and 9 being the highest value. The main factors contributing to the Soil capability consist of:

- Plant available water (80%)
- Soil sensitivity (17%)
- Soil fertility (3%)

The soil capability according to the DAFF (2017) the pipelines has a majority value of 3 (Low), 4 (Low - Moderate) and 5 (Moderate), 6 (Moderate to high) to 7(High) in some parts (Figure 18). The majority of the evaporation ponds have values of 2 (Low – very low) and 3 (Low), with approximately 1 pixel and a value of 5 (Moderate). Similarly, the majority of the Uitkyk reservoir has values of 2 (Low – very low) and 3 (Low), with approximately 1 pixel with a value of 4 (Low – moderate), approximately 1 pixel with a value of 5 (Moderate) and approximately 2 pixels with a value of 6 (Moderate – high). The majority of the proposed SR energy and Kotula Tsatsi sites have values of a majority of 2 (Low – very low) and 3 (Low) and a few pixels with values of 4 (Low – moderate), 5 (Moderate), and 6

(Moderate – high). The majority soil capability of the site is between 2 and 6 which is Very Low – Low to Moderate – high.

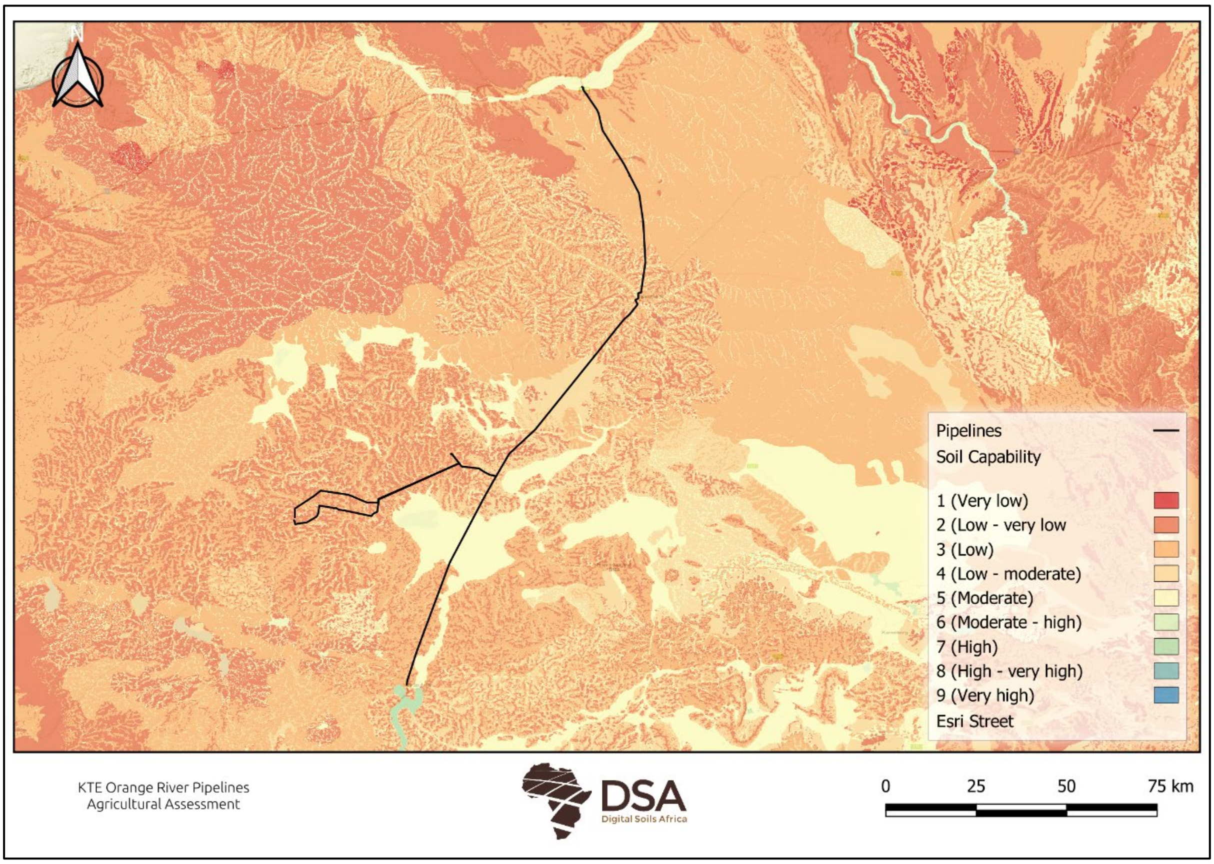


FIGURE 18: THE SOIL CAPABILITY OF THE PIPELINES.

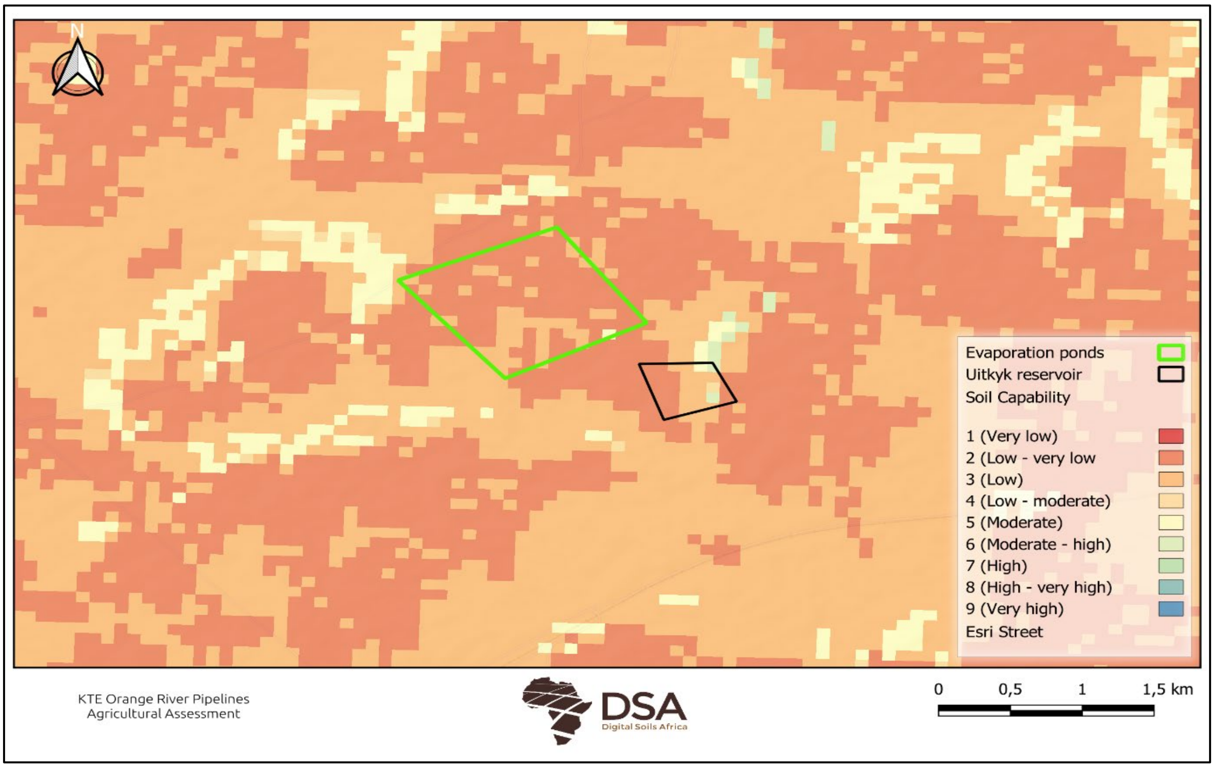


FIGURE 19: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017) FOR BOOSTER PUMP STATION 1B1 (SURVEY AREA).

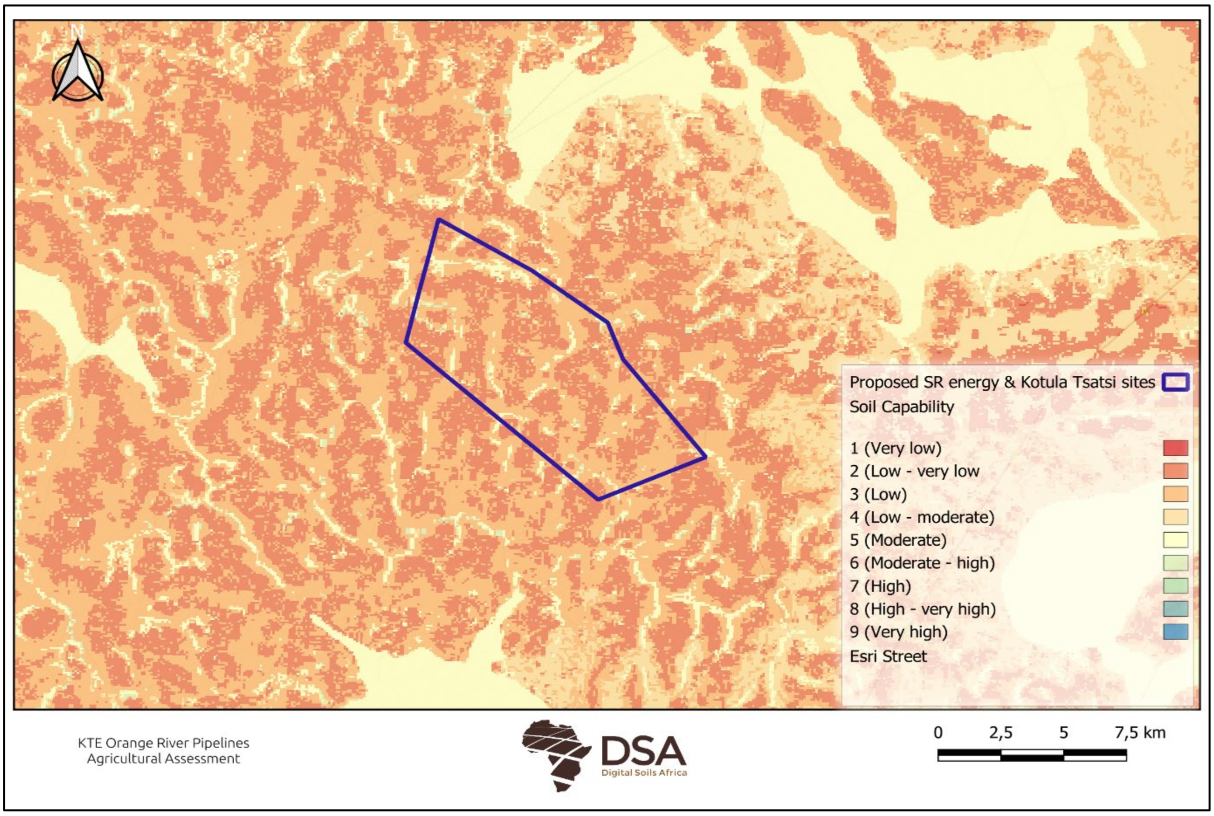


FIGURE 20: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017) FOR RESEVOIR SITE 1A & 1B.

TERRAIN CAPABILITY

Terrain plays an important role in a plant's physiological growth requirements and from a sensitivity and accessibility perspective; therefore, the two terrain modeling concerns included in the terrain capability modeling exercise were plant physiology and terrain sensitivity. The Terrain capability consists of 9 values, with 1 being the lowest value and 9 being the highest value.

The terrain capability, according to the DAFF (2017), ranges from values of 3 (Low), 4 (Low – moderate), 5 (Moderate) in small areas of the pipelines (northern part). The terrain capabilities range from values of 6 (Moderate – high), 7 (High), and 8 (High – very high) for the evaporation ponds, Uitkyk reservoir, proposed SR energy & Kotula Tsatsai sites, and the majority of the pipelines. (Figure 21, Figure 22, Figure 23).

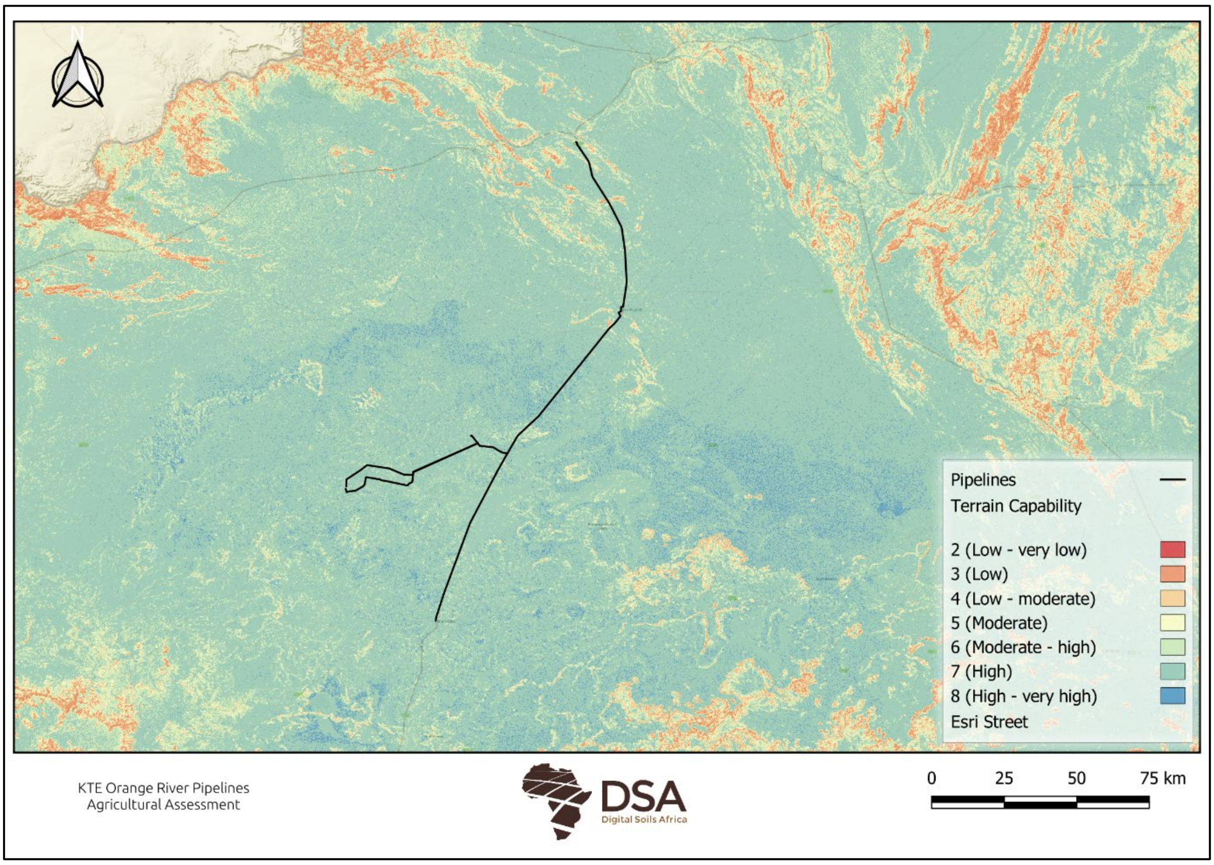


FIGURE 21: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017) FOR OPTION THE PIPELINES.

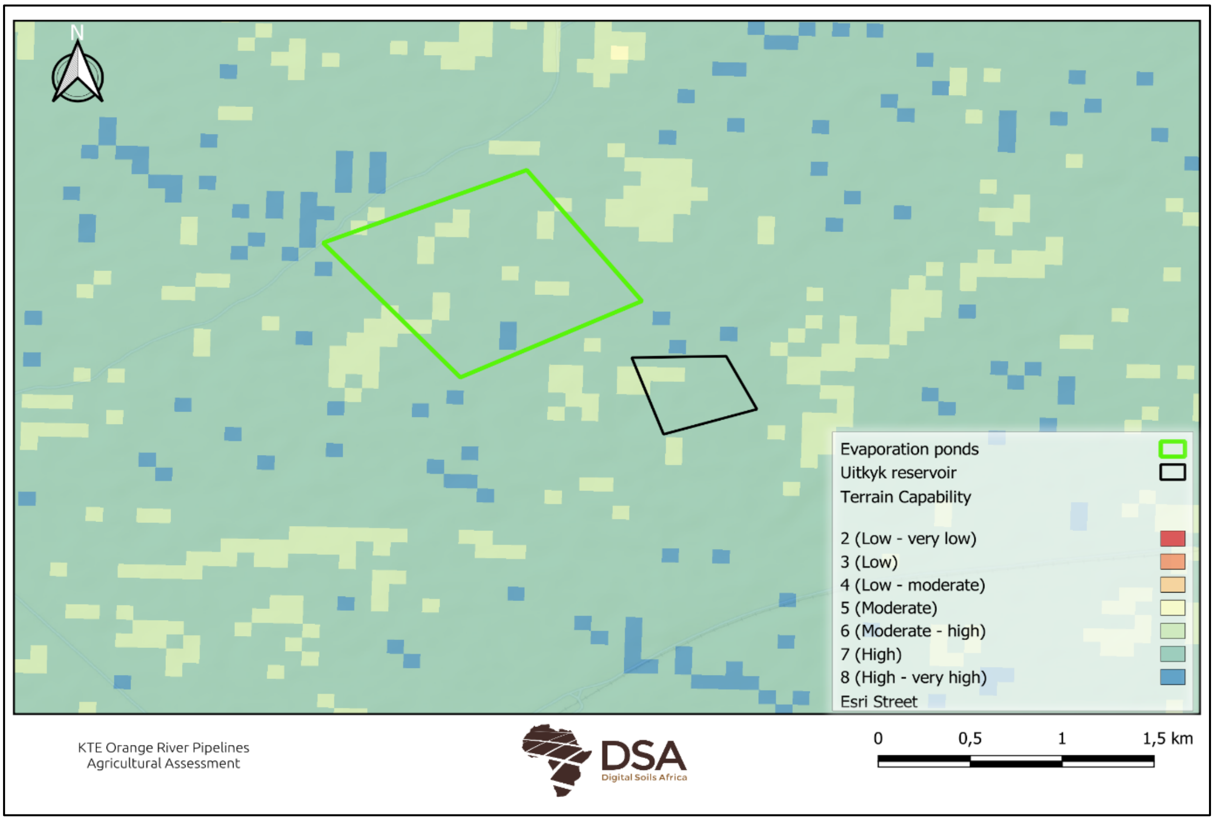


FIGURE 22: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017) FOR THE EVAPORATION PONDS AND UITKYK RESERVOIR.

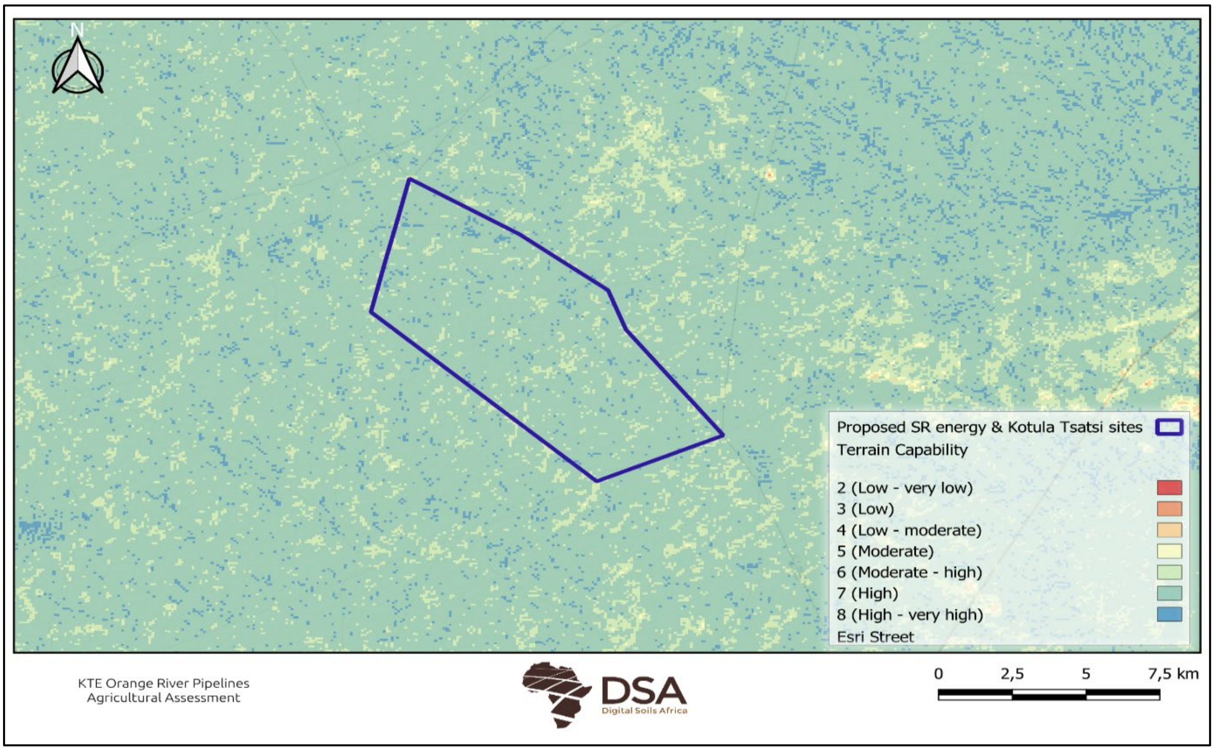


FIGURE 23: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017) FOR THE PROPOSED SR ENERGY & KOTULA TSATSI SITES.

LAND CAPABILITY

The new Land capability (Department of Agriculture, Forestry and Fisheries, 2017) has fifteen classes, as opposed to the eight classes described by Schoeman et al. (2002). The data is usable on a scale of 1:50 000 – 1: 100 000; therefore, it is not suitable for farm scale recommendations. Classes 1 to 7 are of low land capability and only suitable for wilderness or grazing. Classes 8 to 15 are considered to have arable land capability with the potential for high yields increasing with the land capability class number.

TABLE 2: LAND CAPABILITY CLASS AND THE DESCRIPTION OF THE CLASS

Land Capability Class	Description	
1-2	Very Low	
3-4	Very Low to Low	Not arable
5	Low	
6-7	Low to Moderate	
8	Moderate	
9-10	Moderate to High	
11	High	Arable
12-13	High to Very High	
14-15	Very High	

The Land capability values ranges from 4 (Very Low - Low), 5(Low), 6 (Low – moderate), and 7 (Low - Moderate), and there are values of 2 (Very low) and 3 (Very low – low) in small areas of the pipelines (northern part) which is generally considered not arable. (Figure 24, Figure 25, and Figure 26).

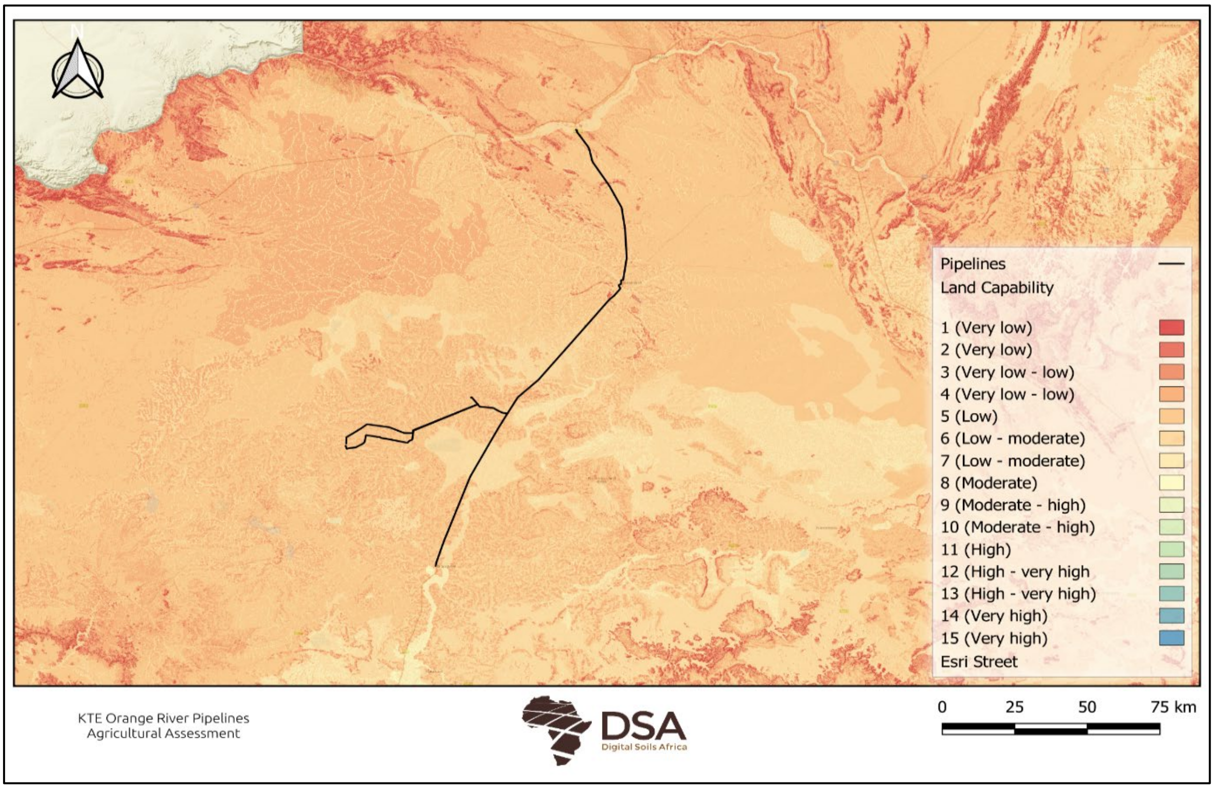


FIGURE 24: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017) FOR THE PIPELINES.

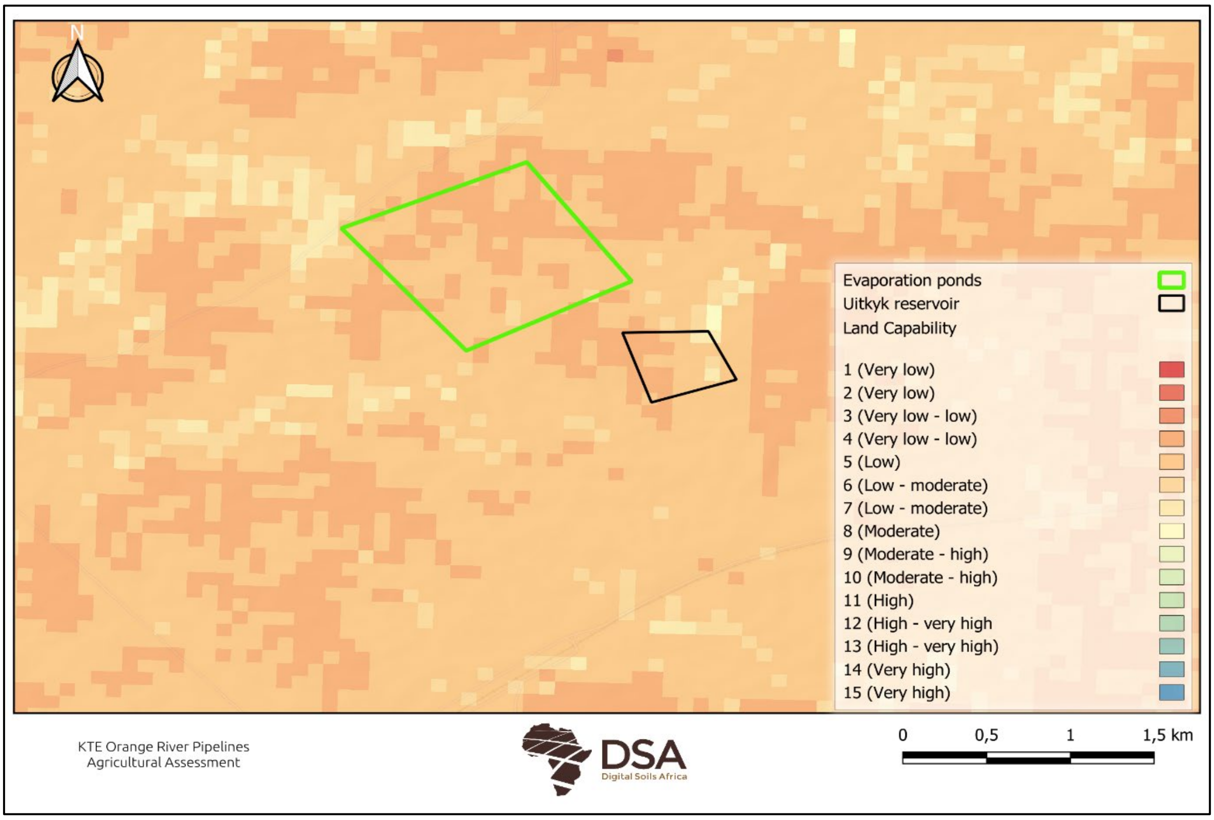


FIGURE 25: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017) FOR THE EVAPORATION PONDS AND UITKYK RESERVOIR.

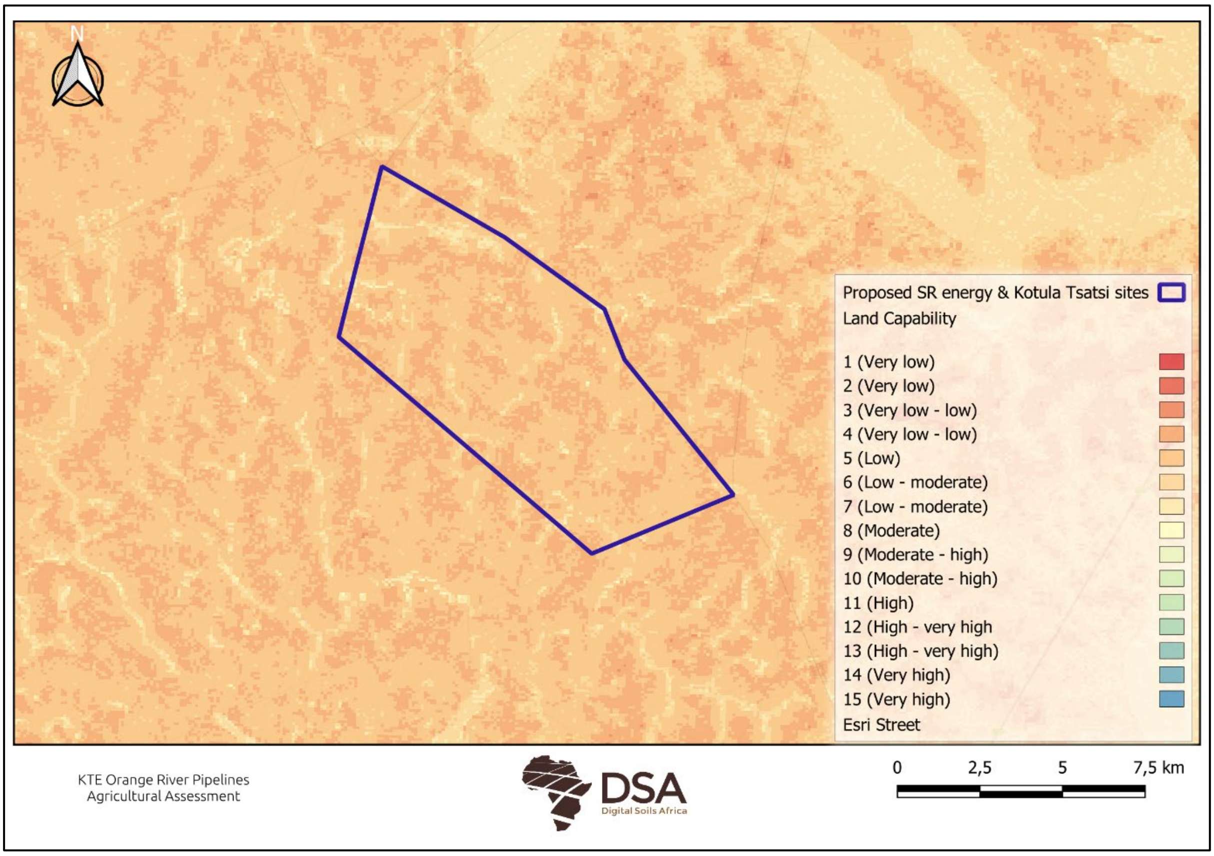


FIGURE 26: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017) THE PROPOSED SR ENERGY & KOTULA TSATSI SITES.

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). The site has a low grazing capacity of 32, 36, and 39 ha/LSU (Figure 27) for the pipelines and 39 ha/LSU for the evaporation ponds, Uitkyk reservoirs, and the proposed SR energy & Kotula Tsatsi sites. A homogeneous unit of vegetation is expressed as the area of land required (in hectares) to maintain a single animal unit (LSU) over an extended number of years without deterioration to vegetation or soil. Where an LSU = An animal with a mass of 450 kg and which gains 0.5 kg per day on forage with a digestible energy of 55%. (Trollope et. Al., 1990).

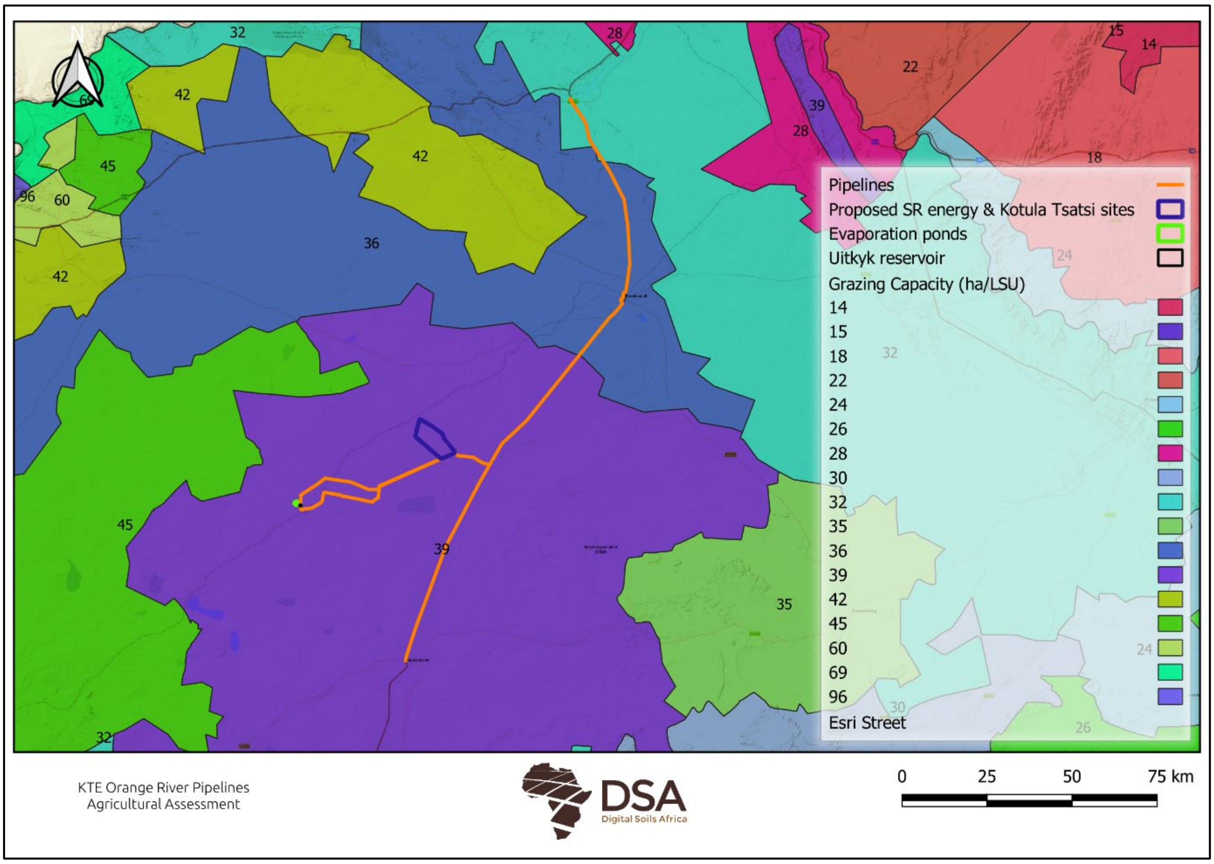


FIGURE 27: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

LAND USE

South African National Land-Cover 2020 (SANLC 2020) (GeoTerraImage, 2020) was compared to the 2014 Land Cover to determine if there was a land use change since 2014. The SANLC 2020 classifications for each site of the project, along with the class names, are listed in Table 3 to Table 11 below for Figure 28, Figure 29, and Figure 30.

TABLE 3: LEGEND TO FIGURE 28

No.	Class Name	Class Definition
3	Dense Forest & Woodland	Natural tall woody vegetation communities, with canopy cover ranging between 35 - 75%, and canopy heights exceeding 2.5 metres. Typically represented by dense bush, dense woodland and thicket communities.
4	Contiguous & Dense Planted Forest	Dense to contiguous cover, planted tree forests, consisting primarily of exotic timber species, with canopy cover exceeding 35%, and canopy heights exceeding 2.5 metres. Typically represented by mature commercial plantation tree stands. This class also includes smaller woodlots and windbreaks, where they have been identified by the same spectral-based image modelling procedures used to detect the plantation forests.
8	Low Shrubland (Fynbos)	Natural, low woody shrubland communities, where the total plant canopy cover is typically both dominant over any adjacent bare ground exposure, and the canopy height ranges between 0.2 – 2 metres. Note: this definition differs slightly from the equivalent gazetted class definition (i.e. total plant canopy cover ranges between 10 - 100%) in order to provide a more comparable content to the 1990 and 2013-14 SANLC datasets. If a tree or tall bush woody cover is evident it is typically < 0.1 % of total canopy cover. Typically representative of low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially *outside* the SANBI defined boundaries for Fynbos, Succulent and Nama-Karoo vegetation communities. This is the same approach as used in the 1990 and 2013-14 SANLC datasets and has been replicated for consistency and comparability.
11	Low Shrubland (Nama Karoo)	This is the same as class 8, Low Shrubland, but now represents low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially inside the SANBI defined boundaries for Nama Karoo vegetation communities.
12	Sparsely Wooded Grassland	Natural woody vegetation, with a woody canopy cover ranging between only 5 - 10%, and canopy heights exceeding 2.5 metres, in a grass-dominated environment. Typically represented by very sparse woodland or lightly wooded grassland communities. This class has been included as it is part of the new gazetted land-cover classification standards, but is challenging to map with 20m resolution imagery, since the associated woody cover component is not a spatially dominant component. Whilst the class has been generated with all possible due care and attention, it must be used and with caution, and should be interpreted as a sub-component of the grassland areas, especially in drier more arid areas.
49	Residential Formal (low veg / grass)	Built-up areas primarily containing formally planned and constructed residential structures and associated utilities. The dominant vegetation (in gardens etc) is grass and/or low shrub based.
55	Village Scattered	Built-up areas primarily associated with scattered rural settlements and associated utilities. It may include some adjacent areas of subsistence farming, especially if the village structures and fields are inter-mixed. This class is also associated with both structures on individual (commercial or

		smallholding) farming units, depending on clustering and size. Scattered villages are defined as those represented by contiguous / adjacent village-classified cells which collectively do not form the majority cover in a surrounding 1 ha window. Note that the class extent includes both bare / non-vegetated and low vegetation covered areas within the village boundary. Woody cover is excluded from this class and represented separately (i.e. classes 2 – 4).
66	Industrial	Built-up areas primarily containing formally planned and constructed industrial structures and associated utilities. Includes both light and heavy industry, power generation, airports, rail terminals and ports. In the agricultural sector this class also represents (chicken and pig) animal batteries, greenhouses and tunnels and intensive feedlots
67	Roads & Rail (Major Linear)	Built-up features represented by primary road and rail networks that are image-detectable (i.e. networks are non-contiguous), as well as smaller airfields and airstrips. Note that road and rail networks have not been mapped as contiguous networks, but are only represented in the NLC dataset where the linear feature is image detectable, which is dependent on object size, shape, orientation, material and surrounding landscape characteristics. This class is therefore not a definitive representation of road and rail networks. It has been included as a requirement to match, as far as possible, the gazetted land-cover standard.
69	Mines: Extraction Sites: Open Cast & Quarries combined	Non-vegetated, active and/or non-active extraction pits associated with surface-based mining activities, including open-cast mines, quarries, and road-side borrow pits etc. Note that in some cases (especially coal mining) there may be some overlap/mis-representation between mine-extraction pits and mine-tailings, due to the challenge of separating these accurately.

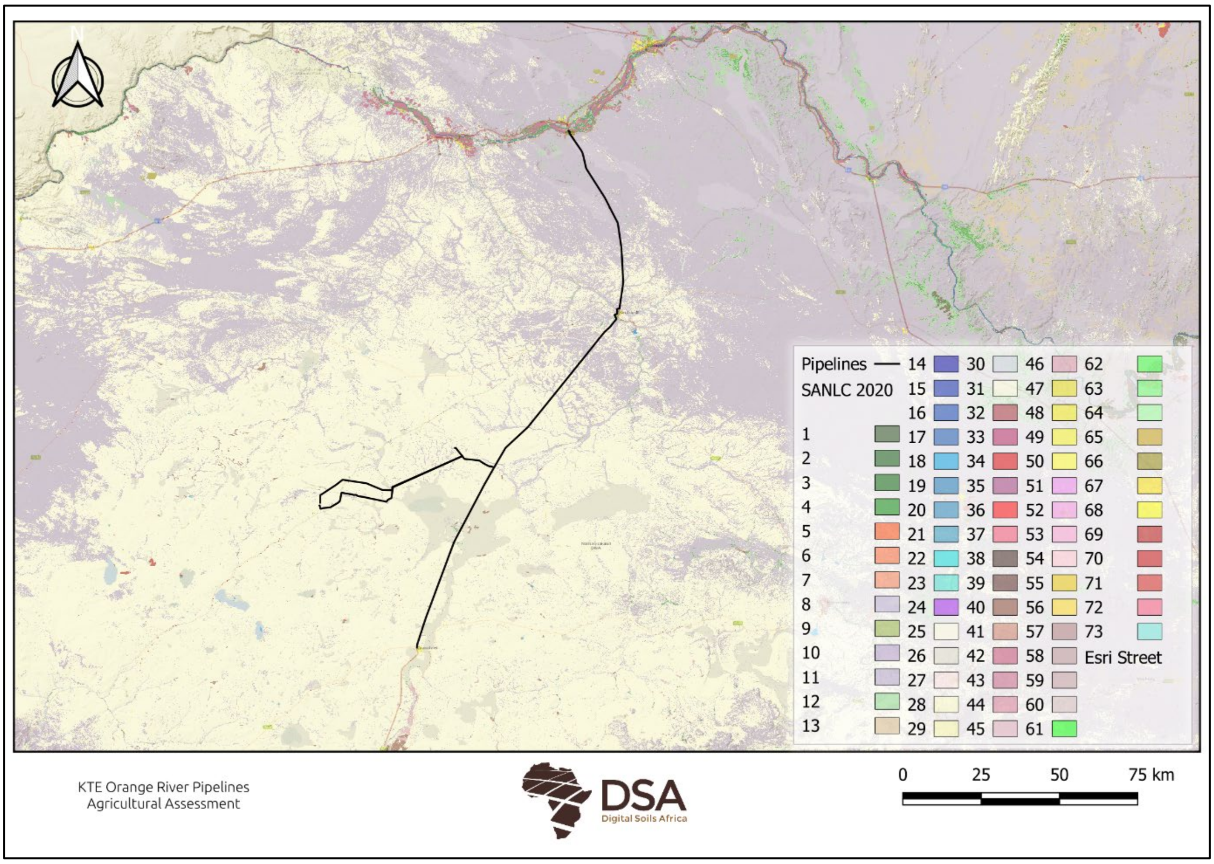


FIGURE 28: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020) FOR THE PIPELINES.

TABLE 4: LEGEND TO FIGURE 29

No.	Class Name	Class Definition
11	Low Shrubland (Nama Karoo)	This is the same as class 8, Low Shrubland, but now represents low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially inside the SANBI defined boundaries for Nama Karoo vegetation communities.
31	Other Bare	Other natural, semi-natural or man-created non-vegetated areas. Typically associated with permanent or near permanent bare ground sites that have insufficient spatial or temporal characteristics to be otherwise classified.

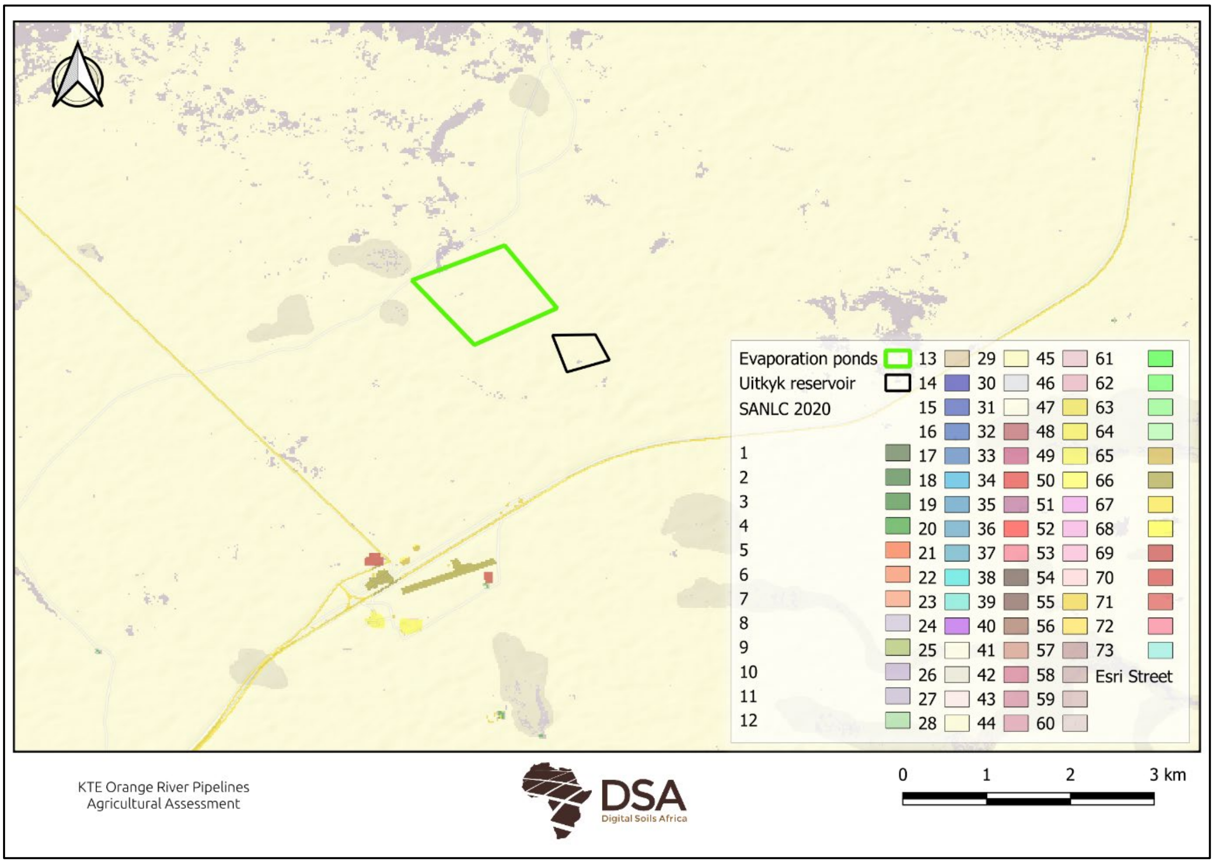


FIGURE 29: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020) FOR THE EVAPORATION PONDS AND UITKYL RESERVOIR.

TABLE 5: LEGEND TO FIGURE 30

No.	Class Name	Class Definition
4	Contiguous & Dense Planted Forest	Dense to contiguous cover, planted tree forests, consisting primarily of exotic timber species, with canopy cover exceeding 35%, and canopy heights exceeding 2.5 metres. Typically represented by mature commercial plantation tree stands. This class also includes smaller woodlots and windbreaks, where they have been identified by the same spectral-based image modelling procedures used to detect the plantation forests.
8	Low Shrubland (Fynbos)	Natural, low woody shrubland communities, where the total plant canopy cover is typically both dominant over any adjacent bare ground exposure,

		and the canopy height ranges between 0.2 – 2 metres. Note: this definition differs slightly from the equivalent gazetted class definition (i.e. total plant canopy cover ranges between 10 - 100%) to provide a more comparable content to the 1990 and 2013-14 SANLC datasets. If a tree or tall bush woody cover is evident it is typically < 0.1 % of total canopy cover. Typically representative of low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially outside the SANBI defined boundaries for Fynbos, Succulent and Nama-Karoo vegetation communities. This is the same approach as used in the 1990 and 2013-14 SANLC datasets and has been replicated for consistency and comparability.
11	Low Shrubland (Nama Karoo)	This is the same as class 8, Low Shrubland, but now represents low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially inside the SANBI defined boundaries for Nama Karoo vegetation communities.
12	Sparsely Wooded Grassland	Natural woody vegetation, with a woody canopy cover ranging between only 5 - 10%, and canopy heights exceeding 2.5 metres, in a grass-dominated environment. Typically represented by very sparse woodland or lightly wooded grassland communities. This class has been included as it is part of the new gazetted land-cover classification standards, but is challenging to map with 20m resolution imagery, since the associated woody cover component is not a spatially dominant component. Whilst the class has been generated with all possible due care and attention, it must be used and with caution, and should be interpreted as a sub-component of the grassland areas, especially in drier more arid areas.
13	Natural Grassland	Natural and/or semi-natural indigenous grasslands, typically devoid of any significant tree or bush cover, and where the grassland component is typically dominant over any adjacent bare ground exposure. Typically representative of low, grass-dominated vegetation communities in the Grassland and Savanna Biomes.
31	Other Bare	Other natural, semi-natural or man-created non-vegetated areas. Typically associated with permanent or near permanent bare ground sites that have insufficient spatial or temporal characteristics to be otherwise classified.
43	Fallow Land & Old Fields (Bush)	Long-term, non-active, previously cultivated lands that are now overgrown with bush dominated woody vegetation. Typically, the cultivated land unit is no longer image detectable. Historical field boundaries (supplied by SANBI) have been mapped from archival topographical 1:50,000 maps circa 1950's-70. This class is only represented if it has not been modified to a more recent, alternative land-cover or land-use class.
45	Fallow Land & Old Fields (Bare)	Long-term, non-active, previously cultivated lands that are now predominately non-vegetated bare ground surfaces. Typically, the cultivated land unit is no longer image detectable. Historical field boundaries (supplied by SANBI) have been mapped from archival topographical 1:50,000 maps circa 1950's-70's. This class is only represented if it has not been modified to a more recent, alternative land-cover or land-use class.
46	Fallow Land & Old Fields (Low Shrub)	Long-term, non-active, previously cultivated lands that are now overgrown with tree-dominated low shrub vegetation. Typically, the cultivated land unit is no longer image detectable. Historical field boundaries (supplied by SANBI) have been mapped from archival topographical 1:50,000 maps circa 1950's-70's. This class is only represented if it has not been modified to a more recent, alternative land-cover or land-use class.
56	Village Dense	Built-up areas primarily associated with scattered rural settlements and associated utilities. It may include some adjacent areas of subsistence farming, especially if the village structures and elds are inter-mixed. This class is also associated with both structures on individual (commercial or

		smallholding) farming units, depending on clustering and size. Dense villages are denned as those represented by contiguous / adjacent village- cells which collectively do form the majority cover in a surrounding 1 ha window. Woody cover is excluded from this class and represented separately (i.e., classes 2-4).
69	Mines: Extraction Sites: Open Cast & Quarries combined	Non-vegetated, active and/or non-active extraction pits associated with surface-based mining activities, including open-cast mines, quarries, and roadside borrow pits etc. Note that in some cases (especially coal mining) there may be some overlap/misrepresentation between mine-extraction pits and mine-tailings, due to the challenge of separating these accurately.

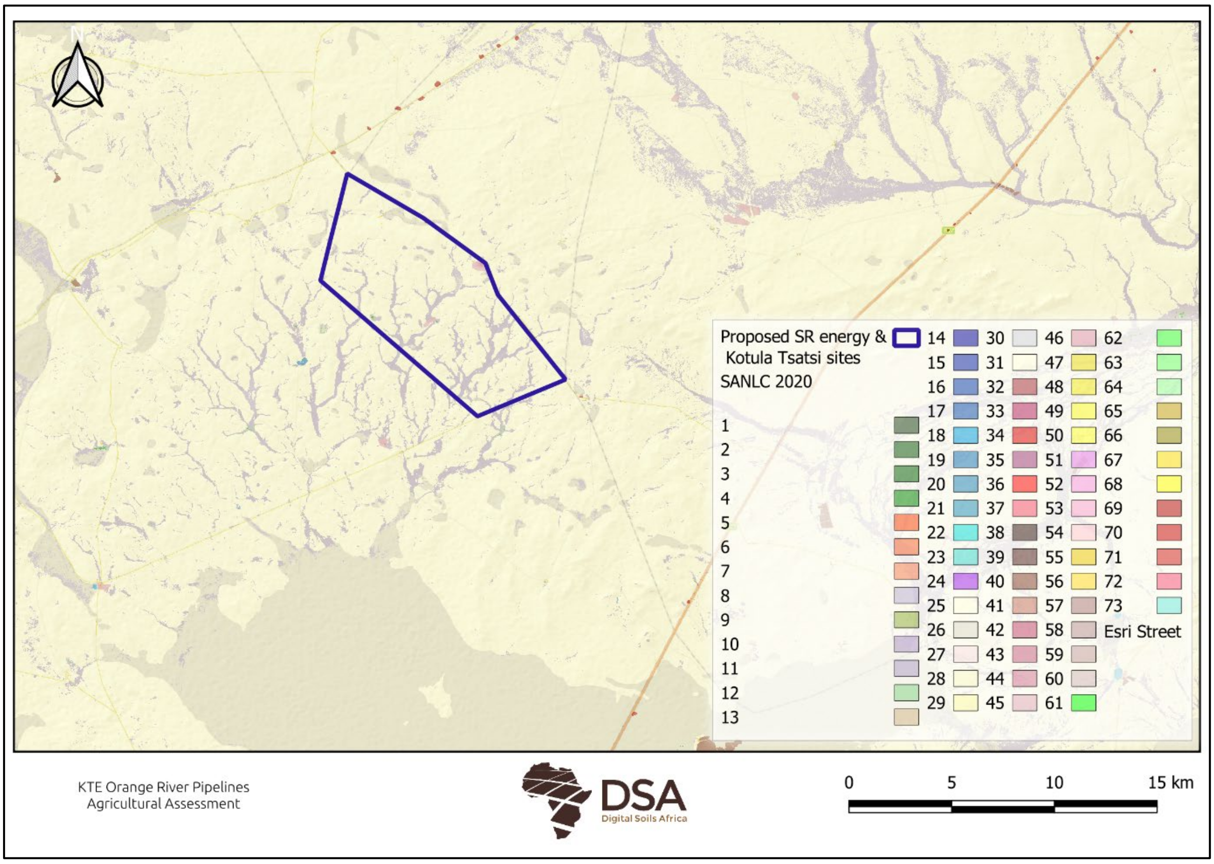


FIGURE 30: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020) FOR THE PROPOSE SR ENERGY & KOTULA TSATSI SITES.

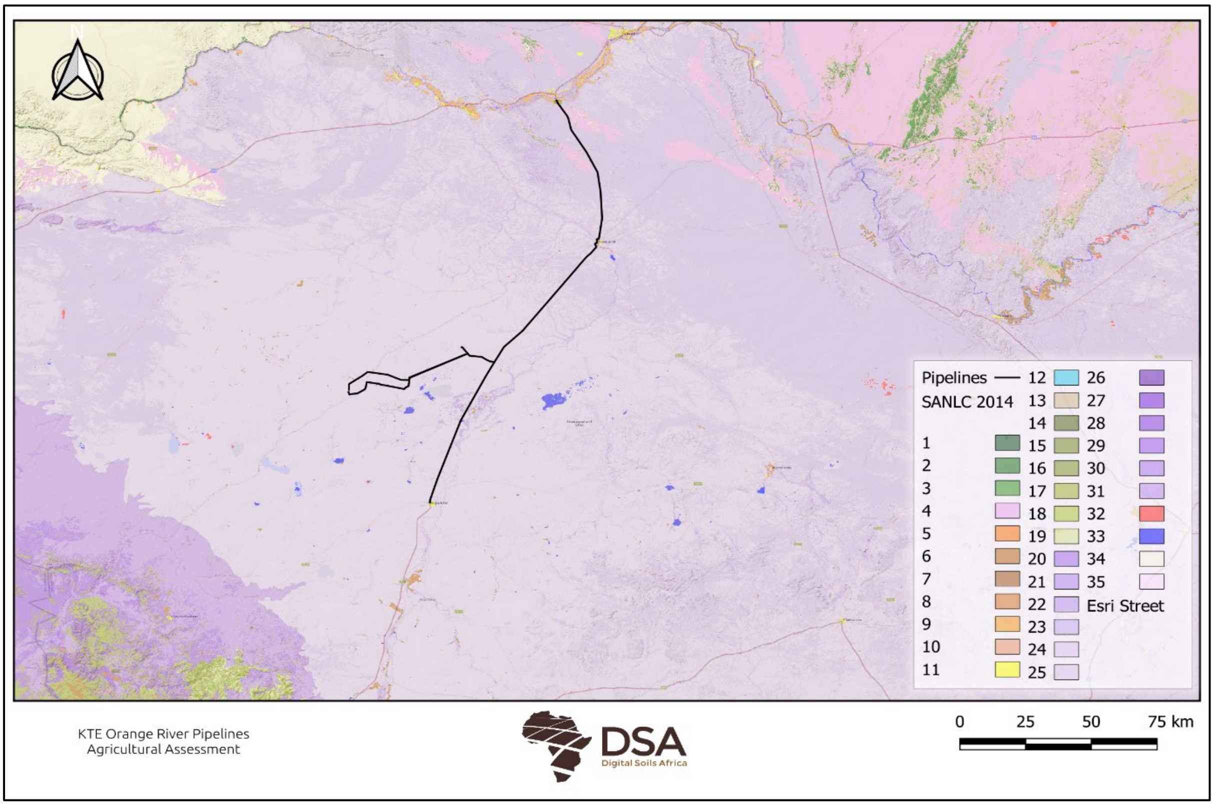


FIGURE 31: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014) FOR THE PIPELINES.

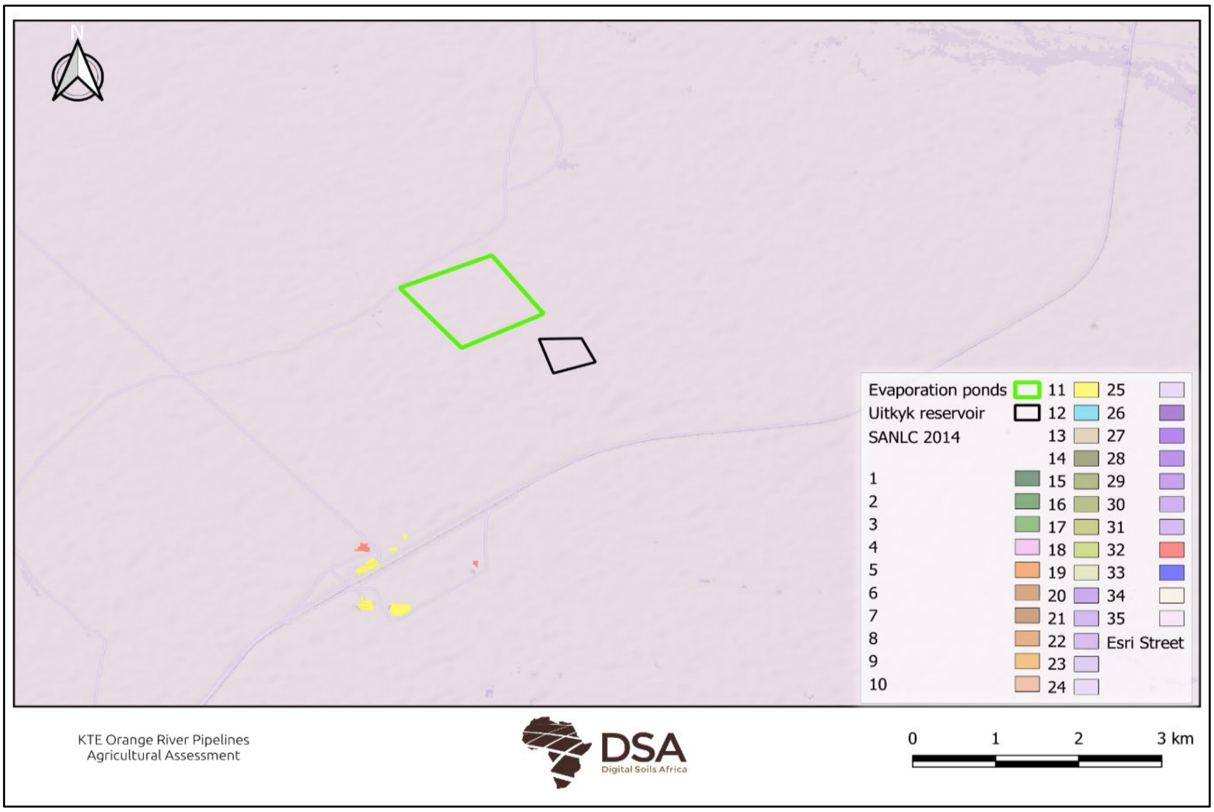


FIGURE 32: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014) FOR THE EVAPORATION PONDS AND UITKYK RESERVOIR.

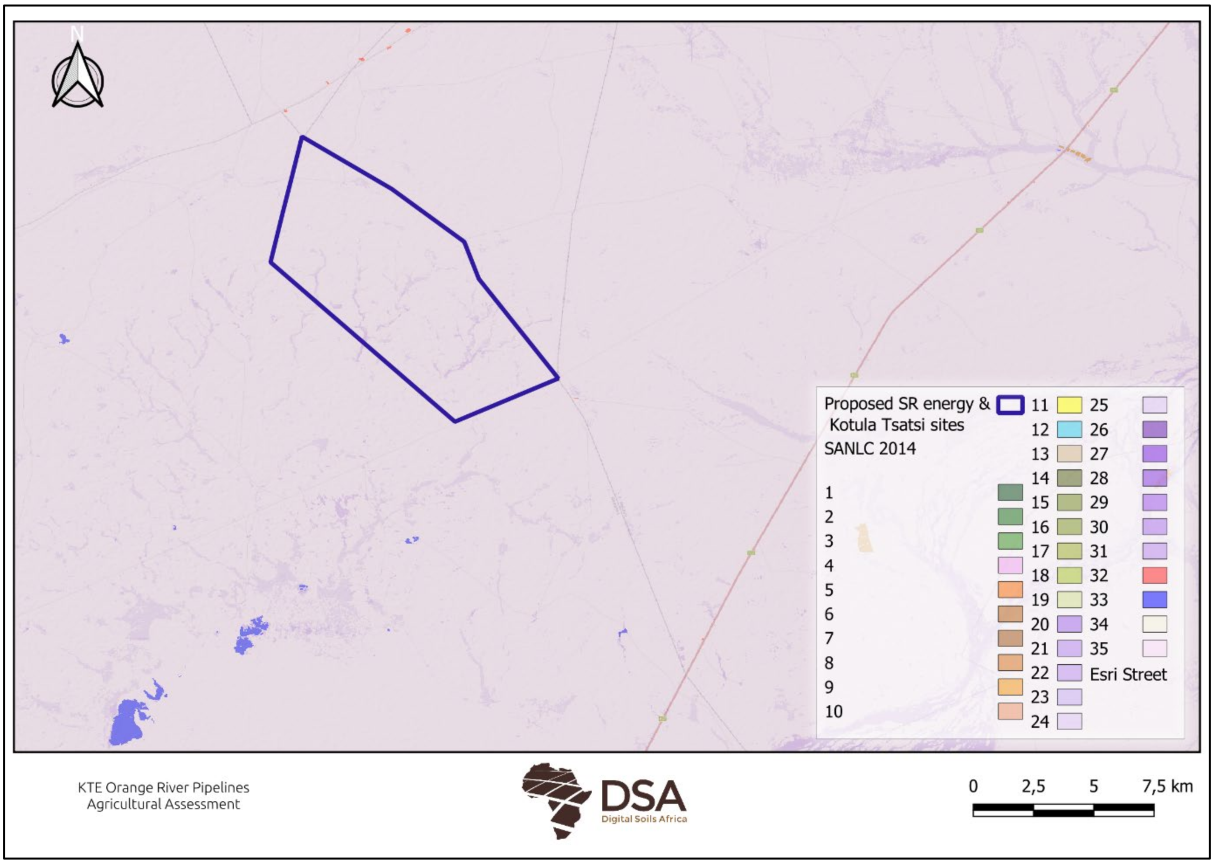


FIGURE 33: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014) FOR THE PROPOSED SR ENERGY & KOTULA TSATSI SITES.

SATELLITE IMAGES

The Google satellite images in Figure 34 to Figure 42 suggest that the land use within the study site has not changed over the period of 2014 to 2023. The study site is mostly bare land and low shrubland.

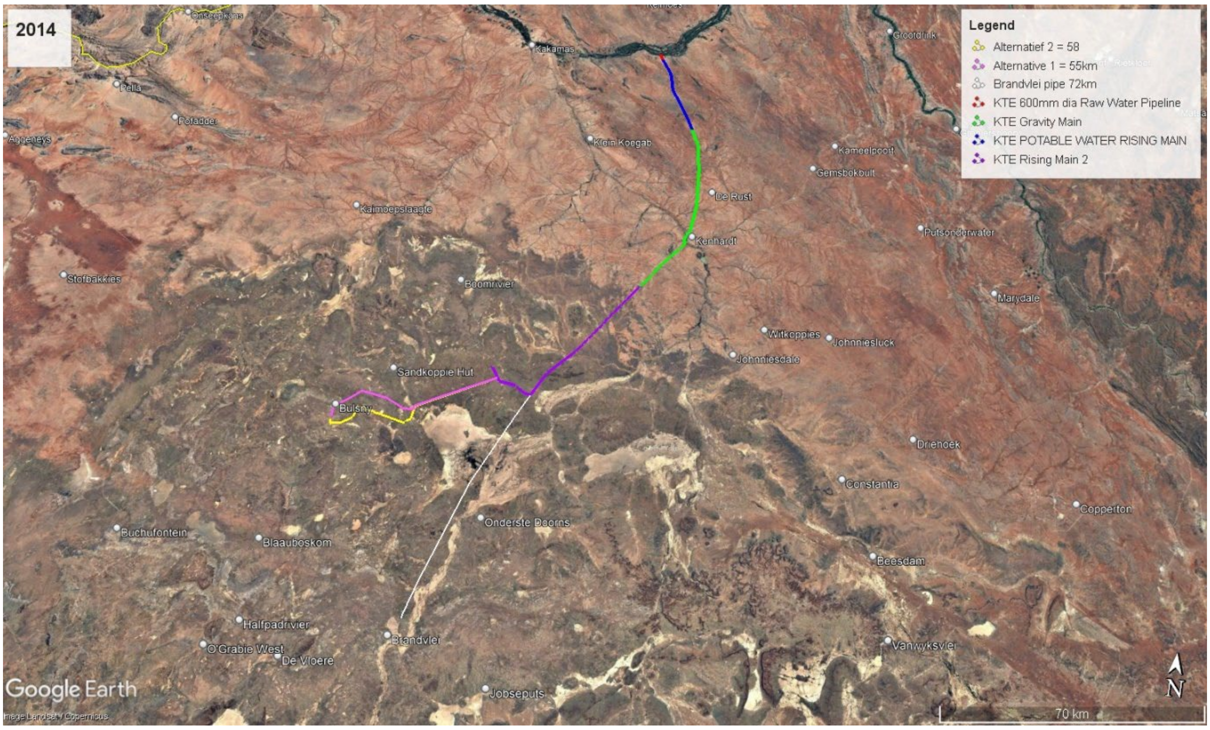


FIGURE 34: GOOGLE SATELITE IMAGES (2014) FOR THE PIPELINES.

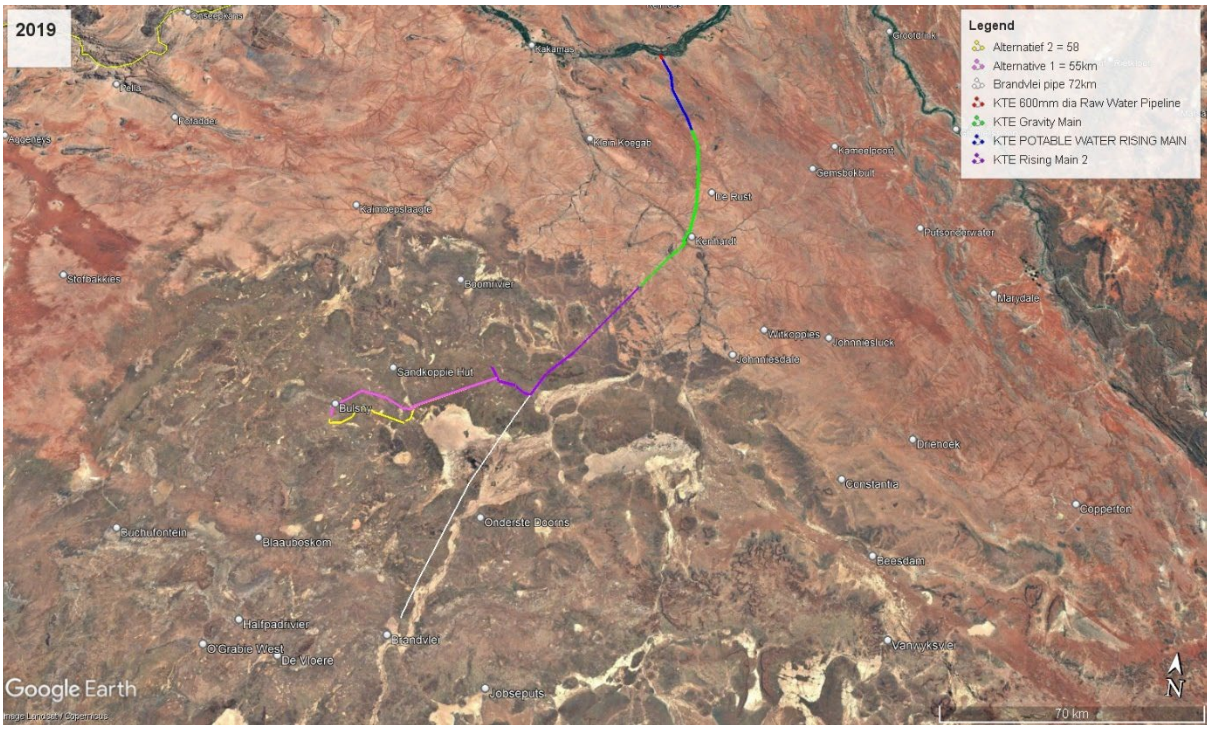


FIGURE 35: GOOGLE SATELITE IMAGE (2019) FOR THE PIPELINES.

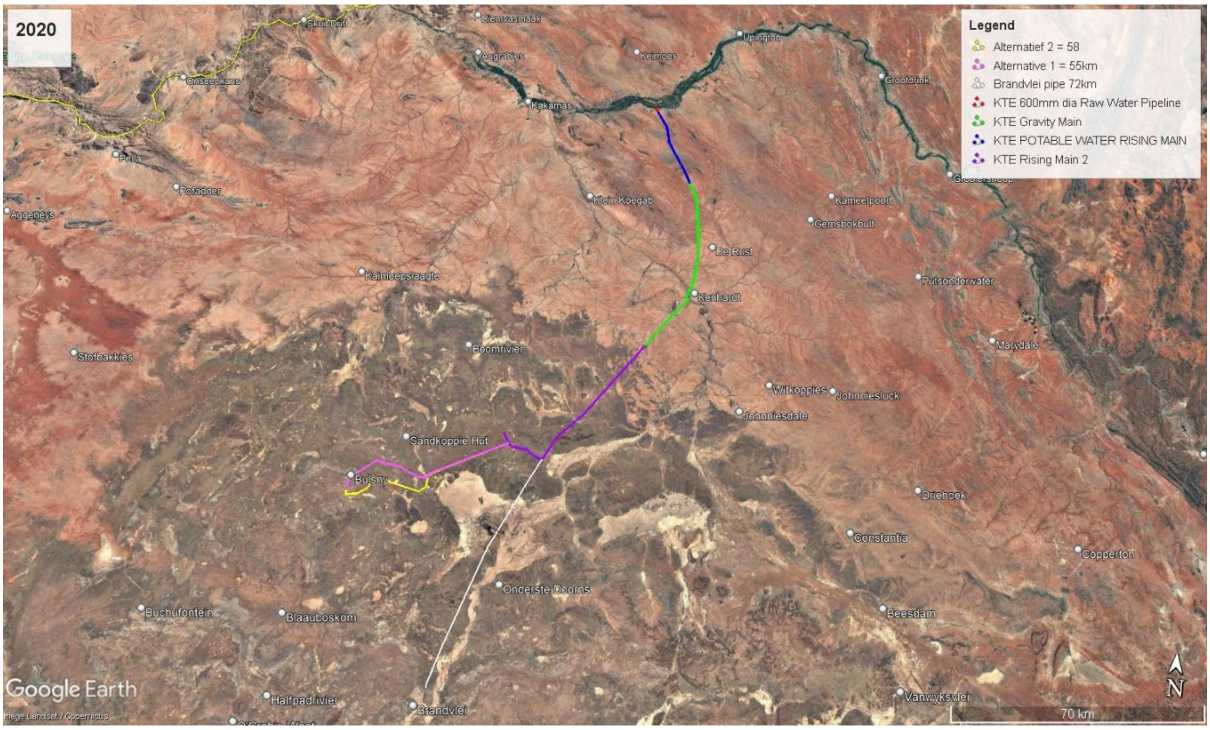


FIGURE 36: GOOGLE SATELITE IMAGE (2020) FOR THE PIPELINES.

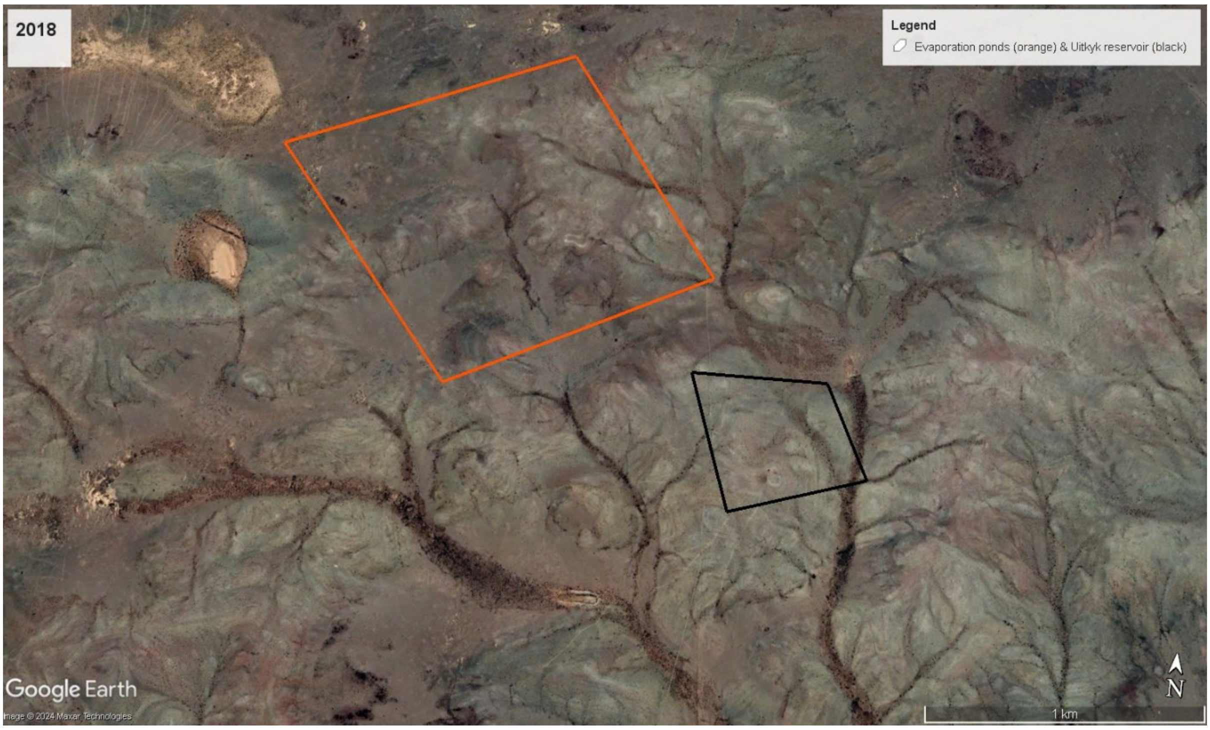


FIGURE 37: GOOGLE SATELITE IMAGE (2018) FOR THE EVAPORATION POND AND UITKYK RESERVOIR.

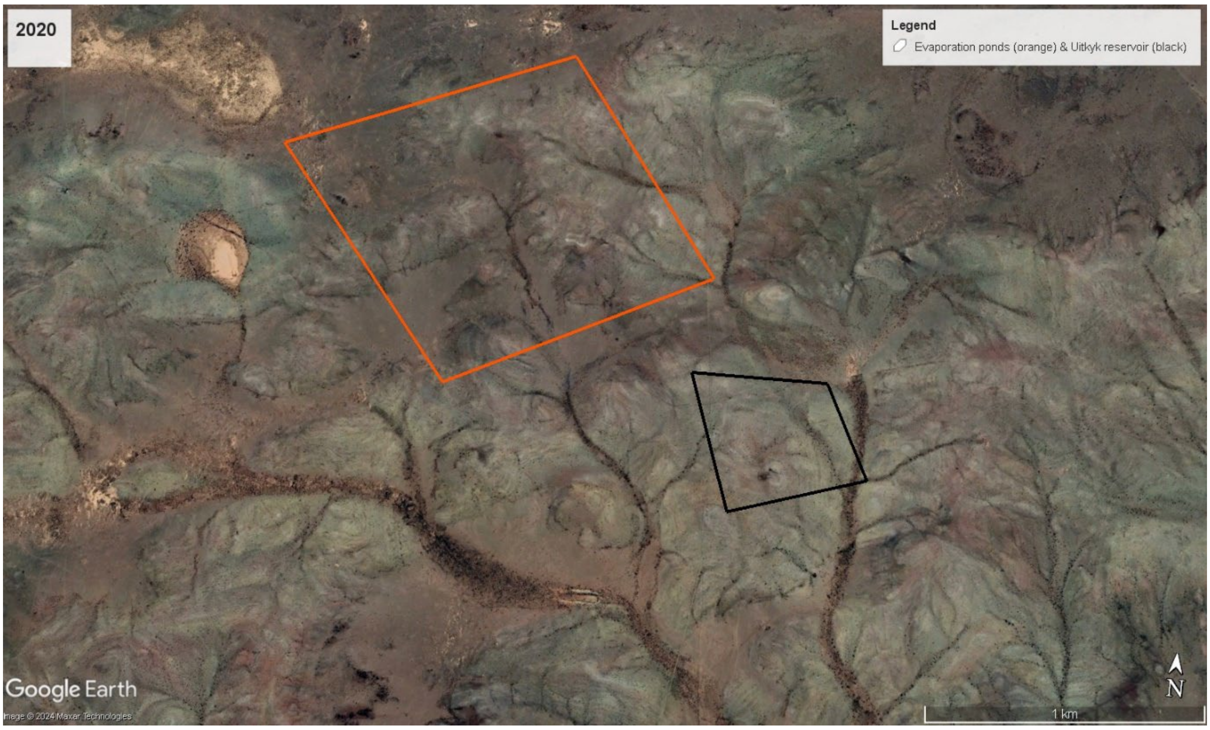


FIGURE 38: GOOGLE SATELITE IMAGE (2020) FOR THE EVAPORATION POND AND UITKYK RESERVOIR.

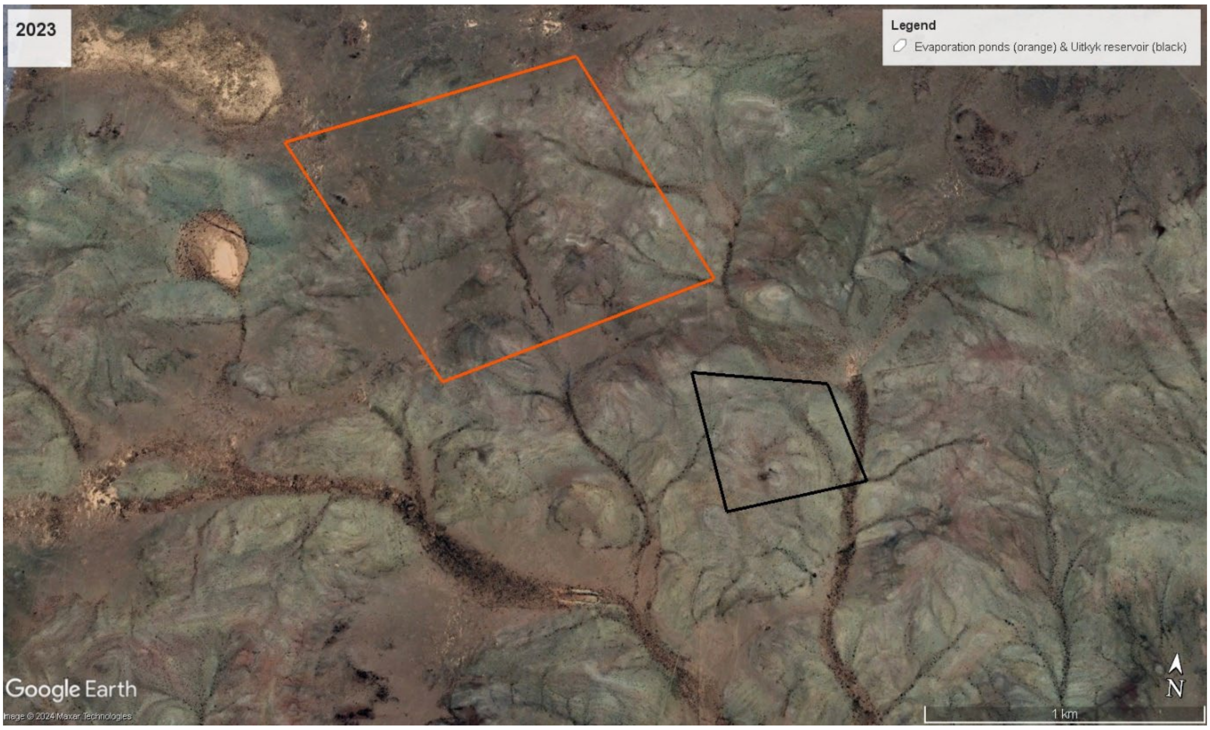


FIGURE 39: GOOGLE SATELITE IMAGE (2023) FOR THE EVAPORATION POND AND UITKYK RESERVOIR.

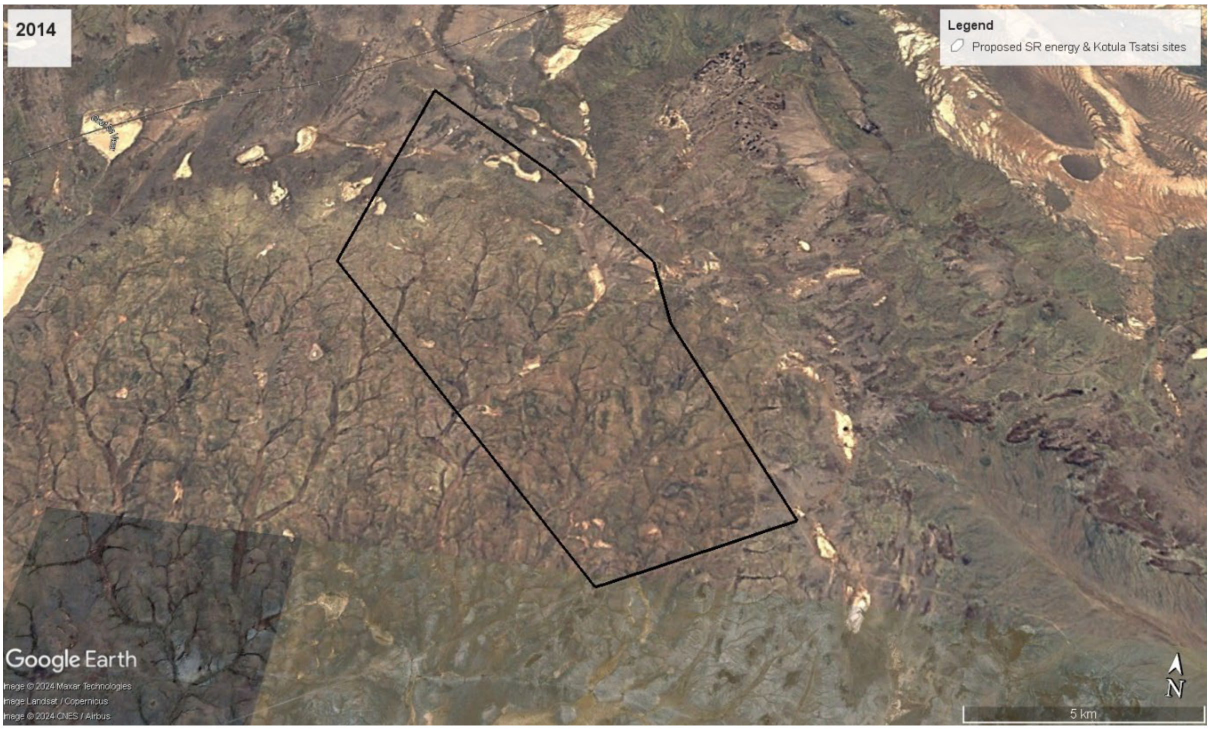


FIGURE 40: GOOGLE SATELITE IMAGE (2014) FOR THE PROPOSED SR ENERGY & KOTULA TSATSI SITES.

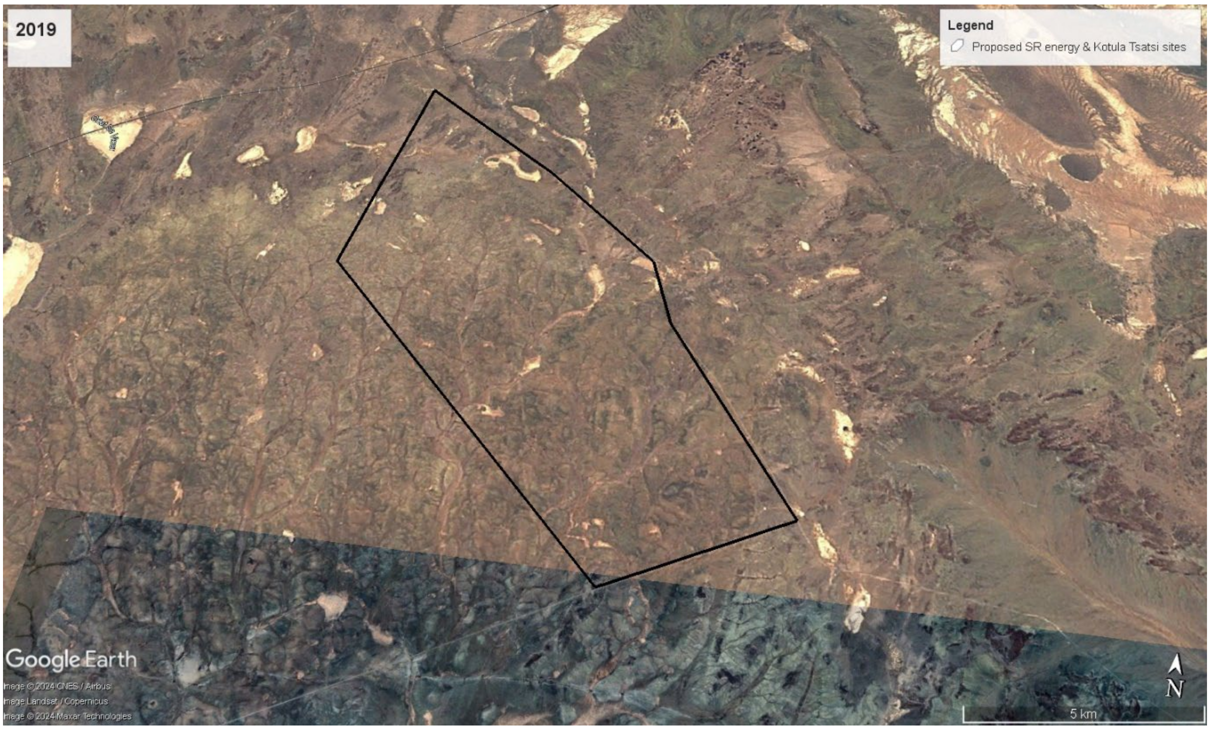


FIGURE 41: GOOGLE SATELITE IMAGE (2019) FOR THE PROPOSED SR ENERGY & KOTULA TSATSI SITES.

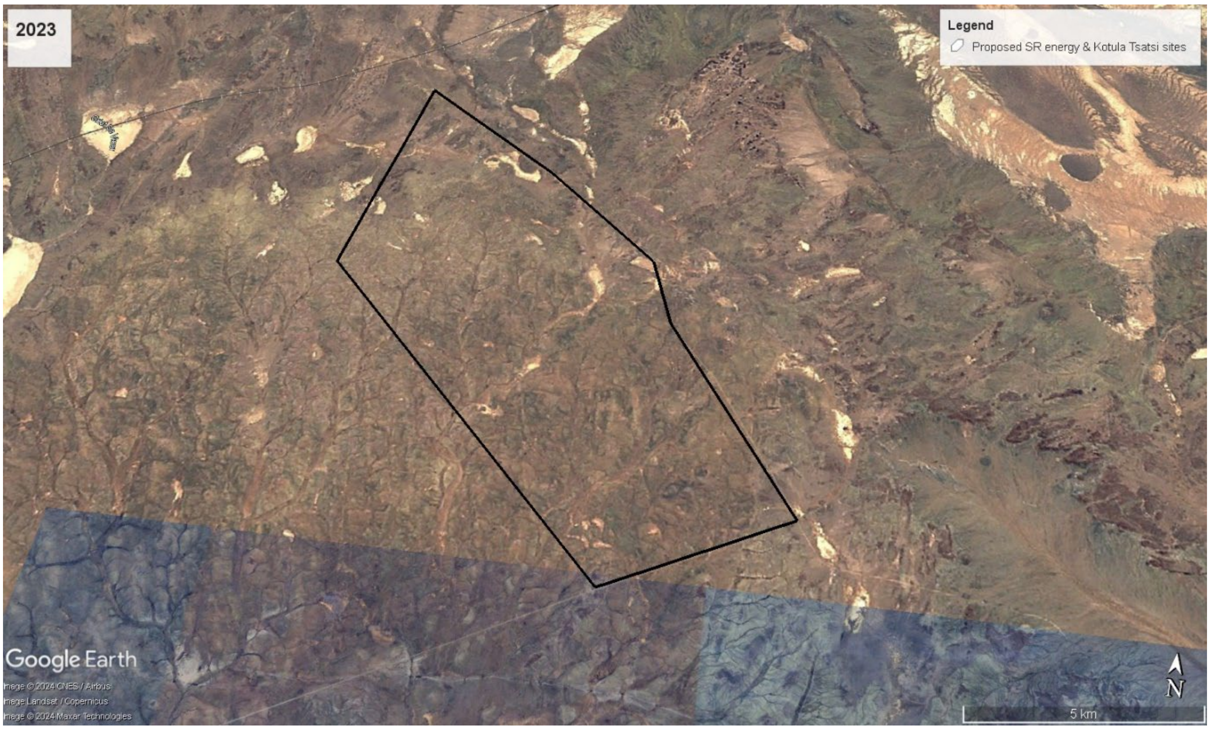


FIGURE 42: GOOGLE SATELITE IMAGE (2019) FOR THE PROPOSED SR ENERGY & KOTULA TSATSI SITES.

SITE VISIT

The site visit confirmed the area's very low land capability. Notable cultivation, in the form of vineyards, was only observed directly adjacent to the Orange River. Since the pipeline is a linear development, it will not cause a significant reduction in agricultural produce. The remainder of the site is characterized by extensive grazing with limited vegetative cover. Rocks were frequently observed on the surface (Figure 43)

FIGURE 43: EXAMPLES OF THE LAND USE ON THE SITE

COMPLIANCE STATEMENT

The proposed activities were evaluated against the current situation, i.e., a 'no-go' scenario. According to the screening tool, the site is classified as having medium agricultural sensitivity due to low to moderate land capability. The climate capability was concluded to be low, with a very limited grazing capacity ranging from 32 to 39 ha/LSU. The land type present in the study area indicates that the soils have low agricultural potential. This was confirmed during the field visit, where shallow rocky soils were dominant. The soil capability was concluded to be very low, while the overall land capability was determined to be very low to moderate, rendering it non-arable land. Vineyard cultivation was observed during the first kilometer of the pipeline south of the Orange River. As the pipeline is a linear development and will occur along the existing R27 road, the development will not significantly impact vineyards.

Based on Google Earth images, there has been no change in land use in the study area. No agricultural practices were observed within the study area from the Google satellite images, with the exception of the one kilometer adjacent to the Orange River. The activities undertaken during the project will not increase the footprint of any current development around these sites and will, therefore not have any further impact on agriculture.

It is the specialist's opinion that the development should continue. The development will not have a significant impact on agricultural activities in the area and poses no threat to food security. In terms of agricultural sensitivity, the development should thus be allowed to proceed.

APPENDIX 2: SPECIALIST CV

Jacobus Johannes (Johan) van Tol

EDUCATION

PhD Soil Science	University of the Free State	2011
M.Sc. Agric Soil Science	University of the Free State	2008
B.Sc. Agric (Hon)	University of the Free State	2007
B.Sc. Agric	University of the Free State	2006
Matric certificate	Transvalia High School	2002

PROFESSIONAL AFFILIATIONS

- SACNASP- Pri Nat Sci 400274/13
- President of the Soil Science Society of South Africa
- Member of the Soil Classification Work Group
- Member of South African Soil Surveyors Organisation

WORK EXPERIENCE

- **University of the Free State** / Professor (full): 2016 - Present
- **Digital Soils Africa** / Soil Scientist: 2015 – Present
- **University of Fort Hare** / Senior Lecturer: 2011 - 2016
- **University of the Free State** / Researcher: 2007 - 2011
- **University of the Free State**/ Assistant Researcher- January 2011- December 2015

PUBLICATIONS AND REPORTS

Total peer-reviewed scientific publications: 83

Total consultancy and research projects: > 105

Selected recent publications:

- Van Zijl, G.M. & van Tol, J.J., 2024. Digital soil mapping enables informed decision-making to conserve soils within protected areas. *South African Journal of Plant and Soil*. https://doi.org/10.1080/02571862.2023.2255158
- Malongweni, S.O. & van Tol, J.J., 2023. Medium-term interactive effects of herbivores and plant life form on the biochemistry of shallow sandy soils in a protected semi-arid savanna. *Environmental Systems Research*. 12:38 https://doi.org/10.1186/s40068-023-00320-9

- Kotze, J.J., Mc Lean, C, van Tol, J.J., 2023. Digitally mapping soil carbon of the uThukela headwater catchment in the Maloti-Drakensberg, a remote Afromontane mountain region. *South African Geographical Journal*. https://doi.org/10.1080/03736245.2023.2272896.
- Kotze, J.J. & van Tol, J.J., 2023. Extrapolation of Digital Soil Mapping approaches for soil organic carbon stock predictions in an Afromontane Environment. *Land,* 12, 520. https://doi.org/10.3390/land12030520
- Van Tol, J.J. & van Zijl, G.M., 2022. South Africa needs a hydrological soil map: a case study from the upper uMgeni catchments. *Water SA,* 48(4) 335 – 347. https://doi.org/10.17159/wsa/2022.v48.i4.3977.
- Van Tol, J.J., Bieger, K. & Arnold, G., 2021. A Hydropedological approach to simulate streamflow and soil water contents with SWAT+. *Hydrological Processes*. DOI:10.1002/hyp.14242.
- Van Tol, J.J., 2020. Hydropedology in South Africa: advances, applications and research opportunities. *South African Journal of Plant and Soil.* https://doi.org/10.1080/02571862.2019.1640300
- Van Tol, J.J. & Lorentz, S.A., 2018 Hydropedological interpretation of soil distribution patterns to characterise groundwater/surface-water interactions. *Vadose Zone Journal*. https://doi:10.2136/vzj2017.05.0097
- Van Tol, J.J., Lorentz, S.A., van Zijl, G.M. & Le Roux, P.A.L., 2018. The contribution of hydropedological assessments to the availability and sustainable water, for all (SDG#6). *In* Lal, R., Horn, R. & Kosaki, T. (eds). Soil and Sustainable Development Goals. Catena-Schweizerbart, Stuttgart.

SPECIALIST DECLARATION

I, Johan van Tol, declare that –

- I act as the independent specialist in this application;
- I regard the information contained in this report to be true and correct;
- I do not have a conflict of interest in this project;
- I will conduct the work relating to the project in an objective manner.

Prof Johan van Tol
PhD Soil Science
Pri Nat Sci 400274/13