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REPUBLIC OF SOUTH AFRICA

DIRECTORATE: OPTIONS ANALYSIS

FEASIBILITY STUDY FOR THE MZIMVUBU WATER PROJECT

LEGAL, INSTITUTIONAL AND FINANCING ARRANGEMENTS

OCTOBER 2014

FEASIBILITY STUDY FOR THE MZIMVUBU WATER PROJECT APPROVAL

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LIST OF REPORTS

REPORT TITLE	DWS REPORT NUMBER
Inception Report	P WMA 12/T30/00/5212/1
Environmental Screening	P WMA 12/T30/00/5212/2
Preliminary Study	P WMA 12/T30/00/5212/3
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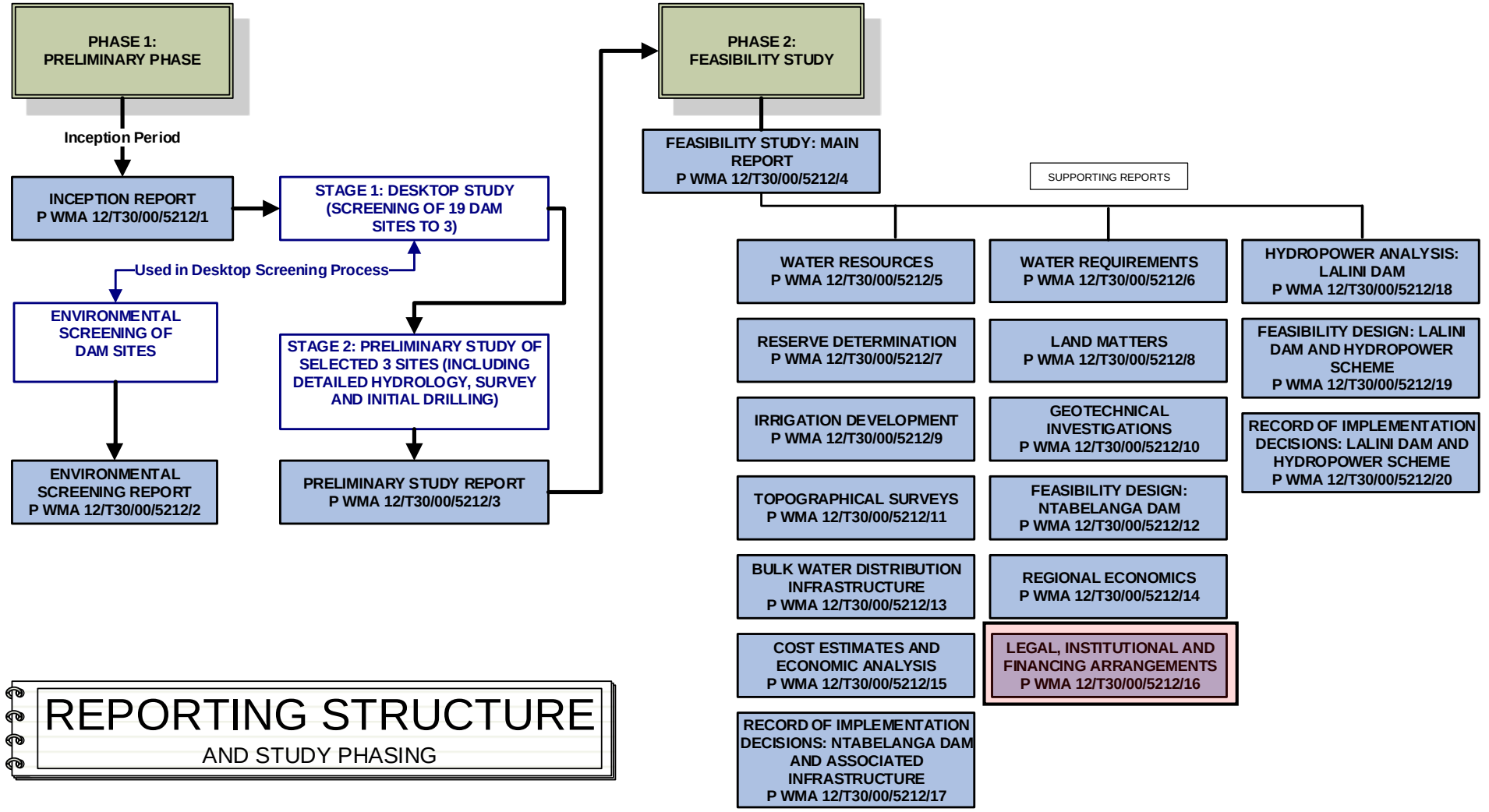
Record of Implementation Decisions: Ntabelanga Dam and Associated Infrastructure	P WMA 12/T30/00/5212/17
Hydropower Analysis: Lalini Dam	P WMA 12/T30/00/5212/18
Feasibility Design: Lalini Dam and Hydropower Scheme	P WMA 12/T30/00/5212/19
Record of Implementation Decisions: Lalini Dam and Hydropower Scheme	P WMA 12/T30/00/5212/20



REPORTING STRUCTURE
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REFERENCE

This report is to be referred to in bibliographies as:

Department of Water and Sanitation, South Africa (2014). ***Feasibility Study for the Mzimvubu Water Project: Legal, Institutional and Financing Arrangements***

DWS Report No: P WMA 12/T30/00/5212/16

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Note on Departmental Name Change:

In 2014, the Department of Water Affairs changed its name to the Department of Water and Sanitation, which happened during the course of this study. In some cases this was after some of the study reports had been finalized. The reader should therefore kindly note that references to the Department of Water Affairs and the Department of Water and Sanitation herein should be considered to be one and the same.

Note on Spelling of Laleni:

The settlement named Laleni on maps issued by the Surveyor General is locally known as Lalini and both names therefore refer to the same settlement.

EXECUTIVE SUMMARY

INTRODUCTION

The Mzimvubu River catchment in the Eastern Cape of South Africa is within one of the poorest and least developed regions of the country. Development of the area to accelerate the social and economic upliftment of the people was therefore identified as one of the priority initiatives of the Eastern Cape Provincial Government.

Harnessing the water resources of the Mzimvubu River, the only major river in the country which is still largely unutilised, is considered by the Eastern Cape Provincial Government as offering one of the best opportunities in the Province to achieve such development. In 2007, a special-purpose vehicle (SPV) called ASGISA-Eastem Cape (Pty) Ltd (AsgiSA-EC) was formed in terms of the Companies Act to initiate planning and to facilitate and drive the Mzimvubu River Water Resources Development.

The five pillars on which the Eastern Cape Provincial Government and AsgiSA-EC proposed to model the Mzimvubu River Water Resources Development are:

- *Afforestation;*
- *Irrigation;*
- *Hydropower;*
- *Water transfer; and*
- *Tourism.*

As a result of this the Department of Water and Sanitation (DWS) commissioned the Mzimvubu Water Project with the overarching aim of developing water resources schemes (dams) that can be multi-purpose reservoirs in order to provide benefits to the surrounding communities and to provide a stimulus for the regional economy, in terms of irrigation, forestry, domestic water supply and the potential for hydropower generation amongst others.

The study commenced in January 2012 and was completed by October 2014 in three stages as follows:

- *Inception;*
- *Phase 1 – Preliminary Study; and*
- *Phase 2 – Feasibility Study.*

The purpose of this study was not to repeat or restate the research and analyses undertaken on the several key previous studies described below, but to make use of that information previously collected, to update and add to this information, and to undertake more focussed and detailed investigations and feasibility level analyses on the dam site options that have then been identified as being the most promising and cost beneficial.

Report numbers P WMA 12/T30/00/5212/2 to 20 describe the feasibility study processes undertaken to select a preferred dam site that would be developed to meet the development goals and social benefits described above.

The other sections of the study describe the process taken to develop an optimum selection of dam location, dam type, and spillway type, and the feasibility level design of the selected type of dam, at the Ntabelanga site that was selected in Phase 1, as described in the Preliminary Study Report No. P WMA 12/T30/00/5212/3.

It was confirmed and agreed in Phase 1 that the sizing and modus operandi of the Ntabelanga Dam and its associated works would take into account its multi-purpose role, namely:

i. to supply potable water to some 726 616 people and other water consumers in the region
ii. to supply raw water for irrigation of some 2 868 ha of high potential agricultural land
iii. to generate hydropower locally at the dam wall to reduce the environmental impact and cost of energy consumption when pumping water
iv. to provide sufficient flow of water downstream of the Ntabelanga Dam to meet environmental water requirements for an ecological Class C
v. to provide additional balancing storage volume and consistent downstream flow releases to enable a second, smaller dam at Lalini (just above the Tsitsa Falls) to generate significant hydropower for supply into the national grid

These multi-purpose usages and requirements for the Ntabelanga Dam are described in the Water Requirements Report No. P WMA 12/T30/00/5212/6, and the Irrigation Development Report No. P WMA 12/T30/00/5212/9.

The infrastructure to be developed is described in the Bulk Water Distribution Infrastructure Report No. P WMA 12/T30/00/5212/13, and the Dam Feasibility Design Report No. P WMA 12/T30/00/5212/12.

The reports listed above describe the development of solutions for these multi-purposes, and the resulting project infrastructure comprises the following:

- *A new dam on the Tsitsa River at Ntabelanga, with capacity to supply the raw and potable water requirements for i) and ii) above.*
- *A water treatment works at the Ntabelanga dam to supply the potable water requirements*
- *Primary, secondary and tertiary bulk water distribution systems the deliver potable water to the whole supply area*
- *A bulk raw water distribution system to supply irrigation water to some 2 868 ha of high potential land*
- *A mini hydropower plant at Ntabelanga Dam to generate up to 5MW of power*

The same scheme is also designed to work conjunctively with a second, larger, hydropower scheme at the Lalini Dam, which is located on the same river downstream of the Ntabelanga Dam, and which could produce up to 37.5 MW of power on a base load basis. This particular component of the conjunctive scheme has to date been studied only at high level, and it is planned to undertake a full feasibility study of this component shortly.

PURPOSE OF REPORT

This report documents existing institutional arrangements within the region that have an interest and/or role on the project. This includes institutions inter alia:

- *Department of Local Government and Traditional Affairs;*
- *Department of Mineral Resources;*
- *Department Water and Sanitation;*
- *Water Boards;*
- *Department of Agriculture and Environmental Affairs;*
- *Provincial Government;*
- *ESKOM;*
- *Local Agricultural Societies or Associations;*
- *Department of Agriculture Forestry and Fisheries;*
- *Chamber of Commerce and representatives from Industry;*
- *Local and District Authorities; and*
- *Tribal Authority for the project area.*

It is expected that the above organisations would be involved in the project implementation at various levels.

The development of a legal, administrative and financial model was investigated detailing potential responsibilities and ownership options. This was achieved through the assessment and development of the following aspects of the project during Phase 2 of the feasibility study:

- *Review legislative impacts on various dam options;*
- *Assess and advise on legal issues during the planning process with specific focus on:*
    - *Social impact,*
    - *HDI impact,*
    - *Land ownership and occupation, and*
    - *Environmental impact.*
- *Develop an implementation plan to ensure legislative compliance;*
- *Determine Capital and Operational Expenditure (CAPEX and OPEX) costs and develop a financial model*
- *Investigate alternative funding options for CAPEX;*
- *Project implementation cash flow analysis; and*
- *Develop institutional model and staffing organogram for operations phase.*

KEY FINDINGS

<u>Legislative Context</u>

The legislative context of the project is very important in the planning processes for this project, and needs to be the basis from which all recommendations on plans, construction, and operation are based.

Due to the multi-purpose nature of the project, it is important to consider the following broader issues:

- *water quality and quantity;*
- *water resources and services institutional considerations;*
- *environmental regulations;*
- *energy and more specifically hydropower;*
- *and land matters.*

The legal documents that need to be consulted are:

- *Constitution of South Africa (1996)*
- *National Water Act (NWA) (1998)*
- *Water Services Act (1997)*
- *National Water Resources Management Strategy (NWRMS) (2013)*
- *National Water Policy Review (NWPR) (2013)*
- *Draft Raw Water Pricing Strategy (2013)*
- *Infrastructure Bill (IB) (2013)*
- *NEMA*
- *National Heritage Resources Act (1999)*
- *National Forests Act (1998)*
- *National Environmental Management: Biodiversity Act (2004)*
- *Expropriation Act (2008)*
- *National Investment Bill (2014)*
- *Electricity Regulation Act, DME 2006 (as amended)*
- *National Energy Act, DME 2008*
- *Electricity Regulation Act: Electricity Regulations for Compulsory Norms and Standards for Reticulation Services (GN 773), DME 2008*
- *Electricity Regulations on the Integrated Resource Plan 2010-2030, DoE 2011*
- *Extension of Securities of Tenure Act (1997)*

The Mzimvubu Water Project is a Strategic Integrated Project (SIP) which is viewed as having "significant economic or social importance". As such, it is subject to the Infrastructure Development Bill B49 of 2013, which provides for special processes in order to ensure fast-tracked approvals. This Infrastructure Bill must be carefully read in conjunction with the other legislation to ascertain the impact it may have on the project.

The issue of land use reform, expropriation and compensation will need special attention, in particular regarding the change of approach from subsistence farming to commercial farming in the particular areas identified in this study. Both Department of Agriculture Forestry and Food (DAFF) and the Provincial Department of Rural Development and Agrarian Reform (DRDAR) will need to play key roles in this process.

Institutional Arrangements
The regulatory and management demands for multipurpose dams are more complex than single purpose projects due to the conflicts of interest amongst the individual users. Consequently, inter- and cross-sectoral co-ordination demands are high, and require strong institutional capacity (refer to http://agriwaterpedia.info).

Food, water and energy nexus considerations need to be on the agenda from the very start of the project. The success and sustainability of the recommended schemes are heavily reliant on the establishment of the most appropriate institutional arrangement for 1) the management and operation of the entire infrastructure, and 2) the management of the social and economic development directly and indirectly related to the project.

These relationships, however should not be developed only once the infrastructure is built, but should be cultivated, and where possible, formalised as soon as possible. It is vital that there is a strong group of champions driving decision making that carefully considers all the stakeholders from the start if this multipurpose dam is to be successful in the long term.

The overall scheme components design, construction and operation should be linked and be managed by a special purpose implementing agency such as the Trans Caledon Transfer Authority (TCTA) or a new Regional Water Utility (RWU), as this would have advantages from a risk management perspective. TCTA have undertaken this role very successfully on several large projects, including the Berg River Dam in Western Cape, and would be well qualified to undertake this role. They already have the experience and capabilities to source government grants, donor funding, and other project finance at very beneficial terms and conditions.

The primary and secondary bulk water distribution infrastructure should ideally be operated as a primary function of a water board, and in this case, Amatola Water would be the logical and capable candidates to undertake this role.

The tertiary bulk water supply reticulation currently falls under the function of Water Services Authorities (WSAs). Whilst this can continue, with those WSAs purchasing treated water in bulk from the operator of the primary and secondary system, consideration might be made to instigate a "wall-to-wall" Regional Water Utility that would include the current responsibilities of the WSAs.

It is recommended that the hydropower component be operated within the same ring-fenced conjunctive scheme as the potable and raw bulk water supply components, so that the financing, operation, maintenance and management, and cashflows can be integrated to maximize the economic and social benefits of this region.

This would require the appointment of a specialist service provider with the skills and capacity to manage, operate and maintain the hydropower plant and associated works. One option that could be considered would be to invite interest from suitable Independent Power Producer (IPP) investors to bring partial equity into the financing equation (i.e. a Private Public Partnership (PPP) arrangement), although this might not be attractive to such IPPs due to a limited internal rate of return.

Financing Arrangements

As is the case with most rural potable water supply schemes in Africa, which have high indigent populations with very low incomes, grant funding of the capital costs of the infrastructure is required. The revenue from water sales and from the equitable share usually only being sufficient to meet operation and maintenance costs, recurrent plant replacement costs, and energy costs (predominantly for pumping).

This is again the case for the potable water supply scheme supplied by the Ntabelanga Dam and water treatment works. At a 10% discount rate, the Unit Reference Value (URV) of potable water supplied to each settlement is R3.00/m^3, which, whilst not a direct indicator of required tariff charges) is still relatively high as an indicator when considering indigent customers.

It should be noted that, within this R3.00/m^3 URV, some R1.15/m^3, or 38%, is attributable to the cost of energy consumed by the scheme. Subsidization of this energy cost through the addition of a hydropower component would therefore bring down the URV of potable water supplied to the settlements to R1.85/m^3 which is far more viable and sustainable.

For the raw water supplied to the potential irrigation schemes near Tsolo, the same situation is found.

Even with full grant funding of the bulk raw water delivery system to edge of field, the unit cost of water supplied is some R0.83/m^3, and in real financial terms, the cost required to meet energy and operation and maintenance costs could be as high as R1.24/m^3.

A cost of between R0.25/m^3 to R0.40/m^3 for bulk raw water supplied is considered to be the maximum desirable/viable to generate sufficient gross margin prospects to encourage investment into the proposed irrigated agriculture farming units.

Of this cost, a significant portion is the energy cost required to lift the raw water from the source to the edge of fields. Again, subsidisation of this energy cost through the addition of a hydropower component could therefore bring down the cost of raw water supplied to the farming units to less than R0.40/m^{3}which is far more viable and sustainable.

Hydropower has much higher income prospects than water supply, and there are several financing options discussed for the additional hydropower infrastructure required.

Whilst the fully grant funded option obviously shows the highest cross-subsidization and grant redemption potential, mixed grant and loan options could also be viable. Funding models such as were used on the Berg River project should also be considered. Much will depend upon the credit rating of the SPV/implementing agency, and the selection of the institutional model will be key to obtaining such a high credit rating to obtain favourable loan terms and conditions.

The financing models undertaken in this study indicate that most of the infrastructure would need to be grant funded in order to deliver a sustainable project able to produce water at an affordable and economically viable tariff. For the Lalini dam and hydropower component, it is estimated that financing of the infrastructure through repayable loans over 20 years would not be viable if such loans were to constitute more than 25% of the total capital requirement.

There are significant differences between implementing only the Ntabelanga scheme an implementing the conjunctive Ntabelanga - Lalini scheme.

The fully grant-funded Ntabelanga only scheme would require a high starting base for the bulk potable water tariff in order to be financially sustainable. This being of the order of R6.00/m^3 before being further transferred and distributed through a new tertiary pipeline system that would need to be implemented by the DMs. This is not likely to be sustainable by the operator nor affordable to the consumer, and is therefore not considered a viable solution.

The conjunctive scheme would still require significant grant funding, as is normally the case on regional water supply systems – especially where constructed in mountainous rural areas with a high proportion of indigent households.

Grant funding of the full conjunction scheme including the Lalini hydropower component would allow low bulk water tariffs to be charged (say R3.00/m^3) as well as generating cash surpluses, which over the 30 year period of analysis could accumulate to over R9 billion even after the full cross-subsidisation of the energy costs of the conjunctive scheme. Such surpluses could be utilized to either repay the grant funding or be put into other social and economic development projects in the region.

If Amatola Water were to become the operator of the conjunctive scheme, this could radically improve their economies of scale which could also have the impact of reducing the overall average cost of bulk water to all of their other customers as well, which would widen the benefits to a larger area than just the Ntabelanga-Lalini region.

If it is considered necessary to reduce the amount of grant funding of the project through the sourcing of loans or equity investments, then there is also potential for this to happen at the same time as keeping the required bulk potable and irrigation water tariffs to a financially viable and sustainable level.

However, the financial burdens imposed upon the scheme due to the need to repay loans, interest, and or equity shareholders dividends, would absorb the potential surplus revenue that could otherwise be used to repay grants and/or to spend on further social upliftment and economic development programmes in this area.

RECOMMENDATIONS AND THE WAY FORWARD

A clear understanding by the implementing entity of current mandates and accordingly roles and responsibilities within the project will be fundamental. It will thus be important to avoid inter-posing structures or creating entities to undertake roles and responsibilities that are already supposed to be undertaken by existing entities. As a part of the sectoral co-ordination process, terms of reference will need to be provided to each entity or structure that will be involved in the implementation and operation of the scheme.

The role of the Presidential Infrastructure Co-ordinating Committee (PICC) and the impact of the Infrastructure Development Act will need to be taken into consideration, as this may provide for existing inter-governmental platforms being replaced with new approaches. It is assumed that the PICC will continue to co-ordinate the planning and management of the project, presumably through the Trans Caledon Tunnel Authority (TCTA), who have been mandated with this role under the Strategic Integrated Project (SIP3) programme.

The issue of land use reform, expropriation and compensation will need special attention, in particular regarding the change of approach from subsistence farming to commercial farming in the particular areas identified in this study. Both DAFF and the Provincial DRDAR will need to play key roles in this process.

It is suggested that a "Regional Co-ordination Unit" be tasked with co-ordination of sectoral roleplayers at a regional level. At present, the Eastern Cape Socio Economic Consultative Council (ECSECC) has been tasked to champion this project on behalf of the Integrated Wild Coast Development Forum. It is through this organization that such Provincial co-ordination might best be channeled during the project implementation notwithstanding recognition of the role that the TCTA is still playing as regards SIP3 co-ordination.

DWS itself must license water use to achieve the broader socio-economic objectives. It currently still has a large role to play in motivation and instigation of the sourcing of grant funding to implement the scheme components prior to any other SPV or similar body being appointed to manage this process.

In the medium to longer term, the overall scheme components design, construction and operation should be linked, and be managed by a special purpose vehicle/implementing agency such as the TCTA or a new Regional Water Utility (RWU), as this would have advantages from a risk management perspective. TCTA have undertaken this role very successfully on several large projects, including the Berg River Dam in Western Cape, and would be well qualified to undertake this role. They already have the experience and capabilities to source government grants, donor funding, and other project finance at very beneficial terms and conditions.

The primary and secondary bulk water distribution infrastructure should ideally be operated as a primary function of a water board, and in this case, Amatola Water would be the logical and capable candidate to undertake this role.

The tertiary bulk water supply reticulation currently falls under the function of WSAs. Whilst this can continue, with those Water Service Authorities (WSAs) purchasing treated water in bulk from the operator of the primary and secondary system, consideration might be made to instigate a "wall-to-wall" Regional Water Utility that would include the current responsibilities of the WSAs.

In addition to the provision of capital funding for the raw water bulk delivery scheme to the identified irrigation areas, emerging farmers must also be supported directly in the form of advice, training, and possibly financial assistance, where the Provincial Department of Rural Development and Agrarian Reform (DRDAR) will again need to play a key role

It is recommended that the hydropower component be operated within the same ring-fenced conjunctive scheme as the potable and raw bulk water supply components, so that the financing, operation, maintenance and management, and cashflows can be integrated to maximize the economic and social benefits of this region.

This would require the appointment of a specialist service provider with the skills and capacity to manage, operate and maintain the hydropower plant and associated works. One other option that could be considered would be to invite interest from suitable IPP investors to bring partial equity into the financing equation (i.e. a PPP arrangement), although this might not be attractive to such IPPs due to a limited internal rate of return.

The recommended institutional model and the proposed institutional roles, responsibilities and financial flow diagram in Figures 1 and 2 assume the overall management of the conjunctive scheme by a Special Purpose Vehicle (SPV) such as the TCTA, and shows the various organisations involved in the scheme, the flow of revenue from energy and bulk water sales, financing arrangements, and operational roles and responsibilities.

The PICC, Inter-Ministerial Committee (IMC) and three key departments (Department of Energy (DoE), DWS and DAFF) all play an important role in oversight and regulation - ensuring that the project is planned, constructed and managed to the standards required in national legislation, and that the project fulfils the agreed regional priorities for economic growth and social upliftment. Co-ordination and co-operation at this senior level is essential if the project is to be successful.

The SPV is central to the project, playing a hands-on oversight and co-ordination role, is responsible for contractual management of the service providers, and a regional co-ordination role with all the relevant stakeholders in the Eastern Cape.

Importantly, the SPV is also responsible for initiating and managing the financing of the project, and the repayment of any loans/grants as required. This critical planning aspect of the project will be a determining factor for the finalization of institutional and contractual arrangements. Due to the nature of the role that this SPV needs to play right from the initiation of project design, it is imperative that the appointment of such an organization to fulfil this role is done as a matter of urgency.

The financing and implementation of all the capital components of the conjunctive scheme (but not the tertiary systems, which would be the responsibility of the WSPs/DMs) would fall under the SPV.

Once the scheme has been implemented and commissioned, the operating costs of the SPV will be covered through the <u>net</u> income generated from the energy sold into the ESKOM grid. The TCTA is an already established organization that specializes in these functions and would be a clear front-runner in the choice of an SPV company.

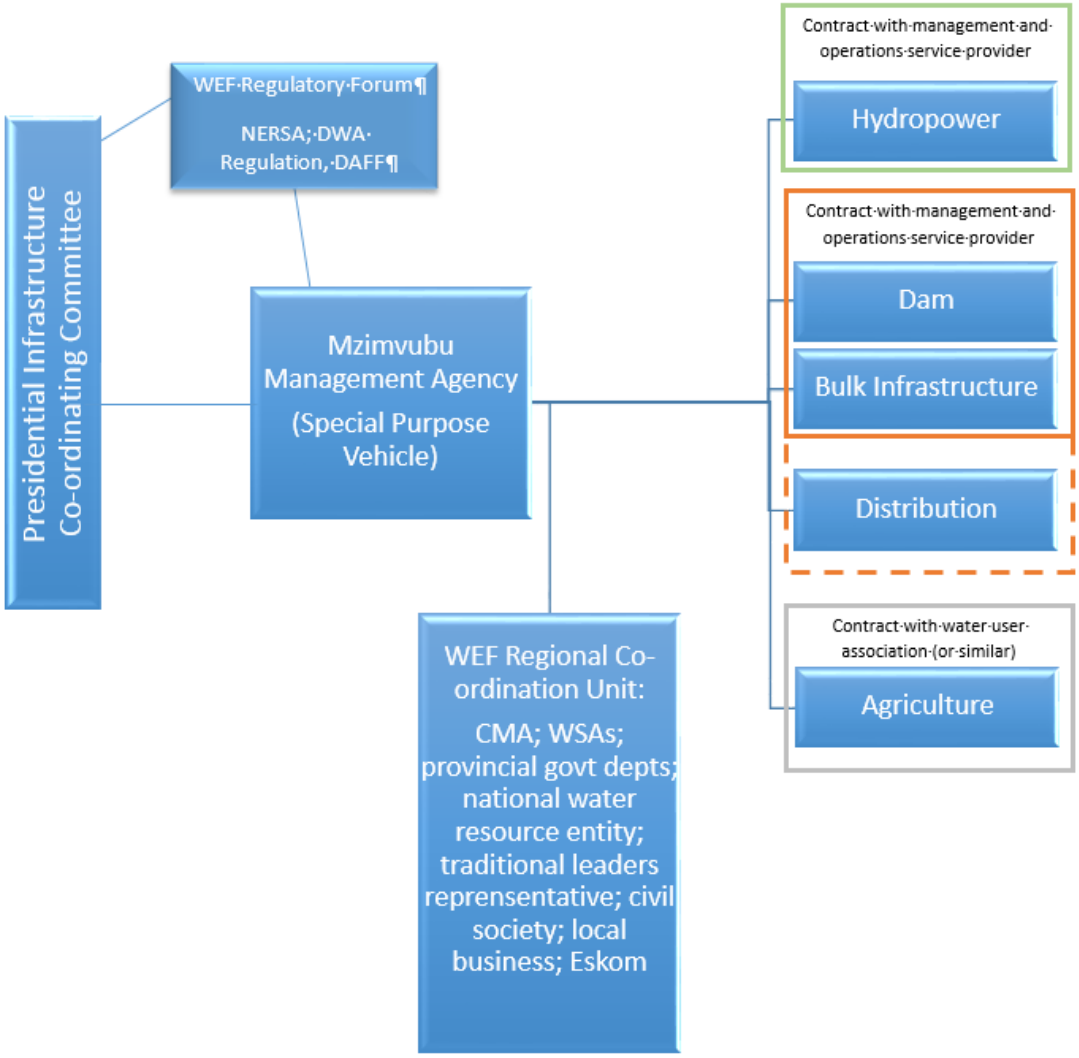
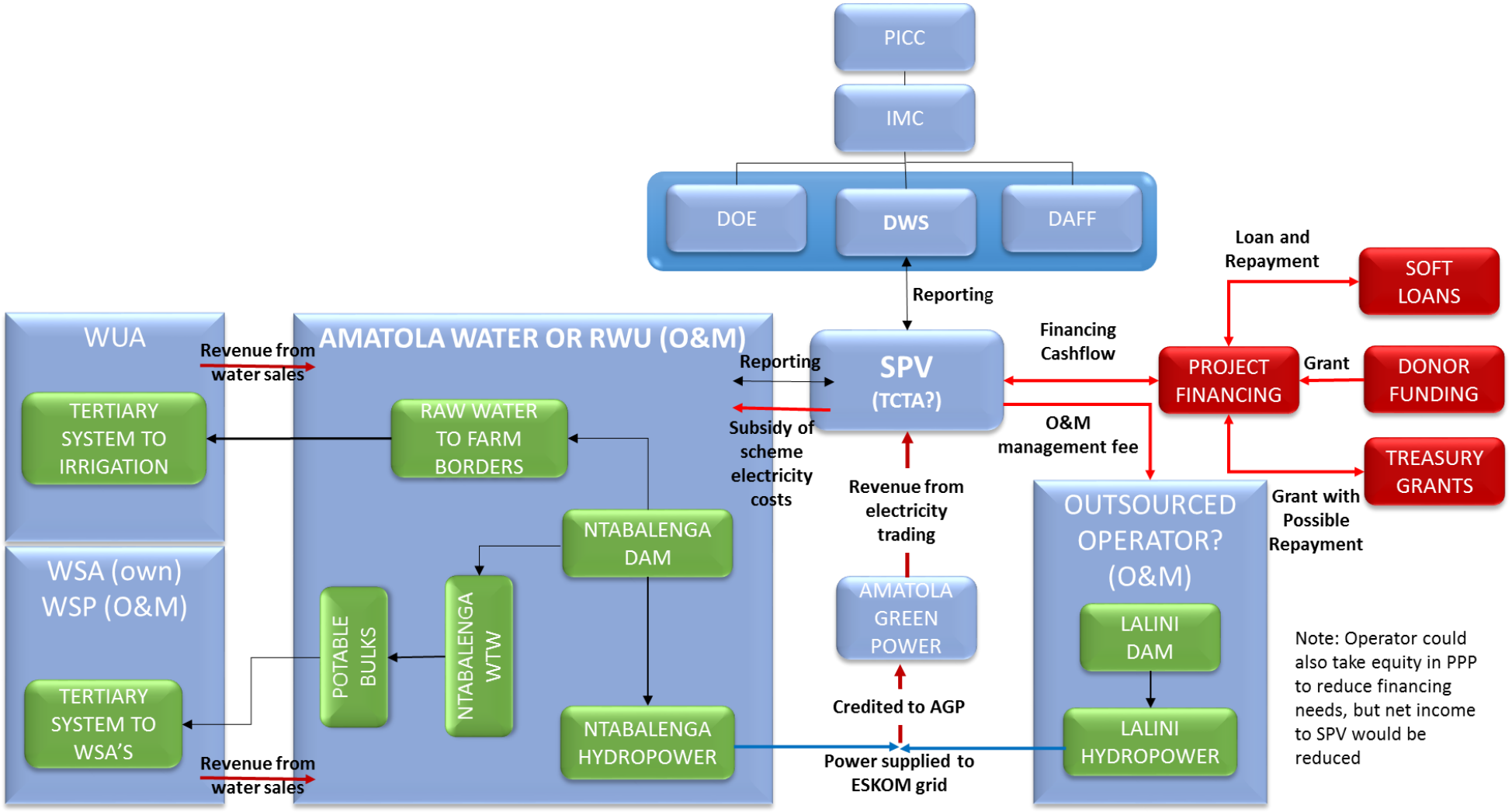


Figure 1: Recommended Institutional Model

It is proposed that Amatola Green Power (or other buyer of the energy) would purchase the power generated by the two hydropower schemes, and all the income from these sales will be paid to the SPV. ESKOM would invoice all energy costs for the entire project to the SPV (and not the water supply scheme operators).

Apart from its own operational costs, the SPV would also appoint an outsourced hydropower scheme operator to operate and maintain the Lalini hydropower scheme, which costs would also be borne by the SPV from its net surplus energy income.

The Lalini power production operator could be purely a contracted operation and maintenance service, in which case the capital funding would be funded entirely through the finance raised by the SPV. Alternatively, this finance could be partly provided by the operator via a PPP arrangement, although the financing models indicate that any repayable finance above 25% of capital cost would nullify the surplus revenue benefits accruing to cross-subsidize the overall conjunctive scheme. Thus, the difference will be that the PPP option would offer less opportunity to cross-subsidize the energy costs of the water supply scheme components, but this would on the other hand require less grant funding.



Note: Regional Water Utility (RWU) could eventually include tertiary systems to customers

Note: Hydropower operation could also be undertaken in-house by main scheme operator

Figure 2: Institutional Roles and Responsibilities and Financial Flow Diagram

The main purpose of the hydropower components of the scheme are therefore to generate sufficient surplus income to finance the SPV operation, to repay loans or even grant funding, and to subsidize the power cost for the production and delivery of bulk raw and potable water.

As is shown on the economic and financial modelling the degree of capital grant funding required will mostly depend upon the affordability cost of water supplied to irrigation and potable water users, and the financial sustainability that this brings to the water supply operator's business.

The Ntabelanga Dam and associated water supply schemes would be funded by the finance sourced through the SPV, but would need to be managed and operated by a regional water utility – at present a function fulfilled by Amatola Water. If they continued to be the operator, Amatola Water would need to cover its operation and maintenance costs through the revenue generated from water sales. Their overall costs of water provision would be significantly reduced due to the subsidized provision of electricity (possibly up to 100% subsidy).

The same operator would also be required to operate the Ntabelanga hydropower plant as well as the delivery of bulk raw water to the new farming units.

A Water User Association (WUA) would represent these new farmers, and they, and the WSAs/DMs would to pay the operator, e.g. Amatola Water, for the bulk water provided. These organisations will need to ensure that they collect sufficient revenue to cover these bulk water purchases as the operator will rely solely on this income to cover the cost of the operation and maintenance.

Thus the benefit from the surplus energy income will be passed down the value chain to these end users, as the water supply operator will have very low or no energy costs to incorporate into their bulk water charge, thus keeping the bulk water tariff significantly lower.

Cognisance must be taken that whilst the bulk potable water supply scheme would likely proceed with very high priority, and would be commissioned within a similar timescale to the other major scheme components, the same might not be the case for the irrigation scheme. In this latter case, a significantly sensitive and lengthy process will be required to deal with the land reform issues, and to identify and establish new emerging commercial farmers. This process could have many pitfalls along the way, and it is still a possibility that the irrigated agriculture component of the project would either not be realized at all, or would take much longer to come to the commissioning stage.

Should this happen, in addition to the lower job creation potential, the downside would be that the water supply operator would not receive the revenue from these bulk raw water supply sales. On the upside, the water supply operator would not incur the costs of operating and maintaining these particular components. On the upside would be further enhanced in that the significant finance required to construct the irrigation components would not be needed, and the energy demand of the raw water pumping would also be less, which would in turn increase the net revenue from energy sales to the SPV. This in turn would increase the amount of subsidy available to improve the sustainability of the potable water supply component and/or could also produce surplus income to repay loans and even grants.

Another matter to consider is that in order to receive the benefits and surplus revenue from the hydropower components, these should also be ready for commissioning as soon as possible so that the cross-subsidies thus produced are available as soon as possible. If not, then some other "bridging" arrangements might be required to fill this subsidization gap.

Local content of goods and services provided to implement and operate the conjunctive scheme should be maximized to prevent leakage of such economic and employment benefits to other parts of the country, or even abroad. This will maximize the intended upliftment benefits of the project on this region.

THE WAY FORWARD

Budgets for further engineering, facilitation and other studies have been allowed for in the cost estimates, but these activities will need to be urgently initiated, managed and implemented, in a co-ordinated manner. This will require the co-ordination, planning and management entity to delegate responsibility for this to a dedicated Project Implementation Unit, who themselves will need to co-ordinate with all of the other sectoral roleplayers.

Future activities that will need to be undertaken include, inter alia:

a) *Appointment of a DWS Project Manager to oversee the implementation;*
b) *Appointment of an Implementing Agent/SPV to co-ordinate, plan and manage the integrated scheme components;*
c) *Obtaining of Environmental Authorization;*
d) *Approval and implementation of the EMPR for the works to be constructed, and appointment of service providers to manage and monitor these processes;*
e) *Development and implementation of the Relocation Action Plan based upon the Relocation Policy Framework prepared during the EIA process;*
f) *Discussions with Amatola Green Power for the sale of power produced by the Ntabelanga and Lalini hydropower schemes;*
g) *Applications to ESKOM for power supplies to the works;*
h) *Application to DoE and ESKOM to establish a "wheeling" arrangement to sell power into the local grid;*
i) *Discussions and agreement with Amatola Water and the three affected DMs regarding future institutional arrangements for the ownership, funding, operation and management of the water supplies sourced from the Ntabelanga Dam;*
j) *Additional geotechnical investigations to inform the design of the Ntabelanga Dam, the Lalini Dam, the other associated capital works, and hydropower components;*
k) *Detailed design and tender documents of Ntabelanga Dam and appurtenant works;*
l) *Detailed design and tender documents of the Ntabelanga water treatment works, primary and secondary potable water distribution systems, and bulk raw water distribution system;*
m) *Detailed design and tender documents of other works;*
n) *Detailed design and tender documents of Lalini Dam and appurtenant hydropower works;*
o) *Appointment of a facilitation unit to manage the consultation and implementation process for land reform and irrigation development;*
p) *Further studies to investigate potential tourism and aquaculture spinoffs from the scheme;*
q) *Appointment of a facilitation unit to provide advice, training and financial assistance to new emerging farmers who would be investing in the new irrigated farm units ;*
r) *Procurement and appointment of contractors to construct the capital works – several different contracts; and*
s) *Procurement and appointment of Construction Administration and Supervision service providers – several different contracts.*

The above list covers the currently envisaged main activities, and others may arise as the implementation process proceeds.

The complexities surrounding the set up and management of a multi-purpose scheme should not be under estimated. Lessons from previous projects across Africa should be taken to heart, and robust, yet flexible legal, institutional and financial arrangements need to be put in place to maximise the resilience and sustainability of the project into the future.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASGISA-EC	Accelerated and Shared Growth Initiative for South Africa – Eastern Cape
CAPEX	Capital Expenditure
CFRD	Concrete-faced rockfill dam
CMA	Catchment Management Agency
CTC	Cost to Company
CV	Coefficient of Variability
DAFF	Department of Agriculture, Forestry and Fisheries
DBSA	Development Bank of Southern Africa
DEA	Department of Environment Affairs
DM	District Municipality
DME	Department of Minerals and Energy
DoE	Department of Energy
DRDAR	Department of Rural Development and Agrarian Reform
DRDLR	Department of Rural Development and Land Reform
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Eastern Cape
ECRD	Earth core rockfill dam
EF	Earthfill (dam)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPWP	Expanded Public Works Programme
ESIA	Environmental and Social Impact Assessment
EWR	Environmental Water Requirements
FSL	Full Supply Level
GERCC	Grout enriched RCC
GN	Government Notices
GW	Gigawatt
GWh/a	Gigawatt hour per annum
IAPs	Invasive Alien Plants
IB	Irrigation Board
IFC	International Finance Corporation
IPP	Independent Power Producer
IRR	Internal Rate of Return
IVRCC	Internally vibrated RCC
ISO	International Standards Organisation
kW	Kilowatt
LM	Local Municipality
ℓ/s	Litres per second
ℓ/c/d	Litres per capita per day

MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MEC	Member of the Executive Council
MIG	Municipal Infrastructure Grant
million m^3	Million cubic metres
MW	Megawatt
NEMA	National Environmental Management Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NOCL	Non-overspill crest level
NWA	National Water Act
NWPR	National Water Policy Review
NWRMS	National Water Resources Management Strategy
O&M	Operations and Maintenance
OPEX	Operational Expenditure
PICC	Presidential Infrastructure Co-Ordinating Committee
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSC	Project Steering Committee
PSP	Professional Services Provider
RBIG	Regional Bulk Infrastructure Grant
RCC	Roller-compacted concrete
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RWI	Regional Water Institution
RWU	Regional Water Utilities
SAWS	South African Weather Service
SEZ	Special Economic Zone
SIP	Strategic Integrated Project
SMC	Study Management Committee
SPV	Special Purpose Vehicle
TCTA	Trans Caledon Tunnel Authority
ToR	Terms of Reference
UOS	Use of System
URV	Unit Reference Value
WEF	Water Energy Food
WRYM	Water Resources Yield Model
WSA	Water Services Authority
WSP	Water Services Provider
WTE	Water Trade Entity
WUA	Water User Association

LIST OF UNITS

Description	Standard unit
Elevation	m a.s.l.
Height	m
Distance	m, km
Dimension	mm, m
Area	m^2 , ha or km^2
Volume (storage)	m^3
Yield, Mean Annual Runoff	m^3/a
Rotational speed	rpm
Head of Water	m
Pressure	Pa
Diameter	mm or m
Temperature	^oC

Description	Standard unit
Velocity, speed	m/s, km/hr
Discharge	m^3/s
Mass	kg, tonne
Force, weight	N
Gradient (V:H)	%
Slope (H:V) or (V:H)	1:5 (H:V) or 5:1 (V:H)
Volt	V
Power	W
Energy used	kWh
Acceleration	m/s^2
Density	kg/m^3
Frequency	Hz

1. BACKGROUND AND INTRODUCTION

The Mzimvubu River catchment in the Eastern Cape Province of South Africa is situated in one of the poorest and least developed regions of the country. Development of the area to accelerate the social and economic upliftment of the people was therefore identified as one of the priority initiatives of the Eastern Cape Provincial Government.

Harnessing the water resources of the Mzimvubu River, the only major river in the country which is still largely unutilised, is considered by the Eastern Cape Provincial Government as offering one of the best opportunities in the Province to achieve such development. In 2007, a special-purpose vehicle (SPV) called ASGISA-Eastem Cape (Pty) Ltd (ASGISA-EC) was formed in terms of the Companies Act to initiate planning and to facilitate and drive the Mzimvubu River Water Resources Development.

The five pillars on which the Eastern Cape Provincial Government and ASGISA-EC proposed to model the Mzimvubu River Water Resources Development are:

- Forestry;
- Irrigation;
- Hydropower;
- Water transfer; and
- Tourism.

The Department of Water and Sanitation (DWS) commissioned the Mzimvubu Water Project with the overarching aim of developing water resources schemes (dams) that can be multi-purpose reservoirs in order to provide benefits to the surrounding communities and to provide a stimulus for the regional economy, in terms of irrigation, forestry, domestic water supply and the potential for hydropower generation amongst others.

1.1 Study Locality

The Mzimvubu River Catchment is situated in the Eastern Cape (EC) Province of South Africa which consists of six District Municipalities (DM) and two Metropolitan Municipalities (Buffalo City and Nelson Mandela Bay). These include Cacadu DM in the west across to the Alfred Nzo DM in the east with the two Metropolitan Areas being located around the two major centres of the province, East London and Port Elizabeth, both of which border the Indian Ocean.

The Mzimvubu River Catchment is situated within three of the DM's namely the Joe Gqabi DM in the north west, the OR Tambo DM in the south and the Alfred Nzo DM in the east and north east. A locality map of the whole catchment area and its position in relation to the DM's in the area is provided in Figure 1-1.

1.2 Study Programme

The study commenced in January 2012 and was completed in October 2014 in three stages as follows:

- Inception ;
- Phase 1 – Preliminary Study; and
- Phase 2 – Feasibility Study.

The purpose of the study is not to repeat or restate the research and analyses undertaken on the several key previous studies described below, but to make use of that information previously collected, to update and add to this information, and to undertake more focussed and detailed investigations and feasibility level analyses for the dam site options identified as being the most promising and cost beneficial.

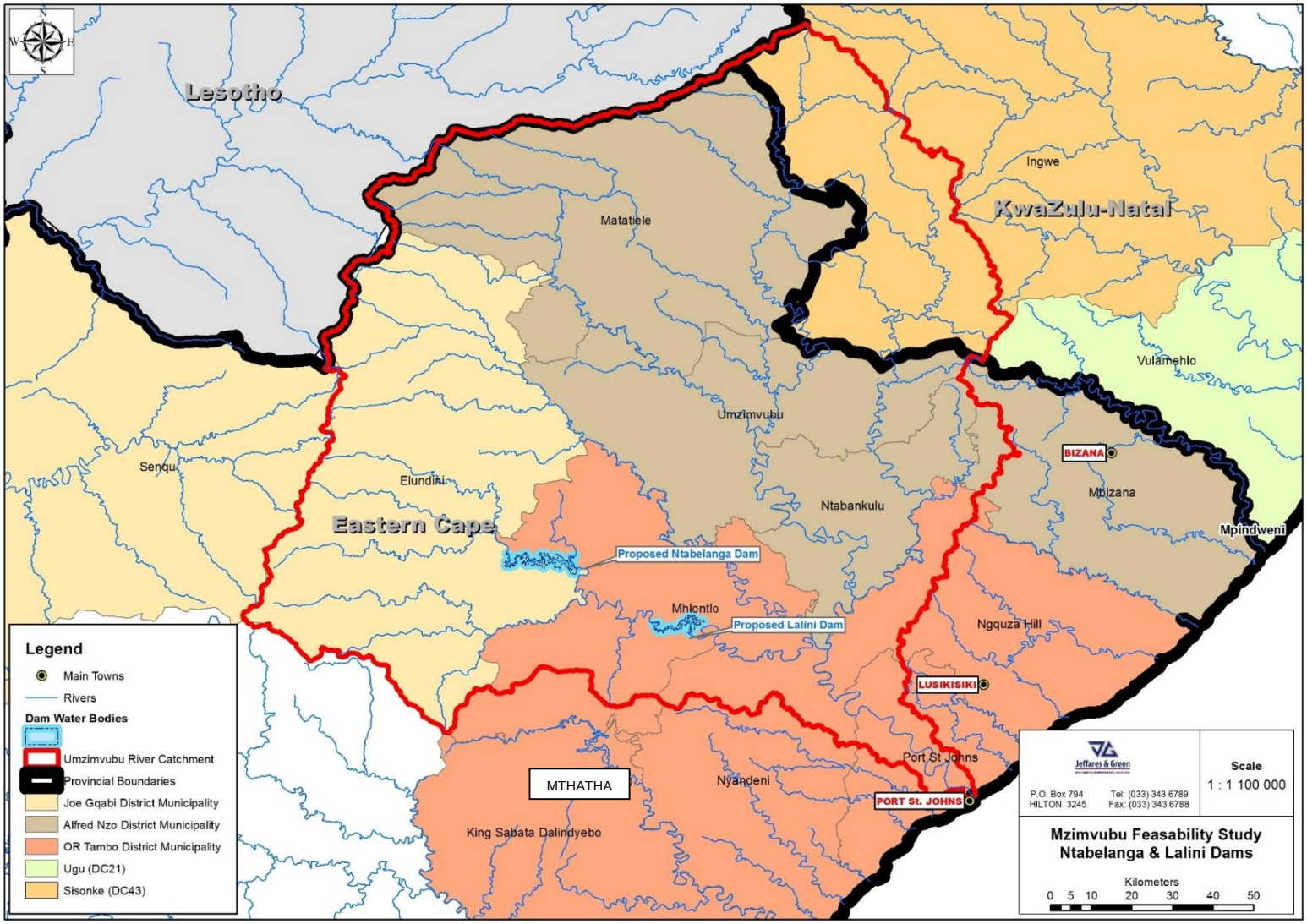


Figure 1-1: Mzimvubu River Catchment Area

1.2.1 Inception Phase

The aim of the Inception Phase was to finalise the Terms of Reference (TOR) as well as to include, *inter alia,* the following:

- A detailed review of all the data and information sources available for the assignment.
- A revised study methodology and scope of work.
- A detailed review of the proposed project schedule, work plan and work breakdown structure indicating major milestones.
- Provision of an updated organogram and human resources schedule.
- Provision of an updated project budget and monthly cash flow projections.

The Inception Phase has been completed and culminated in the production of an Inception Report (DWS Report Number P WMA 12/T30/00/5212/1) which also constitutes the final TOR for the study.

1.2.2 Preliminary Study Phase

This Preliminary Report describes the activities undertaken during the preliminary study phase, summarizes the findings and conclusions, and provides recommendations for the way forward and scope of work to be undertaken during the Feasibility Study phase.

The Preliminary Study Phase was divided into two Stages:

1. Desktop Study
2. Preliminary Study

The aim of the Desktop Study was, through a process of desktop review, analyses of existing reports and data, and screening, to determine the three best development options from the pre-identified 19 development options (from the previous investigation). This process is described in Section 2 of this Report.

The aim of the Preliminary Study was to gather more information with regard to the three selected development options as well as to involve the Eastern Cape Provincial Government and key stakeholders in the process of selecting the single best development option to be taken forward into Phase 2 of the Study.

The main activities undertaken during of the second stage of Phase 1 were as follows:

- Stakeholder involvement;
- Environmental screening;
- Water requirements (including domestic water supply, irrigation and hydropower);
- Hydrological investigations;
- Geotechnical investigations;
- Topographical survey investigations;
- Selection process; and
- Reporting.

1.2.3 Phase 2 – Feasibility Study

The Preliminary Study recommended a preferred dam site and scheme development to be taken forward to Feasibility Study level.

The key activities undertaken during the Feasibility Study are as follows:

- Detailed hydrology (over and above that undertaken during the Preliminary Study);
- Reserve determination;
- Water requirements investigation (including agricultural and domestic water supply investigations);
- Topographical survey (over and above that undertaken during the Preliminary Study);
- Geotechnical investigation (more detailed investigations than during the Preliminary Study);
- Dam design;
- Land matters;
- Public participation;
- Regional economics; and
- Legal, institutional and financial arrangements.

An Environmental Impact Assessment was undertaken by and independent PSP in a separate study that ran in parallel to this one.

1.2.4 Scheme Components

Following the completion of the above feasibility study stages it was agreed that the sizing and modus operandi of the Ntabelanga Dam and its associated works would take into account its multi-purpose role, namely:

i) to supply potable water to some 726 616 people and other water consumers in the region;
ii) to supply raw water for irrigation of some 2 868 ha of high potential agricultural land;
iii) to generate hydropower locally at the dam wall to reduce the cost of energy consumption when pumping water;
iv) to provide sufficient flow of water downstream of the Ntabelanga Dam to meet environmental water requirements for an ecological Class C; and
v) to provide additional balancing storage volume and consistent downstream flow releases to enable a second, smaller dam at Lalini (located on the Tsitsa River some 3.5 km above the Tsitsa Falls) to generate significant hydropower for supply into the national grid.

These multi-purpose usages and requirements for the Ntabelanga Dam are described in the Water Requirements Report No. P WMA 12/T30/00/5212/6, and the Irrigation Development Report No. P WMA 12/T30/00/5212/9.

The infrastructure to be developed is described in the Bulk Water Distribution Infrastructure Report No. P WMA 12/T30/00/5212/13, and the Dam Feasibility Design Report No. P WMA 12/T30/00/5212/12.

The reports listed above describe the development of solutions for these multi-purposes, and the resulting project infrastructure, which comprises the following:

- A new dam on the Tsitsa River at Ntabelanga, with capacity to reliably supply the raw and potable water requirements for i) and ii) above;
- A water treatment works at the Ntabelanga dam to supply the potable water requirements;

- Primary and secondary bulk water distribution systems the deliver potable water to the whole supply area. Tertiary distribution systems to the consumers will be implemented by the District Municipalities;
- A bulk raw water distribution system to supply irrigation water to some 2 868 ha of high potential land; and
- A mini hydropower plant at Ntabelanga Dam to generate up to 5 MW of power.

The same scheme is also expected to work conjunctively with a second hydropower scheme at the Lalini Dam, which is located on the same river and downstream of the Ntabelanga Dam, and which could produce an average of 23 MW of power on a continuous basis. This particular component of the conjunctive scheme has to date been studied only at high level, and it is planned to undertake a full feasibility study of this component shortly. The relative locations of Ntabelanga Dam and Lalini Dam are shown on the above Figure 1-1 and Figure 1-2.

Figures 1-3 and 1-4 show the layouts of the potable and irrigation water bulk distribution systems.

1.3 Purpose of this Report

This report documents existing institutional arrangements within the region that have an interest and/or role on the project. It is anticipated that this will include institutions inter alia:

- Department of Local Government and Traditional Affairs;
- Department of Minerals and Energy;
- Department Water and Sanitation;
- Water Boards;
- Department of Agriculture and Environmental Affairs;
- Provincial Government;
- ESKOM;
- Local Agricultural Societies or Associations;
- Department of Agriculture Forestry and Fisheries;
- Chamber of Commerce and representatives from Industry;
- Local and District Authorities; and
- Tribal Authority for the project area.

It is anticipated that the above organisations will be involved in the project implementation at various levels, and co-ordination will be required between these organisations during the implementation phase of the scheme.

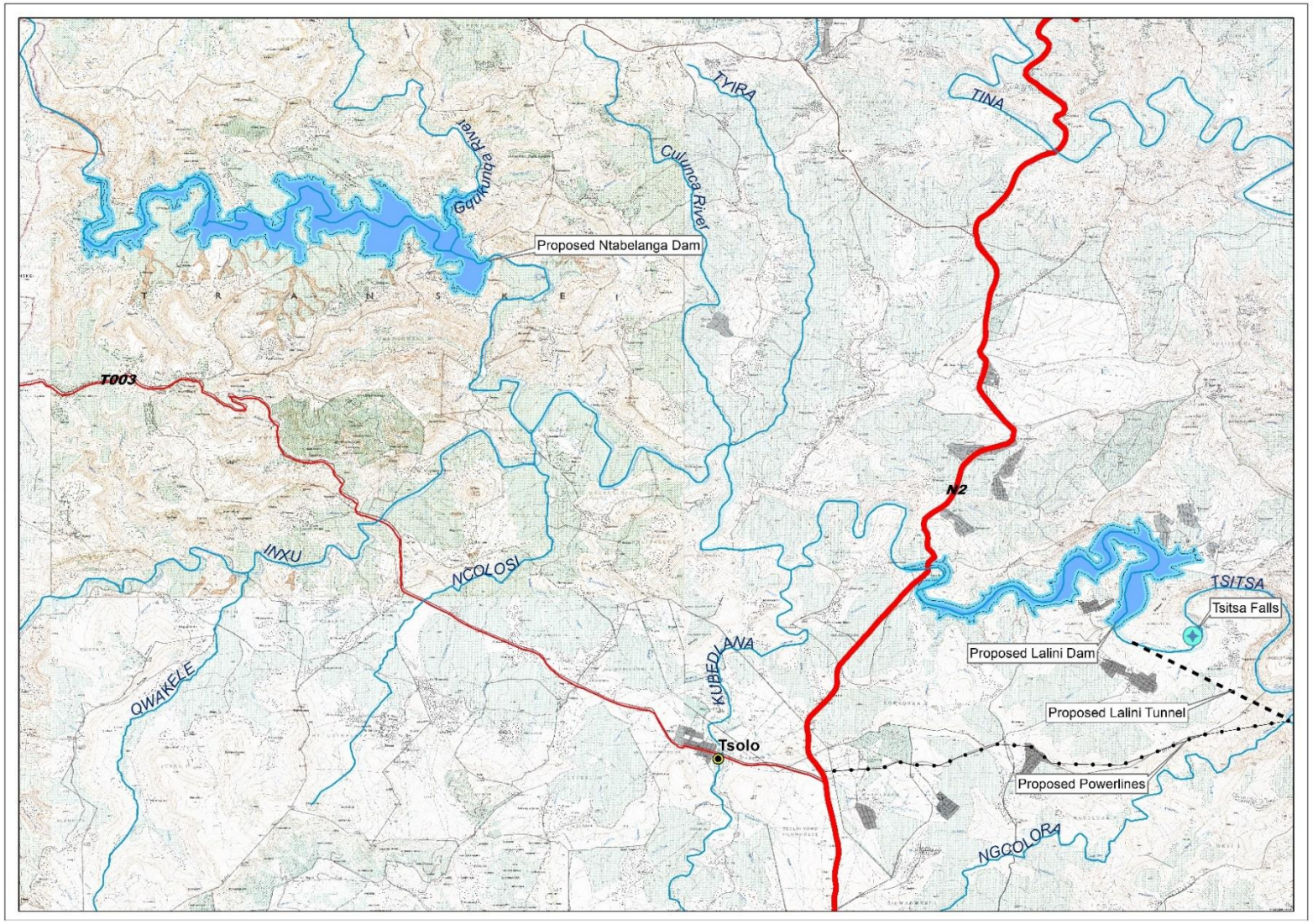


Figure 1-2: Relative Locations of Ntabelanga and Lalini Dams

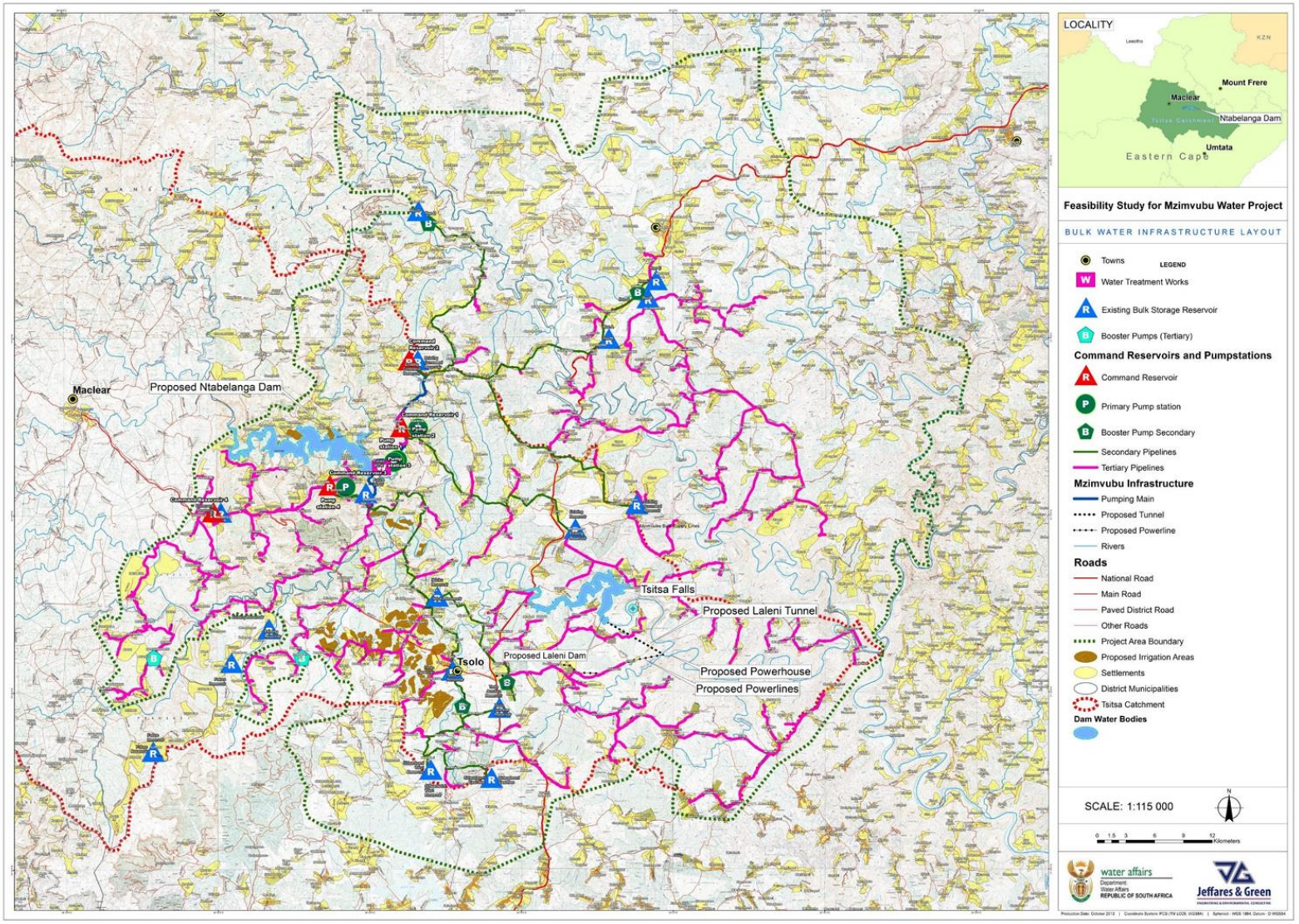


Figure 1-3: Layout of Proposed Primary, Secondary and Tertiary Bulk Water Distribution System

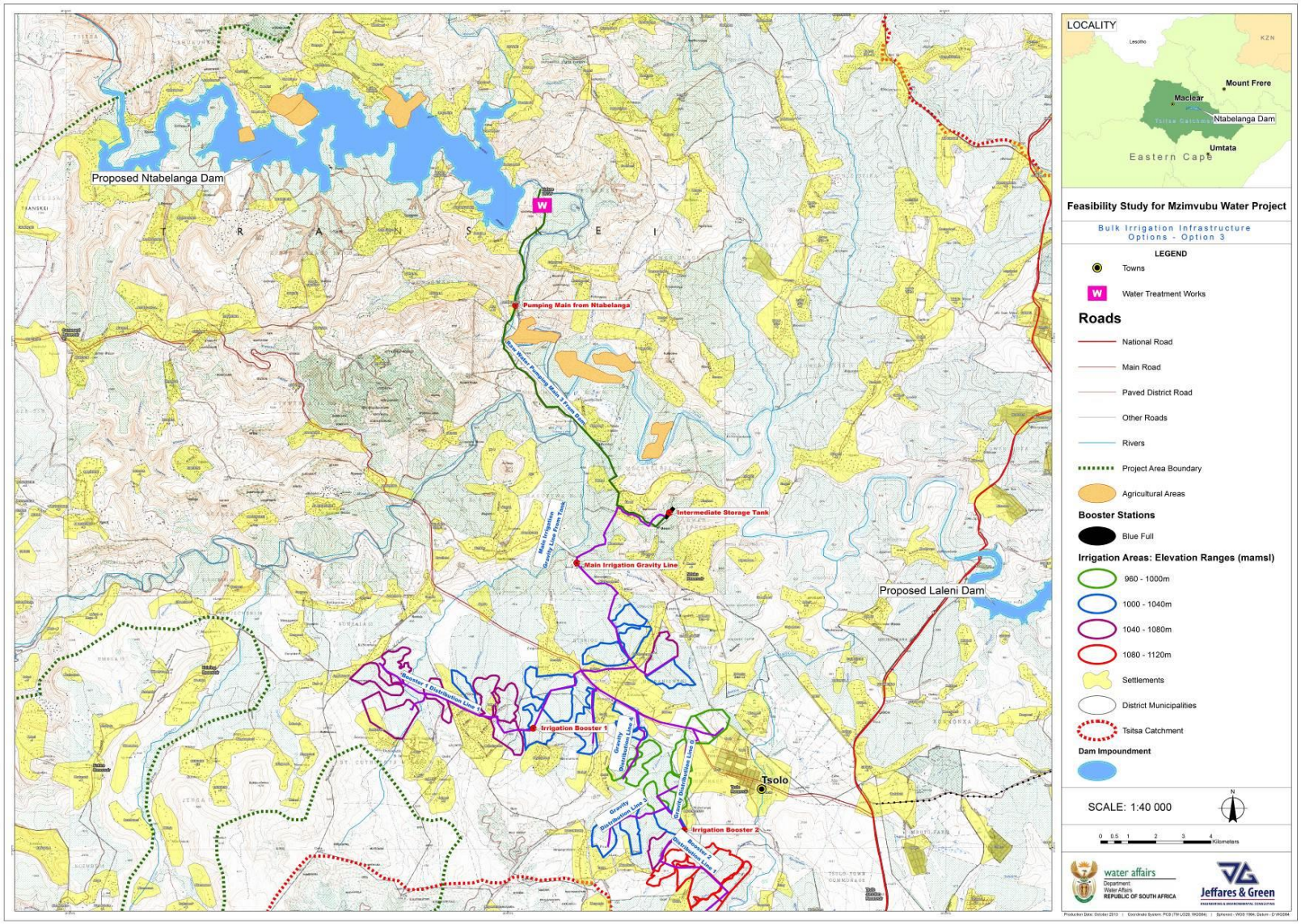


Figure 1-4: Layout Plan of Proposed Irrigation System

The study team has undertaken the investigation of legal, administrative and financial models detailing responsibilities and ownership models of the infrastructure through the assessment and development of the following aspects of the project during the development of Phase 2 of the feasibility study:

- Review legislative impacts on various dam options;
- Assess and advise on legal issues during the planning process with specific focus on:
    - Social impact
    - HDI impact
    - Land ownership and occupation
    - Environmental impact
- Develop an implementation plan to ensure legislative compliance;
- Determine Capital and Operational Expenditure (CAPEX and OPEX) costs and develop a financial model
- Investigate alternative funding options for CAPEX;
- Project implementation cash flow analysis; and
- Develop institutional model and staffing organogram for operations phase.

2. LEGISLATIVE CONTEXT

The Mzimvubu Water Project is a large, and complex project, and as such is subject to various pieces of legislation. In order to understand this legislative framework, the feasibility study looks at the applicable Acts, Regulations, Strategies etc. for the water, agricultural, environmental and energy-related elements of the project. Specific focus is on the project planning processes, and the institutional arrangements for the operational phase.

2.1 Water Quality and Quantity

The key pieces of legislation relating to the water use, and water management are the National Water Act (1998) (NWA) and the Water Services Act (WSA) (1997).

2.1.1 Water Resource Protection

Section 12-18 of the NWA focuses on protection of the water resources. As part of the Feasibility Study, a preliminary determination of the class of the water resource, and a preliminary determination of the reserve have been undertaken. The results of these determinations must be taken into account in all planning, construction and management until such a time as these are superseded by a Gazetted classification and/or reserve determination.

The Reserve Determination Report No P WMA 12/T30/00/5212/7 presents the riverine investigations that were undertaken to determine the ecological requirements at an intermediate level for the Tsitsa River below the Ntabelanga Dam, and at a desk top level for the Tsitsa River below the Lalini Dam and the Tsitsa falls.

These studies produced the following recommendations for the Ecological Water Requirements (EWR) below each dam:

- Ntabelanga Dam EWR – Intermediate Ecological Class C of 87.249 million m^3. This is equivalent to some 21% of the Mean Annual Runoff (MAR) at that location.
- Lalini Dam EWR – Desktop Ecological Class B of 298.837 million m^3. This is equivalent to some 37% of the Mean Annual Runoff (MAR) at the Lalini Dam location.

Estuarine studies were also carried out at the mouth of the Mzimvubu river, which indicated no significant adverse effects produced by the above dams.

2.1.2 Pollution and Emergency Incidents

The planning and implementation processes during the project needs to take into consideration Sections 19 and 20 of the NWA to ensure that prevention, mitigation, and response protocols are in place to protect the water resource.

2.1.3 Water Use Authorisation

Sections 21-55 of the NWA detail all the requirements related to water use authorisations. The activities/infrastructure directly and indirectly related to the Mzimvubu Water project are extensive, and most of the activities listed in Section 21 are applicable, and require a water use authorisation. Authorisation needs to be obtained early on in the planning process, as some of the activities relate to uses during construction. A monitoring and evaluation system must be put in place as part of project management to ensure that the authorisation requirements are not contravened. This process is illustrated in Figure 2-1.

The Department of Water and Sanitation (DWS's) (or Catchment Management Agencies (CMAs)) role as licensing authority is going to be key to achieve the desired outcomes of the broader development objective. If DWS can get the licensing aspect right – and monitors and regulates how water is used and by who, this will create a firm foundation from the project outset. Licensing is an administrative action and accordingly complex – but at least this is "new" water with "new users" and we are not trying to reallocate water from an already over-allocated resource.

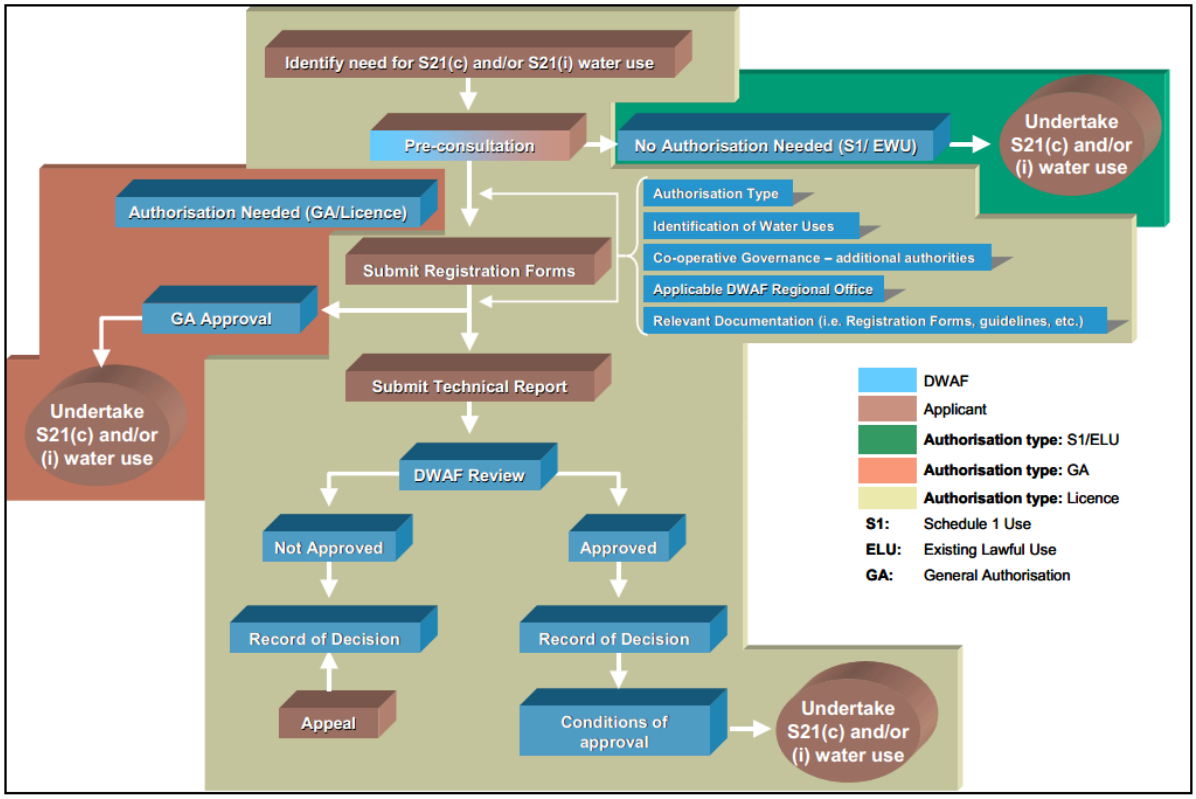


Figure 2-1: Water Use Authorisation Process (DWAF, 2007)

2.2 Water Resources and Services Institutional Considerations

2.2.1 The Current National Water Institutional Arrangements in South Africa

The current arrangements are shown below in Figure 2-2.

a) Department of Water and Sanitation (DWS)

DWS is the custodian of water resources in the country. It responsible for water sector policy, support and regulation.

The National Water Act (1998) makes provision for cost recovery on services rendered by DWS to water users. It is against this background that the Department created the Water Trading Entity (WTE) within its administration. It has been operating as an integral part of the Department with very limited segregation of functions from the Department's Main Exchequer Account. The accountability for its functioning is vested in the Director-General of the DWS who acts as its accounting officer.

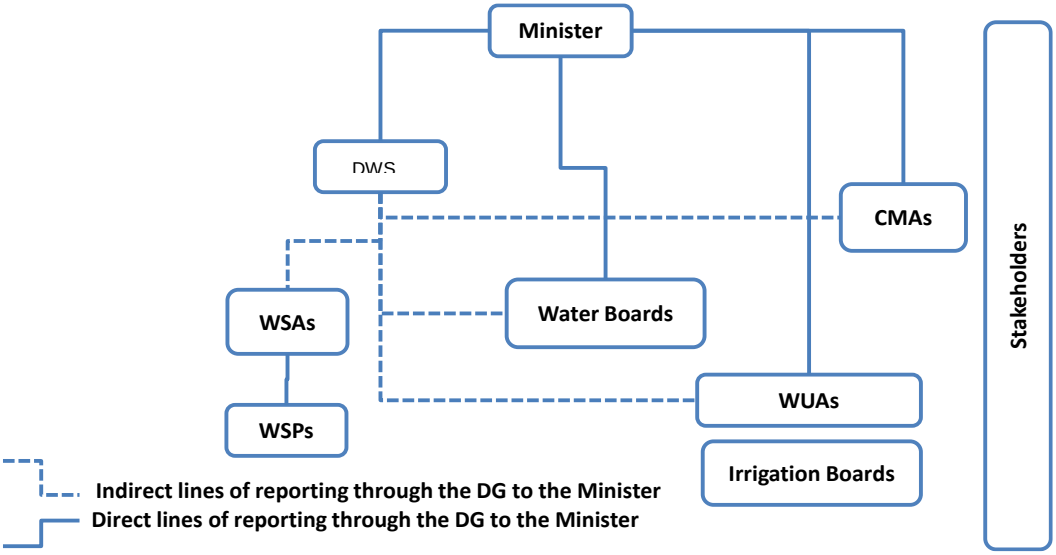


Figure 2-2: Current water institutional arrangements in South Africa

The funding of its activities comes from the Department's equitable share as a transfer and through revenue collection from the various water schemes operated throughout the country. Its main functions relate to the development, operation and maintenance of specific water resources infrastructure and managing water resources in specific water management areas, more specifically:

- the design, project management, funding, construction and commissioning of water resources infrastructure;
- asset management of the facilities associated with water resources infrastructure;
- maintenance and operations of infrastructure; Rehabilitation and Refurbishment of water resources infrastructure; and
- ensure the safety, security, and protection of water resources infrastructure, including the management of releases for ecology integrity.

(http://www.dwaf.gov.za/NWRI/Default.aspx)

b) Trans Caledon Tunnel Authority (TCTA)

The TCTA finances and project manages the implementation of economically viable water projects. The projects are financed off-budget and capital investment costs are repaid through water user charges.

c) Water Boards

Water Boards are state-owned regional water services providers who may provide both bulk services to more than one WSA area (regulated directly by DWS) and retail services on behalf of WSAs (regulated by contract with the WSA). The Minister of Water and Sanitation is the primary regulator of a Water Board.

d) Catchment Management Agency (CMA)

CMAs undertake water resource management at a regional or catchment level and involve local communities, within the framework of the national water resource strategy. Regulation of CMAs is the responsibility of the Minister of Water and Sanitation.

e) Water User Associations (WUA)

WUAs operate at a restricted localised level, and are in effect co-operative associations of individual water users who wish to undertake water related activities for their mutual benefit. A water user association may exercise management powers and duties only if and to the extent these have been assigned or delegated to it. Regulation of WUAs is the responsibility of the Minister of Water and Sanitation.

f) Irrigation Boards

Irrigation boards were established in terms of law in force before the commencement of the NWA. The Act mandates that a board may continue to exist until it is declared to be a water user association or until it is disestablished in terms of the law by or under which it was established. The NWA contends that Irrigation Boards must submit a proposal to transform to a WUA, within 6 months of commencement of the NWA.

g) Water Services Authorities (WSA)

WSAs can be a metropolitan municipality, an authorised district municipality or an authorised local municipality which is responsible for ensuring provision of water services within their area of jurisdiction. Regulation of a WSA is the responsibility of Department of Cooperative Government and Traditional Affairs.

h) Water Services Provider (WSP)

A WSA is a WSA or any person who has a contract with a WSA or another water services provider to sell water to, and/or accept wastewater for the purposes of treatment from, that authority or provider (bulk water services provider); and/or has a contract with a WSA to assume operational responsibility for providing water services to one or more consumers (end users) within a specific geographic area (retail water services provider). Management of a WSP is through a contract with a WSA.

2.2.2 Changes proposed in the National Water Resources Management Strategy (NWRMS) (June 2013) and the National Water Policy Review (NWPR) (30 August 2013)

It is important to consider the changing institutional arrangements in the South African water sector when recommending the way forward for the Mzimvubu Water Project. The figure below shows the envisaged institutional roles throughout the water value chain.

a) Establishment of a National Water Resources Infrastructure Entity

It is intended that the Infrastructure Branch of the DWS, and the related responsibilities falling under the Water Trading Entity, together with hydrometry, HR, IT, and some monitoring elements will be migrated to a National Water Resources Infrastructure Entity that will operate according to business principles. The role will be to own, finance, develop, operate, and maintain national infrastructure. Regional Water Utilities (RWU), or other competent bodies can be contracted to operate and maintain infrastructure, but ownership will remain with the National Entity. Operations of this entity will be funded through water use charges (via the CMAs), and will be enabled to raise funds commercially for investment into infrastructure (DWA NWRMS2, 2013).

b) Establishment of Regional Water Utilities (RWUs)

The Minister is responsible for the effective development and management of regional bulk infrastructure. The Department of Water and Sanitation has proposed the establishment of (RWUs). The purpose of these institutions will be to plan, build, operate, support and maintain regional bulk infrastructure. It is envisioned that RWUs can fill the current gap where WSAs have no or limited capacity for managing and developing regional bulk infrastructure. According to the Strategic Framework for Water Services (2003), water boards are able to operate at a regional level as a bulk water services provider. The role and structure of water boards may change over time with the development of RWUs (DWA NWPR, 2013).

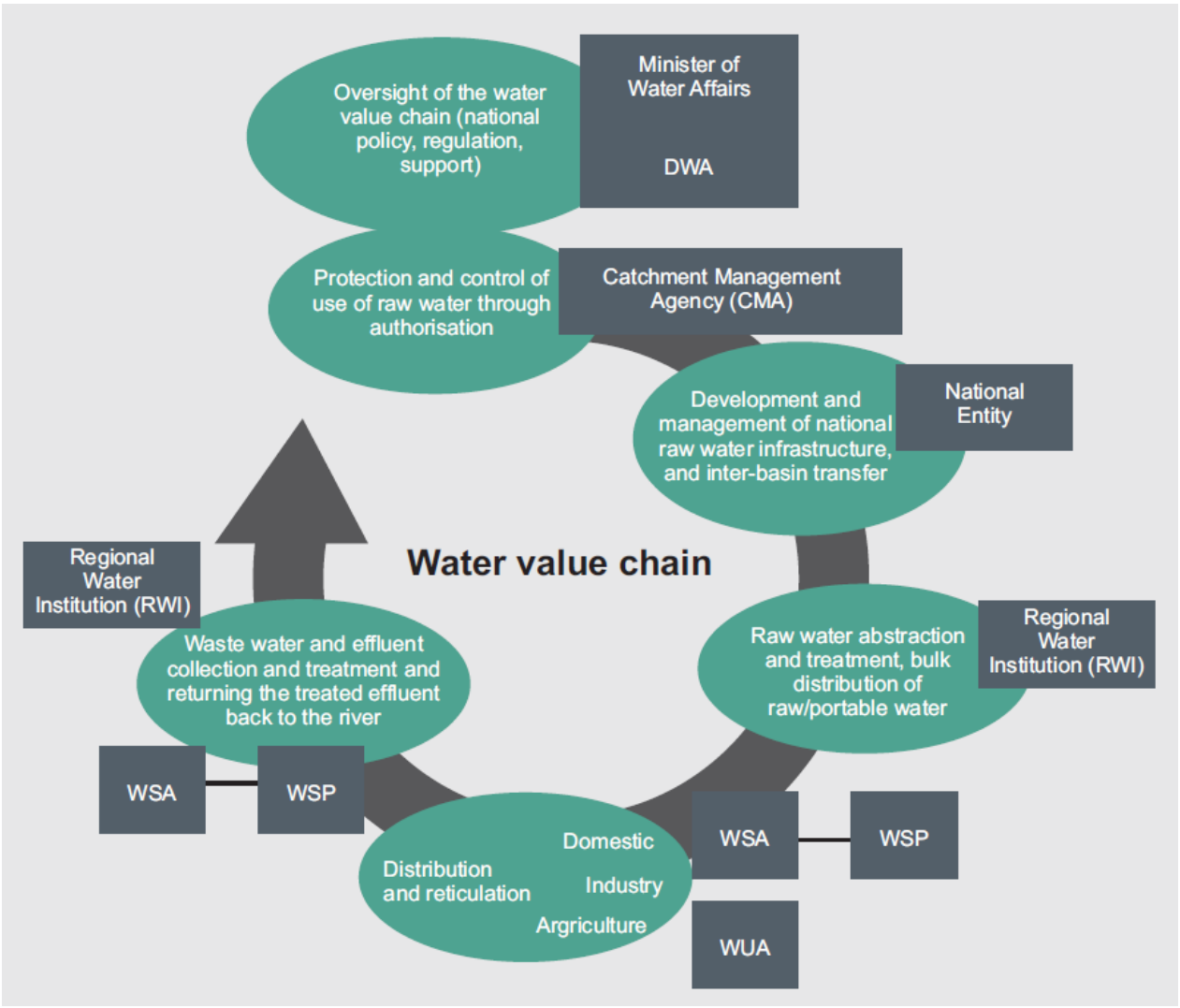


Figure 2-3: Institutional roles though the value chain (DWA NWRMS2, 2013, pg 62)

c) Dis-establishment of Water User Associations (WUAs) and Irrigation Boards (IBs)

The transformation of Irrigation Boards to WUAs has been slow, with 129 that have still not transitioned since 1997. Transformed WUAs have also not sufficiently achieved participation of other users such as municipalities. In addition, the DWS is finding it challenging to provide oversight to a large number of WUAs.

As a result of these, and other reasons, the DWS has decided that as CMAs are established in WMA, the WUAs and IBs will be disestablished and functions will be delegated to CMAs and RWUs (DWA NWPR, 2013).

2.3 Environmental Regulations

2.3.1 National Environmental Management Act (NEMA)

In April 2006 the Minister of Environmental Affairs and Tourism passed environmental impact assessment regulations1 (the Regulations) in terms of Chapter 5 of the National Environmental Management Act, 19982. The Regulations replace the environmental impact assessment (EIA) regulations which were promulgated in terms of the Environment Conservation Act, 19893 in 1997.

Section 24(2) of NEMA empowers the Minister and any Member of the Executive Council (MEC), with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant environmental authorisation. The objective of the Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment, and reporting of the activities that have been identified.

The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

The purpose of the current Environmental Regulations (2010), as listed in Government Notices (GN) R544, R545 and R546, is to identify activities that require environmental authorisation prior to commencement.

Developments which trigger activities listed under either Government Notices (GN) R 544 or GN R 546 require a Basic Assessment Process for Environmental Authorisation. If a proposed development triggers activities listed under GNR 545, then a full Scoping and Environmental Impact Assessment Process is required for Environmental Authorisation.

In terms of the current regulations, the following Listed Activities are applicable to the construction of a dam to be utilised as a multi-purpose reservoir:

a) Government Notice R 544

Activity 9: The construction of facilities or infrastructure exceeding 1000 meters in length for the bulk transportation of water…

(i) With an internal diameter of 0.36 meters or more; or
(ii) With a peak throughput of 120 litres per second or more;

[1] *Environmental Impact Assessment Regulations, 2006*

[2] *Act No. 107 of 1998*

[3] *Act No. 73 of 1989*

Excluding where:

a. Such facilities or infrastructure are for bulk transportation of water…inside a road reserve; or
b. Where such construction will occur within urban areas, but further than 32 meters from a watercourse, measured from the edge of the watercourse.

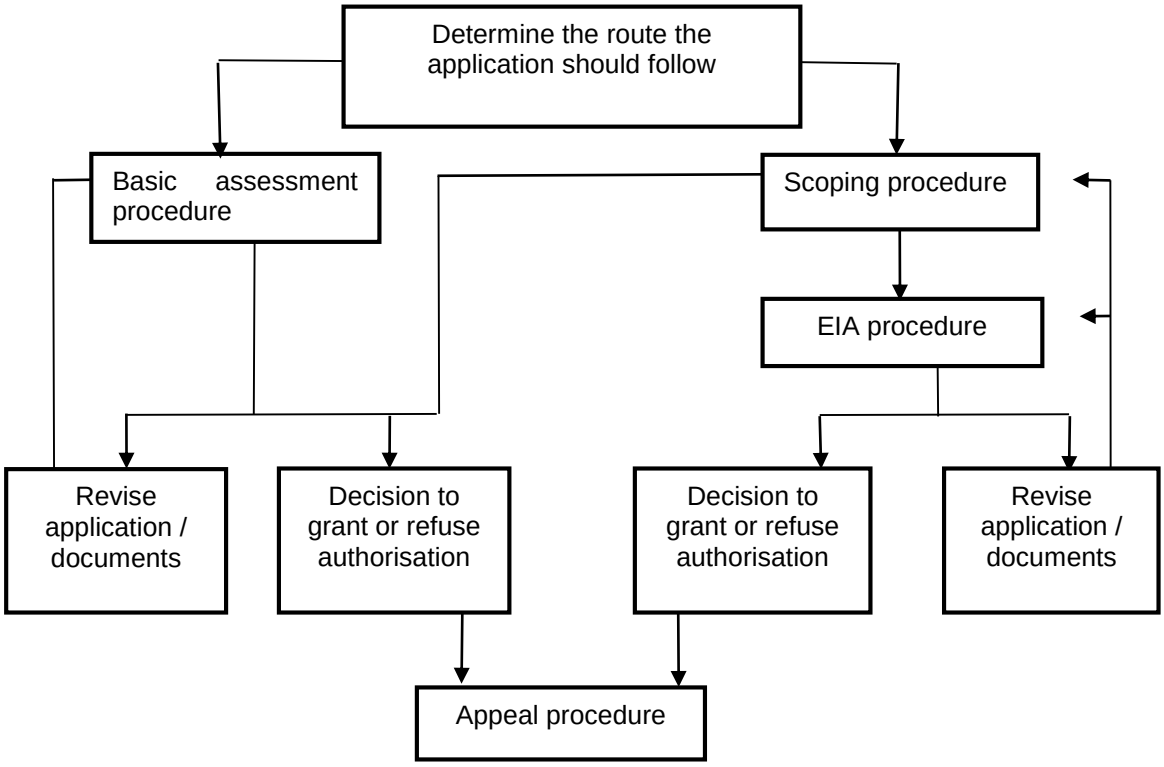


Figure 2-4: Environmental Impact Assessment (EIA) process

Once the proposed dam has been built, it is proposed for use as a supply source for domestic water supply and irrigation. This will require the establishment of an extensive distribution network comprising both bulk and reticulation pipelines. These pipelines will be greater than 1000 meters in length and many will have a diameter in excess of 0.36 meters, thus triggering this Listed Activity.

Activity 11: The construction of:

(i) dams;
(ii) infrastructure or structures covering 50 square meters or more where such construction occurs within a watercourse or within 32 meters of a watercourse, measured from the edge of the watercourse, excluding where construction will occur behind the development setback line.

The proposed dams and associated infrastructure including wall, control room, hydro-electric generation centre, etc. will be constructed within the alignment of the existing watercourse. Development will therefore occur within a watercourse and within 32 meters of a watercourse, triggering Activity 11 of GN R 544.

Activity 18: The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic meters from:

(i) A watercourse;

But excluding where such infilling, depositing, dredging, excavation, removal or moving:

a. Is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or
b. Occurs behind the development setback line.

The construction of the proposed dam will require both the excavation and infilling of material as part of the dam wall construction process. The volume of material to be excavated and infilled will exceed 5 m^3 thus triggering Activity 18 of GN R 544.

Activity 22: The construction of a road, outside urban areas,

(i) With a reserve wider than 13.5 meters; or
(ii) Where no reserve exists, where the road is wider than 8 meters; or
(iii) For which an environmental authorisation was obtained for the route determination in terms of Activity 5 in GN 387 of 2006 or Activity 18 in Notice 545 of 2010.

The construction of an access road to the proposed dam site will be required. This access road will be required to accommodate large, heavy maintenance vehicles and will therefore exceed 8 meters in width. Activity 22 of GN R 544 will therefore be triggered.

b) Government Notice R 546

Listed activities as listed in terms of GN R 546 have not been assessed as the Environmental Assessment Practitioner (EAP) is not in possession of the relevant databases required to make this assessment.

It would be up to the appointed EAP to conduct a full assessment of the relevant databases in order to assess if any of the activities listed in GN R 546 are triggered by the proposed development.

It should be noted that if it is subsequently found that activities listed in GN R 546 are triggered by the proposed development, this will not change the type of Environmental Authorisation Process to be followed.

c) Government Notice R 545

Activity 1: The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 MW or more.

As part of the dam development, it is proposed to establish a hydro-power generation facility. This facility will have the capacity to generate in excess of 20 MW, thus triggering Activity 1 of GN R 545.

Activity 8: The construction of facilities or infrastructure for the transmission and distribution of electricity of 275 kilovolts or more, outside an urban area or industrial complex.

A transmission and distribution network, originating at the proposed dam site will be required in order to carry the electricity generated by the hydro-power facility at the dam. As the facility will produce in excess of 20 MW of electricity, the transmission and distribution network will need to have the capacity to carry in excess of 275 kilovolts, therefore triggering Activity 8 of GN R 545.

Activity 19: The construction of a dam, where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 meters or higher or where the high-water mark of the dam covers an area of 10 hectares or more.

The proposed dam will have a dam wall well in excess of 5 meters in height; and the high-water mark of the dam will cover an area greater than 10 hectares, therefore Activity 19 of GN R 545 is triggered by the proposed development.

Proposed developments which trigger activities listed under GN R 545 require a Scoping and EIA Process for Environmental Authorisation (EA).

2.3.2 National Heritage Resources Act (NHRA) (No. 25 of 1999)

The legislative framework governing heritage resources and their management in South Africa is contained in Section 8(1) of the NHRA 25 of 1999. In carrying out an assessment of the Heritage Resources present in a proposed development area, controlled exclusive surface surveys, as well as database and literature reviews must be undertaken by an appropriately qualified specialist who has experience in working within, and implementing the requirements of, the NHRA.

2.3.3 National Forests Act (No. 84 of 1998)

Should the proposed development require the removal or disturbance of trees in a natural forest, an application will need to be made to the Department of Agriculture, Forestry and Fisheries (DAFF) in terms of Section 7 (1) of the National Forests Act (No. 84 of 1998). Alternatively, if the proposed development requires the removal or disturbance of protected trees as listed in GN No. 716 (dated 7 September 2012), then an application must be made to the DAFF in terms of Section 15 (1) of the National Forests Act.

2.3.4 National Environmental Management: Biodiversity Act (No. 10 of 2004)

The main aims of this Act are, amongst others, to provide for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection.

The biodiversity of the proposed dam site must be investigated and assessed against the requirements of the National Biodiversity Framework in order to ensure compliance. In addition, it must be ascertained whether or not a Bioregional Plan exists for the proposed development area. Development of the proposed dams must be sensitive to the requirements of these plans.

2.4 Hydropower

The White Paper on the Energy Policy of the Republic of South Africa (DME 1998) identifies the Department of Minerals and Energy (now the Department of Energy – DoE) with overall responsibility for energy and renewable energy policy in South Africa. The DoE is mandated to not only establish the appropriate enabling environment for energy and renewable energy, but to also ensure that activities undertaken by other stakeholders are co-ordinated, uniform and effective.

The two key policy documents of relevance to the electricity sector include the White Paper on the Energy Policy of the Republic of South Africa (DME 1998) and the Renewable Energy White Paper (DME 2003).

In addition, the various energy and renewable energy legislation and regulations are listed below:

- Electricity Regulation Act, DME 2006 (as amended)
- National Energy Act, DME 2008
- Electricity Regulation Act: Electricity Regulations for Compulsory Norms and Standards for Reticulation Services (GN 773), DME 2008
- Electricity Regulations on the Integrated Resource Plan 2010-2030, DoE 2011

The main point with regards to the policy and regulatory framework is that outside of the DoE Renewable Energy Independent Power Producer Procurement Programme (REIPPPP or REI4P) procurement process there remains a confusing and difficult legal and administrative environment for hydropower.

Although there has been extensive progress in the wind and solar sectors of late, hydropower is somewhat different from other renewable energy technologies in that the bulk of large-scale hydropower potential in South Africa is located on state-owned land and infrastructure. This has significantly slowed the development process of hydropower in the country as the key state departments, such as the DWS, have not put in place the necessary mechanisms to either develop hydropower resources internally or to make them available to the private sector.

The notable exceptions include the Gariep and Vanderkloof Hydroelectric Power Stations where the DWS and ESKOM have entered into a type of ‘partnership cooperation agreement’. Again however there does not appear to be a policy or regulation that provides for this type arrangement, limiting the replicability of such an arrangement.

The current consideration of the conjunctive use of the Ntabelanga and Lalini Dams for both water supply and hydropower is therefore an opportunity to redress this situation and to ensure that policy is put in place so that other similar schemes can be considered, given the need to develop more green energy sources in South Africa.

2.5 Land Matters

Currently there is no national resettlement and compensation policy in South Africa. The Expropriation Act (63 of 75) provides for the expropriation of land for public use, and the compensation thereof, but this relates to private land only. State owned land is a complex issue that is not covered, and, instead international and national best practice should guide the process. The relevant legal framework is discussed hereunder.

2.5.1 The Constitution of South Africa (Act No. 108 of 1996)

The Constitution of South Africa permits the expropriation of property only in terms of law of general application for a public purpose or in the public interest and subject to compensation, the amount of which and the time and manner of payment of which have either been agreed to by those affected or decided or approved by a court.

Chapter 2: Bill of Rights (Section 25):

(2) Property may be expropriated only in terms of law of general application –

(a) For a public purpose or in the public interest; and
(b) Subject to compensation, the amount of which and the time and manner of payment of which have either been agreed to by those affected or decided or approved by a court.

(3) The amount of the compensation and the time and manner of payment must be just and equitable, reflecting an equitable balance between the public interest and the interests of those affected, having regard to all relevant circumstances, including –

(a) the current use of the property
(c) the market value of the property

2.5.2 The Expropriation Act (63 of 1975) as amended March 2008

This Act regulates the expropriation of land for public purposes. It looks at compensation based on market value and future financial loss.

2.5.3 The Extension of Securities of Tenures Act (62 of 1997)

This Act is primarily concerned with the protection of farm workers from being evicted by owners. Compensation is payable for any structures or crops.

2.5.4 International Best Practice

a) World Commission on Dams

The World Commission on Dams released a set of guidelines based on lessons learnt from 1000 dams across the globe. Several of these relate to the relocation and compensation for loss of land and livelihoods:

- Stakeholders must have opportunity to participate in the decision making processes, and decisions affecting indigenous peoples should be taken with their prior consent.
- Livelihoods should be improved beyond mere compensation for losses, including people downstream of the dam, and
- Agreements should be mutually agreed and legally enforceable to insure the implementation of all mitigation, resettlement and development entitlements.

b) International Finance Corporation (IFC) Performance Standard 5

The IFC Standard recognises both physical displacement and economic displacement, and the need to quantify and compensate accordingly. It emphasises adequate compensation, and community engagement as essential, and that forced evictions should be avoided. A Resettlement Action Plan must be developed at the outset should physical displacement be necessary.

The overarching approach is:

"The client will engage with Affected Communities, including host communities, through the process of stakeholder engagement... Decision-making processes related to resettlement and livelihood restoration should include options and alternatives, where applicable. Disclosure of relevant information and participation of Affected Communities and persons will continue during the planning, implementation, monitoring, and evaluation of compensation payments, livelihood restoration activities, and resettlement to achieve outcomes that are consistent with the objectives of this Performance Standard.

When displacement cannot be avoided, the client will offer displaced communities and persons compensation for loss of assets at full replacement cost and other assistance to help them improve or restore their standards of living or livelihoods, as provided in this Performance Standard. Compensation standards will be transparent and applied consistently to all communities and persons affected by the displacement. Where livelihoods of displaced persons are land-based, or where land is collectively owned, the client will, where feasible, offer the displaced land-based compensation. The client will take possession of acquired land and related assets only after compensation has been made available and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons in addition to compensation. The client will also provide opportunities to displaced communities and persons to derive appropriate development benefits from the project" (IFC Performance Standard 5, 2012 pg pg. 3).

c) World Bank Operational Policy 4.12

The World Bank policy motivates for a comprehensive resettlement policy and plan to be adopted at the start of the project. These documents must include all of the following issues:

6 (a) The resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are:

(i) informed about their options and rights pertaining to resettlement;

(ii) consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and

(iii) provided prompt and effective compensation at full replacement cost[11] for losses of assets[12] attributable directly to the project.

(b) If the impacts include physical relocation, the resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are

(i) provided assistance (such as moving allowances) during relocation; and

(ii) provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.

(c) Where necessary to achieve the objectives of the policy, the resettlement plan or resettlement policy framework also include measures to ensure that displaced persons are

(i) offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living and

(ii) provided with development assistance in addition to compensation measures described in paragraph 6(a); such as land preparation, credit facilities, training, or job opportunities (World Bank OP 4).

2.5.5 *Concluding Comment*

This project will involve the displacement of people as well as the reform of existing land use of people living on State-owned, traditionally-administered land.

The process to be undertaken must be implemented in close consultation and co-operation with the traditional leaders in the affected areas, and involving the Provincial Departments of Rural Development and Agrarian Reform (DRDAR), and Local Government and Traditional Affairs.

3. LEGAL ISSUES DURING THE PLANNING PROCESS

The Mzimvubu Water Project is a Strategic Integrated Project (SIP) which is viewed as having "significant economic or social importance'. As such, it is subject to the Infrastructure Development Bill B49 of 2013, which provides for special processes in order to ensure fast-tracked approvals. Clause 17:1-2 states:

"(1) Whenever any strategic integrated project is implemented in terms of this Act any processes relating to such implementation, including processes relating to any application for any approval, authorisation, licence, permission or exemption and processes relating to any consultation and participation must, as far as it is possible and in order to expedite the matter, run concurrently.

(2) The processes set out in Schedule 2 provide a framework and guide for the implementation of any strategic integrated project, but the time-frames in Schedule 2 may not be exceeded" (B49 of 2013).

The special allowances for a SIP do not exempt the project from legislation, and the requirements for sustainable development and environmental stewardship still apply during the planning process. However, the planning team needs to ensure that all approvals, authorisations, licences, permissions and exemptions required to enable the implementation of the SIP should be submitted simultaneously by the project steering committee if the Schedule 2 timeframes are to be possible.

SCHEDULE 2

(Section 17(2))

Process and periods of time

1. Project plan approved and steering committee determines the applicable legislation and approval, authorisation, licence, permission or exemption required.	
2. Applicant compiles and submits an application and project plan for consideration by the relevant authority.	7 days
3. Public consultation process on the application and project plan.	30 days
4. Application and project plan amended and submitted to the relevant authority for consideration and approval.	52 days
5. Based on approved project plan preparation and submission of detailed development and mitigation plan to the relevant authority.	60 days
6. Public consultation on the development and mitigation plan and review by relevant authority.	44 days
7. Relevant authority consideration and assessment of development and mitigation plan. Regulatory decision.	57 days

Figure 3-1: Schedule 2 of the Infrastructure Development Bill (B49 of 2013)

3.1 Social impact

The social impact study forms part of the EIA process, which is currently underway. This study will consider both temporary and long term social impacts. The specific legal issues that need to be planned for will emanate from this process. The social impact is in many instances linked to the land occupation issues. The broad issues that are envisaged are:

1. *The inundated area of the dam will require the resettlement of a number of homesteads, and will drown certain areas of land currently being used for public amenity, grazing or agriculture.*
2. *Ancillary works such as access roads, camps, power lines, etc. might also require that some homesteads will need to be relocated.*
3. *The potable water supply infrastructure itself will include pipeline routes, pumping stations, treatment works, and storage sites, which themselves will require both temporary and permanent servitudes and some land acquisition.*
4. *Land to be allocated for irrigated agriculture might already be used by members of the community, and such land usage rights and allocations will need to be revisited in order that appropriate mitigation and compensation is undertaken, and so that the maximum benefits can be gained for the local population in terms of economic development and job creation.*
5. *Inundation of land can also interfere with existing access footpaths, bridle paths and roads, and alternative and improved access routes will need to be provided across and around the inundated areas to mitigate for such a social impact.*
6. *The area where the dam is located is generally poorly serviced with water and sanitation facilities. Areas downstream of the dam wall will be serviced with new potable water supply systems, but it is often overlooked that those most affected – the upstream communities adjacent to the inundated areas – also require improved water supplies and sanitation facilities. Provision should therefore be made to ensure that the communities upstream of the dam wall and adjacent to the inundation water line are also served with adequate water supplies and sanitation facilities.*

3.2 HDI impact

The project area is an area characterised by low employment, and poverty. As such the planning process needs to ensure that maximum opportunities for job creation are included in the project construction, as per the guidelines of the Expanded Public Works Programme (EPWP). “The EPWP is a nationwide programme covering all spheres of government and state-owned enterprises. The Programme provides an important avenue for labour absorption and income transfers to poor households in the short to medium-term. It is also a deliberate attempt by the public sector bodies to use expenditure on goods and services to create work opportunities for the unemployed. EPWP Projects employ workers on a temporary or on-going basis either by government, by contractors, or by other non-governmental organisations under the Ministerial Conditions of Employment for the EPWP or learnership employment conditions (refer to *www.epwp.gov.za*).

The planning and implementation process for the involvement of the EPWP should follow the *EPWP Large Projects Guidelines (2012).*

3.3 Land ownership and occupation

The new infrastructure that will be built such as the dams, pipelines, waterworks, pump stations, and any associated infrastructure will traverse both urban and rural areas resulting in unavoidable impacts to both the environment and communities. Part of this land will need to be expropriated in order to expand the service provision of bulk water. This may negatively impact on the current land use and business activities resulting in the need for compensation of the current land owner.

Much of the land in the affected project area is however, State-owned land managed through the tribal authorities, and as a result the process is not governed by law, but by best practice. The process tends to be drawn out, and complex. Outside of the community negotiations, and if the cadastral information is available for all the affected land, planning must allow for at least 18 months for acquiring the land. Despite the various scenarios, the planning process required to fulfil legislative requirements needs to follow a similar process as shown in Figure 3-2.

3.4 Environmental impact

The type and extent of the environmental impact, and the nature of the required planning, mitigation etc. will emanate from the EIA. This process is currently underway, and the final report should be referred to for the requirements for this section.

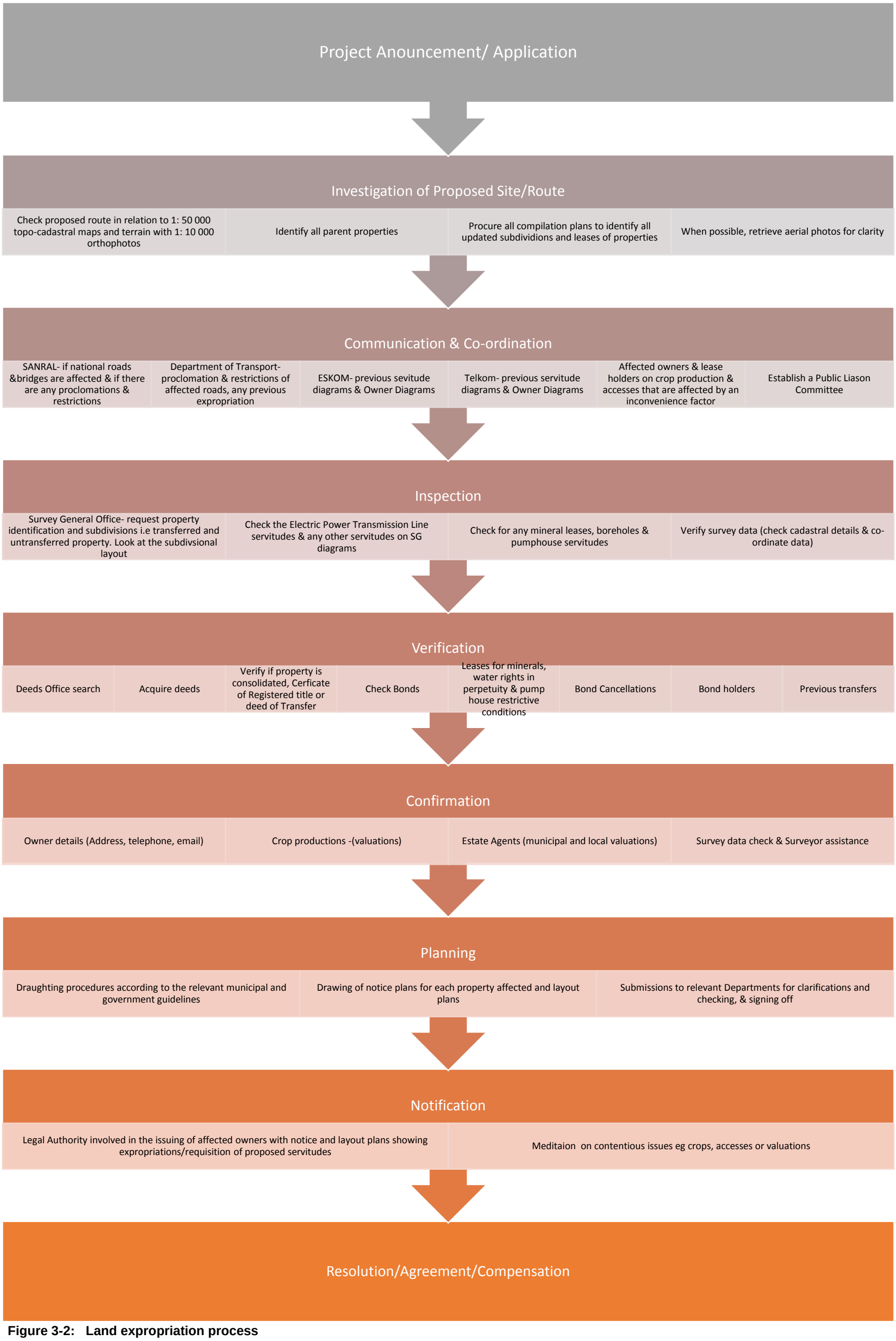
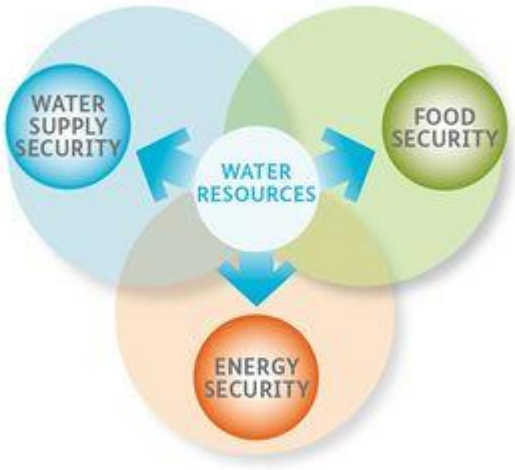


Figure 3-2: Land expropriation process

4. INSTITUTIONAL MODEL OPTIONS

The regulatory and management demands for multipurpose dams are more complex than single purpose projects due to the conflicts of interest amongst the individual users. Consequently, inter- and cross-sectoral co-ordination demands are high, and require strong institutional capacity (refer to http://agriwaterpedia.info). Food, water and energy nexus considerations need to be on the agenda from the very start of the project.

The success and sustainability of the Mzimvubu Water Project is heavily reliant on the establishment of the most appropriate institutional arrangement for 1) the management and operation of the entire infrastructure, and 2) the management of the social and economic development directly and indirectly related to the project. These relationships, however should not be developed only once the infrastructure is built, but should be cultivated, and where possible, formalised as soon as possible. It is vital that there is a strong group of champions driving decision making that carefully considers all the stakeholders from the start if this multipurpose dam is to be successful in the long term.



Water Energy Food Nexus

Lessons from the SABMiller/WWF report "The Water-Food-Energy Nexus: Insights into Resilient Development" are valuable when considering institutional models for this project:

"Nexus policymaking is about designing resilient government or business strategies in ways that take account of the connections between food, water and energy systems. It starts by recognising the interdependence of those systems, and hence challenges single-sector approaches that can have substantial unintended consequences for a country's future development options. …Decisions made in the early stages of development may lead to weak resilience at later stages. This is particularly seen in the evolution of both infrastructure and institutions for governing the use of natural resources. Developing and emerging economies have the opportunity to build resilience in from the outset…. The most resilient economic systems combine robust infrastructure, flexible institutions and functioning natural capital….Policy makers should:

- *Integrate all aspects of development planning, in particular ensuring that water, energy and agricultural sector planning are not done in isolation, but consider how each can contribute to the resilience of the others;*
- *Design institutions for resilience, in ways that strengthen cooperation and coordinated decision-making;*
- *Use economic and regulatory instruments to strengthen the incentives and requirements for building resilience into water, food and energy systems*

(SABMiller/WWF, 2014, pg 1).

This section of the report first contextualises the project within the current, and planned national institutional arrangements, then focusses on the institutions operating in the region, and concludes with a proposed model for operations.

4.1 Water Resources and Water Services Institutional Bodies in the Project Area

4.1.1 Department of Water and Sanitation

The Department of Water and Sanitation (DWS) Eastern Cape Region has offices in King Williams Town and East London. The DWS officials are responsible for the governance of the water resources, and the planning of regional bulk infrastructure in the area. In addition, due to the fact that the Umzimvubu-Tsitsikamma CMA is not functional as yet, the EC DWS office fulfils these functions as well. The operation of DWS dams in the province is contracted to Amatola Water, whose area of operation is shown in Figure 4-1.

4.1.2 Water Board

Amatola Water is one of 20 water boards and utility organisations belonging to the South African Association of Water Utilities and mandated by the South African Government to operate as a water services provider to municipal authorities and certain other water customers, as provided for in national water legislation.

The utility`s primary business activity is to service the bulk, treated water requirements of urban, peri-urban and rural communities situated within a Gazetted services area which is some 43 400 km^2 in extent and is located within the central region of the Eastern Cape Province of South Africa.

With its headquarters in East London in the Eastern Cape Province, Amatola Water operates eleven plants and seven sub-regional, bulk distribution networks in a designated services area of 45 794 km² covering most of the Amathole and part of the Chris Hani District Municipalities. It offers comprehensive contract services to municipalities for water abstraction, treatment, bulk supply and water quality monitoring for domestic, industrial and agricultural use. In response to market demands and opportunities Amatola Water has developed its supplementary servicing capability.

Service agreements are devised for the operation and maintenance of customer-owned water treatment and plant and reticulation installations. Amatola Water supports these services with complementary managerial, technical, laboratory and related specialist advisory services tailored to the needs of major industry and other institutional customers (www.amatolawater.co.za).

4.1.3 Catchment Management Agency

No Catchment Management Agency (CMA) is established in the catchment as yet. The ongoing development of the Business Case for the CMA is the first step in establishment, and this is due to go out for public comment in April 2014. The project falls within the Mzimvubu-Tsitsikamma Water Management Area (see Figure 4-2), and will in future be governed by the CMA that is to be established in the next two years. The CMA will play a critical role in governance, equity and the financial transactions related to water use charges and subsidies.

The CMAs will face significant challenges in self-sustainability due to the vast area they need to manage; the poor economic status of the area (and the accompanying low ability to pay for services); and the human resource capacity constraints in attracting and retaining sufficient and competent staff.

Figure 4-1: Amatola Water Area of Operation

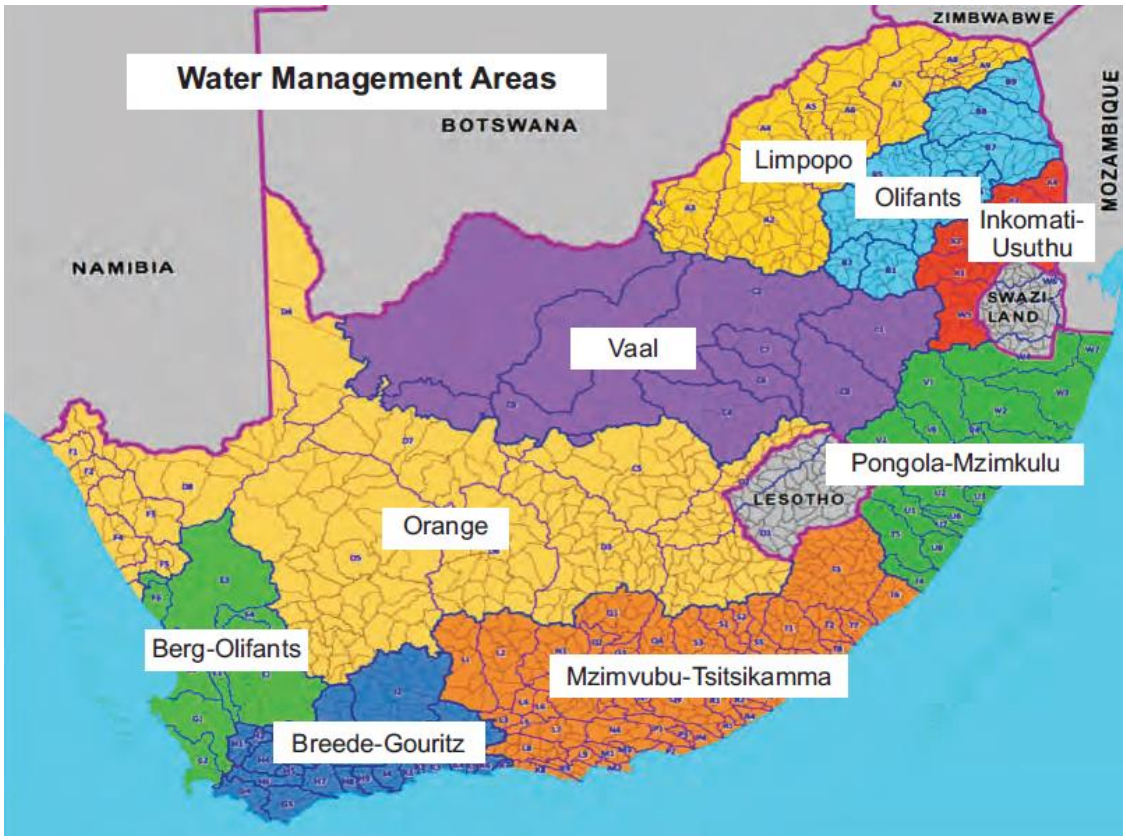


Figure 4-2: Water Management Areas (DWA NWRMS2, 2013)

4.1.4 *Water User Associations (WUAs)*

No Water User Association (WUA) has been established to date. The intent of DWS to dis-establish WUAs (as voiced in the Water Policy Review) should be clarified prior to the establishment of any such bodies. However, a body such as this is required to represent the farmers in the area, and either a WUA or an Agricultural association is needed.

4.1.5 *Irrigation Boards*

No Irrigation Boards are functioning in the area.

4.1.6 *Water Services Authorities*

The three Water Servives Authorities (WSAs) that will benefit from the Mzimvubu Water Project are: OR Tambo DM; Alfred Nzo DM; and Joe Gqabi DM. The WSA has the ultimate responsibility to ensure service delivery in their jurisdiction, and more specifically are responsible for the governance of any WSP; water services development planning; and the technical and financial sustainability of the infrastructure. The historical poor performance of OR Tambo and Alfred Nzo in performing these functions is a concern.

4.1.7 *Water Services Providers*

The OR Tambo DM and the Alfred Nzo DM both perform the Water Services Provider (WSP) function in their jurisdiction. Joe Gqabi DM, has contracted the local municipalities within its jurisdiction to perform this function. The Mzimvubu Water Project falls within the Elundini LM in Joe Gqabi.

4.2 Agricultural, Land and Energy related institutions

4.2.1 Department of Agricultural, Forestry and Fisheries

The Department of Agricultural, Forestry and Fisheries (DAFF) is has a key role to play in the planning and the operational phases of this project. One of the key recommendations is to utilise the Mzimvubu Water Project to catalyse agricultural development in the area.

This can only be successful if the DAFF are integrally involved in the planning of how this should happen, the considerable change management that will need to occur to implement the plans, the identification of funds to subsidise the capital investment needed, and the ongoing support to the farmers into the future. This involvement will most likely be spearheaded by the Directorate: Cooperatives and Enterprise Development.

4.2.2 Local Agricultural Societies/Associations

There are many agricultural groups functioning in the project footprint area. All these groups need to be made aware of the project, and offered the opportunity to participate meaningfully in the proposed plans for the agricultural development in their area.

From the DAFF website, a list of co-operatives in the area is found in Table 4-1.

These all need to be contacted to establish their exact location and determine whether they fall within the affected area. This is unlikely to be an exhaustive list.

4.2.3 Department of Rural Development and Agrarian Reform

The Department of Rural Development and Agrarian Reform (DRDAR), like DAFF, has a key role to play in the planning and operational phases of this project. Significant land reform recommendations have emanated from discussions with the Department, and will require the consultation of many communities on tribal and private land in the area. With the suggestion that the area move from small subsistence farming, to larger commercial farms, the Department of Rural Development and Land Reform (DRDLR) will need to spearhead the transformation process. In addition much research and planning needs to be done with regards to the subsidy of these farmers, both in start-up and in ongoing subsidies to ensure that the farms are viable.

4.2.4 **Department of Energy**

The Department of Energy (DoE) is responsible for ensuring that diverse energy resources are available, in sustainable quantities, and at affordable prices, in support of economic growth and poverty alleviation. It must further provide for energy planning, increased generation and consumption of renewable energies, and contingency energy supply.

The DoE has an important role to play in the decision making regarding the hydropower plant planning, ownership, management, and the provision of electricity into the national grid.

4.2.5 National Energy Regulator of South Africa (NERSA)

As the national energy regulation body, National Energy Regulator of South Africa (NERSA) is an important stakeholder in this project. Any decisions regarding the selling of electricity generated from the hydropower plant must first be approved by NERSA before it can be implemented.

4.2.6 ESKOM

ESKOM is the national electricity supplier in South Africa. As such, it is an important institutional stakeholder in the planning and implementation stages of this project. There are various options as far as the extent of involvement of ESKOM as an owner and/or operator of the envisioned hydropower plants, or as a buyer of surplus electricity generated by the plant.

Table 4-1: List of Co-operatives in the Region

Name of Business	Main Activity	Legal Status	Contact Details	District	Municipality
IKAHENG COMMUNITY GARDEN	Vegetables	Association	MATHAPELO MONYANE - 0793278723	Ukhahlamba	Elundini
MASAKHANE POULTRY PROJECT	Poultry	Association	NOKWAKHA MZAMO - 0837576957	Ukhahlamba	Elundini
ZIZAMELE NAMBA AGRIC. PROJECT	Vegetables	Association	MASONTATHA VICTORIA LOUIS - 0769538488	Ukhahlamba	Elundini
CELUCENDO VEGETABLE PROJECT	Vegetables	Association	NONKOSOMBUSO MEMEZA - 0721438667	Ukhahlamba	Elundini
IKAHENG COMMUNITY GARDEN	Vegetables	Association	MATHAPELO MONYANE - 0793278723	Ukhahlamba	Elundini
MASAKHANE KHALAZEMBE	Vegetables	Association	NOMTHUTHUZENI MZOZOYANA - 0729526222	Ukhahlamba	Elundini
MASAKHANE KHALAZEMBE	Vegetables	Association	NOMTHUTHUZELI MZOZOYANE - 0729526222	Ukhahlamba	Elundini
PHILA UPHILISE	Vegetables	Association	NTENTESA N - 0720406237	Ukhahlamba	Elundini
ZAMA ZAMA FOOD SECURITY PROJECT	Vegetables	Association	NOSANGO MTANGAYI - 0784803213	Ukhahlamba	Elundini
ZAMAKULUNGA PROJECT	Vegetables	Association	MARIGOLD MABALEKA - 0722244498	Ukhahlamba	Elundini
ZAMUKUHLE PROJECT	Vegetables	Association	NTEBOHENG KHAUOE - 0825304675	Ukhahlamba	Elundini
ZIBENZA ZIBUDLA	Wheat	Association	NTEBOHENG KHAUOE - 0825304675	Ukhahlamba	Elundini
MKWEZO MASSIVE	Crops	Association	MR S.C TIMAKWE - 0732232699	O R Tambo	King Sabata Dalindyebo
ZIZAMELE KRANCOLO COOPERATIVE	Maize	Association	MR G SASA - 0726259664	O R Tambo	King Sabata Dalindyebo
MATHEKO WOOL GROWERS ASSOCIATION	Wool Producers	Association	MR A NDZENDZE - 0785839259	O R Tambo	King Sabata Dalindyebo
SIPHAMANDLA PROJECT	Poultry	Association	KHANYISWA PHEMPELE - 0839811088	O R Tambo	King Sabata Dalindyebo
ZAMOKUHLE PROJECT	Vegetables	Association	NTEBOHENG KHAUUOE - 0825304675	O R Tambo	King Sabata Dalindyebo
KIKEWWG FARM	Crops	Association	SD MARARENI - 0848919846	Alfred Nzo	Matatiele

4.2.7 Amatola Green Power

Amatola Green Power (Pty) Ltd (AGP) is an electricity trading company based in Port Elizabeth operating independently from ESKOM or municipalities, subject to the Electricity Act and the National Electricity Regulator. The technology and energy sources that AGP utilises for the generation of electricity are environmentally friendly, reducing the emission of Green House Gasses into the atmosphere, hence the reference to Green Power.

In February 2009 the National Energy Regulator of South Africa (NERSA) awarded AGP with a license to trade Green Power within the framework of the voluntary willing buyer, willing seller market (License No TRD01/ELC/09). The license is very restrictive in its conditions and in order to record a successful transaction, the trader has to submit proof of compliance with the license and the market rules to NERSA.

AGP rents the electrical networks from ESKOM and Municipalities via wheeling agreements which are entered into and pays a fee where required. AGP could have a role to play in the Mzimvubu Water Supply Project in the wheeling of power generated by the proposed hydropower plants.

4.3 Inter-Sectoral Management Framework

In order to ensure the meaningful participation of all the key stakeholders mentioned in the above section, it is important to establish an inclusive management framework that balances the needs of the different sectors.

Various relevant sectoral roleplayers and a suggestion for institutional arrangements are shown in Figure 4-3.

Each element is then explained thereafter.

4.3.1 Inter-Ministerial Committee

It is recommended that a Water Energy Food (WEF) inter-ministerial forum provides strategic oversight throughout planning, construction, and ongoing operations. This committee would inform on emerging policy and strategy, set priorities and performance measures, and make key decisions around subsidies, grant funding etc.

4.3.2 Inter-Sectoral Regulatory Forum

A forum that includes NERSA, DWS regulation branch, and appropriate agricultural and environmental regulation bodies should be formed. This forum will ensure holistic regulation of the larger project/institutions, and ensure sharing of information, and forming of common strategies to overcome challenges.

4.3.3 Mzimvubu Implementation and Management Agency

It is recommended that a special purpose vehicle (SPV) is established to manage all the different elements of the project. This SPV will need to have a water department, an energy department and an agricultural department, with expertise to manage and support these three inter-linked aspects of the project.

Some of the responsibilities would be:

- Planning and management (including implementation oversight),
- Policies and procedures,
- Annual financial and performance reporting and auditing ,
- Contract management of water and hydro operators,
- Monitoring and evaluation,
- Stakeholder engagement,
- Local economic and agricultural development,
- Sourcing of finance, and
- Management of overall project cashflows.

This potential structure also requires the formation of a permanent Secretariat, as well as a Coordination Unit (see below) consisting of a high-level panel of various disciplines, so as to be able to address political, legal, social, technical, financial, and environmental issues.

4.3.4 Water-Energy-Food Nexus Co-ordination Unit

The coordination unit could be permanent or semi-permanent, and could fall under the functions of the SPV. Members of the unit could be called on when necessary, and have the ability to assemble the required staff for any detailed investigation required. The composition of the coordination unit would need to be agreed upon by the Inter-ministerial body, and potential staff identified in detail as part of the formation of the unit. The unit would also require adequate funding in order to ensure its operational effectiveness and continuity.

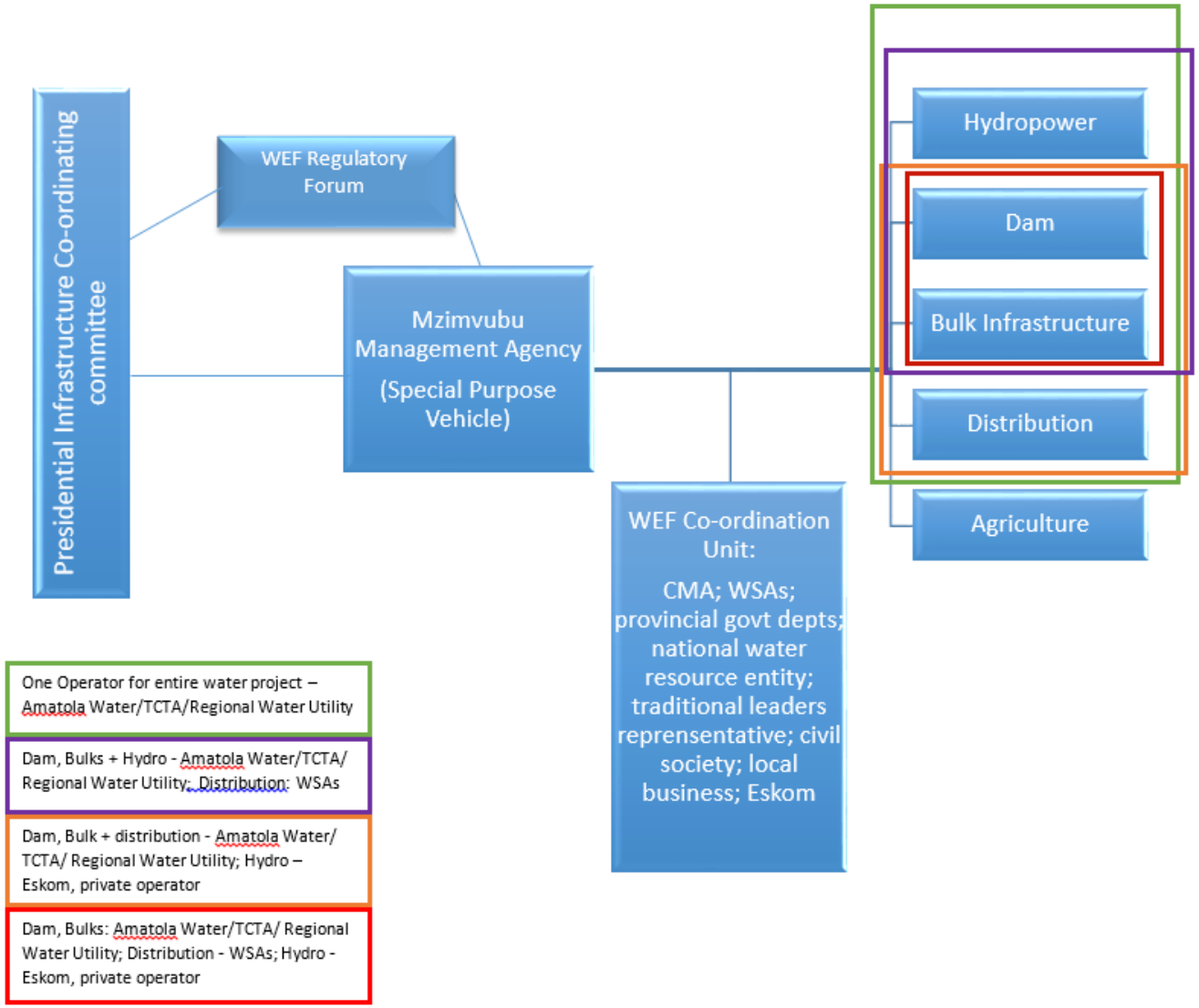


Figure 4-3: Inter-sectoral management organogram

4.3.5 *Ntabalenga Dam*

The DWS could operate and maintain the Ntabalenga dam (through the planned National Water Resources Entity) or contract this function to Amatola Water as it does for 21 other dams in the EC Province. This could be facilitated through an addendum to the current dam management contract. Alternatively, if the DWS establish a RWU, this function may be delegated to this new body. The option of the TCTA to be responsible for the management of the dam could also be investigated. The DWS would remain the owner of the dam regardless of the management arrangement chosen.

4.3.6 *Regional Bulk Water Distribution Infrastructure*

Amatola Water has cemented its reputation as a high quality water management institution through its consistent good performance in the Blue Drop certification programme. Although the water board does not currently operate any infrastructure within the project footprint area, the water board works closely with all of the DMs.

Amatola Water would be the obvious institution to take on the ownership and management of the water and waste water treatment works, and the primary and secondary bulk infrastructure associated with the project. This regional bulk infrastructure also includes the raw water system that is planned for the distribution of water to the proposed new farming units in the Tsolo area for agricultural purposes. The management and operations of this could also reside with Amatola Water up to the property boundaries of each planned farm.

Alternatively, if the DWS establishes a RWU, these functions may be delegated to this new body. As this is water resource infrastructure of national importance, DWS will most likely remain the owner of the bulk infrastructure regardless of the management arrangement chosen.

4.3.7 *Tertiary potable water distribution networks*

On behalf of the three DMs within which the project footprint lies, Amatola Water, as an implementing agent, together with engineering consultants, are in the process of planning the bulk distribution lines for provision of potable water to the end users. The planning and design of tertiary lines and settlement distribution systems supplied by the primary and secondary bulk distribution systems will be the responsibility of the WSA in the area – namely Alfred Nzo District Municipality, OR Tambo District Municipality, and Joe Gqabi District Municipality. Therefore, all capital development and operations and maintenance responsibilities will reside with these WSAs who will need to ensure sufficient revenue is generated from consumers, coupled with grant income from the fiscus to design, build and manage this infrastructure in a sustainable manner.

The OR Tambo DM and the Alfred Nzo DM have a history of poor performance with water and waste water management. This is evidenced by their very low Blue and Green Drop scores since 2008. Their capability and capacity of these organisations to manage the tertiary infrastructure from the Mzimvubu Water Project in a sustainable manner is questionable, and support and improvement are required in this regard.

Based on the performance of the Elundini LM (Joe Gqabi DM) in the 2011 Blue Drop report (Maclear water supply project 79%; and Ugie water supply system 95%), their management capacity and capability to manage the additional infrastructure bodes well.

These WSAs may sub-contract part or all of the function to operate and maintain the infrastructure to a third party, but still remain legislatively responsible for the function. Taking the historically poor performance of Alfred Nzo and OR Tambo into consideration, it is recommended that options to outsource the implementation, management and operations of the tertiary potable water distribution networks should be investigated as part of a Section 78 process. One of these options is to extend the role of Amatola Water or a new RWU to include that of the tertiary distribution systems.

4.3.8 Raw water infrastructure for irrigation

Raw water supply infrastructure for irrigation purposes would be provided to the border of each farm. The construction, ownership, management and operations of the tertiary lines beyond this point will be the responsibility of the farm owner.

A water user association or alternative body would need to be established to co-ordinate, manage, and administrate the farm owners connected to the raw water infrastructure. This body is essential if the requirements of each farmer is to be understood and managed. This body will need to have a representative on the WEF co-ordination unit, and also meet regularly with the agricultural department of the Mzimvubu Management Agency.

The technical operation and management of the raw water pumping stations and bulk transfer pipelines could also be undertaken within the same role of Amatola Water or a new RWU as above, given that the raw water pumping station would be located close to the water treatment works at the Ntabelanga Dam.

4.3.9 Ntabelanga Hydropower

The development of a hydropower plant only at the Ntabelanga Dam would require a significantly larger capacity dam to be developed in order to provide sufficient additional storage capacity for flow regulation as well as additional water depth to provide adequate hydropower generation head. If implemented for the purposes of hydropower generation at Ntabelanga Dam only, the incremental costs of a larger dam and the hydropower plant would be very high compared with the limited power generated.

The proposed solution is to use the Ntabelanga Dam conjunctively with the downstream Lalini Dam and Hydropower Scheme to provide sufficient system storage and flow regulation to Lalini to be able to generate up 37.5 MW of power.

The flow released downstream from Ntabelanga Dam and for environmental flow purposes can still be used to generate power at Ntabelanga dam, and it is proposed that a mini-hydropower plant with output up to 5 MW be constructed close to the dam wall.

The simplest, and perhaps most feasible, institutional option available for the Ntabelanga Dam hydropower plant ownership and structure is for the DWS to build and retain ownership of the Ntabelanga Dam hydropower plant infrastructure (either directly or through appointed operators of the dam), and then to out-source/ enter into an operations and maintenance (O&M) sub-contract with a suitable third-party.

This is considered feasible since the Ntabelanga Dam water scheme could operationally be fully ring-fenced separately from the Lalini Dam hydropower scheme. This does not preclude the conjunctive use of the two dams however.

The power produced could feasibly be supplied directly to the various components of the scheme, such as for example the pump stations and water treatment works, although this would require extensive additional transmission and synchronisation infrastructure, and would add considerable operational complexity.

Additionally, the power supplied from the Ntabelanga hydropower plant would not be sufficient to meet the full demand of the scheme in this same vicinity. It would therefore be better to sell the energy produced and the credit can then be used to offset the main scheme's energy usage charges. This option would, on its own, require full 'grant' funding for the dam and associated hydropower plant to be viable.

The operation of this hydropower plant could be sub-contracted to a suitable third party operator, but this would incur significant operation and management charges, which might increase the above unit cost of power produced to a non-viable level. Given that the Ntabelanga hydropower plant would be of relatively simple configuration with very similar operation and maintenance requirements to a medium sized pumping station, it is considered feasible that a water supply operator such as Amatola Water would be able to operate this plant in parallel with the dam, water treatment works, and primary and secondary bulk water distribution systems.

At this feasibility study stage this is the only option in terms of ownership and structure that stands out for Ntabelanga Dam hydropower plant, while there appear to be a few more options available for the Lalini Dam hydropower plant ownership and structure.

4.3.10 Lalini Hydropower

The development of a second hydropower plant at the Lalini Dam would require the construction and operation of a dam located on the same Tsitsa River some 4.5 km above the Tsitsa Falls, a tunnel transferring water from that dam into the gorge below the falls to a power generation house, and transmission power lines into the existing ESKOM grid system. This scheme could produce up to 37.5 MW of power on a base load basis.

A mini hydropower plant at the Lalini Dam itself is also proposed which would make use of the head of water in the dam and the flow that is required to be released downstream for environmental water requirements. Similarly to the Ntabelanga Dam, this additional plant would be able to produce up to 5 MW.

In scenario being considered under this study, all of the energy thus produced would be sold and the income thus generated would be used to subsidize the operating costs of the conjunctive water, energy and food scheme. The economics of this scenario are discussed later in this report.

As far as the ownership and operation of the scheme, there appear to be a number of options available to the Lalini Dam Hydropower component.

a) DWS Ownership

The first option is similar to the Ntabelanga Dam Hydropower Plant in that the DWS retains ownership of the hydropower plant and sub-contracts the operation and maintenance services to a suitable third-party operation and maintenance company.

b) Public Public Partnership

The second option is for DWS to enter into a public public partnership with either ESKOM or Amatola Water Board. This would mean some capital investment from this public organisation, partial ownership and operation and maintenance.

c) Public Private Partnership

The third option available to the Lalini Dam Hydropower Plant is for the DWS to enter into a public private partnership (PPP) arrangement. This would mean private investment, partial ownership, and operation and maintenance. The operation and maintenance services could presumably be fulfilled by the same private sector company that retains ownership in the plant, however this is not likely to be a requirement and operation and maintenance services could be sub-contracted.

This scenario would require the hydropower plant owner/operator to enter into a Power Purchase Agreement (PPA) with the nominated buyer of the power, as well as pay UOS charges for use of the ESKOM grid. Assuming the nominated buyer of the power is an existing buyer of power, the buyer of the power would amend its existing supply agreement with the grid operator it is connected to. The amendment to the supply agreement should outline the UOS charges as well as how any financial reconciliation of the buyer's electricity accounts is to be dealt with.

The key issue is again to consider is whether the effective net scheme income, comprising the difference between the annual cost of power drawn from the grid by the water supply systems, and annual income from the power sold into the grid, is sufficient to justify the development, operation and maintenance costs of the Lalini hydropower scheme.

In this case the private sector company would need to contribute to the financing of the scheme and would expect at least 15% internal rate of return on such an investment, as well as charging for its own operational overheads. This case could therefore involve a mix of private capital investment and lesser loan or grant funding than if DWS retains full ownership, but it is likely that the benefits of cross-subsidization of the other water supply scheme components would be significant reduced.

d) Independent Power Producer

The third option for the plant is for an Independent Power Producer (IPP) to build, own and operate the plant.

Such IPP involvement would require full private sector financing through equity or debt, which has a significant cost implications through the need to redeem the capital investment or to produce high enough returns on equity for the IPP's investors.

This is unlikely to create a situation where energy can be produced at a low enough cost to produce revenue surpluses sufficient to cross-subsidize the energy requirements of the water supply components of a conjunctive scheme.

As this goes against the main objectives of a conjunctively developed and operated hydropower, water and food production scheme, the involvement of an IPP building owning and operating the hydropower plant is therefore not considered a viable option.

5. FINANCIAL REQUIREMENTS

5.1 Conjunctive Scheme Cost Estimate

Full details of the cost estimates for the various scheme components are given in the Cost Estimates and Economic Analysis Report No P WMA 12/T30/00/5212/15.

Table 5-1 summarises these financial requirements for infrastructure implementation, based upon the proposed conjunctive scheme which includes potable and irrigation water supply, as well as the Ntabelanga and Lalini hydropower components, operated as a single ring-fenced project.

Table 5-1: Cost Estimate for Scheme Implementation

COMPONENT	R'million
Ntabelanga dam and associated works	1 075
Ntabelanga dam hydropower works	88
Ntabelanga land compensation/mitigation costs	18
Ntabelanga power transmission	29
Sub-Total Ntabelanga Dam and Associated Works	*1 209*
Engineering and EMP Costs (12%)	*145*
Sub-Total Ntabelanga Dam and Associated Works incl Eng & EMP	*1 354*
Escalation in Each Year @ 5.5% p.a.	265
Sub-Total Ntabelanga Dam and Associated Works incl Eng, EMP & ESC	*1 619*
VAT (14%)	227
Add in R22 million per year for catchment management (no esc)	220
Allowance for other offset activities (50% of R100 million)	50
Total Ntabelanga Dam and Associated Works (incl Esc + VAT)	**2 116**

COMPONENT	R'million
Ntabelanga water treatment works	643
Ntabelanga primary & secondary bulk treated water distribution system	1 234
Ntabelanga tertiary bulk treated water distribution system (DM's)	1 425
Ntabelanga bulk irrigation water supply system	497
Sub-Total Ntabelanga WTW and Bulk Water Systems	*3 799*
Engineering and EMP Costs (12%)	*456*
Sub-Total Ntabelanga WTW and Bulk Water Systems incl Eng & EMP	*4 255*
Escalation in Each Year @ 5.5% p.a.	1 067
Sub-Total Ntabelanga WTW and Bulk Water Systems incl Eng, EMP & ESC	*5 322*
VAT (14%)	745
Total Ntabelanga WTW and Bulk Water Systems (incl Esc + VAT)	**6 068**

….(cont.)

COMPONENT	R'million
In-farm irrigation investment costs	**105**
Engineering and EMP Costs (12%)	*13*
Sub-Total in-farm irrigation investment costs incl Eng & EMP	*118*
Escalation in Each Year @ 5.5% p.a.	40
Sub-Total in-farm irrigation investment costs incl Eng, EMP & ESC	*158*
VAT (14%)	22
Total in-farm irrigation investment costs (incl Esc + VAT)	**180**

COMPONENT	R'million
Lalini dam and associated works	802
Lalini Access Roads and Bridges	487
Lalini land compensation/mitigation costs	50
Lalini water delivery tunnel, shafts and penstocks	756
Lalini hydropower E&M equipment	175
Lalini hydropower civil works	49
Lalini power transmission lines to grid	29
Sub-Total Lalini Dam and HEP	*2 347*
Engineering and EMP Costs (12%)	*282*
Sub-Total Lalini Dam and HEP incl Eng and EMP	*2 629*
Escalation in Each Year @ 5.5% p.a.	648
Sub-Total Lalini Dam and HEP incl Eng, EMP and Esc	*3 277*
VAT (14%)	459
Add in R22 million per year for catchment management (no esc)	230
Allowance for other offset activities (50% 0f R100 million)	50
Total Lalini Dam and HEP (incl Esc + VAT)	**3 966**
GRAND TOTAL ALL COMPONENTS (R'MILLION INCL ESC AND VAT)	**12 329**

As shown, the DEA allocated a budget of approximately R450 million to be spent over the next 10 years for the catchment restoration and rehabilitation programme which commenced in April 2014. This budget therefore already exists and has been allocated proportionally to the two dams.

Also shown is the estimated budget for the implementation of the tertiary pipelines. This component is not part of the DWS responsibility and falls under the jurisdiction of the three District Municipalities and their Implementing Agents. Such funding is normally sourced from the Regional Bulk Infrastructure Grant (RBIG) and Municipal Infrastructure Grant (MIG) programme.

Allowance has also been made for the potential investment costs for the establishment and equipping of each of the 60 ha (average) farming units, which are expected to be between R3 and 5 million per farming unit. A budget of R4 million including VAT has therefore been allowed per average farming unit, for 45 farms.

These budgets include allowances for engineering (project management, design and supervision services providers) as well as the implementation of the EMP requirements.

Escalation has been calculated from the 2014 baseline to the date of commissioning at 5.5 % p.a., based upon the original implementation programme.

This programme will need to be reviewed in the light of the most likely implementation programme, which will be dependent upon the way that the various scheme components are packaged, the funding availability, the procurement and approvals processes, and the time taken to resolve the many institutional and social issues that are always a feature of such a large project.

It should be noted that there are several risks involved in the accuracy of the above cost estimate:

1. Estimating at feasibility level at best has a confidence level of ± 10%
2. Escalation rates could increase or decrease, especially given the volatile nature of the economy at the moment
3. Rand foreign exchange rates are also volatile and this will affect the cost of all imported materials, services and equipment.
4. The timing of the various components implementation may change which, if later, would increase the escalation cost.
5. The amount of non-grant finance is unknown, and if significant will increase costs, depending on the terms of such loans, interest rates and foreign exchange rates.

One example of the impact of the above risks is that every month's delay in fully implementing a R12.5 billion project increases escalation cost by R57 million (at 5.5% p.a.)

There are other potential costs for which additional budgets might need to be allowed, including:

- Environmental impact offsets including replacement of lost wetlands
- Improvements to other infrastructure in the region for those directly affected by the works – including upgrades to schools, clinics, water supplies and sanitation, and other community facilities
- Development of aquaculture
- Development of tourism and recreational infrastructure
- Development of local industries and agri-processing (which could include special focus on the planned Special economic Zone (SEZ) at Mthatha Airport which will include agri-processing).

The ongoing EIA study is to investigate the environmental and social impacts, and to determine resettlement, mitigations and compensation requirements, as well as these potential offset requirements.

In the meantime, a provisional budget of R100 million has been allowed for these offsets which has been evenly distributed between the Ntabelanga and Lalini components of the conjunctive scheme.

5.2 Alternative funding options for CAPEX

The Cost Estimates and Economic Analysis Report provides various scenarios for the impact on the unit reference value of water supplied, based upon different proportions of infrastructure, and operation and maintenance funding being by grant funds, with the remainder of funding needing to be redeemed through the tariffs charged for water supplied.

For the two water supply scheme components, the industry-standard discounted cashflow analysis was undertaken, which produces a unit reference value (URV) of water supplied.

This methodology includes:

- Capital cost of implementation, split into the expected annual expenditure
- Engineering and environmental costs
- Annual operation and maintenance costs (using percentages of capital costs)
- Water treatment costs (e.g. chemicals)
- Recurrent expenditure on periodical (circa 15 years) replacement of plant and equipment
- Annual energy costs based upon ESKOM tariffs

As this method compares net present values, all price levels were set at current day prices without escalation.

5.2.1 Hydropower Component

The main purpose of the hydropower components of the scheme is to generate an income stream through energy sales into the grid, which will be higher than the cost of energy used by the water supply components of the scheme, which cross-subsidises the overall scheme, and effectively reduces the net cost of energy. This significantly reduces the unit cost of water supplied for potable and irrigation purposes, greatly improves the viability and sustainability of both water supply components.

Such an option also has the advantage of delivering its surplus energy into the grid, adding to the green energy component of power supply, as well as being able to be bought on line at very short notice to meet peaks, unlike coal-fired stations which require long cold-start and shutdown periods.

5.2.2 Arrangements for Connection to the Grid

The local generation and sales of energy into the grid linked with the consumption of energy from the same grid is termed by ESKOM as “wheeling” through bilateral trade.

ESKOM’s information brochure dated September 2012 explains the process involved. NERSA allows wheeling but, under the rules of the Electricity Regulation Act, must approve the arrangement following a formal application process for a generator (i.e. this proposed scheme) to be granted a license to do so.

The generator will be required to pay connection fees and use-of-system charges based upon the generator’s location and MW generated.

a) Energy Offset with ESKOM

ESKOM allows for energy generators who produce power for their own use to also export surplus generated energy on to ESKOM's network. ESKOM does not buy this energy but a financial credit adjustment is given to the customer (in lieu of purchasing the energy) at the standard tariffs in the time of use period. The generator cannot have an account that is a negative Rand value due to large surplus generation, instead the maximum the account can be credited is to take the generator to a zero amount. See Figure 5-1.

The generator will receive credits from ESKOM for the energy sold into the grid. Typically this will be credited at the Megaflex tariff, which, for a 24 hr average supply operation is currently averaging R0.48/kWh.

Higher tariffs would be possible if peak period generation is established, but the investigation undertaken for the Lalini scheme concluded that a peaking station is non-viable in terms of the environmental impacts in the river downsteam amd the significant increased capital costs.

The cost of energy consumed by the other two components of the scheme, predominantly for water pumping, will be charged at the normal ESKOM tariff applicable. For the purposes of this analysis, the typical tariff used is the Ruraflex tariff, which, on the same 24 hr average usage basis has a current average cost of R0.75/kWh.

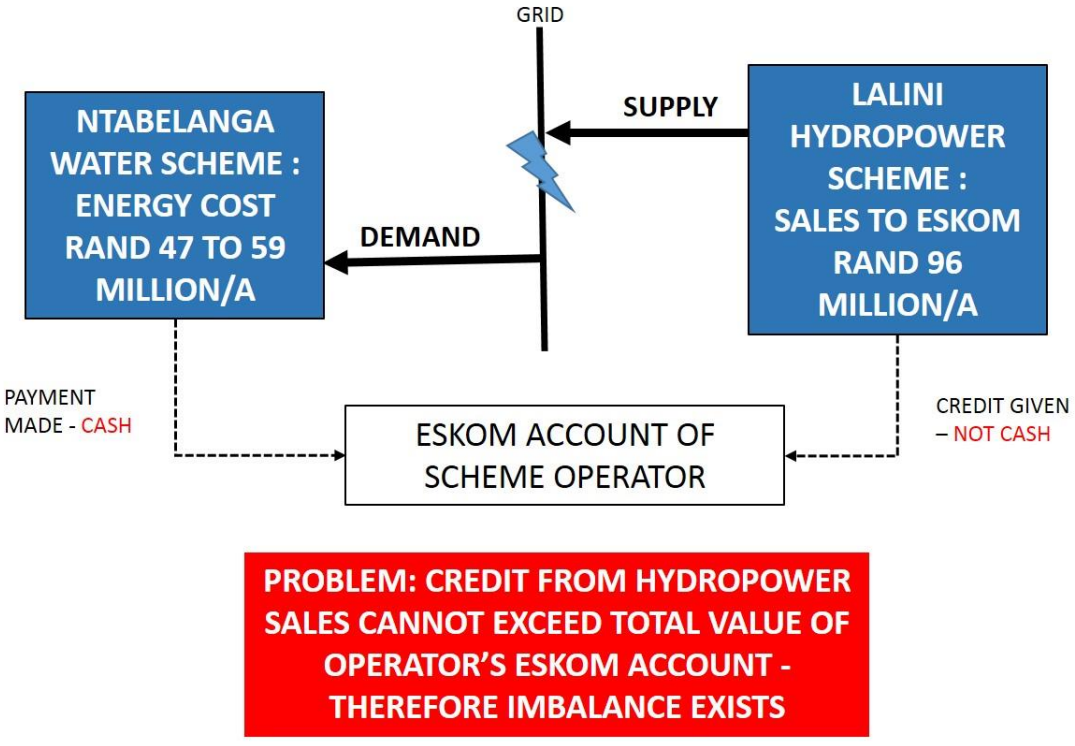


Figure 5-1: Energy offsetting with ESKOM

Given that the average energy consumption for the water supply components of the scheme will range from 8 to 10 MW, and the average output of the hydropower scheme will supply some 26 MW, this produces a net surplus energy that is in excess of the total energy cost. There is no existing mechanism with ESKOM for the value of all the excess energy generated to be credited to the project, thus significantly limiting the ability to subsidise the project, and thus limiting the positive economic benefits from the Lalini hydropower plant.

The same URV models have been run to take into account either full capital redemption, or for various proportions or components of the works being grant funded. In general, it is normal for water supply systems to scattered rural communities with high indigent populations to require significant or total grant funding, with the revenue from the equitable share and water sales being used to fund operation and maintenance costs only.

b) Green Energy Trading with Amatola Green Power

Instead of wheeling power directly with ESKOM, another option is to develop an agreement with Amatola Green Power (AGP), which has a license to trade in green energy anywhere in South Africa.

AGP pays generators in cash for the energy that they supply into the ESKOM grid. The generators pay ESKOM only for the grid access usage charges. AGP will pay the Mzimvubu Management Agency between R0.62 and R1.05/kWh

For each 1 000 kWh (1 MWh) purchased by AGP, a number is generated as a credit with ESKOM by an independent auditing body called the "Issuing Body" and kept in a national database. Tradable Renewable Energy Credits / Certificates (TRECS) are sold by AGP to energy consumers to allow them to obtain their energy requirements from their local grid (ESKOM or Municipality), which energy is duly certified to have been generated from renewable sources. See Figure 5-2.

TRECS are traded on the South African market at present, which is an entirely voluntary market. The buyer of TRECS could end up being a different one than the buyer of the Green Power.

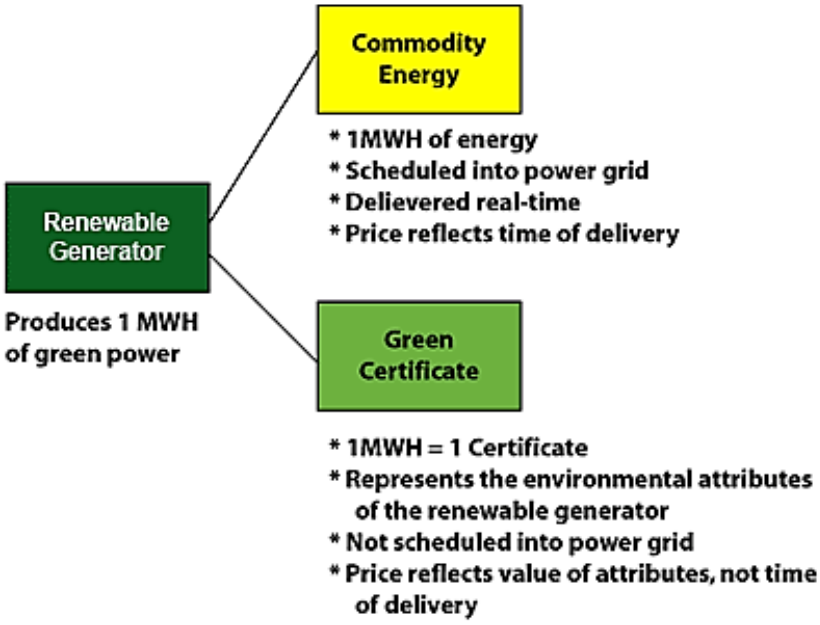


Figure 5-2: Illustration of the Tradable Renewable Energy Credits / Certificates Arrangement

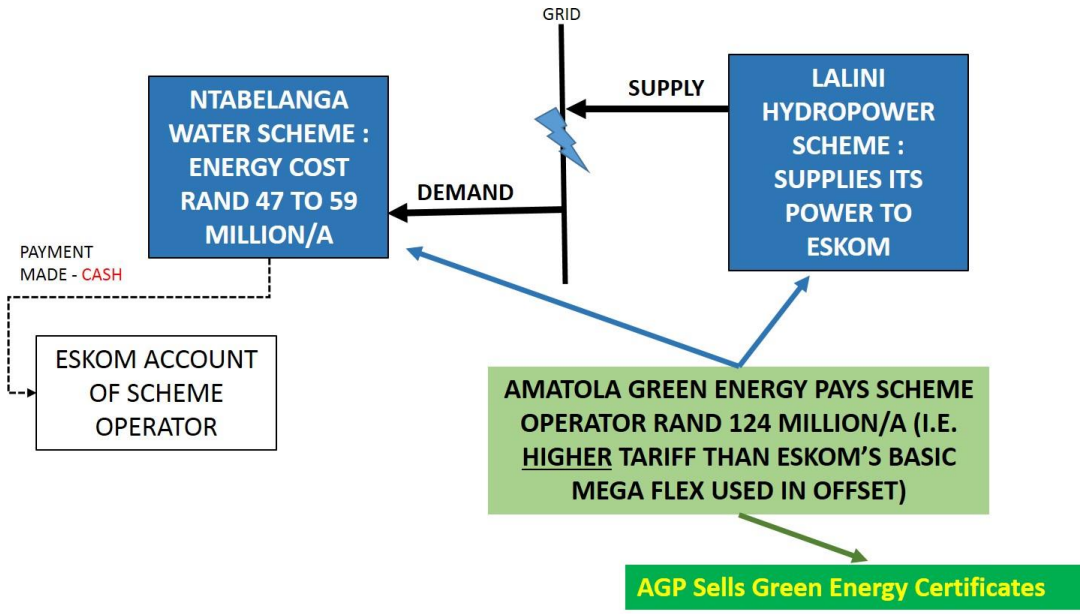


Figure 5-3: Energy Trading with AGP

With this energy trading option, the full economic benefit of the power generation from Laleni Hydropower plant is realised, as Amatola Green Power will pay cash to the scheme for every kWh supplied to the power grid. In this model, not only is the full cost of energy for the Mzimvubu Water Project covered, but additional income at a conservative estimate of R65 million per annum is realised to further subsidize the project.

The Cost Estimates and Economic Analysis Report contains the detailed discounted cash flow models for the potable water, and irrigation water components when considered separately, with Appendix I of the same report containing the combined models for the conjunctive scheme.

5.2.3 *Estimated Manning Requirements for the Various Scheme Components*

Table 5-2 shows a preliminary list of operational staffing requirements expected for the various scheme components. Annual Costs to Company (CTC) are shown based upon current median salary grades paid by Amatola Water. Cognisance has been taken of these costs in the economic analysis.

Table 5-2: Staffing Requirements and Annual Costs for the Various Scheme Components

COMPONENT	ANNUAL MAINTENANCE COSTS R'MILLION	ANNUAL OPS STAFFING COSTS R'MILLION	POWER COSTS/ANNUM R'MILLION		TREATMENT COSTS/ANNUM R'MILLION
			ON COMMISSIONING	BY 2050	
NTABELANGA DAM + MINI HYDRO + ASSOCIATED INFRASTRUCTURE	8	4.2	3	3	
NTABELANGA WTW AND POTABLE BULK WATER SYSTEM (PRIMARY ONLY)	20.1	12.3	36	48.9	7.7
NTABELANGA POTABLE BULK WATER SYSTEM (SECONDARY)	9	4.1	2.5	3	
NTABELANGA POTABLE BULK WATER SYSTEM (TERTIARY)	12	11.6	1.5	2	
NTABELANGA IRRIGATION SYSTEM (DELIVERY TO EDGE OF FIELDS)	5.3	2.5	18.6	18.6	
LALINI DAM AND HYDROPOWER SCHEME	29.9	6.8	3	3	
TOTALS: R'MILLION/ANNUM	**84.3**	**41.5**	**64.6**	**78.5**	**7.7**

5.3 Economic Analysis of Scheme Configurations and Funding

URV models have been run to take into account either full capital redemption, or for various proportions or components of the works being grant funded. In general, it is normal for water supply systems to scattered rural communities with high indigent populations to require significant or total grant funding, with the revenue from the equitable share and water sales being used to fund operation and maintenance costs only.

Various capital redemption scenarios have been modelled from no grant funding (100 % capital cost taken into account in Net Present Value) to full grant funding of the various system components.

For grant funded options, the full cost of operation, maintenance, staffing and power cost is generally always still included, with the exception of scenarios where the impact of partial or full subsidization of power costs are investigated.

In all cases the unit rate for power consumption is averaged as described above, based on the 20 hours per day operational regime, and on scenarios which include hydropower generation, the revenue stream is based upon the option of the green energy trading, with a current tariff averaging R0.80/kWh.

Appendices G and H of the Cost Estimates and Economic Analysis Report, contain the detailed discounted cash flow models for the potable water, and irrigation water components when considered separately, with Appendix I containing the combined models for the conjunctive scheme.

5.4 URV of Ntabelanga Potable Bulk Water System

Appendix G in the Cost Estimates and Economic Analysis Report shows the discounted cash flow models used to calculate the URV of potable water supplied, including all costs from the Ntabelanga Dam, water treatment works, pumping stations, primary and secondary bulk water distribution and storage reservoirs, and tertiary lines to local tanks at each of the settlements to be supplied in the three District Municipalities.

For this analysis, no hydropower installations were included, and the dam and associated infrastructure costing has been proportionally allocated to allow for only those elements or share of costs that would be required to supply the potable water requirements to the planning horizon of the 2050 (i.e. not including the irrigation water components).

The analysis was run for the potable scheme including the tertiary lines (Table 5-3 summarises the results) and for the scheme excluding the tertiary lines (Table 5-4).

Table 5-3: URV for Ntabelanga Potable Water Scheme Alone – Including Tertiary Pipeines

URV: POTABLE WATER SCHEME ONLY INCL TERTIARIES				
Scenario	**Components Grant Funded**	**URV OF WATER SUPPLIED (R/m^3)**		
		6%	**8%**	**10%**
1	Full Capital Redemption	14.21	15.49	16.71
2	Fully grant funded	3.22	2.96	2.72
3	Fully grant funded + 50% Energy Subsidized	2.80	2.57	2.37
4	Fully grant funded + 100% Energy Subsidized	2.37	2.19	2.01

Table 5-4: URV for Ntabelanga Potable Water Scheme Alone– Excluding Tertiary Pipelines

URV: POTABLE WATER SCHEME ONLY EXCL TERTIARIES				
Scenario	**Components Grant Funded**	**URV OF WATER SUPPLIED (R/m³)**		
		6%	**8%**	**10%**
1	Full Capital Redemption	9.45	10.20	10.92
2	Fully grant funded	2.47	2.27	2.08
3	Fully grant funded + 50% Energy Subsidized	2.05	1.88	1.73
4	Fully grant funded + 100% Energy Subsidized	1.62	1.49	1.38

The results serve as an illustration of the obvious benefits of grant funding and the impacts of partial or full subsidization of the energy costs.

Whilst a URV value does not relate directly to the tariff requirements for a viable scheme, experience has shown that this value should be below R2.00/m^3 on grant funded schemes where operation, maintenance and staffing costs need to be recovered for sustainability.

Financial impact models have been built to test such sustainability and are presented in the next section.

As would be expected, the inclusion of the tertiary pipelines would significantly increase the URV of water, but the analysis is based upon the DWS-developed scheme which includes delivery of potable water in bulk to the primary and secondary system only.

The tertiary pipelines would be the responsibility of the DMs to implement, and these are normally funded via grants under the RBIG and MIG funding process.

5.5 URV of Bulk Irrigation Water System

Appendix H in the Cost Estimates and Economic Analysis Report shows the discounted cash flow models used to calculate the URV of bulk irrigation water supplied, including all costs of abstracting raw water from the Ntabelanga Dam, the raw water pumping station, the intermediate bulk storage reservoir, and gravity pipelines to local tanks at each of the proposed farming units.

The delivery of raw water to some of the farm units at higher elevation will also require two small booster pumping stations, which are also included in the analysis. In-field distribution costs and associated equipment are not included, and the URV of water supplied therefore relates to the bulk water to be purchased by the farm unit developers.

Once again, various capital redemption scenarios have been modelled from no grant funding (100 % capital cost taken into account in Net Present Value) to full grant funding of the various system components.

For grant funded options, the full cost of operation, maintenance, staffing and power cost is again included, with the exception of scenarios where the impact of partial or full subsidization of power costs are investigated.

Table 5-5 summarises the results of this analysis.

Table 5-5: Summary of Results of Irrigation Water System URV Analysis

URV: IRRIGATION SCHEME COMPONENTS ONLY				
Scenario	**Components Grant Funded**	**URV OF WATER SUPPLIED (R/m³)**		
		6%	**8%**	**10%**
1	Full Capital Redemption	3.94	4.26	4.56
2	Fully Grant Funded	0.53	0.48	0.44
3	Grant Funded and 50% Energy Subsidized	0.44	0.40	0.37
4	Grant Funded and 100% Energy Subsidized	0.35	0.32	0.29

The results again serve as an illustration of the obvious benefits of grant funding and the impacts of partial or full subsidization of the energy costs.

Whilst a URV value does not relate directly to the tariff requirements for a viable scheme, experience has shown that for irrigated agriculture, where low unit cost of water is required for viability, this value should be well below R0.50/m^3 on grant funded schemes where operation, maintenance and staffing costs need to be recovered for sustainability.

The above table and figure show the significant impact on the URV of raw water delivered in bulk to the edge of field of the proposed farming units, when capital costs and power costs are subsidized.

This is reflected when taking a straightforward non-discounting approach to the operation and maintenance cost of this component, as is shown in Table 5-6.

Table 5-6: Annual Operation and Maintenance Costs for Irrigation Component

OPTION 3 - IRRIGATION PIPELINE DIRECT FROM DAM					
ITEM	**DESCRIPTION**	**AMOUNT**		**O&M per year**	
1	Pipelines	R	405 636 748	0.50%	R 2 028 184
2	Abstraction works	R	8 000 000	0.25%	R 20 000
3	Pumpstations	R	23 280 152	4%	R 931 206
4	Reservoirs	R	50 000 000	0.25%	R 125 000
5	Electrical supply	R	10 000 000	4%	R 400 000
6	Contingencies	R	49 691 690	1%	R 496 917
7	Engineering fees	R	32 796 515		
	Allowance for M&E depreciation and replacement funding				R 956 515
	Total 1	**R**	**579 405 105**		**R 4 957 822**
	VAT	R	81 116 715		R 694 095
	Total	**R**	**660 521 820**		**R 5 651 917**
				Tot. Water	
O&M Cost for supply of raw water to edge of field excluding power				21 240 366	R 0.27
Power Cost per year		**R**	**18 559 958**	21 240 366	R 0.87
Cost for supply of raw water to edge of field including power				**R/m³**	**R 1.14**

Reduction of this unit cost to around R0.25/m^3 by subsidisation of energy (i.e. through the hydropower component), would considerably increase the gross margin produced by each farming unit, and viability of the irrigation component in total.

This is further investigated in the financial impact analyses in the next section.

5.6 Overall URV of Conjunctive Scheme

The above discounted cash flow/URV models have been combined to test the impact of operating the potable water, irrigation water, and hydropower components as an integrated scheme. The combined URV models are given in Appendix I in the Cost Estimates and Economic Analysis Report.

Whilst the URV models for the potable and irrigation water were added incrementally together with the capital, operating and maintenance costs of the conjunctive Ntabelanga-Lalini hydropower components, the value of an annual credit from the surplus energy income from the hydropower component over the annual energy costs of the water supply components was made. This had the effect of significantly reducing the overall URV of water supplied as is shown on Table 5-7 and Figure 5-4.

Again, the impact of various proportions of grant funding of the capital costs of the conjunctive scheme were also considered. Seven scenarios are shown, ranging from no grant funding (full capital redemption) to full grant funding, only operation and maintenance costs redeemed.

Table 5-7: URV for Fully Conjunctive Ntabelanga-Lalini Scheme – Incl. Tertiaries

URV: ALL WATER SUPPLIED: CONJUNCTIVE SCHEME INCL TERTIARIES				
Scenario	**Components Grant Funded**	**URV OF WATER SUPPLIED (R/m³)**		
		6%	**8%**	**10%**
1	None - Full Capital Redemption	11.47	12.95	14.33
2	Lalini Scheme Only	7.78	8.78	9.71
3	Ntabelanga Scheme Only	4.69	5.27	5.81
4	Lalini + Tertiaries	5.86	6.59	7.26
5	Lalini + Tertiaries + Irrigation	5.01	5.64	6.23
6	Lalini + Tertiaries + Irrigation + Prim and Sec Bulk System	3.40	3.80	4.17
7	All Works Grant Funded	0.77	0.82	0.87

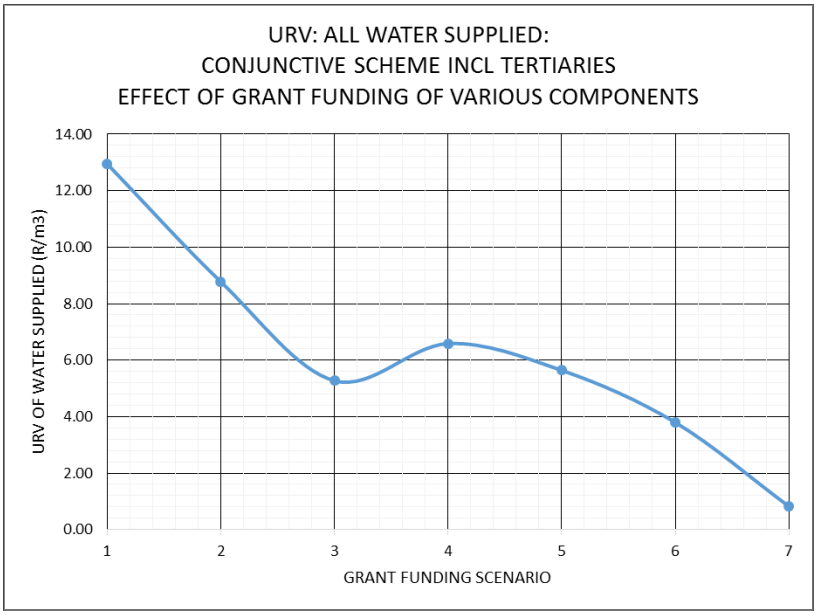


Figure 5-4: Conjunctive Scheme - URVs for Various Grant Funding Scenarios (Incl. Tertiaries)

Alternatives of only grant funding the Ntabelanga scheme or the Lalini scheme components are shown as scenarios 2 and 3. The same analysis was repeated for the fully conjunctive scheme, but without the tertiary pipeline system included. Table 5-8 and Figure 5-5 show the results.

Table 5-8: URV for Fully Conjunctive Ntabelanga-Lalini Scheme – Excl. Tertiaries

URV: ALL WATER SUPPLIED: CONJUNCTIVE SCHEME EXCL TERTIARIES				
Scenario	Components Grant Funded	URV OF WATER SUPPLIED (R/m³)		
		6%	8%	10%
1	None - Full Capital Redemption	9.37	10.60	11.75
2	Lalini Scheme Only	5.51	6.27	6.98
3	Ntabelanga Scheme Only	4.29	4.89	5.45
4	Lalini	5.47	6.22	6.92
5	Lalini + Irrigation	4.63	5.28	5.89
6	Lalini + Irrigation + Prim and Sec Bulk System	3.02	3.44	3.85
7	All Works Grant Funded	0.41	0.49	0.57

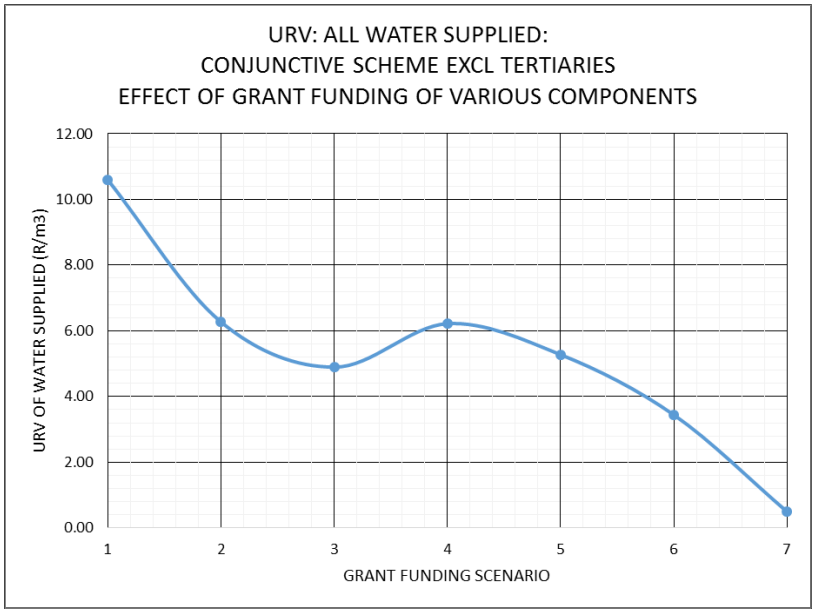


Figure 5-5: Conjunctive Scheme - URVs for Various Grant Funding Scenarios Excl Tertiaries

As can be expected the exclusion of the tertiary pipelines reduces the URV significantly and under the fully grant funded option almost halves the URV of water supplied.

Comparing the URV of water produced for scenario 2 on Table 5-3 (Ntabelanga scheme only – no energy subsidy as no hydropower included) with the URV of water produced in scenario 7 for the full conjunctive scheme on Table 5-7, shows the impact of the cross-subsidization of energy costs, and the benefit of surplus revenue generated by the conjunctive scheme, which produces (at 8% discount rate) a drop in URV value from R2.96/m^3 to R0.82/m^3. The findings indicated that there could be significant merit in development the conjunctive scheme instead of the Ntabelanga scheme only, and it was agreed that both options would be investigated in terms of financial impact assessment. This is especially pertinent given the high proportion of operating costs that are due to energy charges, and the likely continuing increase in energy costs in the future at much higher a rate than normal inflation.

5.7 Financial Impact Assessment

5.7.1 Overview

The financial impact models are different from the economic models in that they take into account the escalated costs, tariffs and cash flow year on year using realistic bulk water tariffs and projected escalation rates which take into account current the current and project economy indicators.

As with the URV models, these financial models were run for a 30 year simulation from this current year, and it was assumed that the bulk water supply operations would be undertaken by an implementing agent such as Amatola Water, who currently operate similar schemes in this region.

Water tariffs, costs and revenue streams were escalated to the date of expenditure, as follows:

- Capital and O&M cost are escalated at 5.5 % p.a., and
- Energy costs escalated at 8.5% p.a. for 3 years then at 6.5% p.a.

The scheme components analysed excluded the tertiary pipelines in order to replicate the limits of infrastructure that would be operated by the bulk water supply operator (such as Amatola Water), and it would then be up to the Water Services Providers (DMs) to reticulate and deliver the potable water onwards from this bulk supplier's terminal reservoirs to the customers.

In terms of actual sales quantities, the water requirements projections were used and adjusted for expected unaccounted for water in terms of losses, and deducting water supplied as free basic water (the latter estimated as some 25% of the total potable water produced).

Using Alfred Nzo DM as an example, their water supply tariffs to domestic customers allow for the first 6 m^3/month per household free to indigent customers, but they also charge some R1.60/m^3 in this lower consumption band if the customer is determined to be "non-indigent". Above 6 m^3/month per household consumption, the tariffs increase steeply to R5.5/m^3 for up to 21 m^3/month/household consumption, and to R10.9/m^3 in the next tariff band, and so on up to a maximum of R22/m^3.

Commercial/industrial customer tariffs start at R5.7/m^3 in the first 10 m^3/month band, rising to R11.5/m^3 in the next 20 m^3/month band and rising steadily to R28.6/m^3 for consumption above 120 m^3/month.

These tariffs bands are set to ensure that the poorer customers are cross-subsidized. In addition, each DM receives annual subsidies through the Local Government Equitable Share programme. These subsidies are to fund the provision of basic services to indigent households, which is currently of the order of R275 per month per indigent household, and of which some R87 per month (average nationally) is typically allocated for water supply services.

The above information was used as an indicator to try to ascertain what bulk potable water supply tariff could be afforded by the DMs that would be supplied by the proposed bulk water supply scheme.

As described in the Legal Institutional and Financing Arrangement Report No. P WMA 12/T30/00/5212/16, it is recommended that a well-resourced and experience bulk water supply operator be appointed to operate and maintain the bulk water supply system, and sites Amatola Water as a strong possible for this role.

According to Amatola Water's Annual Report 2014, they sell bulk raw water at a tariff of R1.57/m^3, and potable water at a tariff of R6.36/m^3, with a resulting composite average water sales tariff of R5.39/m^3 (2014). This is relatively high when compared with the much larger Water Boards such as Rand Water and Umgeni Water, and reflects the benefits of economies of scale that these larger Water Boards enjoy.

The appointment of Amatola Water to operate and maintain the Ntabelanga bulk water supply scheme would more than double this organisation's annual potable water sales and triple the overall water sales, which would certainly add economies of scale to Amatola's operation, which could mean a lowering of the average bulk water tariff to sustain their business.

5.7.2 Sources of Capital Works Funding

Different sources of capital works funding were investigated:

Grant funding: Interest free and with no repayment requirement. The source of such funding would normally be from the National Treasury, although some international agencies can provide grant funding – normally for social upliftment project which otherwise would not be financially viable.

Loan funding: Borrowing funds at a certain interest rate per annum, with a requirement to repay the loan over a period (tenor) normally of the order of 20 to 25 years. The lender would set terms and conditions which would need to be complied with by the borrower. Loans which do not have an agreed fixed interest rate would have a higher risk than those which have fixed interest rates. If the loan funding is to be sourced and repaid in foreign currency, then there would be an exchange rate risk.

Equity funding: An investor raises funding for the purchase of a share in the works for which the investor receives an agreed annual dividend. The equity investment is not repaid but could be traded to other investors as shares.

5.7.3 Ntabelanga Bulk Water Supply Scheme

This analysis was based upon the infrastructure illustrated on Figure 5-6, and excludes the tertiary pipeline system to be implemented by the DMs.

Taking the above situation into consideration, and in order to test the financial viability of the study scheme options, the initial potable and irrigation water sales tariffs in year 1 (2015) were set at R5.00/m^3 and R0.30/m^3 respectively.

Power cost projections were based upon the estimated initial power consumption, and expected power tariff, in the first year of operation (2020), escalated thereafter at 6.5% p.a. Capital works and associated implementation expenditures were escalated from the 2014-based cost estimates at 5.5% p.a. with annual expenditure cash flow estimated from the projected implementation programme timing.

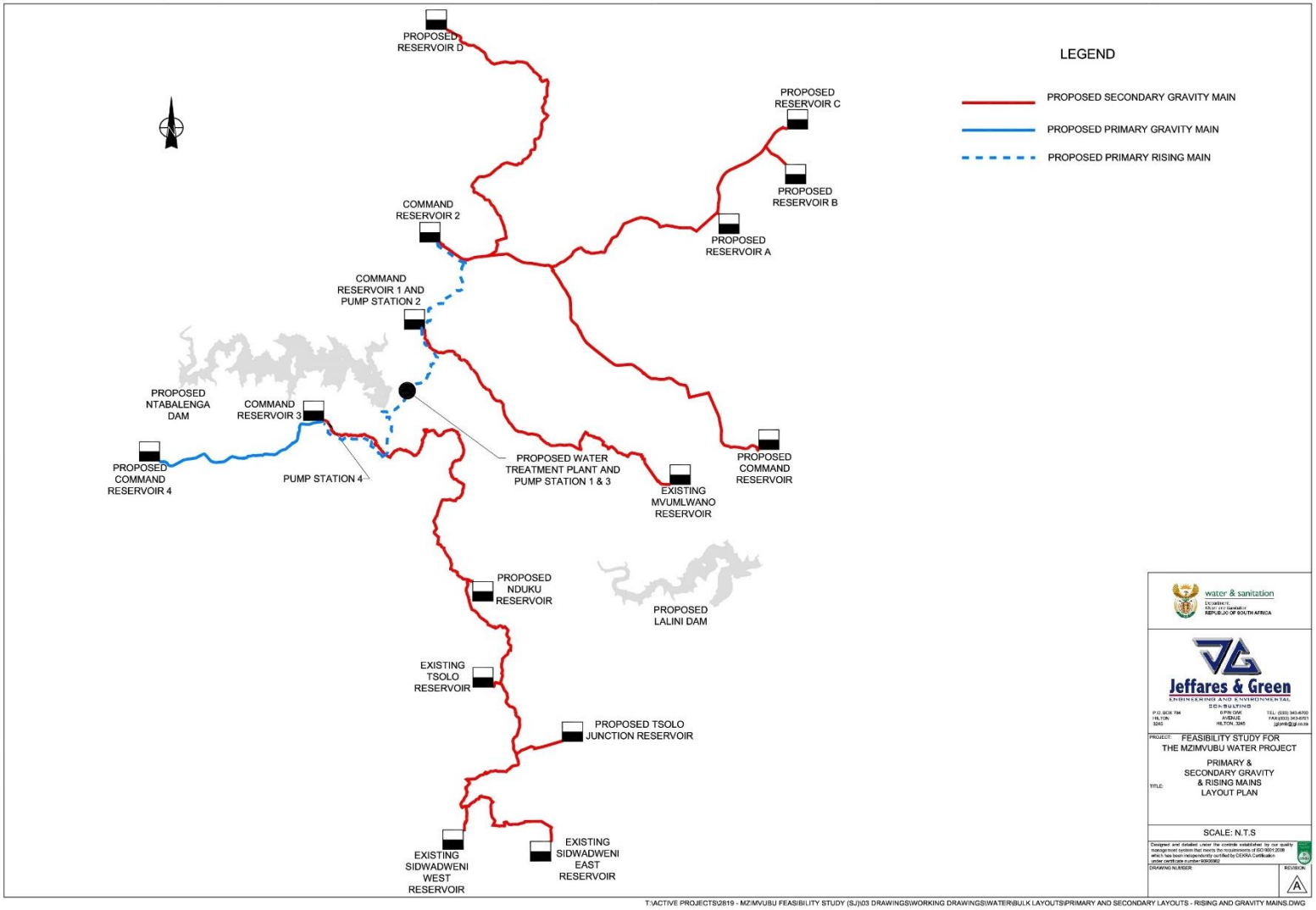


Figure 5-6: Illustration of Primary and Secondary Gravity and Rising Mains Layout

Figure 5-7 shows that even with all capital costs grant funded, the income from water sales would not be sufficient to sustain the management, operation, maintenance and energy costs of the scheme.

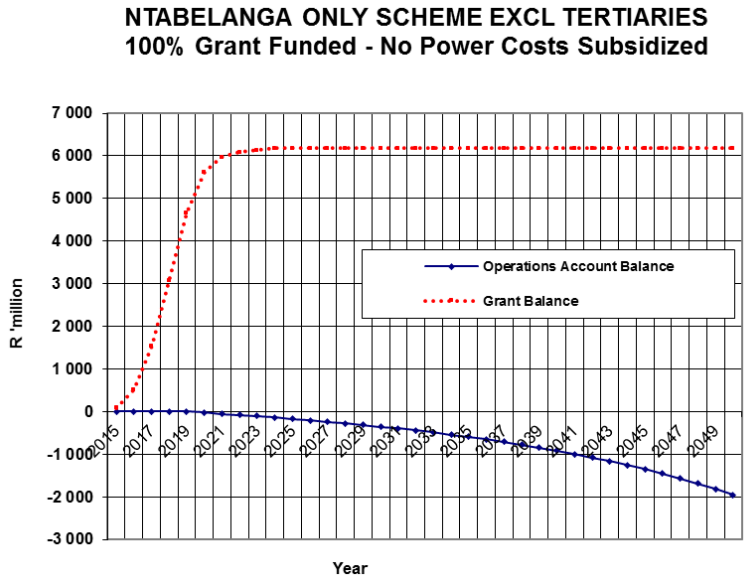


Figure 5-7: Grant Funded Ntabelanga Water Supply Scheme – R5.00/m^3 initial tariff

The operations account balance shows annual operating losses commencing at R25 million per year in the first year of operation rising to R130 million per year in 2050. Thus this scheme would not be financially sustainable in the absence of some subsidy of the management, operation, maintenance and energy costs.

Raising the initial (year 1) bulk water tariff to R6.00/m^3 does bring the operating account into balance, but this is likely to be a non-affordable bulk water tariff for the DMs to pay when the additional management, operation and maintenance costs of the tertiary distribution systems are taken into consideration, together with the high proportion of indigent households to be supplied by this scheme. See Figure 5-8.

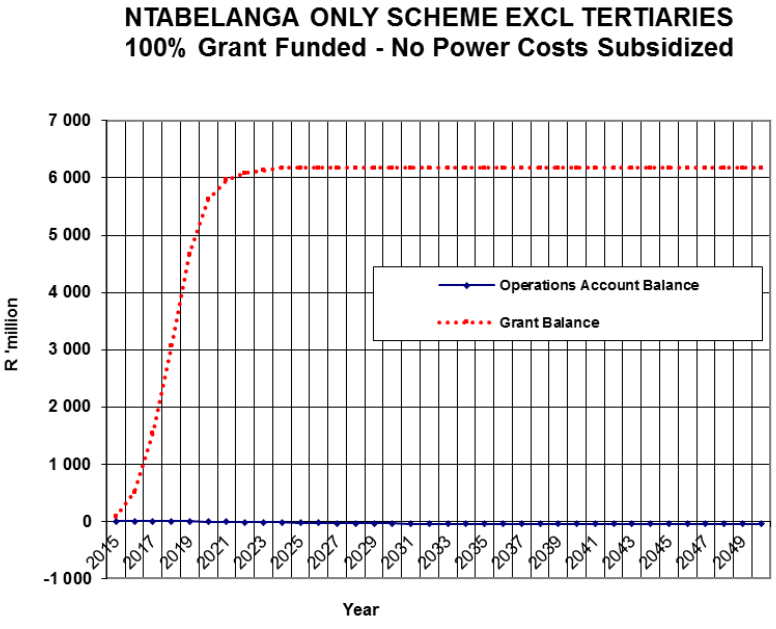


Figure 5-8: Grant Funded Ntabelanga Water Supply Scheme – R6.00/m^3 initial tariff

5.7.4 Grant Funded Conjunctive Scheme Excluding Tertiary System

This financial impact model was initially run for a fully grant funded situation, and using the same base data as for the Ntabelanga scheme excluding the tertiary system.

Apart from higher capital, operations and maintenance costs, the model also includes credit for the energy sold into the grid from the hydropower components of the conjunctive scheme. This energy would be sold as green energy trading certificates (as with the AGP example) and the year 1 (2015) tariff allowed for this was R0.80/kWh, which was then escalated at national escalation rate of 5.5% p.a.

As shown in Figure 5-9, even with water sales tariffs set at ZERO for both potable and irrigation water sold, the revenue generated by hydropower sales alone would sufficient to financial sustain management, operation, maintenance and power costs for the conjunctive scheme.

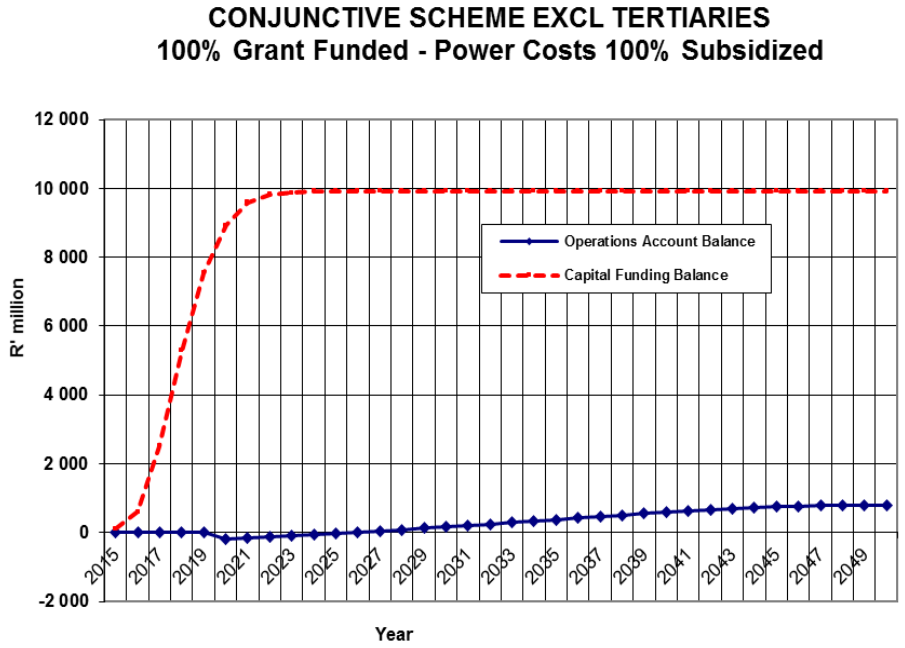


Figure 5-9: Grant Funded Conjunctive Water Supply Scheme – R ZERO/m^3 initial tariff

It is of course not sensible to deliver bulk water at zero tariff and two more scenarios were explored for the fully grant funded conjunctive scheme, setting the bulk potable water tariff to R3.00/m^3 and R5.00/m^3 respectively, and setting the initial irrigation water tariff at R0.30/m^3 in both cases. The results are shown in Figures 5-10 and 5-11.

This scenario shows that by charging an initial bulk water tariff equivalent to R3.00/m^3 for potable water and R0.30/m^3 for irrigation water, all recurring costs can be met as well as generating cash surpluses, which over the 30 year period of analysis accumulate to over R9 billion and which could be utilized to either repay the grant funding or put into other social and economic development projects in the region.

Figure 5-11 shows that increasing the potable bulk water initial tariff to R5.00/m^3 produces even more of cash surplus per annum which would accumulate to more than R14 billion over 30 years.

Under both of these circumstances there would be many options available for the utilisation of such surplus, from the above described usage for other development projects to the simpler action of treating the grant funding as an interest free loan from Treasury, which could be repaid over a given period.

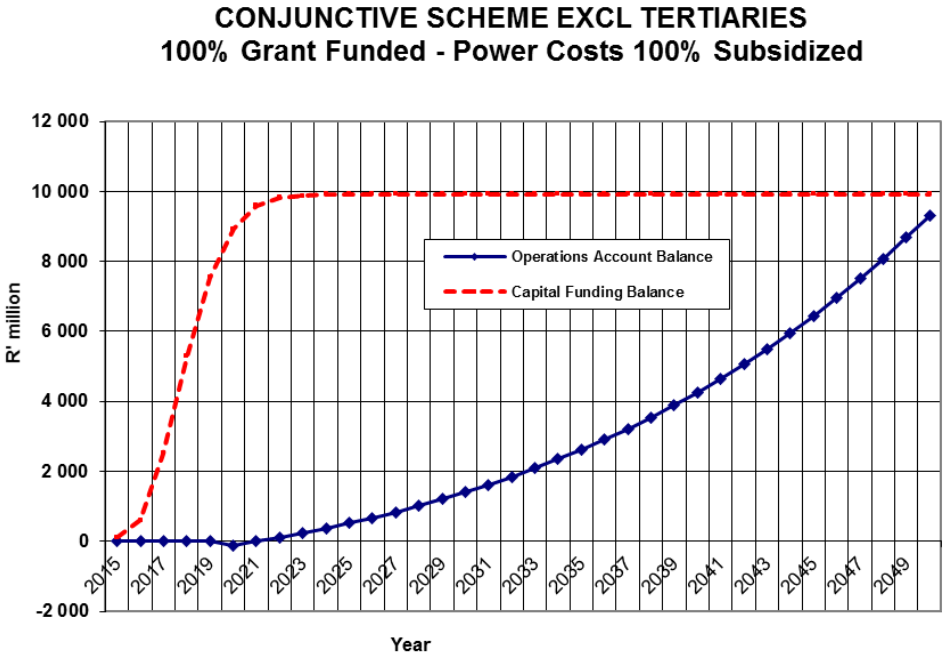


Figure 5-10: Grant Funded Conjunctive Water Supply Scheme – R3.00/m^3 initial tariff

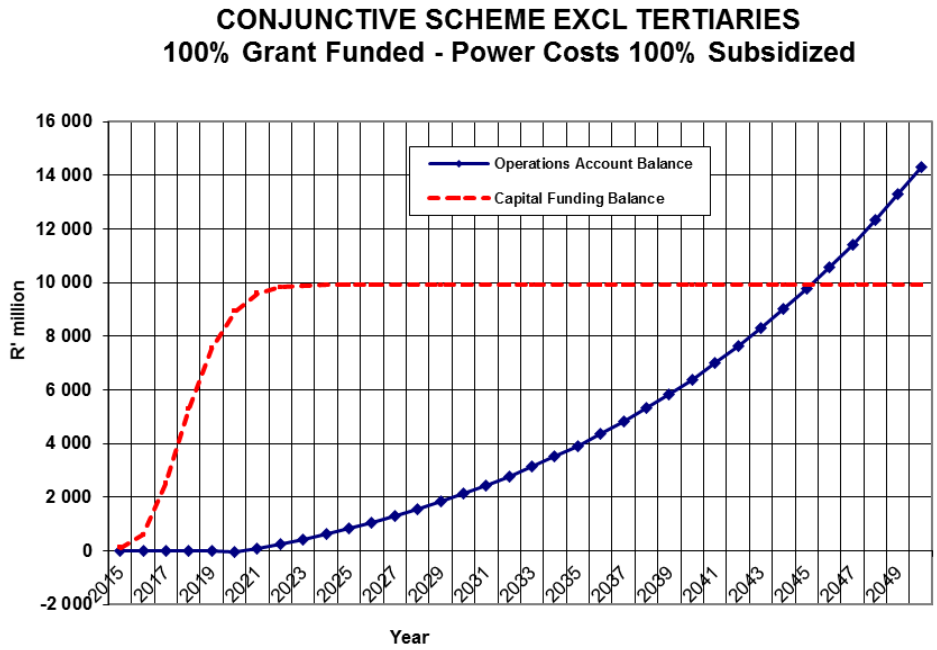


Figure 5-11: Grant Funded Conjunctive Water Supply Scheme – R5.00/m^3 initial tariff

5.7.5 Other Conjunctive Scheme Financing Options

The options considered in this respect were as follows:

- Lalini 40% loan funded @ 9% interest p.a. with R3.00/m^3 initial tariff
- Lalini 60% loan funded @ 6% interest p.a. with R3.00/m^3 initial tariff
- Lalini 60% loan funded @ 9% interest p.a. with R5.00/m^3 initial tariff
- Lalini 100% loan funded @ 6% interest p.a. with R5.00/m^3 initial tariff
- Lalini 25% equity funded @ 15% return on investment - with R5.00/m^3 initial tariff

Each of these models was run and percentages of Lalini funded by loans adjusted until a stable operations account balance was maintained after meeting all other costs and debt repayment conditions.

This indicates the effect of different loan interest rates as well as the initial tariff impacts upon the size of loan that could be repaid within a reasonable period (less than 30 years).

The findings are summarized in Figures 5-12 to 5-16.

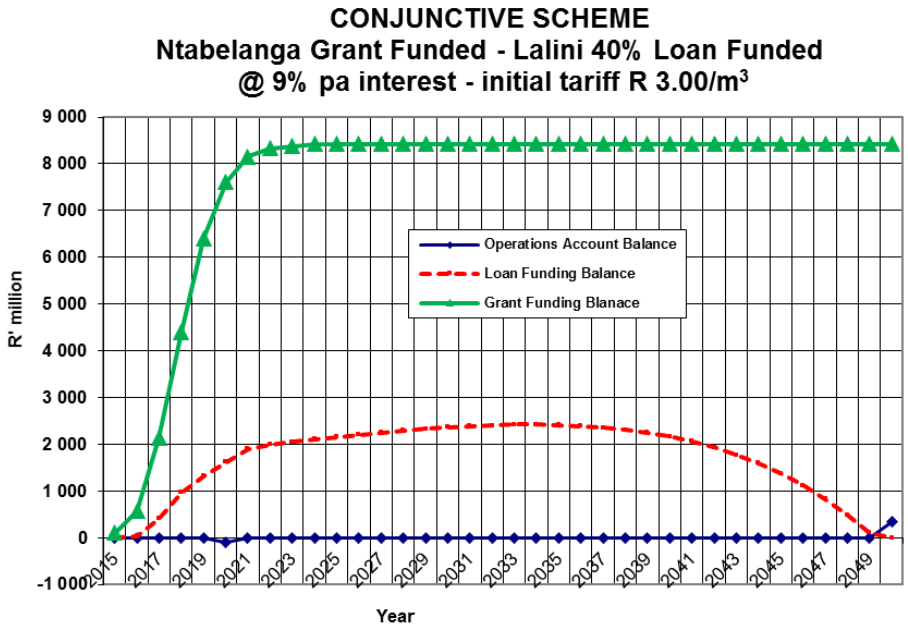


Figure 5-12: Conjunctive Scheme: Lalini 40% Loan Funded @ 9% interest: R3.00/m^3 initial tariff

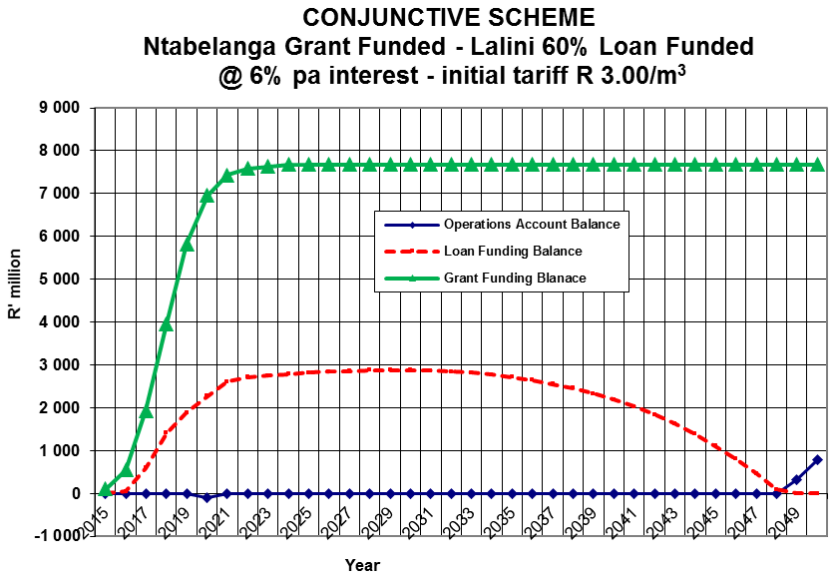


Figure 5-13: Conjunctive Scheme: Lalini 60% Loan Funded @ 6% interest: R3.00/m³ initial tariff

In these two cases it is indicated that from a relatively low bulk water tariff of R3.00/m³, a loan of between 40% and 60% of the Lalini component capital cost could be repaid through revenue generated, depending upon the interest terms of such a loan.

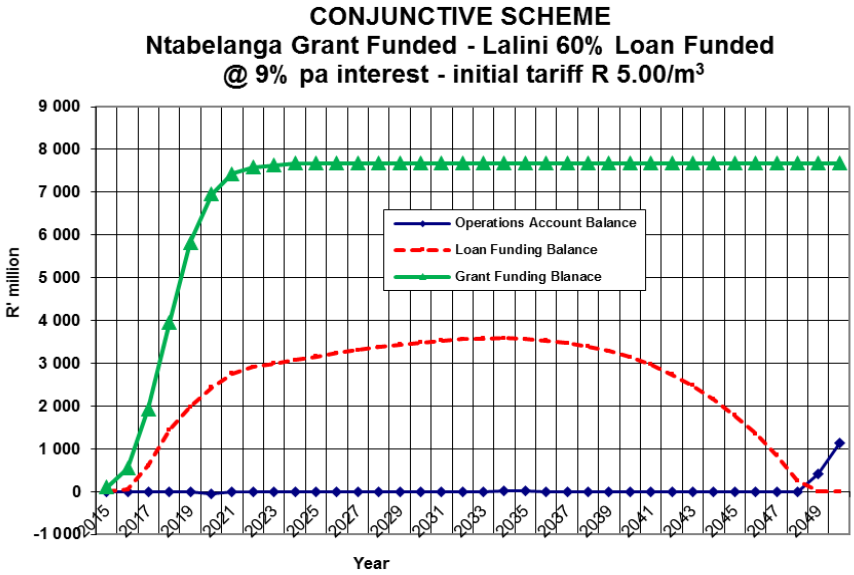


Figure 5-14: Conjunctive Scheme: Lalini 60% Loan Funded @ 9% interest: R5.00/m³ initial tariff

For a loan of 60% of the Lalini scheme cost to be repaid at 9% interest, the initial tariff would need to be increased to R5.00/m³.

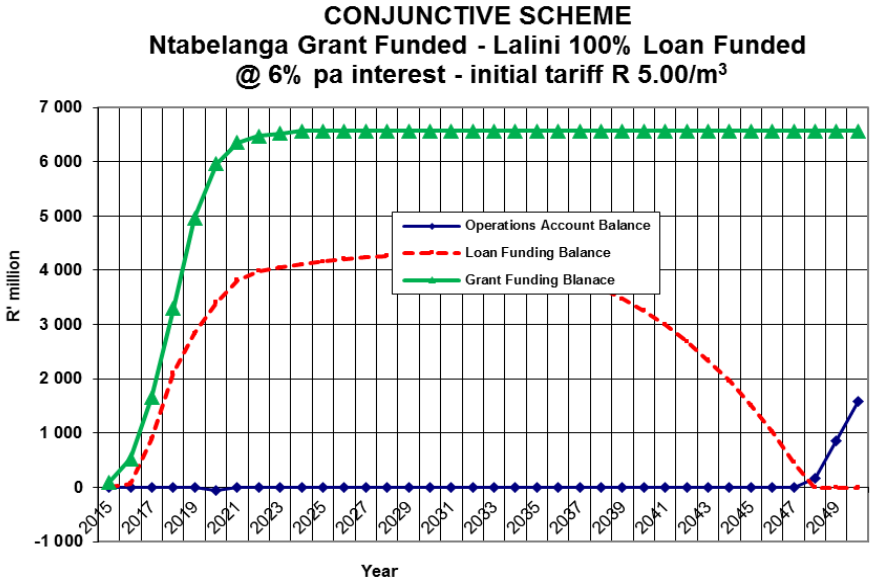


Figure 5-15: Conjunctive Scheme: Lalini 100% Loan Funded @ 6% interest: R5.00/m^3 initial tariff

For a 100% loan for the Lalini scheme cost to be repaid at 6% interest, the initial tariff would again need to be set to R5.00/m^3.

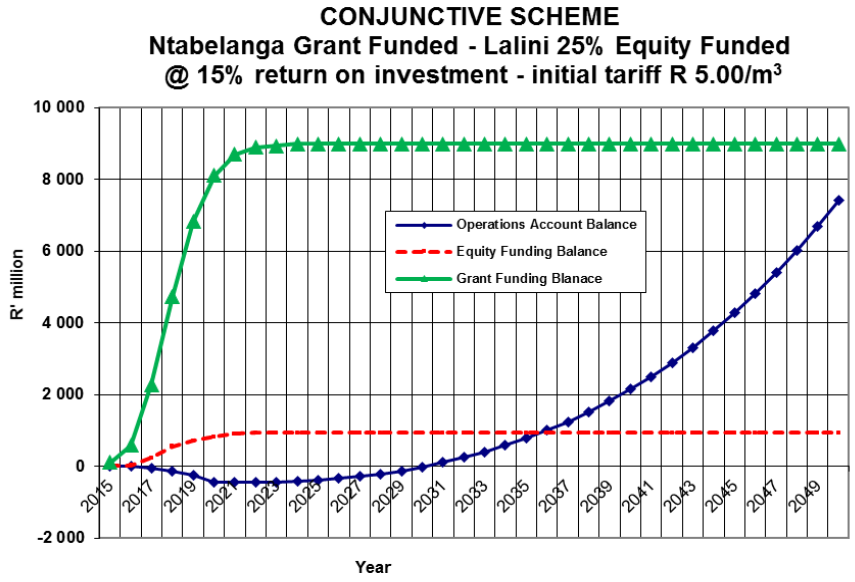


Figure 5-16: Conjunctive Scheme: Lalini 25% Equity @ 15% investment return: R5.00/m^3 initial tariff

Equity investments are another option where the principal capital is not repaid, but an annual dividend (the equity investor's expected return on investment – normally of the order of 15% p.a.) must be paid. In this case it might be attractive for such an equity investor to also be involved in the operation and maintenance aspects, and there are certain entities that specialise in such utilities management. The financial impact model for a 25% equity investment of the Lalini components of the conjunctive scheme would be viable if the initial bulk water tariff was set to R5.00/m^3.

5.7.6 Summary of Financial Analysis

In summary, the fully grant funded Ntabelanga only scheme would require a high starting base for the bulk potable water tariff in order to be financially sustainable. This being of the order of R6.00/m^3 before being further transferred and distributed through a new tertiary pipeline system that would need to be implemented by the DMs. This is therefore not considered a viable solution.

The conjunctive scheme would still require significant grant funding, as is normally the case on regional water supply systems – especially where constructed in mountainous rural areas with a high proportion of indigent households.

Grant funding of the full conjunction scheme including the Lalini hydropower component would allow low bulk water tariffs to be charged (say R3.00/m^3) as well as generating cash surpluses, which over the 30 year period of analysis accumulate to over R9 billion and which could be utilized to either repay the grant funding or put into other social and economic development projects in the region.

If Amatola Water were to become the operator of the conjunctive scheme, this could radically improve their economies of scale which could also have the impact of reducing the overall average cost of bulk water to all of their other customers as well, which would widen the benefits to a larger area than just the Ntabelanga-Lalini region.

If it is considered necessary to reduce the amount of grant funding of the project through the sourcing of loans or equity investments, then there is also potential for this to happen at the same time as keeping the required bulk potable and irrigation water tariffs to a financially viable and sustainable level. However, the financial burdens imposed upon the scheme due to the need to repay loans, interest, and or equity shareholders dividends, would absorb the potential surplus revenue that could otherwise be used to repay grants and/or to spend on further social upliftment and economic development programmes in this area.

5.8 Conclusion

Given the above results, there is a business case for the implementation of a conjunctive integrated multi-purpose scheme incorporating potable water supply, irrigated agriculture, and hydropower under a single, ring-fenced institutional entity.

This concept has been discussed at several forums including the Project Steering Committee meetings, the Wild Coast Integrated Development Forum, and at the Eastern Cape Social Economic Consultative Council (ECSECC), who have been tasked with stewardship of the implementation of this project on behalf of the Provincial Government.

A recent critical review of the above study findings was also undertaken by Mr Mike Muller on behalf of ECSECC, who came to similar conclusions.

6. CONCLUSIONS AND RECOMMENDATIONS

A clear understanding by the implementing entity of current mandates and accordingly roles and responsibilities within the project will be fundamental. It will thus be important to avoid inter-posing structures or creating entities to undertake roles and responsibilities that are already supposed to be undertaken by existing entities. As a part of the sectoral co-ordination process, ToRs will need to be provided to each entity or structure that will be involved in the implementation and operation of the scheme.

A general structure for the sectoral institutions involved, is given in Figure 6-1.

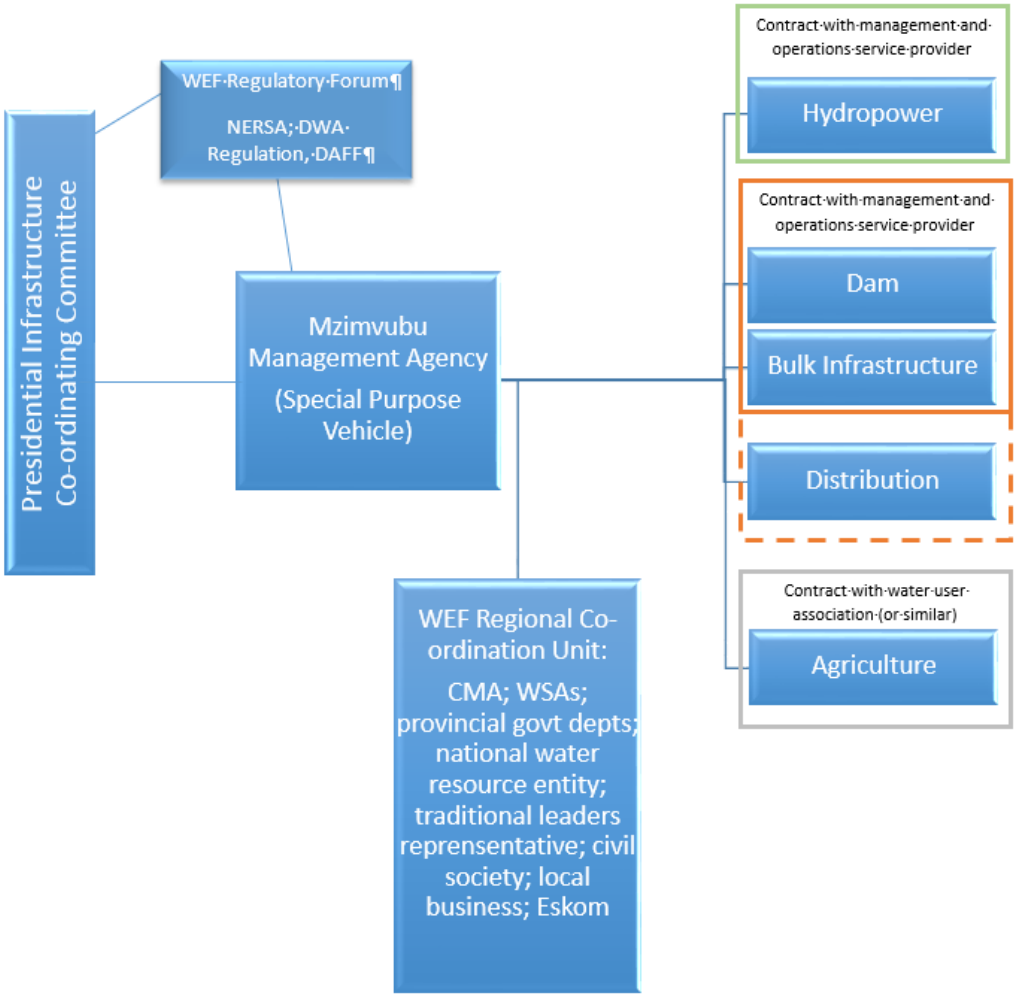


Figure 6-1: Recommended Sectoral Institutional Model

The role of the Presidential Infrastructure Co-ordinating Committee (PICC) and the impact of the Infrastructure Development Act will need to be taken into consideration, as this may provide for existing inter-governmental platforms being replaced with new approaches. It is assumed that the PICC will continue to co-ordinate the planning and management of the project, presumably through the TCTA, who have been mandated with this role under the SIP3 programme.

The issue of land use reform, expropriation and compensation will need special attention, in particular regarding the change of approach from subsistence farming to commercial farming in the particular areas identified in this study. Both DAFF and the Provincial DRDAR will need to play key roles in this process.

It is suggested that a *"Regional Co-ordination Unit*", preferably an existing organization, be tasked with co-ordination of sectoral roleplayers at a regional level. At present, the Eastern Cape Socio Economic Consultative Council (ECSECC) has been tasked to champion this project on behalf of the Integrated Wild Coast Development Forum, and it is through this organization that such Provincial co-ordination might best be channeled during the project implementation, notwithstanding recognition of the role that the TCTA is still playing as regards SIP3 co-ordination.

DWS themselves must license water use to achieve the broader socio-economic objectives. It currently still has a large role to play in motivation and instigation of the sourcing of grant funding to implement the scheme components prior to any other SPV or similar body being appointed to manage this process.

In the medium to longer term, the overall scheme components design, construction and operation should be linked, and be managed by a special purpose vehicle/implementing agency such as the Trans Caledon Tunnel Authority (TCTA), or a new Reagional Water Utility (RWU), as this would have advantages from a risk management perspective. TCTA have undertaken this role very successfully on several large projects, including the Lesotho Highlands and the Berg River Dam in Western Cape, and would be both capable and well qualified to undertake this role. They already have the experience and capabilities to source government grants, donor funding, and other project finance at very beneficial terms and conditions.

The primary and secondary bulk water distribution infrastructure should ideally be operated as a primary function of a water board, and in this case, Amatola Water would be the logical and capable candidates to undertake this role.

The tertiary bulk water supply reticulation currently falls under the function of WSAs. Whilst this can continue, with those WSAs purchasing treated water in bulk from the operator of the primary and secondary system, consideration might be made to instigate a "wall-to-wall" Regional Water Utility that would include the current responsibilities of the WSAs.

In addition to the provision of capital funding for the raw water bulk delivery scheme to the identified irrigation areas, emerging farmers must also be supported directly in the form of advice, training, and possibly financial assistance, where the Provincial DRDAR will again need to play a key role

It is recommended that the hydropower component be operated within the same ring-fenced conjunctive scheme as the potable and raw bulk water supply components, so that the financing, operation, maintenance and management, and cashflows can be integrated to maximize the economic and social benefits of this region.

This would require the appointment of a specialist service provider with the skills and capacity to manage, operate and maintain the hydropower plant and associated works. One other option that could be considered would be to invite interest from suitable IPP investors to bring partial equity into the financing equation (i.e. a PPP arrangement), although this might not be attractive to such IPPs due to a limited internal rate of return.

The institutional and financial flow diagram in Figure 6-2 assumes the overall management of the conjunctive scheme by an SPV such as the TCTA, and shows the various organisations involved in the scheme, the flow of revenue from energy and bulk water sales, financing arrangements, and operational roles and responsibilities.

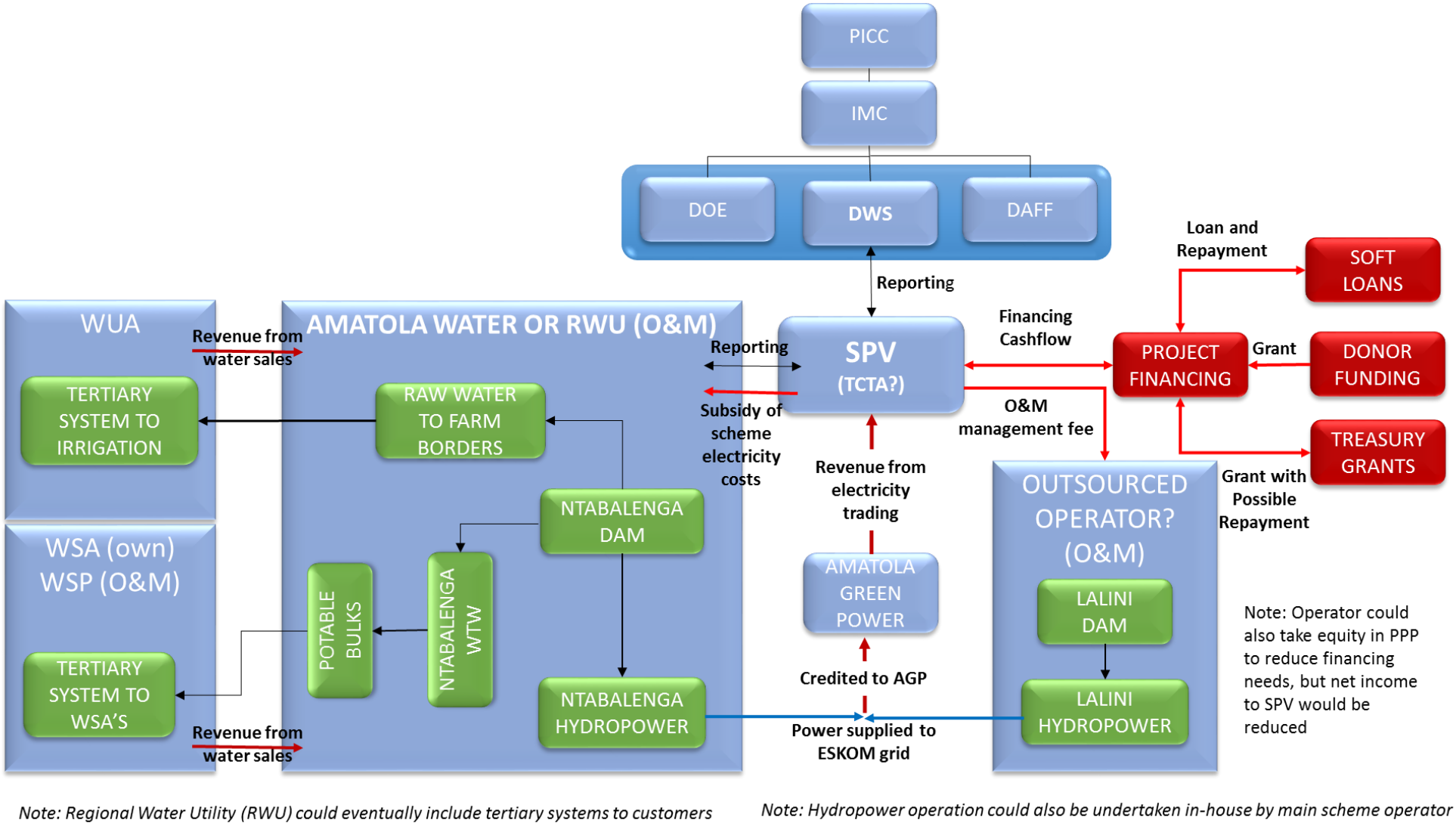


Figure 6-2: Institutional Roles and Responsibilities and Financial Flow Diagram

The PICC, IMC and three key departments (DoE, DWS and DAFF) all play an important role in oversight and regulation - ensuring that the project is planned, constructed and managed to the standards required in national legislation, and that the project fulfils the agreed regional priorities for economic growth and social upliftment. Co-ordination and co-operation at this senior level is essential if the project is to be successful.

The SPV is central to the project, playing a hands-on oversight and co-ordination role, is responsible for contractual management of the service providers, and a regional co-ordination role with all the relevant stakeholders in the Eastern Cape.

Importantly, the SPV is also responsible for initiating and managing the financing of the project, and the repayment of any loans/grants as required. This critical planning aspect of the project will be a determining factor for the finalization of institutional and contractual arrangements. Due to the nature of the role that this SPV needs to play right from the initiation of project design, it is imperative that the appointment of such an organization to fulfil this role is done as a matter of urgency.

The financing and implementation of all the capital components of the conjunctive scheme (but not the tertiary systems, which would be the responsibility of the WSPs/DMs) would fall under the SPV.

Once the scheme has been implemented and commissioned, the operating costs of the SPV will be covered through the net income generated from the energy sold into the power grid. The TCTA is an already established organization that specializes in these functions and would be a clear front-runner in the choice of an SPV company.

Amatola Green Power (or other buyer of energy) would purchase the power generated by the two hydropower schemes, and all the income from these sales will be paid to the SPV.

ESKOM would invoice all energy costs for the entire project to the SPV (and not the water supply scheme operators).

Apart from its own operational costs, the SPV could also appoint an outsourced hydropower scheme operator to operate and maintain the Lalini hydropower scheme, which costs would also be borne by the SPV from its net surplus energy income.

The Lalini power production operator could be purely a contracted operation and maintenance service, in which case the capital funding would funded entirely through the finance raised by the SPV. Alternatively this finance could be partly provided by the operator via a PPP arrangement. As is shown above, the difference will be that the PPP would offer less opportunity to cross-subsidize the energy costs of the water supply scheme components, but this would on the other hand require less grant funding.

The main purpose of the hydropower components of the scheme are therefore to generate sufficient surplus income to finance the SPV operation, to repay loans or even grant funding, and to subsidize the power cost for the production and delivery of bulk raw and potable water.

As is shown on the economic and financial modelling the degree of capital grant funding required will mostly depend upon the affordability cost of water supplied to irrigation and potable water users, and the financial sustainability that this brings to the water supply operator’s business.

The Ntabalenga dam and associated water supply schemes would be funded by the finance sourced through the SPV, but would need to be managed and operated by a regional water utility – at present a function fulfilled by Amatola Water.

If they continued to be the operator, Amatola Water would need to cover its operation and maintenance costs through the revenue generated from water sales. In order to reduce the cost of the water to the emerging farmers and indigent households served by the Mzimvubu project, the actual energy costs incurred by Amatola Water (specific to this scheme only, and not their other areas of supply) will be covered by the revenue generated from the hydropower. As part of contractual arrangements with the SPV, a mechanism for these costs will need to be set up. This can either be done through an offsetting scenario with ESKOM, or as a monthly payment from the SPV.

The same operator would also be required to operate the Ntabelanga hydropower plant as well as the delivery of bulk raw water to the new farming units.

A Water User Association would represent these new farmers, and they, and the WSAs/DMs would to pay the operator, e.g. Amatola Water, for the bulk water provided. These organisations will need to ensure that they collect sufficient revenue to cover these bulk water purchases as the operator will rely solely on this income to cover the cost of the operation and maintenance.

Cognisance must be taken that whilst the bulk potable water supply scheme would likely proceed with very high priority, and would be commissioned within a similar timescale to the other major scheme components, the same might not be the case for the irrigation scheme. In this latter case, a significantly sensitive and lengthy process will be required to deal with the land reform issues, and to identify and establish new emerging commercial farmers. This process could have many pitfalls along the way, and it is still a possibility that the irrigated agriculture component of the project would either not be realized at all, or would take much longer to come to the commissioning stage.

Should this happen, in addition to the lower job creation potential, the downside would be that the water supply operator would not receive the revenue from these bulk raw water supply sales. On the upside, the water supply operator would not incur the costs of operating and maintaining these particular components. The upside would be further enhanced in that the significant finance required to construct the irrigation components would not be needed, and the energy demand of the raw water pumping would also be less, which would in turn increase the net revenue to the SPV from energy sales. This in turn would increase the amount of subsidy available to improve the sustainability of the potable water supply component and/or could also produce surplus income to repay loans and even grants.

Another matter to consider is that in order to receive the benefits and surplus revenue from the hydropower components, these should also be ready for commissioning as soon as possible so that the cross-subsidies thus produced are available as soon as possible. If not, then some other “bridging” arrangements might be required to fill this subsidization gap.

Local content of goods and services provided to implement and operate the conjunctive scheme should be maximized to prevent leakage of such economic and employment benefits to other parts of the country, or even abroad. This will maximize the intended upliftment benefits of the project on this region.

6.1 The Way Forward

Budgets for further engineering, facilitation and other studies have been allowed for in the cost estimates, but these activities will need to be urgently initiated, managed and implemented, in a co-ordinated manner. This will require the co-ordination, planning and management entity to delegate responsibility for this to a dedicated Project Implementation Unit, who themselves will need to co-ordinate with all of the other sectoral roleplayers. Future activities that will need to be undertaken include, inter alia:

a) Appointment of a DWS Project Manager to oversee the implementation;
b) Appointment of an Implementing Agent/SPV to co-ordinate, plan and manage the integrated scheme components;
c) Obtaining of Environmental Authorization;
d) Approval and implementation of the EMPR for the works to be constructed, and appointment of service providers to manage and monitor these processes;
e) Development and implementation of the Relocation Action Plan based upon the Relocation Policy Framework prepared during the EIA process;
f) Discussions with Amatola Green Power for the sale of power produced by the Ntabelanga and Lalini hydropower schemes;
g) Applications to ESKOM for power supplies to the works;
h) Application to DoE and ESKOM to establish a “wheeling” arrangement to sell power into the local grid;
i) Discussions and agreement with Amatola Water and the three affected DMs regarding future institutional arrangements for the ownership, funding, operation and management of the water supplies sourced from the Ntabelanga Dam;
j) Additional geotechnical investigations to inform the design of the Ntabelanga Dam, the Lalini Dam, the other associated capital works, and hydropower components;
k) Detailed design and tender documents of Ntabelanga Dam and appurtenant works;
l) Detailed design and tender documents of the Ntabelanga water treatment works, primary and secondary potable water distribution systems, and bulk raw water distribution system;
m) Detailed design and tender documents of other works;
n) Detailed design and tender documents of Lalini Dam and appurtenant hydropower works;
o) Appointment of a facilitation unit to manage the consultation and implementation process for land reform and irrigation development;
p) Further studies to investigate potential tourism and aquaculture spinoffs from the scheme;
q) Appointment of a facilitation unit to provide advice, training and financial assistance to new emerging farmers who would be investing in the new irrigated farm units ;
r) Procurement and appointment of contractors to construct the capital works – several different contracts; and
s) Procurement and appointment of Construction Administration and Supervision service providers – several different contracts.

The above list covers the currently envisaged main activities, and others may arise as the implementation process proceeds. The complexities surrounding the set up and management of a multi-purpose scheme should not be under estimated. Lessons from previous projects across Africa should be taken to heart, and robust, yet flexible legal, institutional and financial arrangements need to be put in place to maximise the resilience and sustainability of the project into the future.

7. REFERENCES

1. DWA (2007), Water Use Authorisation Application Process External Guideline: Section 21 (c) and (i) Water Use Authorisation Application Process (Impeding or Diverting the Flow of Water in a Watercourse, and/or Altering the Bed, Banks, Course or Characteristics of a Watercourse). DWA, Pretoria.