WIN-SA
WATER INFORMATION NETWORK
- SOUTH AFRICA -

lessons series - issue seven

7

Rural Water Supply in Ukhahlamba District Municipality

"Making knowledge work for us"

OVERVIEW

PROJECT AIM

To supply potable water at RDP standards to the rural communities of Elundini Local Municipality, utilising community-based construction methods.

Ukhahlamba District Municipality

The district forms the far northern part of the Eastern Cape and is bordered by Lesotho and the Free State to the north, and the Northern Cape to the west.

Ukhahlamba District Municipality, as the water services authority for the district, is responsible for overseeing water services in Elundini Local Municipality (LM), as well as the three other LMs that make up the district. These are Senqu, Maletswai and Gariep.

The majority of Ukhahlamba's population is concentrated in former homeland areas in Senqu and Elundini, with Elundini having the greatest backlogs in terms of water services.

Institutional arrangements

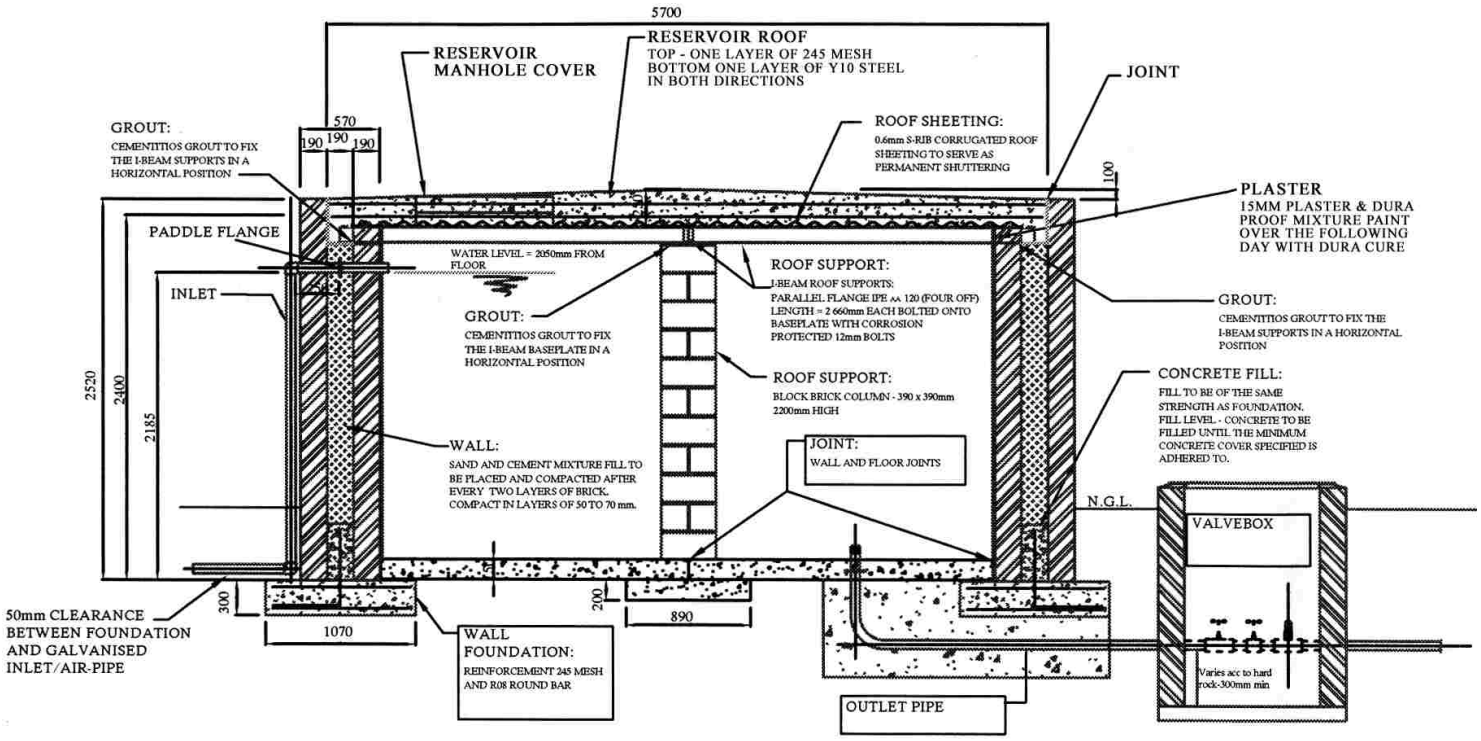
Ukhahlamba had not finalised its Section 78 process at the time of writing (May 2006). Water services provision is therefore undertaken on the basis of interim arrangements. In terms of these arrangements, the four LM's act as water services providers in the urban areas and Bloem Water, a water board, and Sintec, an engineering firm, take care of constructing, operating and maintaining water schemes in the rural areas of Senqu and Elundini respectively. In the commercial farming areas, water services provision is the responsibility of the farmers.

Appropriate design

In order to ensure maximum community involvement in rolling out stand-alone water supply in rural Elundini, Ukhahlamba commissioned Sintec to come up with a reservoir design that would suit a labour-intensive approach.

The main considerations for the design of the reservoir were: community involvement in the construction; the use of local materials to avoid high transportation costs; the implementation of low technology to limit supervision and make optimal use of local unskilled labour; and finally that the reservoir would require minimal maintenance.

The final design employs a rectangular gravity wall, constructed of locally-made cement blocks. It is simple to construct and does not require high level construction skills. It also makes maximum use of local labour.



SECTION THROUGH RESERVOIR

Meeting the challenges of water services delivery in deep rural areas

Ukhahlamba District Municipality, as the water services authority (WSA) for one of the most isolated parts of South Africa, is tackling the challenges of bringing services to remote rural communities through innovative design and the fostering of a delivery-oriented ethos.

Ukhahlamba District Municipality is home to some of the most remote communities in South Africa. These communities lie in the mountainous parts of the former Transkei homeland, in the area known as the Southern Drakensburg.

These former homeland areas are starkly different from the green and empty landscapes of Ukhahlamba's commercial farming areas. The land has been unable to withstand the many subsistence farmers that were crowded into these mountains. Deep dongas, the consequence of erosion, define the landscape.

"The setting of the rural areas is a challenge in itself, because rural areas are not planned. The most serious challenge is the lack of roads. The villages are on the top of mountains and we have to get water to those areas, so it becomes a very serious challenge," says Councillor Amos Mpela, portfolio councillor for technical services in Ukhahlamba.

Ukhahlamba includes two former homelands areas, one in Senqu Local Municipality (LM) and the other in Elundini LM. While both these areas are faced with a legacy of underdevelopment, it is in rural Elundini, also known as the Mount Fletcher area, where the greatest challenges lie.

In addition to the villages being extremely inaccessible, political instability within the local municipality over the past five years has been a major stumbling block for the implementation of projects. This saw a decision in 2004 by Ukhahlamba that, as the WSA, it would deliver services without the support of the LM.

"After a lot of interventions had failed to bring in stability, we said we are going to implement the projects that have been identified, without their support, if they don't want to support us," says Mpela.

This approach was necessary, Mpela says, as backlogs in Elundini's rural areas were the highest in the district, with only 25 percent of the rural population of 106 000 people having access to formal water schemes.

The recent local government elections have resolved this impasse and Mpela describes the situation as greatly improved.

"Yes, it is really an ideal situation now, we have solved the political problems and administrative problems that were linked to the political problems."

The decision to prioritise service delivery over the political infighting at the local municipal level highlights the delivery-oriented culture that has been fostered in this WSA.

Both Mpela and Reynard Brittnell, the water services authority manager at Ukhahlamba, point to the positive relationship that exists between the politicians and officials as being a vital condition for this. Mpela underscores the pivotal role political leadership plays in a WSA's ability to function effectively.

"You can have a good manager, but managers do not take decisions. So if you are on good terms with your manager, if you are committed to what you are doing and if you are committed to the support you give your manager, you will be able to make sure that the right decisions are made [by the council]. That is one thing that stands out clearly in making sure that things go well - as well as the commitment of other people that are actually implementing the projects on the ground," he says.

Councillor Amos Mpela

Brittnell agrees: "The commitment and energy from officials and councillors is key. You'll go a long way to find the positive and constructive energy that we have here. We know what we want to achieve. We have quantified the problem - backlogs. We need to get rid of backlogs. So we are all working together to achieve this."

When Ukhahlamba assumed the role of WSA for the district in July 2003, the technical services department, under the leadership of Mpela, set out to create the institutional capacity to meet these challenges.

"We had to sit down as a department to say, 'now that the functions that we have been performing have dramatically changed, we have to review the organisational structure of the department so we can deal with the new challenges'. That has contributed to us making progress," says Mpela.

The restructuring saw the creation of two new units: a water services authority unit and a water services provision unit.

"It changed dramatically. We made new appointments. We created a new organisational structure. We moved people into new positions, as well as making a few new appointments," says Mpela.

The restructured department has been able to effectively mobilise resources to tackle water services backlogs and related challenges.

"Since we became a water services authority, between 90 percent and 95 percent of the budget we get from MIG (Municipal Infrastructure Grant) has been spent on addressing water services backlogs in the rural areas, as well as other areas where there are [water services] problems," says Mpela.

Tackling backlogs

Ukhahlamba has appointed the engineering firm Sintec to construct and maintain water supply systems in rural Elundini. The appointment is an interim arrangement, subject to the outcome of Ukhahlamba's Section 78 process.

The mountainous terrain and the very poor state of roads in rural Elundini, together with the pressing need to create job opportunities for local people, saw Ukhahlamba commission an innovative reservoir design that would suit the difficult terrain and maximise local employment opportunities.

More than 60 villages have been supplied with clean water since 2004, using this reservoir design and the labour-intensive, community-driven approach championed by Ukhahlamba and implemented by Sintec.

All the schemes are stand-alone schemes. They consist of a borehole and pump station - utilising a diesel-driven pump - pumping water up to the high-level reservoir, which then supplies standpipes positioned to conform to RDP standards of access.

"Our brief from Ukhahlamba was to make the project as community-based as possible, to make maximum use of community labour," says Erno Bezuidenhout, project engineer from Sintec.

Innovative design

The key challenge was to design a water supply system that would allow for labour intensive construction methods and allow for the maximum use of local materials so as to reduce the high transportation costs.

"We looked at various options. We looked at the standard concrete reservoir, but the problem there is that you have to get your shutters on site; you need to transport that by truck right to the village. We looked at ferro-cement reservoirs, pressed steel, pre-cast concrete panel types, but these are fairly expensive and you take away a lot of the local labour opportunities, because you need a specialist contractor," he says.

After an evaluation of the various options it was decided to use a rectangular gravity wall design. This design was chosen because of the labour intensive nature of its construction, as well as the simplicity of its design, allowing it to be built by inexperienced villagers.

"It's not circular, so as to make it easier to construct. That was a major consideration. You use local people, so the skill levels are not that high, and you want to use as much local skills as possible. So the design must be straight forward," says Bezuidenhout.

An additional advantage of the gravity wall design is that it is constructed from cement blocks that can be manufactured on site by local people, using manual block-making machines.

"It's basically two walls, with a cavity between. The cavity is filled up with a soilcrete. The weight of the wall basically holds the water, so even if the blocks are not top quality the structure's integrity will not be compromised," he says.

"The cost of this type of reservoir compares very favourably with the prefabricated alternatives and the labour cost component is typically more than 30 percent for this type of project. Materials are stored with the local community and transport of materials is also provided by the community where possible, so this adds to the benefit that accrues to the local community," Bezuidenhout adds.

The construction of the reservoir, the laying of pipes and building the pump house, are all done by local villagers, who are paid for the work they do.

"The conveyor, used for the continuous pour of the concrete roof, is the only piece of machinery used in the construction. This is because the roof needs to poured in one day. Everything else is done by hand," he says.

Bezuidenhout argues that this gravity wall design is the ideal solution for areas where the topography allows for reservoirs to built on higher ground.

"Where local labour is utilised and the construction is done without fulltime supervision, the gravity wall reservoir is the ideal solution for reservoir sizes below 100 kilolitres," he says.

Community members digging pipe trenches

Manufacturing cement blocks for reservoir and pumphouse walls

Sharing the design
Brittnell says that he is keen to see this reservoir design being shared with other municipalities.

"The consultants have, under our instruction, designed a reservoir that is 100 percent labour intensive. The taxpayer has paid for that, so my idea is to give it to other local authorities and say, 'make minor adjustments and implement'. We, as local government, shouldn't have to keep spending on consultants when the work has already been done," says Brittnell.

Maximising the benefit
The community-centred approach places emphasis on using local resources at all stages. This also applies to transport.

"In most of the villages there is someone who has a tractor and trailer, normally rented out for ploughing and so on. So we rent this tractor and get this guy and he employs a team, so he is our local transport contractor. We get suppliers from the nearest towns to deliver the material to a certain point and the local person takes it from there," says Bezuidenhout.

"At some villages you just can't get a truck in there, you use tractors and trailers. Sometimes wheelbarrows are used when there is no tractor available. The communities always somehow manage to make a plan. It's been a very co-operative experience."

Community participation
A co-operative relationship between the project implementers and the beneficiary communities is vital to the success of any rural water scheme. In Elundini Ukhahlamba follows a highly consultative approach, which involves the establishment of village water committees and project steering committees. These committees decide on the final positions of standpipes, the labour teams and as well as the appointment of the village water operators.

"We let the community decide where the final position of the standpipes will be. We don't want to solve a water problem and create a social problem," Brittnell says, referring to the potentially divisive impact the placement of a standpipe can have.

Eddie Gologolo, Sintec's social facilitator, is responsible for setting up village water committees and project steering committees. He says that using this labour-intensive approach not only brings economic benefits to the community, but also creates a sense of ownership of the scheme.

"There is now clean water and there are village water operators who are operating and maintaining the systems and getting more experienced at it. The villagers are able to maintain and operate the systems because it is them who built it."

He says that the projects have brought benefits to women in particular.

"At least 50 percent of all jobs were reserved for women. From the onset they were doing all types of work. They have gained the experience of how to work in such conditions. The economic benefit is there for the women, in what was a male-dominated type of work."

But more than the temporary economic benefit, the schemes have freed the village women from the very arduous work of collecting water from the streams.

"Women have benefited a lot. It changed their lives. It was a very unbearable situation for a woman to carry a bucket of water from a stream, carrying a baby on her back, climbing up the hill with water. It would take an hour or two hours for women to collect water. Now they have standpipes right in the middle of the village."

Even the design of the standpipe has taken into consideration that the collection of water requires heavy buckets to be lifted. The standpipe has a flat cement top, designed for a bucket to be rested on it while it is being lifted onto the head.

Operation and Maintenance
Brittnell emphasises the importance that proper operation and maintenance play in the success of any scheme.

"Projects fail because of poor maintenance. You have to have a proper operation and maintenance structure in place, you have to have enough staff to implement the

Building the reservoir

operation and maintenance plans and we monitor that. So we make sufficient money available for this," says Brittnell.

He adds that his department has set up a call centre to receive and log complaints about standpipes not working or other problems relating to the schemes. In addition, Ukhahlamba has embarked on a public awareness campaign, distributing pamphlets that set out villagers' rights and responsibilities in relation to the schemes and publicising the call centre number.

The responsibility of overseeing the operation and maintenance of the schemes falls to Johan Nel and his team at Sintec.

Nel says he relies on a three-pronged approach to ensure that problems are identified, reported and remedied. The first is the village water operator who is trained to take care of the scheme.

"We have appointed an operator for each scheme, through the village water committee. He is responsible for starting the engine, to fill it up with diesel and to report problems," says Nel.

The second line of communication relies on the local suppliers of diesel, who are contracted to deliver diesel to all the schemes, according to a prescribed route and schedule. According to Nel, a supplier visits each village every seven days. In addition to delivering the diesel, they report any problems that they find.

Actual maintenance on the schemes is done by two maintenance crews, who although paid by Ukhahlamba, are seconded fulltime to Sintec. Each crew, made up of a mechanic and an assistant, have routes to follow in order to undertake routine maintenance on the schemes, take meter readings and respond to breakdowns.

Nel underscores the importance that detailed record-keeping plays in their O&M programme.

"Extensive records are kept for each village. We record the names of operators, payments, diesel usage, meter readings, so if there are any queries we can find the answer within minutes," he says.

Capital replacement costs

Nel argues that, as much as funding for operation and maintenance is vital for sustainable schemes, so too must a capital replacement fund be established. He says that financial planning has overlooked this vital aspect.

"We have eight boreholes that are now dry. Now the problem is to replace those, however there is no funding to replace those. There should be a capital replacement fund. We are now looking for R1 million to replace the eight boreholes, but that money is not freely available. You have to redrill and you might have to replace the pipes to the reservoirs. So it can cost a lot," says Nel.

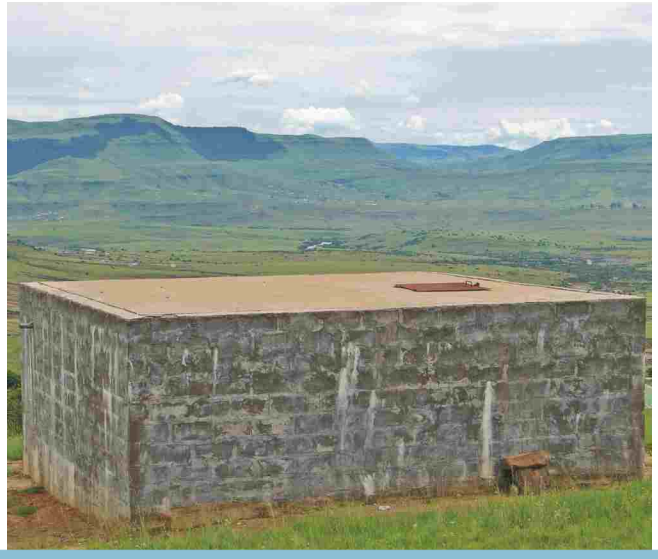
He says that asset replacement and upgrading are something the local authorities will have to get used to.

"Things do not last forever," he adds. Mpela agrees, but says the issue is not a simple one.

"It's a serious challenge because resources are limited and we have to try to balance both the maintenance needs of existing schemes as well as getting services to areas where there are none," he says

Mpela argues that local government, particularly in poor rural areas needs to lobby the national government to ensure that there are sufficient resources available for maintaining schemes and budgeting for capital replacement costs.

Finished reservoir in operation



LOOKING AT THE LESSONS

1 Get everyone playing on the same side

To tackle the challenges that face a water services authority, it is vital that internal relationships are constructive and communication is effective. Nothing can hamper the delivery of services more than strained relationships between the political and technical staff. Ukhahlamba has been able to take steps to address their water services backlogs, by ensuring that all members of their team are playing on the same side. Ukhahlamba has:

- Committed and supportive political leadership
- Clear targets and milestones for project implementation
- An organisational structure that can respond to the work that needs to be done

"We looked at what being a water services authority entailed, in terms of the authority function and the provision function. We also looked at other functions that we had been carrying out as a department. Based on that we looked at our existing structure to see whether it responded to those needs or activities that we need to do. We realised that we had no institutional capacity to deal with the authority function, so we had to come up with a totally new organisational structure." Cllr Amos Mpela, chairperson of technical services, Ukhahlamba District Municipality

"When you talk monitoring, as a political portfolio chair, you have to start with your IDP, then it goes to the budget, then it goes to the key performance areas for the manager, which as the political head, you must have. Then it goes to the SDBIP, the Service Delivery and Budget Implementation Plan, which gives you the indicators for where your projects should be. If you have those tools as a political head and you are constantly sitting down with your manager and saying 'we are supposed to be here, where are we now? Where are the reports? How can we do it differently so we can meet the targets that we are supposed to meet?' That is what makes us to do well. We are assisting each other." Cllr Amos Mpela

2 Appropriate design promotes labour-intensive construction

Municipal infrastructure projects are largely municipal infrastructure grant funded. This funding encourages that projects utilise labour-based construction methodologies. It is necessary to incorporate these objectives into construction design and project implementation plans. This has been achieved through:

- Reservoir design that maximises the labour component, and is suited to non-specialised construction
- Utilising local resources for transportation and storage

"After an evaluation of the various options, it was decided to use a rectangular gravity wall design. This design was chosen because of the labour intensive nature of its construction as well as the simplicity of the design, that would allow it to be built by inexperienced villagers." Erno Bezuidenhout, project engineer, Sintec

"We never used contractors. The villagers were digging trenches on their own, laying pipes on their own, building their reservoirs, building their pump stations, the only thing was the installation of pumps by the suppliers. So they [the local community] gained a lot of experience and they know the system. They can work on the system. Even now the system is being operated and maintained by the community members." Eddie Gologolo, social facilitator and director, Sintec

3 Operation and maintenance systems

In the push to address backlogs, it is essential that sustainable services are provided. Without proper operation and maintenance plans and procedures, taps will run dry. This opens the schemes up to vandalism and reflects badly on all responsible for providing the scheme. Operation and maintenance plans must be part of any business plans and they must be sufficiently resourced. In the Elundini schemes, Ukhahlamba have implemented a structured operation and maintenance system.

- Village water operators tasked to perform basic maintenance and report problems
- Diesel suppliers perform visual inspections of schemes and report any problems
- Dedicated teams of mechanics follow scheduled routes and perform routine preventative maintenance
- Municipal call centre set up to receive complaints

"We did similar water schemes in an adjoining district, between 10 and 20 schemes and we completed the systems before 2000, but there was nobody who took responsibility for O&M, not even the local authority, because it was taken over by another municipality, and all those systems were totally unusable after a while. This illustrates the importance of O&M and somebody to take responsibility for it. You can't leave it to the community, because nobody is going to do it for free, doesn't matter where he lives." Johan Nel, project engineer and director, Sintec

"Everything in life needs maintenance, even a marriage needs maintenance. So we believe in proper maintenance plans. We don't just add a small maintenance paragraph in the original business plan just to get the funding." Reynardt Brittnell, water services authority manager, Ukhahlamba District Municipality

WIN-SA lessons series

The WIN-SA lessons series aims to capture the innovative work of people tackling real service delivery challenges. It also aims to stimulate learning and sharing around these challenges to support creative solutions. To achieve this, the lessons series is supported by ancillary learning opportunities facilitated by WIN-SA to strengthen people-to-people learning. WIN-SA's "Bringing in the harvest" campaign provides the vehicle for this.

To find out more about these and other WIN-SA services go to the WIN-SA portal at www.win-sa.org.za or contact the network directly.

For further information on Ukhahlamba's rural water supply programme visit www.win-sa.org.za/ukh

WIN-SA mission

Our mission is to ensure the body of knowledge in the sector is well managed, readily accessible and applied, leading to improved decision-making and performance, especially of local government.

Contact details

Address: 491 18th Avenue, Rietfontein, Pretoria

Postal Address: Private Bag X03, Gezina, 0031

Tel: (012) 330 9076 **Fax:** (012) 331 2565

E-mail: lessons@win-sa.org.za

Website: www.win-sa.org.za