

# REHABILITATION OF OLIFANTSFONTEIN WETLAND (KAALSPRUIT)

EKURHULENI



fourth**element**



Kaalspruit at R562, Clayville.

Fourth Element has been appointed for the rehabilitation of the Olifantsfontein (Kaalspruit) wetlands at Clayville, northern Ekurhuleni Metropolitan Municipality. The appointment is for the feasibility studies, design and EIA. Construction is envisaged for the 2018/19 financial year.

## Problem Statement

Since the early 1990's, studies of the Hennops River catchment and Centurion Lake point to the tributaries of the Kaalspruit and Olifantspruit as the primary sources of high sediment yield, poor water quality and litter. The last two need to be addressed at a catchment level, while high sediment yields can be due to both catchment yield and in-channel dynamics. Certainly the Kaalspruit has cut into the original wetland and eroded much of the channel down to bedrock in places (see above). The resulting channel has high, steep, unstable river banks which will be a continuous supply of sediment in flood conditions.

Studies show this sediment carries through to downstream systems, smothering habitat and depositing in reservoirs such as Centurion Lake (see below).

## Services

- Hydrological catchment modelling and calibration
- 1D & 2D analysis of hydraulic structures
- Network hydraulic analysis including irrigation and canal systems
- Green engineering systems
- Natural hazard risk assessment
- Climate change risk modelling
- Feasibility studies, concept design, detailed design
- Crop yield modelling
- Cost benefit assessment
- Agricultural engineering support
- Environmental water requirement (EWR)
- River rehabilitation and enhancement
- Long term continuous flow monitoring systems
- Environmental risk advisory services

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Centurion Lake.

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## Design Objective

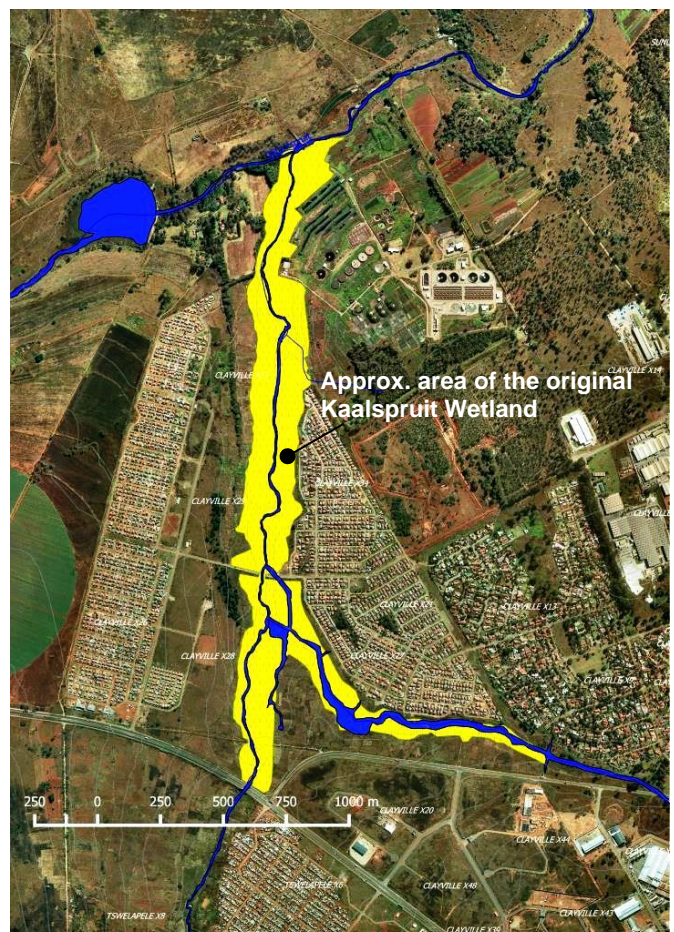
Our objective is to develop design solutions for the rehabilitation of the original wetland which will form part of the mitigation of the sediment, water quality and litter problems experienced in the Hennops River system. We will update the baseline conditions of the Kaalspruit system and test the feasibility of previously identified solutions.

We will also oversee environmental impact studies and coordinate the applications for environmental authorization and water use.

## Design Approach

Central to our approach will be to model the system hydrologically and hydraulically and ensure a comprehensive understanding of the current conditions. The same models will be used to test solutions and will have the capacity to simulate the wetland system under a continuous rainfall series (e.g. over a seasonal cycle) to test flood conveyance, sediment movement and water quality variations.

At this point it is not expected to apply a 2-D hydraulic model, but this will be reviewed.



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