
Section A General Project Specifications

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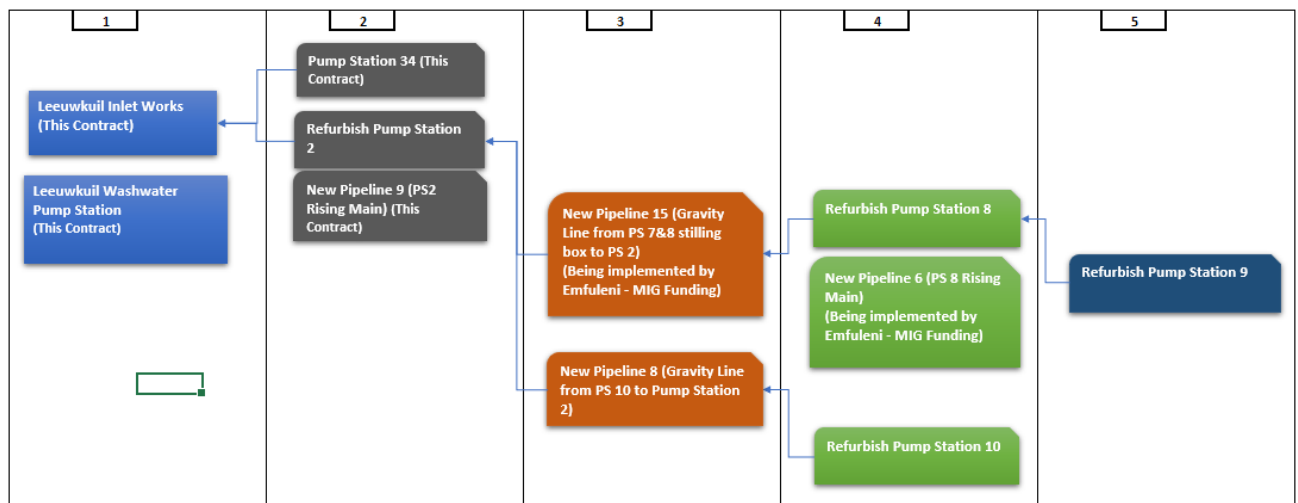
GS 001 – Sequence of Works

Various components of the bulk sanitation infrastructure were identified as critical elements that must be refurbished, replaced or upgraded in order for the system to reduce pollution to a maximum.

These elements have been divided into 3 packages under Rand Water, Department of Water and Sanitation and Emfuleni Local Municipality. Rand Water is the implementing agent for the package of work under this tender.

Although there are 3 packages, the commissioning of these packages are interlinked and the programming of the commissioning will have to be sequenced between the various contractors responsible for the work.

The following is an schematic presentation of the elements and their commissioning priorities:



The scope of work to be done under this contract are listed as follows:

- The Refurbishment of the Inlet Works at Leeuwnkuil WWTW;
- The Refurbishment of the Inlet Works at Rietspruit WWTW;
- The Refurbishment of Pump Station 34 at Leeuwnkuil WWTW;
- Construction of the Upgrade of Pump Station 34 at Leeuwnkuil WWTW;
- Construction of the Upgrade of the Wash Water Pump Station at Leeuwnkuil WWTW; and
- The Construction of Pump Station 2B Rising Main (Pipeline 9).

Commissioning sequence overview:

- Leeuwnkuil Wastewater Pump Station and Leeuwnkuil Inlet Works Refurbishment:** The wash-water pump station must be operational as this element must be up and running before the Mechanical and Electrical equipment for the inlet works refurbishment can be commissioned.
- New Pipeline 9 (PS 2B Rising main):** Pumpstation (PS) 2B has two rising mains of which one has completely collapsed. This new pipeline 9 will replace the old collapsed pipeline as well as provide enough capacity for the future upgrade pump station 2B.
- Pump Station 34 Refurbishment:** Once the inlet Works is ready to receive sewage and can condition the sewage successfully, Pump Station 34 can pump sewage to the inlet works.
- Rietspruit Inlet Works Refurbishment:** None of the above elements are dependent on the Rietspruit Inlet Works. But this element must be prioritised with the Leeuwnkuil Inlet Works as the current status of this inlet works is completely non-functional. There are a number of other elements dependent on the functionality of this unit process and an overview of this is provided in the table below.

| Item | Description | Included in this Contract | Commissioning Sequence |
|------|--|---------------------------|------------------------|
| 1 | Washwater Pump Station at Leeuwkuil WWTW | Yes | 1 |
| 2 | Inlet Works Refurbishment at Leeuwkuil WWTW | Yes | 1 |
| 3 | PS 34 Refurbishment | Yes | 2 |
| 4 | Construct new Pipeline 9 (PS2 Rising Main) | Yes | 2 |
| 5 | Refurbish PS 2B | No | 2 |
| 6 | Construct new Pipeline 8 (Gravity Line from PS 10 to Pump Station 2) | No | 3 |
| 7 | Refurbish PS 10 | No | 4 |
| 8 | Construct new Pipeline 15(Gravity Line from PS 7 and PS8 stilling box to PS 2) | No | 3 |
| 9 | Construct new Pipeline 6 (PS 8 Rising Main) | No | 4 |
| 10 | Refurbish PS 8 | No | 4 |
| 11 | Refurbish PS 9 | No | 5 |
| 12 | Inlet Works Refurbishment at Rietspruit WWTW | Yes | 1 |

The Contractor is responsible to sequence the works to adhere to and enable the commissioning sequence as specified in the table above. The Contractors Programme must clearly show how the above commissioning sequence will be achieved.

GS_002 – Engineering

GS002.1 Employer's Design

The design for the works is detailed on the Drawings and described in the Specifications and the Bills of Quantities.

The Employers design scope includes but is not limited to the following:

- a) Process Design
- b) Hydraulic Design
- c) Unit Process Design
- d) Civil Structural Design
- e) Building design
- f) Mechanical performance design and specifications
- g) Mechanical equipment layout preliminary design to fit Civil structures
- h) Electrical Design to suit Mechanical specifications and stipulate the minimum requirements and performance of the system
- i) The Employers design covers the design required to stipulate the performance specifications to enable the Contractor to do their Workshop drawings, Process and Instrumentation Diagrams (P&ID's), Work Operation Control Philosophy (WOCP's) and Electrical Line diagrams as well as to design the Motor Control Centres (MCC's)
- j) All supporting Civil Engineering Infrastructure related to the Works.

GS002.2 Contractor's Design

The mechanical, electrical and control and instrumentation components are to be designed by the Contractor. The following are the drawing, design and programming requirements:

Drawings shall be prepared by the Contractor for the design of his temporary works, general arrangement (GA) drawings for mechanical and electrical components and the relevant P&ID diagrams. The Contractor shall provide P&ID diagrams showing all equipment. Tag numbers for inclusion on the P&ID diagram shall be agreed with the Engineer.

Drawings on which civil and building requirements for all mechanical installations are indicated shall show the full extent and dimensions of the equipment, the extent of the space required to house the equipment, and the loads imposed by the equipment provided in terms of the contract. Holding down bolts and fixing positions and the extent of base plates shall be shown fully dimensioned.

The following electrical information shall be submitted:

- Fully detailed drawings showing positions of motor connection boxes, etc. which may affect the associated building details such as trench layouts.
- Electrical supply requirements to the control panels.
- Power and control schematic diagrams of all control panels.

The GA drawings, PI&D diagrams, etc. shall be submitted after having been checked and reviewed by the Contractor, who shall stamp, sign and date them to indicate his approval prior to submission. The Engineer shall review and approve the drawings prior to commencement of construction, erection or installation of the equipment concerned. The Engineer shall return the drawings to the Contractor with his comments, and the Contractor shall, if necessary, revise the drawings to incorporate the Engineer's comments and resubmit the drawings for approval.

The Engineer's approval of the drawings as construction drawings shall be based on an evaluation of the appropriateness of the equipment concerned in terms of the overall project, and shall not in any way relieve the Contractor of his responsibilities regarding quality and suitability of materials and equipment supplied.

GS002.3 Drawings

The Drawings issued to tenderers as part of the tender documentation shall be regarded as provisional and preliminary.

The work shall be carried out in accordance with the latest available revisions of the Drawings as issued for construction.

The Drawings for the works prepared by the Engineer for the purposes of obtaining tenders are included as an Annexure.

GS 003 – Tests on Completion of Mechanical and Electrical Plant

GS003.1 Testing Principles

Once the Contractor has satisfied himself with the standard of his work, he shall notify the Engineer at least 48 hours in advance to enable the Engineer to witness the Contractor's checks and/or tests or to perform his own checks, inspections and/or tests, as specified in Clause 7.4 of the Contract.

When giving notification, the Contractor shall provide the Engineer with the results of his own checks and tests indicating that the work is to specification. Failure by the Contractor to notify the Engineer or to provide the required information or, where specified, to perform the required checks or tests, will be grounds for the Engineer not to certify the work as being complete, as well as any subsequent affected work.

The Engineer shall be under no obligation to the Contractor to perform checks, inspections and/or tests. If the Engineer elects not to perform a particular check, inspection and/or test after notification by the Contractor, he will notify the Contractor in writing after which the Contractor can proceed with the relevant work without the Engineer's checks, inspections and/or tests having been performed.

Nothing contained in this Clause shall relieve the Contractor of his responsibilities under the Contract or in any way limit the checks, inspections and/or tests which the Engineer may request or perform in terms of the Contract. The Contractor shall make due allowance for his own and the Engineer's checking, inspection and/or testing procedures in the rates of scheduled payment items and in the construction programme.

Failure by the Contractor to notify the Engineer or to provide the required information or, where specified, to perform the required test, will be grounds to exempt the Employer from payment for the associated work and for all subsequent work which would be affected by the failure of the work to be tested.

In addition to standard tests, a Provisional Sum is included for factory inspections and testing by the Engineer in the Bills of Quantities.

GS003.1.1 Factory Tests and Inspections for Mechanical and Electrical (M&E) Plant

All M&E Plant shall be factory-tested by the manufacturers at their premises prior to dispatch to site. The Contractor shall advise the Engineer in writing of the factory testing not less than 4 weeks prior to the execution of tests, to allow him enough time to arrange tests and inspections by himself or by a 3rd party, if he so wishes.

The manufacturer's Quality Control Plans (QCPs) for manufacture shall be submitted to the Engineer for acceptance before manufacture commences. The completed QCPs and a certificate showing that the Plant was successfully tested and complies with the specifications shall be submitted to the Engineer for checking, before it shall be allowed to be dispatched to site. The results of all tests shall be recorded and inserted into the operating and maintenance manuals.

If not otherwise specified or scheduled, Provisional Sums will be included to cover the costs of the Engineer's testing and inspections in the Bill of Quantities. Where the premises of a manufacturer is not based in one of the centres where the Engineer has suitable representation, the Contractor shall arrange all transport, accommodation, meals, and other sundry expenses as may be required by the Engineer.

Inspections shall typically be done, but not limited, for the following:

- (a) Pipework and structural steelwork (including MCC panels) at the following stages:
 - During manufacture (e.g. for checking of welds, dimensions, hydraulic tests)
 - After manufacture (before surface preparation for corrosion protection).
 - After surface preparation for corrosion protection.
 - After corrosion protection.
- (b) Pump performance witness testing

(c) MCC, SCADA, and generator acceptance (functional) tests.

The tests and inspections shall be arranged so that the plant is typically inspected during single visits and for other items it is done in significant batches (e.g. complete pipework per pump station) so as to limit the number of required visits as far as is reasonable.

GS003.1.2 Commissioning Tests of Mechanical and Electrical (M&E) Plant

The Tests on Completion shall be carried out by the Contractor to demonstrate to the Engineer that the Plant is performing in accordance with the specifications and that it is ready to enter the Defects Notification Period.

Before the Tests on Completion the Contractor shall ensure the security of mountings, true, cool running of Plant, attend to adjustment and tuning, check setpoints and ensure correct lubrication of all items. Sources of vibration and noise shall be located and the problem rectified. Once the Contractor is sure that the Plant is running smoothly, the Engineer shall be requested to attend the Tests on Completion.

The Contractor shall provide all necessary test equipment, materials, tools and competent staff for the performance of the tests and shall submit for the approval of the Engineer certified copies of the calibration certificates for the test equipment.

During the Tests on Completion, the Contractor shall demonstrate the following for each item of M&E Plant:

- True, cool and silent running.
- Electronic and mechanical setpoints and limits for control, operation and protection of Plant to specification (e.g. flows, pressure, rotational speed, water levels, current, voltage, power, etc).
- Simulate manual and automatic starting, modulating and stopping.
- Simulate all alarm conditions (e.g. temperature, flow, pressure, vibration, moisture ingress, water levels, etc.).
- Achievement of specified duties (e.g. flows, pressures, efficiencies, dosing rates, dosing concentrations, etc.).

Where possible (for example pumps), the tests shall be done and performance recorded at the specified duties as well as recommended extreme operational limits of the Plant.

Three copies of test results of all tested Plant shall be submitted by the Contractor to the Engineer within one week after doing the tests.

M&E Plant shall be deemed to be "tested and commissioned" upon the successful completion of the Tests on Completion, at which stage payment for Testing and Commissioning of M&E items that is scheduled in the BOQs shall become claimable.

GS003.2 Defects Notification Period

The period during which the Contractor shall be responsible for remedying of defects related to the work done and equipment provided and installed shall be as stated in the Contract.

Should an item fail to be operable for more than 21 days (continuous or cumulative) within the first (or subsequent) 12 month period, the period of maintenance shall be extended by 12 months from the date of re-commissioning at the end of the 21 day period.

GS_004 – Safety

From date of site handover to the Contractor until the completed work is handed back to the Employer, the Contractor shall be responsible for maintaining safe working conditions on site. As the "owner" of the site, the Contractor shall bear all responsibilities in terms of the Occupational Health and Safety Act, 1993 (Act No 85 and amendments) and the regulations promulgated in terms of the Act or Factories, Machinery and Buildings Work Act, whichever is applicable.

The Contractor shall be responsible for supplying and installing the required safety signs as determined by the Occupational Health and Safety Act, 1993 (Act No 85 and amendments) and the regulations promulgated in terms of the Act or Factories, Machinery and Building Works Act, whichever is applicable, both during the construction phase and for the completed works.

All safety signs shall comply with the requirements of the latest edition of SANS 1186-1 as applicable.

The Contractor shall comply with the Employer's health and safety and environmental specifications applicable to the Contract.

GS_005 – Quality Assurance

- a) The Contractor shall implement a quality assurance system to ensure adequate control of the total construction process including those off-site activities that impact on quality of the final constructed product.
- b) Before commencing with any procurement or construction work, the Contractor shall furnish the Engineer with details of the quality management system.
- c) The Contractor shall before commencing with the project nominate to the Engineer for written acceptance thereof the names of the management representative and the quality auditor complete with CV's to demonstrate their experience in quality management.