

CHAPTER FIVE: IDENTIFICATION AND ASSESSMENT OF ALTERNATIVES

5.1 APPROACH TO THE ASSESSMENT OF ALTERNATIVES

Chapter One of the EIA Regulations 2014 (as amended) provides the **context** for the “*Interpretation and Purpose of Regulations*”, and with regards to “*alternatives*” (page 217), the following is provided:

“**“alternatives”**, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which **may** include alternatives to the –

- (a) property on which or location where the activity is proposed to be undertaken;
 - (b) type of activity to be undertaken;
 - (c) design or layout of the activity;
 - (d) technology to be used in the activity; or
 - (e) operational aspects of the activity;
- and includes the option of not implementing the activity;”**

In line with the above and as a baseline, the assessment of alternatives must include the assessment of the no-go alternative (not implementing the activity).

GN R326 Appendix 2, Section 1, provides the objectives of a Scoping process and in relation to alternatives the following, amongst others, is notated (page 260):

- “(c) identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- (d) identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;”

The content of the Scoping Report is given in GN R326, Appendix 2, Section 2. In relation to the assessment of alternatives the following, amongst others, are provided (page 260):

- “(1) (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including-
 - (i) details of the alternatives considered; ...
 - (ix) the outcome of the site selection matrix;
 - (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such;
 - (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;”

The Scoping Report must therefore, at a minimum, provide a description of the process followed to reach an alternative and if no location alternatives were investigated, the reason for not considering such. The NEMA (as amended) requires an EIA to include the investigation and assessment of impacts associated with alternatives to the proposed project, including the option of not implementing the activity (Sections 24 (4)(b)(i) and 24(4A)).

Section 24O (1)(b)(iv) also requires that the competent authority, when considering an application for Environmental Authorisation, considers: “*where appropriate, any feasible and reasonable*

alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment”.

Within the legislative context outlined above, the assessment of alternatives should at a minimum include the following:

- The assessment of the no-go alternative as a baseline scenario;
- the reasoning/ motivation for the elimination of an alternative; and
- the assessment of reasonable and feasible alternatives.

As is outlined below the following alternatives are being considered in this assessment process:

- No-go alternative;
- Property/ location alternatives;
- Land-use alternatives:
 - Grazing/ game;
 - Citrus production; and
- Layout/ development footprint alternatives
- Irrigation infrastructure alternatives

5.2 NO-GO ALTERNATIVE

The option of not implementing the activity, the no-go option, must be assessed as a baseline. Based on the preliminary site observations during the site visits to the property and preliminary specialist input (refer to Chapter Three of this report), Farm 653 contains three vegetation types, namely Sundays Spekboom Thicket, Bontveld and Koedoeskloof Karroid Thicket.

Some degradation of portions of the Farm, particularly in the Bontveld and Koedoeskloof Karroid Thicket, were observed. The degradation can be seen throughout all three of the identified vegetation types but is most visible in the woody Thicket areas. This is likely due to wildlife and livestock grazing and browsing. The prevalent occurrence of *Opuntia ficus-indica* and *Opuntia aurantica* across the Farm, is another indication of disturbance. Degradation in the Bontveld unit is evident by a moderately low species diversity, limited Fynbos and Grassland species, lack of rare or threatened species, and the relative abundance of *Pentzia incana*, *Felicia filifolia* and *Felicia muricata*; including patches of *Cynodon dactylon*.

Apart from the partially cultivated properties adjacent to the north-eastern boundary Farm 653, which includes existing citrus orchards, the remaining surrounding properties all resemble untransformed land where the land use is predominantly game farming. Further north of the area under assessment (~2km) and along the proposed irrigation pipeline route, however, the landscape becomes predominantly agricultural, with a focus on citrus production.

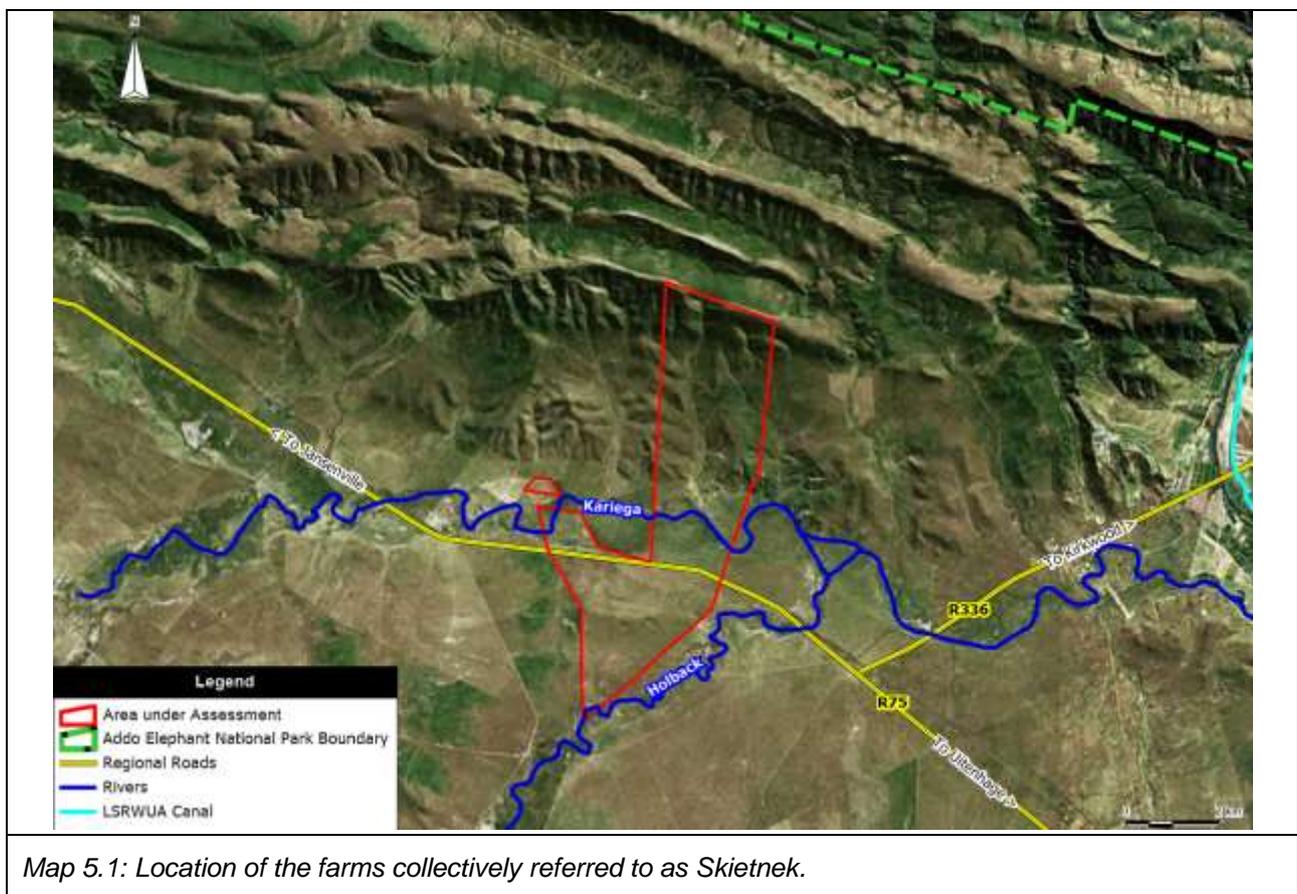
The no-go option would entail not clearing the site for the establishment of citrus and the retention of the three vegetation types which have been identified on the site. This will include the continued invasion of exotic and invasive vegetation, if not actively controlled, and the subsequent degradation thereof. Conversely the no-go option would result in several temporary construction, permanent, as well as seasonal employment phase opportunities not being realized. In addition, given that this proposed agricultural development is an empowerment project the benefits to the potential beneficiaries will not be realized. While the no-go option will have no significant negative biophysical environmental impacts, it will result in the loss of positive social and economic benefits, which are associated with the go option, as well as the farm not being utilised to its full potential (as it is zoned for agriculture). Thus, the **no-go option is not a preferred alternative**.

5.3 PROPERTY/ LOCATION ALTERNATIVES

As indicated in the first paragraph of this Chapter, the EIA Regulations 2014 (as amended), Chapter One provides for the interpretation and purpose of the regulations, including, amongst others the assessment of alternatives, which **may**, include the property or location upon which an activity is proposed to take place. This should not be confused with layout/ footprint alternatives within a specific property boundary, which are included in this assessment process (see section 5.5 below).

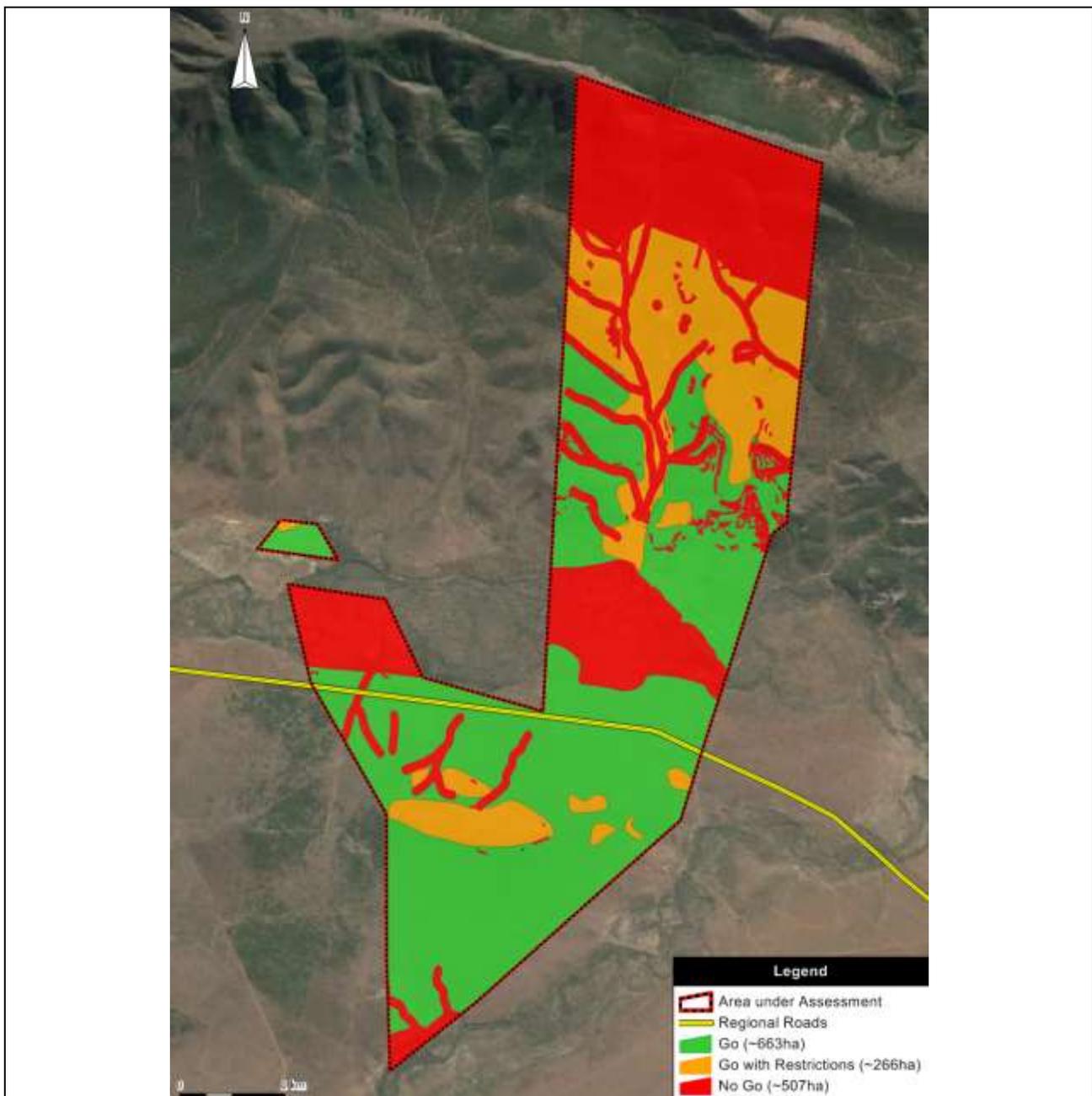
5.3.1 Skietnek (RE and Portion 3 of Farm 82 and RE of Farm 81)

Prior to purchasing Farm 653, the applicant investigated the purchase of another farm located on the R75 towards Jansenville, near Glenconner. The properties included the Remainder and Portion 3 of Farm Skietnek No. 82 and the Remainder of Farm Felsenheim No. 81 and measured ~1436ha in combined extent (see map 5.1 below).



A Rapid Environmental Risk Assessment was undertaken by Public Process Consultants, on behalf of the applicant, in order to determine the environmental constraints and potential sources of risk of an agricultural development of this nature on these properties (see map 5.2 below). The following conclusions were made in that report with regards to the development potential of these farm portions:

- An area of ~663ha was determined to be suitable for agriculture (“Go Areas”).
- However, some of these areas could fall within the 1:100 year floodline of the Kariega and Holback Rivers, which traverse the site.
- In addition, some of the areas mapped as “Go Areas” might not be suitable for citrus production or might require the application of extensive amelioration measures due to the classification of the soils as “Marginally Recommended” (due to slope) by the soil specialist.



Map 5.2: Opportunities and Constraints map prepared during the Rapid Environmental Risk Assessment for the farms collectively referred to as Skietnek.

Another potential constraint to development of the farm portions identified during the environmental risk assessment, was its location in the landscape. The farm under assessment was located ~7,5km (as the crow flies) from the nearest intensive agricultural development. A key consideration is the availability and proximity of irrigation water. The farm is ~8,5km (as the crow flies) from the LSRWUA canal system. In addition, the majority of the farm was identified as falling within a National Protected Area Expansion Strategy (NPAES) Focus Area, which may have imposed further constraints on the potential development area.

Given the above limitations, the farm portions were not considered suitable by the project applicant for the proposed Ikamva Lethu Farms (Pty) Ltd agricultural development and thus, the purchase of property did not proceed. **These farm portions were, therefore, not considered to be a preferred location/ property alternative.**

5.3.2 Remainder of Farm 653

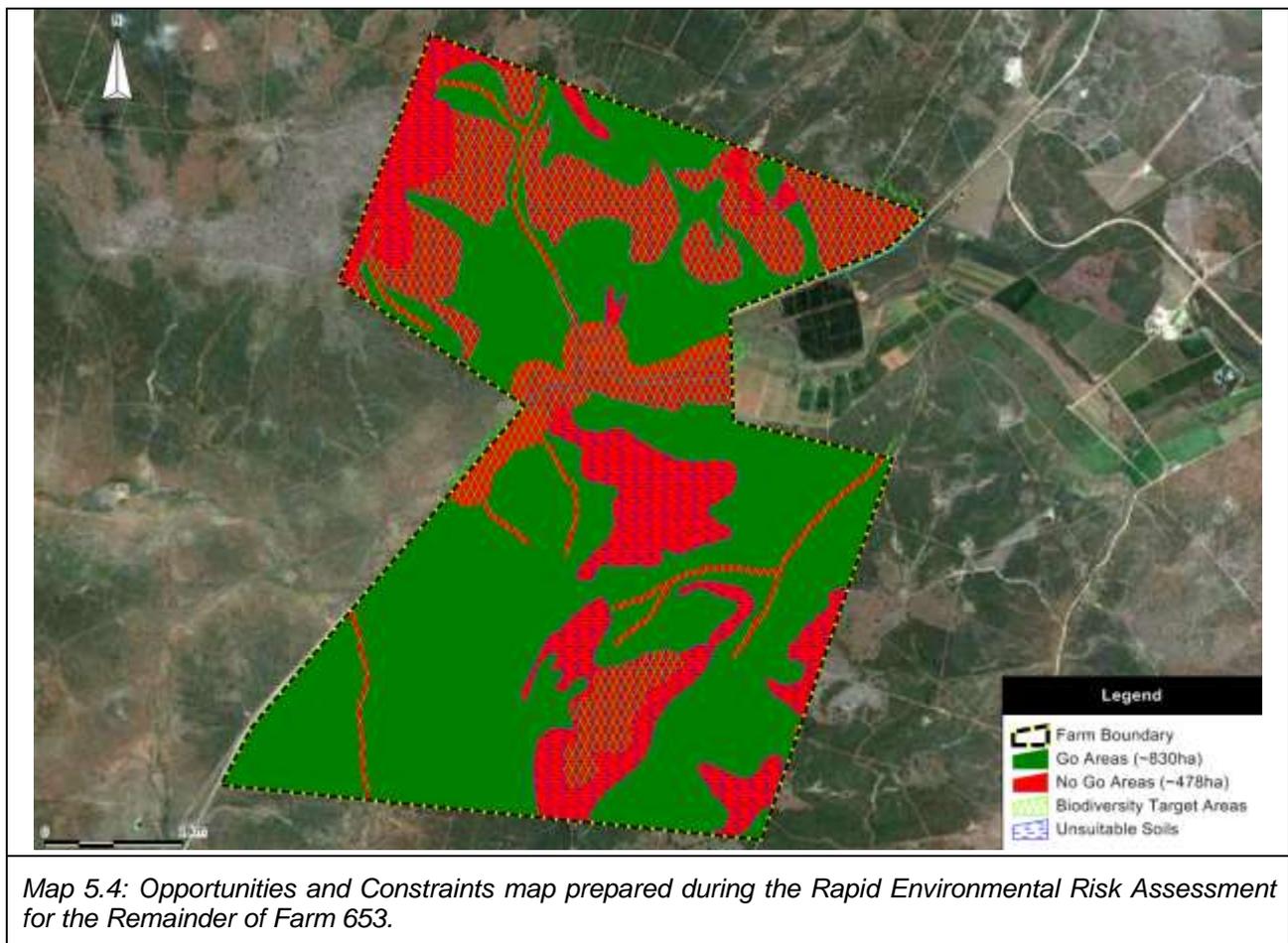
Prior to purchasing the Farm 653 a Rapid Environmental Risk Assessment was undertaken by Public Process Consultants, on behalf of the applicant, in order determine the environmental constraints and potential sources of risk of an agricultural development of this nature on the farm. The farm measures ~1191ha in extent (see map 5.3 below).



Map 5.3: Location of the Remainder of Farm 653.

The following conclusions were made in that report with regards to the development potential of the Farm 653 (see map 5.4 below):

- An area of ~830ha was determined to be suitable for agriculture (“Go Areas”).
- Approximately 74ha of the 830ha have been indicated as “Marginally Recommended” and would require detailed analysis to establish whether they would be suitable for citrus production.



Unlike the Skietnek properties, Farm 653 is located adjacent to some agricultural development (adjacent to the north-eastern boundary of the farm) and there is existing infrastructure on the farm which can be utilized to service the proposed agricultural development. The LSRWUA canal is located ~6km (as the crow flies) north of the farm. In addition, the Farm was not identified as a National Protected Area Expansion Strategy (NPAES) Focus Area. The farm is located ~2km south of the “Valley”, which is renowned for its citrus cultivation, other intensive agricultural practices and associated supporting industries (packhouses, co-op and juicing facilities).

Given the above, the Farm 653 is considered a suitable location for the proposed agricultural development and is thus the **preferred property/ location alternative**.

5.4 LAND USE/ ACTIVITY ALTERNATIVES

5.4.1 Grazing (not preferred)

The applicant’s core business is citrus production, not cattle or wildlife production. Therefore, not having any expertise in this regard, the applicant could potentially face the problems outlined in the reference below i.e. overgrazing, deterioration of the natural resources etc., if this activity were to be undertaken on the site. The applicant’s experience in citrus production, however, will positively benefit the sustainable use of the property.

The negative biophysical environmental impacts that could potentially arise from introducing cattle on the site are; decreased species composition, soil erosion, alien invasion and transformation of the vegetation on the site.

Regarding grazing capacity for domestic stock and carrying capacity for game, PCV du Toit of the Grootfontein Agricultural Development Institute notes the following:

“However, there is a need to distinguish between domestic grazers and game animals. It has been advocated for some time that the term grazing capacity should be reserved to instances where the stocking rate grazing capacity relation of domestic stock is described. This relation is a simple question of the number of animals which can be accommodated sustainably on a given area without the deterioration of the natural resources.

The capacity of the land to carry game, should be referred to as carrying capacity. This stocking rate carrying capacity relation, should be reserved for the use of the land area to game relation. This carrying capacity is much more complex than the simple domestic stock: land area relation. Game, carrying capacity involves such factors as, inter alia: area of suitable habitat, sufficient foraging area, appropriate cover and a large enough area to cater for social needs (Furstenburg 2002).

However, on account of the animal population growth rate, of the different species occupying the land at the same time, this capacity of the land to carry game often becomes overstocked, resulting in the eventual over-grazing of the vegetation. When the area can no longer support the animal population, it crashes, leading to the inevitable, massive die-off of large numbers of game animals. The remainder starts to recover slowly at first on account of the poor vegetative cover and low available plant production resulting in the extremely low carrying capacity. Once the vegetation has recovered to such an extent that it attains its previous carrying capacity, animal numbers start building up again. The whole cycle of animal number build-up and the consequent overgrazing resumes.

In order to combat over-grazing of the veld by game, expensive animal control measures have been instituted and such operations as culling and relocation of game are required, however, these practices seldom prove popular.”

In addition to the above, the applicant specifically purchased this property for the intended purpose of establishing an empowerment company for citrus orchards thereon. Thus, for the reasons outlined above, utilization of the site for grazing by cattle and game is not **considered a feasible alternative and is, therefore, not the preferred land-use alternative** and will not be assessed further in this assessment process.

5.4.2 Citrus Production (preferred alternative)

As outlined in Chapter One of this report, the Farm is located in the SRVM and is zoned for agriculture. In terms of the Section 8 Zoning Scheme Regulations this “*means the cultivation of land for crops and plants or the breeding of animals, or the operation of a game farm on an extensive basis on the natural veld or land, and includes only such activities and buildings as are reasonably connected with the main farming activities of the farm, but does not include the consent uses applicable to agriculture zone 1.*” The applicant specifically purchased this property for the intended purpose of establishing citrus orchards thereon.

The applicant has obtained a water use license for the taking of water from a water resource in terms of section 40 of the National Water Act which entitles them to utilise 675ha of water from the LSRWUA canal system for the proposed citrus development on the Farm 653. Various conditions are attached to the water use license, which amongst others, requires Ikamva Lethu PTY Ltd to maintain the shareholding of the Workers Trust and within SRCC Growers Trust for staff/

employees at 59% or more of the total shares at all times. Micro or drip irrigation will be used to supply water within the orchards to the trees. The applicant has also been granted a permit in terms of Regulation 2 of the Conservation of Agricultural Resources Act 1983 (CARA) for the cultivation of virgin soil, issued by the Department of Agriculture, Forestry and Fisheries, (DAFF) for the establishment of citrus on the Farm.

The Farm 653 is located adjacent to some agricultural development (north-eastern boundary) and there is existing infrastructure on the farm which can be utilized to service the proposed agricultural development. Farm 653 is located ~2km south of the “Valley”, which is renowned for its citrus cultivation, other intensive agricultural practices and associated supporting industries (packhouses, co-op and juicing facilities). It is proposed that Farm 653 is supported by the existing packing and processing facilities available in the “Valley” and in close proximity to the farm under assessment.

As per the outcomes of the Rapid Environmental Risk Assessment, some of the elements contributing to the sustainability of the agricultural potential of the site is access to land, suitable soils, topography of the site and availability of water. Based on the experience of the independent environmental assessment practitioner in the area, access to such land in the Sundays River Valley, which meet the abovementioned requirements, is becoming increasingly scarce. The reason being that, suitable land with sufficient access to water is already being utilized for commercial citrus production. This is leading to the expansion of intensive agriculture towards the fringe of the historically developed portions of the “Valley”.

The proposed agricultural development on the Farm will create several temporary construction phase, as well as permanent, operational and seasonal employment opportunities. In addition to the direct employment opportunities related to the farming operations, a number of indirect jobs will also be created by the proposed development, particularly within the packaging and logistics industries, amongst others. The citrus to be produced within the proposed expansion area will predominantly be for international export and will therefore generate income from foreign currency, thus, contributing to local economic growth. A portion of the citrus produced will, however, also be sold locally to vendors or juicing factories which will assist in stimulating local markets. In addition, given that this agricultural development is an empowerment project there will be additional benefits to be realized for beneficiaries associated with the project, which is required be maintained at a minimum of 59% in terms of the water use license.

For the reasons outlined above **this is the preferred alternative**, which will be assessed in detail during the EIA phase of the assessment, and which will include the assessment of layout alternatives (development footprints) within the preferred site. Chapter Six of this report provides an overview of the methodology for the identification, rating and assessment of impacts (both positive and negative) and the specialist studies to be undertaken during the EIA phase of the assessment.

5.5 LAYOUT ALTERNATIVES

The EIA phase of the assessment will assess layout alternatives (alternative development footprints) on Farm 653, based on detailed specialist studies, technical input, as well as public consultation. Specialist studies to form part of this assessment are;

- Soil Suitability – potential of soils for the establishment of citrus orchards
- Vegetation – species of special concern, ecological corridors, conservation targets
- Aquatic – aquatic sensitivity and associated buffer zones
- Irrigation efficiency and requirements – drip and pivot irrigation

- Heritage – heritage features on site, if any
- Traffic – access and egress from the site on the MR00470 road (Sunland Road)
- Visual – impact on sensitive receptors in the immediate landscape
- Roads and Wet Services – recommendations regarding domestic water, effluent management, and stormwater management for the logistical services area
- Security Risk – potential elevated security risk posed by the proposed development on rhino and exotic game in the area

The final layout (preferred development footprint within the site) for the project will be determined by the specialists and technical input in the EIA phase of the assessment, as well as public consultation. **Layout alternatives (development footprints) are feasible and will be assessed in full in the EIA phase of the assessment.**

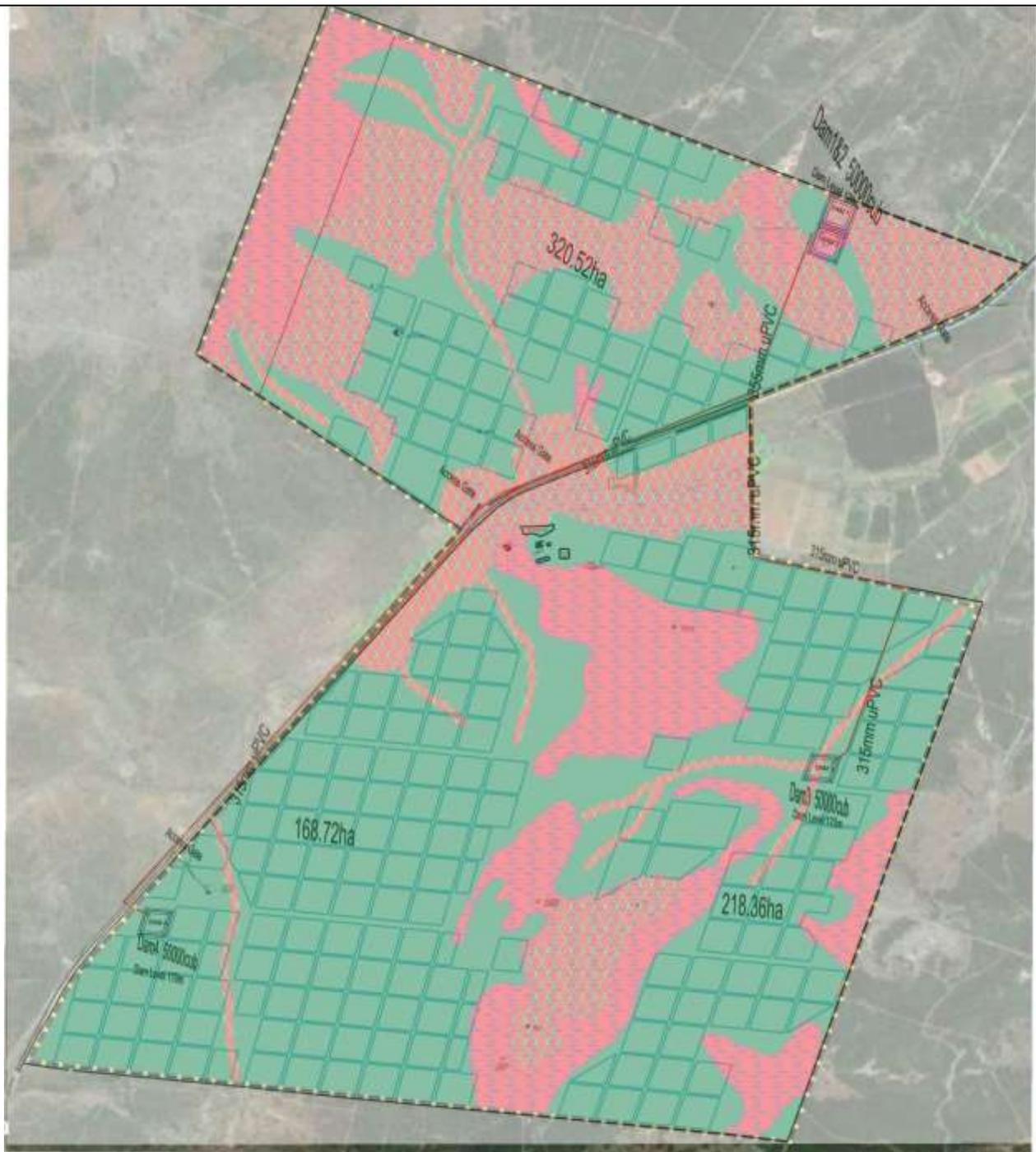
5.5.1 Alternative 1 (not preferred)

The Alternative 1 layout was based on preliminary input from the soil, as well as the vegetation and aquatic specialists. The layout below proposed the clearance of ~920ha of indigenous vegetation for the establishment of ~708ha of citrus orchards, as well as the installation of associated infrastructure (Map 5.5).

Irrigation water for the development will be provided from the Lower Sundays River Water Users Association (LSRWUA) canal system and was proposed to be reticulated from the canal offtake point located on the Remainder of Farm 714, to Farm 653, via a uPVC pipeline with an internal diameter of 500mm and a throughput capacity of 340 L/s. The pipeline was proposed to be installed in the road reserve and over private land for a distance of ~7km's. Additionally, an existing dam (~17 000m³) was required to be expanded to have a total capacity of ~50 000 m³. In addition, three new dams, each with a capacity to store ~50 000 m³ was required to be constructed.

Subsequent to the development of Alternative 1, a Security Risk Assessment, as well as a Visual Impact Assessment was conducted. Based on the outcome of the additional assessments, public participation, as well as technical input, the Alternative 1 layout was amended.

This alternative is therefore, **not the preferred layout alternative.**



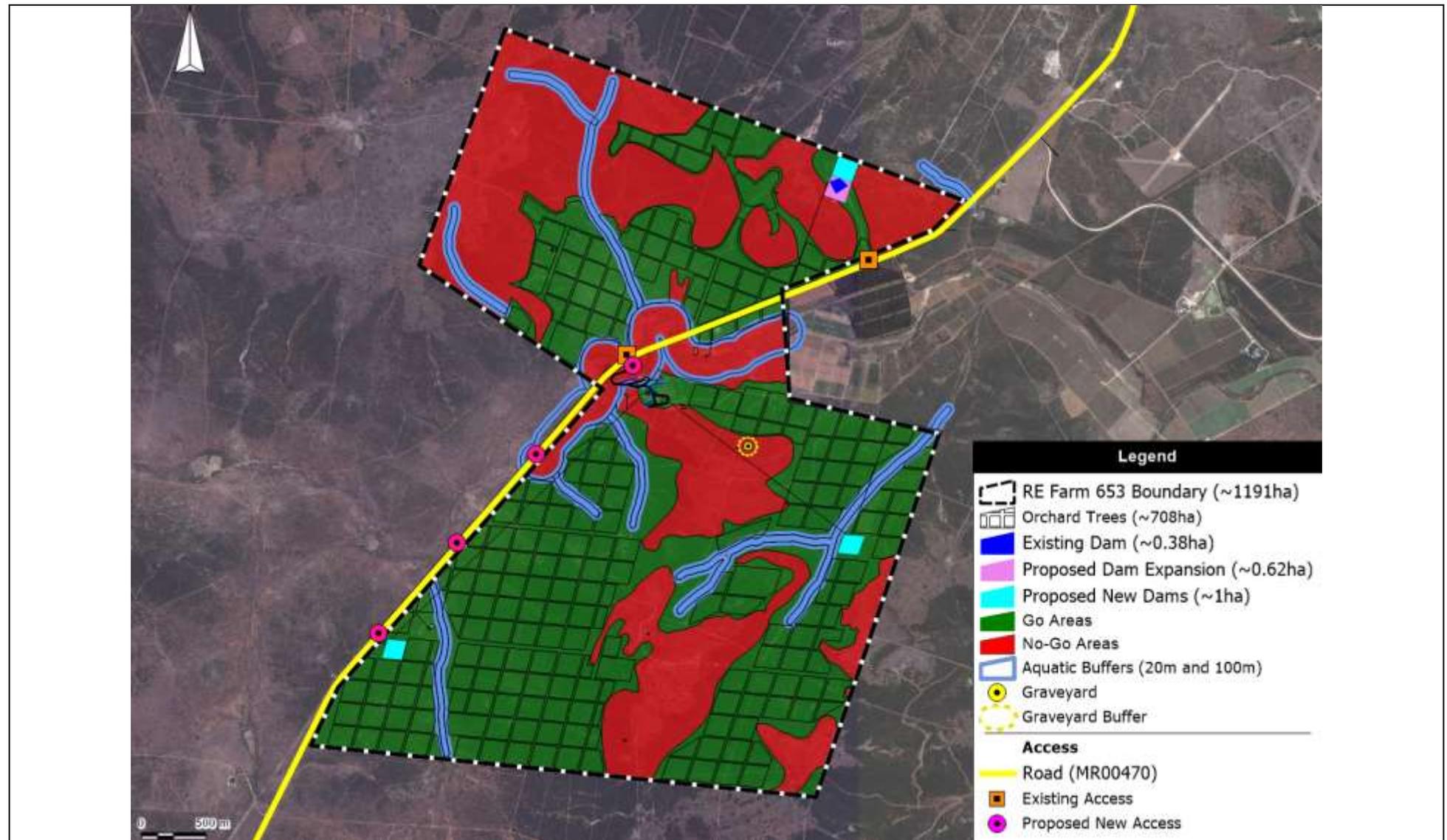
Map 5.5: Alternative 1 (not preferred) proposed to clear ~920ha of indigenous vegetation for the establishment of citrus orchards, including associated infrastructure, the expansion of an existing dam and the construction of three new dams. This alternative was based on the initial proposal, along with preliminary specialist and technical input. This layout was amended subsequent to additional specialist and technical input, and public participation.

5.5.2 Alternative 2 (preferred)

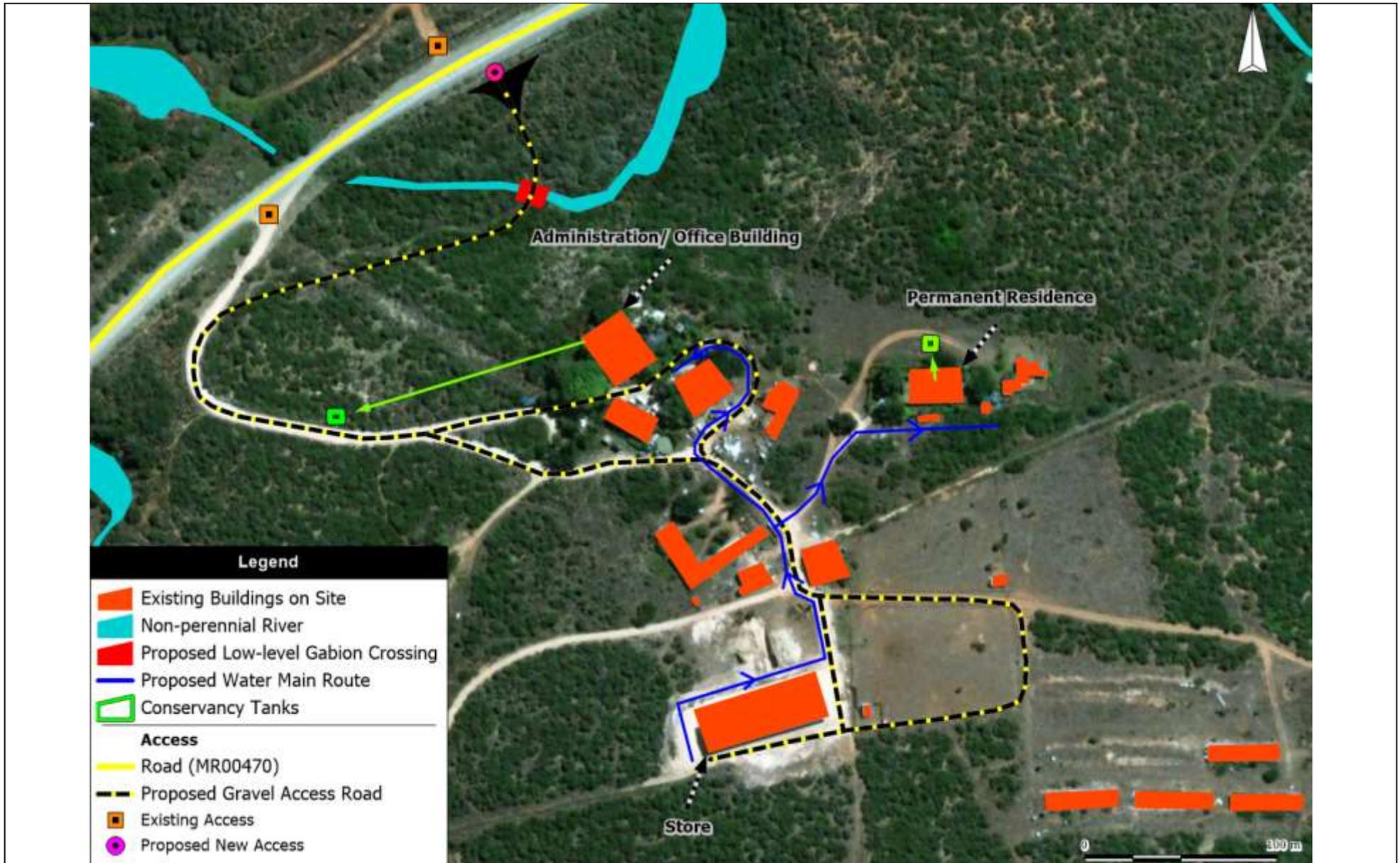
The Alternative 2 layout is based on additional input from the Security Risk Assessment, Visual Impact Assessment, technical input, and public participation. The preferred layout below proposes to clear ~920ha of indigenous vegetation for the establishment of ~708ha of citrus orchards, as well as the installation of associated infrastructure (Map 5.6). While the total area proposed for development remains the same as Alternative 1, this Alternative Layout changes the configuration of the orchard layout, in particular to accommodate a minimum 300m no-go biodiversity buffer from the northern and north western boundaries of the property, as recommended by the Security Risk Assessment.

Irrigation water for the development will be provided from the Lower Sundays River Water Users Association (LSRWUA) canal system and will be reticulated from the canal offtake point located on the Remainder of Farm 714, to Farm 653, via two uPVC pipes ($\varnothing 450\text{mm}$; throughput 280 L/s) for a distance of ~578m. The two pipelines converge into a single uPVC pipe ($\varnothing 630\text{mm}$; throughput 280 L/s), for a distance of ~137m across the Sundays River. Following the crossing, the reticulation again splits into two uPVC pipelines ($\varnothing 450\text{mm}$; throughput 280 L/s) for a distance of ~7km, where it terminates at one of the dams proposed for construction near the north-eastern boundary of Farm 653. The pipeline will be installed in the road reserve and over private land for a total distance of approximately ~8km's. Additionally, an existing dam (~17 000m³) is required to be expanded to have a total capacity of ~45 000 m³. In addition, three new dams, each with a capacity to store ~45 000 m³ is required to be constructed.

Based on the information described above, **Alternative 2 is the preferred alternative** and will be assessed in full in the EIA phase of the assessment.



Map 5.6: Alternative 2 (preferred) proposes to clear ~920ha of indigenous vegetation for the establishment of 708ha of citrus orchards, including associated infrastructure, the expansion of an existing dam and the construction of three new dams. This preferred alternative is based on additional specialist and technical input, as well as public participation.



Map 5.7: Proposed logistical services layout, including existing buildings to be utilised on site.

5.6 IRRIGATION INFRASTRUCTURE ALTERNATIVES

5.6.1 Alternative 1 (not preferred)

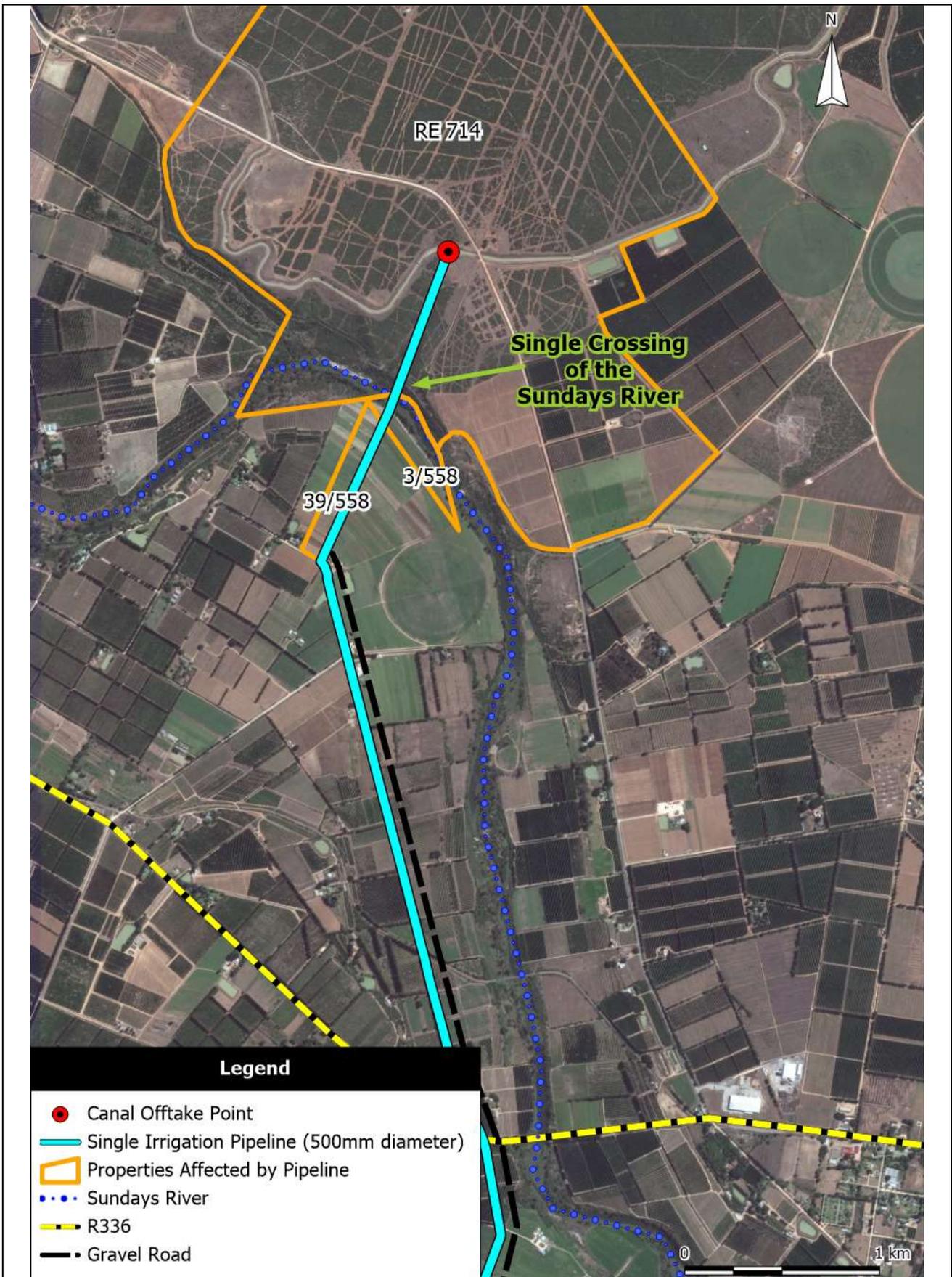
Alternative 1 is based on the initial proposal regarding the irrigation pipeline required for the proposed development, and included the following components (Map 5.8 & 5.9):

- Irrigation water for the proposed development to be reticulated from the canal offtake point located on RE/ 714, to Farm 653, via a single uPVC pipeline with an internal diameter of 500mm and a throughput capacity of 340L/s.
- The pipeline to cross the Sundays River in order to provide irrigation water from the LSRWUA canal system, which is located to the north of the River.
 - Pipeline is proposed to be submerged through the river and anchored on either side by means of galvanised puddle pipes cast in concrete on the river banks.
- The pipeline to be installed within the road reserve and over private land for a distance of ~8km's. The following properties will be affected by the proposed pipeline route:
 - Remainder of Farm 714;
 - Portion 3 of Farm 558;
 - Portion 39 of Farm 558;
 - Portion 6 of Farm 558; and
 - The proposed pipeline route is also required to be installed in the reserve of a proclaimed public road (MR00470).
- Pipeline to terminate on the RE Farm 653 at one of the proposed new dams required to be constructed.

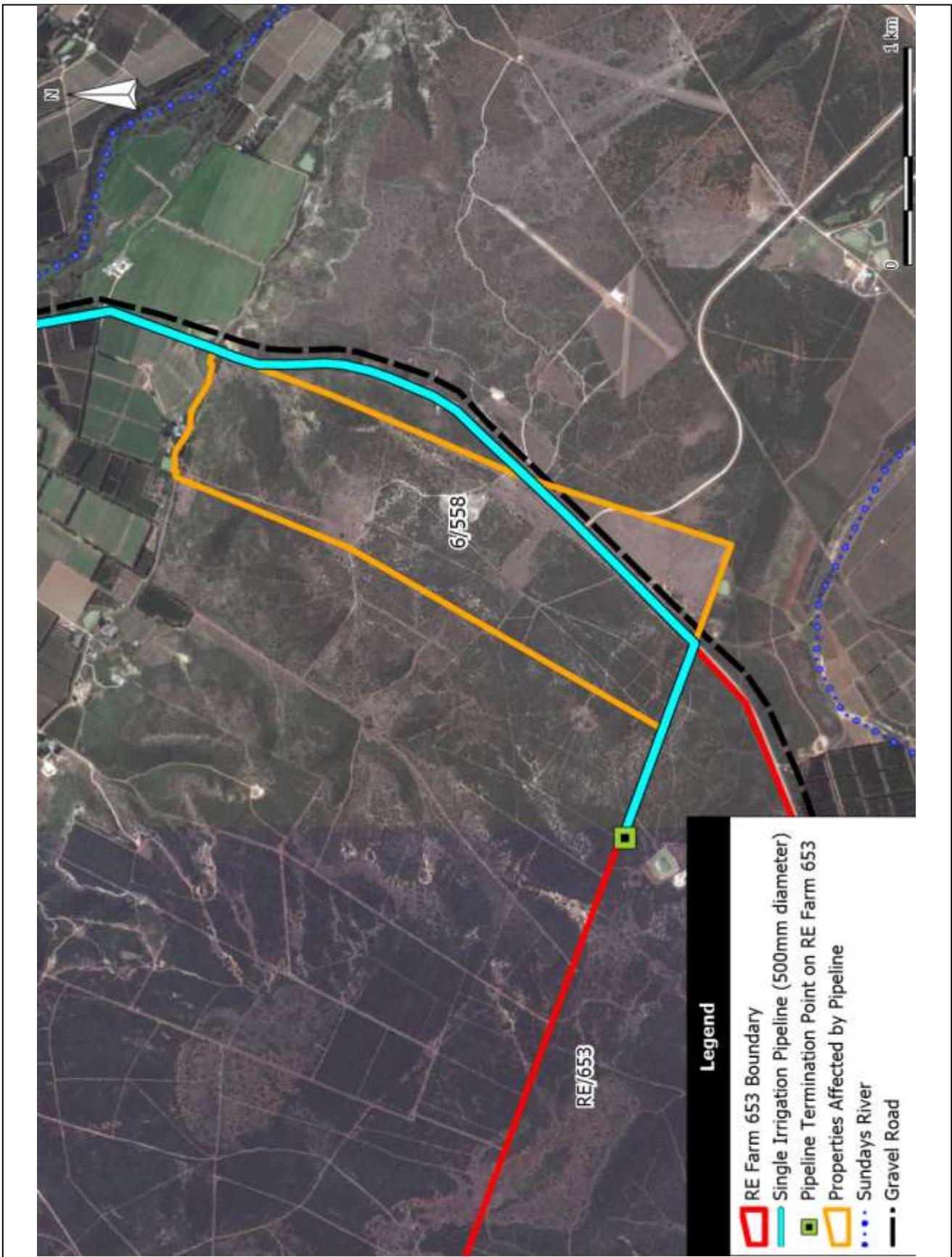
The total footprint area proposed to be disturbed by the installation of the pipeline is conservatively estimated at ~5.6ha (7m width x 8000m length).

Following the initial proposal, and together with technical input from the irrigation specialist, as well as from the project applicant, the Irrigation Infrastructure Alternative 1 was amended. However, the pipeline corridor (length, route and disturbance footprint) has not changed, therefore no substantial change to the scope of the assessment in terms of the proposed irrigation infrastructure has taken place.

For the reasons mentioned above, this is **not the preferred irrigation infrastructure alternative**.



Map 5.8: Irrigation Infrastructure Alternative 1 (not preferred), northern section of the pipeline corridor. Showing the single irrigation pipe (500mm diameter), single crossing of the Sundays River, as well as the properties affected by the pipeline corridor.



Map 5.9: Irrigation Infrastructure Alternative 1 (not preferred), southern section of the pipeline corridor. Showing the single irrigation pipe (500mm diameter) and the termination of the pipeline on the RE of Farm 653, as well as the properties affected by the pipeline corridor.

5.6.2 Alternative 2 (preferred)

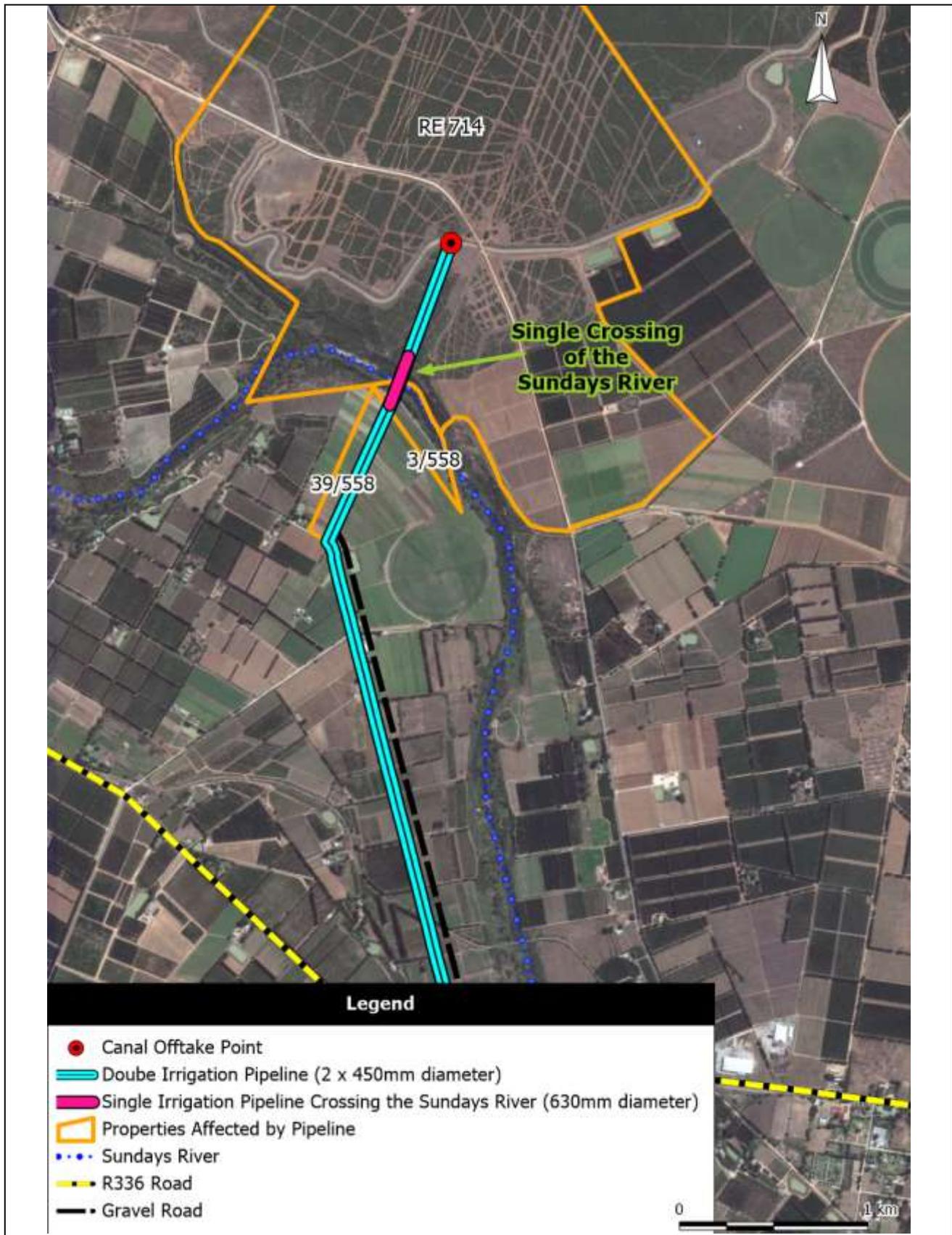
Alternative 2 is based on technical input from the irrigation specialist, as well as from the project applicant. This alternative, through consultation with the relevant parties, was considered to be the most financially viable option. The following irrigation infrastructure components are associated with this preferred alternative (Map 5.10 & 5.11):

- Irrigation water for the development will be provided from the Lower Sundays River Water Users Association (LSRWUA) canal system and will be reticulated from the canal offtake point located on the Remainder of Farm 714, to Farm 653, via **two** uPVC pipes (ø450mm; throughput 280 L/s) for a distance of ~578m.
- The two pipelines converge into a single uPVC pipe (ø630mm; throughput 280 L/s), for a distance of ~137m across the Sundays River.
- Following the crossing, the reticulation again splits into two uPVC pipelines (ø450mm; throughput 280 L/s) for a distance of ~7km, where it terminates at one of the proposed new dams on Farm 653.
- The pipeline to be installed within the road reserve and over private land for a distance of ~8km's. The following properties will be affected by the proposed pipeline route:
 - Remainder of Farm 714;
 - Portion 3 of Farm 558;
 - Portion 39 of Farm 558;
 - Portion 6 of Farm 558; and
 - The proposed pipeline route is also required to be installed in the reserve of a proclaimed public road (MR00470).

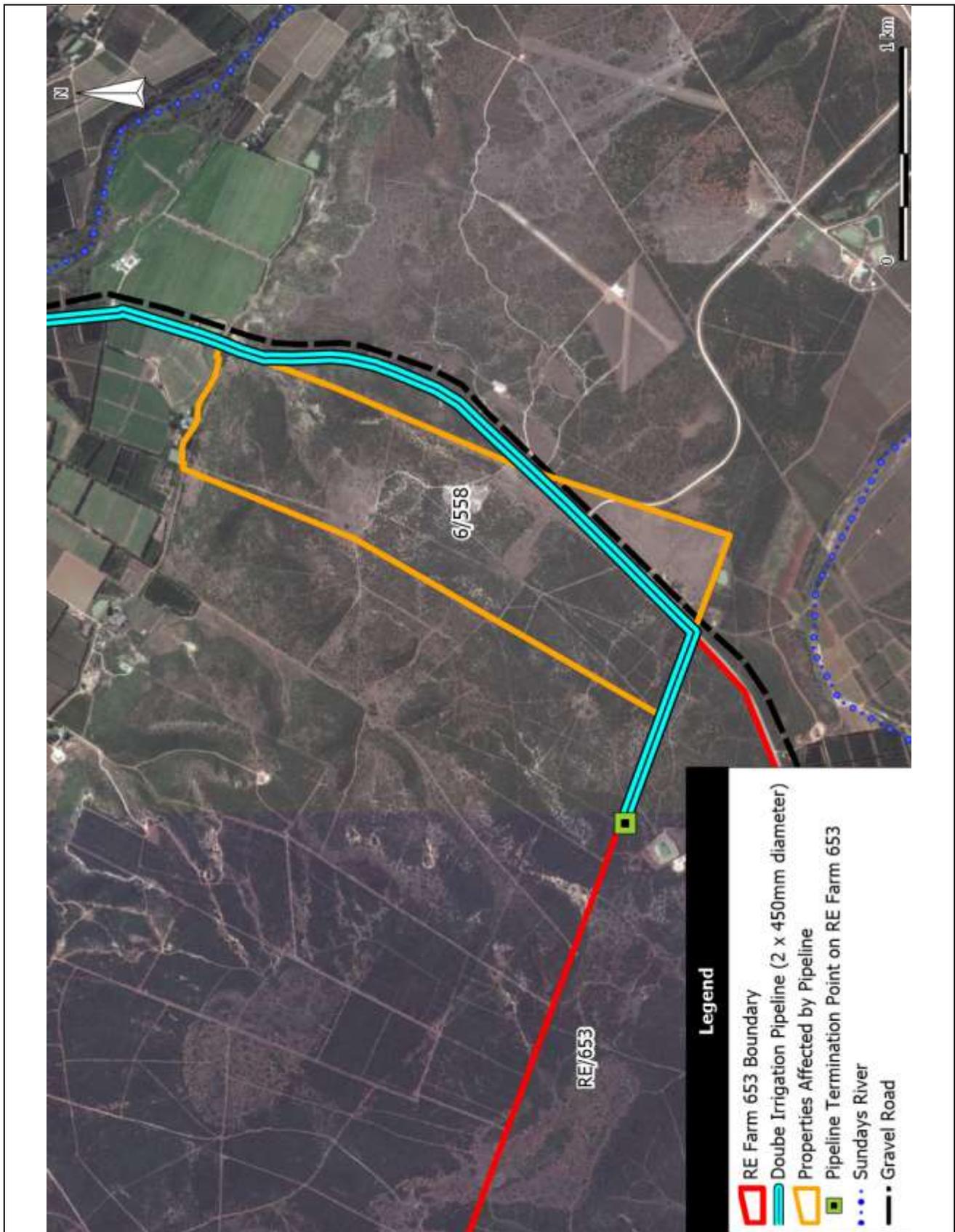
The total footprint area that proposed to be disturbed by the installation of the pipeline is conservatively estimated at ~5.6ha (7m width x 8000m length).

The amendments to Alternative 1 (not preferred) has not resulted in a change to the pipeline corridor (length, route and disturbance footprint). Therefore, no substantial change to the scope of the assessment, in terms of the proposed irrigation infrastructure has taken place.

For the reasons mentioned above, this is **the preferred irrigation infrastructure alternative**.



Map 5.10: Irrigation Infrastructure Alternative 2 (preferred), northern section of the pipeline corridor. Showing the double irrigation pipeline (2 x 450mm diameter pipes), single crossing of the Sundays River (single, 630mm diameter pipe), as well as the properties affected by the pipeline corridor.



Map 5.11: Irrigation Infrastructure Alternative 2 (preferred), southern section of the pipeline corridor. Showing the double irrigation pipeline (2 x 450mm diameter pipes) and the termination of the pipeline on the RE of Farm 653, as well as the properties affected by the pipeline corridor.

5.7 CONCLUDING REMARKS

The preferred property location alternative is the Farm 653 due to the lower number of constraints to development that were identified for this farm during the Rapid Environmental Risk Assessment.

The preferred activity alternative to be undertaken on the property is the proposed establishment of citrus orchards, which will be assessed in full in the EIA phase of the assessment. As a baseline the no-go alternative will be assessed in full in the EIA Phase of the assessment.

Based on preliminary specialist, as well as technical input and public participation, Layout Alternative 2 is the preferred layout/ development footprint alternative. Should additional layout/ development footprint alternatives be identified as a result of specialist input, technical input, or public participation through the Scoping Process, these alternatives will be assessed in full in the EIA phase of the assessment.

The preferred irrigation infrastructure alternative is Alternative 2. Should additional irrigation infrastructure alternatives be identified through the Scoping Process, these will be assessed in full in the EIA phase of the assessment.