



Mandlakazi Pipe Bridge

Mandlakazi Upstream Bulk Post Tensioned Pipe Bridge

PROJECT OVERVIEW

- **Project:** Mandlakazi Upstream Bulk: Post Tensioned Pipe Bridge
- **Client:** Zululand District Municipality
- **Main Contractor:** Afrostructures (Pty) Ltd
- **Project Engineers:** ECA Consulting
- **Specialist Subcontractor:** Post Tensioning & Structural Solutions (PTS-S) in partnership with Struttura Consulting

The Mandlakazi Upstream Bulk Post-Tensioned Pipe Bridge forms part of the Mandlakazi Regional Bulk Water Supply Scheme (MRBWS) — a major infrastructure initiative aimed at addressing long-term water shortages by transferring water from Jozini Dam to communities across the Zululand and uMkhanyakude District Municipalities.

The 211.5 m post-tensioned concrete box girder is carried on two abutments and four intermediate piers, arranged over five spans: four 47 m spans running from the south abutment through Piers 1 to 4, followed by a shorter 23.5 m span to the north abutment.

The girder is a single-cell, hollow post-tensioned concrete box girder with a rectangular cross-section approximately 3.6 m wide and 2.8 m deep, comprising a top flange (deck slab) and bottom flange (soffit slab) connected by two webs, enclosing a continuous internal void. Cast-in openings with steel wire mesh covers are provided in the girder walls for lighting and ventilation of this internal void.

PTS-S SCOPE

PTS-S were proud to play a specialist role in bringing this structure to life, having been subcontracted by Afrostructures (Pty) Ltd for the design, supply and installation of the post-tensioning system — a critical component in turning the structural design into a durable, high-performance bridge.

The bridge was constructed in four stages, with each stage incorporating 6 No. 19-strand tendons progressively coupled through to Segment 4. This arrangement ensured the continuity of the PT tendons and provided the required bridge capacity across the full 211.5m length of the bridge.

Behind those numbers is a process that demands precision from tendon design and detailing, through installation and stressing, coordination on site, and a strong understanding of how design translates into construction — all to ensure the post-tensioning system performs exactly as intended within the completed structure.



BENEFITS OF POST-TENSIONING IN BRIDGES

Post-tensioning is more than steel and concrete — it's about controlling forces, managing construction, and making long-span structures possible. By actively compressing the concrete, post-tensioning allows longer spans with slender, more efficient sections, increases load capacity, and reduces cracking and deflection under load. The result is a more durable structure with lower long-term maintenance, exactly the performance required of a bridge like the Mandlakazi Upstream Bulk Water Supply Pipe Bridge.

PROJECT TIMELINE

Construction Start: February 2026

Anticipated Completion: September 2026

