PW 347



DEPARTMENT OF PUBLIC WORKS

CIVIL ENGINEERING MANUAL

OCTOBER 2004

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A. GENERAL PROCEDURE

A.1 THE MANUAL

The purpose of this manual is to serve as a guide to the functions, duties and responsibilities of consulting civil engineers in the design, documentation and administration of projects for the Department of Public Works.

A.2 DEFINITIONS

The following words, expressions and abbreviations shall have the meanings assigned to them except where the context requires otherwise:

A.2.1 Employer

"Employer" means the Government of the Republic of South Africa as represented by the Director General: Department of Public Works and includes any person acting in and duly authorised to act in that capacity as well as any officer to whom any powers vested in the Director General have been delegated.

A.2.2 Department

The National Department of Public Works.

A.2.3 Director General

The person appointed as Head of Department, of the Department of Public Works.

A.2.4 Departmental Project Manager

(see Section A.4)

A.2.5 Consultant

The Consultant is the Private Consulting Civil Engineer or Consulting Civil Engineering Firm appointed by the Department in terms of the "Letter of Appointment", to execute the work for which this Manual of Procedure is intended.

A.2.6 Principal Agent / Lead Consulting Engineer

A Consultant (not necessarily a civil engineer) appointed by the Department to act as co-ordinator and team leader of a group of consultants working on the same project.

A.2.7 Engineer

The "Engineer" means the natural or juristic person or partnership named as the Engineer in the Special Conditions of Contract (see Annexure B.2) for the supervision and management of the Engineering Works undertaken by the Contractor.

A.2.8 Engineer's Representative / Resident Engineer

A person appointed from time to time by the Engineer to represent the Engineer on the Construction Site.

A.2.9 Client / User Department

(see Section A.8)

A.2.10 Letter of Appointment

(see Sections A.5 and A.6)

A.2.11 PDR

Preliminary Design Report, as described further in Section B of this Manual.

A.2.12 PEP

Project Execution Plan

A.2.13 GCC '90

The General Conditions of Contract for use in connection with Works of Civil Engineering Construction (6th Edition, 1990); issued by the South African Institution of Civil Engineers.

A.2.14 PW 677

The departmental Conditions of Contract as published by the Department of Public Works, mainly applicable to Building Contracts.

A.2.15 PW 772

The Department's "Preliminaries etc. forming part of Bills of Quantities".

A.2.16 PW 371

The Department's "Specification of Materials and Methods to be Used".

A.2.17 PRM Forms

A system of pro-forma documents used by the Department for Project Management.

A.3 THE EMPLOYER

The Employer for the work is the Director General: National Department of Public Works or his authorised representative. The Consulting Engineer will deal with the Employer through the Departmental Project Manager as set out in this manual.

A.4 APPOINTMENT

The letter of invitation to perform professional services (generally referred to as "the letter of appointment") together with the associated annexures, forms a binding contract between the Department and the Consulting Engineering Firm the moment the Consultant accepts the invitation to perform professional services in writing.

The Consultant and the Departmental Project Manager will initial each page at the bottom right hand corner as well as all changes / amendments, if applicable, made to the original contract documentation.

A.5 THE AGREEMENT

Where the Department's standard letter of appointment forms the basis of the commission, the Consultant is required to execute the work in accordance with this manual and with such supplementary instructions as the Department may issue from time to time. In cases where a special agreement is entered into, this will state any variations in procedure, which may be required.

The standard appointment letter consists of the following:

The appointment letter itself

- Section A: General Conditions and Information
- Section B: Reimbursement tariffs for typing, printing, duplicating work and forwarding
- Section C: Travelling and subsistence arrangements and tariffs on Charges
- Section D: Indemnification of the Department by firms with limited liability
- Section E: Conditions applicable to the appointment of firms in association
- Section X1: Extent of civil engineering appointment
- Section X2: Professional fees in respect of civil engineers appointment
- Appendix "N": Briefing document, if applicable

After appointment, the Consultant shall draw up a Project Execution Plan (PEP) indicating cashflows as well as work program. This document, once approved, will form part of the agreement.

Remuneration tables referred to in the appointment letter are available on the Departmental website, i.e. *http://www.publicworks.gov.za*.

A.6 THE BRIEFING MEETING

After acceptance of the appointment the Consultant is required to arrange a consultation / briefing meeting with the Departmental Project Manager. At this stage the Consultant shall advise the Department which partner/director will be responsible for controlling the service. Minutes of this meeting must be kept and forwarded to the Departmental Project Manager.

A.7 APPROVAL

A.7.1 Official Approval

The Consulting Engineer may not proceed from one stage to another without the written approval of the Departmental Project Manager. He must obtain prior approval before undertaking any survey, soil testing, travelling, etc. See also Section A.13. in this regard.

A.7.2 Approval by a Client / User Department

Approval of any proposals either verbally or in writing by a Client / User Department is not binding on the Director General and does not relieve the Consultant in any way of the responsibility for obtaining written approval of any proposals from the Departmental Project Manager.

A.8 THE CLIENT / USER DEPARTMENT

The designated occupant(s)/user(s) of a facility is/are the Client or User Department(s). Any discussions between the Consultant and the Client / User Department, must be arranged through the Departmental Project Manager. Any requests from Client / User Departments for amendments to the approved design must be referred by the Client / User Department to the Departmental Project Manager and his written authority obtained before such additions / alterations can be incorporated in the design proposals.

A.9 PROGRESS REPORTS

To control the strict adherence to the time schedule required for compliance with the documentation programme laid down in terms of the letter of appointment or as provided at the briefing the Consultant is required throughout the design and documentation stages to render to the Department progress reports to the last working day of each month on the form Annexure A1 (PRM014/6).

In completing the form special attention must be drawn to any delays or changes in the estimated cost of the service and the cause thereof.

A.10 FINANCIAL CONTROL

A.10.1 General

Financial control is done on a dual basis, i.e. construction (execution) costs and professional fees, which include travelling cost, supervision etc.

A.10.2 Departmental Budget

The Department makes a cost provision for each of its projects for budgeting purposes. The Consultant is required to design the project as economically as possible.

A.10.3 Approved Cost Limit

When the various stages of the project are approved an estimate of cost will concurrently be approved and the Consultant is required to adhere strictly to this cost limit, subject to escalation in costs or such deviation as approved by the Departmental Project Manager. Such estimates shall include preliminary and general costs and an estimate of Contract Price Adjustment based on the formula below, but exclude any amounts for professional fees, travelling, supervision etc. for which the Department will make its own allowance.

CPA = 85% x *i* x TP x [(T/2) + 3]

Where:	i	=	Estimated rate of inflation
	TP	=	Tender Price (estimate)
	Т	=	Time for completion (months)

The Consultant must ensure that the design is comprehensive, as no allowance shall be made for any contingencies.

A.11 QUALITY ASSURANCE PLAN

Consultants appointed by the Department shall confirm in writing with the Departmental Project Manager that they have a Quality Assurance Plan, to ensure that the designs carried out are to an acceptable standard. Their Quality Assurance Plan shall be compliant with the stipulations of the latest edition of SABS ISO 9001 (SANS 9001) specifications.

Special preference shall be given to firms who have SABS ISO 9001 (SANS 9001) accreditation or SABS ISO 9001 (SANS 9001) compliant quality control systems.

It is the intention of the Department to make accreditation in terms of SABS ISO 9001 (SANS 9001) a prerequisite for Consultants to be admitted to the Consultants Roster by the year 2008.

A.12 CONSULTANT TEAM

A.12.1 Appointment of other Consultants

The architects, quantity surveyors, other engineering disciplines and any other specialists involved in the project are separately appointed by the relevant Departmental Project Managers and are briefed by them in respect of their scope of work, terms of agreement, departmental standards and technical aspects of their work.

A.12.2 Liaison with Consultants

In terms of their several agreements, all consultants are required to liaise closely with one another during all stages of the project and to keep each other fully informed of all relevant developments. This liaison will be done via the Departmental Project Manager. Direct liaison between consultants will only take place as determined by the Departmental Project Manager. In cases where a Lead Consultant / Principal Agent is appointed, the Departmental Project Manager can delegate certain liaison and co-ordination functions to the Lead Consultant / Principal Agent. Designs must be co-ordinated with that of the other members of the design team (where applicable) before submission of proposals. The Consultant shall not accept instructions from other consultants with regard to design standards, the extent of his brief and changes to approved proposals without the prior approval of the Departmental Project Manager.

Co-ordination between consultants must be such that work is not duplicated, as the Department will not remunerate twice for the same work.

A.12.3 Responsibility of Civil and Structural Engineers

The Department expects that the issue of responsibility / liability between the Civiland Structural Engineer(s) be without ambiguity before a construction contract is awarded.

At the first briefing meeting the Departmental Project Manager will spell out the different responsibilities of the civil and structural engineer.

To clarify the above, the Department would hold the structural engineer responsible for the design performance of building/(s), even if earthworks were carried out under the "footprint" of the structure. Therefore, it is the prerogative of the structural engineer to verify / accept work done under the earthworks phase of the contract.

The Civil Engineer will be responsible for the balancing of earthwork quantities and the Structural Engineer will be responsible for the bearing capacity and related specifications of earthworks under the footprint of a structure.

Although the above depends to a large extent on a well co-ordinated design, specification(s), drawings and supervision, the Department does not accept split responsibility in this regard. Should the building for instance crack in due time, the structural engineer would be held responsible.

A.13 USE OF SPECIALISTS

If the service of a specialist consultant is required, three (3) quotations for these services must be obtained and submitted to the Departmental Project Manager for approval. This is applicable for:

- A.13.1 Geotechnical investigations
- A.13.2 Traffic impact studies
- A.13.3 Site surveys
- A.13.4 Hydrological studies, etc.

A.14 FORMS OF CONTRACT

The service for which the Consultant is appointed will be executed by contract in one or more of the ways indicated below.

The Department will decide in due course what form of contract will be employed. The Consultant's recommendations in this regard should be included in the Preliminary Design Report and will be taken into consideration.

A.14.1 Civil Engineering Contract (GCC '90)

Tender documents including drawings, specifications and schedules of quantities as well as an estimate of the cost are prepared by the Consultant, and submitted to the Project Manager in draft form. After approval the Department will arrange for the invitation of tenders, submit these to the Consultant for recommendation, and through the Department's tender procedures accept a tender.

A.14.2 Nominated Sub-contract to Building Contract

Procedure as for A.14.1 except that after acceptance by the Department's tender procedures, the successful tenderer becomes a nominated sub-contractor to the main contractor.

A.14.3 Civil Work Included in Building Contract (PW 677)

Civil engineering services are included in the building contract. Contract drawings and technical specifications are prepared by the Civil Engineer and submitted to the Principal Agent / Project Leader, who after approval will arrange to have these included in the main building documentation. Although the defects liability period (maintenance period) on a building contract is normally 3 months, the civil portion will be subject to a defects liability period of 12 months.

A.14.4 Separate Mechanical and / or Electrical Contract

In certain circumstances (for example pump station installations), it may be expedient to have a separate mechanical / electrical subcontract. Tender documents including drawings, specifications and schedules of quantities as well as an estimate of the cost are prepared by the Mechanical / Electrical Consultant, and submitted to the Principal Agent in draft form. The Principal Agent will thereafter be responsible for the compilation of the Tender Document. After approval the Department will arrange for the invitation of tenders, submit these to the Consultant for recommendation, and through the Department's tender procedures accept a tender.

A.15 CONSTRUCTION MONITORING

The Consultant will be required to supervise the construction of the works for which the Consultant has been appointed and which have been included in the documentation as approved by the Departmental Project Manager (see Section D). The Consultant will also ensure that the Contractors comply with all the relevant acts and statutory regulations, e.g. National Water Act (Act 36/1998), Occupational Health and Safety Act (Act 85/1993), etc.

A.16 DRAWINGS

Please refer to Annexure A2 of this manual in this regard.

A.17 TRAVELLING PROCEDURES AND COSTS

A.17.1 General

All trips are undertaken entirely at the Consultants own risk and only essential trips are to be undertaken.

Travelling and subsistence costs and allowances will be reimbursed in accordance with Annexure C of the Letter of Appointment.

In cases where air or rail travel is authorised, the Consultant is required to make own travel arrangements and pay the costs, which will be reimbursed. The ticket must be attached to the application for a reimbursement.

A.17.2 Authority to Travel

All applications for authority to travel by whatever means must be made through the Departmental Project Manager. Refer to Annexure C of the Letter of Appointment.

A.18 SUBMISSION OF ACCOUNTS

A.18.1 Form of Submission

All accounts must be submitted on the forms provided by the Project Manager. They must be accompanied by invoices where relevant. Only the appropriate portions of the forms must be filled in.

A.18.2 Claims for Subsistence and Travelling

Such claims must be submitted as soon as possible after the journey has been made and in no circumstances later than three months after the date thereof.

A.18.3 Claims for Other Disbursements

Such claims must be submitted as soon as possible after the event or as soon as receipt of invoices, but not more than monthly.

A.18.4 Fees on Contract Price Adjustments

Fees are to be determined on the final value of the works, calculated according to the stipulations in the letter of appointment, if applicable.

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B. THE DESIGN STAGE

B.1 STAGE 1: REPORT AND PRELIMINARY DESIGN PROPOSALS

- B.1.1 This stage encompasses the Report and Preliminary Design stages as described in the Letter of Appointment.
- B.1.2 Unless otherwise instructed these two stages will be treated as one. If it becomes apparent that these two stages should be separated the prior approval of the Departmental Project Manager must be obtained.
- B.1.3 Three copies of the Preliminary Design Report (PDR) and Site Clearance (Annexure B6.2) are required. Although of a general nature, the report must contain sufficient information on the proposals and recommendations to enable worthwhile comment to be made by the Client / User Department and this Department. Refer to SECTION C – "Design Guide", which sets out relevant design requirements.

Particular attention should be paid to the suitability of the site, availability of construction materials, bulk and existing services and the presence of servitudes, or the necessity of acquiring servitudes or extra land as well as problems that may arise from adjoining sites (see Annexure B6.1). This report should also contain recommendations as to the best method of executing the scheme, such as phasing, number of contracts etc. as well as estimates for the various proposals vide clauses A.10 and A.14. Special attention must be given to any electrical power requirements for mechanical installations required by civil engineering project elements.

B.1.4 The Preliminary Design Report will consist of an Executive Summary, followed by the report which shall include at least the following sections:

Executive Summary

Section 1: <u>Introduction</u> Appointment, Project Name and WCS No.,

> Project location, Available information Scope of work – a discussion of the full extent of the project, i.e. limits of design, other designs affected, etc. Purpose of project,

Section 2: <u>Description of project</u> A detail description of the project, including discussion and motivation of design proposals.

Section 3: Land use

A discussion of the existing land uses and anticipated future land use

Section 4: <u>Impact on environment and water related matters</u> A summary of the environmental scan / EIA done (see Section C.13.) Section 5: Geotechnical / Geological Discussion

A discussion of geotechnical / geological factors influencing the project, with special attention to dolomitic areas. The Compliance Certificate for Dolomitic Areas must be bound into the PDR.

Section 6: Traffic Impact Studies (if necessary)

The effect of traffic on the proposals must be discussed. If necessary, a specialist must do a Traffic Impact Study, and the findings must be incorporated into the PDR. (see Section C.5.4)

Section 7: Design Standards

A discussion of the relevant design standards used and motivation for deviation of norms.

Section 8: Possible problems that may arise as a result of the project

A discussion of possible problems regarding shifting of services, properties affected, drainage, pavement design, availability of construction materials, topography, flood lines, climate, geology, accessibility, traffic etc.

Section 9: Liaison with parties concerned

Section 10: Comparison of alternatives

Section 11: Cost estimate

- Section 12: Summary and recommendations
- Section 13: <u>List of drawings</u> (actual drawings can be bound in separate volume)
- B.1.5 Monthly progress reports, in duplicate, as per Annexure A1(PRM014/6) of this manual are to be submitted not later than the 7th day of each month to the Departmental Project Manager.

B.2 STAGE 2: DESIGN AND TENDER STAGE

The Consultant may not proceed with Stage 2 without written approval of the Departmental Project Manager, after consultation with the Directorate: Civil Engineering of the Department. Refer to the letter of appointment to ascertain which of the following sections (B.2.1, B.2.2 or B.2.3) are applicable.

- B.2.1 Separate Civil Contract Vide Clause A.14.1
 - B.2.1.1 The Consultant shall prepare a Final Design Report presenting and justifying the designs developed in the Detail Design Stage. This report should contain the following minimum information:

Locality plan and list of plans Project definition Brief project overview and description Site and miscellaneous dictates

Environmental assessment (copy of the Record of Decisions must be included - see section C.13.5) Design standards used for all infrastructure services, i.e. water, sewer, storm water, roads, etc. Unique project issues Transportation issues, access routes, etc. Geological and geotechnical issues Reference to Preliminary Design report, highlighting changes Cost analysis of alternatives Motivation for chosen alternative Estimated contract value (including a confidential priced schedule of quantities using current construction rates) and period Special conditions of contract Material acquisition Wet and other services Expropriation issues if any Brief discussion on construction method etc. List of documents submitted

- B.2.1.2 The Contract Document shall be compiled in accordance with Annexure B1 "Sequence of Contract Document".
- B.2.1.3 Documentation shall be based on the General Conditions of Contract 1990 issued by the SAICE, SABS 1200 (SANS 1200), the Departmental Special Conditions of Contract (Annexure B2 – Latest version) and the documents contained in Annexure B3.1. Except for the "List of Specifications" in Annexure B3.2, the documents contained in Annexure B3.1 and the Special Conditions of Contract may in no circumstances be amended.
- B.2.1.4 The Department's latest policy regarding Targeted Procurement and the relevant forms shall be incorporated into the document.
- B.2.1.5 The clauses forming Annexure B4 must be considered in compiling the Project Specification (SABS 0120 Part 2 Section 0, Clauses 4 & 5) (SANS 10120) and the Preamble to the Schedule of Quantities.
- B.2.1.6 Calling for and the acceptance of tenders is a function of the Department. To enable the Department to advertise the Contract for tender, a Pre-Tender Estimate and Site Clearance (Annexure B6.2) must be submitted with the printed tender documents.

When instructed to do so, the Consultant must print the following number of tender documents:-

Contract Documents		-	25 copies or as otherwise directed
Reduced drawings	(A2)	-	25 Sets or as otherwise directed

The above must be sent to the office of the Departmental Project Manager referred to in Annexure A of the Letter of Appointment, for tender purposes. Three Contract documents and one set of drawings may be retained by the Consultant for contract administration. B.2.1.7 The Consultant will be expected to conduct a tender site inspection and to report and make recommendations on the acceptance of tenders. Notices to Tenderers (Addendums) must be avoided as far as possible. If it should be essential to issue a Notice to Tenderers arising from the site inspection, it must be approved by the Departmental Project Manager and issued to the tenderes by the Consultant not later than 14 days before the closing date of the tender.

> An agenda must be issued for, and minutes kept of the tender site inspection. Both these documents will be used for future reference only, and are not contractually binding.

- B.2.1.8 The engineer shall evaluate the tenders received on an impartial basis to ensure that the most cost-effective tender is accepted. In the recommendations for the award of the contract, due cognizance shall be taken of the issues enumerated in Annexure B9 to achieve the successful completion of the works within the specified parameters and with minimal risk accruing to the Department.
- B.2.2 Nominated Sub-contract to Building Contract Vide Clause A.14.2
 - B.2.2.1 The document shall generally be compiled in accordance with the sequence described in Annexure B1 with deviations where required and agreed with the Project Manager.
 - B.2.2.2 Documentation should be based on the Department's General Conditions of Contract (PW 677, Annexure B7), the Department's "Preliminaries etc. forming part of Bills of Quantities" (PW 772), the Department's "Specification of Materials and Methods to be Used" (PW 371) and/or SABS 1200 (SANS 1200) as applicable, those documents contained in Annexure B8 and the Building Contract, or any other conditions of contract as prescribed by the Department for the contract.
 - B.2.2.3 Any applicable clauses contained in Annexure B4 should be considered in compiling the Project Specification.
 - B.2.2.4 As per B.2.1.5.
 - B.2.2.5 As per B.2.1.6.
 - B.2.2.6 As per B.2.1.7.
 - B.2.2.7 As per B.2.1.8.
- B.2.3 Civil Work included in the Building Contract Vide Clause A.14.3
 - B.2.3.1 The document will be compiled by the Quantity Surveyor appointed for the service.
 - B.2.3.2 Documentation prepared by the Quantity Surveyor will be based on those documents listed in Clause B.2.2.2 except for SABS 1200 (SANS 1200). The Civil Engineering Consultant will be required to prepare tender drawings and a Project Specification relating to the civil works only, based on the Department's "Specification of Materials and Methods to be Used" (PW 371).

- B.2.3.3 Should the planning require certain matters to be stated in the tender (e.g. procedure clauses) these should be included in the project specification. In particular it must be stated that the defects liability period on the civil portion of the works will be 12 months, which differs from the requirement for the Building Contract.
- B.2.3.4 Estimating, scheduling and tender arrangements are the function of the Department and the Quantity Surveyor. The Civil Engineer is requested to assist the Quantity Surveyor wherever possible in this regard.

B.2.4 VAT and Contingencies

Contractors must be registered in terms of the Value - Added Tax Act, (Act No. 89 of 1991). Tendered rates and lump sums should make provision for the payment and recovery of any taxes, obligatory levies on all items to which they apply, but exclude Value Added Tax (VAT). Value-added tax shall be added to the sum of the total of the Schedule of Quantities in order to determine the Tender Sum. Should the rate at which VAT is charged be increased or decreased by legislation in relation to the rate applicable at the tender closing date, the difference in payment of VAT shall be borne by the employer or shall be to his benefit.

No provision must be made for a contingency allowance in the contract documents.

B.2.5 Penalties

The penalty for late completion of the contract shall be calculated as described in the "Addendum to Notes to Consultant Quantity Surveyors on the Preparation of Bills of Quantities (QS37E, latest version)" available from the Departmental website.

In the case of Nominated Sub-contracts the penalty which applies to the main contract will apply to the Sub-contract.

B.2.6 Securities

The following percentages of the estimate will be required for security:

	Estimate		Percentage
0	to	R 100 000	: 0.00%
R 100 001	to	R 1 000 000	: 2.50%
R 1 000 001	to	R 3 000 000	: 5.00%
R 3 000 000) to	R 5 000 000	: 5.00% to 10.00%
			according to risk
	more than	R 5 000 000	: 10.00%

B.2.7 Limit of Retention

The Limit of Retention is usually taken as 10% of Tender Price, but may be reduced on large contracts in consultation with the Project Manager.

Retention can be increased in lieu of security for contracts with an estimate of below R 2 million, as follows:

2,5% for projects more than R 100 000 to R 1 million

5,0% for projects more than R 1 million to R 2 million

B.2.8 Design Calculations

The Consultant shall exercise all reasonable skill, care and diligence in the execution of his work. He shall be responsible for breach of professional duty by reason of any error, omission or neglect by him in connection with the work performed by him or done under its auspices by Sub-designers and/or additional service providers.

Design calculations must be done and kept in a systematic way. They shall be kept and safeguarded for at least 10 (ten) years.

The Department reserves the right to request all calculations and to have any plans and calculations submitted by the Consultant checked and inspected with the knowledge of the Consultant, by another consulting firm or any other person or firm.

SECTION C: DESIGN GUIDE

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C. DESIGN GUIDE

C.1 PRECEDENCE OF DESIGN GUIDELINES

Where applicable, services should generally be designed in accordance with the following documents, in the precedence shown:

- C.1.1 Applicable Laws and Acts of South Africa, especially with regard to environmental, water and effluent matters
- C.1.2 Departmental Directives, with special emphasis on directives regarding dolomitic areas. The following PRM forms are available from the Departmental Project Manager for work on dolomitic areas: PRM006, PRM007, PRM011, PRM012, PRM016, AND PRM018.
- C.1.3 SANS (previous SABS) Specifications. (All references to SABS documents are deemed to be references to the applicable SANS document as per Government Notice No. 1373 of 8 November 2002.)
- C.1.4 "Guidelines for Human Settlement Planning and Design" obtainable from the CSIR.
- C.1.5 Requirements of Local Authority where the relevant authority provides the fire services. In the case where the Local Authority's requirements are more stringent than those described in this document, the Local Authority requirements shall prevail.

In Section F is a table giving references to the newest Design Guidelines available. Section F will periodically be updated and published on the Departmental website, i.e. *http://www.publicworks.gov.za*.

C.2 DESIGN RESPONSIBILITY

Unless otherwise agreed to with the Departmental Project Manager in writing, and where applicable, the Consultant will inter alia be responsible for the design of the following:

- C.2.1 Bulk earthworks, excluding footprint areas of structures / buildings.
- C.2.2 All vehicle traffic areas, i.e. excluding pedestrian walkways except where these fall in the road verge.
- C.2.3 Aprons and drainage areas in dolomitic areas.
- C.2.4 Bulk water supply and main sewer pipelines, including pumping installations, if applicable.
- C.2.5 Water storage and purification, as well as sewage treatment if applicable.
- C.2.6 Main sewer pipelines, excluding plumbing.
- C.2.7 All external domestic water/fire mains and hydrants. Branch pipes to buildings are the responsibility of the Architect.
- C.2.8 Storm water drainage excluding rainwater disposal.
- C.2.9 External telecommunication and electrical ducting.
- C.2.10 Sports facilities (excluding buildings) to the extent agreed with the Project Manager.
- C.2.11 Solid Waste disposal

C.2.12 Railway sidings excluding electrification.

C.3 GENERAL GUIDELINES FOR SERVICES

- C.3.1 On sites with existing installations the Consultant must contact the Regional Manager who will endeavor to point out the positions of existing water supply, sewers and electrical reticulations on site.
- C.3.2 Existing water and sewer information must also be gathered from the appropriate local authority and where applicable from the end user. This includes as-built information, local authority requirements and preferences on technical detail and operating data (e.g. water pressure, pipeline capacity, fire regulations, municipal bulk contributions, municipal connection fees, etc.), where applicable. Services to be relocated must be identified.
- C.3.3 Should the interface points between the internal system and the external system (Local Authority) be outside the boundaries of the property of the Client / User Department, the Local Authority should be approached to provide an interface point at the property boundary. If this cannot be done Treasury approval has to be obtained to work outside the said property. This aspect shall be thoroughly investigated and the financial implications thereof reported on at the report stage.
- C.3.4 The Consulting Engineer must perform a provisional site investigation to obtain site condition information with regard to:
 - soil type
 - existing services (or lack thereof)
 - general site surface conditions

This does not include geotechnical and other detail investigations to be done by specialists

- C.3.5 The Consultant will be responsible to identify interface points of all wet services, and for the applications to the applicable local authority to connect into their existing services.
- C.3.6 In cases where no existing water services are available, the utilization of other sources such as bore holes or surface water must be investigated. In cases where no existing water or sewer services are available, a report recommending the preferred water and sanitation system to be used, must be forwarded to the Department for approval before detail design commences.
- C.3.7 The Consultant will only be responsible for the reticulation of bulk services on the inside of the departmental property from the property boundary. The Consultant however has to report on connection fees and bulk contributions of the local authority / bulk service provider.
- C.3.8 Special care must be taken for installation of services / ducting in dolomitic areas: The stipulations in the Departmental Guide re. Dolomite:
 - "Appropriate Development of Infrastructure on Dolomite: Guidelines for Consultants"

shall be adhered to.

C.3.9 Ducting

C.3.9.1 General

The Civil Engineer is responsible for the co-ordination and detailing with respect to subsurface service ducting for other disciplines / consultants outside buildings.

C.3.9.2 Electrical Ducting

Attention is specifically drawn to the requirements of SABS 1200 LC (SANS 1200 LC) and the Departmental specifications for electrical work with respect to ducting for electrical services.

C.3.9.3 Telecommunication Ducting

Telecommunication ducting must be provided in accordance with the requirements of Telkom. The position of such ducting must be obtained from the Architect.

C.3.9.4 Other Communication Ducting

The position of ducting for any other communication services must be obtained from the Architect or Client / User Department where applicable (subject to approval of the Departmental Project Manager). Such ducting must be provided in accordance with the requirements of the supplier of the system.

C.3.9.5 Service Markers

Subsurface services and ducting must be marked with markers at turning points and at suitable intervals on straight sections. Details of service markers are given in Annexure C.3.

C.4 SITE SURVEY

- C.4.1 Cognizance must be taken of section A.13 regarding the appointment of surveyors.
- C.4.2 The two primary objectives of the site survey are to provide:
 - A comprehensive plan of the site showing all the necessary detail and data required for the design and accurate siting of the proposed structure / project;
 - Permanently marked and accurately fixed (in plan and level) survey stations to be used for any future setting out, control of construction and subsequent monitoring.
- C.4.3 Detail to be surveyed

The detail to be surveyed is described in Annexure C1

C.5 ROADS AND PARKING AREAS

- C.5.1 Chapters 7 and 8 of "Guidelines for Human Settlement Planning and Design" should be used as basis for the design of roads, streets, accesses and parking areas.
- C.5.2 Appropriate values must be chosen for the following geometric design parameters, based on the proposed design speed for the road:
 - Horizontal curvature

- Gradients
- Vertical curves
- Sight distances
- Design vehicle dimensions, determined by the type of facility being designed for.
- Cross sectional element dimensions
- C.5.3 Special attention must be given to adequate surface drainage of parking areas. A minimum gradient of 0,5% must be used to avoid ponding of water.
- C.5.4 In areas / facilities with a high rate of pedestrians, care must be taken to avoid / minimize conflict points between vehicles and pedestrians. Sidewalks and or pedestrian walkways must be provided where required.
- C.5.5 When choosing a pavement design for a road or parking area, the following must be taken into account:
 - The design lifetime of the facility.
 - The estimated E80 axle loading over the design lifetime.
 - Available construction materials
 - The macro-climatic region of South Africa in which the facility is to be constructed.
 - The prevention of water penetration through the pavement, especially in dolomitic areas.
 - The maintenance related to the type of pavement design.
 - Life cycle cost of the pavement, taking into account both initial capital (construction cost) and maintenance costs over the lifetime of the pavement.
- C.5.6 Interlocking Blocks and Concrete Paving
 - Surfacing with interlocking blocks is generally preferred.
 - Surfacing with interlocking blocks should always be used where justified as result of traffic load, where oil and fuel leakage/spillage is likely to occur, e.g. parking areas, filling stations, where tight turning action by heavy vehicles would damage bituminous surfacing, etc.
 - Blocks with double interlock must be used for trafficked areas.
 - Cast in-situ concrete pavements should be considered for areas extensively used by heavy vehicles, and evaluated in terms of future maintenance.

C.5.7 Bituminous surfacing

- Bituminous surfacing should be considered for large areas to be surfaced, such as roads and streets in departmental complexes, due to a possible cost advantage.
- A total lifecycle cost comparison is to be made to decide whether bituminous surfacing or interlocking blocks should be used.
- Due consideration should be given to the lighter forms of surfacing such as single/double seals etc., where possible, for economic reasons.

- C.5.8 Traffic Engineering
 - C.5.8.1 Traffic engineering is seen as a specialist competency. Cognizance must be taken of section A.13 regarding the appointment of specialists. A specialist traffic engineer must be appointed by the Consultant, with approval of the Departmental Project Manager, in cases where:
 - The location of the project has a marked impact on the traffic flow to and from the site, generally applicable in urban and industrial areas.
 - The internal traffic flow on the site is impacted markedly by the project.

C.6 GEOTECHNICAL INVESTIGATION

- C.6.1 The purpose of a geotechnical investigation is to provide an accurate assessment of subsurface conditions. The investigation will assist the engineer in the selection of suitable foundation types, the preparation of adequate and economic foundation designs, the selection of appropriate embankment slopes and the preparation of reliable tender documents. It will also provide guidance to the Contractor in the preparation of his tender and the execution of the work. It is essential that the work be carried out in a competent manner, soil profiles are described using standard terminology, the results are reported in full and the validity of the information is not disclaimed.
- C.6.2 Depending on circumstances, investigations may extend from superficial visual inspections to sophisticated surface and subsurface testing. These will have to be agreed with the Departmental Project Manager at the appropriate stage of work.
- C.6.3 The Engineer shall submit for consideration a proposed investigation methodology with the Departmental Project Manager before commissioning any work on behalf of the Department. After agreement has been reached on the work to be undertaken and whether geophysical investigations are required, the engineer shall obtain at least three quotations for such geophysical investigations, and he shall submit a report including his recommendation to the Departmental Project Manager for a ruling.

After the geophysical investigations have been completed the Engineer shall prepare draft tender documents for the detailed investigation which will include some or all the following: exploratory holes, in situ testing, laboratory testing, survey to set out and pick up positions and levels of exploratory holes, profiling holes, logging cores and photographing the cores. The draft documents shall be submitted to the Department for approval before tenders or quotations are obtained for the work.

Tenders shall be invited for the work unless the estimated value of the work is considered by the Department to be too low to justify calling for tenders. In such cases, contractors selected with the approval of the Department shall be invited to quote for the work. See also Section A.13 in this regard.

- C.6.4 Geotechnical investigations should be carried out by geotechnical engineers (registered professional engineers) or engineering geologists (normally registered natural scientists) who are well experienced in the type of work envisaged.
- C.6.5 The investigation normally takes place in a number of phases. The phases include a desk study, site reconnaissance, preliminary fieldwork, detailed investigation and verification of conditions during construction. A guide to the

information, which may be obtained and reported on in the various phases, is given in Annexure C2:

- C.6.6 The following additional aspects have to be reported on in dolomitic areas:
 - The site shall be demarcated according to risk zones according to current practice.
 - Describe and reference the methodology used in the risk characterisation of the site.
 - Outline the motivation for the risk characterisation of each zone.
 - Water boreholes, permanent or temporary natural water drainage features traversing the site.
 - Conditions of all wet services, canals, pipes and ducts which may convey water and water retaining structures with reference to water tightness (infiltration and exfiltration).
- C.6.7 Cognisance must be taken of the Departmental publication: "Appropriate Development of Infrastructure on Dolomite: Guidelines for Consultants", in order to obtain a Clearance Certificate regarding dolomite.

C.7 SOILS INVESTIGATION

- C.7.1 In-situ testing of soils for the construction of embankments, roads etc. is described in "TRH 14: Guidelines for road construction materials"
- C.7.2 Testing of soils for the construction of embankments, roads etc. in borrow pits is also described in "TRH 14: Guidelines for road construction materials"

Borrow pits and/or quarries should be identified and investigated during the project design stage. The exploitation of materials is controlled by the Minerals Act No. 50 of 1990. It is a requirement that a Standard Environmental Management Programme be lodged with the relevant Regional Director of the Department of Minerals and Energy.

C.8 WATER SUPPLY

- C.8.1 SABS 0252-1 (SANS 10252-1):1993 "Part 1: Water Supply Installations for Buildings" must be used in the choice and design of a specific water supply system. Cognisance should also be taken of Chapter 9 of "Guidelines for Human Settlement Planning and Design".
- C.8.2 The potential sources of water, the sustainability thereof and the water quality must first be assessed when planning a water supply scheme for the project. Careful consideration should be taken of water pressure sensitivity of the water supply measured over at least a 24-hour normal workday cycle.
- C.8.3 The most general water sources are potable water from bulk supply pipelines and boreholes. The preferred water supply system shall be water of a suitable quality provided by the Local Authority. The method, which is however selected, shall be thoroughly investigated and the financial feasibility thereof motivated at the report stage.
- C.8.4 The following basic principles must be adhered to when developing a water supply scheme from boreholes:
 - The presence, quantity and depth of underground water cannot normally be predicted beforehand with a high degree of accuracy.

- A reputed specialist, prior to any final design criteria being established, should investigate existing boreholes and wells in the area.
- If needed, the Consultant will appoint a specialist to determine the most likely sites, subject to the approval of the Department, as described in Section A.13.
- When reverting to boreholes, a reputable driller registered with the Borehole Water Association of South Africa should be used.
- Siting and drilling of boreholes should be executed in terms of the relevant sections of SABS 0299 (SANS 10299 Parts 0 to 9) and the Association's publication "Minimum Code of Practice for Borehole Consumption and Pump Installation".
- In all cases, ground water should be analysed to determine its fitness for human consumption, manufacture of concrete as well as possible effects on pipe systems, etc. The publication "Quality of Domestic Water Supplies, Vol. 1: Assessment Guide (1998)" by the Water Research Commission is to be consulted in this regard.
- The determination of borehole yield should be done in accordance with the Guidelines.
- The supply of an Operation and Maintenance Manual is mandatory and shall be forwarded to the Department as a draft with the preliminary design report and drawings, and in final format one month before commissioning of the system.
- A new set of boreholes has to be licensed by the Department of Water Affairs and Forestry for use by the Client / User Department. The Civil Engineer must facilitate the application procedure.
- C.8.5 Requirements regarding water storage on site must be in accordance with the Guidelines and be discussed with the Project Manager. The purpose of storing water is to meet pressure balancing requirements and to cater for emergencies e.g. fire fighting, planned shutdowns and forced containment of imprisoned people, etc.
- C.8.6 Cognisance must be taken of pressure requirements, annual average daily flow, peak flows and summer peak flows as described in the Guidelines, to design water supply systems. A realistic factor shall be applied to take into account the deterioration of flow due to the internal corrosion of the pipe work in the supply network. A factor after 50 years of usage should be adopted.
- C.8.7 Pipe Materials

The most commonly used pipes are galvanised mild steel pipes to SABS 62 (SANS 62) for above ground applications. The other available materials are the plastics, which include polyvinyl chloride (PVC), unplasticised polyvinyl chloride (uPVC), high-density polyethylene (HDPE) and polypropylene (PP). Concrete pipes are not recommended in reticulation systems.

Special attention shall be given during the design of water supply pipelines to the corrosive nature and other properties of the in-situ soil and their effect on pipeline materials proposed for the project. Soil tests shall be carried out to determine the effect of the soil properties on the pipe materials proposed. Galvanic action as a result of pipe / acidic soil or electrical interaction shall be investigated and appropriate measures to prevent this phenomenon shall be investigated and reported on.

The materials to be used shall be agreed upon by the Department and the Local Authority at the report stage.

Depending on economy, water quality and site conditions, the use of uPVC pipes is preferred by the Department for pipes larger than 75mm diameter and HDPE for pipes equal to and smaller than 75mm diameter.

In dolomitic areas only HDPE pipes may be used underground, unless specifically approved otherwise by the Department.

Internal burrs of welded pipes shall be removed on completion of the welding or limited in height where approved by the Department.

The use of resilient seal valves is preferred. Valves must be clockwise closing. The positions of air and scour valves shall be carefully determined during the detail design of the pipe system.

All necessary tools to open valves and manhole covers shall be supplied as part of the Contract. A minimum of two tools for each application is required.

C.8.8 Fire requirements and Hydrants

Cognisance must be taken of the most recent Departmental publications regarding fire security, i.e. "Standard Technical Specification for a Pump Installation for Automatic Sprinkler Fire Extinguishing System", "Schematic Diagram for a Fire Pump Installation", as well as "Guidelines for Human Settlement Planning and Design, SABS 090 (SANS 10090) and SABS 0400 (SANS 10400).

The fire requirements as set out in the Guidelines, are usually the overriding criteria for the flow requirements in the design of a water distribution pipe network and SABS 0252 (SANS 10252-1) or SABS 0400 (SANS 10400) for hydrants and hose reels at buildings. Requirements depend on the risk category and standards have been set on the basis of a minimum flow for a given period (a) from a single hydrant and (b) from a group of hydrants within a given area.

Table 1 in Part A, "Administration", of SABS 0400 (SANS 10400) classifies buildings according to their occupancy and from the tables in Part T, "Fire Protection", the risk category for each occupancy class can be deduced. Part W, "Fire Installation", provides the guidelines regarding provision of water for fire fighting purposes.

It is also important to obtain local fire regulations and requirements as well as to determine the ability (booster pumps, etc.) of the appropriate local authority to assist with fire activities. As far as possible, these parameters must be included and reported on in the fire design of the water distribution system.

The capacity and ability of the Local Authority to assist in fire fighting activities must be ascertained and reported on.

Where possible, hydrants should only be installed on pipes 75mm in diameter or larger. Hydrants must be constructed in accordance with the details provided in the Department's standard drawings.

The material used for water and fire mains must be specified to be at least class 9 uPVC according to SABS 966 (SANS 966) or class 10 HDPE to SABS ISO 4427 (SANS 4427).

Internal burrs of welded pipes shall be removed on completion of the welding or limited in height where approved by the Department.

See following table for proposed fire water flows and pressures.

	ITEM	MIN FLOW OR PRESSURE
	Min. Design Fire Flow with all hydrants within a 270m radius discharging simultaneously	100 ℓ/s
For Commercial	Duration of Fire Flow	4 h
Establishments	Minimum Hydrant Flow	25 ℓ/s
	Minimum Hose Reel Flow	0,5
	Minimum residual head with fire	Maximum building height +7m with a minimum of 15m (150kPa)
For Residential Areas on premises of commercial industries, military	Min. Design Fire Flow with one hydrant discharging	20 ℓ/s
	Duration of Fire Flow	2 h
	Minimum Hydrant Flow	20 ℓ/s
prison grounds	Minimum Hose Reel Flow	0,5 ℓ/s
	Minimum residual head with fire	Maximum building height +7m

C.8.9 Combined Reticulation

Domestic water supply and fire reticulation must be combined outside buildings if possible. Water and fire connections into buildings must be separate (architectural). No valves are permitted on fire connections.

- C.8.10 Domestic Flows and Pressures
 - Daily water demands excluding gardening (except where shown), shall be based on the following:

Residential Housing (including gardening)	As per Fig 9.7 of the "Guidelines for Human Settlement Planning and Design"
Single quarters	400{/u/d
Offices and administration	70l/p/d or 400l/100m²/d
Kitchen/dining	90 ℓ /p/d
Clinic	250{/bed/d or 500{/100m²/d
Laundry	15 ℓ /p/d
Schools	18 ℓ /p/d
Colleges	45 ℓ /p/d
Maintenance	1,5% of total water demand
Canteen	60ℓ/10m²/d
Vocational	100ℓ/trainee/d

Industrial manufacturing/repair	400{/100m²/d
Church/chapel	20l/p/d or 2000l/erf/d (incl gardening)
Commercial (shops/petrol station)	10 { /10m²/d

For water demands for prisons, prison farms and police stations with prisoner cells, see DPW "Guidelines for the design of civil services for New Generation Prisons".

- Irrigation 25mm per week unless more detailed information is available pertaining to the particular site. Where large areas are to be irrigated a detailed study will be required.
- The minimum residual pressure at any domestic fitting should not be less than 100 kPa and the maximum static pressure in the network must not exceed 1000 kPa.
- The network shall be designed for the lowest pressures within this range, taking cost effectiveness into account.
- Friction coefficients for uPVC and HDPE shall not be less than:

	k = 0,1mm	in Colebrook White equation
or	N = 0.01	in Manning equation

• The Consultant shall apply appropriate peak factors to the average flows which shall not be less than those in the "Guidelines for Human Settlement Planning and Design" for residential houses, not less than 12 for a single building with many water fittings and not less than 3 for the combined flow from a large departmental establishment.

C.8.11 Other Practical Considerations

As far as possible, all distribution pipes should be laid to form closed loops and to reduce as far as possible the likelihood of water standing in a pipeline for more than two days.

Isolating valves shall be placed in the most economical practical positions possible and in such a manner as to isolate portions of the supply with minimal disruption to the rest of the reticulation network.

The system available static pipe pressure shall determine the class of pipes to be specified. Even if pressure relief valves are specified, the pipe class shall be specified not to be less than 90 m water pressure.

Air and scour valves shall be suitably placed so as to ensure the proper working and maintenance of the reticulation network.

Pipeline markers, as specified in Section C.3.9.5 and Annexure C.3, must be incorporated into the design.

Water meters shall be installed at functional facilities such as the cellblock, kitchen, laundry etc. at large prisons.

In dolomitic areas additional water meters will be required for water loss monitoring purposes.

All sites shall be equipped with a quality glycerin filled pressure meter just downstream of the site bulk water meter. The pressure meter shall be the largest available size not to read more than 150% of the maximum incoming supply pressure. Graduations shall be in kPa and shall be readable to an accuracy of at least 50kPa.

Where the maximum incoming pressure exceeds 300kPa, adjustable pressure reducing equipment shall be installed in the supply lines feeding the buildings, just inside the buildings. The Pressure Reducing Valve shall be capable of reducing pressures from 150% of maximum incoming supply pressure down to 160kPa minimum.

C.9 SANITATION

C.9.1 Cognizance should be taken of the most recent issues of SABS 0252-2 (SANS 10252-2) "Part2: Drainage Installations for Buildings" and Chapter 10 of "Guidelines for Human Settlement Planning and Design" in the choice and design of a specific sanitation system.

Before a sanitation system is designed, the Consulting Engineer should examine the available options and select the most appropriate solution for the project. Human waste can either be treated on site before disposal, or removed from the site and treated elsewhere. This is dependent on the requirements of the Environmental Impact Assessment.

The method, which is selected, shall be thoroughly investigated and the total financial feasibility thereof motivated at the report stage. The net present value over a period of 20 years, using the formula in paragraph 1.7 of Annexure B9, must be calculated for each scheme investigated. An interest rate equal to the current capital lending rate minus the current escalation rate shall be used in the calculation.

C.9.2 On-site Sewage Disposal

Two basic categories of on-site disposal sanitation systems exist viz.:

• Water added – no conveyance required, such as:

Flushing toilets towards septic tank, various low-flow on-site sanitation systems, etc.

• No water added – no conveyance required, such as:

Ventilated pit toilets, ventilated vault toilets, continuos composting toilets, etc.

Many commercial manufacturers provide on-site disposal systems that may be a variant of the above. When the Consulting Engineer decides to opt for an on-site sewage disposal system, the selection of the most appropriate solution will depend on its particular application. If applicable, enduser/community inputs are essential in the system selection.

C.9.3 On-site Sewage Treatment Works

Small plants will generally be package plants provided by a supplier where the sewage flows and / or site characteristics make septic tanks not feasible. The Consultant will, however, be responsible for the successful placing in operation of the plant.

Small plants can generally be categorised as biological disc plants or activated sludge plants designed to operate satisfactorily at both the minimum (initial) and maximum (final) design flows. The consultant will be required to submit a draft operation and maintenance manual with his preliminary design report to the Department. The draft operation report shall clearly spell out the operating personnel required as well as the hours they will have to work. A normal 5 day, 8 hour per day week must be strived for as far as possible. Only when the Department is satisfied that the proposed

process can be successfully operated with normal operators and assistants, will the Department authorise detail design.

Should the Department conceive that the proposed process will create difficult, error prone or costly maintenance conditions, the Department will require the consultant to submit an alternative design.

The capability of the plant to be successfully operated by a normal operating team as defined in the Water Act, remains the sole responsibility of the Consultant.

The final and complete Operating and Maintenance Manual shall be supplied one week after the successful commissioning of the sewage treatment plant.

C.9.4 Sewage Treatment at Central Municipal Works, i.e. Municipal Connection

The design of a sewer system must be in accordance with the relevant sections of the most recent issues of SABS 1200 (SANS 1200) and SABS 0252-2 (SANS 10252-2).

The proposed sewer system shall be capable of conveying the proposed flows taking into account the average daily flows and peak flows that may occur. The existing system shall be checked for capability of maintaining the proposed additional flows added to it.

The peak flow factor to be designed for should be 3.5 for populations smaller than 1 000, 2.5 for populations of 1 500; which can be reduced to 2.0 if a population of more than 3 000 is served. Intermediate values can be interpolated.

The flows should be designed for a seepage factor of 15%.

Where gravity flow or pumping of sewage to a central treatment plant is not feasible, on site septic tanks must be considered. Conservancy tanks with sufficient capacity can be considered as a last resort. The design of the conservancy tank must be done in consultation with the Local Authority, taking into account their capacity to empty the tanks.

C.9.5 Manholes

The use of precast concrete manholes is preferred, but in-situ concrete and engineering brick manholes are also acceptable. A class I mortar must be specified for bricklaying. Manholes must not be plastered.

Dolomite aggregates must be specified for use in concrete for manhole products.

Waterproofing of joints in precast manholes is mandatory. Waterproofing tests on manholes must be done after construction. Special care must be taken to construct the benching of a manhole with smooth transitions and according to specification.

Standards for precast manhole segments are covered in SABS 1294 (SANS 1294).

The special measures specified in the Departmental publication: PW 344, "Appropriate Development of Infrastructure on Dolomite: Guidelines for Consultants", must be strictly adhered to in dolomitic areas.

All the necessary tools to open manholes shall be supplied with the Contract. A minimum of two tools for each application is required.

C.9.6 Pipe Materials

There are a number of types of pipes used for the construction of sewers, such as vitrified clay, reinforced concrete (dolomitic aggregates) and rigid class 34 uPVC pipes (SABS 791 / SANS 791). It is the Department's preference to specify vitrified clay pipes in sizes up to 300mm and where applicable, reinforced concrete (dolomitic aggregates) for larger diameters.

Internal burrs of welded pipes shall be removed on completion of the welding or limited in height where approved by the Department.

The special measures specified in the Departmental publication: "Appropriate Development of Infrastructure on Dolomite: Guidelines for Consultants", must be strictly adhered to in dolomitic areas.

C.9.7 Pumped Sewage Installations

C.9.7.1 General

Gravity flow is the preferred method of sewage conveyance. Pumping sewage should only be considered after all alternatives have been investigated to the fullest consequence. Only if the alternatives are not feasible or impossible, pump stations can be considered.

The design and planning of a sewage pumping station involves the integration of various disciplines. The location of a pump station is important and a comprehensive study should be made to ensure that the area to be served can be adequately drained. Furthermore attention should also be given to the location of the station as it could very well determine the overall development of the area.

The preparation of an Operating and Maintenance Manual is mandatory and must be forwarded to the Department simultaneous with the Design Report and Tender Drawings. This Preliminary Manual shall describe the operation of the pump station and need not include the manuals of equipment suppliers. The final and complete Operating and Maintenance Manual shall be supplied one week after the successful commissioning of the pump station.

The departmental "Guidelines for Design and Construction of Pump Stations", Annexure C4. must be used in the design of sewage pump stations.

C.9.7.2 Pump stations

There is a whole range of different types of pump stations varying from simple sumps to large elaborate complexes. Basically there are two types, namely the Wet Well Station and the Dry Well Station. A proper investigation should be carried out to determine the appropriate type of pump station to be provided.

The Wet Well Station normally consists of a sump, which contains both the sewage discharged from the outfall sewer and the submersible pumps themselves. The Department is not in favour of submersible pumps and prefers suction pumps mounted at ground level. These stations are normally considered for smaller installations where the flow is not excessive. The sumps are not generally accompanied by above ground buildings when submersible pumps are used, with electrical switchgear housed in simple weatherproof kiosks. In a Dry Well Station, the pumps are located in the dry well adjacent to the wet well. Dry Well Stations have generally been used where the volume of sewage to be pumped is large, where the pumping head is large or where the depth of the incoming sewer is substantial. The arrangement of the dry well to the wet well should preferably allow for the pumps to have a positive suction head at all times, but this is not absolutely necessary.

The requirements for sewer manholes given elsewhere in these guidelines apply to the design of pump station wells.

All the necessary tools and equipment to operate the pump station shall be supplied with the Contract, except for the tools to carry out repair work.

C.9.7.3 Pump selection

The most important aspect of sewage pumping station design is that of the choice of the pumps themselves. Design information and product detail are readily available from specialist pump manufacturers.

The pumps shall be chosen and designed in order to maintain the duty flow and head for any given situation, and adequate provision in the design shall be made for a back-up system when pump maintenance or breakdowns occur.

Cognisance must be taken of the safeguards as specified in paragraph 4 of Annexure C4.

C.9.7.4 Pipework

The pipework in a sewage pumping station has to be carefully sized and laid out to prevent blockages. The number of bends should be limited and care must be taken to ensure that deposits that occur during off pumping periods do not prevent the subsequent pump operation. The preferred pipe material inside a pipe station is cast iron, ductile iron or corrosion protected steel pipes. Rising main pipes can be uPVC, corrosion protected steel pipes or preferably HDPE pipes.

C.9.7.5 Safety and Cleanliness

Stairways are preferable to ladders or step irons and stainless steel handrailings must be provided. Other safety features are non-slip treads and rubber mats in front of switchgear.

When step irons are provided, they shall be of the fully plastic encapsulated type.

Good pressure water supply for hosing down internal and external floors and walls should be encouraged, adequately dealing with such effluent to drain towards a suitable disposal point.

C.9.8 Sewage Flows

The average daily sewage design values to be utilised for prisons, prisoner holding cells and prison farms are set out in the departmental PW 342, "Guidelines for the Design of Civil Services for New Generation Prisons".

DESCRIPTION	DESIGN VALUE
Residential Housing	900
Single Quarters	360
Offices and Administration	67 ℓ/p/d
Kitchen	81 ℓ/p/d
Clinic	225 {/bed/d
Laundry	14,3
Educational	43 {/student/d
Maintenance	1,35 % of total water intake/d
Canteen	57 ℓ/10m²
Vocational	70 ℓ/trainee/d
Commercial including petrol stations	8,5 ℓ/10m²/d
Chapel or church	19 ℓ /p/d
Schools	37 ℓ/p/d
Industrial / manufacturing / repair	140 {/p/d

The table below supplies average daily sewage design flows for other works of the Department:

Friction coefficients for uPVC and HDPE shall not be less than:

or

k = 0,6mm	in Colebrook White equation
N = 0,012	in Manning equation

The consultant shall apply appropriate peak factors to the average sewage flows which shall not be less than 5 for a single house, not less than 10 for a single building with many water fittings and not less than 2,5 for the combined sewage flow from a large departmental establishment.

C.10 STORM WATER

C.10.1 The requirements for storm water management are described in the "Guidelines for Human Settlement Planning and Design", Chapter 6. It includes the requirements for the design flood frequencies for minor and major systems for the appropriate land use as well as relevant environmental issues. Tables 6.1 and 6.2 of the Guidelines, duplicated below, give the design flood recurrence intervals.

Table 6.1: Design flood frequencies for major systems		
LAND USE	DESIGN FLOOD RECURRENCE INTERVAL	
Residential	50 years	
Institutional (e.g. schools)	50 years	
General commercial and industrial	50 years	
High value central business districts	50 – 100 years	

Table 6.2: Design flood frequencies for minor systems		
LAND USE	DESIGN FLOOD RECURRENCE INTERVAL	
Residential	1 – 5 years	
Institutional (e.g. schools)	2 – 5 years	
General commercial and industrial	5 years	
High value central business districts	5 – 10 years	

A minimum recurrence interval of 2 years shall be used for minor systems except in high risk dolomite areas where the minimum recurrence interval shall be 5 years for minor systems.

- C.10.2 The National Water Act, Act 36 of 1998, must be read in conjunction with the above-mentioned document. According to section 144 of the Act, a 100-year recurrence interval flood line must be shown on residential / institutional development plans.
- C.10.3 The determination of flood lines is a specialist competency and the Consultant may appoint a specialist, with approval of the Department, if necessary. The stipulations in Section A.13 must be adhered to in this regard.
- C.10.4 The recommended minimum size of sediment carrying storm water pipes is 450 mm diameter, and shall as far as possible be "self-cleansing". The minimum acceptable class of pipe to be used has to withstand a 45,0 kN per metre length of pipe load for class D Proofloading as described in SABS 677 (SANS 677), unless there is no possibility of vehicle loads occurring. In addition, if vehicle loads are expected, the strength of the pipe must be designed accordingly for traffic loads.

Storm water pipes in dolomite areas shall be of HDPE except where otherwise approved by the Department.

C.10.5 All the necessary tools to open manholes shall be supplied with the Contract. A minimum of two tools for each type is required.

C.11 SUBSURFACE DRAINAGE

C.11.1 General Sub-Surface Drainage

The Consultant shall review and report on the relevant and / or geotechnical information to assess the need to provide a subsoil drainage system.

Subsurface drainage is an important element in the management of water. The handling of subsurface drainage is extensively covered in the TRH 15 document "Subsurface Drainage for Roads" published by the CSIR. Although this document is specifically aimed at subsurface drainage for roads, the basic principles can be used for other applications.

In dolomite areas subsurface drainage may not be allowed except if designed by a specialist in construction on dolomite areas.

C.11.2 Sub-Surface Drainage Systems for Buildings

Special attention shall be given to the waterproofing of basements and the removal of subsurface water in buildings. Particular attention shall be given to the provisions in SABS 021 (SANS 10021) "The waterproofing of buildings"

The outside of basement walls shall be adequately waterproofed and a drainage system shall drain the subsurface water through the basement walls into collector drains inside the building. The water from these drains shall drain into a sump to be pumped into a suitable point of the storm water system around the building.

Sumps shall generally be provided in the basement or at lift shafts and dewatering shall be accommodated by means of electric pumps. The pump shall be designed such that the maximum calculated design flow can be accommodated. The system should be designed with electronic controls and alarm systems so that adequate warning of flooding can be given if the
pumps fail to switch on in time. These pumps shall be wired to be powered off the electrical emergency supply system.

The supply of an Operation and Maintenance Manual is mandatory and shall be forwarded to the Department in draft form together with the preliminary design report and drawings and in final format one month before commissioning of the system.

C.12 EXISTING ELECTRICAL SERVICES

C.12.1 Existing Cables

Any existing underground cables must be specified to be encased in suitable split pipes, before new roads are constructed over them, as part of the civil engineering contract. Permanent markers must also be provided, e.g. in the kerbing, to show where sleeves or cables cross under the roads. Service markers, as specified in Section C.3.9.5 and Annexure C3, must be incorporated into the design as an alternative to markers in the kerbing.

Cables shall be installed at least 1m (one metre) below the road surface.

C.12.2 Alterations to Existing Reticulation

If instructed to do so by the Departmental Project Manager, and should any work be required on the existing electrical system such as re-routing or lowering of underground cables, moving of overhead lines, making safe against damage of existing electrical services and telephone cables etc., the Department must appoint an Electrical Consulting Engineer to do the planning and specifying of such work. Any such work, if involved, must form part of the civil engineering contract, and allowances must be made in the schedule of quantities and estimate for any such work. This electrical subdocument must be compiled by the Electrical Consulting Engineer.

Ducting in dolomitic areas shall also be treated in accordance with Section C.3.8.

C.12.3 Electrical Sub-contractor

The contract documentation must make provision for the civil contractor to appoint an accredited electrical contractor to undertake any such electrical work. The Sub-contractor must be in a position to make an electrician available at all times to make good any damage caused to electrical services by the civil contractor.

An accredited person in terms of the Occupational Health and Safety Act must certify all electrical work.

C.13 ENVIRONMENTAL ISSUES

C.13.1 Relevant Legislation

The stipulations contained in the Environment Conservation Act No. 73 of 1989, the National Environmental Management Act No. 107 of 1998 as well as the Regulations in terms of Act No. 73 of 1989, as published in the Government Gazette No. 5999 on 5 September 1997 (R1182, R1183 and R1184), have to be adhered to.

C.13.2 Preliminary Design Stage

A Pre-Environmental Impact Assessment (EIA) Checklist must be submitted to the Department of Environmental Affairs and Tourism (DEAT) if doubt exists whether the EIA process has to be followed.

In the event that the EIA process has to be followed, a complete Scoping Report, based on a Plan of Study approved by DEAT, is needed. An EIA is only needed if requested by DEAT.

C.13.3 Detail Design Stage

If a Scoping Report and/or EIA was done during the preliminary design stage, only the relevant issues have to be amended and/or updated. An Environmental Management Plan (EMP) must be submitted if requested by DEAT.

C.13.4 Construction Stage

If a Scoping Report and/or EIA was done during either the preliminary or detail design stage, only the relevant issues have to be amended and/or updated before construction starts. An Environmental Management Plan (EMP) must be submitted if requested by DEAT.

C.13.5 Record Of Decisions (ROD)

No project should be embarked upon beyond the preliminary design stage unless the Record of Decision (ROD), emanating out of the above, has been filed with the consultant. If the civil engineering work is a sub-component of a larger project, the consultant shall insist that he be presented with proof that an ROD is on file, and ensure how it influences his design. The relevant stipulations in the ROD must be incorporated into the Contract Specifications.

C.14 SOLID WASTE DISPOSAL

- C.14.1 Cognisance should be taken of Chapter 11 of "Guidelines for Human Settlement Planning and Design" and "Minimum Requirements for Waste Disposal by Landfill" produced by the Department of Water Affairs and Forestry, in the design of a solid waste disposal system.
- C.14.2 Preferably solid waste should be disposed of using the existing local authority infrastructure. The cost aspect of this must be addressed in the design report.
- C.14.3 All solid waste disposal systems must comply with the appropriate current South African legislation i.e. Environment Conservation Act 73 of 1989, National Water Act 36 of 1998 and the Health Act 63 of 1977. The Department of Water Affairs and Forestry also published reports (second edition 1998) with regards to "Minimum Requirements for Waste Disposal by Landfill" and "Water Quality Monitoring at Waste Management Facilities", which is of major importance in solid waste management.
- C.14.4 For new landfill sites the Civil Engineer must obtain the necessary permits as described in the above documents. If necessary, the Civil Engineer must facilitate the appointment of a specialist consultant in this regard. Three (3) quotations for these services must be obtained and submitted to the Departmental Project Manager for approval. The processes to be followed, costs involved both for the permits and the Consultants time, must be addressed in the design report.

C.15 HAZARDOUS WASTE DISPOSAL

- C.15.1 When dealing with hazardous and toxic waste, the current South African legislation and in particular the stipulations contained in the Occupational Health and Safety Act 85 of 1993 with particular reference to hazardous chemical substances, offences and penalties, have to be adhered to. The Department of Water Affairs and Forestry also published a report (Second Edition 1998) with regards to the "Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste", which is of major importance when dealing with hazardous waste.
- C.15.2 If analyses confirm that a waste does contain hazardous substances (as listed in SABS 0228 / SANS 10228), the producer (originator / generator) must be registered as a Hazardous Waste Generator and determine the relevant Minimum Requirements. These could include pre-treatment, destruction, venting, or disposal according to the specific Act.
- C.15.3 Infectious waste includes medical waste, human tissue, waste from biological research facilities and water analysis laboratories. Infectious waste can be disposed of by incineration, pre-treatment by sterilization, direct irradiation or micro-waving before landfilling.
- C.15.4 The proper handling and disposal procedure of toxic and hazardous waste is complex. The Civil Engineer must appoint a specialist consultant, with approval of the Department, if necessary. See Section A.13 in this regard.

SECTION D: THE CONSTRUCTION STAGE

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D. THE CONSTRUCTION STAGE

D.1 ADMINISTRATION AND CONSTRUCTION MONITORING OF A SEPARATE CIVIL CONTRACT

D.1.1 Functions of the Consulting Engineer

The Consultant Engineer is responsible for the interpretation to the Contractor of the intent of the design and documentation and for the monitoring of quality control of workmanship and materials. The Consulting Engineer's attention is drawn to his obligations in terms of the most recent Regulations of the Occupational Health and Safety Act (Act 85 of 1993). The Departmental Project Manager of the Department is responsible for the overall administration and financial control on behalf of the Department and the Consultant Engineer shall assist him in this regard. All correspondence relating to contract administration must therefore be addressed to the Departmental Project Manager.

D.1.2 Functions in terms of the Agreement

The Consultant Engineer's functions in respect of the administration of the contract and construction monitoring of the works are laid down in principle in part X1 of the Letter of Appointment.

Certain of these functions are amplified in the following clauses.

D.1.3 Contractual Claims

Attention is drawn to the fact that certain functions are reserved for the Director General, such functions comprising:

- Approval of Variation Orders
- Extension of the Contract Period
- Release of the Guarantee
- Application of the Penalty (Delay Report), and
- Termination of the Contract
- Signing of the final account

However, it is the Consultant's duty to submit reports and recommendations in respect of these matters to the Departmental Project Manager for comment and forwarding to the Office of the Director General.

D.1.4 Handing Over of Site

The first function at the contract stage is the handing over of the site to the Contractor. It shall be the prerogative of the Departmental Project Manager, on behalf of the Director General, to conduct the handing over of the site meeting and he will be responsible for taking and issuing the minutes of this meeting only. The Departmental Project Manager will advise the Consultant of the time and date of the meeting and the Consultants attendance will be required. Thereafter the Consultant will be responsible for conducting site meetings and issuing minutes. At the handing over of the construction site the Departmental Project Manager will issue 3 sets of the contract documents and tender drawings to the Contractor (see section D.1.6).

D.1.5 Construction Programme

The Contractor must, immediately upon the site being handed over to him or as detailed in the contract documents, hand over to the Consultant a detailed construction- and cash flow programme taking into account all trades and aspects of the works and allowing for any procedural / contractual requirements. When the Consultant is satisfied that the programme is adequate a copy must be submitted to the Departmental Project Manager for his record.

D.1.6 Issue of Drawings

Apart from the tender drawings issued to the Contractor by the Departmental Project Manager at site handover the Consultant will be responsible for the issue of all working drawings to the Contractor in terms of Clause 16 of GCC '90. All drawings must be issued under cover of a site instruction and the Resident Engineer must maintain an updated drawing schedule on site at all times indicating date of issue and revision number of drawings issued.

D.1.7 Construction Monitoring

In addition to the standard requirements as set out in the Letter of Appointment the Consultant shall:

- D.1.7.1 Ensure that all site instructions are entered in the site instruction book provided by the Departmental Project Manager and furnish the Departmental Project Manager with copies of all site instructions. The Consultant and the Contractor must sign all site instructions. Site instructions may only be issued by the Consultant. Facts and circumstances referred to in Sub-clauses 51(3)(a) 51(3)(f) of GCC '90 shall also be recorded in the official site instruction book.
- D.1.7.2 Furnish the Departmental Project Manager with draft variation orders on the Department's prescribed VO form for approval by the Department (see Section E).
- D.1.7.3 Submit payment certificates prepared in accordance with Annexure D1 to the Departmental Project Manager before the 15th of each month.
- D.1.7.4 Submit the draft final account prepared in accordance with Annexure D2 (PRM044/civ) directly to the Departmental Project Manager, certified in accordance with Annexure D3 (PRM045/civ), for approval. The Departmental Project Manager will arrange for signature of the Final Account by the Contractor.
- D.1.7.5 Arrange for the handing over of the project, i.e. practical completion, completion and final approval, in accordance with Clause D.1.11.
- D.1.7.6 Ensure that a site diary is available on site and is kept up to date. The site diary shall have records of rain, which shall include the date, time, duration, and amount, as well as all other details that may be required when lodging a claim. It is encouraged that dated photographs of the site be kept. Both the Consultant and the Contractor may have separate site diaries.
- D.1.8 Decisions and Instructions on Site
 - D.1.8.1 Decisions on matters arising on site

The Consultant will deal with all minor matters arising on site. If any major points arise on site, which have significant financial and / or time implications or require decisions in principal, the Consultant

must apply in writing to the Departmental Project Manager for a ruling.

D.1.8.2 Requests made by Client / User Departments

Requests from representatives of a Client / User Department for changes to the design must be made officially in writing by the Head Office of that Department to the Director General and the Consultant may not implement any such changes without the written approval of the Departmental Project Manager.

- D.1.9 Functions of the Consultant which concern the Departmental Project Manager
 - D.1.9.1 Financial Control

The Departmental Project Manager is the authorised local representative of the Director General and as such holds the funds for all contracts and is therefore responsible for overall administration and financial control. In order to execute financial control over the project and preclude unauthorised over expenditure it is imperative that a revised completion estimate be submitted to the Departmental Project Manager monthly together with the minutes of site meetings on Annexure D4. If unauthorised over expenditure.

D.1.9.2 Site Meetings

The Departmental Project Manager must be invited to attend all formal site meetings on behalf of the Department.

D.1.9.3 Suggestions

The Consultant must give due consideration to any suggestions in respect of the execution of the Contract, which may be made by the Departmental Project Manager. In the event that the Consultant does not agree with such suggestion, the Consultant must request that the matter be referred to the Departmental Project Manager's superior for a decision.

D.1.9.4 Payment Certificates

The Departmental Project Manager will arrange for the payment of all certificates. Payment certificates must be submitted to the Departmental Project Manager on a date as agreed to by the Departmental Project Manager.

In the event that a certificate cannot be submitted before the 15th of the month the Departmental Project Manager may, by special arrangement, reserve the necessary funds if he is informed telephonically of the amount of the certificate and the certificate is submitted before the 20th of the month.

D.1.9.5 Delay Report

On completion of the Contract the Departmental Project Manager must be furnished with written recommendations regarding the imposition of penalties on Annexure D6 (PRM043/1-5civ Contract Completion Report).

- D.1.10 Formal Site Meetings
 - D.1.10.1 Arrangement of and Attendance at Site Meetings

The Consultant will convene site meetings and act as Chairman. Those represented at site meetings beside the Consultant shall be other professional consultants if applicable, the Contractor, the Departmental Project Manager as he may decide, as well as the User Department's Representative together with any others concerned with the work at the discretion of the Chair or the Department. Due notice must be given to all who will attend.

D.1.10.2 Frequency of Site Meetings

Formal site meetings must be held <u>at least once a month</u>. Site meeting minutes should be distributed not later than one week after the meeting.

D.1.10.3 Format of Minutes

Minutes must be prepared in accordance with Annexure D7.

- D.1.10.3.1 Every clause included in Annexure D7, with its relevant sub-heading, must be included in all minutes. Where matters have not been fully dealt with the relevant clauses must contain sufficient information to obviate the necessity of referring back to previous minutes.
- D.1.10.3.2 Where any item in the minutes calls for further action to be taken, e.g. queries to be dealt with, information to be furnished or work to be executed, the name of the person who is to deal with the matter must be recorded alongside the item concerned in an action column in the right hand margin of the minutes, together with the date of completing such action.
- D.1.10.3.3 A graph of actual and predicted cash flow must be attached to the site minutes using the "Californian Expenditure Curve". (See Annexure D8).
- D.1.10.4 Information Required to Maintain Progress

At each site meeting the Engineer must ascertain from the Contractor whether he requires any drawings, information or decisions to ensure the maintenance of progress of the Contract and to obviate delays. The Contractor's reply and, where appropriate, the names of persons who are to take the requisite action must be recorded in the minutes.

D.1.10.5 Late Completion

If it seems likely that the Contractor is not going to complete the Contract on time he must be warned in terms of the relevant clauses of the Contract Document, and it must be recorded that penalties will be applied should he complete late.

D.1.10.6 Distribution of Minutes

A copy of the minutes must be forwarded to the Departmental Project Manager under cover of Annexure D4. The requirements of the Departmental Project Manager and the User Department must be determined at the first site meeting.

- D.1.11 Handing Over Procedures
- D.1.11.1 Certificate of Practical Completion (Clause 54.(1) of GCC '90)

As soon as the Works have reached a stage that allows their use for their intended purpose without danger or undue inconvenience, the Consultant must arrange with the Contractor and the Departmental Project Manager for a joint inspection of the Works. The Consultant must issue a list to the Contractor, setting out the work to be completed to justify the issue of a Certificate of Practical Completion. As soon as the work on this list is completed a Certificate of Practical Completion must be issued. (Refer to form PRM041/1civ)

D.1.11.2 Certificate of Completion (Clause 54. (4) of GCC'90)

After the contractor has received the Certificate of Practical Completion a further list of work to be completed within a specified time frame, to justify the issue of a Certificate of Completion must be handed to the Contractor. The Consultant must arrange with the Contractor and the Departmental Project Manager for a joint inspection of the Works. If at the inspection it is concluded that the Works are essentially complete the Consultant shall advise the Departmental Project Manager in writing, including a list of defects and of work still to be completed in the defects liability period. The Certificate of Completion must then be issued. (Refer to form PRM041/2civ). The Departmental Project Manager will advise the Contractor and the Department's Head Office accordingly and arrange for the release of Guarantees. The Consultant shall immediately proceed with the preparation of the draft final account accordance with Clause D.1.7.4 and submit written in recommendations on delays in accordance with Clause D.1.9.5 of this Manual.

The submission of appropriation drawings and maintenance / operating manuals to the Departmental Project Manager must be facilitated by the Consultant at this stage. Refer to Clauses 7.6 and 7.7 of Annexure A2, Clause 16(12) of the Special Conditions of Contract, and Section 8(15) of Board Notice 18 of 2003 or Regulation 2.1.1.4.14 of R1113, whichever is applicable to the specific appointment (see the specific Letter of Appointment in this regard). Three (3) copies of any maintenance/operating manual and a transparent set of appropriation drawings are required.

The Consultant must submit as-Built drawings, as per Section 7 of Annexure A2.

D.1.11.3 Final Approval Certificate (Clause 55.(1) of GCC '90)

The Consultant and the Departmental Project Manager shall take final delivery after a joint inspection at the end of the defects liability period, subject to all defects having been rectified. The Consultant must issue the Final Approval Certificate (refer to form PRM046/civ), and confirm this in writing to the Departmental Project Manager, who will inform the Contractor and the Department's Head Office accordingly and arrange for the release of the final retention.

D.2 ADMINISTRATION AND CONSTRUCTION MONITORING OF CONTRACTS OTHER THAN SEPARATE CIVIL CONTRACTS

D.2.1 General

Where the civil work is executed as a direct or nominated sub-contract to a building contract the Civil Engineer will assist the other members of the professional team in the above duties.

D.2.2 Payment Certificates

- D.2.2.1 Where the civil work is executed as a nominated sub-contract to a building contract the Civil Engineer will certify the certificates of the sub-contractor but these will be further processed by the Quantity Surveyor appointed for the main contract.
- D.2.2.2 In the case of comprehensive building contract(s) all measurements will be done by the Quantity Surveyor. The Civil Engineer will only be responsible for certifying the quality of the work, as and when appropriate / required.

D.3 PROVISION OF SITE STAFF

D.3.1 General

- D.3.1.1 Should the Department require the Consulting Firm to provide site staff for construction monitoring, the Consulting Firm shall appoint to the satisfaction of the Department such competent site staff as may be necessary for the efficient checking of setting out, verification of the construction to the design, testing of the construction for conformance with specifications, day-to-day inspection of the construction of the Works, measuring up of the Works on site, and agreeing to the quantities with the Contractor's representatives.
- D.3.1.2 The staff thus appointed can either be full-time or part-time. The category of staff needed by the Department must be clarified with the Departmental Project Manager.
- D.3.1.3 The Consultant shall submit a recommendation for the appointment of site staff on forms PRM033/1-4 in Annexure D5. In completing the application refer to the relevant Clauses of the letter of appointment.
- D.3.1.4 In projects extending over the salary increment date of site staff, the Consulting Engineer shall re-submit the complete application of such a member of staff for approval by the Department, i.e. form PPM033/1-4.
- D.3.1.5 The Engineer's Representative, and his appointment to undertake the construction monitoring, shall be approved by the Department. His appointment will on no account relieve the Engineer of any of the obligations entrusted to him.
- D.3.1.6 The Consulting Firm shall submit applications for approval by the Department of the personnel structure and details of the staff on the prescribed forms together with a detailed breakdown of their remuneration packages, which are to be certified by an external auditor (forms PRM 033/1-4).
- D.3.2 Consulting Firm's Site Staff

The actual costs of site staff provided by the Consulting Firm will be reimbursable by the Department as per Section X2 of the Letter of Appointment.

plus

All other direct costs and expenses as mutually agreed between the Consulting Firm and the Department will be reimbursable by the Department as per Section C of the Letter of Appointment.

D.3.3 Reimbursement of Technical Support Services during the Construction Phase

The Consulting Firm shall, if and when required by the Department to do so, provide the necessary equipment for a suitable site laboratory and survey office to provide acceptance control as mutually agreed beforehand between the Department and the Consultant. The costs of providing such services shall be agreed between the Departmental Project Manager and the Consultant.

For the use of specialist services, three (3) quotations for these services must be obtained and submitted to the Departmental Project Manager for approval.

The Contractor shall provide the laboratory buildings, survey office and the fixed facilities needed therewith, which are necessary for the construction monitoring of the Works, for the use of the Consultant at the cost of the Department. The type and extent of the buildings and facilities provided shall depend on the nature of the particular contract and agreed beforehand between the Departmental Project Manager and the Consultant.

Geotechnical and drilling investigation costs are also reimbursable as specified above. The engineering interpretation shall however be deemed to be inclusive in the civil engineering fees, unless specifically otherwise approved by the Department.

SECTION E: VARIATIONS

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E. VARIATIONS

E.1 GENERAL

E.1.1 Site Instructions

All variations to the Contract must be made in writing on the Site Instructions Form (Form PW 320, Annexure E3), and in the cases described below confirmed by variation orders.

E.1.2 Variation Orders

Only extensions of the contract completion date, provisional and prime cost sums and additional work that cannot be done at contract rates must be covered by a variation order. Whenever possible acceptable rates are to be negotiated with the Contractor and approved by the Department before the work is put in hand. A separate section shall be provided for measurement of this work.

N.B.: 1. A Variation Order is not required for additional work, resulting from a variation in quantities, carried out at contract rates provided that any increase in the Contract Sum must be approved by the Departmental Project Manager before the work is put in hand.

2. Variation orders must be obtained from the Department for all work that is outside the scope of Works as defined in the Contract, even if contract rates can be used for this work.

3. A Variation Order must be applied for and approved by the Department for all Extension of Time claims related to additional work or variation orders outside the Scope of Work as defined in the contract.

E.1.3 Day Works

In general work must not be done as day works unless this is unavoidable and can be regarded as an emergency. Work paid against day works must be accompanied by day work sheets certified by both the Engineer's Representative and the Project Manager. Work carried out on a day work basis must be covered by a variation order including the estimated cost of the work. See Annexure E1 (form PRM038 – VO Motivation) and Annexure E2 (form PRM037 - VO).

E.1.4 Contract Price Adjustment on Variation Orders

When new rates are negotiated these must be based on scheduled rates and/or the prices and wages ruling at the time of tender. If such prices are unobtainable, rates must be based on the time of negotiation and deescalated to the time of tender. Such adjusted rates will be accepted as rates that would have ruled at the time of tender. Negotiated rates must be certified by the Consulting Engineer as being fair and reasonable and recommended for acceptance.

E.1.5 Principal Agent / Lead Consultant

In contracts where the Civil Engineering Consultant is not the Principal Agent / Lead Consultant, the procedure laid down by the Principal Agent / Lead Consultant must be followed.

E.2 RESPONSIBILITY FOR ISSUING SITE INSTRUCTIONS / VARIATION ORDERS

E.2.1 Separate Civil Contracts

Refer to Clauses D.1.7.1 and D.1.7.2.

E.2.2 Nominated Sub-contract to Building Contract

Where civil work is carried out as a nominated sub-contract to the building contract the Civil Engineering Consultant shall submit a draft variation order (where necessary) for any changes to the civil work to the Principal Agent / Lead Consultant for further processing.

E.2.3 Civil Work Included in a Building Contract

In this case the Principal Agent / Lead Consultant will be responsible for the preparation of all variation orders. The Civil Engineering Consultant shall however assist him where civil engineering matters are concerned.

E.3 FINANCIAL CONTROL

Since the Department is required to plan and execute its construction programme within fixed yearly allocation of funds, strict control over expenditure in general and specifically on variations has to be exercised to ensure that: -

- a) the annual agreed cash flows allocated are not exceeded;
- b) the Department is on no account placed in the position of having to authorise *ex post facto* applications for additional funds for the completion of a contract;

Consequently changes in the approved requirements, no matter how minor, which may be requested at any stage by officials of the Client / User Department or other members of the design team may only be implemented if they are approved by the Project Manager.

NOTE: If the Civil Engineering Consultant makes unauthorised alterations on the instructions of other consultants or a Client / User Department or cause other consultants to make changes resulting in claims for additional or fruitless expenses, he will be held responsible for the payment of such claims.

E.4 FORMAT

E.4.1 Standard Form

Draft variation orders must be submitted to the Departmental Project Manager or where civil work is included in the building contract, to the Principal Agent / Lead Consultant on the standard departmental variation order forms available from the Department. See Annexure E1 (form PRM038) and Annexure E2 (form PRM037).

E.4.2 Motivation

Each variation order must be prepared timeously and be accompanied by a full motivation for approval by the Department. Wherever practical such motivation must be submitted on a variation order form bearing the same number as the variation order.

E.4.3 Essential Information

- E.4.3.1 Where applicable the following information must be contained in each variation order :
 - Negotiated rates with provisional quantities and the estimated total extra cost or saving.
 - An endorsement to the effect that rates have been de-escalated to the month prior to the closing of tenders.
 - Variation orders must be itemised if possible.
- E.4.3.2 Except in the case of an extension of time, motivations accompanying variation orders must contain the following:
 - A statement that rates are fair and reasonable.
 - A statement as to whether funds are available to meet the cost of the VO or not.
 - A statement as to whether fruitless expenditure is involved.

E.5 VARIATION ORDERS FOR EXTENSION OF TIME

- E.5.1 No Contract Price Adjustment may be paid for an extended contract period, other than that provided for in Clause 3 of the Contract Price Adjustment Schedule in the GCC '90, until the Variation Order covering the extension of time has been approved by the Department .
- E.5.2 Variation order for an extension of time as a result of abnormal rainfall in terms of Clause 50(5) of the Special Conditions of Contract (where applicable) must only be submitted after practical completion has been certified, at which stage the algebraic extension of time can be calculated.
- E.5.3 An extension of time will only be considered where the Contractor has been delayed in terms of the Contract and has submitted a claim in writing in terms of the General Conditions of Contract (e.g. Clause 51 of GCC'90). Delays in the supply of materials or non-performance of sub-contractors will not be considered reason for granting an extension of time. However, such delays may be taken into consideration when the Department considers the imposition of penalties for late completion.
 - N.B. The Consultant must process variation orders expeditiously and not allow them to accumulate for attention towards the end or at the end of the Contract.

SECTION F: REFERENCE DOCUMENTS

Clause	Page	
F.1	GENERAL	52
F.2	REFERENCES TO DESIGN GUIDELINES AND OTHER INFORMATION DOCUMENTS TO BE USED FOR WORK FOR THE NATIONAL DEPARTMENT	OF
	PUBLIC WURKS	
F.3	STANDARD DRAWINGS	53

F. <u>REFERENCE DOCUMENTS</u>

F.1 GENERAL

In Sections A to E of this Manual reference is made to various other documents to be consulted in the use of this Manual of Procedure for Consulting Civil Engineers. These documents are revised from time to time and the latest available version is to be used.

On the tables below a list of reference documents and standard drawings is provided. This table will regularly be updated and published on the Departmental website:

http://www.publicworks.gov.za.

(Date of current revision: 2004-02-27)

Updates of these tables are to be bound into this Manual.

F.2 REFERENCES TO DESIGN GUIDELINES AND OTHER INFORMATION DOCUMENTS TO BE USED FOR WORK FOR THE NATIONAL DEPARTMENT OF PUBLIC WORKS

NAME / DESCRIPTION	PUBLISHED BY	NO.	DATE
Appropriate Development of Infrastructure on Dolomite: Guidelines for Consultants	Department of Public Works	PW 344	March 2004
Guidelines for the Design of Civil Services for New Generation Prisons	Department of Public Works	PW 342	March 2004
Standard Specification for Domestic and Fire Water Storage and Fire Water Supply for Public Buildings	Department of Public Works	PW 345	April 2004
Standard Technical Specification for a Pump Installation for Automatic Sprinkler Fire Extinguishing System	Department of Public Works	PW 338	
Civil Engineering Manual	Department of Public Works	PW 347	October 2004
Schematic Diagram for a Fire Pump Installation	Department of Public Works	PW 340	
Working Guideline for Project Managers	Department of Public Works	Manual	June 2003
Conditions of Contract	Department of Public Works	PW 677	
Preliminaries etc. forming part of Bills of Quantities	Department of Public Works	PW 772	
Specification of Materials and Methods to be Used	Department of Public Works	PW 371	
General Conditions of Contract for use in connection with Works of Civil Engineering Construction	SAICE	GCC'90	1990
Guidelines for Human settlement Planning and Design	CSIR	BOU/E2001	2000
National Water Act 1998, and Regulations	Government of the Republic of South Africa	Act 36 of 1998	1998
Water Services Act 1997, and Regulations	Government of the Republic of South Africa	Act 108 of 1997	1997
Environment Conservation Act 1989, and Regulations	Government of the Republic of South Africa	Act 73 of 1989	1989
National Environmental Management Act 1998, and Regulations	Government of the Republic of South Africa	Act 107 of 1998	1998
Occupational Health and Safety Act 1993, and Regulations	Government of the Republic of South Africa	Act 85 of 1993	1993

NAME / DESCRIPTION	PUBLISHED BY	NO.	DATE
National Building Regulations and Building Standards Act 1996, and Regulations	Government of the Republic of South Africa	Act 29 of 1996	1995
Minerals Act 1990, and Regulations	Government of the Republic of South Africa	Act 50 of 1990	1990
Local Government Act 1998 (Gauteng)	Government of the Republic of South Africa	Act 10 of 1998	1998
Fire Brigade Services Act 2000	Government of the Republic of South Africa	Act 14 of 2000	2000
Post Office Act 1998	Government of the Republic of South Africa	Act 124 of 1998	1998
Electricity Act 1996	Government of the Republic of South Africa	Act 88 of 1996	1996
Water Supply and Drainage for Buildings, Part 1 and 2	Standards South Africa, a Division of SA Bureau of Standards	SABS 0252 Parts 1 & 2 SANS 10252-1 & -2	1994
Community Protection against Fire	Standards South Africa, a Division of SA Bureau of Standards	SABS 090 SANS 10090	1972
Development, maintenance and management of groundwater resources	Standards South Africa, a Division of SA Bureau of Standards	SABS 0299 SANS 10299 Parts 0 – 9	2003
Concrete non-pressure pipes	Standards South Africa, a Division of SA Bureau of Standards	SABS 677 SANS 677	1986
Unplasticized poly(vinyl chloride) (PVC-U) sewer and drain pipes and pipe fittings	Standards South Africa, a Division of SA Bureau of Standards	SABS 791 SANS 791	2002
The waterproofing of buildings (including damp-proofing and vapour barrier installation)	Standards South Africa, a Division of SA Bureau of Standards	SABS 021 SANS 10021	2002
The installation of glazing in buildings	Standards South Africa, a Division of SA Bureau of Standards	SABS 0137 SANS 10137	2002
Application of National Building Regulations	Standards South Africa, a Division of SA Bureau of Standards	SABS 0400 SANS 10400	1990
Quality management systems - Requirements	Standards South Africa, a Division of SA Bureau of Standards	SABS ISO 9001 SANS 9001	2000
Standard Specifications for Civil Engineering Construction (Series)	Standards South Africa, a Division of SA Bureau of Standards	SABS 1200 SANS 1200	1981 - 1990
Code of practice for use with standardized specifications for civil engineering construction and contract documents	Standards South Africa, a Division of S A Bureau of Standards	SABS 0120 SANS 10120	1981 - 1996
Guidelines for road construction materials	Department of Transport	TRH 14	1996
Subsurface Drainage for Roads	Department of Transport	TRH 15	1995
Minimum Requirements for Waste Disposal by Landfill	Department of Water Affairs and Forestry		1998
Water Quality Monitoring at Waste Management Facilities	Department of Water Affairs and Forestry		1998
Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste	Department of Water Affairs and Forestry		1998

F.3 STANDARD DRAWINGS

DRAWING NO.	DESCRIPTION
121	PUMPHOUSE (WOOD AND IRON)
185	PIT PRIVY
189	OTWAY PIT

DRAWING NO.	DESCRIPTION			
199	SECURITY FENCES			
202	REINFORCED BRICK RESERVOIR			
215	AERATION TOWER AND TANK			
221	WATER LEVEL INDICATOR			
225	WATER LEVEL			
226	SAND WASH TROUGH			
230	KERB CATCH PIT			
231	GAS CABINET			
233	MINIMUM WATER PURIFICATION			
234	CONSERVANCY TANK (LARGE)			
235	PUMPHOUSE			
236	SUMP AND PUMPHOUSE			
237	PUMPHOUSE BOREHOLE			
238	CATCHPIT AND CAST IRON GRATING			
2391	SEPTIC TANK FOR RANGE 1 – 150			
239/A	SEPTIC TANK FOR DWELLING			
241	SEPTIC TANK FOR RANGE 150 – 1000			
242/1/2	TYPE SEPTIC TANK FOR 1000 – 3000 PERSONS			
242/3	REINFORCEMENT FOR SEPTIC TANK			
245	PUMPHOUSE AND FUEL STORE			
246	250 000 GAL REINFORCED BRICK RESERVOIR			
248	PUMPHOUSE FOR SEWAGE EJECTOR			
249	SECURITY MEASURES TO WATER CISTERNS			
250	SQUA PRIVVIES			
251	CONSERVANCY TANK			
252	MORTUARY			
253	WALL BOX FOR CELL CISTERNS			
254	DRYING PLATFORM FOR SEWAGE SCREENINGS WITH FLY PROOF OVER			

DRAWING NO.	DESCRIPTION			
255/A	TYPE A SWIMMING BATH CHANGE ROOM (25x12,5 m)			
255/B	TYPE A SWIMMING BATH FILTER ROOM			
255/1	PLAN (GENERAL AND PIPE LAYOUT) & DETAILS			
255/2	CONCRETE CONSTRUCTIONS			
255/3	REINFORCEMENT			
255/4	BENDING SCHEDULE AND SPECIFICATIONS			
256	2 500 GAL. UNDERGROUND RC TANK			
257	25x12,5 m GUNITE SWIMMING BATH			
260	SLUDGE DISTRIBUTING DEVICE			
261	TYPE PUMPHOUSE FOR EFFLUENT			
262	STEEL STAND FOR 80 kl. TANK			
263	PUMPHOUSE AND SUMP			
264	ROAD PIPE CULVERT			
265/1	1 000 kl. CONCRETE RESERVOIR			
/2	DETAILS OF RESERVOIR			
266	FILTRATION PLANT FILTER DRUM			
267/A	SWIMMING BATH TYPE C – CHANGE ROOMS (15x10 ml.)			
/B	SWIMMING BATH TYPE C – FILTER ROOM			
267/1	TYPE SWIMMING BATH – PLAN, LAYOUT AND DETAILS			
/2	TYPE SEWAGE PUMP STATION – REINFORCEMENT			
267/3	BENDING SCHEDULE AND SPECIFICATION			
268/A	TYPE SEWAGE PUMP STATION – PLAN, SECTION, etc.			
/B	TYPE SEWAGE PUMP STATION – REINFORCEMENT			
/C	TYPE SEWAGE PUMP STATION - REINFORCEMENT			
270/A-H	BOX CULVERTS			
272	MATURATION PONDS			
273	GRIDGATE			
274	TYPE CW NAME BOARD			

DRAWING NO.	DESCRIPTION			
275	SUMP FOR CABLE VAULT			
276	SOCCER FIELD FOR HIGH SCHOOLS			
277	TYPE TENNIS COURTS			
278	TYPE BASKETBALL COURT			
279	TYPE HOCKEY FIELD			
280	SQUASH COURTS			
281	TYPE RUGBY FIELD			
282	TYPE CRICKET COURT			
283	TYPE BADMINTON COURT			
284	TYPE 400 m ATHLETIC TRACK			
285	TYPE JUKSEI PITCH			
286	TYPE JAVELINE – THROWING TRACK			
287	TYPE HAMMER & DISCUS CAGE WITH RING FOR SHOTPUT			
288	HIGH AND LONG JUMP TRACK			
290	THRUST BLOCK DETAILS			
291	SUBMERSIBLE PUMP SUMP			
292	SEPTIC CONSERVANCY TANK COMBINATION			
293	FLOATING DRAW OFF CHEMICAL DOSER			
294	SEEPAGE TRENCH			
295	DE – AERATION CHAMBER			
296	TYPE D SWIMMING BATH			
297	SEDIMENTION TANK			
298	5kl. WATER TANK AND PUMP CHAMBER			
299	SOLAR HEATING			
300	5kl. WATER TANK AND PUMP CHAMBER			
301	TYPICAL LAYOUT OF PIT TOILETS			
301(cv)	DETAIL DRAWING OF THRUST BLOCKS FOR FIRE HYDRANT AND VALVE CHAMBERS			
302(cv)	FIRE HYDRANT			

DRAWING NO.	DESCRIPTION			
303(cv)	DETAILS OF PREFABRICATED STEEL MANHOLE COVERS			
303	EVAPORATION TRANSPIRATION			
303E	FRENCH DRAIN			
304(cv)	DETAILS OF SECURITY FENCES AND WALLS			
305(cv)	DETAILS OF DEWATERING AND SUBMERSIBLE PUMPS			
305/A	DOMITORY HOTWATER INSTALLATION			
305	DOMITORY ABLUTION BLOCKS			
306	HAY INTERSEPTING TRAP FOR STABLES etc.			
307	CATCHPIT,KERBS AND MANHOLE DETAILS			
310	TYPICAL LAYOUT OF PIT TOILET			
311	TYPE GUARD POST			

ANNEXURES FOR SECTIONS A – E

ANNEXURES FOR SECTION A

ANNEXURE A1

PRM014/6

DEPARTMENT OF PUBLIC WORKS

MONTHLY PROGESS REPORT ON CIVIL ENGINEERING DESIGN

For attention:

		WCS NO: REFERENCE NO:
1.	Mr/Ms	Departmental Project Manager
2.	Mr/Ms	Principal Agent / Lead Consultant
Repo	ort on progress for the month and v	vear of:

Report on progress for the month and year of:

PROJECT: _____

Consulting Engineer:

1. PROGRESS	PRELIMINARY REPORT	DOCUMENTATION		
	Authorised starting date	Programmed completion date		
Roads				
Stormwater				
Water Reticulation				
Sewerage				
Other				
Service as whole				
2. TARGET DATES			Yes / No	Yes / No
Can target dates be met				
If no, give dates	that car	be met		
3. ESTIMATE THIS MONTH				
ESTIMATE LAST MONTH				

REMARKS: (give reasons for revised estimate or target dates)

DATE:

ANNEXURE A2

INSTRUCTIONS FOR THE PREPARATION, NUMBERING AND ISSUE OF DRAWINGS FOR CIVIL ENGINEERING SERVICES

1. INTRODUCTION

The following are the requirements in respect of drawings, which are to be strictly adhered to.

2. DRAWING TITLES

- 2.1 Drawing titles are to be in accordance with the layout and detail shown in the example at the end of this Annexure. The Departmental Project Manager shall approve the wording of the title.
- 2.2 The column above the title is to be used for general notes from the top down and to indicate revisions to the previously issued drawings from the bottom upwards.
- 2.3 All titles and details of the drawings are to be in English.

3. SIZE AND LAYOUT OF DRAWINGS

- 3.1 Only metric drawing sizes may be used.
- 3.2 Preference is given to the A1 size of drawing.
- 3.3 Only one size of drawing is to be used throughout the service unless otherwise approved by the Departmental Project Manager.
- 3.4 Where any drawing is too large for a single sheet and separate sheets are prepared for survey, report, draft or working drawing purposes, e.g. site plans, a key to the various plans must be prepared to a reduced size showing how the various sheets should be jointed together in order to obtain a composite plan of the entire site (or such other detail as is being depicted). The key should be included on all drawings forming part of such composite plan.

3.5 The following scales shall be used in the preparation of drawings. The scales used shall be chosen to ensure clarity of the drawing details.

ANNEXURE A2

Locality /Key Plans	1:5 000, 1:50 000				
Site plans	1:1 000, 1:500				
Longitudinal sections(road)	1:1 000 horizontal				
	1:100 vertical				
Detail drawings	1:200, 1:100, 1:75				
	1:50, 1:25				
	1:20, 1:10				
	1:5, 1:2, 1:1				

4. SERVICE NUMBER

A "C" number (see Annexure A to your letter of appointment) is allocated to each service and no other number should be used when referring to drawings or documents connected to this service. An example of a service number would be say C3365. This number should be used to number the drawings, specification and/or the Schedule of Quantities. A specific drawing number would be say C3365/25.

5. NUMBERING OF DRAWINGS

- 5.1 A list of drawings should be provided on the first plan which should be numbered with the suffix /0.
- 5.2 The general site plan must be numbered using the suffix /1.
- 5.3 Drawings must be grouped according to activities with gaps between activities to allow for supplementary drawings. Consecutive numbering must be employed for each activity, e.g.:

C3365/20 - /24 sewerage C3365/50 - /57 water supply C3365/70 - /85 roads

5.4 Where a comprehensive site survey is undertaken the survey drawings must be numbered consecutively using an alphabetical suffix starting with /A, e.g. C3365/A, C3365/B etc. 5.5 The use of letters of the alphabet, or of sub-numbers, for the numbering of drawings must be avoided, except in the case of a comprehensive survey as stated in 5.4 above.

ANNEXURE A2

5.6 Preliminary, Draft and Working Drawings

In order to distinguish between preliminary report drawings, draft working drawings and approved working drawings the following numbering system must be adopted.

- 5.6.1 Preliminary report drawings are to be indicated by the addition of the suffix (PREL 1), e.g. C3365/12 (PREL 1). Should it be necessary to submit revised preliminary report drawings an appropriate note must be made in the NOTES column and the suffix altered to the following sequential number, e.g. C3365/12 (PREL 2).
- 5.6.2 Draft working drawings which are submitted for approval are to be indicated by the addition of the suffix (DRAFT 1), e.g. C3365/12 (DRAFT 1). Revisions to these drawings must be indicated in the NOTES column and the suffix altered to the next sequential number, e.g. C3365/12 (DRAFT 2).
- 5.6.3 After approval of the draft working drawings the suffix must be removed from the drawing number and the revision notes removed from the NOTES column.

6. ELECTRONIC FORMAT

- 6.1 All plans and report books that are submitted, must be accompanied by the electronic versions of the information preferably on CD, otherwise on 90mm micro discs.
- 6.2 A sub directory must be created for the project based on the plan series number Example: d:\WCS3365\ with sub directories named \plans, \report, \other, underneath.
- 6.3 A word file named Readme.doc / .txt (stored under \other) to be created, containing explanatory notes on the layering, grey scale, naming and other conventions used, to enable a third party to easily amend or print / plot drawings / report book(s).

6.4 Drawing data is to be submitted in CAD vector format only – not to be scanned and be submitted as images. See also section 7.7 for "as built" drawings.

ANNEXURE A2

- 6.5 The following CAD formats are preferable:
 - 6.5.1 AutoCad (.dwg)
 - 6.5.2 Caddie for Windows (.drw)
 - 6.5.3 Allycad (.drg)
 - 6.5.4 Microstation
 - 6.5.5 Ultimate CAD
 - 6.5.6 Data exchange (.dxf) format will be accepted only if the Designer does not have the means to submit the plans in the above formats.
- 6.6 Drawing data must be stored in the \plans sub directory.

6.7 F	Plotter	pens	with	corres	ponding	line	widths	should	be	as	follows
-------	---------	------	------	--------	---------	------	--------	--------	----	----	---------

Plotter pen	Line width (mm)
1	0,30
2	0,35
3	0,50
4	0,70
5	0,15
6	1,00
7	0,25
8	0,10
9	no plot

- 6.8 Electronic Drawings should have meaningful file names related to the drawing number.
- 6.9 If .tif or other images were used as background (i.e. survey plans, photo mosaics, etc.), the images must be given meaningful names, relating them to the drawing in which they are used.
- 6.10 The use of grey scale CAD entities (e.g. lines, etc.) should be avoided distinction between lines, etc. should be done using different pen widths. Images used as survey plan background should be printed in grey scale (only slightly lighter than the new CAD data).

6.11 All drawings shall be compiled in layers. Each layer shall consist of one category of drawing information. The colour code of each layer shall be as the default for each cad system.

ANNEXURE A2

7. PRINTING AND ISSUE OF DRAWINGS

- 7.1 Generally preliminary drawings are to be paper prints which are bound into the preliminary report. A full set of paper prints of the draft working drawings must be submitted to the Departmental Project Manager for approval.
- 7.2 All drawings are to be signed in the appropriate place in the title block, as drawn, designed and checked by each member of your staff responsible for these activities.
- 7.3 For separate civil contracts reduced drawings will generally be required for tender purposes. No drawing (or document) may be printed for tender purposes until so instructed by the Departmental Project Manager. In such cases construction drawings and documents must be issued in accordance with Clause 16 of GCC '90 (see Section D of this Manual).
- 7.4 In the case where other consultants are involved plans must be supplied to the Principal Agent / Lead Consultant as required for co-ordinating purposes. The printing and issue of drawings is to be kept to the absolute minimum required for the proper and effective co-ordinating with the various members of the design team and administration of the Contract.
- 7.5 No drawings may be submitted to local authorities or other bodies without the prior approval of the Project Manager.
- 7.6 On completion of the Contract a full set of transparencies of appropriation drawings is to be signed and stamped "As Built" and submitted to the Departmental Project Manager.
- 7.7 "As Built" drawings must also be submitted electronically using the same principles as described in section 6 above. The drawing must be submitted in CAD vector format (for use with further extensions of project) as well as a scanned / PDF format (for "as built" record purposes). A film copy of the drawing is also to be submitted at the cost of the consultant.

A legible name of the compiler and the date have to appear on the "as built" drawings.

8. AMENDED DRAWINGS

The procedure to be followed when amending working drawings during the contract period is as follows:

- 7.8 Revised working drawings shall be numbered using the suffix Rev, e.g. C3365/20 Rev 1, C3365/20 Rev 2 etc.
- 7.9 All amendments must be clearly dated and numbered so that the nature and time of alteration to previous versions of a drawing may be easily identified. A brief description of the amendment should be given. Alterations to drawings must be kept to a minimum and variations made by way of site instructions where possible.
- 7.10 No amendment or supplementary working drawing may be issued for construction without the prior approval of the Departmental Project Manager if: -
 - 7.10.1 alterations to approved layouts or details are involved or if
 - 7.10.2 additional work is being indicated.
- 7.11 Such approval of the Departmental Project Manager should, unless prior approval has been granted, be sought telephonically and confirmed in writing if required by the Departmental Project Manager.
- 7.12 Copies of amended working drawings need not be forwarded to the Departmental Project Manager unless approval of the revision is required in terms of 7.3 above.

9. EXAMPLE OF TITLE BLOCK

(See the next page)



ANNEXURES FOR SECTION B

ANNEXURE B1

B.1 SEQUENCE OF CONTRACT DOCUMENT

With reference to SABS 1200 Part 1: Format and Contents – page 7, the following sequence is to be used when assembling contract documents:

1. Cover

PRINTED ON WHITE PAPER

- 2. Notice to Tenderers (if any). *
- 3. Contents List.
- 4. Schedule of Documents (Annexure B3.1/Civil Eng. Contract & Annexure B8.1/ Building Contract).
- 5. List of Drawings.

PRINTED ON PINK PAPER

6. Special Conditions of Contract (Annexure B2).

PRINTED ON BLUE PAPER

- List of Specifications (similar to Annexure B3.2/ Civil Eng. Contract & Annexure B8.2/ Building Contract).
- 8. Index to Specifications.
- 9. Project Specifications (see SABS 0120 / SANS 10120 Part 1, Clauses 3.1 & 3.2).

PRINTED ON WHITE PAPER

- 10. Standardised/Particular Specifications (see SABS 0120 / SANS 10120 Part 1, C1.4). ***
- 11. Annexure A drawing of Departmental Name board (see Annexure B5).
- 12. Annexure B Locality Plan.

PRINTED ON YELLOW PAPER

- 13. Preamble to Schedule of Quantities (see SABS 0120 Part 4 Section A Page 1).
- 14. Schedule of Quantities.

PRINTED ON WHITE PAPER

- 15. Appendix to Tender (Annexure B3.3). **
- 16. Pro-formas (Annexures B3.4 and B3.5). **
- 17. Cash Flow Program
- 18. Data Sheets and Drawings (if bound in).

Notes:

- * Conditions of Tender are not required as they are covered to the satisfaction of the Department on the reverse of the Tender form. Advertisement of the tender will be arranged by the Department and will appear in the State Tender Bulletin.
- ** Forms and documents referred to are for use when compiling a document for a separate civil contract vide Sub-clause B.2.1. Refer to Annexure B8 for the documents applicable to other forms of contract.
- *** SABS 1200 (SANS 1200) specifications should not be bound into the tender document (see also Annexure B3.2 in this regard).

ANNEXURE B2

Only Page 1 of 13 as an example
DEPARTMENT OF PUBLIC WORKS

SPECIAL CONDITIONS OF CONTRACT forming the Annexure to the

GENERAL CONDITIONS OF CONTRACT

SIXTH EDITION (1990) for use in connection with

WORKS OF CIVIL ENGINEERING CONSTRUCTION

(Issued by the South African Institution of Civil Engineers)

(Newest version)

ANNEXURE B3.1

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS

SCHEDULE OF DOCUMENTS

1. The general conditions governing this contract are:

GENERAL CONDITIONS OF CONTRACT 1990* for use in connection with WORKS OF CIVIL ENGINEERING CONSTRUCTION

- 2. Additional documents forming part of the Contract in terms of Clause 1(1)e are:
 - 2.1 This document - See Contents List
 - 2.2 Specification - Listed in the List of Specifications (SABS 1200 / SANS 1200 or similar)
 - 2.3 Drawings – Listed in the List of Drawings
 - 2.4 Tender Form: Civil Engineering Services - Form PW 782
 - 2.5 Additional Particulars of Tenderer – Form PW 207**
 - 2.6 Article Agreement for Civil Engineering Construction – Form PW 786***
 - 2.7 Deed of Suretyship – Form PW159**
 - 2.8 Works of Civil Engineering Construction – Form PW 785***
 - 2.9 Application for Tax Clearance Certificate (in respect of tenders) - ST 5.1**
 - 2.10 Declaration of interest**

Notes:

Not bound into this document but available at the Contractor's expense from:

The Secretary, The South African Institution of Civil Engineers,

POSTNET - SUITE 81, Private bag X65, HALFWAY HOUSE, 1685.

- Issued separately with this document
- Pro formas available from the Department

LIST OF SPECIFICATIONS

1. SABS 1200 (SANS 1200) _ Standardised Specifications for Civil

ANNEXURE B3.2

Engineering Construction.*

- 2. PW 371 Specification of Materials and Methods to be Used.**
- 3. PW 331 Standard Specification for Electrical Installations and Electrical Equipment pertaining to Mechanical Services.**
- 4. Standard Specifications for Electrical Installations.**
- 5. Example of Bills of Quantities & Specification for Comprehensive Services Incorporating Electrical Installations (Newest version). **
- 6. PW 379(Civil)– Standard Conditions in respect of the supply, delivery and installation of electrical, mechanical, pneumatic and vacuum operated equipment, control systems, plant and materials scheduled for inclusion in engineering contracts.
 - * Not issued with this document, but available at the Contractor's expense from the S A Bureau of Standards, Private Bag X 191, PRETORIA, 0001.
 - ** Not issued with this document but available from the Director General, Department of Public Works, Private Bag X 65, PRETORIA, 0001, or any office of the Regional Representative of this Department.

APPENDIX TO TENDER

<u>Clause</u>

Engineer	1(1)(m)	
Special conditions	1(1)(t)	See Special Conditions of Contract
Address of Employer	1(2)(b)	
Address and telephone Number of Engineer	1(2)(b)	
Address and telephone Number of Contractor	1(2)(b)	
Amount of cash deposit or guarantee. See note (1)	10	% of Tender Price (see Clause 6) of Conditions of Tender)
Time within which security must be provided	10	21 days from date of Letter of Acceptance
Duration of security	10	Until issue of Certificate of Completion of the Works
Time within which Works to be commenced	12(1)	21 days
Programme to be furnished within	14	21 days from date of Letter of Acceptance
Daywork allowances	40(4)(b)	33 1/3 % on the gross remunerationof the workmen actually engaged.10 % on nett cost of materialsactually used
Special non-working days	45	All South African statutory and building industry holidays
Time for Completion. See notes (2), (3)	45(1)	calendar weeks

Amount of penalty	47(1)	R (per calendar day) (VAT excluded)
Percentage advance on materials not yet built into the Permanent Works	52(1)(e)	Maximum per cent
Percentage retention	52(3)	per cent
Limit of retention money	52(3)	per cent of Tender Price
Retention Money Guarantee	52(6)	not permitted
Delivery of Contractor's final statements	52(9)	Within 21 days after certified date of Completion of Works
Defects Liability Period	56(1)	12 months
Abnormal rainfall	50(5)	X = 20 mm Y = 10 mm
Contract Price Adjustment	49(2)	

Coefficients for calculating Contract Price Adjustment Factorx = 0.15 $a = \dots$ $b = \dots$ $c = \dots$ $d = \dots$ $\alpha = \dots$ $\beta = \dots$ $\beta = \dots$ $d = \dots$ $d = \dots$

"L" is the "Labour Index" and shall be the "Consumer Price Index - All Items" for the urban area of as published in the Statistical News Release P0141.1, of Statistics South Africa.

"P" is the "Plant Index" and shall be the "Civil Engineering Plant Index" as published in the Statistical News Release P0142.1, of Statistics South Africa.

"M" is the "Materials Index" and shall be the "Civil Engineering Materials Index" as published in the Statistical News Release P0142.1 of Statistics South Africa.

"F" is the "Fuel Index" and shall be a combination of the "Petrol (P) and Diesel (D) Indices" as specified and for the areas as published in the Statistical News Release P0141.1, of Statistics South Africa.

 $(F = \alpha P + \beta D)$ (See Note 4)

Price variation of 49 (3) special materials: Method by which Rates or price for Special materials, items or portions of the Works variations shall be the base month concerned determined Period of Validity of Tender Refer to Tender form Date Signature On behalf of *Note : (1) Sureties may also be provided, See Conditions of Tender (PW 782)

- (2) If the Time for Completion is not stated, the Tenderer is to fill it in.
- (3) The time for Completion includes:
 - (a) Time for the provision of security (See Conditions of Tender (PW 782) max 21 days).
 - (b) Period within which an order in writing to commence work or possession of the site must be given (clause 12 (1) max. period 14 days).
 - (c) All special non-working days.
 - (4) The total of $\alpha + \beta = 1$

1. PROJECT SPECIFICATION CLAUSES

The following clauses must be considered and used where applicable depending on the circumstances pertaining to the particular site.

PS2 DESCRIPTION OF SITE AND ACCESS

You must include an A4 size locality plan as Annexure A to the Project Specification.

PS6.1 Source of Water Supply

Water is available on site which the Contractor may use at his own discretion. The Contractor must make the temporary connection and install a meter at his own expense at a point approved by the Engineer. The connection shall be watertight. Water will not be charged for, but consumption will be monitored to prevent wastage.

Where the site is located on dolomite, the Contractor shall take the necessary precautions to safeguard the use / abuse of water. If in the opinion of the Engineer the Contractor is negligent or is abusing the service, such that the continual use of the service compromises the integrity of the underlying dolomite, the service may be discontinued. In such cases the Contractor shall make own arrangement for water.

The Department does not guarantee the sufficiency or continuity of the supply and no claims will be considered in this regard.

The Contractor will be held responsible for any wastage of water due to negligence.

PS6.2 Source of Power Supply

Single/3 Phase power is available on site which the Contractor may use at his own discretion. The Contractor must make the temporary connection and install a meter at his own expense at a point approved by the Engineer. Power will be charged for at a tariff to be determined by the Regional Manager of the Department.

The Department does not guarantee the sufficiency or continuity of the electrical supply and if the supply should fail or be insufficient the Contractor shall make his own arrangements. The Department will not be liable for any claims in this respect.

PS8.n Security Check on Personnel

Tenderers should note that it is a specific condition of the Contract that the Engineer may in certain areas require from the Contractor that his personnel or certain numbers of them be security classified. The Contractor shall comply with requirements that the

Commanding Offices may have in this regard and must take specific note of the fact that a reasonable amount of time will be required for security clearance.

PS8.n+1 Restricted Working Hours

In terms of Clause 41 of GCC '90, normal working hours will be those hours laid down by the Commanding Officer in conjunction with the Engineer.

PS8.n+2 Prohibition on Taking of Photographs

The Contractors attention is drawn to the Defence Act No. 44 of 1957 as amended and the Correctional Services Act No. 111 of 1998, which clearly state that the taking of photographs or making of sketches is prohibited and even the possession of a camera on site is an offence.

PS9 Abnormal Rainfall

The values of Nn and Rn for use in Sub-clause 12(8) of the Special Conditions of Contract shall be as follows: -

Source of information: Weather Bureau, Department of Transport.

Rainfall Station:

MONTH	Nn	Rn	MONTH	Nn	Rn
January			July		
February			August		
March			September		
April			October		
May			November		
June			December		
			Average Annual Rainfall		

Period: –

PSAn Time Related Items (Sub-clause 8.2.2)

An approved extension of time (other than an extension of time granted in terms of Clause 12(8) of the Special Conditions of Contract) will entitle the Contractor to submit a claim for additional payment. Any such approved additional payment will be made for proven additional costs for each relevant time related item but will be limited to a maximum amount determined from the sum tendered for such item and from the designated operation, the period stated for the completion of the item or the tendered contract period, as applicable.

PSABn Name Board (Sub-clause 3.2.1)

You must make provision for only one name board as per Annexure B5 which must be bound in as Annexure A to the Project Specification.

PSACn Sample / Trial Section

Depending on the nature of the contract, a clause must be added requiring a sample / trial section to be provided / constructed and approved by the engineer before the actual work is executed.

8. PREAMBLE CLAUSES

The standard preamble to the Schedule of Quantities as laid down in SABS 0120 (SANS 10120) Section 4: Part A: General must be used with the following change(s).

1.1.6 A price, rate or the work "NIL" is to be entered against each item of the schedule of quantities, whether the quantities are stated or not. If a rate is not entered against an item or a word other than "NIL" is entered the item will be considered to be covered by other prices in the schedule but the rate will nevertheless be taken as NIL and no claim will be considered if the quantity of such item increase or decrease.



Annexure B5

ANNEXURE B6.1

DECLARATION ON SITE RELATED ASPECTS

(to accompany Preliminary Report vide Clause B.1.3)

It is hereby certified that:

*1(a) the site of the Works is situated on State property and that the works will be wholly executed within the confines of the Site

or

- * (b) certain parts of the Works are situated outside State property and that details thereof have been included in the Preliminary Report.
- *2(a) no existing servitudes are affected by the Works and that no new servitudes are required

or

- * (b) servitudes are affected and/or new servitudes required and that details thereof have been included in the Preliminary Report.
- *3(a) no buildings require demolition

or

* (b) certain buildings require demolition and that details thereof have been included in the Preliminary Report.

SIGNED

DATE

FIRM:

.....

*Delete the items not applicable

ANNEXURE B6.2

SITE CLEARANCE

(to accompany printed tender documents vide Clause B2.1.6)

SERVICE:

.....

It is hereby certified that:

*1(a) the site of the Works is situated on State property and that the works will be wholly executed within the confines of the Site

or

- * (b) certain portions of the Works are situated outside State property and that a list of all such portions is appended hereto.
- *2(a) no existing servitudes are affected by the Works and that no new servitudes are required

or

- * (b) servitudes are affected and/or new servitudes required and that a list of all such servitudes is appended hereto.
- *3(a) no buildings require demolition

or

- * (b) certain buildings require demolition and that a list of all such buildings is appended hereto.
- *4. the Site is immediately available for the construction of the Works.

SIGNE	D	DATE
FIRM:		

*Delete the items not applicable

G.P.-S. 024-0540 4/98

Only Page 1 of 8 as an example

CONDITIONS OF CONTRACT



ANNEXURE B7

- PUBLIC WORKS REPUBLIC OF SOUTH AFRICA
- 1. (1) (a) **"Bills of Quantities"** means the document referred to in this Contract in which is entered the description and quantity of work for the execution of this Contract. The Priced Bills of Quantities means the Bills of Quantities as amended or approved by the Director-General, which contain the rates at which the Director-General agrees to pay the Contractor for the Works, which rates are hereinafter referred to as Schedule Rates.
- 1. (1) (b) "Contract" means and includes the articles of agreement, the conditions of tender, the tender and the acceptance of tender, these conditions of contract, and if any, the Specification, the Drawings and the Bills of Quantities.
- 1. (1) (c) "Contractor" means the person or persons, partnership, firm or company whose tender for this work has been accepted and includes his or their heirs, executors, administrators and/or successors and any representative of the Contractor appointed in writing for the purpose only of receiving on behalf of the Contractor communications, from the Director-General/Representative/Agent.
- 1. (1) (d) "Contract Sum" means the sum stated in the articles of agreement.
- 1. (1) (e) "Department" means the Department of Public Works of the Government of the Republic of South Africa.
- 1. (1) (f) "Director-General" means the officer appointed to the post of Director-General: Public Works and includes any person acting in that capacity as well as any officer to whom any powers vested in the Director-General in terms of these Conditions of Contract have been delegated.
- 1. (1) (g) **"Drawings"** means any drawing relating to the Works referred to in this Contract or available to the Contractor at the time of tender or supplied by the Director-General or his Representative/Agent to the Contractor during the construction of the Works and also any working drawing, detail drawing or sketch supplied by the Director-General or his Representative/Agent to the Contractor from time to time.
- 1. (1) (h) "Final Delivery Certificate" means the document issued by the Representative/Agent confirming that all the known defects have been rectified and that the Works are prima facie in good order and have been accepted.
- 1. (1) (i) "First Delivery Certificate" means the document issued by the Representative/Agent confirming prima facie completion of the Works or a portion thereof.
- 1. (1) (j) "Order in Writing" means any printed, typed or written document or letter signed by or on behalf of the Representative/Agent and addressed to the Contractor for the purpose of conveying any instructions to the Contractor relating to the Works and the execution thereof.
- 1. (1) (k) "Representative/Agent" means the person appointed generally or specifically by the Director-General to act on his behalf in regard to certain aspects of the administration and execution of this Contract.
- 1. (1) (I) "Site" means the land or other place on, under, in or through which the Works are to be executed or carried out and any other land or places provided by the Director-General for the purpose of the Contract.
- 1. (1) (m) "Specification" means the document referred to in this Contract in which the method of executing the Works and the nature of the materials to be supplied and used are described.
- (1) (n) "Works" means all the buildings, structures or services (including any omissions, substitutions, additions, alterations and variations thereto) that are to be erected or constructed in terms of this Contract and includes materials or goods wherever the same are being manufactured or prepared, whether the same are on the site or not, and all excavations and other structures and services that are necessary for the execution of the work under this Contract.
- 1. (2) Words importing the singular also include the plural and vice versa unless the intention of the Contract indicates otherwise.
- 2. (1) Within twenty-one days of the date of acceptance of his tender the Contractor shall deposit his Bills of Quantities with the Director-General with all items properly priced, extended and cast in ink. The Director-General shall be at liberty to make such adjustments to individual rates as will eliminate errors, discrepancies or what he considers to be imbalanced rates without altering the Contract Sum.
- Drawings, Specifications and Bills of Quantities
- (2) The Drawings, Specification and/or Priced Bills of Quantities and other relevant documentation shall form part of the Contract, shall be signed by the Contractor and shall be retained by the Director-General. The Contractor shall be supplied with an unsigned copy of these documents.
- 2. (3) The Contractor shall in addition be supplied with two copies of the Drawings, Specification and/or Bills of Quantities, one set of which must at all times be kept on the Site and be accessible to the parties to the Contract and the Representative/Agent and on completion of the Works these documents shall be returned to the Director-General or the Representative/Agent together with any copies made thereof. Where additional copies are reasonably required such copies shall be provided free of charge to the Contractor. No extension of time will be granted as a result of delays resulting from such request for additional copies. These documents shall remain the property of the Director-General and shall be delivered to the Representative/Agent whenever this is requested.
- 2. (4) Figured dimensions shall be followed in preference to scale.
- 2. (5) None of the documents hereinbefore mentioned or any information contained therein shall be used for any purpose other than for this Contract. The copyright in these documents vests in the Government.

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ANNEXURE B8.1

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS

1. The general conditions governing this contract are:

DEPARTMENT OF PUBLIC WORKS CONDITIONS OF CONTRACT PW 677*

for use in connection with

WORKS AS PART OF A BUILDING CONTRACT

- 2. Additional documents forming part of the Contract in terms of Clause 1(1)(b) are:
 - 2.1 This document See Contents List
 - 2.2 Specification Listed in the List of Specifications
 - 2.3 Drawings Listed in the List of Drawings
 - 2.4 Tender and Conditions of Tender Form PW 782
 - 2.5 Additional Particulars of Tender Form PW 206**
 - 2.6 Contract Agreement Form PW 786**
 - 2.7 Deed of Suretyship Form PW 159**
 - 2.8 Guarantee for the Execution of Contract Form PW 822***
 - 2.9 Application for Tax Clearance Certificate (in respect of tenders) ST 5.1**
 - 2.10 Declaration of interest**

Notes:

- * Not bound into this document but available free of charge from: The Director General, Public Works, Private Bag x 65, PRETORIA, 0001 or any office of the Regional Representative of the Department
- ** Issued seperately with this document
- *** Pro Formas available from the Department

ANNEXURE B8.2

LIST OF SPECIFICATIONS

1.	SABS 1200 (SAN	S 1200) –	Standardised Specifications for Civil Engineering Construction*
2.	PW 772 _	Preliminaries etc formin	g part of Bills of Quantities. **
3.	PW 371 –	Specification of Materia	Is and Methods to be Used.**
4.	PW 331 –	Standard Specification pertaining to Mechanic	for Electrical Installations and Electrical Equipment al Services.**
5.	Standard Specific	ations for Electrical Insta	allations.**
6.	PW 379 -	Standard Conditions in electrical, mechanical, p systems, plant and mate	respect of the supply, delivery and installation of oneumatic and vacuum operated equipment, control erials.

- * Not issued with this document, but available at the Contractor's expense from the S A Bureau of Standards, Private Bag x 191, PRETORIA, 0001.
- ** Not issued with this document, but available from the Director General, Department of Public Works, Private Bag x 65, PRETORIA, 0001, or any office of the Regional Representative of this Department.

APPENDIX B8.3

APPENDIX TO TENDER (FORM PW 206)

	<u>Clause</u>	
Special conditions	29	Bound in
Amount of cash deposit or guarantee. See note (1)	PW 206	10% of Tender Price
Time within which security must be provided	PW 206	21 days
Duration of security	PW 822	Until issue of Certificate of Completion
Political riot insurance	12(3)(b)	Not required
Time within which Works to be commenced	20(3)	21 days
Time for Completion. See notes (2), (3)	20(2))
Special non-working days	20(2)	Good Friday, Christmas Day, Ascension Day, Day of the Vow
Amount of penalty	24(2)(a) 24(3)(a)	R (per calendar day)
Period of maintenance		12 months
Daywork allowances	19(a)	33 $^{1}/_{3}$ % on the gross remuneration of the workmen actually engaged 10% on nett cost of materials
Percentage retention	23(2)(e)	10%
Limit of retention money	23(2)(e)	5% of Contract Sum
Percentage advance on unused materials	23(3)	Maximum of 85%
Minimum amount of monthly certificates	23(2)(a)	R1 000
Time within which payment to be made after certificate	23(2)(a)	21 days
Settlement of disputes to be by reference to	27(2)	Court

Price Variation: Contract Price Adjustment Factor*

x = a = b = c = d = l =

"L" shall be the Consumer Price Index – All items, for the urban area of

Price Variation: Direct Cost Variation

Special materials, items or portions of the Works concerned	Price bases on which variations shall be determined	Rates or price for the base month
Period of Validity of Tender	60 days	3
Date	Signature	
	On behalf of	

*Delete whichever is inapplicable

Note:	(1)	Sureties may also be provided.	See Tender.
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- (2) If the time for Completion is not stated, the Contractor is to fill it in.
- (3) The time for Completion includes:
 - a) Time for provision of security (See Tender max 21 days)
 - b) Period within which an order in writing to commence work or possession of the site must be given (Clause 20(3) max period 14 days)
 - c) All statutory and building industry holidays (Clause 20(2)

ANNEXURE B8.4

PW 822

The Director-General: Public Works c/o The Regional Representative Private Bag X

Sir

GUARANTEE FOR THE EXECUTION OF A CONTRACT IN TERMS OF THE CONDITIONS OF CONTRACT PW $\mathbf{677}$

1.	With reference to the contract between
	and the Department of Public Works, Republic of South Africa, for the
	E WEI
	for the sum of R
	\\/we in my/our capacity as
	and hereby representing beg to advise that
	I/we hold structur displayed the sum of P
5	$\frac{1}{D} \left[\frac{1}{D} \right] \left[\frac{1}{D} \left[\frac{1}{D} \right] \left[\frac{1}{D} \left[\frac{1}{D} \right] \left[\frac{1}{D} \left$
	1 L L L
	being 10% of the contract amount, for the due fulfillment of the said contract.

2. I/We hereby renounce the benefits of the exceptions non-numeratae pecuniae, non causa debiti, excussionis et divisionis, with the meaning and effect whereof I/we declare ourselves to be conversant, undertake to pay you the said amount of R______ on receipt of a written demand from you to do so and which demand may be made by you if (in your opinion and sole discretion) the said contractor fails or neglects to commence with the works on the dates prescribed in the contract, or if he fails or neglects to proceed therewith or if he for any reason fails or neglects to complete the service in accordance with the Conditions of Contract or if his estate is sequestrated or if he surrenders his estate in terms of the Insolvency Laws in force within the Republic of South Africa. Subject to the above, but without in any way detracting from your rights to adopt any of the procedures provided for you in Clause 24 of the Contract, the said demand can be made by you at any stage.

TENDER ADJUDICATION: GUIDELINE

1. SUBMISSION OF TENDER RECOMMENDATIONS

The engineer shall evaluate the tenders received on an impartial basis to ensure that the most costeffective tender is accepted. The recommendation as to the award of the tender must be submitted to the Departmental Project Manager utilising form PRM 028, for submission to the Tender Board.

2. TENDER ADJUDICATION REPORT

When making recommendations the following aspects must be taken into account in the completion of the Tender Adjudication Report as per the standard pro-forma provided in PRM028:

2.1 Completeness of tenders

a) Table of comparison

The completeness of the tenders shall be assessed against the relevant tender rules and other issues, in the matrix format illustrated below:

DESCRIPTION		TENDERER REF. NO.					
		2	3	4	5	Etc	
Form of tender							
Signing of tender							
Alterations to tender documents							
Tender qualifications							
Alternative tenders							
Attendance at site inspection							
Tender withdrawal or modification							
after closing date							
Cancellation of contract							
Legal aspects							
Submission of tenders							
Additional information required							
APP forms							
Original Tax Clearance Certificate							
Amendments to tender by employer							
Disqualification of tender							
Signing of addenda							

• The following legends can be used to indicate compliance or otherwise:

\checkmark	=	compliance
×	=	non-compliance
*	=	partial or incorrect compliance
•	=	recommended disqualification
N/A	=	not applicable
æ ● N/A	= = =	partial or incorrect compliance recommended disqualification not applicable

- List of tenderers according to the reference numbers in the matrix.
- When non-compliance "x" and partial or incorrect compliance "#" is registered, comments shall be given on the respective cases.

b) Comments

The following shall be commented on in the conclusions:

- Provide recommendations in respect of withdrawal, modification and disqualification of tender as appropriate.
- Supply reasons for recommending acceptance of the tender where tender rules have not been complied with.
- If cancellation of the contract is contemplated, recommendations and reasons for the action must be supplied. Any information regarding irregularities in terms of tender rules shall be submitted under separate cover, marked

"Confidential for the attention of the Project Manager"

- 2.2 Arithmetical errors and omissions
 - Listing of the errors and omissions together with the corrections.
 - Effect of the corrections on the tender.
 - Reference to Annexure containing the details of the corrections, adjustment to the totals and tender sum.
- 2.3 Qualifications
 - Validity of the qualifications in terms of Tender Rules.
 - Implications and risks to the Department especially with regard to cash flow and programming of the works.
 - Recommendations.
- 2.4 Alternative tenders
 - Validity of the alternatives offered in terms of Tender Rules.
 - Description of the alternatives offered, the acceptability or otherwise thereof and the need for further investigation to assess the viability and adequacy of the designs.
 - Advantages and disadvantages of the alternatives offered i.e. cost-effectiveness to the Department and cost benefit to the public.
 - The cost, time and risk implications of the offers.
 - Recommendations.
- 2.5 Programme and cash flow
 - Assessment of the programme submitted for the works.
 - Comparison and implications of the projected cash flows on the works reflecting the actual value of the work i.e. excluding contract price adjustment (CPA) and contingency costs.

2.6 Balancing of rates

- Analysis of the tendered rates to assess the reasonableness thereof, with particular reference to those major items subjected to variations.
- Implications of unbalanced rates on the final cost of the works.
- Reference to an Annexure detailing the unbalanced rates (if required).
- 2.7 Analysis of the tender where shorter contract periods are offered
 - Description of the analysis carried out and the results thereof taking due account of corrections, escalation and time offered for completion of the work.
 - The analysis shall include an economic evaluation to determine:
 - A net present value (NPV) based on the following formula using discount rates of (i - 2)%, i % and (i + 2)% respectively.

$$NPV = \sum_{n=1}^{n=N} \left(1 + \frac{i}{100 \times 12}\right)^{-n} \times A_n$$

Where:

NPV	=	net present value
An	=	estimated cash flow for month n
n	=	month 1, month 2, etc.
Ν	=	contract period in months
i	=	discount rate per annum in % [current capital lending rate
		(i.e. minus) current escalation rate]

- Above only to be done if cash flows are provided.
- A sensitivity analysis for possible scenarios, focusing on the major items of work that are most likely to vary.
- Reference to an Annexure showing the results of the respective analyses.

Note:

- (1) No annotations, remarks or alterations whatsoever are to be made in the priced schedules, tender form or any other part of the tender.
- (2) All tender documents are to be returned by hand or registered post.
- (3) Your attention is drawn to paragraph 26 of ST36, "Conditions and Procedures in regard to Tender, Contract and Order" (available from the Chief Director: State Purchases) which states that although prices and names may be made known (on request) at the opening of tenders these may not be disclosed by telephone or other means subsequently.

ANNEXURES FOR SECTION C

SITE SURVEY DETAIL

The following detail has to be surveyed:

- All natural and man made features that may have an impact on the siting of the project.
- Contours to 0,25m vertical intervals on a scale of 1:500 and to 0,50m on a scale of 1:1 000 with supplementary spot heights wherever the contours are unable to portray ground shapes faithfully. Frequent spot heights shall be given on features such as roads, railways, bridges, etc. where elevations may be necessary for engineering design. Tachometric spot heights shall be taken on all changes of slope, on top of ridges and in the bottom of valleys.
- Positions of survey stations, and details of survey beacons used for the survey.
- Rivers, streams, springs, canals, dams, pans, marshes and areas subject to tidal flooding together with names and direction of flow, as appropriate.
- Highest known flood levels of main streams, as near as can be determined from local evidence or information.
- The source of such information and the specific point and date concerned must be indicated on the plan.
- High tide marks, high water marks of rivers, streams and dams.
- A description of the bed of a stream, e.g. sandy, boulders, solid rock, silted, etc.
- Forest, bush, shrub, plantations, orchards, avenues, hedges, individual trees which are landmarks, or the preservation of which may be desirable for scenic purposes, etc.
- Cultivated lands (differentiating between dry and irrigated), rock outcrops and hard or continuous rock, cliffs, sand dunes, etc.
- Eroded areas and gullies.
- Above ground and / or exposed water mains, sewers, storm water pipes, gas, petroleum and other services.
- Power and telephone lines, showing individual poles or pylons in their surveyed positions.
- Underground pipe lines, cables and other buried services the positions of which shall be determined from local authorities and surface indications, e.g. manholes, cable markers, etc., if such services will be affected by the planned construction.
- Other underground services e.g. signal cables, telephone cables, sewers, storm water pipes, etc.
- Manholes.
- Spot heights.
- Road levels.
- Cuttings and banks (road and rail).
- Fences and property beacons.
- Culvert dimension shall be given.
- Natural drainage and drainage improvements.
- Structures affected by planning.

- Existing access to adjoining properties.
- Position of foundation test holes with reduced ground levels if available.
- North point.
- Any special features.
- Road and footpaths, differentiating between blacktop and other surfaces as well as between national, provincial and other roads.
- Structures, with details regarding the openings, sizes, structure number and type of construction where such a structure has a bearing on the site.
- Drainage and irrigation furrows.
- All individual buildings, differentiating between types of construction, and stating the general use of the building or groups of buildings other than dwellings (e.g. store, school, etc.).
- National monuments and buildings or structures of historical interest. Describe briefly.
- Gates and fences, differentiating between ordinary, stock proof, jackal proof, security fences, etc.
- Stone, brick or any other type of walls.
- Wells, bore holes, windmills.
- Quarries, tunnels, mine workings, etc.
- Graves and cemeteries.
- All cadastral and servitude information shall be shown in the surveyed area with names of owners and municipal boundaries, if applicable. Where it is difficult to supply cadastral information and where such data can be omitted without detrimental effect, approval shall be obtained from the Department.

GEOTECHNICAL INVESTIGATION

The investigation normally takes place in a number of phases. The phases include a desk study, site reconnaissance, preliminary fieldwork, detailed investigation and verification of conditions during construction. In certain instances, the process may be iterative, with some phases being repeated prior to final site selection and commencement of detailed investigation. The following is a guide to the information which may be obtained in the various phases:

A. Desk study :

- Topographical maps and aerial photographs should be consulted to gain information on the general topography and prominent features.
- Geological maps should be consulted to gain information on the basic geology.
- Local authorities and other organisations should be approached to establish whether they have knowledge of investigations conducted in the area or have records available.
- The government mining engineer should be approached for information on mining operations where such operations are known to have been undertaken.
- The study of overlapping aerial photographs through a stereoscope may be of value in identifying geological features such as faults, dykes, geological boundaries, etc., soil types and drainage patterns. These features are often not apparent in the field.

B. Site reconnaissance

 A site reconnaissance should be undertaken to gain geotechnical information from visible features, establish the suitability of various geophysical testing methods and investigate accessibility for drilling equipment.

C. Geophysical investigations

- Wherever practicable, a geophysical investigation shall be undertaken and shall comprise a seismic or resistivity or gravimetric or electromagnetic evaluation of the subsurface conditions of sufficient extent and depth in order to assist in the selection of the most economic detailed investigation as well as in the siting of foundations.
- It should be noted that a proper geophysical investigation could substantially reduce the number of bore holes required at any site.
- Only drilling will be required if the footprint of the structure is fixed.

D. Detailed investigations – Exploratory holes

- The purpose of exploratory holes is to permit visual examination, testing of the in situ material and for the recovery of samples.
- Generally hand or machine (backactor) excavated test pits should be put down first, followed by large diameter auger holes and finally small diameter cored holes. Planning should be flexible so that the work can be varied as necessary in the light of fresh information.
- To obtain the greatest benefit from the investigation, it is essential that there be adequate direction and supervision of the work by competent personnel who have appropriate knowledge and experience and the authority to decide on variations to the investigation when required.

- E. Logging and profiling
- This work shall be carried out in accordance with the following:
- "A guide to soil profiling for civil engineering purposes."
- "A guide to core logging for civil engineering purposes."
- "A guide to percussion bore hole loggin."
- Produced by SAIEG, SAICE Geotechnical Division and AEG (1993), edited by ABA Brink and RM Bruin.

The geotechnical report shall provide clear guidance to the engineer, enabling him to select the most appropriate solutions and foundation types. The report should quantify the parameters required for the design of the proposed foundation and embankments.

The report, together with the inspection of the site, shall provide the contractor with sufficient information to reasonably anticipate any problems that may occur during the execution of the works. This will enable the contractor to tender a realistic price for the construction of the work and to select the most appropriate equipment and techniques therefore.

The report shall be compiled under the following headings and shall include, but not be limited to, the following, as relevant:

- A. Introduction
- Terms of reference
- Description of the planning stage, and the purpose for which the investigation was conducted
- B. Description of the site(s)
- Location of the site(s)
- Accessibility of the site(s)
- Traffic ability of the site for construction equipment
- Listing of sources from which data is available or was obtained from
- Description of regional geology, vegetation, drainage and other general features of importance
- C. Investigations carried out
- Name(s) of firm(s) responsible for the field work (consultant, contractor)
- Name(s) of person(s) responsible for the interpretation of the geophysical work and for the profiling
- Dates on which the work was conducted
- Description of the types of field work undertaken and equipment used
- D. Investigation results
- Description of the soils encountered, identifying their stability or potential problems they may present e.g. tendency to heave, collapse, settle, etc.

ANNEXURE C2.3

- Description of hard rock geology identifying the type, quality, degree of weathering, fracturing, etc.
- Potential for boulders and other obstructions to deep seated foundations
- Description of the problems experienced or to be expected
- Description of ground water and expected variations
- Field and laboratory testing carried out i.e.
- Types of tests conducted on the respective materials
- Results obtained and their reliability
- E. Recommendations
- Type of foundation best suited
- Expected bearing capacity and settlement for the respective materials on which founding could be considered
- Friction values and rock socket parameters for the design of piles
- Precautionary measures.
- Construction sequences

F. References

 Listing of standards used for the classification of materials in respect of soil condition and rock hardness

G. Annexures

- Locality plan to appropriate scale
- Results of geophysical investigations
- Bore hole, auger hole and test pit logs
- Photographs of bore hole cores recovered
- Laboratory test results
- Drawings to scale showing the location including levels of all positions investigated, physical features of the site and setting out points

ANNEXURE C3



GUIDELINES FOR DESIGN AND CONSTRUCTION OF PUMP STATIONS

1. INTRODUCTION

Pumping of sewage must under no circumstances lead to contamination of the environment. It is also illegal to allow any sewage to enter into the stormwater system or into the watercourses. It is therefore vitally important that the inclusion of any pump station in a sewer system be avoided as far as possible.

2. LOCATION

Should the provision of a pump station be unavoidable, the following aspects must be addressed when deciding on the location:

- The inconvenience must be minimised
- Should something go wrong, the impact must be minimised
- It must be accessible by road
- It must have a water connection
- It must have an electricity connection
- It must be above the 1:50 year flood line
- The impact on the environment must be minimised

3. PUMP STATION REQUIREMENTS

Pump station designs must comply with the following:

- The Occupational Health and Safety Act (Act 85 of 1993)
- The Guidelines For the Provision Of Engineering Services And Amenities In Residential Township Development (Red Book) issued by The National Housing Board
- The pump station must be fenced by a concrete palisade fence with a lockable pedestrian gate and a gate for vehicle access
- The area around the pump station must have a 2m wide concrete apron draining into the wet sump
- The pump station and surrounding area must be easily maintained
- A washing slab draining into the wet sump must be provided
- Lifting devices must be provided for lifting the pump onto a truck
- Sufficient working space must be provided
- Well-designed stairs must be provided
- Cat ladders are not preferred
- Dry wells must be equipped with sump pumps
- Sufficient storage area must be provided for operational manuals, tools and lubricants
- Wet sumps must be sized to allow for 8 stop/starts per hour. For submersible pumps it can be up to 15 stop/starts per hour
- The pump station must be functional, but as simple as possible
- All sumps must be well ventilated to prevent the building up of dangerous gasses

For ease of maintenance it is preferable to have self-priming pump installations with the pump situated above ground level although wet well installations can be more cost effective for smaller pump stations. For protection of the pumps it is preferred to have a muncher installed in the inlet. As an alternative a screening device to remove large solids in the effluent from entering the pump

station shall be installed. Degritters can also be provided to remove grit before it enters the sump. For large pump stations these devices can be mechanically operated.

Lifting facilities shall be provided to raise the muncher out of the inlet for maintenance purposes.

4. SAFEGUARDS

Preventative measures must be taken to avoid any possibility of spillage. Such preventative measures must include one or more of the following:

- Provision of a standby pump which can be activated automatically should the duty pump become inoperative
- Provision of standby generators to generate electricity during power failures
- Provision of emergency storage capacity for the containment of any sewage spillage
- Overflow of the system shall not be towards any storm water drainage system

It is a requirement to have all pump stations equipped with at least 2 pumps of which one serves as the duty pump and the other as the standby.

All pump stations shall be wired to a central emergency electrical generating system.

5. PUMPS

When selecting pumps the following aspects must be taken into account:

- The pump must be able of doing the required duty at a rotational speed not exceeding 1 500 RPM
- The suction inlet must be at least 100mm diameter
- The impellers must be of a non-clog type and must be able to handle solids of up to 75mm in diameter
- To prevent excessive wear on the impellers, volutes, liners, wear rings etc, these items must be protected with an approved abrasive resistant coating
- All shaft seals must be double mechanical seals
- The pumps must be selected to ensure that the duty specified falls well into the stable range of the head/quantity characteristic curve of the pump
- The pump shall have a non-overloading power curve
- Only electrical powered pumps may be installed
- The electrical motors must be rated for continuous operation at an output of 10% in excess of the maximum power requirements of the pump when operating at the maximum duty
- All wet wells must be able to be isolated from the incoming flow for a short while
- As a general rule all pumps larger than 5kW must be installed on the surface or in a dry well

For submersible pumps, the following additional measures must be taken:

- All slide rails, locating plates, lifting eyes and lifting ropes must be of grade 304 stainless steel
- Each pump must be fitted with a seal monitoring sensor
- Each pump must be fitted with a temperature sensor in the motor stator

Each pump station must have at least two pumps but at the same time care must be taken not to provide excessive standby capacity.

Where two pumps are installed, the pumps must be sized such that the ratio between the pump capacity (both pumps running), and the peak dry weather flow is 2:1. Where 3 pumps are installed the pumps should be sized such that the ratio between the pump capacity (with 2 pumps running), and the peak dry weather flow is 1,5:1.

All standby pumps must be used in the normal operation of the pump station.

6. PIPEWORK

When designing the pipework, the following must be addressed:

- Pipework must be properly designed and detailed
- Only gate valves must be used
- Only swing check valves must be used
- Vortex formation at suction pipes must be prevented
- Air must not be trapped in the suction pipe
- Every suction pipe must be equipped with an isolating valve
- A flexible coupling must be provided between the valve on the suction pipe and the pump
- The maximum flow velocity in the suction pipes must not exceed 1,5m/s (Check NPSH)
- On the delivery side a check valve must be provided followed by a gate valve
- A flexible coupling must be provided between the pump and the check valve
- The pipework must be properly supported to prevent the pipework from resting on the pump
- The maximum flow velocity in the delivery pipes must not exceed 3,0m/s
- The layout of the pipework must be such that the pump can be removed without dissembling the pipework
- It must be possible to remove any pump without affecting any other pump
- For submersible pumps the valves and check valves must be installed in a separate box outside the wet sump and access from the natural ground must be easy
- All pumps must be fitted with pressure meters on the delivery side

7. RISING MAINS

Rising mains must be designed to take care of the following:

- Rising mains must be of such a diameter that solids deposited while the pumps are stopped will be scoured out when the pumps are working. A velocity of 0,9m/s to 1,2m/s is commonly considered to be desirable
- The minimum internal diameter is 75mm
- Where possible the rising main must have a positive grade with no low points or high points
- Scour valves and air valves must be avoided at all cost
- The rising main must be analysed for water hammer
- To prevent the release of H₂S at the outlet, turbulence must be avoided
- Unbalanced thrust must be balanced

8. ELECTRICAL INSTALLATION

Switchgear must always be installed above ground level. Where superstructures are provided, the switchgear must be inside the superstructure. For submersible pump stations a weatherproof panel manufactured of corrosion resistant material must be provided at least 2m from the pump station.

Panels must have at least the following functions:

- It must comply with SABS 0142
- It must have a padlock lockout system
- All equipment must be numbered and labelled according to the panel drawings
- Rotation of the duty and standby pumps
- An Ampere-meter for every pump
- A Voltmeter
- An hour-meter for every pump
- A kW-hour meter for the pump station
- A welding socket
- A 15 amp socket
- For each motor indicating lights showing:

Running (Green) Stop (Red) Fault (Yellow)

The pumps must be controlled by ultrasonic level switches and must control the pumps such that the running time for all pumps is more or less the same for any day. At a given water level the first pump must be activated and should the water level rises even more, the other pumps are activated one by one. In cases where the water level rises extremely high the standby pump must also be activated. At a predetermined low water level all pumps must be switched off.

A telemetric alarm system must be activated should:

- A power failure occur at which the emergency scheme shall automatically take over
- A pump trip
- A pump or pumps do not start
- The sump run empty and the pump or pumps do not shut down

Sufficient site lightning must be provided as well as lighting for the pump station.

9. GENERAL

All equipment must have corrosion resistant metal tags attached to it giving the most important technical details. Three copies of the operating and maintenance manuals must be supplied giving the following information.

- A flow diagram of the pump station showing all the components as well as the working pressures and flow rates
- Operation of the pump station
- Maintenance of the pump station
- Complete list of emergency spares to be kept in store
- A list of spares with specifications, names and addresses of suppliers of all components used in the pump station, pipework and rising main
- A complete set of the as-built drawings
- Electrical panel drawings

ANNEXURES FOR SECTION D

MONTHLY PAYMENT CERTIFICATES

- 1. Monthly payment certificates for civil engineering services must be based on an accurate assessment of the work completed up to the time of measurement.
- 2. The quantities of work completed must be filled in on a blank schedule of quantities and valued at contract rates and prices.
- 3. The schedule of quantities must show the quantity of work scheduled in the contract documents and the quantity of work measured to date as well as the percentage completion of each item. A separate schedule must be made for measurement of work executed against variation orders. The total for each section of the schedule of quantities must be carried to a summary sheet.
- 4. Refer to Clause D.1.9.4. for time of submission of the Payment Certificate. The Departmental Project Manager will arrange for payment to be made within 21 days of submission of the certificate to his office, (refer to the Appendix to Tender Annexure B3.3).
- 5. The payment certificate must be submitted under cover of Form PW 156 (Annexure D1.2) which must be filled in as follows:

Item 1 CONTRACT PARTICULARS

Item 1.1 Contract Sum

The original contract sum (Tender Price) must be filled in including any allowances for VAT, Contingencies, etc.

This amount must be used for calculating the Limit of Retention (see Item 3.6).

Item 1.2 Variations: Nett additions/omissions

This item must not be completed on civil contracts. Work done against variation orders must be included in Item 3.1 (see Clause 3 above).

Item 1.3 Estimated Contract Price Adjustment

The estimated total value of Contract Price Adjustment on completion is to be indicated here.

Item 1.5 Estimated Final Value

Fill in the latest estimate of completion value for the Contract (Contract Price – Clause 1(1)g of GCC '90). This amount should be that used in completing Annexure D4 but should also include estimated CPA as per 1.3 above. It is required for Departmental financial control only and is not used elsewhere on the form.

Item 3 **PAYMENT DETAILS**

- Item 3.1 Value of Work Done
 This total must be brought forward from the summary sheet referred to in Clause 3 above.
 Item 3.2 Materials on Site
 100% of materials on site, for which the necessary proof of ownership can be produced, must be paid for under this item. (See PRM035civ in this regard). For civil contracts a certain percentage, to conform to the specification in the "Appendix to tender" (Annexure B2), is again subtracted under item 3.7.
- Item 3.3 Materials Off Site

Does not apply to civil contracts – see item 2.7.

Item 3.4 Contract Price Adjustments

In terms of GCC '90 escalation must also be paid on value of materials on site.

Contract Price Adjustments in respect of nominated sub-contractors should not be taken into consideration here but should be included in the amount reflected under Item 3.5.

Should the Contractor exceed his contract period, Clause 3.0 of the Contract Price Adjustment Schedule must be applied.

Item 3.5 Nominated Sub-contractors

The name of and amount due to all nominated sub-contractors (including Contract Price Adjustment and VAT where applicable but excluding materials on site) must be indicated here.

Item 3.6 Retention Money

Calculate the Limit of Retention from the percentage stated in the Appendix to the Tender and item 1.1 and enter in the space for maximum retention. Calculate normal retention at 10% of SUB-TOTAL A and enter the space for retention money. Carry the lesser of the two into the right hand (money) column. After the issuing of the Certificate of Completion, 50% of the above values must be used. Should the Contract be divided into separate portions (phases), the above calculations should be repeated separately for each individual phase of the work on a summary sheet and the total of the minimums carried to the right hand (money) column.

Item 3.7 Materials on Site

Payment for materials on site may only be made on receipt of proof of the Contractor's ownership certified by the Supplier.

Advances for materials on an extended site may only be authorised after approval by the Departmental Project Manager.

The 85% advance (100% payment under item 3.2 minus 15% under item 3.7) for materials on site is a maximum and due care must be exercised in making any advance.
ANNEXURE D1.1/4

Refer to Clause B.2.5 of this manual.

Item 4. **DEDUCTIONS**

Item 4.1	Previous Payments
Item 4.2	Penalty for Late Completion
	Should the Contractor exceed his contract period, Clause 46(1) of GCC '90 (penalties) must be applied progressively.
Item 4.3 Item 4.4	Other (Specify)
	Any direct payments made by the Department on behalf of the Contractor must be filled in here. Such amounts must also be included in the value of work done (SUB-TOTAL A) or elsewhere in the certificate.

This item may also be used to recover overpayments to the Contractor on other contracts as directed by the Project Manager.

Item 7 AMOUNT PAYABLE

Item 8 STAGE

The progress of the least advanced phase of the Contract must be indicated.

ANNEXURE D1.2



PROGRESS PAYMENT

PW1526 (PRM034/2)

Key Information Advice Number F Category Code* F Distribution C WCS Number C Contract Number C	Payee's Code Payment Number Contractor's Code (* screen print of #WE06PE to be attached)
SERVICE:	
CONTRACTOR: PAYEE	
ADDRESS	
	VATNO
Contract Sum 14% VAT inclu	
1 ESTIMATED FINAL COST: 1.1 Contract Sum MINUS VAT 1.2 Estimated variations Excluding VAT 1.3 Estimated Contract Price Adjustment 1.4 Estimated VAT (14%) 1.5 Total	+/+
2 DATE OF VALUATION	
3 PAYMENT DETAILS: Payment No: Certificate No: 3.1 Value of work done	+
3.4 Contract Price Adjustments: Principal Contract	+
3.6 MINUS Retention Money: Maximum Retention Money = 3.7 PLUS Material on Site (Civil Contract) of 3.8 Miscelaneous (Specify) PLUS: MINUS:	SUB TOTAL A - + R0.00 + SUB TOTAL B
4 DEDUCTIONS: 4.1 Previous Payments No: 1 To: 1 4.2 Penalty for late completion 4.3 Penalty for non-compliance with APP 4.4 DIRECT PAYMENTS to Nominated Sub-Contractors/Suppliers 5 NET AMOUNT 6 PLUS VAT (14%) (Cumulative:) 7 AMOUNT PAYABLE	- - - - - - - - - - SUB TOTAL C - This payment +
8 STAGE **Code 4 ** 1=Progress payment 2=First Delivery 3=Final Delivery 4=Final I	Payment
Expected date of First Delivery if Stage =1	
Thereby certify that in terms of this Contract the payee is entitled to the paye CERTIFICATE DATE: \square	nent as calculated above
	Signed: Principal Agent/Representative
	NUMBER:
D Payment Authorised By Project Manager:	Updated By Assisting Official:
Print Name:	Print Name:
Signature:	Signature:
Bank: Date:	Rank: Date:
Verified By Finance Section:	
Print Name:	Rank:
Signature:	Date:

FINAL STATEMENT

- 1. Appropriation of drawings must be done as work proceeds. Final measurements and quantities for completed sections of the Contract must be agreed with the Contractor as soon as possible after completion of such sections of the work.
- 2. The final statement for the Contract must be in accordance with Annexure D2.2.
- 3. The final account must be certified in accordance with Annexure D3 and forwarded to the Departmental Project Manager within three weeks after your receiving the official decision regarding imposition of penalties. The Department will forward the final account to the Contractor for signature.
- 4. Where work has been done as daywork, the final account must be accompanied by an audited statement regarding the wages paid to the relevant employees as well as time sheets and invoices for all materials used, certified by the Engineer's Representative. See also Section E Clause E.1.3.
- 5. Variation order work must be summarised in a separate schedule, such work must not be remeasured in the other schedule. See also Section E – Clause E.1.2.

ANNEXURE D2.2 PRM044/1civ

DEPARTMENT OF PUBLIC WORKS FINALISATION OF FINAL ACCOUNT

- 1. Prerequisites for Departmental approval of the final account
 - 1.1 "Certificate of Completion" (PRM041civ/2) issued.
 - 1.2 "Certificate of Compliance and Indemnity by Consultants" (part 1 only) (PRM045/1civ) signed.
 - 1.3 "Final Statement" (PRM044/2civ) signed by all consultants involved.
 - 1.4 "Contract Completion Report" (PRM043/1civ) finalized (not necessary if nil report).
 - 1.5 "Geographical Targeted Procurement Management System" (GTPMS) compliance evidence handed in (relevant DF form).
 - 1.6 Guarantees, certificates, maintenance contracts and manuals
 - 1.6.1 When applicable submit guarantees e.g. roof, waterproofing, etc.
 - 1.6.2 Control and confirm that electrical certificate of compliance has been issued.
 - 1.6.3 Control and confirm that maintenance contracts are in place where this is contractually required (Ceded to the Department if required from a nominated sub-contractor).
 - 1.6.4 Where applicable, submit operational and maintenance manuals and maintenance specifications.
 - 1.6.5 When applicable, submit as-built drawings for mechanical installations provided by the contractor.
 - 1.6.6 Control and confirm that the original site instruction book(s) and site visitor book have been submitted to the Department.
- Prerequisites for final payment to the contractor
 - 2.1 Accepting the final account after approval by the Department in signing of the "Final Statement" by all parties including the contractor (resolution of signature from contractor required). The exception is that the final account shall be deemed signed by the contractor after three months if the contractor fails to object and sign subject to Clause 52(10) of the General Conditions of Contract '90.

Note: The Final Statement can only be presented to the contractor for acceptance subsequent to the acceptance thereof by the Departmental project manager and the Director-General of the Department of Public Works.

- 2.2 "Final Approval Certificates" issued (PRM046/civ).
- 3. Prerequisite for final payment to consultants
 - 3.1 Signing of the "Final Statement" by the concerned consultant(s).
 - 3.2 Signing of the "Certificate of Compliance and Indemnity by Consultants" (PRM045/1civ and PRM045/2civ) by the concerned consultant(s).
 - 3.3 Submission of "As Built" drawings on A size 0.08mm thickness polyester film marked "As Built" dated and signed by concerned consultant (principal).
 - 3.4 "Final Approval Certificates" (PRM046/2civ) issued.
 - 3.5 Compliance certified and reconciliation of the prescribed space and cost norms submitted when applicable, by the concerned consultant(s) (PRM019/1 and -/2).

pp DIRECTOR-GENERAL DEPARTMENT OF PUBLIC WORKS

DATE:

DEPT. PROJECT MANAGER

DATE:

I, the undersigned, duly authorised, accept the above statement as correct.

CONTRACTOR

DATE:

DATE:

CONSULTING ENGINEER

PRINCIPAL AGENT / LEAD CONSULTANT

Applicable for engineering contracts where 12 months retention period is required and retention amount also included in final value of contract

FOR DEPARTMENTAL USE F.4 Name: _____ OPW: _____ Contract close out captured on WCS (WG10PU):

Date:

ANNEXURE D2.2 PRM044/2civ

DEPARTMENT OF PUBLIC WORKS FINAL STATEMENT

WCS NO: _____REFERENCE NO: _____

PROJECT:

CONTRACTOR:

NET AMOUNT OF CONTRACT (EXCLUDING VAT)		R			
APPROVED VARIATIONS		R	-		
		R	+		
		R			
PLUS: CONTRACT PRICE ADJUSTMENT		R	+		
LESS: CONTRACT PRICE ADJUSTMENT		R	-		
		R			
(1) LESS: Penalty for Late Completion (PW156 4.2)			_		
(2) LESS: Penalty for Non-Compliance with APP (PW156 4.3)	(2) LESS: Penalty for Non-Compliance with APP (PW156 4.3) R +				
			R		
VALUE ADDED TAX			R	+	
				-	
FINAL VALUE OF CONTRACT			R		
* RETENTION RETAINED (INCLUDING VAT)			R		

DATE

DEPARTMENT OF PUBLIC WORKS CERTIFICATE OF COMPLIANCE AND INDEMNITY BY CONSULTANTS

WCS NO: REFERENCE NO:

PROJECT:

DEPT. PROJECT MANAGER: PRINCIPAL AGENT / LEAD CONSULTANT: NAME OF CONTRACTOR:

- 1. I/We appointed (Engineers / Project Manager *) Consultants appointed to prepare the Final Account for this service, hereby certify that the final account has been prepared according to the following requirements:
 - (a) That it has been prepared in accordance with the Department's example;
 - (b) Where schedule rates are applicable these have been used and non-schedule rates, where possible, have been based on schedule rates;
 - (c) Where it is not possible to use schedule rates, items have been priced by me/us in accordance with the appropriate clause of the Condition of Contract. Calculations of non-schedule rates have been included with the final account and invoices, quotations, etc., where applicable are also attached thereto;
 - (d) Copies of all invoices, receipted accounts, etc. mentioned in the final account are attached and are cross referenced to the items in the final account;
 - (e) Fluctuations in cost are in accordance with the contract price adjustment provisions laid clown in the schedule of quantities;
 - (f) All "daywork" sheets duly approved have been checked and attached to the final account;
 - (g) All items included in the final account (except provisional items) are covered by the necessary approved variation orders or written site instructions;
 - (h) All provisional items have been remeasured. Where provisional items have been varied, a list of all such unvaried items has been included in the final account, stating that such items have not been executed as measured;
 - (i) All fruitless expenditure has been identified in the final account and a list of these items with their respective values, is attached thereto. For the purpose of this subclause "fruitless expenditure" shall mean the value of the work carried out and subsequently altered as a result of negligence and/or defective planning, resulting in work already planned and executed in good faith being made undone;
 - (j) All calculations and amounts have been checked;
 - (k) No payments have been made to the contractor, which are not in terms of the Contract;
 - (I) Unless otherwise instructed by the Department, penalties for late completion of the contract have been deducted from monies due to the contractor and the deduction shown on the final statement.
 - * Delete which is not required

I/We indemnify the Department against any overpayment which was made in terms of the final account as a result of incorrect information provided by me/us unless I/we can prove to the reasonable satisfaction of the Department that there was no negligence on my/our part or on the part of anyone in my/our employ. The Department shall be obliged, against payment to it in terms of this indemnity, to give cession to me/us of such claims as it may have against the contractor or any other party as may be necessary to enable me/us to recover from the contractor or any other party the amount paid over in terms of this indemnity. This document shall not constitute any novation of my/our obligations towards the Department.

SIGNATURE

DATE

FIRM / CONSORTIUM / FIRMS-IN-COLLABORATION

ANNEXURE D4.1

The Director General		Your Ref:	
Private Bag X65		WCS No	
0001		My Ref:	
Attention: Departmental Project Ma	anager		
Service:			
Attached please find a copy of th	e minutes of site me	eeting no	
CONSULTING ENGINEER:			
CONTRACTOR:			
		-	
ORIGINAL TENDER	DETAILS	ESTIMATED FINAL DE	TAILS
Tender amount (Latest revision)		Estimated final contract amount as	on
Approved by Department on:	(date)		(date)
Schedule Items	[Schedule Items	
		Be-measurements	
		Approved Additional Work (VO's)	
		Estimated CPA	
Sub-total		Sub-total	
VAT		VAT	
TOTAL		TOTAL	
CONTRACTUAL DATES		OVER-/UNDER EXPENDITURE	
Commencement date	(date)	Amount	
Commencement date Contract period	(date) (months)	Amount Percentage	
Commencement date Contract period Completion date	(date) (months) (date)	Amount Percentage Percentage time lapsed	
Commencement date Contract period Completion date	(date) (months) (date)	Amount Percentage Percentage time lapsed Percentage money spent	
Commencement date Contract period Completion date <u>APPROVED COMPLETION DATE</u>	(date) (months) (date)	Amount Percentage Percentage time lapsed Percentage money spent CONTRACTUAL DATES	
Commencement date Contract period Completion date <u>APPROVED COMPLETION DATE</u> Approved extension of time	(date) (months) (date) (days)	Amount Percentage Percentage time lapsed Percentage money spent CONTRACTUAL DATES Extra time acceptable for extention of time	(days)
Commencement date Contract period Completion date APPROVED COMPLETION DATE Approved extension of time	(date) (months) (date) (days) (date)	Amount Percentage Percentage time lapsed Percentage money spent CONTRACTUAL DATES Extra time acceptable for extention of time Estimated contract period	(days) (months)

EXPENDITURE TO DATE	ESTIMATED EXPENDUTURE (Including VAT)				
Payment certificate No Certificate date	(date)	Previous financial year: (20/20) (date) Present financial year: (20/20) Future financial years:			
Value of Work		(20/20)			
СРА		(20/20)			
VAT					
TOTAL		TOTAL			
% of Estimated Expenditure		PREVIOUS EST	IMATED EXPENDI	TURE	
		1			
Estimated value of next two paymer	t certificates	Cert. No	Date	Amount	
(Including VAT)					

Reasons for change in Estimated Expenditure:

Signature:

Date:

GUIDELINES

The different forms, making up the complete submission, are spread over 5 forms, each as per tab at the bottom of worksheers

Start by completing the forms by moving from the second tab to the next until PRM033-4

Only type the required information in shaded cells - unshaded cells contain formulas etc, do not alter or remove theses!

Repeating information need not be typed in again as Excel does this for you

This format makes provision for five site staff members. If less are required, simply enter zeros in the remaining spaces where no names are entered and regard these as "full time", in other words replace the "#" on PRM033-1 with a "1". If additional site staff personnel are required at a later stage, replace the zeros with actual data and the correct symbol against full or part time - this way the officials having to make decisions can always have the complete cost picture. Hide the portions not required if less than five members are applied for - when printing these will not show.

Start to open tab marked "PRM033-1:

Rows 7 and 9: delete the Post descriptions which are not aplicable

Complete all shaded cells

Follow the instructions emphasised by the red blocks and arrows. Be sure to follow the method description exactly

Type the motivation for the site staff in the appropriate block:

State the reasons why site staff is/are required clearly, stating what the effect will be if not appointed, under which regulation the appointment is requested, what the duties of the site staff will be

Costs for all disciplines can be entered - the value for "building" will automatically appear as the difference between the Total and the sum of the others (civil, stuctural, electrical, mechanical and electronic)

Open tab marked "PRM033-2:

Type in the appropriate values in the shaded cells

Open tab marked PRM033-3:

One of two possibilities exist: site staff is either "full time" or "part time", depending on the entry on PRM033-1

Excel will indicate one as "not applicable" depending on what was entered on PRM033-1 Complete the shaded cells in the scenarion that is not marked "not applicable" If no indication was entered on PRM033-1, both scenarios will be marked "not applicable" If both are marked "not applicable", go back to PRM033-1 and indicate the appropriate scenario

Tab: PRM033-4:

If all information was correctly entered on the previous tabs, there should be no need to type/enter anything in this sheet

Tab: ROUTE FORM:

If all information was correctly entered on the previous tabs, there should be no need to type/enter anything in this sheet

Go to File / Print ; in the box entitled: Print What" Tick "Entire Workbook" Forward for approval cycle.

ROUTE FORM

Project:

WCS: 0

Application for the Appointment of Site Staff Confidential

То:	Signed :	Date:]
	-	1	1
Project Manager	0		
	0		
D/Major Projects: ~ D/Maintenance	: ~ Chief Regional Project Mar	ager (delete which is	not applicable)
	0		
Chief Director: Development Operation	ntions ~ Area Manager: … (del	ete which is not appli	cable)
	0		
	Chief Degianal Draiget Mar	ener (delete which is]
D/Major Projects: ~ D/Maintenance	al	lager (delete which is	not applicable)
	8		
Project Manager			1
	0		

0

PRM 033-1

Appl	cation Addressed to:					
1	Principal Agent					
<u></u>						
_	Due le et Mere e see		1		ļ	
2.	Project Manager					
3.	D/Major Projects: ~ D/Mainte	nance: ~ Chief Regional Project Manag	er (delete whic	h is not applica	able)	
4.	Chief Director: Development	Operations ~ Area Manager: (delete	which is not ap	olicable)		
	•	· · ·		•		
			1			
4 00	O IECT:			WCC.		
1. PK	OJECT:			WCS:		
			Qualifi-	Appointed		
Site \$	Staff Nominated for Appointm	ent:	cation:	Discipline		
1	••					
2						
3						
3						
4					-	
э					Į	
	NB:					
Enter	first letter of ONE Discipline onl	y (no combination): "B" for Building,				
"S"fo	r Structural, "C"for Civil, "E"for	Electrical, "EL"for Electronical/Security, "M	"for Mechanic	al.		
2. Co	ntact Particulars:					
		Address:	Age:	Phone:		
0			-			
0						
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0						
_						
3. An	ticipated Contract Period:					
3. An	ticipated Contract Period:			Total		
3. An	ticipated Contract Period:	From (date) to (date):		Total Months:		
3. An	ticipated Contract Period:	From (date) to (date):		Total Months:		
3. An 4. An	ticipated Contract Period: ticipated Period(s) of appoint	From (date) to (date):		Total Months:		
3. An 4. An	ticipated Contract Period: ticipated Period(s) of appoint	From (date) to (date): ment(s)		Total Months:		
3. An 4. An	ticipated Contract Period: ticipated Period(s) of appoint	From (date) to (date): iment(s)	Full Time	Total Months:		
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3. An 4. An	ticipated Contract Period: ticipated Period(s) of appoint	From (date) to (date): ment(s) No of Months on Site	Full Time	Total Months: Part Time		
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PRM 033-1



PRM 033-1

		(0011122111112)		
0				
NAME	OF FIRM:			
DATE:	1			
SIGNE	ED	Standard Form Amendment Date:	6-Aug-02	

PRO	JECT:			WCS:
	_		0	0
				<u> </u>
NAM	E:			
		<u> </u>		0
				Per Month
1	Fringe Be	nefits not included in Basic Salary which may include):	
	а	Normal Annual Bonus (expressed per month)		
	b	Group Life Insurance Premiums		
	С	Employers Contribution to Medical Aid		
	d	Pension/provident Fund Contribution		
	е	Other Costs as per Letter of Appointment		
		Specify:		
		TOTAL:		R0.00
			_	<u> </u>
2	Costs Pay	vable Due to Statutory Requirements which may inclu	<u>de:</u>	
	a	Workman's Compensation Fund Contributions		
	b	Unemployment Insurance Fund Contributions		
	C	Regional Services Council Levies		
	a			<u> </u>
60	+			
	<u> </u>			
		TOTAL		D0.00
		TOTAL:		R0.00
2				
<u> </u>	<u>Site Assoc</u>			
				R0.00
	+			1.00
ΝΔΜ		•		
		<u>.</u>		
	F.	0-Jan-00		
	<u> </u>			
	+			
SIGN	IED	Standard Form Amendment Date:	6-Aug-02	

PRM 033-3

				14/00
PRO	JECT:			wcs:
			0	0
NAM	E:			
	-		1	0
	This Applic	ation is for:		
		Puil Time Supervision	#	
			#	
1	Basic Annu	lal Salary (expressed per month)		
2	Fringe Ben	efits not included in 1 (PRM033-2)		R0.00
3	Costs Paya	able Due to Statutory Requirements (PRM033-2)		R0.00
4	TOTAL CO	ST OF EMPLOYMENT		R0.00
5	12% of 4 (s	see note D below)		Not Applicable
6	Site Associ	iated Allowances (if any) (PRM033-2)		Not Applicable
7	10% of Iten	n 6 above		Not Applicable
8	FULL TIME	E SUPERVISION (Total 4 to 7)		Not Applicab
9	PARTTIM	ESUPERVISION		
	9.1	Annual Cost of Employment (Item 4 above X 12months)		Not Applicable
	9.2	Rate (according to note A below)		
	9.3	Hours to be Spent on Site (see note B below)		
	9.4	R/hour rate If R/hour rate is more than max.		Not Applicable
	9.5	Part Time Remuneration with the max amount		Not Aplicable
10		#VALUE!		
10	IRAVELLI	NG Distance to and from the Cite (actimated)	(1,000)	
	10.1	Distance to and nom the Site (estimated)	(KIII) (km)	
	10.2	Total distance (10.1+10.2) (see note C below)	(km)	0.00
	10.3	Rate for travelling (at the time of application)	(R/km)	0.00
	10.4	Total Cost of Travelling	(1)/((1))	R0.00
	Notes:			1.0.00
ic the	A A	Enter "15" or "17.5", depending on the level of Site Staff	Membe	r applying for
in ex ated t		according to the Departmental category based time fee	rates	r applying lol,
e site notiva	В	A maximum of 50 hours may be applied for. Time spen	t on site	in excess
m the ally n		hereof will be without further remuneration.		
d froi	С	Distances applied for here may not be exceeded without	t prior a	proval of the
to an e spe ger		Departmental Project Manager. Remuneration of travell	ing will	be calculated
avel Itob		according to actual distances per month at the applicabl	e rate o	f the time of
JOKT JOKT ect N	D	Surcharge of 12% is only payable for site staff who are in	n ful tim	e employ of
Retu of 11 Proj		the appointed firm and will have to attend to full time site	superv	ision
NAM		0		
		0lan-00		
				<u> </u>
	<u> </u>			
SIGN	ED	Standard Form Amendment Date:	6-Aug-02	

PRM 033-3

PROJECT:			Ì	,				WCS:
							0	0
It is recommended that the following Site Staff	:							
Name:	Discipline	Full/Part Time:	Month	Total Salary:	Cost of Travel:	Total Cost of Site Staff:	% of Contract	% of Disci- pline
0	0	Part Time	-	#VALUE!	R0.00	#VALUE!	#VALUE!	FALSE
0	0	Part Time	-	#VALUE!	R0.00	#VALUE!	#VALUE!	FALSE
0	0	Part Time	-	#VALUE!	R0.00	#VALUE!	#VALUE!	FALSE
0	0	Part Time	-	#VALUE!	R0.00	#VALUE!	#VALUE!	FALSE
0	0	Time	-	#VALUE!	R0.00	#VALUE!	#VALUE!	FALSE
he enneinted for Supervision on the Preject			0			#VALUE!	#VALUE!	
be appointed for Supervision on the Project:			0					
for the disciplines, periods and remuneration b	asi	is as state	d he	rein. Said appo	intment(s) are to	be made in ter	ms of the r	elevant
			ligat					
I, as Project Manager, undestand that, should any required, I must seek prior approval therefor befor	dev eis	viation, ext suing the r	ensio neces	n, alterartion and sary instruction t	l/or amendment t o the Professiona	o the terms of thi al Team.I confirr	s approval l n that the	De
Recommended / Not Recommended			-	Supported / Not	Supported			
Project Manager		Data	-	D/Major Project	be: D/Maintona	naa: Chiaf Ba		Data
0		Date	-		is. ~ D/maintena			Date
Approved / Not Approved								
Chief Director: Development Operations ~ Area	a Ma	anager:	(de	lete which is no	t applicable)	Date		
0					,			
	1	1	1			Standard Form	Amendment Date:	6-Aug-02

ANNEXURE D6 PRM043/1civ

DEPARTMENT OF PUBLIC WORKS CONTRACT COMPLETION REPORT

A	CONTRACT PARTICULARS:		
1.	File No. HO / RO 2. WCS	No. 3.	Tender No.
4.	Service		
5.	Contractor		
6.	Contract sum R	11. Extended contractu	al completion date
7.	Tender acceptance date	12. Date of first delivery	/Actual completion
8.	Contract period	13. Days completed late	e
9.	Original contractual completion date	14. Penalty per day	R
10.	Extensions approved (calendar days)	15. Penalty imposed	R
B Tabu	EXTENSIONS GRANTED PRIOR TO COMPLI	ETION extensions granted)	Days (calendar)
-			
С	CONDONATIONS FOR CONSIDERATION		
Tabu addii	Iate incidents which can be taken into account w ional supporting documents if necessary)	hen applying penalties (attach	Days (calendar)
			·

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager

ANNEXURE D6 PRM043/2civ

1

D	WORK PERFORMANCE on the WCS with "X". At	E OF CO tach or re	NTRACTOR (NOTE fer to correspondence	: Mark any ce.)	negative aspect the	at has been or should	be captured
1.	Problems encountered:	(a)	Guarantee/Security	(b)	Site hand over		
2.	Programming of work						
3.	Quality of work						
4.	Recommendation re grading:	(a)	Unlimited capabilities	(b)	Cannot be recomn contracts	nended for future	
		(c)	Limited capabilities	Ca	an manage contracts t	to the value of <u>R</u>	
E	SECTION A TO D COM	PLETED	BY:				
-	PRINCIPAL AGENT / PR	ROJECT	MANAGER (PRIVATE	E / IF ANY)	-	DATE	
	SUPPORTED BY:						
	DEPARTMENTAL PROJ	IECT MAI	NAGER			DATE	
F	COMMENTS BY D/MP,	D/Maint,	C/RPM				
	No delay, no pe	enalty			Full penalty to be	e applied in terms of the	e Contract
					Penalty to be wa C of this report	ived / reduced accordi	ng to section
	D/MP, D/Maint, C/RPM				-	DATE	

ABBREVIATIONS

Г

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager

G	PENALTY COMMITTEE CD/DO, CD/P+FM (refer first to CD where the project was initiated.) (In the event of full penalty or no penalty (no delay) the RM, D/MP or D/Maint may act on behalf of the Penalty Committee.)								
1.	Recommendation								
-									
2.	CD/DO or CD/P+FM Decision: A penalty of	must be imposed for	DATE	days.					
-	CD/P+FM or CD/DO or RM or D/MP or D/Maint		DATE						
Н	PROCUREMENT SECTION								
1.	WCS updated re contractor's performance (#WG07PU)		Date:						
2.	WCS updated re penalty decision (#WG07PU)		Date:						
3.	Contract completion report to DPM		Date:						

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager

Organigram pertaining to the handling of the Contract Completion Report (PRM043)



НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager

Directive pertaining to the handling of the Contract Completion Report (PRM043)

- 1 This report must be handled immediately after completion of the works.
- 2 The Principal Agent (or Private Project Manager, if one was appointed) must complete sections A to D of the report which must be supported by the DPM.
- 3 Thereafter at HO the DPM's Director or at RO the DPM's C/RPM comments on and signs the report.
- 4 Should one of the following apply, the report does not necessarily need to be submitted to the Penalty Committee but may be signed off by the D/MP or D/Maint at HO or by the RM at RO:
 - 4.1 When the contract was completed in time (no penalties).
 - 4.2 When extension was granted for all delays (no penalties).
 - 4.3 When extension was granted for part of the delays and no application was received for the waiver, reduction or condonation of the balance of the delays (penalties apply for the balance of the delays).
 - 4.4 When delays occurred and no application was received for the waiver, reduction or condonation of these delays (penalties apply for the full delay).
- 5 After the report has been signed off, the Procurement Section at HO or at RO, as the case may be, updates the WCS (#WG07PU) regarding the contractor's performance and the decisions on penalties, if any. A copy of the report is then submitted to the DPM, who must immediately inform the consultants of the penalty amount (if applicable) to be included in the final account.
- 6 Should the contractor apply for the waiver, reduction or condonation of all or any part of the delays, the report must be referred to the Penalty Committee at HO for a decision. The Penalty Committee consists of the CD/DO and the CD/P+FM.
- 7 Applications for decisions by the Penalty Committee must for HO services be send through the HO Procurement Section and for RO services through the RO Procurement Section whom must in turn send it to HO Procurement Section.
- 8 After the Penalties Committee's decision, the report is returned along the same route as described in 7 above. The Procurement Section at HO updates the WCS (#WG07PU) regarding the contractor's performance and the decision on penalties. A copy of the report is then submitted to the DPM. The original Contract Completion Report must be placed on the central file (HO or RO, which ever the case may be).
- 9 The DPM informs the Principal Agent as well as the Consultant, if any, of the decisions in the report to be implemented.

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager

1

Contract number:	
WCS No.	
Consultant Ref No.	

DEPARTMENT OF PUBLIC WORKS

Date of writing minutes

MINUTES OF SITE MEETING NO. ? HELD AT time ON day date AT THE SITE OFFICE OF contractor name AT location of offices FOR THE contract description.

DEPARTMENT OF PUBLIC WORKS	CONTRACT/
CONSULTING ENGINEER	
CONTRACTOR	
TENDER SUM	
TIME FOR COMPLETION	
CONTRACT STARTING DATE	
CONTRACT COMPLETION DATE	
EXTENSION OF TIME GRANTED	
REVISED COMPLETION DATE	

1.

ATTENDANCE

1.1 DEPARTMENT OF PUBLIC WORKS

1.2 (Client / User Department name)

1.3 (Contractor name)

- Head Office
- Site Office

1.4 (Principal Agent / Lead Consultant name)

:

:

1.5 (Consultant name)

:

:

- 1.6 <u>Other</u>
- 1.7 <u>Apologies</u>

2.	REPRESENTATIVES

2.1 Employer

2.2 Client / User Department

2.3 <u>Contractor</u>

Head Office : Site Office :

2.4 Principal Agent / Lead Consultant

Head Office	:
Site Office	:

2.5 <u>Consultant</u>

Head Office Site Management

3. MINUTES OF PREVIOUS MEETING

3.1 Approval

3.2 Matters arising

To be discussed together with new items on agenda

:

:



8. EXTENSION OF TIME

8.1 Record of Extension of Time due to Rainfall

A summary of the rainfall, standing time and temperatures as agreed to on site is as follows :

ACTION

	Date	Rainfall (mm)	Min. Temp. (°C)	Max. Temp. (°C)	Standing time (days)	
						Extension
						of time (V)
						Recorded
Total	Rw =					(days)
	v	= (Nw - N	in) + <u>(F</u>	$\frac{Rw - Rn}{X} =$		

8.2 Applied for and Approved Extension of Time

Reason for Extension of time	Date Applied For	Date Approved

9. SITE INSTRUCTIONS

9.1 All site instructions issued during the contract period will be dealt with under this item.

10. CONTRACT DRAWINGS

- **10.1** <u>New Drawings and Amended Drawings</u> All new drawings issued during the contract period will be listed under this item and will be issued with a Site Instruction.
- 10.2 Drawing Amendments
- 11. MATERIAL DESIGNS, SUBMISSIONS AND APPROVALS
- 11.1 Borrow pits and Gravels

11.2 Surfacing and Similar

11.3 Concrete Mix Designs

12. SAFETY ON SITE AND ACCOMMODATION OF TRAFFIC

12.1 <u>Accidents</u>

Refer to Annexure VI

13. VARIATION ORDERS

13.1 <u>Variation Orders</u>

Additional work shall only be ordered upon approval of the employer. Specific numbers will identify variation orders (e.g. VO1, VO2 etc.), in the monthly payment certificates:

ACTION

13.2 Daywork Orders

Daywork shall only be undertaken upon the instruction of the engineer.

14. MEASUREMENT AND PAYMENT

14.1 Measurement of quantities and finalisation thereof must be undertaken on a continuous basis to avoid re-measurement at a later stage.

14.2 Payment certificates handed in are as follows :

Value	Date submitted	Date paid
	Value	Value Date submitted

15. BUDGETING

15.1 Estimation of the contract amount will be recorded against the original tender sum on a continuous basis to assist the employer in the project budgeting. Any items of work not shown on the drawings or in the schedule of quantities must be regarded as omitted from the schedules of quantities and classified as a possible over-expenditure.

15.2

16. BORROWPITS & SIMILAR (if applicable)

16.1 Strict control is to be exercised at the borrowpits regarding excavations and final finishing of the areas.

16.2 All dealings etc. shall be recorded here.

17. LOCAL AUTHORITIES,COMMUNITY AND LANDOWNERS

17.1 Any dealings or negotiations shall be recorded here.

18.	CLAIMS		
-----	--------	--	--

18.1 The contractor must familiarise himself with the procedure stated in the General Conditions of Contract should he consider submitting a contractual claim.

ACTION

- **18.2** The Employer expects the engineer's representative and the site agent to work in close co-operation with one another in terms of the daily running of the contract and differences are to be lodged timeously with the Engineer in order to prevent claim situations from developing.
- 19. ACCEPTANCE AND QUALITY CONTROL

19.1 <u>Acceptance Control</u>

The engineer is to \overline{d} efine the system to be used and ensure monthly that it is operational and reported on.

20. STANDARD OF WORK

20.1 All parties to report on standard of work after site inspection.

21. SUBCONTRACTORS

- **21.1** Subcontractors approved will be listed here.
- **21.2** Subcontractors including ABE's are to be dealt with under this heading.

22. COMPLIANCE WITH THE APP PROGRAMME AS PER THE CONTRACT DOCUMENT

22.1 Labour Maximisation

Contractual commitment and progress to be reported.

22.2 <u>ABE Utilisation</u>

Contractual commitment and progress to be reported.

22.3 PDI Supervisory Staff

Contractual commitment and progress to be reported.

22.4 Bonus / Penalties

ACTION



FOR contractor name

FOR consultant name

25. NEXT MEETING

25.1 Dates reserved for future meetings :

26.

DISTRIBUTION OF MINUTES

AUTHORITY	ADDRESS	NO OF COPIES
Department of Public Works Tel : Fax : Cell :	Mr.???? Postal Address	
<u>Client / User Department</u> Tel : Fax : Cell :	Mr.???? Postal Address	
Principal Agent / Lead Consultant Tel : Fax : Cell :	Head Office Mr. Postal Address	
<u>Consultant name</u> Tel : Fax : Cell :	Head Office Mr. Postal Address	
Tel : Fax : Cell :	<u>Site Office</u> Mr.	
<u>Contractor name</u> Tel : Fax :	Head Office Mr. Postal Address	
Tel : Fax : Cell :	Site Office Mr.	
Others as requested by Department		
TOTAL N	UMBER	

27.	ANNEXURES		
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- I SITE INSTRUCTIONS
- II AMENDED DRAWINGS ISSUED
- **VARIATION ORDERS** Ш
- IV PROGRESS
 - (a) Cashflow diagram(b) Physical Progress
- ۷ CLAIMS
- VI ACCIDENTS

ANNEXURES FOR SECTION E

VARIATION ORDER: MOTIVATION



CONTRACT			
CONTRACTOR			
WCS No REFERE	NCE NoTEND	DER No	
(Mark applicable block with X)		VARIATION ORDER No.	//
1. REASON FOR VARIATION:		($\langle \rangle_{\Delta}$
1.1 ADDITIONAL WORK	1.4 OMITTED WORK		
1.2 SPECIFICATION CHANGE	1.5 OTHER		
1.3 DESIGN CHANGE			
2. MOTIVATION		$\langle 0 \rangle \langle$	
	/	1	
	h		
	\sim		
	(<i>V</i> ,)		
3. RATES ARE FAIR AND REASONABLE		ATES 3.2	NON-SCHEDULED RATES
4. FUNDS ARE AVAILABLE		UNDS ARE REQUIRED	
6. NO FRUITLESS EXPENDITURE IS INVOLVED	7. FRUITLESS EXI	PENDITURE IS INVOLVED	
RECOMMENDED			
FIR	CONSULTANT	DATE	
ACCEPTED FOR IS CONTRACTOR			
FIRM	PRINCIPAL AGENT	DATE	
APPROVED WITH RESPECT TO FINANCIAL	L POSITION RESULTING FROM VARIATIO	DN ORDER	
DEPARTMENTAL DELEGATED OFFICER	OFFICIAL TITLE	DATE	

PW778 (1)

VARIATION ORDER



CONTRACT								
CONTRACTO	R							
WCS No	REFERENCE N	o	TE	NDER No			•	
	DESCRIPTION (WITH No. OF SITE I	INSTRUCTION AND	ek					MATE
	DATE ISSUED)		NON SCHEDULE ITEM MARK	UNIT	QUANTITY	RATE	$\overline{\mathbf{x}}$	оміт с
						h	Ň	
					0)			
			R	V /	V			
			Ň	M				
		TOTAL						
THE ABOVE	PATE DAT	JJJ	/ BA	SE MONT	TH (DELETE IF	NOT APPL	ICABLE)	
RECOMMEN								
	FIRM	CONSULTANT					DATE	
ACCEPTED F	OR ISSUE TO CONTRACTOR							
	IRM	PRINCIPAL AGE	NT				DATE	
APPROVED	APPROVED WITH RESPECT TO FINANCIAL POSITION RESULTING FROM VARIATION ORDER							
* DEPARTME	NTAL DELEGATED OFFICER	OFFICIAL TITLE				l	DATE	
* Variation Order can only be issued after being signed by the Delegated Officer PW778(2)05/02								

ANNEXURE E3

ANNEXURE E3



DEPARTMENT OF PUBLIC WORKS

SITE INSTRUCTIONS

File No	Tender No.	WCS No
Name of Service		
Contractor		
	DETAILS OF INSTRUCTION	\land
	~	
	$\langle \mathcal{O} \rangle$	
	·····	
·····		
	5	
//////////////////////////////////		
······		
Representative/Agent	D	ate
Instruction received by:		
Signature of Contractor/Forman	D	ate
NOTE: Site instructions having a fina	ancial implication must be supported by	an approved V.O. before being executed

1/2001
PRM FORMS:

(only PRM Forms modified for use in Civil Engineering Contracts)

DEPARTMENT OF PUBLIC WORKS HANDING OVER OF SITE MEETING MINUTES *

(Clauses 12 & 13 GCC'90)

-	PROJECT:
-	PROJECT MANAGER:
	PRINCIPAL AGENT:
•	CONTRACTOR:
j.	SITE MEETING NUMBER: <u>1:</u> 6. DPW TENDER NO:
' .	DATE OF MEETING: 8. WCS NUMBER:
).	
0.	CONTRACT INFORMATION:
0.1 0.2 0.4 0.6	Contract Award Amount: 10.3 Guarantee approved: Guarantee received: 10.3 Guarantee approved: Contract Commencement Date: 10.5 Contract period: Completion Date: 10.5 Contract period:
1.	ATTENDANCE REGISTER
	NAME FIRM DISCIPLINE TEL NO. FAX NO. POSTAL ADDRESS

12. **RESIDENT ENGINEER** (Clerk of Works)

If a Resident Engineer (Clerk of Works) is required, a proper motivation must be submitted by the Principal Agent to the Project Manager for perusal (Duties defined in Clause 2 of GCC'90).

13. CONTRACTOR

Contractor must make the name(s) available of his representative(s) for all contractual matters relating to the site (Contractor's Site Agent: Clause 25 of GCC'90), as well as the name of his foreman and a responsible person in accordance with the Occupational Health and Safety Act.

14. PROPERTY OWNER(S), GENERAL PUBLIC, LOCAL COMMUNITY, LOCAL AUTHORITIES, MOVEMENT INTO AND ON SITE

- 14.1 Role of / and relationship between local community (Project Steering Committee) and the contracting parties.
- 14.2 Nobody will be allowed on site without the necessary approval/permission given by the Contractor and or the Client/Owner (Security areas, National Defence Force installations or any other required security arrangement).
- 14.3 At SANDF installations the following must be taken in consideration:
- 14.3.1 Access permits must be arranged.
- 14.3.2 All permits for deliveries must be arranged two days in advance of delivery and to reflect at least the vehicle drivers particulars and the vehicle registration number and access approval for everyone on and in the vehicle.
- NOTE: * This pro-forma serves only as an example and the site meeting minutes of each project should be project dedicated
 - The site handover cannot take place without para.10.2 & 10.3 having been complied with in all respects

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- 14.3.3 All workers must be accompanied by driver/overseer. No loafing or idling of individuals in or around the gate of the site will be permitted.
- 14.3.4 Any deviation from formal designated areas and access roads will not be permitted. Any employee of the Contractor roaming about outside the designated area will be prohibited from coming onto the base.
- 14.3.5 The Contractor must at all times endeavour to prevent complaints from the SANDF due to his own or his employees' action(s) out of context of the contract.
- 14.3.6 The Contractor must immediately report in writing about any incident, occurrence or accident that may have contractual implications.
- 14.3.7 The Contractor must take care that due to the building operations the site and surrounding areas will be kept neat and tidy.
- 14.3.8 The establishing of borrow pits in security areas will not be permitted.

15. SUB-CONTRACTORS: CLAUSES 8 AND 9 OF GCC 1990

The names of all Sub-contractors to be employed by the Contractor during the contract period must be submitted to the Engineer / Principal Agent for approval. Suppliers are not ormalized as sub-contractors except where stipulated.

16. THE PRINCIPAL AGENT / ENGINEER: CLAUSE 2 OF GCC 1990

The Principal Agent / Engineer and / or his delegated representative(s) (consultants) where required will be in charge of the administration of the Contract for Supervision, quality control, financial control and norms and this includes all nominated or direct contracts.

17. SITE AND / OR PROGRESS MEETINGS

- 17.1 All representatives at the meeting(s) must be delegated to take binding decisions, although it may be sometimes necessary to refer some decisions to higher authority.
- 17.2 Any decision taken at the meeting must be ormalized in writing through an instruction in the site book, a letter of instruction and / or an approved Variation Order if required.
- 17.3 Any claim or intention to claim must be brought to the attention of the Meeting / Engineer / Principal Agent in writing and within 28 days of the cause of the delay or where contractually required any specific shorter period (clause 51 of GCC '90). Not complying with this instruction/procedure will be regarded as relinquishment of the claim.
- 17.4 All important matters must be brought to the attention of the meeting timeously and supported by a written notification.
- 17.5 The contractor may submit new tariffs for additional work in writing to the meeting only if the contract value is exceeded by 15% (clause 40 of GCC '90).
- 17.6 Any matters of a routine nature must be settled by the Engineer / Principal Agent and the Contractor's Representative before the meeting and only noted at the meeting if no agreement can be reached.
- 17.7 Special attention must be given at the meeting to the following:
- 17.7.1 Progress measured against approved programme
- 17.7.2 Variation Orders: applied for pending approved
- 17.7.3 Delays and disruptions
- 17.7.4 Quality and workmanship
- 17.7.5 Rain and weather condition records, authenticated by the Engineer's Representative.

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- 17.8 Any item being discussed will be allocated a unique reference number, which will be published in the subsequent minutes until the problem has been solved.
- 17.9 The minutes must have an action column in the right hand margin indicating which party/person needs to take the required action. The date by which such activity should be completed must be recorded.
- 17.10 All consultants to report on progress at the meeting.

18. CONTRACT DOCUMENTS AND DRAWINGS

Drawings and documents used for the contract must be properly filed for reference purposes and kept in a good condition on site until completion the project. Drawings replaced must be submitted to the Engineer / Principal Agent to be destroyed, which must also be done with all drawings on completion of the project.

19. DRAWINGS AND DOCUMENTS HANDED OVER TO THE CONTRACTOR

- 19.1 1 x PW371 Standard Specification
- 19.2 1 x PW320 Site instruction book pages numbered to......
- 19.3 1 x Visitors book
- 19.4 2 x sets of drainage details
- 19.5 2 x sets of Hardware sample list PW377
- 19.6 2 x copies of name board drawing, 1 x copy for contractor and 1 x copy for Engineer / Principal Agent to prepare
- 19.7 3 x sets of civil engineering drawings,
- 19.8 3 x sets of structural engineering drawings, (if applicable)
- 19.9 3 x sets of architectural drawings, (if applicable)
- 19.10 3 x sets of electrical engineering drawings, (if applicable)
- 19.11 3 x sets of mechanical engineering drawings, (if applicable)
- 19.12 Contract Document, 1 x priced copy **plus** 1 x blank copy, supplied by Civil Engineer

20. CONTRADICTIONS IN THE DOCUMENTATION

Anything unclear or contradictory in the documents must be timeously brought to the attention of Engineer / Principal Agent and this also includes the non-availability of specified material.

21. ESTABLISHING THE SITE

21.1 Camp site

Where the building site is within a SANDF base or within the confines of any other state owned property, and also not near an existing town or city, a camp site and the access to the site to be used by the contractor and his staff will be pointed out to the contractor. The campsite must be kept neat and tidy at all times.

21.2 F.5 BUILDING SITE

All building rubble must be removed from the site on a regular basis. Trees cannot be removed without approval by the Engineer / Principal Agent or the representative of the client department. After contract completion the stipulation of clause 22 of GCC'90 must be strictly adhered to.

21.3 Housing and Accommodation

The provision of housing or any accommodation for the contractor and / or his staff does not form part of this contract.

21.4 <u>Electricity and Water</u>

In most instances water and electricity is available, but if problems should arise the contractor must supply water and electricity. Under no circumstances will it be allowed to draw water from a fire hydrant.

The necessary arrangements must be made with the local suppliers to be connected to available services

21.4 Effluent and Garbage Disposal

Where a campsite for staff living quarters has been established it must be kept hygienic with ablutions connected to existing systems.

21.5 <u>Working Hours</u>

No work shall be done on Sundays and statutory holidays, especially at military installations. Working hours must be cleared with the client representative.

22. MEASURING AND PAYMENTS

- 22.1 The Contractor shall be entitled to receive a monthly progress payment which shall be based on a progress payment certificate issued by the Engineer / Principle Agent (Clause 52 of GCC '90).
- 22.2 All fees for supervision by consultants must be based on certified payment certificates with copies attached to the account.
- 22.3 Cost control of the contract is regarded as of vital importance and measurement of quantities, at completion of the contract, must be finalised in time. No work must be covered until measured by the Engineer / Principle Agent who has been given timeous notice of work completed. (Clauses 28, 52 to 55 of GCC'90)
- 22.4 The contractor must submit acceptable proof of ownership of material delivered on site before any payment in terms of Clause 52.(1)(e) of GCC'90 may be given, including proof that VAT has been paid. Ownership of materials on site shall revert to the Department of Public Works in terms of Clause 32 of GCC'90. The Contractor shall sign over the ownership to the Department by submission of form PRM035/1

23. SITE INSTRUCTIONS AND VARIATION ORDERS

- 23.1 The site instruction book may not be removed from the site until completion of work has been certified.
- 23.2 Only the Engineer / Principle Agent may remove pages from the site instruction book, but the original copy may not be removed at all.
- 23.3 Site instructions must be listed in the minutes of the next meeting following the site instruction date.
- 23.4 Site instructions, being formal and binding, will only be issued by the Engineer / Principal Agent or his delegated representative (other consultants).
- 23.5 Site instructions will be issued for the rectification of defective work with copies to the Contractor, Project Manager and all consultants.
- 23.6 On any instruction or additional work or adjustments that may have cost implications a variation order shall be issued, but only after permission has been obtained from the Principal Agent and the Project Manager.
- 23.7 The preparation of variation orders is fully described in the manuals and must be strictly adhered to and the following must also be taken in consideration:
- 23.7.1 Be sure that the extra work required is really necessary.
- 23.7.2 The Engineer / Principle Agent in issuing variation orders may not exceed the prescribed financial limits, i.e. contract value ±15%. (Cl. 53 of GCC'90)
- 23.7.3 When issuing a variation order, the availability of funds required must first be established. If this is not adhered to, the Department of Public Works will hold the Engineer / Principle Agent liable for unauthorised expenditure.
- 23.7.4 When issuing variation orders care must be taken not to exceed cost and area limits, all as directed by the Engineer / Principle Agent.
- 23.7.5 The Engineer / Principle Agent will prepare, approve and issue variation orders with the required input from other consultants.

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- 23.7.6 The proposed variation order shall be listed in the site meeting minutes.
- 23.7.7 All variation orders shall be listed in the financial report.
- 23.7.8 Variation orders may not be used to rectify bad/incorrect design or workmanship.
- 23.7.9 Copies of variation orders will be issued by the Engineer / Principle Agent to:
 - Other Consultants (if applicable) (with figures)
 - The Contractor (without figures)
 - The Project Manager (with figures)
- 23.7.11 Engineer / Principle Agent to prepare variation order drawing with copy to other consultants (if applicable) and when variation is approved, three (3) copies to Contractor.
- 23.7.12 The client / user cannot instruct Engineer / Principle Agent / Contractor directly and any variation order required by the client must be submitted to the Project Manager firstly to be measured against cost and area norms and budget. If acceptable, the Project Manager will instruct the Engineer / Principle Agent to issue acceptable variation orders.
- 23.7.13 If a variation order is issued late and may cause an extension of the contract period or extended period, it will not be approved.

24. FUNDS

- 24.1 Savings on a contract are not owned by the contract but may facilitate requests for additional funds.
- 24.2 Funds on specialist contracts are not to be utilised for cross funding.
- 24.3 Pre-conditions (PRM039), when applying for additional funds, shall in the following cases be strictly adhered to:
 - Variation orders where scheduled tariffs are applicable to a maximum of 50% of Contract Amount
 - Variation orders where non-scheduled tariffs are applicable to a maximum of 5% of Contract Amount
 - Adjustments to Provisional Items and work measured provisionally
 - Adjustments to Provisional Sums (excluding profit and attendance)
 - Adjustments to Provisional Profit and Attendance on Provisional Sums

25. EXTENSION OF CONTRACT PERIOD

- 25.1 Claims or the intention to claim for extension of contract period must be submitted in writing within the required period and no late claims will be entertained (Clauses 45 and 51 of GCC'90).
- 25.2 All submissions for claims for extension of contract period will be recorded in the site minutes progressively with an indication whether pending, approved or not approved.
- 25.3 Claims must be fully, and acceptably motivated by the contractor and adjudicated by the Engineer / Principle Agent before submission to the Project Manager for final adjudication.
- 25.4 Where a claim is submitted due to bad weather the following must be considered:
- 25.4.1 The weather must have been exceptionally detrimental.
- 25.4.2 The weather influenced the overall progress.
- 24.4.3 Any/all rain must be measured, recorded in writing and signed off by the Engineer's Representative on site and the Contractor's Site Agent. (Weather Bureau records may be considered).
- 25.4.4 Delays must be real and proven and measured against the critical path of the contractor's programme, or according to the rainfall formula given in the Special Conditions of Contract, whichever is applicable.

26. FINANCIAL REPORTS

- 26.1 Financial reports will be prepared by the Engineer / other Consultants and submitted to the Project Manager on a monthly basis or any other period through the Engineer / Principle Agent.
- 26.2 Monthly reports must accurately reflect the financial standing of the project and must include detailed reports on payments and anything else that may influence the contract value.
- 26.3 The contractor is to be warned in time and in writing of the implication of delays.

27. SITE MEETINGS

- 27.1 Site meetings shall take place at least monthly and should be supported by a technical meeting alternating fortnightly or any other regular arrangement if so requested.
- 27.2 Refer to the instructions in the Manual of Procedure for Consulting Civil Engineers on the requirement for a site meeting e.g. extra documentation, attendance, distribution, etc.

28. BEACONS AND REFERENCE POINTS

Benchmarks pegs, cadastral pegs and / or any other formal reference points which indicate the borders of the site must be formally pointed out to the contractor and acknowledged by the contractor by signing PRM032: Acknowledgement of Handing Over of Site.

29. INFORMATION, DRAWING AND / OR VARIATION ORDERS REQUIRED BY THE ENGINEER / PRINCIPAL AGENT OR THE CONTRACTOR

This item appears in minutes of every site meeting and is utilised for general information, enquiries and referring to site instructions and Variation orders issued.

30. DAMAGE TO EXISTING SERVICES

- 30.1 The Contractor and / or his staff will be held responsible for any damage to identified and known existing services.
- 30.2 Any damage to existing services must be reported to the Engineer / Principal Agent immediately and must be noted in the site instruction book.
- 30.3 The arrangement to have the damage repaired must not be delayed at all.

31. CONTRACTOR'S PROGRAMME

- 31.1 The contractor must submit the programme to the Engineer / Principal Agent within two weeks of handing over of site.
- 31.2 The programme must reflect where, when and what work will be done and what the proposed progress will be.
- 31.3 The Engineer / Principal Agent shall upon submission of the proposed programme of works, review, comment, approve the contractors programme within two weeks.

32. PROGRESS

- 32.1 The progress report must indicate the compliance with the APP requirements as well as overall progress by utilising the payment certificate statistics.
- 32.2 Report must also include a detail progress report on all elements of the contract.
- 32.3 Progress reports must indicate whether the contract is on time or running late. When running late the contractor must be informed in writing and requested to submit his plan of action to rectify the situation. (Clause 43 of GCC'90)

32.4 All other consultants must also report to the Engineer / Principal Agent about progress of their respective disciplines.

33. QUALITY

- 33.1 This item will remain on the agenda for the run of the contract allowing recording of remarks / comments on workmanship.
- 33.2 Site instructions will be issued when unacceptable work is produced and if the work is not rectified within a reasonable period, a formal written instruction to remove / re-executed the work within a specified time, will be issued. (Clause 29 of GCC'90)

34. DISRUPTIONS

This item remains on the agenda for the run of the contract and as soon as any disruption occurs it must be reported to the Engineer / Principal Agent.

35. SCOPE OF THE CONTRACT

The consultants will describe the scope of the contract and answer any questions specifically about the project and documents available.

36. GENERAL

The following items may also need to be addressed:

- Trees to be removed
- Night watchmen if required
- Telephone communication to the site
- The position for the erection of the notice board
- Position of site office, equipment and material, stores, etc.
- Trial mixes, sand, stone and other material samples to be provided.
- Contractor to submit proof of insurance in terms of the Occupational, Health and Safety Act (1993) Act 83 of 1993 and any other proof of insurance required.
- Workman's Compensation
- Blasting activities
- Traffic accommodation
- Underground water
- etc.

37. NEXT MEETING

The address, place, date, time of the regular meetings must be established for the foreseeable future.

38. APPROVAL OF MINUTES

- 38.1 Minutes shall be signed by the Engineer / Principle Agent, the representative of the client / user Department, the Project Manager / representative of the Department of Public Works and the Contractor's duly authorised representative / owner of the company.
- 38.2 The Engineer / Principle Agent shall safeguard all signed sets of site meeting minutes. (off the site)

PRINCIPAL AGENT

CONTRACTOR

DATE

DATE

REPRESENTATIVE OF USER / CLIENT DEPARTMENT

REPRESENTATIVE OF DEPARTMENT OF PUBLIC WORKS / PROJECT MANAGER

DATE

DATE

DEPARTMENT OF PUBLIC WORKS <u>PROGRESS PAYMENT</u>

Advice number FMS Distribution WCS number Contract number Payee's code Contractor's code (if 4.4 is applicable) Payment number Regional Office					
FMS Distribution Image: Solution of the second of the					
WCS number Image: Sode					
Contract number Payee's code Contractor's code (if 4.4 is applicable) Payment number Regional Office HO Ref. RM Ref. VAT No. SERVICE CONTRACTOR : PAYEE Address Contract amount (VAT incl.)					
Payes code (if 4.4 is applicable) Payment number Image: Contractor's code Regional Office HO Ref. Regional Office HO Ref. SERVICE VAT No. CONTRACTOR : PAYEE Contract amount (VAT incl.) Regional Office R Contract amount (VAT incl.) Image: Contract amount (VAT incl.)					
Payment number HO Ref. Regional Office HO Ref. SERVICE VAT No. CONTRACTOR : PAYEE Contract amount (VAT incl.)					
Regional Office HO Ref. RM Ref. VAT No. SERVICE VAT No. CONTRACTOR : PAYEE Contract amount (VAT incl.) R C					
SERVICE RM Ref. CONTRACTOR : PAYEE VAT No.					
SERVICE					
Contract amount (VAT incl.)					
Address Contract amount (VAT incl.)					
Contract amount (VAT incl.)					
B					
1. ESTIMATED FINAL COST					
1.1 Contract sum MINUS VAT					
1.3 Estimated contract price adjustment					
1.4 Estimated VAT					
2. DATE OF VALUATION 1 / / / / / / / / / / / / / / / / /					
3.1 Value of work done					
3.2 Material on site +					
3.3 Material off site +					
3.5 Nominated sub-contractors include. CPA					
SUB-TOTAL A					
3.6 MINUS Retention money: Maximum reten. Money R					
3.8 Miscellaneous (Specify) PLUS e.g. VAT on Penalties +					
MINUS e.g. Guarantee amount					
SUB-TOTAL B					
4. DEDUCTIONS					
4.2 Penalty for late completion					
4.3 Penalty for non-compliance with APP					
4.4 Direct payments to Nominated sub-Contractors/Suppliers					
5 NET AMOUNT SUB-TOTAL C					
6. PLUS VAT (Cumulative R) This payment +					
7. AMOUNT PAYABLE					
8. STAGE **Code **1 = Progress payment 2 = Practical completion 3 = Completion 4 = Final account					
Expected date of Practical completion if STAGE = 1 / / /					
I hereby certify in terms of this contract the payee is entitled to the payment as calculated above					
CERTIFIED DATE / / / SIGNED AGENT/REPRESENTATIVE					
ALLOCATIONS					
Payment indicator Warrant voucher Date /////					
Responsibility Objective Item Allocation amount					
Payment checked Official title					
Payment authorised Posted					
Designation Verified					
Date					

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DEPARTMENT OF PUBLIC WORKS <u>APPLICATION FOR PAYMENT OF MATERIALS ON SITE IN TERMS OF CLAUSE 52 (2) AND VESTING</u> <u>OF OWNERSHIP IN TERMS OF CLAUSE 32 OF THE GENERAL CONDITIONS OF CONTRACT 1990.</u>

	WCS NO: REFERENCE NO:	
PROJECT:		
NAME OF CO	NTRACTOR:	

I/we hereby apply for % payment in respect of the following materials which have been delivered on site and attach the relevant invoices and receipts:-

MATERIALS:	,	ALUATION:
	R	
	R	
	R	
	R	
	R	
	R	
	R	
	R	
	R	
	R	
TOTAL VALUE	R	

I/we certify that these materials were my/our bona fide property at the time of delivery on site, ownership of which had passed to me/us according to Law. The ownership is hereby transferred to the Department of Public Works.

CONTRACTOR / AUTHORISED REPRESENTATIVE	DATE
CONSULTANT CIVIL ENGINEER	DATE
PRINCIPAL AGENT/REPRESENTATIVE	DATE

PRM036civ/1

DEPARTMENT OF PUBLIC WORKS CONTRACT STATUS REPORT

	MONTH: WCS NO:			
		REFERE		
PROJ	IECT:			
PROJ PRIN	IECT MANAGER:			
Α	PROGRESS AND COMPLETION:			
A1 A2 A3 A4	Contract Commencement Date: Contractual Completion Date: Extended Completion Date: Extended Practical Completion Date	e:	(Date of letter of accept (= mor (as approved by client) (as determined by agen	ance of tender) hth of contract) t)
	REASONS FOR VARIANCE BETW	EEN A2, A3 AND A4	:	
	OTHER COMMENTS REGARDING	B DELAYS, PROGRE	SS, ETC.:	
B B1 B2 B3 B4 B5	FINANCIAL DATA: Tender Amount (including VAT): Anticipated Final Cost: Subject to cost norms? If Yes, will contract be completed w If No, furnish reasons for variation f	R R ithin cost norm limits? rom tender norms rec	(Fror Yes Yes onciliation and corrective	n Financial report) / No / No action to be taken:
B6	Details of monetary and / or time cla	aims received from Co	ontractor:	
с	NOMINATED / SELECTED	DEADLINE F		DATE OF TENDER
	SUB-CONTRACTORS	TO AVC	DID DELAYS	ACCEPTANCE

CERTIFIED CORRECT:

CONSULTING ENGINEER

NB

DATE

- 1 FINANCIAL REPORT TO BE ATTACHED TO THIS DOCUMENT
- 2 FINAL ACCOUNT TO BE SUBMITTED TO THE DEPARTMENT WITHIN 3 MONTHS DELIVERY

PRINCIPAL AGENT / PROJECT MANAGER

DATE

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DEPARTMENT OF PUBLIC WORKS

FINANCIAL REPORT

PROJECT: PROJECT MANAGER: PRINCIPAL AGENT:

	DESCRIPTION	TENDER ANALYSIS A	PREVIOUS REPORT B	CURRENT REPORT C	CURRENT REPORT (B - C)	ACCUMULATIVE VARIATIONS (C - A)	REFERENCE
1	PRELIMINARIES						
2	BUILDING WORK						
3	PROVISIONAL ITEMS AND WORK MEASURED PROVISIONALLY						PRM036/1/3
4	PROVISIONAL SUMS (EXCLUDING PROFIT AND ATTENDANCE)						PRM036/1/4
5	PROFIT AND ATTENDANCE ON PROVISIONAL SUMS						PRM036/1/5
6	VARIATION ORDERS (APPROVED)						PRM036/1/6
7	VARIATION ORDERS, SITE INSTRUCTIONS AND OTHER NOT						PRM036/1/7
	SUB-TOTAL A:						
8	CPA (PROJECTED)						
	SUB-TOTAL B:						
9	VAT						
	SUB-TOTAL C:						
10	LESS CREDITS FOR OLD MATERIALS ETC.						
11	ANTICIPATED TOTAL COSTS:						

 MONTH:

 WCS NO:

 REFERENCE NO:

WCS NO:

PROVISIONAL ITEMS AND WORK MEASURED PROVISIONALLY

DESCRIPTION	OMISSION	ADDITION
TOTAL		
NET ADJUSTMENT		

PROVISIONAL SUMS (EXCLUDING PROFIT AND ATTENDANCE)

DESCRIPTION	OMISSION	ADDITION
TOTAL		
NET ADJUSTMENT		

PROFIT AND ATTENDANCE ON PROVISIONAL SUMS

DESCRIPTION	OMISSION	ADDITION
TOTH		
IOIAL		
NET ADJUSTMENT		

VARIATION ORDERS (APPROVED)

DESCRIPTION	OMISSION	ADDITION
VARIATION ORDERS (SCHEI	DULED RATES) (not exceeding	50% of contract value
VARIATION ORDERS (NON-S excluding VAT)	SCHEDULED RATES) (not exce	eding 5% of contract value
TOTAL		
NET ADJUSTMENT		

VARIATION ORDERS, SITE INSTRUCTIONS AND OTHER INSTRUCTIONS NOT YET APPROVED

DESCRIPTION	OMISSION	ADDITION
TOTAL		
NET ADJUSTMENT		

PROFESSIONAL FEES (FEES ON CPA EXCLUDED)

DESCRIPTION	AMOUNT
CIVIL ENGINEER	
OTHER(SPECIFY)	
TOTAL	

PRM036civ/9

DEPARTMENT OF PUBLIC WORKS COST NORM REPORT

MONTH:	
WCS NO:	
REFERENCE NO:	

PROJECT:

PROJECT MANAGER: PRINCIPAL AGENT:

DESCRIPTION	NORMS RECONCILIATIO	PREVIOUS REPORT	CURRENT REPORT	REFERENC E
ANTICIPATED FINAL COST	K I			
ADD PROFESSIONAL FEES (EXCLUDING FEES				PRM036/8
SUB-TOTAL A:				
OMIT CPA (PROJECTED)				
SUB-TOTAL B:				
ADD RESERVE FUND 1				
ADD RESERVE FUND 2				
ADD RESERVE FUND 3				
TOTAL:				

RESERVE FUND ANALYSIS (TENDER PROVISION)

RESERVE FUND 1	
RESERVE FUND 2	
RESERVE FUND 3	
TOTAL:	
ACCUMULATIVE VARIATIONS (+ OR -) (CPA EXCLUDED)	
SUB-TOTAL:	
*ADJUSTMENT FOR OTHER SAVINGS OR LOSSES	
BALANCE OF RESERVE FUND	

* DESCRIPTION:

PRINCIPAL AGENT:

DEPARTMENT OF PUBLIC WORKS ANNUAL CASH FLOW FOR BUDGETING PURPOSES

DATE OF REPORT:

WCS NO:

REFERENCE NO:

PROJECT: PROJECT MANAGER:

DISCIPLINE	YEAR												TOTAL
		YE	EAR 0	YEAR 0+1	YEAR 0+2	YEAR 0+3	YEAR 0+4	YEAR 0+5	YEAR 0+6	YEAR 0+7	YEAR 0+8	YEAR 0+9	-
	AMOUNTS ALREADY PAID IN PREVIOUS FINANCIAL YEARS R X 1000	AMOUNTS ALREADY PAID IN PRESENT FINANCIAL YEAR R X 1000	ESTIMATED AMOUNT PAYABLE FOR REMAIN OF FINANCIAL YEAR R X 1000	R X 1000	R X 1000	R X 1000	R X 1000	R X 1000	R X 1000	R X 1000	R X 1000	R X 1000	R X 1000
A CONTRACTORS													
1 MAIN CONTRACTOR													
2 SUB CONTRACTOR													
3 SUB CONTRACTOR													
SUB-TOTAL A:													
B CONSULTANTS:													
1 CIVIL ENGINEER													
OTHER (SPECIFY)													
2													
3													
4													
5													
SUB-TOTAL B:													
TOTAL (A + B):													

NOTE: 1 THE FINANCIAL YEAR OF THE PUBLIC SECTOR RUNS FROM 01 APRIL TO 31 MARCH

2 (YEAR O) REPRESENT THE PRESENT FINANCIAL YEAR, YEAR (0 +1) REPRESENT THE FOLLOWING FINANCIAL YEAR, ETC.

(PLEASE INSERT THE APPROPRIATE YEARS AT TOP OF EACH COLUMN - E.G. IF THE PRESENT YEAR IS 93/94, (YEAR 0 + 1) IS 94/95, ETC.)

PRM039/civ/1

DEPARTMENT OF PUBLIC WORKS APPLICATION FOR ADDITIONAL FUNDS

R	WCS: EFERENCE: ENQUIRIES:	F.5.1 Approved Expected Total	Extension to contract tim	e calendar days calendar days calendar days
1 1.1	Contract amount: Site Instructions, VO's pending/approved Funds previously requested Additional funds required now		R R R	(Excluding VAT) (Excluding VAT) (Excluding VAT)
1.2	Adjustment to Provisional Items and work measured provisionally: Funds previously requested Additional funds required now		R	(Excluding VAT) (Excluding VAT)
1.3	Adjustment to Provisional Sums (excluding profit and attendance): Funds previously requested Additional funds required now		R	(Excluding VAT) (Excluding VAT)
1.4	Adjustment to Profit and Attendance on Provisional sums: Funds previously requested Additional funds required now		R	(Excluding VAT) (Excluding VAT)
1.5	Additional preliminaries – value +/or time related if applicable: Funds previously requested Additional funds required now Total funds requested (excluding CPA)	A	R R R	(Excluding VAT) (Excluding VAT) (Excluding VAT)
1.6	CPA originally requested (if applicable) Additional CPA F.5.1.1 Total CPA B		R R R	(Excluding VAT) (Excluding VAT) (Excluding VAT)
1.7	Total funds required: Total (A + B) Plus 14% VAT F.5.1.2 TOTAL		R R R	
2.	Additional funds (Total of previous and current requests	excludina CP/	A and VAT):	
	Non-scheduled tariffs (1.1) Scheduled tariffs J Adjustment (1.2, 1.3, 1.4 and 1.5) Total additional funds requested (excluding CPA and VA	г)	R R R	 (% of contract amount) (% of contract amount) (% of contract amount) (% of contract amount)
3. 4. 5.	Project is still within set cost norms Please find summary of Variation Orders attached Practical Completion Certificate has been issued		Yes / No Yes / No Yes / No	Approved cost norm, if applicable
Signe PRIN	d: CIPAL AGENT / CONSULTING ENGINEER		Date:	
Signe PROJ	d: ECT MANAGER /OPERATIONAL MANAGER ^{⊤1}		Date:	
Additio	onal Funds: Approved / Not Approved		Additional funds: Reco	mmended / Not Recommended
Client	Budget Administration		Director: Major Project	s Date

This form has to be signed by the Operational Manager for projects executed by a region

DEPARTMENT OF PUBLIC WORKS

APPLICATION FOR APPROVAL TO EXCEED THE CONTRACT AMOUNT BY MORE THAN 5% FOR NON-SCHEDULED TARIFFS/50% FOR SCHEDULED TARIFFS ^{*2} IN ORDER TO EXECUTE ADDITIONAL WORK BY MEANS OF VARIATION ORDER

PROCEDURE TO BE FOLLOWED

- 1. Rule number one: Avoid the situation by appropriate, complete, correct and up to date tender documentation.
- 2. Monitor and control the financial situation on the project continuously. The minimum form of control is the monthly contract status report prepared by the consultant with the Principal Agent. Approved and Proposed Variation Orders must be valued and reflected in these reports monthly. The percentage increase/decrease on the Contract Amount must be calculated and shown on each report.
- 3. The restriction not to exceed 5% based on non-scheduled and 50% based on scheduled tariffs of the original contract amount in real terms is a State Tender Board regulation and is enforced by them as such. This regulation is to enforce proper planning and control, financially and otherwise, and to prevent contracts, particularly "alterations and additions" contracts, from running on unabated and unrestricted forever.

There is also a 15% limit which is a contractual condition to bind the Contractor to his rates for variations within the limit of 15% above or below the Contract Amount as set out in clause 53 of the General Conditions of Contract (1990) and which has nothing to do with the above issue.

4. If it appears likely that proposed variation orders will exceed the 5% and/or the 50% limit then application must be made well in advance using the Standardised format attached. Approval must be obtained before instructions are given to the Contractor. Applications must be submitted to the Tender Committee via the Chief Director or Regional Manager.

5. GUIDELINES FOR APPLICATION

ITEM 1 AND 2

The front page must contain all the basic information and calculation of percentages for every application. (Note: The extended completion date must only be shown if the extension has already been officially approved).

ITEM 3 BACKGROUND

Provide accurate and condensed background information. Refer to and attach supporting documentation if applicable and relevant (e.g. letter from Client Department).

If the application is as result of a request for additional accommodation, services or changes please confirm that approval has been obtained from Client Services/Port Folio Management and that norms have been adjusted.

Attach a copy of the latest contract status report (Summary page only).

ITEM 4 MOTIVATION

Give brief but convincing motivation. The motivation has to be very specific and should, inter alia, at least cover the following points:

- Why this requirement could not have been foreseen at the time when the work had been planned and documented originally.
- Why this intended work has to be done in this present contract and why it can not be done in a subsequent contract.
 - T2 The original contract amount may under no circumstance be exceeded by more than 5% where non-scheduled tariffs and 50% where scheduled tariffs are applicable and funds having been authorised.

- It will have to be shown and proven beyond any reasonable doubt that the work will be done at the same rates as the original work tendered for. It is impossible to prove this on "lump sum" or "specification" contracts and therefore any additional costs will have to be dealt with as "nonscheduled tariffs". The reasonability of such non-scheduled tariffs will have to be proven by some other means such as quotes from a sufficient number of other contractors.
- It has to be borne in mind that a large number of variation orders on a contract is normally
 perceived as indicative of poor planning and poor management. In point of fact, on "lump sum"
 or "specification" contracts there are supposed to be no variation orders at all due to the
 difficulty in establishing a fair price for the variation. In the private sector this is normally done by
 negotiation, but a civil servant will have to prove that he negotiated the best deal for the state
 and this is normally easier said than done. Hence the necessity for bill rates, quotations from
 different contractors, etc.

ITEM 5 ESTIMATED COST OF PROPOSED VARIATIONS

Give a breakdown of the elements involved with estimates for each element and the total estimated cost.

Confirm that the additional work will be done at existing rates in the Bills of Quantities if this is the case.

If not, explain how the estimate has been established e.g. rates to be negotiated but based on existing rates, calling for quotations via the Contractor).

If the estimate is based on quotation submitted by the Contractor confirmation is required by the quantity surveyor that the price is considered to be fair and reasonable for the work involved.

ITEM 6 RECOMMENDATION See Standardised format.

Note 1: Work carried out in excess of 5% based on non-scheduled and 50% based on scheduled tariffs without prior approval will be treated as unauthorised expenditure and will not be approved by the State Tender Board although such cases must be submitted to the Board.

Such cases will be reported to the Auditor-General by the Board with serious consequences for the Director-General and the Department.

Note 2: The Departmental Tender Committee meets every Tuesday at 08:00.

Applications must reach the Tender Section (Mr R Lloyd-Jones) not later than Thursday preceding.

DEPARTMENT OF PUBLIC WORKS

Private Bag X65, Pretoria, 0001, Tel (012) 337-2000
Central Government Offices, Cnr Vermeulen and Bosman Street, Pretoria

	From:	(PRO	JECT MANAGER)
<u>Tel:</u>	Fax:	e-mail:	@pwdmail.pwv.gov.za
	Enquiries:	Ref: _	
	Departmental Standing Tender Commit	1) The Ch tee	airman
2)	The Chief Director Office of the State Tender Board Department of National Treasury Private Bag X49 PRETORIA 0001		
Date			
Dear	Sir/Madam		
PROJECT NA	AME ^{*1} :		
WCS NO.: TENDER NO			-
³ APPLICATI SCHEDULEE BY MEANS (ON FOR APPROVAL TO EXCEED THE D TARIFFS/50% FOR SCHEDULED TAR DF VARIATION ORDER	CONTRACT AN	OUNT BY MORE THAN 5% FOR NON- ER TO EXECUTE ADDITIONAL WORK
1. CONT	RACT PERIOD		
Contra Contra	act Commencement Date:		

Contract Period:	
Original Contract Completion Date:	
Extended Contract Completion Date:	

а. Contract Amount R Estimated Cost of Variation Orders based on non-scheduled tariffs b.(1) issued to date: R Percentage increase over Contract Amount to date: B x 100 А % b.(2) Estimated Cost of Variation Orders based on scheduled tariffs issued to date: R Percentage increase over Contract Amount to date: B x 100 Α % Estimated Cost of Proposed Variations contained in This Application c.(1) based on non-scheduled tariffs: R Percentage increase over Contract Amount if application is approved <u>B + C</u> x 100 А % Estimated Cost of Proposed Variations contained in This Application c.(2) based on scheduled tariffs: R Percentage increase over Contract Amount if application is approved <u>B+C</u> x 100 A % BACKGROUND

MOTIVATION 4.

3.

5. ESTIMATED COST OF PROPOSED VARIATIONS (DETAILS)

RECOMMENDATION 6.

It is recommended that approval be requested from the State Tender board to exceed the Contract % Based on non-scheduled /scheduled tariffs or both^{*2} in order to execute Amount by Additional work by means of Variation Order.

FOR DIRECTOR-GENERAL

- *1 Omit the words "Project Name" - only the name of the project must be printed in bold type.
- *2 The original contract amount may under no circumstance be exceeded by more than 5% where nonscheduled tariffs and 50% where scheduled tariffs are applicable and funds having been authorised.
- *3 Heading must only reflect the case for which approval is sought (i.e if the submission is for approval to exceed on non-scheduled tariffs, reference to scheduled tariffs need not be part of heading unless the combined effect of scheduled and non-scheduled tariffs exceed 50%). Same applies for the information in paragraph 2b, 2c and 6.

PRM039/civ/5

2. CONTRACT AMOUNT AND FINANCIAL IMPLICATIONS (VAT INCLUDED)

PRM040civ/1

CLAIM NO.	WCS NO: REFERENCE NO:	
PROJECT:		
PRINCIPAL AGEN CONTRACTOR:	Γ:	
 Contract and Contract con Contract per Submission of Date of site h Original cont Extensions a 	ount: nmencement date: iod: date of acceptable guarantee: nandover: rractual completion date: warded prior to this application: ntractual completion date as result of 8.:	R
9. Date on which the one of contract of co	ch cause of delay arose: ractor's letter in which extension is applied for: DN: (See attached report for complete motivation inclu	uding PRM040/2)
8. Adjusted cor 9. Date on whic 10. Date of contr RECOMMENDATIC	PRINCIPAL AGENT/PROJECT MANAGER	uding PRM040/2)
8. Adjusted cor 9. Date on whic 10. Date of contr RECOMMENDATIC Submitted by: Submitted by:	ch cause of delay arose: ractor's letter in which extension is applied for: DN: (See attached report for complete motivation inclu PRINCIPAL AGENT/PROJECT MANAGER PROJECT MANAGER	DATE

D/MAJOR PROJECTS / D/E & D (.....)

DATE

DEPARTMENT OF PUBLIC WORKS EXTENSION OF TIME CLAIM

PROJECT:		
CONTRACTOR:		
	WCS No.:	
PROJECT MANAGER:	FILE No.:	
	TENDER No.:	

NOTE: ALL CLAIMS HAVE BEEN MADE IN TERMS OF CLAUSE 50 AND/OR 51 OF GCC '90 AND/OR CLAUSE 50(5) OF THE SPECIAL CONDITIONS OF CONTRACT ("Abnormal Rainfall")

Claim No	Date of Event	Date of Application in Writing	Within 28 Days	Working Days claimed by Contractor	Working Days Recommended by Civil Engineer	Reason for Claim	Work Activity	Critical Path	Working Days Recommended by Project Manager	Reasons for Project Managers Decision

PRM040civ/2

PRM040civ/3

FILE NR. WCS NR.

DEPARTMENT OF PUBLIC WORKS

SUBMISSION OF APPLICATION FOR EXTENSION OF TIME BY PRINCIPAL AGENT CLAIMS _____ TO _

(THIS FORM PROPERLY COMPLETED MUST BE ATTACHED TO EACH CLAIM SUBMITTED)

PROJECT:

Claims for the extension of contract time must comply with the following requirements, information needed with regard to each case is marked with a <u>X</u>.

The required proof shall be submitted on or before ______, failing which claims for extension ______ cannot be granted.

A new application, completed in the correct format with all necessary proof can be resubmitted for the same claim.

Х	CLAIM NR.	INFORMATION NEEDED		
		Please note that applications for extension of the contract period must be processed in numerical sequence.		
		Contractor must, according to clauses 50 and/or 51 of the General Conditions of Contract 1990, formally apply in writing for		
		extension. Contractor's application must be appended.		
		Contractor must clearly indicate, in the claim, under which clause of the conditions of contract this application for the		
		extension of time is made.		
		Each submission, regardless of the number of events, must have a cover page (PRM040/1). The Principal Agent must		
		make a recommendation with regard to each event separately on the standard departmental form and sign it.		
		Different types of events must be handled as separate claims and must not be combined.		
		Specific dates for each claim must be provided. (From to)		
		Each event (regardless of the period) must be submitted as a separate claim, not more than one event per form and all		
		submissions must be summarized (PRM040/2).		
		Letter of appointment of contractor must accompany the first application for extension of time.		
		Completed contract completion report must only accompany application for extension after first delivery.		
		Reasons motivating a claim must be attested where proof cannot be provided.		
		CLAIMS AS RESULT OF VARIATION ORDER/SITE INSTRUCTION: Approved variation order/site instruction, with proof		
		when contractor received the variation order/site instruction, is required.		
		UNREST OR UNREST RELATED INCIDENTS: An original affidavit or attestation of the events by the SA Police must		
		accompany the claim.		
		INCLEMENT WEATHER: During which no work is possible (any rain). Weather Bureau statistics containing average		
		rainfall figures per month for at least the previous 5 years as well as the average rainy days per month plus on site		
	recorded rainfall figures must accompany each claim. Similar statistics to be presented for abnormal cold (climos) ar			
		wind (dust / wind-chill). Claims for consequential delays must, in addition, be fully motivated.		
		LATE DELIVERY OF MATERIAL: Written declaration from the supplier, stating dates of order, original delivery and actual		
		dates and reasons for late delivery.		
		With each claim an updated construction program, indicating the effect of the delay on the project with the accordingly		
		adjusted completion date, must be submitted also indicating if the event of the claim is on the critical path or not.		
		Should the delay be caused by an outside party e.g. the client, a letter from the party must accompany that claim.		
		PRM040/1: Application for extension of contract period		
		PRM040/2: Summary form for claims		
		PRM040/3: Information needed		
		PRM043/1 TO -/3: Contract Completion Report at finalization of project		

Signed by (Principal) Agent

Tel

Fax _____

Date

NOTE: Form to be utilised by:

2. Project Manager as a guideline to Principal Agents and Contractors on correct procedures or requesting outstanding information.

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Principal Agent to confirm that all necessary information has been submitted. 1.

PRM041civ/1

DEPARTMENT OF PUBLIC WORKS
CERTIFICATE OF PRACTICAL COMPLETION
(Clause 54 (1), (2) & (3) of GCC 1990)

	WCS NO: REFERENCE NO:					
PROJECT:						
PROJECT MANAGER: PRINCIPAL AGENT: NAME OF CONTRACTOR: TENDER/ORDER NO.:						
Date of practical completion:						
The Works have reached a stage that danger or undue inconvenience.	at allows their use for t	neir intended purpose	without			
Representative	Signature	Date				
USER DEPARTMENT:						
Representative	Signature	Date				
CONTRACTOR:						
Representative	Signature	Date				
DEPARTMENT OF PUBLIC WORKS	-					
Project Manager	Signature	Date				

DEPARTMENT OF PUBLIC WORKS <u>CERTIFICATE OF COMPLETION</u> (Clause 54 (4), (5) & (6) of GCC 1990)

	KEI EKENCE NO.					
PROJECT MANAGER: PRINCIPAL AGENT: NAME OF CONTRACTOR: TENDER/ORDER NO.:						
Date of completion:						
The defects liability period of commences on the date of iss	months in accordance wit <u>certificate of completion</u> .	h the conditions of contract,				
All other work specified, as satisfactorily.	well as all work issued per variati	ion order, have been completed				
CONSULTANT:						
Representative	Signature	Date				
USER DEPARTMENT:						
Representative	Signature	Date				
CONTRACTOR:						
Representative	Signature	Date				
DEPARTMENT OF PUBLIC V	WORKS					
Project Manager	Signature	Date				
	Oignature	Date				

DEPARTMENT OF PUBLIC WORKS CONTRACT COMPLETION REPORT

Α	CONTRACT PARTICULARS:		
1.	File No. HO / RO 2. WCS No	. 3. Tend	er No.
4.	Service		
5.	Contractor		
6.	Contract sum R	11. Extended contractual cor	npletion date
7.	Tender acceptance date	12. Date of first delivery/Actu	al completion
8.	Contract period	13. Days completed late	
9.	Original contractual completion date	14. Penalty per day R	
10.	Extensions approved (calendar days)	15. Penalty imposed <u>R</u>	
В	EXTENSIONS GRANTED PRIOR TO COMPLETION	NC	
Таbı	ulate incidents (attach supporting documents for exte	ensions granted)	Days (calendar)
F	CONDONATIONS FOR CONSIDERATION		
Tahı	late incidents which can be taken into account when	annlying penalties (attach	Days (calendar)
addi	tional supporting documents if necessary)		

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager
PS	Procurement Section				

PRM043/2civ

D	WORK PERFORMANCE OF CONTRACTOR (NOTE: Mark any negative aspect that has been or should be captured on the WCS with "X". Attach or refer to correspondence.)
1.	Problems encountered: (a) Guarantee/Security (b) Site hand over
2.	Programming of work
3.	Quality of work
4.	Recommendation re (a) Unlimited (b) Cannot be recommended for future grading: capabilities contracts
	(c) Limited capabilities Can manage contracts to the value of R
E	SECTION A TO D COMPLETED BY:
	PRINCIPAL AGENT / PROJECT MANAGER (PRIVATE / IF ANY) DATE
	SUPPORTED BY:
	DEPARTMENTAL PROJECT MANAGER DATE
F	COMMENTS BY D/MP, D/Maint, C/RPM
	No delay, no penalty Full penalty to be applied in terms of the Contract
	Penalty to be waived / reduced according to section C of this report
	D/MP, D/Maint, C/RPM DATE

ABBREVIATIONS

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager
PS	Procurement Section				

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G	PENALTY COMMITTEE CD/DO, CD/P+FM (refer first to CD where the project was initiated.) (In the event of full penalty or no penalty (no delay) the RM, D/MP or D/Maint may act on behalf of the Penalty Committee.)						
1.	Recommendation						
	CD/DO or CD/P+FM		DATE				
2.	Decision: A penalty of	must be imposed for	days.				
	CD/P+FM or CD/DO or RM or D/MP or D/Maint		DATE				
F	F.6 PROCUREMENT SECTION						
1.	WCS updated re contractor's performance (#WG07PU)		Date:				
2.	WCS updated re penalty decision (#WG07PU)		Date:				
3.	Contract completion report to DPM		Date:				

ABBREVIATIONS

	НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
	RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
	RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager
ľ	PS	Procurement Section				

Organigram pertaining to the handling of the Contract Completion Report (PRM043)



ABBREVIATIONS

НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager
PS	Procurement Section				

Directive pertaining to the handling of the Contract Completion Report (PRM043)

- 1 This report must be handled immediately after completion of the works.
- 2 The Principal Agent (or Private Project Manager, if one was appointed) must complete sections A to D of the report which must be supported by the DPM.
- 3 Thereafter at HO the DPM's Director or at RO the DPM's C/RPM comments on and signs the report.
- 4 Should one of the following apply, the report does not necessarily need to be submitted to the Penalty Committee but may be signed off by the D/MP or D/Maint at HO or by the RM at RO:
 - 4.1 When the contract was completed in time (no penalties).
 - 4.2 When extension was granted for all delays (no penalties).
 - 4.3 When extension was granted for part of the delays and no application was received for the waiver, reduction or condonation of the balance of the delays (penalties apply for the balance of the delays).
 - 4.4 When delays occurred and no application was received for the waiver, reduction or condonation of these delays (penalties apply for the full delay).
- 5 After the report has been signed off, the Procurement Section at HO or at RO, as the case may be, updates the WCS (#WG07PU) regarding the contractor's performance and the decisions on penalties, if any. A copy of the report is then submitted to the DPM, who must immediately inform the consultants of the penalty amount (if applicable) to be included in the final account.
- 6 Should the contractor apply for the waiver, reduction or condonation of all or any part of the delays, the report must be referred to the Penalty Committee at HO for a decision. The Penalty Committee consists of the CD/DO and the CD/P+FM.
- 7 Applications for decisions by the Penalty Committee must for HO services be send through the HO Procurement Section and for RO services through the RO Procurement Section whom must in turn send it to HO Procurement Section.
- 8 After the Penalties Committee's decision, the report is returned along the same route as described in 7 above. The Procurement Section at HO updates the WCS (#WG07PU) regarding the contractor's performance and the decision on penalties. A copy of the report is then submitted to the DPM. The original Contract Completion Report must be placed on the central file (HO or RO, which ever the case may be).
- 9 The DPM informs the Principal Agent as well as the Consultant, if any, of the decisions in the report to be implemented.

ABBREVIATIONS

				1	
НО	Head Office	DPM	Departmental Project Manager	D/MP	Director: Major Projects
RO	Regional Office	CD/DO	Chief Director: Development Operations	D/Maint	Director: Maintenance
RM	Regional Manager	CD/P+FM	Chief Director: Property and Facilities Management	C/RPM	Chief: Regional Project Manager

PS Procurement Section
DEPARTMENT OF PUBLIC WORKS FINALISATION OF FINAL ACCOUNT

- 1. Prerequisites for Departmental approval of the final account
 - 1.1 "Certificate of Completion" (PRM041/3civ) issued.
 - 1.2 "Certificate of Compliance and Indemnity by Consultants" (part 1 only) (PRM045civ) signed.
 - 1.3 "Final Statement" (PRM044/2civ) signed by all consultants involved.
 - 1.4 "Contract Completion Report" (PRM043civ) finalized (not necessary if nil report).
 - 1.5 "Geographical Targeted Procurement Management System" (GTPMS) compliance evidence handed in (relevant DF form).
 - 1.6 Guarantees, certificates, maintenance contracts and manuals
 - 1.6.1 When applicable submit guarantees e.g. roof, waterproofing, etc.
 - 1.6.2 Control and confirm that electrical certificate of compliance has been issued.
 - 1.6.3 Control and confirm that maintenance contracts are in place where this is contractually required (Ceded to the Department if required from a nominated sub-contractor).
 - 1.6.4 Where applicable, submit operational and maintenance manuals and maintenance specifications.
 - 1.6.5 When applicable, submit as-built drawings for mechanical installations provided by the contractor.
 - 1.6.6 Control and confirm that the original site instruction book(s) and site visitor book have been submitted to the Department.
- 2 Prerequisites for final payment to the contractor
 - 2.1 Accepting the final account after approval by the Department in signing of the "Final Statement" by all parties including the contractor (resolution of signature from contractor required). The exception is that the final account shall be deemed signed by the contractor after three months if the contractor fails to object and sign subject to Clause 52(10) of the General Conditions of Contract '90.

Note: The Final Statement can only be presented to the contractor for acceptance subsequent to the acceptance thereof by the Departmental project manager and the Director-General of the Department of Public Works.

- 2.2 "Final Approval Certificates" issued (PRM046/2civ).
- 3 Prerequisite for final payment to consultants
 - 3.1 Signing of the "Final Statement" by the concerned consultant(s).
 - 3.2 Signing of the "Certificate of Compliance and Indemnity by Consultants" (PRM045civ Part 1 and 2) by the concerned consultant(s).
 - 3.3 Submission of "As Built" drawings on A size 0.08mm thickness polyester film marked "As Built" dated and signed by concerned consultant (principal).
 - 3.4 "Final Approval Certificates" (PRM046/2civ) issued.
 - 3.5 Compliance certified and reconciliation of the prescribed space and cost norms submitted when applicable, by the concerned consultant(s) (PRM019/1 and -/2).

DEPARTMENT OF PUBLIC WORKS FINAL STATEMENT

WCS NO: ______REFERENCE NO: ______

PROJECT:

CONTRACTOR:

NET AMOUNT OF CONTRACT (EXCLUDING VAT)			R	
APPROVED VARIATIONS		R	-	
			R	+
			R	
PLUS: CONTRACT PRICE ADJUSTMENT			R	+
LESS: CONTRACT PRICE ADJUSTMENT		R	-	
			R	
(1) LESS: Penalty for Late Completion (PW156 4.2)	R		1	
(2) LESS: Penalty for Non-Compliance with APP (PW156 4.3)	R	+	R	-
	- h	L.	R	
VALUE ADDED TAX			R	+
				-
FINAL VALUE OF CONTRACT			R	
* RETENTION RETAINED (INCLUDING VAT)			R	

CONSULTING ENGINEER

DATE:

DEPT. PROJECT MANAGER

DATE:

PRINCIPAL AGENT / LEAD CONSULTANT

pp DIRECTOR-GENERAL DEPARTMENT OF PUBLIC WORKS

DATE:

DATE	
DAIL	

I, the undersigned, duly authorised, accept the above statement as correct.

CONTRACTOR

DATE

* Applicable for engineering contracts where 12 months retention period is required and retention amount also included in final value of contract

FOR DEPARTMENTAL USE			
Contract close out captured on WCS (WG10PU):	Name:	OPW:	
	Date:		

PRM045/1civ

DEPARTMENT OF PUBLIC WORKS CERTIFICATE OF COMPLIANCE AND INDEMNITY BY CONSULTANTS

WCS NO:	
REFERENCE NO	:

PROJECT:

DEPT. PROJECT MANAGER: PRINCIPAL AGENT / LEAD CONSULTANT: NAME OF CONTRACTOR:

- 1. I/We appointed (Engineers / Project Manager *) Consultants appointed to prepare the Final Account for this service, hereby certify that the final account has been prepared according to the following requirements:
 - (a) That it has been prepared in accordance with the Department's example;

(b) Where schedule rates are applicable these have been used and non-schedule rates, where possible, have been based on schedule rates;

(c) Where it is not possible to use schedule rates, items have been priced by me/us in accordance with the appropriate clause of the Condition of Contract. Calculations of non-schedule rates have been included with the final account and invoices, quotations, etc., where applicable are also attached thereto;

- (d) Copies of all invoices, receipted accounts, etc. mentioned in the final account are attached and are cross referenced to the items in the final account;
- (e) Fluctuations in cost are in accordance with the contract price adjustment provisions laid clown in the schedule of quantities;
- (f) All "daywork" sheets duly approved have been checked and attached to the final account;
- (g) All items included in the final account (except provisional items) are covered by the necessary approved variation orders or written site instructions;
- (h) All provisional items have been remeasured. Where provisional items have been varied, a list of all such unvaried items has been included in the final account, stating that such items have not been executed as measured;
 - (i) All fruitless expenditure has been identified in the final account and a list of these items with their respective values, is attached thereto. For the purpose of this subclause "fruitless expenditure" shall mean the value of the work carried out and subsequently altered as a result of negligence and/or defective planning, resulting in work already planned and executed in good faith being made undone;
- (j) All calculations and amounts have been checked;
- (k) No payments have been made to the contractor, which are not in terms of the Contract;
- (I) Unless otherwise instructed by the Department, penalties for late completion of the contract have been deducted from monies due to the contractor and the deduction shown on the final statement.
- * Delete which is not required

PRM045/2civ

I/We indemnify the Department against any overpayment which was made in terms of the final account as a result of incorrect information provided by me/us unless I/we can prove to the reasonable satisfaction of the Department that there was no negligence on my/our part or on the part of anyone in my/our employ. The Department shall be obliged, against payment to it in terms of this indemnity, to give cession to me/us of such claims as it may have against the contractor or any other party as may be necessary to enable me/us to recover from the contractor or any other party the amount paid over in terms of this indemnity. This document shall not constitute any novation of my/our obligations towards the Department.

SIGNATURE

DATE

FIRM / CONSORTIUM / FIRMS-IN-COLLABORATION

PRM046/civ

DEPARTMENT OF PUBLIC WORKS <u>FINAL APPROVAL CERTIFICATE</u> (Clause 55 of GCC 1990)

WCS NO: REFERENCE NO:				
PROJECT:				
PROJECT MANAGER: PRINCIPAL AGENT: NAME OF CONTRACTOR: TENDER/ORDER NO.:				
This is to certify that the Final Approval Certificate of the above-mentioned service was issued on and that all defects have been rectified in accordance with clauses 30, 54 & 56 of GCC 1990.				
CONSULTANT:				
Representative	Signature	Date		
USER DEPARTMENT:				
Representative	Signature	Date		
CONTRACTOR:				
Representative	Signature	Date		
DEPARTMENT OF PUBLIC WOR	KS			
Project Manager	Signature	Date		