**BRANDWACHT-AAN-RIVIER HOME OWNERS ASSOCIATION**
**ROADS AND STORMWATER**
**CONTRACT NO. 288-01**
**BRANDWACHT-AAN-RIVIER: EROSION PROTECTION AND APPURTENANT WORKS**

## Overview of the works

### General description of the contract

The contract entails civil engineering works required for the repair and stabilisation of the Brandwacht River subject to the necessary environmental approvals, specifications and requirements.

### Contract works required

The contract comprises the construction of one cascade structure and one area of slope stabilisation.

### Locality

Brandwacht-aan-Rivier is situated at approximately 18°51' 32"E and 33°57'15"S, approximately 2 km to the south of Stellenbosch Station along the R 44 to Somerset West.

### Extent

The extent of the Site of Works is indicated on the drawings supplied with the procurement documentation. The site of works is restricted to the street reserve and the open space along the river. Any part of the Site of Works may only be entered on the written consent of the Engineer. The site shall further include all approved spoil sites and borrow pits designated by the Engineer or the Client.

Due to environmental and security issues, the Contractor shall only be allowed to have a limited camp on site, the camp to be located to the east of the Gate house along the river.

### Environmental constraints

As with all construction sites, the site is being deemed as environmentally sensitive and the Contractor shall educate his personnel accordingly. The Contractor shall appoint his most senior full-time employee on site to act as the Environmental Awareness Representative (EAR) to be attend to the strict enforcement of the following general environmental management requirements: -

- The Contractor shall induct all visitors and new employees, including employees of subcontractors, of procedures and restrictions on a regular basis.
- The Contractor shall ensure that all drainage routes remain open for the duration of the contract.
- The natural flow of water shall not be diverted by construction activities in such a way that new draining patterns may result.
- Flood and erosion damage to the environment and private property must be actively avoided.
- Soil erosion caused by construction and resulting blockage of stormwater drainage systems shall be avoided by best practice construction methods.
- Materials shall be stored in fenced areas and opening haul roads shall be restricted to approved routes.
- Construction personnel and labourers shall not enter the areas adjacent to the approved construction area.
- In the event of construction workers accessing restricted access areas outside the site of works, the Contractor shall at his own expense fence the site of works with an acceptable standard construction fence consisting of straining posts not further than 36 m apart, three intermediate standards and three intermediate droppers all to be spaced not further than 3 m apart, three strands of smooth wire 300 mm apart. The fence line shall be marked with red and white danger tape to render it visible to all on site.
- No person apart from the site-agent may contact adjacent owners or enter the premises adjacent to the site of works.
- Notwithstanding the above, the consent of the Engineer, the Contractor remains responsible for the actions of the Contractor's Site Agent when he enters the premises adjacent to the site of works.
- No personnel apart from security personnel may be housed on site.
- Adequate mess areas and toilet facilities shall be available to the contractor's personnel and labourers and shall be maintained in a hygienic working condition at all times.
- Vegetation may only be removed from areas designated by the Engineer.
- Instructions for the replanting of specific plants shall be followed carefully.

- The Contractor shall take due care of the site of works to mitigate all the possible negative impacts of the construction process to obviate pollution of natural streams by either storm water runoff and / or raw sewage.
- Traffic flow shall be controlled to keep the site safe for all persons on the site of works as well as the surrounding areas.
- The Site shall be kept clean and neat throughout the contract and maintenance period.
- After completion of earthworks, all earthworks areas shall immediately be covered with mulch.
- Wherever dust from the Works becomes a nuisance to the public, traffic or public roads or may damage adjacent properties, the Contractor shall, when so ordered by the Engineer, apply sufficient water or take other measures to control the dust.
- Plant and/or vehicles with oil leaks must be removed from the Site of Works immediately and repaired before returned to the Site of Works.
- All concrete mixing areas, fuel - and oil storage areas shall be bunded in terms of generally accepted environmental requirements.
- Water used to clean concrete mixing plant, wheel barrows and hand tools shall be filtered and stored in a reservoir where the water may be neutralized and transported to the local treatment works.
- Plant may be serviced on bunded concrete surfaces only.
- Bunded areas shall be built in such a manner that leaking oil or fuel shall neither percolate into or onto natural soil nor overflow natural drainage or manmade drainage systems for sewage or stormwater.
- Any violation of the instructions will be regarded as serious and the Engineer reserves the right to instruct remedial action by the Contractor.
- The Engineer also reserves the right to issue further instructions with regard to environmental affairs, should be deemed necessary.

**Access**

The site is accessible from the R44.

From the north, a left slip lane is available to give access to the New Mediclinic Hospital. A left turn at the T – intersection at the end of this road will allow the driver to progress to the gate house.
From the south, a right turn is required into Trumali Street, then turning left at the first intersection, left again at the next and right at the next to progress to the gate house.

The Contractor shall be responsible for maintaining access to the site for the duration of the Contract and shall take precautionary action to limit damage to roads utilized as access. Any damage to infra-structure shall be reported to the Local Authority and repairs shall be done to the same standard prevailing before damage where and when necessary and as indicated by the Engineer, the work to be done under supervision of the relevant authority.

**Topography**

The topography of the river is relatively steep and the Contractor shall protect the works against flooding, erosion and sedimentation.

**Weather conditions**

The climate is moderate with mostly winter rainfall. Weather data collected at the La Colline Weather Observatory over approximately 12 years shows that the average rainfall of 701 mm per annum with a low of 385 mm in 2015 and a high of 994 mm in 2013.

**Drainage**

The Brandwacht River is the main drainage reach for the precinct and surrounding suburbs of Stellenbosch.

Overflows from the municipal water purification works 1600 m to the South East drains to the stream on a daily basis. The Contractor shall take care to manage the run-off during the construction period.

**Vegetation**

Pristine natural vegetation as well as exotics are present in and around the stream bed. The upkeep is meticulous and the Contractor shall actively avoid damaging any plant.

The Contractor shall only remove vegetation where approved in writing by the Environmental Consultant, namely ERS. No interference with stable gardens will be tolerated,

Labourers shall be inducted by the Environmental Consultant ‘s representative when they first access the site of works.

**Soil and Subsoil Conditions**

**Qualification**

The information regarding the ground and subsoil conditions given hereinafter shall only serve as a guide and indication to the Contractor regarding the subsurface conditions and materials that may be encountered. The provision of the data does not relieve the Contractor of his responsibility to satisfy himself as to the subsurface conditions to be encountered and to all matters described in Clause 3(2) of the General Conditions of Contract and in terms of the specifications.

**Stratigraphy**

The reader is referred to the South African Committee for Stratigraphy (SACS) for detailed information regarding the identified Members, Formations and Groups. The following is a compilation of information published by ABA Brink: -

- Bedrock: Tygerberg Formation of the Malmesbury Group (SACS Code – 64, Label – Nm, Parent – Unknown),
- Intrusions of the Cape Granite Suite.

Reference: Du Toit (1954), Du Toit A.L., the Geology of South Africa, Third Edition, Oliver & Boyd.

**Bedrock**

The Tygerberg Formation is classified as a late-Precambrian marine sedimentary deposit of just over 600 million years ago. Instability in the earth’s crust to the end of the Precambrian period has led geo-synclinal activity culminating in the intrusion of Cape Granite plutons between 610 and 595 million years ago.

Granites of the Cape Granite Suite are normally associated with the Malmesbury Group materials and is present on site.

**Residual horizons**

The residual soil horizons are derived from weathering of the bedrock. Field observation have shown that the residual horizons are mostly derived from the Cape Granite suite covered by thin horizons of Quarternary Sediments. Observations have shown that the residual soils are highly susceptible to erosion. The dispersivity of the clay content is a significant contributor to the erodibility of the materials.

Care shall be taken not to disturb the residual soils or use excavated materials for backfilling due to poor compactibility characteristics. All excavations shall be “neat”, meaning over-excavation shall be obviated. The only excavation allowed shall be to the approved dimensions.

Care shall be taken to avoid shooting flow of water over the residual soils.

**Topsoil Horizons**

The natural topsoil may be described as remnants of hill wash and a small portion of windblown sand. Due to the excessive slope and the dispersivity of the soils the topsoil is shallow with a significant content of coarse angular sand derived from residual granites. These sediments / sands may be deemed to be the basal pebble marker, indicating the contact between recent deposits overlying the residual materials.

**Site Safety and Security**

The Brandwacht-aan-Rivier security complex requires full disclosure of the personal information of all personnel and labour brought onto site. The Contractor remains solely responsible for the conduct and actions of the persons, even the visitors check in by the Contractor onto the site and into the security complex.

The Contractor shall do all that is necessary to obviate the possibility of harbouring vagrants at the construction camp or allow vagrants to enter through opened fences. The Contractor shall induct his personnel and labourers not to receive any visitors on site.

**Targeted Labour**

The Contract is too small to require the employment and training of targeted communities. Preference shall however be given to employing contractors, sub-contractors and labour from the Stellenbosch Municipal Area.

**Existing Services**

For the duration of the contract the approach to existing services will be to rather move the works away from existing service that to move the services. It is simply too expensive to move existing services.

**Scope of Works**

This Project Specification is set out in three portions namely Portion 1 that is contained in this volume and covers the general description of the project as a whole, the facilities available and required and the requirements to be met by the Contractor in general but also by the different subcontractors. Portion 2 covers variations and additions to Standardised and Particular Specifications applicable to the contract while Portion 3 covers the Standard Specification not forming part of the Standardized Specifications.

**Status**

The following order of precedence will apply for the purpose of this contract:-

a) Contract Agreement;
b) Tender Form and Appendices;
c) Special Conditions of Contract;
d) General Conditions of Contract;
e) Project Specifications;
f) Standardised specifications (SANS 1200) and particular specifications;
g) Schedule of Quantities;
h) Drawings;
i) Statutory regulations and requirements;
j) Standard SANS Specifications (not SANS 1200);
k) Other Standard Specifications.

Should the requirements in any part of the Tender Document be contrary to any other part, the document will take precedence and will prevail according to the ranking in the abovementioned list from top (a) to bottom (k).

**Details of the Contract**

**Preliminary and General**

Apart from compliance to the contractual requirements of insurances, guarantees and registration with the necessary regulating departments and enforcement agencies, the contractor shall establish on site within 14 calendar days after the acceptance of the contract sureties.

The Contractor's detail construction programme shall be submitted for acceptance with 14 calendar days of establishment on site.

The Contractor shall, within fourteen days after establishment on site submit samples of all materials to be imported from commercial sources for approval.

**The Works**

- Preliminary setting out;
- Environmental delineation;
- Clearing and grubbing of the approved Construction Camp site;
- Earthworks to the design levels
- Subbase for planned on the parking area and the area where offices will be erected;
- Erect Site Office and yard;
- Fence the Site Office yard;
- Construct a concrete floored bunded area for mixing concrete and mortar
- Setting out of the site of works;

<u>Cascade Structures</u>

- Clearing and grubbing the site of works allowing 3 m work space outside the edge of the works;
- Construction fences and safety measures;
- Carefully remove only such parts of the existing works to allow re-use thereof as required;

- Load, remove, transport and spoil rubble at approved regional spoil sites;
- Neat excavation to foundation level.
- Neat Excavate pipe trenches.
- All excavation faces and planes shall to be covered by concrete shall be covered with a 10% Bentonite : Water mixture, applied using a whitewash / slushing brush. The Contractor shall change the mixture to maximize the adhesion to the excavation faces.
- Installation of a bypass drain and appurtenant valves to take the river flow through the site of works.
- Placing of rebar.
- Casting of foundations.
- Construction of first three brick courses.
- Installation of subsoils drains and pipes through walls.
- Construction of brickwork, including the biota ladder and backfilling the void between the two brick faces using 10 MPa Concrete and boulders (Afrikaans – spaarklippe).
- Installation of the structural steel grating, built into the brickwork.
- Installation of panel fence posts.
- Installation of fence panels.
- Installation of electrical fences.
- Energizing the electrical fences.
- Landscape site of works to a soft rolling landscape;
- Cover with mulch to avoid dust and windblown sand.
- Finishing the site of works.

Slope Stabilization

- Clearing the site of works allowing 3 m work space outside the edge of the works - no vegetation shall be removed unnecessarily;
- Construction fences, safety railings and safety measures;
- Earthworks to create bedding planes for logs.
- Place logs
- Install containment pegs to retain logs in place.
- Backfill topsoil behind log while preparing the next bedding plane for the next log above the first row of logs.
- Place logs and repeat the process until the slope has been covered.
- Planting in topsoil behind logs.
- Mulching.
- Clean-up and finishing the site of works.

Finishing

- Finishing of the site of works by removing all construction yard buildings, stores, bunded concrete mixing area, subbase, rubble and debris, spreading and raking topsoil to smoothen landscaped surfaces as well as cut and fill slopes;
- Remove the Contractor’s camp;
- Submit data books and “As-built” drawings;
- Practical Completion of Civil Works;
- Tree planting (by Client);
- Install irrigation systems (by Client);
- Plant ground covers (by Client);
- Mulching (by Client);
- Practical Completion of Landscaping (by Client);
- Care for plantings (by Client);
- Works Completion.