



UMKHOMAZI WATER PROJECT PHASE 1 ENVIRONMENTAL IMPACT ASSESSMENT

PUBLIC MEETING – 23 OCTOBER 2013

Baynesfield Club, 10h00



WELCOME & INTRODUCTION

AGENDA

1 Welcome & Introduction

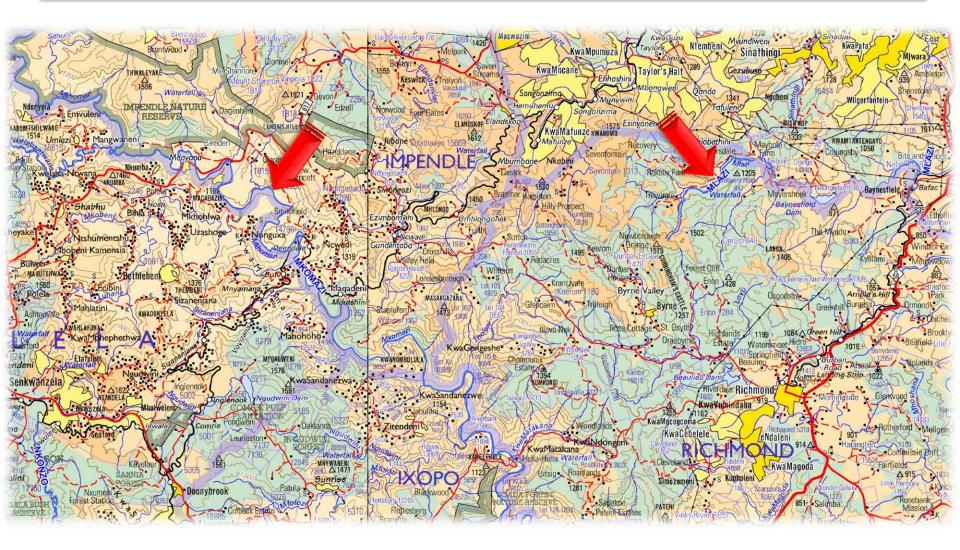
2 Purpose & Rules of the Meeting

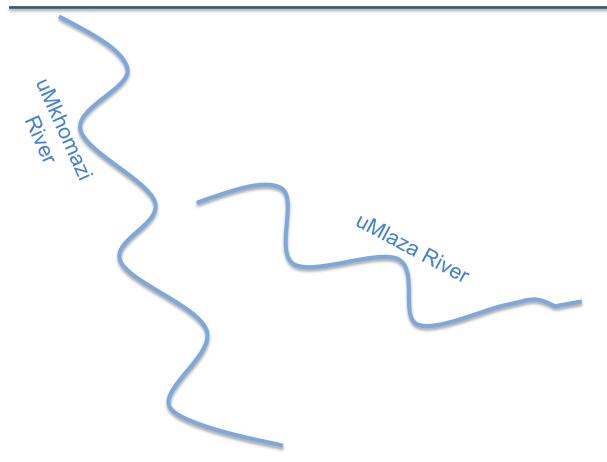
3 Presentations:

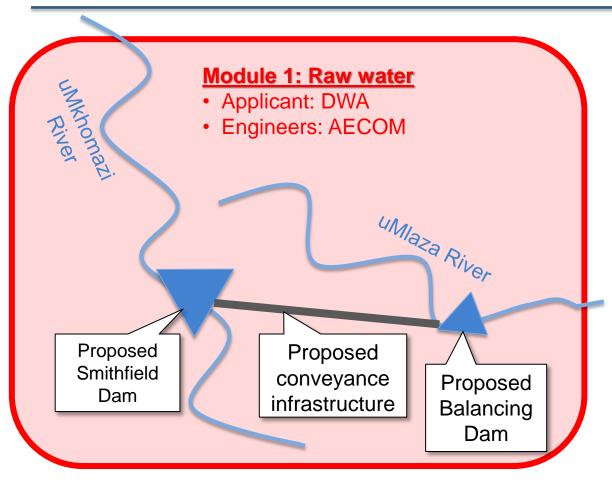
3.1	Project Background & Motivation	DWA/AECOM
3.2	uMWP-1 - Raw Water Component	AECOM
3.3	uMWP-1 - Potable Water Component	Knight Piésold
3.4	Environmental Impact Assessment	Nemai

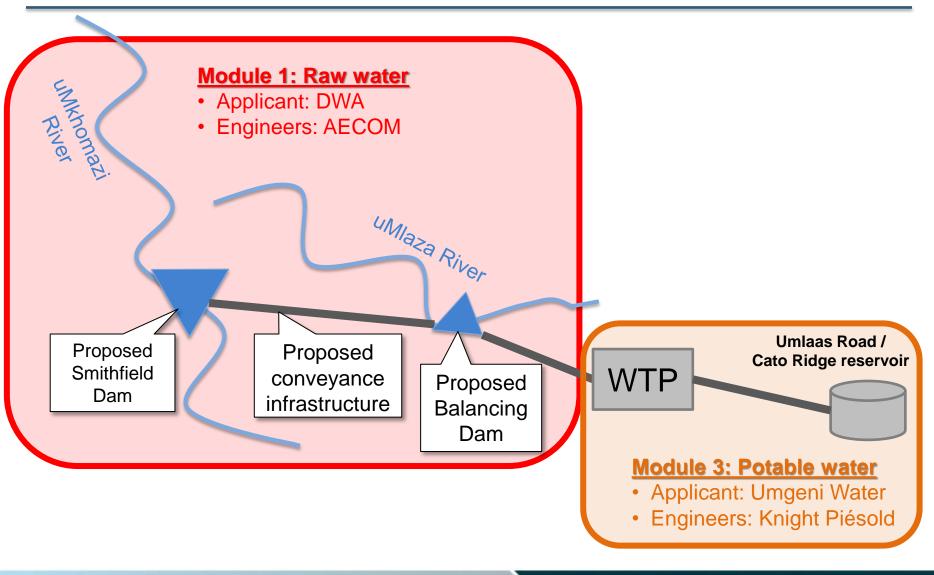
4 Discussion

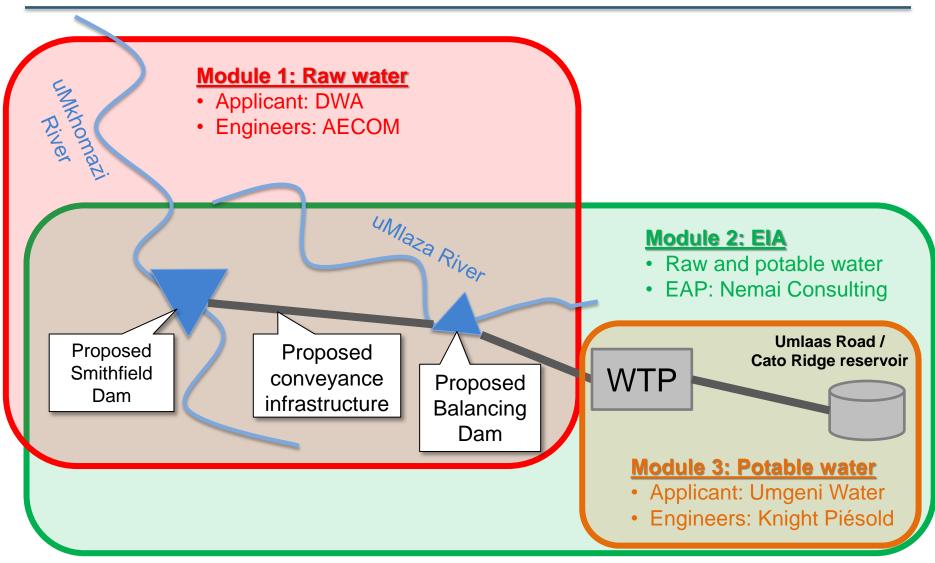
5 Way Forward / Close











uMWP-1 Raw Water Component

Project Role	Affiliation	Representatives
Project Proponent	Department of Water Affairs	 K. Bester S. Moodley water affairs Department: Water Affairs REPUBLIC OF SOUTH AFRICA
Engineering Feasibility Study	AECOM	➢ H. Pieterse
Environmental Assessment Practitioner	Nemai Consulting	 D. Henning R. Maharaj

uMWP-1 Raw Water Component

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uMWP-1 Potable Water Component

Project Role	Affiliation	Representatives
Project Proponent	Umgeni Water	 L. Archer G. Subramanian
Engineering Feasibility Study	Knight Piésold	 A. Doorgapershad G. Lempert <i>Knight Piésold</i>
Environmental Assessment Practitioner	Nemai Consulting	 D. Henning R. Maharaj

PURPOSE & RULES OF THE MEETING

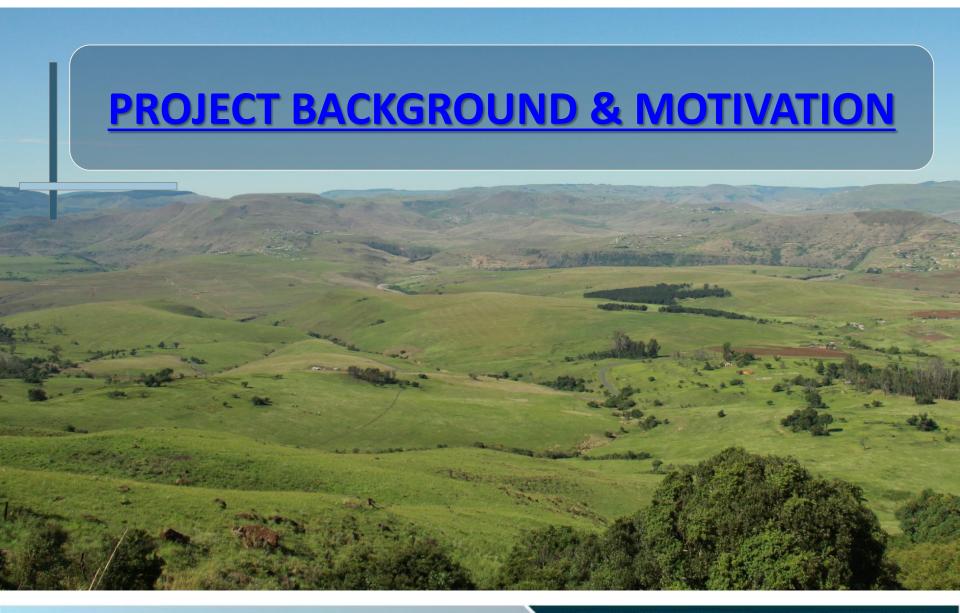
PURPOSE OF THE MEETING

- 1. To introduce the project
- 2. To provide an overview of the Environmental Impact Assessment process
- 3. To provide a platform for project-related discussions
- 4. To obtain input into the Scoping Phase

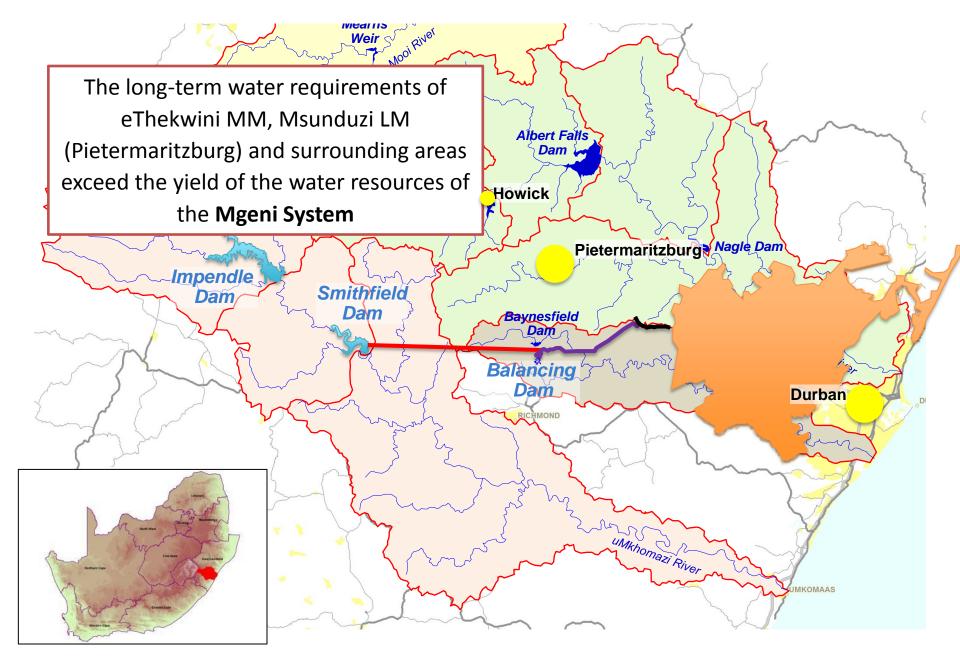


RULES OF THE MEETING

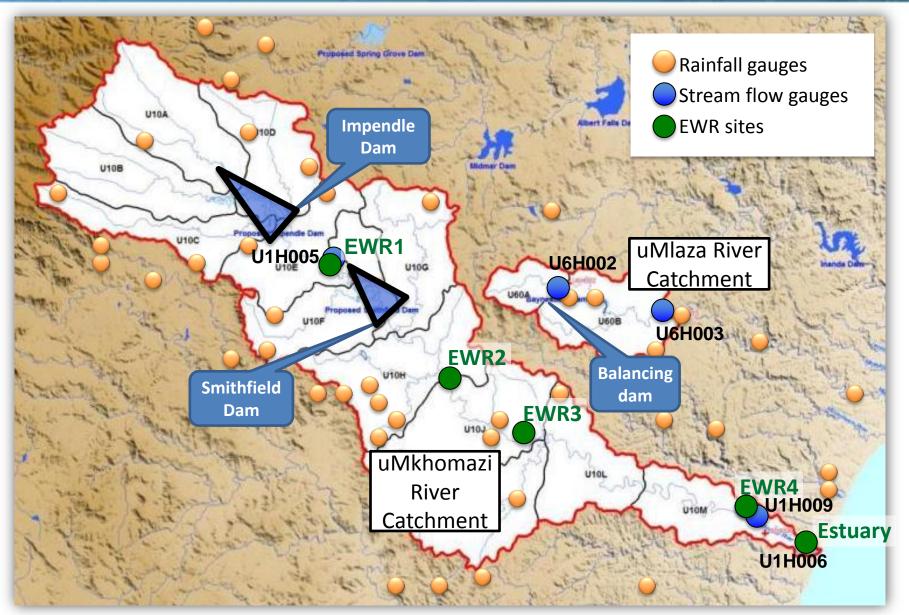
- 1. Questions to relate to project at hand
- 2. Opportunities for seeking clarification at end of presentations
- 3. Address project team through facilitator
- 4. Identify yourself before asking a question
- 5. Meeting closing time
- 6. Cell phones off, please



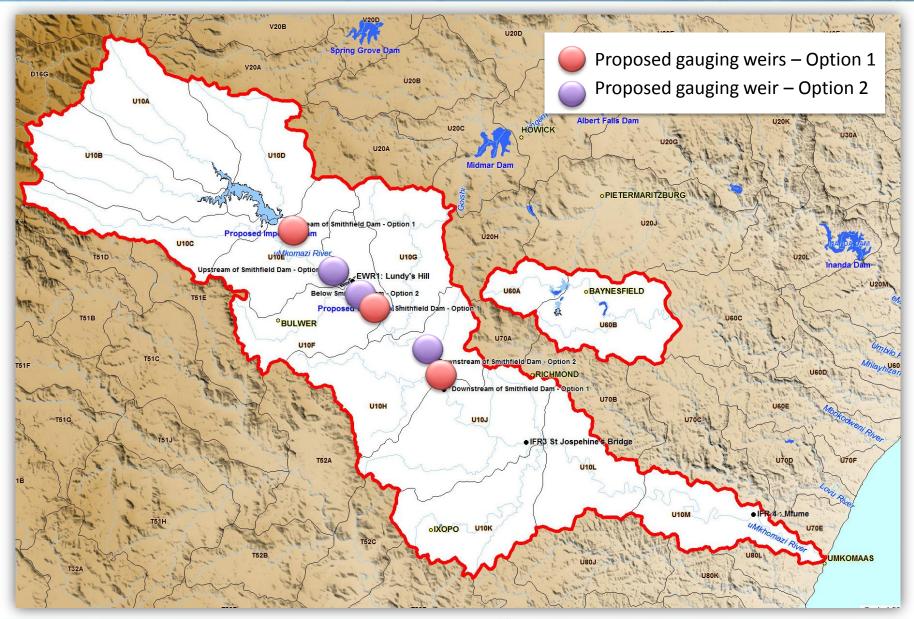
Background to the project



Water resource focus area (1)

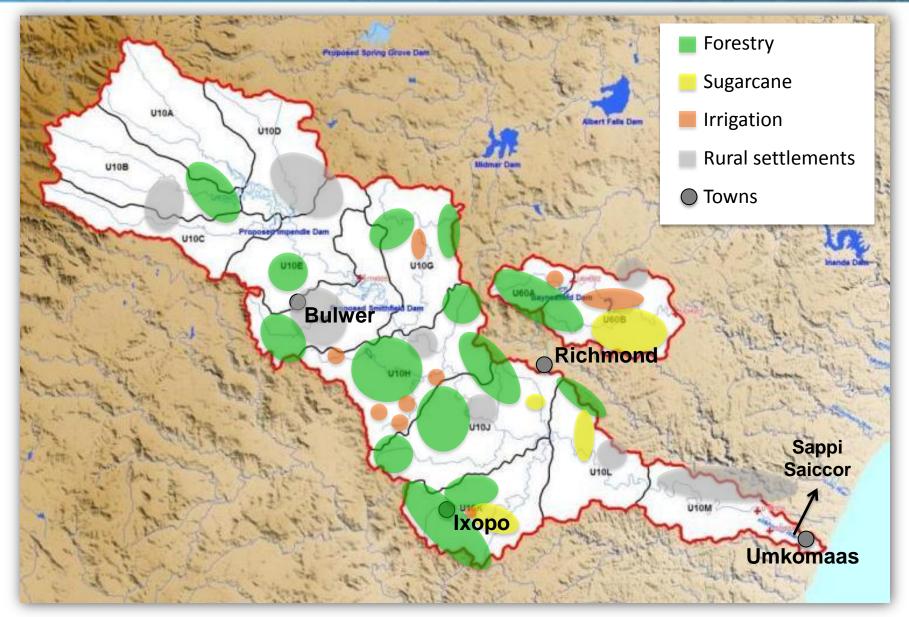


Water resource focus area (2)



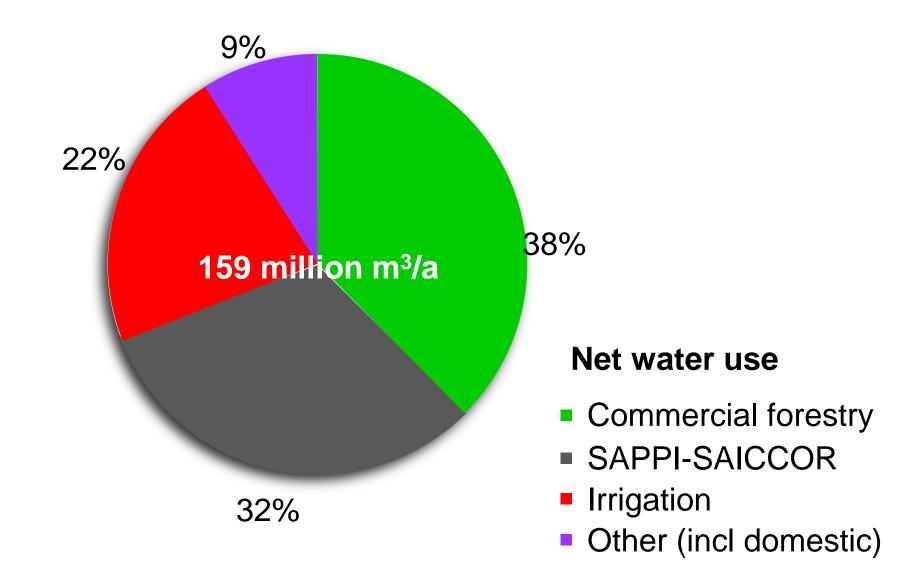
WATER IS LIFE - RESPECT IT, CONSERVE IT, ENJOY IT.

Land use



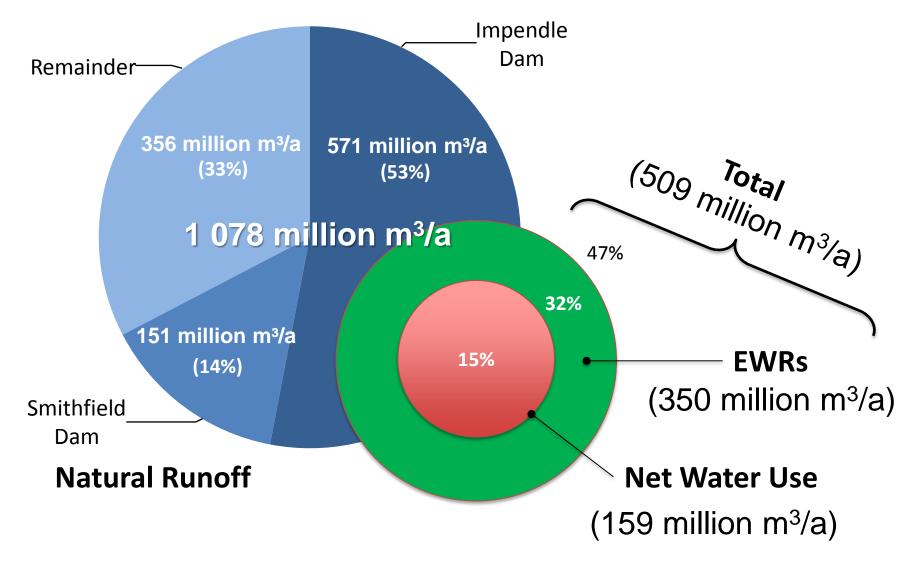
WATER IS LIFE - RESPECT IT, CONSERVE IT, ENJOY IT.

Net water use in the uMkhomazi Catchment

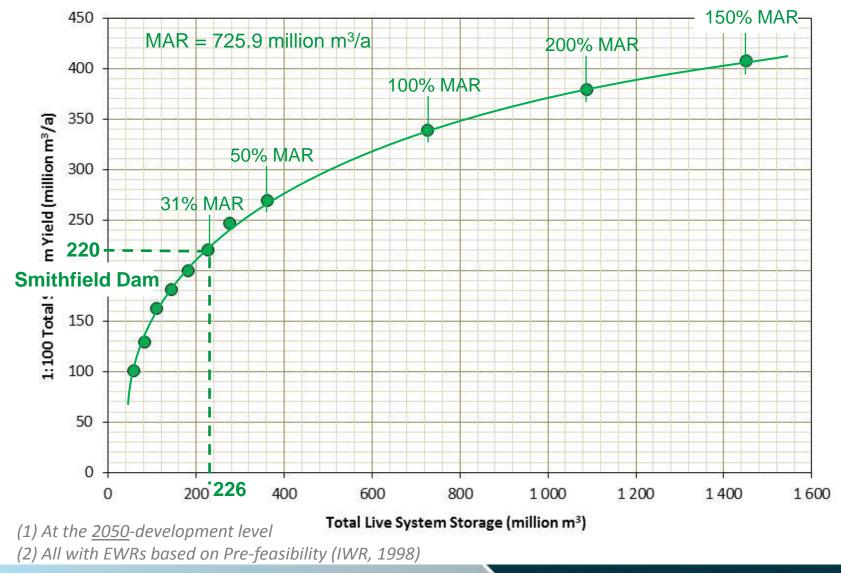


Hydrology of the uMkhomazi River Catchment

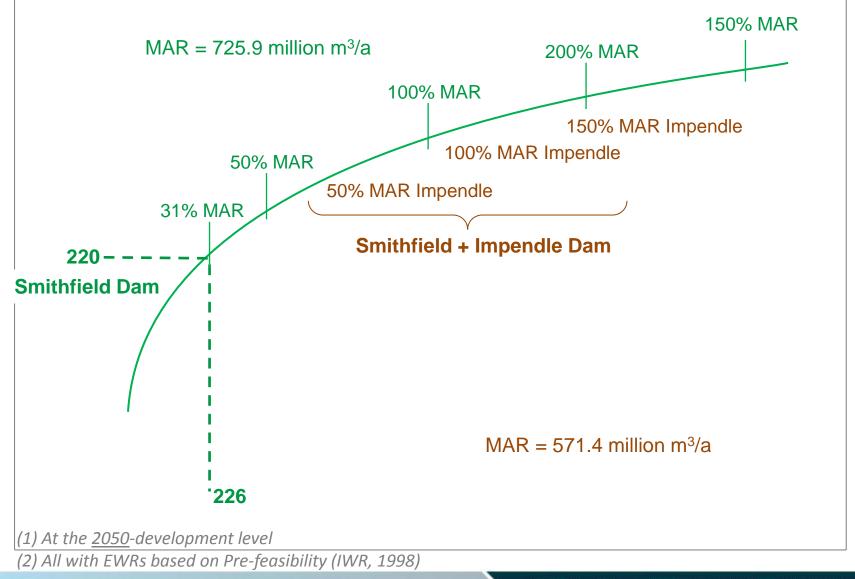
Natural runoff, water use and EWRs



Summary of yield results

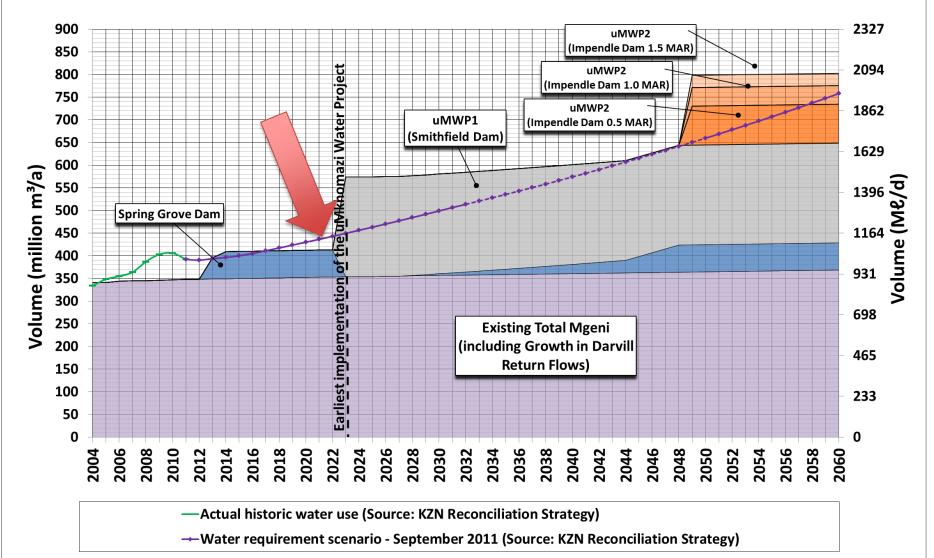


Summary of yield results

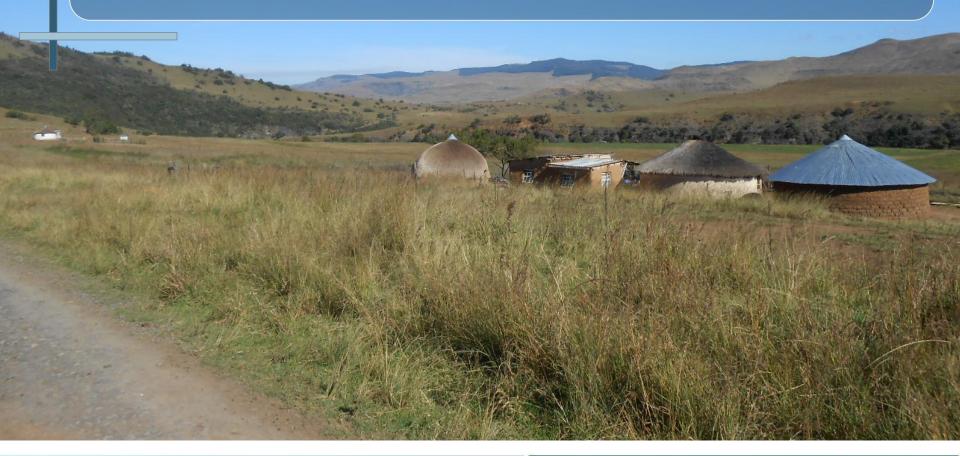


Water balance uMWP-Mgeni Transfers

Water requirement projection for the integrated Mgeni System



uMWP-1 - RAW WATER COMPONENT



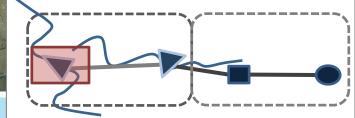
WATER IS LIFE - RESPECT IT, CONSERVE IT, ENJOY IT.

Proposed Smithfield Dam

U10E

Optimized tunnel inlet position

Scale 1:30000

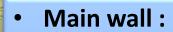




Site A

Site B

Smithfield Dam: Draft artist impression (1)



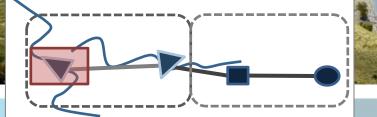
- 83.7 m high
- 1 224 m long
- Saddle wall:
 - 26.7 m high
 - 731 m long

Smithfield Dam: Draft artist impression (2)

In comparison: Midmar Dam Wall height: <u>25.8 m</u> Volume: <u>235.5 million m³</u>

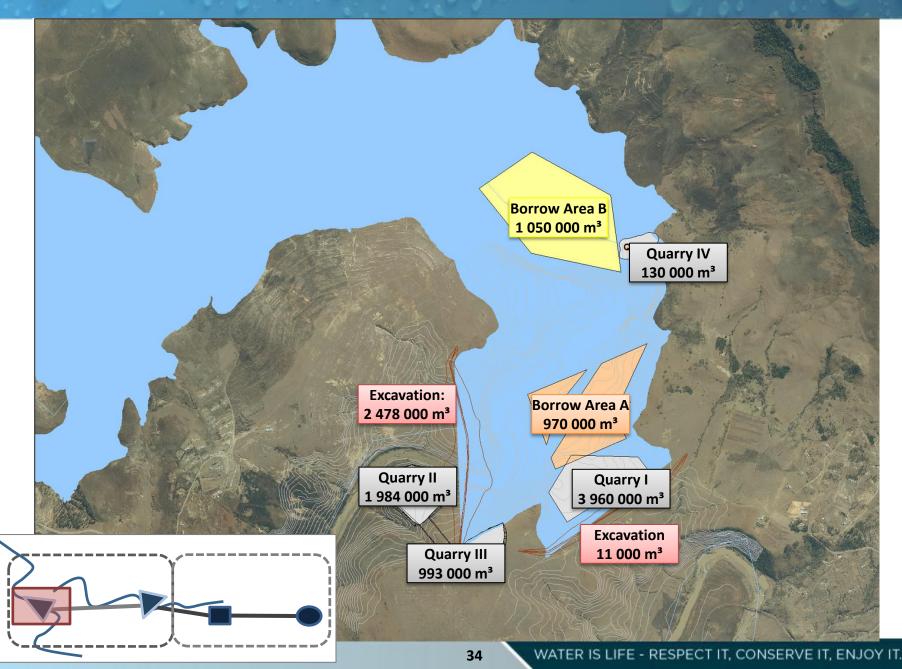
Smithfield Dam: FSL: <u>930 masl</u> Volume: <u>251 million m³</u>

Smithfield Dam: Draft artist impression (3)

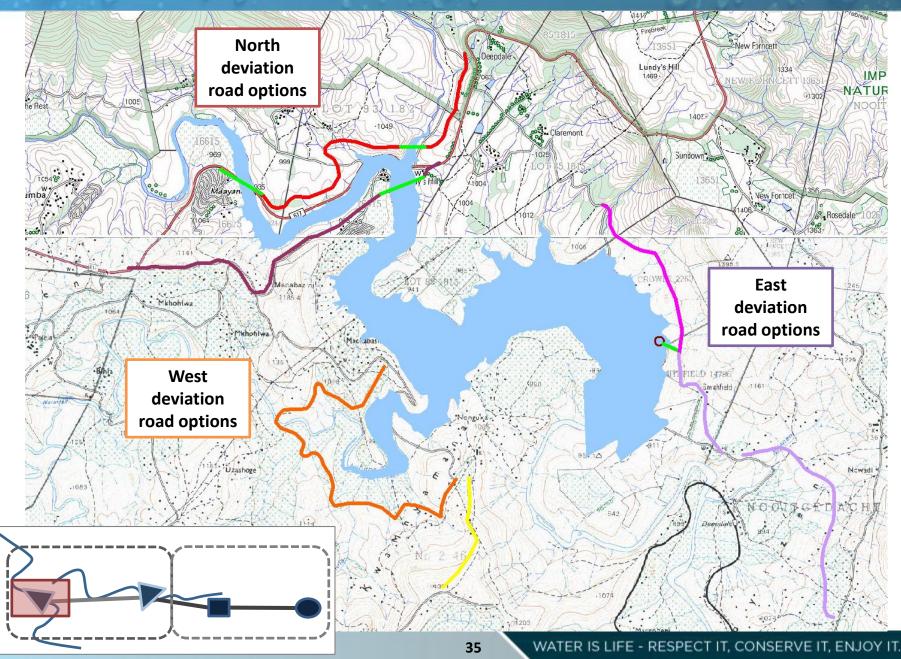


For this size dam, an amount of <u>**R 14 000</u></u> <u>million**</u> is currently required for phase 1 of the uMkhomazi Project (Incl. Smithfield Dam, tunnel, balancing dam, WTP, treated water pipeline to Umlaas Road)</u>

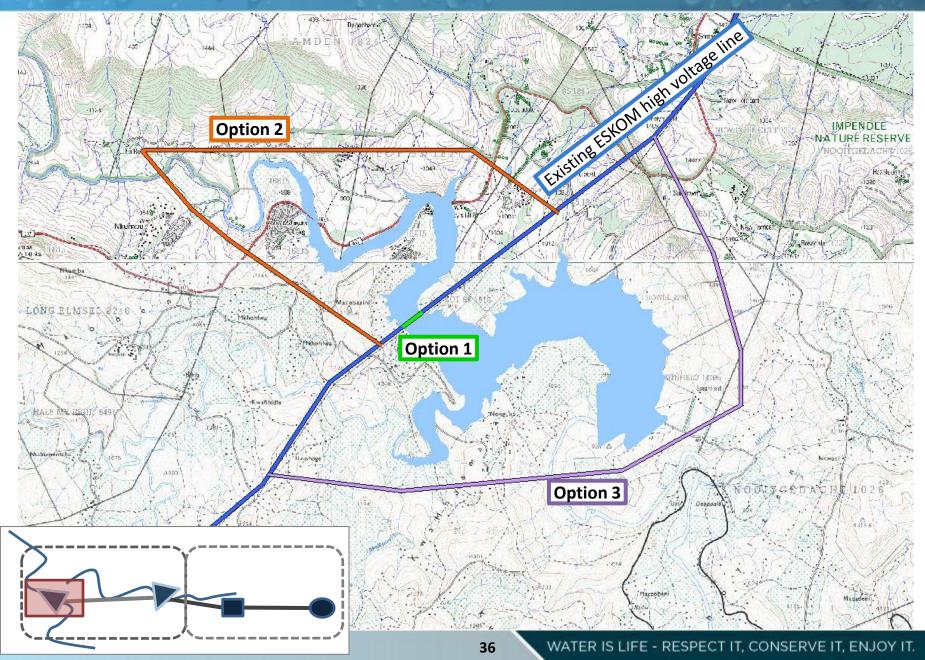
Smithfield Dam: Quarry and Earthfill Borrow Areas



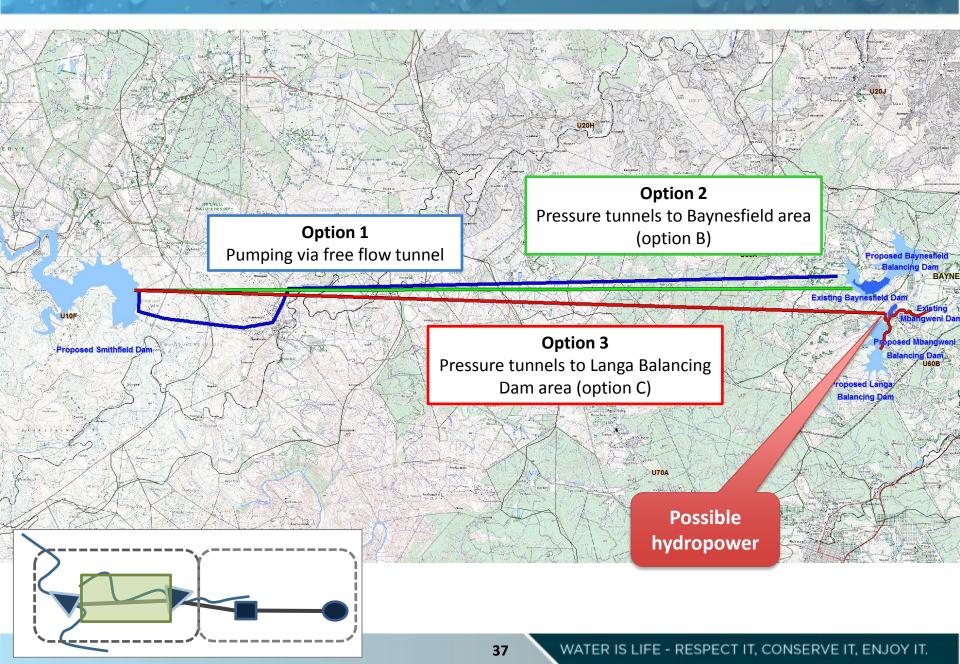
Smithfield Dam: Roads



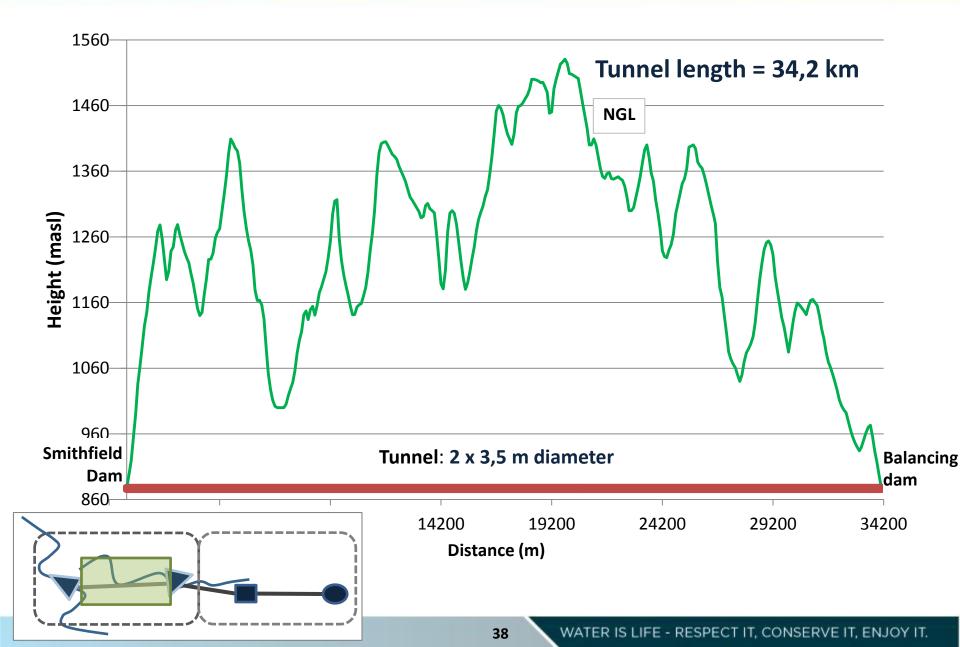
Smithfield Dam: Eskom infrastructure



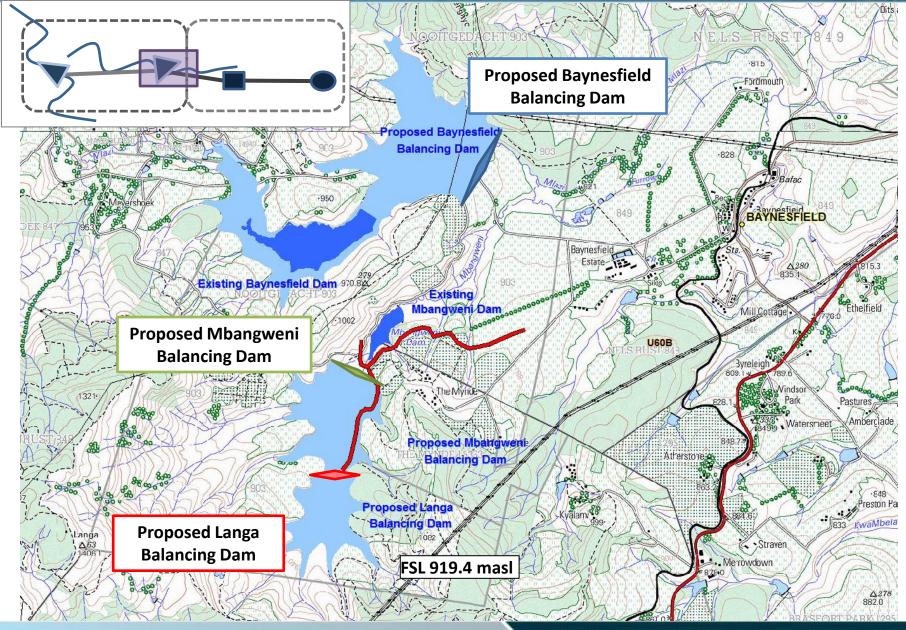
Raw water conveyance infrastructure (tunnel)



Raw water conveyance infrastructure (tunnel)



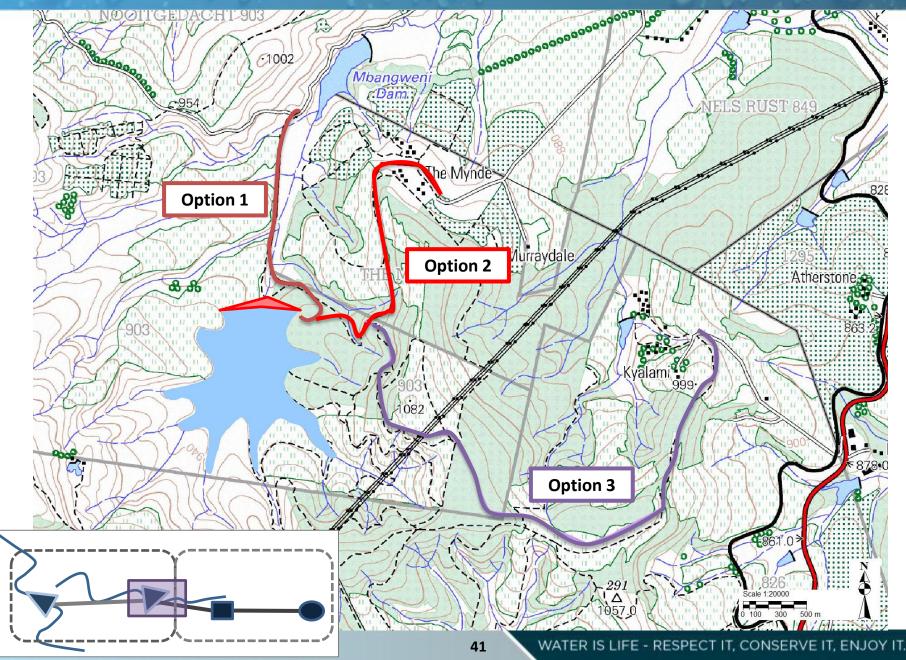
Balancing Dam (incl. small section of pipeline)



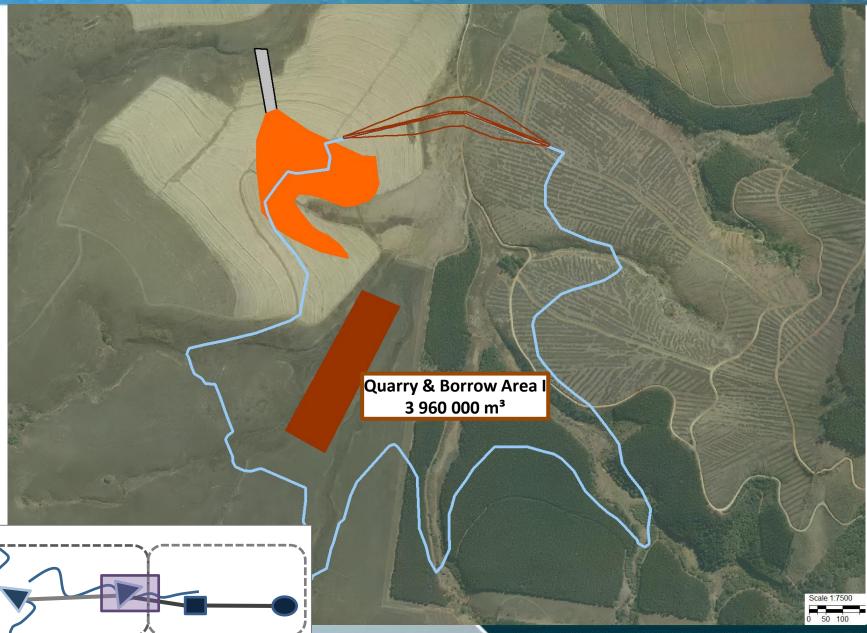
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Langa Balancing Dam: Roads



Langa Balancing Dam: Quarry and Earthfill Borrow Areas



Project programme



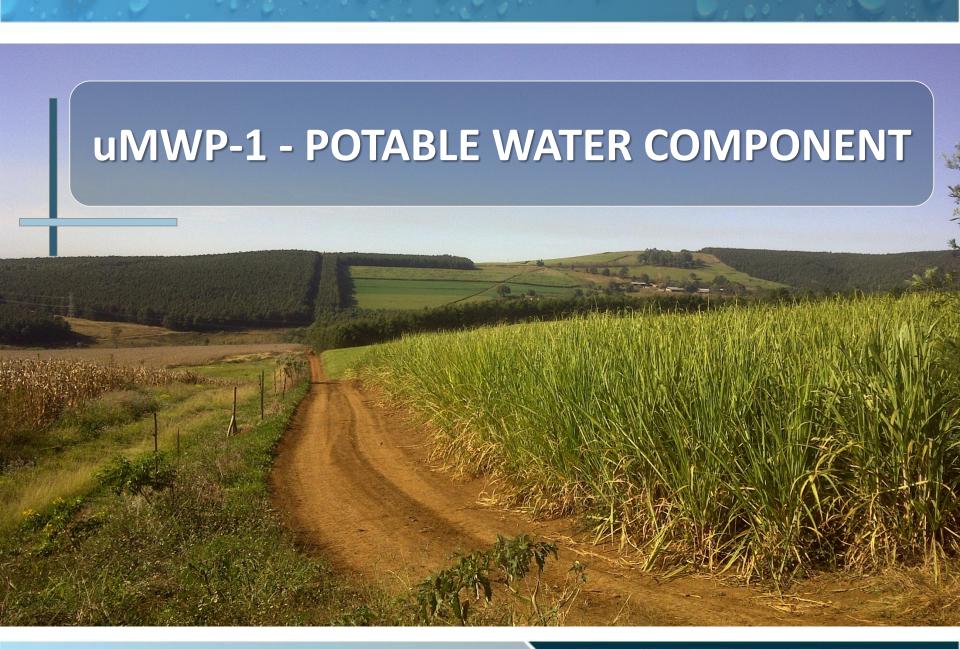
Web page



http://www.dwa.gov.za/Projects/uMkhomazi/default.aspx



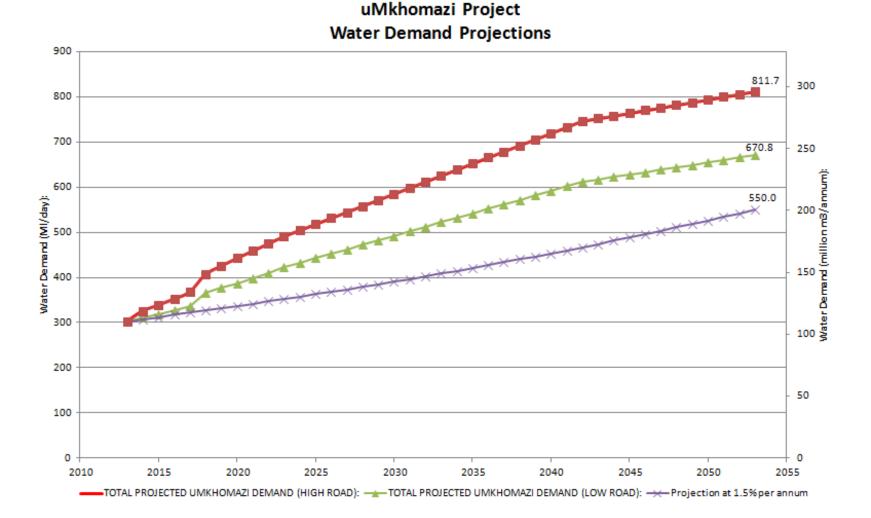
"...Once completely developed, phase 1 and 2 of the uMWP will be the largest water transfer scheme in South Africa, comparable to the Lesotho Highlands Water Project in terms of volume and tunnel lengths and diameters..."



Project Team:

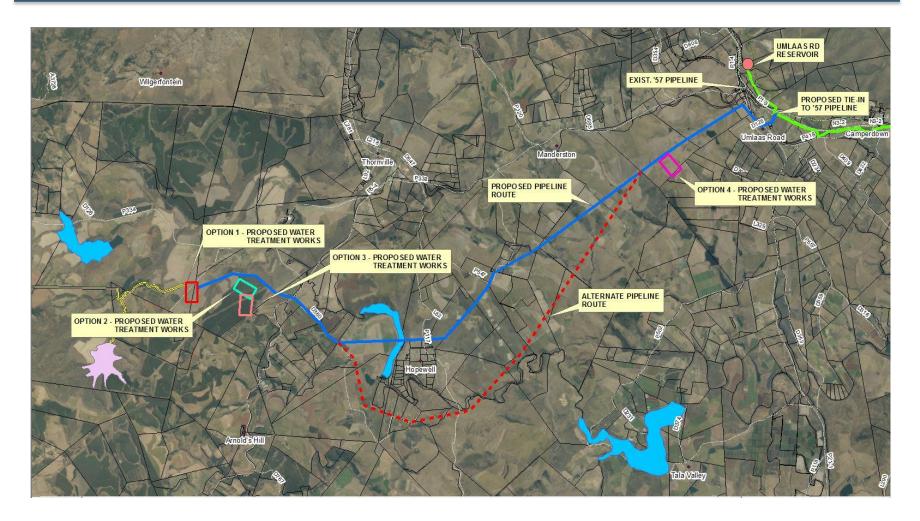
- Client: Umgeni Water
- Lead Consultant: Knight Piésold Consulting
- Water Treatment Works: Veolia Water
- Geotechnical Investigations: Knight Hall Hendry
- Engineering Survey: J C Martin Surveys

Water Demand Projections:

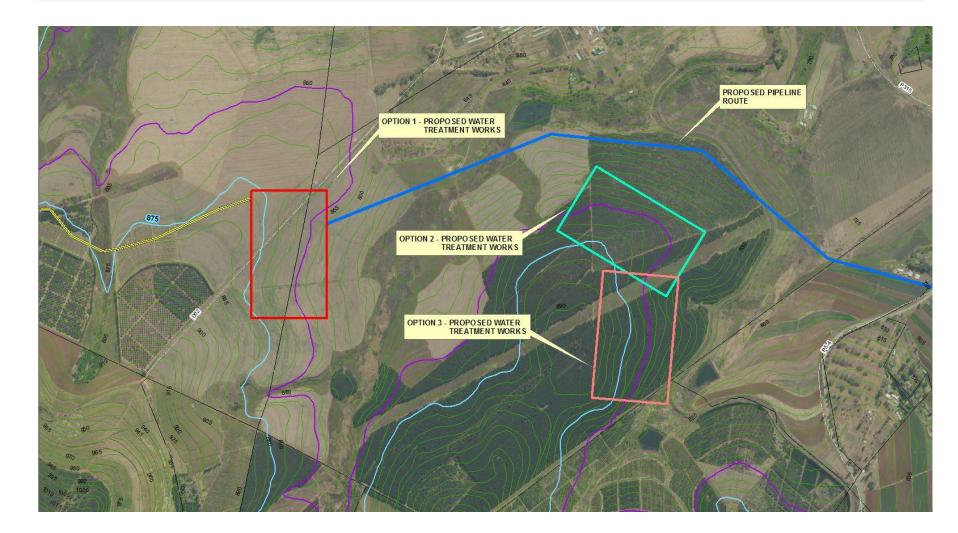


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Pipeline Routing



Proposed WTW sites at Baynesfield



Pipeline Details

- Gravity potable water pipeline to Umlaas Road
- Links into existing '57 Pipeline Western Aqueduct
- Routing avoids high elevations to maintain gravity flow
- DN2100 (2.1 metre diameter) thin-walled steel pipeline/s
- Total length: 21.3 km (24.5 km alternate route)
- Pipeline depth: approximately four metres to invert
- Pipeline capacity: 350 Ml/d each (phased as needed)
- Primary corrosion protection: External coating operating in unison with induced current and sacrificial anodes
- Internal lining for protection against internal corrosion

Tasks to date

- Water demand forecasts
- WTW location and preliminary process design
- Pipeline sizing and routing

Current and Upcoming Tasks

- Engineering survey (commenced)
- Geotechnical investigations (November 2013)
- Final costing
- Final reports

Pipeline Design

Questions?

Water Treatment Works

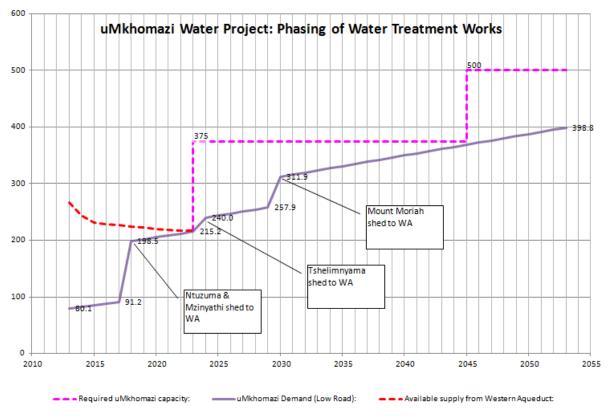
Process & Layout

Dr. Günter Lempert

1. Phased Implementation

Two Major Milestones:

- Phase 1: 2023 must have ca 375 Ml/d available
- Phase 2: 2045 must have ca 500 Ml/d available
- Logical size would be trains in multiples of 125 Ml/d



uMWP-1: Public Meeting – 23 October 2013

2. Process Technology

2.1. Main Process Considerations

- Turbidity
- Soft water
- Fe
- E-Coli / Organics (future increases)
- THM's (due to pre-chlorination)
- Light floc
- Sludge / Waste minimization

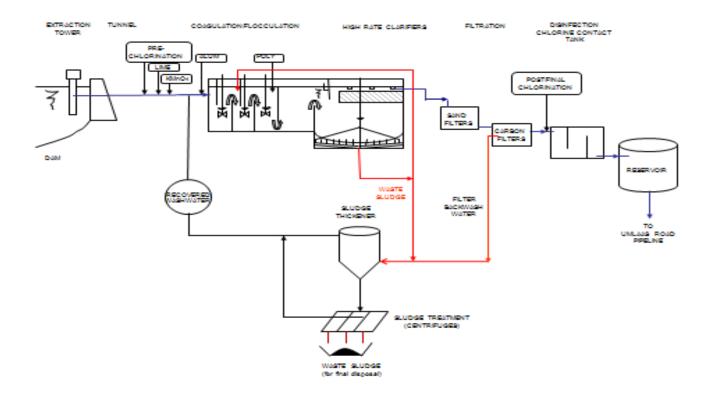
2. Process Technology

2.2. Basic Process Design Philosophy

- Employ known/proven unit processes
- "Manageable" units/trains
- Easy duplication (for future expansion)
- Flexibility to change chemicals
- Gravity flow as far as possible
- Small footprint

2. Process Technology

2.3 Treatment Process Envisaged



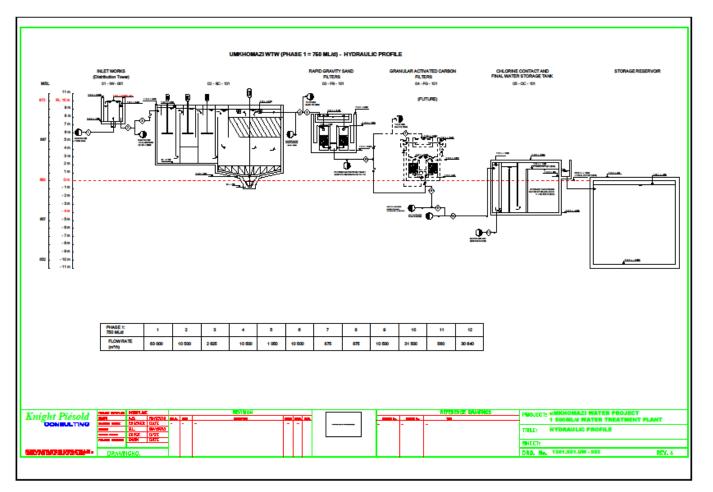
2. Process Technology

2.3. Basic Treatment Process Chosen

- Coagulation and Flocculation
- Sludge Blanket Clarifier
- Rapid Gravity Filters
- Granular Activated Carbon (GAC) Filters (future)
- Disinfection (Chlorination)
- Final Water Storage Reservoir 6 h
- Sludge handling

2. Process Technology

2.4. Hydraulic Profile



3. Conclusions

- 1. Total treatment capacity in phases of 125 Ml/d:
 - 250 Ml/d required by 2023
 - Phase 1 = give 375 Ml/d will last till 2045
 - Thereafter as required up to 1 250 MI/d
- 2. Conventional treatment process for dam water proposed;
- 3. BUT use high-rate unit processes to reduce area/footprint rqd;
- 4. Envisaged process has been presented.

ENVIRONMENTAL IMPACT ASSESSMENT



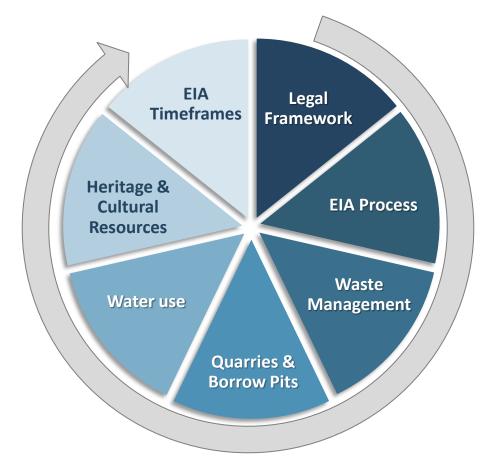






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PRESENTATION OUTLINE



LEGAL FRAMEWORK

Constitution of the Republic of South Africa, (No. 108 of 1996)



V

National Environmental Management Act (No. 107 of 1998)

EIA Regulations

- GN No. R. 543 of 18 June 2010
- GN No. R. 544 of 18 June 2010
- GN No. R. 546 of 18 June 2010

GN No. R. 545 of 18 June 2010

National Water Act (Act No. 36 of 1998)

Environment Conservation Act (Act No. 73 of 1989):

National Environmental Management Air Quality Act (Act No. 39 of 2004)

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

National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

National Environmental Management: Waste Act (Act No. 59 of 2008)

National Forests Act (No. 84 of 1998)



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Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)

Occupational Health & Safety Act (Act No. 85 of 1993)

KZN Heritage Act (Act No. 04 of 2008)

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

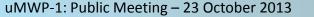
Kwazulu-Natal Planning and Development Act (Act No. 06 of 2008)

KwaZulu-Natal Nature Conservation Management Act (Act No. 09 of 1997).

Integrated Coastal Management Act (Act No. 24 of 2008)

National Road Traffic Act (Act No. 93 of 1996)

Other...

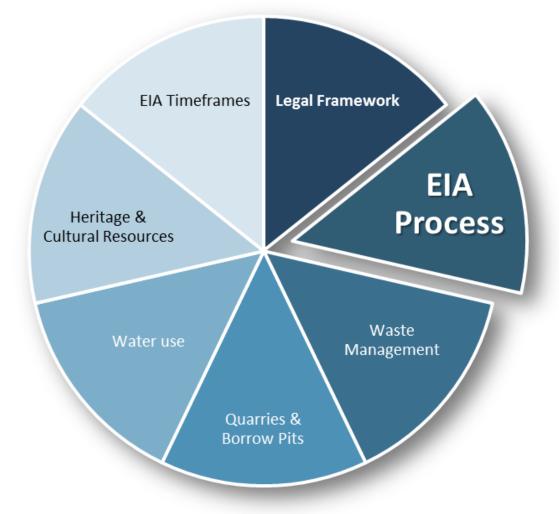


Legal Framework

> Waste Manageme

EIA Timeframe

Heritage & ultural Resource



Authorities' Meetings:

- DEA pre-application consultation meeting
- Environmental Authorities Meeting



EIA Process

Heritage & Iltural Resour

Authorities' Meetings

Separate EIAs with combined Public Participation

uMWP-1 Component	Infrastructure	Project Applicant		
Raw Water	 Smithfield Dam Water conveyance infrastructure Langa Balancing Dam 	Department of Water Affairs	Water affairs Department: Water Affairs REPUBLIC OF SOUTH AFRICA	
Potable Water	Water Treatment WorksGravity pipeline	Umgeni Water	WATER · AMANZI	
Raw Water Potable Water United Cato Ridge Reservoir				

uMWP-1: Public Meeting – 23 October 2013

FIA Tim

Heritage & Sultural Resource EIA Process

Authorities' Meetings

Process – Scoping & EIA (Listing Notices 1 – 3)

EIA Tir

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Process

Authorities' Meetings

Process – Scoping & EIA (Listing Notices 1 – 3)

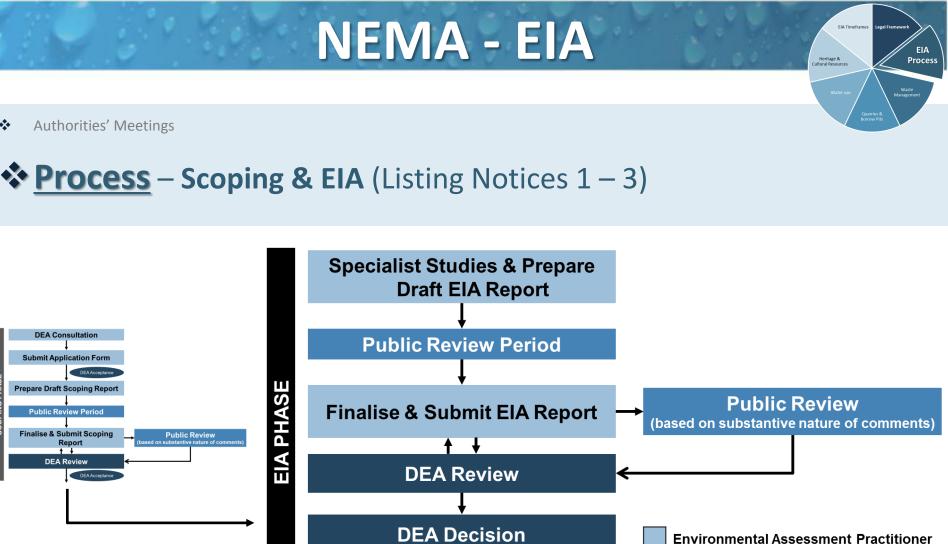


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WATER IS LIFE - RESPECT IT, CONSERVE IT, ENJOY IT.

EIA Process

Heritage & Iltural Resouro



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Notify I&APs

DEA

Interested & Affected Parties

Authorities' Meetings

Process



FIA Tim

Heritage & Sultural Resource EIA

Process

Waste anageme



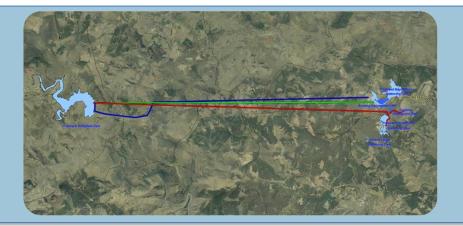
Authorities' Meetings

Process

Feasible Alternatives –

Raw Water –

- □ Major storage dam (Smithfield Dam)
- □ Raw water conveyance infrastructure
- □ Balancing dam (incl. raw water pipeline)
- **Gauging weirs**
- **Hydropower** plants
- **Roads**
- □ Waste disposal sites
- Eskom transmission lines
- **Quarries & borrow areas**



EIA Process

Heritage & Iltural Resourc



Authorities' Meetings

Process

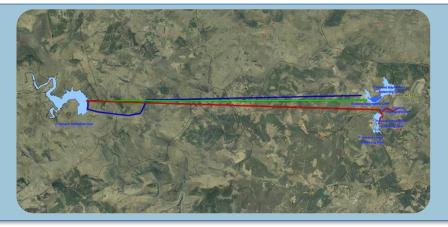
Feasible Alternatives –

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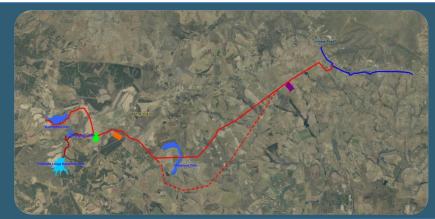
> Potable Water –

- Water treatment works
- ➢ Gravity pipeline)



EIA Process

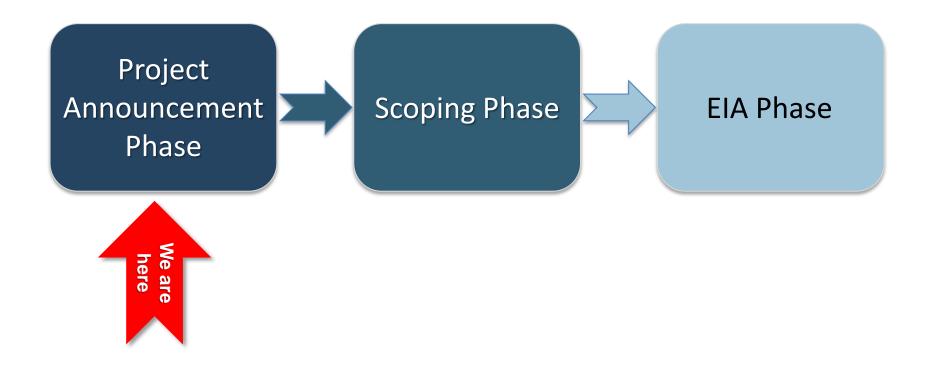
Heritage & Iltural Resour





- Authorities' Meetings
- Process
- Feasible Alternatives

Public Participation –



EIA Proce<u>ss</u>

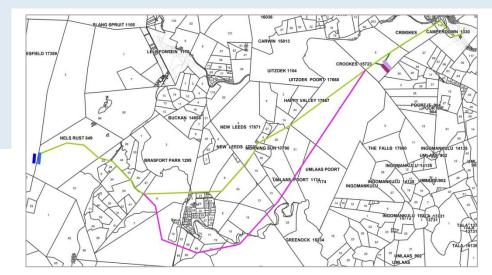
Heritage & Iltural Resouro



- Process
- Feasible Alternatives

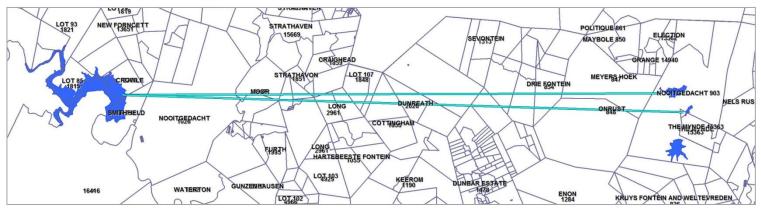
✤ <u>Public Participation</u> –

Landowner identification



FIA Tim

Heritage & ultural Resource EIA Process

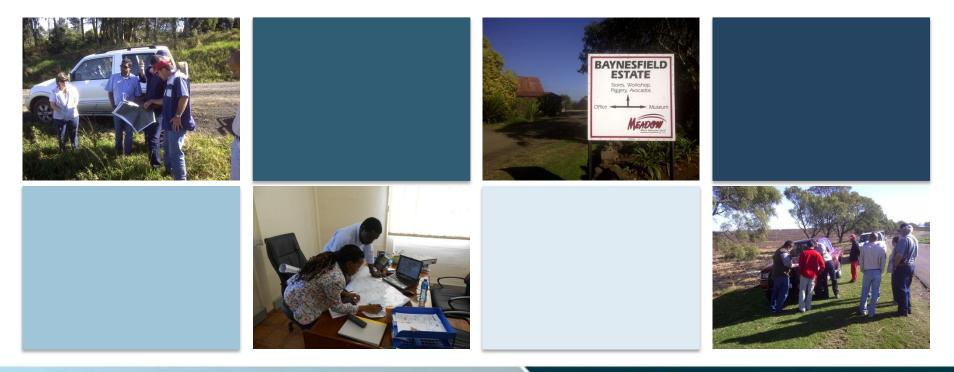




- Authorities' Meetings
- Process
- Feasible Alternatives

Public Participation –

Discussions with specific landowners



EIA Pr<u>ocess</u>

Heritage & ultural Resourc

- Authorities' Meetings
- Process
- Feasible Alternatives

Public Participation –

Discussions with specific landowners

> Notification:

- □ Newspapers (*The Star, The Witness; Isolezwe*)
- Onsite Notices
- Background Information Documents

BACKGROUND INFORMATION DOCUMENT	
PROPOSED UMKHOMAZI WATER PROJECT PHASE 1	
RAW WATER - DEA Ref. No.: 9 Smithfield Dam - 14/12/16/3/3/3/94 • Saturding Dam - 14/12/16/3/3/3/94 • Saturding Dam - 14/12/16/3/3/3/94	
POTABLE WATER - DEA RM. No.: 14/12/16/3/3/95	
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Heritage & Iltural Resourc



- Authorities' Meetings
- Process
- Feasible Alternatives

Public Participation –

- Discussions with specific landowners
- Notification
- Targeted Meetings
- Public Meetings
- Meetings with Traditional Authorities



uMWP-1: Public Meeting – 23 October 2013

EIA

Process

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NEMA - EIA

- Authorities' Meetings
- Process
- Feasible Alternatives
- Public Participation

Scoping Phase aims –

- Prioritisation of environmental issues and impacts
- > Selection of suitable & feasible alternatives to be investigated further
- Identification of relevant specialist studies
- > Determine public participation requirements



EIA Process

Heritage & Iltural Resour

NEMA - EIA

- Authorities' Meetings
- Process
- Feasible Alternatives
- Public Participation
- Scoping Phase aims

Preliminary list of Specialist Studies (EIA Phase) –

- > Terrestrial Fauna and Flora Study
- Heritage Impact Assessment
- > Aquatic and Riverine Assessment
- > Agricultural Impact Assessment
- Visual Impact Assessment
- Socio-economic Study
- Social Impact Assessment
- Wetland Assessment & Delineation
- Estuarine Study
- Traffic Impact Study

EIA

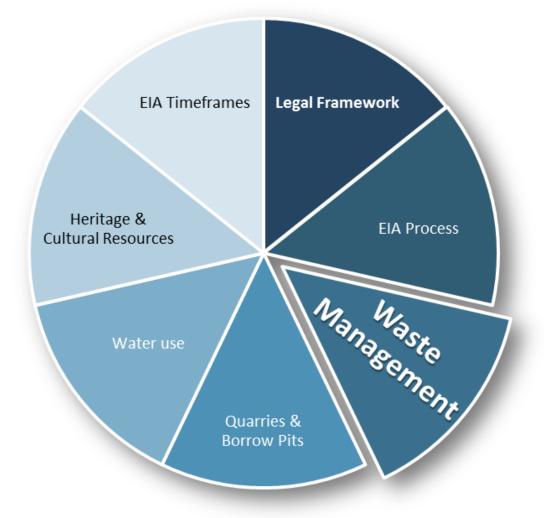
Process

Heritage & Iltural Resourc

- Water Quality Study
- Geotechnical Study



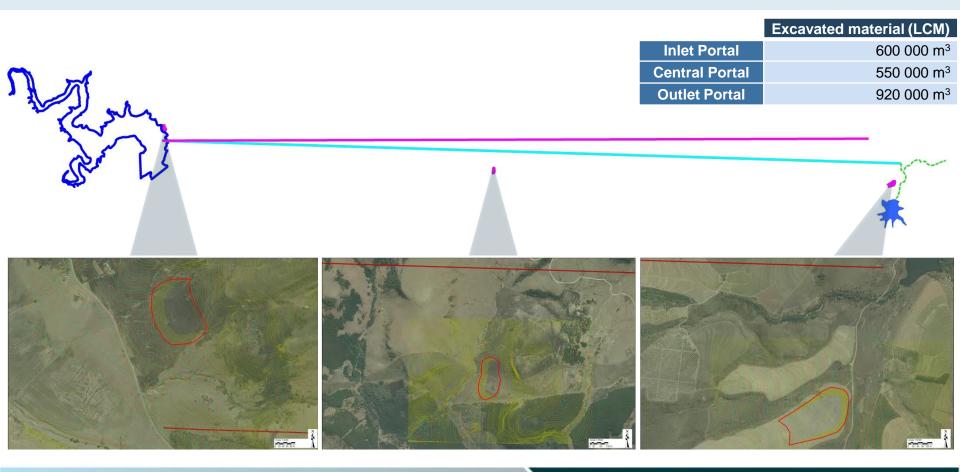
NEM:WA – Waste Management



NEM:WA – Waste Management

✤ <u>Raw Water</u>:

Disposal of excess spoil material – tunnel inlet, central adit and outlet



NEM:WA – Waste Management

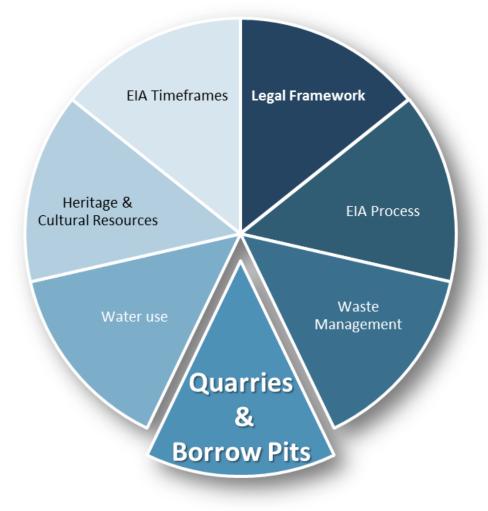
Raw Water

Potable Water:

- Sludge generation at Water Treatment Works [± 21 780 m³/day]
- Treatment of sludge to reduce water and organic content.
- Management of sludge may include:
 - Disposal to land to support an agricultural operation
 - Disposal at a licenced landfill
 - Re-use (e.g. using it as additive for making bricks)

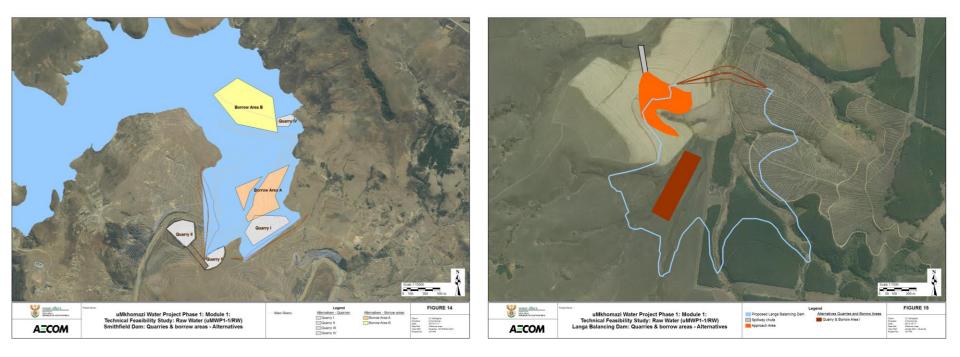


MPRDA – Quarries & Borrow Pits

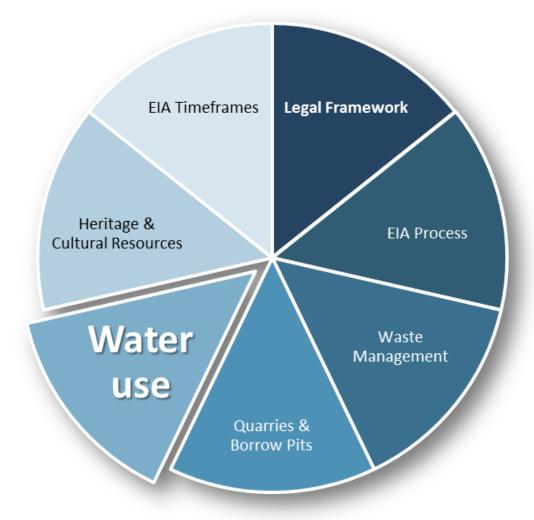


MPRDA – Quarries & Borrow Pits

- Authority = DMR
- Sourcing of construction material
- EMPs to be submitted to DMR



NWA – Water Use



NWA – Water Use

- Multiple water uses triggered
- EIA Report to contain information to satisfy WULA requirements
- Reserve determination



KZN HERITAGE ACT – CULTURAL & HERITAGE RESOURCES



KZN HERITAGE ACT - CULTURAL & HERITAGE RESOURCES

- Authority = Amafa aKwaZulu-Natali
- Phase 1 HIA
- Phase 2: Paleontological and Archaeological survey if required



Heritage & Cultural Resources

EIA TIMEFRAMES

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uMWP-1: Public Meeting – 23 October 2013

WATER IS LIFE - RESPECT IT, CONSERVE IT, ENJOY IT.

Time Fan

Thank you











