

DUE DILLIGENCE ASSESSMENT OF THE LOWVELD AGRICULTURAL COLLEGE, MARAPYANE CAMPUS

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STATUS ASSESSMENT OF THE INFRASTRUCTURE OF THE LOWVELD AGRICULTURAL COLLEGE, MARAPYANE CAMPUS

Executive Summary

The Marapyane Campus located in the JS Maroka Municipality is a satellite campus of the Lowveld College of Agriculture (LCA) and is situated some 50kms north-west of

STATUS ASSESSMENT OF THE INFRASTRUCTURE OF THE LOWVELD AGRICULTURAL COLLEGE, MARAPYANE CAMPUS

1. Introduction

The Marapyane Campus located in the JS Maroka Municipality is a satellite campus of the Lowveld College of Agriculture (LCA) and is situated some 50kms north-west of Marble Arch in the Mpumalanga Province (MP). The DARDLA, through the LCA and the Marapyane Campuses, provides Certificate and Diploma training for students in courses on farm training and skills transfer. The Marapyane Campus was established as a centre of excellence specialising in zoological related farming activities as opposed to the ore biological activities of the Nelspruit campus.

The New University's Project Management Team was requested to undertake a due diligence on the Marapyane Campus. The study is driven by the need to provide the Interim Council of the University of Mpumalanga (UMP) with sufficient substantive information in order for them to make an informed decision on the incorporation of the Marapyane Campus into the UMP and, if incorporated, as to what precisely will be incorporated inclusive of short, medium and long-term liabilities if any.

This report provides some background to the status of the infrastructure on the Marapyane Campus.

2. Background

The Marapyane Campus was initially built in 1990 by the then Bophuthatswana government as an educational college. It was closed in 2004 and was re-opened in 2012 following a visit by President Zuma in June 2010. The existing campus can accommodate 240 students with accommodation for 230 students (110 female and 120 Male) on site. The current student population is 233 comprising of 115 first year students and 118 second year students.

The Campus land is made up of three land parcels:

- (1) the original College of Education site of 20Ha;
- (2) 30Ha given to the College by the Cattle Co-Op; and
- (3) a 125Ha site donated by the Tribal Authority as a long term lease,

The 125Ha site is located 5km to the east on a dirt road, and is used for Irrigation, Fodder Production, Agronomy and Dry Land Farming. A portion of the site is occupied by the local Provincial Veterinary Clinic also under the jurisdiction of the Mpumalanga DARDLA.

The decision to incorporate the LCA into the University of Mpumalanga was confirmed at a meeting held on the 6th March 2013 between the Minister of Higher Education and the Premier of Mpumalanga. This decision has enabled the Department of Higher Education and Training (DHET), together with the DARDLA and the New Universities Project Management Team (NU-PMT), to initiate detailed planning for incorporation.

As part of this planning process it was agreed to undertake a due diligence and feasibility study to review, assess and evaluate the most appropriate options and make recommendations on the future of the Marapyane Campus within the post-school education and training system.

3. Location of Site

The Marapyane Agricultural College is located on part of the Farm Klippan 680 K.R. The College is located within this property, and occupies only an un-subdivided portion of this Farm.

A public road, the D 2091, going north from the village of Marapyane, traverses the Farm Klippan. This would appear to be a Provincial Road and there may or may not be a proclamation in this regard. The Marapyane Agricultural College is located on the western side of this road and is fairly centrally positioned on the Farm Klippan 680 K.R.

The attached locality plans show the site in relation to the village of Marapyane. The site is located in the Dr JS Moroka Local Municipality in the Nkangala District Municipality in Mpumalanga Province.

The site is on the north-western edge of the Province, bordering on Gauteng and Limpopo provinces.

4. Objectives

The objective of this report is to document the information emanating from a due diligence and feasibility assessment on the Marapyane campus of the LCA. The Campus forms part of the LCA. The document will inform the Interim Council of the University of Mpumalanga (UMP) to make an informed decision as to the incorporation

of this campus into the broader UMP training programmes and to elaborate on the current and future infrastructure requirements for the Marapyane campus to function to its potential

5. Scope of Work

The infrastructure and spatial requirement assessment was undertaken by a team of specialist consultants under the guidance of C Paddon and W Potgieter. This report conduct a comprehensive overview of the current status of “Marapyane Agricultural College Campus” which includes all three properties identified as portions of the campus and deals with the following infrastructure requirements:

- Environmental requirements including any proposed activity which may trigger the requirement of an EIA/BAR
- Town planning including the current land ownership of all three properties, the availability and the current status of SG diagrams and Title Deeds of all three properties and the current zoning rights of all three properties
- Geotechnical aspects including potential geotechnical problem which may hamper and/or hinder future development of the campus
- Bulk services requirements including the current and future planned provision of bulk services of all three properties and the compliance of these bulk services to acceptable standards of engineering practice
- Current building structures - detailed review of the current structures and infrastructure improvements to be done per building with reference to suitability for use and current and potential occupation rates and considering the scenarios for future expansion of the campus as mentioned below.
- Costing of current, “to be completed” and future extensions of buildings and infrastructure on the campus
- Operational and Maintenance cost in terms of short, medium and long-term operational and maintenance liabilities if the Marapyane campus, should this campus be incorporated into the University of Mpumalanga.

This report is the products from review of relevant documentation and literature over the last 4 years, two site visits and inspections to the campus and various discussions with consultants previously involved with development of the campus (DARDLA strategic plans, proposals, funding documents in so far as they relate to the building/s on the campus and spatial development plans).

6. Development Scenarios

The infrastructure report provides an assessment of two scenarios set for possible current and future development, including:

- (1) Scenario 1 – current status with 230 students in residences on campus (50 day students), and
- (2) Scenario 2 – increase the number of students to 330 students on campus and 50 off campus which is regarded as taking the campus to its capacity in terms of residences and classrooms.

7. Town planning

The town planning inputs were provided by Beth Heydenrich.

The information contained herein has been compiled to assist in gaining clarity with regard to the ownership of the land, the extent of the property boundaries, zoning information and other issues which will impact on the development of the Marapyane Agricultural College and the possible inclusion of the college as part of the University of Mpumalanga.

7.1. Property Description

The Marapyane Agricultural College is located on part of the Farm Klippan 680 K.R. A locality plan, a Regional Locality plan and an Aerial view of the site are included in Annexure 3. The Farm Klippan 680 K.R. is 692,1267 hectares in extent. SG diagrams SG A 7416/1958 and SG Y207/1989 are also included in the Annexure 3. They pertain to the whole of the Farm Klippan.

There are no approved Surveyor General diagrams for the portion of the Farm Klippan on which the Marapyane Agricultural College is located. As such, it cannot be stated with any certainty how large the area used by the College, is. A very approximate size, as calculated from the aerial photography, is that the Marapyane Agricultural College occupies approximately 10 hectares, this being just a small portion of the total property which is 692, 1267 hectares.

7.2. Ownership and Legal Issues

The Farm Klippan 680 K.R. is registered in the name of the SUID AFRIKAANSE NATURELLE TRUST and is held in terms of Deed of Transfer N^o T1148/1990 BP. The Suid Afrikaanse Naturelle Trust owns the entire Farm Klippan 680 K.R

A copy of the Title Deed is required to ascertain whether there are any servitudes or restrictions in the Title Deed.

Investigation has ascertained that this Title Deed has not been microfilmed in the Deeds Office and obtaining a copy of this deed is thus proving problematic. The deed has been ordered from the Pretoria Deeds Office.

The Marapyane Agricultural College is located on a small portion of this property. The property has never been subdivided and nor has a formal lease accompanied by any SG diagrams, been registered

7.3. Existing Zoning

As the site was originally part of the Transvaal prior to its incorporation into Bophuthatswana it would be zoned in terms of the Town Planning and Townships Ordinance Act No. 15 of 1986. The site is presumably zoned as one of the following “Agricultural Industry”, “Agricultural Land” or “Agricultural Purposes”. No copy of the zoning certificate has been found.

Neither of the three “Agricultural” zoning permit any form of educational institution as a primary right on land; this would mean the portion would need to be rezoned to a more appropriate land use.

Historically, the State, Provincial authorities and Local authorities were not required to comply with their own regulations. As such, when this facility was established, no building plans or Town Planning approvals would have been required. In line with the transparency now required of public bodies, all environmental and other legislation must be complied with by any entity wishing to develop. This is to ensure that public comment can be obtained through the advertising process required for a consent or rezoning application.

7.1. Other aspects

It is unclear whether any approved building plans exist for the development. For any further buildings, this should be regularised, with “as built” plans being submitted for approval as well as plans being submitted for all new structures. These plans should then be approved by the Local Authority where after Occupancy Certificates will be issued and relevant insurances will be possible.

For a facility of this nature, this is imperative to protect the public and reduce liability on the educational institution.

Prior to the Local Authority being able to approve such plans, the land use zoning must first be attended to so that an Education use is permitted on this land.

This would require the submission of consent of use or rezoning application.

Furthermore, an Environmental Impact Assessment (EIA) may well be required due to the size of the site. See Environmental considerations hereafter.

Another issue to be dealt with is the provision of services to the site. It would appear that sewer is a particular problem, and that the scale of the development was not taken into consideration when the present arrangements for dealing with sewerage, were made. The environmental impact in this regard may well presently contravene certain Environmental laws. The Municipality also needs to approve the sewer treatment proposals.

Water also needs to be dealt with more formally than has been done to date.

8. Environmental considerations

Lidwala was requested to do a desk top assessment of environmental considerations for further developments and improvements of infrastructure on the campus.

A number of maps were compiled from the Mpumalanga Biodiversity Conservation Plan (MBCP) project. The MBCP maps were used to investigate the sensitivity of the area and the following were noted from the different maps:

- (1) Map 1: Critical Biodiversity Area – The existing college and proposed developments falls within the CBA area (Central Sandy Bushveld SVcb12) marked in red.
- (2) Map 2: Listed Notice 3 Biodiversity Priority Areas – The Agricultural College site falls in the pink zone because of the CBA and it would be necessary to apply for activities under Listed Notice 3 as well.
- (3) Map 3: Sensitive vegetation – The yellow area indicate that the area is “Important and necessary” to maintain the sensitive vegetation in this area
- (4) Map 4: Vegetation type - is the Central sandy Bushveld SVcb which is very vulnerable vegetation type.
- (5) Map 5: The area is not an important aquatic area and no maintenance of an aquatic ecosystem is required.

- (6) Map 6: The land capability is Medium for agricultural use and can be used for grazing
- (7) Map 7: Topographical Map indicating the College as being located on the farm Klippan 692KRnames.

From the maps and information, the following information is important and indicate:

- (1) The Marapyane campus falls in a Critical Biodiversity Area (CBA).
- (2) It would be necessary to apply for and EIA for any improvements and extensions to the infrastructure – for the size of the activity.
- (3) An EIA process will take 14 months to get and EA depending on the availability specialist assessments and information needed for the project.
- (4) Specialist assessments will be needed to identify and mitigate possible impacts on the sensitive area.

Should the Marapyane campus wish to extend their activities, the following activities will require an Environmental Authorization application:

- (1) LN 1 Activity 3: the construction of facilities for the slaughter of animals (more than 50 poultry/6 game or red meat units per day).
- (2) LN 1 Activity 4: The construction of infrastructure for the concentration of animals.
- (3) LN1 Activity 9: the construction of facilities for the transportation of water, sewerage or storm water for more than 1000m.
- (4) LN2 Activity 15: The alteration of undeveloped land to residential and institutional.
- (5) LN3 Activity 2(dd): The construction of a reservoir in a CBA.
- (6) LN3 Activity 12(b): The clearance of an area of 300m² of vegetation where 75% of the vegetation is indigenous vegetation.

9. Geotechnical aspects

SMEC South Africa undertook a geological and geotechnical engineering desk study of the Marapyane site. The investigation was focussed at providing advanced warning of any geotechnical related problems which may occur during further development.

The investigation comprised a desk study of available information (from published sources and previous geotechnical reports). No profiles were inspected or samples taken. The geotechnical report is based on a limited desk study of published records of likely geotechnical problems.

9.1. Site Description

The Physical Environment - The area of investigation comprises tall grassland veld with scattered scrub, mostly thorn trees. The topography is nearly flat plains. Drainage is from North to South and drainage courses are poorly defined and widely spaced, a few shallowly incised streams occur on the site and both are non-perennial.

Climate - The area may be classified (after Thornwaite) as having a sub-humid warm climate and a Weinert's N value of between 3 and 4. This implies that the predominant mechanism of weathering in the area is chemical rather than mechanical.

The average annual rainfall at Settlers (20km west of the site) is 601mm, with a minimum of 317 and a maximum of 844, with about 85 % of this falling in the summer months. On about 21 days of the year a precipitation of more than 10mm may be expected. Average maximum and minimum air temperatures are 27° and 11° respectively with extremes of 39° and -6° being recorded.

Geology - The entire area is underlain by basalt of the Letaba Formation of the Karoo sequence. The basalt is a dark coloured, fine grained rock. It is generally weathered to a depth of about 3m. In the weathered state it is grey-green and exhibits a sugary texture. Being a massive igneous rock, it exhibits an undulating weathering surface and this may give rise to problems with hard rock occurring at varying depths below surface.

Soils - The predominant soil type in the area is clay which varies in colour from black to red brown and is derived from the basalt. When the depth to bedrock is shallow the overlying soil is usually a brown, gravelly sand. Calcrete occurs as a capping to and formed within the upper weathered basalt.

9.2. Engineering Geological

Construction Materials

The only materials suitable for use during construction were weathered basalt and calcrete. These should both be suitable for use as selected subgrade and for sub base

if stabilised in the construction of paved or surfaced roads. The calcrete is variable in quality in any one source an detailed testing and control will be necessary for this material. From a geological point of view, no sources of crushed stone or sand are likely to occur in the area and it is likely that these will have to be imported. The nearest source of suitable rock is likely to be from the Soutpansberg Group near Nylstroom, some 50km away.

Expansive Clay

The basalt on weathering gives rise to an expansive clay. The clay is generally not thick except along stream courses where a thickness of at least 2m can be expected.

Excavations and Slope Stability

In view of the very flat topography, it is not envisaged that any excavations of any appreciable depth will be required. It is anticipated that blasting will not be required in any excavations less than about 4m depth.

Foundation Conditions

Given the likely thinness of the clays it will most probably be most economical to remove the clays beneath planned roads or foundations. A detailed determination of the thickness and expansiveness of the clay must be carried out during a detailed geotechnical investigation should further development of the area be planned, with particular emphasis on low lying areas.

9.3. Conclusions

Conditions are generally considered to be favourable for development of the site, and there are no geotechnical conditions which preclude development from taking place or which would result in an uneconomic development due high foundation, ground treatment or other costs relating solely to the ground conditions.

The basalt weathers to an expansive clay and this gives rise to what is expected to be the most significant problem during construction.

There is a general lack of good quality soils and natural gravels in the area which implies that these would need to be imported.

10. Bulk Infrastructure

This section deals with a brief evaluation of the bulk infrastructure, comprising water, sewage, electricity, roads, parking and storm water. The bulk infrastructure

requirements will be assessed in terms of the current and future planned provision of these services of all three properties and the compliance of these bulk services to acceptable standards of engineering practice.

10.1. Water

The water supply system of the Marapyane Main Campus Premises comprises:

- Two boreholes and pumpstation to pump ground potable water towards an elevated water tower.
- A 50 kl elevated water tower with a 50,000 litre dam at its base of locally supplied potable water;
- A basic water treatment installation treat the borehole water, and
- A gravity system supplying potable water to each building

3 boreholes provide irrigation water on the premises.

The boreholes are located on the western boundary of the premises.

The primary borehole lies some 500 m from the sewage package plant and could due to the fall in elevation be exposed to the future contamination of this valuable source of water.

10.1.1. Maintenance Requirements

The maintenance requirements allow for daily, monthly and annual maintenance requirements to ensure that the potable water system operates optimally.

Water from the borehole on the southern-western corner of the premises is exposed to possible pollution from the uncontrolled discharge of untreated effluent from the sewage package plant.

10.1.2. Future extensions

Due to uncertainties around a deteriorating ground water source, the possibility is being pursued to supply potable water in future from Dr JS Maroka's potable water supply system. The consultant company, Endecon has pursued the possible connection of the Marapyane water system to the Greenside Clinic or any other point

close to the Marapyane College. The current demand that could be supplied from external source is summarized below (excluding any irrigation of sportfields, gardens, etc that will be supplied from on-site boreholes:

• Large Stock	2 500 litres/day
• Small Stock	2 400 litres/day
• Hostels	48 000 litres /day
• Houses	6 000 litres/day
• Kitchens	28 000 litres/day
• Office	10 400 litres/day
• Future farm houses and stores	2 100 litres/day
Total daily potable water consumption:	99 400 litres / day

Details on costs to facilitate the upgrading is covered under Section 9.5

10.2. Sewage

The sewage system of the Marapyane Main Campus Premises comprises:

- a sewer collector system with a gravity drainage system from each building towards a collector sump, pump station and pipeline, and
- Bio-Filter plant where effluent is being treated and disposed into the environment

All sewerage is processed on the property at the sewerage plant.

10.2.1. Sewage collector system

The sewage collector system comprises a gravity network, a collector sump and pump station – see layout attached.

Current Condition

A site inspection was held on 28 March 2014. A photo report was developed from this site visit. During this inspection the following observations were made:

1. It is apparent that none of the operation and maintenance requirements have

been attended to

2. The area where the pump station and collector sump are located in a fenced in area

Maintenance Requirements

The maintenance requirements allow for daily, monthly and annual maintenance requirements to ensure that the sewer system operates optimally and to prevent any failure of this strategic and environmentally sensitive installation.

10.2.2. Bio-Filter Plant

The Bio-Filter plant has been developed for minimal operating attention. All that is normally necessary to obtain satisfactory operation of this type of plant is to ensure that all mechanical equipment operates continuously. The rotating biological contactors should operate at all times, and the re-circulation pump operates intermittently on float control. The chlorinator should operate at all times. In the longer term, it will also be necessary to remove accumulated sludge or solids from the septic tank (generally, sludge removal may be required between eight months and a year. Sludge level should be checked periodically.

The Bio-Filter plant comprises of a primary septic tank, Bio-Filter RBC (Rotating Biological Contactor) rotor unit, a humus tank and a chlorine contact tank. The effluent from the development (mainly domestic waste) is received in the concrete septic tanks or primary sedimentation tanks from where it is treated in the RBC. The Bio-Filter RBC plant is generally simple to operate and is fitted with continuously rated motors, transmissions and bearings which will function for many years with the minimum of attention, if correctly maintained.

The RBC Operating Process

Raw sewage flows into the first compartment of the septic tank where primary sedimentation and anaerobic digestion takes place. From the second compartment of the septic tank, the effluent flows to the Bio-Filter RBC stage, where aerobic treatment takes place. It should be noted that over a period of time, sludge build-up occurs in the septic tank, and needs to be drawn-off every 8 – 12 months (desludging process) and carted away by vacuum tanker.

Septic tank effluent then flows through the Bio-Filter basins where aerobic treatment

takes place, by the RBC units. Primary rotors will show more intense bacterial growth on the discs than the secondary rotors due to the variety of organisms present. Bio-Filter rotors must rotate at all times, except during the maintenance shutdown periods. Individual rotors may be stopped by depressing the stop-lock buttons adjacent to each machine. There are certain cleaning requirements to clean the rotor discs under normal operating conditions.

The third component in the system is the humus Tank. Effluent from the Bio-filter plant flows to the humus tank where the humus is settled out. The settled humus sinks to the bottom of the cone from which it is returned to the septic tank by means of the humus return pump and through the automatic re-circulation arrangement, fitted in the adjacent pump sump. Some manual operation is necessary to spray and disperse floating humus on top of the humus tank. The sludge draw-off valve is manually operated and installed in the pump sump and should be opened for 3 minutes twice daily, in the morning and afternoon, to desludge the humus tank.

Clarified effluent from the humus tank is disinfected in the chlorine contact tank by means of a Chlorine dosing which should be at a rate of 4 – 6 mg/l. Residual chlorine level should periodically be tested at the outlet of the chlorine contact tank.

The RBC is supplied with an electrical control panel from where pumps are controlled. Electrical installations are generally robust but also require normal servicing by skilled technical artisans or when continuous tripping occur.

Like any other sewage purification plant, it is recommended to keep the site generally in a clean and neat condition. This includes hosing down the various parts of the plant periodically.

Quality control

The Bio-Filter plant has been designed and rated to handle domestic sewage only. The operation of the plant could be seriously impaired should this plant receive foreign matter in the form of industrial waste. It is therefore extremely important to ensure that foreign matters not enter the sewage system.

All kitchens should be fitted with screens and grease traps at the outlet sewers from these kitchens where oils, fats and food residues are intercepted and not be allowed to enter the sewer systems.

For cleaning purposes, use should only be made of biodegradable soaps and cleaning materials. Use only environmental friendly disinfectants.

In accordance with the recommendations of the Department of Water Affairs, monthly tests of plant-effluent should be undertaken, and the test results be made available for inspection

Current Condition

A site inspection was held on 28 March 2014. A photo report was developed from this site visit. It is apparent that none of the operation and maintenance requirements have been attended to during this inspection the following observations were made:

- (1) The area where the Bio-Filter plant was operated was fenced in
- (2) The access gate to the Bio-filter plant was completely overgrown and it could only be opened with major effort – no lock was on the gate
- (3) There was clearly no signs of any movement of people into the premises for a number of months
- (4) There was clearly signs of birds and the entrance and walkway to the different components was covered with spider webs
- (5) There was dead birds lying on the premises (on and around the septic tank structure
- (6) The area around the septic structure was clearly wet with clear signs that the septic tank was spilling through the top access manholes
- (7) None of the mechanical equipment was in a working order with no indication of live electrical installations on the premises
- (8) All the mechanical equipment was clearly in a very poor state of deterioration
- (9) The chlorine contact tank and chlorine storage tank was empty and clearly not working

Maintenance requirements

The supplier of the Bio-Filter package plant has developed an operations and maintenance and manual for the installation. This allows for daily, monthly and annual maintenance requirements to ensure that the plant operates optimally and to prevent any failure of this strategic and environmentally sensitive installation.

10.2.3. Corrective actions

The following should be considered its corrective actions

- Develop a Maintenance and operations contract for the operations of the of Bio-filter RBC purification plant and college sewer system at Marapyane for at least a three year term. The work should at least include the following:
 - Desludging of the Septic Tank
 - Maintenance on mechanical equipment including the drive units, rotors and pumps
 - Desludge and clean humus tank and chlorine contact tank
 - Cleaning of plant area and
 - Installation of screen at sewer booster sump

10.3. Roads, Parking and Storm water

The roads, storm water and parking on the premises are very basic with significant room for improvement.

The area is relatively flat and proper storm water management to keep surface water away from buildings needs to be attended to.

A ringroad to feed all buildings and facilities on the campus is planned which will also include access and parking area at all buildings on the campus.

10.4. Electricity

Pienaar and Erwee Electrical Engineers was involved with evaluation and assessment of the bulk electrical infrastructure on the Marapyane Campus. The bulk connector electrical infrastructure on the College premises consists of the following:

- 2 x 1MVA 22/11kV transformers
- 5 x 315kVA 11kV/400V miniatures substations
- 11kV reticulation network,

- 400V Reticulation, and
- LV installations to the following buildings:
 - Main Hall
 - 2 x Admin Buildings
 - 15 x Classrooms/Labs
 - 4 x Dining halls
 - 32 Hostel wings
 - 20 Small Houses

From the brief evaluation it was recommended that the existing electrical installation on the campus needs to be evaluated, tested and re-commissioned by a certified Contractor. The contractor will be responsible for the following:

1. Testing of the complete system and insure that the it complies to the following standards:
 - a) SABS 0142: "Code of Practice for the Wiring of Premises",
 - b) the Occupational Health and Safety Act
 - c) the Local Government Act, municipal by-laws and any special
2. Test all circuits with respect to:
 - a) Correct operation of all circuits
 - b) Earth resistivity test with 500V megger
 - c) Earth leakage test on all switched socket outlets with a certified earth leakage test unit.
 - d) All luminaries to confirm correct operation of lamps, ballast and starters.
 - e) Ensures that the load is balanced over the three phases as far as practical.
3. Fixing of all the defective equipment and installations that do not comply.
4. Supplying COC's and associated documentation.

A report was compiled by Pienaar and Erwee Electrical Engineers in October 2012 following an investigation on the supplies to the new admin block, animal clinic, sports

field and kitchen.

The existing load on the 315kVA miniature substations are as follow:

- MS3 (the substation on southern side of the admin block) is 260A or 180kVA.
- MS2 (the substation on western side of the admin block) is 455A or 314kVA.

We requested the loads of the different developments from the consultants. From the information received the loads are as follow:

- Admin Block - 250A / 175kVA
- Animal Clinic - 250A / 175kVA
- Sports Fields - 80A / 50kVA
- Kitchen - 250A / 175kVA

From the numbers received it was estimated that the total additional load to the college will be 830A / 575kVA. It was also assessed that the existing miniature substation infra-structure will not be sufficient to feed all the new developments. The capacity of the substation would have to be increased. It was recommended to replace the existing MS3 with a new 500kVA miniature substation to feed the existing load and the new admin block and kitchen.

The existing MS3 can then be repositioned to feed the new animal clinic and sports fields.

The cost (Vat and fees excl) for the above mentioned upgrade to be as follow:

- New 500kVA miniature substation - R 240,000.00
- Repositioning the existing 315kVA MS - R 60,000.00
- Total Estimated Cost - R 300,000.00

Electricity is supplied from the local Eskom supply and a standby generator is urgently needed.

10.5. Solid Waste

Limited information was obtained on the management of solid waste on site. The site visit revealed that limited effort is made to manage rubbish on the premises. Photos of an area currently being used as a dumping area demonstrates that solid waste

management be addressed as a matter of priority. See photo report 7c

10.6. Recreation

Recreational facilities need to be planned to ensure that this aspect be appropriately addressed on the campus, including sport fields, etc

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10.7. Costs

The bulk infrastructure on the premises requires upgrading and further development to service the demands. Allowance should be made for attending to priority items (short term) items and longer term upgrading.

10.7.1. Short term priorities

The short term infrastructure requirements are included in the following table as determined in October 2013:

No	Item Description	Budget Estimate	Detail
1	Welding Laboratory	R 200 000	Electrical Installation to make area functional
2	Water laboratory	R 530 000	Bulk Connection and irrigation to tunnels, Testbench Pumpstation and Irrigation
3	Sewer Plant	R 130 000	Desludging of septic tanks and blockage clearance, Mechanical Servicing and clearing of plant area
4	Water Supply repairs	R 20 000	Immediate repairs
5	Paving	R 500 000	Phase 1 Completion and New Areas needed to reduce excessive dust
	Total	R 1 380 000	

10.7.2. Planned infrastructure

Description	Type	Total	Total
Infrastructure			(incl VAT & Cont)
Phase II Outstanding			
Paved Roads	Remainder of paving.	R 6 000 000.00	R 7 866 000.00
Landscaping	Remainder of Landscaping.	R 400 000.00	R 524 400.00
Water Reticulation	Upgrade	R 432 209.54	R 566 626.71
College: New Structures			
Water Supply	Municipal connection	R 5 000 000.00	R 6 555 000.00
Sewer Upgrade		R 3 500 000.00	R 4 588 500.00
Irrigation @ Water Lab		R 340 000.00	R 445 740.00
Electrical Upgrade		R 2 000 000.00	R 2 622 000.00
Total		R 17 672 209.54	R 23 168 266.71

ICT coverage is from the local MTN network. Vodacom is at present not available but is to be installed in the very near future. This coverage is intermittent and unsuitable for education purposes as it supplies a minor amount of band width. The current contract is with a private company. It was said that DARDLA would prefer a direct contract with Telkom providing at least 4 GB for the 250 students and 20 staff members.

11. Buildings

The original campus buildings are marked out on the Marapyane Site Layout as buildings 1- 86 and include staff housing.

The campus itself is well cared for in the sections that are used regularly, but the outlying areas tend to be left untouched. There is definitely a serious lack of maintenance.

The existing campus had dirt roads and these have deteriorated to the rear of the property. New paving has been laid out from the main gate past the new Administration block but the balance of the roadway and parking lots have not been completed. There is a serious storm water problem in these areas.

Since 2012 an additional four new buildings have been constructed, the main gate house, a double storey Administration Block, the Veterinary Clinic and a Kitchen. The attached building register table (**Annexure 5x**) indicates the area, condition and needs for refurbishment.

The following two scenarios have been evaluated.

11.1. Scenario 1 – Existing 234 Students

Currently the College accommodates 234 students, 224 of whom are in residence. However the unfinished classrooms and laboratories are vital to the development of the academic programme. The most essential of these are the incomplete laboratories (Agri-Mechanics, Soil Science, Water and Welding), student recreation centres and not listed on the building register is the outdoor recreational sports facilities.

11.2. Scenario 2 - Upgrade for 330 Students

The original Education College was designed to accommodate 330 students. This included 6 additional residences, housing 66 students in total which were destroyed in a veld fire. These buildings were demolished entirely for safety. An additional 106 students need to be accommodated to bring the students bed number to 330. To meet this number, the suggestion is to rebuild 4 2-storey 24 bed units and 1 single storey of 12 beds. The location of these units would be the original building sites.

These double storey units would duplicate the standard units currently on site, which have rooms to the north and the bathrooms and kitchenette on the south.

To accommodate the increase in teaching staff an additional classroom block, one auditorium and academics offices would need to be refurbished as will the as yet unrefurbished 15 staff houses.

Concern lies in what the existing unfinished Great Hall and Gymnasium buildings would be used for. The Great Hall is very large and can accommodate more than a thousand people. The gymnasium is more suitable as an examination hall as it is north facing and does not require as much heat in winter as the Great Hall.

11.3. Costing for upgrades

The costing of the buildings to accommodate the two scenarios have been done. The costing is based on standard and market related unit cost upgrades. The cost estimates for upgrading to accommodate student numbers for the two scenarios (inclusive of VAT, professional fees) are:

- Scenario 1 – R 18,1m
- Scenario two – R 80,1m

More detail of which buildings have been scheduled for upgrade/renovation for the two scenarios are included in the Annexure 5.

12. Financials

The following

13. Conclusions

The following conclusions have been reached from the brief assessments:

13.1. Townplanning

As the entire Farm Klippan 680 KR is owned by the Tribal Trust and as the Marapyane Agricultural College is located on a small portion of this entire property, no formal Deeds, lease or SG diagrams exist in this regard. This would need to be attended to. It may be necessary to submit a consent use or rezoning application.

This process is likely to take approximately 18 months and needs to be attended to legalise the existing use.

13.2. Environmental

The environmental considerations with regard to this site need to be further investigated. The proposed extension of the academic programme to include animal husbandry etc. requires a full description of the proposed land improvements in order to finalise exactly what activities would trigger the need for an EIA.

13.3. Geotechnical

Conditions are generally considered to be favourable for development of the site. There are no geotechnical conditions which preclude development from taking place or which would result in an uneconomic development due high foundation, ground treatment or other costs relating solely to the ground conditions.

The basalt weathers to an expansive clay and this gives rise to what is expected to be the most significant problem during construction.

There is a general lack of good quality soils and natural gravels in the area which implies that these would need to be imported at high cost.

13.4. Bulk Infrastructure

The following conclusions can be drawn with respect to the bulk infrastructure on the Marapyane premises

1. Specialists (Engineers, environmentalists) would need to be appointed to advise the LCA and to gain Council approval of extensions to bulk services (most notably water and sewage).

2. Water – the following brief findings:
 - a. The internal supply network on the campus was not evaluated due to lack of information,
 - b. The Marapyane campus' ground water source can still cope with the current demand, however the system needs proper operating procedures and maintenance. An on-going and short term budget should be made available for this purpose. The nature of the on-site source is that funding is spent on electricity only (pumping costs) and ongoing maintenance is omitted,
 - c. The phase 2 budget of R560 000 should be made available to do immediate upgrading of the water system to sustain the water supply infrastructure in the short and medium term and to accommodate the scenario 2 expansions, should that realise
 - d. Further developments (increase the number of students and expansions of farming activities) will put the existing ground water potable water system under stress to meet the future demand. Alternative boreholes on the property will have to be developed or the planned connection to the Municipal system should be implemented. The costs for this development was budgeted for at R6,6 million which excludes the upgrading of the internal network on the campus.
3. Sewage – the following brief findings from the evaluation:
 - a. The sewage from the premises is supposedly being treated by a Bio-filter RBC purification plant. The package plant is suitable to handle sewage volumes and quality of this magnitude and nature, however the plant requires proper maintenance and operations. The plant has severely been neglected to a non-functional state.
 - b. The plant will require a complete revamp, cleaning and decommissioning. The estimated cost for this purpose according to the Endecon report is in the order of R4,6million.
 - c. A proper maintenance and operations contract (for at least 3 years) for the operations of the purification plant and college sewer system at Marapyane should be introduced. The cost of such an operational procedure should be budgeted for and an allowance of about R300 000 per annum should be made available for this purpose, assuming the

entire plant and supporting infrastructure be upgraded to deal with the current effluent load. These should allow for the following:

- i. Desludging of the Septic Tank
 - ii. Maintenance on mechanical equipment including the drive units, rotors and pumps
 - iii. Desludge and clean humus tank and chlorine contact tank
 - iv. Cleaning of plant area and
 - v. Installation of screen at sewer booster sump
- d. The extension of activities on the campus should not be allowed unless the plant be upgraded and re-commissioned.
4. Electricity – Electricity is supplied from Eskom. The following need to be attended to:
- a. A brief evaluation of the infrastructure by a specialist requested that the existing electrical installation on the campus be evaluated, tested and re-commissioned by a certified Contractor (see Section 9 for detail), It is important to fix all defective equipment and installations that do not comply to the local authority requirements and to issue COC's and associated documentation.
 - b. From the specialist assessments it was found that the existing mini substation infra-structure will not be sufficient to feed all the new proposed developments. The capacity of the substation would have to be increased to feed the existing load and the new admin block and kitchen. The total estimated cost for this upgrade was about R 300,000.
 - c. From the Endecon report it was also found that a general investment of R2,6million is required for the upgrading of electricity on the campus. The details of this proposed extension was requested not verified yet.
 - d. Due to intermittent supply, a standby generator is urgently needed. It is assumed that the cost for this supply is included in the R2,6m.
5. Roads, parking and storm water.
- a. The roads, storm water and parking on the premises are sparsely developed and should be attended to ensure proper access to all buildings.

- b. Ongoing paving, storm water management and landscaping has been budgeted for at about R1 million.
 - c. A budget of R 7,9 million has been budgeted for to address proper development of a ring road, proper storm water management to keep surface water away from buildings and to secure parking areas at assembly points.
6. Other infrastructure
- a. The campus will have to attend to proper fencing of their fixed assets
 - b. Sport fields and other amenities – upgrading and new facilities (R25m)
 - c. Irrigation requirements (R12m)
 - d. New farming developments

13.5. Buildings

The balance of the refurbishment needs to be completed; a suitable building programme proposed in order to complete the priority areas soonest. Of great importance are the four laboratories which are preventing the full academic programme from being taught thoroughly.

Due consideration must be taken of the public open space and the outdoor recreational sports facilities. The College is not in walking distance from any amenities and the students need more constructive opportunities for social engagement.

13.6. Finances

Annexures

Annexure 1:	Layout Map of existing Campus
Annexure 2:	Layout with campus extensions
Annexure 3:	Town planning maps
Annexure 4:	Environmental maps
Annexure 5:	List of buildings and proposed costs
Annexure 6:	Infrastructure
Annexure 7:	Photo report

Annexures 1

Layout Map of Campus

Annexures 2

Layout campus of proposed extensions

Annexures 3

Town planning maps

Annexures 4

Environmental maps

Annexures 5

List of buildings and proposed costs to improve/renovate

Marapyane Campus
Status Assessment Report



Annexure 5

Annexure 6
Layout of Bulk Infrastructure

Annexure 6a - Bulk Sewage system



Annexure 6a: Location and basic layout of sewer plant

Annexure 7

Photo reports

Marapyane Campus
Status Assessment Report



Entrance to Bio-Filter Plant	Pumpstation and sump
Septic Tank with dead bird	Discharge pond
Chlorine contact tank	Chlorine store and Bio-Filters with DB
Electrical DB and Humus tanks	Overgrown Bio-Filter plant area
Bio-Filters behind spider webs	