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MOSSEL BAY: UPGRADING OF EXISTING STORMWATER SYSTEMS IN D'ALMEIDA AND BAKKE STREET AREA

August 2017

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INTRODUCTION

- **Background Information**
  - During 2013's heavy rainfall, flooding was experienced at the Nautica Development on the corner of Louis Fourie and Bakke Street in Mossel Bay. The flooding resulted in extensive damage to the parking area of the development.
  - Mossel Bay Municipality operates and maintains this storm water network and needed measures to prevent future flooding.

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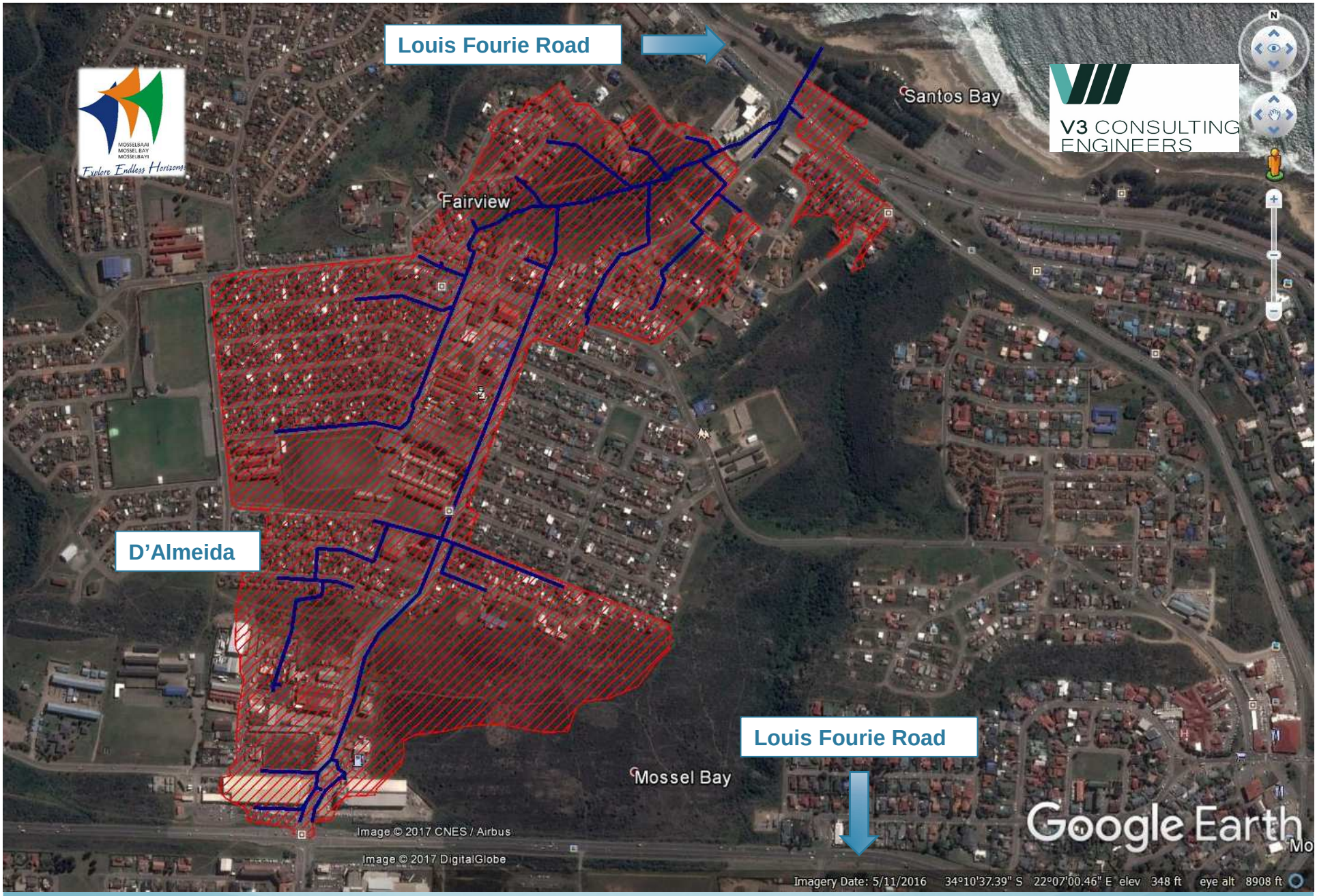
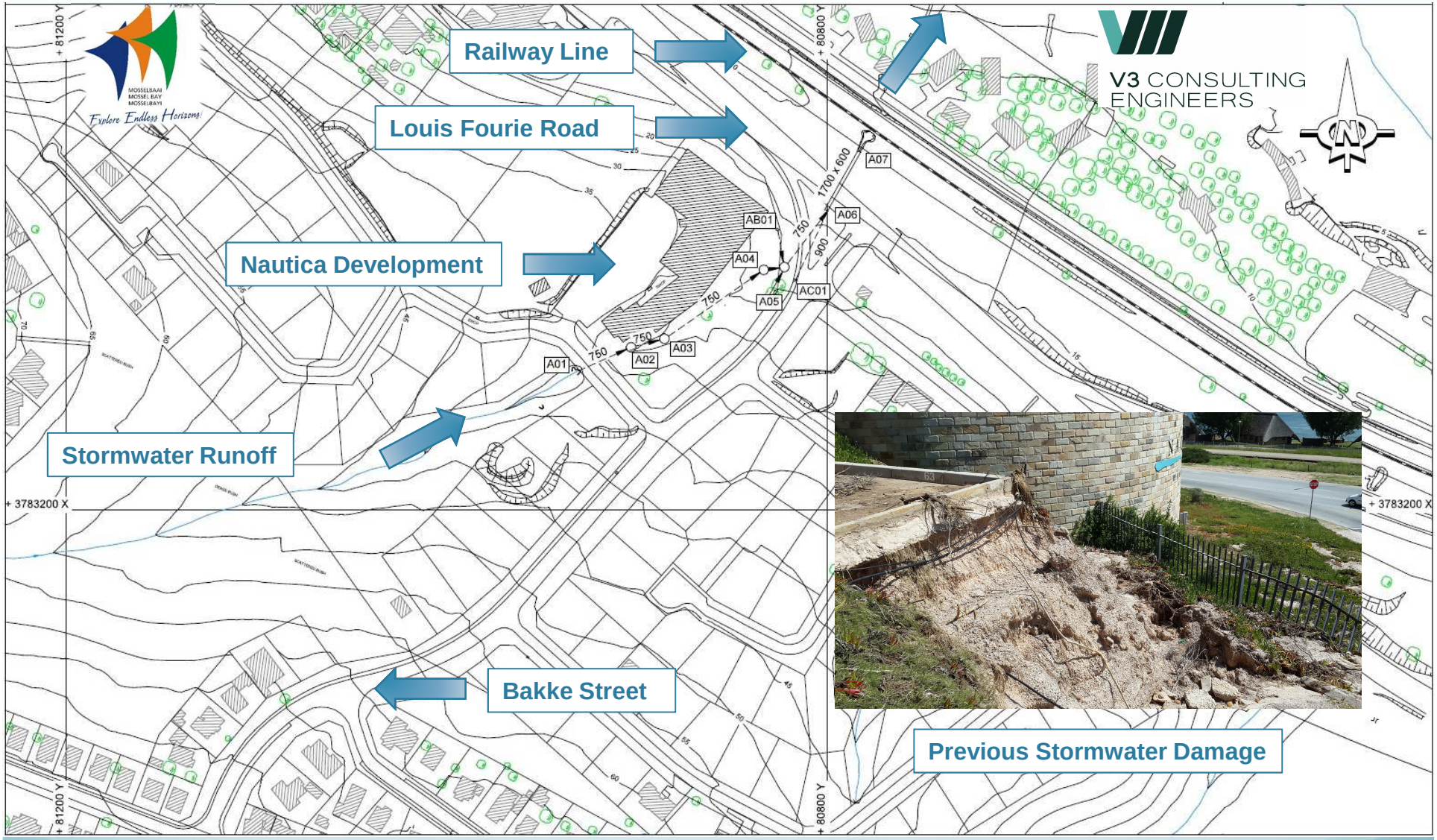


The stormwater catchment area lies between Louis Fourie Road in the south through the D'Almeida Residential area, to Louis Fourie Road in the North.

The stormwater culminates at the Bakke Street/Louis Fourie Road intersection from where the stormwater has to cross Louis Fourie Road, Transnet's railway line and through four concrete pipes to discharge into the ocean.



A large volume of stormwater joins the system through the existing 750 mm pipe underneath the Nautica development.

This pipe can not cope with the volume of water upstream of the development and has failed spectacularly in the past causing large damage and danger to lives and property.

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Louis Fourie Road in the foreground with Bakke Street in the background.

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Damage to the raised parking area

Damage to the parking area at the development

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Before Photo of Channel at Railway Crossing
(Upstream View)

Before Photo of Channel at Railway Crossing
(Downstream View)

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Before Photo of Transition to 4 x 750mm Pipes at Railway Culvert Outlet.

Before Photo of 4 x 750mm Pipe discharge into the ocean.

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- **Design**
  - The design philosophy adopted by Mossel Bay Municipality was to divert enough stormwater away from the “Nautica” system to ensure the existing pipe operates within it’s capacity.
  - Enlarging the existing pipe underneath the Nautica development was not feasible.
  - To achieve this, the diversion required the upgrading / altering of the existing systems in D’Almeida in the vicinity and adjacent to Mossel Street and Bakke Street.

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Proposed alterations to the pipe network and the diverted stormwater catchment area.

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- **Design continued…**
  - A design flood with a recurrence interval of 1 in 10 years was used for the analysis.
  - Flood peaks were calculated using the Rational Method.
  - The run-off for a storm with a 1:10 year recurrence interval was estimated and ranges from 1.7 m^3/s to 4.4 m^3/s.
  - The inlet capacity of the existing stormwater system needed to be upgraded to accommodate the 1:10 runoff.

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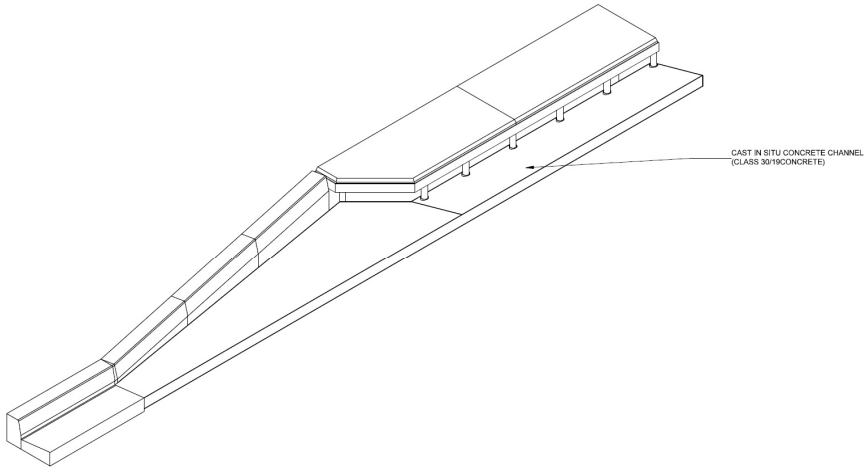
Typical Condition of Existing Inlets



DETAIL SW2.1: DETAIL OF CATCHPIT

Drawing of Inlet Upgrade

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- **Design continued…**
  - The slopes of the network are very steep and super critical flow with high flow velocities were calculated throughout the system.
  - The maximum slope of pipeline route along Bakke Street is 1:5.
  - The design required smooth pipes with welded joints which has to handle flow velocities up to 16 m/s.
  - This required extra care and necessitated to switch the design from 2D computer modelling to 3D modelling.

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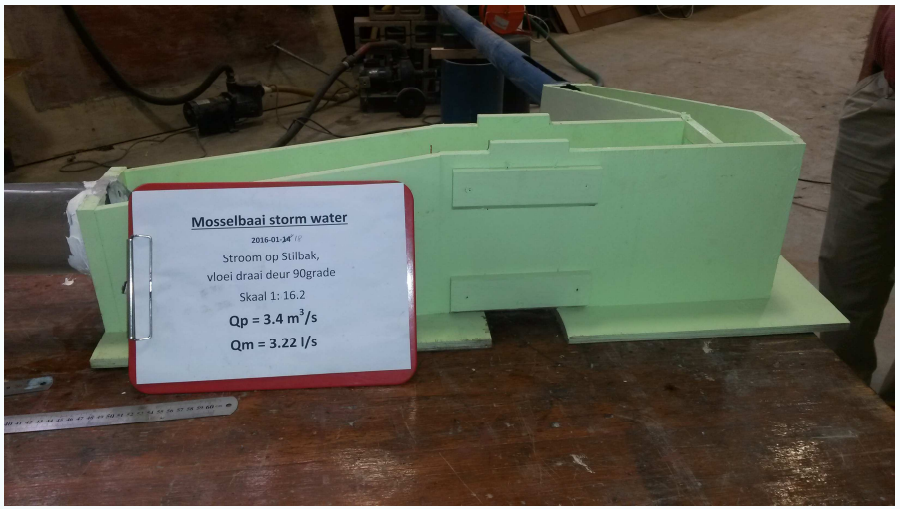
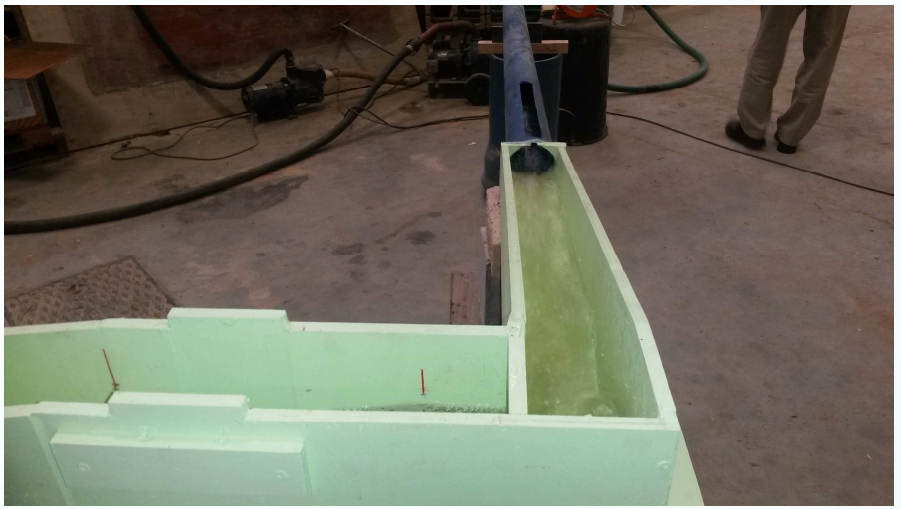


3D Model of 90° Stilling Basin



Flow in 3D Model of 90° Stilling Basin

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3D Model

- Scale 1:16.2
- Qp = Peak Flow = 3.40 m³/s
- Qm = Model Flow = 3.22 l/s

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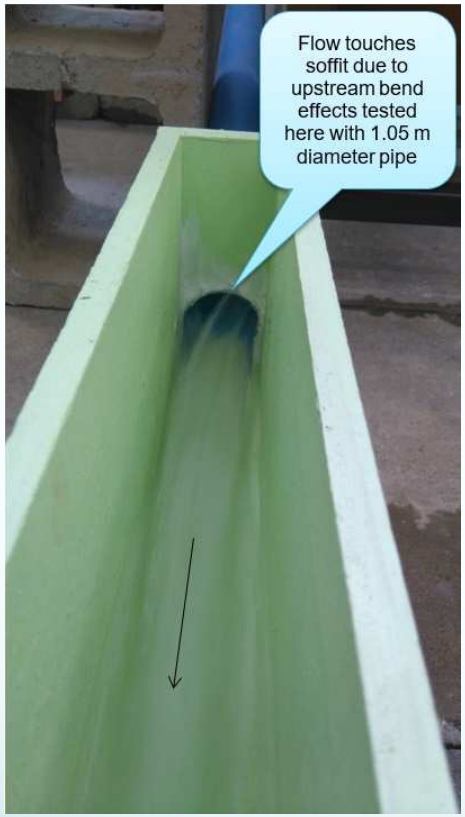

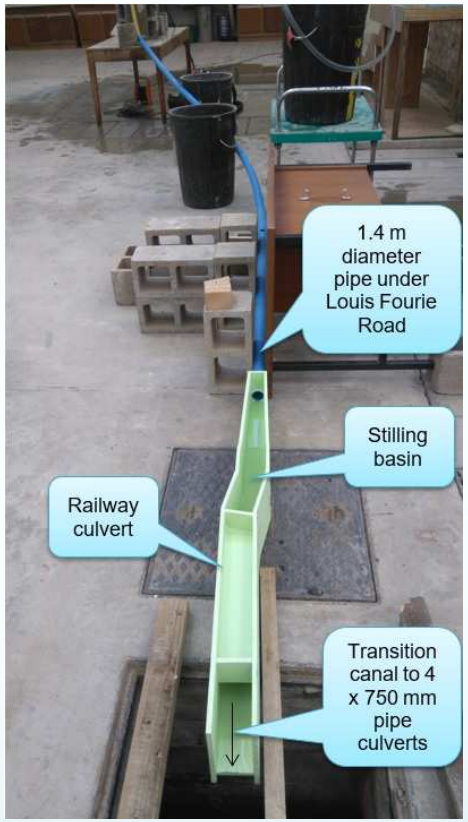

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Lower stilling basin and transition structure canals between Louis Fourie Road and the railway line at the design discharge of 4.4 m³/s

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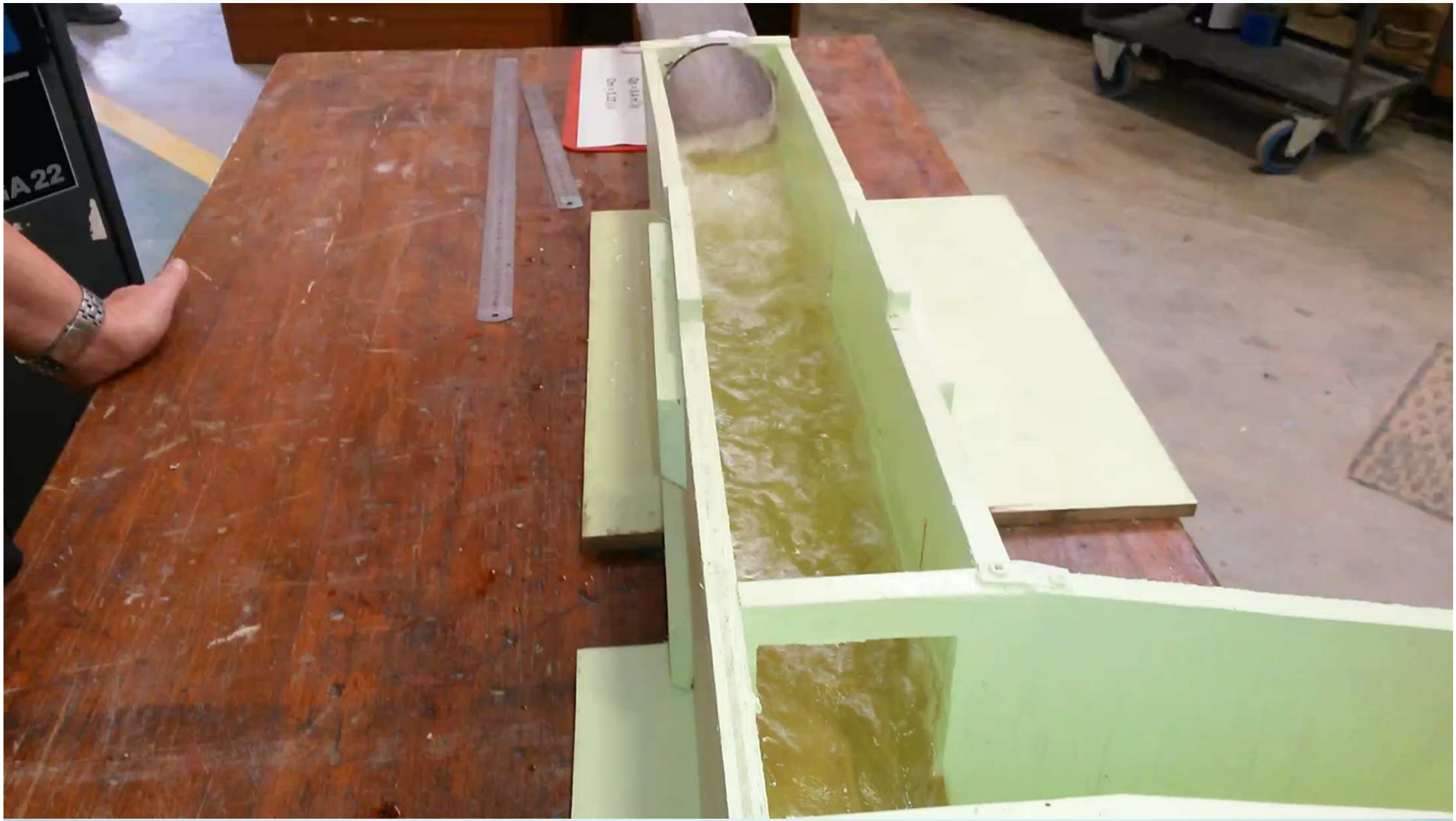

3D Model of 90° Stilling Basin

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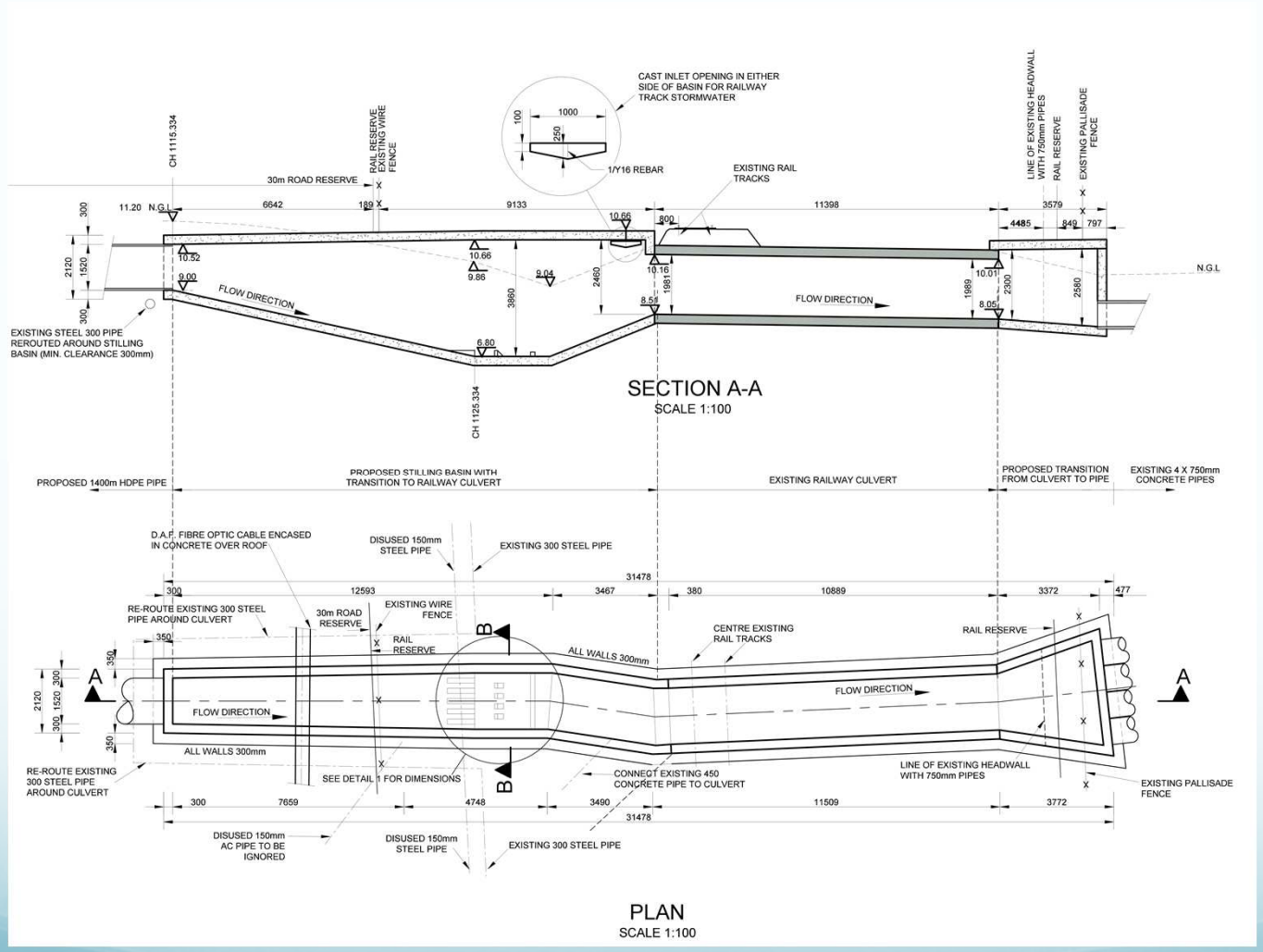

Lower stilling basin and transition

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3D Model of Railway Stilling Basin

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- **Tender**
  - Contractor: Urhwebo e-Transand
  - Tender Value: R 17 million
  - Duration: 30 Weeks

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- Construction

1400mm ND Pipe laying in progress

1400mm ND Pipe Trench

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- Construction continued…

Construction of Railway Stilling Basin

Railway Stilling Basin

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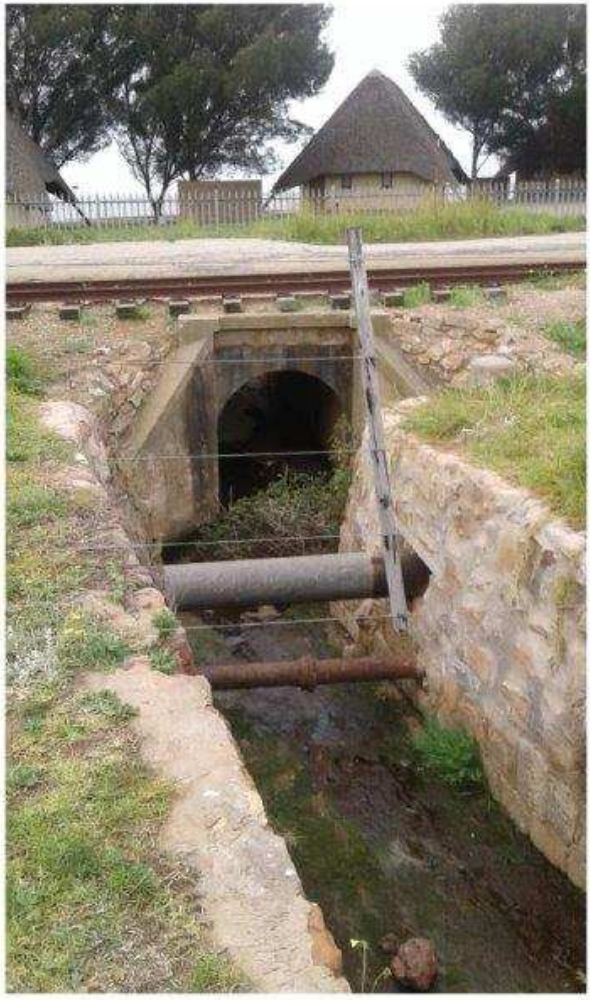

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MOSSEL BAY: UPGRADING OF D'ALMEIDA STORMWATER: LOWER STILLING BASIN: BEFORE & AFTER PHOTOS

Urhwebo e-Transand
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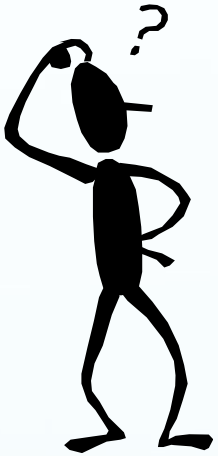

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