



Tel: +27 (0)11 682 0911

Physical address:

522 Impala Rd

Dikole Section, Johannesburg South, 2058

Civil Chamber Specifications

SS 2.2.2 – General Requirements

Civil and Structural works are to be carried out as per the requirements of the SANS 2001 “Construction Works Standards” and SANS 1200 “The Standardized Specification for Civil Engineering Construction.

All works to be carried out are required to be undertaken without interruptions to the normal operations (except during scheduled shutdowns). This requirement applies to all existing automation, electrical and mechanical services.

SS 2.2.3 – Service Water Supply

Connection points (water source)

The position of the potable water connections will be pointed out to the contractor on site, by the client or the client’s representatives.

The operating pressure for the existing connection point, are to be confirmed by the Contractor.

The Contractor shall make allowance for installing a water meter connection at the water connection point. Water for construction shall be to the Contractor’s account and shall be deemed to be included in the tendered rates.

SS 2.2.4 – Detailed Civil Scope of Works:

The Contractor's obligations under this project shall include, but not be limited to, the following principal items:

SS 2.2.4.1 – Isolation Valve Chamber

- A. Fencing off around designated site areas
- B. Surveying and setting out of works (including generating survey drawings and supply survey information in native and “.dwg” formats)
- C. Accommodation of traffic along existing road maintaining entry and access for the Employer's staff
- D. Conduct a geotechnical investigation
- E. Compiling conditions assessment benchmark report for existing structures and services which may be affected by the works
- F. Relocation and/or protection of existing services and structures
- G. Services detection (including detecting the location and depth of services, and generating and issuing of services detection information in native and “.dwg” formats)
- H. Excavation and Earthworks including dealing with water in excavations, as well as confirmation of founding conditions (Through the Contractor's Professionally Registered Geotechnical Engineer, appointed to oversee the geotechnical aspects of the construction)
- I. Dealing with water (pumping to wash water sump or nearest storm water drain), the Contractor is to ensure that they always have back-up pumps available because the area is well known to have high water table. The Contractor is required to have made adequate allowance in their tender bid to deal with water.
- J. Design and construction of a shoring system for vertical excavations
- K. Construction of water tight chamber
- L. Water tightness testing of chamber prior to backfill according to SANS 2001 or BS8007, whichever is more conservative
- M. Design and installation of maintenance walkways



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522 Impala Rd

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- N. Backfilling with imported material or as prescribed by the Geotechnical investigation
- O. Testing of construction material during the construction process
- P. Generation of as-built drawings
- Q. Reinstatement of structures or services damaged or relocated during construction to their pre-construction condition / location.



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522 Impala Rd

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SS 2.2.5 – VARIATIONS AND ADDITIONS TO STANDARDIZED SPECIFICATIONS

The variations and additions to the applicable standardized specifications have been compiled to provide supplemental site and project specific information, and in that regard are intended to supplement or partially replace aspects of the other related specification, most notably: SANS 1200; SANS 10120; SANS 2001 and the Technical Specifications contained in this document.

The variations and additions below are provided, to varying extents, some of the following specifications applicable to this project:

Specification No.	Description
SANS 1200 - A	Standardized Specification for Civil Engineering Construction – General
SANS 1200 - DA	Standardized Specification for Civil Engineering Construction – Earthworks
SANS 2001 – BE1	Construction Works – Earthworks (General)
SANS 2001 – BS1	Construction Works – Site Clearance
SANS 2001 – CC1	Construction Works – Concrete Works (Structural)
SANS 2001 – CS1	Construction Works – Structural Steelwork

AA GENERAL - (SABS1200AA – 1986)

AA 3 MATERIALS

AA 3.1 QUALITY AND SAMPLES

Substitute the second sentence of the first paragraph of “AA3.1” with the following:

“Materials shall bear the official mark of the appropriate standard.”

Also add the following as a second paragraph:

“The Contractor is responsible for the cost of all testing to ascertain that all construction materials comply with the relevant minimum requirements, and all costs associated with testing of the materials shall be deemed to be included in the tendered rates. Samples on which control testing is required by the Engineer, shall be delivered free of charge to an approved laboratory and tested there as per the Engineer’s requirements – on the Contractor’s account. The cost of control tests done by the Engineer and of which the results do not comply with the minimum requirements shall be for the Contractor’s account.

The Contractor shall inform the Engineer of any control testing/site inspections to be done at least 48 hours before such tests/inspections are required, and the contractor must allow in his/her programme for the time necessary for the tests/inspections to be undertaken, and the processing of the results thereof.

The handling, storage, transport and erection of equipment, machinery and materials shall be strictly in accordance with the requirements of the supplier and or manufacturer.

All materials shall be new and of the best quality available unless otherwise specified. Materials must function satisfactorily under prevailing climate and weather conditions at the place of installation.

All materials shall comply with the SANS applicable to them.”

AA 3.3 DELAY DUE TO SUPPLY OF MATERIALS

Add new sub-clause “AA 3.3”:

“The Contractor shall ensure that the work is not delayed, due to a lack of materials on site, by placing orders with suppliers for the required materials timeously – with the lead times scheduled in programmes submitted to the Engineer for approval”



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522 Impala Rd

Dikole Section, Johannesburg South, 2058

AA 4 PLANT

AA 4.1 CONTRACTOR'S OFFICE, STORES AND SERVICES

Add the following to "AA 4.2":

"Security of the Contractor's camp and construction site will be the Contractor's own responsibility and no additional payment will be made if additional security measures (crime prevention, etc.) need to be employed during the contract period (as may be deemed required by the Engineer).

The Contractor shall make his own arrangements for housing his employees and transporting them to and from the site – such housing, shall however; meet relevant legislated requirements for temporary housing, as well as meeting the Contractor's code of ethics. The Contractor is responsible in all respects for the housing and transporting of his employees and for the arrangement thereof, and no extension of time due to any delays resulting from this will be granted."

AA 4.3 HAND TOOLS

Add new sub-clause "AA 4.3":

"The Contractor shall provide and maintain all hand tools required for the execution of the Works and all such costs shall be deemed to be included in the tendered rates and no separate payment will be made for it."

AA 4.4 MEDICAL FACILITIES AND SAFETY EQUIPMENT

Add new sub-clause "AA 4.4":

"The Contractor shall provide a First Aid cabinet fully equipped and maintained with the minimum contents as listed in the Annexure (Regulation 3) to the General Safety Regulations of the Occupational Health and Safety Act (Act 85 of 1993), to deal with accidents and ailments which are likely to occur during the construction period.

The Contractor shall provide personal safety equipment and facilities as required by Regulation 2 of the General Safety Regulations of the Occupational Health and Safety Act (Act 85 of 1993).

The Contractor shall designate his Safety Officer and Qualified First Aider. The Contractor shall give copies of the minutes of the site safety meetings to the Engineer."

AA 5 CONSTRUCTION

AA 5.1 SURVEY

AA 5.1.2 Preservation and Replacement of Beacons and Pegs Subject to the Land Survey Act

Add the following paragraph at the end of sub clause “A 5.1.2”:

“Before the commencement of construction work, the Contractor, in consultation and liaison with the Engineer, shall search for plot pegs where boundaries have not been established by the erection of walls or fences (e.g. between two adjacent undeveloped even or on an undeveloped corner erf) and the Contractor shall compile a list of such pegs that are apparently in their correct positions. Where pegs are not in their correct positions this should be noted by the Contractor and the Engineer should be notified immediately”.

AA 5.2 WATCHING, BARRICADING, LIGHTING AND TRAFFIC CROSSINGS

Add the following to the end of “AA 5.2”:

“Where no minimum requirements for watching, barricading, lighting and traffic crossings for work on public roads are specified in the project or earthworks specifications then the requirements set out in SABS 1200 AA-1986 for ‘Watching, Barricading, Lighting and Traffic Crossings’ shall apply.

All deep excavations shall be sufficiently barricaded, with barricading complying with the requirements of SANS 10400-B or as per the Engineer’s requirements.”

AA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Add the following to “AA 5.4”:

“It can be expected that existing services will be encountered during the course of construction. The Contractor must determine as far as is possible in conjunction with the relevant authorities the location of the various services. Special care must be taken to avoid disrupting these services. The cost of locating and protecting the services shall be deemed to have been included in the tendered rates. All services must be detected and exposed before any bulk excavation may start.”

AA 5.5 DEALING WITH WATER ON WORKS

Add the following to the end of “AA5.5”:

“Dedicated dewatering measures must be provided for in the event of a high/perched water table.



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522 Impala Rd

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Over and above his general obligations in regard to dealing with water as specified in SANS 1200 A, the Contractor shall deal with and dispose of all water so as to ensure that the Works are kept sufficiently dry at all times so that they can be properly executed, and he shall protect them against flood damage. For this purpose the Contractor shall provide sufficient pumps, pipes and other equipment that may be necessary. Payment for dealing with water shall be included in the Contractor's rates for foundations, except in so far as special provision for dealing with water may be made elsewhere in the Specifications."

AA 5.6 POLLUTION

Replace "AA 5.6" with the following:

"The Contractor shall take all reasonable measures to minimize any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) or machinery as a result of the execution of the Works (including excessive vibration of machinery caused by construction equipment)."

AA 5.8 GROUND AND ACCESS TO WORKS

Add the following to "AA 5.8":

"The Contractor shall maintain adequate access to all property at all times unless otherwise sanctioned by the Engineer. Details of the proposed methods of providing access shall be submitted to the Engineer for approval before such access is restricted. Any claims arising from impeded accesses shall wholly be the responsibility of the Contractor.

Construction along existing roads should be executed in such a manner that both pedestrian and vehicular traffic can be accommodated at all times.

Road traffic signs shall comply with the requirements of the 'South African Road Traffic Signs Manual' and shall be approved by the Engineer before construction commences."

AA 7 TESTING

AA 7.1 PRINCIPLES

Add the following to the end "AA 7.1.1":

"The Contractor is expected to anticipate any tests which may be reasonably requested by the Engineer which are not included in the technical specifications or bills of quantities. The rates for the tests and all costs thereof shall be deemed to be included in the contractor's tendered rates. Anticipated tests are to be

qualified by the Contractor during the tender stage, failing which the Engineer may decide on what is deemed to be 'reasonable'."

AA 7.4 STATISTICAL ANALYSIS OF CONTROL TESTS

Add sub-clause "AA 7.4" as follows:

"Test results shall not be evaluated by statistical methods. All results shall comply with the specified minimum requirements and SANS Specifications of the materials concerned."

AA7.5 PROCESS CONTROL

Add new sub-clause "AA 7.5":

"All test results obtained by the Contractor in the course of his process control of the Works shall be submitted to the Engineer or his representative prior to requesting inspection of the relevant portions of the Works. Any request for inspection shall be submitted on the prescribed forms which will be provided by the Engineer – any request for inspection shall be sent to the Engineer at least 48 hours before the intended completion date of the works.

The Contractor shall make suitable arrangements for process control prior to commencement with the Works. Should he intend using site personnel for this purpose he shall ensure that suitably trained and competent personnel take charge of the necessary test work and that the necessary equipment is at their disposal prior to commencement of the Works. Failure to comply with these requirements shall be just cause for the Engineer to order suspension of the works without additional remuneration or for the Engineer to recommend termination to the Employer."

AA 8 MEASUREMENT AND PAYMENT

Add the following sub-clauses

"AA 8.7 Provision for Health and Safety Measures (Time Related and or Fixed Charge)

The rate shall cover the cost to provide a health and safety plan as well as any additional safety measures and or appointments. Individual items may be scheduled separately. This item is to comply with all Rand Water Health and Safety Specifications.

.....Unit: Sum"

And;



Tel: +27 (0)11 682 0911

Physical address:

522 Impala Rd

Dikole Section, Johannesburg South, 2058

“AA 8.8 Provision Environmental Measures (Time Related and or Fixed Charge)

The rate shall cover the cost to provide an environmental management plan as well as any additional environmental measures and or appointments. Individual items may be scheduled separately. This item is to comply with all Rand Water Environmental Specifications.

.....Unit: Sum”

BE1 EARTHWORKS - (SUPPLEMENT TO SANS 2001-BE1: 2008)

The following specification is drawn up with SANS 1200 D as a basis and supplements the provisions of SANS 2001-BE1: 2008.

BE1 - 4 REQUIREMENTS

BE1 - 4.1 MATERIALS

BE1 - 4.1.6 Contamination of Suitable Fill Material

Add the following sub-clause to section BE1 sub-clause 4.1:

“The Contractor shall deal with materials from all excavations for structures in such a way as to ensure that usable material is not contaminated with unsuitable material. If usable material is contaminated, such contaminated material shall be removed and replaced with material of a standard at least equal to the usable material, all at the Contractor's expense. No additional payment shall be made in respect of this and all relevant costs shall be deemed to be included in the tendered rates.”

BE1 - 4.2 METHODS AND PROCEDURES

BE1 - 4.2.2 Excavations

BE1 - 4.2.2.4 Detection, Location and Exposure of Existing Services

Add the following sub-clause to BE1 4.2.2:

“The provisions of Sub-clause 5.2 of SANS 1200 AA shall apply, in addition to the requirements of this sub-clause.

The drawings showing the position of known existing services shall be issued to the contractor by the Engineer. The Contractor shall verify the position of all services and all other obstacles and existing works on the Site. Manholes, valve boxes and the like will be regarded as known services. Prior to the commencement of any construction in any particular area, the Contractor shall verify the positions of services and report to the Engineer any that are missing.

Where any subterranean services are shown on drawings, the Contractor shall have the suitable detection equipment available on Site for as long as it necessary to detect and locate such services. The Engineer may instruct the Contractor to undertake hand excavation to expose services.

If existing services are not shown on the drawings, but the existence thereof can be reasonably expected, the Contractor shall, in conjunction with all relevant authorities, determine the exact path and location of such services before the commencement of construction. After locating the exact position of services, whether indicated on the drawings or not, such services shall be deemed to be known services and the Contractor shall be liable for all costs and subsequent costs arising from the damage thereof as a result of the Contractor's activities. These services must also be indicated on the 'Record drawings'."

BE1 - 4.2.2.5 Protection of cables

Add the following sub-clause to BE1 4.2.2:

"The Contract shall advise the Engineer at least 7 days in advance of the actual date on which he proposes to excavate near any cable. The Contractor shall not use mechanical equipment to excavate within 3 meters of the estimated position of any cable and shall, if necessary, expose the cable by means of hand excavation carried out under proper supervision (complying with all necessary Occupational Health and Safety requirements and standards). When the Contractor is instructed to use hand excavation, the Contractor shall backfill such cable trenches with approved material to the compaction density ordered.

Where a service is damaged due to the Contractor's negligence, the contractor shall bear the cost of the immediate repairs of the service. Any penalty incurred by the Client from the owner/custodian of the damaged service shall be transferred to the Contractor."

BE1 - 4.2.3 Disposal

Substitute the first sentence of sub-clause BE1-4.2.3 with the following:

"All surplus material which is suitable for fill shall be spread and compacted as fill within a designated area of the site. All material unsuitable for fill shall be transported to an approved dumping site (decided upon by the Contractor); the Engineer will not be liable for any materials disposed by Contractor.

Disposal of rubble/surplus material or any other debris/material to be removed from site should be undertaken when said material reaches 10m³ or has been kept on site for a week, whichever is reached first. The Employer/Engineer may impose fines on the Contractor for the late removal of material from site."

BE1 - 4.2.7 Dust

Add the following sub-clause:

"Wherever dust from any of Works or construction activities becomes a nuisance to the public or damages adjacent properties, the Contractor shall, at the instruction of the Engineer, apply sufficient water or take

other measures to lay the dust. The cost of dealing with dust (including, but not limited to, suppression) shall be included rates for construction.”

BE1 - 4.2.8 Excavated material not to endanger or interfere

Add the following sub-clause BE1-4.2.8 to SANS 2001-BE1:

“All excavated material shall be so deposited as not to interfere with or endanger the Works (for example, by causing the sides of an excavation to collapse), other property or traffic. The Engineer may order the Contractor to remove any material that the Engineer considers liable to endanger or to interfere with the Works, private property, traffic or pedestrians, and to place such material at some other approved location. If the necessity for such removal is, in the opinion of the Engineer, a result of some fault on the part of the Contractor, the cost of removal shall be borne by the Contractor, but otherwise it will be borne by the Employer.

All surplus material not required for backfilling or forming embankments as indicated elsewhere in the Contract or as may be ordered by the Engineer, and material unsuitable for backfilling, forming embankments or topsoiling shall be deposited on a site or sites as described under BE1 4.2.3.”

BE1 – 5 – COMPLIANCE WITH THE REQUIREMENTS

BE1 - 5.2 TOLERANCES

BE1 - 5.2.1 Position, dimension and levels

Replace the first sentence of sub-clause 5.2.1 with the following:

“The earthworks shall be finished to within the limits given in table 1 to a degree of accuracy II for both ‘*Excavations for structural foundations*’ and ‘*Terraces and embankments*’”.

BE1 - 6 SAFETY

Add the following clause and sub-clauses to SANS2001-BE1: 2008:

“BE1 – 6.1 Barricading and lighting

In terms of the applicable regulation of the Machinery and Occupational Safety Act, 1983 (Act 6 of 1983), every excavation that is accessible to the public or that is adjacent to a public road or thoroughfare or by which the safety of persons may be endangered, shall be

- a) Adequately protected by a barrier or fence (designed to SANS 10400 requirements) of height at least 1 000mm and as close to the excavation as practicable; and
- b) Provided with warning lights at night (which comply with the requirements set out by the Engineer at the time of construction).

The Contractor may NOT provide a watchman for the safeguarding of excavations after hours – and as such all excavations are to be left safely barricaded from the public and from tampering – unless instructed otherwise by the Engineer.

BE1 – 6.2 Safeguarding of excavations

The provisions of SANS 1200 D-1988 sub-clause 5.1.1.2 are applicable.

Insert the following after paragraph (b) (2), before paragraph (c) of sub-clause 5.1.1.2:

“The Contractor or his agent or his representative shall not require or allow any person to work under unsupported overhanging material or in an excavation which is more than 1,5m deep, and any excavation which has not been adequately supported or braced if there is a danger of the overhanging material or the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question – and shall comply with the requirements of SANS 10400 and the Occupational Health and Safety Act (latest amendment).

The Engineer may request that trenches must be barricaded due to reasons that he sees fit. The barricade will be at least 1.2 metres high and the distance between wire strands will not exceed 200 mm if a wire fence is erected. If a barricade net is erected the openings in the net will not exceed 100 x 100 mm. The barricade (net or wire fence) will be supported at distances not greater than 1 metres with suitable sturdy supports. After completion of the work(s) the barricades must be removed completely and no barricading material may be left on site. The barricade will be erected on both sides of the trench with a minimum distance of 5 metres and a maximum distance of 10 metres from the side of the trench.”

Add the following to SANS 2001 BE1:

“BE1 - 7 SCHEDULED ITEMS

The entire provisions of SANS 1200 D: 1990 part 8 (Measurement and Payment) shall apply and where reference is made to clauses/sub-clauses in SANS 1200 D: 1990 (Or any other part of SANS 1200) the equivalent clauses in SANS 2001-BE1 shall be applicable instead – where reference is made to other parts of SANS 1200 then the relevant SANS 2001 standard (where applicable) shall be applicable instead.”

Also add the following subclause to the end of BE1 – 7:



Tel: +27 (0)11 682 0911

Physical address:

522 Impala Rd
Dikole Section, Johannesburg South, 2058

“BE1-7: 8.3.9: Shoring of Excavations

The rate shall include all costs associated with the design, procurement, delivery and installation of a shoring design – with the excavation activity scheduled under 8.3.1. The rate shall also include complying with the requirements of the technical, occupational health and safety, as well as environmental specifications applicable to the project.....Rate: Sum

“BE1-7: 8.3.10: Additional Soil Testing

This item shall cover the all costs associated with soil testing which may be anticipated to be required, as per the requirements of the technical specification.....Rate: Sum”



Tel: +27 (0)11 682 0911

Physical address:

522 Impala Rd

Dikole Section, Johannesburg South, 2058

BS1 SITE CLEARANCE – (SUPPLEMENT TO SANS 2001-BS1: 2008)

The following specification is drawn up with SANS 1200 C as a basis and supplements the provisions of SANS 2001-BS1: 2008.

The Contractor shall program his work in such a manner that re-clearing will not be necessary. The entire cost of re-clearing shall be borne by the Contractor.

Where suitable topsoil exists within the limits of the area to be excavated, the Contractor shall remove the topsoil to an average depth of 300mm, together with any veld grasses and other similar vegetation as directed by the Engineer. The topsoil shall be transported and deposited in temporary stockpiles in an area which is to be confirmed with the Engineer prior to stockpiling.

Add the following sub-clauses to SANS 2001-BS1: 2008

“BS1 - 6 MEASUREMENTS AND PAYMENT

The items scheduled for clearance and demolition will be classified according to the nature of the materials involved and the methods of their disposal.

Only those areas designated to be cleared as per the guidelines of SANS 2001-BS1: 2008 will be measured for payment. The area of surfaced roads, paved areas, railway formations, and major structures falling within such areas, designated to be cleared, will normally be deducted from such measurement.

Where conservation of topsoil without prior clearing is ordered, the removal of topsoil from the specified area will be measured as excavation and no payment will be made for clearing and grubbing.

BS1 - 7 SCHEDULED ITEMS

The entire provisions of SANS 1200 C (latest amendment) part 8 (Measurement and Payment) shall apply and where reference is made to clauses/sub-clauses in SANS 1200 C (Or any other part of SANS 1200) the equivalent clauses in SANS 2001-BE1 shall be applicable instead – where reference is made to other parts of SANS 1200 then the relevant SANS 2001 standard (where applicable) shall be applicable instead.”

CC1 CONCRETE WORKS (STRUCTURAL) - (SUPPLEMENT TO SANS 2001-CC1: 2012)

The following specification is drawn up with SANS 1200 G as a basis and supplements the provisions of SANS 2001-CC1: 2012:

CC1- 4 REQUIREMENTS

CC1- 4.2 MATERIALS

CC1- 4.2.1 Cementitious binders

Add the following sentence to the end of 4.2.1.2:

“Where the manufacturer of a cementitious binder specifies more stringent storage conditions to those prescribed by this sub-clause then the manufacturer’s requirements shall take precedence

Where the cement is supplied in bags, the bags shall be closely and neatly stacked to a height not exceeding 12 bags with different brands and/or types of the same brand stored separately.”

Substitute 4.2.1.3 with the following:

“4.2.1.3 Cement shall not be kept in storage on site for longer than eight weeks or the storage time prescribed by the manufacturer, whichever is less.”

CC1- 4.2.3 Aggregates

Add the following sentence to the end of 4.2.3.7:

“In addition to the above, sand is to be stored in such a way that contamination by foreign matter is prevented.”

CC1- 4.3 FORMWORK

CC1- 4.3.2 Design and Construction of Formwork and Falsework

CC1- 4.3.2.1 General

Add the following sub-clause to the end of 4.3.2.1:

“4.3.2.1.7 The design and construction of formwork and Falsework will be the responsibility of the Contractor; however, the Engineer shall review the design and construction thereof for approval. The design and construction of Formwork and Falsework shall comply with all Occupational Health and Safety Act and accompanying regulatory requirements – in addition to the requirements contained in CC1:2012.”

CC1- 4.7 QUALITY OF CONCRETE

CC1- 4.7.8 Mixing

Add the following before section 4.7.8.1:

“The concrete mix shall be designed by a specialist organization. No concrete shall be placed until the Contractor’s concrete mix design has been approved by the Engineer. The Contractor shall submit to the Engineer a statement of the mix proportion proposed, together with a report from the specialist organization, showing the 28 day concrete strength obtained when using the material proposed for the work. The cost of the concrete mix design shall be borne by the Contractor and shall be deemed to be included in the rates for concrete work.

Admixtures may be used to increase the workability of the concrete but only with the express approval of the Engineer and when the details of the active ingredients of the admixture and their effects are supplied to the Engineer for approval before use. No additives likely to impair the short or long term low permeability required for the concrete will be approved.”

CC1- 4.8 PRECAST CONCRETE

Add the following before section 4.8.1:

“The employer is indemnified against all claims resulting/which may result from or for infringement of patent rights, design or trademarks in respect of any precast system used in connection with the works and the payment of any royalties due, or that might become due, as a result of the use of such a system.”

CC1- 4.10 HANDLING AND ERECTION OF PRECAST CONCRETE UNITS

Replace the first sentence of sub-clause 4.10.3.1 with the following:

“4.10.3.1. Temporary supports shall be so designed and arranged, by the Contractor and reviewed by the Engineer for Approval, that account is taken of: ...”



Tel: +27 (0)11 682 0911

Physical address:

522 Impala Rd

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Add the following sub-clause to SANS 2001-CC1:2012:

“CC1 - 6 MEASUREMENTS AND PAYMENT

The entire provisions of SANS 1200 G: 1982 part 8 (Measurement and Payment) shall apply and where reference is made to clauses/sub-clauses in SANS 1200 G: 1982 the equivalent clauses in SANS 2001-CC1:2012 shall be applicable instead – where reference is made to other parts of SANS 1200 then the relevant SANS 2001 standard (where applicable) shall be applicable instead.”

Also add the following sub-clauses to the end of CC1-6:

“CC1-6: 8.9 – Concrete Cube Testing

Concrete Cube Testing to be carried out as per the requirements of SANS 2001-CC1 (latest amendment) and as per the requirements of the technical specifications (which take precedence), with separate items scheduled separately. Testing of concrete shall be undertaken at 7, 14 and 28 day intervals per truck load of concrete delivered to site.....Rate: No.”

“CC1-6: 8.10 – Curing

Curing carried out as per the requirements of SANS 2001:CC1.....Rate: Sum”

“CC1-6: 8.11 – Water tightness Testing

Undertake water tightness testing as per the requirements of the Technical Specification. The rate shall include the costs associated with the supply of the water to be used for testing; the actual testing procedure and pumping out and disposal of the water.....Rate: Sum”



Tel: +27 (0)11 682 0911

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CS1 STRUCTURAL STEELWORK - (SUPPLEMENT TO SANS 2001-CS1: 2017)

CS1- 4 REQUIREMENTS

CS1- 4.2 DRAWINGS

CS1- 4.2.5 Erection drawings

Add the following sentence to the end of sub-clause 4.2.5.1:

“All temporary steelwork necessary for erection purposes shall be designed by a relevant competent person, registered as such with the Engineering Council of South Africa as a Professional Engineer or Engineering Technologist, in the employ of the Contractor.”

CS1 - 6 MEASUREMENTS AND PAYMENT

The entire provisions of SANS 1200 H: 1990 part 8 (Measurement and Payment) shall apply and where reference is made to clauses/sub-clauses in SANS 1200 H: 1990 the equivalent clauses in SANS 2001-CS1:2017 shall be applicable instead – where reference is made to other parts of SANS 1200 then the relevant SANS 2001 standard (where applicable) shall be applicable instead.

SS 2.2.6 – FUNCTIONAL SPECIFICATIONS

The entirety of the Structural Design aspects of the proposed Works (excluding temporary structures, required for and during construction, as well as any precast concrete units which have to be erected) to be completed are to be designed by the Employer, through their representatives.

The following functional specifications are provided to the Contractor to set a basis for the minimum requirements of elements whose requirements need to be clarified for design and/or pricing and/or construction and/or fabrication purposes. It should be noted that where clarity is given elsewhere in this document on critical elements then such clarity will not be repeated below, but are still applicable.

SS 2.2.6.1 – Preliminary and General

- A. The Contractor's attention is drawn to the fact that works on the isolation valve chamber needs to be completed.
- B. It is anticipated that the site for the construction of the valve chamber is underlain by soils with high activity with plastic indices upward of 30. Thus a geotechnical investigation is required to provide recommendation for the construction of the chamber illustrated in drawing R061397/200-202 – the structure is expected to exert a bearing stress of 160 kPa on the ground and as such a solution which would yield a bearing capacity of a minimum of 200 kPa should be provided.
- C. The requirements for the Geotechnical investigation are set out below:
 - i. The Contractor shall employ, following the written notification and written approval by the Engineer, of a competent professionally registered Geotechnical Engineer to conduct a detailed geotechnical investigation of the site onto which the works will be erected.

- ii. The Geotechnical Engineer shall have at least 8 years of experience in the design and construction supervision of similar works.
 - iii. The Contractor will be required to effect the recommendations of the approved report.
 - iv. The Engineer will peruse the report and finalize their drawings based on the recommendations of the said report.
 - v. The Geotechnical Engineer shall be under the employ of the Contractor for the duration of the construction period to inspect the works.
- D. Design of the temporary works shall comply with all requirements of the Occupational Health and Safety Act (latest amendment relevant at the time of appointment), and the Construction regulations (latest amendment relevant at the time of appointment).
- E. Equipment and plant selected for use by the Contractor shall be specified in the tender document, and shall be selected on the basis of minimizing on site vibration to existing machinery; approval for the equipment and plant shall be at the discretion of the Engineer during construction.
- F. The Contractor shall provide adequate drainage of excavations and the rates thereof shall be deemed to be included in the tendered rates.

SS 2.2.6.2 – Site Clearance:

- A. Any materials obtained from the removal of vegetation and demolition of structures, that do not form part of the material to be disposed, shall remain the

property of the client or the custodian of the service (should it be a municipal service item).

SS 2.2.6.3 – Earthworks:

- A. All haul distances for the duration of construction shall be taken as Freehaul and the Contractor shall include all costs associated with this specification into their earthworks rates.
- B. All existing structures and roads adjacent to where excavations are to be made, which may be affected by Construction operations (SANS 2001 and SANS 10400 shall apply), shall be adequately supported against collapse by the Contractor. Any repairs or replacements for the damage to or collapse of existing boundary walls (and the damage or collapse of other structures resulting from the damage or collapse of the boundary walls) shall be to borne by the Contractor.
- C. Contractor is expected to implement shoring (or other approved vertical excavation support techniques) to be able to achieve vertical excavations. The shoring design and construction will be undertaken by the geotechnical engineering under the employ of the Contractor, the go ahead for the construction will be sought from the Engineer. A specialist will be required to execute the vertical excavation works.

SS 2.2.6.4 – Concrete Works:

- A. All concrete is to be finished to the specifications contained in this specification document, contract documents or drawings.
- B. All concrete mixes by the Contractor should comply with the minimum requirements set out in SANS 2001-CC1:2012.

- C. All concrete (preparation, deliver and or erection) is required to comply with the requirements of SANS 2001-CC1:2012
- D. All concrete to be at least 35 MPa cube strength at 28 days, unless specified otherwise on the construction drawings.
- E. All concrete for the chamber base, walls and roof panels must include a crystalline waterproofing admixture

SS 2.2.6.5 – Structural Steel Works:

- A. All structural steel shall be grade S355JR, unless shown otherwise on the drawings.
- B. All structural steelwork to be hot dip galvanized to SABS 763 after fabrication. All bolts and fasteners shall be corrosion protection.
- C. The Contractor is required to provide workshop drawings to the Engineer for approval prior to commissioning the manufacture of any structural steel elements.

SS 2.2.6.7 – General Requirements:

- A. The Contractor may be required to support existing cables and other services on site during construction – to accommodate such services during excavation activities. The costs associated with such work (as well as the design and erection of necessary temporary works) shall be deemed to be included in the rates for excavation works.
- B. The Contractor is required to comply with the requirements of the Occupational Health and Safety Act (latest amendment) and its accompanying Construction Regulations (latest amendment) – and is also required to prepare and submit all documents pertaining with the requirement of the said Act and regulations.

The Contractor's attention is drawn to the following risks which may arise on site:

- i. The presence of medium voltage cables within the anticipated working area of the valve chamber.
 - ii. Vertical excavations and excavations surface support required for the valve chamber.
 - iii. Working at heights and deep excavations.
 - iv. Potentially heaving soils and the use of cranes next to open excavations.
- C. The Contractor is required to accompany their priced documents with a proposed, high level, construction method statement, in line with Occupational Health and Safety, as well as, Construction Regulation standards. The method statement should include a programme highlighting the critical activities anticipated for the proposed works.
- D. The Contractor is required to issue to the Engineer, prior to the use of intended construction materials, test certificates issued by an accredited, independent testing authority (Accredited by the South African Bureau of Standards or other equivalent accreditation body) to confirm that the respective materials comply with the specified requirement, or a certificate by the patent holder or designer, certifying that the manufactured item complies in all respects with relevant product specifications.
- E. Owing to the potential high activity of the soil, the geotechnical investigation and the recommendations thereof will inform the final solution to be implemented for the Valve Chamber. The Contractor should bear in mind that this process may be

undertaken during construction and should be factored into the construction programme.

- F. A Degree of Accuracy II shall be applicable to all structural works under this project.
- G. The Contractor's Attention is drawn to the fact that this is a multi-disciplinary project and as such Construction work will require adequate integration.
- H. The Contractor shall make allowance in his tendered rates for hiring and keeping in his employ, for the duration of the construction activity, a Professional Registered Engineer (Pr. Eng.) to assist him with the design of the temporary works. The design of the works is to be issued to the engineer in design file for approval – the design of the works shall be deemed to be included in the tendered rates for formwork.
- I. The new Valve chamber, designed to be water tight, will be water tightness tested to the requirements of BS 8007 sub-clause 9.2.
- J. The review time of 21 days (for reviews to be undertaken) shall apply to all individual submissions. Therefore where a contractor is aware of items requiring multidiscipline integration then the Contractor should aim to submit all documents at once – otherwise separate submissions shall be treated as individual submissions.

The review time of 21 days shall not be deemed to include comments on the submissions made. Receipt of comments shall trigger a new review cycle.

The above applies to all design submissions issued to the Engineer.



Tel: +27 (0)11 682 0911

Physical address:

522 Impala Rd

Dikole Section, Johannesburg South, 2058