COMPLAINCE STATMENT FOR TURN180 HARSTWATER, NEAR PAMPIERSTAD, NOTRHERN CAPE PROVINCE

PREPARED FOR

TURN 180 ENVIRONMENTAL CONSULTANTS

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BACKGROUND TO THE STUDY

Digital Soils Africa (Pty) LTD (DSA) were tasked by Turn 180 Environmental Consultants to undertake an Agricultural Compliance Statement for 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. An Environmental Screening Report (ESR) was generated for the application using the National Web-based Screening Tool. The ESR classifies the area as being of high sensitivity for the *Agricultural* theme.

The site does not infringe on crops, but rather that the site borders agricultural land, therefore, justifying a Compliance Statement. 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 area is between Hartswater and Pampierstad, in the Northern Cape Province. A Basic Assessment Process will be followed to obtain EA for the proposed project and the following activities will be applied for:

Activity 14 – "The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage *occurs in containers with a combined capacity of 80 cubic meters or more but not exceeding 500 cubic meters*". Activity 27 – "*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation*".

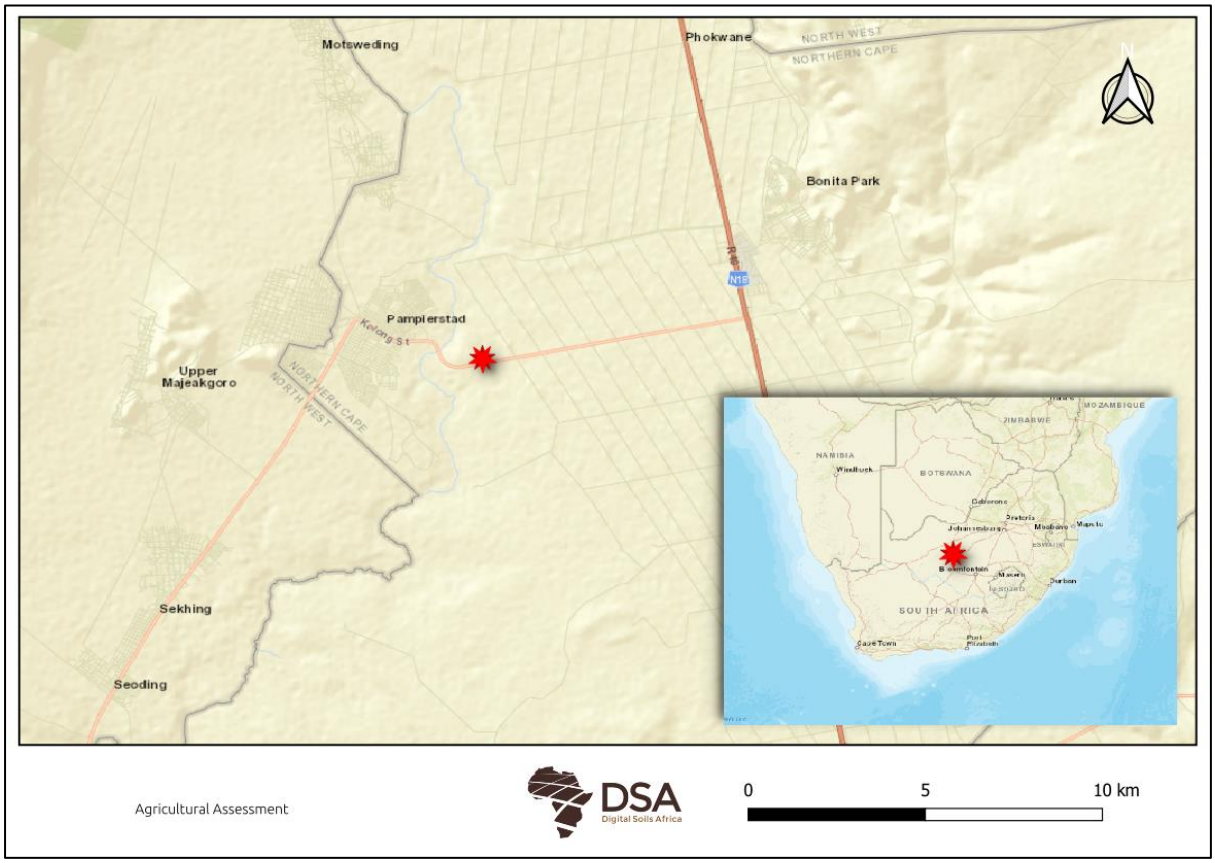


FIGURE 1: LOCATION OF THE STUDY AREA IN NORTHERN CAPE PROVINCE.

ENVIRONMENTAL SCREENING TOOL

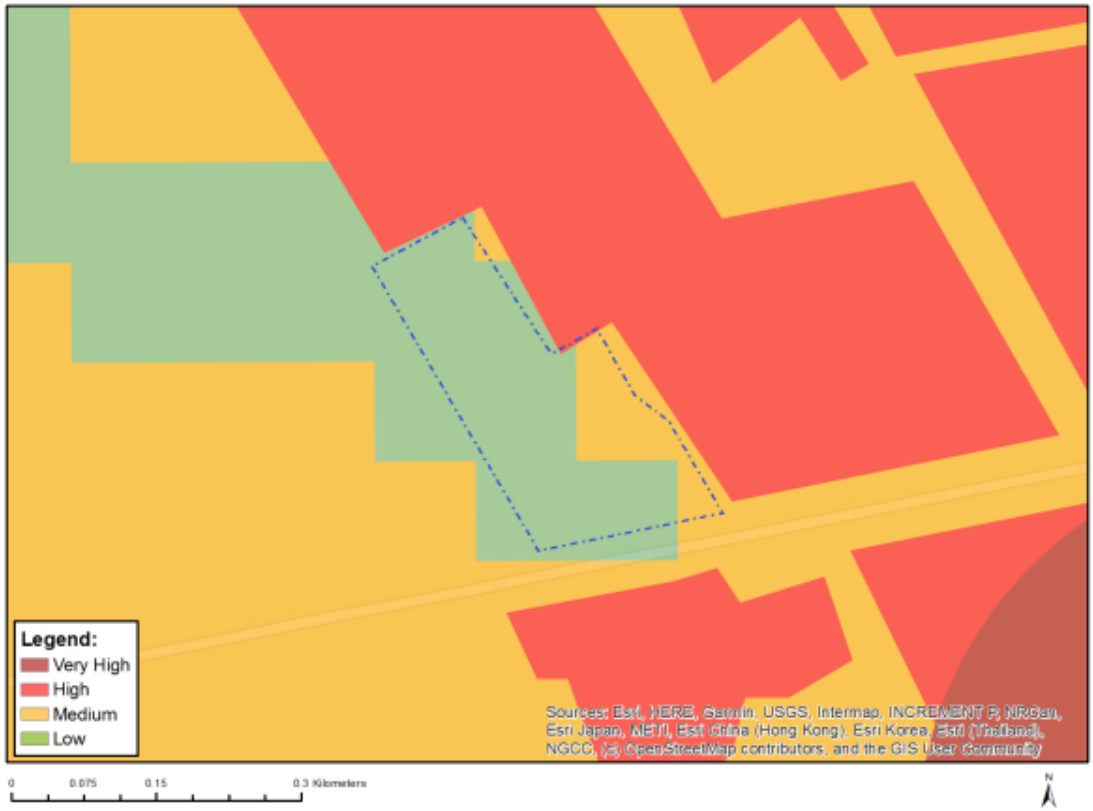
Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

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 land use (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 is classified as high agricultural sensitivity (Figure 2). The high sensitivity is due to annual crop cultivation on low and medium Land capability (Department of Agriculture, Forestry and Fisheries, 2017), classifying the soils as having a land capability class of 1-8. It is most likely that the site does not infringe on crops, but rather that the site borders agricultural land.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
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.

FIGURE 3: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL.

FIGURE 4:THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL.

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."*

The study area is not situated in a Protected Agricultural Area (Figure 5).

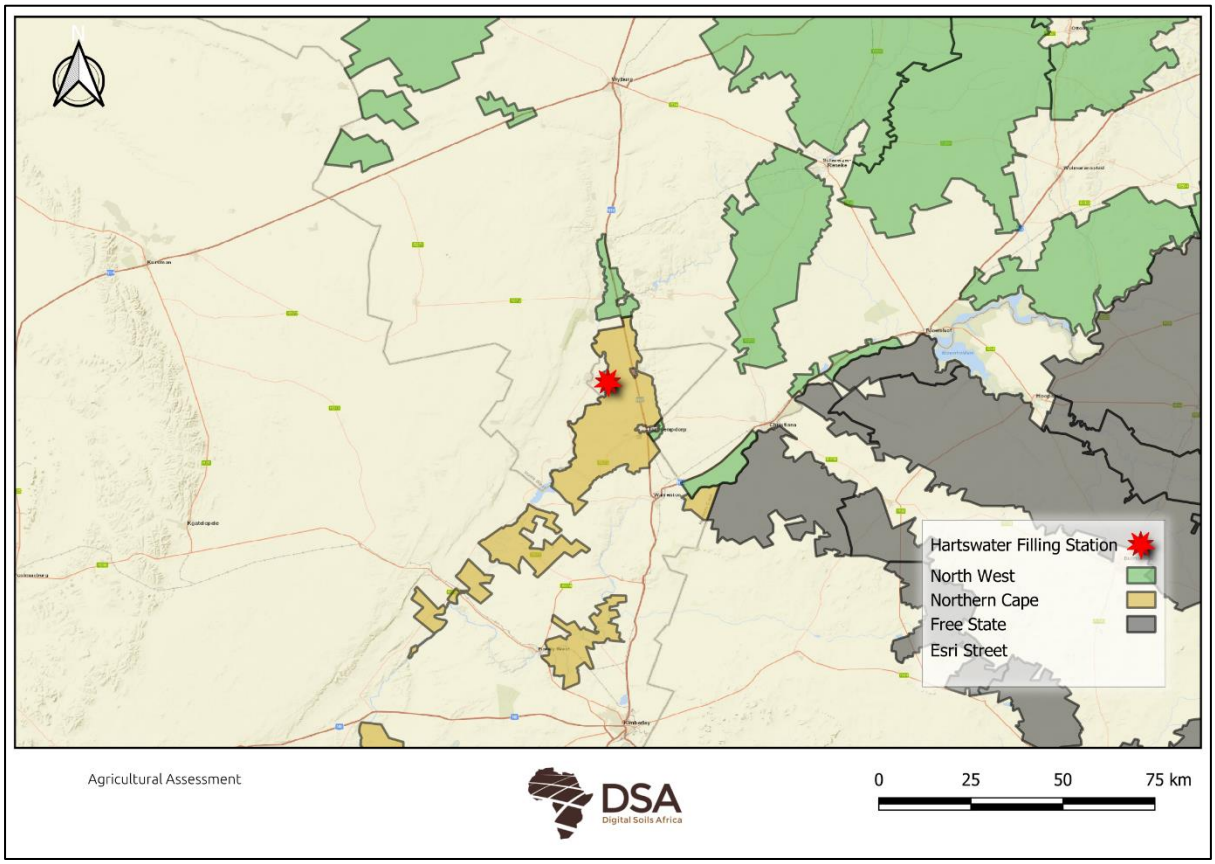


FIGURE 5: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

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. (pg23)
- The compliance statement must:
  - be applicable to the preferred site and proposed development footprint (pg4);
  - confirm that the site is of "low" or "medium" sensitivity for agriculture(pg22);

- indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site (pg22).

- 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 (pg23);
  - 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 (pg5);
  - confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities (pg22);
  - 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 (pg22);
  - any conditions to which the statement is subjected (pg22);
  - 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 (pg4Error! Bookmark not defined.).

ASSUMPTIONS, UNCERTAINTIES OR GAPS IN KNOWLEDGE OR DATA

No field observations were made, therefore, all materials used are considered true.

RESULTS

CLIMATE CAPABILITY

The climate of the study area is temperate and the climate classification as BSh by the Köppen-Geiger. During the year there is minimal rainfall, with annual precipitation of 454mm. The average annual temperature is 19.3 °C. The climate consists of hot wet summers (December to February) and mild dry winters (June to August). The climate of the site is classified as semi-arid (Figure 6). Therefore, cultivation of dry land crops will be restricted.

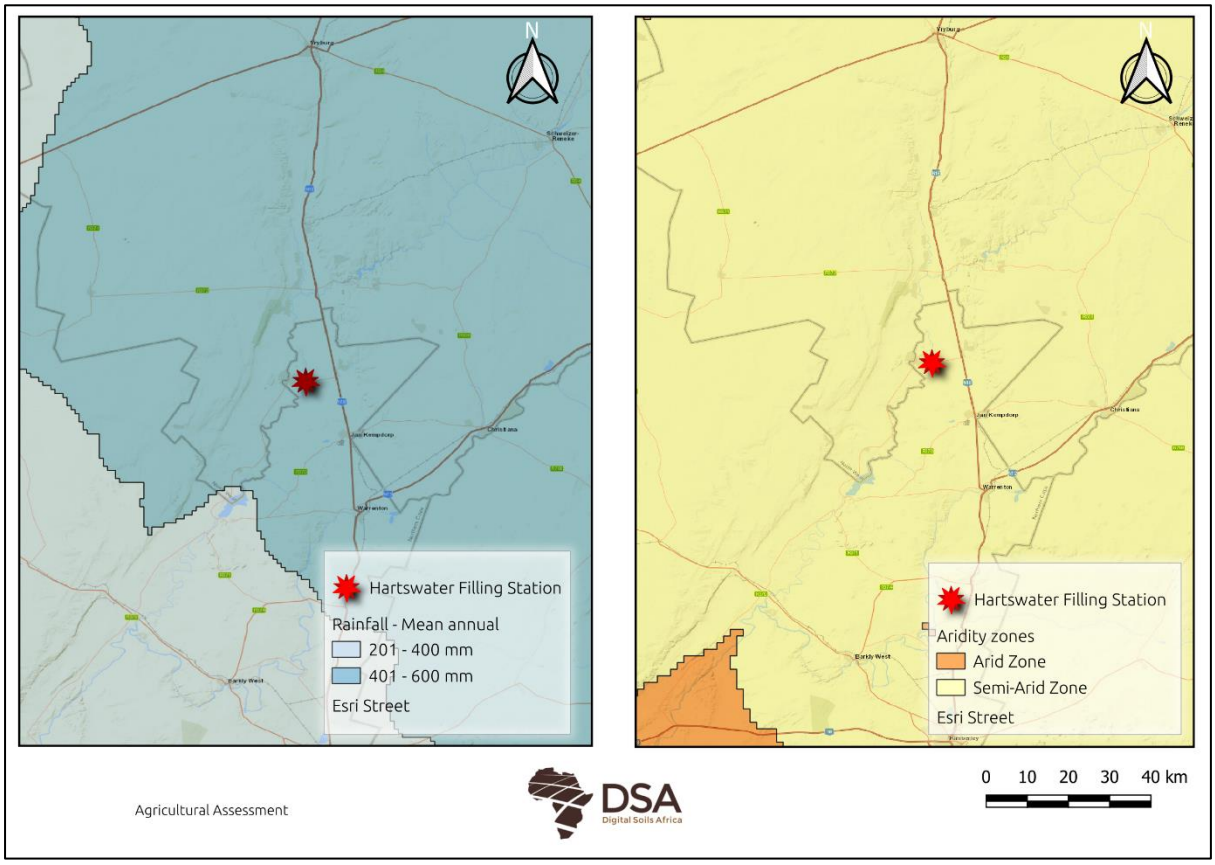


FIGURE 6: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

TALE 1: CLIMATIC PROPERTIES OF HARTSWATER (CLIMATE-DATA.ORG).

Avg. Temperature °C	25 °C	24.3 °C	22.5 °C	18.7 °C	15.1 °C	11.5 °C	11.4 °C	14.5 °C	18.6 °C	22 °C	23.6 °C	24.9 °C
Min. Temperature °C	18.8 °C	18.4 °C	16.7 °C	12.7 °C	8.9 °C	5.2 °C	4.6 °C	6.9 °C	10.6 °C	14.1 °C	16.1 °C	18.1 °C
Max. Temperature °C	31.5 °C	30.7 °C	29 °C	25.3 °C	22.3 °C	19.1 °C	19.3 °C	22.6 °C	26.8 °C	29.8 °C	31 °C	31.9 °C
Precipitation / Rainfall mm	87	70	60	40	15	9	4	9	13	33	47	67
Humidity(%)	46%	51%	52%	53%	50%	50%	43%	34%	28%	30%	33%	41%
Rainy days (d)	9	9	8	5	2	1	1	1	2	5	6	8
avg. Sun hours (hours)	11.7	11.1	10.3	9.6	9.3	9.0	9.3	9.8	10.5	11.2	11.7	11.9
Avg. Temperature °C	25 °C	24.3 °C	22.5 °C	18.7 °C	15.1 °C	11.5 °C	11.4 °C	14.5 °C	18.6 °C	22 °C	23.6 °C	24.9 °C

Climate capability is highest weighted factor (40%) in the calculation of the Land capability (DAFF, 2017) which is used in the Screening Tool to determine the 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 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 4 (Figure 7). This is considered a low to moderate climate capability.

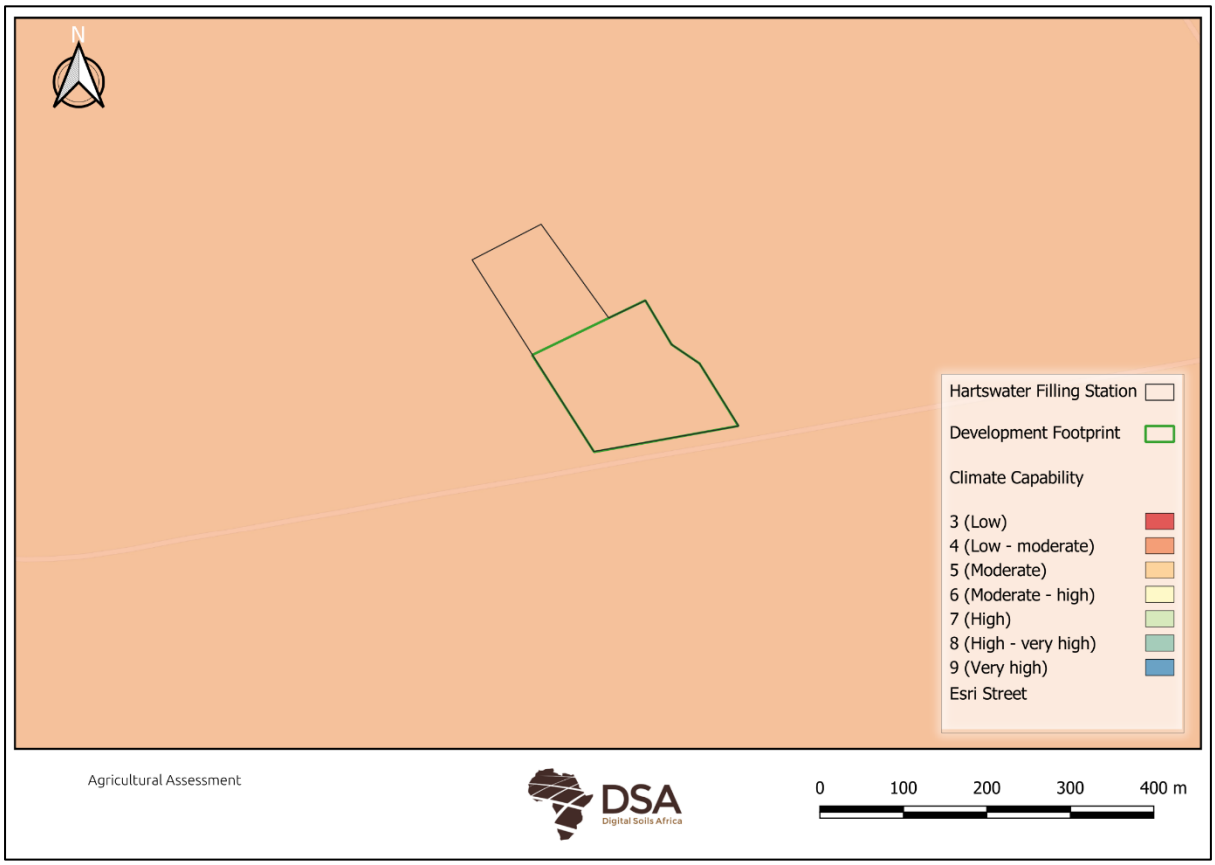


FIGURE 7: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

SOIL

LANDTYPE

A land type is an area which 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. Landtype data was used in calculating the soil capability (DAFF, 2017), and therefore, indirectly used in the Screening tool for estimating the agricultural sensitivity.

The study area comprises of the Ah (freely drained soils) and Dc (sandy soils overlaying clayey subsoils). These soils are generally moderate to high potential agricultural soils. The area falls both in land type Ah and Dc (Land Type Survey Staff, 1972 – 2002) (Figure 8).

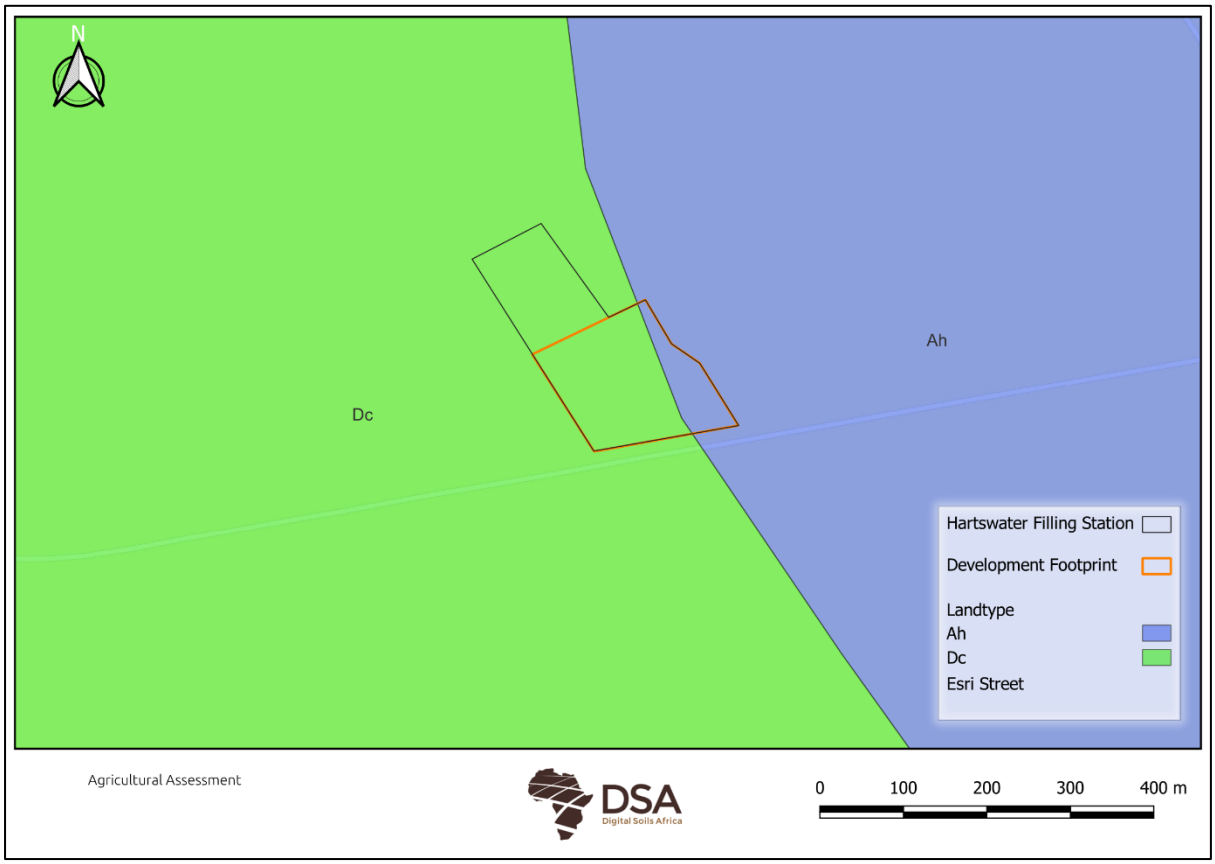


FIGURE 8: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

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:

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

The Soil capability according to the Department of Agriculture, Forestry and Fisheries, 2017, is a value of 2 (low to moderate), 3 (low) and 5 (Moderate) (Figure 9). This is considered a low to moderate Soil capability.

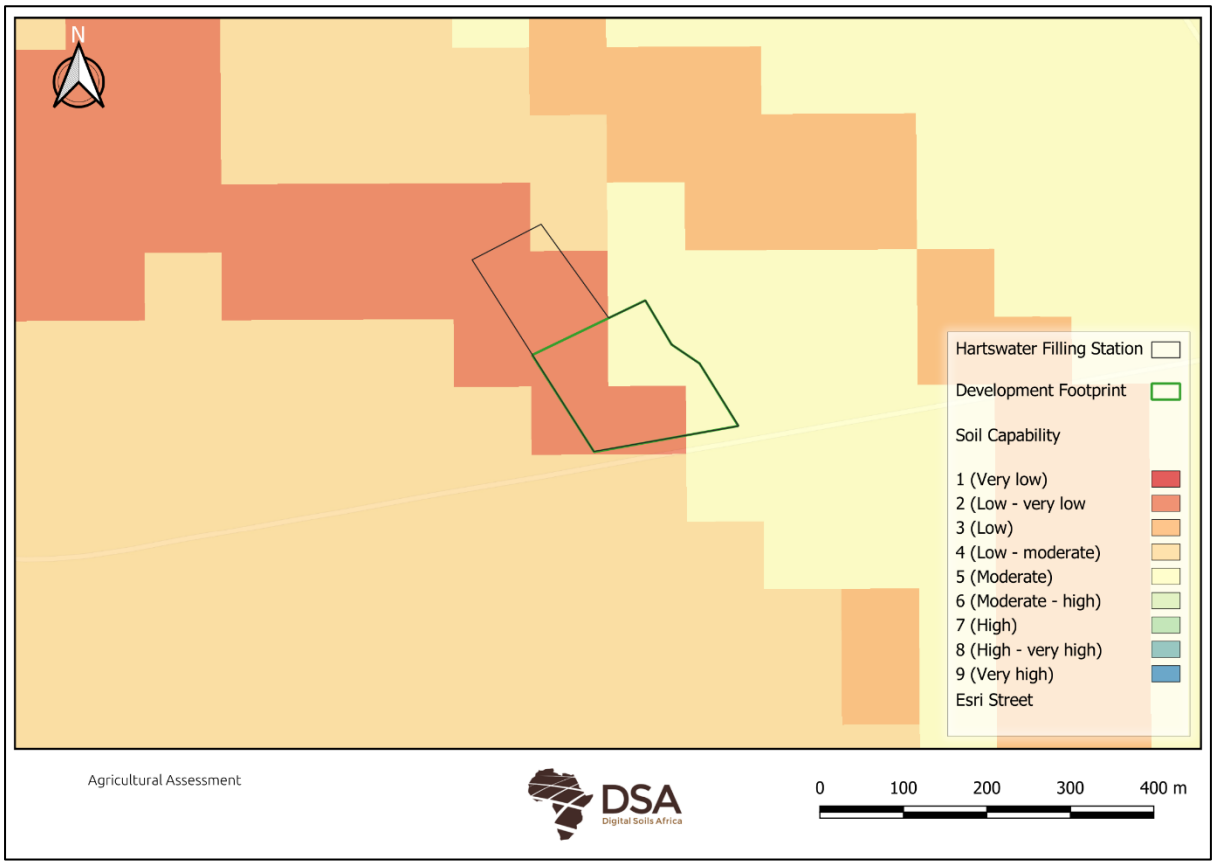


FIGURE 9: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

TERRAIN CAPABILITY

Terrain plays an important role in a plants' physiological growth requirements, and from a sensitivity and accessibility perspective, Therefore, the two terrain modelling concerns included in the terrain capability modelling 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), is a value of 6 (Moderate to High) and 7 (High) (Figure 10). This is considered a high terrain capability.

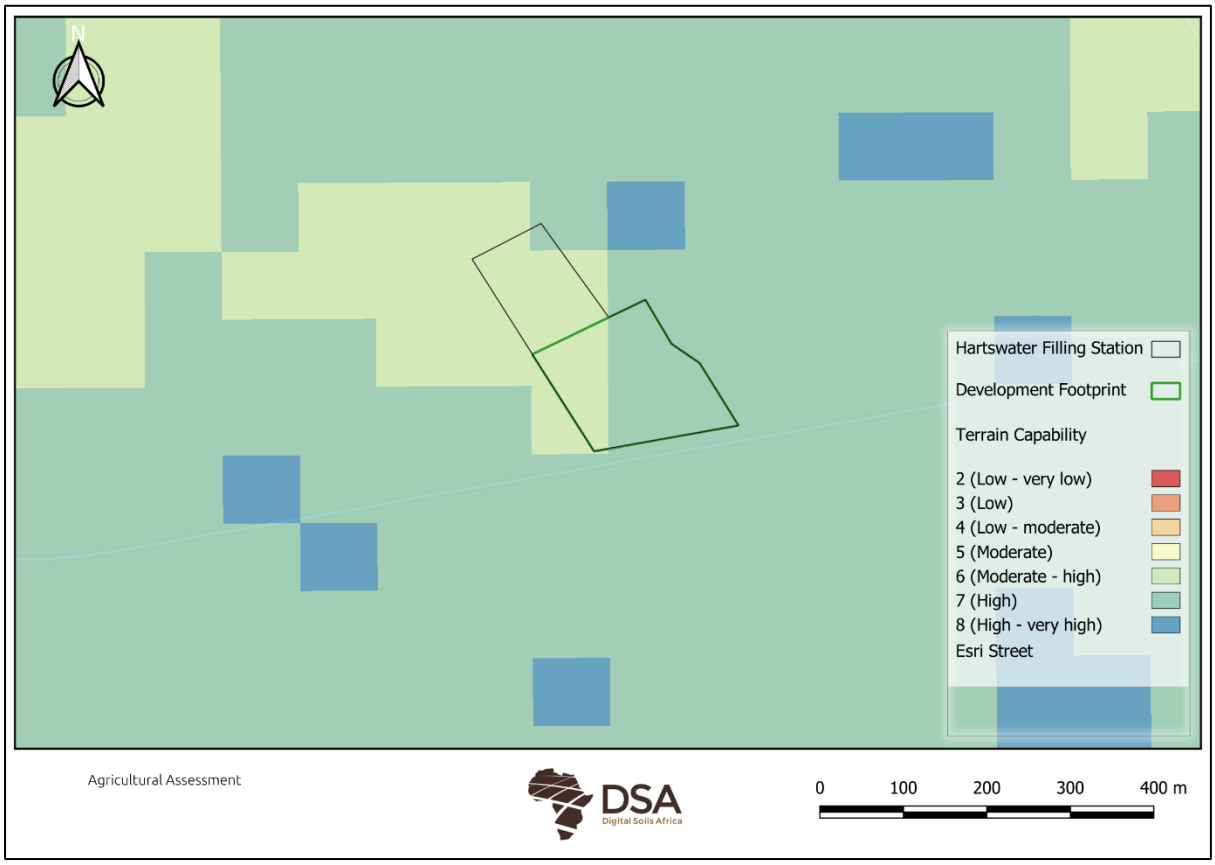


FIGURE 10: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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, 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
5	Low
6-7	Low to Moderate
8	Moderate
9-10	Moderate to High
11	High
12-13	High to Very High
14-15	Very High

The Land capability according to the Department of Agriculture, Forestry and Fisheries, 2017, is a value of 4 (Very low-low), 5 (low) and 6 (Low-moderate) which is generally considered to have low to moderately arable land capability (Figure 11).

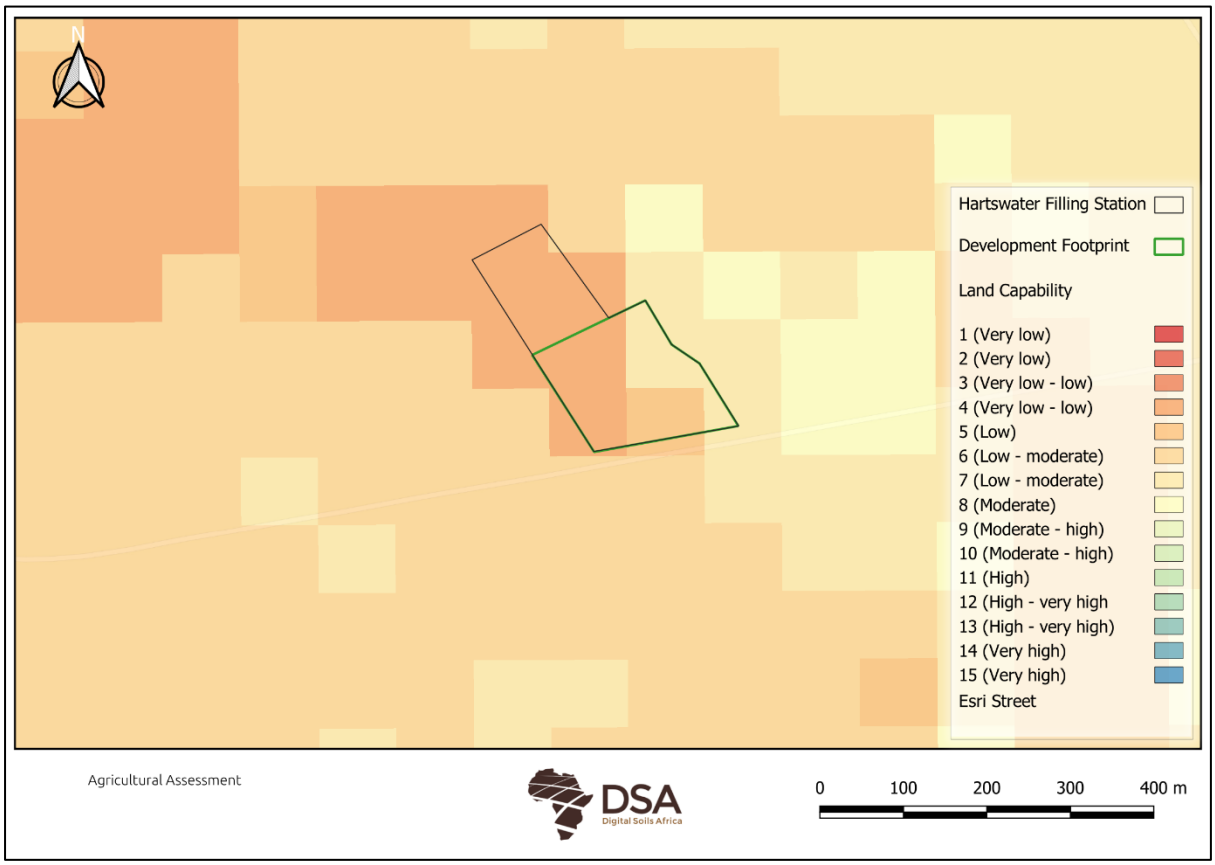


FIGURE 11: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). The site has a high grazing capacity of 9 ha/LSU (Figure 12). A homogeneous unit of vegetation 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).

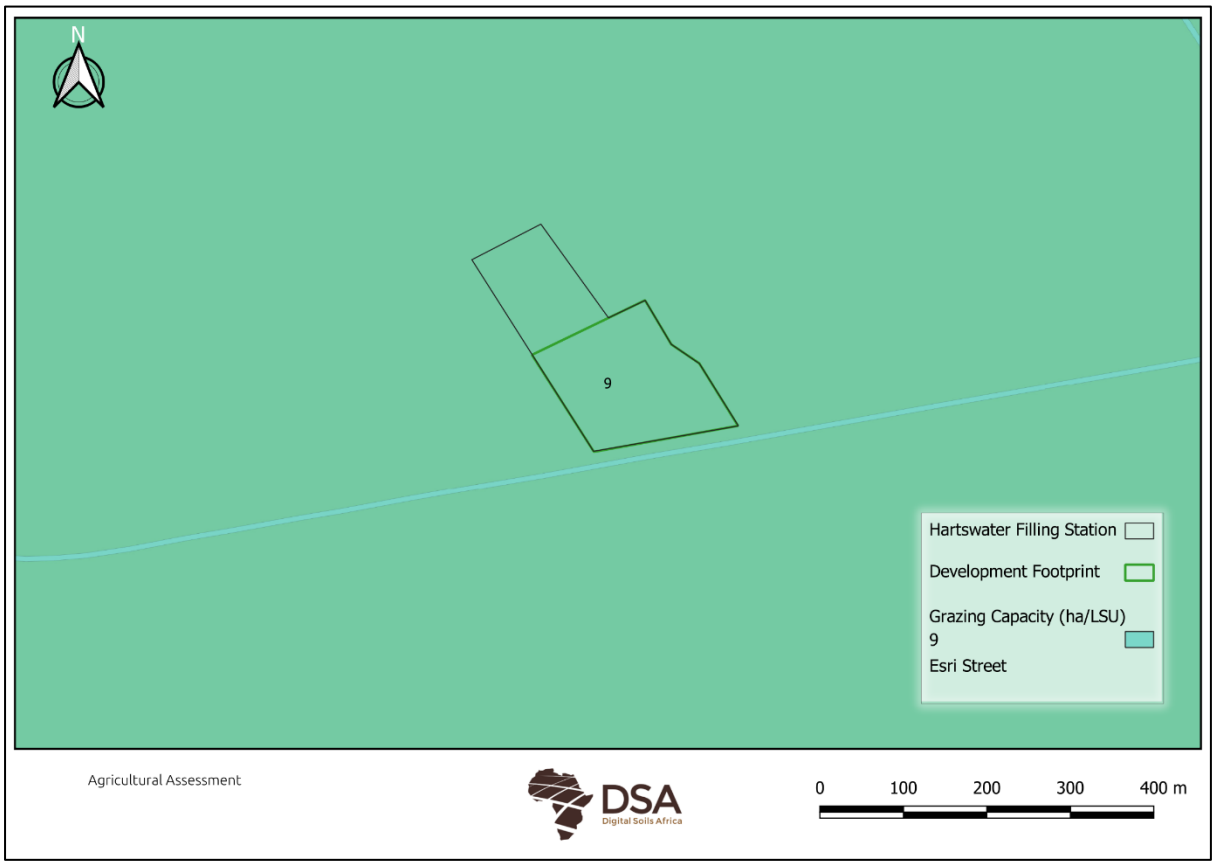


FIGURE 12: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

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, and there was conflicting classification in the study area. The 2014 land use had lands in a section of the study area. SANLC 2020 classifies the area as Dense Forest and Woodland (3), while there is also Continuous and Dense Planted Forest (4), Natural Grassland (13) and Village Scattered (55) areas present in the Development Footprint (Figure 13), while the 2014 does not consist of Village Scattered (55) (Figure 14).

TABLE 3: LEGEND TO FIGURE 13

No.	Class Name	Class Definition
3	Dense Forest and 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	Continuous and 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.
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.
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 villageclassified cells which collectively do not form the majority cover in a surrounding 1 ha window. Note that the class extent includes both bare / nonvegetated and low vegetation covered areas within the village boundary. Woody cover is excluded from this class and represented separately (i.e., classes 2 – 4).

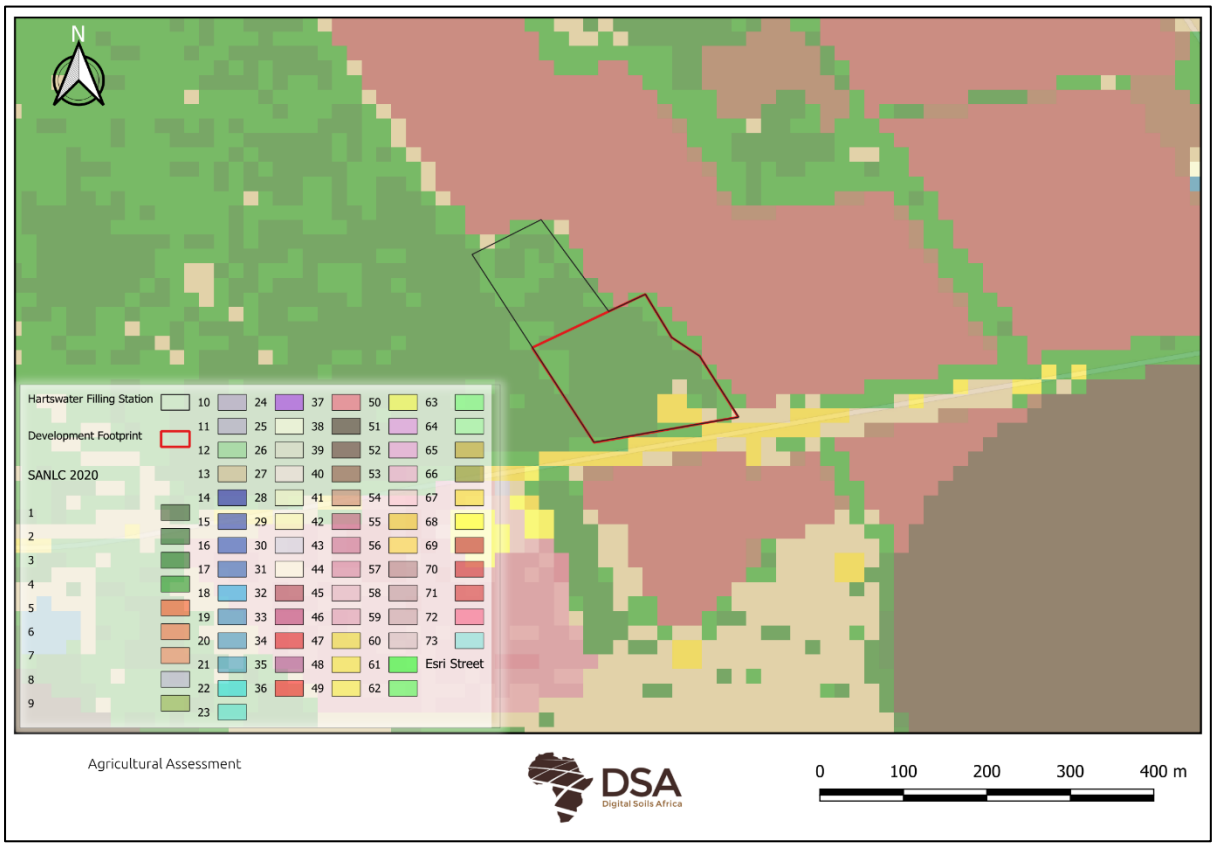


FIGURE 13: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020).

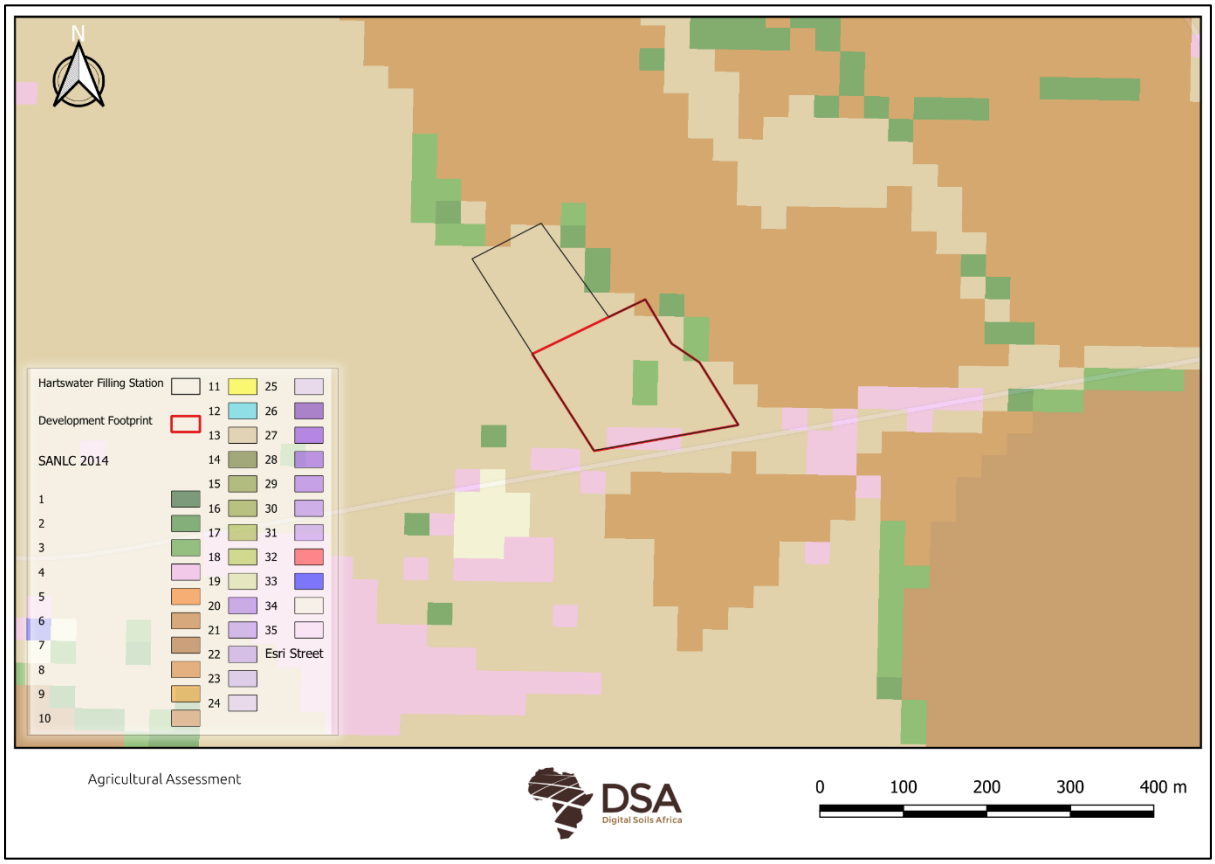


FIGURE 14: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014).

The earliest available images from Google satellite suggest that the land use has been consistent for many years. The study area consists of a dwelling and unused veld. The photographs validate the satellite images.

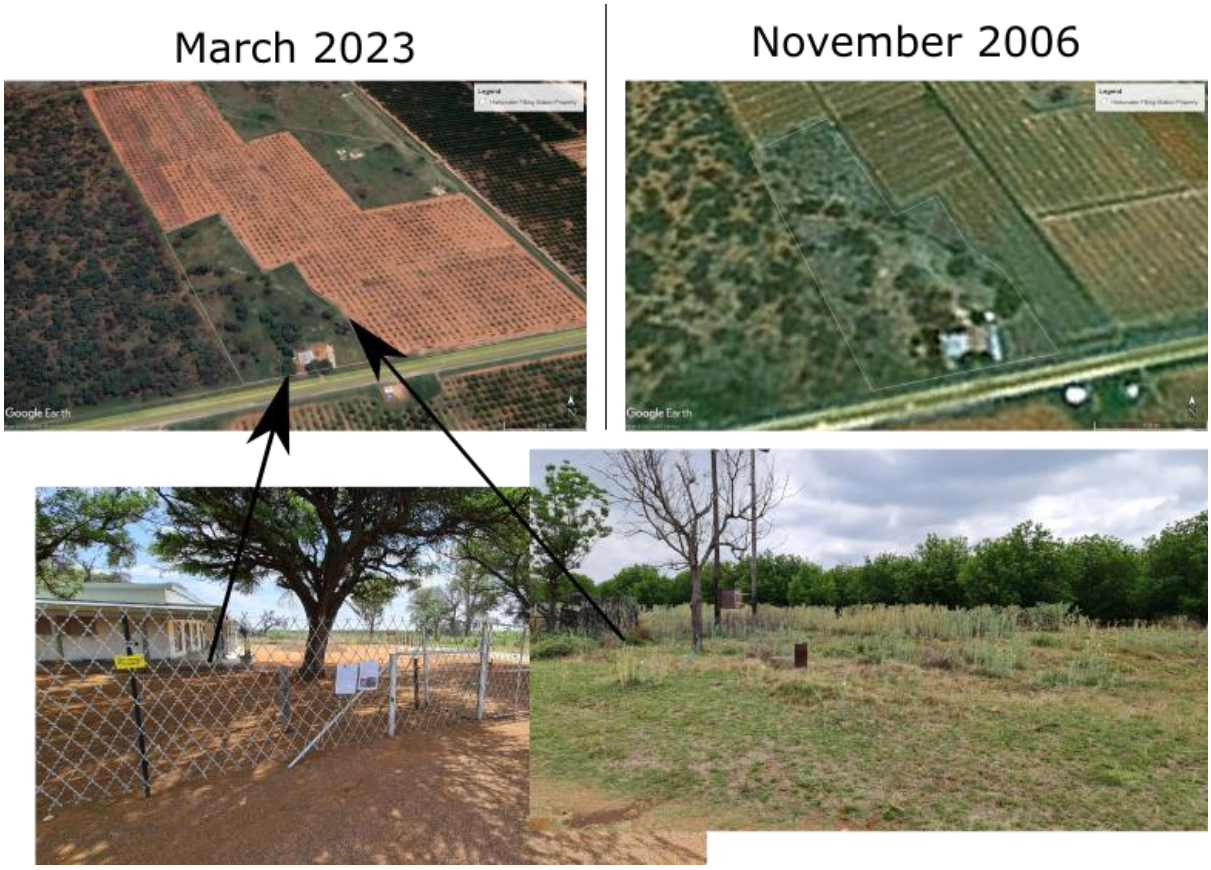


FIGURE 15: LAND USE FROM GOOGLE EARTH AND PHOTOGRAPHS (SUPPLIED BY TURN 180).

COMPLIANCE STATEMENT

According to the screening tool, the site is classified as having a high agricultural sensitivity due to existing cultivated pastures. Based on the land use (SANLC 2014 and 2020, and Google satellite image), there is an overlapping pixel on the screening tool rather than any loss of the neighbouring lands.

Therefore, the sensitivity of the area was amended to low and medium. But the surrounding area is irrigated orchards and would be considered as Very High sensitivity. Therefore, no activities from these sites should impact the surrounding agricultural activities. Especially runoff from the site into the irrigation canals of the irrigation scheme.

The loss of land for grazing is insignificant and no micro siting should result from the development.

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

APPENDIX 1: SPECIALIST CV

DR DARREN BOUWER

EDUCATION

PhD Soil Science	University of the Free State	2018
M.Sc. Soil Science	University of the Free State	2013
B.Sc. Soil Science (Hon)	University of the Free State	2009
B.Sc. Soil Science	University of the Free State	2008
Matric certificate	Queens College	2005

PROFESSIONAL AFFILIATIONS

- SACNASP- Pri Nat Sci 400081/16
- Member of the Soil Science Society of South Africa
- Member of the Soil Classification Work Group
- Member of South African Soil Surveyors Organisation

WORK EXPERIENCE

- **Digital Soils Africa** / Soil Scientist - May 2012 – Present
- **Ghent University** / Researcher- January 2016 - December 2016
- **University of the Free State**/ Assistant Researcher- January 2011- December 2015

PUBLICATIONS

Total consultancy reports: >120 **Total Publications: 5**

Most relevant:

Bouwer, D., Le Roux, P. A., van Tol, J. J., & van Huyssteen, C. W. (2015). Using ancient and recent soil properties to design a conceptual hydrological response model. Geoderma, 241, 1–11.

Van Zijl, G. M., Bouwer, D., van Tol, J. J., & le Roux, P.A.L. (2014). Functional digital soil mapping: A case study from Namarroi, Mozambique. Geoderma, 219-220, 155–161.

SPECIALIST DECLARATION

I, Darren Bouwer, 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.

Dr Darren Bouwer
PhD Soil Science
Pri Nat Sci 400081/16