

River stabilisation on Vereeniging's Riviera

A controlled drop in the water level provides a window for the construction of a 330m gabion wall.

Sited on the banks of the Vaal River, Vereeniging's Riviera Villas residential complex required an environmentally engineered solution to stabilise a section of embankment that had become badly eroded.

Responding to the challenge, Riaan Coetzee of consulting firm, WSM Leshika, invited Louis Cheyne, managing director of Gabion Baskets, to assist in the detailed design of the gabion structure required to carry out the rehabilitation programme. (Gabion Baskets is a leading manufacturer of gabion and river mattress products.)

Cheyne says that the embankment to be stabilised was approximately 1,5m high with a badly eroded soil foundation. A 1,5m high gabion wall with a base width of 1m in height and a width of 1,5m, with a second gabion layer of 0,5m x 0,5m was recommended with a vertical front face.

"Normally a river mattress toe is recommended at the toe of the structure for at least a length of 1,5m to prevent scour," Cheyne explains. "However in this case the riverbed was sloping too steeply away from the wall and would have necessitated the placement of a mattress in deep water."

As a result a sausage (cylindrical) gabion of 650mm diameter was chosen to stabilise the toe of the gabion wall to prevent erosion of the base and subsequent subsidence.

"This sausage gabion is only packed to about 75% of its capacity to facilitate a more flexible apron protection in front of the wall (compared to what a normal gabion box would provide at this point)," Cheyne continues.

"A non-woven needle punched geotextile having a mass of 210g/m² - A4 (U24) was used below and behind the gabion wall with an overlap of 200mm at all joins. The wall to be constructed was to be about 330m long parallel to river flow. This work was to happen in June, incidentally at the same time that the water level in the Vaal river was dropped to allow for the annual maintenance of the machinery at the Barrage."

Due to the excessive corrosion evident in the area, PVC coated Class A galvanised materials were decided upon for the gabions to be used in the project to offer increased corrosion protection and a designed life expectancy of approximately 60 years. The PVC coating supplied was a grey colour to blend in with the colour of the rock supplied.

Critical path

Construction officially started on 28 May, with Reg Laskey of Littlecreek Civils appointed to undertake the works. Laskey has in excess of 35 years experience with gabion installations on a diverse range of projects spread across KwaZulu-Natal and the Gauteng area.

"The project's critical path was to place and fill as many base gabion baskets as possible for the length of 330m, as the water level between the dam and the Barrage was to be dropped between the 11th and 22nd of June. The alternative would have meant carrying out the workings in 1,5m deep

water, which would have made the project much more difficult and time consuming," Cheyne explains.

To enable trucks to gain access to the site an existing boathouse had to be removed along the waterfront. A 20 ton Hyundai excavator and a wheel loader with a 3m³ bucket were used on site during this period to rapidly move the excavated soil and debris from the river edge and off site, and to bring in the rock required for the gabions placed along the river edge.

Fortunately for Littlecreek, the base gabions, sausage gabions and geotextile were placed during the planned low water period and most of the base gabions were filled with rock. The contractor was then able to proceed with the final filling of the base gabions and the construction of the gabion layer above this level once the water had reverted to its normal level.

A lot of final levelling of the site is still required with topsoil and the placing of a 1,3m wide concrete block pathway behind the wall frontage. The boat berthing projections still need to be replaced and spaced more evenly along the river edge as they had also come loose from their foundations, with severe corrosion also evident at the base of these platforms.

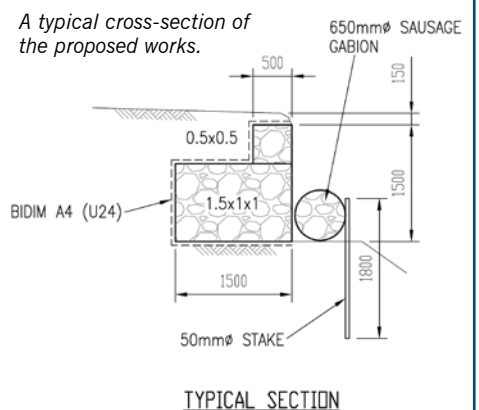
The work is currently on programme for completion by 31st August. The 1st September is officially Spring Day and the start of the water sports season, which would rule out any further construction activity after this date.

CW

Reg Laskey of Littlecreek Civils.



Construction of the Riviera Villas gabion riverbank stabilisation structure.



Project team

- Consultant: WSM Leshika
- Contractor: Littlecreek Civils
- Gabion manufacturer: Gabion Baskets