Chapter 11

Documentation and Tendering
SCOPE

The South African Pavement Engineering Manual (SAPEM) is a reference manual for all aspects of pavement engineering. SAPEM is a best practice guide. There are many appropriate manuals and guidelines available for pavement engineering, which SAPEM does not replace. Rather, SAPEM provides details on these references, and where necessary, provides guidelines on their appropriate use. Where a topic is adequately covered in another guideline, the reference is provided. SAPEM strives to provide explanations of the basic concepts and terminology used in pavement engineering, and provides background information to the concepts and theories commonly used. SAPEM is appropriate for use at National, Provincial and Municipal level, as well as in the Metros. SAPEM is a valuable education and training tool, and is recommended reading for all entry level engineers, technologists and technicians involved in the pavement engineering industry. SAPEM is also useful for practising engineers who would like to access the latest appropriate reference guideline.

SAPEM consists of 14 chapters. A brief description of each chapter is given below to provide the context for this chapter, Chapter 11.

Chapter 1: Introduction discusses the application of this SAPEM manual, and the institutional responsibilities, statutory requirements, and, planning and time scheduling for pavement engineering projects. A glossary of terms and abbreviations used in all the SAPEM chapters is included in Appendix A.

Chapter 2: Pavement Composition and Behaviour includes discussion on the history and basic principles of roads. Typical pavement structures, material characteristics and pavement types are given. The development of pavement distress and the functional performance of pavements are explained. As an introduction, and background for reference with other chapters, the basic principles of mechanics of materials and material science are outlined.

Chapter 3: Materials Testing presents the tests used for all material types used in pavement structures. The tests are briefly described, and reference is made to the test number and where to obtain the full test method. Where possible and applicable, interesting observations or experiences with the tests are mentioned. Chapters 3 and 4 are complementary.

Chapter 4: Standards follows the same format as Chapter 3, but discusses the standards used for the various tests. This includes applicable limits (minimum and maximum values) for test results. Material classification systems are given, as are guidelines on mix and materials composition.

Chapter 5: Laboratory Management covers laboratory quality management, testing personnel, test methods, and the testing environment and equipment. Quality assurance issues, and health, safety and the environment are also discussed.

Chapter 6: Road Prism and Pavement Investigation discusses all aspects of the road prism and pavement investigations, including legal and environmental requirements, materials testing, and the reporting of the investigations. Chapters 6 and 7 are complementary.

Chapter 7: Geotechnical Investigations and Design Considerations covers the investigations into potential problem subgrades, fills, cuts, structures and tunnels. Guidelines for the reporting of the investigations are provided.

Chapter 8: Material Sources provides information for sourcing materials from project quarries and borrow pits, commercial materials sources and alternative sources.

Chapter 9: Materials Utilisation and Design discusses materials in the roadbed, earthworks (including cuts and fills) and all the pavement layers, including soils and gravels, crushed stones, cementitious materials, primes, stone precoating fluids and tack coats, bituminous binders, bitumen stabilised materials, asphalt, spray seals and micro surfacings, concrete, proprietary and certified products and block paving. The mix designs of all materials are discussed.

Chapter 10: Pavement Design presents the philosophy of pavement design, methods of estimating design traffic and the pavement investigation process. Methods of structural capacity estimation for flexible, rigid and concrete block pavements are discussed.

Chapter 11: Documentation and Tendering covers the different forms of contracts typical for road pavement projects, including conventional contracts, pavement performance guarantee systems, design and construct, and
In the documentation sections, the design, contract and tender documentation are discussed. The tender process is also discussed, from pre-qualification, through site inspection, to tendering and tender evaluation.

**Chapter 12: Construction Equipment and Method Guidelines** presents the nature and requirements of construction equipment and different methods of construction. The construction of trial sections is also discussed. Chapters 12 and 13 are complementary, with Chapter 12 covering the proactive components of road construction, i.e., the method of construction. Chapter 13 covers the reactive components, i.e., checking the construction is done correctly.

**Chapter 13: Quality Management** includes acceptance control processes, and quality plans. All the pavement layers and the road prism are discussed. The documentation involved in quality management is also discussed, and where applicable, provided.

**Chapter 14: Post-Construction** incorporates the monitoring of pavements during the service life, the causes and mechanisms of distress, and the concepts of maintenance, rehabilitation and reconstruction.

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**FEEDBACK**

SAPEM is a “living document”. The first edition was made available in electronic format in January 2013. It is envisaged that SAPEM will be updated after one year. Feedback from all interested parties in industry is appreciated, as this will keep SAPEM appropriate.

To provide feedback on SAPEM, please email sapem@nra.co.za.
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1. INTRODUCTION

When the design is complete and is approved by all interested and affected parties, the process can proceed to the procurement of the Works needed to construct the facility. The processes associated with this are shown in Figure 1.

![Figure 1. Procurement of Works](image)

The purpose of procurement and tendering is to obtain priced offers from competent teams to carry out the work. Offers from different tenderers are compared in a fair and transparent manner, and the work is awarded to the most favourable offer.

In the field of road development, it is also essential to ensure that the procurement process assists in developing the industry, so that the pool of resources available to carry out the work expands and remains competitive. In addition, it is also essential to ensure that the procurement process makes all the client needs and related risks known to potential tenderers, so that they respond appropriately and price the work based on a good understanding of what is required.

2. FORMS OF PROCUREMENT

The procurement of road works takes on many forms, with some examples shown in Figure 2. Each procurement form is suited to particular circumstances. The various forms are outlined in Table 1.

The risks associated with the various forms of procurement are transferred from the client to the Contractor in increasing proportions as shown in Figure 3.

Conventional wisdom is to allocate risk to the party best placed to manage it. Therefore, it is standard practice to use the contract most suited to the associated risk profile, as described in the next sections.
### Table 1. Types of Procurement

<table>
<thead>
<tr>
<th>Procurement Type</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Procurement</td>
<td>The contractor is appointed by the client to construct the Works as designed by the designer. Normally the designer is a consulting engineer. The consulting engineer also administers the contract and monitors that the contractor constructs the Works as designed, and that the works comply with the specified requirements.</td>
</tr>
<tr>
<td>Product Performance Guarantee System (PPGS)</td>
<td>The contracting team includes a guarantee for the product. Therefore, there is a reduced need for monitoring quality during construction on behalf of the client.</td>
</tr>
<tr>
<td>Design and Construct</td>
<td>The contractor employs a designer and delivers a Turnkey solution that must meet the intended purpose of the facility. Turnkey implies the owner literally turns the key and takes over the road.</td>
</tr>
<tr>
<td>Concession</td>
<td>The concessionaire provides a complete solution for the duration of the concession period. Only the level of service provided to users is audited during the concession period.</td>
</tr>
</tbody>
</table>

### Figure 2. Types of Contracts

### Figure 3. Client’s and Contractor’s Risks
2.1 Conventional Contracts

Conventional contracts are suited to projects where the client, or their agent (consulting engineer), knows what is required and can specify this in the tender and contract documentation. The contractor then prices the tender with the knowledge of what is required and how to achieve those requirements. The client has systems and resources, such as consulting engineers, in place to ensure that the contractor achieves these desired requirements during construction, in the knowledge that if these are achieved, the project will be successful.

This form of contract is normally suited to road construction and rehabilitation situations where the clients, consulting engineers and contractors are all knowledgeable and have a good understanding of readily available technologies and materials. It is the most suitable form of contract for road works where there is sufficient time for investigation, design and contract documentation. All the possible uses of locally available materials are investigated and all risks can be identified and allowed for in the contract documents. All the items of work are properly quantified and specified in the design, schedule of quantities and related specification and documentation. The contractor, in turn, prices these items with minimal allowance for extraneous risks. Variation orders are issued during construction to cater for any situations that were not catered for in the bill of quantities. This type of contract therefore delivers a fair price for the work involved. Typical examples for general conditions of contract published by SAICE (GCC, 2010) are shown in Figure 4.

![Figure 4. Examples of General Conditions of Contract Published by SAICE](image)

2.2 Product Performance Guarantee System (PPGS)

Product Performance Guarantee System (PPGS) contracts are suited to situations where there are a variety of proprietary products available to meet the requirements. In such a situation, it is not possible to specify all the product qualities, or to easily compare like with like in a tender evaluation, in view of the proprietary, and often “secret”, nature of the material qualities. In such situations, it may be simpler to specify a short term performance guarantee, and accept the best price offered to achieve this performance.

This form of contract is suited to a situation where, for example, certain functional requirements such as skid resistance are required on a road, which has a strong pavement that is unlikely to influence performance of the friction course. This form of contract is also only suitable if there is a high likelihood that the contractor can meet its guarantee requirements should something go wrong. Normally the guarantee is only a relatively short duration, say 3 years, on the assumption that if the product lasts for 3 years it should provide adequate performance for another 4 to 7 years.

2.3 Design and Construct

A design and construct form of contract means that the contractor employs a designer to design the project to meet its intended purpose. The contract documents need only specify the intended purpose of the project and any related performance requirements. The contractor's team then design the facility to suite the contractor's own capabilities, and to meet the performance requirements.
This form of contract is suited to bridges, for example, where the contractor may have specific formwork or techniques available that may suit the project and offer unique benefits that are not be realised in a conventional contract. However, in roadworks where the underlying quality is difficult to discern immediately, the client needs to ensure that a sufficiently long defects liability period is in place to prove the quality of the works and their "fitness for purpose" over the medium term. For this reason, such works normally have an extended guarantee period of between 3 and 5 years. Where innovative methods and products are used, that have not been well established, the client may require an even longer defects liability period, up to 8 years. During this, the contractor has to rectify any defects that occur due to quality problems in respect of design and construction that were not detected during construction. The client has minimal control of quality as the contractor has to deliver a product that is "fit for purpose".

There are certain inherent inefficiencies in this type of procurement. Each tenderer has its own design team to design the facility in order for it to be priced and tendered. As it is unlikely that any variation orders will be issued during construction, all possible risks have to be identified by the contractor's team during the tender phase and allowed for in the price. Therefore, the client pays for these risks, whether or not they materialize.

### 2.4 Concession

These contracts are normally called Build, Operate, Toll, Transfer (BOTT) contracts. In this form of contract, the Concessionaire is allowed to manage the entire facility and provide the required service levels for the duration of the concession period. In most cases, the concessionaire is paid for providing the required service levels through tolls or some form of shadow tolling. A monthly amount is paid, subject to an audit that the required service levels are being maintained.

The duration of the concession is determined by the capital amount invested by the concessionaire, and the concomitant time required to recover that investment and provide for risks that may arise.

The inefficiencies listed above under design and construct are all inherent in this form of contract. In addition, the tender evaluation of such a contract is a complex and difficult task. Many different solutions may be offered that all have to be evaluated and compared fairly. Therefore, the minimum duration of concession contracts normally range between 15 and 30 years.

When properly constituted, concession contracts can yield valuable long term benefits in terms of the development of new "road owners" with new ideas, and the ability to deal with problems quickly and effectively. While in some cases Concession contracts may seem expensive, it should be noted that at least 40% of all profits made out of road users provide some form of public benefit in the form of corporate tax and VAT.

### 2.5 Other Forms of Contract

There are several other forms of contract that are considered from time to time. For example:

- **Leasing and management**: contracts, where a private sector institution manages a facility or leases it from the owner over a fixed period, to provide specified levels of service.

- **Build, Finance and Operate**: Contracts similar to lease contracts are Build, Finance and Operate (BAFO) contracts used in the UK. The concessionaire is paid a monthly shadow toll depending on the availability of road lanes to traffic and a notional monthly traffic volume. This has the advantage of using private sector finance to build and manage the facility. The disadvantage is that the monthly shadow toll has to be paid, regardless of the financial situation of the road authority. In times of reduced budgets, many such contracts can drain the budget to the point where only minimal amounts are left over for other work.

- **Routine maintenance**: contracts are a form of management contract, where a consulting engineer and contractor manage the maintenance of a road over 3 to 5 years. In these situations, the consulting engineer may manage what needs to be done to ensure effectiveness, while the contractor manages how to do it as efficiently as possible. Initially, the client may carry all of the risks associated with such contracts. But, as the consulting engineer and contractor team become proficient in understanding what needs to be done and the related costs, more risk can be passed to this team by only specifying performance levels instead of paying unit rates for work done.
3. DESIGN DOCUMENTATION

Designs have to be carried out in conformance with the client's codes of procedure. These specify design inputs, and describe investigation and calculation procedures. The design drawings and investigation documentation should also be prepared in accordance with the clients codes of practice, so that they conform to the requirements for contract documentation. In most cases, these codes are obtained from the client or the Construction Industry Development Board (CIDB) or downloaded from their websites, www.cidb.org.za. Design documentation is discussed in more detail in Chapter 6, Section 7 and Chapter 7, Section 8.

4. CONTRACT DOCUMENTATION

When a design is complete, the consulting engineer usually prepares contract documentation on behalf of the client. The contract documents are developed in a style and format specified by the client, and comply with the CIDB Standards for Uniformity in Construction Procurement (CIDB, August 2006).

Further references include a series of Practice Manuals, prepared by SAICE, that provide guidance to the use of the CIDB and SANS standards for preparing contract documents. These manuals are updated from time to time and include:

- **SAICE Practice Manual #1**: The Use of the South African National Standards in Construction Procurement. (2004a)

The Contract Documentation forms an integral part of tender documentation. Prospective tenderers must be aware of the type of contract and related contractual obligations and specifications in order to tender. On most rural road tenders in South Africa, the COLTO Standard Specification for Roads and Bridge Works is used. An update is currently being initiated.

Figure 5. COLTO Standard Specifications for Roads and Bridge Works
4.1 Important Aspects for Documentation Preparation

Some selected aspects that need particular attention when drawing up documentation for road works are:

(i) The description of the Works needs to be clear and include all pertinent issues contained in the Works.

(ii) Any apparent conflict between the required use of certain material sources and material quality specifications must be addressed. The documents may specify the use of certain material sources for layers with fixed quality requirements. The designer should be reasonably sure that the materials from these sources are of adequate quantities, and can meet the required specification. Otherwise, the contractor could claim that the material is unsuitable. In many cases, this may have to be resolved with careful selection of materials in the borrow pits and should be noted on the drawings.

(iii) Seasonal moisture changes can have a major influence on constructability. Where such risks could be significant, they should be highlighted in the documents.

(iv) Areas that may experience persistent light rainfall need careful consideration of the contract duration and the criteria for extension of time.

(v) Occupational Health and Safety Act aspects need to be included insofar as they relate to safety and health. In most cases, these should include safety factors related to accommodation of traffic.

(vi) Any relevant payment factors should be considered, such as, additional pay factors for better riding quality or asphalt consistency and quality.

(vii) Proprietary products are sometimes useful and may not be specified explicitly. These are normally accommodated using an acceptable product as a reference and specifying “equivalent” or “similar to” it.

(viii) Allowance needs to be made for increased quantities of patching and crack sealing that may occur between the field investigations and the actual construction of the Works.

(ix) The quantities for patches need careful consideration. Quantities differ for many small patches versus fewer larger patches.

(x) The processing time for approval of the environmental impact assessment (EIA) and issuing of the record of decision (RoD) must be noted.

(xi) Services in urban and semi-urban areas always present problems, and need to be properly investigated and allowed for in the schedules.

(xii) Testing must be carried out using stabilisers that are readily available for the project in the area. Provision must be made for the non-availability of such stabilisers during construction.

(xiii) Traffic accommodation often represents an important part of all roadworks, and must be carefully considered and allowed for in the design and documentation.

(xiv) Subgrade conditions that present problems, and are significantly at variance with the materials investigation results, cause problems during construction. Care needs to be taken to minimise the risk of this occurring.

(xv) Geotechnical reports and the information contained in Part C4 of the tender documents need to present a reasonable factual view of the expected conditions.

(xvi) Care needs to be taken when classifying materials as soft, intermediate and hard. The quantities included should be adequate to avoid having very high prices for very low quantities of certain material classes.
5. TENDER DOCUMENTATION

The format of tender documentation in South Africa is specified by SANS 10403:2003 “Formatting and Compilation of Construction Procurement Documents” (shown in Figure 6) and the Construction Industry Development Board (www.CIDB.org.za) guidelines. The various CIDB guidelines and prescripts give full details of how to compile tender documents to ensure uniformity of documentation, and certainty and fairness in procurement processes. Therefore, these should be consulted and applied in all cases.

![SANS 10403:2003 Standard](image)

Figure 6. SANS 10403: Formatting and Compilation of Construction Procurement Documents

The important thing is to provide as much information as possible to allow the Contractor to price the works fairly, and to understand the site conditions and related risks that must be accommodated in the price.

5.1 General Document Contents

In accordance with the CIDB Guidelines, the tender document should have the following contents:

5.1.1 Part T: Documents that Relate Solely to the Tender

(i) Part T1: Tendering Procedures

- **T1.1 Tender Notice and Invitation to Tender:** Alerts tenderers to the nature of the supplies, services and engineering and construction works required by the employer. Should contain sufficient information to enable tenderers to respond appropriately.

- **T1.2 Tender Data:** States what the applicable conditions of tender are, and where they may be found. Tender Data also provides the variables for standardised conditions of tender, such as the required insurances and tender validity periods.

CIDB Tender Documentation Guidelines

The various CIDB guidelines and prescripts give full details of how to compile tender documents to ensure uniformity of documentation, and certainty and fairness in procurement processes. These should be consulted and applied in all cases.
Typical List of Documents

A typical list of documents includes the following:

- **Volume 1:** The SAICE Conditions of Contract for Construction Works (First Edition 2004), as amended.
- **Volume 2a:** The COLTO Standard Specifications for Road and Bridge Works, 1998, issued by the Committee of Land Transport Officials.
- **Volume 2b:** The SABS Standard Specifications. SABS 1200 Standardised Specifications for Civil Engineering Construction.
- **Volume 3:** The Project Document, containing
  - Tender Notice
  - Conditions of Tender
  - Tender Data
  - Returnable Schedules
  - General and Particular Conditions of Contract
  - Project Specifications
  - Pricing Schedule
  - Form of offer and Site Information as issued by the Employer.

The employer’s Letter of Acceptance and any correspondence from the selected tenderer, performance security-demand guarantee and all addenda issued during the period of tender will also form part of this volume once a successful tenderer has been appointed. This volume also includes the Requirements of the Occupational Health and Safety Act and Regulations.

- **Volume 4:** Roadworks Drawings
- **Volume 5:** Structures Drawings
- **Volume 6:** Materials Investigation and Utilization
- **Volume 7:** Works Quality Plan and Construction Supervision Procedural Manual
- **Volume 8:** EIA Related Documents

(ii) **Part T2: Returnable Documents**

- **T2.1 List of Returnable Documents:** Ensures that everything the employer requires a tenderer to submit with the tender is included in, or returned with, the tender submission.
- **T2.2 Returnable Schedules:** Contains documents that the tenderer is required to complete for the purpose of evaluating tenders and other schedules, which upon acceptance become part of the subsequent contract.

5.1.2 **Part C: Documents that Relate Solely to the Contract**

(i) **Part C1: Agreements and Contract Data**

- **C1.1 Form of Offer and Acceptance:** Formalises the legal process of offer and acceptance.
- **C1.2 Contract Data:** States the applicable conditions of contract and associated contract specific data that collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the contract.

(ii) **Part C2: Pricing Data**

- **C2.1 Pricing Instructions:** Provides the criteria and assumptions, which are assumed for the contract that the tenderer has taken into account when developing the prices or target, in the case of target and cost reimbursable contracts.
- **C2.2 Activity Schedule and Bill of Quantities:** Records the contractor’s prices for providing supplies, services, engineering and construction works, which are described elsewhere in a specification within the Scope of Work section of the contract.

(iii) **Part C3: Scope of Work**

Specifies and describes the supplies, services, or engineering and construction works to be provided. Any other requirements and constraints, relating to the manner in which the contract work is to be performed, must be described.
Part C4: Site Information (Engineering and Construction Works Contracts Only)

This part includes a description of the site as at the time of tender. This enables the tenderer to price the tender and to decide upon the method of working and programming.

5.2 Typical Roadworks Documentation

In terms of typical Roadworks documentation, these above sections of the tender documents typically contain the following:

(i) List of Contract Documents

List of Volumes included in the Contract including:
- Standard General Conditions of Contract
- Standard Specifications
- Project Document
- Drawings
- Materials Investigation and Utilisation

(ii) Part T1: Tendering Procedures

The tendering procedures normally contain three sub-sections:
- T1.1 Tender Notice and Invitation to Tender: This contains the tender notice and informs the tenderer who the client is, and what the project involves. Also included is where tender documents can be obtained and queries lodged.
- T1.2 Conditions of Tender: This generally contains a copy of the CIDB standard conditions of tender and related rules, as contained in Annexure F of the CIDB Standards for Uniformity for Construction Procurement (CIDB, 2006).
- T1.3 Tender Data: This contains all of the conditions applicable to the specific tender that are called for in the Standard Conditions of Tender. A typical example for Roadworks is:
  - F.1.1 The Employer is ... The Employer’s domicilium citandi et executandi (permanent physical business address) is: ... The Employer’s address for communication relating to this project is: ...
  - F.1.2 The tender documents issued by the Employer comprise: (list of documents)
  - F.1.3 The Employers Agent for the Design and Tender stage of the project is ...
  - F.2.1 Tenderers are to be registered with the CIDB, prior to the submission of a tender, in a contractor grading designation of X–CE for (civil engineering, ranges from 1 to 9–CE). Joint Ventures are eligible to submit tenders provided that: ...
  - F.2.7 The arrangements for a compulsory clarification meeting are: ...
  - F.2.11 The tenderer shall not take the tender document apart and rebind it.
  - F.2.12 If a tenderer wishes to submit an alternative tender offer, the only criteria permitted for such an alternative tender offer is that it demonstrably satisfies the employer’s standard and requirements, the details of which may be obtained from the employer’s agent.
  - F.2.13.2 Tenders to be submitted as follows: ...
  - F.2.13.5 The Employer’s address for delivery of tender offers and identification details to be shown on each tender offer package are: ...
  - F.2.13.6 A two envelope procedure will/will not apply.
  - F.2.15 The closing time for submission of tender offers is ...
  - F.2.16 The tender offer validity period is 90 days.
  - F.2.23 The tenderer is required to submit with his tender: ...
  - F.3.4 The time and location for opening of the tender offers are: ...
  - F.3.13.1 Tender offers will only be accepted if: ...
  - F.3.18 The number of paper copies of the signed contract to be provided by the Employer is 1.

(iii) Part T2: Returnable Documents

A typical list of returnable schedules includes:
- FORM A1: Certificate of Attendance at Site Visit and Clarification Meeting
- FORM A2: Certificate of Authority for Signatory
- FORM A3: Compulsory Enterprise Questionnaire
- FORM A4: Schedule of Variations or Deviations
• FORM A5: Schedule of Addenda to Tender Documents
• FORM A6: Certificate of Tax Clearance
• FORM A7: Certificate of Insurance Cover
• FORM A8: Tenderer’s Bank
• FORM A9: Schedule of Current Commitments
• FORM A10: Compliance with Occupational Health and Safety Act, 1993
• FORM A11: Certificate of Registration with CIDB
• FORM A12: Certificate of Tender Compliance
• FORM B1: Contractor’s Establishment On Site
• FORM B2: Schedule of Special Materials
• FORM C1: Preferencing Schedule: Tenderer’s BEE Scorecard
• FORM D1: Schedule of Work Experience
• FORM D2: Schedule of Contractor’s Equipment
• FORM D3: Schedule of Specialist Subcontractors
• FORM D4: Preliminary Programme
• FORM D5: Particulars of The Contract Engineer Appointed by The Contractor as Defined in Sub-Subclause 1.1.25 of the Particular Conditions of the Contract
• FORM D6: Particulars of Acceptance/Quality Control Laboratory and Staff

(iv) Part C1.1 Forms of Offer and Acceptance
This typically contains:
• A form of offer
• A letter of acceptance

(v) Part C1.2 Contract Data
This section contains all the documents related to the Contract that are signed upon being appointed to carry out the Works. It describes the applicable General Conditions of Contract, which typically involve one of the following:

• FIDIC: Conditions of Contract for Construction for Building and Engineering Works designed by the Employer (FIDIC, 1999). See Figure 7.
• SAICE: General Conditions of Contract (GCC) for Construction Works (GCC, 2010). See Figure 8.
• NEC: Contracts (1995). See Figure 9.
  – Engineering and Construction Short Contract
  – Engineering and Construction Contract
  – Term Services Contract

Particular Conditions of Contract that amend the General Conditions, or provide more detailed information required by the GCC, are included, such as:

• Programme
• Health and safety
• Environmental protection
• Restrictions of working
• Insurances
• Contract price adjustment procedures
• Retention
• Priority of documents
• BEE requirements
• All requirements in respect of management and administration of the Works, including requirements for extension of time, securities, and guarantees that may be required.
Figure 7. FIDIC Contracts

Figure 8. General Conditions of Contract for Construction Works
(vi) **Part C1.3: Other Standard Forms**

- Form of Guarantees (performance and retention)
- Form of Occupational Safety and Health Act agreements
- Pro-forma Appointment of Mine Manager, as required for managing borrow pit exploitation

(vii) **Part C2: Pricing Instructions**

This typically includes the following statements, as well as any other pertinent to the project:

- Measurement and payment shall be in accordance with the relevant provisions of the COLTO Standard Specification for Road and Bridge Works for State Authorities (1998) as amended in the Scope of Works as well as the relevant portions of SABS 1200 as produced by SABS.
- The units of measurement described in the Pricing Schedule are metric units.
- A list of abbreviators used in the Pricing Schedule ...
- For the purpose of the Pricing Schedule, the following words shall have these meanings assigned to them:
  - Unit: The unit of measurement for each item of work as defined in the COLTO Standard Specification for Road and Bridge Works for State Authorities (1998 edition).
  - Quantity: The number of units of work for each item.
  - Rate: The payment per unit of work for which the Service Provider tenders to do the work.
  - Amount: The product of the quantity and the rate tendered for an item.
  - Lump Sum: An amount tendered for an item, the extent of which is described in the Pricing Schedule, the Scope of Work or elsewhere, but of which the quantity of work is not measured in units.
- Unless otherwise stated, items are measured net, in accordance with the drawings. No, allowance is made for waste.
- It is assumed that prices included in the bills of quantities are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. Refer to [www.sabs.co.za](http://www.sabs.co.za) or [www.iso.org](http://www.iso.org) for information standards.
- The prices and rates in the Pricing Schedule are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that may be required in, and for, the execution of the work, described in accordance with the provisions of the Scope of Work. These shall cover the cost of all general risks, liabilities and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out.
- Where the Scope of Work requires detailed drawings and designs, or other information to be provided, all costs associated therewith are deemed to have been provided for, and included in the unit rates and sum amount tendered for such items.

Chapter 11: Documentation and Tendering

- An item against which no price is entered will be considered to be covered by the other prices or rates in the Pricing Schedule. A single lump sum will apply should a number of items be grouped together for pricing purposes.
- The quantities set out in the Pricing Schedule are approximate, as measured by the designer, and do not necessarily represent the actual amount of work to be done. The contractor (tenderer) is offered the opportunity to alter quantities in the schedule in terms of “Schedule E” included in the Pricing Schedule. The quantities of work accepted and certified for payment will be used for determining interim payments due. The final quantities in the Pricing Schedule shall not exceed the “Lump Sum” price tendered, which shall only vary as provided for in the contract data (Particular Conditions of Contract).
- Reasonable compensation will be received where no pay item appears in the Pricing Schedule, in respect of work required in terms of the Contract, and which is not covered in any other pay item.
- The short descriptions of the items of payment given in the Pricing Schedule are only for the purpose of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
- The item numbers appearing in the Pricing Schedule refer to the corresponding item numbers in the COLTO Standard Specification for Road and Bridge Works for State Authorities (1998), unless stated otherwise.
- The contractor’s completion statement shall reflect the fixed Lump Sum price as shown on the Form of Offer, but adjusted according to F3.9 in the tender data, and as adjusted in terms of the Particular Conditions of Contract.

It also includes detailed schedules of quantities, as well as summaries and a breakdown of how the tender sum is to be calculated.

(viii) Part C3: Scope of Work

This section describes any particular issues related to the Works that the contractor should take note of in addition to the Standard Specifications.

- **Section A: Standard Amendments to the Standard Specifications:** This section sets out any standard amendments to the standard specifications for the works, which are developed and issued by client bodies or organisations, and are distributed for inclusion in their Contract documents.

- **Section B: Project Specifications:** This section sets out the project specification, which describes any additions of amendments to the Standard Specifications applicable to the project.

- **Section C: Environmental Management Plan (EMP):** This typically includes all issues that need to be managed by the Contractor during the Construction of the Works to minimize or mitigate harmful environmental effects, in compliance with the National Environmental Management Act (see side-box). It typically includes the following sections:
  - Management of Contractor Activities During the Operations and Maintenance Phase: This section describes the purpose and objectives of the EMP, as well as roles and responsibilities of the client, the client’s environmental representative, as well as the appointment processes and duties of the site environmental control officer (SECO) and the external environmental auditor. Any special conditions related to the project are also set out.
  - Construction and Site Camps: This section typically describes issues to be complied with, and managed, in respect of the following, amongst others:
    - Location of construction camps
    - Construction camp restrictions and restraints
    - Ablution facilities
    - Heating and cooking facilities
    - Water for human consumption
    - Eating areas
    - Fencing and no-go areas
    - Fires
    - Workshops
  - Protection of Heritage Resources: This section identifies any known heritage resources, and the management required to preserve them. Also included are actions required in the event of any chance Heritage Finds.
  - Noise Management: This section describes the management and mitigation of noise in general, as well as road construction activities and equipment, and blasting and vibration limitations.
  - Soil Management: This section describes the management and mitigation actions required to limit the impacts of topsoil storage, spoil material, borrow pits and quarries on the surrounding communities and natural environment.
- **Air Quality Management**: This section describes the management and mitigation of dust, and vehicles and machinery emissions on the environment.
- **Water Management**: The negative impacts and related actions to mitigate the effects of construction activities, storm water runoff and discharge, erosion protection, flood lines, proximity to rivers, streams and/or wetlands, water abstracted from river and streams, river crossings, alteration of water courses and pollution control are set out.
- **Waste Management**: The handling and disposal of solid waste, to limit and mitigate contamination of the natural environment, and limit impacts on human safety are described. This includes issues such as waste minimisation, waste classification and tracking, domestic waste disposal, construction waste disposal and hazardous waste.
- **Ecological Management**: This section describes actions required to minimise damage to the ecology by the Works and project. It includes issues such as ecologically sensitive areas and habitats, clearing of vegetation, rare or endangered species, indigenous trees, weeds and alien vegetation, and re-vegetation after construction.
- **Environmental Awareness Training**: This typically describes any awareness and management training required to sensitise all staff on the above issues.

**Section D: BBBEE Requirements**
Any particular BBBEE requirements are set out in this section.

**Section E: Requirements of the OHS Act and Regulations**
This section describes any issues identified as potentially unsafe, as well as how safety and the health of all staff must be assured. Issues dealt with include:
- Compliance with the Occupational Health and Safety Act 85 of 1993 and all related legislation.
- The contractor incurring expenses and stoppages from OHS compliance.
- The duties imposed on the contractor by the Construction Regulations.
- Implementation of a formal risk assessment programme.
- The Statutory obligation to issue Personal Protective Equipment (PPE) to employees, and to replace defective PPE free of charge to the employees.
- Regulatory audits of the Works.
- The Contractor is required to provide copies of internal Health and Safety manuals, and confirmation of the registration of all the employees with the Workmen's Compensation Commission, with a certified copy of a letter of good standing from the commissioner.
- Safety specifications and the provision of a safety plan.
- Maintenance of a health and safety file.

This section also sets out any requirements, or clarifies any issues, considered during the tender evaluation, and how these are included in the evaluation. The OHS organisational structure is shown in Figure 10.

![Figure 10. Occupational Health and Safety (OHS) Organisational Structure](image)
(ix) Part C4: Site Information

Site information includes:

- Location of the project and arrangements for the site inspection.
- Description of the Works, as well as temporary works required.
- All issues related to preferential procurement and subcontractors.
- Any requirements in respect of plant and materials.
- Descriptions of any services that need to be crossed or moved.
- Location and requirements in respect of the contractor’s site establishment.
- Issues related to adjoining properties, material utilisation including borrow areas, and interfaces with other authorities and land-owners.
- Survey issues and locations of any beacons and bench marks.
- Materials investigation and utilisation information, such as centre line soils survey data, borrow pit data and geotechnical data. Chapter 6 of this manual sets out typical requirements for the content of this section. An example summary is shown in the green side-box.

(x) Part C5: Annexures

This contains all the standard forms that eventually form part of the Contract.

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Example Summary of Materials Utilisation and Design

1. Introduction
   1.1 Scope of Investigation
   1.2 Methodology
   1.3 Disclaimers

2. Physiography of the Route
   2.1 Physical Route Description
   2.2 Geology
   2.3 Climate
   2.4 Topography

3. Traffic
   3.1 Traffic Description
   3.2 Design Traffic

4. Pavement Design
   4.1 Construction Information
   4.2 Traffic and Design Strategies
   4.3 Proposed Pavement Design

5. Rehabilitation Investigation
   5.1 Pavement Test Pits
   5.2 Test Pits: Discussion
   5.3 Rutting And Riding Quality Measurements
   5.4 Visual Condition
   5.5 Deflection Measurements

6. Centre Line Soils Investigation
   6.1 Investigation
   6.2 Results of Investigation

7. Borrow Materials
   7.1 Other Potential Sources of Gravel
   7.2 Quarries

8. Other Construction Material
   8.1 General
   8.2 Coarse Aggregate
   8.3 Fine Aggregate
   8.4 Gravel
   8.5 Asphalt Aggregate
   8.6 Water

9. Geotechnical Evaluation and Design Recommendations
   9.1 Introduction
   9.2 Ground Conditions
   9.3 Bridges
   9.4 Major Culverts and Service Crossings
   9.5 Major Cuttings and Embankments
National Environmental Management Act, No. 107 of 1988
[Assented to 19 November 1998, Date of Commencement to be Proclaimed]

ACT
To provide for cooperative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

PREAMBLE

- WHEREAS many inhabitants of South Africa live in an environment that is harmful to their health and wellbeing;
- Everyone has the right to an environment that is not harmful to his or her health or wellbeing;
- The State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities;
- Inequality in the distribution of wealth and resources, and the resultant poverty, are among the important causes as well as the results of environmentally harmful practices;
- Sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations;
- Everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development;
- The environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another;
- AND WHEREAS it is desirable:
  - That the law develops a framework for integrating good environmental management into all development activities;
  - That the law should promote certainty with regard to decision making by organs of state on matters affecting the environment;
  - That the law should establish principles guiding the exercise of functions affecting the environment;
  - That the law should ensure that organs of state maintain the principles guiding the exercise of functions affecting the environment;
  - That the law should establish procedures and institutions to facilitate and promote cooperative government and intergovernmental relations;
  - That the law should establish procedures and institutions to facilitate and promote public participation in environmental governance;
  - That the law should be enforced by the State and that the law should facilitate the enforcement of environmental laws by civil society.
6. **TENDER PROCESS**

The tender processes need to follow the CIDB standards for uniformity, contained on [www.CIDB.org.za](http://www.CIDB.org.za). The following sections outline typical processes that need to be followed for roadworks.

### 6.1 Pre-Qualification

In some cases, where tenders involve complex and large scale works, it is useful to pre-qualify contractors and to only allow contractors that can demonstrate adequate capacity to tender for the works. This reduces the number of tenders received that need to be evaluated, and avoids unnecessary tender expenditure by contractors who may not have adequate capacity to carry out the works. In most cases of roadworks in South Africa, it is normally sufficient to use the CIDB Contractor Grading criteria, which only allows contractors with a high enough grading to tender for works above certain values, or which require specific expertise. Pre-qualification is generally only applied to very large or complex contracts.

### 6.2 Site Inspection

Part of the tendering process includes a site inspection, during which all prospective tenderers are informed of all aspects of the project that may be relevant for the preparation of their offers. The site inspection process needs to include the provision of a tender information document that includes the following basic information:

- Key plan
- Introduction
- References
- Programme for inspection of the site
- Description of the works
- Proposed construction programme
- Camp site, services and accommodation
- Summary of quantities
- General requirements
- Annexures
- Photographs
- Notes

Attendance of the site inspection is normally compulsory, and prospective tenderers have to get their certificates of attendance signed during the inspection.

### 6.3 Tendering

This involves the prospective tenderers assessing the project requirements, preparing prices for the schedule of quantities, as well as providing all other information required in the documents.

Finally, the tenderers must deliver their tenders for evaluation, as specified in the tender documents.

### 6.4 Tender Evaluation

The tender evaluation must be carried out to ensure fairness and transparency. It should follow a process that ensures that all the important aspects of the various offers received are properly evaluated. This typically involves an evaluation of all of the following elements and issues within the offers received, and a preparation of a report on the findings:

- Tender information
- Addenda
- Tenders received
- Completeness of tenders
- Arithmetical errors and omissions
The tender evaluation document is provided to the client, who then makes the final decision on the contract award.

7. AWARD OF CONTRACT

When the client has decided on the contractor to which it wants to award the contract, the client signs the letter of acceptance contained in the tender documents, and specifies the date of commencement of the Contract.
REFERENCES AND BIBLIOGRAPHY


