

eThekwini Municipality

Outflow Strategy in eThekwini

Presented by : Hope Joseph (BSc Civil Eng.)



CONTENTS





ETHEKWINI MUNICIPALITY

- Supply 909 MI/day of water from 9 Treatment Works
- 12 000km of water mains
- 263 Water Reservoirs
- 500 000 water connections
- Treat 500 MI/d of Waste Water
- 27 Waste Water Treatment Works
- 7 000 km of sewer mains





WATER CLASSIFICATION

- DWS study Mvoti to Umzimkulu
- Consortium of consultants (R4A, CSIR, Golder Assts)
- Outcome water resource class
- Class define required level of ecological protection
- Regulate the quality and quantity of treated effluent that can be disposed to estuary
- 16 estuaries in eThekwini

Multi-criteria Analysis

 Durban Bay (harbour) : uMngeni are both excluded from this study

- Estuaries Included are :
- North : Ohlanga ; uMdloti and uThongati
- South : Mbokodweni ; Little aManzimtoti ; uMkomazi plus Isipingo lagoon









uThongati

Max discharge to estuary = 20 MI/day

PES 🔳 D

REC C

TEC 🔳 D

- REC can only be achieved if no wastewater is discharged into the estuary
- Some sensitivity to level of treatment
- Ultimate capacity required = 140 Ml/day

Mdloti

- Do NOT improve if wastewater removed as catchment quality is very poor. More closed = poor O2. Relative insensitive to level of treatment.
- Max discharge to estuary = 50 ML/day
- Ultimate capacity = 125 MI/day





uMngeni

EWR must be implemented as well as other recommended interventions

Mbokodweni & Little Amanzimtoti

- Cost significant to improve and low importance.
- Further wastewater can be accommodated
- Estuaries must not become health hazard

uMkhomazi

No further wastewater into estuary. The proposed Smithfield dam with appropriate operating rule will comply to the TEC





Option 1: Combine flows & build sea outfall



REUSE IN THE NORTH



Option 2: Combine flows & indirect reuse to Hazelmere





Option 3: Indirect reuse at Tongaat WTW



Sunning dale

Glen Anil

DIRECT REUSE IN NORTH

Avo ca Hilb

Potable water reclamation from KwaMashu is discharged into the existing trunk main of the NA in the vicinity of Duffs Road.

KwaMashu WWTW Design = 65 Ml/day Current = 52 Ml/day

NOT BEING PERSUED

Potable water reclamation from Northern is discharged to the NA at Newlands east.

cwlands East

Northern WWTW Design = 70 Ml/day Current = 59 Ml/day

Greenwood D

KwaMashu WWTW & Northern WWTW to existing Northern Aqueduct (NA)



REUSE PROJECTS IN SOUTH



Option 1: Amanzimtoti WWTW to Kingsburgh WWTW to Nungwane Dam





Option 2: Toti WWTW to Kingsburgh WWTW to Toti WTW



CONCEPT PLAN - UW





CAPACITY TO IMPLEMENT REUSE

Water re-use projects are complex and sophisticated, require high level of competence and skill. Capable implementation agency will require:

- Technical expertise
- Planning ability
- Project management capability
- Financial strength
- Trusted water services delivery
- Accepted by community and customers
- Compliance of existing WWTWs to achieve strict discharge standards is critical to the future success of water re-use.
- Strict enforcement of discharge standards;
- Addressing the management and performance failures of wastewater treatment plans.
- Water re-use has good potential to solve local water shortage problems
- Water re-use gives best quantitative benefit in coastal applications (uses water that would have discharged into the sea)





Possible Location/s of Tongaat/La Mercy Desal Plant

Existing Genazzano WWTW site with proposed 3 to 12 MI/day plant

Existing Genazzano WWTW site with proposed 3 to 12 MI/day plant

RESERVOIR	CURRENT DEMAND (ML/DAY)	FUTURE DEMANDS (ML/DAY)	TOTAL DEMAND (ML/DAY)
LA MERCY AIRPORT (LMA)	2.900	13.200	16.100
WESTBROOK	0.600	0.000	0.600
DESAINAGAR	0.128	0.000	0.128
LA MERCY	2.172	0.000	2.172

- Gennazano WWTW site land needs to be secured. This WWTW is planned to be decommissioned but there are some studies underway by Iliso Consulting on behalf of THD to utilise/expand the works/site for future La Mercy Development.
- Detailed feasibility still to be commissioned for proposed containerised desalination plant and associated extraction wells & pumps at this location.
- Supply to LMA reservoir to be initiated potential delay of rising main stream crossing.
- Funding availability for desalination system and supply to LMA reservoir to be confirmed
- Supply to LMA reservoir dependent on transfer of LMA reservoir to EWS. UW currently obtaining board approval for this.

Desalination

REMIX PLANT @ CENTRAL WWTW

- In response to the demand EWS believes that a remix water system could support the deficit in supply, by installing a Demonstration Plant providing approximately 6.25 Ml/day with a possible ultimate scenario of 50 Ml/day for the Inner City and a further 50 Ml/day for the South of Durban. This in alignment to the growth expected and thus water demand increase.
- Joint team effort between eThekwini and Japanese government
- Proposed full scale100 ML/day plant
- 50% seawater + 50% sewage
- Electricity consumption down by 40 50%

OUTFALL LENGTH = 3160m

SUPPLY OPTIONS

DURBAN WATER RECYCLING (DWR)

Aim is to treat 47.5 MI/d of municipal wastewater to a near potable standard for direct reuse in industrial processes.

DWR -PROJECT MOTIVATION

Veolia

- Alternative to augmentation of the city's Southern Wastewater Treatment Works marine outfall.
- Mondi Paper expressed the desire to increase it's off take of reclaimed water

DWR - PROJECT ACHIEVEMENTS

Sustainable Development of Water Resources

- At capacity the plant reduces the city's water consumption by 5%
- Extends the life of the city's water catchment resources.
- Unused water can be directed to unserviced communities.

Pollution Load Reduction and Waste Minimisation

- Reduction in the sea outfall pollution load by 24%
- The process operates at 97.9% water utilisation efficiency

INDUSTRIAL REUSE @ UMKOMAAS

WWTW & SAPPI

- Water reuse for industrial
- Discharged to the estuarine
- Open up economic and residential development
- **Regionalization of treatment**

IRRIGATION REUSE @ CATO RIDGE

WWTW

- Cato Ridge wwtw consists of a bar screen at the head of works and 5 oxidation ponds for treatment
- Treats ± 300kl/day of domestic wastewater
- Treated effluent is pumped to neighboring golf course, were it will be used to water the golf course
- Excess effluent is discharged into nearby watercourse

EWS IS ACTIVELY INVESTIGATING SOME OF THESE PROJECTS WHILE OTHERS ARE IN THE IMPLEMENTATION PHASE CERTAINLY WE HAVE TO CONSIDER THESE OF PROJECTS MOVING FORWARD DUE TO THE SCARCITY OF WATER RESOURCES

Thank You

ANY QUESTIONS