MAKANA LEAP

LIVESTOCK AND COMMONAGE MANAGEMENT: GRAHAMSTOWN

PROJECT PROPOSAL

Prepared by

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Introduction

Following a public participation process, many issues relating to the management of the Grahamstown Commonage were raised by the public and informed citizens of Makana. These issues are provided in summary in the Environmental Issues Audit of the LEAP process, and include:

"An ongoing issue is the shortage of grazing land for small stock owners and/or some stockowners owning too many cattle, resulting in a lack of rotational grazing and over-grazing in many areas. So far branding of animals has not yet occurred, which makes commonage management difficult to monitor. There also is a perceived male gender bias around commonage management. There is also the issue of different expectations around land-use, with many promoting commercial stock farming, while communities may wish to keep cattle for primarily cultural reasons. This does impact on what stock density is seen as appropriate.

Concern was raised that LEAP must not bypass farm workers and farm dweller concerns in discussions about land use. Evictions of farm workers have secondary impacts that can be overlooked, such as leading to additional cattle on the commonage. It was suggested that the department of agriculture must also be involved in the comprehensive audit on land issues." (LEAP Project Team 2004).

During a special session of the LEAP Public Meeting, held at the City Hall in April 2004, the public was asked to identify those issues which has greatest impact on the environmental condition of the commonage and its surroundings.

Issues identified by the LEAP Process

Specific issues relating to commonage were recorded by the LEAP process and include:

<u>Overgrazing</u>

- On commonage

<u>Perceived land shortage for small farmers and cultural use</u>

- Access commonage for cultural use needed
- More land required for communal grazing, to allow rotation and resting of fields
- Stray animals in urban areas

<u>Technical support and skills support for small farmers needed</u>

<u>Fencing required to keep livestock off roads</u>

- All roads affected, urban and rural

- Uncontrolled grazing on verges
- Danger and tourism loss

Assessing carrying capacity of land

- Need to promote quality and not quantity

Assessing capacity of market and supporting infrastructure

Need sustainable veld management practices

During an earlier survey of the commonage by ECARP (2001), there were two hundred and sixty three (263) people who owned livestock and grazed them on the Grahamstown commonage. This database has now been up-dated and includes contact details for many of the livestock owners. The total number of livestock in 2001 amounted to three thousand seven hundred and seventy (3770), comprising 1858 cattle, 1912 goats and an un-determined number of donkeys. ECARP (2001) estimated that they had probably under-counted the livestock numbers by 400 large stock units. As many of the animals are small framed, all the livestock approximate 1760 LSU.

Suggested Long-term Objectives (to be finalized in stakeholder workshop)

To optimize the contribution of livestock to livelihoods and to the local economy.

To establish and maintain decision-making structures which will enable effective decision making on livestock issue on the Grahamstown Commonage and its adjacent farms.

To effectively manage the veld of the commonage by implementing a veld monitoring and resting programme.

To fence the entire commonage, making traffic on the N2 and other public roads safe.

To provide access to effective and affordable animal health facilities to all livestock owners.

To provide safe animal handling facilities.

To provide livestock sale infra-structure and access to markets.

To provide training for livestock owners on issues of animal health, breeding and trading.

To provide safe “kraals” for overnight protection of all livestock in Grahamstown East.

To prepare an accurate estimate of the carrying capacity of the commonage and associated rangeland.

To ensure access to grazing on the commonage is carried out in an equitable and fair manner.

To organise the grazing Association so that it can access Drought Relief funds from the Provincial Department of Agriculture, and have access to help during exceptional circumstances.

To improve the quality of livestock on the commonage and associated farms by introducing a registered Nguni herd in co-operation with the Department of Livestock and Pasture Science, University of Fort Hare

Suggested Short-term targets (to be finalized in stakeholder workshop)

Organize a meeting between livestock owners, affected parties and the Project Team.

To fence the N2 and Provincial Roads to Bedford and Fort Beaufort.

To fence the southern side of the old entrance to Rini.

To maintain the existing boundary fences on the commonage and recently acquired farms

Audit existing infrastructure for livestock management on all properties under the control of Makana, including fences, water points, wind pumps, stock handling facilities, kraals, dip tanks, etc.

To provide/manage effectively stock management facilities - kraals, dip tanks, sale pens, animal crush, etc at a site in Grahamstown East.

To provide water points at appropriate sites in the Eastern Commonage.

To facilitate a workshop on “Animal Health, Livestock condition and Marketting”.

To facilitate a workshop on acceptable environmental behaviour and good neighbourliness to Livestock Owners.

To prepare, in consultation with stakeholders, a code of conduct for livestock owners

To form a local fully functional Grazing Association.

Database of Stock owners

A database of stock owners has been prepared by ECARP during a previous survey. This database has been up-graded in August 2004 to include contact information for stockowners. No new information on livestock owners has now been included.

Stakeholders

Livestock owners in Rini
Adjacent farmers
Makana Municipality
National African Farmers Union (NAFU)
Eastern Province Livestock Agency (EPLA)
Eastern Cape Department of Agriculture Veterinary services (ECDA)
South African National Roads Agency Ltd (SANRAL)
Provincial Roads Engineer, Grahamstown
National Department of Land Affairs (NDLA)
ECDA Agricultural Extension Officers
ECARP
SANDF
ARC-Range & Forage Institute

Technical Specifications and Estimated Costs

Fencing

Following a workshop of the LEAP, it was recognized that the fencing options for the commonage requires serious deliberation about the options available.
Suggestions include:

Standard stock fence

The standard, 9 strand, barbed wire fence has been tested throughout southern Africa. It is an effective barrier against both small stock and large stock. This has a large dis-advantage as the fencing is stolen. Some towns e.g Middelburg (Cape) have marked the entire fence with uniquely-coloured paint to make it clearly identifiable in the event of it being stolen.

Cost (per km)
Material and labour: R20/m

National Road Guard rail

This method is employed with some success in George, where the entire N2 has been fenced with guard rails. Although more expensive than standard stock fence, these rails are not stolen and represent a barrier to all large stock. The poles used are short and of limited alternative uses.

Cost (per km) To be determined
Material
Labour

Cable fence

The cable fence is an option which requires only a single strand. Double stranded cable fencing is not permitted as motorists leaving the road would be seriously endangered if encountering the fence. Cable is also in short supply.

Cost (per km) To be determined
Material
Labour

Concrete posts and razor wire

This fence has been tested along the N2 north of Umtata. Access is allowed through motor gates. This is an expensive component of the project, and alternative access roads are created by destroying the fence.

Cost (per km) To be determined
Material
Labour
Motor gate

Ditches/trenches

Ditches are dug along sections where traditional fencing fails. One disadvantage is that ditches close over, and are only barriers to large stock.

Cost (per km) To be determined
Material
Labour

***Euphorbia tirucalli* (milk bush, pencil tree, mbelebele)**

This species is commonly used in the Ngqushwa district and in countries like Kenya and Tanzania for fencing. *E. tirucalli* produces a gooey sap that children play with, but which is known to trigger the infection interaction between the Epstein-Barr virus and Burkitt's lymphoma. (see Appendix 1 for full details). It should therefore not be considered as a potential barrier.

Kraal and race

One each at Inniskilling, Upper Gletwyn, Mayfield, Glenn Craig, Armistice, Tempe, Slaaikraal and Dead Horse Kloof

Material: R5000 each
Labour: R4000 each
Total: R72000

Grazing system

A simple two-camp system is recommended for the management of this area. The most crucial rest period for any grassland is the summer growing season, and a rest during this season of 4-6 months in a three to four year cycle is necessary.

Monitoring framework

The veld in Makana has not received any monitoring attention in the past. There are essentially two major vegetation systems, one associated with the nutrient poor, acid soils of the Witteberg quartzites on the western side of the city and another on the nutrient rich alkaline system of the eastern section. Most of the grassland production and livestock grazing is taking place in the eastern section. Veld condition assessment techniques are well developed, and appropriate techniques, including the use of satellite imagery, can be initiated by the ARC- Range & Forage Institute.

Animal monitoring system

It is essential that large stock on the commonage are adequately marked with owner details. A system of ear tags was initiated some years back. This system should be further developed and expanded.

Animal health programme

Dipping and treatment of animals against bovine TB, contagious abortion, blanthrax (black quarter and anthrax) and numerous tick borne diseases is essential. This animal health programme should be offered as an incentive for livestock owners to co-operate in the commonage management programme and to join the Grazing Association.

Drought relief application

The Minister of Agriculture has on numerous occasions in the past announced the availability of funds for the purchase and transport of additional fodder in exceptional circumstances (e.g. during drought and after fire or floods). However farmers need to be organized in order to avail themselves of these opportunities. The Grazing Association needs to establish a proper set of books and banking accounts to access these funds. This programme should be only be open to members of the grazing association and should be an incentive for livestock owners to co-operate in the commonage management programme and to join the Grazing Association.

Livestock owner training

Those who attended the LEAP workshop have requested animal health training for the livestock owners. This can be provided by the ARC and the ECDA in a workshop for members of the Grazing Association.

Livestock marketing

The marketing of livestock by the people of Grahamstown is a key ingredient to reducing animal numbers. The provision of regular sale events and a guaranteed market and reliable pricing structure will facilitate the removal of animals from the commonage and provide a regular income to livestock owners. This approach is far preferable to the restricting of numbers in a top down manner. This programme should be only be open to members of the grazing association and should be an incentive for livestock owners to co-operate in the commonage management programme and to join the Grazing Association.

Veld Improvement Programme

There are numerous opportunities for improving the veld condition for animal production. These include:

- the cutting of shrubs using a PTO driven bush-cutter. This will be to counter a major invasive problem developing on the eastern commonage where indigenous woody weeds (Cliffortia spp, Selago spp.) are encroaching the grasslands of the farms Upper Gletwyn and Inniskilling.
- clearing of alien weeds (jointed cactus, hakea, black wattle, long-leaved wattle).

These opportunities can be used for job-creation within the Poverty Relief Programme.

Contact details

1. EPLA (tel: 6224724)
2. ECDA Veterinary services (Contact person: Dr Pretorius, Dr Nick Fisher or Dr Luwanga-Iga)
3. SANRAL (Contact person: Mr Fanie van Aardt Tel: 041 3983200 Fax: 041 3983211 e-mail: aardts@nra.co.za)
4. Provincial Roads (Resident Engineer Mr John Ross Tel: 6222727)
5. Dept. of Land Affairs (Contact person: Mr Henk Prinsloo or Ms Claire Bezuidenhout 041 3637888 e-mail: CDBezuiden@dla.gov.za)
6. Agricultural Extension Officers (Contact person: Mr Thembile Mhlana tel: 6035400 cell: 0835544606)
7. ECARP (Contact person: Ms Lali Naidoo) tel: 046-6225429 Fax: 046-6222617 e-mail: ecarp@imaginet.co.za
8. Makana Municipality (Contact person: Mr Kevin Bates e-mail: kgb@makana.gov.za) Tel: 6036093
9. SANDF (Contact person: Lt Col du Preez tel: Tel: 6222011 Fax: 6222086)
10. Adjacent farmers (Peter Wylie tel:6372980, Adrian Moss cell: 0825782737 naartjie@albanynet.co.za, Non-resident owner of Bothas Post, Mike Palmer, Correctional Services, T. Hoole 6227721)
11. ARC-Range & Forage Institute (Contact person: Tony Palmer, Andrew Ainslie a.ainslie@ru.ac.za, Ms Nokuzola Mgxashe n.p.mgxashe@ru.ac.za, Tek: 6222638 fax: 6222398)
12. Livestock owners in Rini (Mr Vuyisile Mamkeli)
13. National African Farmers Union (NAFU) (Mr Edgars Veto cel:0722156412)

BUDGET

Fencing

Length along N2 and Prov. Roads: 19000m @ R20/m	**R380 000.00**
Perimeter of all Properties: 22600m @ R20/m	**R452 000.00**

Construction of handling facilities

8 sites at R9000 per site:	**R76000.00**

Workshops

Workshops (3 workshops)	
Venue hire, transport, refreshments, minute secretary	**R30 000.00**

Grazing Association

Venue hire	
Transport	
General administration of database	
Postage	
Telephone (annual costs)	**R25 000.00**

Veld rehabilitation programme

Bush cutting	**R40 000.00**
Planting spekboom (BioCarbon Project)	**R60 000.00**

Total	**R1 030 000.00**

Income

Material donation (Poles and wire)(SANRAL?)	TBD
Labour donation (Resident Engineer)	TBD
Makana Contribution to material and Labour	R275 000.00
Membership Fee (Grazing Association)	
259 members @ R50per annum	R12950.00
Poverty Relief Programme	R60000.00

Figures and Tables

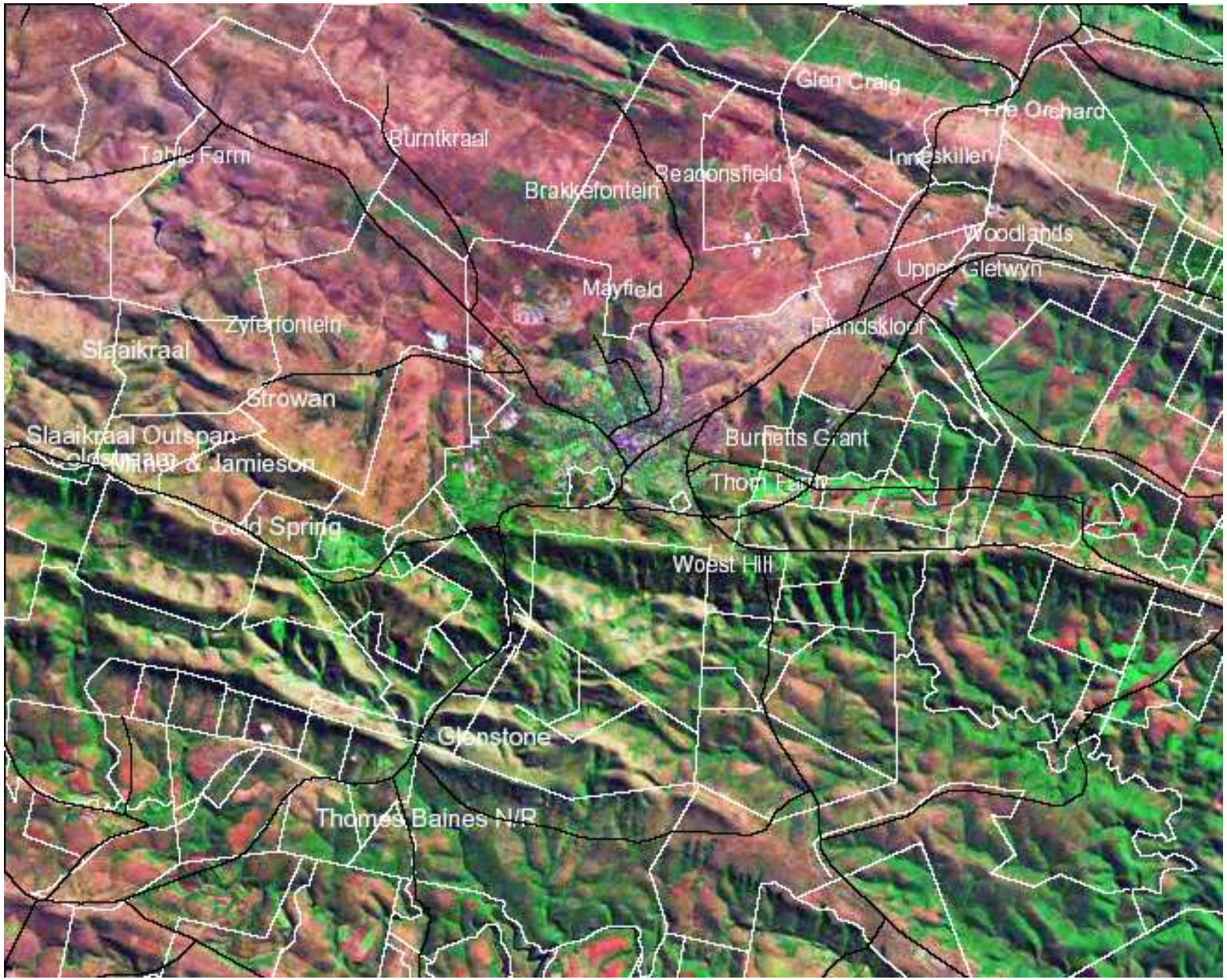


Figure 1. A ortho-rectified Landsat TM image of the area surrounding Grahamstown, showing the boundaries of all major farms. The dark green areas are sites of forest, dense spekboom thicket and riparian thicket. Grasslands appear as a pink colour, with dark red areas usually associated with fynbos or woody shrubs (*Pteronia incana, Cliffortia* or *Selago*). (See Appendix 2 for full details of processing).

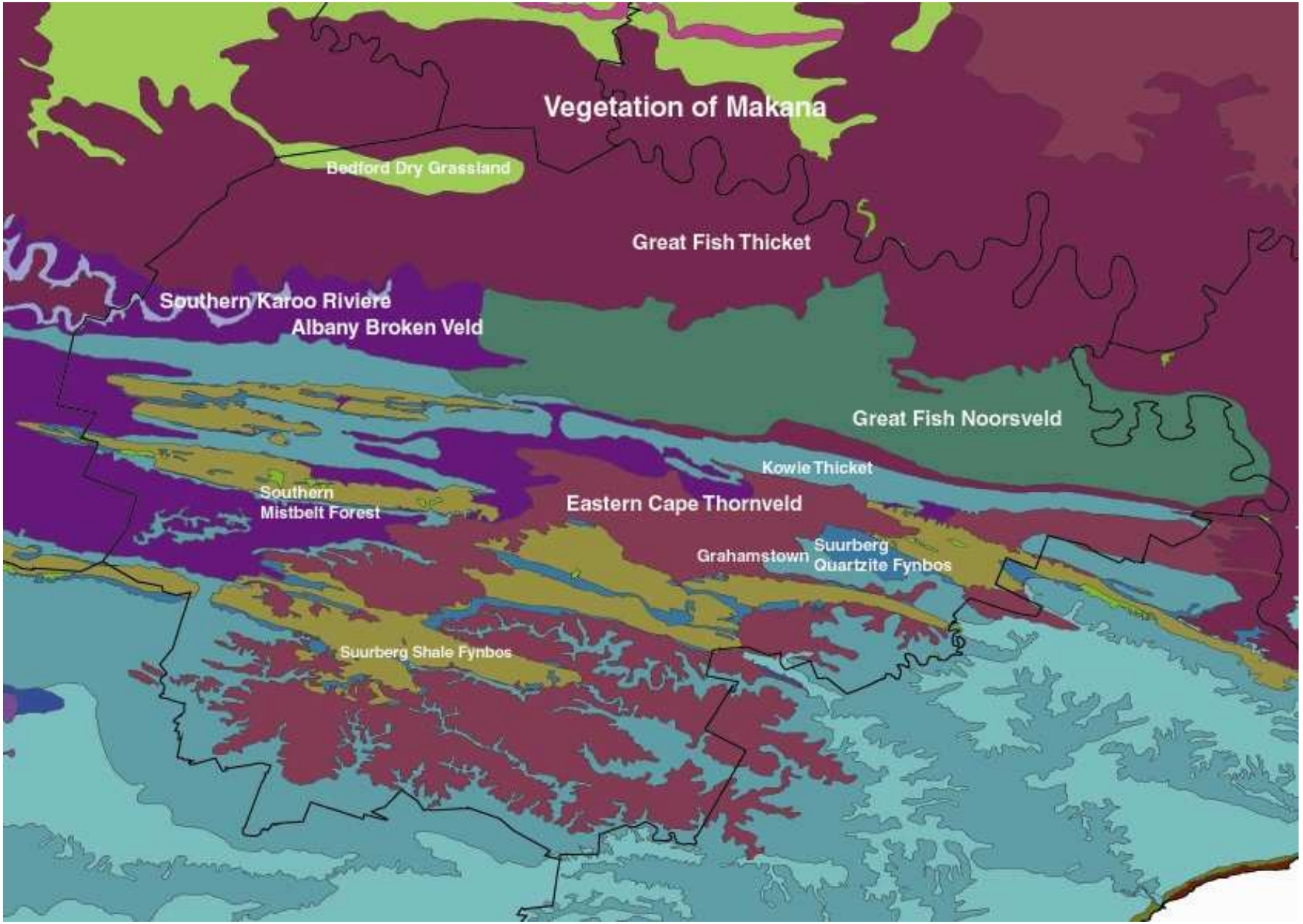
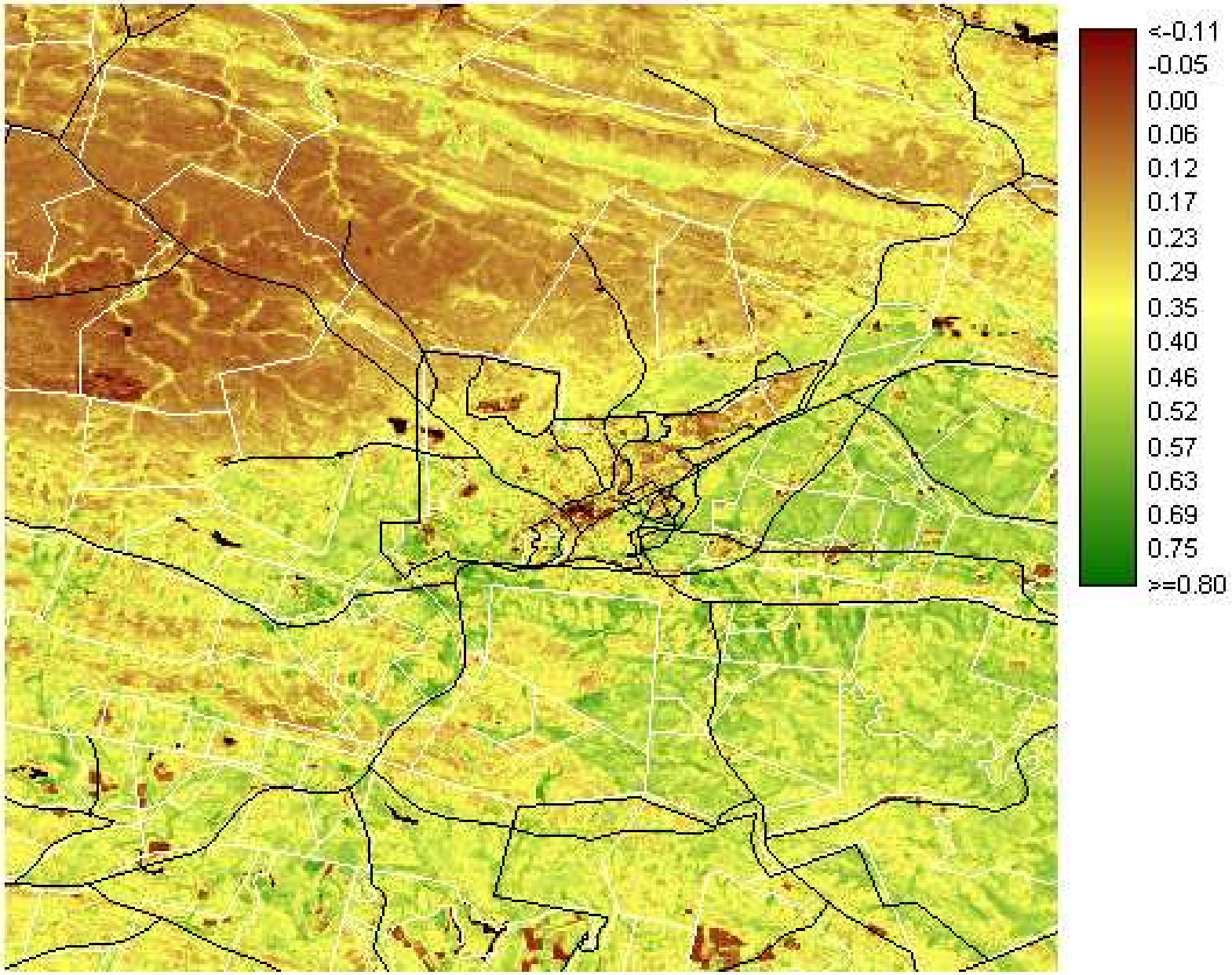

Vegetation of Makana
Bedford Dry Grassland
Great Fish Thicket
Southern Karoo Riviere
Albany Broken Veld
Great Fish Noorsveld
Kowie Thicket
Southern
Mistbelt Forest
Eastern Cape Thornveld
Grahamstown
Suurberg
Quartzite Fynbos
Suurberg Shale Fynbos

Figure 2. Portion of the new national vegetation map of South Africa, showing the distribution of vegetation types in Makana. The new vegetation types defined within Makana include: Bedford Dry Grassland, Great Fish Thicket, Great Fish Noorsveld, Kowie Thicket, Eastern Cape Thornveld, Albany Broken Veld, Southern Karoo Riviere, Suurberg Quartzite Fynbos, Suurberg Shale Fynbos and Southern Mistbelt Forest. The area around Grahamstown is classified as Eastern Cape Thornveld, Suurberg Quartzite Fynbos, Kowie Thicket and Souther Mistbelt Forest.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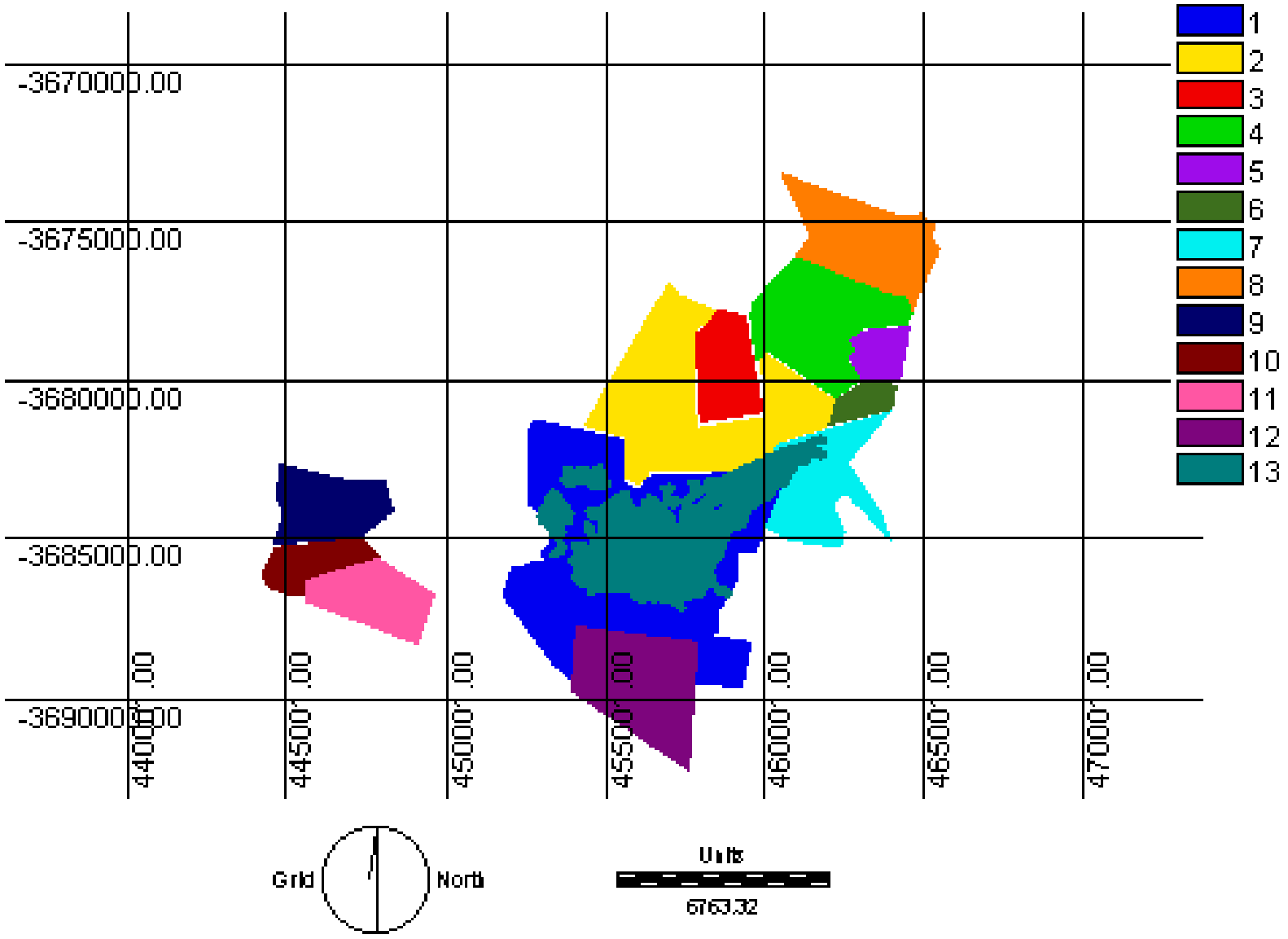
0.69
0.75
>=0.80

Figure 4. A Landsat TM Normalized difference vegetation index (NDVI) for Grahamstown and its surrounding farms recorded in the summer of 1993. This was a good summer season and reflects the optimum conditions for this area. The dark brown areas have a low standing green biomass, and have an associated low carrying capacity. These may be urban areas, ploughed lands or degraded rangeland. It is clear that farms Tempe and Glenn Craig have large areas of low standing biomass, and estimates of carrying capacity for these farms should be adjusted downwards. The most actively growing grasslands, and therefore the most important for livestock production, are situated on the farms Armistice, Inniskilling and Upper Gletwyn. The dark green areas south of the city are forests, and thicket with a high active green woody biomass, or cultivated lands.

Figure 4. A ortho-rectified Landsat TM image of the area surrounding Grahamstown, showing the boundaries of those properties under the control of the Makana Municipality. (See Figure 3 for names and Table 1 for area information). The urban areas are indicated and have been excluded from all grazing estimates.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10
11
12
13
Grid
North
Units
6763.32

Figure 5. The location and names of land parcels which are part of the Grahamstown Commonage.
1= Original Commonage 2= Brakkefontein and Mayfield 3 = Beaconsfield
4=Glen Craig 5=Armistice 6=Inniskilling 7=Upper Gletwyn 8=Tempe 9=Slaaikraal & Slaaikraal Outspan 10=Coldstream
11=Jamieson & Milner 12=Featherstoneskloof
13=Urban

Farm	Number on Map	Area (ha)	Veld Condition (based on NDVI)	Length of perimeter fence	Dominant Vegetation Type	Official Carrying capacity (ha/LSU)	Number of LSU
Original Commonage (excluding Urban)	1	2347	Poor	4.4973	Eastern Cape Thornveld	6	391
Brakkefontein and Mayfield	2	2105	Poor	3.5226	Eastern Cape Thornveld	6	351
Beaconsfield	3	590	Poor	1.1628	Eastern Cape Thornveld	6	98
Glen Craig	4	1244	Moderate	2.0976	Eastern Cape Thornveld	6	207
Armistice	5	264	Good	0.7752	Eastern Cape Thornveld	6	44
Inniskilling	6	184	Good	0.7068	Eastern Cape Thornveld	6	30
Upper Gletwyn	7	806	Good	2.3997	Eastern Cape Thornveld	6	134
Tempe	8	1086	Moderate	1.995	Kowie Thicket, Great Fish Thicket	6	181
Slaaikraal & Slaaikraal Outspan	9	699	Good	1.3167	Suurberg Quartzite Fynbos	6	116
Coldstream	10	385	Good	1.1343	Suurberg Quartzite Fynbos	6	64
Jamieson & Milner	11	658	Good	1.3566	Suurberg Quartzite Fynbos	6	109
Featherstoneskloof	12	1203	Poor	1.7157	Southern Mistbelt Forest and Suurberg Quartzite Fynbos	9	133
Urban	13	2143	N/A			0	
Total non-urban		11578					
Total LSU							1862

Table 1. List of properties currently included in the grazing management scheme of the Makana Municipality, providing areas of land, veld condition, current official carrying capacity (Eastern Cape Dept of Agriculture) and estimate of the number of large stock units which they can carry.

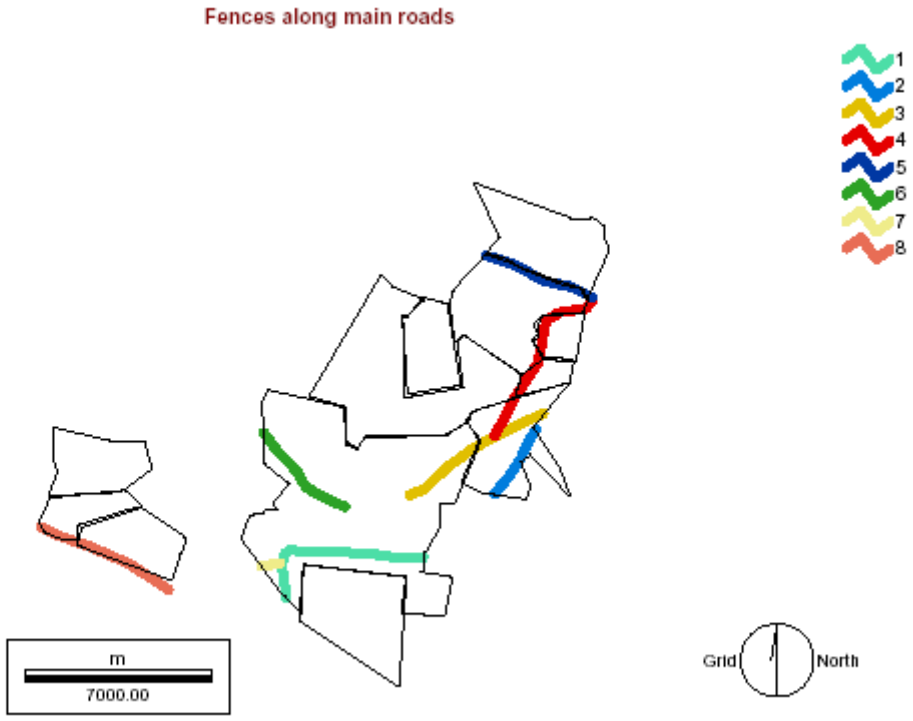

Figure 6. Sections of the N2 and the provincial roads which need to be fenced.

Fence Number	Distance	Length required
1	1.5276	3.0552
2	0.8037	1.6074
3	1.6245	3.249
4	1.767	3.534
5	1.1229	2.2458
6	1.1742	2.3484
7	0.1824	0.3648
8	1.4478	1.4478
		19.3002

Table 2. Distances of fence required along the roads. Where fencing of both sides is required, distances have been doubled.

Appendix 1

Euphorbia tirucalli **(milk bush, pencil tree, mbelebele)**

The white sap from the African milkbush ***E. tirucalli*** is used by children as a gooey toy or as glue in their schoolbooks, while adults use it to make herbal remedies. Rosemary Rochford, a virologist at the University of Michigan in Ann Arbor, Michigan found that the plant sap works as a switch that determines how the **Epstein-Barr virus**, the cause of **Burkitt's lymphoma**, replicates in human host cells. Even diluted a million-fold, the sap acts like an "on/off switch", activating three crucial genes in the virus and leading to rapid replication.

Up to 10 children in every 100,000 suffer from Burkitt's lymphoma in sub-Saharan Africa, where it is characterised by tumours in the jaw. This compares with only 0.1 cases in every 100,000 children in the Western world. (Source: New Scientist, May 13 2003.)

Branchlets cylindrical, 5-8mm in diameter, smooth. Form brush-like masses and are a characteristic feature of this species. Latex is toxic. Used medicinally, as an insect repellant and as a fish poison.

Appendix 2.

Description of the processing applied to the Landsat TM data used in this report.

GeoCover™ Product Description Sheet
Orthorectified Landsat Thematic Mapper Mosaics

Mosaic Product Specifications:

- Spectral Bands: 3 - Landsat TM bands
  - Band 7 (mid-infrared light) is displayed as red
  - Band 4 (near-infrared light) is displayed as green
  - Band 2 (visible green light) is displayed as blue
- Coverage: The GeoCover Landsat mosaics are delivered in a Universal Transverse Mercator (UTM) / World Geodetic System 1984 (WGS84) projection. The mosaics generally extend north-south over 5 degrees of

latitude, and span east-west for the full width of the UTM zone. For mosaics between 60 degrees north and 60 degrees south latitude, the width of the mosaic is the standard UTM zone width of 6 degrees of longitude. For mosaics above 60 degrees of latitude, the UTM zone is widened to 12 degrees, centered on the standard UTM meridian. To insure overlap between adjacent UTM zones, each mosaic extends for at least 50 kilometers to the east and west, and 1 kilometer to the north and south.

- Pixel size: 28.5 meters,
- Contrast Enhancement: In order to maximize the information of each mosaic, EarthSat has applied a company proprietary contrast stretch known as LOCAL (Locally Optimized Continuously Adjusted Look-up-tables) stretch. This stretch uses multiple, locally collected histograms, to create a radiometrically seamless blend of contrast adjustment across areas of potentially extreme contrast ranges. The suffix __loc" is added to the mosaic name to signify the application of the LOCAL stretch.
- Absolute Positional Accuracy: 50 meters Root Mean Square Error.
- File Naming Convention: Within each UTM zone the "partitions" extend from the equator to the north and south (in the northern and southern hemisphere respectively) in 5 degree increments. The naming convention for the mosaics is three components, separated by hyphens; the first element is the hemisphere (either N or S), the second is the UTM zone number (1-60_, the last element is the latitude of the southern edge of the mosaic in the northern hemisphere and the northern edge of the mosaic in the southern hemisphere (there are some exceptions). For example:
    - N-13-25_loc: names a mosaic partition in the northern hemisphere, in UTM zone 13, extending between 25 and 30 degrees north latitude.
    - S-21-10_loc names a mosaic partition in the southern hemisphere, in UTM zone 21, extending between 10 and 15 degrees south latitude.
- GeoCover Mosaic Image Product Delivery Format: The GeoCover Landsat image mosaics are being delivered to NASA both as uncompressed color imagery in GeoTIFF format and as compressed color imagery in MrSID™ file format. The data are delivered as 24-bit color uncompressed GeoTIFF files and as 24-bit color MrSID compressed files. The MrSID compressed file format is rapidly becoming accepted as the compression format of choice within a geodetic environment. More information on the compression format and viewing software can be found at http://www.lizardtech.com.

Source (Input) Data:

***Imagery*:**

- Spectral Bands: All seven Landsat TM bands,
- Coverage: Single Landsat WRS Path/Row,
- Projection/Datum: SOM / WGS84,
- Pixel Size: Mixture of 28.5 and 30 meters,
- Interpolation Method: Cubic Convolution,

- Orientation: Path oriented,
- Coverage Date: Scene dependent (nominally 1990 +/- 3 years).

***Control*:**

- Horizontal: Controlled scenes contained 6 to 12 photo-identifiable points with absolute positional accuracy not greater then 15.0 meters RMS.
- Vertical: DTM with 3-arc second postings, where available. Where 3-arc second data are not available, GTOPO30 (30-arc second) digital elevation models are used.

Digital Image Processing:

- Photogrammetric Block Adjustment:
  Performed using Earth Satellite Corporation's proprietary photogrammetric software.
- Orthorectification:
  Resampled to a UTM/WGS84 projection using nearest neighbor (i.e. no interpolation).
- Image Enhancements:
  The data are spatially and spectrally unenhanced.

Appendix 3

Extract from the Makana IDP relating to the Stock Farming Project.

Ref.	Project/Activities	Location	Dept.	(R) Budget	2004/2005 (R'000)	Source of Funding	Notes (*)
81	Stock farming project – Grahamstown	Gtown	CSS	TBD	TBD	CBPW/NLCP L/Affairs	Commence with the reintroduction of infrastructure on the different farm units. Implement the Farm Management Plans including the Grazing Agreements. Complete the Stock Registration Phase Complete the allocation of stock to different farming units