



**Transnet National
Ports Authority (TNPA)
Buffalo Bridge Replacement Project**



Background

Project Value: ±R250m | Duration: July 2012-April 2014

The Buffalo River Bridge was completed in 1935 and is a unique landmark characteristic of the Port of East London. As a combined rail, road and services conduit, it is an asset of high importance to the logistics of the Port and local

community. Transnet National Ports Authority (TNPA) appointed RCE to conduct a pre-feasibility study for the replacement of the bridge due to its perceived inability to comply with future requirements.

Key Features

The study was aimed primarily at developing a number of bridge replacement options. The most viable option is then selected for further development. The approach adopted was to deal with the client's requirements in the context of a range of engineering, socio economic, land use and feasibility determinants.

screening studies, traffic predictions, construction alternatives and cost comparisons.

Engineering options and their associated construction and operating costs are evaluated as input into a broader, multi-criteria analysis (MCA). The entire study enjoys much greater definition by virtue of a high resolution LiDAR aerial survey conducted for the Port.

This includes site & structural evaluation, environmental

Services Provided

The following Engineering services were provided:

- + Establishment of topographic and geotechnical conditions
- + Fatigue assessment of existing bridge condition
- + Structural modelling by finite element analysis
- + Review of design loading
- + Stress and fatigue life analysis
- + Development of optional Engineering solutions
- + Evaluation of developed options by risk and multi-criteria analysis

This was performed considering the following:

- + Evaluation factors: rail transport demand, port functionality, road user requirements, envisaged developments, environmental and heritage concerns, rail service continuity
- + Constraints: Fixed roads and infrastructure, adverse topography, minimum curvature requirement, vertical alignment allied to fixed points, freeboard and hydrology, land use and commercial development

Outcome

Five different options (inclusive of the status quo) were developed to basic Engineering level. A MCA has been employed to assist in evaluating these options. The complex but technically viable Option E is recommended.

The chosen option positively contributes to optimum land use and avoids freeboard constraints. The preservation of the existing bridge as a working monument (road options only) is also achieved for an extended period.